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CADO

The Zeiss Index of Photographic Lenses 33399

Merté, W.W. (None)
Zeiss, Jean
(Not known) (None)

(None)

Nov '48 Unclass. Germany English 84 tables, diagrs, graphs
(Original Document not available)

CADO, Wright-Patterson Air Force Base, Dayton, O.

A compilation is made of lens formula cards obtained from the Zeiss Works. In general, the list of objectives is arranged by types, such as Tessar, Cook, Hekton, etc. An explanation of terms used on the cards precedes the lists, and each type of objective is described by pertinent information. The information covers aperture ratio, focal length, spherical correction, astigmatism, a meridian section of the system of lenses, the rectangular system of coordinates for x, y, and z curves, and other data. In the text of the Index, remarks are made about particular lenses. A sample card in translation has been included as a guide in interpreting the data presented.

Copies of this report obtainable from Central Air Documents Office; Attn: MCIDXD

Photography (26)
Still Cameras (3)

Lenses, Photo (54659.2)

AIR DOCUMENTS DIVISION, T-2
R 29 of 33399

F-TS-6378-RE

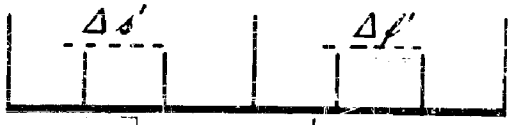
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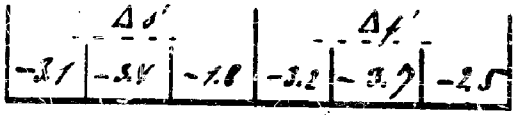
Tessar 1/9 f=142.2mm Experimental

Single Objective

Double Objective

Spherical Aberration





Incidence Heights Chromatic Aberration





-1/9 (+16) -93

Astigmatism

Sagittal Fans Tangential Fans Sagittal Fans Tangential Fans





Front Angle Distortion



Front Angle Distortion

Tang. Rad.

+20 -3 -11 -26

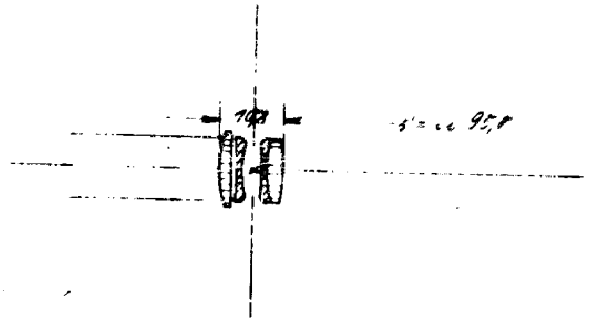


Radii thickness and air spaces for f=100mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6	d_7
104	∞	54	16	53.5	201	49.3	2.1	1.1	1.1	1.8	14	1.1	2.5

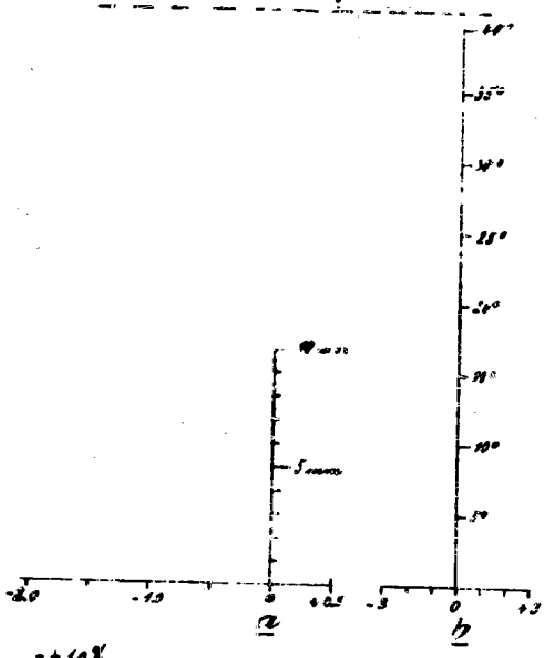
48

Tessar 1/9 f=142.2mm Experimental

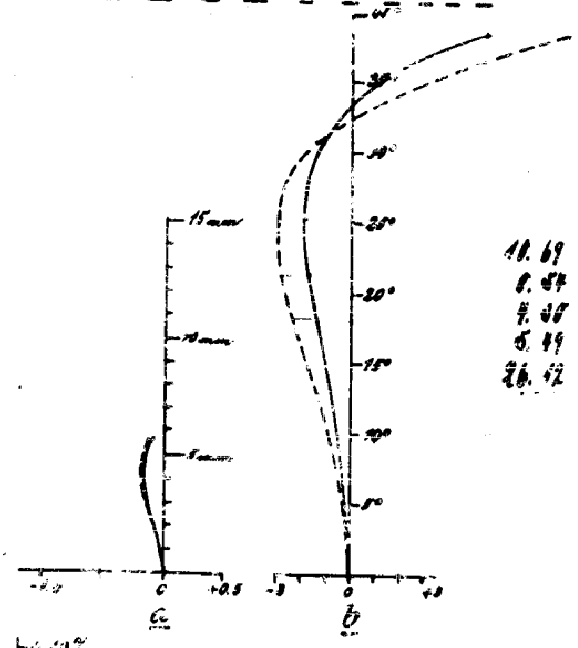


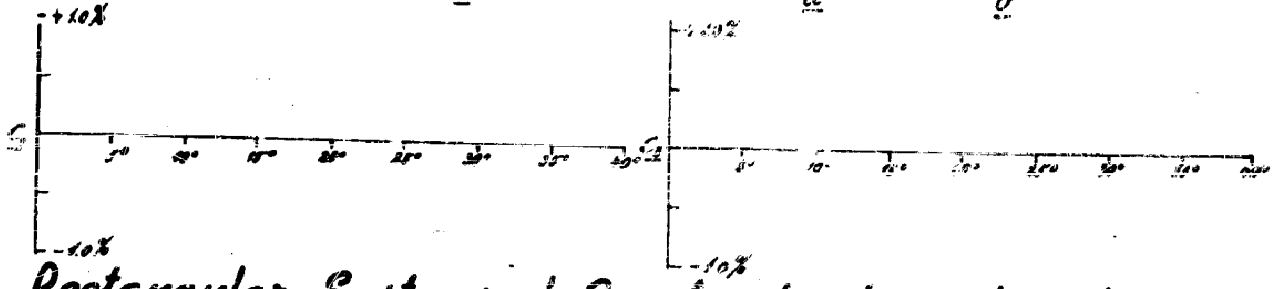
	n_d	$n_F - n_C$	ν
L_1	1.60116	0.01321	58.6
L_2	1.57171	0.01305	57.8
L_3	1.53234	0.01309	57.2
L_4	1.60273	0.01371	56.7

Single Objective

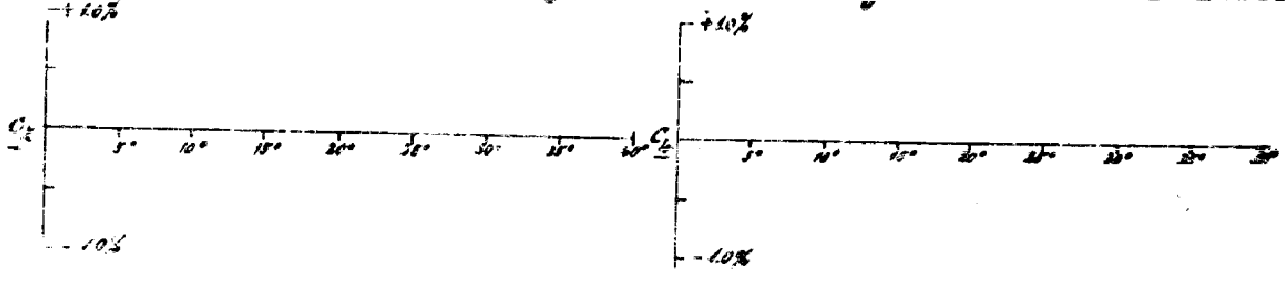


Double Objective





Rectangular Systems of Coordinates for a b and c Curves



N° 27,518 A.D. 1912

Date of Application, 28th Nov., 1912

Complete Specification Left, 16th May, 1913—Accepted, 31st July, 1913

PROVISIONAL SPECIFICATION.

Improvements in Lenses for Photographic and the like purposes.

I, OTHO FREDERICK LAN-DAVIS, Director & Secretary of J. H. Dallmeyer, Ltd., Church End Works, Willesden, N.W., do hereby declare the nature of this invention to be as follows:—

My invention relates to lenses used for photographic and similar purposes, and is a rapid lens corrected to a high degree for spherical, chromatic and [illegible] aberrations, and is of very simple construction. Four glasses are used, two cemented in front of the diaphragm and two cemented behind the diaphragm, the crown glasses in both front and back combinations being made of low dispersion and of high refractive index, and the flints being made of medium refractive index and medium dispersion. The focal length of the front combination is either positive of great length, infinite or negative, and of the back combination is strongly positive. According to one construction of the front combination, the flint glass is in front, and according to another the crown glass is in front.

Dated the 28th day of November, 1912.

C. F. LAN-DAVIS.

COMPLETE SPECIFICATION.

[illegible] Lenses for Photographic and the like purposes.

I, OTHO FREDERICK LAN-DAVIS, Director & Secretary of J. H. Dallmeyer, Ltd., Church End Works, Willesden, N.W., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described in and by the following statement:—

My invention relates to lenses used for photographic and similar purposes, and is a rapid lens corrected to a high degree for spherical, chromatic and [illegible] aberrations, and is of simple construction. Four glasses are used, two cemented in front of the diaphragm and two cemented behind the diaphragm, the crown glasses in both front and back combinations being made of low dispersion and of high refractive index, and the negative lenses of medium refractive index and medium dispersion.

The drawing illustrates a lens corrected for spherical, chromatic [illegible] aberrations. The system is composed of thick meniscus lenses, the [illegible] of high refracting index and low dispersion, and the [illegible] of low refractive index and [illegible] medium dispersion. In this specification, constructions [illegible] and in a subsequent development of this invention [illegible] two, the crowns being of glass of high refractive index and low dispersion and the flints of glass of medium refractive index and medium dispersion.

A.D. 1913 Nov. 28 N° 27,518.
LAN-DAVIS' COMPLETE SPECIFICATION.

FIG. 1.

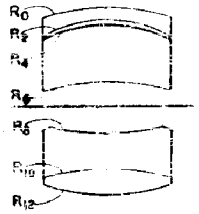
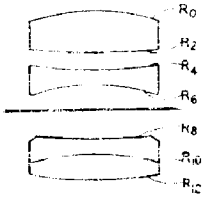


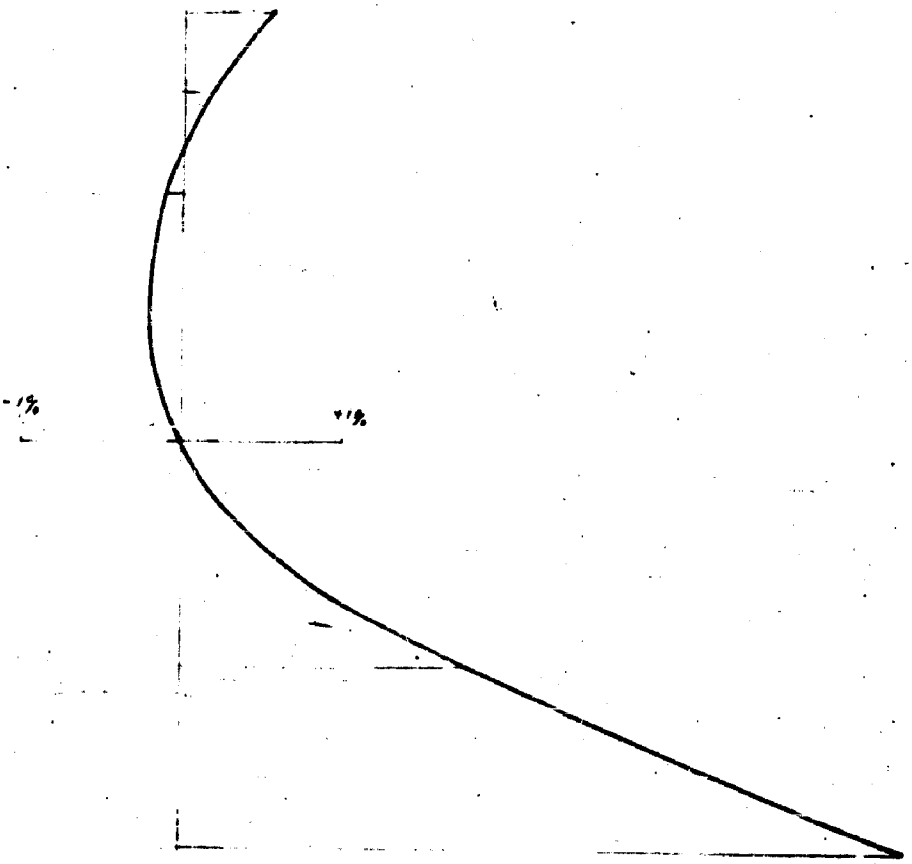
FIG. 2.

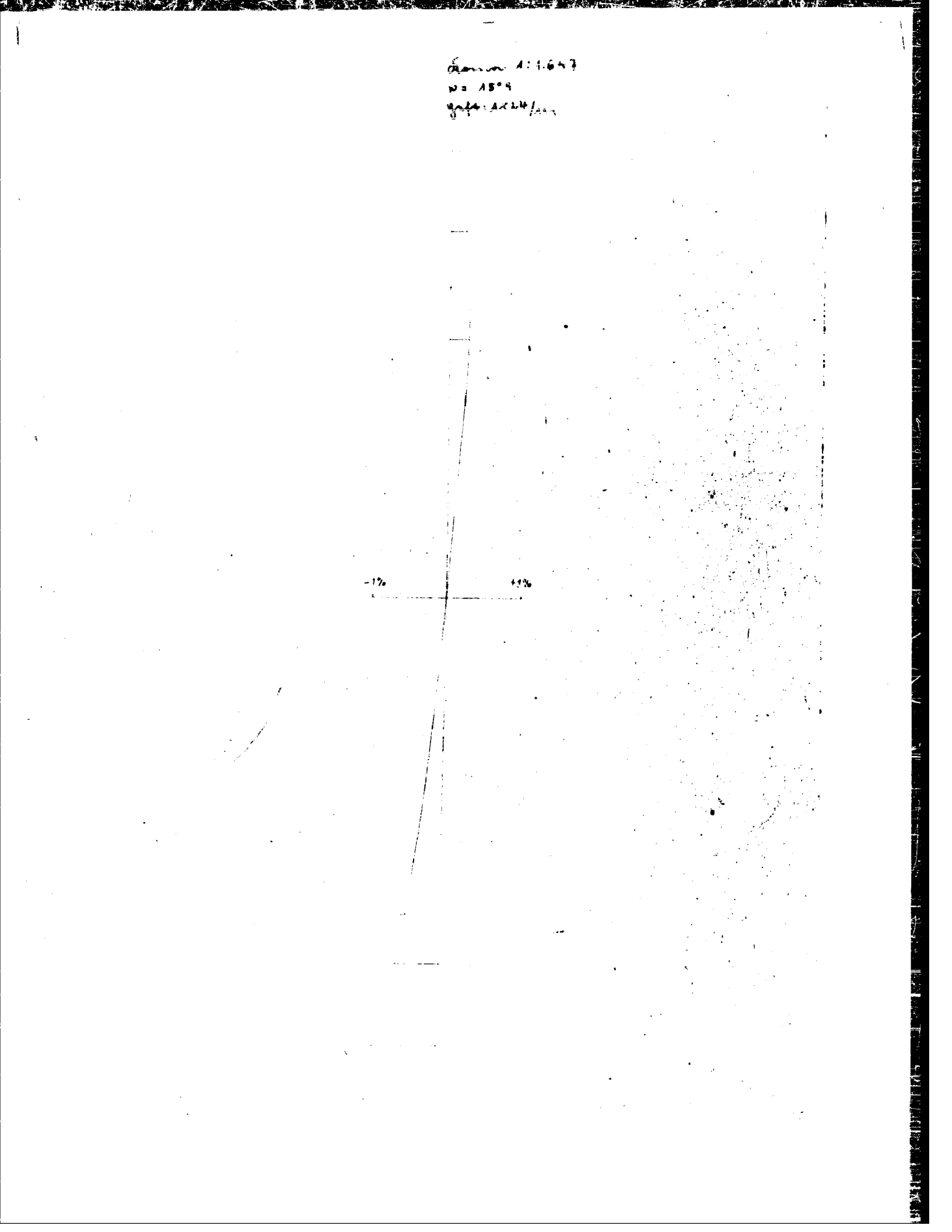


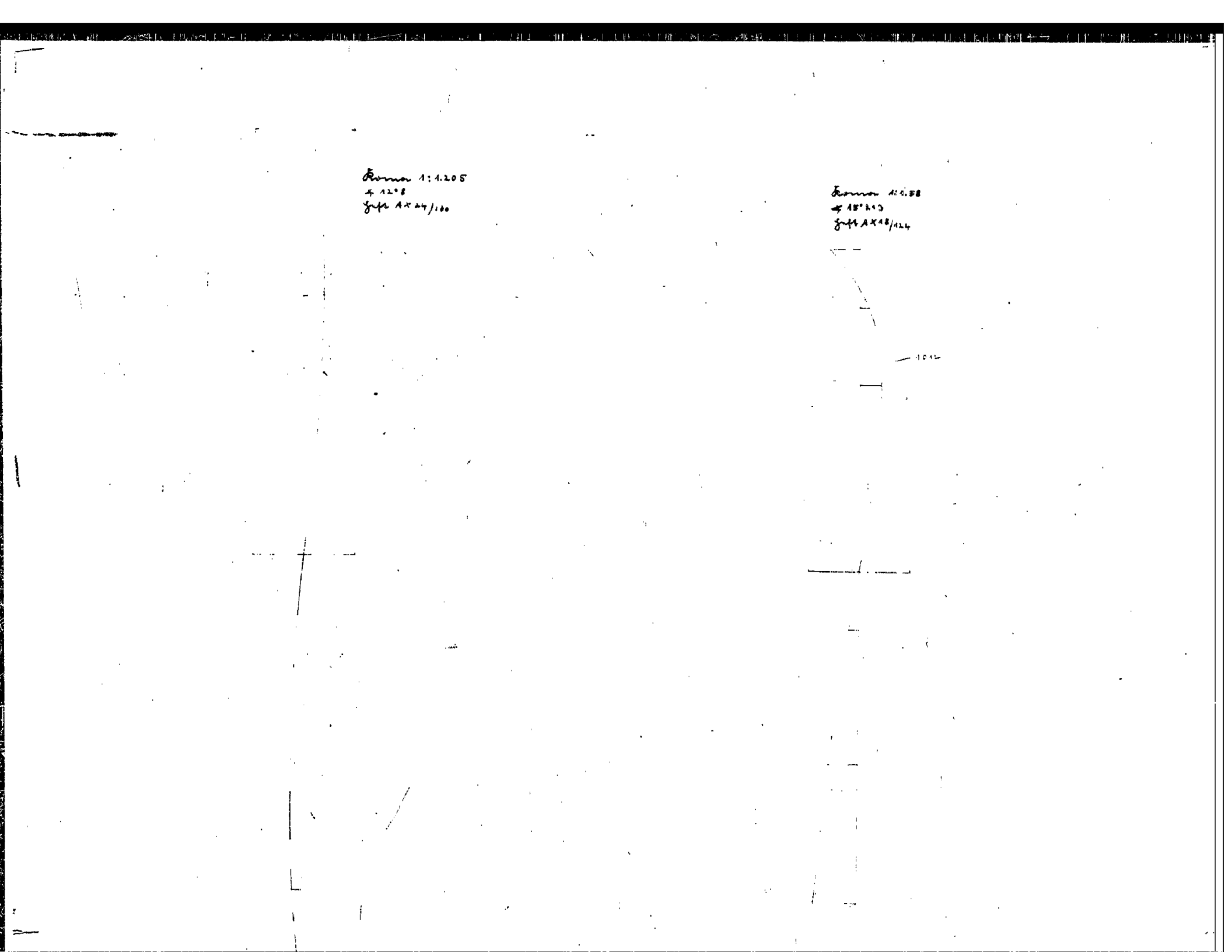
Form 1:3,85

$\varphi = 18°38'29,4''$

Profil: AX24/3

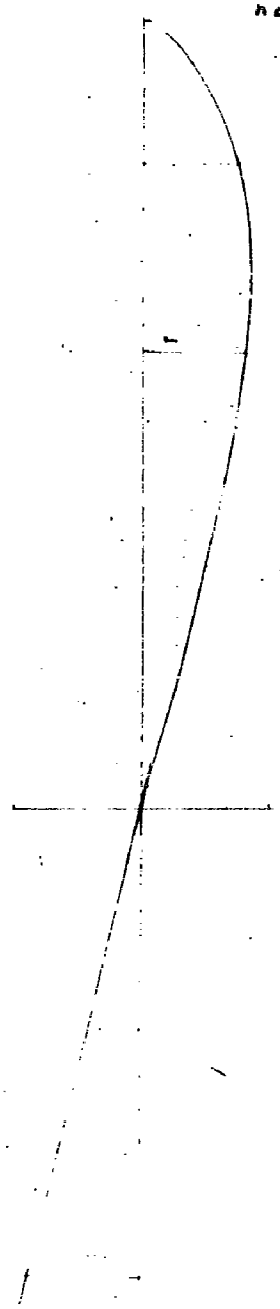



-1%
+1%


Roma 1:1.205
φ 12°8
Gr. AX 24/100
Roma 1:1.38
φ 15°2'3
Gr. AX 18/124

Planar 1:1.5 8
f 15°21 3
4x18/14 6

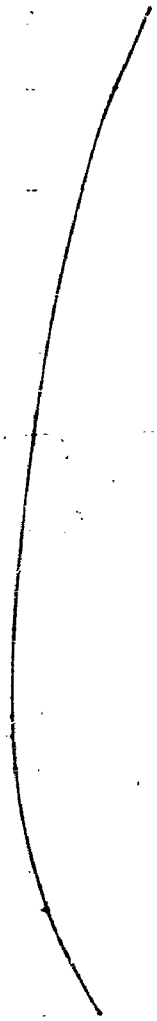
nach Smyth Linse



Koma Rechn. in AX 32/1

Büschel-Öffnung 1:3,2

" " - Neigung 10,3[illegible]

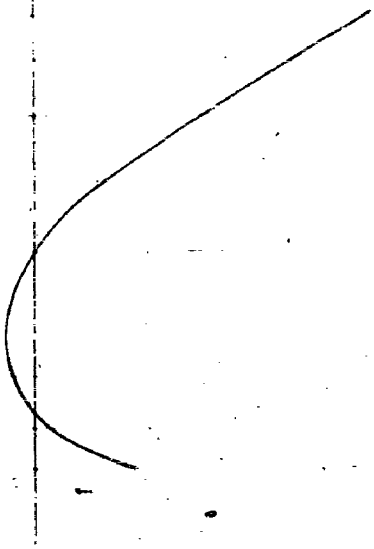


1810

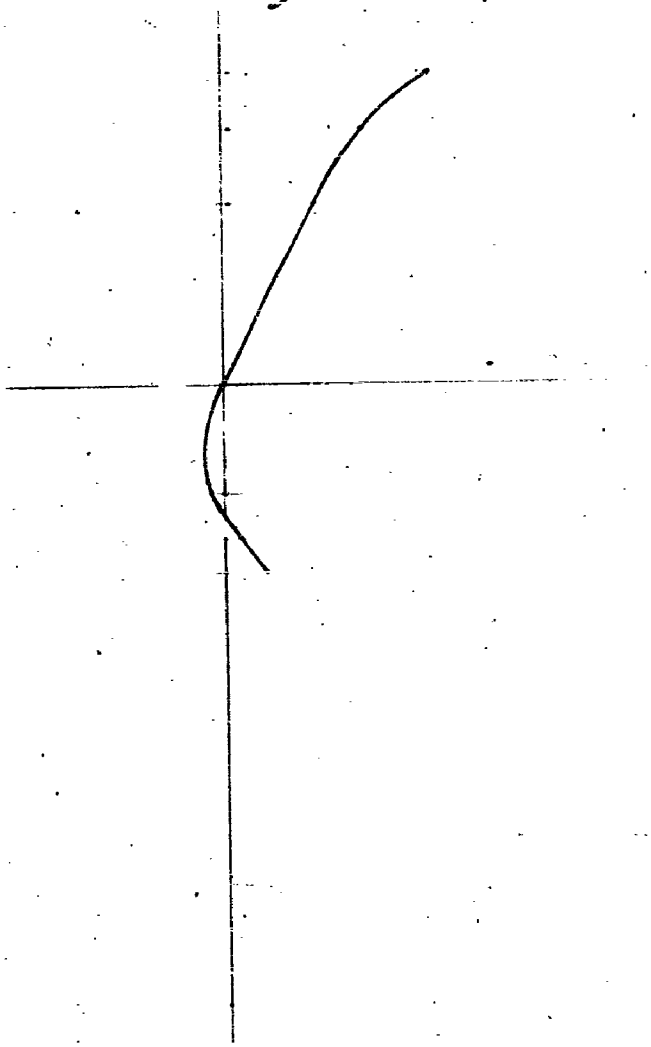
Kona
Öffnung 1:2,4
f = 39,4691
Kuhn. in AF 1/64-65



Kona
Öffnung 1:2,05
f = 30,1228
Kuhn. in AF 1/66-67



Kuna.
Böschel-Neigung 2:1,6561
Böschel-Öffnung 1:64
Rechnung in AW 49/33



Renner 4 8'45'
in Z. 07/58-61

1 : 2.58

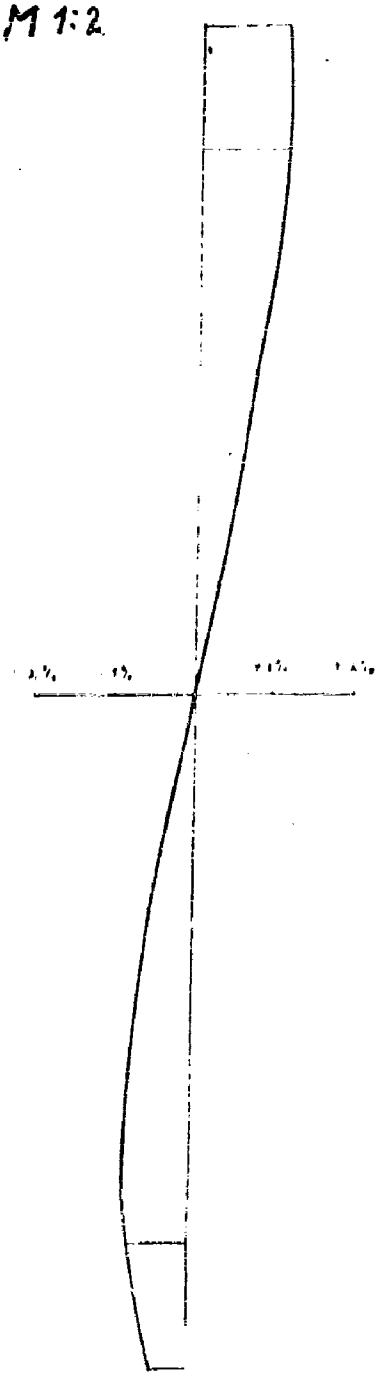
1 : 2.63

Norma 1:1,183

-4 10°38

Satz: AX35/65

M 1:2



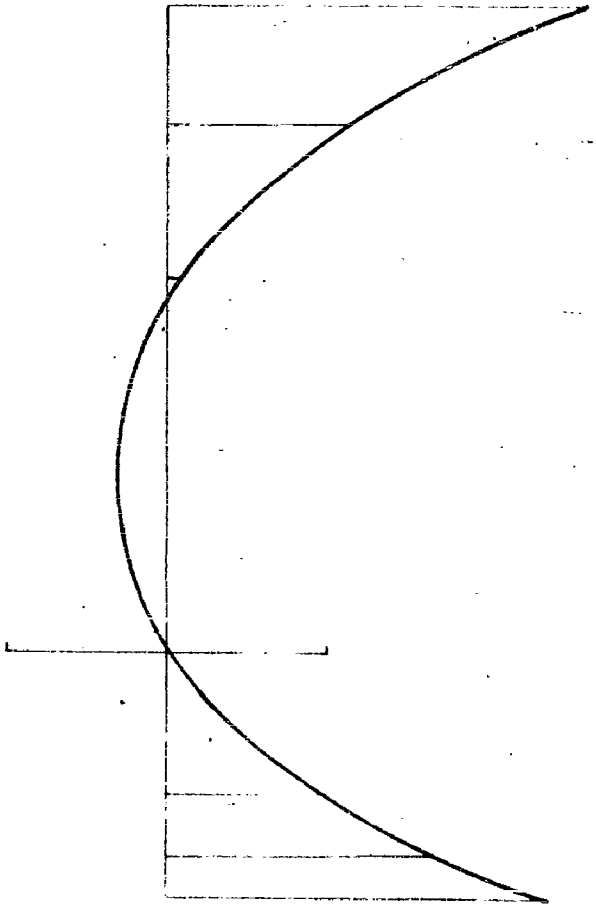
1419

Profil A: 3.57 H= 60.2 %

φ 22°98

Breite 113 im AW 39

" 115 im AX 22



1980

Kurve

Büschelentlad. 5"

mit Zündspl.

Büschelentlad. 5"

1 : 2,5

ohne Zündspl.

1 : 7,5

(Entfernung 1,00 cm)

Koma 5°
mit Zusatzglas

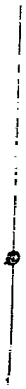
II oben + 0.8
I oben + 0.3

I unt. − 1.4
II " − 1.8
III " − 1.8

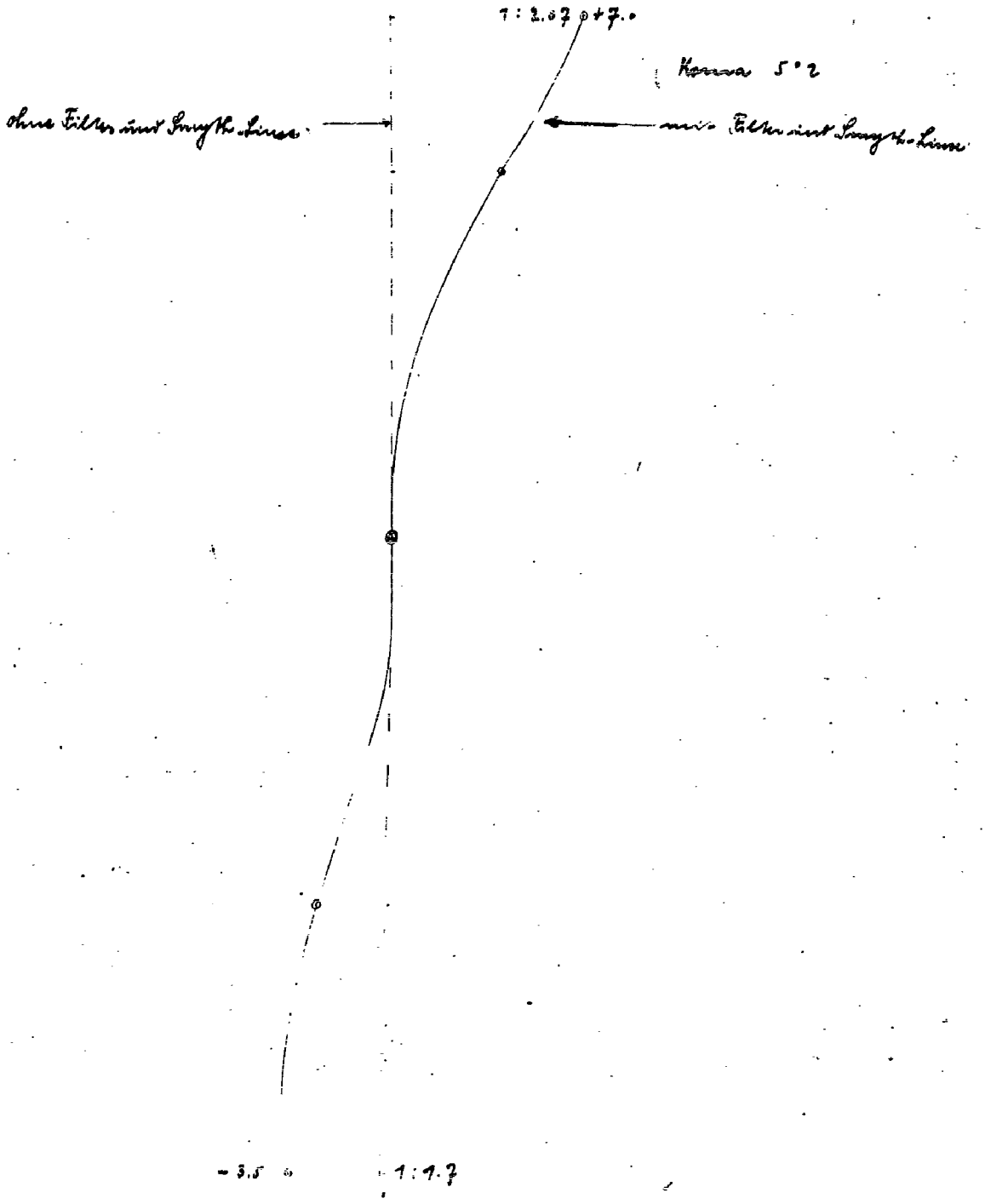
Koma Zeiss Nafzing 5°
ohne Zusatzglas
1:2.0

II oben − 1.0
I oben − 0.8

I unten − 0.6
II unten − 0.8
III unten − 0.6



1:1.7


1 : 2.67 ⌀ +7.0
Kerma 5°2
ohne Filter mit Symph. Linse
mit Filter mit Symph. Linse
- 3.5 ⌀
1 : 1.7

Römer

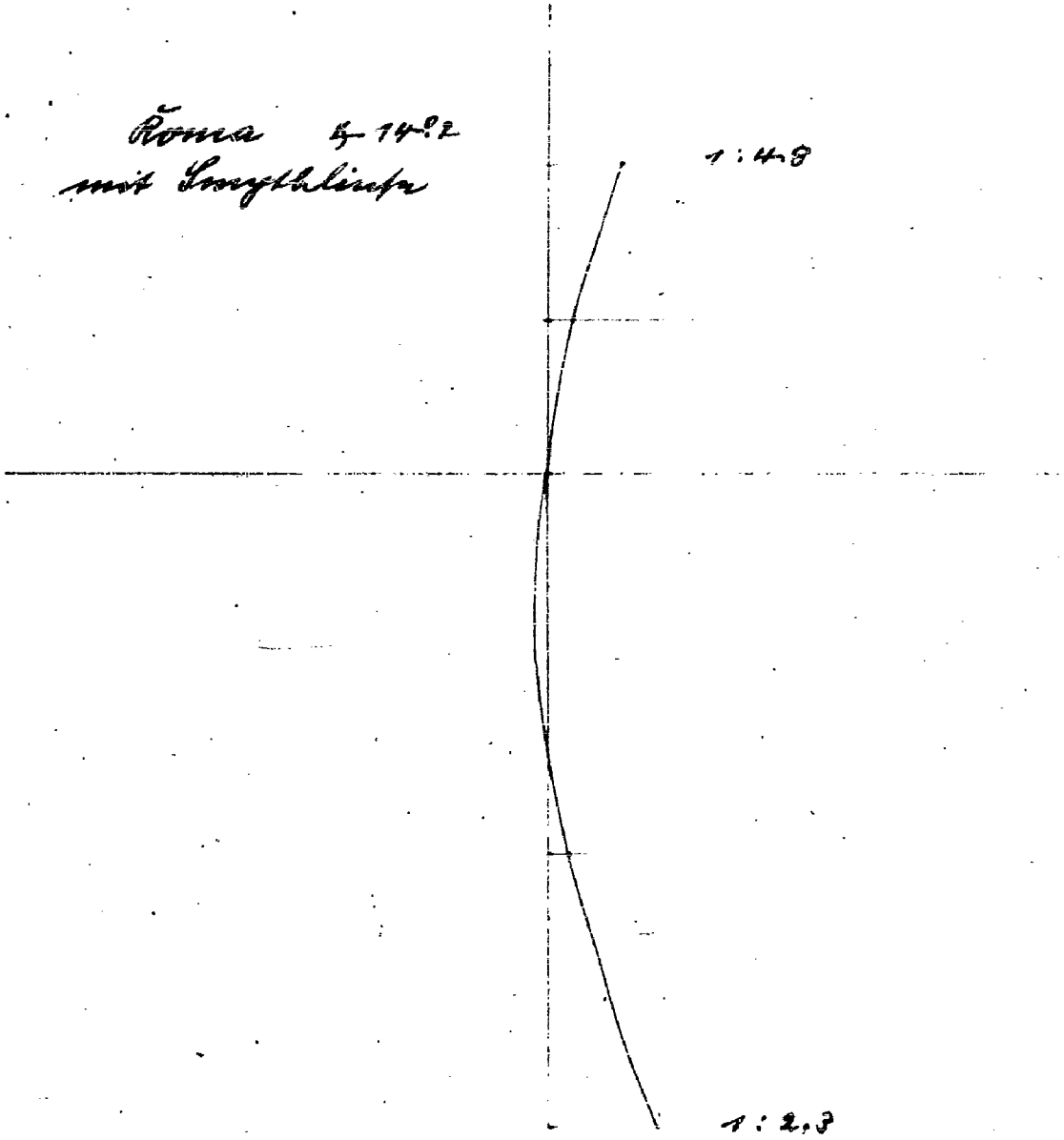
Übersichtsaufnahme 1:2,5

± 10°5

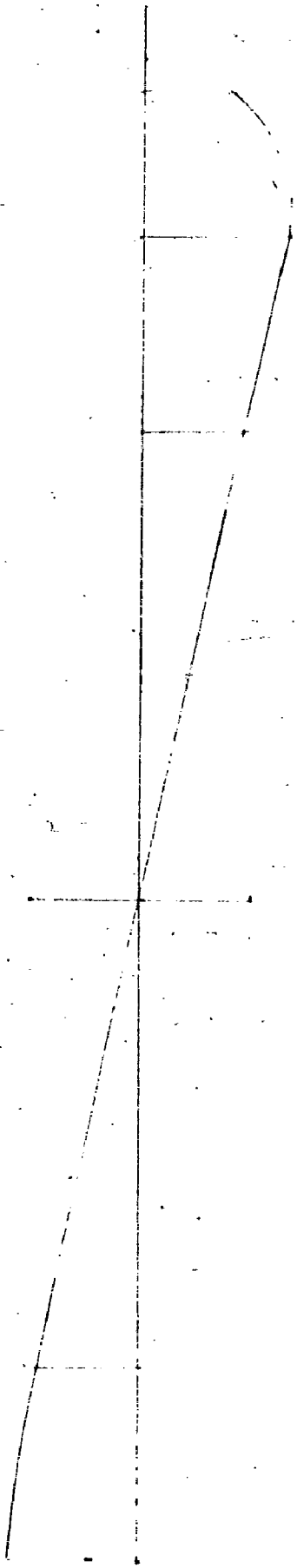
AA 2/116-119

14330

Roma 4-14.2
mit Longitudin



Bonn
L -12,7
Feuchtigkeit 66%
4 X 13/00-65



Firma A-19.3

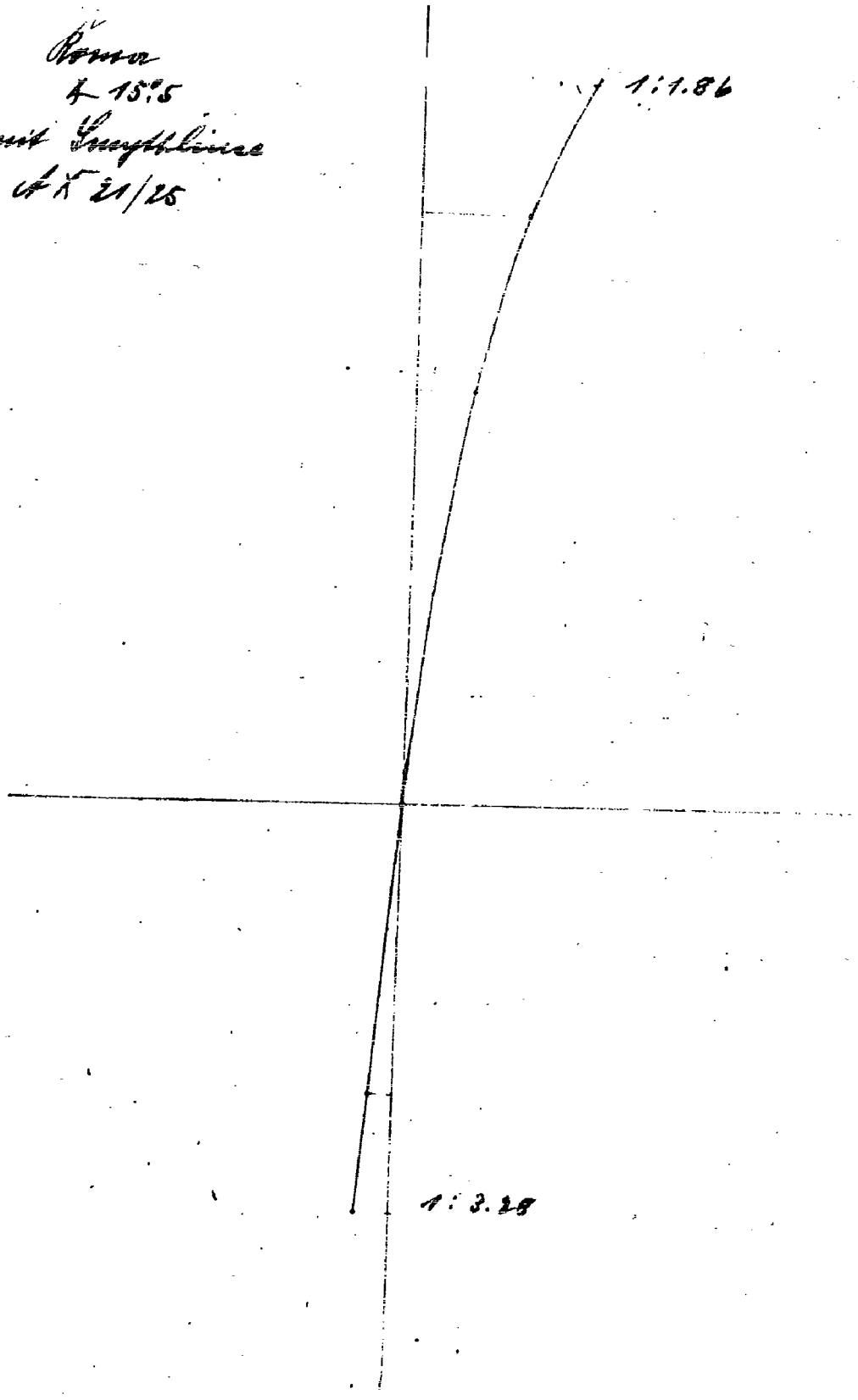
Fettigkeit des meist.

Eiweißgehalt 39%

A.X 46/32-35

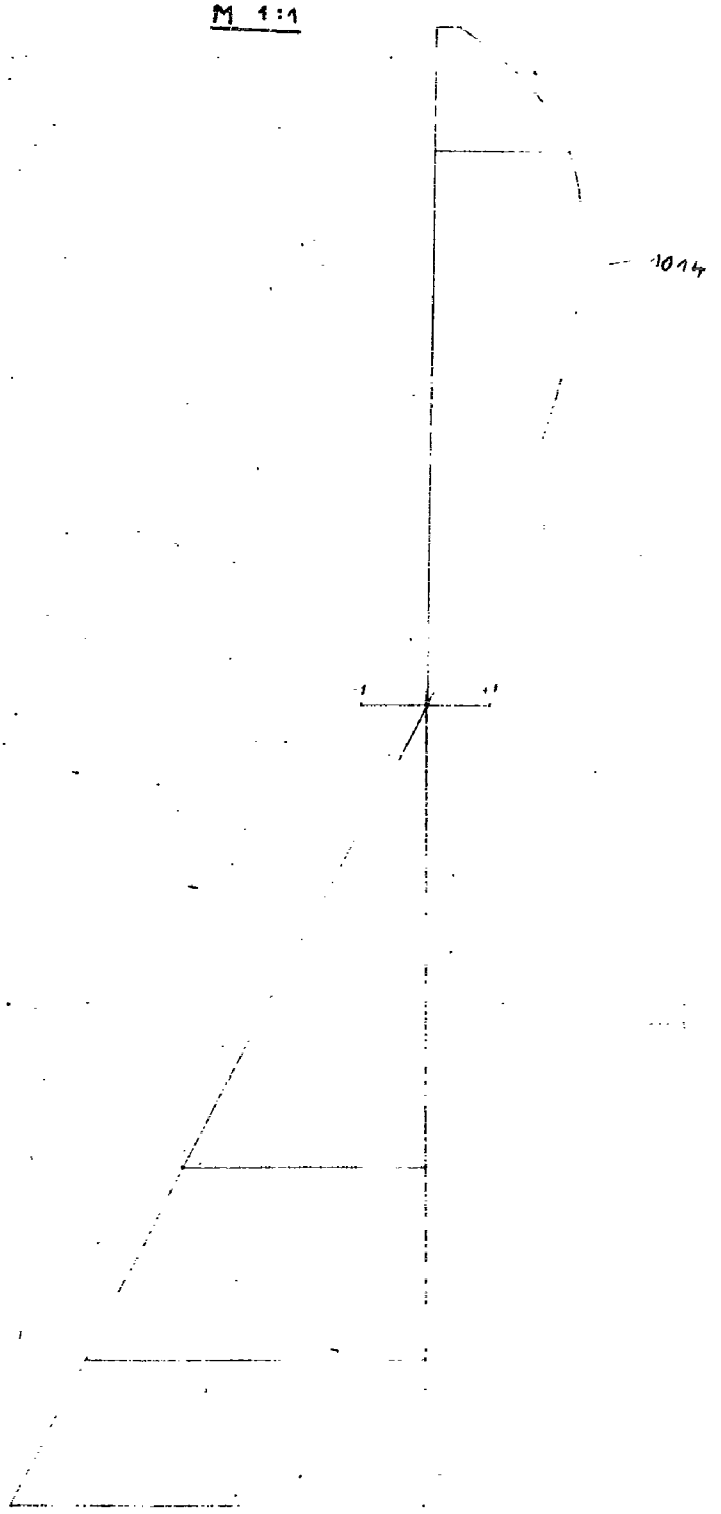
14 35

Rom
L 15:5
mit Symphline
4 x 21/25

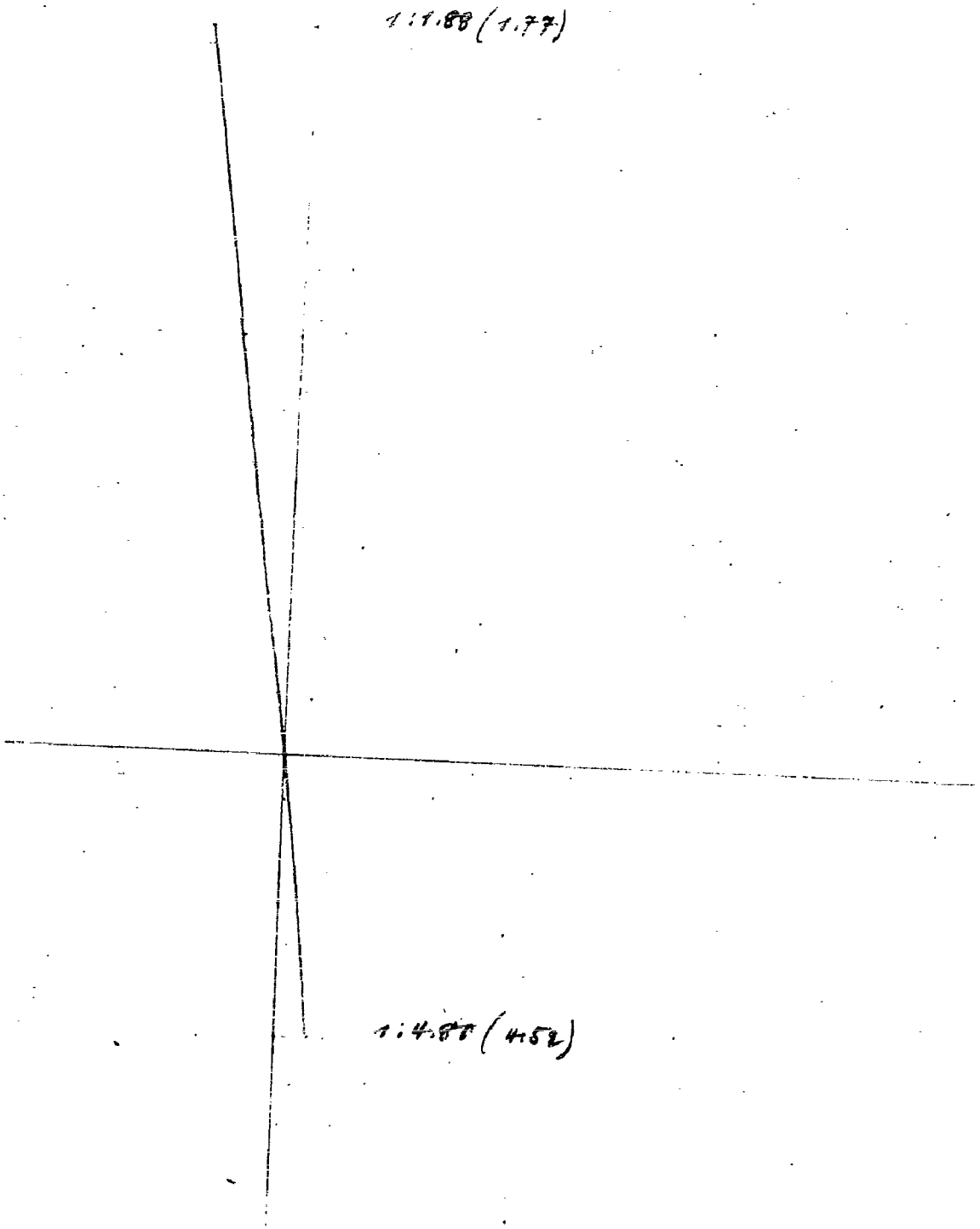


Formen 1:1,705
w = 15° 59 86
Größe A x 48/2.2-24

M 1:1



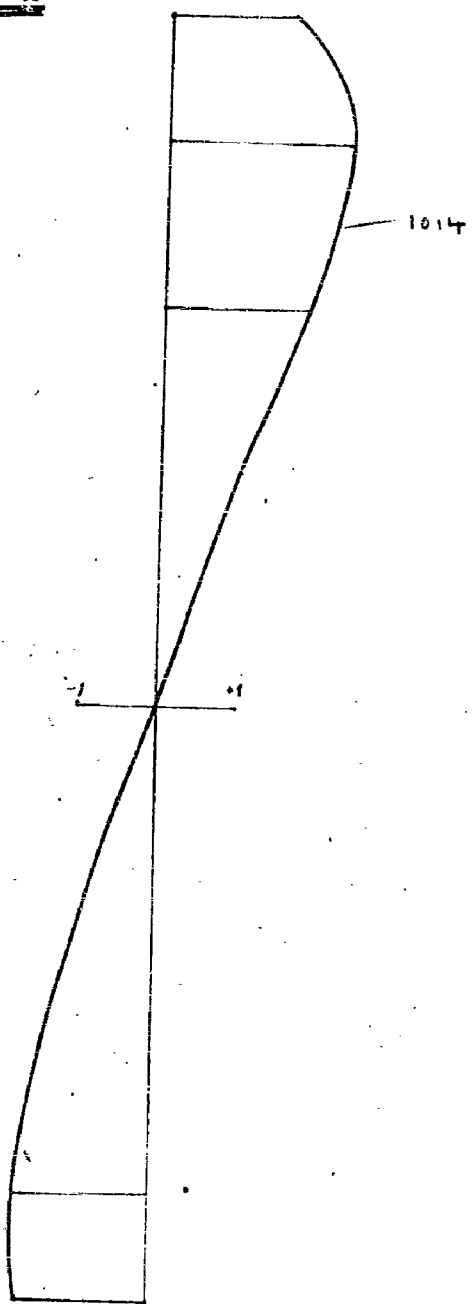
Roma Δ 19°6 (HJ 1/144)



1439"

Konus 1:1,24
w = 11°6477
γ = 71/139

M 1:2



INHS

Krone

1:2.0

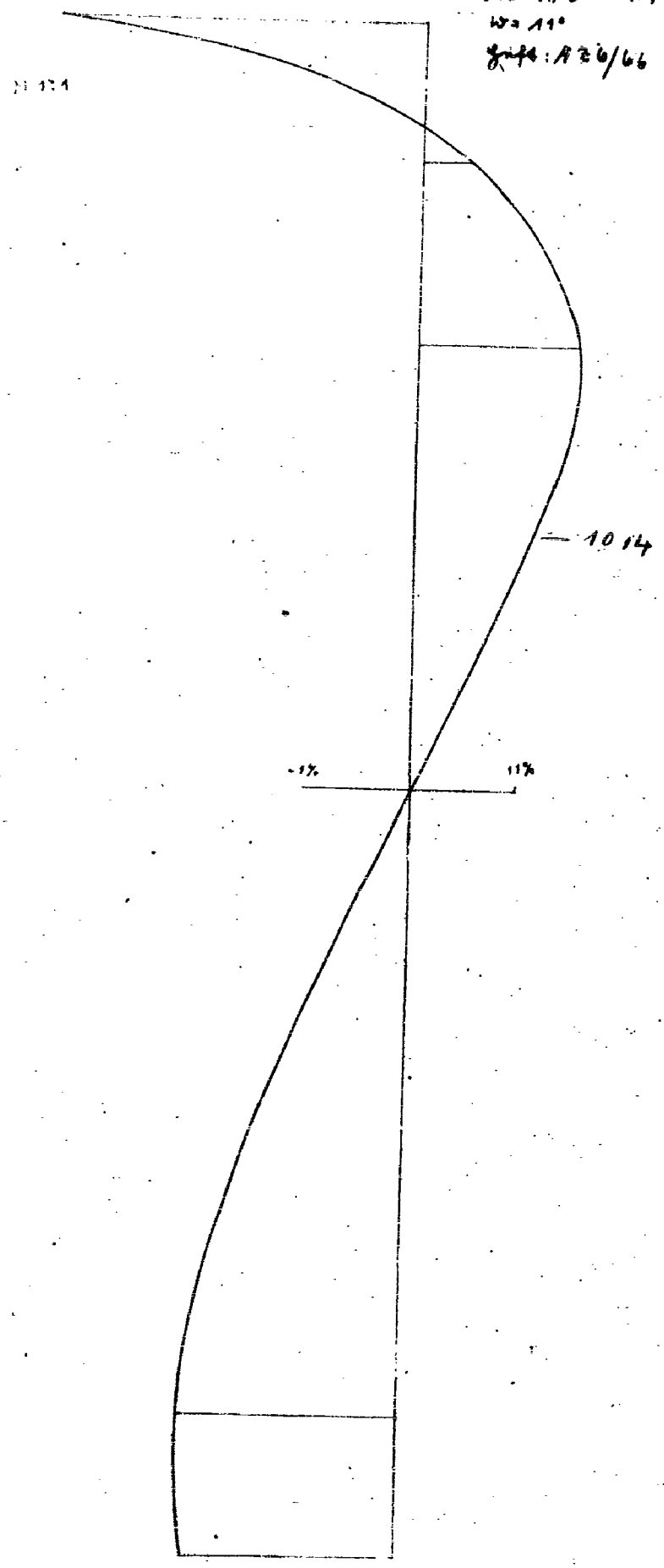
ohne Smyth.L

mit Smyth-Linie.

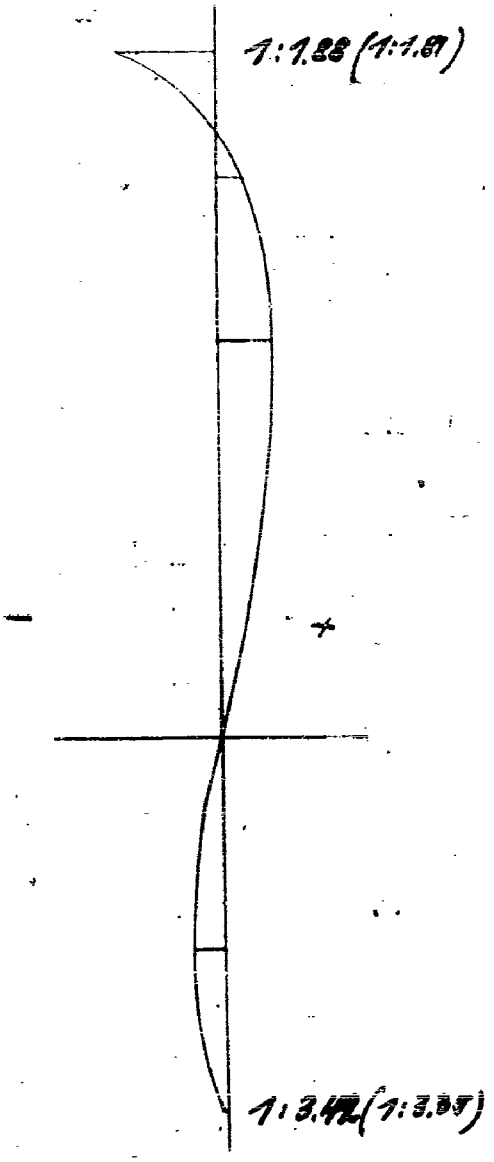
Perückolnaij. 5°

A x 50/26-28

1:1.64

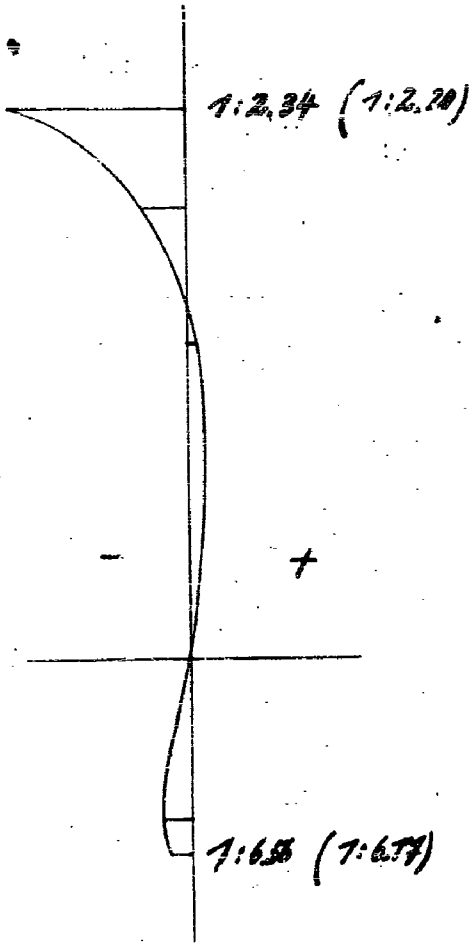

Düse 1:1.4
W = 11°
Zeichn.: A 26/66
1:1.4
10,14
-1%
11%

Löffel - Neig. 15°14'59



gem. in AZ 13/47

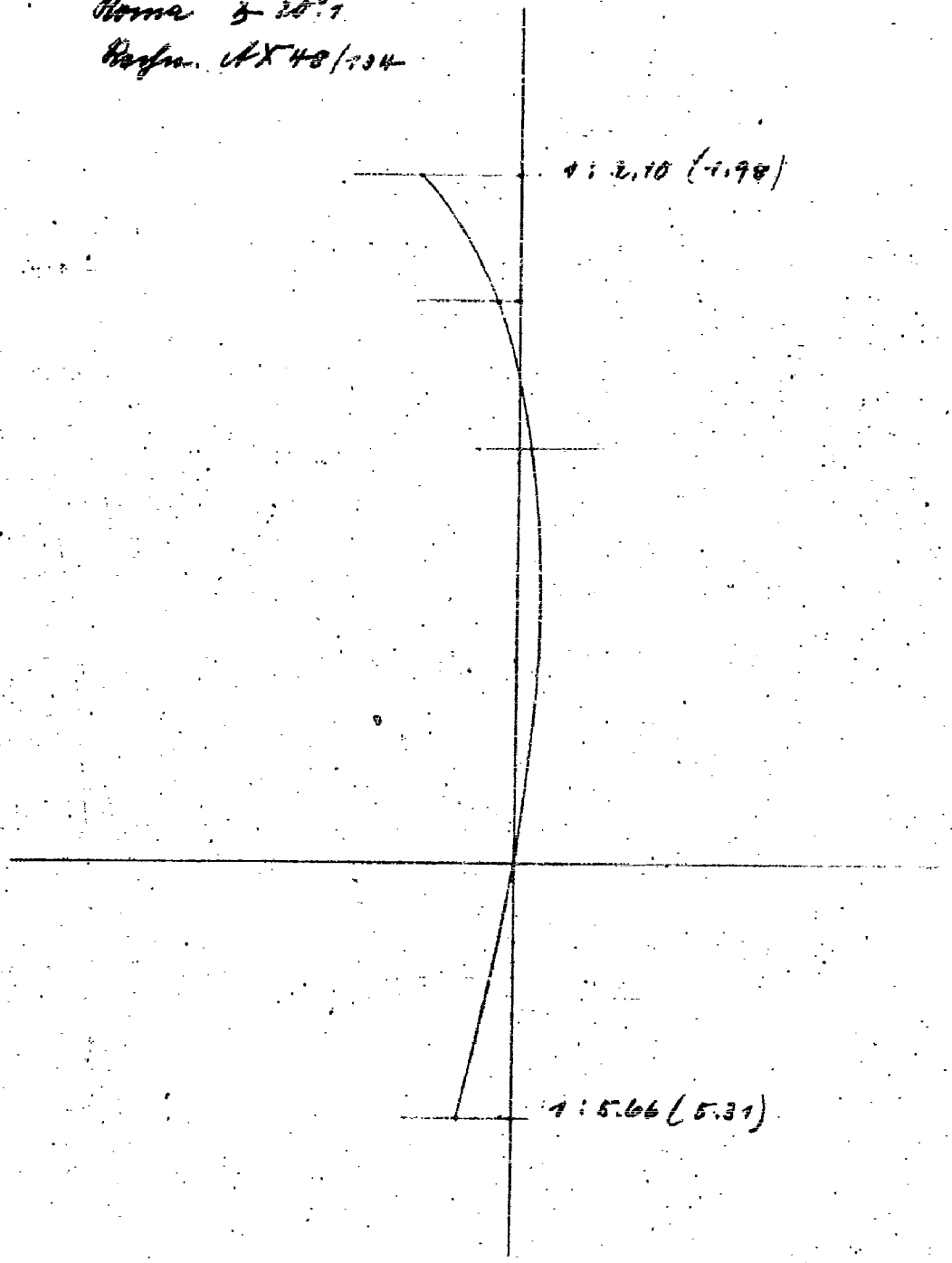
Löffel - Neig. 44°29'13



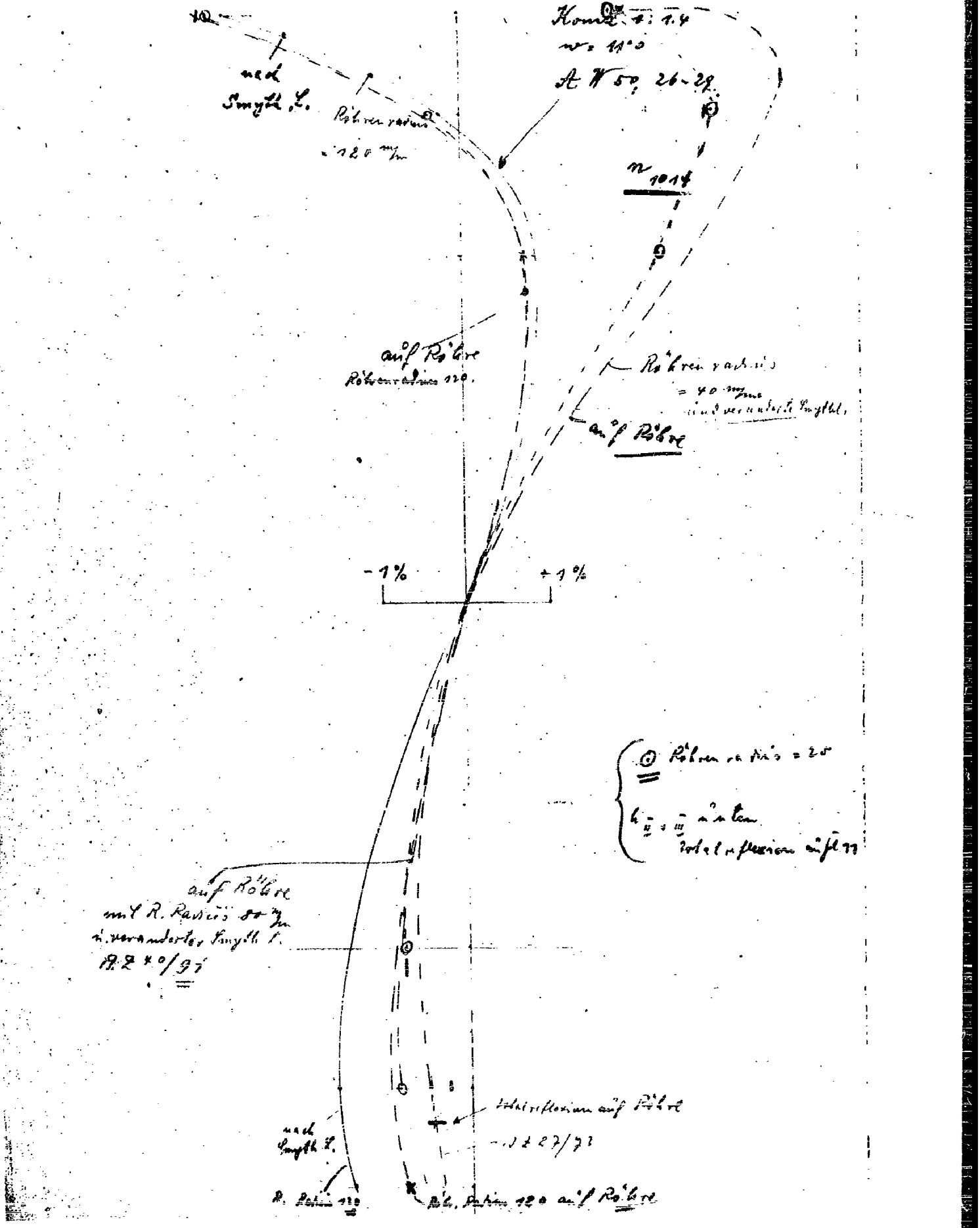
gem. in AK 39/715

Rome 5 20.7

Reflm. 4X40/134



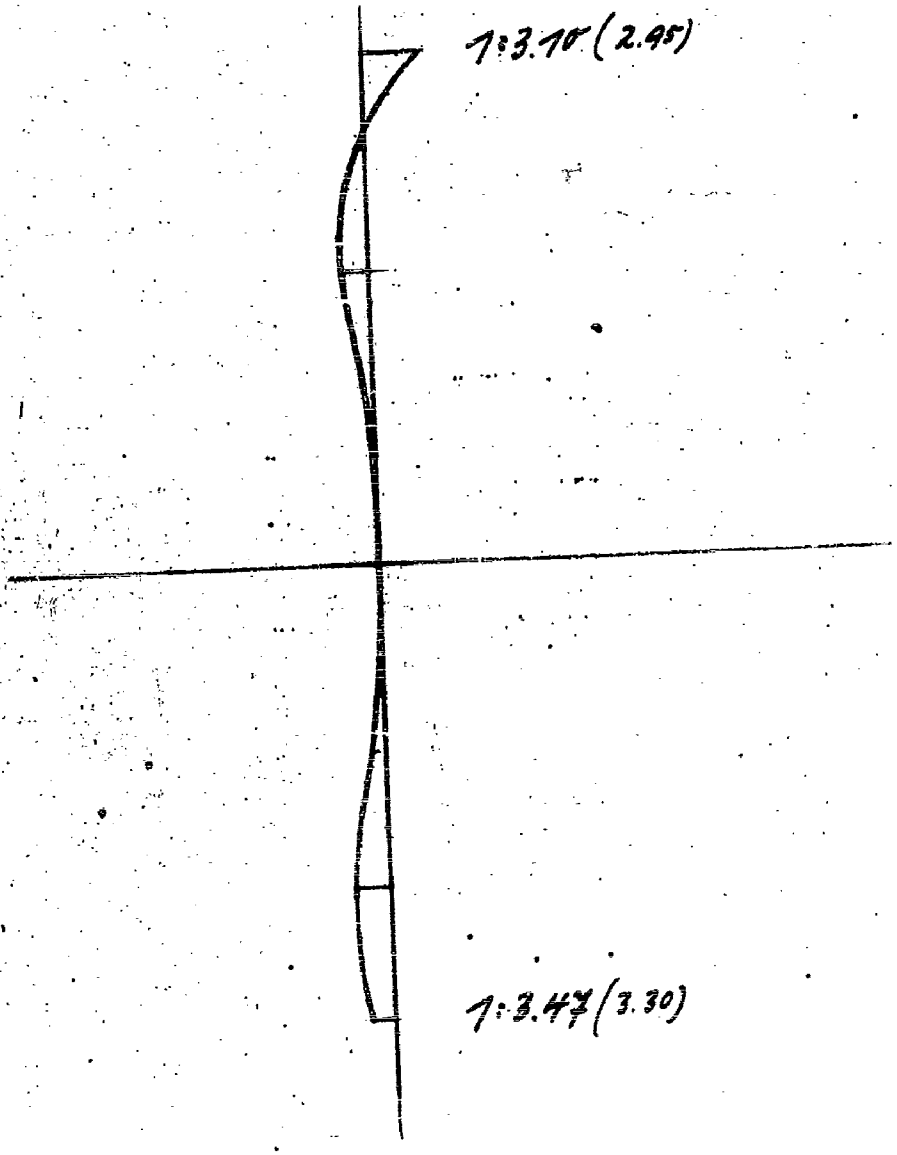
1445


nach Smyth L.
Röhrenradius = 120 mm
Komb. f: 1.4
n = 11°
At N 50, 26-28
n 1014
auf Röhre
Röhrenradius 120.
Röhrenradius = 40 mm
und veränderte Smyth L.
auf Röhre
-1%
+1%
auf Röhre
mit R. Radius 80 m
u. veränderter Smyth L.
R.Z 40/37
Interferenzen auf Röhre
-1227/37
nach Smyth L.
R. Radius 120
R.L. Radius 120 auf Röhre

Roma

Neigung 17°8370

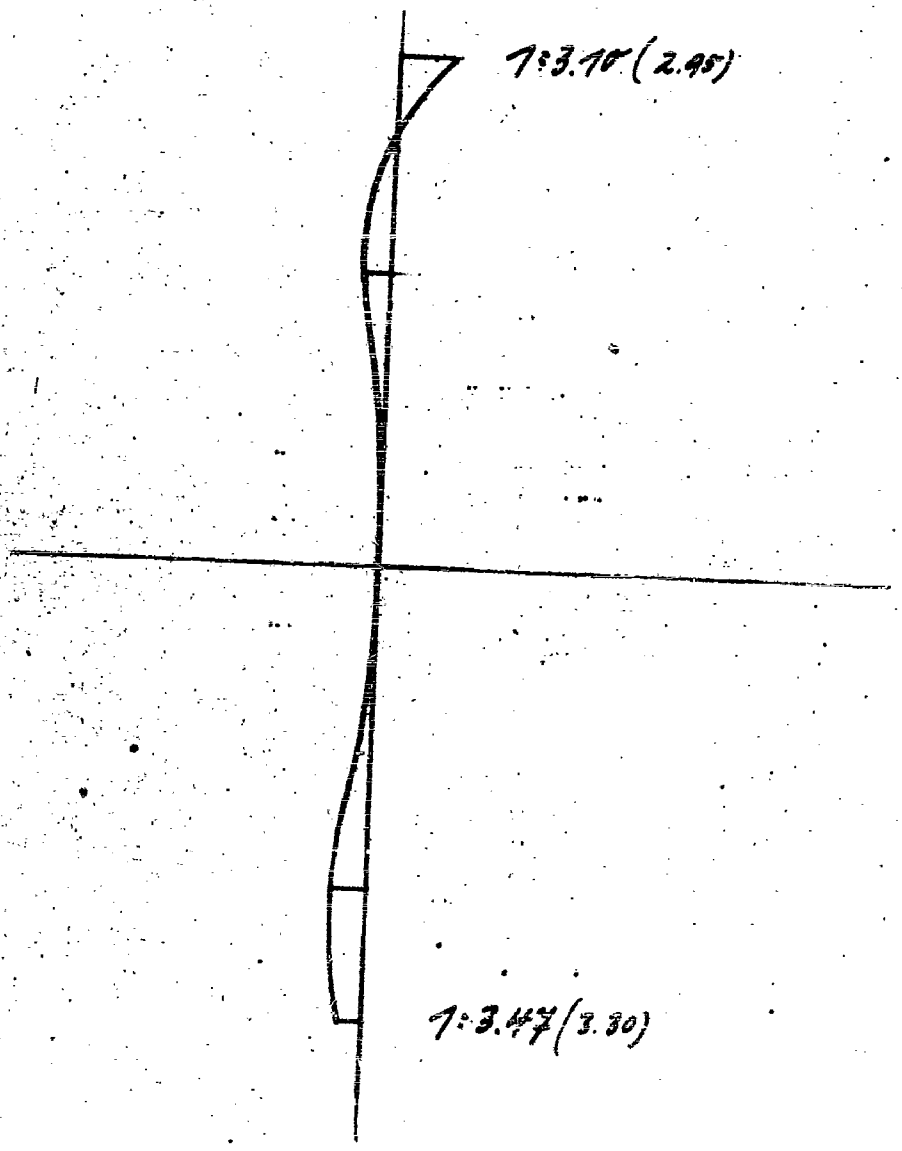
A+ 33/ 45-99



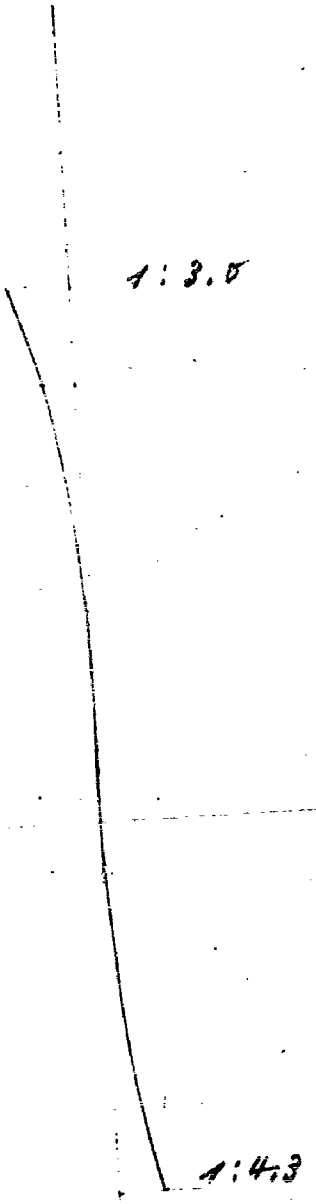
Roma

Meigang 17°8370

At 33/46-99



Bönna 19:9
AK 26/120-121



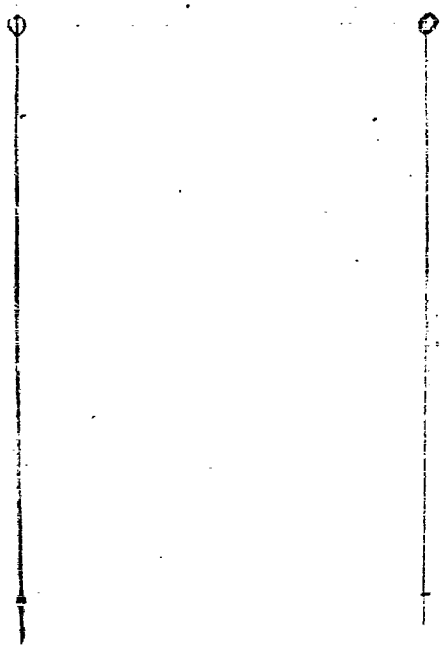
1:2.0

4°9

1:2.0 (auf. vor.)

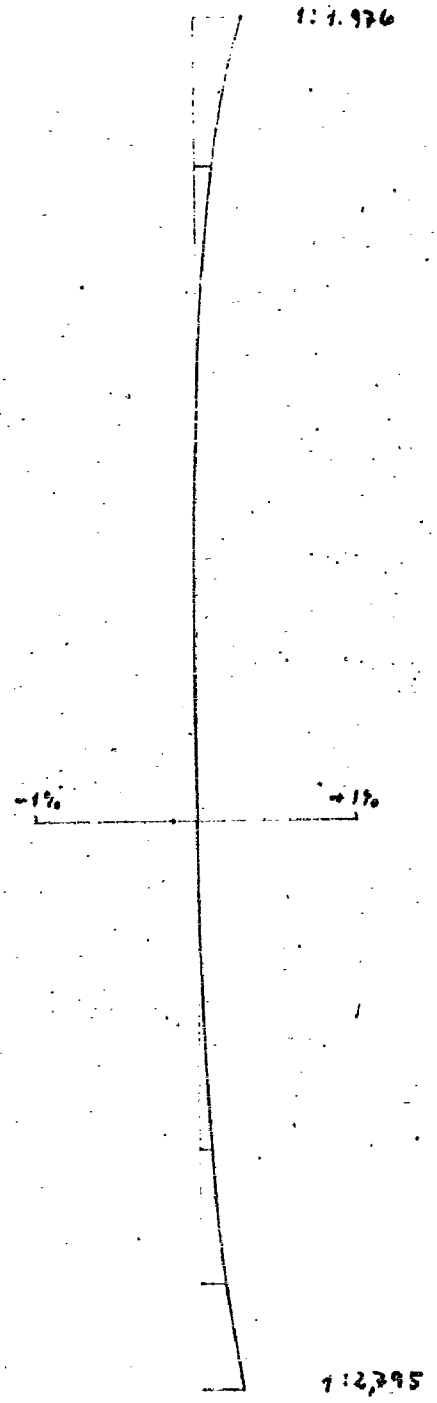
Beschleunigung 4.9s

D 226/11-27.

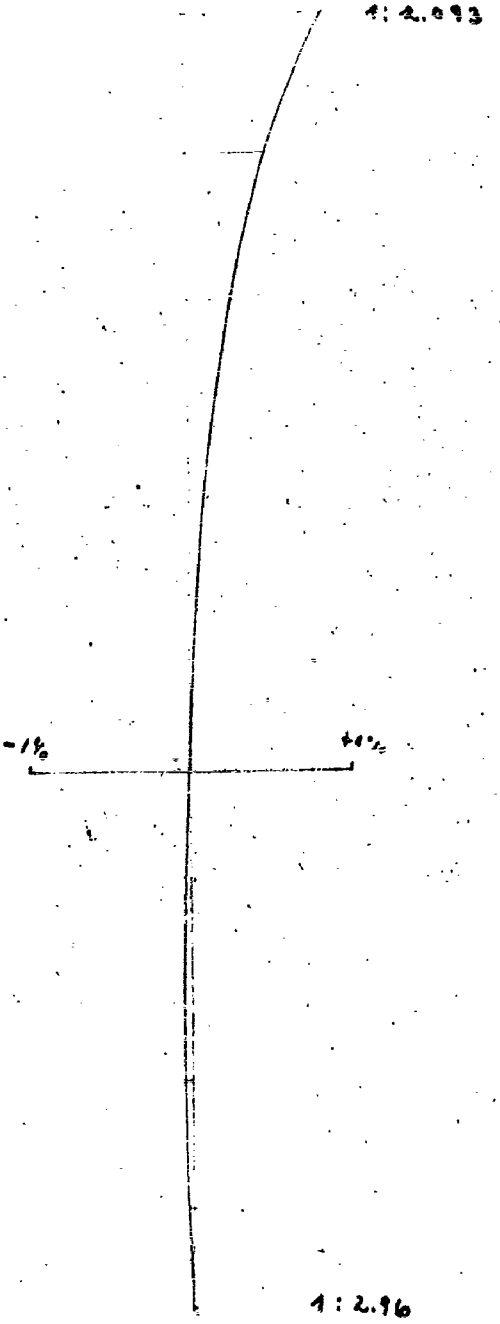


1450

Formular 5.14
AZ 15/47

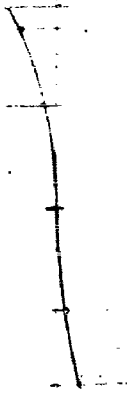


nach Abschlussglas



auf Röhre

14 VI

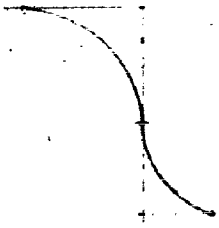


Coma A 245/102–103 w.

Büschel-Neigung 16.°703 83 mm 73

Büschel-Öffnung 1:7.95 für II. Ord.
1:9 " III. "

1.8.44



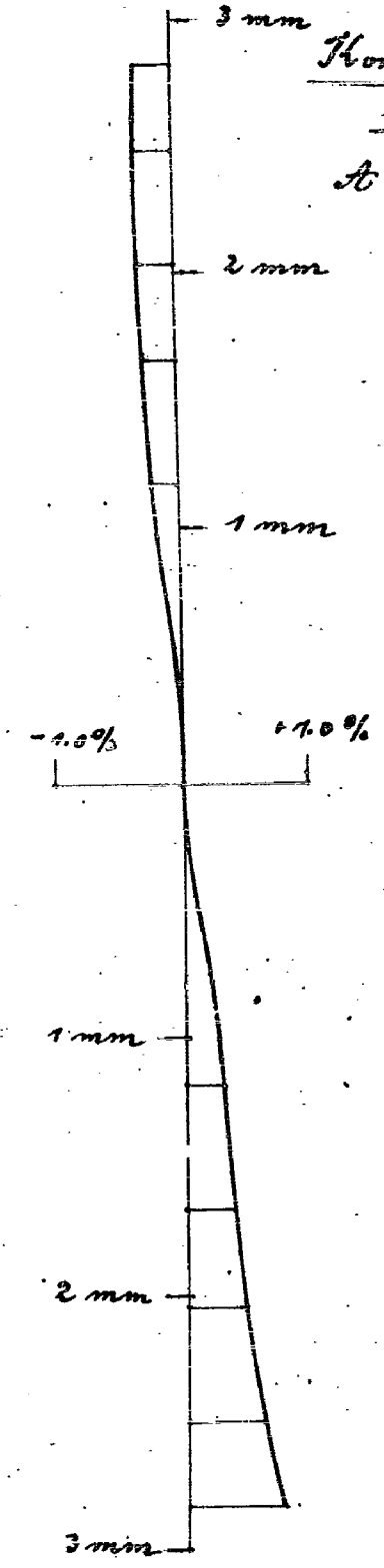
Coma A 245/104–105

Büschel-Neigung 17.°024

Büschel-Öffnung 1:14 für III. Ord.
1:17.5 " IV. "

1:15.92

14 mm

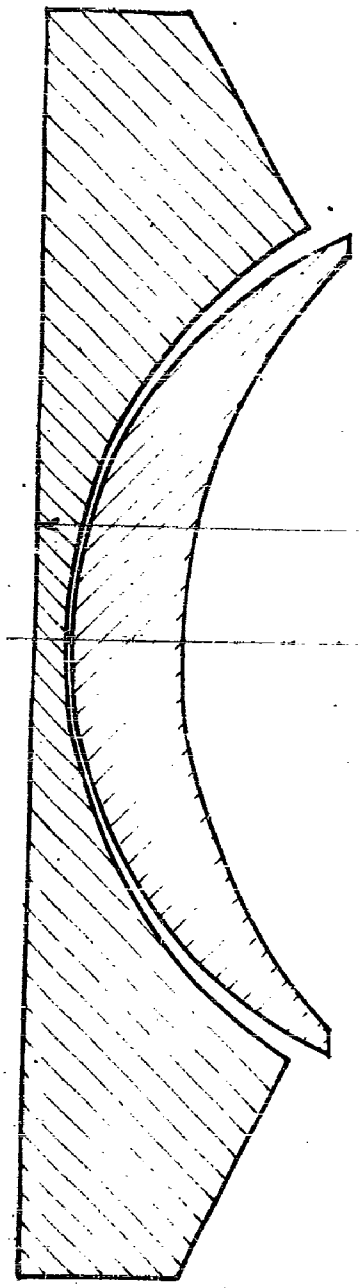


Koma 1:17,2

φ: 15° 15

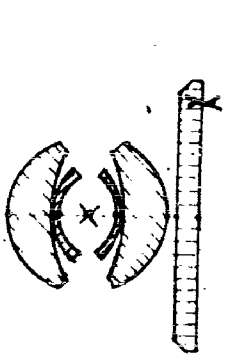
AZ 30, 54-57 u. 64-65.

Die Einfallswinkel sind 10-fach vergrössert.



M 1:2

252.7



1:≈3.6

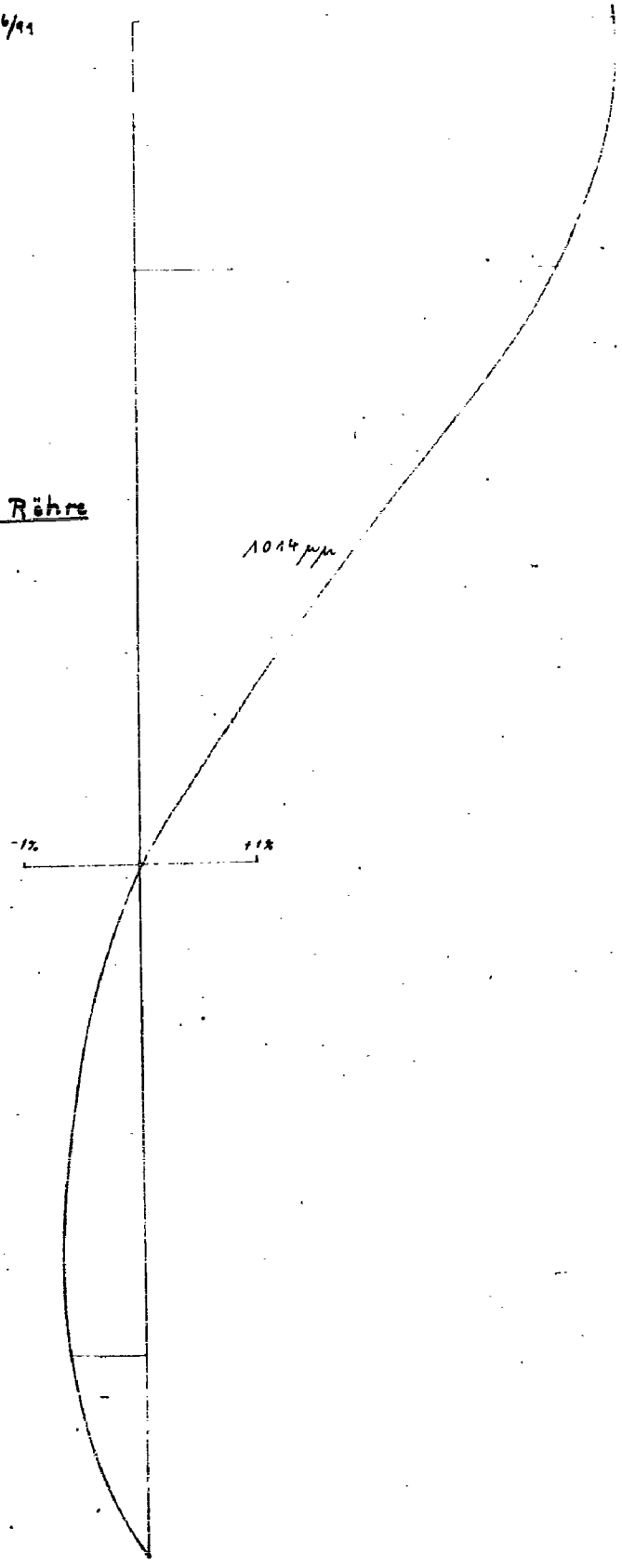
F1

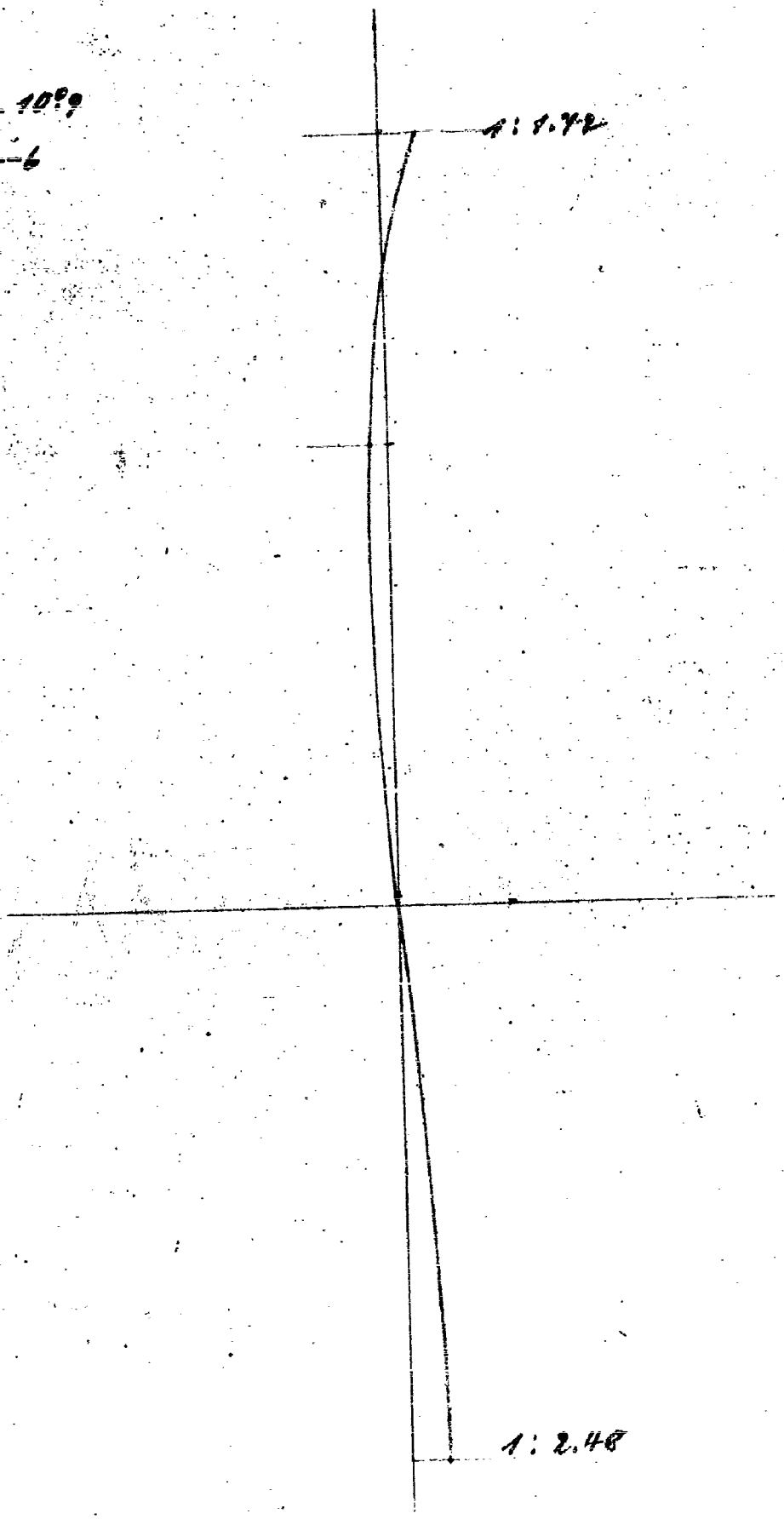
Linse	n_d	ν
1	1.5163	64.0
2	1.7283	28.3
3	1.5163	64.0
4	1.7283	28.3
5	1.7283	28.3
6	1.5163	64.0
Platte	1.5365	(0.91)

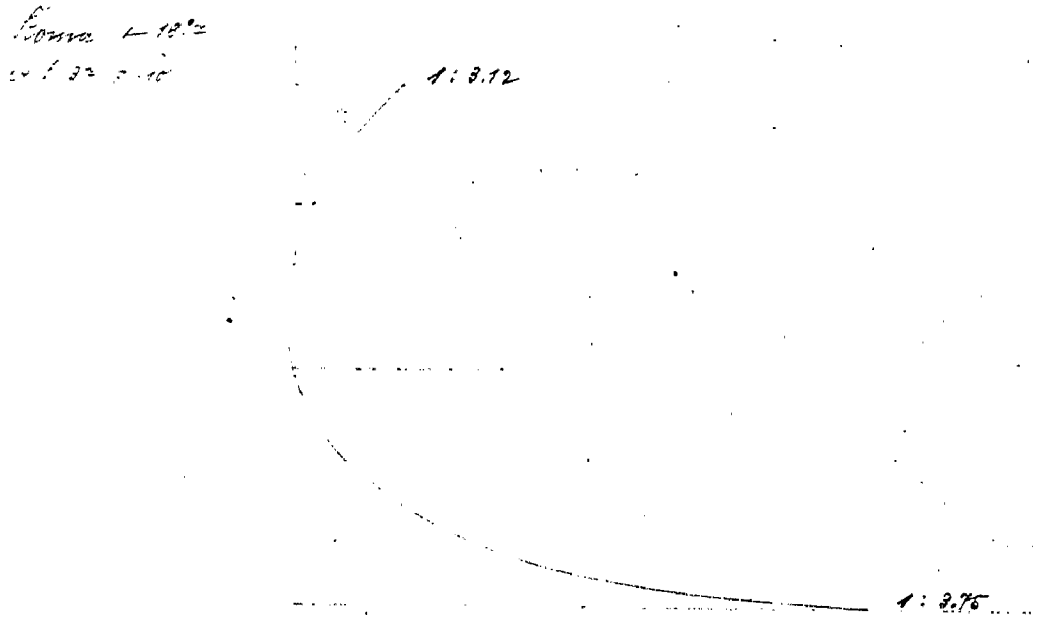
Farbe → 10°93

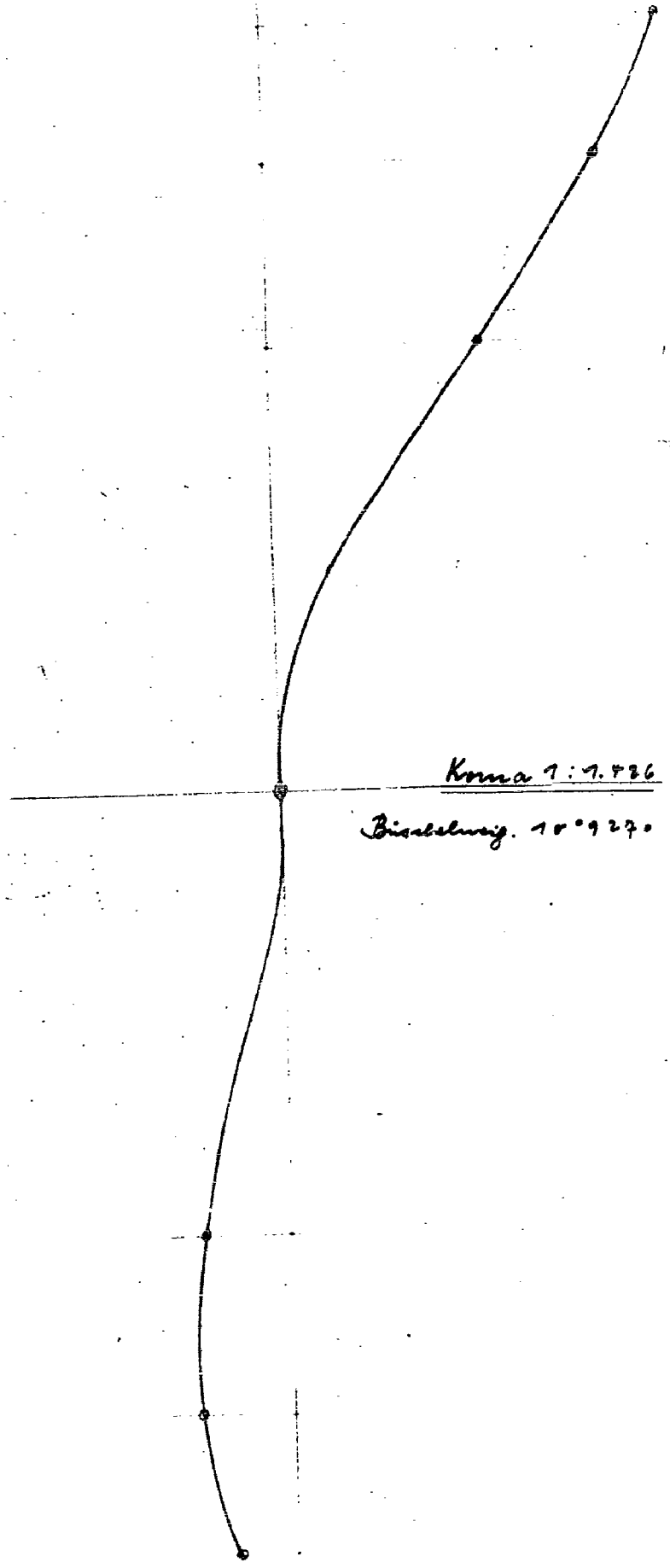
Zeichn: A 226/91

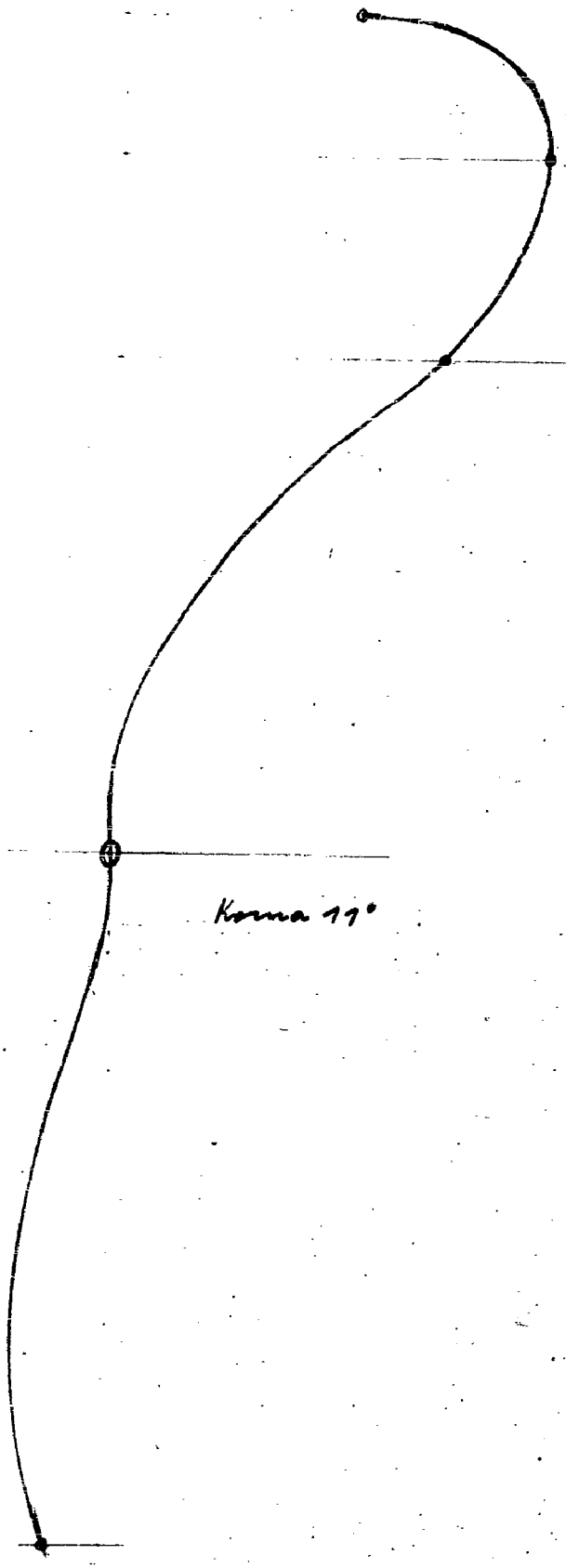
auf Röhre




1 : 1.72
1 : 2.48


1 : 3.12
1 : 2.75


Koma 1:1.726
Bisektionswinkel 10°9'20"

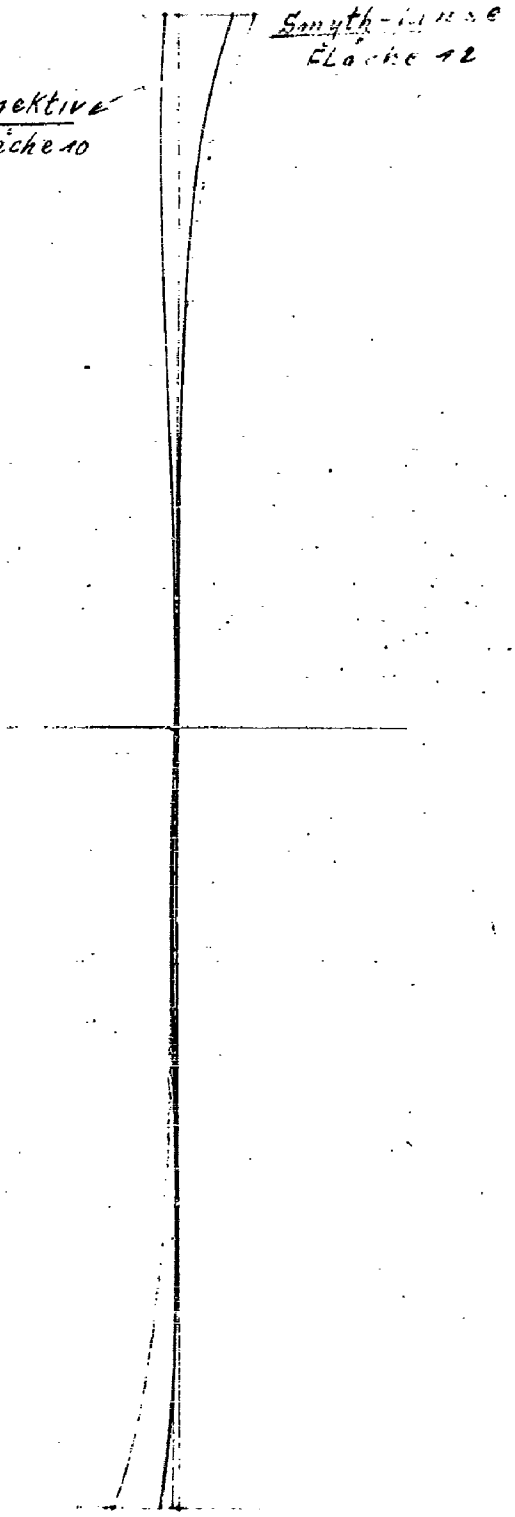

Koma 19°

Linse für f = 5,04
AZ 29/038

Röhre Fläche 11

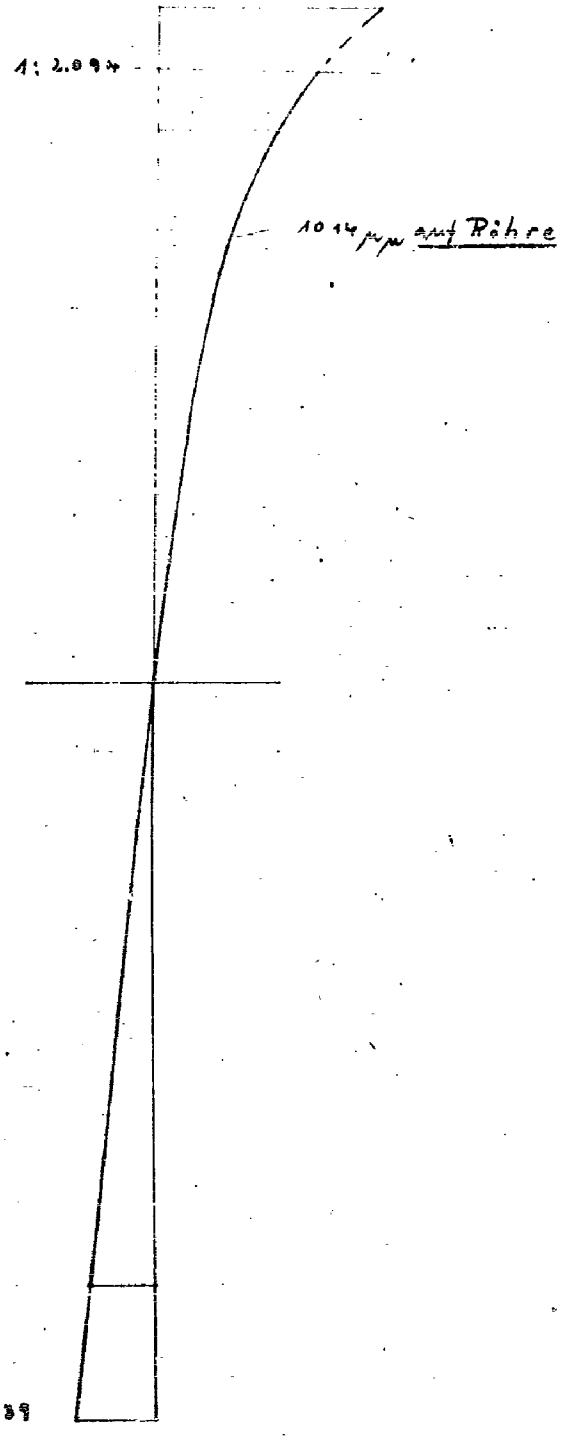
Smyth-Linse
Fläche 12

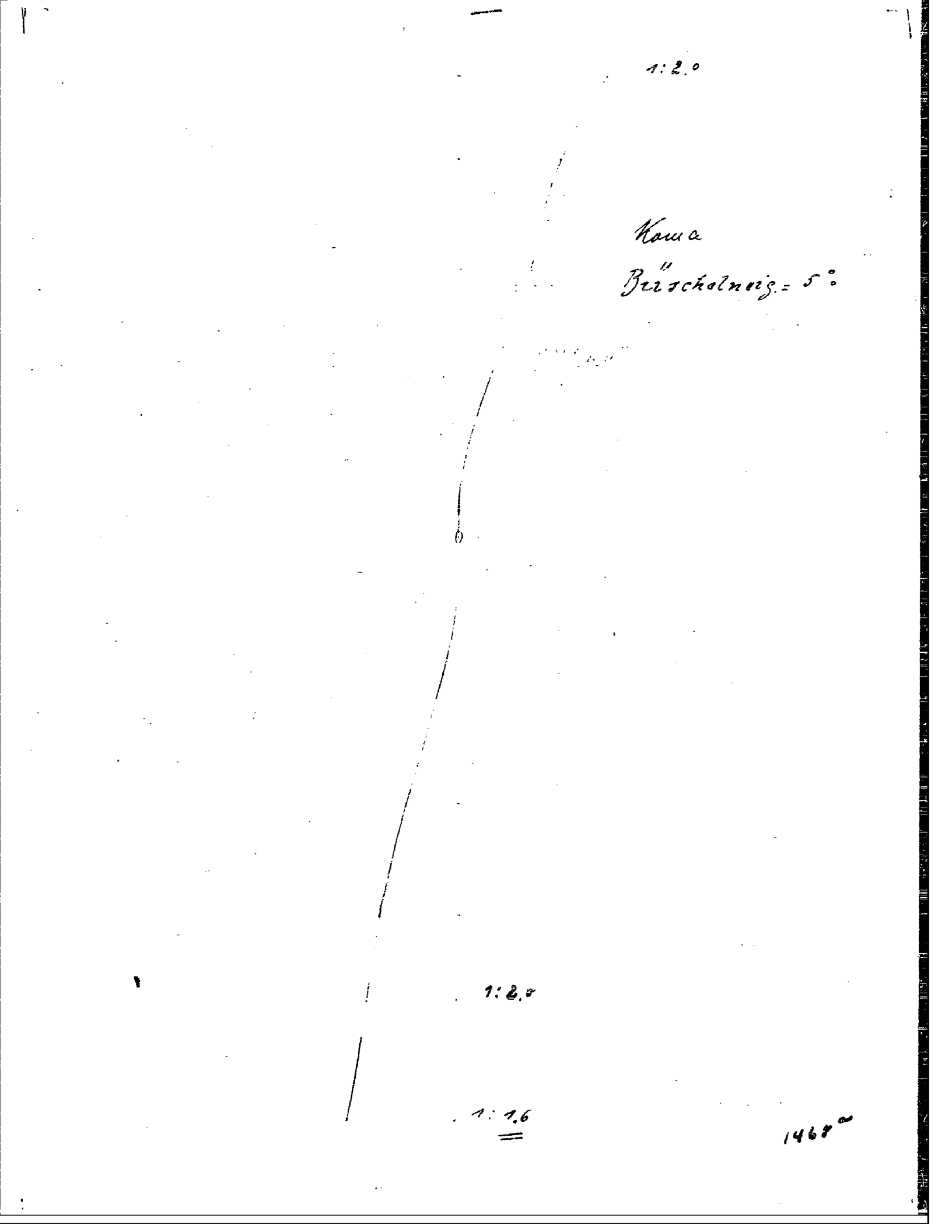
Objektive
Fläche 10



Kurve für φ 5°24

1 : 5.90 A 239/14




1:2.0
Kamm
Böschungswinkel = 5°
1:2.0
1:1.6
1468 m

Kanne für 5°C

A 239/14

1:2.094

10 14 µm auf Röhre



1:1.739

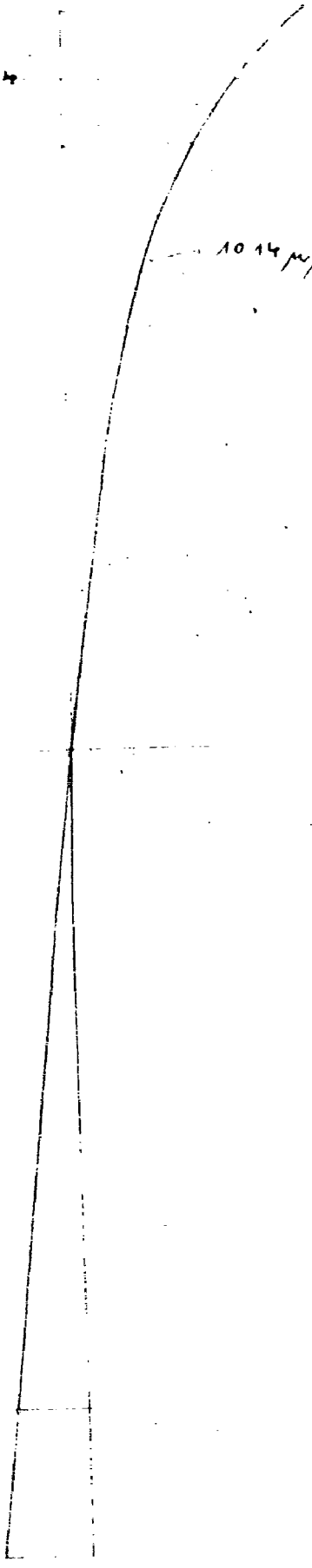
1468

Kurve für φ 5°04

A 239/14

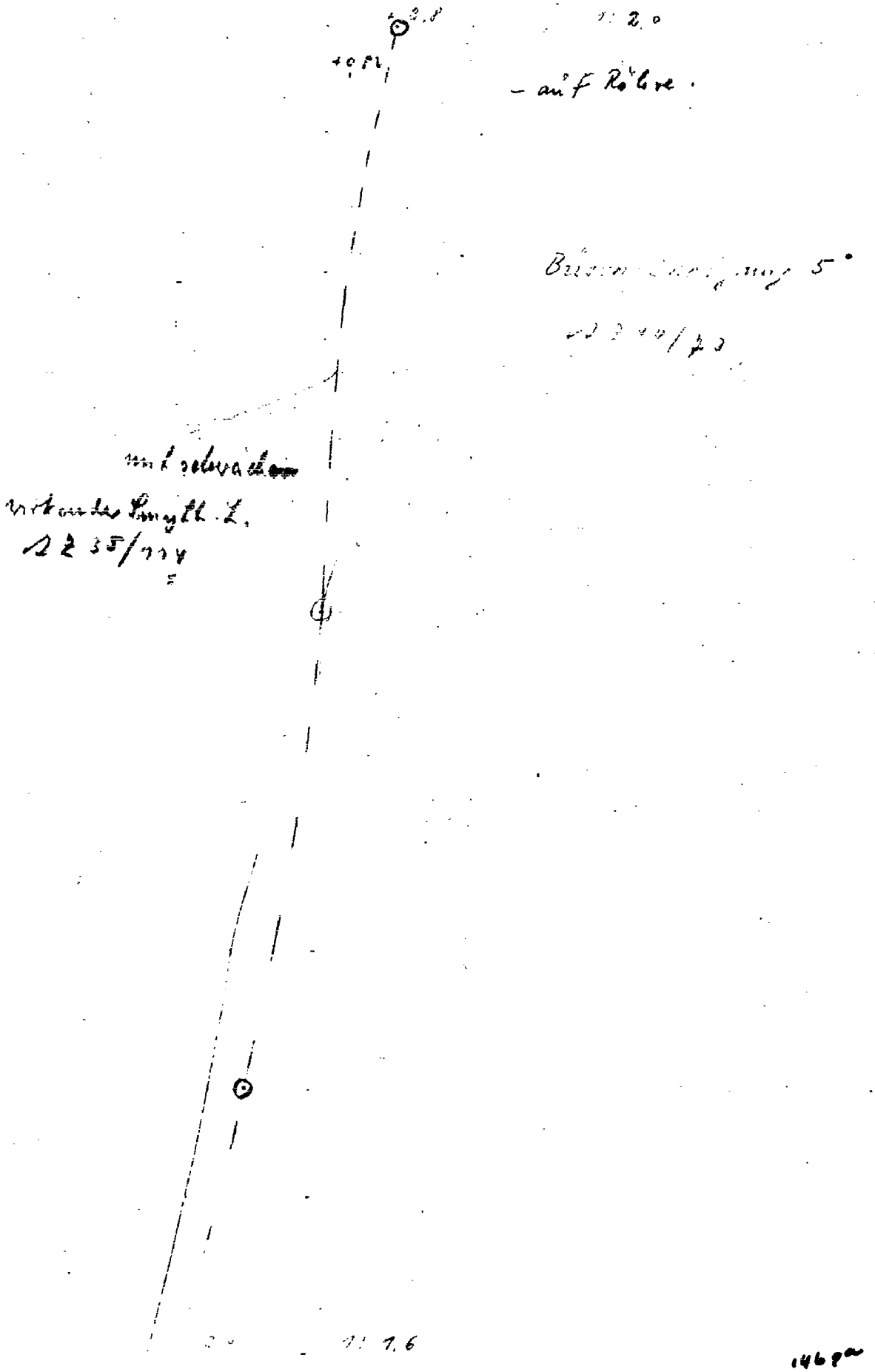
1 : 2.094

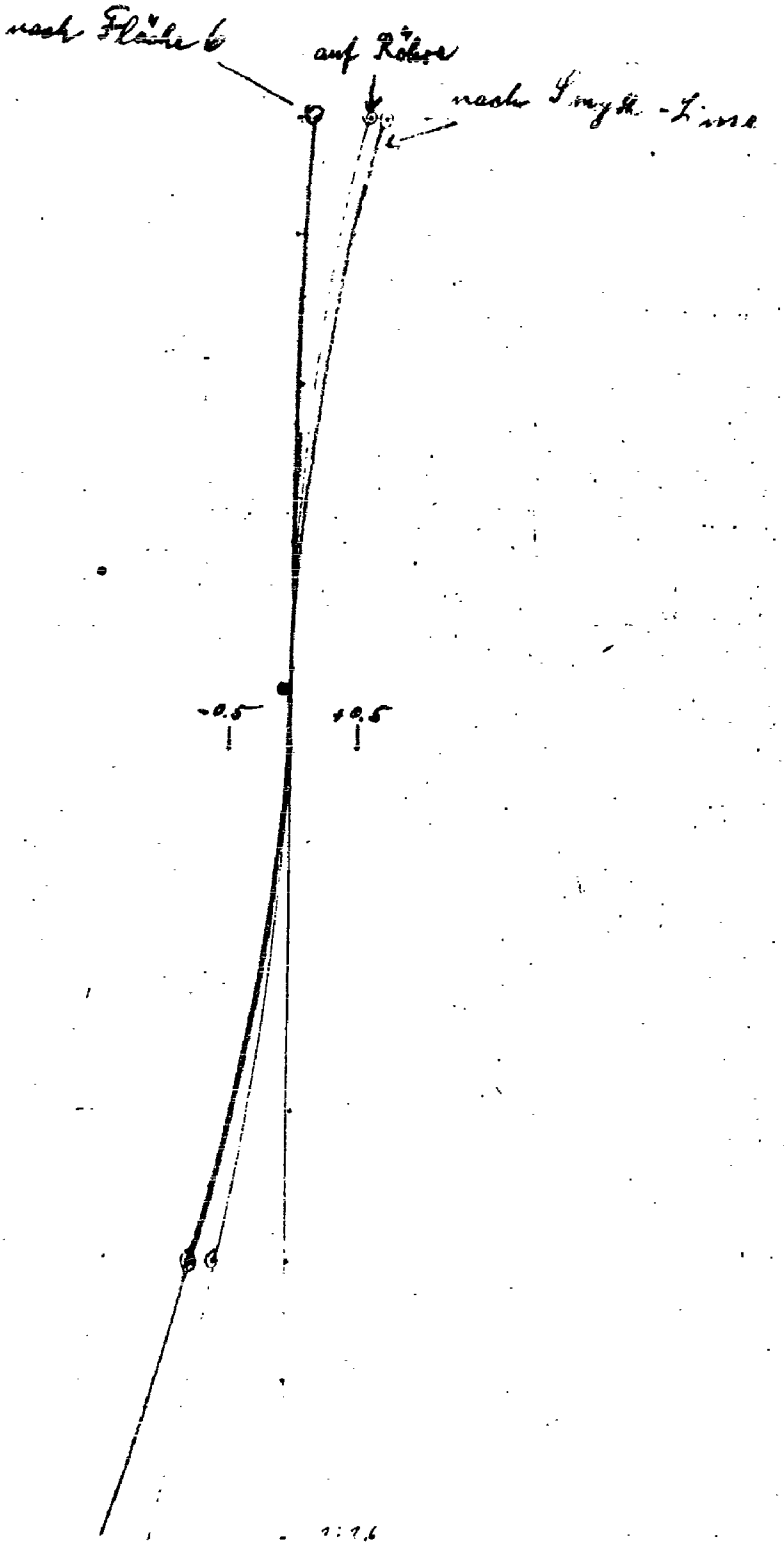
1014 µµ auf Röhre

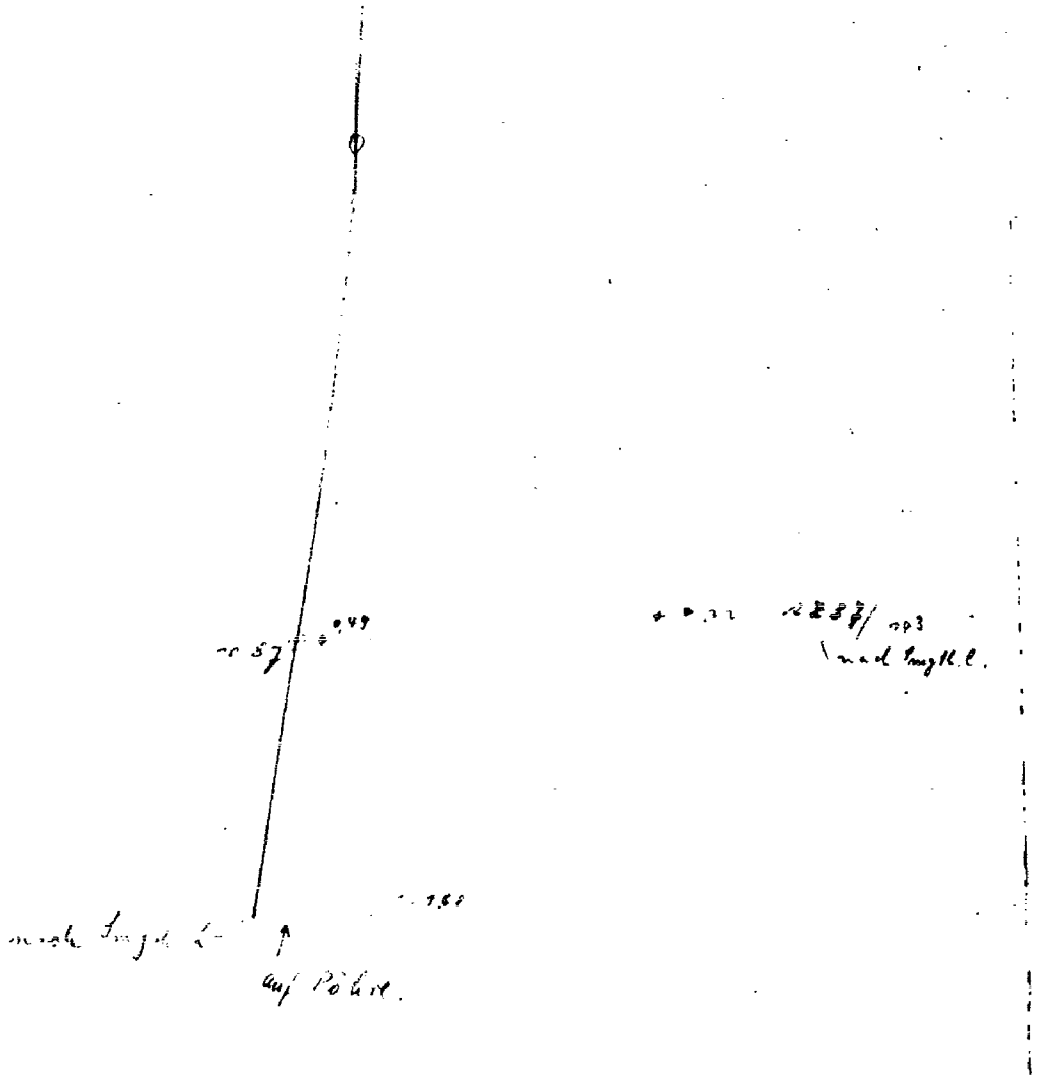


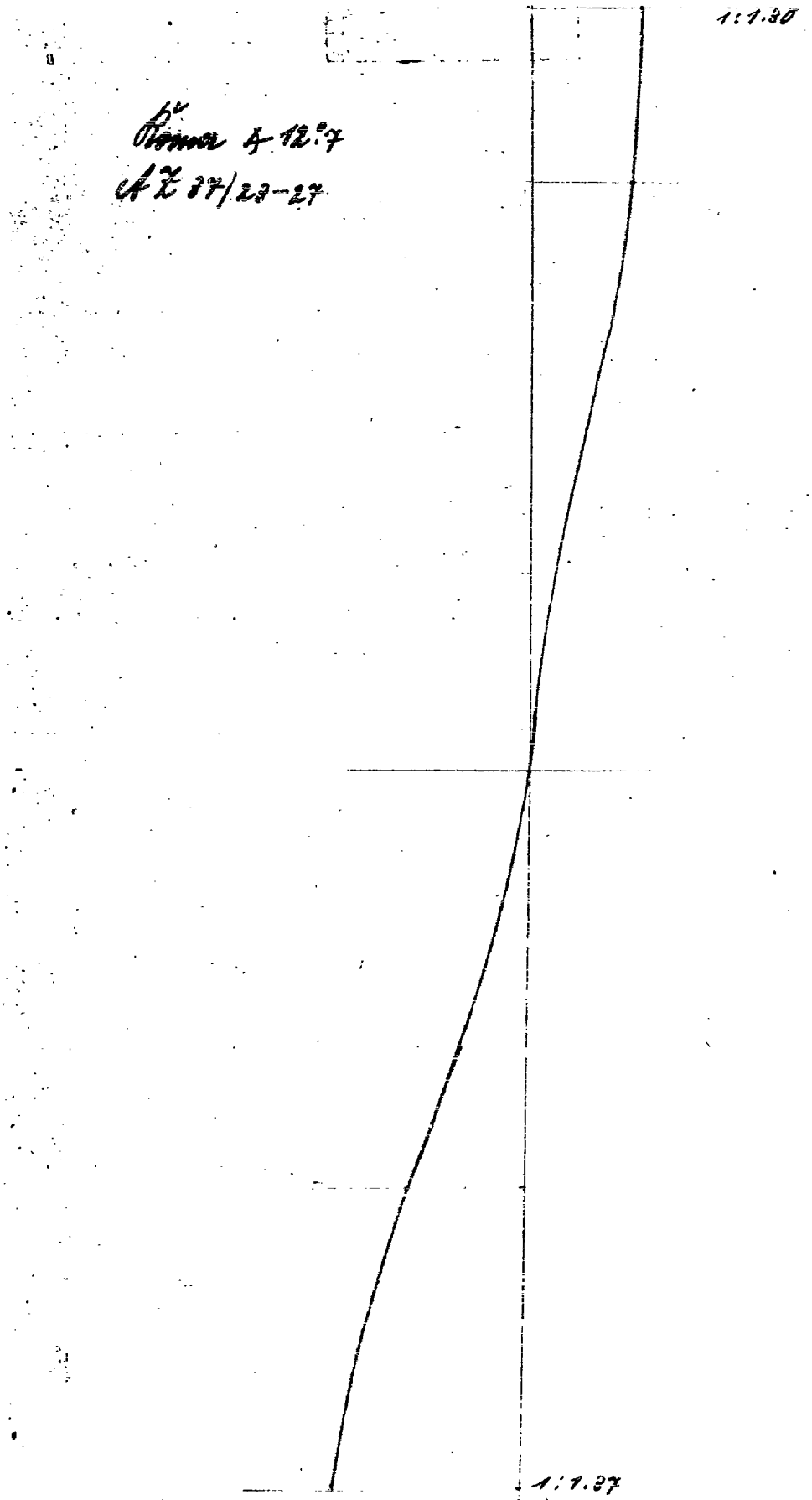
1 : 1.739

14 ⊜ 8

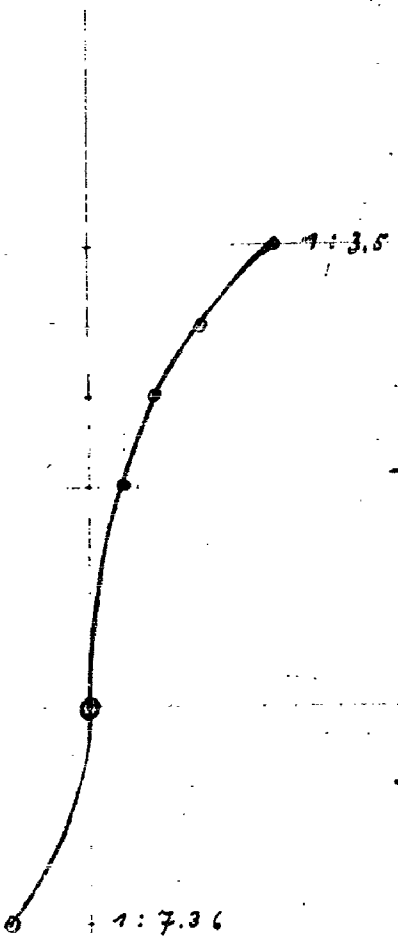

+ 0.11
+ 2.0
– auf Rübe.
Bäume
mit Schwalben
Virtuelle Symm. L.
A 2 35/114
+ 7.6
1469m


nach Fläche 6
auf Röhre
nach Symm.-Linie
-0.5
+0.5





Bona 4-12.7
4Z 37/23-27



Kanna 23°3

IV oben	+ 0.42
III oben	+ 0,25
II oben	+ 0,15
I oben	+ 0.09
I unten	− 0.18

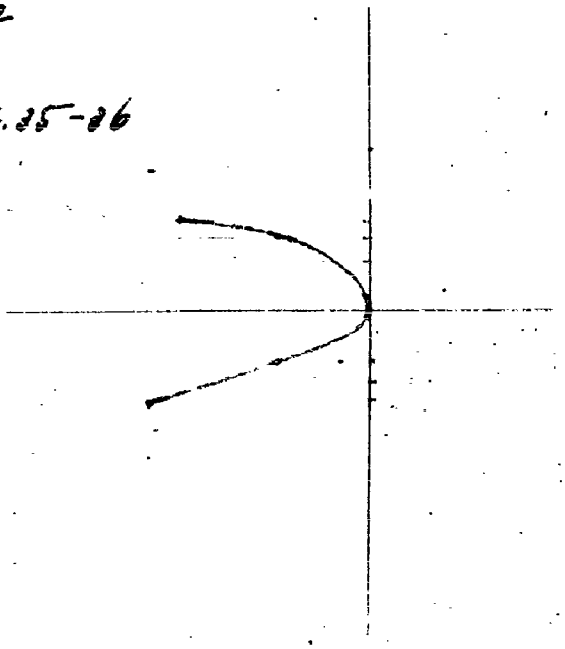
1470 a

Roma 1:18.6

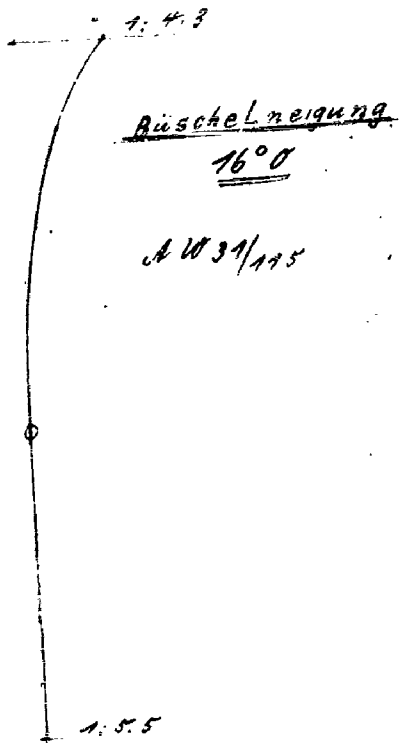
Δ 22.2

AW 45/92

AZ 37/13 ss. 25-26



14 T 3

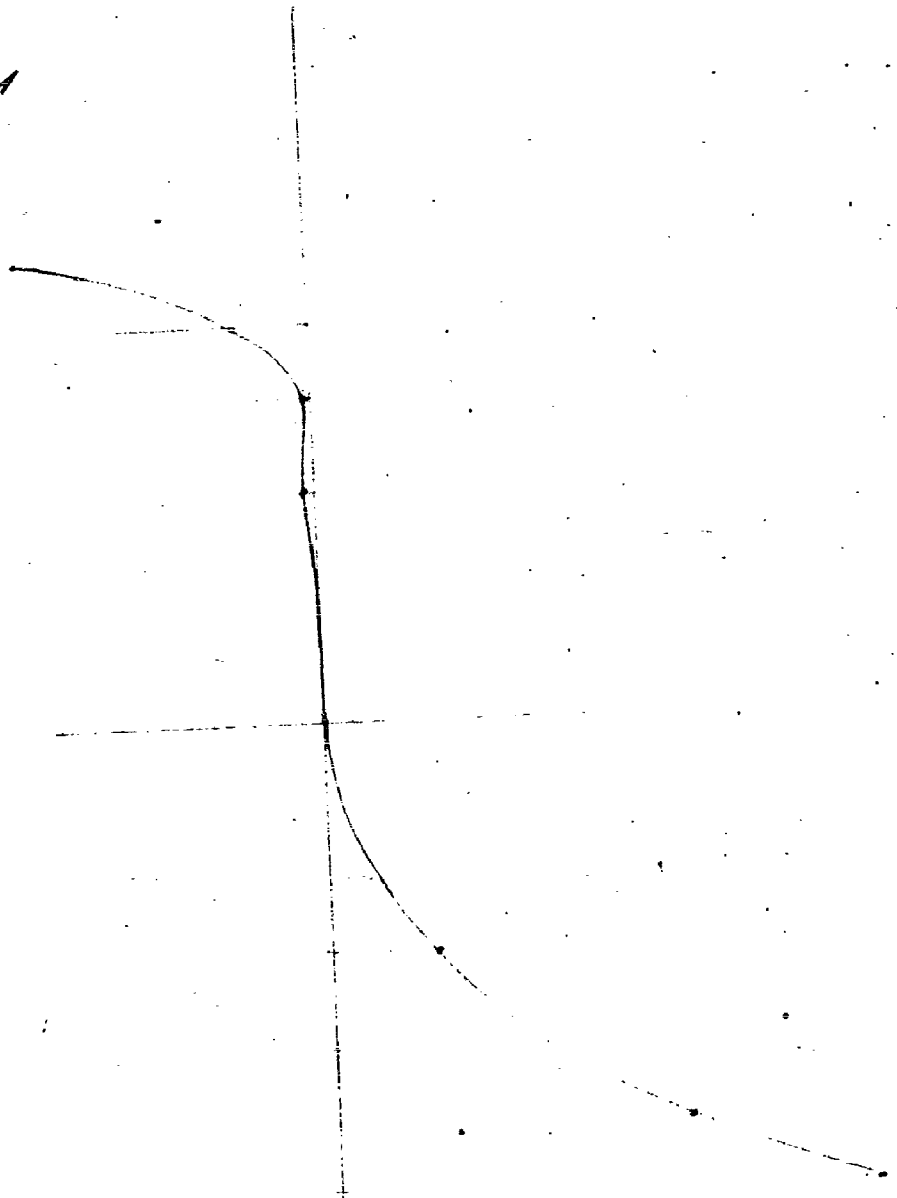


Büschelneigung
16°

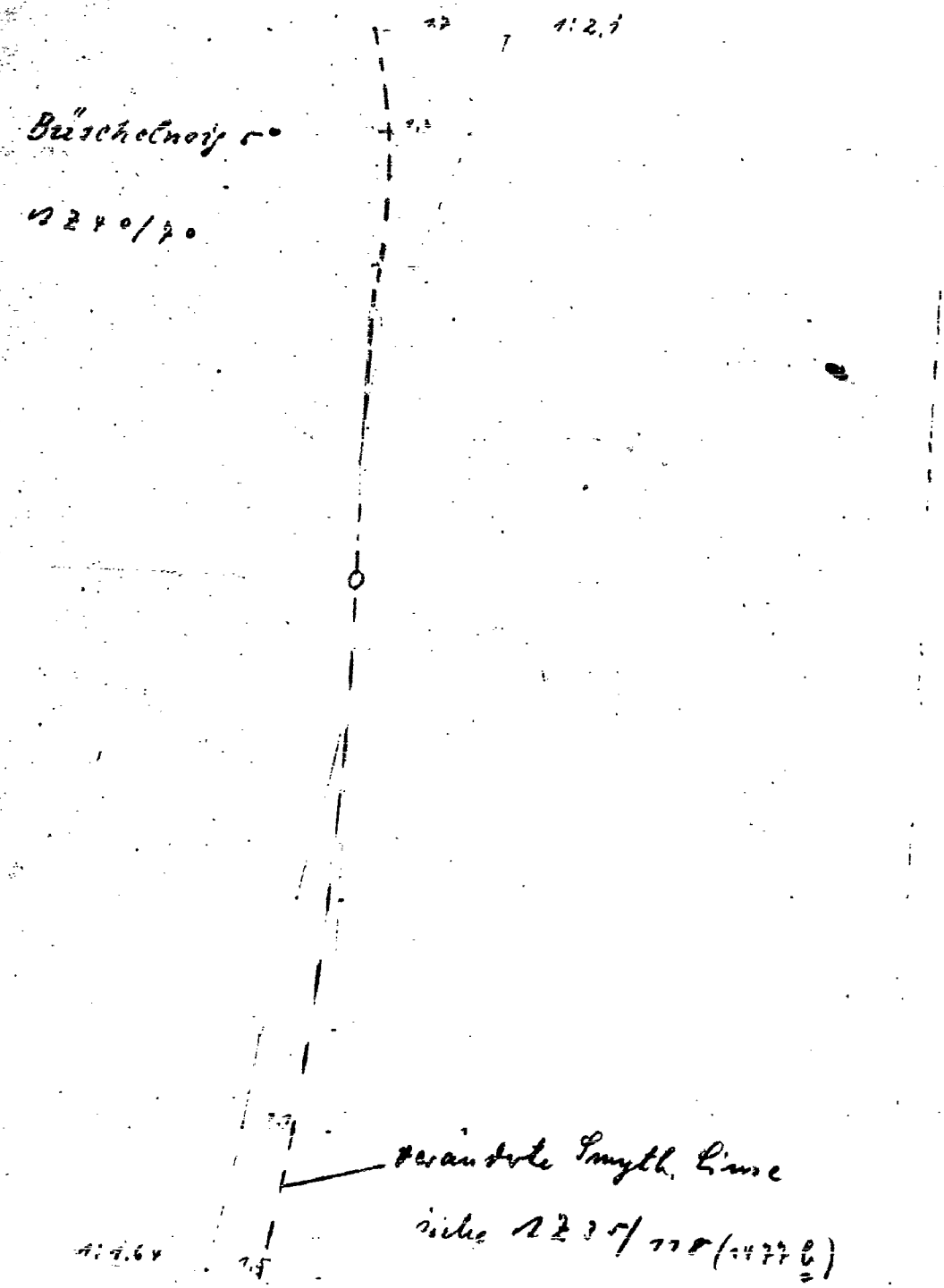
AW 31/115

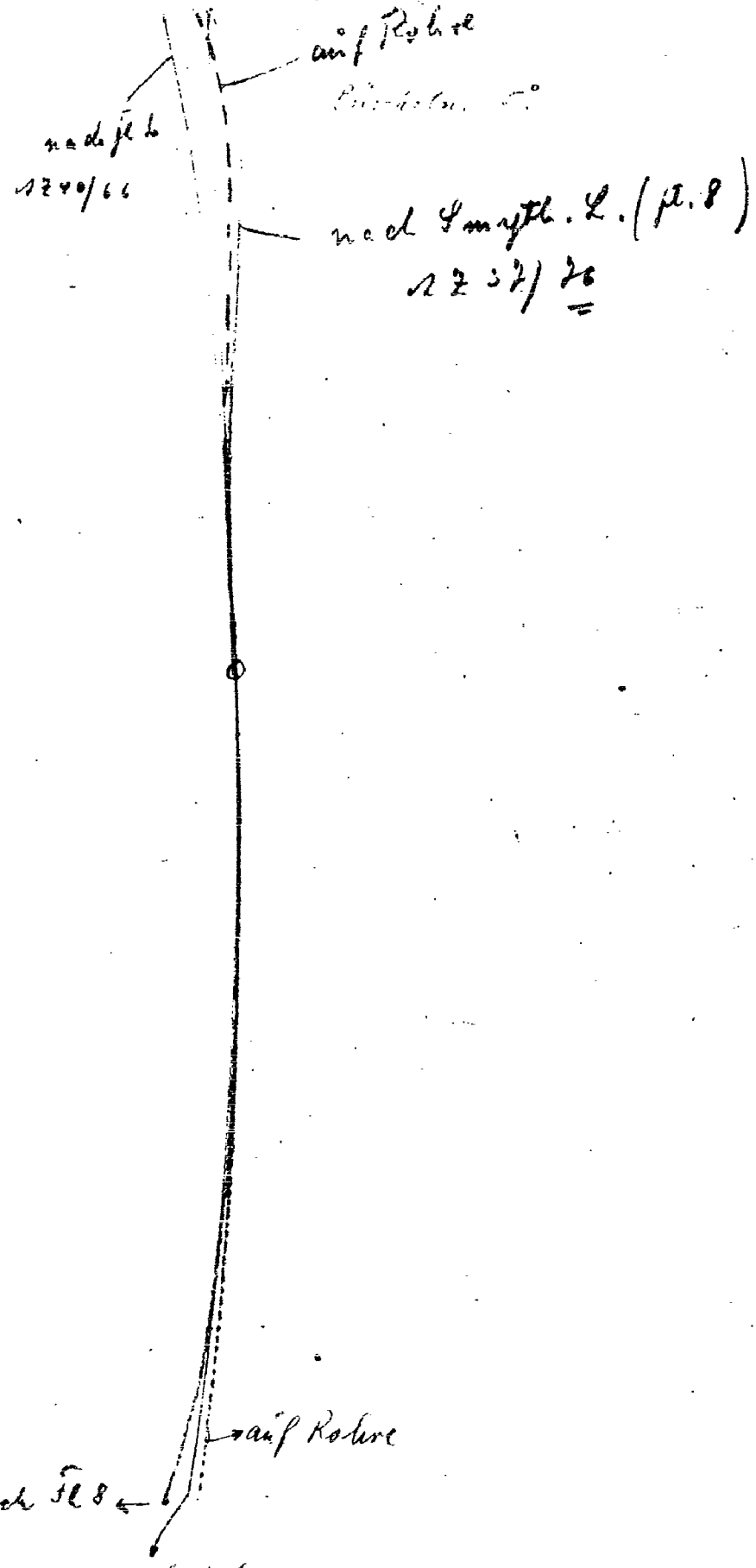
1474

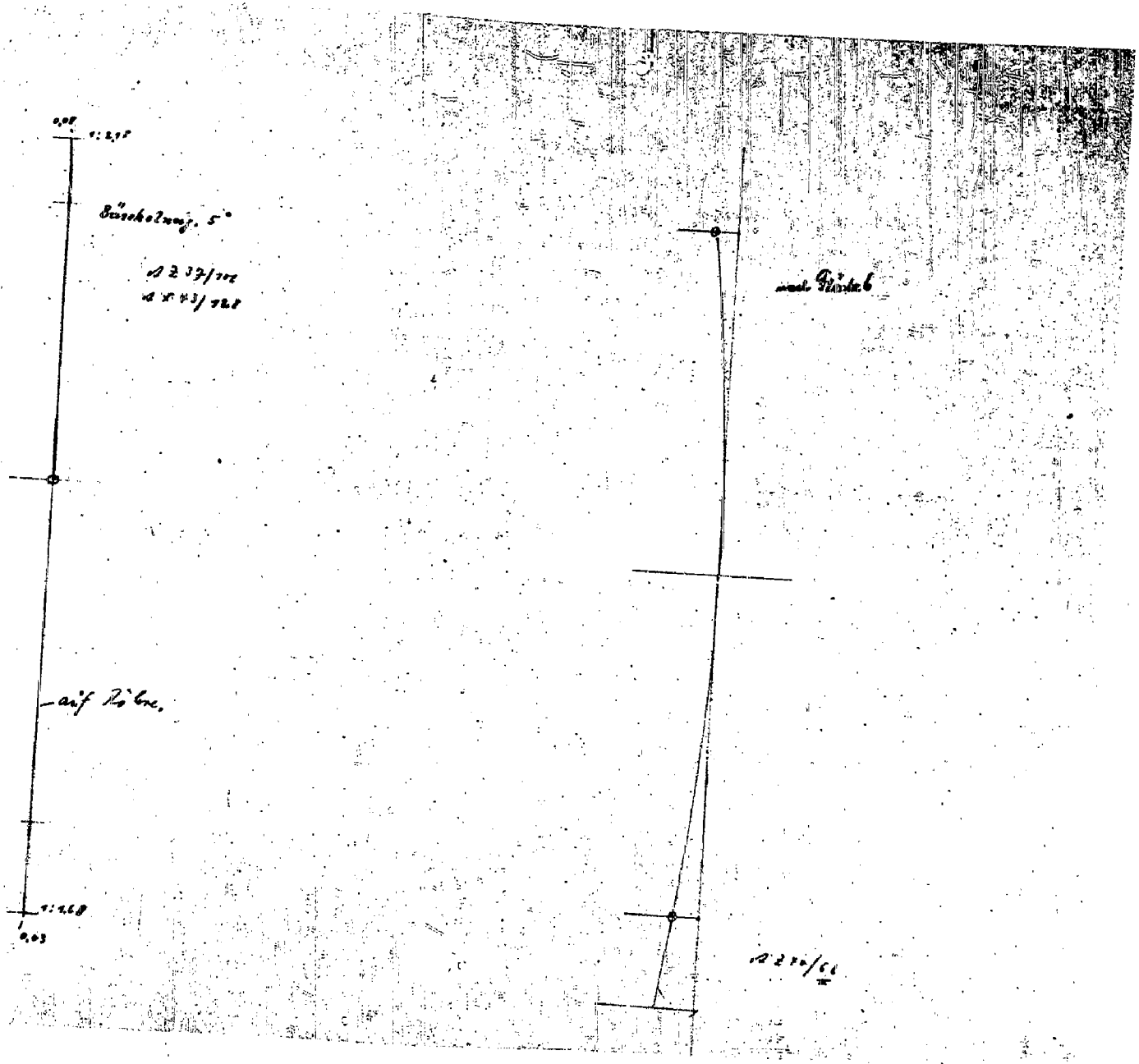
Ротор 1 : 8.4
Δ 17°6
M 40/16-21

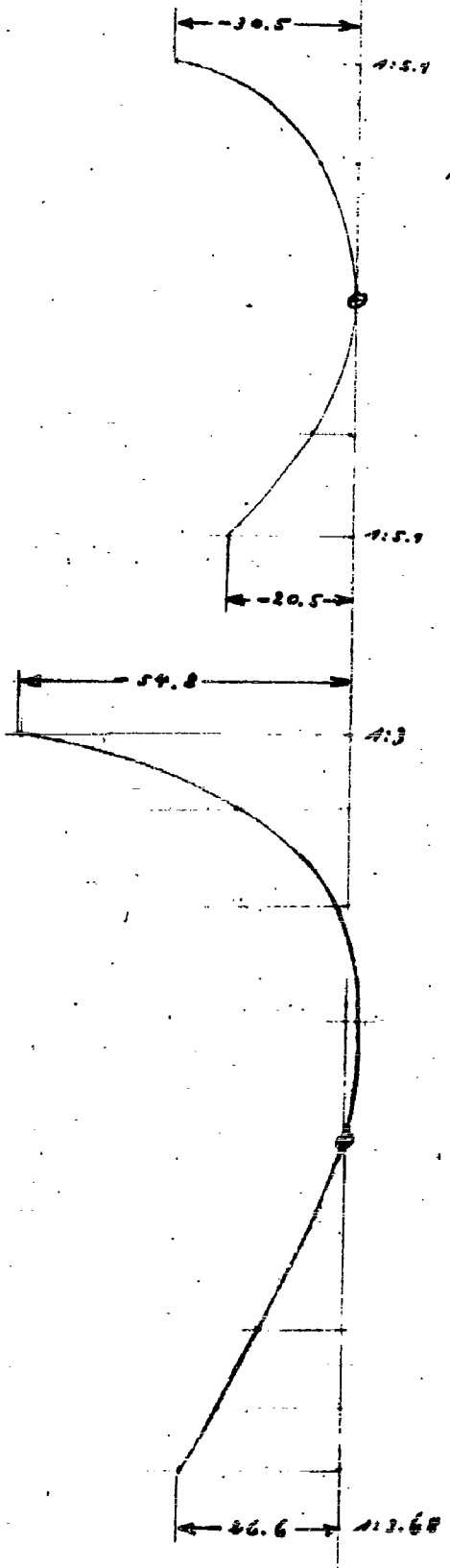


1474


Brüchotnoj r.
1:2,1
1:4,6
1,5
veränderte Smyth. Linie
siehe A 235/778 (A 778 e)

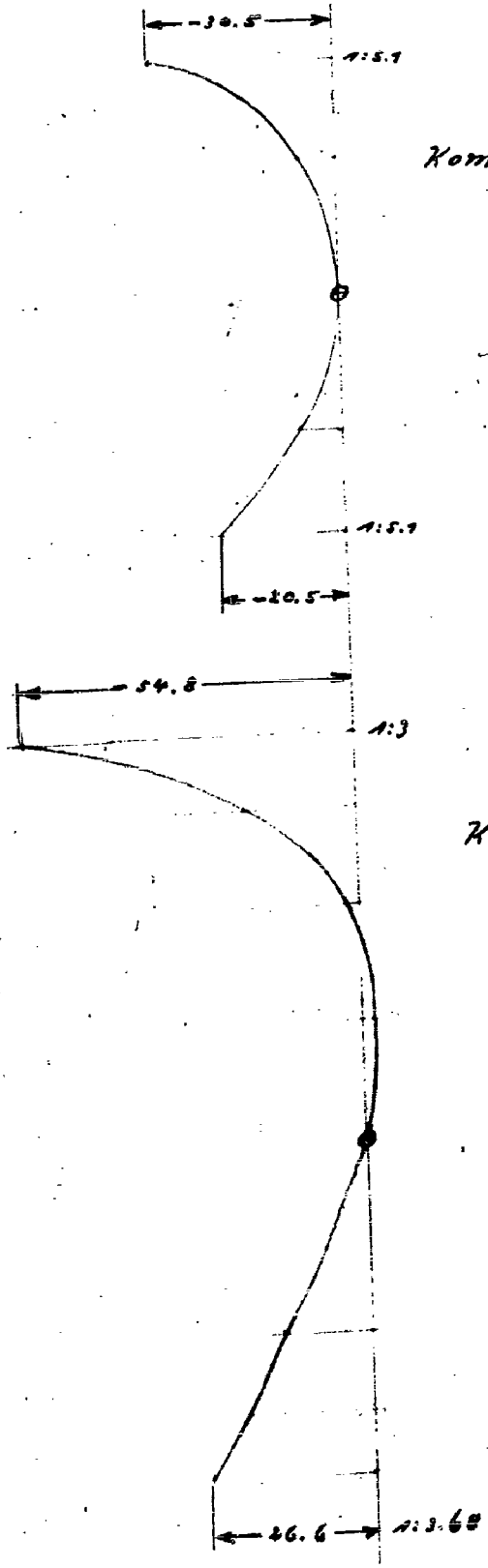

auf Rohre
nach Fl 6
1240/66
nach Symptk. L. (Pl. 8)
NZ 2/26
auf Rohre
nach Fl 8
nach Pl 6


Bäsenholzmaß. 5°
auf Räder.
auf Räder.



Koma: Büschelneigung: 19.3748
Büschelöffnung: 1:5.1
QK 32/116-118

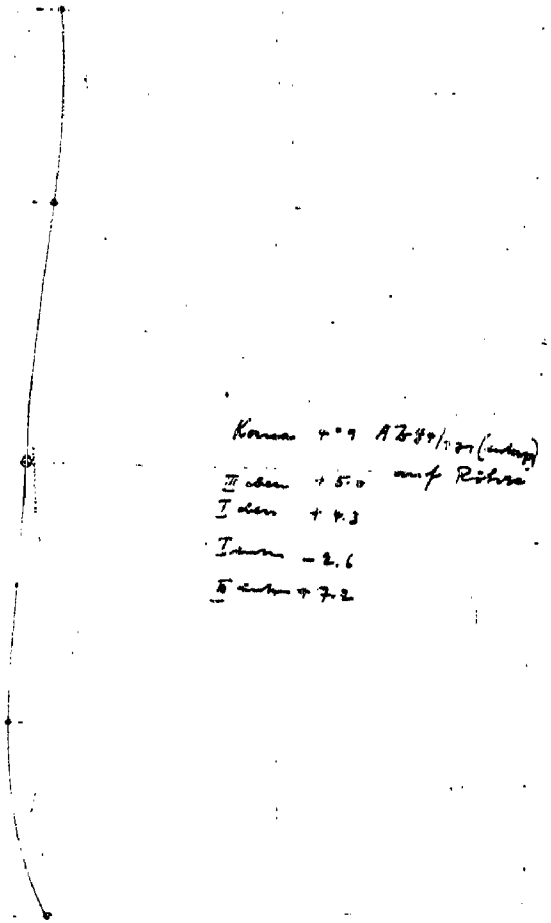
Koma: Büschelneigung: 15.0752
QK 39/124-128



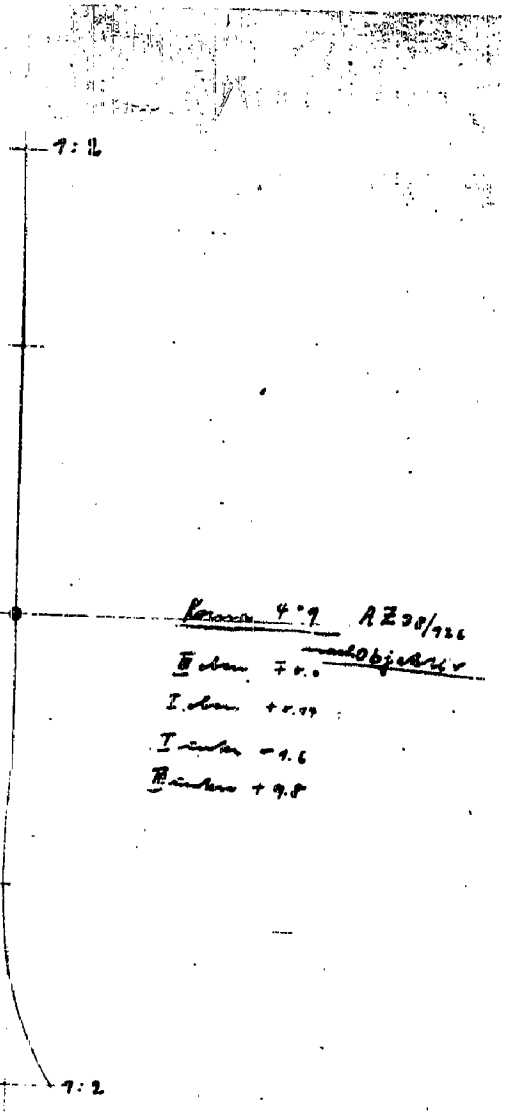
Koma: Büschelneigung: 19.3148°
Büschelöffnung: 1:5.1
Ax 32/116-118

Koma: Büschelneigung: 15.0742°
Ax 39/124-128

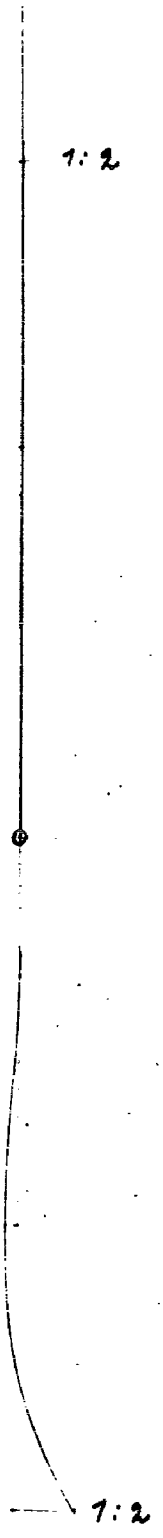
85.95



Kanne 4°9 AZ 38/1126 (Lehmpf)
III oben + 5.0 auf Rippe
I oben + 4.3
I unten − 2.6
III unten + 7.2



Kanne 4°9 AZ 38/1126 Lehmobjekt
III oben + 6.0
I oben + 4.99
I unten − 1.6
III unten + 9.8



Kowa 4·9 (A 238/178)

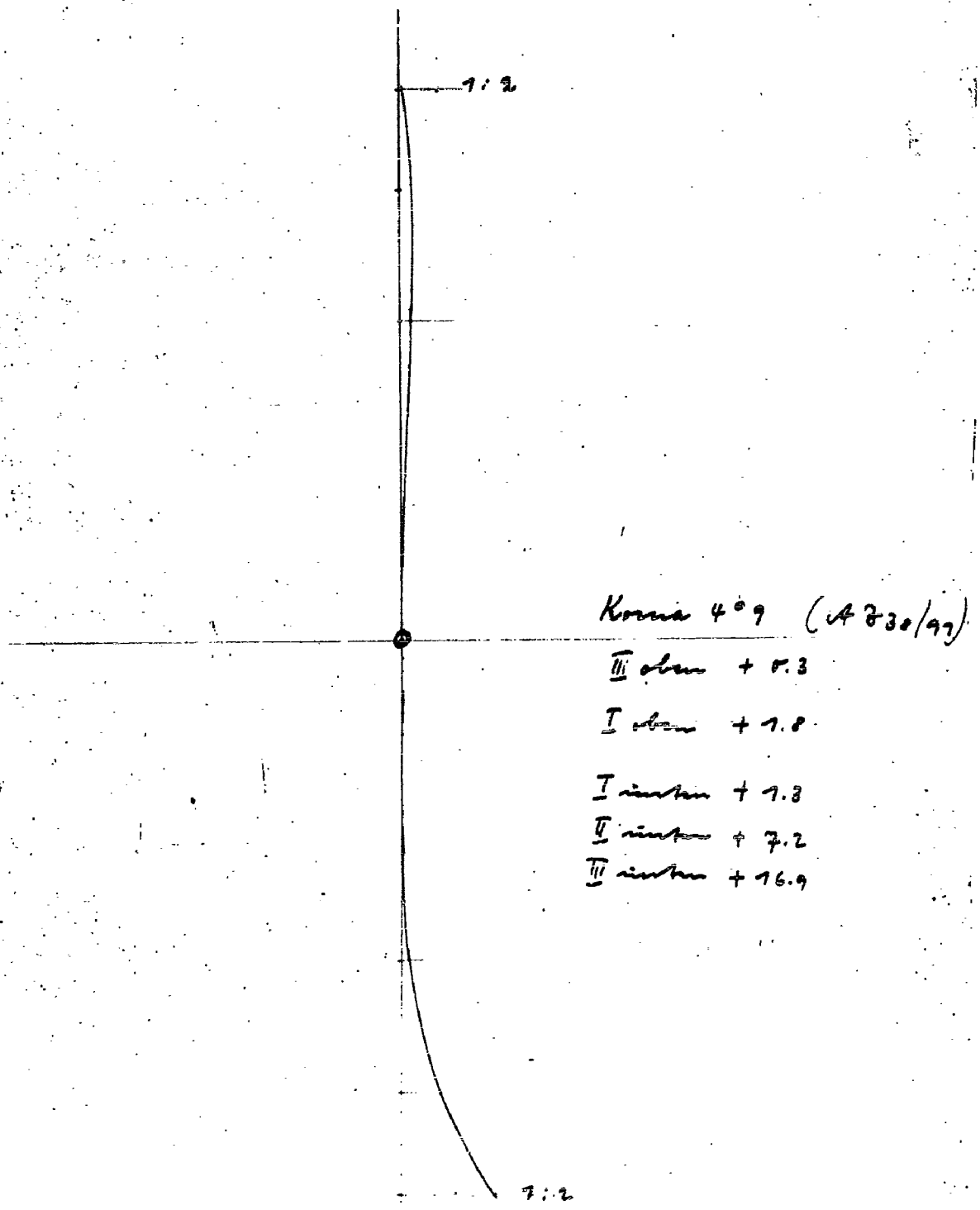
III oben I ± 0.0 Objektiv

I oben + 0.2

I unten − 9.9

III unten + 9.2

Kamin 4°7 (BA 3/4-5)
auf Decke
III oben + 3.5
I oben + 3.7
I unten - 2.6
III unten - 4.4
Kamin 4°7 (BA 3/4-2
(Objektbau)
III oben - 2.7
I oben + 0.4
I unten + 1.4
III unten + 3.2
+ 1:2.4
+ 1:2.0



Konus 4°9 (AZ 30/97)

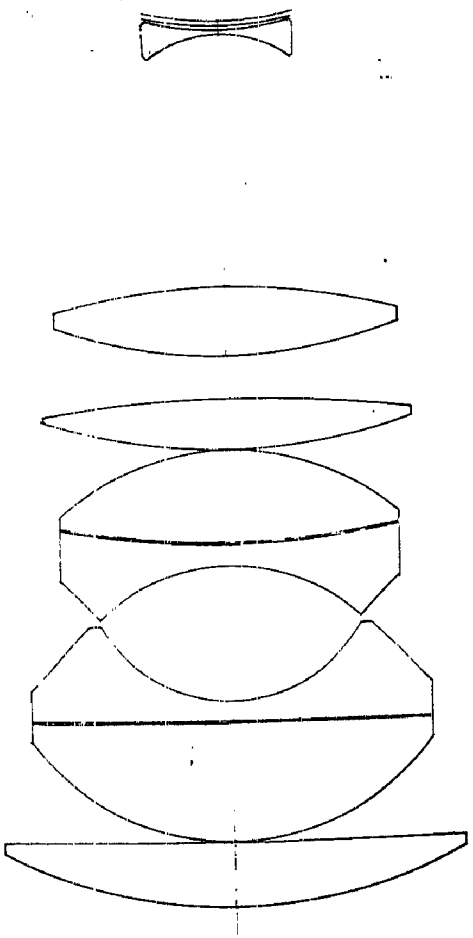
III oben + 0.3

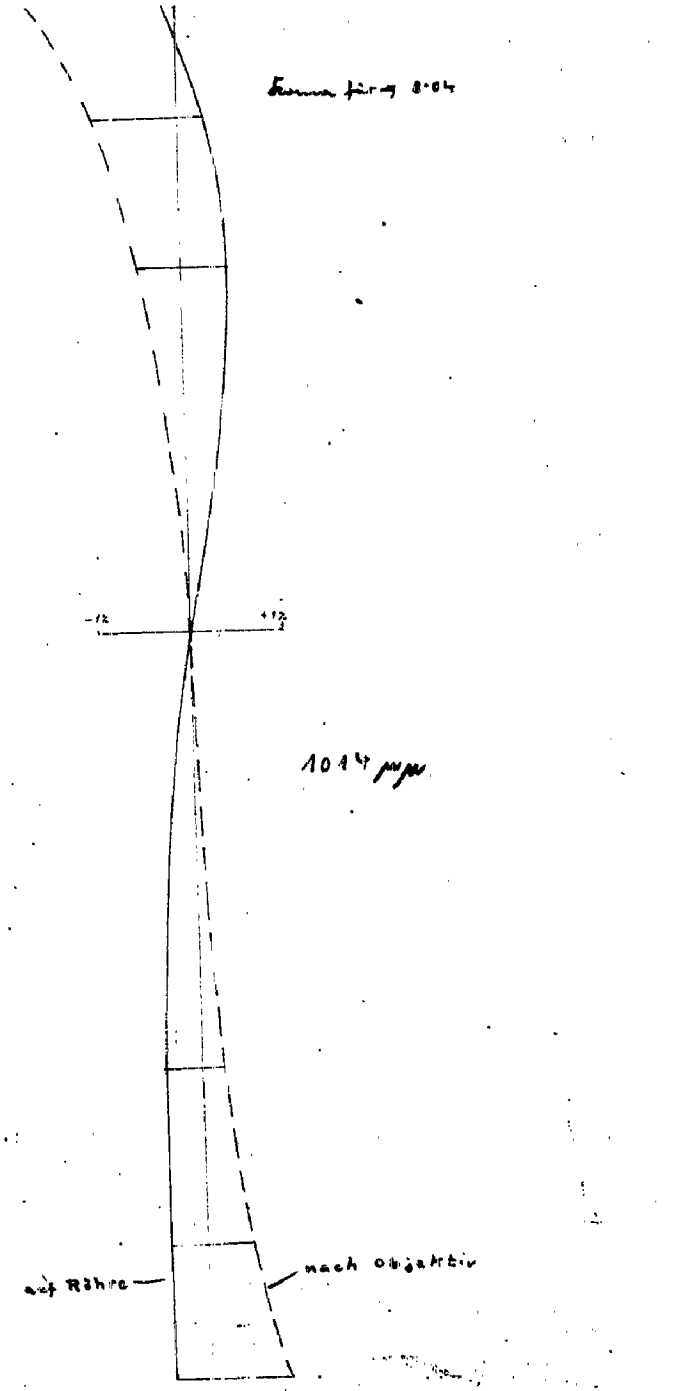
I oben + 1.8

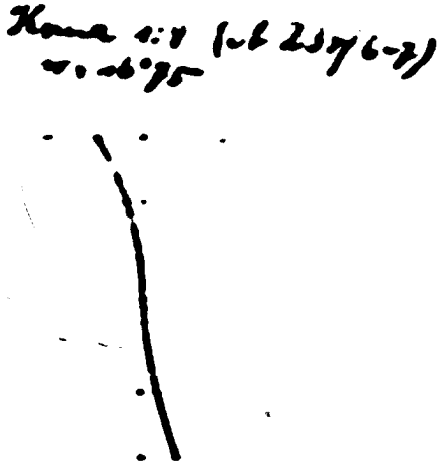
I innen + 1.8

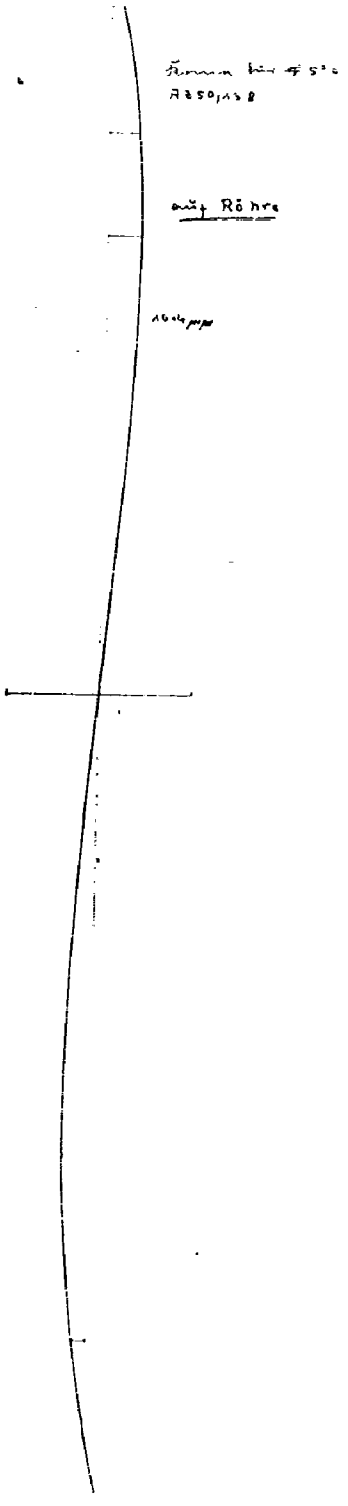
II innen + 7.2

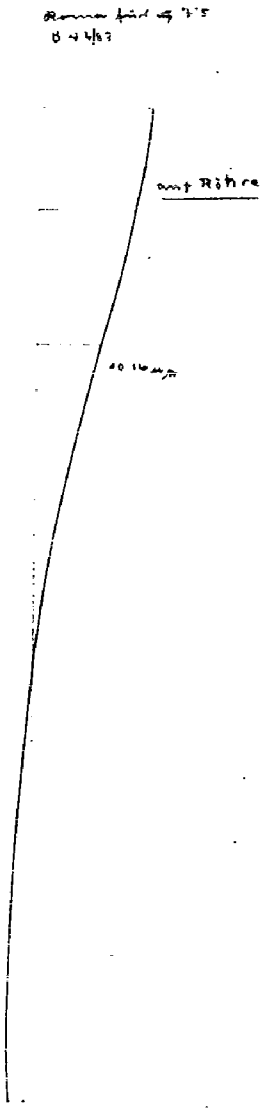
III innen + 16.9




Linse fürg 8.04
-1%
+1%
1014 µm
auf Röhre
nach objektiv



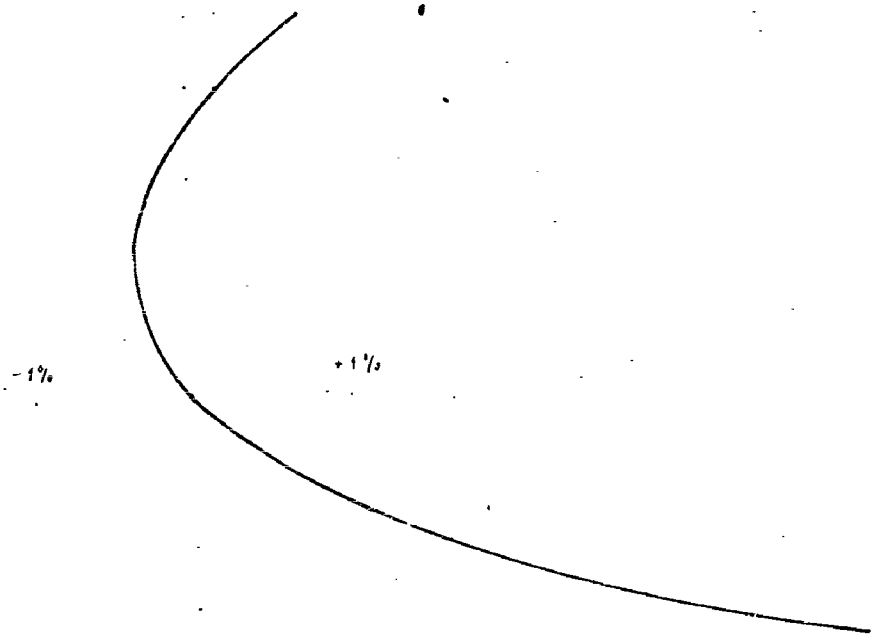

mit Röhre


mit Röhre

Steigung 1:5.02

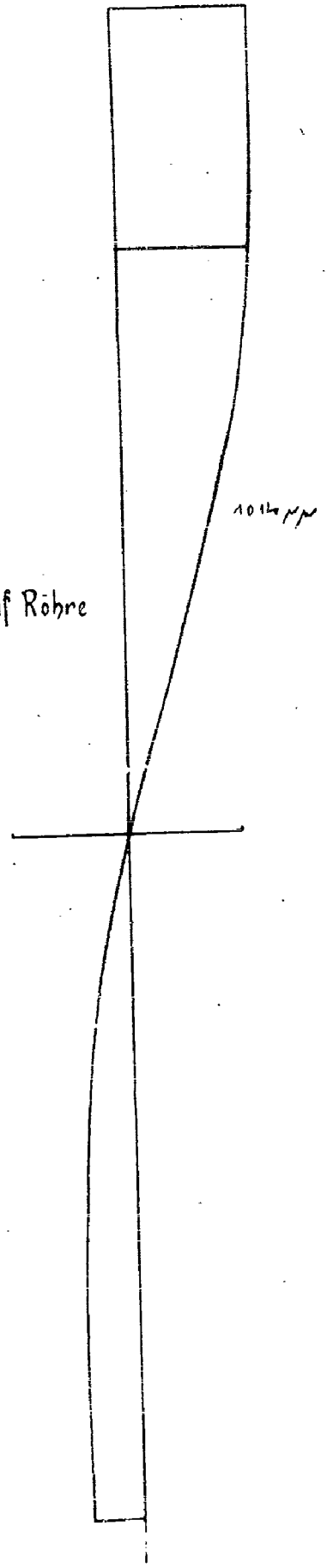
W = 18°19 53.4

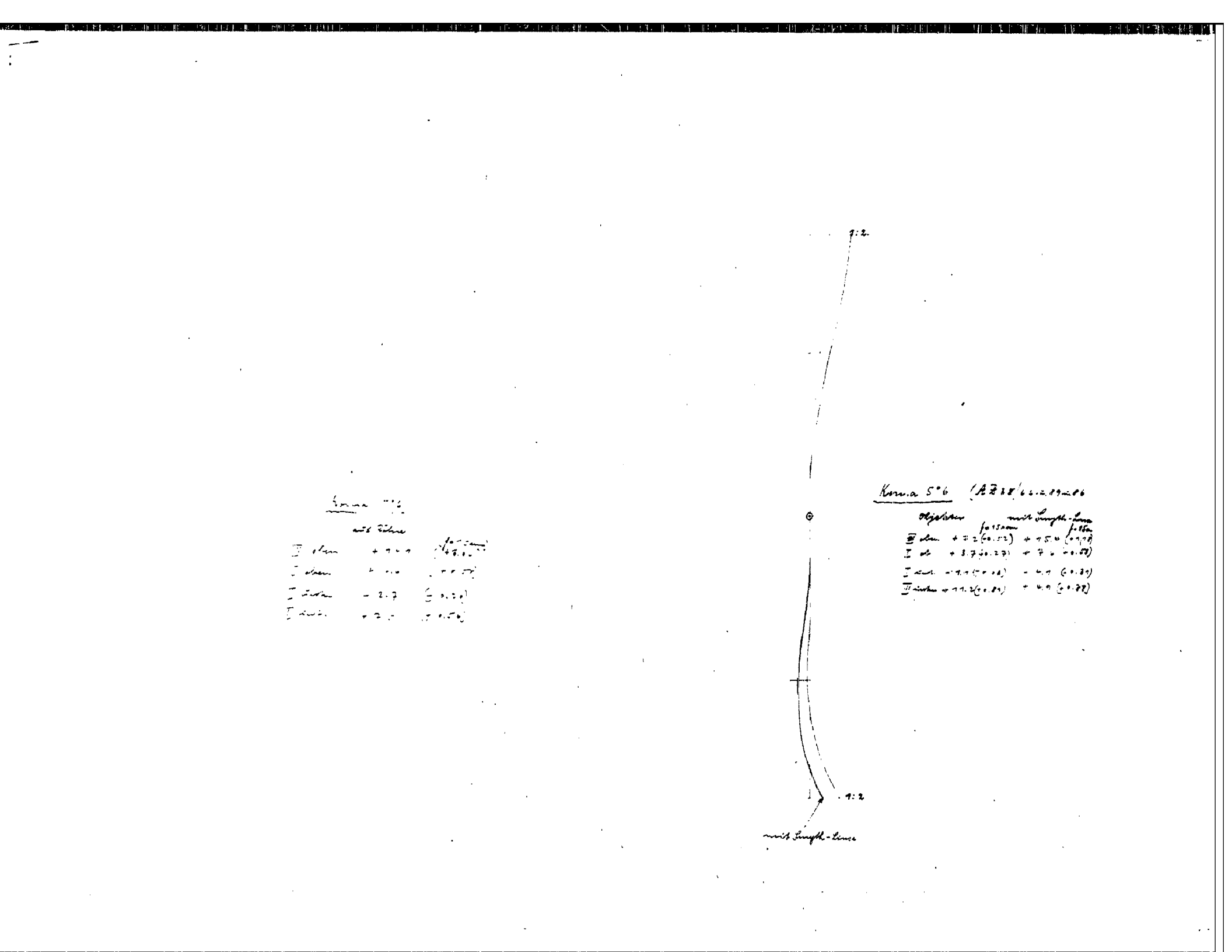
Kurve: A X 10/118

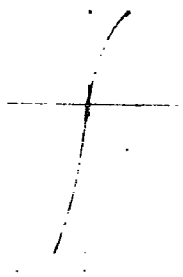


Roma 4 10°.8203

AZ 40/128




9:2
9:2
mit Lenght-Lens

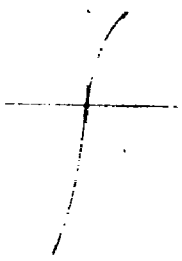


Kona $\lambda = 9°32'3$

$\varphi = 13.6$

Mappe

gerech. G + L

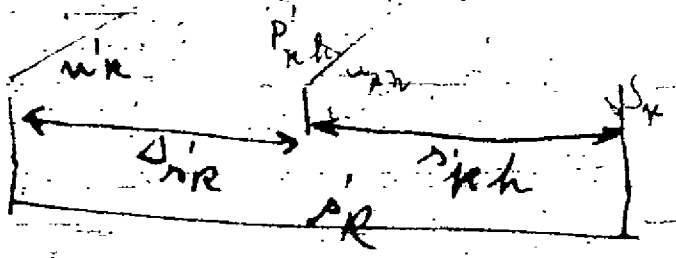


Кома [illegible]

Обр 13.6

Марк

дюйм. 6 и 2 ,7



MERIDIONAL COMA

Meridional coma have not been included in the demonstrations shown on Zeiss' cards.

They have been calculated for all the objectives listed and have been demonstrated on special cards for a minor portion of the objectives listed hereafter. These special cards refer to Zeiss' numbers as indicated on the right side of the compilation.

The principle of demonstration is not uniform. As far as the curves for meridional comas pass through the origin of coordinates, their calculation is based on the formula

$$e = \Delta s'_k \frac{\sin u'_k}{\sin \Delta u'} - (t'_k - a'_k). \quad \text{See diagram}$$

Where

e = the meridional coma

$\Delta S'_k$ = Distance on optical axis between point of intersection of coma-ray and p.o.i. of the pertinent principal ray.

u'_k = Angle of inclination of coma ray to the axis

$\Delta u'$ = Angle formed by coma ray and principal ray

t'_k = length of intersection of the tangential (meridional) point image — OVER

a'_k = Distance from point of intersection of coma ray and axis, to point of intersection of coma ray and the last refracting surface.

t'_t = Tangential (meridional) point image to the rear of the last refracting surface.

Curves of meridional comae are drawn on an orthogonal system of coordinates, drawing the incidence heights of the object-pencils of rays in the entrance pupil as ordinates and the comae = e as abscissae. The latter ones at a scale of 5:1 to the ordinates.

Explanation of terms used on cards

Double Objective:

This term refers to objectives, which have a stop between any of the component lenses, opposed to Single Objectives, in which a stop would be placed either in front of the first lens (front stop), or in back of the last lens (rear stop).

Spherical corrections:

Spherical aberrations and aberrations from the sine condition are indicated on the right side of the cards by the a-curves; spherical aberrations in solid curves, and aberrations from the sine condition in interrupted curves. On the left side of the cards these aberrations are indicated in figures under the headings $\Delta s'$ and $\Delta f'$.

Incidence heights:

In most cases three incidence heights are indicated. The greatest incidence height (that of the marginal ray) is $h_{III} = \frac{f}{2k}$, where f means the paraxial focal length = 100 mm, and $\frac{1}{k}$ the maximum possible aperture ratio. $h_{II} = \sqrt{\frac{2}{3}} \cdot h_{III}$ and $h_I = \sqrt{\frac{1}{3}} \cdot h_{III}$. Values shown in the co-ordinate systems on the right side of the card indicate the exact figures, whereas figures, given for h_{III}, h_{II}, and h_I under the heading "Incidence height" on the left side of the card are very often multiplied with a factor for greater distinctness and for the sake of convenience.

Chromatism:

Figures given under this heading refer to the chromatic correction, as f.i. in the expression: $\log s'_g - \log s'_d$, i.e. the logarithm of the ratio of the paraxial intersection lengths for g' and d; and the expression: $\log f_g - \log f_d$, i.e. the logarithm of the ratio of paraxial focal lengths for g' and d.

The first mentioned expression is a measure for the correction of chromatic longitudinal aberration, the latter expression is a measure for the correction

of the chromatic magnification difference. Both these chromatic errors are given for the spectral rays.

Wherever other figures are given, as in the case of corrections made for other colors or for more colors, there will, as a rule, be a special reference on the card, calling attention thereto.

Astigmatism: (With subdivisions sagittal (equatorial) pencils and tangential (meridional) pencils)

Under this heading the sagittal (equatorial) and tangential (meridional) image curvatures are indicated. They are demonstrated on the right side of the card by the b-curves, sagittal curvatures in solid curves, and tangential curvatures in interrupted curves.

Front angles:

On the right side of the cards the front angles are expressed on the ordinate axis at a suitable scale. On the abscissa axis the sagittal and tangential image curvatures are demonstrated. On the left side of the card the values for the front angles are expressed in mm. The number of degrees of the angles is multiplied by 2.4, figures for image curvatures are multiplied by 4 for the sake of convenience.

Distortion:

Distortions are indicated by the c-curves as a percentage of ($f \cdot \tan w$), where f means the focal length and w the front angle. The angles are drawn as abscissas, the distortions as ordinates. Front angles are generally the same as those used for the b-curves. If not specially indicated otherwise, the distortion curves are calculated for the scale $n = \infty$. If calculated and drawn at an other scale, the scale used, will be indicated on the card.

Radii " r ", Thicknesses " d " and Air spaces " l ":

These data are given for a focal length of 100 mm. Note that the air space is termed " b " whenever a stop is placed within the air space of an objective. In such case the air space is subdivided into b_1 and b_2, indicating the distance between the vertex of one lens and the stop as b_1, and the distance between the stop and the

vertex of the following lens as b_2, the total of b_1 plus b_2 gives b.

On the right side of the cards there are furthermore, apart from the 6 co-ordinate systems, a demonstration of the meridian section of the system of lenses and a table, indicating optical data of the materials used for the lenses. These data show the mean refraction indices n_d and the Abbe-numbers ν. In most cases this table also shows the figure for partial dispersion $n_f - n_d$. In the great majority of cases, however, the data n_d and ν are sufficient to establish the optical properties of the glass beyond any doubt. A great number of cards also indicate reflection losses, caused by the individual lenses of the objective.

Preface

The card index, listing image defects of photographic lenses and objectives, was initiated in the Photographic Calculation Department of the Zeiss Works at the turn of the century and maintained up to the end of World War II in 1945.

The method of compilation is based on a book by M. v Rohr. "Theorie und Geschichte des Photographischen Objektivs". published by Julius Springer Verlag, Berlin about 1898.

The card index represents a good general view of the progress of optical photographic development in all countries, using foreign and domestic patent literature as a principal source of information. The main value of the index, however, is its use as a tool for mathematical calculation of all types of lenses and objectives.

In the following condensed form of the index the original chronological sequence of the Zeiss Works has been abandonned, substituting a consecutive enumeration, and grouping the various types of objectives individually, such as Objectives based on the Cooke Lens, Double Objectives, composed of various types of lenses, etc. A short introduction is written for each separate group. The list states manufacturer, designation or type of objective, aperture ratio, focal length, half angle of coverage, and wherever expedient, remarks referring to optical qualities etc. and a reference to the original number of the Zeiss Card Index for further information. The term "Half Angle of Coverage" is generally to be understood for a fully opened stop, and with a ± tolerance of 5. Objectives designated as "V" (as f.i. V1935 No. 8) are test objectives, calculated and manufactured at the Zeiss works, the V standing for Test, the following number for the year etc. i.e. V 1935 No. 8 = The eighth test made during the year of 1935. The names of Zeiss personnel have principally not been mentioned on cards listing the data achieved in such tests.

y_k
Δs_k
ρ_k
s_k
α_k
s_{k+1}
α_k
s_k
ρ_{k+1}
Δy_{k+1}
z_{k+1}

Tessars consist of three groups of lenses, the two exterior ones being converging lenses, the interior lens, separated by an air space is dispersive lens. One of the converging lenses, preferably the rear one, consists of two lenses of opposite refraction power, the lenses are held together by means of a converging cemented surface.

Cons. No.	Name of Objective	Ap. Ratio	Focal length	Diff angle of coverage degrees	Remarks	Zeiss Numbers
1)	Original form of the Zeiss Tessar			25		19
2)	Tessar	1/2.7	8.2 cm	21		635
2a)	Tessar	1/2.7	8 cm	21		640
3)	V 1927 No. 10	1/2.7	16.5 cm	22		769
4)	V 1927 No. 8	1/2.7	10.5 cm	17.5	(Cemented surface in the first component	768
5)	Tessar	1/2.7	22.5 cm	17.5		764
6)	Tessar	1/2.7	7.5 cm	17.5	(Cemented surface is concave to Stop)	631
7)	Tessar	1/2.7	2 cm	15	(Cemented surface is in the first component)	797
8)	Tessar, Versuch No. 1-1924	1/2.7	73.6 mm	20	(The cemented surface is in first component)	630
9)	V 1931 No. 2	1/2.7	10 cm	18		909
10)	V 1930 No. 11	1/2.7	5 cm	18		869
11)	Tessar	1/2.5	10 cm	15	(The cemented surface is in the first component	1139
12)	V 1931 No. 4	1/2.8	5 cm	25		879
13)	V 1938 No. 8	1/2.8	5 cm	22		1217
14)	Tessar	1/2.8	5 cm	24		929
15)	Tessar	1/2.8	5 cm	25	(Rieg Kontax)	920
16)	V 1923 No. 5	1/2.8	7.5 cm	20	(Cemented surface is concave to stop)	611
17)	V 1931 No. 26	1/2.8	5 cm	24		915
18)	E. Leitz, Wetzlar	1/3.4	100 mm	24	with deformed back surface	562
19)	Tessar	1/3.5	300 mm	18	Mit deformierter Hinterflaeche	383
20)	Jos. Schneider, Kreuznach	1/3.5	10 cm	20		1228
21)	Josl Schneider & Co, Kreuznach P.A. Sch 83426	1/3.5	10 cm	25	(Cemented surface is in the first component	867
22)	Tessar	1/3.5	15 cm	28	(For great angle of image)	706
23)	O.A.S. Vs No. 9	1/3.5	8 cm	25	O.A.S. is an abbreviation for Optische Anstalt	1176
24)	O.A.S. ~~No. 8~~ Vs No. 8	1/3.5	8 cm	22	a subsidiary of the Zeiss Co, manufacturing	1175
25)	V 1930 No. 12	1/3.5	5 cm	18	primarily a slightly inferior grade of lenses	873
26)	V 1930 No. 13	1/3.5	5 cm			874
27)	V 1934 No. 15	1/3.5	5 cm	25		1056
28)	Tessar	1/3.5	5 cm	27		1030
29)	Tessar	1/3.5	5 cm	24		1137
30)	Tessar	1/3.5	50 mm	18	~~Zeitschr. f. Instr.Kde~~, 1907)	236
31)	Tessar	1/3.5	300 mm	17.5		215
32)	Tessar	1/3.5	300 mm	17.5		107
33)	Tessar	1/3.5	100 mm	18	(For motion picture photography)	596
34)	Voigtlaender AG Anastigmat	1/3.5	10 cm	20	(Cemented surface is in the first component)	880
35)	Jos. Schneider	1/3.5	100 mm	26		992
36)	V 1938 No. 3	1/3.5	5 cm	22.5	(For small angle ~~of image~~)	1201
37)	Tessar	1/3.6	174.6 mm			93
38)	Tronnier	1/3.6	100 mm	25	~~U. S. Patent~~ 1,924,527 of 8/29/33	1040
39)	Tronnier	1/3.8	100 mm	23	~~Patent~~ ditto 1,924,527 of 8/29/33	1039
40)	Aldis	1/4	100 mm	10	~~British~~ Patent 13,119-1914	625
41)	Bausch & Lomb Projection Objective	1/4	391.4 mm	21		337
42)	~~Deformed~~ Objective	1/2	46.2 mm	20		957
43)	Leitz-Wetzlar	1/3.5	5 cm	20		855
44)	V 1930 No. 10	1/2.7	5 cm	20		868
45)	Jos. Schneider	1/4.35	100 mm	20		995
46)	Dr. Fruem and Ten. G.m.b.H. Braunschweig	1/4.5	100 mm			618
47)	Tessar	1/4.5	15 cm	27		216
48)	S-Tessar	1/4.5	25 cm	22	(For scale ca3	1229
49)	Jos. Schneider	1/4.5	100 mm	27		996
50)	Tessar	1/4.5	145 mm	27		97
51)	V 1935 No. 17	1/4.5	3.5 cm	28	(The fourth lense is made of a new glass with a high refraction index	1100
52)	Tronnier, Kreuznach	1/4.5	10 cm	29	~~U.S. Patent~~ 1,924,527 8/29/33	1029
52a)	W. F. Bielicke	1/4.5	12.8 cm	27		746

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TESSAR LENSES

The Tessar type of lens consists of three lens units, the two exterior being converging lenses, and the interior lense, separated by an air space, a dispersing lense. One of the converging units, preferably the rear one, consists of two lenses of opposite refraction power, ~~the lenses being~~ which are held together by means of a ~~converging~~ cemented surface.

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Number
53)	Tessar	1/4.5	50	cm	20	(In Triplicate)	1127
54)	Tessar	1/4.5	153.20	mm	25		560
55)	Tronnier	1/4.5	100	mm	27	~~American Patent 1,924,527 No. 3~~	1034
56)	Tessar	1/4.5	50	cm	25	(Scale n = ∞ Aerial Photography)	446
57)	~~Special Tessar~~ S-Tessar	1/4.5	25	cm	22.5	(For scale ~~and~~ $\frac{}{n}$ = 3 ~~of~~ 9/2/38	1250
58)	Tessar	1/4.5	150	mm	28		206
59)	V 1926 No. 1 and V 1926 No. 22	1/4.5	15	cm	25	Experimental objectives	700
60)	Tessar	1/4.5	15	cm		Original and Duplicate	209
61)	Tessar	1/4.5	50	cm	20	Calculation of 10/8/1937	1180
62)	Anti-Comar	1/4.5	15	cm	28	Made by Plaubel & Co, Frankfurt Main ~~1/18/21~~	547
63)	Tessar	1/4.5	21	cm	27	With compensation plate ~~9/28/20~~	545
64)	Tessar	1/4.5	15	cm	27		412
65)	Tessar	1/4.5	163.3	mm	28		411
66)	Tessar	1/4.5	25	cm	25		413
67)	V 1930 No. 2	1/4.5	~~15~~ 13.5	cm	22	(First and last lenses are constructed of Crown Glass of a high refraction index)	839
68)	V 1930 No. 3	1/4.5	13.5	cm	27	(First and last lense are constructed of Crown Glass of high refraction index)	843
69)	V 1930 No. 4 ~~Experimental lens~~	1/4.5	13.5	cm	27	First and fourth lenses are constructed of Crown Glass of high refraction index	856
70)	V 1929 No. 13 ~~Ex. Lens~~	1/4.5	10.5	cm	30	Experimental Lens	833
71)	Tessar V 1930 No. 1	1/4.5	13.5	cm	26	First and fourth lenses are constructed of Crown Glass of high refraction index	837
72)	Tessar ~~(new experimental)~~	1/4.5	15	cm	27	New experimental	791
73)	Goerz Anastigmat	1/4.5	15	cm	27	Tests proved this objective to be inferior to the Zeiss Tessar	707
74)	Goerz Anastigmat	1/4.5	15	cm	27		709
75)	Kapella Limited	1/4.5	100	mm	23	~~British patent No. 209371~~	714
76)	Skopar, ~~(made by Voigtlaender)~~	1/4.5	13.5	cm	20	(The gemented surface located in the first lens)	752
77)	Voigtlaender	1/4.5	10	cm	15	(The gemented surface located in the first lens)	760
78)	V 1927 No. 11	1/4.5	14	cm	29	Experimental objective	772
79)	Tessar	1/4.5	15	cm	29		484
80)	Tessar	~~1/4.5~~ 1/4.7	148.3	mm	28		421
81)	Tessar	1/4.5	150	mm	29		90
82)	Aldis-Anastigmat	1/4.5	5.75	~~in cm~~	27	~~No. 16 40402~~	349
83)	Jos. Schneider	1/4.5	100	mm	28		993
84)	V 1931 No. 24	1/4.5	13.5	cm	22	~~(~~Experimental ~~lens)~~ objective	910
85)	Tessar ~~with small spherical zones~~	1/4.75	157.6	mm	28	With small spherical zones	470
86)	Ussar	1/4.7	145	mm	28		458
87)	I-R-Tessar	1/4.8	50	cm	15	(Corrected for A'	1142
88)	I-R-Tessar	1/4.8	50	cm	15	Corrected ~~Ditto~~ for A'	1141
89)	Tronnier	1/4.8	100	mm	17.5	~~U.S. American Patent 1,924,527 of 8/29/33 No. 2~~	1033
90)	Tessar	1/4.8	160	mm	24		452
91)	A-Tessar	1/5	50	cm	20		841
92)	Astro-Tessar	1/5	600	mm	10		68
93)	Tessar	1/5	50	cm	20	(Corrected for A' ~~Zeitschrift fuer Instrumentenkunde edition~~ 1907 p. 78)	850
94)	Tessar	1/4.7	145	mm	28		92
95)	Tessar	1/5	50	cm	20		447
96)	I-R-Tessar	1/5	50	cm	20	(Corrected for A'	1144
97)	Astro-Tessar	1/5	600	mm	10		318
98)	Tessar	1/5	50	cm	20		441
99)	Tessar	1/5	180	mm	20	(Last thickness not quite sufficient)	453
100)	V 1936 No. 4	1/5	14	cm	20	For reduction scale 1/4.5 - a-curve for d, C, & g',	1205
101)	V 1933 No. 2	1/5	100	cm	15	Calculated for A'	1008
102)	Tessar	1/5	80	cm	15		1017
103)	Tessar	1/5	50	cm	22		417
104)	A-Tessar	1/5	50	cm	20		883
105)	Tessar	1/5	545	mm	20		426
106)	Tessar	1/5	50	cm	25		462
107)	Tessar	1/5	38	cm	20		476
108)	A-Tessar	1/5	50	cm	20		1015

Nos.	Name of Objective	Ap. Ratio	Focal length	Half angle of coverage degree	Remarks	Zeiss Number
109)	Tessar	1/5	50 cm	20		434
110)	Tessar	1/5	50 cm	20		433
111)	Tessar	1/5	554 mm	20		435
112)	Tessar	1/5.1	512.7 mm	27	Based on 1/4.5, f=50 cm of 11 10/11	448
113)	Tessar	1/4.5	25 cm	22		416
114)	Jos. Schneider	1/5.4	1[illegible]0 mm	25		994
115)	Koehler Optical Co, New York	1/5.9	149.7 mm	17	Ja 7, 1921, p. 8	350
116)	Tessar	1/5.5	176 mm	29	The British Journal of Photography, edition 1.7.21 - p 8	419
117)	Tessar	1/5.6	135 mm	29	German Patent No. 142294, basic patent for the Tessar Objective	373
118)	Tessar	1/6.4	102.7 mm			154
119)	Zeiss B. & L. (Bausch and Lomb) Tessar	1/5.8	15 cm	28		208
120)	Tessar	1/6.1	147 mm	31		74
121)	B-Tessar (Amatar)	1/6.3	150 mm	23		71
122)	Tessar	1/6.3	25 cm	30		258
123)	Tessar	1/6.3	136 mm	30		111
124)	R. Steinheil			28	British Patent No. 17,624-07 French Patent No. 380,615 of 8/7/07	131
125)	Tessar	1/6.3	155 ~~165~~ mm	30	Front lens made of Baryte-Flint	94
126)	Tessar	1/6.3	155 mm	29	Front and back lenses made of Baryte-Flint	96
127)	Tessar	1/6.3	161.3 mm	29	Front and back lenses made of Baryte-Flint	95
128)	Tessar	1/6.3	155 mm	29	Front and back ditto lenses made of Bardium Glass	96a
129)	Tessar 1246	1/6.3	126.6 mm	28		61
~~129~~)	V 1931 No. 12	1/6.3	12 cm	15	Experimental objective	912
130)	Tessar	1/6.3	150 mm	30		191
131)	Amatar	1/6.3	150 mm	30		192
132)	Tessar	1/6.3	148 mm	29	Experiment, Construction drawing of 5/8/08	149
133)	Tessar	1/6.3	15 cm	29	Koma curves, Partialy calculated for the G'-line	207
134)	C. F. Lon-Davis (Dallmeyer)	1/6.3	66.5 mm	25	British Patent 27,518-1912 Second example	334
135)	Tessar	1/6.3	25 cm	25	Partialy calculated for the G'-line	212
136)	Tessar	1/6.3	15 cm	29	First and fourth lenses constructed of Baryte-Flint	405
137)	Tessar	1/6.3	21 cm	25		465
138)	B-Tessar	1/6.3	182 mm	26		176
139)	B-Tessar	1/6.3	150 mm	~~29~~ 25	Zeiss-Kodak Anastigmat made by Bausch & Lomb	177
140)	B-Tessar	1/6.3	150 mm	29		179
141)	Tessar	1/6.3	165.8 mm	29	Front and back lenses of Baryte-Flint	144
142)	Tessar	1/6.3	164.4 mm	25	Front and back lenses of Baryte-Flint	145
143)	Tessar	1/6.3	145 mm	30	Front and back lenses of Baryte-Crown	24
144)	Amatar	1/6.3	153 mm	29		178
145)	B-Tessar	1/6.3	150 mm	30		180
146)	Tessar	1/6.37	153 mm	30		190
147)	C. F. Lon-Davis (Dallmeyer)	1/6.8	61.1 mm	25	British Patent 27,518-1912, First example calculated 10/11/13	333
148)	Olor	1/6.8	200 mm	25	Made by Lacour-Berthiot, Paris	323
149)	Olor	1/6.8	200 mm	25	Cemented surface concave to stop, cemented and ditto convex to stop	351
150)	Tessar	1/6.8	127 mm	29		463
151)	Voigtlaender	1/6.8	100 mm	29		381
152)	Steoplagioless Tessar	1/6.8	21 cm	30	with compensation plate 11/10/27 for Stereoplanigraph	974
153)	Tessar	1/7.2	175 mm	29	For 3 F.P. Kodak 9x14 cm	203
154)	Tessar	1/7.2	173.4 mm	25	Experimental calculation	146
155)	Tessar	1/7.9	125.7 mm	30 40	Attempt to develop the Tessar objective as a wide-angle objective	153
156)	Steoplagioless Tessar	1/8	21 cm	28		875
157)	Tessar	1/8	2.8 cm	40	Wide-angle objective	980
158)	Tessar	1/9.1	150.8 mm	40	Trial calculation	152
159)	Tessar	1/9	32 cm	20		284
160)	Tessar	1/9.15	146.5 mm	40	Wide-angle objective	155

Cons. No.	Name of Objective	Ap. Ratio	Focal length	Half angle of Coverage degree	Remarks	Zeiss Numbers
161)	Tessar	1/9	140.2 mm	40	Trial calculation	147
162)	Tessar	1/9	139.9 mm	40	Ditto	148
163)	Tessar	1/9	142.2 mm	40	ditto	150
164)	Tessar	1/9.1	146.1 mm	40		156
165)	Tessar	1/9	231.7 mm	40	Original type	143
166)	Tessar	1/9	142.5 mm	40	Trial calculation Wide-angle objective	151 418
167)	Tessar	1/9	50 cm	25	Apochromatic objective	38
168)	Reproduction Tessar	1/10	640 mm	17	(Spherical	
169)	Reproduction Tessar	1/10	640 mm	17	Calculation also made for the G-line)	76
170)	Kapella Ltd.	1/10	0.932 cm	20	British Patent 209,391 (Data given in this patent specification indicate only f=0.932)	716 783
171)	Apo-Tessar	1/10	64 cm	21		1237
172)	Tessar	1/16	21.0 cm	17	For scale 1/3 (Experimental objective)	
173)	V 1935 No. 5	1/20	8.8 cm	17	For scale 1/3.59	1155
174)	V 1937 No. 20	1/20	14 cm	17	(Experimental objective) For scale 1/1.8	1218

COOKE LENSES

Objectives, consisting of three lenses, the two exterior ones being converging lenses, the interior third lens being separated from the two exterior ones by an airspace and being a dispersing lens, are designated as "Cooke Lenses."

These triplet lenses were first developed by Harold Dennis Taylor at the beginning of the 1890's. With these lenses correction of errors is possible to such an extent that even at the present time the modern forms of this type of objective are among the best anastigmats used in certain optical fields.

Construction of these objectives is remarkably simple, so that they can be produced easily without incurring considerable cost.

Such triplet lenses or triplets have been developed for utilization in a variety of cases pertaining to the field of photography, as for universal objectives, for motion picture photography and projection, for objectives of high light intensity, as lenses for portrait photography having a long focal length, and moreover as objectives for aerial photography and astro-photography, and occassionally also as reproduction objectives.

This type of objective is not suitable for wide-angle photography as may be seen from the compilation which follows, considering that the even at a small initial aperture of the stop, the usuable angle of image cannot be increased much above the standard angle of image of universal objectives.

Cons. No.	Name of Objective	Ap. Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers
175	V1933 No. 10	1/1.8	5 cm	20	(Experimental lense). (Fifth surface spherical) aspherical	1012 1072
176	V1933 No. 9	1/1.8	5 cm	19	ditto	1011 1077
177	V1932 No. 5	1/2	5 cm	19	ditto	937
178	V1933 No. 12	1/2.0	1 cm	16	ditto (thicknesses of the lenses made especially to afford manufacture in short focal lengths)	
179	V 1938 No. 12	1/2.0	2.5 cm	17		1018
180	V1937 No. 21	1/2.5	5 cm	20		1234
181	Kapella	1/2.5	1 cm	10	(Calculated for G' d, c)	1187
182	~~2,064,550~~ Kapella	1/2.5	10 cm	10	~~(American Patent 2,064,550)~~	1126
183	Bausch & Lomb	1/2.5	2.5 cm	18	~~(American Patent 1,934,561)~~	1228
184	Finder-Triplet	1/2.6	8 cm	17		1046
185	V1921 No. 3 Triplet	1/2.6	6.5 cm	25	Calculated for nF	1073
186	I. G. Farben	1/2.7	10 cm	10	(The first lense has a cemented surface, which is without effect in the d-line)	
187	Triotar	1/3	2.7 cm	20	(For substandard film). (Due to coma, only usable up to a total angle of 14°)	1045
188	Triplet	1/2.7	7.5 cm	20		633
189	Finder-Triplet	1/2.8	7.5 cm	15	(Rolleiflex finder) (Spherically over-corrected)	632
190	Finder-Triplet	1/2.8	7.5 cm			1211
191	Finder-Triplet	1/2.8	7.5 cm	14	Rolleiflex finder ~~Ultra~~ spherically over-corrected	1216
192	V1933 No. 11	1/2.8	7.5 cm	10		1172
193	Finder-Triplet	1/2.8	8 cm	15	(Finder objective)	1016
194	V 1931 No. 11 Finder-Triplet	1/2.8	6 cm	10		997
195	Finder-Triplet	1/2.8	6 cm	10	Refer to	942 ~~942~~
196	~~British Patent 155646/20~~, Taylor, Taylor and Hobson	1/3 ~~1/2.9~~	100 mm	12	~~(For the purpose of example No. 1 see~~ The British Journal of Photography of 24 Feb 1921, pp. 66/67	846
197	Taylor, Taylor & Hobson	~~1/2.9~~ 1/3	100 mm	15	~~British Patent 155646/20, example II~~ Refer to No. 2 see The British Journal of Photography of 24 Feb 1921 pp. 66/67	556
198	Modified Hypar	~~1/2.5~~ 1/3	35 mm	20		557
199	Triplet	1/3	7.5 cm	20		634
200	Finder-Triplet	1/3.1	5 cm	10		615
201	Bosch-Glaukar	1/3.1	130 mm	17	(Calculated for the g' and D-line)	1078
202	Steinheil	1/3.2	55 mm	15		296
203	Ernoskop	1/3.2	33.5 cm	20		586
204	Triplet	1/3.2	178 mm	20		742
205	Epi-Objective	1/3.3	25 cm	20	(For episcopic projection)	629
206	Micro-Projection Objective	1/3.3	5 cm	20		1071
207	Motion Picture Hypar	1/3	3.5 cm	20		872
208	I-Finder-Triplet	1/3.5	7.5 cm	15	C. P. Goerz, Berlin	601
209	Askania, of Bamberg-Friedenau	1/3.5	100 mm	15		1090
210	Steinheil	1/3.5	10 cm	17	Spherically, chromatically and astigmatically corrected objective	447
					Example No. 14 ~~British Patent~~ and Hobson	1120

No.	Name of Objective	Rel. Ratio	Focal Length		Half angle of coverage degrees	Remarks	Zeiss No.
211)	~~V 1933 No. 12~~	~~1/3.5~~	~~7.9~~	~~cm~~	22		626
212)	~~Finder Objective, V 1933 No. 11~~	~~1/3.5~~	~~7.5~~	~~cm~~	10		672
213)	Ernemann Co, Dresden	1/3.5	250	mm	17	~~Three lens~~ objective (with removable spheric yellow screen)	403 943
214)	V 1932 No. 1	1/3.5	2.5	cm	12		
215)	Triotar	1/3.5	166	mm	15	(The last surface aspherical)	3[illegible]
216)	Heliomar	1/3.5	100	mm	15	(Voigtlaender)	352
217)	Epiotar	1/3.5	43	cm	15	Made of "Rassglas" (toured glass) (for episcopic projection)	1115
218)	Triplet	1/3.5	10	cm	12	Steinheil Example No. 1	1024
219)	Triotar	1/3.5	21	cm	20	~~with modifications~~	652
220)	Projection Objective	~~1/3.5~~ 1/3.6	32	cm	10	made of plate glass for reasons of economy. Chromatic correction consequently impossible (see also No. 650)	651
221)	Projection Anastigmat	1/3.5	387	mm	25	(Calculated for g and D)	348
222)	Finder Triplet, 1923, No. 13	1/3.5	7.5	cm	10		614
223)	H. D. Taylor				10	~~Second example, Fig. 1~~ Double Objective for C ~~(German Patent 381,825)~~	138
224)	Triplet	1/3.5	10	cm	25		1032
225)	Balloptikon	1/3.5	333.6	mm	10	made by Bausch & Lomb. (Projection Objective, calculated for C. D. F. G.)	705
226)	Epiotar	1/3.5	26	cm	20	(episcopic projection)	795
227)	Projection Triplet	1/3.6	15	cm	18	(Converging lenses made of plate glass)	664
228)	Projection Triplet	1/3.6	15	cm	20	Converging lenses ~~ditto~~ made of plate glass	663
229)	Projection Triplet	1/3.6	15	cm	10	Converging lenses ~~ditto~~ made of plate glass	662
230)	Orikar	1/3.6	36	cm	20		740
231)	Triplet	1/3.6	7.5	cm	10	(All three lenses made of plate glass; ~~free~~ chromatic correction therefore not possible)	653
232)	Projection Objective	1/3.6	32	cm	10	(All three lenses made of plate glass; chromatic correction therefore not possible)	650
233)	Epikar	1/3.7	37	cm	17.5	(For episcopic projection)	749
234)	Epikar	1/3.7	37	cm	22	~~ditto~~ For episcopic projection	750
235)	C & H. C. Beck	1/3.8	107.27	mm	18	~~(American patent No. 1,035,408 of 8/13/12, British patent, see card 264,)~~ (American patent specification data proved to be 10.72 inches instead of 10 inches)	224
236)	Finder Triplet	1/4	7.5	cm	15		1213
237)	V 1931 No. 32	1/4	8.5	cm	12		932
238)	V 1931 No. 36	1/4	13	cm	10		933
239)	Huet & Co cope	1/4	68.9	mm	5	~~(British patent 303,767)~~	914
240)	Zeiss Ikon Epidiaskop Objective	1/4	29	cm	10	~~Calculation No. 877 of 3/15/30~~ (for episcopic and diascopic projection)	584
241)	Feuillet	1/4	28.3	cm	15	~~French patent 749,858~~	1067
242)	Triplet	1/4	7.5	cm	5		889
243)	Triplet	1/4	7.5	cm	5		890
244)	Taylor, Taylor and Hobson	1/4	158	mm	20		307
245)	Dimax	1/4	40	cm	15	Made by Leitz, Wetzlar, (Projection objective)	739
245a)	V 1931 No. 27	1/4	7	cm	10		940
246)	Triotar	1/4	15	cm	20		518
247)	Projection Triplet	1/4	38	cm	20	(front and back lenses made of ~~crown-cast~~ glass)	744
248)	Triplet	1/4	8	cm	12	plate	928
249)	A. Taylor and H.D. Taylor	1/4.4	100	mm	10	~~(British patent 210,705)~~	688
250)	Trioplan	1/4.5	10.5	cm	15		793
251)	Radionar	1/4.5	7.5	cm	20		1025
252)	V 1931 No. 1	1/4.5	2.7	cm	15	(Glass plate of 7 mm of thickness between objective and image, used as a trichinoscope for meat inspection)	907
253)	~~Chromatic quartz lens~~ Quartz Aplanat	1/4.5	12	cm	18	(For exposures with ultraviolet light)	896
254)	Triplet	1/4.5	15	cm	10	(For projections)	501

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers No.
255)	Jos. Schneider	1/4.5	100	mm	25	~~(French patent 766,495)~~	1071
256)	V 1914 II Triotar	1/4.5	16.5	cm	20		347
257)	V 1936 No. 8	1/4.5	3.5	cm	20	(Calculated for n_d = 546 and n_g = 313. An objective of high transparency, also in the ultraviolet region of the spectrum)	1119
258)	C. P. Goerz	1/4.5	100	mm	15	~~(Registered design No. 773,489; Example I)~~	576
259)	Anastigmat	1/4.5	100	mm	20	(Very useful universal objective, diagonal of the image = focal length)	861
260)	V 1931 No. 20	1/4.5	3	cm	10	(Objective for motion picture photography and projection)	906
261)	O. A. S. Pho-Ski 639	1/4.5	5	cm	22	~~(O.A.S. is an abbreviation for "Optische Anstalt Saalfeld"; a subsidiary of the Zeiss Co., manufacturing primarily a slightly inferior grade of lenses)~~	863
262)	Tronnier, Bad Kreuznach	1/4.5	100	mm	20	~~(German patent 501,068)~~ (Calculated for d and g'-lines)	812
263)	Triplet	1/4.5	193	mm	18		816
264)	Anastigmat	1/4.5	10	cm	20		861
265)	Tenaxiar	1/4.5	10	cm	20	(Goerz Objective)	851
266)	Triplet	1/4.5	5	cm	21		862
267)	Quartz-Sodium-Chloride Anastigmat	1/4.5	12	cm	21	(Achromatized and of high transparency in the ultraviolet region)	804
268)	Achromatic Quartz Anastigmat	1/4.5	25	cm	15	ditto.	803
269)	Triotar	1/4.5	15	cm	18	(Correction of the lateral rays of the image not favorable, this objective was withdrawn from the market after a short period)	372
270)	V 1929 No. 14	1/4.5	10.5	cm	25	(Last lens was made of plate glass)	831
271)	Tenaxiar, Goerz Objective	1/4.5	10	cm	25		826
272)	A Kerber, Leipzig	1/4.5	100	mm	10	Objective made of three separate lenses, data taken from "Zeitschrift fuer Instrumenten Kunde" Vol. 11 1916, pp. 269-278 (Journal of the instrument trade). (This objective was calculated on the basis of Seidel's preliminary computations)	415
273)	Triplet for aerial photography	1/4.5	36	cm	12	(The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculated for the d and g' lines)	398
274)	Triplet ~~for aerial photography~~	1/4.5	36	cm	12	ditto.	396
275)	Anastigmat	1/4.5	180	mm	25		346
276)	Cooke Anastigmat	1/4.5	5½	in.	10	(Exact data measured by Zeiss 1/5, f=146.5 mm made by Taylor, Taylor and Hobson 3/20/13	310
277)	Projection Triplet	1/4.5	25	cm	20		316
278)	V1912, X	1/4.5	40	cm	20		285
279)	~~Tronnier~~	1/4.5	10	cm	25	~~(American patent 1,987,878)~~	1110
280)	Portrait Anastigmat	1/4.5	24	cm	25	Made by Voigtlaender & Son, Braunschweig 11/28/99	270
281)	U.V. Objective	1/4.5	120	mm	5	(Made of optical glass permitting a high degree of U.V. transparency)	300
282)	Taylor-Cooke ~~lens~~ for Astrophotography	1/4.6	208	mm	12.5	(Data have been adapted to those found in the May 1904 edition of "Monthly Notices" 7/16/34	87
283)	Triplet	1/4.8	12	cm	10	Scale of image 1:1	1093
284)	I-R-Triplet	1/4.8	50	cm	12		1148
285)	Triplet	1/4.8	50	cm	12	(The abscissas of the b-curves have been magnified 10 times for the sake of distinctness) (This objective was the prototype of all objectives having an aperture ratio of 1/4.8 and f=50 cm, used in aerial photography during World War I)	477
286)	Triplet	1/5	70	cm	12	(The abscissas of the b-curves have been magnified 10 times for the sake of distinctness)	321
287)	Triplet	1/5	25	cm	20		442
288)	Triplet	1/5	70	cm	12.5	(The abscissas of the b-curves have been magnified 10 times for distinctness)	439

The abscissas of the b-curves have been magnified 10 times for the sake of distinctness.

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers
289	Ballon-Triplet	1/5	70	cm	12.5	(The abscissas of the b-curves have been magnified 10 times for the sake of distinctness)	394
290	Triplet	1/5	70	cm	11		303
291	Triplet	1/5	70	cm	11	ditto (Calculated for d and g'-lines	319
292	Ballon-Triplet	1/5	70	cm	11	Effect of stop-displacement on b-curves	401
293	Triplet	1/5	150	cm	10	Ditto. Spherically over-corrected to eliminate aberration of the marginal rays by deformation (Optical retouching, figuring)	461
294	Ballon-Triplet	1/5	70	cm	10	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	397
295	Taylor-Cooke Lens	1/5	480	mm	10	For astrophotography. (Tangential coma-curves for inclination of the pencil of rays w = 10° 43' and aperture ratio 1:6)	221
296	Triplet	1/5	48	cm	10	(Spherical correction for n_{366}, and d and g - lines)	223
297	Cooke Anastigmat Lens	1/5.6	6	in.		No. 28,232 measured and calculated by Zeiss to be 1/6.1, f= 160 mm, made by Taylor, Taylor & Hobson	309, 1112
298	Triotar	1/5.6	10.5	cm	11		
299	Ballon-Triplet	1/5.13	718	mm	12	(The abscissas of the b-curves have been magnified 10 times for the sake of distinctness)	395
300	F. W. Gehrke	1/5.5	10	cm	25	(American patent No. 1,860,575) (Thickness of the last lens too small for the indicated aperture ratio of 1/5.5)	1061
301	I. G. Farben	1/5.5	106	mm	22	(German registered design No. 1,217,680)	962
302	Triplet	1/6	( )	cm	12	(For aerial photography)	1014
303	E. Busch	1/6	100	mm	5	(British patent 300,468 11/15/28) (Correction of spherical aberration poor)	848
304	Triplet	1/6	180	cm	10	(Spherical correction over-corrected intentionally; it was eliminated by marginal figuring)	423
305	Triplet	1/5.6	163.5	mm	30		234
306	Triplet	1/6	120	cm	10		429
307	Triplet	1/6	210	cm	5	(Spherical correction intentionally over-corrected; this was eliminated by deformation)	428
308	Triplet III	1/6	142.9	mm	30		457
309	Triplet	1/6	180	cm	12		427
310	Triplet	1/6	180	cm	10	(Abscissas of b-curves mangified 10 times for distinctness. Spherical correction over-corrected; this was eliminated by marginal figuring	425
311	C. P. Goerz	1/6.25	100	mm	12	German registered design No. 773,487 Example II)	577
312	Triplet	1/6.3	13.5	cm	10	Made by Oskar Simon, Dresden. (As of 20°, the curves are very poor)	786
313	Triplet	1/6.3	13.5	cm	30	(The two exterior lenses are made of plate glass)	785
313a	Ernastigmat	1/6.3	135	cm	30	Cooke Lens	775
314	I. G. Farben	1/6.3	10	cm	30	French patent 672,417 of 12/27/29	901
315	Rodenstock, Muenchen	1/6.3	10	cm	10	The two exterior lenses are made of plate glass	963
316	Rodenstock	1/6.3	10	cm	30	German registered design 1,103,366 (The two exterior lenses are made of plate glass)	877
317	Achromatic U. V. Anastigmat	1/6.3	386	mm	15	(Made of quartz and sodium chloride)	773
318	Quartz-Anastigmat	1/6.3	386.2	mm	20	(Not achromatized)	770

Cons. No.	Name of Objective	An. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers No.
319	V 1912 - IX	1/6.3	15	cm	27	~~Protected for G & H. G. Beale, Under British patents 22,157-10, claim No. 5 and 3,399-11, claim No. 1~~	283
320	Quartz-Anastigmat	1/6.3	100	mm	25		729
321	Achromatic U. V. Anastigmat	1/6.3	12	cm	18	Made of quartz and sodium chloride	796
322	Jos. Schneider, Kreuznach	1/6.3	10	cm	15	~~German patent 71,761~~	708
323	Taylor-Cooke Lens III	1/6.3	151.18	mm	30		185
324	Cooke Lens V	1/6.3	15	cm	25	Quality of image within a circle of a diameter equal to the focal length is nearly equivalent to the quality of image achieved with the corresponding Tessar. Although the objective has one lens less than the Tessar, the average mass production proved to be nearly as costly, since the air space between the first and second lenses had to be exact to a tolerance of 1/100 of a mm.	232
325	Triplet	1/6.3	10.5	cm	20	The two external lenses are made of plate glass	825
326	Triplet	1/6.3	120	cm	12	Abscissas of the b-curves have been magnified 10 times for the sake of distinctness	424
327	Same as Cooke Lens VIII	1/6.3	15	cm	22	Calculated for the d and g' lines	228
328	Cooke Lens VII	1/6.3	15	cm	22		233
329	Triplet	1/6.3	120	cm	22	Objective for Aerial photography. The Abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Spherical calculation for d, f, g'	475
329a	Taylor-Cooke Lens I	1/6.3	150.38	mm	25		183
330	Taylor-Cooke II	1/6.3	152	mm	25	Spherical calculation for d and g'	184
331	Primoplane Lens	1/6.5	6	in.	5	Made by Taylor, Taylor and Hobson. Correction for margin and center of image field ~~pretty~~ poor	311
332	Triple-Anastigmat	1/6.8	100	mm	10	Made by Voigtlaender & Sohn. Calculated for the d and g' lines; correction of center not good; correction of margin ~~pretty~~ poor	345
333	Eastman 1	1/6.8	10	cm	10	~~U.S. American patent 1,880,393~~	1009
334	V 1912 IV.	1/6.8	73	mm	25	Calculated d and g' lines	286
335	Cooke - Luxor Anastigmat	1/6.8	6	in.	10	Made by Taylor, Taylor and Hobson, — their No. 28,867. Acquired from T. T. & H. Construction data measured at Zeiss, Jan. 1912	269
336	H. D. Taylor (IV), Example Fig. 5	1/8	100	mm	20	~~British patent 15,107-05 Fig. 10; German patent 86,757, IV example Fig. 5~~	139
337	H. D. Taylor		98.96	mm	25	Aperture ratio not given, spherical correction ~~pretty~~ poor. ~~German patent 86,757, IV example Fig. 3~~	140
338	H. D. Taylor	1/5.5	101.03	mm	25	~~British patent 15,107-05, Fig. 9, German patent 86,757, Fig. 4~~	142
339	H. D. Taylor				5 correction	Aperture ratio not given. Spherical and astigmatid poor. ~~British patent 1699-99 IV, which corresponds to British patent 15,107-05 Fig. 10 and German patent 86,757 Fig. 5~~	186
340	H. D. Taylor		100	mm	5	Aperture ratio not given. Spherical and astigmatic correction ~~pretty~~ poor. ~~British patent 3398-05, Fig. 1.~~	182
341	H. D. Taylor		187.27	mm	5	Aperture ratio not given. Spherical correction ~~pretty~~ poor. f= 100. red ~~British patent 1699-99, Fig. 3~~	187
342	H. D. Taylor		100	mm	5	Aperture ratio not given f=100. Spherical and astigmatic correction ~~pretty~~ poor. ~~British patent 7661-06, 2nd example~~	188
343	H. D. Taylor	1/7	100	mm	20	Aperture ratio approximately 1/7. ~~British patent 7661-06, 1st example~~	189
344	Same as Cooke Lens IV	1/6.8	15	cm	30		231

Cons. No.	Name of Objective	An. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers No.
345	Cooke Lens IX	1/6.8	15	cm	25		235
346	Cooke Lens ~~IV~~ VI	1/6.8	15	cm	25		227
347	Taylor, Taylor & Hobson	1/7	146	mm	30	~~No. 32,272~~ Marked 1/6.5, 5½ in.	308
348	Taylor, Taylor & Hobson Cooke Primoplane Lens	1/6.5	120 → 6	in.	35	r_6 and d_3 modified by Zeiss	314
349	Ballon Triplet	1/7	20	cm	6	Scales for angles and aberrations of the b-curves have been presented in a form differing from the standard presentation, as can be seen from the figures given on this card.	
350	Special Objective for motion picture photography of machine gun-firing practice "C/10"	1/7.5	9	cm	10		393 930
351	Taylor, Taylor & Hobson	1/7.7	100	mm	30	~~British patent 157,037~~	578
351a	C & H. C. Beck	1/6			25 ~~30~~	~~British patent 4,414-1911~~	266
351b	C & H. C. Beck	1/6			30 ~~35~~	~~U.S. patent 1,399-1911~~	265
352	Plateglass Triplet	1/7.7	10	cm	25	The two exterior ~~lenses~~ made of plate glass	913
353	American patent 1,514,356	1/7.7	100	mm	30	~~Patented by Warmisham 11/4/24~~	717
354	Kodar	1/7.9	131	mm	20	(See also card No. 575) The data given were calculated at Zeiss on 9/30/26	747
355	Eastman	1/8	100	mm	20	~~U.S. American patent 1,658,365~~	830
356	Improved Cooke Lens IX	1/7	100	mm	25	(See also Card No. 235)	304
357	Improved Cooke Lens IX	1/7	100	mm	25	(See also card No. 304)	313
358	Modified Taylor Lens	1/7	100	mm	25		292
359	C & H. C. Beck	1/7	106.8	mm	10	~~British patent 22,157-10~~ 3rd example. Patent specification slightly incorrect	293
360	Triplet	1/8	25	cm	10		529
361	Triplet	1/8.3	200	mm	20		520
362	Triplet	1/8.3	200	mm	18		519
363	Triplet	1/8.4	202	mm	18		532
364	Igetar	1/8.8	9.5	cm	30	Data taken from drawing, submitted by IGF 6/19/28	844
365	Objective for Astrophotography	1/10	360	cm	40	Calculated for Colors n F, n436	211
366	Triplet	1/12.5	60	cm	15		420
367	Triplet	1/15	70	cm	10		1105
368	I. R. Triplet	1/15	70	cm	10	Calculated for the region 546 to 842 μμ	1181
369	V 1937 No. 12	1/16	21	cm	11	Scale of image 1/3	1178
370	V 1937 No. 11, Triplet	1/16	36	cm	7	~~ditto~~. Scale of image 1/3	1219
371	H. D. Taylor, Reproduction Objective	1/16	100	mm	10	~~British patent 7225-02~~	53
372	Triplet	1/90	162.5	cm	6		916

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HEKTOR LENSES

The ~~manifold~~ utilization of Cooke lenses has been ~~demonstrated~~ shown in the foregoing compilation. In the course of further development, the individual components of Cooke lenses were no longer constructed of ~~lenses~~ (single lenses), but were composed of two and sometimes three individual lenses.

Of all the objectives ~~developed along this line~~ of this present kind, the Tessar type is most closely related to the Taylor, Triplet, since only in the Tessar one of the two exterior ~~groups of lenses~~ is composed of two lenses, ~~which~~ are held together by a ~~converging~~ cemented surface, ~~this~~ producing ~~generally~~ a ~~very~~ considerable increase ~~of~~ optical ~~capacity~~ efficiency of the Tessar, as compared with the Cooke lens.

However, considering all pertinent factors, even the more complicated objectives, developed from the Triplet (Cooke) do not surpass the optical qualities of the Tessar.

The following compilation lists a number of objectives, based on the Cooke lens, and composed of (5) or more individual lenses, without any reference to quality or degree of optical efficiency ~~with regard to the numerical sequence~~. ordered by the number of lens components.

"Biotar" is a designation used by Zeiss for various types of objectives.

ETS-6/7/28

Insert I page 10.

The wide utilization of Cooke lenses has been shown in the foregoing compilation. In the course of further development, the individual components of Cooke lenses were no longer constructed of single units, but were composed of two and sometimes three individual lenses.

Of all the objectives of this general sort, the Tessar type is most closely related to the Taylor Triplet, since in the Tessar only one of the two exterior units is composed of two lenses, of which a ~~these~~ are held together by a cemented surface. This produces a considerable increase in optical efficiency in the Tessar, as compared with the Cooke lens.

However, considering all pertinent factors, even the more complicated

no space

objectives developed from the Cooke Triplet do not surpass the optical qualities of the Tessar.

The following compilation lists a number of objectives, based on the Cooke lens and composed of five or more individual lenses, without any reference to quality or degree of optical efficiency as related to the number of lens components.

"Biotar" is a designation used by Zeiss for various types of objectives.

A combination of a Petzval objective and a Smyth lens, the latter serving solely for the purpose of reducing field curvature, was developed first.

These "Biotars" were in reality nothing more than a Petzval system with a dispersing supplementary lens. They were not much in demand, since the back focus was very short, and the objective, consequently, rather difficult to install in most of the camera types.

A second group of Biotars, designated by Zeiss as "Biotar III," and listed here under numbers 670, 671, 667, 668, 679, 669, and 672, ~~(Consecutive numbers 373 to 379 in this compilation)~~ can be considered as based on the Cooke lens, as may be seen by the drawings of meridional sections of the lenses shown on the cards. This second group has never been sold to the trade and was never listed in Zeiss's catalogues.

A third group of Biotars showed best optical efficiency where a brilliant image was desired. Since these objectives had particularly high resolving power, this particular group of Biotars has also been produced by other manufacturers under different names and with slight modifications, so far as possible without infringing on Zeiss's patent.

The Zeiss Biotars produced during the last twenty years were all based on this last-mentioned group. They achieved an aperture ratio of 1/1.4 and higher.

A combination of a Petzval objective and a Smyth lense, the latter one serving solely for the purpose of reducing field curvature, was developed first.

These Biotars were in reality nothing more than a Petzval system with a dispersing supplementary lense. They were not much in demand, since the back focus was very short, and the objectives, consequently, rather difficult to install in the majority of camera types.

A second group of Biotars, designated by Zeiss as "Biotar III", and listed here under numbers 670, 671, 667, 668, 679, 669, 672 (Consecutive numbers 373 to 379 in this compilation), could be considered as based on the Cooke lense, as may be seen by the demonstration of intersections of the axes of the lenses shown on the cards. This second group has never been sold to the trade and was never listed in Zeiss's catalogues.

A third group of Biotars showed best optical efficiency where a brilliant image was desired. This particular group of Biotars has also been produced by other manufacturers under different names and with slight modifications, as far as it was possible without infringing with Zeiss's patent, since these objectives had particular high resolving power.

The Zeiss Biotars produced during the last twenty years were all based on this last-mentioned group, achieving an aperture ratio of 1/1.4 and higher.

Cons. No.	Name of Objective	Ap. Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers
373	Biotar III	1/1.8	8.5 cm	20		670
374	Biotar III	1/1.8	8.5 cm	15		671
375	Biotar III	1/1.8	8.5 cm	15		667
376	Biotar III	1/1.8	8.5 cm	18		668
377	Biotar	1/1.8	12 cm	20		679
378	Biotar	1/1.8	54 mm	15	(Contrary to the above-mentioned Biotars this objective is composed of only five lenses)	669
379	Biotar III	1/1.8	8.5 cm	20	(Contrary to the other above-mentioned Biotar III objectives, the dispersing lens of this objective is composed of two individual lenses. Displacement of the stop from the second to the third air space has only slight effect on the b and c curves)	672
380	E. Leitz	1/2	10 cm	10	(British patent 382,246)	1001
381	E. Leitz, Wetzlar	1/2	10 cm	18	(British patent 381,135)	987
382	E. Leitz	1/2.0	100 mm	14	(Patented in Austria No. 3,628-32)	1038
383	Biotessar	1/2.2	1.5 cm	18	(This objective was used for micro-photography)	756
384	V 1925 No. 7	1/2.2	5 cm	15		703
385	V 1925 No. 8	1/2.2	10 cm	16		702
386	Biotessar	1/2.25	15 mm	18		758
387	E. Leitz, Wetzlar	1/2.5	100 mm	19		886
388	E. Leitz, Wetzlar	1/2.5	100 mm	22	(German patent 526,308)	923
389	Anastigmat	1/2.5	100.9 mm	20	This objective was made by Leitz and was designated as "Hektor" it was used with f=5 cm as the objective for the Leica 24 x 36 mm)	865
390	C. P. Goerz, 0.14740	1/2.7	10 cm	25	(German patent 425,146 of 2/16/26 (See also card No. 718) Swiss patent 117,019 of 10/1/26, French patent 608,925 of 8/5/26). This objective was put on the market shortly before the Goerz Co. stopped the production of objectives. It was called the "Lucinar" as compared with the Tessar 1/2.8, composed of 4 lenses only, which was produced in the 1930's, it had a more marked astigmatic and chromatic zone, where aperture ratio and focus were the same.	692
391	V 1925 No. 1	1/2.7	8.5 cm	20		681
392	V 1925 No. 2	1/2.7	16.5 cm	20		794
393	V 1925 No. 2	1/2.7	16.5 cm	20	The two above-mentioned V (test) objectives represent investigations within the Biotessar development. Note that cards Nos. 794 and 683 show two different modes of demonstration of the same objective.	683

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers No.
394	C. P. Goerz	1/2.7	100	mm	25	~~This card is a more explicit~~ duplicate of card No. 692 with more explicit data	718
395	Biotessar	1/2.8	16.5	cm	20		801
396	Biotessar	1/2.8	17	cm	20		800
397	Biotessar	1/2.8	5	cm	20		1221
398	V 1928 No. 15	1/2.8	5	cm	20		1242
399	Biotessar	1/2.8	12.4	cm	18		1256
400	V 1925 No. 4	1/2.9	14	cm	20		736
401	V 1925 No. 4	1/2.9	10	cm	20		693
402	V 1925 No. 4	1/3	17	cm	20		689
403	V 1925 No. 4	1/3	17	cm	20	(Test objective with extended stop clearance)	691
404	Biotessar	1/2.7	4	cm		(Spherical calculation for d and g')	834
405	V 1925 No. 3	1/3	17	cm	20		690
406	V 1922 No. 2	1/3.5	75	~~cm~~ mm	20		595
407	V 1934 No. 17	1/3.64	10	cm	11		1069
408	V 1934 No. 17	1/3.5	10.4	cm	11	This card ~~demonstrates~~ shows a repeated calculation of the objective as per card 1069	1070
409	V 1921 No. 16	1/4	15	cm	25		575
410	5-Lens Dialyt	1/4	139.5	mm	25		580
411	5-Lens Dialyt	1/4	137.6	mm	25		572
412	V 1921 No. 15	1/4	15	cm	25		574
413	5-Lens Dialyt	1/4	138.06	mm	25		571

See Insert I attached

BIOTAR LENSES

The real Biotar ~~could~~ may be considered as derived from the Gauss double objective. Like all Gauss objectives, the Biotars have a particularly good sphero-chromatic correction.

The Biotar is composed of four ~~groups of lenses~~, of which the two exterior ~~ones~~ consist of converging lenses, the two interior ~~ones~~ being negative menisccuses. For further details see Article "Das Zeiss-Biotar 1/1.4, ein neues Objektiv fuer Kinoaufnahmen," "The Zeiss -Biotar 1/1.4, a new Objective for motion picture photography" in "Die Kinotechnik" 10th edition (1928), book 17 pp 452-453. This article is also filed in the microfilm library of the ~~Airdocument Division, T-2, Wright Field~~ under the number R3512 F 262. See also "...d book of Scientific and Applied Photography," Supplement, Volume No. 1.1943 by Springer - Verlag, Vienna p 60.

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss ~~Numbers~~ No.
414	V 1931 No. 9	1/2.3	1.5	cm	12	(For microphotography)	904
415	Biotar	1/1.5	2.5	cm	16	(For motion picture photography on films of substandard width	821
416	V 1927 No. 4	1/1.4	5	cm	14	For motion picture photography on standard films	762
417	Biotar	1/1.4	20~~28~~	cm	16	For ~~an~~ Aerial Reconnaissance photography at unfavorable illumination	1235
418	Kapella, 1/1.4	~~1/1.4~~	1	cm	15	~~U.S. American patent 2,019,985~~ The back converging component ~~is composed~~ comprises of two individual lenses.	1130
419	Kapella	1/1.5	10	cm	8	~~British patent 342,880~~ The second dispersing meniscus faces the stop ~~with it's~~ convex side of the	956
420	Biotar	1/1.4	5	cm	18	For motion picture photography	948
421	Biotar	1/1.4	5	cm	20	For "Contax 24x36"	960
422	V 1927 No. 6	1/1.4	5	cm	17	~~French patent 659,612~~	765
423	V 1929 No. 1	1/1.4	4	cm	17		799
424	W. F. Bielicke	1/1.3	10	cm	13~~18~~	~~Patented in the U. S., Gt. Brit. and France.~~ Only the front component of this objective is similar to the Biotar. The back component is considerably modified. Correction very poor.	918
425	Jos. Schneider	1/1.2	100	mm	20	The rear component has an additional converging lens. The entire object has a strong barrel-shaped distortion	969
426	V 1931 No. 7	1/1.6	1	cm	10		895
427	Zeiss-Ikon	1/1.7	10	cm	15	~~German registered design 901,842~~	781
428	V 1928 No. 4	1/1.8	10.5	cm	20		809

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Insert I page 10

BIOTAR LENSES

The real Biotar may be considered as derived from the Gauss double objective. Like all Gauss objectives, the Biotars have a particularly good sphero-chromatic correction.

The Biotar is composed of four lens units, of which the two exterior consist of converging lenses, and the two interior negative meniscuses. For further details, refer to ~~see Article~~ "Das Zeiss-Biotar 1/1.4, ein Neues Objektiv fuer Kinoaufnahmen," -- (The Zeiss-Biotar 1/1.4, A new Objective for Motion Picture Photography) in Die Kinotechnik, 10th edition, 1928, Book 17 pp.452-453. This article is also filed in the microfilm library of the Air Documents Division, Intelligence Department, Wright-Patterson Air Force Base, Dayton, Ohio, under the number R3512 F 262.

Refer to → ~~See also~~ Handbook of Scientific and Applied Photography, Supplement, ~~Volume~~ Vol. 1: 1960. ~~No. 1, 1943 by~~ Springer - Verlag, Vienna, ~~p 00.~~ 1943.

Insert I page 13

PLASMATS

Plasmats are double objectives, consisting of two symmetrical or nearly symmetrical components, each composed of a converging meniscus and two lenses separated from the meniscus by an air space. The latter part of the objectives is composed of one biconcave and one biconvex lens, held together by a cemented surface.

FTS-6[illegible]

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of coverage, degrees	Remarks	Zeiss Numbers No.
429	V 1931 No. 14	1/1.5	2.5 cm	14		903
430	V 1931 No. 14	1/1.5	2.5 cm	14		903
431	V 1931 No. 22	1/1.5	2.5 cm	14		905
431	V 1938 No. 2	1/1.5	5 cm	29		1200
432	Biotar	1/1.4	20 cm	17	Calculated spherical for c and f	1223
433	V 1937 No. 22	1/1.4	5 cm	20		1196
434	V 1928 No. 3 Biotar	1/1.4	8.5 cm	17		811
435	Biotar	1/1.9	2.5 cm	18		815
436	W. Hasselkus	1/1.9	10 cm	20	British patent 323,138	959
437	V 1937 No. 27	1/1.9	5 cm	22		1188
438	V 1937 No. 25	1/1.9	5 cm	22		1183
439	V 1937 No. 24	1/1.9	5 cm	20		1182
440	Kapella	1/2	98.97 mm	25	British patent 470,522, as compared with the Biotar the meniscuses of this objective are composed of three lenses, instead of two lenses as in the Biotar	1252
441	V 1926 No. 7	1/2	10 cm	27		743
442	Xenon	1/2	4.5 cm	23	Made by Jos. Schneider, Kreuznach	882
443	V 1931 No. 5	1/2	4.75 cm	23	(See also card No. 884)	881
444	C. W. Fredrick (Eastman)	1/2	100 mm	18	U. S. Patent 1,685,600	823
445	Kapella	1/2	10 mm	20	British patent 461,304, (III) example	1254
446	Biotar	1/2	4.5 cm	20		958
447	Biotar	1/2	5 cm	18	With extended stop space	952
448	Biotar	1/2	4.5 cm	25		961
449	Taylor, Taylor and Hobson, Anastigmat	1/2	100 mm	22		665
450	Leitz, Registered design	1/2	10 cm	15	German 1,279,098	1023
451	Kapella	1/2	1.5 cm	10	British patent 355,452 (ex) II, similar to the Biotar with additional lense placed in front	1002
452	Kapella	1/2	10 cm	20	British patent 461,304, (ex) II	1230
453	Kapella	1/2	10 cm	20	British patent 461,304, (ex) I	1227
454	Kapella	1/2	1 cm	15	British patent 427,008	1104
455	Kapella	1/2	1.5 cm	17	British patent 355,452, (ex) I, see also No. 1002	999
456	Biotar	1/2	4 cm	22		977
457	A. S. Hobson	1/2	100 mm	22	British patent 157,040	573
458	Grosset	1/2.0	100 mm	10	U. S. patent 2,003,861, 6/4/35; French patent 759,379, 2/2/34	1036
459	Kapella	1/2.0		17	British patent 377,537	975
460	Biotar	1/2	10 cm	23		1171
461	V 1931 No. 5	1/2	4.7 cm	25	This is a modification of test objective No. 5, see also card 881	884
462	V 1931 No. 10	1/1.5	2.5 cm	10		919
463	Dr. Rudolph	1/2.7	10 cm	20		981
464	Biotar	1/2.8	21.8 cm	25		1049
465	Dr. Rudolph	1/3	100 mm	10	German patent 420,223, (ex) II	675
466	V 1934 No. 12	1/3.5	21.0 cm	25		1048
467	Planar	1/4	202 mm	20	This Gauss objective does not fall within the Biotar patent, since both the exterior converging components are meniscuses.	539
468	Biotar	1/4	10 cm	20		1120
469	Kapella	1/4.8	10 cm	8	British patent 333,065	917

See Drawing I attached

PLASMATS

Double objectives, consisting of two symmetric or nearly symmetric parts, each composed of a converging meniscus and a group of lenses, separated from the meniscus by an air space, the latter part of the objectives being composed of one biconcave and one biconvex lens, which are held together by a cemented surface.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers No.
470	Ernst Arbeit, Wetzlar	1/6.5	100 mm	30	British patent 2305-03, German Patent 135,742	2
471	V 1918 No. 15	1/7	100 mm	32		515
472	P. Rudolph,	1/6.3		27	French patent 506,486. This type of	

Cons. No.	Name of Objectives	Ap Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers
	Dr. Paul					No.
472	P. Rudolph	1/6.3		27	~~French patent 506,486.~~ This type of objective has a particularly good spherochromatic correction, to which Dr. P. Rudolph attributes the increased depth of focus of the image. Careful tests, however, did not prove this to be true. There is also no substantiation of Dr. R.'s theory to be found in ~~with a view point to~~ theoretical considerations.	454
	Double		Rudolph's			1075
473	Ross Xpress	1/4.6	21 cm	33		538
474	Plasmat	1/4	15 cm	27	Made by Hugo Meyers & Co	806
475	Hasselkus	1/4	100 mm	32	~~British patent 2295,519~~	
476	Objective for aerial photogrammetery	1/4.5	25 cm	32	Test objective 1929. This objective is particularly free of distortion for a field of image exceeding 60° and particularly suitable for photogrammetry.	935
477	Orthometar	1/4.5	21 cm	32	(mentioned above)	1103
478	Orthometar	1/4.5	21 cm	32	The two (last) mentioned objectives were made by Zeiss for the special purpose of aerial photogrammetry	1102
	Meyer					
479	Meyer-Satz Plasmat	1/4.5	10 cm	32	Three objectives mentioned above	946
480	V 1935 No. 18	1/4.5	21 cm	32	are particularly suitable for aerial photogrammetry	1095
481	Orthometar	1/4.5	3.5 cm	32		1131
482	Orthometar	1/4.5	21 cm	27		986
483	Orthometer	1/4.5	21 cm	32	The three last mentioned objectives are particularly suitable for aerial photogrammetry	
484	~~Orthometar~~	~~1/4.5~~	~~21 cm~~	~~32~~	~~Ditto~~	983
485	Finder Objective	1/4.5	7.5 cm	32	This objective has a field of image exceeding 60°	982
486	Rudolph	1/4.5	10 cm	28		876
487	V 1935 No. 15	1/4.5	21 cm	33	~~German patent 310,615.~~ This objective is a "Double Plasmat"	1099
488	V 1926 No. 4	1/4.5	21 cm	30		734
489	Objective for aerial photogrammetry	1/4.5	21 cm	32		802
490	Objective for aerial photogrammetry	1/4.5	21 cm	32		741
491	Objective for aerial photogrammetry	1/4.5	21 cm	32	~~British patent 178,338~~	738
492	V 1926 No. 4	1/4.5	21 cm	27	The following four items the front component of the objectives ~~have~~ has been calculated also. No. 493 & 494 deal with the same objective under different designations, with the numbers given on the right side, and are therefore the same German patent ~~135,742~~. This is a modification of the objective described on card No. 2.	726
493	V 1918 No. 3	1/4.5	15 cm	27		454
494	Satz-Lens (Double Plasmat) Test objective 1918 No. 3	1/4.5	15 cm	27		454a
495	Eurypian	1/6	124.5 mm	25		243
496	E. Arbeit, Wetzlar	1/6.8	240 mm	26	~~German patent 250,781 (Sept. 17,12)~~ ~~French patent 446,615 (July 13,12)~~ ~~British patent 16,331-12~~	268
497	C 1934 No. 7	1/6.3	21 cm	32	Calculated for image scale 1:5	1037
498	Orthometar	1/8	13.5 cm	32	For "Steoplag-C/4" an apparathe for restitution of aerial photographs	845
499	Apochromat Claron	1/9	18 cm	20	Made by Jos. Schneider & Co, Kreuznach	898
500	Rudar Lens	1/9.1	255 mm	27		514
501	V 1929 No. 5	1/9	16.5 cm	30		807
502	C. P. Goerz				Aperture ratios: Single lens 1/10 double objective 1/2 approximately. Calculated for single lens and for the double objectives ~~German patent 107,358 of 1/22/99~~	12

Insert I page 15

ERNOSTARS

For light transmitting capacity, field of image, and sharpness, the Ernostars ~~ERNOSTARS~~ and range among the best objectives, along with Biotars and Sonnars.

The Ernostar consists of four individual lenses or groups of lenses. Three of these are converging components, but the second one is a dispersing component.

These objectives may be considered as derived from the Cooke lens, a converging lens being placed between the first and second components.

The Ernostars were offered the trade by the Ernemann Company up to 1926, when this company was merged with the Zeiss concern. They were produced with light transmitting capacities ranging from 1/2 to 1/1.4 With slower aperture ratios, as for instance 1/1.6, sharp images were achieved at an angle of 40° without stopping down. Ernostars with an aperture ratio of 1/1.4 and 1/1.5 rendered a sharp image only out to an angle of 35°.

The success of the Ernostars was due to their capacity for correcting errors of wide-aperture pencils of rays in the central parts of the image, and to successful astigmatic flattening, as well as to an extensive correction of the coma of the ~~zonal~~ latter and ~~corner~~ marginal pencils of rays of the image field.

PTS-657-1.1

Cons. No.	Name of Objectives	Ap. Ratio	Focal length		Half Angle of converage degrees	Remarks	Zeiss ~~Numbers~~ No.
503	Jos. Schneider Double Objective	1/11.3	100	mm	26	The single lens was controlled by Zeiss, the aperture ratio was found to be 1/9. Aperture ratio for the double objective is 1/18	971
504	C. P. Goerz	1/12.5	100	mm	27	~~British patent 158,902; French patent 532,570; German patent 378,894~~ Aperture ratio of the double objective 1/6.3	585
505	V 1936 No. 7	1/20	7.5	cm	22	Calculated for image scale 1 : 5	1163
506	Euryplan Lens	1/11	262	mm	25	Aperture ratio for double objective 1/7	526
506a	Bausch & Lomb	1/11	6½	in.	33		1212

~~With regard to~~ light transmitting capacity, field of image, and sharpness, the

ERNOSTARS

range among the best objectives, ~~together~~ with Biotars and Sonnars.

The Ernostar consists of four individual lenses or groups of lenses, three of which are converging components, the second one being a dispersing component.

These objectives maybe considered as derived from the Cooke-lens, by placing a converging lens between the first and second ~~lenses of the Cookelens~~.

The Ernostars ~~have been placed on the market~~ by the Ernemann Company up to 1926, ~~at which time~~ this company was merged with the Zeiss concern. They were produced with light transmitting capacities ranging from 1/2 to 1/1.4. With ~~smaller~~ aperture ratios, as for instance 1/1.8, sharp images were achieved at an angle of 40° without ~~diaphragmation~~, ~~whereas~~ Ernostars with an aperture ratio of 1/1.4 and 1/1.5 ~~still~~ rendered a sharp image at an angle of 35°.

The success of the Ernostars was due to their capacity of correcting errors of ~~wide spread~~ pencils of rays ~~of~~ the central parts of the image, ~~and also due~~ to successful astigmatic ~~planiching~~, as well as an extensive correction of the coma of the ~~lateral~~ and ~~marginal~~ pencils of rays of the imagefield.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length		Half angle of converage degrees	Remarks	Zeiss ~~Numbers~~ No.
507	Ernemann	1/1	10	cm	15	~~German registered design No. 982,623 of 3/17/27~~	777
508	E. Leitz	1/1.3	10	cm	12	~~British patent 301,135~~	1000
509	Ernemann ~~Br. Pat. ex 2~~	1/2	100	mm	10	~~British patent 32,152-26~~ Chromatic correction not good considering the large aperture ratio	711
510	Ernemann	1/2	10	cm	10	~~German registered design No. 948,612~~ calculated for d and g' chromatic and spherical correction insufficient	778
511	Ernemann	1/2	100	~~mm~~ cm	15	~~British patent 32,152-26~~ calculated for d and g' good spherical correction for an image field of about 30°	710
512	V 1929 No. 4	1/2	2.5	cm	15		1248
513	Ernemann	1/2	100	~~mm~~ mm	10	~~German patent 426,260~~ correction poor	763
514	Ernostar	1/2	100	~~mm~~ mm	14	~~German patent 401,274; U.S. patent 1,581,271 of 1/13/23~~ first and second group of lenses composed of two lenses each, correction good	682
515	Ernemann	1/2	100	mm	12	~~French patent 590,651; British 101,912~~	695
516	Ernemann	1/1.8 ~~1/2.8~~	100	mm	20	~~Austrian patent 163,892 of 8/15/25~~	712
517	Ernemann	1/1.6	100	mm	17	~~Austrian patent 103,882 of 8/15/25~~	704
517a	Ernemann	1/2	100	mm	12	~~British patent 232,531~~ The last mentioned objective was the prototype of Ernostars produced by the Ernemann Co. in aperture ratios 1/1.6 to	728
518	C. P. Goerz	1/1.9	10	cm	15	~~German patent 428,825~~ calculated for g and g'	776
519	Ernostar	1/2.7	15	cm	22	see ~~also~~ card No. 697	694

Insert I page 16

SONNARS

The Sonnars may be considered as a further development of the Ernostars, in the sense that the second lens of the Ernostar is cemented to its preceding and its following lens, thus producing an objective which in contrast to the Ernostar, consists of only six glass-air surfaces.

With initial aperture ratios of 1/2 as well as of 1/1.5, and with a focal length of 5 cm, images of good sharpness, reaching into the corners, are achieved for a field of 2.4 x 3.6 cm.

The total image field of these Sonnars of high light transmission capacity measures about 45°. In this connection, it should be noted that Sonnars have been produced with smaller aperture ratios, such as 1/2.8 and 1/4, with focal lengths of 18 cm and 13 cm respectively, for a field of 2.4 x 3.6 cm, i.e., for relatively small image fields.

If properly machined and calculated, quality of the image of all these Sonnars, corrected for either a minor or a major field, might be considered as the best product of objectives of equal aperture ratio and image field.

Attention is called to card No. 940, ~~a photostatic copy of~~ an article taken from the British Journal of Photography, of Nov. 12, 1931, dealing with patent specifications for large-aperture lenses.

for which data was obtained from

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
520	Ernemann	1/2.8	100 mm	20	~~French patent 337,964~~ ~~British patent 235,863 of 2/11/26;~~ ~~Swiss patent 113,293 of 1/2/26;~~ ~~French patent 590,651 (also U.S. pat. 596,060; Austrian patent 101,912~~	
521	~~Ernostar~~ Ernemann	1/2	100 mm	10	~~British patent 113,976; French patent 583,101 of 1/7/25; U. S. patent 1,564,872 of 1/12/25~~	697
522	C. C. Minor, Chicago	1/2	65 mm	5	~~U. S. patent 1,560,667 of 11/30/20,~~ see "The American Cinematographer" Vol. 3. No. 5 ~~of 8/15/22, p. 2.~~ This Minor objective can be considered with regard to ~~its~~ exterior construction as an early form of the Ernostar; correction, however, is considerably inferior	598 Aug 1922 p. 4
523	Ernemann	1/2	10 cm	15	~~British patent 27,184 of 7/24/22.~~ In this objective, consisting of only four lenses, the chromatic, longitudinal aberrations are not sufficiently eliminated	591
524	Ernostar	1/1.4	5 cm	20	See also observation made concerning Card No. 104	624
524a	Alinar	1/2	4 cm	20	A motion picture projection anastigmat	947
524b	Alinar	1/2 ~~1/3~~ e	and 5 cm 6 cm	12	" " "	1161 1162

total See Insert Attached

SONNARS

The Sonnars may be considered as a further development of the Ernostars, in the sense that the second lens of the Ernostar was cemented to its preceding and its following lens, thus producing an objective, which, opposed to the Ernostar, consisted of only six surfaces bordering on glass and air.

With initial aperture ratios of 1/2 as well as 1/1.5 and with a focal length of 5 cm, images of good sharpness, reaching into the corners, were achieved for format 2.4 x 3.6 cm.

The image field of these Sonnars of high light transmission capacity measures about 45°. In this connection, it should be noted, that Sonnars have also been produced with smaller aperture ratios, as f.i. 1/2.8 and 1/4, with one pertinent focal lengths of 18 cm and 13 cm respectively, for format 2.4 x 3.6 cm, i.e., for relatively small image fields.

If properly machined and calculated, quality of the image of all these Sonnars, corrected for either a minor or a major image field, might be considered as the best product of objectives of equal aperture ratio and image field.

Attention is called to card No. 940, a photostatic copy of an article taken from The British Journal of Photography of Nov. 13, 1931, dealing with patent specifications for large-aperture lenses.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
525	V 1930 No. 7	1/1.4	2.5 cm	10	Calculated for d and g'	931
526	V 1930 No. 6	1/1.4	5 cm	10	Calculated ditto for d and g'	754
527	Sonnar	1/1.4	5 cm	20	Trace of rays drawn for format 24x36 mm	1195
528	Zeiss-Ikon, Sonnar	1/1.4	2.5 cm	15		965
529	Sonnar	1/1.5	5 cm	22.5		1184
530	Sonnar	1/1.5	1.5 cm	22.5	For 16 mm film	1160
531	Sonnar	1/1.5	5 cm	22.5		1064a
532	Sonnar	1/1.5	5 cm	22.5		1064
533	Sonnar	1/1.5	5 cm	20	This card appears in original and duplicate	
534	Sonnar	1/1.5	5 cm	22.5		973
535	Zeiss-Ikon	1/1.6	100 mm	12	~~French patent 701,934 of 3/31/30~~	1043
536	Alinar	1/1.9	9 cm	10	~~German patent 530,843 of 7/26/31~~ Projection objective of the Sonnar type	887
536a	Sonnar	1/2	5 cm	22.5		1208
537	Sonnar	1/1.9	8 cm	10	Projection objective of the Sonnar type	1044
538	Sonnar	1/2	5 cm	22.5		1140
539	Sonnar	1/2	5 cm	22.5		944
540	Sonnar	1/2	5 cm	20		941
541	Zeiss-Ikon, Bertele	1/2.8	100 mm	12.5		911
542	Sonnar	1/2	5 cm	22.5	~~Nov. 39~~ Format 24x36 mm. The last component of this objective is composed of three lenses	888 1191

Present Page 17

TELE-OBJECTIVES

Tele-objectives may be used where, in spite of a great focal length, a convenient camera size is desired.

Tele-objectives are composed of a frontal converging unit of lenses and a rear unit of dispersing lenses, both of which are arranged with a considerable air distance between them, so that the rear principal point is in most cases situated in front of the objective. The focal length is consequently longer than the camera extension for distant objects.

The fact that the camera extension thus becomes considerably shorter than the focal length constitutes a disadvantageous effect on the aperture ratio, on the diameter of the image field, and sometimes also on the quality of the image, and similar factors. These disadvantageous effects increase with the degree of shortening of the camera extension.

The largest aperture ratios of Tele-objectives are at the present time about 1/3 to 1/4; as a rule, however, the aperture ratios are smaller. In cases of particularly high degrees of shortening of camera extensions, aperature ratios of 1/50 and even smaller occur frequently.

Tele-objectives are pricipally used for long-distance photography, since objects located at a far distance can be photographed relatively well with the long focal lengths of these objectives. The types of lesser light-transmitting capacity, on the other hand, are better suited for hunting, sport, and similar photography.

The range of application of Tele-objectives has been widened in recent years by the production of Tele-objectives having a good image quality, free of pin-cushion distortion, which had previously been encountered in many Tele-objectives.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degree	Remarks	Zeiss Numbers No.
543	Sonnar	1/2	7 cm	15		1179
544	Sonnar	1/2	8 cm	25	The last component consists of two dispersing lense enclosing one converging	1174
545	Sonnar	1/2	1 cm	15		1168
546	Sonnar	1/2	5 cm	22.5	Calculated for e,d,F,g. see also Card No. 1044	1152
547	Sonnar	1/2	5 cm	22.5		1020
548	Sonnar	1/2	8.5 cm			989a
549	Zeiss-Ikon	1/2	10 cm	20	~~British patent 383,591 of 11/17/32~~	972
550	Sonnar	1/2	5 cm	22.5		953
551	Sonnar	1/2	5 cm	22.5		953
552	Sonnar	1/2	5 cm	22.5	The last three cards represent ③ different modes of calculation	953
553	Sonnar	1/2.5	3.5 cm	25	Similar to the "Biogon" 1/2.8, f=3.5 cm	1060
554	Sonnar	1/2.5	5 cm	20	~~German patents 581,742 of 7/19/33 and 530,843 of 2/18/32; U. S. patent 1,975,677 of 2/9/32~~	988
555	Sonnar	1/2.8	3.5 cm	30	Similar to the "Biogon"	1107
556	Finder objective	1/2.8	8 cm	10		1013
557	Zeiss-Ikon, Sonnar	1/2.8	7.6 cm	10		1042
558	Tele-Sonnar	1/2.8	18 cm	10	Distance between ~~foremost vertex~~ front vertex and focal point = 95% of focal length	1108
559	Sonnar, (Zeiss-Ikon)	1/2.8	5 cm	10	Principally a finder objective	900
560	Sonnar	1/2.8	5 cm	10		939
561	Sonnar	1/4	7.5 cm	5		891
562	Sonnar	1/4	30 cm	5	Within its small image field this objective has an extraordinarily good sharpness	1246
563	Sonnar	1/4	13.5 cm	10	Calculated spherically for A', C, d, F, g	1185
564	Sonnar	1/4	7.5 cm	10		1199
565	Sonnar	1/4	30 cm	5	Spherically calculated C, d, F, g	1197
566	Sonnar	1/4	18 cm	10	Spherically ~~distg~~ calculated C, d, F, g	1186
567	Sonnar	1/4	13.5 cm	10	Spherically calculated for d, g'	1116
568	Sonnar	1/4	7.5 cm	10		1091
569	Sonnar	1/4	13.5 cm	10		1047
570	Sonnar	1/4	13.5 cm	10		950

Tele-objective

TELE Supplement I attached

~~In cases, in which~~ in spite of a great focal length, a convenient camera size is desired, ~~the Tele-Objectives fill this requirement.~~ Tele-Objectives with ~~They~~ are composed of a frontal converging group unit of lenses and a rear group unit of dispersing lenses, both ~~groups~~ of which ~~of lenses being~~ are arranged at a considerable air distance between them, so that the rear principal point is in most cases situated in front of the objective. The focal length is consequently longer than the camera-extension for distant ~~objectives~~ objects.

The fact that the camera-extension thus becomes considerably shorter than the focal length, ~~of course,~~ constitutes a disadvantageous effect on the aperture ratio, dimension of the image field, and sometimes also on the quality of the image, and similar factors. These disadvantageous effects, ~~of course,~~ increase with the degree of shortening of the camera-extension.

The largest aperture ratios of Tele-Objectives are at the present time about 1/3 to 1/4; as a rule, however, the aperture ratios are smaller. In cases of particularly high degrees of shortening of ~~the~~ camera extensions, aperture ratios of 1/50 and even smaller occur frequently.

Tele-Objectives are principally used for long-distance photography, since objects located at a far distance can be photographed relatively well with the long focal lengths of these objectives. The types of lesser light-transmitting capacity, on the other hand, are better suited for hunting, sports and similar photography.

The range of application of Tele-Objectives has been widened in recent years by producing Tele-Objectives having a good image quality, free of cushion-shaped distortion, which ~~had~~ previously ~~been~~ encountered in many Tele-objectives.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
571	Tele-Objective	1/14	433.9 mm	2	Composed of a Tessar 1/4.7, f=145 and a Tele-negative f=60	135

Insert I page 18

This arrangement of lenses which consists of an anastigmat or other individually corrected objective in conjunction with a "TELE-NEGATIVE," is typical for the so-called "COMPOSITE-TELE-OBJECTIVE".

The combination of these two groups of lenses is termed, ~~as mentioned above, a~~ a Composite-Teleobjective

COMPOSITE - TELE-OBJECTIVE.

By varying the air space between the two component parts of the objective, the focal length can be varied as desired.

Another type of Tele-objective, of slightly higher optical capacity, is composed of a positive component and a dispersing unit of lenses separated from the first units by a considerable air space; the negative and the positive components, however, are arranged at a fixed distance, and balanced in a way which produces the best possible correction of aberrations.

This last mentioned type of objective is termed TELE-OBJECTIVE, in the literal sense of the word.

See sheet I attached

This arrangement of lenses is typical for so-called "COMPOSITION-TELE-OBJECTIVES" which consists of an anastigmat or another individually corrected objective in conjunction with a "TELE-NEGATIVE".

The combination of these two groups of lenses is termed, as mentioned above, a

COMPOSITION - TELE - OBJECTIVE.

By varying the air space between the two component parts of the objective, the focal lengths can be varied as desired.

Another type of Tele-Objective, of slightly higher optical capacity, is composed of a positive component and a dispersing group of lenses, separated from the first group by a considerable air space; the negative and the positive components, however, are arranged at a fixed distance, and balanced in a way which produces the best possible correction of aberrations.

This last mentioned type of objectives is termed TELE-OBJECTIVE, in the literal sense of the word.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
572	Lee-Davis	1/6	120 mm	5	~~British patent 1185 of 7/11/14~~ Calculated for d and g'	
573	Composition Tele-Objective				~~Tele-Objective~~ Teleobjective	583
	Tessar	1/3.5	50 cm	5	Negative ~~minus 20 mm~~ f = -20 mm	136
574	Tele-Objective			2	with fixed focal length I form	91
575	Composition Tele-Objective	1/12.5	537.2 mm	2	Positive f= 135 Negative f=60 mm	133
576	Long distance Objective			2	~~British patent 21,933-1891~~	134
577	Long distance Objective	1/10	45 cm	2	Calculated for d and g'.	169
578	Long ditto Distance objective	1/10	295.35 mm	7	With fixed focal length. Calculated for d and g' prototype for the Zeiss "Magnar" 1/10	170
579	Long ditto distance Objective	1/12.3	295 mm	7		171
580	Long ditto. distance objective	1/12.3	295 mm	7		172
581	Long ditto distance Objective	1/9.3	427 mm	8	Calculated for d and g'	173
582	Long ditto distance objective	1/10	45 cm			174
583	Long ditto objective	1/10	45 cm			175
584	Minimum Tele-Objective	1/10	45 cm			181
585	~~Tele-Objective~~ Teleobjective	1/11	240 mm	20	~~British patent 15,732-1905~~	202
586	Bis-Telar, Busch, Rathenow	1/8	240 mm	50	~~British patent 15,732-1905~~	201
587	~~Tele-Objective~~ Teleobjective	1/9.6	43 cm	7	Calculated for d and g'	217
588	~~Tele-Objective~~ Teleobjective	1/11	50 cm			218
589	Ross Telecentric	1/6.8	100 mm	11	~~German patent 263,873~~	305
590	Ross Telecentric	1/6.8	305 mm	13	~~U. S. patent 1,073,950; British patent 2,347-12~~	341
591	V ~~1913~~ 1915 XVIII	1/6.3	~~2036~~ 3036 cm	14		340
592	Long distance objective	1/6.8	100 mm	15		342
593	V 1914 I (L.D. Objective)	1/6.8	28 cm	15		343
594	Long Distance Objective	1/6.2	170 mm	14	Calculated for d and g'	344
595	Ross, Telecentric	1/6.8	100 mm	12	(modified) Infringed on German patent-see card 305	336
596	L. B. Booth, Cambridge			20	~~U. S. patent 1,156,743 fig. 1~~	408
597	L. B. ditto Booth Cambridge				~~U. S. ditto 1,156,743 fig. 2~~	409
598	~~Tele-Objective~~ Teleobjective	1/50	3.25 m	12	For military long-distance photography on the ground	414
599	Long distance Objective	1/6	60 cm	12		440
600	Long distance ditto. objective	1/50	3000 mm	2.5	For military use	431
601	Long distance ditto. objective	1/50	3000 mm	2.5	For ~~ditto~~ military use	438
602	W. Bielicke	1/6.8	300 mm	16	~~U. S. patent 1,202,021~~	444
603	Long distance objective	1/7	120 cm	7		422
604	Long distance ditto objective	1/50	~~3250~~ 3250 ~~251~~ mm	2.5		451
605	Tele-Objective Teleobjective	1/6.5	259 mm	10		460
606	V 1917 II (L.D. Objective)	1/6	25 cm	14		436
607	Long Distance Objective	1/5.7	250 mm	15	Composed of three lenses and of good light-transmitting capacity ~~1/5.7~~ 1/5.7 f=250 mm. Calculated for D and g'	479
608	Long Distance Objective	1/6	250 mm	17	Composed of three lenses, and of good light-transmitting capacity ~~1/6.~~ f=250 mm. Calculated for D and g'	480

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers
609	Long Distance Objective	1/6.5	27.5 cm	17	Composed of three lenses and of good light-transmitting compacity.	
610	Long Distance Objective of High light transmitting capacity	~~1/6.2~~ 1/7.2	300 mm	15	~~27.5 cm~~ Calculated for D and G'	481
					Calculated for D and G'	482
611	L. D. Objective	1/6	25 cm	15	~~ditto~~ Calculated for D and G'	500
612	L. D. Objective	1/6.3	25 cm	15	~~Protype~~ of the Zeiss "Tele-Tessar"	509
613	L. D. Objective	1/7.9	25 cm	15	Prototype	512
614	L. D. Objective	1/6.7	28 cm	15		506
615	L. D. Objective	1/8	25 cm	15		516
616	L. D. Objective	1/7	133 mm	15	(T. T.) & Hobson ~~British patent No 132,067 (9/19/1918)~~	524
617	L. D. Objective of high light transmitting capacity	1/6	120 mm	15	T. T. & Hobson ~~Taylor, Taylor~~	536
618	Tele-Tessar	1/6.3	40 cm	16	Calculated spherically for d and g'	549
619	Tele-Tessar	1/6.3	25 cm	16	Calculated ~~ditto~~ spherically for d and g'	550
620	Tele-Tessar	1/5.5	25 cm	16		551
621	Tele-Photo-Objective	1/6.8	15 cm	5	(L.B.Booth) ~~British patent 151,507/1920~~ example I ~~ex~~ Spherically and chromatic correction. Calculated for d and g'	553
622	Tele-Photo-Objective	1/6.8	11.8 cm	10	(L.B.Booth) ~~British patent 151,507/1920~~ example II ~~ex~~ Spherical aberration calculated for d and g'	554
623	C. P. Goerz	1/6.3	100 mm	7	~~German registered design 779,501~~	568
624	Lan-Davis	1/6	120 mm	12	~~British patent No. 1185 of 7/11/14~~	582
625	C. P. Goerz	1/33.3	100 mm	2.5	~~German registered design 779,501~~ Calculated for d and g'	567
626	L. B. Booth	1/6	100 mm	10	~~British patent 139,719 of 3/11/20~~ ~~U. S. patent 1,480,929 of 7/22/20~~ Calculated for d and g'	581
627	"Zentral Zeitung für Mechanik und Optik"	1/6	~~12 in.~~		(Central Journal for Mechanics and Optics) ~~British patent 198,958~~	642
628	V 1931 No. 21	1/4	7.5 cm		Spherical calculation for d and g'	649
629	T. T. & Hobson	1/6	12 cm	15	~~British patent 144,992~~	657
630	~~Tele-Objective~~	1/8	50 cm	7.5	~~German patent 398,451~~	645
631	Kapella	1/6	120 mm	15	~~British patent 198,958~~	685
632	Kapella	1/4.8	100 mm	5	~~ditto 198,958~~	686
633	Ross	1/5.5	280 mm	15	~~ditto patent 188,621~~	687
634	~~Tele-Objective~~ Jos. Schneider, Kreuznach	1/4.5	10 cm	2	~~German patent 432,236 of 8/3/26~~	733
635	Jos. Schneider, Kreuznach	1/4.5	100 mm	10		829
636	Jos. ditto Schneider, Kreuznach	1/2.9	10 cm	10	Spherically not corrected	835
637	Jos. ditto Schneider, Kreuznach	1/4.5	~~100~~	10	~~German patent No. 471,565~~ Spherically and astigmatically corrected for d and g'	857
638	Tele-Tessar	1/8	50 cm	10		864
639	V 1931 No. 23	1/4	7.5 cm	6	Calculated spherically for c,d,f,g'	902
640	V 1931 No. 21	1/4	7.5 cm	5	The rear principal point of this objective coincides approximately with the front vertex. Since ~~we defined~~ Tele-Objectives as having their rear principal point in front of the vertex, this objective constitutes a boundary case.	908
641	V 1931 No. 33	1/4	~~7.5 18~~ cm	5	The rear principal point of this objective is also situated in the front component, so that this objective is ~~effectively~~ not a legitimate Tele-Objective.	926
642	V 1931 No. 30	1/6.3	18 cm	5		924
643	V 1931 No. 34	1/6.3	18 cm	6		938
644	V 1932 No. 2	1/6.3	18 cm	15		949
645	Tele-Tessar	1/10	25 cm	5	This objective was used for machine gun camera	968
646	C. W. Frederick (Eastman)	1/4.5	10 cm	7	~~U. S. patent 1,897,896~~	1003
647	Tele-Tessar "K"	1/8	30 cm	3	This objective is really not a normal Tele-Tessar, which would have an image field of 30°, whereas ~~the here to discribed~~ this objective ~~only~~ has an image field of scarcely 5°.	1028
648	I. R. Tele-Objective	1/25	3000 ~~cm~~ mm	25	Scale of the coordinate axes are taken 10 fold. The image field amounts to about 6°	1146

Insert I page 20

WIDE-ANGLE OBJECTIVES

The objectives designated "Wide-Angle Objectives" comprise a group having an image-field diameter considerably exceeding the focal length in the focal plane.

As early as the middle of the 19th century, research was being conducted to develop types of objectives meeting these requirements.

Attention is called to the "Protar" 1:8, constructed by Dr. Paul F. Rudolph, as well as "The Panoramic Lens" of Th. Sutton, who developed a lens of confocal spheric surfaces, thus achieving at the same time a spherically confocal image field.

Recent research in Boston proved the possibility of placing this speric image field in the plane with good sharpness and with correct perspective.

The standard wide-angle objectives, which have a plane image field, are limited by the so-called cosine-law (4th power) which causes a decrease of light flux so that it is generally prohibitive to exceed an angle of 90° to any considerable extent with these objectives. It is noteworthy that the Goerz Hypergon has been up to approximately 140°. This, however, was possible only with the help of a specially constructed stop. More recently constructed objectives, based on the findings of R. Hill, permit projection from the object area up to 180° without excessive decrease of light flux. These objectives have a strong barrel-shaped distortion and generally need a rectification.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
649	V 1937 No. 3	1/5.6	7.5 cm	15	b-curves calculated for two different stop-positions	1151
651	V 1937 No. 10	1/3.5	24 cm	5°	For this objective, compare remark pertaining to ~~No. 640~~, card No 908	1210
652	V 1938 No. 22	1/4.5	13.5 cm	6		1247
653	Kapella	1/5	10 cm	5	British patent 22,709	1255
654	Magnar	1/10	45 cm	7		745
655	Kino-Tele-Tessar	1/4	15 cm	2.5 ~~7.5~~	(Motion picture T. T. ~~Contrary~~ to the normal Tele-Tessar, this objective only has an image field of 40°	842

See Insert I attached In contrast

WIDE-ANGLE OBJECTIVES

~~The designation~~ wide-angle objectives comprises a group of (The objectives) having an image field diamter considerably exceeding the focal length in the focal plane.

~~Already as early as the middle and the end~~ of the 19th century, research ~~and experiments have been conducted~~ to develop types of objectives ~~corresponding to~~ these requirements.

Attention is called to the "Protar" 1::8 constructed by P. Rudolph as well as to the "The Panoramic Lense" of Th. Sutton, who developed a lense of Confocal spheric surfaces, thus achieving at the same time a spherically confocal image field.

Recent research in Boston proved the possibility ~~to place~~ this spheric image field into the plane with good sharpness and correct perspective.

The standard wide-angle objectives, which have a plane image field, are limited by the so-called cosine-law (4th power), causing a decrease of light flux, so that it is generaly prohibitive to exceed an angle of 90° to any considerable extent with these objectives. It is noteworthy, however, that the Goerz-Hypergon has been up to approximately 140°. This, however, was possible only with the help of a specially ~~constructed~~ stop. More recently constructed objectives, based on the findings of R. Hill, permitted projection from the object area up to 180° without excessive decrease of light flux. These objectives, however, have a strong barrel-shaped distortion and generally need a rectification.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
656	Wide-Angle Objectives	1/5.5	100 mm	50	These two types are said to be developed for objectives allowing an angle of over 200°. (Produced by A. E. G. (Allegemeine Elektrizitaets-Gesellschaft, Berlin)	1058
657	Wide-Angle Objectives	1/5.5	10 cm	50		1059
658	V 1936 No. 6	1/6	2.5 cm	40	The six possibilities of image reflection resulting from two-fold reflections at the (4) glass air surfaces of this objective are all located in front of the stop, and can thus not disturb the image area.	1128
659	V 1935 No. 2	1/6.2	10 cm	55	Cards Nos. 1241, 1226, and 1215 describe the same type of objective	1083
660	V 1935 No 16	1/6.3	2.5 cm	55		1094
661	Protar	1/6.3	210 mm	50	(Next Design)	56
662	Wide-Angle Objective	1/6.3	66 mm	45	"Tobogon" ~~German~~ (Regt. Design) ~~1,380,601~~	1241
663	C. Zeiss	1/6.3	75.9 mm	45	~~These three cards describe one and the same type of objective~~	1226
664	C. Zeiss	1/6.3	66 mm	45		1215
665	AEG. ~~No. 420,596~~	1/6.3	1.7 cm	100	Wide-angle objective for over 180°	1121
666	V 1937 No. 4	1/6.3	2.5 cm	35		1154
667	V 1937 No. 1	1/6.3	2.5 cm	35		1153
668	V 1935 No. 16 5	1/6.3	2.5 cm	50	"Perimetar"	1098
669	V 1936 No. 18	1/6.8	1.6 cm	90		1143
670	Sphaerogon	1/7	4.1 cm	70		1117
671	Sphaerogon	1/8	36.2 mm	95		1114
672	Sphaerogon	1/8	36 mm	90		1113
673	Wide-Angle Objective	1/8	3.8 cm	90		1097
674	Goerz Wide-angle Dagor objective	1/9	10 cm	50	These objectives rendered good services up to 100°.	827
675	Goerz Wide-Angle Objective	1/9	100 mm	40	~~Goerz patent 388,636~~	617

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers
676	M. André Lévy	1/9	10 cm	55	French patent 816,614	1222
677	Protar	1/9	150 mm	35		158
678	New Type of Protar	1/9		35		120
679	New type of Protar	1/9		35		119
680	Anastigmat	1/9	150.18 mm	35	Spherically and anastigmatically calculated for d and g'	99
681	Protar	1/9	150 mm	30		98
682	V 1935 No. 12	1/8	3.8 cm	90		1082
683	Protar	1/12.5	18 cm	50		324
684	Protar	1/12.5	150 mm	50		109
685	New Type Protar	1/14	180 mm	30	This card in original and duplicate	117
686	New type Protar	1/14		35	(Calculated, but not constructed)	118
687	New Type Protar	1/15		50		105
688	Wide-Angle "Lynkeioskop"	1/15	100 mm	50		724
689	V 1931 No. 25	1/15	30 cm	30		951
690	R & I. Beck, (Hill)	1/16		50	British patent 225,898	1068
691	Rodenstock "Pantogonal"	1/18		50		126
692	Protar	1/18	390329 mm	40		558
693	V 1932 No. 18	1/7.7	10.5 cm	45	With one aspheric surface	970
694	Protar	1/18	141 mm	50		159
695	"Protar"	1/18	182 mm	45	With decreased secondary spectrum	123
696	"Protar"	1/18	141 mm	40		110
697	Rodenstock "Pantogonal"	1/18		45	German patent 167,224	106
698	Protar	1/21	63 cm	30	With front stop	430
699	Hypergon	1/22	6 cm	67	(Produced by Zeiss)	725
700	Pantoskop	1/30	206.7 mm	40	Produced by the Busch Co.	936

HIGH - SPEED OBJECTIVES

701	V 1935 No. 20	1/0.65	6.5 cm	10	Sections through the optical axis not shown demonstrated on this card. The compiler of these data remembers that this objective had an image field of approximately 15° at an aperture ratio of 1/0.65, with a negative ~~flanishing length~~. This was the objective of highest light transmitting capacity ever constructed by the Zeiss works.	1096
702	R-Biotar, (X-ray Biotar)	1/0.85	7.5 cm	6.5	This objective was constructed by the Janker Co., Bonn, for X-ray motion picture photography, and proved to be very useful. It is similar to the objective discribed in German patent 607,631 of the year 1932, and represents a good demonstration of the sensitivity with regard to correction of the objectives location. The card lists spherical longitudinal aberrations for image scales 1:∞, 1:20,	1156
703	R-Biotar, (X-ray Biotar)	1/0.85	12.6 cm	5	This demonstration is listed on two cards, image scales of spherical longitudinal aberrations are listed 1:9.5 for ∞, 1:20,	1134
704	R-Biotar (X-ray Biotar)	1/0.85	12 cm	6.5	title see also data on card 1156	1135
705	V 1931 No. 35	1/0.99	5 cm	6.5	German patent 607,631 and U. S. patent 1,967,836 of 7/24/34. See card 1156	927
706	Kapella	1/1	1 cm	5	British patent 419,552 (Horace W. Lee)	1089
707	Dr. P. Rudolph	1/1	10 cm	5	This demonstration on two cards	897
708	Kapella	1/1	1 cm	10	British patent 419,552 (Horace W. Lee) U. S. Patent 2,012,822 of 8.27.35	1081
709	A. Jackenbroll	1/1	100 mm	5		1041
710	Pro-Anastigmat	1/1	35 mm	2.5	H. Ernamann, Dresden	325
711	Kapella	1/1.4	10 cm	10	U. S. patent 1,955,617	1063
712	Minor	1/1.4	4 cm	15	U. S. patent 1,877,355	1005
713	V1930 No. 8	1/1.4	2.5 cm	15		871
714	Gramatzki	1/1.4	10 cm	10		945
715	V 1930 No. 9	1/1.4	2.5 cm	3	A telescope objective	866
716	Kapella	1/1.5	10 cm	5	British patent 258,092, II example II	789
717	Kapella	1/1.5	10 cm	5	British patent 258,092, I example I	788
718	Hugo Meyer, Goerlitz	~~1/1.0~~ 1/1.5	10 cm	15	French patent 805,679	1225
719	M. R. Berthon	1/1.5	6.5 cm	5	French patent 557,460	621
720	Section thru optical axis of U.S. patent 1,098,623	1/1.7			(Chas. C. Minor)	382

Image scales of spherical longitudinal aberrations are listed for 1/∞, 1/20, 1/12, and 1/9.5 example 1:14, 1:20.

field flattener

drawing is shown

Cor.s. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of converage degrees	Remarks	Zeiss Numbers No.
721	Biotar	1/1.8	5 cm	5	Petzval System, ~~together~~ with a Smythiensf, and therefore designated as a Biotar. ~~Due to the short intercept of it's focal point~~ and the resulting limited useability, this objective was only utilized for cameras on a relatively small scale	564
722	Wm. Lee & Kapella	1/1.8	10 cm	10	~~British patent 299,265~~	852
723	Rodenstock	1/1.6	10 cm	10	~~German registered design 1,374,430~~	1166
724	Symmetric objective	1/1.8	100 mm	15	Patent applied and refused	603
725	Kipro-anastigmat	1/1.9	9.5 cm	10	Ernostar type objective	1167
726	Jos. Schneider & Co., Berlin	1/1.9	100 mm	13		1243
727	V 1930 No. 5	1/1.9	2.5 cm	10		859
728	Zeiss Ikon	1/1.9	10 cm	10	~~German patent 481,830 of 12/18/27~~	853
729	Busch	1/2.48	193.44 mm	5	The focal lengths adjustable by adjusting the central component	1077
730	Feuillet	1/2	10.5 cm	5	~~French patent No. 1049,258~~	1066
731	Zeiss Ikon	1/2	10 cm	18	~~French patent No. 786,127 of 2/25/35~~	1157
732	C. W. Frederick	1/2.2	100 mm	5	~~U. S. patent 1,620,337 of 3/8/27~~	822
733	Dr. Paul Rudolph	1/2	100 mm	10		646
734	Leitz	1/2.5	100 mm	10	~~French patent 822,753 of 6/7/37~~	1253
735	~~Symmetric objective~~ (Dr. P. Rudolph)	1/2.5	100 mm	5	Symmetric objective	604
736	H. D. Taylor	1/2	100 mm	25	~~British patent 5,799-12~~	339

BIOTESSARS, UNARS, HELIARS AND OTHER OBJECTIVES BASED ON THE COOKE LENSE

737	V 1938 No. 16	1/1.5	7 cm	13		1236
738	V 1923 No. 3	1/1.75	8.5 cm	10	Similar to "Biotar III"	607
739	E. Leitz, Wetzlar	1/1.8	100 mm	20	Similar to "Hektor"	922
740	V 1937	1/1.9	1.25 cm	8	Similar to "Biotar III"	1170
741	V 1923 No. 2	1/1.90	7 cm	10	Similar to "Biotar III"	606
742	V 1922 No 6	1/1.95	7.5 cm	10	Similar to "Biotar III"	599
743	W. Behrke, Dresden	1/2	100 mm	10		608
744	V 1923 No. 6	1/2	85 mm	10	See also data on card No. 608	609
745	Willy F. Bielicke, Berlin	1/2	100 mm	8	~~U. S. patent 1,540,752 of 6/9/25~~	674
746	Optical Works, Ruedersdorf	1/2.0	10 cm	20		780
747	Kapella	1/2.5	25.4 mm	17	~~French patent 593,855~~	766
748	Bielicke	1/2.5	10 cm	20	~~U. S. patent 1,888,156~~	979
749	Bielicke	1/2.5	10 cm	20		979a
750	V 1931 No. 19	1/2.8	5 cm	8		892
751	Zeiss Ikon	1/2.8	10 cm	20	~~British patent 383,591 of 11/17/32~~	978
752	Voigtlaender	1/2.8	10 cm	22.5	~~German patent 696,166 of 10/5/36~~ Heliar	1123
753	V 1938 No. 6	1/2.8	5 cm	21		1224
754	V 1938 No. 23	1/2.8	5 cm	20	See ~~also~~ card No. 1221	1249
755	V 1926 No. 3	1/2.9	14 cm	21	See ~~also~~ card No. 735	701
756	V 1926 No. 3	1/2.9	14 cm	21	~~The last two cards describe one and~~ the same test objective of the Heliar type. Cards Nos. 701 and 735 describe	735
757	Cemented Dialyt, Form II					
	~~II, Composed of 5 lenses~~	1/3		26	Composed of five lenses	680
758	~~U. S. Patent Office~~	1/3		20	~~Patented for Barnes and Booth~~ Heliar	637
759	L. D. Booth	1/3		20	~~British patent 151,506 of 9/30/20~~ Heliar, compare with card No. 637	552
760	V 1931 No. 8	1/3.2	2 cm	10	Biotessar, similar to the Heliar	394
761	Voigtlaender Triple anastigmat	1/3.3			~~German patent 124,934~~ Basic patent for "Dynar", Heliar and Oxyn, the latter ~~one~~ was produced as a reproduction objective for a limited period only	4
762	Voigtlaender, Heliar	1/3.5	21 cm	21		563
763	Dialyt ~~composed~~ of 5 lenses	1/3.5	115.89 mm	26		673
764	V 1937 No. 26	1/3.5	5 cm	22½		1204
765	H. D. Taylor	1/4		15	~~British patent 15,107-95 Fig. 7~~	141
766	Voigtlaender, Heliar	1/4.5	100 mm	21	Calculated for n = ∞ and n= 1:1	36
767	Voigtlaender, Triple anastigmat	1/4	100 mm	26	This ~~demonstration~~ drawing is identical with ~~the one mentioned under consecutive~~ Card No. 4 ~~number~~ 761. The remarks made in connection with this objective also apply to this card, which Zeiss therefore ~~also~~ marked as No. 4.	4

Cons. No.	Name of Objectives	Ap. Ratio	Focal length		Half angle of converage degrees	Remarks	Zeiss numbers No.
768)	H. Harting ~~Calculated app. Ratio abt~~	1/4			23	U. S. ~~patent 766,036 of 7/26/04~~ German ~~patent 154,910~~	82
769)	Rodenstock "Eurygonal"	1/4.3			22.5	Data taken from "Phot. Kunst" 1906/07 p. 377 ~~German patent 192,546 of 8/8/06~~	121
770)	Unar	1/4.5	145	mm	22	Two curves of meridional coma for inclination of pencil of rays calculated for 14.6 and 20.9 and aperture ratio of 1:6.3	
770a)	Jos. Schneider	1/2.9	10	cm	23	U. S. ~~Patent 2,076,686 of 4/13/37~~	17
770b)	V 1938 No. 17	1/2	6	cm	15		1147
770c)	V 1938 No. 11	1/2.0	5	cm	18		1239
770d)	V 1938) No 7	1/2.0	5	cm	18		1233
~~771a~~)	Kapella	1/1.4	10.5	cm	5	U. S. ~~Patent 1,955,617~~	1214
771)	Ross	1/4.5	100	mm	25	~~British patent 29,637-13 of 12/23/13~~ See also card No. 387. Ross ~~Limited~~ Ltd, London, designated the objectives covered by this patent as "Xpress-Lens." Construction differs from Zeiss's Tessar in so far as the cemented component of the Xpress Lens is composed of three lenses, whereas the Tessar has only two lenses in this component.	1092 ~~546~~
771a)	Ross Xpress	1/4.5	6	in.	26		546
772)	Heliar	1/4.5	15	cm	26		387
773)	V 1936 No. 4	1/4.5	8.5	cm	10		699
774)	Astro-Unar	1/5	600	mm	6	Curve from original coma, aperture ratio 1/6, and inclination 5.17° are demonstrated ~~shown~~	1118
775)	H. D. Taylor	1/5			20	~~British patent 22,607-93 Fig. 9~~	58
776)	Tasto-Unar ~~(Aperture 120 mm)~~	1/5.3	639.3	mm	6	~~German patent 81,625 Fig. 19~~ Aperture 120 mm	137 50
777)	Olor	1/6	500	mm	22.5	Made by Lacour-Berthiot	431
778)	H. Harting ~~app~~	1/6			10	~~U. S. patent 765,006 of 7/12/04~~ ~~German patent 154,910~~ ~~British patent 22,157-10 filed 1904~~	83
779)	C & H. C. Beck	1/6.3	100	mm	4	The Beck Air-lens of the Unar was replaced by a converging cemented surface to ~~Alliminate~~ eliminate disturbing reflections. This development led to the construction of the Tessar	306
780)	Unar	1/6.3	147	mm	21		
781)	Unar	1/6.3	145	~~mm~~ cm	21	ditto.	18 16

The Beck Air-lens of the Unar was replaced by a converging cemented surface to eliminate disturbing reflections, this development led to the construction of the Tessar

DOUBLE OBJECTIVES WITH COMPONENTS OF VARIOUS CONSTRUCTIONS

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of converage degrees	Remarks	Zeiss Numbers No.
						Single objective f = 527.1, Double objective f = 240.9	
782)	Rodenstock		240.87	mm	6		88
783)	Dr. R. Steinheil				12	Single objective f= 527.1 Double objective f= 240.9	5
~~784~~)	~~P. Rudloph~~						
784)	Dr. P. Rudolph	1/3.2	10	cm	20	~~British patent 261,326~~	782
785)	C. C. Minor	1/4	115	mm	10	~~U. S. patent 1,077,420~~	569
786)	Petzval's ~~cemented dialyt~~	1/5			15		
787)	Ernst Leitz, Wetzlar	1/6			23		112
788)	Dr. Paul Rudolph	1/3.8	10	cm	23		86
789)	Aldis, 1896 III	1/4			15		998
790)	Dr. P. Rudolph	1/5	100	mm	15	~~British patent 161,091 of 4/7/21~~ ~~Fig. 3, German patent 431,807 of 1/13/21~~	195
791)	Rodenstock "Heligonal"	1/6			15		587
792)	Dr. P. Rudolph	1/6	100	mm	26	~~British patent 161,091 of 4/7/21~~	125
793)	Eastman Park	1/6	98.0	mm	20	~~U. S. patent 1,952,028 Fig. 2~~	589
794)	Dr. Rudolph	1/6	100	mm	25	~~German patent 456,912 of 3/5/25~~	715 824

Insert I page 24

Note Changes in Columns
Name of Object
+ Half Angle
3 Remarks
4 Zeiss No.
5 Page

CONVERTIBLE OBJECTIVES

Apart from perfecting photographic objectives by means of more or less useful additions of optical means, i.e., by increasing the number of lenses without any structural restrictions for front and back components, the optical efficiency has also been increased by combining two systems of lenses, each of which in itself represents a useful photographic objective. Such objectives, composed of two single lenses, have, as a rule, a considerably larger aperture ratio and a better correction of distortion than either of the two single lenses.

The more common possibilities of combining two separate systems of lenses are as follows: (1) Opposition of two symmetrical single lenses, equidistant from either side of the stop. These are the so-called symmetrical Double Objectives. (2) The composition of two geometrically similar single lenses of different focal lengths, the arrangement of the single lenses to the stop corresponding to the similarity-ratio; these objectives are termed semi-symmetric. (3) Combination of two photographic lenses, not geometrically similar, into one double objective.

Symmetric objectives were constructed by Steinheil as early as 1865. No further details will be given at this time, and a description of a number of ~~CONVERTIBLE~~ convertible Objectives ~~OBJECTIVES~~ from the Zeiss files will be presented. Wherever necessary for better understanding, additional information will be given. In the previous sections of this compilation, the order of aperture ratios ranging from large to smaller ratios ~~in this section~~ has been more or less followed; but this order is no longer maintained, due to the fact that the aperture ratios of single objectives, double objectives, symmetric objectives and semi-symmetric objectives do not permit this subdivision. The sequence of Zeiss' original card numbers has been used.

NOTE: The half angle of coverage is always indicated for the Double Objective only.

Cons. No.	Name of Objectives	Ac. Radio	Focal length	Half angle of coverage degrees	Remarks	Zeiss ~~Numbers~~ No.
795	Fred E Altman, (Eastman)	1/6	10 cm	15	~~U. S. patent 1,880,394~~	1004
796	Ernemann, Dresden	1/6.26	106.5 mm		~~German patent 294,796~~	399
797	Leitz, "Periplan"	1/6.3	200 mm	20		34a
798	Leitz, "Periplan"	1/6.5	200 mm	25		57
799	Leitz, "Periplan"	1/6.5	200 mm	32		34
800	Protar	1/6.5	199.1 mm	30		35
801	Unar-Doublet	1/6.5	183 mm	32		40
802	Protan	1/6.5	199.74 mm	27		46
803	Dr. Rudolph, "Tessar"	1/6.8	15 cm	30	Not the standard Tessar type	469
804	Rudar	1/6.8	126 mm	30		471
805	Kapella	1/6.8	123.5 cm		~~British patent 376,644 of 7/7/32~~	1065
806	Dr. P. Rudolph	1/7	100 mm	30	~~U. S. patent 1,391,161,091 of 4/7/21~~	592
807	Rodenstock, "Imagonal"	1/7		32	~~German patent 166,265~~	89
808	Rodenstock "Imagonal"	1/7		27	See also card No. 89	124
809	Ernemann, Dresden	~~1/7~~ 1/6.8	107.7 mm	30	~~German patent 294,607~~	400
810	E. Ross	1/7	98.02 mm	15	~~U. S. patent 1,352,028~~	698
811	~~U. S. Patent~~ Eastman	1/7	98.02 mm	15	Fig. 1. This ~~demonstration~~ similar to that ~~given~~ on card No. 698	713
812	Rudar	1/7.2	15 cm	30 ~~20~~		495
813	Rudar	1/7.2	14.4 cm	30		496
814	Rudar	1/7.2 ~~12.70~~	15 cm	25		511
815	Rudar	1/7.5	15 cm	30		489
816	Dallmeyer Stigmatic Lens III	1/7.5	15 cm	37	second example	374
817	Leitz, Periplan	1/7.8	200.16 mm	32	~~(2nd ex.~~ requested by patent office)	9
818	Leitz, Periplan	1/7.8	200.3 mm	32		7
819	Bausch & Lomb	1/8	187.6 mm	22	This card in original and duplicate	289
820	Conrad Beck & Courthope Beck, ~~app~~	1/8		25	~~U. S. patent 871,559~~	128
821	Leitz Periplan, ~~app~~	1/8		27	Data taken from British Journal 1899, p. 266	33
822	Bausch & Lomb	1/8	177 mm	27	~~This card~~ in original and duplicate	290
823	Bausch & Lomb	1/8		27	Modified ~~demonstration~~ of card 290. ~~Card No. 291~~ in original and duplicate	291 → 291
824	Protar	1/8	205 mm		For n = 1:1	41a
825	Protar	1/8	205 mm	28	Same objective as on the previous line, data on this card a little more explicit	41
826	Voigtlaender	1/10	500 mm	17	Reproduction Objective, ~~German patent 342,997~~ and ~~supplement 354,263 of 11/23/21~~	570
827	H. D. Taylor	1/16		30	~~British patent 1,991-99, of Jan. 1893~~	27

See insert I attached

~~SYMMETRICAL OBJECTIVES~~

Apart from perfecting photographic objectives by means of more or less useful additions of optical means, i.e., by increasing the number of lenses without any structural restrictions for front and back components, the optical efficiency has also been increased by combining two systems of lenses, each of which represents a useful photographic objective by itself. Such objectives, composed of two single lenses, have, as a rule, a considerably larger aperture ratio and a better correction of distortion than either of the two single lenses.

The more commonly used possibilities of combining two separate systems of lenses are as follows: (1) Opposition of two symmetrically single lenses, equidistantly on both sides of the stop. These are the so-called symmetrical Double Objectives. (2) The composition of two geometrically similar single lenses of different focal lengths, the arrangement of the single lenses to the stop corresponding to the similarity-ratio. These objectives are termed as semi-symmetric. (3) Combination of two photographic lenses, not geometrically similar to each other, into one double objective.

Symmetric objectives have already been constructed by Steinheil in the year 1865. We shall refrain to go into further details at this present time, and shall now proceed to describe a number of CONVERTIBLE ~~CONVERTIBLE SYMMETRICAL OBJECTIVES~~ OBJECTIVES will be presented, from the Zeiss files. Wherever necessary for better understanding, we shall add some additional information.

In ~~Contrary to~~ the previous sections of this compilation, in which we have more or less maintained order of aperture ratios ranging from large ratios to smaller ones, this order is no longer maintained in this section, due to the fact that the aperture ratios of single objectives, double objectives, symmetric objectives and semi-symmetric objectives do not permit this sub-division. We have therefore used the sequence of Zeiss' original card numbers.

NOTE: In the half angle of coverage is always indicated for the Double Objective only.

Cons. No.	Name of Objective	Half angle of coverage degrees	Remarks	Zeiss Numbers No.
828	C. Reichert, Wien	22	The single lenses of this objective are Gauss type lenses and consist of two Meniscuses, the interior one dispersing, the exterior one converging. The disparsing meniscus is composed of two lenses, cemented to each other and of opposite refraction power.	1
829	Steinheil Orthostigmat	15		6
830	C. P. Goerz, Double Anastigmat	20		14
831	Orthoprotar	20	Orthoprotars are very suitable as image measuring objectives, due to their excellent collection of distortion. They can be produced in a way that the distortion practicaly amounts to zero for a varity of image scales; i.e., they are stationary orthoscopic.	15
832	Goerz	27	~~British patent 3,618-03, U. S. patent 745,550 of 12/1/03~~	54
833	Protar ~~Set Lens~~	35		62
834	C. P. Goerz, ~~No. 5 Lens set objective~~	30		63
835	C. Reichert, Wien, ~~1st example~~	15	~~U. S. patent 849,900~~	64
836	C. Reichert, Wien, 2nd example	20		65
837	C. Reichert, Wien, 3rd example	20		66
838	E. Laitz	20	~~German patent 118,433~~	67
839	Protar ~~Lens~~	20	The Protar lenses were components of the protar sets. Maximum aperture ratios of the double objectives ranged from 1/6.3 to 1/7.7 depending on whether the objectives were symmetric or not. This card ~~and~~ original in duplicate	70
840	Protar ~~Lens~~, as above	30	This card shows Coma curves	70a
841	Dr. R. Steinheil	20	~~British patent 21,211-02~~	72
842	~~Deformed Set Objective~~	35	This is a symmetric objective with two aspherical exterior surfaces	73
843	Osker ~~Simon~~, Dresden	30		75
844	Deformed Set Objectives	35	See remark for ~~Cons. Number 842~~ Card No. 73,	78
845			" " " ~~842~~ Card No. 73,	79
846		30	" " " ~~842~~ Card No. 73	80
847	Oscar Heimstaedt, Wien		~~German patent 189,255 of 10/28/07~~	101
848	C. P. Goerz		~~American Patent 171,369~~	102
849	H. D. Taylor	30	~~British patent 24,391-05~~	108
850	O. Heimstaedt	30		122
851	C. F. Luh-Davis		~~British patent 18,073-06~~	127
852	C. P. Goerz, double astigmat	17.5		129
853	C. P. Goerz, double astigmat	29		130
854	Ernst Gundlach, Berlin		~~German patent 194,546~~	132
855	C. P. Goerz, ~~1st example~~	22	This type of lenses was the bases for Goerz's "Celor",	166
856	C. P. Goerz, ~~2nd example~~	22	"Syntor", and "Dogmar" with the Dogmar 1/4.5, this group	167
857	C. P. Goerz, ~~3rd example~~	20	of objectives achieved it's highest optical capacity and with Dogmar 1/3.5 the highest degree of light-transmitting capacity. Dogmars 1/4.5 are made available in three different focal lengths, viz:- that of the double objective and those of the two single lenses ~~which, differ from each other~~	168
858	Dr. Schroder	12		193
859	Berthiot, Paris, Porigraphe Symmetrique	40		196
860	Orthoprotar	37	See remark pertaining to ~~Cons. No. 831~~ Card No. 15	226
861	Double Amatar	27	The double objective is holo-symmetric	238
862	Double Amatar	28	The double ~~ditto~~ objective is holo-symmetric	239
863	Cristopher Graf, (~~original and duplicate~~)	16	~~U. S. patent, 981,112 of 12/24/09~~	247
864	Goerz-Dogmar (original and duplicate) Original more explicite	16	~~U. S. patent, 1,108,307-1913~~, See remarks ~~given~~ for with ~~Cons. Nos. 855-57~~ Card No. 166.	298
865	Goerz-Celor	24	~~German patent, 202,089~~ see also cons. No. 2 for remarks	301
866	Goerz-Celor	26	~~American patent 100,209~~ ~~855 57~~ ~~German patent No. 202,089~~	302
867	Double Protar	30		312
868	~~Set Lens~~	35	Second and ~~the~~ next to the last lenses of this double objective made of Fluorite	317
869	Graf-Lens, modified by ~~B & L~~	23		320
870	Eastman ~~objective~~	22		322
871	Maximar	25		326
872	Maximar	27		327
873	Maximar	24	Modifications of ~~Modified dem notration of~~ the previous card (327)	328
874	C. P. Goerz	15	~~German registered design 589,975(6/26/12)~~ See also Reference Eder's hand book, ed. 1913, p.112. For U. V. Photography with the help of silver filters at λ = 313	368

Cons. No.	Name of Objective	Half angle of coverage degrees	Remarks	Zeiss Numbers
875	Orthoprotar	~~15~~ 30	See remarks given for Cons. No. 831	370
876	Linear Anastigmat, Rietzschel, ~~Munchen~~	25	(This card out of Zeiss's consecutive numeration)	353
877	~~Set Lens~~ (with ~~deformed~~ aspherical surfaces)	17	~~German patent 282,015~~	384
878	Goerz, Dogmar (This card in duplicate)	25	Three focal lengths available for front and back component of this objective	385
879	Goerz, Artar	15	A reproduction projective, construction similar to the Dogmar	388
880	Eastman Kodak Co	23	~~U. S. patent 1,160,148 of 11/16/15~~ Construction similar to Dogmar	410
881	Cooke, Aviar ~~Lens~~	25	~~Card Nos. 422a, 432, 432a, 445, 445a, 455~~	422a
882	Cooke, Aviar ~~Lens~~	25	In connection with the ~~five~~ last ~~demonstrations~~, see copy of a report taken from "The Photographic Dealer" ~~ed~~ July, 1920 p III, attached to card No. 445	432
883	" " "	25		432a
884	" " "	25		445
885	" " "	25		445a
886	C. P. Goerz	27	~~German patent No. 107,358~~	455
887	Dr. P. Rudolph	27	~~German patent applied for 3/24/1918~~	456
888	~~Set Lens~~ I Convertible Objective	27		464
889	" II Convertible Objective	26		466
890	" III Convertible Objective	25		468
891	" V 1919 No. 1 Convertible Objective	30		487
892	Rudar ~~Lens~~	35		488
893	Goerz Convertible Objective	35	~~German patent 107,358~~	493
894	~~Set Lens~~ V 1919 No. 5 Convertible Objective	30		499
895	~~Set Lens~~ V 1919 No. 6 Convertible Objective	30		504
896	~~Set Lens~~ Convertible Objective	30		505
897	~~Set Lens~~ V 1919 No. 8 Convertible Objective	30		507
898	~~Set Lens~~ V 1919 No. 9 Convertible	33		508
899	Rodenstock, ~~Munchen~~ Objective	27	~~German patent 321,069~~	513
900	~~Set Lens~~ Convertible Objective	32		521
901	~~Set Lens~~ Convertible Objective	37		522
902	~~Set Lens~~ V 1919 No. 15 Convertible Objective	30		523
903	Double Anastigmat Plasmat Rodenstock, Convertible	20		525
904	~~Set Lens~~ V 1920 No. 1 Objective	30		528
905	~~Set Lens~~ V 1920 No. 3 Convertible	30	~~German patent 386,346~~	530
906	~~Set Lens~~ Convertible Objective	30	Construction similar to the Double Plasmat	534
907	Rietzschel, Dialyt	25	Double objective composed of two Gauss Lenses	537
908	Double Anastigmat (Meyer)	27	Construction similar to the Dagor	539
909	Kodak Anastigmat	22	Construction similar to the Dagor	541
910	Kodak Anastigmat	25	Construction similar to the Dagor	542
911	~~Set Lens~~ V 1920 No. 5 Convertible	30	Construction similar to the Double Plasmat	543
912	~~Deform Set Lens~~ Objective Deformed Convertible Objective	27	The two exterior surfaces of the double objective are aspheric	545
913	Kodak Anastigmat	25		546
914	~~Set Lens~~ Convertible Objective	28	~~British patent 29,636-1913~~	547
915	Double Amatar, ~~with compensation~~			
916	~~plate~~ V 1920 No. 8	30	With compensation plate	548
917	Kodak Anastigmat	24		549
	This shows lens specifications pertaining to ~~Demonstration~~ shown on drawing card No. 542			550
918	Protar ~~Lens~~	27		561
919	Goerz	27	~~German patent 74,437 of 12/20/92~~ Original form of the Goerz "Dagor"	565
920	Steinheil	23	~~German patent 346,029~~ Construction similar to Dogmar	566
921	A. A. Smith, Bromley	50	~~British patent 133,459 of 10/30/19~~	588
922	Rodenstock Convertible Objective	25	~~German patent 368,465 2nd ex.~~ Construction Similar to Dogmar	594
923	Gehrke, Dresden	35	~~German registered design 789,443 of 9/12/21~~	600
924	~~Set Lens~~ V 1923 No. 7	30		610
925	Rodenstock	26	~~German patent 366,288~~ Construction similar to the Dagmar	613
926	Christopher Graf	5	~~British patent 194,608~~ Construction similar to the Dagmar	619
927	V 1922 No. 4	30		622
928	~~T. T.~~ & Hobson Taylor, Taylor	28	~~British patent 165,657 of 7/7/21~~ Unsymmetrical ~~Set Lens~~ Convertible Objective	623
929	M. Zwillinger Taylor, Taylor	21	~~U. S. patent 1,235,895~~	658
930	~~T. T.~~ & Hobson	25	~~French patent 489,140, 1st ex.~~	659
931	~~T. T.~~ & Hobson Taylor, Taylor	15	~~French patent 489,140, 2nd ex.~~	660
932	Rodenstock	24.5	~~German patent 368,465 2nd ex.~~ Similar to the Dogmar	661

Cons. No.	Name of Objective	Half angle of coverage degrees	Remarks	Zeiss ~~Numbers~~ No.
933	~~Cat Lens. (See also V1920 No. 4~~	36		662
934	C. W. Frederick, and F. E. Ross	25	~~U. S. patent 1,306,958~~ Construction similar to Dogmar	666
935	Du Motel	5	~~French patent 552,080~~ Construction similar to the Dogmar	696
936	Ames	5	~~U. S. patent 1,492,503~~	720
937	Dagor	37		722
938	Quartz Anastigmat	20	For U.V. Photography, focal length for $\lambda = 340\ \mu\mu$	730
939	Dagor	27		731
940	Dogmar	23.5		732
941	Geodar	30	Derived from the Dagor objective	737
942	Kodak, Anastigmat	24	Construction similar to Dogmar	748
943	Helostar	25	Construction data calculated by Zeiss	751
944	Agfa Double Anastigmat	26	Construction data calculated by Zeiss	753
945	Dogmar	20		759
946	Kodak Anastigmat	23	Construction similar to Dogmar.	767
947	Four-Lens Objective (Goerz)	24	Construction data calculated by Zeiss	774
948	Kapella	30	~~British patent 260,801 of 11/11/26~~	792
949	Geodar with compensation plate	30	Object for photogrammetry	808
950	C. P. Goerz	29	Similar to the Dogmar. See British Journal of Photography ed. 1898, p. 570	925
951	Geodar for compensation plate 3 mm	30	For Photogrammetry	930
952	Jos. Schneider & Co.	30	~~German patent 579,288 of 7/3/30~~	985
953	V 1932 No. 9	30	This objective is fitted with a thick glass plate between objective and image for correction of distortion	986
954	Meniscus Objective	20	With aspheric surface	987
955	V 1933 No. 2	18	With two aspheric surfaces. ~~compare with previous demonstration~~	990
956	Meniscus Lens	17	With one aspheric surface	1026

~~THE FOLLOWING POSITIONS START WITH A NEW NUMERICAL SEQUENCE OF ZEISS'S CARD NUMBERS. THESE ARE AND ARE ALSO DISCRIPTIONS OF SET OBJECTIVES.~~

Cons. No.	~~Name~~ of Objective	Half angle of coverage ~~degrees~~	Remarks	Zeiss ~~Numbers~~ No.
957	Emil Busch, Rathenow	20	~~British patent 19,504 1901~~	3
958	" "		No data given, see card ~~number~~ 3	3a
959	Hugo Meyer, Aristostigmat	25	~~German patent 125,560 of 4/4/1900~~	10
960	Planar	20	Double objective composed of two Clauss objectives. See also card No. 29a	29
961			See card No. 29	29a
962	Apochromat-Planar	20	A reproduction objective	37
963	Rodenstock	30	Double objective composed of two Clauss objectives	84
964	Rodenstock	10	Projection objectives. German registered design 262,201	100
965	New Protar ~~Lens~~	40	~~German patent 196,734~~	103
966	" " "	25	~~German patent 196,734 2nd Example~~	104
967	" " "	30		113
968	" " "	30		114
969	" " "			115
970	" " "	25		116
971	Meyer Aristostigmat	20	Composed of two different Clauss objectives	151
972	Orthoprotar	35		161
973	C. P. Goerz	30		162
974	C. P. Goerz		Same objective as above, with modified patent specifications	163
975	C. P. Goerz			165
976	Voiglaender, Apochromat-Collinear	5	A reproduction objective	194
977	A. H. Rietzschel, ~~München~~			199 ~~199~~
978	Ross, Homocentric	25		200
979	Protar, ~~Lens IV~~ Series IV	10		205
980			Slight modification of ~~the above mention objective~~	207
981	Double Amatar III	30		213

Cons. No.	Name of Objective	Half angle of coverage degrees	Remarks	Zeiss Numbers
982	Double Amatar III	35		214
983	Double Amatar III	35	With Quartz Lens - German patent 242,170, ex. 2	219
984	Protar Lens c	35		220
985	Double Amatar III	30		222
986	Double Amatar III	30	Duplicate of the above mentioned card	222
987	Protar, Lens c		See also card No. 224 a	224
988	" "		See also " " No. 224	224a
989	" " IV	28-30		237
990	Reichert, Neucombinar	30	This card in original and duplicate	240
991	Set Lens	40		241
992	Double Amatar	28-30		242
993	Maximar	28-30		244
994	Maximar (Ica)	34-35		245
995	Maximar	27	Control calculation for objective demonstrated on card No. 244	246
996	Maximar	28-27		248
997	Reichert	21		249
998	Hekla Anastigmat	25	Double objective composed of two Gauss objectives	250
999	Maximar	28		252
1000	" Maximar		With barite crown of highest refraction power	253
1001	" Maximar	27		254
1002	Staeble Objective	27	Double objective composed of two different Gauss objectives	259
1003	Hekla Anastigmat II	28		261
1004	Goerz Tenastigmat	30	Similar to the Dogmar	267
1005	Graf Lens	23-24	Similar to the Dogmar. This card in original and duplicate	288
1006	Goerz Double anastigmat "Dagor"	28 -	Similar to the Dogmar	297
1007	Hekla Anastigmat	28	Gauss double objective	315
1008	"Hekla" Anastigmat	28	← Gauss double objective	329
1009	V 1913 XV	28	← Gauss double objective	330
1010	Symmetrical Gauss Objective	28	← Gauss double objective	331
1011	Krauss Anastigmat	27	← Gauss double objective	332
1012	V 1913 XVII	27	← Gauss double objective	338
1013	Ernamann Double Anastigmat	27	← Gauss double objective	371
1014	Staeble, Choroplast	25	← Gauss double objective	450
1015	Gauss Objective with small spherical zones		Reference to See "Central-Zeitung f. Optik u. Mechanik" ed. 1905, p. 68	467
1016	Ross Homocentric Lens c	25		474
1017	Gauss Objective with small spherical zones		See remark for card No. 467	478
1018	Symmetrical Objective (Dr. Paul Rudolph)	10	German patent 401,630	605
1019	Dr. Paul Rudolph, Gauss Double Objective c		" " 402,223, ex. No. 1 complete	676
1020	Dr. Paul Rudolph, Gauss Double Objective c	25	" " 420,825	677
1021	Dr. Paul Rudolph, Single Gauss Objective			678
1022	Zeiss	5		771
1023	Kapella	15	U. S. Patent 1,779,257	805
1024	Gallus Objective	25		870
1025	New Protar Lens IV	35		960
1026	Deformed Objectives V 1936 No. 10	27	Double objective with aspheric external surface	1125
1027	Apo-Planar	15		1169
1028	Kapella	25		1209

Cons. No.	Name of Objective	Half angle of coverage degrees	Remarks	Zeiss Numbers
982	Double Amatar III	35		214
983	Double Amatar III	35	With Quarte Lens - ~~German patent 242,170~~	219
984	Protar, ~~Lens~~	35		220
985	Double Amatar III	30		222
986	Double Amatar III	30	Duplicate of the above ~~continued~~ card	222
987	Protar, ~~Lens~~ Series VII		See also card No. 224 a	224
988	" " " ← Protar		See also " " No. 224	224a
989	" " " IV ← Protar, Series V ~~28~~ 30			237
990	Reichert, Neucombinar	30	This card in original and duplicate	240
991	~~Set Lens~~ Symmetrical Objective	40		241
992	Double Amatar	~~28~~ 30		242
993	Maximar	~~28~~ 30		244
994	Maximar (Ica)	~~34~~ 35		245
995	Maximar	27	~~Control~~ calculation for objective ~~demonstrated~~ on card No. 244	246
996	Maximar	~~28~~ 27		248
997	Reichert	21		249
998	Hekla Anastigmat	25	Double objective composed of two Gauss Objectives	250
999	Maximar	28		252
1000	" Maximar		With Barite crown of highest refraction power	253
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1003	Hekla Anastigmat II	28		261
1004	Goerz Tenastigmat	30	Similar to the Dogmar	267
1005	Graf ~~Lens~~	23-24	Similar to the Dogmar. This card in original and duplicate	288
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1007	Hekla Anastigmat	28	Gauss double objective	315
1008	"Hekla" Anastigmat	28	← Gauss double objective	329
1009	V 1913 XV	28	← Gauss double objective	330
1010	Symmetrical Gauss Objective	28	← Gauss double objective	331
1011	Krauss Anastigmat	27	← Gauss double objective	332
1012	V 1913 XVII	27	← Gauss double objective	338
1013	Ernamann Double Anastigmat	27	← Gauss double objective	371
1014	Staeble, Choroplast	25	← Gauss double objective	450
1015	Gauss Objective with small spherical zones		See "Central-Zeitung f. Optik u. Mechanik" ed. 1905, p. 68	467
1016	Ross Homocentric ~~Lens~~	25		474
1017	Gauss Objective with small spherical zones		See remark for card No. 467	478
1018	Symmetrical Objective (Dr. Paul Rudolph)	10	~~German patent 401,630~~	605
1019	Dr. Paul Rudolph, Gauss Double ~~Objective~~		~~German patent~~ 402,223, ~~Cl. No. 1~~	676
1020	Dr. Paul Rudolph, Gauss Double ~~Objective~~	25	~~German patent~~ 420,825	677
1021	Dr. Paul Rudolph, Single Gauss ~~Objective~~			678
1022	Zeiss	5		771
1023	Kapella	15	~~U. S. Patent 1,779,257~~	805
1024	Gallus Objective	25		870
1025	New Protar ~~Lens~~ IV Series IV	35		960
1026	~~Reformed~~ Objectives V 1936 No. 10	27	Double objective with aspheric external surface	1125
1027	Apo-Planar	15		1169
1028	Kapella	25		1209

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LENSES AND TELESCOPES, SUPERIMPOSED ON OBJECTIVES FOR VARIATION OF FOCAL LENGTH

The best universal objectives, as, for instance, the Tessar, are constructed unsymmetrically. It is, therefore, in the majority of cases impossible to photograph with individual components of these objectives, in contrast to convertible objectives which permit photography with each of the component parts of the double objective.

When lenses are superimposed, they must be free of all disturbing flaws in order to avoid detrimental influences on the sharpness of the image of the photographic objective ~~caused by these superimposed lenses.~~ In the great majority of cases these superimposed lenses are of simple construction; they are cheap, available, and suitable for vignetting. The superimposed lenses will introduce color defects into the image, and to avoid these the objective has to be stopped down more or less whenever this simple type of lens is superimposed. To achieve a presentable image field with a certain degree of sharpness, the astigmatism of the superimposed lenses must be eliminated so far as possible. The Distars and Proxars, the former for extending the focal length, the latter for shortening ~~the focal length~~ it, are calculated in such a way that the principal rays passing through the entrance pupil of the objective on which the additional lenses are superimposed do not cause additional astigmatism in the total combination of objective and superimposed lenses.

This consideration leads to the meniscus shape of these superimposed lenses.

By superimposing these lenses, the quality of the image is impaired. It is generally impossible to attain, with the total arrangement of objective and superimposed lens, an angle of coverage exceeding that achieved by the objective without the superimposed lens.

For this reason, no figures have been given in this section under the heading "Half Angle of Coverage."

LENSES AND TELESCOPES, SUPERIMPOSED ON OBJECTIVES FOR VARIATION OF FOCAL LENGTHS

The best universal objectives, as, for instance, the Tessar, are constructed unsymmetrically. It is, therefore, in the majority of cases impossible, to photograph with individual components of these objectives, contrary to double objectives composed of Set-Lenses, which permit photography with each of the component parts of the double objective. By superimposing lenses, detrimental influences on the sharpness of the image of the photographic objective, caused by these superimposed lenses, these latter ones would have to be free from all disturbing flaws. In the great majority these superimposed lenses are of simple construction; they are cheap, easily available and favorable with regard to vignetting. The superimposed lenses will naturally introduce color defects into the image, and in an endeavor to avoid these the objective has to be stopped to a major or minor extent whenever this simple type of lenses is superimposed. To achieve a presentable image field with a certain degree of sharpness the astigmatism of the superimposed lenses has to be eliminated as far as possible. The Distars and Fromars, the former ones for extending the focal length, the latter ones for shortening the focal length, are calculated in such a way that the principal rays passing through the entrace pupil of the objective, on which the additional lenses are superimposed, do not cause additional astigmatism in the total combination of objective and superimposed lense.

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For this reason, no figures have been given in this section under the heading "Half Angle of Coverage."

Cons. No.	Name of Objectives	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers No.
1029	Tessar, with superimposed lens -3 diopters, biconcave	1/4.5	15	cm		Figures pertaining to the Tessar are not given. Card No. 360 indicates -3 diopters, biconcave for the superimposed lens, which means that the lens has exterior	360
1030	Tessar, with superimposed lens -3 diopters, Periscope	1/4.5	15	cm		surfaces of equal dispersing effect. On card 362 the lens shows the same figure for the diopter, but in periscopic form, which means that the lens is a meniscus of a known type, viz:- Radii of curves: r_1 = 121 mm. In both cases the distance between the front surface of the Tessar and the rear surface of the superimposed lens amounts to 2 mm. A comparison of the a and b curves clearly indicates that the biconcave superimposed lens has a more favorable influence on the aberrations represented by the a-curves than those of the periscopic superimposed lens. On the other hand, when this latter one is used, the b-curves are more favorable than those of the biconcave lens. By superimposing -3 diopters the focal length of 15 cm is increased to 25 cm.	362
1031	Tessar, with superimposed lense -3 diopters, biconcave.	1/6.3	13.5	cm		The above mentioned remarks apply here accordingly. Remarks for Cards Nos. 360 and 362 apply here.	361
1032	Tessar, with superimposed lense -3 diopters, Periscope	1/6.3	13.5	cm		Remarks for this Card No. 360 and 362 apply here.	363
1033	Tessar, with superimposed plus one diopter Ostw. (This abbreviation stands for Ostwald and means that the respective lens corresponds to the Ostwald trace of the Tscherning-curve.)	1/4.5	15	cm		This superimposed lens decreases the focal length.	366
1034	Tessar, with superimposed lens plus one diopter Woll. (The abbreviation stands for Wollerston and means that the respective type of lens corresponds to the Wollerston trace of the Tscherning-curve.)	1/4.5	15	cm		For decreasing the focal length. Wollerston lenses are generally more curved than Ostwald lenses. Their effect on the a-curves is unfavorable, whereas effect on the b-curves is generally still more favorable than that of Ostwald lenses.	365

Cons. No.	Name of Objectives	Ap Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers
1035)	Tessar, with superimposed lens plus one diopter Woll.	1/4.5	15 cm		See previous description	364
1036)	Tessar with superimposed lens -1/5 diopter Woll.	1/4.5	15 cm			369
1037)	Tessar with superimposed lens -3 diopters.	1/4.5	15 cm		Deformed distar lens	375
1038)	Tessar with superimposed lens -3 diopters Ostw.	1/6.3	13.5 cm			367
1039)	Tessar with superimposed lens -3 diopters, Ostw.	1/6.3	13.5 cm		See also presentation No. 367	357
1040)	Tessar	1/6.3	50 cm		With superimposed lens	628
1041)	Tessar	1/4.5	40 cm		With superimposed lens	627
1042)	Tessar	1/4.5	15 cm		With distar lens -3.5 diopters Ostw.	379
1043)	Tessar	1/6.3	13.5 cm		With superimposed lens -3 diopters plano-concave	359
1044)	Tessar	1/4.5	15 cm		With superimposed lens -3 diopters plano-concave	358
1045)	Tessar	1/6.3	13.5 cm		With superimposed lens -3 diopters Woll	356
1046)	Tessar	1/4.5	15 cm		With superimposed lens -3 diopters Ostw.	355
1047)	Tessar	1/4.5	15 cm		With superimposed lens -3 diopters Woll	354
1048)	Tessar	1/4.5	15 cm		With distar lens -2 diopters Ostw.	378
1049)	Tessar	1/4.5	15 cm		With distar lens -1.5 diopters Ostw. See also Card No 367	377
1050)	C. P. Goerz dispersing superimposed lens system				In an endeavor to avoid colored defects which are bound to incur in connection with the relatively simple lenses, these systems of two superimposed lenses of opposite refraction power were constructed. They are similar to Distars	590
1051)	C. P. Goerz				Converging superimposed lens system. See the above mentioned remarks, but note that this system is similar to the Proxars	656

With the use of Proxars and Distars, the camera extension as well as the focal length are considerably changed, This undesirable fact lead in the case of many cameras to a focal or telescopic superimposed lens systems and/or superimposed telescopes. The camera extension set to ∞ was not changed, whereas the focal length was increased proportionate to the magnification of the superimposed telescope.

1052)	V 1935 No. 14, Superimposed telescopic 1/3.5 7.5 cm	This form of Tessar was used for the "Rolleiflex" camera the focal length was increased from 7.5 cm, to 127.6 cm without changing the setting of the camera extension.	1084
1053)	V 1936, No. 11, Superimposed telescopic with Tessar 1/3.5 7.5 cm	ditto.	1124
1054)	V 1936, No. 15	ditto.	1136
1055)	V 1935, No. 13, Superimposed telescopic with Tessar 1/3.5 7.5 cm	ditto	1129
1056)	Spectacle glass of the Ostwald type, + 6 diopters		281
1057)	" " " " " " + 7 "		280
1058)	" " " " " " + 8 "		279
1059)	" " " " " " + 8½ "		278
1060)	" " " " " " + 9 "		277
1061)	" " " " " " + 9 "		276
1062)	" " " " " " + 10¼ "		275
1063)	" " " " " " + 10½ "		274
1064)	" " " " " " + 10¾ "		273
1065)	" " " " " " + 11.15 "		272
1066)	" " " " " " + 20 "		271

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APLANATS

Aplanats are objectives rendering good sharpness in the central area of the image at medium aperture ratios. They differ from Anastigmats inasmuch as their angular image field is considerably smaller; but it is still considerably larger than that of telescope objectives.

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TELESCOPE f OBJECTIVES

These objectives have a very good correction of longitudinal spherical aberration; they also comply satisfactorily with the sine condition, whereas a correction of the narrow oblique pencils of rays, inclined toward the axis, has generally not been considered.

These objectives have a very high degree of sharpness at the central area and only a small angular image field.

Cards ~~listed under consecutive Numbers 1056-1066~~ demonstrate the results of astigmatic calculation for the center point of the eye, assumed to be located at a distance of 25 mm from the interior vertex of the lens, and indicated for various diopters of lenses corresponding to the Ostwald ~~trace~~ of the Tscherning-curve.

APLANATS

Aplanats are objectives rendering good sharpness ~~of the central area~~ of the image at medium aperture ratios. They differ from Anastigmats inasmuch as their angular image field is considerably smaller; but ~~it is~~ still considerably larger ~~than that of telescope~~ objectives.

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers
1067	British patent 215,262		13.5	cm	6	Construction similar to Steinheil's Aplanat	719
1068	Aplanat	1/8	13	cm	6		257
1069	Aplanat	1/8	13	cm	8		255
1070	Ica-Aplanat, (Helios)	1/8	13	cm	8		256
1071	Aplanat No. 102	1/5	531.6	mm			210
1072	Peter Schnuell				10	~~German registered design 321,255~~	85
1073	Aplanat	1/6.5	144	mm		Focal length of single lengths 264.4 mm	47
1074	U V Aplanat	1/6.5	145.8	mm	10		31
1075	U V Aplanat	1/8	156	mm	10		30
1076	Grabb's-Aplanatic						28
1077	Steinheil's "Rapidantiplanet"	1/6.5			12	Data taken from: A. Gleichen, Lehrbuch Der geometrischen Optik, p.473	11
1078	Steinheil, Periscop				12 ~~10~~		20
1079	Goerz				10 ~~12~~	~~German patent 89,458~~	21

TELESCOPE - OBJECTIVES

These objectives have a very good correction ~~of spherical~~ longitudinal aberrations; they also comply satisfactorily with the sine condition, whereas a correction of the narrow oblique pencils of rays, inclined toward the axis, has generally not been considered.

These objectives have a very high degree of sharpness at the central area and only a small angular image field.

Cons. No.	Name of Objective	Ap. Ratio	Focal length		Half angle of coverage, degrees	Remarks	Zeiss ~~Numbers~~
1080	Collimator Objective	1/15	2685	mm.	2.5	Calculated for c,d,f,g'. For the sake of distinctness the ~~aberrations~~ from the sine condition and the spherical longitudinal aberrations have been ~~demonstrated~~ (10) fold as compared with the scale generally used on Zeiss's cards; distance between optical axis and point of incidence has been ~~demonstrated~~ at (5) times the normal scale	376
1081	Collimator Objective	1/14	283	cm	2.5	For testing of photo-objectives	449
1082	V 1917 III.	1:4.5	18	cm	2.5	Telescope objective consisting of two components. Used for machine gun cameras	459
1083	Objective composed of three lenses with two cemented surfaces	1/4.4	240	mm	2.5	German patent 135,362, Fig. 4	483
1084	~~Long-distance objective~~ V 1933 No. 7	1/8	50	cm	3		1019
1085	Projection objective ~~composed of two lenses~~	1/3	30	cm	2.5		639
1086	E-objective (Astro-objective)	~~1/3~~			2.5	Aperture ratio abt. 1/3	443

The following comprises a group of objectives of various types of construction in which the a-curves, or the b-curves, or both the a- and the b-curves indicate aberrations of such an extent that the optical qualities of these objectives should be rather low.

1087	I.C.F.	1/1.9	10	cm	10	~~German registered design 1,321,747~~	1088
1088	I.C.F. Periscope objective	1/6.3	105	mm	8	~~German registered design 1,164,895~~	976

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PETZVAL LENSES

Whenever a high speed, good sharpness and only a small angular image field are required, the Petzval Lenses, or, more explicitly, their modifications and further developments, have been successfully used. Longitudinal spherical aberrations, as well as departure from the sine condition, can be easily corrected at aperture ratio of nearly up to 1/1, producing sharp image fields of 10-15°. The following objectives are all Petzval Systems of various compositions.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers
1089)	Albert Ferdinand Shore	1/8.5	117	mm	5	British patent 350,717 of 6/18/31. (data given in patent specification seemed to be incorrect)	966
1090)	Felms	1/3.3	82	mm	5	U. S. patent 1,812,851 of 3/18/29	967
1091)	Isocele lens	1/4.5	10	cm	4		955
1092)	A. A. des Etablissements Optis	1/4	80.2	mm	4		643
1093)	E. Heinrich Kopplin, Dresden.	1/6.3	14	cm	5		527
1094)	Gasc & Charconnet	1/17.5	80	mm	5		517
1095)	Objective for instaneous photography Paul Waechter, Friedenau	1/7.6	127	mm	6		299

PETZVAL LENSES

Wherever a high degree of light intensity, good sharpness and only a small angular image fields are required, the Petzval Lenses or, more explicitly their modifications and further developments, have been successfully used. Spherical longitudinal aberrations, as well as aberrations of the sine- condition, can be easily corrected at aperture ratio of nearly up to 1/1, producing sharp image fields of 10-15°. The following objectives are all Petzval Systems of various compositions.

Cons. No.	Name of Objectives	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers
1096)	V 193[illegible] No. 7	1/1.5	10	cm	6.5		1159
1097)	D. L. Word, Projection Objective	1/1.6	10	cm	17	U. S. Patent 2,076,190. By adding a Smyth lens the image field is anastigmatically flattened to 30°	1220
1098)	Biotar with an additional Smyth lens.	1/1.8	8.5	cm	10	A projection system of high light intensity. This card shows the double objective with additional lens, as opposed to the double objective without additional lens, only a minor change of the a-curves, whereas the b-curves only indicate about half of the image curvatures.	225
1099)	Zeiss-Ikon, Projection objective	1/1.9	10	cm	15		847
1100)	Ikon	1/1.9	100	mm	15	German patent 681,830 of 12/16/37	838
1101)	V 1937 No. 8	1/1.9	10	cm	10		1158
1102)	C. Zeiss, Projection objective	1/1.9	10	cm	10		1010
1103)	W. Repp	1/2.2	100	mm	10	U. S. Patent 1,415,002	818
1104)	W. Repp	1/2.2	100	mm	10	U. S. Patent 1,479,251	817
1105)	Projection Optics Co.	1/2.2	100	mm	5	U. S. Patent 1,415,002. Same as the preceding demonstration, drawing	644
1106)	Graf Optical Co. Projection objective.	1/2.5	5	cm	10	U. S. Patent 1,479,251 of 9/28/28 British Patent 180,949 of 9/3/21 See also Card No. 1076	1079
11-7)	Projection Objective	1/2.5	5	cm	10	See also Card No. 1079	1076
1108)	Ivan Gramatzki, Berlin, Friedenau	1/1.25	100	mm	10	German registered design 76,828	899
1109)	Warmisham and Kapella	1/3			10	British Patent 180,949 of 6/8/22, [illegible]	655
1110)	Warmisham and Kapella	1/3			5	British Patent 180,949 of 6/8/22, [illegible]	654
1111)	Busch, Portrait Double objective	1/3	245	mm	10		386
1112)	Petzval Portrait objective	1/3.6	186.3	mm	10	A Projection objective	390

Comp. No.	Name of Objectives	Ap. Ratio	Focal length		Half angle of coverage degrees	Remarks	Zeiss Numbers
1113	Petzal, Projection objective	1/3,3			10	Anastigmatic flattening of the image field for 30° nearly ideal with the additional lens	26
1114	Petzval, Portrait objective	1/3.34	206.8	mm	10	A Projection objective	392
1115	Petzval, Portrait objective	1/3.4	189.3	mm	10	A Projection objective	389
1116	Petzval, Portrait objective	1/3.44	135.7	mm	5	A Projection objective	391
1117	Zeiss-Ikon, Projection objective	1/2.5	12	cm	5	~~German Registered Design 996,683~~	836
1118	A. Holmann	1/2.7	173.5	mm	5	~~U. S. Patent 1,913,389 Table I~~	1021
1119	A. Holmann	1/2.7	148	mm	7	~~U. S. Patent 1,913,389~~	1062

In addition to drawings of the type "Petzval objectives with components of various constructions" ~~Further to demonstrations~~ given under ~~consecutive Nos. 782-827~~ the following objectives are ~~equally~~ also listed as,

DOUBLE OBJECTIVES WITH COMPONENTS OF VARIOUS CONSTRUCTIONS

1120	M. R. Berthon	1/1.5	63	mm	8	~~French Patent 537,460.~~ For an aperture ratio of 1/1.5 the correction of the a-curves is poor	620
1121	Dr. Paul Rudolph	1/1.0	10	cm	10	~~U. S. Patent 1,833,593 of 11/24/31~~ Data given in the patent specification indicate that this objective has an aperture ratio of 1/1.12. Lens diameters are insufficient for an aperture ratio of 1/1 as stated on this card.	858
1122	Dr. Paul Rudolph	1/3.2	10	cm	10	U. S. Patent 1,812,717 of ~~6/30/31.~~	784
1123	Dr. Paul Rudolph	1/2.9	100	mm	15	~~Celmar f. II~~	787
1124	Lacour-Berthiot, Paris	1/3.5	100	mm	15	~~U. S. Patent 1,168,873~~	559
1125	C. & H.C. Beck, ~~aperture ratio att.~~	1/6			5	~~British Patent 22,157-1910 2nd ex.~~ b-curves and c-curves calculated for variation to (2) different locations of the stop.	295
1126	Dallmeyer	1/5.6					197
1127	Busch-Rathenow	1/1.9	9.56	mm	10	~~German Registered Design 1,405,484~~	1251
1128	Jos. Schneider, Kreuznach	1/2.9	10	cm	20	~~German Patent 105,563~~	1339
1129	Jos. Schneider, Kreuznach	1/2.9	10	cm	24		1165
1130	Horace W. Lee, (Kapella)	1/1.9	1	cm	15	~~British Patent 419,552~~	1086
1131	Kapella	1/4.5	10	cm	15	~~German Patent 407,156 of 3/15/34~~	1055
1132	Ica-Helios	1/8	13	cm	10	An Aplanat	263
1133	Leitz, "Periplan"				30	~~Data taken from German Patent 116,449~~	32
1134	Alfred Taylor	1/3.5	100	mm	2	~~British Patent 168,923~~	614
1135	V 1938 No. 26	1/2.5	5	cm	18	This objective was termed ~~Hekar~~	1257
1136	V 1938 No. 21	1/4	8.5	cm	12	This objective was ditto termed Herar	1245
1137	V 1938 No. 20	1/4.5	13.5	cm	6	This objective was ditto termed Herar	1244
1138	V 1938 No. 9	1/3.5	8	cm	24	This objective was ditto termed Herar	1231
1139	V 1937 No. 30	1/3.5	18	cm	25	This objective was ditto termed Herar	1194
1140	V 1938 No. 10	1/2.8	8	cm	24	This objective was ditto termed Herar	1232
1141	V 1938 No. 1	1/2	5	cm	22	This objective was ditto termed Herar	1198
1142	V 1937 No. 29	1/3.5	8	cm	23	This objective was ditto termed Herar	1193
1143	V 1937 No. 28	1/2.8	5	cm	20	This objective was ditto termed Herar	1192
1144	~~Hekar~~ Herar	1/3.5	7.5	cm	25	German Patent 652,882 of 11/10/37	1190
1145	~~Hekar~~ Herar	1/2.8	52.3	mm	20	Herar	1189
1146	V 1936 No. 17	1/3.5	7.5	cm	25	This objective was termed ~~Hekar~~	1173
1147	V 1938 No. 18	1/3.5	3.5	cm	25	This objective was ditto termed Herar	1240
1148	V 1936 No. 16	1/2.8	8	cm	23	This objective was ditto termed Herar	1138
1149	Aldis-Objective	1/8	77	mm	10	This objective was ditto termed Herar	262
1150	Aldis (ex.) I	1/7.8	150	mm	10		229
1151	Aldis (ex.) 3 III	1/7.8	156	mm	10		260
1152	Aldis (ex.) 2 II	1/7.64	168	mm	10		230
1153	H. L. Aldis				10	See data on Card No. 8	71
1154	H. L. Aldis, (Photo.) ~~Lens~~ Camera	1/7.7	197.26	mm	15	~~Patented Sept. 3/01~~ See ~~also~~ Card No. 71	8
1155	Anastigmat, Series IV	1/12.5	118.4	mm	10	~~Series IV~~	55

MISCELLANEOUS OBJECTIVES

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers
1156	Single meniscus			17	Single meniscuses having a stop located directly in front of the vertex of their convex surface permits anastigmatic planishing for an image field of 6bt. 30°	25
1157	British Patent No. 6093/26			6	This meniscus has a stop at the concave surface. The image field is anastigmatic, but not planished.	810
1158	Polack, Paris	1/7	10 cm	5	This hyperchromatic objective is a triplet of good monochromatic spheric correction. By using flint glass for the two converging lenses and crown glass in the dispersing lens, the chromatic longitudinal aberrations become larger than those of an individual lens. By means of this, considerable color defect, and artistic softness and a better depth sharpness is achieved	779
1159	C. & H. C. Beck	1/3.8		5	British Patent No. 2619-11. Data given in patent specification are obviously erroneous, as the diameters of the two exterior lenses do not permit the indicated aperture ratio.	264
1160	V 1935 No. 11	1/2	5 cm	20	Tessar with aspheric front surface. The trace of rays of a meridional pencil is shown on a separate card, attached to this demonstration.	1085
1161	V 1935 No. 10	1/2	5 cm	10	Tessar with aspheric front surface	1109
1162	V 1934 No. 10	1/2	5 cm	19	Tessar with aspheric ditto front surface	1053
1163	V 1934 No. 9	1/2	5 cm	19	Tessar with aspheric ditto front surface	1052
1164	V 1934 No. 8	1/2.8	5 cm	23	Tessar with aspheric ditto front surface	1051
1165	V 1934 No. 6	1/2.8	5 cm	23	Tessar with aspheric rear surface	1050
1166	V 1934 No. 11	1/1.5	5 cm	18	Tessar with aspheric front surface	1035

In addition to demonstrations given under consecutive Nos. 828-1028 on pp. 21-25, the following objectives are equally listed as:

SET - OBJECTIVES

1167	Eugene Lacour			10	French Patent 338,344, 12/21/03	81
1168	Gallus Objective	1/8.5	24 cm	23	A Swiss objective for Photogrammetry	854
1169	Voigtländer 4-Lens Objective	1/14		10	4-lens objective	398
1170	Rudar Lens Objective	1/8	25 cm	27	Construction similar to the Plasmat	472
1171	Rudar Lens Objective	1/8	25 cm	35	Construction similar ditto to each Plasmat	490
1172	Rudar Lens Objective	1/9	252 mm	30	Construction similar ditto to the Plasmat	498
1173	Dr. Rudolph	1/10	265 mm	28	Construction similar ditto to the Plasmat	473
1174	R. 45,642	1/9.75	15.6 cm	30	Construction similar ditto to the Plasmat	491
1175	Rudar Lens Objective	1/11	24 cm	25		497
1176	Rudar Lens Objective	1/10	191 mm	30		496
1177	R. 45,697	1/8.56	17 cm	35		492

Cons. No.	Name of Objectives	Ap. Ratio	Focal length	Half angle of coverage degrees	Remarks	Zeiss Numbers No.
1178	Lacour-Berthiot	1/3.5	96 mm	10	French Patent No. 456,434	325
1179	Protar	1/8	244 mm	25	A wide-angle objective	77
1180	Bambino Objective	1/2	10 cm	12	Inexpensive Projection Objectives	1007
1181	Bambino Objective	1/2	7 cm	15		1006
1182	Warmisham and Kapella Ltd., Anastigmat Lens Objective	1/1.5		15	Photography of 3/25/30 p 17 March 27, 1930.	860
1183	M. Lloyd Cassel Bishop	1/5	300 mm	5	French Patent 523,517 of 7/8/20	597
1184	Hans Zaepernik, Portrait Objective	1/3.5	30 cm		Portrait Objective	602
1185	C. P. Goerz	1/2	150 mm	10	U. S. Patent 1,474,475	636
1186	Eastman, C. W. Frederick	1/2.8	100 mm	10		819
1187	Opt. Works, Ruedersdorf	1/4.3	65 mm	10	Symmetrical objective with prism	58
1188	Opt. Works, Ruedersdorf	1/4	10 cm	10	German Patent 382,193 of 7/30/23	684/599
1189	Unar Lens	1/8	200 mm	30		39

MAGNIFIERS

1190	5-fold magnifying picture viewer, f=50 mm for small format 24 x 36 sq. mm		50 mm	25	Center of motion of the eye is located about 50 mm in front of the lens nearest to the eye. Calculation for n_e shows a well planished anastigmatic image field at 50°. Chromatic magnification difference between C and F amounts to about 1%.	1203
1191	Flektoskop		4.7 cm	15	The space to be viewed thru this magnifier is projected by the camera objective on the frosted surface of the lens pertaining to the magnifier; the trace of rays is deflected by a prism to facilitate easier viewing. Distance between the center of motion of the eye and the lens nearest to the eye amounts to about 20 mm.	1202

OBJECTIVES OFFERING EITHER INSUFFICIENT DATA

1192	Tessar	1/6	218.65 mm	30		23
1193	This card demonstrates distortion-curves of photographs taken with shear-jointed telescope-cameras, having a focal length of 20 mm. Distortion is calculated for cameras used with the shear jointed telescopes types "SF-14" and "SF-09"					406
1194	C. P. Goerz				No data given. See A. Gleichen, Geometric Optics, p.429	14a
1195	C. P. Goerz				No data given	161
1196	C. Reichert and F. Kollmorgen, Wien				No data given, see also consecutive No. 328 ≡ Card No. 1, p.	1a
1197	V 1936 No. 5	1/2.8	5 cm	25	Tessar. Data not intelligible	1206
1198	Projection Objective With strongly shortened extension	1/8	38 cm		b-curves not indicated	648
1199	Trans-Lux Daylight Picture Screen Corp., New York	1/3	2.5 cm	15,18	British Patent 348,123 of 5/1/31	1132
1200	This card presents distortion curves for a Telescope Objective	1/50	3 m		Insufficient data	407
1201	V 1933 No. 4	1/2	7.0 cm	18	Insufficient data	993b
1202	Data pertaining to demonstration #543				Card Demonstration #543 not in this file	---
1203	Insufficient data pertaining to #235			25	Card #235 not in this file	235a
1204	Insufficient data pertaining to #501			25	Card #501 not in this file	502
1205	Insufficient data pertaining to #501			29	Card #501 not in this file	503
1206	Insufficient data pertaining to #893				Card #893 not in this file	---
1207	Insufficient data pertaining to #382				Card #382 not in this file	---
1208	Insufficient data pertaining to #734				Card #734 not in this file	---
1209	Insufficient data pertaining to #851				Card #851 not in this file	---
210	Inter Office Notice				Card #322 not in this file	---

RECENT OBJECTIVES

The following objectives are a portion of those classified by the Zeiss Works during the period immediately before the war and for the earlier years of hostilities.

Identification of Objective	Aperature Ratio	Focal Length		Zeiss No.	Page
Jos. Schneider	1/5	10	cm	1401	
I. R. Objective	1/2	72	cm	1402	
Laack	1/1.35	3	cm	1402	
Zeiss Ikon	1/1.5	100	mm	1403	
V 1941 No. 6	1/2.8	35	cm	1404	
V 1941 No. 7	1/2.8	35	cm	1405	
Zeiss Ikon, Sonnar	1/2.8	9	cm	1406	
Arthur Warnisham, Kapella	1/2	10	cm	1407	
V 1941 No. 13	1/i	7	cm	1408	
V 1941 No. 15	1/1	15	cm	1409	
V 1941 No. 15	1/1	15	cm	1409	
V 1941 No. 14	1/2	25	cm	1410	
V 1941 No. 4	1/4.5	12.5	cm	1411	
V 1941 No. 5	1/3.5	3.5	cm	1412	
	1/1	15	cm	1413	
V 1941 No. 17	1/12.5	67.5	cm	1414	
V 1941 No. 16. No. See card 1415a	1/2	35	cm	1415	
V 1941 No. 16	1/2	35	cm	1415a	

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V 1940 No. 9	1/5	100 cm	1416
V 1941 No. 18	1/2.4	125 mm	1417
V 1941 No. 19	1/1.5	30 cm	1418
German Registered Design of 10-8-41	1/1.5	5 cm	1419
German Registered Design of 10-15-41	1/1	7 cm	1420
V 1941 No. 23	1/2	2.5 cm	1421
Wide-Angle Objective	1/4	5 cm	1422
V 1941 No. 2	1/5	1 m	1423
V 1941 No. 19	1/1.5	30 cm	1424
V 1941 No. 22	for finite scale n = 75.4		1425
V 1941 No. 22	1/1.5	40 cm	1425
	1/1.5	5 cm	1425b
I. R. Objective	1/1.5	40 cm	1426
V 1941 No. 26	1/1.5	40 cm	1427
Zeiss Ikon	1/1.2	100 mm	1428
Kodak Petzval Objective	1/2.8	10 cm	1429
V 1939 No. 33	1/1.4	5 cm	1430
V 1939 No. 33 (Duplicate)	1/1.4	5 cm	1430
Telikon Teleobjective with concave air space	1/6.3	10 cm	1431
Telikon Teleobjective with concave air space	1/6.3	10 cm	1432
Tessar	1/3.5	3.5 cm	1433
I. R. Biotar with Smyth lens	1/1.5	15 cm	1434

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V 1942 No. 1	1/1	13	cm	1435
V 1941 No. 24	1/2	10	cm	1436
I. R. - Sonnar with Smyth lens	1/1.5	15	cm	1437
V 1942 No. 2	1/1	7.5	cm	1438
Hugo Meyer, Joelitz (Paul Schaeffer)	1/1.5	10	cm	1439
Sonnar	1/1.4	5	cm	1440
V 1942 No. 3	1/1	7.5	cm	1441
V 1942 No. 4	1/1.5	40	cm	1442
G. Rodenstock	1/1.9	10	cm	1443
V 1942 No. 8	1/1	7.5	cm	1444
V 1942 No. 9	1/1.5	5	cm	1445
V 1942 No. 7	1/1.4	5	cm	1446
Tessar	1/12.5	67.5	cm	1447
V 1942 No. 11 See also Card No. 1467	1/1	5	cm	1448
Biogon	1/2.7	35	cm	1449
Zeiss Ikon	1/2	10	cm	1450
V 1942 No. 13	1/1.5	30	cm	1451
V 1942 No. 12	1/1.5	40	cm	1452
Rodenstock	1/2	1	cm	1453
Wide-Angle Objective	1/5.7	5	cm	1454
V 1942 No. 14	1/3.5	50	cm	1455
V 1942 No. 16	1/18	38	cm	1456
Pleon	1/8	7.25	cm	1457

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I. G. Farben	1/1.4	10	cm	1458
I. G. Farben	1/1.4	10	cm	1459
I. R. Objective	1/1	5	cm	1460
Zeiss Ikon, Wide-Angle Objective	1/2.8	10	cm	1461
Meyer, Joerlitz (Paul Schaeffer)	1/1.5	10	cm	1462
Zeiss See also Card No. 225	1/1.8	10	cm	1463 Zetschr. f. Instrumentunkunde 31 ed. 11 Sep. Bk 9 pp 265-270
Zeiss Ikon, Sonnar	1/1.4	8.5	cm	1464
V 1942 No. 5 for the Linhof Camera	1/2.8	13.5	cm	1465
I. R. Objective	1/1	7.5	cm	1466
I. R. Objective	1/1	5	cm	1467
I. R. Objective	1/1.5	15	cm	1468
V 1942 No. 27 I. R. Objective	1/1.5	15	cm	1469a
V 1942 No. 21 I. R. Objective	1/1.5	15	cm	1469b
V 1942 No. 21 I. R. Objective	1/1.5	15	cm	1469c
V 1942 No. 21 I. R. Objective	1/1.5	75	cm	1469d
V 1942 No. 20	1/1	6.5	cm	1470
Biogon	1/2.8	3.5	cm	1471
Sonnar	1/2.8	7.5	cm	1472
Astro-Gesellescraft Bielicke Co	1/1.05	10	cm	1473
Apo-Tessar	1/9	45	cm	1474
V 1939 No. 40 ~~2 Surface Seven Deformed~~	1/2	5	cm	1475
Busch	1/2.5	10	cm	1476

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V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477a
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477b
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477c
Objective	1/2	68	mm	1478
Zeiss	1/6.3	8	cm	1479
Leitz	1/1.3	100	mm	1480
V 1943 No. 4, Petzval ~~(Petzval form)~~	1/1.5	15	cm	1481
V 1943 No. 4, Petzval ~~(Petzval form)~~	1/1.5	15	cm	1481a
U. R. Objective B	1/1.5	15	cm	1482
U. R. Objective B	1/1.5	15	cm	1482a
				1482b
Kapella	1/2.5	10	cm	1483
Meyer Goelitz	1/1.6	10	cm	1484
Tessar	1/3.5	3.5	cm	1485
U. R. Objective A	1/1	25	cm	1486
Tessar	1/3.5	4	cm	1487
V 1942 No. 15	1/3.5	50	cm	1488
U. R. Objective B	1/1	25	cm	1489
U. R. Objective A	1/1	9	cm	1490
U. R. Objective	1/1	5	cm	1491
Leitz U. R. Objective	1/1	9	cm	1492
V 1944 No. 2 U. R. Objective	1/1	5	cm	L14937
Kipro-Anastigmat. See also Card 1390	1/1.9	10	cm	1494

I. G. Farben	1/1.5	100 mm	1495
Optikolechna, Spolecnost	1/3.5	100 mm	1496
Askania Teleobjective	1/3	100 mm	1497
Kodak Teleobjective	1/3.8	100 mm	1498
Kodak Teleobjective	1/3.8	100 mm	1499
G. Rodenstock ~~2 Muenchen~~	1/2.5	10 cm	1500
Telemetar	1/5	1 m	1503

UNCLASSIFIED CARDS

Name of Objective	Aperature Ratio	Focal Length	Zeiss No.	Page
Rapidor	1/4.5	150mm	579	
Biotessar	1/2.25	1.5 cm	757	
Sonnar	1/2	1 cm	1122	

FOREWORD

This volume presents the card index, listing image defects of photographic lenses and objectives, which was initiated in the Photographic Calculation Department of the Zeiss Works at the turn of the century, and maintained to the end of World War II in 1945.

The method of compilation is based on a book by M. v Rohr, Theorie und Geschichte des Photographischen Objektivs, published by Julius Springer Verlag, Berlin, about 1898.

The card index represented a good general view of the progress in optical photographic development in all countries, using foreign and domestic patent literature as a principal source of information. The main value of the index, however, was in its use as a tool for mathematical calculation of all types of lenses and objectives.

INTRODUCTION

In the following condensed form of the index of photographic lenses and objectives, the compilers have abandoned the original chronological sequence of the Zeiss Works, substituting a grouping of the various types of objective individually, such as: Cooke Lens, Plasmats, Tele-Objectives, etc. A short introduction is written for each separate group. The list gives manufacturer, designation or type of objective, aperture ratio, focal length, half angle of coverage, and, wherever expedient, remarks referring to optical qualities, etc., and a reference to the original number of the Zeiss Card Index for further information. The term "Half Angle of Coverage" is generally to be understood as indicating a fully opened stop, and with a tolerance of ±5°. Objectives designated as "V" (e.g. V 1935 No. 8) are test objectives, calculated and manufactured at the Zeiss Works, the V standing for Test; the following number for the year, etc.; i.e., V 1935 No. 8 means the eighth test made during the year of 1935. The names of Zeiss personnel have usually not been mentioned on cards listing the data achieved in such tests.

Attention is called to the fact that a number of the cards of the original Zeiss file, representing calculations made during the last years of the war, have not yet been located. Data given on these cards will be added as soon as possible.

The grouping into various types of objectives has been made rather arbitrarily, considering that a systematic classification of the material at hand would have gone far beyond the scope of this condensed compilation.

MERIDIONAL COMA

Values of meridional coma have not been included in the graphs shown on the Zeiss cards.

They have been calculated for all the objectives listed, and have been shown on special cards for a minor portion of the objectives listed hereafter. These special cards refer to Zeiss numbers, as indicated on the right side of the compilation.

The principle according to which the coma is represented is not uniform. However, if the curves for meridional coma pass through the origin of coordinates, their calculation is based on the formula:

$$e = s'_k \frac{\sin u'_k}{\sin u'} - (t'_k - a'_k) \quad \text{(See diagram)}$$

where

e = the meridional coma

s'_k = distance on optical axis between point of intersection of a coma ray and that of the pertinent principal ray

u'_k = angle of inclination of coma ray to the axis

u' = angle formed by coma ray and principal ray

t'_k = intersection length of the tangential (meridional) image point, measured from

$a'_k = Q_k P'_k$ = distance from point of intersection of principal ray and axis to point of intersection of principal ray and the last refracting surface

P'_k = tangential (meridional) image point after the last refraction.

Curves of meridional coma are drawn on an orthogonal system of coordinates, with the incidence heights of the object-pencils of rays in the entrace pupil as ordinates and the comae = e as abscissas, the latter at a scale of 5:1 to the ordinates.

EXPLANATION OF TERMS USED ON CARDS

Double Objective

This term refers to objectives which have a stop between any of the component lenses, as opposed to single objectives comprise the portion of the system (double lens) behind, or rarely in front of, the stop. The Single Objective in a convertible lens performs satisfactorily alone. 1/ See Convertible Objectives.

Spherical Aberration

Sperical aberration and departure 2/ from the sine-condition are indicated on the right side of the cards by s-curves, spherical aberration by solid curves, and departure from the sine-condition by dashed curves. On the left side of the cards, these aberrations are indicated in figures under the headings s' and f'.

Incidence Heights

In most cases three incidence heights are indicated. The greatest incidence height (that of the marginal ray) is $h_{III} = \frac{f}{2k}$, where f means the paraxial focal length = 100 mm, and k the maximum possible f-number. Also, $h_{II} = \frac{2}{3} \cdot h_{III}$, and $h_I = \frac{1}{3} \cdot h_{III}$. Values shown in the coordinate systems on the right side of the card indicate the exact figures, whereas figures given for h_{III}, h_{II}, and h_I, under the heading "Incidence Height" on the left side of the card, are very often multiplied by a factor for greater distinctness and for the sake of convenience.

Chromatic Aberration

Figures given under this heading refer to the chromatic correction; for instance, in the expression: $\log s'_{g'} - s'_d$; that is, the logarithm of the ratio of the paraxial intersection lengths

1/ Refer to Henney and Dudley: Handbook of Photography, pp. 41-42, McGraw-Hill, 1939.

2/ See Remarks accompanying illustrations at the end of von Rohr's "Theorie und Geschichte des Photographischen Objectivs." Refer to Hardy and Perrin: The Principles of Optics, pp. 93-94.

for g' and d;

The first mentioned expression is a measure for the correction longitudinal chromatic aberration; the latter expression is a measure for the correction of the chromatic difference of magnification. Both these chromatic errors are computed by paraxial ray tracing.

Wherever other figures are given, as in the case of corrections made for other colors or for more colors, there will, as a rule, be a special reference on the card calling attention thereto.

Astigmatism (With subdivisions: sagittal fans and tangential (meridional) fans):

Under this heading, the sagittal and tangential (meridional) image curvatures are indicated. They are shown on the right side of the card by the b-curves, sagittal curvatures by solid curves, and tangential curvatures by dashed curves.

Front Angles:

The front angle is the angle in the object space between a principal ray and the axis. On the right side of the card, the front angles are expressed on the ordinate axis at a suitable scale. On the abscissa axis the sagittal and tangential image curvatures are shown. On the left side of the card, the values for the front angles are expressed in a unit having the value: 1 unit $= \frac{1'}{2.4}$ degree.

The image curvatures are expressed in a unit having the value: 1 unit $= \frac{1}{4}$ mm.

Distortion:

Distortions are indicated by the c-curves as a percentage of (f. tan w), where f means the focal length and w the front angle. The angles are drawn as abscissas, the distortion as ordinates. Front angles are generally the same as those used for the b-curves. If not specially indicated otherwise, the distortion curves are calculated for an infinitely distant object. If calculated and drawn for another object distance, the object distance used will be indicated on the card.

Radii "r", Thickness "d", and Air Spaces "l":

These data are given for a focal length of 100 mm. Note that the air space is termed "b" whenever a stop is placed within the air space of an objective. In such cases the air space is subdivided into b_1 and b_2, designating the distance between the vertex of one lens and the stop as b_1 plus b_2 equaling b.

On the right side of the card there are, furthermore, apart from the eight coordinate systems, a drawing of the meridian section of the system of lenses and a table indicating optical data for the materials used for the lenses. These data show the mean refraction indices n_d and the Abbe-numbers . In most cases this table also shows the figure for partial dispersion $n_G' - n_d$. In the great majority of cases, however, the data n_d and are sufficient to establish beyond any doubt the optical properties of the glass. A great number of cards also indicate reflection losses caused by the individual lenses of the objective.

This last information is expressed as percent by the unlabelled column of numbers at the right edge of the card, next to the b-curve for the double objective. The figure at the bottom of this column is the combined percent reflection loss for the system.

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INTRODUCTION

This ~~volume~~ presents the card index, listing image defects of photographic lenses, ~~and objectives~~, which was initiated in the Photographic Calculation Department of the Zeiss Works at the turn of the century, and maintained to the end of World War II in 1945.

The method of compilation is based on a book by M. v Rohr, Theorie und Geschichte des Photographischen Objektivs, published by Julius Springer Verlag, Berlin, about 1898.

The card index represented a good general view of the progress in ~~optical photographic~~ development in all countries, using foreign and domestic patent literature as a principal source of information. The main value of the index, however, ~~was~~ in its use as a tool for mathematical calculation of all types of lenses ~~and objectives~~.

In the following condensed form of the index of photographic lenses ~~and objectives~~, the compilers have abandoned the original chronological sequence of the Zeiss Works, substituting a grouping of the various types of objective individually, such as: Cooke Lens, Plasmats, Tele-Objectives, etc. A short introduction is written for each separate group. The list gives manufacturer, designation or type of objective, aperture ratio, focal length, half angle of coverage, and, wherever expedient, remarks referring to optical qualities, etc., and a reference to the original number of the Zeiss Card Index for further information. The term "Half Angle of Coverage" is generally to be understood as indicating a fully opened stop, and with a tolerance of $\pm 5^0$. Objectives designated as "V" (e.g. V1935 No. 8) are test objectives, calculated and manufactured at the Zeiss Works, the V standing for test, the following number for the year, etc.; i.e., V 1935 No. 8 means the eighth test made during the year of 1935. The names of Zeiss personnel have usually not been mentioned on ~~cards~~ listing the data achieved in such tests.

Attention is called to the fact that a number of the cards of the original Zeiss file, representing calculations made during the last years of the war, have not yet been located. Data given on these cards will be ~~added as soon as possible~~.

The grouping into various types of objectives has been made rather arbitrarily, considering that a systematic classification of the material at hand would have gone far beyond the scope of this condensed compilation.

Insert I page 3.

COOKE LENSES

Cooke Lenses are objectives which consist of three single lens components. The two exterior components are converging lenses and the interior component, separated from each exterior one by an air space, is a dispersing lens.

These triple lenses were developed by Harold Dennis-Taylor at the beginning of the 1890's. Correction of error is possible to such an extent that the modern forms of this type of objective are among the best anastigmats in certain optical fields.

The construction of these objectives is remarkably simple, and they can be produced easily at slight cost.

Such triple lenses, or triplets, have been developed for utilization in several fields of photography. They may be used for universal objectives, for motion picture photography and projection, for objectives of high light intensity, as

lenses for portrait photography having a long focal length, as objectives for aerial photography and astro-photography, and occasionally as reproduction objectives.

This type of objective is not suitable for wide-angle photography, as may be seen from the compilation which follows. Even at a small aperture, the usable angle of image cannot be greatly increased above the standard angle of image of universal objectives.

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EXPLANATION OF TERMS USED ~~ON CARDS~~

Double Objective

This term refers to objectives which have a stop between any of the component lenses, as opposed to single objectives which comprise the portion of the system (double lens) behind, or rarely in front of, the stop. The Single Objective in a convertible lens performs satisfactorily alone. 1/ See Convertible Objectives.

Spherical Aberration

Spherical aberration and departure 2/ from the sine-condition are indicated on the right side of the cards by a-curves, spherical aberration by solid curves, and departure from the sine-condition by dashed curves. On the left side of the cards, these aberrations are indicated in figures under the headings Δ s' and Δ f'.

Incidence Heights

In most cases three incidence heights are indicated. The greatest incidence height (that of the marginal ray) is $h_{III} = \frac{f}{2k}$, where f means the paraxial focal length = 100 mm, and k the maximum possible f-number. Also, $h_{II} = \sqrt{\frac{2}{3}} \cdot h_{III}$, and $h_I = \sqrt{\frac{1}{3}} \cdot h_{III}$. Values shown in the coordinate systems on the right side of the card indicate the exact figures, whereas figures given for h_{III}, h_{II}, and h_I, under the heading "Incidence Height" on the left side of the card, are very often multiplied by a factor for greater distinctness and for the sake of convenience.

Chromatic Aberration

Figures given under this heading refer to the chromatic correction; for instance, in the expression: $\log s'_{g'} - s'_d$; that is, the logarithm of the ratio of the paraxial intersection lengths for g' and d; and in the expression: $\log f_{g'} - \log f_d$; that is, the logarithm of the ratio of paraxial focal lengths for g' and d.

The first mentioned expression is a measure for the correction of longitudinal chromatic aberration; the latter expression is a measure for the correction of the chromatic difference of magnification. Both these chromatic errors are computed by paraxial ray tracing.

Wherever other figures are given, as in the case of corrections made for other colors or for more colors, there will, as a rule, be a special reference on the card calling attention thereto.

Astigmatism (With subdivisions: sagittal fans and tangential, meridional, fans)

Under this heading, the sagittal and tangential (meridional) image curvatures are indicated. They are shown on the right side of the card by the b-curves, sagittal curvatures by solid curves, and tangential curvatures by dashed curves.

Front Angles

The front angle is the angle in the object space between a principal ray and the axis. On the right side of the card, the front angles are expressed on the ordinate axis at a suitable

1/ Refer to Henney and Dudley: Handbook of Photography, pp. 41, 42. McGraw-Hill, 1939.

2/ See Remarks accompanying illustrations at the end of von Rohr's "Theorie und Geschichte des Photographischen Objektivs." Refer to Hardy and Perrin: The Principles of Optics, pp. 93, 94.

scale. On the abscissa axis the sagittal and tangential image curvatures are shown. On the left side of the card, the values for the front angles are expressed in a unit having the value: 1 unit = $\frac{1}{2.4}$ degree.

The image curvatures are expressed in a unit having the value: 1 unit = $\frac{1}{4}$ mm.

Distortion

Distortions are indicated by the c-curves as a percentage of (f · tan w), where f means the focal length and w the front angle. The angles are drawn as abscissas, the distortions as ordinates. Front angles are generally the same as those used for the b-curves. If not specially indicated otherwise, the distortion curves are calculated for an infinitely distant object. If calculated and drawn for another object distance, the object distance used will be indicated on the card.

Radii " r" , Thicknesses " d" , and Air Spaces " l"

These data are given for a focal length of 100 mm. Note that the air space is termed " b" whenever a stop is placed within the air space of an objective. In such cases the air space is subdivided into b_1 and b_2, designating the distance between the vertex of one lens and the stop as b_1, and the distance between the stop and the vertex of the following lens as b_2, the total of b_1 plus b_2 equaling b.

On the right side of the card there are, furthermore, apart from the eight coordinate systems, a drawing of the meridian section of the system of lenses and a table indicating optical data for the materials used for the lenses. These data show the mean refraction indices n_d and the Abbe-numbers ν . In most cases this table also shows the figure for partial dispersion $n_G'-n_d$. In the great majority of cases, however, the data n_d and ν are sufficient to establish beyond any doubt the optical properties of the glass. A great number of cards also indicate reflection losses caused by the individual lenses of the objective.

This last information is expressed as percent by the unlabeled column of numbers at the right edge of the card, next to the b-curve for the double objective. The figure at the bottom of this column is the combined percent reflection loss for the system.

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MERIDIONAL COMA

Values of meridional coma have not been included in the graphs shown on the Zeiss cards. These cards are available for reference at the Library, Wright-Patterson Air Force Base.

They have been calculated for all the objectives listed, and have been shown on special cards for a minor portion of the objectives listed hereafter. These special cards refer to Zeiss numbers, as indicated on the right side of the compilation.

The principle according to which the coma is represented is not uniform. However, if the curves for meridional coma pass through the origin of coordinates, their calculation is based on the formula

$$e = \Delta\, s'_k \frac{\sin u'_k}{\sin \Delta\, u'} - (t'_k - a'_k) \quad \text{(See diagram.)}$$

where

e = the meridional coma

$\Delta\, S'_k$ = distance on optical axis between point of intersection of a coma ray and that of the pertinent principal ray

u'_k = angle of inclination of coma ray to the axis

$\Delta\, u'$ = angle formed by coma ray and principal ray

t'_k = intersection length of the tangential (meridional) image point

$a'_k = Q_k P'_k$ = distance from point of intersection of principal ray and axis to point of intersection of principal ray and the last refracting surface

p'_t = tangential (meridional) image point after the last refraction.

Curves of meridional coma are drawn on an orthogonal system of coordinates, with the incidence heights of the object pencils of rays in the entrance pupil as ordinates and the comae = e as abscissas, the latter at a scale of 5:1 to the ordinates.

FOREWORD

The subject headings contained in this list include all those which have been used to this date by the Central Air Documents Office in cataloging documents for the Air Technical Index.

Wherever possible, existing subject headings have been selected. When it was necessary to establish a new heading, it was attempted to avoid inversions unless the direct form would tend to obscure the significant meaning of the heading. Thus, "Infrared recognition devices" is used in preference to "Recognition devices, Infrared"; while, in the case of "Nozzles, Laval," the inverted form was retained. "See" and "See also" references have been included in accordance with conventional library procedure.

The serial numbers shown behind each subject heading serve primarily operational purposes of CADO but will also assist users of the Air Technical Index in establishing a subject card file since subject headings, which are arranged numerically by their serial numbers, will automatically be in the proper alphabetical order. This often proves of considerable assistance, especially in the case of complex subject headings containing several dashes and commas.

In addition to the serial numbers, there are listed with each subject heading the subject division(s) and section(s) to which the heading pertains. The division and section breakdown employed is that of the ATI Distribution Guide (formerly the Standard Aeronautical Indexing System), a complete listing of which precedes the list of subject headings. The divisions and sections of this Guide are included in order to aid users of the Air Technical Index in determining their fields of interest.

While this subject heading list is to serve primarily the processing requirements of the Central Air Documents Office, it should be consulted in requesting CADO Demand Bibliographies, as well as other CADO products and services which are beyond the scope of specific document requests.

This list is preliminary and is published at this time for the purposes mentioned above. A more comprehensive list incorporating subject headings from lists accomplished by other organizations is now in preparation and will be published at a later date.

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- Hektor-Type Lenses . . . . .
- Biotar-Type Lenses . . . . .
- Plasmats . . . . .
- Ernostars . . . . .
- Sonnars . . . . .
- Teleobjectives . . . . .
- Composite-Teleobjectives . . . . .
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INTRODUCTION

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Spherical aberration and departure[2] from the sine-condition are indicated on the eight side of the cards by a-curves, spherical aberration by solid curves, and departure from the sine-condition by dashed curves. On the left side of the cards, these aberrations are indicated in figures under the headings s' and f'.

Indidence Heights

In most cases three incidence heights are indicated. The greatest incidence height (that of the marginal ray) is $h_{III} = \frac{f}{2k}$, where f means the paraxial focal length = 100 mm, and k the maximum possible f-number. Also, $h_{II} = \frac{2}{3} \cdot h_{III}$, and $h_I = \frac{1}{3} \cdot h_{III}$. Values shown in the coordinate systems on the right side of the card indicate the exact figures, whereas figures given for h_{III}, h_{II}, and h_I, under the heading "Incidence Height" on the left side of the card, are very often multiplied by a factor for greater distinctness and for the sake of convenience.

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$$e = s'_k \frac{\sin u'_k}{\sin u'} - (t'_k - a'_k) \quad \text{(See diagram)}$$

where

e = the meridional coma

s'_k = distance on optical axis between point of intersection of a coma ray and that of the pertinent principal ray

ω_k = angle of inclination of coma ray to the axis

u' = angle formed by coma ray and principal ray

t'_k = intersection length of the tangential (meridional) image point

$a'_k = Q_k P'_k$ = distance from point of intersection of principal ray and axis to point of intersection of principal ray and the last refracting surface

p'_t = tangential (meridional) image point after the last refraction.

Curves of meridional coma are drawn on an orthogonal system of coordinates, with the incidence heights of the object pencils of rays in the entrance pupil as ordinates and the com comae = e as abscissas, the latter at a scale of 5:1 to the ordinates.

TESSAR LENSES

The Tessar type of lens consists of three lens units, the two exterior being converging lenses, and the interior lens, separated by an air space, a dispersing lens. One of the converging units, preferably the rear one, consists of two lenses of opposite refraction power, which are held together by means of a cemented surface.

Name of Objective	Aperture Ratio	Focal Length	Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Original form of the Zeiss Tessar			25		19	49
Tessar	1/2.7	8.2 cm	21		635	
Tessar	1/2.7	8 cm	21		640	
V 1927 No. 10	1/2.7	16.5 cm	21		769	
V 1927 No. 8	1/2.7	10.5 cm	17.5	Cemented surface in the first component	768	
Tessar	1/2.7	2.5 cm	17.5		764	
Tessar	1/2.7	7.5 cm	17.5	Cemented surface is concave to stop	631	
Tessar	1/2.7	2 cm	15	Cemented surface is in the first component	797	
Tessar, Versuch No. 1-1924	1/2.7	73.8 mm	20	Cemented surface is in the first component	630	
V 1931 No. 2	1/2.7	10 cm	18		909	
V 1930 No. 11	1/2.7	5 cm	18		888	
Tessar	1/2.5	10 cm	15	Cemented surface is in the first component	1139	
V 1931 No. 4	1/2.8	5 cm	25		879	
V 1938 No. 8	1/2.8	5 cm	22		1217	
Tessar	1/2.8	5 cm	24		929	
Tessar	1/2.8	5 cm	25	For Kontax	920	
V 1923 No. 5	1/2.8	7.5 cm	20	Cemented surface is concave to stop	611	
V 1931 No. 26	1/2.8	5 cm	24		915	
E. Leitz, Wetzlar	1/3.4	100 mm	24	With aspherical back surface	562	
Tessar	1/3.5	300 mm	18		383	
Jos. Schneider, Kreuznach	1/3.5	10 cm	20		1238	
Jos. Schneider & Co., Kreuznach P.A. Sch 83426	1/3.5	10 cm	25	Cemented surface is in the first component	867	
Tessar	1/3.5	15 cm	28	For wide field angle	706	
O.A.S. Vs No. 9	1/3.5	8 cm	25	O.A.S. is an abbreviation for Optische Anstalt a subsidiary of the Zeiss Co. manufacturing primarily a slightly inferior grade of lenses	1176	
O.A.S. Vs No. 8	1/3.5	8 cm	22		1175	
V 1930 No. 12	1/3.5	5 cm	18		873	
V 1930 No. 13	1/3.5	5 cm			874	
V 1934 No. 15	1/3.5	5 cm	25		1056	
Tessar	1/3.5	5 cm	27		1080	
Tessar	1/3.5	5 cm	24		1137	
Tessar	1/3.5	50 mm	18	Journal of the Instrument Trade,,1907	256	
Tessar	1/3.5	300 mm	17.5		215	
Tessar	1/3.5	300 mm	17.5		107	
Tessar	1/3.5	100 mm	18	For motion picture photography	596	
Voigtlaender AG Anastigmat	1/3.5	10 cm	20	Cemented surface is in the first component	880	
Jos. Schneider	1/3.5	100 mm	26		992	
V 1938 No. 3	1/3.5	5 cm	22.5	For small field angle	1201	
Tessar	1/3.6	174.6 mm			93	
Tronnier	1/3.6	100 mm	25		1040	
Tronnier	1/3.3	100 mm	23		1039	
Aldis	1/4	100 mm	10		625	

Bausch & Lomb Projection Objective	1/4	391.4	mm	21		337
Aspherical Objective	1/2	46.2	mm	20		957
Leitz-Wetzlar	1/3.5	5	cm	20		855
V 1930 No. 10	1/2.7	5	cm	20		863
Jos. Schneider	1/4.35	100	mm	20		995
Dr. Pruemm and Gen. G.m.b.H Braunschweig	1/4.5	100	mm			618
Tessar	1/4.5	15	cm	27		216
S-Tessar	1/4.5	25	cm	22	For scale n = 3	1229
Jos. Schneider	1/4.5	100	mm	27		996
Tessar	1/4.5	145	mm	27		97
V 1935 No. 17	1/4.5	3.5	cm	28	The fourth lens is made of a new glass with a high refraction index	1100
Tronnier, Kreuznach	1/4.5	10	cm	29		1029
W. F. Bielicke	1/4.5	18.8	cm	27		746
Tessar	1/4.5	50	cm	20	In triplicate	1127
Tessar	1/4.5	153.20	mm	25		560
Tronnier	1/4.5	100	mm	27	Scale n = Aerial Photography For scale n = 3 of 9/2/38	1034
Tessar	1/4.5	50	cm	25		446
S-Tessar	1/4.5	25	cm	22.5		1350
Tessar	1/4.5	150	mm	28		206
V 1926 No. 1 and V 1926 No. 22	1/4.5	15	cm	25	Experimental objectives	700
Tessar	1/4.5	15	cm		Card in original and duplicate	209
Tessar	1/4.5	50	cm	20	Calculation of 10/6/1937	1180
Anti-Comar	1/4.5	15	cm	28	Made by Plaubel & Co., Frankfurt Main	547
Tessar	1/4.5	21	cm	27	With compensation plate	545
Tessar	1/4.5	15	cm	27		412
Tessar	1/4.5	163.3	mm	28		411
Tessar	1/4.5	25	cm	25		413
V 1930 No. 2	1/4.5	13.5	cm	22	First and last lenses are constructed of Crown Glass of a high refractive index	839
V 1930 No. 3	1/4.5	13.5	cm	27	First and last lenses are constructed of Crown Glass of high refractive index	843
V 1930 No. 4	1/4.5	13.5	cm	27	First and fourth lenses are constructed of Crown Glass of high refractive index. Experimental Lens	856
V 1929 No. 13	1/4.5	10.5	cm	30	Experimental Lens	833
Tessar V 1930 No. 1	1/4.5	13.5	cm	26	First and fourth lenses are constructed of Crown Glass of high refractive index	837
Tessar	1/4.5	15	cm	27	New Experiment	791
Goerz Anastigmat	1/4.5	15	cm	27	Tests proved this objective to be inferior to the Zeiss Tessar	707
Goerz Anastigmat	1/4.5	15	cm	27		709
Kapella Limited	1/4.5	100	mm	23		714
Skopar, Voigtlaender	1/4.5	13.5	cm	20	Cemented surface located in the first lens	752
Voigtlaender	1/4.5	10	cm	15	Cemented surface located in the first lens	760
V 1927 No. 11	1/4.5	14	cm	29	Experimental objective	772
Tessar	1/4.5	15	cm	29		484
Tessar	1/4.7	158.3	mm	28		421
Tessar	1/4.5	156	mm	29		90
Aldis Anstigmat	1/4.5	5.75	cm	27		349
Jos. Schneider	1/4.5	100	mm	28		993
V 1931 No. 24	1/4.5	13.5	cm	22	Experimental objective	910
Tessar	1/4.75	157.6	mm	28	With small spherical zones	479
Ussar	1/4.7	145	mm	28		458

I-R-Tessar	1/4.8	50	cm	15	Corrected for A'	1142
I-R-Tessar	1/4.8	50	cm	15	Corrected for A'	1141
Tronnier	1/4.8	100	mm	17.5		1033
Tessar	1/4.8	160	mm	24		452
A-Tessar	1/5	50	cm	20		841
Astro-Tessar	1/5	600	mm	10		68
Tessar	1/5	50	cm	20		850
Tessar	1/4.7	145	mm	28	Zeitschrift fuer Instrumentenkunde, 1907 p. 78, (Journal of the Instrument Trade.)	92
Tessar	1/5	50	cm	20		447
I-R-Tessar	1/5	50	cm	20	Correct for A'	1144
Astro-Tessar	1/5	600	mm	10		818
Tessar	1/5	50	cm	20		441
Tessar	1/5	120	mm	20	Last thickness not quite sufficient	453
V 1928 No. 4	1/5	14	cm	20	For reduction scale 1/4.5 - a-curve for d, C, & g'	1205
V 1933 No. 8	1/5	100	cm	15	Calculated for A'	1008
Tessar	1/5	80	cm	15		1017
Tessar	1/5	50	cm	22		417
A-Tessar	1/5	50	cm	20		883
Tessar	1/5	545	mm	20		428
Tessar	1/5	50	cm	25		462
Tessar	1/5	38	cm	20		476
A-Tessar	1/5	50	cm	20		1015
Tessar	1/5	50	cm	20		434
Tessar	1/5	50	cm	20		433
Tessar	1/5	554	mm	20		435
Tessar	1/5.1	512.7	mm	27	Based on 1/4.5, f = 50 cm of 11/18/11	448
Tessar	1/4.5	25	cm	23		416
Jos. Schneider	1/5.4	100	mm	25		994
Koehler Optical Co., New York	1/5.9	149.7	mm	17		350
Tessar	1/5.5	176	mm	29	T. . British Journal of Photography, Jan 7, 1921, p. 8	419
Tessar	1/5.6	135	mm	29	German Patent No. 142294, basic patent for the Tessar Objective	373
Tessar	1/6.4	102.7	mm			154
Zeiss, Bausch and Lomb, Tessar	1/5.8	15	cm	28		208
Tessar	1/6.1	147	mm	31		74
B-Tessar (Amatar)	1/6.3	150	mm	28		71
Tessar	1/6.3	25	cm	30		256
Tessar	1/6.3	136	mm	30		111
R. Steinheil				28		131
Tessar	1/6.3	155	mm	30	Front Lens made of Barium-Flint	94
Tessar	1/6.3	155	mm	29	Front and back lenses made of Barium-Flint	98
Tessar	1/6.3	151.3	mm	29	Front and back lenses made of Barium-Flint	95
Tessar	1/6.3	155	mm	29	Front and back lenses made of Barium-Flint	96a
Tessar	1/6.3	126.6	mm	28		81
V 1931 No. 12	1/6.3	12	cm	15	Experimental objective	912
Tessar	1/6.3	150	mm	30		191
Amatar	1/6.3	150	mm	30		192
Tessar	1/6.3	148	mm	29	Experiment. Construction drawing of 5/[illegible]8	149
Tessar	1/6.3	15	cm	29	Coma curves. Partially calculated for the G'-line	207
C. F. Lan-Davis (Dallmeyer)	1/6.3	56.3	mm	15		334
Tessar	1/6.3	25	cm	25	Partially calculated for the G'-line	212

Tessar	1/6.3	15	cm	29	First and fourth lenses constructed of Barium-Flint	405
Tessar	1/6.3	21	cm	25		465
B-Tessar	1/6.3	182	mm	26		176
B-Tessar	1/6.3	150	mm	23	Zeiss-Kodak Anastigmat, made by Bausch & Lomb	177
B-Tessar	1/6.3	150	mm	29		179
Tessar	1/6.3	165.8	mm	29	Front and back lenses of Barium-Flint	144
Tessar	1/6.3	164.4	mm	25	Front and back lenses of Barium-Flint	145
Tessar	1/6.3	145	mm	30	Front and back lenses of Barium-Crown	24
Amatar	1/6.3	153	mm	29		178
B-Tessar	1/6.3	150	mm	30		180
Tessar	1/6.37	153	mm	30		190
C. F. Lan-Davis (Dallmeyer)	1/6.8	61.1	mm	25	First example calculated 10/11/13	333
Olor	1/6.8	200	mm	25	Made by Lacour-Berthiot, Paris. Cemented surface concave to stop	323
Olor	1/6.8	200	mm	25	Cemented surface concave to stop	351
Tessar	1/6.8	127	mm	29		463
Voigtlaender	1/6.8	100	mm	29		381
Steoplag Mess Tessar	1/6.8	21	cm	30	With compensation plate. For Stereoplanigraph	974
Tessar	1/7.2	175	mm	29	For 3 F.P. Kodak 9x14 cm	203
Tessar	1/7.2	173.4	mm	25	Experimental Calculation	14
Tessar	1/7.9	125.7	mm	80	Attempt to develop the Tessar Objective as a Wide-Angle Objective	153
Steoplag Mess Tessar	1/8	21	cm	28		875
Tessar	1/8	2.8	cm	80	Wide-Angle Objective	980
Tessar	1/8.1	150.8	mm	40	Trial calculation	152
Tessar	1/9	32	cm	20		284
Tessar	1/9.15	146.5	mm	40	Wide-Angle Objective	155
Tessar	1/9	140.2	mm	40	Trial calculation	147
Tessar	1/9	139.9	mm	40	Trial calculation	148
Tessar	1/9	142.2	mm	40	Trial calculation	150
Tessar	1/9.1	146.1	mm	40		156
Tessar	1/9	231.7	mm	40	Original type	143
Tessar	1/9	142.5	mm	40	Trial calculation. Wide-Angle Objective	151
Tessar	1/9	50	cm	25		416
Reproduction Tessar	1/10	640	mm	17	Apochromatic objective	38
Reproduction Tessar	1/10	640	mm	17	Apochromatic objective. Spherical calculation also made for the G'-line	76
Kapella, Ltd.	1/10	0.932	cm	20	Data given in this patent specification indicate only f = 0.932	716
Apo-Tessar	1/10	64	cm	21		763
Tessar	1/16	21.0	cm	17	For scale 1/3	1237
V 1935 No. 5	1/20	8.8	cm	17	Experimental objective. For scale 1/3.59	1155
V 1937 No. 20	1/20	14	cm	17	Experimental objective. For scale 1/1.8	1218

COOKE LENSES

Cooke Lenses are objectives which consist of three single lens components. The two exterior components are converging lenses and the interior component, separated from each exterior one by an air space, is a dispersing lens.

These triple lenses were developed by Harold Dennis-Taylor at the beginning of the 1890's. Correction of error is possible to such an extent that the modern forms of this type of objective are among the best anastigmats in certain optical fields.

The construction of these objectives is remarkably simple, and they can be produced easily at slight cost.

Such triple lenses, or triplets, have been developed for utilization in several fields of photography. They may be used for motion picture photography and projection, for objectives of high light intensity, as lenses for portrait photography having a long focal length, as objectives for aerial photography, and occasionally as reproduction objectives.

This type of objective is not suitable for wide-angle photography, as may be seen from the compilation which follows. Even at a small aperture, the usable angle of image cannot be greatly increased above the standard angle of image of universal objectives.

Name of Objective	Aperture Ratio	Focal Length	Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1933 No. 10	1/1.8	5 cm	20	Experimental lens. Fifth surface aspherical	1012	
V 1933 No. 9	1/1.8	5 cm	19	Experimental lens. Fifth surface aspherical	1011	
V 1932 No. 5	1/2	5 cm	19	Experimental lens. Fifth surface aspherical	937	
V 1933 No. 12	1/2.0	1 cm	16	Experimental lens. Fifth surface aspherical. Thickness of the lenses made especially to afford manufacture in short focal lengths	1018	
V 1936 No. 12	1/2.0	2.5 cm	17		1234	
V 1937 No. 21	1/2.5	5 cm	20	Calculated for G' d, c	1187	
Kapella	1/2.5	1 cm	10		1126	
Kapella	1/2.5	10 cm	10		1228	
Bausch & Lomb	1/2.5	2.5 cm	18		1046	
Finder Triplet	1/2.6	8 cm	17		1073	
V 1921 No. 3 Triplet	1/2.6	6.5 cm	25	Calculated for nF	555	
I. G. Farben	1/2.7	10 cm	10	The first lens has a cemented surface, which is without effect in the d-line	1045	
Triotar	1/3	2.7 cm	20	For substandard film. Because of coma, usable only up to a total angle of 14°	633	
Triplet	1/2.7	7.5 cm	20		632	
Finder Triplet	1/2.8	7.5 cm	15	Rolleiflex finder. Spherically over-corrected	1211	
Finder Triplet	1/2.8	7.5 cm		Rolleiflex finder. Spherically over-corrected	1216	
Finder Triplet	1/2.8	7.5 cm	14		1172	
V 1935 No. 11	1/2.8	7.5 cm	10	Finder Objective	1016	
Finder Triplet	1/2.8	6 cm	15		997	
V 1931 No. 11 Finder Triplet	1/2.8	6 cm	10		842	
Finder Triplet	1/2.8	6 cm	10		846	
Taylor, Taylor and Hobson	1/3	100 mm	12	Refer to The British Journal of Photography, 24 Feb 1921, pp. 86,-87	556	
Taylor, Taylor and	1/3	100 mm	15	Refer to The British Journal of Photography, 24 Feb 1921, pp. 86,-87	557	
Modified Hypa	1/3	35 mm	20		634	
Triplet	1/3	7.5 cm	20		615	
Finder Triplet	1/3.1	5 cm	10		1073	

Busch-Glaukar	1/3.1	130	mm	17	
Steinheil	1/3.2	55	mm	15	
Ernoskop	1/3.2	33.5	cm	20	
Triplet	1/3.2	178	mm	20	
Epi-Objective	1/3.3	25	cm	20	
Micro-Projection Objective	1/3.3	6	cm	20	
Motion Picture Hypar	1/3	3.5	cm	20	
I-Finder Triplet	1/3.5	7.5	cm	15	
Askania, of Bambegg-Friedenau	1/3.5	100	mm	15	
Steinheil	1/3.5	10	cm	17	
V 1928 No. 12	1/3.5	7.8	cm	22	
Finder Objectives V 1923 No. 11	1/3.5	7.5	cm	10	
Ernemann Co, Dresden	1/3.5	250	mm	17	
V 1932 No. 1	1/3.5	2.5	cm	12	
Trietar	1/3.5	166	mm	15	
Helomar	1/3.5	180	mm	15	
Epiotar	1/3.5	43	cm	15	
Triplet	1/3.5	10	cm	12	
Triotar	1/3.5	21	cm	20	
Projection Objective	1/3.6	32	cm	10	
Projection Anastigmat	1/3.5	387	mm	20	
Finder Triplet, V 1923, No. 13	1/3.5	7.5	cm	10	
H. D. Taylor				10	
Triplet	1/3.5	10	cm	25	
Balloptikon	1/3.5	333.6	mm	10	
Epiotar	1/3.5	26	cm	20	
Projection Triplet	1/3.6	15	cm	18	
Projection Triplet	1/3.6	15	cm	20	
Projection Triplet	1/3.6	15	cm	10	
Orikar	1/3.6	36	cm	20	
Triplet	1/3.6	7.5	cm	10	
Projection Objective	1/3.6	32	cm	10	
Epikar	1/3.7	37	cm	17.5	
Epikar	1/3.7	37	cm	22	
C. & G. C. Beck	1/3.8	107.27	mm	18	
Finder Triplet	1/4	7.5	cm	15	
V 1931 No. 32	1/4	8.5	cm	12	
V 1931 No. 36	1/4	13	cm	10	
Huet & Co.	1/4	68.9	mm	5	
Zeiss Ikon Epidiascope Objective	1/4	29	cm	10	
Feuillet	1/4	28.3	cm	15	

Calculated for the g' and D-line	296
	586
	742
	629
For episcopic projection	1074
	972
C. P. Goerz, Berlin	601
	1090
Spherically, chromatically and astigmatically corrected objective	647
Example No. 1. See card No. 1024	1022
	626
	672
Three-lens objective (with removable spherical yellow screen)	403
	943
The last surface aspherical	380
Voigtlaender	352
Made of "Gussglas" (poured glass.) For episcopic projection	1115
Steinheil Example No. 1	1024
	652
Made of plate glass for reasons of economy. Chromatic correction consequently impossible. See also No. 650	651
Calculated for g and D	348
	614
Double objective calculated for G'	138
	1032
Made by Bausch & Bomb. Projection objective, calculated for C. D. F. G'	795
Episcopic projection	795
Converging lenses made of plate glass	664
Converging lenses made of plate glass	663
Converging lenses made of plate glass	662
	740
All three lenses made of plate glass; chromatic correction therefore not possible	650
All three lenses made of plate glass; chromatic correction therefore not possible	650
Episcopic projection	749
Episcopic projection	750
For U.S. patent specification data proved to be 10.72 inches instead of 10 inches	294
	1213
	932
	933
	914
For episcopic and diascopic projection	584
	1067

Triplet	1/4	7.5	cm	5		889
Triplet	1/4	7.5	cm	5		890
Taylor, Taylor and Hobson	1/4	158	mm	20		307
Dimax	1/4	40	cm	15	Made by Leitz, Wetzlar. Projection objective	739
V 1931 No. 27	1/4	7	cm	10		940
Triotar	1/4	15	cm	20		518
Projection Triplet	1/4	38	cm	20	Front add back lenses made of plate glass	744
Triplet	1/4	8	cm	12		928
A. Taylor and H. D. Taylor	1/4.4	100	mm	10		688
Trioplan	1/4.5	10.5	cm	15		793
Radionar	1/4.5	7.5	cm	20		1025
V 1931 No. 1	1/4.5	2.7	cm	15	Glass plate of 7 mm thickness between objective and image, used as a trichinoscope for meat inspection	907
Quartz Anastigmat	1/4.5	12	cm	18	For exposures with ultraviolet light; not achromatized	896
Triplet	1/4.5	15	cm	10	For projections	501
Jos. Schneider	1/4.5	100	mm	25		1071
V 1914 II Triotar	1/4.5	16.5	cm	20		347
V 1936 No. 8	1/4.5	8.5	cm	20	Calculated for μ = 546 and $\mu\mu$ = 313. An objective of high transparency, also in the ultraviolet region of the spectrum	1119
C. P. Goerz	1/4.5	100	mm	15		576
Anastigmat	1/4.5	100	mm	20	Very useful universal objective. Diagonal of the image = focal length	861
V 1931 No. 20	1/4.5	3	cm	10	Objective for motion picture photography and projection	906
O. A. S. Pho-Ski 639	1/4.5	5	cm	22		863
Tronnier, Bad Kreuznach	1/4.5	100	mm	20	Calculated d and g' lines	812
Triplet	1/4.5	193	mm	18		816
Anastigmat	1/4.5	10	cm	20		861
Tenaxiar	1/4.5	10	cm	20	Goerz Objective	851
Triplet	1/4.5	5	cm	21		862
Quartz-Sodium-Chloride Anastigmat	1/4.5	12	cm	21	Achromatized and of high transparency in the ultraviolet region	804
Achromatic Quartz Anastigmat	1/4.5	25	cm	15	Achromatized and of high transparency in the ultraviolet region	803
Tricar	1/4.5	15	cm	18	Correction of the lateral rays of the image was not favorable, and this objective was withdrawn from the market after a short period	372
V 1929 No. 14	1/4.5	10.5	cm	25	Last lens made of plate glass	831
Tenaxiar, Goerz	1/4.5	10	cm	25		826
A. Korber, Leipzig	1/4.5	100	mm	10	Objective made of three separate lenses, data taken from Zeitschrift fuer Instrumenten Kunde Vol. 11, 1916, pp. 269-278 (Journal of the Instrument Trade). This objective was calculated on the basis of Seidel's preliminary computations	415

Triplet	1/4.5	36	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculated for the d and g' lines. For aerial photography	398
Triplet	1/4.8	36	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculated for the d and g' lines. For aerial photography	396
Anastigmat	1/4.5	180	mm	25		346
Cooke Anastigmat	1/4.5	5½	in.	10	Exact data measured by Zeiss 1/5, f = 146.5 mm made by Taylor, Taylor and Hobson 3/20/13	310
Projection Triplet	1/4.5	25	cm	20		316
V 1912, X	1/4.5	40	cm	20		285
Tronnier	1/4.5	10	cm	25		1110
Portrait Anastigmat	1/4.5	24	cm	25	Made by Voigtlaender & Sohn, Braunschweig 11/28/99	270
Untraviolet Objective	1/4.5	120	mm	5	Made of optical glass permitting a high degree of ultraviolet transparency	300
Taylor-Cooke	1/4.6	208	mm	12.5	Data have been adapted to those found in the May 1904 edition of "Monthly Notices." For Astrophotography	87
Triplet	1/4.8	12	cm	10	Scale of image 1:1 7/16/34	1093
I-R-Triplet	1/4.8	50	cm	12		1148
Triplet	1/4.8	50	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. This objective was the prototype of all objectives having an aperture ratio of 1/4.8 and f = 50 cm, used in aerial photography during World War I	477
Triplet	1/5	70	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	321
Triplet	1/5	25	cm	20		442
Triplet	1/5	70	cm	12.5	The abscissas of the b-curves have been magnified 10 times for distinctness	439
Ballon Triplet	1/5	70	cm	12.5	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness.	394
Triplet	1/5	70	cm	11		303
Triplet	1/5	70	cm	11	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculation for d and g' lines	319
Ballon Triplet	1/5	70	cm	11	Effect of stop displacement on b-curves	401
Triplet	1/5	150	cm	10	Effect of stop displacement on b-curves. Spherically over-corrected to eliminate aberration of the marginal rays by deformation (optical figuring)	461
Ballon Triplet	1/5	70	cm	10	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	397
Taylor-Cooke	1/5	480	mm	10	For astrophotography. Tangential coma-curves for inclination of the pencil of rays w = 10° 43' and aperture ratio 1:6	221

Triplet	1/5	48	cm	10	Spherical correction for $^{n}366$, and d and g lines	223
Cooke Anastigmat	1/5.6	6	in.		Number 28,232 measured and calculated by Zeiss to be 1/6.1, f = 160 mm, made by Taylor, Taylor & Hobson	309
Triotar	1/5.6	10.5	cm	11		1112
Ballon Triplet	1/5.13	718	mm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	395
F. W. Gehrke	1/5.5	10	cm	25	Thickness of the last lens too small for the indicated aperture ratio of 1/5.5	1961
I. G. Farbén	1/5.5	106	mm	22		962
Triplet	1/6	60	cm	12	For aerial photography	1014
E. Busch	1/6	100	mm	5	Correction of spherical aberration poor	846
Triplet	1/6	180	cm	10	Spherical correction over-corrected intentionally; it was eliminated by marginal figuring	423
Triplet	1/5.6	163.5	mm	30		234
Triplet	1/6	120	cm	10		429
Triplet	1/6	210	cm	5	Spherical correction intentionally over-corrected; this was eliminated by deformation	428
Triplet III	1/6	142.9	mm	30		457
Triplet	1/6	180	cm	12		427
Triplet	1/6	180	cm	10	Abscissas of b-curves magnified 10 times for distinctness. Spherical correction over-corrected. This was eliminated by marginal figuring	425
C. P. Goerz	1/6.25	100	mm	12		577
Triplet	1/6.3	13.5	cm	10	Made by Oskar Simon, Dresden. As of 20°, the curves are very poor	786
Triplet	1/6.3	13.5	cm	30	The two exterior objectives are made of plate glass	785
Ernastigmat	1/6.3	135	mm	30	Cooke Lens	775
I. G. Farben	1/6.3	10	cm	30		901
Rodenstock	1/6.3	10	cm	10	The two exterior objectives are made of plate glass	963
Rodenstock	1/6.3	10	cm	30	The two exterior objectives are made of plate glass	877
Achromatic Ultra-violet Anastigmat	1/6.3	386	mm	15	Made of quartz and sodium chloride	773
Quartz Anastigmat	1/6.3	386.2	mm	20	Not achromatized	770
B 1912 - IX	1/6.3	15	cm	27		283
Quartz Anastigmat	1/6.3	100	mm	25		729
Achromatic Ultra-violet	1/6.3	12	cm	10	Made of quartz and sodium chloride	796
Jos. Schneider, Kreuznach	1/6.3	10	cm	25		708
Taylor-Cooke Lens III	1/6.3	151.18	mm	30		185
Cooke Lens V	1/6.3	15	cm	25	Quality of image within a circle of a diameter equal to the focal length is nearly equivalent to the quality of image achieved with the corresponding Tessar. Although the objective has one lens less than the Tessar, the average mass production proved to be nearly as costly, since the air space between the first and second lenses had to be exact to a tolerance of 1/100 of a mm	232

Triplet	1/6.3	10.5	cm	20	The two external lenses are made of plate glass	825
Triplet	1/6.3	120	cm	12	Abscissas of the b-curves have been magnified 10 times for the sake of distinctness	424
Same as Cooke Lens VIII	1/6.3	15	cm	22	Calculated for the d and g' lines	228
Cooke Lens VII	1/6.3	15	cm	22		233
Triplet	1/6.3	120	cm	22	Objective for Aerial photography. The abscissas for the b-curves have been magnified 10 times for the sake of distinctness. Spherical calculation for C, d, F, g'	475
Taylor-Cooke I	1/6.3	150.38	mm	25		182
Taylor-Cooke II	1/6.3	152	mm	25	Spherical calculation for d and g'	184
Primoplane	1/6.5	6	in.	5	Made by Taylor, Taylor and Hobson. Correction for margin and center of image field poor	311
Triple Anastigmat	1/6.8	100	mm	10	Made by Voigtlaender & Sohn. Calculated for the d and g' lines; correction of center not good; correction of margin poor	345
Eastman	1/6.8	10	cm	10		1009
V 1912 IV	1/6.8	73	mm	25	Calculated d and g' lines	236
Cooke - Luxor Anastigmat	1/6.8	6	in.	10	Made by Taylor, Taylor and Hobson, - their No. 28,867. Acquired from T. T. & H, Construction data measured at Zeiss, Jan, 1912	269
H. D. Taylor, Example IV, Fig. 5	1/8	100	mm	20		139
H. D. Taylor		98.96	mm	25	Aperture ratio not given; spherical correction poor	140
H. D. Taylor	1/5.5	101.03	mm	25		142
H. D. Taylor				5	Aperture ratio not given; Spherical and astigmatic correction poor	186
H. D. Taylor		100	mm	5	Aperture ratio not given; Spherical and astigmatic correction poor	182
H. D. Taylor		167.27	mm	5	Aperture ratio not given; Spherical correction poor. f = 100. Red	187
H. D. Taylor		100	mm	5	Aperture ratio not given; f = 100. Spherical and astigmatic correction poor.	188
H. D. Taylor	1/7	100	mm	20	Aperture ratio approximately 1/8	189
Same as Cooke Lens IV	1/6.8	15	cm	30		231
Cooke Lens IX	1/6.8	15	cm	25		235
Cooke Lens VI	1/6.8	15	cm	25		227
Taylor, Taylor & Hobson	1/7	146	mm	30	Marked 1/6.5, 5¾ in.	308
Cooke Primoplane Lens	1/6.5	6	in.	35	r_6 and d_3 modified by Zeiss	314
Hillon Triplet	1/7	120	cm	8	Scales for angles and aberrations of the b-curves have been presented in a form differing from the standard presentation, as can be seen from the figures given on this card	393

Special Objective for motion picture photography of machine gun-firing practice "C/10"	1/7.5	9	cm	10		930
Taylor, Taylor & Hobson	1/7.7	100	mm	30		578
C & H. C. Beck	1/6			25		266
C & H. C. Beck	1/6			30		265
Plateglass Triplet	1/7.7	10	cm	25	The two exterior objectives made of plate glass	913
American patent 1,514,356	1/7.7	100	mm	30	See also Card No. 575	717
Kodar	1/7.9	131	mm	20	The data given were calculated at Zeiss on 9/30/26	747
Eastman	1/8	100	mm	20		830
Improved Cooke Lens IX	1/7	100	mm	25	See also Card No. 235	304
Improved Cooke Lens IX	1/7	100	mm	25	See also Card No. 304	313
Modified Taylor Lens	1/7	100	mm	25		292
C & H. C. Beck	1/7	106.8	mm	10	Patent specification slightly incorrect	293
Triplet	1/8	25	cm	10		529
Triplet	1/8.3	200	mm	20		520
Triplet	1/8.3	200	mm	18		519
Triplet	1/8.4	202	mm	18		532
Igetar	1/8.8	9.5	cm	30	Data taken from drawing, submitted by IGF 6/19/28	844
Objective for Astrophotography	1/10	360	cm	40	Calculated for Colors n F, n436	211
Triplet	1/12.5	60	cm	15		420
Triplet	1/15	70	cm	10		1105
I. R. Triplet	1/15	70	cm	10	Calculated for the region 546 to 942	1181
V 1937 No. 12	1/16	21	cm	11	Scale of image 1/5	1178
V 1937 No. 11, Triplet	1/16	36	cm	7	Scale of image 1/3	1219
H. D. Taylor, Reproduction Objective	1/16	100	mm	10		58
Triplet	1/90	162.5	cm	6		916

HEKTOR LENSES

The wide utilization of Cooke lenses has been shown in the foregoing compilation. In the course of further development, the individual components of Cooke lenses were no longer constructed of single units, but were composed of two and sometimes three individual lenses.

Of all the objectives of this general sort, the Tessar type is most closely related to the Taylor Triplet, since in the Tessar only one of the two exterior units is composed of two lenses which are held together by a cemented surface. This produces a considerable increase in optical efficiency in the Tessar, as compared with the Cooke lens.

However, considering all pertinent factors, even the more complicated objectives developed from the Cooke Triplet do not surpass the optical qualities of the Tessar.

The following compilation lists a number of objectives, based on the Cooke lens and composed of five or more individual lenses, without any reference to quality or degree of optical efficiency as related to the number of lens components.

Biotar is a designation used by Zeiss for various types of objectives.

A combination of a Petzval objective and a Smyth lens, the latter serving solely for the purpose of reducing field curvature, was developed first.

These Biotars were in reality nothing more than a Petzval system with a dispersing supplementary lens. They were not much in demand, since the back focus was very short, and the objective, consequently, rather difficult to install in most of the camera types.

A second group of Biotars, designated by Zeiss as Biotar III, and listed here under numbers 670, 671, 667, 668, 679, 669, and 672, can be considered as based on the Cooke lens, as may be seen by the drawings of meridional sections of the lenses shown on the cards. This second group has never been sold to the trade and was never listed in Zeiss's catalogues.

A third group of Biotars showed best optical efficiency where a brilliant image was desired. Since these objectives had particularly high resolving power, this particular group of Biotars has also been produced by other manufacturers under different names and with slight modifications, so far as possible without infringing Zeiss's patent.

The Zeiss Biotars produced during the last twenty years were all based on this last-mentioned group. They achieved an aperture ratio of 1/1.4 and higher.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Biotar III	1/1.8	8.5	cm	20		670	
Biotar III	1/1.8	8.5	cm	15		671	
Biotar III	1/1.8	8.5	cm	15		667	
Biotar III	1/1.8	8.5	cm	18		668	
Biotar	1/1.8	12	cm	20		679	
Biotar	1/1.8	54	mm	15	In contrast to the Biotars mentioned above, this objective is composed of only five lenses	669	
Biotar III	1/1.8	8.5	cm	20	In contrast to the other Biotar III objectives mentioned above, the dispersing lens of this objective is composed of two individual lenses. Displacement of the stop from the second to the third air space has only slight effect on the b and c curves	1972	
E. Leitz	1/2	10	cm	10		1001	
E. Leitz, Wetzlar	1/2	10	cm	18		987	
E. Leitz	1/2	100	mm	14		1038	
Biotessar	1/2.2	1.5	cm	18	This objective was used for microphotography	756	
V 1925 No. 7	1/2.2	5	cm	15		703	
V 1925 No. 8	1/2.2	10	cm	18		702	
Biotessar	1/2.25	15	mm	18		758	
E. Leitz, Wetzlar	1/2.5	100	mm	19		866	
E. Leitz, Wetzlar	1/2.5	100	mm	22		923	
Anastigmat	1/2.5	100.9	mm	20	This objective, made by Leitz and designated "Hektor," was used with f = 5 cm as the objective for the Leica 24 x 36 mm	865	
C. P. Goerz, 0.14740	1/2.7	10	cm	25	See also Card No. 718. This objective was put on the market shortly before the Goerz Co. stopped the production of objectives. It was called the "Lucinar." Compared with the Tessar 1/2.8, composed of 4 lenses only, which was produced in the 1930's, it had a more marked astigmatic and chromatic zone, where as aperture ratio and focal length were the same	692	

V 1925 No. 1	1/2.7	18	cm	20		681
V 1925 No. 2	1/2.7	16.5	cm	20		794
V 1925 No. 2	1/2.7	16.5	cm	20	The two V (test) objectives mentioned above represent investigations within the Biotessar development. Note that Cards Nos. 794 and 683 show two different methods of presentation of the same objective.	683
C. P. Goerz	1/2.7	100	mm	25	A duplicate of Card No. 692 with more explicit data	718
Biotessar	1/2.8	16.5	cm	20		801
Biotessar	1/2.8	17	cm	20		800
Biotessar	1/2.8	5	cm	20		1221
V 1928 No. 15	1/2.8	5	cm	20		1242
Biotessar	1/2.8	12.4	cm	16		1256
V 1925 No. 4	1/2.9	14	cm	20		736
V 1925 No. 4	1/2.9	10	cm	20		693
V 1925 No. 4	1/3	17	cm	20		689
V 1925 No. 4	1/3	17	cm	20	Test objective with extended stop clearance	691
Biotessar	1/2.7	4	cm		Spherical calculation for d and g'	834
V 1925 No. 3	1/3	17	cm	20		690
V 1922 No. 2	1/3.5	75	mm	20		595
V 1934 No. 17	1/3.64	10	cm	11		1069
V 1934 No. 17	1/3.5	10.4	cm	11	This card shows a repeated calculation of the objective as per Card 1069	1070
V 1921 No. 16	1/4	15	cm	25		575
5-Lens Dialyt	1/4	139.5	mm	25		580
5-Lens Dialyt	1/4	137.6	mm	25		572
V 1921 No. 15	1/4	15	cm	25		574
5-Lens Dialyt	1/4	138.06	mm	25		571

BIOTAR LENSES

The real Biotar may be considered as derived from the Gauss double objective. Like all Gauss objectives, the Biotars have a particularly good sphero-chromatic correction.

The Biotar is composed of four lens units, of which the two exterior consist of converging lenses and the two interior negative meniscuses. For further details, refer to "Das Zeiss-Biotar 1/1.4, ein Neues Objektiv fuer Kinoaufnahmen," -- ("The Zeiss-Biotar 1/1.4, A New Objective for Motion Picture Photography") in Die Kinotechnik, 10th edition, 1928, Book 17, pp. 452-453. This article is also filed in the microfilm library of the Air Documents Division, Intelligence Department, Wright-Patterson Air Force Base, Dayton, Ohio, under the number R 3512 F 282. Refer to Handbook of Scientific and Applied Photography, Supplement, Vol. 1, p. 60. Springer - Verlag, Vienna, 1943.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1931 No. 6	1/2.3	1.5	cm	12	For microphotography	904	
Biotar	1/1.5	2.5	cm	16	For motion picture photography on films of substandard width	821	
V 1927 No. 4	1/1.4	5	cm	14	For motion picture photography on standard films	762	
Biotar	1/1.4	20	cm	15	For aerial reconnaissance photography at unfavorable illumination	1235	
Kapella	1/1.4	1	cm	15	The back converging component comprises two individual lenses	1130	

Kapella	1/1.5	2.5	cm	8	The convex side of the second dispersing meniscus faces the stop	956
Biotar	1/1.4	5	cm	18	For motion picture photography	948
Biotar	1/1.4	5	cm	20	For "Contax 24 x 36"	960
V 1927 No. 6	1/1.4	5	cm	17		765
V 1929 No. 1	1/1.4	4	cm	17		799
W. F. Bielicke	1/1.3	10	cm	13	Only the front component of this objective is similar to the Biotar. The back component is considerably modified. Correction very poor	918
Jos. Schneider	1/1.2	100	mm	20	The rear componeht has an additional converging lens. The entire object has a strong barrel-shaped distortion	969
V 1931 No. 7	1/1.6	1	cm	10		895
Zeiss Ikon	1/1.7	10	cm	15		781
V 1928 No. 4	1/1.8	10.5	cm	20		809
V 1931 No. 14	1/1.5	2.5	cm	14		903
V 1931 No. 22	1/1.5	2.5	cm	14		905
V 1938 No. 2	1/1.5	5	cm	29		1200
Biotar	1/1.4	20	cm	17	Calculated spherical for e and f	1223
V 1937 No. 22	1/1.4	5	cm	20		1196
V 1928 No. 3 Biotar	1/1.4	8.5	cm	17		811
Biotar	1/1.9	2.5	cm	18		815
W. Hasselkus	1/1.9	10	cm	20		959
V 1937 No. 27	1/1.9	5	cm	22		1188
V 1937 No. 25	1/1.9	5	cm	22		1183
V 1937 No. 24	1/1.9	5	cm	20		1182
Kapella	1/2	98.97	mm	25	The meniscuses of this objective are composed of three lenses, instead of two as in the Biotar	1252
V 1926 No. 7	1/2	10	cm	27		743
Xenon	1/2	4.5	cm	23	Made by Jos. Schneider, Kreuznach	882
V 1931 No. 5	1/2	4.75	cm	23	See also Card No. 884	881
C. W. Fredrick (Eastman)	1/2	100	mm	18		823
Kapella	1/2	10	mm	20		1254
Biotar	1/2	4.5	cm	20		952
Biotar	1/2	5	cm	18	With extended stop space	952
Biotar	1/2	4.5	cm	25		961
Taylor, Taylor and Hobson, Anastigmat	1/2	100	mm	22		665
Leitz	1/2	10	cm	15		1023
Kapella	1/2	1.5	cm	20	Similar to the Biotar with an additional lens placed in front	1002
Kapella	1/2	10	cm	20		1230
Kapella	1/2	10	cm	20		1227
Kapella	1/2	5	cm	15		1104
Kapella	1/2	1.5	cm	17	See also No. 1002	999
Biotar	1/2	4	cm	22		977
Taylor, Taylor and Hobson	1/2	100	mm	22		575
Grosset	1/2	100	mm	10		1036
Kapella	1/2			17		975
Biotar	1/2	10	cm	23		1171
V 1931 No. 5	1/2	4.7	cm	25	This is a modification of test objective No. 5. See also Card 881	884
V 1931 No. 10	1/1.5	2.5	cm	10		919
Dr. Paul Rudolph	1/2.7	10	cm	20		981

Biotar	1/2.8	21	cm	25		1049
Dr. Paul Rudolph	1/3	100	mm	10		675
V 1934 No. 12	1/3.5	21	cm	25		1048
Planar	1/4	202	mm	20	This Gauss objective does not fall within the Biotar patent, since both the exterior converging components are meniscuses	539
Biotar	1/4	10	cm	20		1120
Kapella	1/4.8	10	cm	8		917

PLASMATS

Plasmats are double objectives, consisting of two symmetrical or nearly symmetrical components, each composed of a converging meniscus and two lenses separated from the meniscus by an air space. The latter part of the objective is composed of one biconcave and one biconvex lens, held together by a cemented surface.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Ernst Arbeit, Wetzlar	1/6.5	100	mm	30		2	
V 1918 No. 15	1/7	100	mm	32		515	
Dr. Paul Rudolph	1/6.3			27	This type of objective has a particularly good spherochromatic correction, to which Dr. P. Rudolph attributes the increased depth of focus of the image. Careful tests, however, did not probe this to be true. There is also no substantiation of Dr. Rudolph's theory to be found in theoretical considerations	454	
Ross Xpress	1/4	21	cm	33		1075	
Double Plasmat	1/4	15	cm	27	Made by Hugo Meyer & Co	538	
Hasselkus	1/4	100	mm	32		606	
Objective for aerial	1/4.5	25	cm	32	Test objective 1929. This objective is particularly free of distortion for a field of image exceeding 60° and particularly suitable for photogrammetry	925	
Orthometar	1/4.5	21	cm	32		1103	
Orthometar	1/4.5	21	cm	32	The last two mentioned above objectives were made by Zeiss for the special purpose of aerial photogrammetry	1102	
Meyer-Satz Plasmat	1/4.5	10	cm	32		946	
V 1935 No. 18	1/4.5	21	cm	32		1095	
Orthometar	1/4.5	3.5	cm	32		1131	
Orthometar	1/4.5	21	cm	27		986	
Orthometar	1/4.5	21	cm	32	The last three mentioned above	983	
Orthometar	1/4.5	21	cm	32	objectives are particularly suitable for aerial photogrammetry	983	
Finder Objective	1/4.5	7.5	cm	32	This objective has a field of image exceeding 60°	982	
Rudolph	1/4.5	19	cm	28	This objective is a "Double Plasmat"	876	
V 1935 No. 15	1/4.5	21	cm	33		1099	
V 1926 No. 4	1/4.5	21	cm	30		734	
Objective for aerial photogrammetry	1/4.5	21	cm	32		902	

Objective for aerial photogrammetry	1/4.5	21	cm	32		741
Objective for aerial photogrammetry	1/4.5	21	cm	32		738
V 1926 No. 4	1/4.5	21	cm	27	For the following four items the front component of the objectives has been calculated also. Numbers 493 & 494 deal with the same objective under different designations, with the numbers given on the right side, and are therefore the same German patent. This is a modification of the objective described on Card No. 2	728
V 1918 No. 3	1/4.5	15	cm	27		454
Satz lens (Double Plasmat) Test Objective 1918 No. 3	1/4.5	15	cm	27		454a
Euryplan	1/6	124.5	mm	25		243
E. Arbeit, Wetzlar	1/6.8	240	mm	26		268
C 1934 No. 7	1/6.3	21	cm	32	Calculated for image scale 1/5	1037
Orthometar	1/8	13.5	cm	32	For "Steoplag-C/4," an apparatus for restitution of aerial photographs	845
Apochromat Claron	1/9	18	cm	20	Made by Jos. Schneider & Co, Kreuznach	898
Rudar Lens	1/9.1	255	mm	27		514
V 1929 No. 5	1/9	16.5	cm	30		807
C. P. Goerz	~~1/9~~	16.5	cm	30 ?	Aperture ratios: Single lens 1/10 double objective 1/2 approximately. Calculated for single lens and for the double objectives	12
Jos. Schneider	1/11.3	100	mm	26	The single lens was controlled by Zeiss. The aperture ratio was found to be 1/9. Aperture ratio for the double objective is 1/18	971
C. P. Goerz	1/12.5	100	mm	27	Aperture ratio of the double objective 1/6.3	585
V 1936 No. 7	1/20	7.5	cm	22	Calculated for image scale 4:5	1163
Euryplan Lens	1/11	262	mm	25	Aperture ratio for double objective 1/7	526
Bausch & Lomb	1/11	6½	in.	33		1212

ERNOSTARS

For light-transmitting capacity, field of image, and sharpness, the Ernostars range among the best objectives, and with Biotars and Sonnars.

The Ernostar consists of four individual lenses or groups of lenses. Three of these are converging components, but the second one is a dispersing component.

These objectives may be considered as derived from the Cooke lens, a converging lens being placed between the first and second componehts.

The Ernostars were offered the trade by the Ernemann Company up to 1926, when this company was merged with the Zeiss concern. They were produced with light transmitting capacities ranging from 1/2 to 1/1.4. With slower aperture ratios, as for instance 1/1.8, sharp images were achieved at an angle of 40° without stopping down. Ernostars with an aperture ratio of 1/1.4 and 1/1.5 rendered a sharp image only out to an angle of 35°.

The success of the Ernostars was due to their capacity for correcting errors of wide-aperture pencils of rays in the central part of the image, and to successful astigmatic flattening, as well as to an extensive correction of the coma of the lateral and marginal pencils of rays of the image field.

Name of Objective	Aperture Ratio	Focal Length	Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Ernemann	1/1	10 cm	15		777	
E. Leitz	1/1.3	10 cm	12		1000	
Ernemann British patent, example II	1/2	100 mm	10	Chromatic correction not good considering the large aperture ratio	711	
Ernemann	1/2	10 cm	10	Calculated for d and g'. Chromatic and spherical correction insufficient	778	
Ernemann	1/2	100 mm	15	Calculated for d and g'. Good spherical correction for an image field of about 30°	710	
V 1929 No. 4	1/2	2.5 cm	15		1248	
Ernemann	1/2	100 mm	10	Correction poor	763	
Ernostar	1/2	100 mm	14	First and second group of lenses composed of two lenses each. Correction good	552	
Ernemann	1/2	100 mm	12		695	
Ernemann	1/1.8	100 mm	20		712	
Ernemann	1/1.6	100 mm	17		704	
Ernemann	1/2	100 mm	12	This objective was the prototype of Ernostars produced by the Ernemann Co in aperture ratio 1/1.6	728	
C. P. Goerz	1/1.9	10 cm	15	Calculated for g and g'	776	
Ernostar	1/2.7	15 cm	22	See Card No. 697	694	
Ernemann	1/2.8	100 mm	20		697	
Ernemann	1/2	100 mm	10		598	
C. C. Minor, Chicago	1/2	65 mm	5	See "The American Cinematographer" Vol. 3. No. 5 Aug 1922 p. 4. This Minor Objective with regard to exterior construction can be considered as an early form of the Ernostar; correction, however, is considerably inferior	591	
Ernemann	1/2	10 cm	15	In this objective, consisting of only four lenses, the chromatic, longitudinal aberrations are not sufficiently eliminated	624	
Ernostar	1/1.4	5 cm	20	See also observation made concerning Card No. 104	947	
Alinar	1/2	4 cm	20	A motion picture projection anastigmat	1161	
Alinar	1/2 and 6	6 cm	12	A motion picture projection anastigmat	1162	

SONNARS

The Sonars may be considered as a further development of the Ernostars, in the sense that the second lens of the Ernostar is cemented to its preceding and its following lens, thus producing an objective which in contrast to the Ernostar consists of only six glass-air surfaces.

With initial aperture ratios of 1/2 as well as of 1/1.5, and with a focal length of 5 cm, images of good sharpness, reaching into the corners, are achieved for a field of 2.4 x 3.6 cm.

The total image field of these Sonnars of high light transmission capacity measures about 45°. In this connection, it should be noted that Sonnars have been produced with smaller aperture ratios, such as 1/2.8 and 1/4, with focal lengths of 18 cm and 13 cm respectively, for a field of 2.4 x 3.6 cm, i.e., for relatively small image fields.

If properly machined and calculated, quality of the image of all these Sonnars, corrected for either a minor or a major field, might be considered as the best product of objectives of equal aperture ratio and image field.

Attention is called to Card No. 940, for which data was obtained from an article taken from The British Journal of Photography, Nov. 12, 1931, dealing with patent specifications for large-aperture lenses.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1930 No. 7	1/1.4	2.5	cm	10	Calculated for d and g'	931	
V 1930 No. 8	1/1.4	5	cm	10	Calculated for d and g'	754	
Sonnar	1/1.4	5	cm	20	Branch of rays drawn for field of 24 x 36 mm	1195	
Zeiss Ikon, Sonnar	1/1.4	2.5	cm	15		965	
Sonnar	1/1.5	5	cm	22.5		1184	
Sonnar	1/1.5	1.5	cm	22.5	For 16 mm film	1160	
Sonnar	1/1.5	5	cm	22.5		1064a	
Sonnar	1/1.5	5	cm	22.5		1064	
Sonnar	1/1.5	5	cm	20	This card in original and duplicate	973	
Sonnar	1/1.5	5	cm	22.5		1043	
Zeiss Ikon	1/1.6	100	mm	12		987	
Alinar	1/1.9	9	cm	10	Projection objective of the Sonnar type	1808	
Sonnar	1/2	5	cm	22.5		1044	
Sonnar	1/1.9	8	cm	10	Projection objective of the Sonnar type	1140	
Sonnar	1/2	5	cm	22.5		944	
Sonnar	1/2	5	cm	22.5		941	
Sonnar	1/2	5	cm	20		911	
Zeiss Ikon, Bertele	1/2	100	mm	12.5		988	
Sonnar	1/2	5	cm	22.5	Format 24 x 36 mm. The last component of this objective is composed of three lenses	1191	
Sonnar	1/2	7	cm	15		1179	
Sonnar	1/2	8	cm	25	The last component consists of two dispersing lenses enclosing one converging	1174	
Sonnar	1/2	1	cm	15		1168	
Sonnar	1/2	5	cm	22.5	Calculated for e, d, F, g. See also Card No. 1044	1152	
Sonnar	1/2	5	cm	22.5		1020	
Sonnar	1/2	8.5	cm			989a	
Zeiss Ikon	1/2	10	cm	20		972	
Sonnar	1/2	5	cm	22.5		953	
Sonnar	1/2	5	cm	22.5		953	
Sonnar	1/2	5	cm	22.5	The last three cards represent three different modes of calculation	953	
Sonnar	1/2.5	3.5	cm	25	Similar to the Biogon. 1/2.8, f = 3.5 cm	1060	
Sonnar	1/2.5	5	cm	20		988	
Sonnar	1/2.8	3.5	cm	30	Similar to the Biogon	1107	
Finder objective	1/2.8	8	cm	10		1013	
Zeiss Ikon, Sonnar	1/2.8	7.6	cm	10		1042	
Tele Sonnar	1/2.8	18	cm	10	Distance between front vertex and focal point = 95% of focal length	1108	
Sonnar, Zeiss Ikon	1/2.8	5	cm	10	Principally a finder objective	900	
Sonnar	1/2.8	5	cm	10		939	
Sonnar	1/4	7.5	cm	5		891	

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Sonnar	1/4	30	cm	5	Within its small image field this objective has an extraordinarily good sharpness	1246
Sonnar	1/4	13.5	cm	10	Calculated spherically for A', C, d, F, g	1165
Sonnar	1/4	7.5	cm	10		1199
Sonnar	1/4	30	cm	5	Spherically calculated C, d, F, g	1197
Sonnar	1/4	18	cm	10	Spherically calculated C, d, F, g	1186
Sonnar	1/4	13.5	cm	10	Spherically calculated for d, g'	1116
Sonnar	1/4	7.5	cm	10		1091
Sonnar	1/4	13.5	cm	10		1047
Sonnar	1/4	13.5	cm	10		950

TELEOBJECTIVES

Teleobjectives may be used where, in spite of a great focal length, a convenient camera size is desired.

Teleobjectives are composed of a frontal converging unit of lenses and a rear unit of dispersing lenses, both of which are arranged with a considerable air distance between them, so that the rear principal point is in most cases situated in front of the objective. The focal length is consequently longer than the camera extension for distant objects.

The fact that the camera extension thus becomes considerably shorter than the focal length constitutes a disadvantageous effect on the aperture ratio, on the diameter of the image field, and sometimes also on the quality of the image, and similar factors. These disadvantageous effects increase with the degree of shortening of the camera extension.

The largest aperture ratios of Teleobjectives are at the present time about 1/3 to 1/4; as a rule, however, the aperture ratios are smaller. In cases of particularly high degrees of shortening of camera extension, aperture ratios of 1/50 and even smaller occur frequently.

Teleobjectives are principally useful for long-distance photography, since objects located at a far distance can be photographed relatively well with the long focal lengths of these objectives. The types of lesser light-transmitting capacity, on the other hand, are better suited for hunting, sport, and similar photography.

The range of application of Teleobjectives has been widened in recent years by the production of Teleobjectives having a good quality, free of pin-cushion distortion, which had previously been encountered in many Teleobjectives.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Teleobjective	1/4	433.9	mm	2	Composed of a Tessar 1/4.7, f = 145 and a Telenegative f = 60	135	

COMPOSITE-TELEOBJECTIVE

This arrangement of lenses which consists of an anastigmat or other individually corrected objective in conjunction with a Telenegative, is typical for the so-called Composite-Teleobjective.

The combination of these two groups of lenses is termed a Composite-Teleobjective.

By varying the air space between the two component parts of the objective, the focal length can be varied as desired.

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Another type of Teleobjective, of slightly higher optical capacity, is composed of a positive component and a dispersing unit of lenses separated from the first unit by a considerable air space; the negative and the positive components, however, are arranged at a fixed distance, and balanced in a way which produces the best possible correction of aberrations.

This last mentioned type of objective is termed Teleobjective, in the literal sense of the word.

Name of Objective	Aperture Ratio	Focal Length	Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Lan-Davis	1/6	120 mm	5	Calculated for d and g' Teleobjective	563	
Composition Teleobjective Tessar	1/3.5	50 cm	5	Negative f = -20mm	136	
Teleobjective			2	With fixed focal length I form	91	
Composition Teleobjective	1/12.5	537.2 mm	2	Positive f = 135 mm. Negative f = 60 mm	133	
Long Distance Objective			2		134	
Long Distance Objective	1/10	45 cm		Calculated for d and g'	169	
Long Distance Objective	1/10	295.35 mm	7	With fixed focal length. Calculated for d and g'. Prototype for the Zeiss "Magnar" 1/10	170	
Long Distance Objective	1/12.3	295 mm	7		171	
Long Distance Objective	1/12.3	295 mm	7		172	
Long Distance Objective	1/9.3	427 mm	8	Calculated for d and g'	173	
Long Distance Objective	1/10	45 cm			174	
Long Distance Objective	1/10	45 cm			175	
Minimum Teleobjective	1/10	45 cm			181	
Teleobjective	1/11	240 mm	20		202	
Bis-Telar, Busch, Rathenow	1/8	240 mm	50		201	
Teleobjective	1/9.6	43 cm	7	Calculated for d and g'	217	
Teleobjective	1/11	50 cm			218	
Ross Telecentric	1/6.8	100 mm	11		305	
Ross Telecentric	1/6.8	305 mm	13		341	
V 1913 XVIII	1/6.3	30 cm	14		340	
Long Distance Objective	1/6.8	100 mm	15		342	
V 1914 I Long Distance Objective	1/6.8	28 cm	15		343	
Long Distance Objective	1/6.2	170 mm	14	Calculated for d and g'	344	
Ross, Telecentric	1/6.8	100 mm	12	Modified. Infringed German patent. See Card 305	336	
L. B. Booth, Cambridge			20		408	
L. B. Booth, Cambrigge					409	
Teleobjective	1/50	3.25 m	12	For military long-distance photography on the ground	414	
Long Distance Objective	1/6	60 cm	12		440	
Long Distance Objective	1/50	3000 mm	2.5	For military use	431	
Long Distance Objective	1/50	3000 mm	2.5	For military use	438	
W. Bielicke	1/6.8	300 mm	16		444	
Long Distance Objective	1/7	120 cm	7		422	

Long Distance Objective	1/50	3250	mm	2.5		451
Teleobjective	1/6.5	259	mm	10		460
V 1917 II Long Distance Objective	1/6	25	cm	14		436
Long Distance Objective	1/5.7	250	mm	15	Composed of three lenses and of good light-transmitting capacity 1/5.7 f = 250 mm. Calculated for D and g'	479
Long Distance Objective	1/6	250	mm	17	Composed of three lenses, and of good light-transmitting capacity. Calculated for D and g'	480
Long Distance Objective	1/6.5	27.5	cm	17	Composed of three lenses and of good light-transmitting capacity. Calculated for D and G'	481
Long Distance Objective of high light-transmitting capacity	1/7.2	300	mm	15	Calculated for D and G'	482
Long Distance Objective	1/6	25	cm	15	Calculated for D and G'	500
Long Distance Objective	1/6.3	25	cm	15	Prototype of the Zeiss "Tele-Tessar"	509
Long Distance Objective	1/7.9	25	cm	15		512
Long Distance Objective	1/6.7	28	cm	15		506
Long Distance Objective	1/8	25	cm	15		516
Long Distance Objective	1/7	133	mm	15	Taylor, Taylor & Hobson	524
Long Distance Objective	1/6	120	mm	15	Taylor, Taylor & Hobson. Of high light-transmitting capacity	536
Tele-Tessar	1/6.3	40	cm	16	Calculated spherically for d and g'	549
Tele-Tessar	1/6.3	25	cm	16	Calculated spherically for d and g'	550
Tele-Tessar	1/5.5	25	cm	16		551
Tele-Photo-Objective	1/6.8	15	cm	5	L. B. Booth. Example I. Spherical and chromatic correction. Calculated for d and g'	553
Tele-Photo-Objective	1/6.8	11.8	cm	10	L. B. Booth. Example III. Spherical aberration calculated for d and g'	554
C. P. Goerz	1/6.3	100	mm	7		568
Lan-Davis	1/6	120	mm	12		582
C. P. Goerz	1/33.3	100	mm	2.5	Calculated for d and g'	567
L. B. Booth	1/6	100	mm	10	Calculated for d and g'	581
"Zentral Zeitung fuer Mechanik und Optik"	1/6				Central Journal for Mechanics and Optics	642
V 1931 No. 21	1/4	7.5	cm		Spherical calculation for d and g'	649
Taylor, Taylor & Hobson	1/6	12	cm	15		657
Teleobjective	1/8	59	cm	7.5		645
Kapella	1/6	120	mm	15		685
Kapella	1/4.8	100	mm	5		686
Ross	1/5.5	280	mm	15		687
Teleobjective Jos. Schneider, Kreuznach	1/4.5	10	cm	2		733
Jos. Schneider, Kreuznach	1/4.5	100	mm	10		829
Jos. Schneider, Kreuznach	1/2.9	10	cm	10	Spherically not corrected	835

Jos. Schneider, Kreuznach	1/4.5			10	Spherically and astigmatically corrected for d and g'	857
Tele-Tessar	1/8	50	cm	10		864
V 1931 No. 23	1/4	7.5	cm	6	Calculated spherically for c, d, f, g'	902
V 1931 No. 21	1/4	7.5	cm	5	The rear principal point of this objective concides approximately with the front vertex. Since Teleobjectives have been defined as having their rear principal point in front of the vertex, this objective constitutes a boundary case	908
V 1931 No. 33	1/4	7.5	cm	5	The rear principal point of this objective is also situated in the front component, so that this objective is in effect not a legitimate Teleobjective	926
V 1931 No. 30	1/6.3	18	cm	5		924
V 1931 No. 34	1/6.3	18	cm	6		938
V 1932 No. 2	1/6.3	18	cm	15		949
Tele-Tessar	1/10	25	cm	5	This objective was used for machine gun camera	968
C. W. Frederick, (Eastman)	1/4.5	10	cm	7		1003
Tele-Tessar "K"	1/8	30	cm	3	This objective is really not a normal Tele-Tessar, which would have an image field of 30°, whereas this objective has an image field of scarcely 5°	1028
I. R. Teleobjective	1/25	3000	mm	25	Scale of the coordinate axes are taken 10 fold. The image field amounts to about 6°	1146
V 1937 No. 3	1/5.6	7.5	cm	15	b-curves calculated for two different stop positions	1151
V 1937 No. 18	1/6.3	7.5	cm	15		1171
V 1937 No. 10	1/3.5	24	cm	5	For this objective, compare remark pertaining to Card No. 908	1210
V 1938 No. 22	1/4.5	13.5	cm	5		1247
Kapella	1/5	10	cm	5		1255
Magnar	1/10	45	cm	7		745
Kino-Tele-Tessar	1/4	15	cm	2.5	Motion picture T. T. In contrast to the normal Tele-Tessar, this objective has an image field of only 4°	842

WIDE-ANGLE OBJECTIVES

The objectives designated Wide-Angle Objectives comprise a group having an image-field diameter considerably exceeding the focal length in the focal plane.

As early as the middle of the 19th century, research was being conducted to develop types of objectives meeting these requirements.

Attention is called to the Protar 1:8, constructed by Dr. Paul Rudolph, as well as to The Panoramic Lens of Th. Sutton, who developed a lens of confocal spheric surfaces, thus achieving at the same time a spherically confocal image field.

Recent research in Boston proved the possibility of placing this spheric image field in the plane with good

sharpness and with correct perspective.

The standard wide-angle objectives, which have a plane image field, are limited by the so-called cosine-law (4th power) which causes a decrease of light flux so that it is generally prohibitive to exceed an angle of 90° to any considerable extent with these objectives. It is noteworthy that the Goerz Hypergon has been up to approximately 140°. This however, was possible only with the help of a specially constructed stop. More recently constructed objectives, based on the findings of R. Hill, permit projection from the object area up to 180° without excessive decrease of light flux. These objectives have a strong barrel-shaped distortion and generally need a rectification.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Wide-Angle Objective	1/5.5	100	mm	50	These two types are said to be developed for objectives allowing an angle of over 200°. Produced by A. E. G. (Allegemeine Elektrizitaets-Gesellschaft, Berlin)	1058	
Wide-Angle Objective	1/5.5	10	cm	50		1059	
V 1936 No. 6	1/6	2.5	cm	40	The six possibilities of image reflection resulting from two-fold reflections at the four glass air surfaces of this objective are all located in front of the stop, and therfore can not disturb the image area	1128	
V 1935 No. 2	1/6.2	10	cm	55		1083	
V 1935 No. 16	1/6.3	2.5	cm	55		1094	
Protar	1/6.3	210	mm	50		56	
Wide-Angle Objective	1/6.3	68	mm	45	Tobogon. Cards Nos. 1241, 1226, and 1215 describe the same type of objective	1241	
C. Zeiss	1/6.3	75.9	mm	45		1226	
C. Zeiss	1/6.3	66	mm	45		1215	
AEG	1/6.3	1.7	cm	100	Wide-Angle Objective for over 180°	1121	
V 1937 No. 4	1/6.3	2.5	cm	35		1154	
V 1937 No. 1	1/6.3	2.5	cm	35		1153	
V 1935 No. 16B	1/6.3	2.5	cm	50	Perimetar	1098	
V 1936 No. 18	1/6.8	1.6	cm	90		1143	
Sphaerogon	1/7	4.1	cm	70		1117	
Sphaerogon	1/8	36.2	mm	95		1114	
Sphaerogon	1/8	36	mm	90		1116	
Wide-Angle Objective	1/8	3.8	cm	90		1097	
Goerz Wide-Angle Objective Dagor	1/9	10	cm	50	These objectives rendered good services up to 100°	827	
Goerz Wide-Angle Objective	1/9	100	mm	40		617	
M. Andre Levy	1/9	10	cm	55		1222	
Protar	1/9	150	mm	35		158	
New Type of Protar	1/9			35		120	
New Type of Protar	1/9			35		119	
Anastigmat	1/9	150.18	mm	35	Spherically and anastigmatically calculated for d and g'	99	
Protar	1/9	150	mm	30		98	
V 1935 No. 12	1/8	3.8	cm	90		1082	
Protar	1/12.5	18	cm	50		324	
Protar	1/12.5	150	mm	50		109	
New Type Protar	1/14	180	mm	30	This card in original and duplicate.	117	
New Type Protar	1/14			35	Calculated, but not constructed	118	
New Type Protar	1/15			50		105	
Wide-Angle Pinkeloskop	1/15	100	mm	50		724	
V 1931 No. 25	1/15	30	cm	30		951	
R. & I. Beck, (Hill)	1/16			50		1068	

Rodenstock Pantogonal	1/18			80		126
Protar	1/18	390	mm	40		558
V 1932 No. 18	1/7.7	10.5	cm	45	With one aspheric surface	970
Protar	1/18	141	mm	50		159
Protar	1/18	182	mm	45	With decreased secondary spectrum	123
Protar	1/18	141	mm	40		110
Rodenstock Pantogonal	1/18			45		106
Protar	1/21	63	cm	30	With front stop	430
Hypergon	1/22	6	cm	67	Produced by Zeiss	725
Pantoscope	1/30	206.7	mm	40	Produced by the Busch Co.	936

HIGH-SPEED OBJECTIVES

V 1935 No. 20	1/0.65	6.5	cm	10	Sections through the optical axis are not shown on this card. The compiler of these data remembers that this objective had an image field of approximately 15° at an aperture ratio of 1/0.65, with a negative field flattener. This was the objective of highest light-transmitting capacity ever constructed by the Zeiss works	1096
R-Biotar, (X-ray Biotar)	1/0.85	7.5	cm	6.5	This objective was sonstructed by the Janker Co, Bonn, for X-ray motion picture photogr raphy, and proved to be very useful. It is similar to the objective described in German patent 607, 621 of the year 1932, and presents a good example of sensitivity with regard to correction of the objectives location. The card lists spherical longitudinal aberrations for image scales 1:14, 1:20	1156
R-Biotar, (X-ray Biotar)	1/0.85	12	cm	5	This drawing is shown on two cards. Image scales of spherical longitudinal aberrations are listed for 1/00, 1/20, 1/12, 1/9.5. See also data for Card 1135	1134
R-Biotar (X-ray Biotar)	1/0.85	12	cm	6.5	Image scales of spherical longitudinal aberrations are listed for 1/00, 1/20, 1/12, and 1/9.5. See also data on Card 1156	1135
R-Biotar (X-ray	1/0.89	5	cm	6.6	See Card 1156	927
Kapella	1/1	1	cm	5	Horace W. Lee	1089
Dr. Paul Rudolph	1/1	10	cm	5	This drawing on two cards	897
Kapella	1/1	1	cm	10	Horace W. Lee	1081
A. Jeckenbroll	1/1	100	mm	5		1041
Pro-Anastigmat	1/1	35	mm	2.5	H. Ernamann, Dresden	325
Kapella	1/1.4	10	cm	10		1063
Minor	1/1.4	4	cm	15		1005
V 1930 No. 8	1/1.4	2.5	cm	15		871
Gramatiki	1/1.4	10	cm	10		945
V 1930 No. 9	1/1.4	2.5	cm	33	A telescope objective	866
Kapella	1/1.5	10	cm	5		789
Kapella	1/1.5	10	cm	5		788
Hugo Meyer, Goerlitz	1/1.5	10	cm	15		1225
M. R. Berthon	1/1.5	6.5	cm	5		621

Chas. C. Minor	1/1.7					382
Biotar	1/1.8	5	cm	5	Petzval System, with a Smyth lens, and therefore designated a Biotar. Because of the short back focal length and the resulting limited usability, this objective was utilized only for cameras on a relatively small scale	564
Wm. Lee & Kapella	1/1.8	10	cm	10		852
Rodenstock	1/1.8	10	cm	10		1166
Symmetric Objective	1/1.8	100	mm	15	Patent applied for and refused	603
Kipro-Anastigmat	1/1.9	9.5	cm	10	Ernostar type objective	1167
Jos. Schneider	1/1.9	100	mm	13		1243
V 1930 No. 5	1/1.9	2.5	cm	10		859
Zeiss Ikon	1/1.9	10	cm	10		853
Busch	1/2.48	198.44	mm	5	The focal lengths adjustable by adjusting the central component	1077
Feuillet	1/2	10.5	cm	5		1066
Zeiss Ikon	1/2	10	cm	18		1157
C. W. Frederick	1/2	100	mm	5		822
Dr. Paul Rudolph	1/2	100	mm	10		646
Leitz	1/2.5	100	mm	10		1253
Dr. Paul Rudolph	1/2.5	100	mm	5		604
H. D. Taylor	1/2	100	mm	25	Symmetric objective	339

BIOTESSARS, UNARS, HELIARS AND OTHER OBJECTIVES BASED ON THE COOKE LENS

V 1938 No. 16	1/1.5	7	cm	13		1236
V 1923 No. 3	1/1.75	8.5	cm	10	Similar to Biotar III	607
E. Leitz, Wetzlar	1/1.8	100	mm	20	Similar to Hektor	922
V 1937	1/1.9	1/25	cm	8	Similar to Biotar III	1170
V 1923 No. 2	1/1.9	7	cm	10	Similar to Biotar III	606
V 1922 No. 6	1/1.95	7.5	cm	10	Similar to Biotar III	599
W. Gehrke, Dresden	1/2	100	mm	10		608
V 1923 No. 6	1/2	65	mm	10	See also data on Card No. 608	609
Willy F. Bielicke, Berlin	1/2	100	mm	8		674
Optical Works, Ruedersdorf	1/2	10	cm	20		780
Kapella	1/2.5	25.4	mm	17		766
Bielicke	1/2.5	10	cm	20		979
Bielicke	1/2.5	10	cm	20		979a
V 1931 No. 19	1/2.8	5	cm	8		892
Zeiss Ikon	1/2.8	10	cm	20		978
Voigtlaender	1/2.8	10	cm	22.5	Heliar	1123
V 1938 No. 6	1/2.8	5	cm	21		1224
V 1938 No. 23	1/2.8	5	cm	20	See Card No. 1221	1249
V 1926 No. 3	1/2.9	14	cm	21	See Card No. 735	701
V 1926 No. 3	1/2.9	14	cm	21	Card Nos. 701 and 735 describe the same test objective of the Heliar type	735
Cemented Dialyt, Form II	1/3			26	Composed of five	680
Barton Booth	1/3			20	Composed of five lenses; Heliar	637
L. B. Booth	1/3			20	Heliar. Compare with Card No. 637	552
V 1931 No. 8	1/3.2	2	cm	10	Biotessar, similar to the Heliar	394
Voigtlaender Triple Anastigmat	1/3.3				Basic patent for Dynar, Heliar and Oxyn. The latter was produced as a reproduction objective for a limited period only	4
Voiglaender, Heliar	1/3.5	21	cm	21		563
Dialyt of 5 lenses	1/3.5	115.89	mm	36		673

V 1937 No. 26	1/3.5	5	cm	22½		1204
R. D. Taylor	1/4			15		141
Voigtlaender, Heliar	1/4.5	100	mm	21	Calculated for n = ∞ and n = 1:1	36
Voigtlaender, Triple Anastigmat	1/4	100	mm	26	This drawing is identical with Card No. 4 above. The remarks made in connection with that objective also apply to this card, which Zeiss therefore marked as No. 4	4
H. Harting	1/4			23		382
Rodenstock Eurygonal	1/4.3			22.5	Data taken from Phot. Kunst, 1906/07 p.377.	121
Unar	1/4.5	145	mm	22	Two curves of meridional coma for inclination of pencil of rays calculated for 14.6 and 20.9 and aperture ratio of 1:6.3	17
Jos. Schneider	1/2.9	10	cm	23		1147
V 1938 No. 17	1/2	6	cm	15		1239
V 1938 No. 11	1/2	5	cm	18		1233
V 1938 No. 7	1/2	5	cm	18		1214
Kapella	1/1.4	10.5	cm	5		1092
Ross	1/4.5	100	mm	25	See also Card No. 387/ Ross Ltd, London, designated the objectives covered by this patent as "Xpress-Lens." Construction differs from Zeiss's Tessar in so far as the cemented component of the Xpress-lens is composed of three lenses, whereas the Tessar has only two lenses in this component	546
Ross Xpress	1/4.5	6	in.	26		387
Heliar	1/4.5	15	cm	26		699
V 1936 No. 4	1/4.5	8.5	cm	10		1118
Astro-Unar	1/5	600	mm	6	Curve from original coma, aperture ratio 1/6 and inclination 5.17° are shown	56
H. D. Taylor	1/5			20	Aperture 120 mm	137
Astro-Unar	1/5.3	639.3	mm	6		50
Ojor	1/6	500	mm	22.5	Made by Lacour-Berthiot	431
H. Harting	1/6			10		83
C. & H. C. Beck	1/6.3	100	mm	4		306
Unar	1/6.3	147	mm	21	The Beck Air-lens of the Unar was replaced by a converging cemented surface to eliminate disturbing reflections. This development led to the construction of the Tessar	16
Unar	1/6.3	145	mm	27	The Beck Air-lens of the Unar was replaced by a converging cemented surface to eliminate disturbing reflections. This development led to the construction of the Tessar	16

DOUBLE OBJECTIVES WITH COMPONENTS OF VARIOUS CONSTRUCTIONS

Rodenstock		240.87	mm	6		88
Dr. R. Steinheil				12	Single objective f = 527.1 Double objective f = 240.9	5
Dr. Paul Rudloph	1/3.2	10	cm	20		782
C. C. Minor	1/4	115	mm	10		566
Petzval	1/5			15	Cemented dialyst	112

Ernst Leitz, Wetzlar	1/6			23	Single objective f = 376.25 Double objective f = 220.7	86
Dr. Paul Rudolph	1/3.6	10	cm	23		998
Aldis, 1896 III	1/4			15		195
Dr. Paul Rudolph	1/6	100	mm	15		587
Rodenstock Heligonal	1/6			15		125
Dr. Paul Rudolph	1/6	100	mm	26		589
Eastman	1/6	98	mm	20		715
Dr. Paul Rudolph	1/6	100	mm	25		824
Fred E. Altman, (Eastman)	1/6	10	cm	15		1004
Ernemann, Dresden	1/6.26	106.5	mm			399
Leitz, Periplan	1/6.3	200	mm	20		34a
Leitz, Periplan	1/6.5	200	mm	25		57
Leitz, Periplan	1/6.5	200	mm	32		34
Protar	1/6.5	199.1	mm	30		35
Unar-Doublet	1/6.5	183	mm	32		40
Protar	1/6.5	199.74	mm	27		46
Dr. Paul Rudolph, Tessar	1/6.8	15	cm	30	Not the standard Tessar type	469
Rudar	1/6.8	126	mm	30		471
Kapella	1/6.8	123.5	cm			1065
Dr. Paul Rudolph	1/7	100	mm	30		592
Rodenstock Imagonal	1/7			32		89
Rodenstock Imagonal	1/7			27	See also Card No. 89	124
Ernemann, Dresden	1/6.8	107.7	mm	30		400
E. Ross	1/7	98.02	mm	15		698
Eastman	1/7	98.02	mm	15	Figure I. This drawing similar to that on Card No. 698	713
Rudar	1/7.2	15	cm	30		495
Rudar	1/7.2	14.4	cm	30		496
Rudar	1/7.2	15	cm	25		511
Rudar	1/7.5	15	cm	30		489
Dallmeyer Stigmatic Lens III	1/7.5	15	cm	37		374
Leitz Periplan	1/7.8	200.16	mm	32	Second example requested by patent office	9
Leitz Periplan	1/7.8	200.3	mm	32		7
Bausch & Lomb	1/8	187	mm	22	This card in original and duplicate	289
Conrad Beck & Courthope Beck	1/8			25		128
Leitz Periplan	1/8			27	Data taken from British Journal of Photography, 1899, p. 266	38
Bausch & Lomb	1/8	177	mm	27	In original and duplicate	290
Bausch & Lomb	1/8			27	Modified drawing of Card 290. In original and duplicate	291
Protar	1/8	205	mm		For n = 1:1	41a
Protar	1/8	205	mm	28	Same objective as on the previous line. Data on this card a little more explicit	41
Voigtlaender	1/10	500	mm	17	Reproduction objective	570
H. D. Taylor	1/16			30		27

CONVERTIBLE OBJECTIVES

Apart from perfecting photographic objectives by means of more or less useful additions of optical means, i.e., by increasing the number of lenses without any structural restrictions for front and back components, the optical efficiency has also been increased by combining two systems of lenses, each of which in itself represents a useful photographic objective. Such objectives, composed of two single lenses, have, as a rule, a considerably larger aperture ratio and better correction of distortion than either of the two single lenses.

The more common possibilities of combining two separate systems of lenses are as follows: (1) Opposition of symmetrical single lenses, equidistant from either side of the stop. These are the so-called symmetrical

Double Objectives. (2) The composition of two geometrically similar single lenses of different focal lengths, the arrangement of the single lenses to the stop corresponding to the similarity-ratio. These objectives are termed semi-symmetric. (3) Combination of two photographic lenses, not geometrically similar, into one double objective.

Symmetric objectives were constructed by Steinheil as early as 1865. No further details will be given at this time, and a description of a number of Convertible Objectives from the Zeiss files will be presented. Wherever necessary for better understanding, additional information will be given. In the previous sections of this compilation, the order of aperture ratios ranging from large to smaller ratios has been more or less followed; but in this section this order is no longer maintained, due to that fact that the aperture ratios of single objectives, double objectives, symmetric objectives and semi-symmetric objectives do not permit this subdivision. The sequence of Zeiss's original card numbers has been used.

NOTE: The half angle of coverage is always indicated for the Double Objective only.

Name of Objective	Half Angle of Coverage Degrees	Remarks	Zeiss No.	Page
C. Reichert, Fritz Rollmorgen,	22	The single lenses of this objective are Gauss-type lenses and consist of two Meniscuses, the interior one dispersing, the exterior one converging. The dispersing meniscus is composed of two lenses, cemented to each other and of opposite refraction power	1	
Steinheil Orthostigmat	15		6	
C. P. Goerz Double Anastigmat	20		14	
Orthoprotar	20	Orthoprotars are very suitable as image measuring objectives, because of their excellent correction of distortion. They can be made in a way that the distortion practically amounts to zero for a variety of image scales; i.e., they are stationary orthoscopic	15	
Goerz	27		54	
Protar, Convertible Objective	35		62	
C. P. Goerz	30		63	
C. Reichert, Wien, Example I	15	5-lens Convertible Objective	64	
C. Reichert, Wien, Example II	20		65	
C. Reichert, Wien, Example III	20		66	
E. Leitz	20		67	
Protar	20	The Protar lenses were components of the protar sets. Maximum aperture ratios of the double objectives ranged from 1/6.3 to 1/7.7 depending on whether the objectives were symmetrical or not. This card in original and duplicate	70	
Protar	30	This card shows Coma curves	70a	
Dr. R. Steinheil	20		72	
Spherical Convertible Objective	35	This is a symmetric objective with two aspherical exterior surfaces	73	
Osker Simon, Dresden	30		75	
Deformed Convertible Objective	35	See remark for Card No. 73	78	
Deformed Convertible Objective		See remark for Card No. 73	79	
Deformed Convertible Objective	30	See remark for Card No. 73	80	
Oscar Heimstaedt, Wien			101	
C. P. Goerz			102	
H. D. Taylor	30		108	
O. Heimstaedt	30		122	
C. F. Lan-Davis			127	
C. P. Goerz, double astigmat	17.5		129	
C. P. Goerz, double astigmat	29		130	
Ernst Gundlach, Berlin			132	
C. P. Goerz, Example I	22	This type of lens was the basis for Goerz's Celor, Syntor, and Dogmar. With the Dogmar 1/6.5, this group of objectives achieved its highest optical capacity and with Dogmar 1/3.5 the highest degree of light-transmitting capacity. Dogmars 1/4.5 are made available in three different focal lengths, viz:- that of the double objective and those of the two single lenses	166	

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C. P. Goerz, Example II	22		167
C. P. Goerz, Example III	30		168
Dr. Schroder	12		193
Berthiot, Paris, Porigraphe Symmetrique	40		196
Orthoprotar	37	See remark pertaining to Card No. 15	226
Double Amatar	27	The double objective is holo-symmetric	238
Double Amatar	28	The double objective is holo-symmetric	239
Cristopher Graf	16		247
Goerz-Dogmar	16	Original and duplicate. Original more explicit. See remarks for Card No. 166	298
Goerz-Celor	24	See remarks for Card No. 166	301
Goerz-Celor	26	See remarks for Card No. 166	302
Double Protar	30		312
Convertible Objective	35	Second and next to the last lens of this double objective made of Fluorite	317
Graf-Lens, modified by Bausch & Lomb	23		320
Eastman	22		322
Maximar	25		326
Maximar	27		327
Maximar	24	Modification of previous Card No. 327	328
C. P. Goerz	15	Refer to Eder's Handbook, ed. 1913, p.112. For Ultra-violet Photography with the help of silber filters at $\alpha_2 = 313$	368
Orthoprotar	30	See remarks given for Cons. No. 231	370
Linear Anastigmat, Rietzschel	25	This card is out of Zeiss's consecutive numbering	353
Convertible Objective	17	With aspherical surfaces	384
Goerz, Dogmar	25	In duplicate. Three focal lengths available for front and back component of this objective	385
Goerz, Artar	15	A reproduction projective. Construction similar to the Dogmar	388
Eastman Kodak Co	23	Construction similar to Dogmar	410
Cooke, Aviar	25		422a
Cooke, Aviar	25	In connection with Cards Nos. 422a, 432, 432a, 445, and 445a, see copy of a report taken from The Photographic Dealer July, 1920 p. III, attached to Card No. 445	432
Cooke, Aviar	25		432a
Cooke, Aviar	25		445
Cooke, Aviar	25		445a
C. P. Goerz	27		455
Dr. Paul Rudolph	27		456
Convertible Objective I	27		464
Convertible Objective II	26		466
Convertible Objective III	25		468
Convertible Objective V 1919 No. 1	30		487
Rudar	35		488
Goerz	35		493
Convertible Objective V 1919 No. 5	30		499
Convertible Objective V 1919 No. 6	30		504
Convertible Objective	30		505
Convertible Objective V 1919 No. 8	30		507
Convertible Objective V 1919 No. 9	33		508
Rodenstock	27		513
Convertible Objective	32		521
Convertible Objective	37		522
Convertible Objective V 1919 No.15	30		523
Rodenstock, Double Anastigmat Eustigmat	20		525
Convertible Objective V 1920 No. 1	30		528
Convertible Objective V 1920 No. 3	30		530
Convertible Objective	30	Construction similar to the Double Plasmat	534
Rietzschel, Dialyt	25	Double objective composed of two Gauss Lenses	537
Meyer, Double Anastigmat	27	Construction similar to the Dagor	539
Kodak Anastigmat	22	Construction similar to the Dagor	541
Kodak Anastigmat	25	Construction similar to the Dagor	542
Convertible Objective V 1920 No. 5	30	Construction similar to the Double Plasmat	543

Deformed Convertible Objective	27	The two exterior surfaces of the double objective are aspheric	545
Kodak Anastigmat	25		546
Convertible Objective	28		547
Double Amatar, V 1920 No. 8	30	With compensation plate	548
Kodak Anastigmat	24		549
Protar		This shows lens specifications pertaining to drawing shown on Card No. 542	550
Protar	27		561
Goerz	27	Original form of the Goerz's Dagor	565
Steinheil	23	Construction similar to Dogmar	566
A. A. Smith, Bromley	50		588
Rodenstock	25	Construction similar to Dogmar	594
Gehrke, Dresden	35		600
Convertible Objective V 1923 No. 7	30		610
Rodenstock	26	Construction similar to the Dogmar	613
Christopher Graf	5	Construction similar to the Dogmar	619
V 1922 No. 4	30		622
Taylor, Taylor & Hobson	28	Unsymmetrical Convertible Objective	623
M. Zwillinger	21		658
Taylor, Taylor & Hobson	25		659
Taylor, Taylor & Hobson	15		660
Rodenstock	24.5	Similar to the Dogmar	661
Convertible Objective	36	See also V 1920 No. 4	662
C. W. Frederick and F. E. Ross	25	Construction similar to Dogmar	666
Du Motel	5	Construction similar to the Dogmar	696
Ames	5		720
Deger	37		722
Quartz Anastigmat	20	For Ultra-violet Photography focal length = 100 mm calculated for λ = 340 $\mu\mu$	730
Dagor	27		731
Dogmar	23.5		732
Geodar	30	Derived from the Dagor Objective	737
Kodak, Anastigmat	24	Construction similar to Dogmar	748
		Construction data calculated by Zeiss	
Helostar	25	Construction data calculated by Zeiss	751
Agfa Double Anastigmat	26	Construction data calculated by Zeiss	753
Dogmar	20		759
Kodak Anastigmat	23	Construction similar to Dogmar. Construction data calculated by Zeiss	767
Goerz	24	Four-Lens Objective	774
Kapella	30		792
Geodar	30	With compensation plate. Object for photogrammetry	808
C. P. Goerz	29	Similar to the Dogmar. Refer to British Journal of Photography, 1898, p. 570	925
Geodar	30	For Photogrammetry. For compensation plate 3 mm	930
Jos. Schneider & Co	30		985
V 1932 No. 9	30	This objective is fitted with a thick glass plate between objective and image for correction of distortion	986
Meniscus Objective	20	With aspheric surface	987
V 1933 No. 2	18	With two aspheric surfaces. Compare with Card No. 987	990
Meniscus Lens	17	With one aspheric surface	1026

(THE FOLLOWING ENTRIES BEGIN A NUMERICAL SEQUENCE OF ZEISS CARD NUMBERS. THESE ALSO ARE DESCRIPTIONS OF CONVERTIBLE OBJECTIVES)

Emil Busch, Rathenow	20		3
Emil Busch, Rathenow		No data given. See Card No. 3	3a
Hugo Meyer, Aristostigmat	25		10
Planar	20	Double objective composed of two glauss objectives. See also Card No. 29a	29
Planar		See Card No. 29	29a

Apochromat Planar	20	A reproduction objective	37
Rodenstock	30	Double objective composed of two gauss objectives	84
Rodenstock	10	Projection objective. German registered design 262,201	100
New Protar Objective	40		103
New Protar Objective	25		104
New Protar Objective	30		113
New Protar Objective	30		114
New Protar Objective			115
New Protar Objective	25		116
Meyer Aristostigmat	20	Composed of two different gauss objectives	151
Orthoprotar	35		161
C. P. Goerz	30		162
C. P. Goerz		Same objective as above, with modified patent specifications	163
C. P. Goerz			165
Voigtlaender, Apochromat Collinear	5	A reproduction objective	194
A. H. Rietzschel, Muenchen			199
Ross, Homocentric	25		200
Protar, Series IV	10		205
Protar, Series IV		Slight modification of Card No. 205	207
Double Amatar III	30		213
Double Amatar, III	35		214
Double Amatar, III	35	With Quartz Lens	219
Protar	35	With Quartz Lens	220
Double Amatar, III	30		222
Double Amatar, III	30	Duplicate of the card above	222
Protar, Series VII		See also Card No. 224a	224
Protar		See also Card No. 224	224a
Protar, Series IV	30		237
Reichert, Neucombinar	30	This card in original and duplicate	240
Convertible Objective	40		241
Double Amatar	30		242
Maximar	30		244
Maximar (Ica)	35		245
Maximar	27	Check calculation for objective shown on Card No. 244	246
Maximar	27		248
Reichert	21		249
Hekla Anastigmat	25	Double objective composed of two gauss objectives	250
Maximar	28		252
Maximar		With barite crown of highest refraction power	253
Maximar	27		254
Staeble Objective	27	Double objective composed of two different gauss objectives	259
Hekla Anastigmat II	28		261
Goerz Tenastigmat	30	Similar to the Dogmar	267
Graf	23-24	Similar to the Dogmar. This card in original and duplicate	288
Goerz Double Anastigmat Dagor	28	Similar to the Dogmar	297
Hekla Anastigmat	28	Gauss double objective	315
Hekla Anastigmat	28	Gauss double objective	329
V 1913 XV	28	Gauss double objective	330
Symmetrical Gauss Objective	28	Gauss objective	331
Krauss Anastigmat	27	Gauss double objective	332
V 1913 XVII	27	Gauss double objective	338
Ermanmann Double Anastigmat	27	Gauss double objective	371
Stachelmark, Choroplast	25	Gauss double objective	450
Gauss Objective		With small spherical zones. Refer to Central Zeitung f. Optik u. Mechanik, 1905, p. 68	467
Ross Homocentric	25		474
Gauss Objective		With small spherical zones. See remark for Card 467	478
Dr. Paul Rudolph, Symmetrical Objective	10		605
Dr. Paul Rudolph			676

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Dr. Paul Rudolph	25	Gauss double objective	377
Dr. Paul Rudolph		Single Gauss objective	678
Zeiss	5		771
Kapella	15		805
Gallus Objective	25		870
New Protar Series IV	35		960
Spherical Objectives V 1936 No.10	27	Double objective with aspheric external surface	1125
Apo-Planar	15		1169
Kapella	25		1209

LENSES AND TELESCOPES, SUPERIMPOSED ON OBJECTIVES FOR VARIATION OF FOCAL LENGTH

The best universal objectives, as, for instance, the Tessars, are constructed unsymmetrically. It is, therefore, in the majority of cases impossible to photograph with individual components of these objectives, in contrast to convertible objectives in which photography is permitted with each of the component parts of the double objective.

When lenses are superimposed, they must be free of all disturbing flaws in order to avoid detrimental influences on the sharpness of the image of the photographic objective. In the great majority of cases these superimposed lenses are of simple construction; they are cheap, available, and suitable for vignetting. The superimposed lenses will introduce color defects into the image, and to avoid these the objective has to be so stopped down more or less whenever this simple type of lens is superimposed. To achieve a presentable image field with a certain degree of sharpness, the astigmatism of the superimposed lenses must be eliminated so far as possible. The Distars and Proxars, the former for extending the focal length, the latter for shortening it, are calculated in such a way that the principal rays passing through the entrance pupil of the objective on which the additional lenses are superimposed do not cause additional astigmatism in the total combination of objective and superimposed lenses.

This consideration leads to the meniscus shape of these superimposed lenses.

By superimposing these lenses, the quality of the image is impaired. It is generally impossible to attain, with the total arrangement of objective and superimposed lens, an angle of coverage exceeding that achieved by the objective without the superimposed lens.

For this reason, no figures have been given in this section under the heading, "Half Angle of Coverage."

Name of Objective	Aperture Ratio	Focal Length	Remarks	Zeiss No.	Page
Tessar	1/4.5	15 cm	Figures pertaining to the Tessar are not given. Card No. 360 indicates -3 diopters, biconcave for the superimposed lens, which means that the lens has exterior surfaces of equal dispersing effect. On Card 362 the lens shows the same figure for the diopter, but in periscopic form, which means that the lens is a meniscus of a known type, viz: - Radii of curves: r_1 = 121 mm. In both cases the distance between the front surface of the superimposed lens amounts to 2 mm. A comparison of the a and b curves clearly indicates that the biconcave superimposed lens has a more favorable influence on the aberrations represented by the a-curves than those of the periscopic superimposed lens. On the other hand, when this latter one is used, the b-curves are more favorable than those of the biconcave lens. By superimposing -3 diopters the focal length of 15 cm is increased to 25 cm.	360	

Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters, biconcave. Remarks for Cards Nos. 360 and 362 apply here	361
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters, periscope. Remarks for Cards Nos. 360 and 362 apply here	363
Tessar	1/4.5	15	cm	With superimposed lens plus one diopter Ostw. (This abbreviation stands for Ostwald and means that the respective lens corresponds to the Ostwald branch of the Tscherning-curve.) This superimposed lens decreases the focal length	366
Tessar	1/4.5	15	cm	With superimposed lens plus one diopter Woll. (The abbreviation stands for Wollaston and means that the respective type of lens corresponds to the Wollaston branch of the Tscherning-curve.) For decreasing the focal length. Wollaston lenses are generally more curved than Ostwald lenses. Their effect on the a-curves is unfavorable, whereas effect on the b-curves is generally still more favorable than that of Ostwald lenses.	365
Tessar	1/4.5	15	cm	With superimposed lens plus one diopter Woll. See remarks for Card No. 365	364
Tessar	1/4.5	15	cm	With superimposed lens -1/5 diopter Woll	369
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters. Aspheric Distar Objective	375
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters Ostw.	367
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters, Ostw. See Card No. 367	357
Tessar	1/6.3	50	cm	With superimposed lens	628
Tessar	1/4.5	40	cm	With superimposed lens	627
Tessar	1/4.5	15	cm	With Distar lens -3.5 diopters Ostw.	379
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters plano-concave	359
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters plano-concave	358
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters Woll	356
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters Ostw.	355
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters Woll	354
Tessar	1/4.5	15	cm	With Distar lens -2 diopters Ostw.	378
Tessar	1/4.5	15	cm	With Distar lens -1.5 diopters Ostw. See Card No. 367	377
C. P. Goerz				Dispersing superimposed lens system. In an endeavor to avoid color defects which are bound to incur in connection with relatively simple lenses, these systems of two superimposed lenses of opposite refraction power were constructed. They are similar to Distars	590
C. P. Goerz				Converging superimposed lens system. See the remarks above, but note that this system is similar to the Proxars	656

With the use of Proxars and Distars, the camera extension and the focal length were considerably changed, which led in the case of many cameras to afocal or telescopic superimposed lens systems and/or superimposed telescopes. The camera extension set to ∞ was not changed, whereas the focal length was increased proportionate to the magnification of the superimposed telescope.

V 1935 No. 14, Superimposed telescopic	1/3.5	7.5	cm	This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm, to 127.3 cm without changing the setting of the camera extension	1084

V 1936, No. 11, Superimposed telescopic with Tessar	1/3.5	7.5	cm	This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm, to 127.6 cm without changing the setting of the camera extension	1124
V 1936, No. 15				This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm, to 127.6 cm without changing the setting of the camera extension	1136
V 1935, No. 13, Superimposed telescopic with Tessar	1/3.5	7.5	cm	This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm, to 127.6 cm without changing the setting of the camera extension	1129
Spectacle glass of the Ostwald type, +		6	diopters		281
Spectacle glass of the Ostwald type, +		7	diopters		280
Spectacle glass of the Ostwald type, +		8	diopters		279
Spectacle glass of the Ostwald type, +		8½	diopters		278
Spectacle glass of the Ostwald type, +		9	diopters		277
Spectacle glass of the Ostwald type, +		9	diopters		276
Spectacle glass of the Ostwald type, +		10 1/4	diopters		275
Spectacle glass of the Ostwald type, +		10 1/4	diopters		274
Spectacle glass of the Ostwald type, +		10 1/4	diopters		273
Spectacle glass of the Ostwald type, +		11.15	diopters		272
Spectacle glass of the Ostwald type, +		20	diopters		271

Cards Nos. 1129 to 271, listed above, show the results of astigmatic calculation for the center point of the eye, assumed to be located at a distance of 25 mm from the interior vertex of the lens, and indicated for various diopters of lenses corresponding to the Ostwald branch of the Tscherning-curve.

APLANATS

Aplanats are objectives rendering good sharpness in the central area of the image at medium aperture ratios. They differ from Anastigmats inasmuch as their angular image field is considerably smaller; but it is still considerably larger than that of telescope objectives.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
British patent 215,262	12.5	18n	cm	36	Construction similar to Steinheil's Aplanat	719	
Aplanat	1/8	13	cm	6		257	
Aplanat	1/8	13	cm	8		255	
Ica Aplanat, Helios	1/8	13	cm	8		256	
Aplanat No. 102	1/5	531.6	mm			210	
Peter Schnuell				10		65	
Aplanat	1/6.5	144	mm		Focal length of single lengths 264.4 mm	47	
Ultra-violet Aplanat	1/6.5	145	mm	10		31	
Ultra-violet Aplanat	1/8	156	mm	10		30	
Grabb's-Aplanatic						28	
Steinheil, "Rapidanti-planet"	1/6.5			12	Data taken from: A. Gleichen, Lehrbuch Der Geometrischen Optik, p. 473	11	
Steinheil, Periscope				12		20	
Goerz				10		21	

TELESCOPE OBJECTIVES

These objectives have a very good correction of longitudinal spherical aberration; the[y] [do] toward the factorily with the sine condition, whereas a correction of the narrow oblique pencils of ra[ys] axis, has generally not been considered.

[sup]ply satis-

These objectives have a very high degree of sharpness at the central area and only a [small] field.

[ar] image

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Page
Collimator Objective	1/15	2685	mm	2.5	Calculated for c, d, f, g'. the sake of distinctness t departure from the sine c tion and the longitudinal s cal aberration have been enlarged ten fold as compa with the scale generally us Zeiss's cards; distance bet optical axis and point of inc dence has been drawn at five times the normal scale	
Collimator Objective	1/14	208	cm	2.5	For testing of photo-objectives	
V 1917 III	1:45	16	cm	2.5	Telescope objective consisting of two components. Used for machine gun cameras	
Objective composed of three lenses with two cemented surfaces	1/4.4	240	mm	2.5	German patent 135,362, Fig. 4	
V 1933 No. 7	1/8	50	cm	3	Long Distance Objective	1019
Projection Objective	1/3	30	cm	2.5	Composed of two lenses	639
E-Objective (Astro-Objective)				3.5	Aperture ratio about 1/3	[illegible]

The following comprise a group of objectives of various types of construction in which the a-curves, or b-curves, or both the a- and the b-curves indicate aberrations of such an extent that the optical qualities of the objectives should be rather low.

I. G. Farben	1/1.9	10	cm	10		1086
I. G. Farben Periscope	1/3.3	105	mm	8		976
Albert Ferdinand Shore	1/8.5	117	mm	5	Data given in patent specification seemed to be incorrect	966
Felms	1/3.3	82	mm	5		967
Isocele Lens	1/4.5	10	cm	4		955
Societe Anonyme des Etablissements Optis	1/4	80.2	mm	4		943
E. Heinrich Kopplin, Dresden	1/6.3	14	cm	5		527
Gasc. & Charconnet	1/17.5	80	mm	5		517
Paul Waechter, Friedenau	1/7.5	127	mm	4		299

PETZVAL LENSES

Whenever high speed, good sharpness and only a small angular image field are required, the Petzval Lenses or, more explicitly, their modifications and further developments, have been successfully used. Longitudinal spherical aberrations, as well as departure from the sine condition, can be easily corrected at aperture ratio of

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Dr. Paul Rudolph	1/1	10	cm	10	Data given in the patent specification indicate that this objective has an aperture ratio of 1/1.12. Lens diameters are insufficient for an aperture ratio of 1/1 as stated on this card	858
Dr. Paul Rudolph	1/3.2	10	cm	10		784
Dr. Paul Rudolph	1/2.9	100	mm	15		787
Lacour-Berthiot, Paris	1/3.5	100	mm	15		559
C. & H, C. Beck	1/6			5	b-curves and c-curves calculated for variation to two different locations of the stop	295
Dallmeyer	1/5.6					197
Busch-Rathenow	1/1.9	9.56	mm	10		1251
Jos. Schneider, Kreuznach	1/2.9	10	cm	20		1339
Jos. Schneider, Kreuznach	1/2.9	10	cm	24		1165
Horace W. Lee, Kapella	1/1	1	cm	15		1086
Kapella	1/4.5	10	cm	15		1055
Ica Helios	1/8	13	cm	10	An Aplanat	263
Leitz, Periplan				30		32
Alfred Taylor	1/3.5	100	mm	2		616
V 1938 No. 26	1/2.5	5	cm	18	This objective was termed Herar	1257
V 1938 No. 21	1/4	8.5	cm	12	This objective was termed Herar	1245
V 1938 No. 20	1/4.5	13.5	cm	6	This objective was termed Herar	1244
V 1938 No. 9	1/3.5	8	cm	24	This objective was termed Herar	1231
V 1937 No. 30	1/3.5	18	cm	25	This objective was termed Herar	1194
V 1938 No. 10	1/2.8	8	cm	24	This objective was termed Herar	1232
V 1938 No. 1	1/2	5	cm	22	This objective was termed Herar	1198
V 1937 No. 29	1/3.5	8	cm	23	This objective was termed Herar	1193
V 1937 No. 28	1/2.8	5	cm	20	This objective was termed Herar	1192
Herar	1/3.5	7.5	cm	25		1190
Herar	1/2.8	52.3	mm	20		1189
V 1936 No. 17	1/3.5	7.5	cm	25	This objective was termed Herar	1173
V 1938 No. 18	1/3.5	3.5	cm	25	This objective was termed Herar	1240
V 1936 No. 16	1/2.8	8	cm	23	This objective was termed Herar	1138
Aldis-Objective	1/6	77	mm	10	This objective was termed Herar	262
Aldis Example I	1/7.8	150	mm	10		220
Aldis Example III	1/7.8	156	mm	10		260
Aldis Example II	1/7.94	168	mm	10		230
H. L. Aldis				10	See data on Card No. 8	71
H. L. Aldis, Photographic Objective	1/7.7	197.26	mm	15	See Card No. 71	6
Anastigmat, Series IV	1/12.5	118.4	mm	10		55
Single Meniscus				17	Single meniscus having a stop located directly in front of the vertex of the convex surface permits anastigmatic flattening for an image field of about 30°	25
British Patent No. 3093/26				6	This meniscus has a stop at the concave surface. The image field is anastigmatic, but not flattened	810

PTO-1210-RE

Poiack, Paris	1/7	10	cm	5	This hyperchromatic objective is a triplet of good monochromatic spherical correction. By using flint glass for the two converging lenses and crown glass in the dispersing lens, the chromatic longitudinal aberrations become larger than those of an individual lens. By means of this, considerable color defect, an artistic softness and a better depth of focus are achieved	779
C. & H. C. Beck	1/3.8			5	Data given in patent specification are obviously erroneous, as the diameters of the two exterior lenses do not permit the indicated aperture ratio	264
V 1935 No. 11	1/2	5	cm	20	Tessar with aspheric front surface. The trace of rays of a meridional pencil is shown on a separate card, attached to this drawing	1035
V 1935 No. 10	1/2	5	cm	10	Tessar with aspheric front surface	1109
V 1934 No. 10	1/2	5	cm	19	Tessar with aspheric front surface	1053
V 1934 No. 9	1/2	5	cm	19	Tessar with aspheric front surface	1052
V 1934 No. 8	1/2.8	5	cm	23	Tessar with aspheric front surface	1051
V 1934 No. 6	1/2.8	5	cm	23	Tessar with aspheric rear surface	1050
V 1934 No. 11	1/1.5	5	cm	18	Tessar with aspheric front surface	1035

In addition to drawings already given as descriptions of Convertible Objectives, the following objectives are also listed as:

CONVERTIBLE OBJECTIVES

Eugene Lecour Gallus Objective	1/8.5	24	cm	10 23	A Swiss objective for Photogrammetry	81 654
Voigtlaender 4-Lens Objective	1/14			10	4-Lens Objective	398
Rudar Objective	1/8	25	cm	27	Construction similar to the Plasmat	472
Rudar Objective	1/8	25	cm	35	Construction similar to the Plasmat	490
Rudar Objective	1/9	232	mm	30	Construction similar to the Plasmat	498
Dr. Paul Rudolph	1/10	265	mm	28	Construction similar to the Plasmat	473
R. 45,642	1/9.75	15.6	cm	30	Construction similar to the Plasmat	491
Rudar Objective	1/11	24	cm	25		497
Rudar Objective	1/10	191	mm	30		494
R 45,897	1/8.56	17	cm	35		492
Lacour-Berthiot	1/3.5	96	mm	10		325
Protar	1/6	244	mm	25	A Wide-Angle Objective	77
Bambino Objective	1/2	10	cm	12	Inexpensive projection objectives	1007
Bambino Objective	1/2	7	cm	15		1006
Warmisham and Kapella Ltd., Anastigmat Objective	1/1.5			15	The British Journal of Photography of March 27, 1930, p. 17	860

FTS-6345-RE

M. Lloyd Cassel Bishop	1/5	300	mm	5		597
Hans Zaepernik	1/3.35	30	cm			602
P. A. & C. P. Goerz	1/2	150	mm	10	Portrait Objective	636
C. W. Frederick Eastman	1/2.8	100	mm	10		819
Optical Works, Ruedersdorf	1/4.3	65	mm	10	Symmetrical objective with prism	593
Optical Works, Ruedersdorf	1/4	10	cm	10		684
Unar	1/8	200	mm	30		39

MAGNIFIERS

5-fold Magnifying Picture Viewer		50	mm	25	Center of rotation of the eye is located about 50 mm in front of the objective nearest to the eye. Calculation for n_e shows a well flattened, anastigmatic image field at 50°. Chromatic magnification difference between C and F amounts to about 1%. f = 50 mm for small format 24 x 36 sq mm	1203
Fiektoskop		4.7	cm	15	The space to be viewed through magnifier is projected by the camera objective on the frosted surface of the lens pertaining to the magnifier; the rays are deflected by a prism to facilitate easier viewing. Distance between the center of rotation of the eye and the lens nearest to the eye amounts to about 29 mm	1202

OBJECTIVES OFFERING EITHER CONFUSED OR INSUFFICIENT DATA

Tessar	1/6			30		23
					This card shows distortion-curves of photographs taken with shear-jointed telescope-cameras, having a focal length of 20 mm. Distortion is calculated for cameras used with the shear jointed telescopes types "SF-14" and "SF-09"	406
C. P. Goerz					No data given. See A. Gleichen, Geometric Optics, p. 429	14a
C. P. Goerz					No data given	161
C. Reichert and F. Kollmorgen, Wien					No data given. See Card No. 1, p.	1a
V 1938 No. 5	1/2.8	5	cm	25	Tessar. Data not intelligible	1206
Projection Objective					b-curves not indicated. With strongly shortened extension	648
Trans-Lux, Daylight Picture Screen Corp., New York	1/3	2.5	cm	18		1132
This card presents distortion curves for a Telescope Objective	1/50	3	m		Insufficient data	407
V 1933 No. 4	1/2	7	cm	18	Insufficient data	991b
Data pertaining to Card No. 543					Card No. 543 not in this file	---
Insufficient data pertaining to No. 235				25	Card No. 235 not in this file	235a

Insufficient data pertaining to No. 501	25	Card No. 501 not in this file	502
Insufficient data pertaining to No. 501	29	Card No. 501 not in this file	503
Insufficient data pertaining to No. 893		Card No. 893 not in this file	---
Insufficient data pertaining to No. 382		Card No. 382 not in this file	---
Insufficient data pertaining to No. 734		Card No. 734 not in this file	---
Insufficient data pertaining to No. 851		Card No. 851 not in this file	---
Inter Office Notices pertaining to No. 322		Card No. 322 not in this file	---

RECENT OBJECTIVES

The following objectives are a portion of those classified by the Zeiss Works during the period immediately before the war and for the earlier years of hostilities.

Identification of Objective	Aperture Ratio	Focal Length		Zeiss No.	Page
Jos. Schneider	1/5	10	cm	1401	
I. R. Objective	1/2	72	cm	1402	
Lanck	1/1.35	3	cm	1402	
Zeiss Ikon	1/3.5	100	mm	1403	
V 1941 No. 6	1/2.8	35	cm	1404	
V 1941 No. 7	1/2.8	35	cm	1405	
Zeiss Ikon, Sonnar	1/2.8	8	cm	1406	
Arthur Warnisham, Kapella	1/2	10	cm	1407	
V 1941 No. 13	1/1	7	cm	1408	
V 1941 No. 15	1/1	15	cm	1409	
V 1941 No. 15	1/1	15	cm	1409	
V 1941 No. 14	1/2	25	cm	1410	
V 1941 No. 4	1/4.5	12.5	cm	1411	
V 1941 No. 5	1/3.5	3.5	cm	1412	
V 1941 No. 15	1/1	15	cm	1413	
V 1941 No. 17	1/12.5	67.5	cm	1414	
V 1941 No. 15, See Card No. 1415a	1/2	35	cm	1415	
V 1941 No. 16	1/2	35	cm	1415a	
V 1940 No. 9	1/5	100	cm	1416	
V 1941 No. 18	1/2.4	125	mm	1417	
V 1941 No. 19	1/1.5	30	cm	1418	
German Registered Design of 10-8-41	1/1.5	5	cm	1419	
German Registered Design of 10-15-41	1/1	7	cm	1420	
V 1941 No. 23	1/2	2.5	cm	1421	
Wide-Angle Objective	1/4	5	cm	1422	
V 1941 No. 2	1/5	1	m	1423	
V 1941 No. 19 1	1/1.5	30	cm	1424	
V 1941 No. 22. For finite scale n = 75.4				1425	
V 1941 No. 22	1/1.5	40	cm	1425	
	1/1.5	5	cm	1425b	
I. R. Objective	1/1.5	40	cm	1426	
V 1941 No. 26	1/1.5	40	cm	1427	
Zeiss Ikon	1/1.2	100	mm	1428	
Kodak Petzval Objective	1/2.8	10	cm	1429	
V 1939 No. 33	1/1.4	5	cm	1430	
V 1939 No. 33 (Duplicate)	1/1.4	5	cm	1430	
Telikon Teleobjective with Concave Air Space	1/6.3	10	cm	1431	
Telikon Teleobjective with Concave Air Space	1/6.3	10	cm	1432	
Tessar	1/3.5	3.5	cm	1433	
I. R. Biotar with Smyth Lens	1/1.5	15	cm	1434	
V 1942 No. 1	1/1	13	cm	1435	
V 1941 No. 24	1/2	10	cm	1436	

I. R. - Sonnar with Smyth Lens	1/1.5	15	cm	1437
V 1942 No. 2	1/1	7.5	cm	1438
Hugo Meyer, Goelitz (Paul Schaeffer)	1/1.5	10	cm	1439
Sonnar	1/1.4	5	cm	1440
V 1942 No. 3	1/1	7.5	cm	1441
V 1942 No. 4	1/1.5	40	cm	1442
G. Rodenstock	1/1.9	10	cm	1443
V 1942 No. 8	1/1	7.5	cm	1444
V 1942 No. 9	1/1.5	5	cm	1445
V 1942 No. 7	1/1.4	5	cm	1446
Tessar	1/12.5	67.5	cm	1447
V 1942 No. 11. See Card No. 1467	1/1	5	cm	1448
Biogon	1/2.7	35	cm	1449
Zeiss Ikon	1/2	10	cm	1450
V 1942 No. 13	1/1.5	30	cm	1451
V 1942 No. 12	1/1.5	40	cm	1452
Rodenstock	1/2	1	cm	1453
Wide-Angle Objective	1/5.7	5	cm	1454
V 1942 No. 14	1/3.5	50	cm	1455
V 1942 No. 16	1/18	38	cm	1456
Pleon	1/8	7.25	cm	1457
I. G. Farben	1/1.4	10	cm	1458
I. G. Farben	1/1.4	10	cm	1459
I. R. Objective	1/1	5	cm	1460
Zeiss Ikon, Wide-Angle Objective	1/2.8	10	cm	1461
Meyer, Goerlitz (Paul Schaeffer)	1/1.5	10	cm	1462
Zeiss. See also Card No. 225	1/1.8	10	cm	1463
		Zetschr. f. Instrumentunkunde 31 ed. 11 Sep. Bk 9 pp. 265-270		
Zeiss Ikon, Sonnar	1/1.4	8.5	cm	1464
V 1942 No. 5. For the Linhof Camera	1/2.8	13.5	cm	1465
I. R. Objective	1/1	7.5	cm	1466
I. R. Objective	1/1	5	cm	1467
I. R. Objective	1/1.5	15	cm	1468
V 1942 No. 27. I. R. Objective	1/1.5	15	cm	1469a
V 1942 No. 21. I. R. Objective	1/1.5	15	cm	1469b
V 1942 No. 21. I. R. Objective	1/1.5	15	cm	1469c
V 1942 No. 21. I. R. Objective	1/1.5	75	cm	1469d
V 1942 No. 20	1/1	6.5	cm	1470
Biogon	1/2.8	3.5	cm	1471
Sonnar	1/2.8	7.5	cm	1472
Astro-Gesellescraft Bielicke Co	1/1.05	10	cm	1473
Apo-Tessar	1/9	45	cm	1474
V 1939 No. 40	1/2	5	cm	1475
Busch	1/2.5	10	cm	1476
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477a
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477b
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477c
Objective	1/2	68	mm	1478
Zeiss	1/8.3	8	cm	1479
Leitz	1/1.3	100	mm	1480
V 1943 No. 4, Petzval	1/1.5	15	cm	1481
V 1943 No. 4, Petzval	1/1.5	15	cm	1481a
U. R. Objective B	1/1.5	15	cm	1482
U. R. Objective B	1/1.5	15	cm	1482a
				1482b
Kapella	1/2.5	10	cm	1483
Meyer Goelitz	1/1.8	10	cm	1484
Tessar	1/3.5	3.5	cm	1485
U. R. Objective A	1/1	25	cm	1486
Tessar	1/3.5	4	cm	1487
V 1942 No. 15	1/3.5	50	cm	1488
U. R. Objective B	1/1	25	cm	1489
U. R. Objective A	1/1	9	cm	1490
U. R. Objective	1/1	5	cm	1491
Leitz U. R. Objective	1/1	9	cm	1492

V 1944 No. 2 U. R. Objective	1/1	=5	cm	1494
Kipro-Anastigmat. See also Card No. 1390	1/1.9	10	cm	1495
I. G. Farben	1/1.5	100	mm	1496
Optikolechna, Spolechnost	1/3.5	100	mm	1497
Askania Teleobjective	1/3	100	mm	1498
Kodak Teleobjective	1/3.8	100	mm	1499
Kodak Teleobjective	1/3.8	100	mm	1500
G. Rodenstock	1/2.5	10	cm	1502
Telemetar	1/5	1	m	

UNCLASSIFIED CARDS

Name of Objective	Aperature Ratio	Focal Length	Zeiss No.	Page
Rapidor	1/4.5	150 mm	579	
Biotessar	1/2.25	1.5 cm	757	
Sonnar	1/2	1 cm	1122	

TRANSLATION

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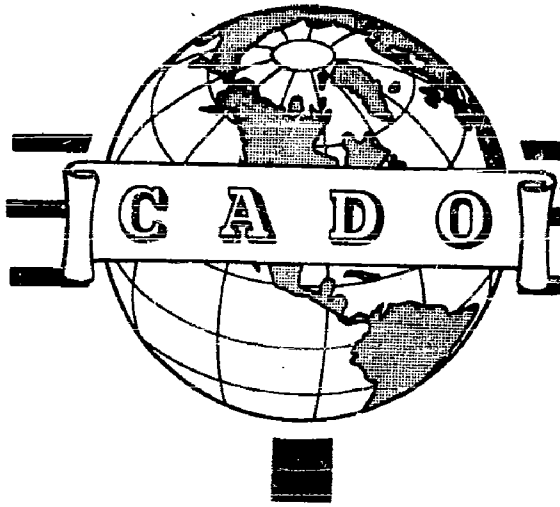
THE ZEISS INDEX OF PHOTOGRAPHIC LENSES

Volume I

November 1948

by

W. W. Merte



CENTRAL AIR DOCUMENTS OFFICE

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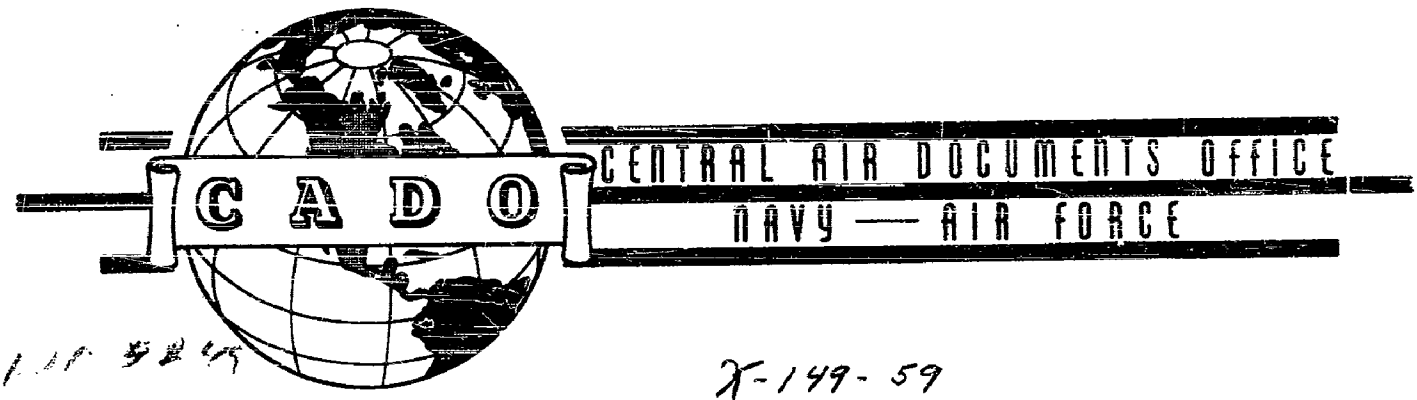
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W. W. Merté



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W. W. Merte'

Translated from the German
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(The above reprint of the Air Technical Index catalog card for this report is included for the convenience of recipients of the Index.)

(Abstract)
#3378

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(Additional Detailed Optical Data in Volume II)

#3358

INTRODUCTION

This two-volume report presents the card index, listing optical characteristics and image defects of photographic lenses, which was initiated in the Photographic Calculation Department of the Zeiss Works at the turn of the century, and maintained to the end of World War II in 1945.

The method of compilation is based on a book by M. v Rohr, Theorie und Geschichte des Photographischen Objektivs, published by Julius Springer Verlag, Berlin, about 1898.

The card index represented a good general view of the progress in the development of photographic optics in all countries, using foreign and domestic patent literature as a principal source of information. The main value of the index, however, is in its use as a tool for mathematical calculation of all types of lenses.

In the following condensed form of the index of photographic lenses, the compilers have abandoned the original chronological sequence of the Zeiss Works, substituting a grouping of the various types of objective individually, such as: Cooke Lens, Plasmats, Teleobjectives, etc. A short introduction is written for each separate group. The list gives manufacturer, designation or type of objective, aperture ratio, focal length, half angle of coverage, and, wherever expedient, remarks referring to optical qualities, etc., and a reference to the original number of the Zeiss Card Index for further information. The term "Half Angle of Coverage" is generally to be understood as indicating a fully opened stop, and with a tolerance of $\pm 5^{\circ}$ Objectives designated as "V" (e.g., V1935 No. 8) are test objectives, calculated and manufactured at the Zeiss Works, the V standing for test, the following number for the year, etc.; i.e., V 1935 No. 8 means the eighth test made during the year of 1935. The names of Zeiss personnel have usually not been mentioned on pages listing the data achieved in such tests.

Attention is called to the fact that a number of the cards of the original Zeiss file, representing calculations made during the last years of the war, have not yet been located. Data given on these cards will be published if they become available.

The grouping into various types of objectives has been made rather arbitrarily, considering that a systematic classification of the material at hand would have gone far beyond the scope of this condensed compilation.

EXPLANATION OF TERMS USED

Double Objective

This term refers to objectives which have a stop between any of the component lenses, as opposed to single objectives which comprise the portion of the system (double lens) behind, or rarely in front of, the stop. The Single Objective in a convertible lens performs satisfactorily alone.[1] See Convertible Objectives.

Spherical Aberration

Spherical aberration and departure[2] from the sine-condition are indicated on the right side of the cards by a-curves, spherical aberration by solid curves, and departure from the sine-condition by dashed curves. On the left side of the cards, these aberrations are indicated in figures under the headings $\Delta s'$ and $\Delta f'$.

Incidence Heights

In most cases three incidence heights are indicated. The greatest incidence height (that of the marginal ray) is $h_{III} = \frac{f}{2k}$, where f means the paraxial focal length = 100 mm, and k the maximum possible f-number. Also, $h_{II} = \sqrt{\frac{2}{3}} \cdot h_{III}$, and $h_I = \sqrt{\frac{1}{3}} \cdot h_{III}$. Values shown in the coordinate systems on the right side of the card indicate the exact figures, whereas figures given for h_{III}, h_{II}, and h_I, under the heading "Incidence Height" on the left side of the card, are very often multiplied by a factor for greater distinctness and for the sake of convenience.

Chromatic Aberration

Figures given under this heading refer to the chromatic correction; for instance, in the expression: $\log s'_{g'} - s'_d$; that is, the logarithm of the ratio of the paraxial intersection lengths for g' and d; and in the expression: $\log f_{g'} - \log f_d$; that is, the logarithm of the ratio of paraxial focal lengths for g' and d.

The first mentioned expression is a measure for the correction of longitudinal chromatic aberration; the latter expression is a measure for the correction of the chromatic difference of magnification. Both these chromatic errors are computed by paraxial ray tracing.

Wherever other figures are given, as in the case of corrections made for other colors or for more colors, there will, as a rule, be a special reference on the card calling attention thereto.

Astigmatism (With subdivisions: sagittal fans and tangential, meridional, fans)

Under this heading, the sagittal and tangential (meridional) image curvatures are indicated. They are shown on the right side of the card by the b-curves, sagittal curvatures by solid curves, and tangential curvatures by dashed curves.

1/ Refer to Henney and Dudley: Handbook of Photography, pp. 41, 42. McGraw-Hill, 1939.

2/ See Remarks accompanying illustrations at the end of von Rohr's Theorie und Geschichte des Photographischen Objektivs. Refer to Hardy and Perrin: The Principles of Optics, pp. 93, 94.

Front Angles

The front angle is the angle in the object space between a principal ray and the axis. On the right side of the card, the front angles are expressed on the ordinate axis at a suitable scale. On the abscissa axis the sagittal and tangential image curvatures are shown. On the left side of the card, the values for the front angles are expressed in a unit having the value:
1 unit = $\frac{1}{2.4}$ degree.

The image curvatures are expressed in a unit having the value: 1 unit = $\frac{1}{4}$ mm.

Distortion

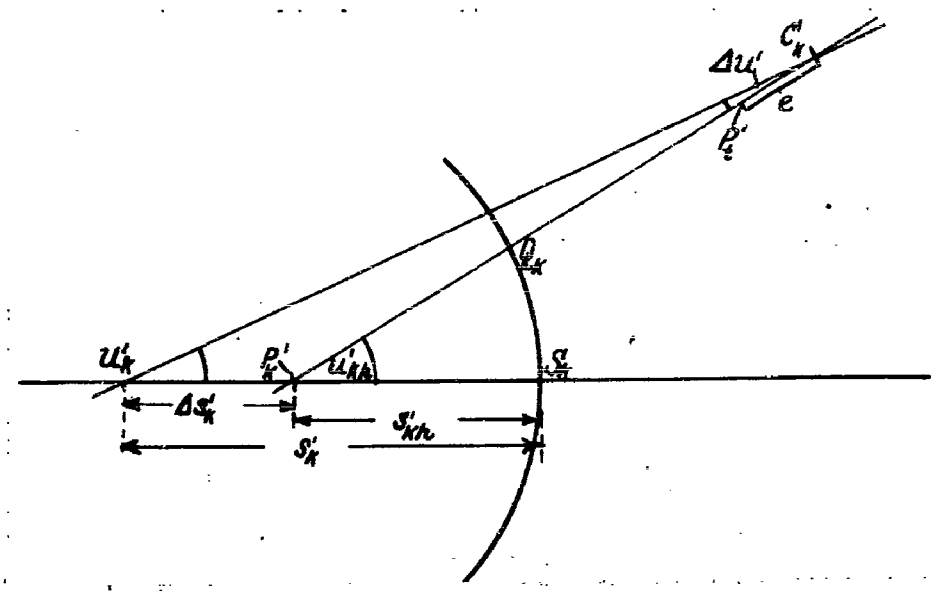
Distortions are indicated by the c-curves as a percentage of (f · tan w), where f means the focal length and w the front angle. The angles are drawn as abscissas, the distortions as ordinates. Front angles are generally the same as those used for the b-curves. If not specially indicated otherwise, the distortion curves are calculated for an infinitely distant object. If calculated and drawn for another object distance, the object distance used will be indicated on the card.

Radii "r", Thicknesses "d", and Air Spaces "l"

These data are given for a focal length of 100 mm. Note that the air space is termed "b" whenever a stop is placed within the air space of an objective. In such cases the air space is subdivided into b_1 and b_2, designating the distance between the vertex of one lens and the stop as b_1, and the distance between the stop and the vertex of the following lens as b_2, the total of b_1 plus b_2 equaling b.

On the right side of the card there are, furthermore, apart from the eight coordinate systems, a drawing of the meridian section of the system of lenses and a table indicating optical data for the materials used for the lenses. These data show the mean refraction indices n_d and the Abbe-numbers ν. In most cases this table also shows the figure for partial dispersion $n_{G'} - n_d$. In the great majority of cases, however, the data n_d and ν are sufficient to establish beyond any doubt the optical properties of the glass. A great number of cards also indicate reflection losses caused by the individual lenses of the objective.

This last information is expressed as percent by the unlabeled column of numbers at the right edge of the card, next to the b-curve for the double objective. The figure at the bottom of this column is the combined percent reflection loss for the system.



Values of meridional coma have not been included in the graphs shown on the Zeiss cards. These cards are available for reference at the Library, Wright-Patterson Air Force Base.

They have been calculated for all the objectives listed, and have been shown on special cards for a minor portion of the objectives listed hereafter. These special cards refer to Zeiss numbers, as indicated on the right side of the compilation.

The principle according to which the coma is represented is not uniform. However, if the curves for meridional coma pass through the origin of coordinates, their calculation is based on the formula

$$e = \Delta s'_k \frac{\sin u'_k}{\sin \Delta u'} - (t'_k - a'_k) \quad \text{(See diagram)}$$

where

e = the meridional coma

$\Delta S'_k$ = distance on optical axis between point of intersection of a coma ray and that of the pertinent principal ray

u'_k = angle of inclination of coma ray to the axis

$\Delta u'$ = angle formed by coma ray and principal ray

t'_k = intersection length of the tangential (meridional) image point

$a'_k = Q_k P'_k$ = distance from point of intersection of principal ray and axis to point of intersection of principal ray and the last refracting surface

p'_t = tangential (meridional) image point after the last refraction.

Curves of meridional coma are drawn on an orthogonal system of coordinates, with the incidence heights of the object pencils of rays in the entrance pupil as ordinates and the comae = e as abscissas, the latter at a scale of 5:1 to the ordinates.

TESSAR-TYPE LENSES

The Tessar type of lens consists of three lens units, the two exterior being converging lenses, and the interior lens, separated by an air space, a dispersing lens. One of the converging units, preferably the rear one, consists of two lenses of opposite refraction power, which are held together by means of a cemented surface.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Original form of the Zeiss Tessar				25		19	49
Tessar	1/2.7	6.2	cm	21		635	50
Tessar	1/2.7	8	cm	21		640	51
V 1927 No. 10	1/2.7	16.5	cm	21		769	52
V 1927 No. 8	1/2.7	10.5	cm	17.5	Cemented surface in the first component	768	53
Tessar	1/2.7	2.5	cm	17.5		764	54
Tessar	1/2.7	7.5	cm	17.5	Cemented surface is concave to stop	631	55
Tessar	1/2.7	2	cm	15	Cemented surface is in the first component	797	56
Tessar, Versuch No. 1-1924	1/2.7	73.6	mm	20	Cemented surface is in the first component	630	57
V 1931 No. 2	1/2.7	10	cm	18		909	58
V 1930 No. 11	1/2.7	5	cm	18		869	59
Tessar	1/2.5	10	cm	15	Cemented surface is in the first component	1139	60
V 1931 No. 4	1/2.8	5	cm	25		879	61
V 1938 No. 8	1/2.8	5	cm	22		1217	62
Tessar	1/2.8	5	cm	24		929	63
Tessar	1/2.8	5	cm	25	For Kontax	920	64
V 1923 No. 5	1/2.8	7.5	cm	20	Cemented surface is concave to stop	611	65
V 1931 No. 26	1/2.8	5	cm	24		915	66
E. Leitz, Wetzlar	1/3.4	100	mm	24		562	67
Tessar	1/3.5	300	mm	18	With aspherical back surface	383	68,69
Jos. Schneider, Kreuznach	1/3.5	10	cm	20		1238	70
Jos. Schneider & Co, Kreuznach P.A. Sch 83426	1/3.5	10	cm	25	Cemented surface is in the first component	867	71
Tessar	1/3.5	15	cm	28	For wide field angle	706	72
O.A.S. Vs No. 9	1/3.5	8	cm	25	O.A.S. is an abbreviation for Optische Anstalt, a subsidiary of the Zeiss Co,, manufacturing primarily a slightly inferior grade of lenses	1176	73
O.A.S. Vs No. 8	1/3.5	8	cm	22		1175	74
V 1930 No. 12	1/3.5	5	cm	18		873	75
V 1930 No. 13	1/3.5	5	cm			874	76
V 1934 No. 15	1/3.5	5	cm	25		1056	77
Tessar	1/3.5	5	cm	27		1030	78
Tessar	1/3.5	5	cm	24		1137	79
Tessar	1/3.5	50	mm	18	Journal of the Instrument Trade,, 1907	236	80
Tessar	1/3.5	300	mm	17.5		215	81
Tessar	1/3.5	300	mm	17.5		107	82
Tessar	1/3.5	100	mm	18	For motion picture photography	596	83
Voigtlaender AG Anastigmat	1/3.5	10	cm	20	Cemented surface is in the first component	880	84
Jos. Schneider	1/3.5	100	mm	26		992	85
V 1938 No. 3	1/3.5	5	cm	22.5	For small field angle	1201	86
Tessar	1/3.6	174.6	mm			93	87
Tronnier	1/3.6	100	mm	25		1040	88
Tronnier	1/3.8	100	mm	23		1039	89
Aldis	1/4	100	mm	10		625	90

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Bausch & Lomb Projection Objective	1/4	391.4	mm	21		337	91
Aspherical Objective	1/2	46.2	mm	20		957	92
Leitz-Wetzlar	1/3.5	5	cm	20		855	93
V 1930 No. 10	1/2.7	5	cm	20		868	94
Jos. Schneider	1/4.35	100	mm	20		995	95
Dr. Pruemm and Gen. G.m.b.H. Braunschweig	1/4.5	100	mm			618	96
Tessar	1/4.5	15	cm	27		216	97
S-Tessar	1/4.5	25	cm	22	For scale n = 3	1229	98
Jos. Schneider	1/4.5	100	mm	27		996	99
Tessar	1/4.5	145	mm	27		97	100
V 1935 No. 17	1/4.5	3.5	cm	28	The fourth lens is made of a new glass with a high refraction index	1100	101
Tronnier, Kreuznach	1/4.5	10	cm	29		1029	102
W. F. Bielicke	1/4.5	18.8	cm	27		746	103
Tessar	1/4.5	50	cm	20	In triplicate	1127	104-106
Tessar	1/4.5	153.20	mm	25		560	107
Tronnier	1/4.5	100	mm	27		1034	108
Tessar	1/4.5	50	cm	25	Scale n = ∞ Aerial Photography	446	109
S-Tessar	1/4.5	25	cm	22.5	For scale n = 3 of 9/2/38	1250	110
Tessar	1/4.5	150	mm	28		206	111
V 1926 No. 1 and V 1926 No. 22	1/4.5	15	cm	25	Experimental objectives	700	112
Tessar	1/4.5	15	cm		Card in original and duplicate	209	113,114
Tessar	1/4.5	50	cm	20	Calculation of 10/8/1937	1180	115
Anti-Comar	1/4.5	15	cm	28	Made by Plaubel & Co., Frankfurt Main	547	116
Tessar	1/4.5	21	cm	27	With compensation plate	545	117
Tessar	1/4.5	15	cm	27		412	118
Tessar	1/4.5	163.3	mm	28		411	119
Tessar	1/4.5	25	cm	25		413	120
V 1930 No. 2	1/4.5	13.5	cm	22	First and last lenses are constructed of Crown Glass of a high refractive index	839	121
V 1930 No. 3	1/4.5	13.5	cm	27	First and last lenses are constructed of Crown Glass of high refractive index	843	122
V 1930 No. 4	1/4.5	13.5	cm	27	First and fourth lenses are constructed of Crown Glass of high refractive index. Experimental Lens	856	123
V 1929 No. 13	1/4.5	10.5	cm	30	Experimental Lens	833	124
Tessar V 1930 No. 1	1/4.5	13.5	cm	26	First and fourth lenses are constructed of Crown Glass of high refractive index	837	125
Tessar	1/4.5	15	cm	27	New Experiment	791	126
Goerz Anastigmat	1/4.5	15	cm	27	Tests proved this objective to be inferior to the Zeiss Tessar	707	127
Goerz Anastigmat	1/4.5	15	cm	27		709	128
Kapella Limited	1/4.5	100	mm	23		714	129
Skopar, Voigtlaender	1/4.5	13.5	cm	20	Cemented surface located in the first lens	752	130
Voigtlaender	1/4.5	10	cm	15	Cemented surface located in the first lens	760	131
V 1927 No. 11	1/4.5	14	cm	29	Experimental objective	772	132
Tessar	1/4.5	15	cm	29		484	133
Tessar	1/4.7	158.3	mm	28		421	134
Tessar	1/4.5	156	mm	29		90	135,136
Aldis Anastigmat	1/4.5	5.75	cm	27		349	137
Jos. Schneider	1/4.5	100	mm	28		993	138
V 1931 No. 24	1/4.5	13.5	cm	22	Experimental objective	910	139
Tessar	1/4.75	157.6	mm	28	With small spherical zones	470	140
Ussar	1/4.7	145	mm	28		458	141

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
I-R-Tessar	1/4.8	50	cm	15	Corrected for A'	1142	142
I-R-Tessar	1/4.8	50	cm	15	Corrected for A'	1141	143
Tronnier	1/4.8	100	mm	17.5		1033	144
Tessar	1/4.8	160	mm	24		452	145
A-Tessar	1/5	50	cm	20		841	146
Astro-Tessar	1/5	600	mm	10		68	147
Tessar	1/5	50	cm	20		850	148
Tessar	1/4.7	145	mm	28	Zeitschrift fuer Instrumentenkunde, 1907 p. 78, (Journal of the Instrument Trade)	92	149
Tessar	1/5	50	cm	20		447	150
I-R-Tessar	1/5	50	cm	20	Corrected for A'	1144	151
Astro-Tessar	1/5	600	mm	10		318	152
Tessar	1/5	50	cm	20		441	153
Tessar	1/5	180	mm	20	Last thickness not quite sufficient	453	154
V 1938 No. 4	1/5	14	cm	20	For reduction scale 1/4.5 - a-curve for d, C, & g'	1205	155
V 1933 No. 8	1/5	100	cm	15	Calculated for A'	1008	156
Tessar	1/5	80	cm	15		1017	157
Tessar	1/5	50	cm	22		417	158
A-Tessar	1/5	50	cm	20		883	159
Tessar	1/5	545	mm	20		426	160
Tessar	1/5	50	cm	25		462	161
Tessar	1/5	38	cm	20		476	162
A-Tessar	1/5	50	cm	20		1015	163
Tessar	1/5	50	cm	20		434	164
Tessar	1/5	50	cm	20		433	165
Tessar	1/5	554	mm	20		435	166
Tessar	1/5.1	512.7	mm	27	Based on 1/4.5, f = 50 cm of 11/18/11	448	167
Tessar	1/4.5	25	cm	23		416	168
Jos. Schneider	1/5.4	100	mm	25		994	169
Koehler Optical Co., New York	1/5.9	149.7	mm	17		350	170,171
Tessar	1/5.5	176	mm	29	The British Journal of Photography, Jan 7, 1921, p. 8	419	172
Tessar	1/5.6	135	mm	29	German Patent No. 142294, basic patent for the Tessar Objective	373	173
Tessar	1/6.4	102.7	mm			154	174
Zeiss, Bausch and Lomb, Tessar	1/5.8	15	cm	28		208	175
Tessar	1/6.1	147	mm	31		74	176,177
B-Tessar (Amatar)	1/6.3	150	mm	23		71	178
Tessar	1/6.3	25	cm	30		258	179
Tessar	1/6.3	136	mm	30		111	180
R. Steinheil				28		131	181
Tessar	1/6.3	155	mm	30	Front lens made of Barium-Flint	94	182
Tessar	1/6.3	155	mm	29	Front and back lenses made of Barium-Flint	96	183,184
Tessar	1/6.3	161.3	mm	29	Front and back lenses made of Barium-Flint	95	185
Tessar	1/6.3	155	mm	29	Front and back lenses made of Barium-Flint	96a	186
Tessar	1/6.3	126.6	mm	28		61	187
V 1931 No. 12	1/6.3	12	cm	15	Experimental objective	912	188
Tessar	1/6.3	150	mm	30		191	189
Amatar	1/6.3	150	mm	30		192	190
Tessar	1/6.3	148	mm	29	Experiment. Construction drawing of 5/8/08	149	191
Tessar	1/6.3	15	cm	29	Coma curves. Partially calculated for the G'-line	207	192
C. F. Lan-Davis (Dallmeyer)	1/6.3	56.5	mm	15		334	193
Tessar	1/6.3	25	cm	25	Partially calculated for the G'-line	212	194

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Tessar	1/6.3	15	cm	29	First and fourth lenses constructed of Barium-Flint	405	195
Tessar	1/6.3	21	cm	25		465	196
B-Tessar	1/6.3	182	mm	26		176	197
B-Tessar	1/6.3	150	mm	23	Zeiss-Kodak Anastigmat, made by Bausch & Lom	177	198
B-Tessar	1/6.3	150	mm	29		179	199
Tessar	1/6.3	165.8	mm	29	Front and back lenses of Barium-Flint	144	200
Tessar	1/6.3	164.4	mm	25	Front and back lenses of Barium-Flint	145	201
Tessar	1/6.3	145	mm	30	Front and back lenses of Barium-Crown	24	202,203
Amatar	1/6.3	153	mm	29		178	204
B-Tessar	1/6.3	150	mm	30		180	205
Tessar	1/6.37	153	mm	30		190	206
C. F. Lan-Davis (Dallmeyer)	1/6.8	61.1	mm	25	First example calculated 10/11/13	333	207
Olor	1/6.8	200	mm	25	Made by Lacour-Berthiot, Paris. Cemented surface concave to stop	323	208
Olor	1/6.8	200	mm	25	Cemented surface concave to stop	351	209,210
Tessar	1/6.8	127	mm	29		463	211
Voigtlaender	1/6.8	100	mm	29		381	212
Steoplag Mess Tessar	1/6.8	21	cm	30	With compensation plate. For Stereoplanigraph	974	213
Tessar	1/7.2	175	mm	29	For 3 F.P. Kodak 9x14 cm	203	214
Tessar	1/7.2	173.4	mm	25	Experimental Calculation	146	215
Tessar	1/7.9	125.7	mm	80	Attempt to develop the Tessar Objective as a Wide-Angle Objective	153	216
Steoplag Mess Tessar	1/8	21	cm	28		875	217
Tessar	1/8	2.8	cm	80	Wide-Angle Objective	980	218
Tessar	1/9.1	150.8	mm	40	Trial calculation	152	219
Tessar	1/9	32	cm	20		284	220
Tessar	1/9.15	146.5	mm	40	Wide-Angle Objective	155	221
Tessar	1/9	140.2	mm	40	Trial calculation	147	222
Tessar	1/9	139.9	mm	40	Trial calculation	148	223
Tessar	1/9	142.2	mm	40	Trial calculation	150	224
Tessar	1/9.1	146.1	mm	40		156	225
Tessar	1/9	231.7	mm	40	Original type	143	226
Tessar	1/9	142.5	mm	40	Trial calculation. Wide-Angle Objective	151	227
Tessar	1/9	50	cm	25		418	228
Reproduction Tessar	1/10	640	mm	17	Apochromatic objective	38	229
Reproduction Tessar	1/10	640	mm	17	Apochromatic objective. Spherical calculation also made for the G'-line	76	230,231
Kapella,Ltd.	1/10	0.932	cm	20	Data given in this patent specification indicate only f = 0.932	716	232
Apo-Tessar	1/10	64	cm	21		783	233
Tessar	1/16	21.	cm	17	For scale 1/3	1237	234
V 1935 No. 5	1/20	8.8	cm	17	Experimental objective, for scale 1/3.59	1155	235
V 1937 No. 20	1/20	14	cm	17	Experimental objective for scale 1/1.8	1218	236

COOKE-TYPE LENSES

Cooke Lenses are objectives which consist of three single lens components. The two exterior components are converging lenses and the interior component, separated from each exterior one by an air space, is a dispersing lens.

These triple lenses were developed by Harold Dennis-Taylor at the beginning of the 1890's. Correction of error is possible to such an extent that the modern forms of this type of objective are among the best anastigmats in certain optical fields.

The construction of these objectives, is remarkably simple, and they can be produced easily at slight cost.

Such triple lenses, or triplets, have been developed for utilization in several fields of photography. They may be used for universal objectives, motion picture photography and projection, for objectives of high light intensity, as lenses for portrait photography having a long focal length, as objectives for aerial photography and astrophotography, and occasionally as reproduction objectives.

This type of objective is not suitable for wide-angle photography, as may be seen from the compilation which follows. Even at a small aperture, the usable angle of image cannot be greatly increased above the standard angle of image of universal objectives.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1933 No. 10	1/1.8	5	cm	20	Experimental lens. Fifth surface aspherical	1012	237
V 1933 No. 9	1/1.8	5	cm	19	Experimental lens. Fifth surface aspherical	1011	238
V 1932 No. 5	1/2	5	cm	19	Experimental lens. Fifth surface aspherical	937	239
V 1933 No. 12	1/2.5	1	cm	16	Experimental lens. Fifth surface aspherical. Thickness of the lenses made especially to afford manufacture in short focal lengths	1018	240
V 1938 No. 12	1/2.5	2.5	cm	17		1234	241
V 1937 No. 21	1/2.5	5	cm	20	Calculated for G' d, c	1187	242
Kapella	1/2.5	1	cm	10		1126	243
Kapella	1/2.5	10	cm	10		1228	244
Bausch & Lomb	1/2.5	2.5	cm	18		1046	245
Finder Triplet	1/2.6	8	cm	17		1073	246
V 1921 No. 3 Triplet	1/2.6	6.5	cm	25	Calculated for nF	555	247
I. G. Farben	1/2.7	10	cm	10	The first lens has a cemented surface, which is without effect in the d-line	1045	248
Triotar	1/3	2.7	cm	20	For substandard film. Because of coma, usable only up to a total angle of 14°	633	249
Triplet	1/2.7	7.5	cm	20		632	250
Finder Triplet	1/2.8	7.5	cm	15	Rolleiflex finder. Spherically over-corrected	1211	251
Finder Triplet	1/2.8	7.5	cm		Rolleiflex finder. Spherically over-corrected	1216	252
Finder Triplet	1/2.8	7.5	cm	14		1172	253
V 1933 No. 11	1/2.8	7.5	cm	10	Finder Objective	1016	254
Finder Triplet	1/2.8	8	cm	15		997	255
V 1931 No. 11 Finder Triplet	1/2.8	6	cm	10		942	256
Finder Triplet	1/2.8	6	cm	10		846	257
Taylor, Taylor and Hobson	1/3	100	mm	12	Refer to The British Journal of Photography, 24 Feb 1921, pp. 66, 67	556	258
Taylor, Taylor and Hobson	1/3	100	mm	15	Refer to The British Journal of Photography, 24 Feb 1921, pp. 66, 67	557	259
Modified Hypar	1/3	35	mm	20		634	260
Triplet	1/3	7.5	cm	20		615	261
Finder Triplet	1/3.1	5	cm	10		1078	262

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Busch-Glaukar	1/3.1	130	mm	17	Calculated for the g' and D-line	296	263
Steinheil	1/3.2	55	mm	15		586	264
Ernoskop	1/3.2	33.5	cm	20		742	265
Triplet	1/3.2	178	mm	20		629	266
Epi-Objective	1/3.3	25	cm	20	For episcopic projection	1074	267
Micro-Projection Objective	1/3.3	5	cm	20		872	268
Motion Picture Hypar	1/3	3.5	cm	20	C. P. Goerz, Berlin	601	269
I-Finder Triplet	1/3.5	7.5	cm	15		1090	270
Askania, of Bamberg-Friedenau	1/3.5	100	mm	15	Spherically, chromatically and astigmatically corrected objective	647	271
Steinheil	1/3.5	10	cm	17	Example No. 1. See card No. 1024	1022	272
V 1923 No. 12	1/3.5	7.8	cm	22		626	273
Finder Objectives V 1923 No. 11	1/3.5	7.5	cm	10		672	274
Ernemann Co., Dresden	1/3.5	250	mm	17	Three-lens objective (with removable spherical yellow screen)	403	275
V 1932 No. 1	1/3.5	2.5	cm	12		943	276
Triotar	1/3.5	166	mm	15	The last surface aspherical	380	277
Helomar	1/3.5	180	mm	15	Voigtlaender	352	278
Epiotar	1/3.5	43	cm	15	Made of" Gussglas" (poured glass.) For episcopic projection	1115	279
Triplet	1/3.5	10	cm	12	Steinheil Example No. 1	1021	280
Triotar	1/3.5	21	cm	20		652	281
Projection Objective	1/3.6	32	cm	10	Made of plate glass for reasons of economy. Chromatic correction consequently impossible. See also No. 650	651	282
Projection Anastigmat	1/3.5	387	mm	20	Calculated for g and D	348	283
Finder Triplet, V 1923, No. 13	1/3.5	7.5	cm	10		614	284
H. D. Taylor				10	Double objective calculated for G'	138	285
Triplet	1/3.5	10	cm	25		1032	286
Balloptikon	1/3.5	333.6	mm	10	Made by Bausch & Lomb. Projection objective, calculated for C. D. F. G'	705	287
Epiotar	1/3.5	26	cm	20	Episcopic projection	795	288
Projection Triplet	1/3.6	15	cm	18	Converging lenses made of plate glass	664	289
Projection Triplet	1/3.6	15	cm	20	Converging lenses made of plate glass	663	290
Projection Triplet	1/3.6	15	cm	10	Converging lenses made of plate glass	662	291
Orikar	1/3.6	36	cm	20		740	292
Triplet	1/3.6	7.5	cm	10	All three lenses made of plate glass; chromatic correction therefore not possible	653	293
Projection Objective	1/3.6	32	cm	10	All three lenses made of plate glass; chromatic correction therefore not possible	650	294
Epikar	1/3.7	37	cm	17.5	Episcopic projection	749	295
Epikar	1/3.7	37	cm	22	Episcopic projection	750	296
C & H. C. Beck	1/3.8	107.27	mm	18	U.S. patent specification data proved to be 10.72 inches instead of 10 inches	294	297
Finder Triplet	1/4	7.5	cm	15		1213	298
V 1931 No. 32	1/4	8.5	cm	12		932	299
V 1931 No. 36	1/4	13	cm	10		933	300
Huet & Co.	1/4	68.9	mm	5		914	301
Zeiss Ikon Epidiascope Objective	1/4	29	cm	10	For episcopic and diascopic projection	584	302
Feuillet	1/4	28.3	cm	15		1037	303

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Triplet	1/4	7.5	cm	5		889	304
Triplet	1/4	7.5	cm	5		890	305
Taylor, Taylor and Hobson	1/4	158	mm	20		307	306
Dimax	1/4	40	cm	15	Made by Leitz, Wetzlar. Projection objective	739	307
V 1931 No. 27	1/4	7	cm	10		940	308
Triotar	1/4	15	cm	20		518	309
Projection Triplet	1/4	38	cm	20	Front and back lenses made of plate glass	744	310
Triplet	1/4	8	cm	12		928	311
A. Taylor and H. D. Taylor	1/4.4	100	mm	10		688	312
Trioplan	1/4.5	10.5	cm	15		793	313
Radionar	1/4.5	7.5	cm	20		1025	314
V 1931 No. 1	1/4.5	2.7	cm	15	Glass plate of 7 mm thickness between objective and image, used as a trichinoscope for meat inspection	907	315
Quartz Anastigmat	1/4.5	12	cm	18	For exposures with ultraviolet light; not achromatized	896	316
Triplet	1/4.5	15	cm	10	For projections	501	317
Jos. Schneider	1/4.5	100	mm	25		1071	318
V 1914 II Triotar	1/4.5	16.5	cm	20		347	319
V 1936 No. 8	1/4.5	8.5	cm	20	Calculated for λ = 546 and λ = 313. An objective of high transparency, also in the ultraviolet region of the spectrum	1119	320
C. P. Goerz	1/4.5	100	mm	15		576	321
Anastigmat	1/4.5	100	mm	20	Very useful universal objective. Diagonal of the image = focal length	861	322
V 1931 No. 20	1/4.5	3	cm	10	Objective for motion picture photography and projection	906	323
O. A. S. Pho-Ski 639	1/4.5	5	cm	22		863	324
Tronnier, Bad Kreuznach	1/4.5	100	mm	20	Calculated for d and g'-lines	812	325
Triplet	1/4.5	193	mm	18		816	326
Anastigmat	1/4.5	10	cm	20		861	327
Tenaxiar	1/4.5	10	cm	20	Goerz Objective	851	328
Triplet	1/4.5	5	cm	21		862	329
Quartz-Sodium-Chloride Anastigmat	1/4.5	12	cm	21	Achromatized and of high transparency in the ultraviolet region	804	330
Achromatic Quartz Anastigmat	1/4.5	25	cm	15	Achromatized and of high transparency in the ultraviolet region	803	331
Triotar	1/4.5	15	cm	18	Correction of the lateral rays of the image was not favorable, and this objective was withdrawn from the market after a short period	372	332
V 1929 No. 14	1/4.5	10.5	cm	25	Last lens made of plate glass	831	333
Tenaxiar, Goerz Objective	1/4.5	10	cm	25		826	334
A. Kerber, Leipzig	1/4.5	100	mm	10	Objective made of three separate lenses, data taken from Zeitschrift fuer Instrumenten Kunde Vol. 11, 1916, pp. 269-278 (Journal of the Instrument Trade). This objective was calculated on the basis of Seidel's preliminary computations	415	335

Name	Speed	Focal Length		Half angle		Zeiss No.	Page
Triplet	1/4.8	36	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculated for the d and g' lines. For aerial photography	398	336
Triplet	1/4.8	36	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculated for the d and g' lines. For aerial photography	396	337
Anastigmat	1/4.5	180	mm	25		346	338
Cooke Anastigmat	1/4.5	5½	in.	10	Exact data measured by Zeiss 1/5, f = 146.5 mm made by Taylor, Taylor and Hobson 3/20/13	310	339
Projection Triplet	1/4.5	25	cm	20		316	340
V 1912, X	1/4.5	40	cm	20		285	341
Tronnier	1/4.5	10	cm	25		1110	342
Portrait Anastigmat	1/4.5	24	cm	25	Made by Voigtlaender & Sohn, Braunschweig 11/28/99	270	343
Ultraviolet Objective	1/4.5	120	mm	5	Made of optical glass permitting a high degree of ultraviolet transparency	300	344
Taylor-Cooke	1/4.6	208	mm	12.5	Data have been adapted to those found in the May 1904 edition of "Monthly Notices." For Astrophotography	87	345
Triplet	1/4.8	12	cm	10	Scale of image 1:1 7/16/34	1093	346
I-R-Triplet	1/4.8	50	cm	12		1148	347
Triplet	1/4.8	50	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. This objective was the prototype of all objectives having an aperture ratio of 1/4.8 and f = 50 cm, used in aerial photography during World War II	477	348
Triplet	1/5	70	cm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	321	349
Triplet	1/5	25	cm	20		442	350
Triplet	1/5	70	cm	12.5	The abscissas of the b-curves have been magnified 10 times for distinctness	439	351
Ballon Triplet	1/5	70	cm	12.5	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	394	352
Triplet	1/5	70	cm	11		303	353
Triplet	1/5	70	cm	11	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness. Calculated for d and g-lines	319	354
Ballon Triplet	1/5	70	cm	11	Effect of stop displacement on b-curves	401	355
Triplet	1/5	150	cm	10	Effect of stop displacement on b-curves. Spherically overcorrected to eliminate aberration of the marginal rays by deformation (optical figuring)	461	356
Ballon Triplet	1/5	70	cm	10	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	397	357
Taylor-Cooke	1/5	480	mm	10	For astrophotography. Tangential coma-curves for inclination of the pencil of rays $w = 10^{\circ} 43'$ and aperture ratio 1:6	221	358

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Triplet	1/5	48	cm	10	Spherical correction for $^{n}366$, and d and g - lines	223	359
Cooke Anastigmat	1/5.6	6	in.		Number 28,232 measured and calculated by Zeiss to be 1/6.1, f = 160 mm, made by Taylor, Taylor & Hobson	309	360
Triotar	1/5.6	10.5	cm	11		1112	361
Ballon Triplet	1/5.13	718	mm	12	The abscissas of the b-curves have been magnified 10 times for the sake of distinctness	395	362
F. W. Gehrke	1/5.5	10	cm	25	Thickness of the last lens too small for the indicated aperture ratio of 1/5.5	1061	363
I. G. Farben	1/5.5	106	mm	22		962	364
Triplet	1/6	60	cm	12	For aerial photography	1014	365
E. Busch	1/6	100	mm	5	Correction of spherical aberration poor	848	366
Triplet	1/6	180	cm	10	Spherical correction over-corrected intentionally; it was eliminated by marginal figuring	423	367
Triplet	1/5.6	163.5	mm	30		234	368
Triplet	1/6	120	cm	10		429	369
Triplet	1/6	210	cm	5	Spherical correction intentionally over-corrected; this was eliminated by deformation	428	370
Triplet III	1/6	142.9	mm	30		457	371
Triplet	1/6	180	cm	12		427	372
Triplet	1/6	180	cm	10	Abscissas of b-curves magnified 10 times for distinctness. Spherical correction over-corrected. This was eliminated by marginal figuring	425	373
C. P. Goerz	1/6.25	100	mm	12		577	374
Triplet	1/6.3	13.5	cm	10	Made by Oskar Simon, Dresden. As of 20^{0}, the curves are very poor	786	375
Triplet	1/6.3	13.5	cm	30	The two exterior objectives are made of plate glass	785	376
Ernastigmat	1/6.3	135	mm	30	Cooke Lens	775	377
I. G. Farben	1/6.3	10	cm	30		901	378
Rodenstock	1/6.3	10	cm	10	The two exterior objectives are made of plate glass	963	379
Rodenstock	1/6.3	10	cm	30	The two exterior objectives are made of plate glass	877	380
Achromatic Ultra-violet Anastigmat	1/6.3	386	mm	15	Made of quartz and sodium chloride	773	381
Quartz Anastigmat	1/6.3	386.2	mm	20	Not achromatized	770	382
V 1912 - IX	1/6.3	15	cm	27		283	383
Quartz Anastigmat	1/6.3	100	mm	25		729	384
Achromatic Ultra-violet	1/6.3	12	cm	18	Made of quartz and sodium chloride	796	385
Jos. Schneider, Kreuznach	1/6.3	10	cm	15		708	386
Taylor-Cooke Lens III	1/6.3	151.18	mm	30		185	387
Cooke Lens V	1/6.3	15	cm	25	Quality of image within a circle of a diameter equal to the focal length is nearly equivalent to the quality of image achieved with the corresponding Tessar. Although the objective has one lens less than the Tessar, the average mass production proved to be nearly as costly, since the air space between the first and second lenses had to be exact to a tolerance of 1/100 of a mm	232	388

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Triplet	1/6.3	10.5	cm	20	The two external lenses are made of plate glass	825	389
Triplet	1/6.3	120	cm	12	Abscissas of the b-curves have been magnified 10 times for the sake of distinctness	424	390
Same as Cooke Lens VIII	1/6.3	15	cm	22	Calculated for the d and g' lines	228	391
Cooke Lens VII	1/6.3	15	cm	22		233	392
Triplet	1/6.3	120	cm	22	Objective for aerial photography. The abscissas for the b-curves have been magnified 10 times for the sake of distinctness. Spherical calculation for C, d, F, g'	475	393
Taylor-Cooke I	1/6.3	150.38	mm	25		183	394
Taylor-Cooke II	1/6.3	152	mm	25	Spherical calculation for d and g'	184	395
Primoplane	1/6.5	6	in.	5	Made by Taylor, Taylor and Hobson. Correction for margin and center of image field poor	31[illegible]	396
Triple Anastigmat	1/6.8	100	mm	10	Made by Voigtlaender & Sohn. Calculated for the d and g' lines; correction of center not good; correction of margin poor	345	397
Eastman	1/6.8	10	cm	10		1009	398
V 1912 IV	1/6.8	73	mm	25	Calculated d and g' lines	286	399
Cooke - Luxor Anastigmat	1/6.8	6	in.	10	Made by Taylor, Taylor and Hobson, - their No. 28,867. Acquired from T. T. & H. Construction data measured at Zeiss, Jan 1912	269	400
H. D. Taylor, Example IV, Fig. 5	1/8	100	mm	20		139	401
H. D. Taylor		98.96	mm	25	Aperture ratio not given; spherical correction poor	140	402
H. D. Taylor	1/5.5	101.03	mm	25		142	403
H. D. Taylor				5	Aperture ratio not given. Spherical and astigmatic correction poor	186	404
H. D. Taylor		100	mm	5	Aperture ratio not given. Spherical and astigmatic correction poor.	182	405
H. D. Taylor		187.27	mm	5	Aperture ratio not given. Spherical correction poor. f = 100. Red	137	406
H. D. Taylor		100	mm	5	Aperture ratio not given f = 100. Spherical and astigmatic correction poor	188	407
H. D. Taylor	1/7	100	mm	20	Aperture ratio approximately 1/8	189	408
Same as Cooke Lens IV	1/6.8	15	cm	30		231	409
Cooke Lens IX	1/6.8	15	cm	25		235	410
Cooke Lens VI	1/6.8	15	cm	25		227	411
Taylor, Taylor & Hobson	1/7	143	mm	30	Marked 1/6.5, 5½ in.	308	412
Taylor, Taylor & Hobson Cooke Primoplane Lens	1/6.5	6	in.	35	r_6 and d_3 modified by Zeiss	314	413
Ballon Triplet	1/7	120	cm	6	Scales for angles and aberrations of the b-curves have been presented in a form differing from the standard presentation, as can be seen from the figures given on this card	393	414

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Special Objective for motion picture photography of machine gun-firing practice "C/10"	1/7.5	9	cm	10		950	415
Taylor, Taylor & Hobson	1/7.7	100	mm	30		578	416
C & H. C. Beck	1/6			25		266	417
C & H. C. Beck	1/6			30		265	418
Plateglass Triplet	1/7.7	10	cm	25	The two exterior objectives made of plate glass	913	419
American patent 1,514,356	1/7.7	100	mm	30	See also Card No. 575	717	420
Kodar	1/7.9	131	mm	20	The data given were calculated at Zeiss on 9/30/26	747	421
Eastman	1/8	100	mm	20		830	422
Improved Cooke Lens IX	1/7	100	mm	25	See also Card No. 235	304	423
Improved Cooke Lens IX	1/7	100	mm	25	See also Card No. 304	313	424
Modified Taylor Lens	1/7	100	mm	25		292	425
C & H. C. Beck	1/7	106.8	mm	10	Patent specification slightly incorrect	293	426
Triplet	1/8	25	cm	10		529	427
Triplet	1/8.3	200	mm	20		520	428
Triplet	1/8.3	200	mm	18		519	429
Triplet	1/8.4	202	mm	18		532	430
Igetar	1/8.8	9.5	cm	30	Data taken from drawing, submitted by IGF 3/19/28	844	431
Objective for Astro-photography	1/10	360	cm	40	Calculated for Colors n F, n436	211	432
Triplet	1/12.5	60	cm	15		420	433
Triplet	1/15	70	cm	10		1105	434
I. R. Triplet	1/15	70	cm	10	Calculated for the region 546 to 842 $\mu\mu$	1181	435
V 1937 No. 12	1/16	21	cm	11	Scale of image 1/3	1178	436
V 1937 No. 11, Triplet	1/16	36	cm	7	Scale of image 1/3	1219	437
H. D. Taylor, Reproduction Objective	1/16	100	mm	10		53	438
Triplet	1/90	162.5	cm	6		916	439

HEKTOR-TYPE LENSES

The wide utilization of Cooke lenses has been shown in the foregoing compilation. In the course of further development, the individual components of Cooke lenses were no longer constructed of single units, but were composed of two and sometimes three individual lenses.

Of all the objectives of this general sort, the Tessar type is most closely related to the Taylor Triplet, since in the Tessar only one of the two exterior units is composed of two lenses which are held together by a cemented surface. This produces a considerable increase in optical efficiency in the Tessar, as compared with the Cooke lens.

However, considering all pertinent factors, even the more complicated objectives developed from the Cooke Triplet do not surpass the optical qualities of the Tessar.

The following compilation lists a number of objectives, based on the Cooke lens and composed of five or more individual lenses, without any reference to quality or degree of optical efficiency as related to the number of lens components.

Biotar is a designation used by Zeiss for various types of objectives.

A combination of a Petzval objective and a Smyth lens, the latter serving solely for the purpose of reducing field curvature, was developed first.

These Biotars were in reality nothing more than a Petzval system with a dispersing supplementary lens. They were not much in demand, since the back focus was very short, and the objective, consequently, rather difficult to install in most of the camera types.

A second group of Biotars, designated by Zeiss as Biotar III, and listed here under numbers 670, 671, 667, 668, 679, 669, and 672, can be considered as based on the Cooke lens, as may be seen by the drawings of meridional sections of the lenses shown on the cards. This second group has never been sold to the trade and was never listed in Zeiss's catalogues.

A third group of Biotars showed best optical efficiency where a brilliant image was desired. Since these objectives had particularly high resolving power, this particular group of Biotars has also been produced by other manufacturers under different names and with slight modifications, so far as possible without infringing Zeiss's patent.

The Zeiss Biotars produced during the last twenty years were all based on this last-mentioned group. They achieved an aperture ratio of 1/1.4 and higher.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Biotar III	1/1.8	8.5	cm	20		670	440
Biotar III	1/1.8	8.5	cm	15		671	441
Biotar III	1/1.8	8.5	cm	15		667	442
Biotar III	1/1.8	8.5	cm	18		668	443
Biotar	1/1.8	12	cm	20		679	444
Biotar	1/1.8	54	mm	15	In contrast to the Biotars mentioned above, this objective is composed of only five lenses	669	445
Biotar III	1/1.8	8.5	cm	20	In contrast to the other Biotar III objectives mentioned above, the dispersing lens of this objective is composed of two individual lenses. Displacement of the stop from the second to the third air space has only slight effect on the b and c curves	672	446
E. Leitz	1/2	10	cm	10		1001	447
E. Leitz, Wetzlar	1/2	10	cm	18		987	448
E. Leitz	1/2	100	mm	14		1038	449
Biotessar	1/2.2	1.5	cm	18	This objective was used for microphotography	756	450
V 1925 No. 7	1/2.2	5	cm	15		703	451
V 1925 No. 8	1/2.2	10	cm	16		702	452
Biotessar	1/2.25	15	mm	18		758	453
E. Leitz, Wetzlar	1/2.5	100	mm	19		886	454
E. Leitz, Wetzlar	1/2.5	100	mm	22		923	455
Anastigmat	1/2.5	100.9	mm	20	This objective, made by Leitz and designated "Hektor," was used with f = 5 cm as the objective for the Leica 24 x 36 mm	865	456
C. P. Goerz, 0.14740	1/2.7	10	cm	25	See also Card No. 718. This objective was put on the market shortly before the Goerz Co. stopped the production of objectives. It was called the "Lucinar." Compared with the Tessar 1/2.8, composed of 4 lenses only, which was produced in the 1930's, it had a more marked astigmatic and chromatic zone, whereas aperture ratio and focal length were the same	692	457

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
V 1925 No. 1	1/2.7	18	cm	20		681	458
V 1925 No. 2	1/2.7	16.5	cm	20		794	459
V 1925 No. 2	1/2.7	16.5	cm	20	The two V (test) objectives mentioned above represent investigations within the Biotessar development. Note that Cards Nos. 794 and 683 show two different methods of presentation of the same objective.	683	460
C. P. Goerz	1/2.7	100	mm	25	A duplicate of Card No. 692 with more explicit data	718	461
Biotessar	1/2.8	16.5	cm	20		801	462
Biotessar	1/2.8	17	cm	20		800	463
Biotessar	1/2.8	5	cm	20		1221	464
V 1928 No. 15	1/2.8	5	cm	20		1242	465
Biotessar	1/2.8	12.4	cm	18		1256	466
V 1925 No. 4	1/2.9	14	cm	20		736	467
V 1925 No. 4	1/2.9	10	cm	20		693	468
V 1925 No. 4	1/3	17	cm	20		689	469
V 1925 No. 4	1/3	17	cm	20	Test objective with extended stop clearance	691	470
Biotessar	1/2.7	4	cm		Spherical calculation for d and g'	834	471
V 1925 No. 3	1/3	17	cm	20		690	472
V 1922 No. 2	1/3.5	75	mm	20		595	473
V 1934 No. 17	1/3.64	10	cm	11		1069	474
V 1934 No. 17	1/3.5	10.4	cm	11	This card shows a repeated calculation of the objective as per Card 1069	1070	475
V 1921 No. 16	1/4	15	cm	25		575	476
5-Lens Dialyt	1/4	139.5	mm	25		580	477
5-Lens Dialyt	1/4	137.6	mm	25		572	478
V 1921 No. 15	1/4	15	cm	25		574	479
5-Lens Dialyt	1/4	138.06	mm	25		571	480

BIOTAR-TYPE LENSES

The real Biotar may be considered as derived from the Gauss double objective. Like all Gauss objectives, the Biotars have a particularly good sphero-chromatic correction.

The Biotar is composed of four lens units, of which the two exterior consist of converging lenses and the two interior negative meniscuses. For further details, refer to "Das Zeiss-Biotar 1/1.4, ein Neues Objektiv fuer Kinoaufnahmen," -- ("The Zeiss-Biotar 1/1.4, A New Objective for Motion Picture Photography") in Die Kinotechnik, 10th edition, 1928, Book 17,pp. 452-453. This article is also filed in the microfilm library of the Central Air Documents Office, Intelligence Department, Wright-Patterson Air Force Base, Dayton, Ohio, under the number R 3512 F 262. Refer to Handbook of Scientific and Applied Photography, Supplement, Vol. 1, p. 60. Vienna, Springer - Verlag 1943.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1931 No. 9	1/2.3	1.5	cm	12	For microphotography	904	481
Biotar	1/1.5	2.5	cm	16	For motion picture photography on films of substandard width	821	482
V 1927 No. 4	1/1.4	5	cm	14	For motion picture photography on standard films	762	483
Biotar	1/1.4	20	cm	16	For aerial reconnaissance photography at unfavorable illumination	1235	484
Kapella	1/1.4	1	cm	15	The back converging component comprises two individual lenses	1130	485

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Kapella	1/1.5	10.	cm	8	The convex side of the second dispersing meniscus faces the stop	956	486
Biotar	1/1.4	5	cm	18	For motion picture photography	948	487
Biotar	1/1.4	5	cm	20	For "Kontax 24 x 36"	960	488
V 1927 No. 6	1/1.4	5	cm	17		765	489
V 1929 No. 1	1/1.4	4	cm	17		799	490
W. F. Bielicke	1/1.3	10	cm	13	Only the front component of this objective is similar to the Biotar. The back component is considerably modified. Correction very poor	918	491
Jos. Schneider	1/1.2	100	mm	20	The rear component has an additional converging lens. The entire object has a strong barrel-shaped distortion	969	492
V 1931 No. 7	1/1.6	1	cm	10		895	493
Zeiss Ikon	1/1.7	10	cm	15		781	494
V 1928 No. 4	1/1.8	10.5	cm	20		809	495
V 1931 No. 14	1/1.5	2.5	cm	14		903	496
V 1931 No. 22	1/1.5	2.5	cm	14		905	497
V 1938 No. 2	1/1.5	5	cm	29		1200	498
Biotar	1/1.4	20	cm	17	Calculated spherical for c and f	1223	499
V 1937 No. 22	1/1.4	5	cm	20		1196	500
V 1928 No. 3 Biotar	1/1.4	8.5	cm	17		811	501
Biotar	1/1.9	2.5	cm	18		815	502
W. Hasselkus	1/1.9	10	cm	20		959	503
V 1937 No. 27	1/1.9	5	cm	22		1188	504
V 1937 No. 25	1/1.9	5	cm	22		1183	505
V 1937 No. 24	1/1.9	5	cm	20		1182	506
Kapella	1/2	98.97	mm	25	The meniscuses of this objective are composed of three lenses, instead of two as in the Biotar	1252	507
V 1926 No. 7	1/2	10	cm	27		743	508
Xenon	1/2	4.5	cm	23	Made by Jos. Schneider, Kreuznach	882	509
V 1931 No. 5	1/2	4.75	cm	23	See also Card No. 884	881	510
C. W. Fredrick (Eastman)	1/2	100	mm	18		823	511
Kapella	1/2	10	mm	20		1254	512
Biotar	1/2	4.5	cm	20		958	513
Biotar	1/2	5	cm	18	With extended stop space	952	514
Biotar	1/2	4.5	cm	25		961	515
Taylor, Taylor and Hobson, Anastigmat	1/2	100	mm	22		665	516
Leitz	1/2	10	cm	15		1023	517
Kapella	1/2	1.5	cm	10	Similar to the Biotar with an additional lens placed in front	1002	518
Kapella	1/2	10	cm	20		1230	519
Kapella	1/2	10	cm	20		1227	520
Kapella	1/2	1	cm	15		1104	521
Biotar	1/2	1.5	cm	17	See also No. 1002	999	522
Taylor, Taylor and Hobson	1/2	4	cm	22		977	523
Grosset	1/2	100	mm	10		573	524
Kapella	1/2			17		1036	525
Biotar	1/2	10	cm	23		975	526
V 1931 No. 5	1/2	4.7	cm	25		1171	527
					This is a modification of test objective No. 5. See also Card 881	884	528
V 1931 No. 10	1/1.5	2.5	cm	10		919	529
Dr. Paul Rudolph	1/2.7	10	cm	20		981	530

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Biotar	1/2.8	21	cm	25		1049	531
Dr. Paul Rudolph	1/3	100	mm	10		675	532
V 1934 No. 12	1/3.5	21	cm	25		1048	533
Planar	1/4	202	mm	20	This Gauss objective does not fall within the Biotar patent, since both the exterior converging components are meniscuses	539	534
Biotar	1/4	10	cm	20		1120	535
Kapella	1/4.8	10	cm	8		917	536

PLASMATS

Plasmats are double objectives, consisting of two symmetrical or nearly symmetrical components, each composed of a converging meniscus and two lenses separated from the meniscus by an air space. The latter part of the objective is composed of one biconcave and one biconvex lens, held together by a cemented surface.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Ernst Arbeit, Wetzlar	1/6.5	100	mm	30		2	537
V 1918 No. 15	1/7	100	mm	32		515	538
Dr. Paul Rudolph	1/6.3			27	This type of objective has a particularly good spherochromatic correction, to which Dr. P. Rudolph attributes the increased depth of focus of the image. Careful tests, however, did not prove this to be true. There is also no substantiation of Dr. Rudolph's theory to be found in theoretical considerations	454	539
Ross Xpress	1/4	21	cm	33		1075	540
Double Plasmat	1/4	15	cm	27	Made by Hugo Meyer & Co	538	541
Hasselkus	1/4	100	mm	32		806	542
Objective for aerial Photogrammetry	1/4.5	25	cm	32	Test objective 1929. This objective is particularly free of distortion for a field of image exceeding 60° and particularly suitable for photogrammetry	935	543
Orthometar	1/4.5	21	cm	32		1103	544
Orthometar	1/4.5	21	cm	32	The last two objectives mentioned above were made by Zeiss for the special purpose of aerial photogrammetry	1102	545
Meyer-Satz Plasmat	1/4.5	10	cm	32		946	546
V 1935 No. 18	1/4.5	21	cm	32		1095	547
Orthometar	1/4.5	3.5	cm	32		1131	548
Orthometar	1/4.5	21	cm	27		986	549
Orthometar	1/4.5	21	cm	32	The last three objectives mentioned are particularly suitable for aerial photogrammetry	983	550
Finder Objective	1/4.5	7.5	cm	32	This objective has a field of image exceeding 60°	982	551
Rudolph	1/4.5	10	cm	28	This objective is a "Double Plasmat"	876	552
V 1935 No. 15	1/4.5	21	cm	33		1099	553
V 1926 No. 4	1/4.5	21	cm	30		734	554
Objective for aerial photogrammetry	1/4.5	21	cm	32		802	555

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Objective for aerial photogrammetry	1/4.5	21	cm	32		741	556,557
Objective for aerial photogrammetry	1/4.5	21	cm	32		738	558,559
V 1926 No. 4	1/4.5	21	cm	27	For the following four items the front component of the objectives has been calculated also. Numbers 493 & 494 deal with the same objective under different designations, with the numbers given on the right side, and are therefore the same German patent. This is a modification of the objective described on Card No. 2	726	560,561
V 1918 No. 3	1/4.5	15	cm	27			
Satz lens (Double Plasmat) Test Objective 1918 No. 3	1/4.5	15	cm	27		454 454a	562 563
Euryplan	1/6	124.5	mm	25			
E. Arbeit, Wetzlar	1/6.8	240	mm	26		243	564
C 1934 No. 7	1/6.3	21	cm	32		268	565
					Calculated for image scale 1/5	1037	566
Orthometar	1/8	13.5	cm	32	For "Steoplag-C/4," an apparatus for restitution of aerial photographs	845	567
Apochromat Claron	1/9	18	cm	20	Made by Jos. Schneider & Co., Kreuznach	898	568
Rudar Lens	1/9.1	255	mm	27			
V 1929 No. 5	1/9	16.5	cm	30		514	569
C. P. Goerz						807	570
					Aperture ratios: Single lens 1/10 double objective 1/2 approximately. Calculated for single lens and for the double objectives	12	571
Jos. Schneider Double Objective	1/11.3	100	mm	26	The single lens was controlled by Zeiss. The aperture ratio was found to be 1/9. Aperture ratio for the double objective is 1/18	971	572
C. P. Goerz	1/12.5	100	mm	27	Aperture ratio of the double objective 1/6.3	585	573
V 1936 No. 7	1/20	7.5	cm	22	Calculated for image scale 4:5	1163	574
Euryplan Lens	1/11	262	mm	25	Aperture ratio for double objective 1/7	526	575
Bausch & Lomb	1/11	$6\frac{1}{2}$	in.	33		1212	576

ERNOSTARS

For light-transmitting capacity, field of image, and sharpness, the Ernostars range among the best objectives, and with Biotars and Sonnars.

The Ernostar consists of four individual lenses or groups of lenses. Three of these are converging components, but the second one is a dispersing component.

These objectives may be considered as derived from the Cooke lens, a converging lens being placed between the first and second components.

The Ernostars were offered the trade by the Ernemann Company up to 1926, when this company was merged with the Zeiss concern. They were produced with light transmitting capacities ranging from 1/2 to 1/1.4. With slower aperture ratios, as for instance 1/1.8, sharp images were achieved at an angle of 40° without stopping down. Ernostars with an aperture ratio of 1/1.4 and 1/1.5 rendered a sharp image only out to an angle of 35°.

The success of the Ernostars was due to their capacity for correcting errors of wide-aperture pencils of rays in the central part of the image, and to successful astigmatic flattening, as well as to an extensive correction of the coma of the lateral and marginal pencils of rays of the image field.

Name of Objective	Aperture Ratio	Focal Length	Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Ernemann	1/1	10 cm	15		777	577
E. Leitz	1/1.3	10 cm	12		1000	578
Ernemann British patent, example II	1/2	100 mm	10	Chromatic correction not good considering the large aperture ratio	711	579
Ernemann	1/2	10 cm	10	Calculated for d and g'. Chromatic and spherical correction insufficient	778	580
Ernemann	1/2	100 mm	15	Calculated for d and g'. Good spherical correction for an image field of about 30^{0}	710	581
V 1929 No. 4	1/2	2.5 cm	15		1248	582
Ernemann	1/2	100 mm	10	Correction poor	763	583
Ernostar	1/2	100 mm	14	First and second group of lenses composed of two lenses each. Correction good	682	584
Ernemann	1/2	100 mm	12		695	585
Ernemann	1/1.8	100 mm	20		712	586
Ernemann	1/1.6	100 mm	17		704	587
Ernemann	1/2	100 mm	12	This objective was the prototype of Ernostars produced by the Ernemann Co in aperture ratios 1/1.6	728	588
C. P. Goerz	1/1.9	10 cm	15	Calculated for g and g'	776	589
Ernostar	1/2.7	15 cm	22	See Card No. 697	694	590
Ernemann	1/2.8	100 mm	20		697	591
Ernemann	1/2	100 mm	10		598	592
C. C. Minor, Chicago	1/2	65 mm	5	See "The American Cinematographer" Vol. 3. No. 5 Aug 1922 p. 4. This Minor Objective with regard to exterior construction can be considered as an early form of the Ernostar; correction, however, is considerably inferior	591	593
Ernemann	1/2	10 cm	15	In this objective, consisting of only four lenses, the chromatic, longitudinal aberrations are not sufficiently eliminated	624	594
Ernostar	1/1.4	5 cm	20	See also observation made concerning Card No. 104	947	595
Alinar	1/2	4 cm	20	A motion picture projection anastigmat	1161	596
Alinar	1/2	5 and 6 cm	12	A motion picture projection anastigmat	1162	597

SONNARS

The Sonnars may be considered as a further development of the Ernostars, in the sense that the second lens of the Ernostar is cemented to its preceding and its following lens, thus producing an objective which in contrast to the Ernostar consists of only six glass-air surfaces.

With initial aperture ratios of 1/2 as well as of 1/1.5, and with a focal length of 5 cm, images of good sharpness, reaching into the corners, are achieved for a field of 2.4 x 3.6 cm.

The total image field of these Sonnars of high light transmission capacity measures about 45°. In this connection, it should be noted that Sonnars have been produced with smaller aperture ratios, such as 1/2.8 and 1/4, with focal lengths of 18 cm and 13 cm respectively, for a field of 2.4 x 3.6 cm, i.e., for relatively small image fields.

If properly machined and calculated, quality of the image of all these Sonnars, corrected for either a minor or a major field, might be considered as the best product of objectives of equal aperture ratio and image field.

Attention is called to Card No. 940, for which data were obtained from an article taken from The British Journal of Photography, Nov. 12, 1931, dealing with patent specifications for large-aperture lenses.

Name of Objective	Aperture Ratio	Focal Length	Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1930 No. 7	1/1.4	2.5 cm	10	Calculated for d and g'	931	598
V 1930 No. 6	1/1.4	5 cm	10	Calculated for d and g'	754	599
Sonnar	1/1.4	5 cm	20	Branch of rays drawn for field of 24 x 36 mm	1195	600
Zeiss Ikon, Sonnar	1/1.4	2.5 cm	15		965	601
Sonnar	1/1.5	5 cm	22.5		1184	602
Sonnar	1/1.5	1.5 cm	22.5	For 16 mm film	1160	603
Sonnar	1/1.5	5 cm	22.5		1064a	604
Sonnar	1/1.5	5 cm	22.5		1064	605
Sonnar	1/1.5	5 cm	20	This card in original and duplicate	973	606,607
Sonnar	1/1.5	5 cm	22.5		1043	608
Zeiss Ikon	1/1.6	100 mm	12		887	609,610
Alinar	1/1.9	9 cm	10	Projection objective of the Sonnar type	1208	611
Sonnar	1/2	5 cm	22.5		1044	612
Sonnar	1/1.9	8 cm	10	Projection objective of the Sonnar type	1140	613
Sonnar	1/2	5 cm	22.5		944	614
Sonnar	1/2	5 cm	22.5		941	615
Sonnar	1/2	5 cm	20		911	616
Zeiss Ikon, Bertele	1/2	100 mm	12.5		888	617
Sonnar	1/2	5 cm	22.5	Format 24 x 36 mm. The last component of this objective is composed of three lenses	1191	618
Sonnar	1/2	7 cm	15		1179	619
Sonnar	1/2	8 cm	25	The last component consists of two dispersing lenses enclosing one converging	1174	620
Sonnar	1/2	1 cm	15		1168	621
Sonnar	1/2	5 cm	22.5	Calculated for e, d, F, g. See also Card No. 1044	1152	622
Sonnar	1/2	5 cm	22.5		1020	623
Sonnar	1/2	8.5 cm			989a	624
Zeiss Ikon	1/2	10 cm	20		972	625
Sonnar	1/2	5 cm	22.5		953	626
Sonnar	1/2	5 cm	22.5		953	627
Sonnar	1/2	5 cm	22.5	The last three cards represent three different modes of calculation	953	628
Sonnar	1/2.5	3.5 cm	25	Similar to the Biogon. 1/2.8, f 3.5 cm	1060	629
Sonnar	1/2.5	5 cm	20		988	630
Sonnar	1/2.8	3.5 cm	30	Similar to the Biogon	1107	631
Finder objective	1/2.8	8 cm	10		1013	632
Zeiss Ikon, Sonnar	1/2.8	7.6 cm	10		1042	633
Tele Sonnar	1/2.8	18 cm	10	Distance between front vertex and focal point = 95% of focal length	1108	634
Sonnar, Zeiss Ikon	1/2.8	5 cm	10	Principally a finder objective	900	635
Sonnar	1/2.8	5 cm	10		939	636
Sonnar	1/4	7.5 cm	5		891	637

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Sonnar	1/4	30	cm	5	Within its small image field this objective has an extraordinarily good sharpness	1246	638
Sonnar	1/4	13.5	cm	10	Calculated spherically for A', C, d, F, g	1185	639
Sonnar	1/4	7.5	cm	10		1199	640
Sonnar	1/4	30	cm	5	Spherically calculated C, d, F, g	1197	641
Sonnar	1/4	18	cm	10	Spherically calculated C, d, F, g	1186	642
Sonnar	1/4	13.5	cm	10	Spherically calculated for d, g'	1116	643
Sonnar	1/4	7.5	cm	10		1091	644
Sonnar	1/4	13.5	cm	10		1047	645
Sonnar	1/4	13.5	cm	10		950	646

TELEOBJECTIVES

Teleobjectives may be used where, in spite of a great focal length, a convenient camera size is desired.

Teleobjectives are composed of a frontal converging unit of lenses and a rear unit of dispersing lenses, both of which are arranged with a considerable air distance between them, so that the rear principal point is in most cases situated in front of the objective. The focal length is consequently longer than the camera extension for distant objects.

The fact that the camera extension thus becomes considerably shorter than the focal length constitutes a disadvantageous effect on the aperture ratio, on the diameter of the image field, and sometimes also on the quality of the image, and similar factors. These disadvantageous effects increase with the degree of shortening of the camera extension.

The largest aperture ratios of Teleobjectives are at the present time about 1/3 to 1/4; as a rule, however, the aperture ratios are smaller. In cases of particularly high degrees of shortening of camera extension, aperture ratios of 1/50 and even smaller occur frequently.

Teleobjectives are principally used for long-distance photography, since objects located at a far distance can be photographed relatively well with the long focal lengths of these objectives. The types of lesser light-transmitting capacity, on the other hand, are better suited for hunting, sport, and similar photography.

The range of application of Teleobjectives has been widened in recent years by the production of Teleobjectives having a good image quality, free of pin-cushion distortion, which had previously been encountered in many Teleobjectives.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Teleobjective	1/14	433.9	mm	2	Composed of a Tessar 1/4.7, f = 145 and a Telenegative f = 60	135	647

COMPOSITE TELEOBJECTIVES

This arrangement of lenses, which consists of an anastigmat or other individually corrected objective in conjunction with a Telenegative, is typical for the so-called Composite Teleobjective.

The combination of these two groups of lenses is termed a Composite-Teleobjective.

By varying the air space between the two component parts of the objective, the focal length can be varied as desired.

Another type of Teleobjective, of slightly higher optical capacity, is composed of a positive component and a dispersing unit of lenses separated from the first unit by a considerable air space; the negative and the positive components, however, are arranged at a fixed distance, and balanced in a way which produces the best possible correction of aberrations.

This last mentioned type of objective is termed Teleobjective, in the literal sense of the word.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Lan-Davis	1/6	120	mm	5	Calculated for d and g' Teleobjective	583	648
Composition Teleobjective Tessar	1/3.5	50	cm	5	Negative f = -20mm	136	649
Teleobjective				2	With fixed focal length I form	91	650
Composition Teleobjective	1/12.5	537.2	mm	2	Positive f = 135 mm. Negative f = 60 mm	133	651
Long Distance Objective				2		134	652
Long Distance Objective	1/10	45	cm		Calculated for d and g'	169	653
Long Distance Objective	1/10	295.35	mm	7	With fixed focal length. Calculated for d and g'. Prototype for the Zeiss "Magnar" 1/10	170	654
Long Distance Objective	1/12.3	295	mm	7		171	655
Long Distance Objective	1/12.3	295	mm	7		172	656
Long Distance Objective	1/9.3	427	mm	8	Calculated for d and g'	173	657
Long Distance Objective	1/10	45	cm			174	658
Long Distance Objective	1/10	45	cm			175	659
Minimum Teleobjective	1/10	45	cm			181	660
Teleobjective	1/11	240	mm	20		202	661
Bis-Telar, Busch, Rathenow	1/8	240	mm	50		201	662
Teleobjective	1/9.6	43	cm	7	Calculated for d and g'	217	663
Teleobjective	1/11	50	cm			218	664
Ross Telecentric	1/6.8	100	mm	11		305	665
Ross Telecentric	1/6.8	305	mm	13		341	666,667
V 1913 XVIII	1/6.3	30	cm	14		340	668
Long Distance Objective	1/6.8	100	mm	15		342	669
V 1914 I Long Distance Objective	1/6.8	28	cm	15		343	670
Long Distance Objective	1/6.2	170	mm	14	Calculated for d and g'	344	671
Ross Telecentric	1/6.8	100	mm	12	Modified. Infringed German patent. See Card 305	336	672
L. B. Booth, Cambridge				20		408	673
L. B. Booth, Cambridge						409	674
Teleobjective	1/50	3.25	m	12	For military long-distance photography on the ground	414	675
Long Distance Objective	1/6	60	cm	12		440	676
Long Distance Objective	1/50	3000	mm	2.5	For military use	431	677
Long Distance Objective	1/50	3000	mm	2.5	For military use	438	678
W. Bielicke	1/6.8	300	mm	16		444	679
Long Distance Objective	1/7	120	cm	7		422	680

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Long Distance Objective	1/50	3250	mm	2.5		451	681
Teleobjective	1/6.5	259	mm	10		460	682
V 1917 II Long Distance Objective	1/6	25	cm	14		436	683
Long Distance Objective	1/5.7	250	mm	15	Composed of three lenses and of good light-transmitting capacity 1/5.7 f = 250 mm. Calculated for D and g'	479	684
Long Distance Objective	1/6	250	mm	17	Composed of three lenses, and of good light-transmitting capacity. Calculated for D and g'	480	685
Long Distance Objective	1/6.5	27.5	cm	17	Composed of three lenses and of good light-transmitting capacity. Calculated for D and G'	481	686
Long Distance Objective of high light-transmitting capacity	1/7.2	300	mm	15	Calculated for D and G'	482	687
Long Distance Objective	1/6	25	cm	15	Calculated for D and G'	500	688
Long Distance Objective	1/6.3	25	cm	15	Prototype of the Zeiss "Tele-Tessar"	509	689,690
Long Distance Objective	1/7.9	25	cm	15		512	691
Long Distance Objective	1/6.7	28	cm	15		506	692
Long Distance Objective	1/8	25	cm	15		516	693
Long Distance Objective	1/7	133	mm	15	Taylor, Taylor & Hobson	524	694
Long Distance Objective	1/6	120	mm	15	Taylor, Taylor & Hobson. Of high light-transmitting capacity	536	695,696
Tele-Tessar	1/6.3	40	cm	16	Calculated spherically for d and g'	549	697
Tele-Tessar	1/6.3	25	cm	16	Calculated spherically for d and g'	550	698
Tele-Tessar	1/5.5	25	cm	16		551	699
Tele-Photo-Objective	1/6.8	15	cm	5	L. B. Booth. Example I. Spherical and chromatic correction. Calculated for d and g'	553	700
Tele-Photo-Objective	1/6.8	11.8	cm	10	L. B. Booth. Example II. Spherical aberration calculated for d and g'	554	701
C. P. Goerz	1/6.3	100	mm	7		568	702
Lan-Davis	1/6	120	mm	12		582	703
C. P. Goerz	1/33.3	100	mm	2.5	Calculated for d and g'	567	704
L. B. Booth	1/6	100	mm	10	Calculated for d and g'	581	705
"Zentralzeitung fuer Mechanik und Optik"	1/6				Central Journal for Mechanics and Optics	642	706
V 1931 No. 21	1/4	7.5	cm		Spherical calculation for d and g'	649	707
Taylor, Taylor & Hobson	1/6	12	cm	15		657	708
Teleobjective	1/8	50	cm	7.5		645	709
Kapella	1/6	120	mm	15		685	710
Kapella	1/4.8	100	mm	5		686	711
Ross	1/5.5	280	mm	15		687	712
Teleobjective Jos. Schneider, Kreuznach	1/4.5	10	cm	2		733	713
Jos. Schneider, Kreuznach	1/4.5	100	mm	10		829	714
Jos. Schneider, Kreuznach	1/2.9	10	cm	10	Spherically not corrected	835	715

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Jos. Schneider, Kreuznach	1/4.5			10	Spherically and astigmatically corrected for d and g'	857	716
Tele-Tessar	1/8	50	cm	10		864	717
V 1931 No. 23	1/4	7.5	cm	6	Calculated spherically for c, d, f, g'	902	718
V 1931 No. 21	1/4	7.5	cm	5	The rear principal point of this objective concides approximately with the front vertex. Since Teleobjectives have been defined as having their rear principal point in front of the vertex, this objective constitutes a boundary case	908	719
V 1931 No. 33	1/4	7.5	cm	5	The rear principal point of this objective is also situated in the front component, so that this objective is in effect not a legitimate Teleobjective	926	720
V 1931 No. 30	1/6.3	18	cm	5		924	721
V 1931 No. 34	1/6.3	18	cm	6		938	722
V 1932 No. 2	1/6.3	18	cm	15		949	723
Tele-Tessar	1/10	25	cm	5	This objective was used for machine gun camera	968	724
C. W. Frederick, (Eastman)	1/4.5	10	cm	7		1003	725
Tele-Tessar "K"	1/8	30	cm	3	This objective is really not a normal Tele-Tessar, which would have an image field of 30^{o}, whereas this objective has an image field of scarcely 5^{o}	1028	726
I. R. Teleobjective	1/25	3000	mm	25	Scale of the coordinate axes are taken 10 fold. The image field amounts to about 6^{o}	1146	727
V 1937 No. 3	1/5.6	7.5	cm	15	b-curves calculated for two different stop positions	1151	728
V 1937 No. 18	1/6.3	7.5	cm	15		1177	729
V 1937 No. 10	1/3.5	24	cm	5	For this objective, compare remark pertaining to Card No. 908	1210	730
V 1938 No. 22	1/4.5	13.5	cm	6		1247	731
Kapella	1/5	10	cm	5		1255	732
Magnar	1/10	45	cm	7		745	733
Kino-Tele-Tessar	1/4	15	cm	2.5	Motion picture T. T. In contrast to the normal Tele-Tessar, this objective has an image field of only 4^{o}	842	734

WIDE-ANGLE OBJECTIVES

The objectives designated Wide-Angle Objectives comprise a group having an image-field diameter considerably exceeding the focal length in the focal plane.

As early as the middle of the 19th century, research was being conducted to develop types of objectives meeting these requirements.

Attention is called to the Protar 1:8, constructed by Dr. Paul Rudolph, as well as to The Panoramic Lens of Th. Sutton, who developed a lens of confocal spheric surfaces, thus achieving at the same time a spherically confocal image field.

Recent research in Boston proved the possibility of placing this spheric image field in the plane with good

sharpness and with correct perspective.

The standard wide-angle objectives, which have a plane image field, are limited by the so-called cosine-law (4th power) which causes a decrease of light flux so that it is generally prohibitive to exceed an angle of 90° to any considerable extent with these objectives. It is noteworthy that the Goerz Hypergon has been up to approximately 140°. This, however, was possible only with the help of a specially constructed stop. More recently constructed objectives, based on the findings of R. Hill, permit projection from the object area up to 180° without excessive decrease of light flux. These objectives have a strong barrel-shaped distortion and generally need a rectification.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Wide-Angle Objective	1/5.5	100	mm	50	These two types are said to be developed for objectives allowing an angle of over 200°. Produced by A. E. G. (Allegemeine Elektrizitaets-Gesellschaft, Berlin)	1058	735
Wide-Angle Objective	1/5.5	10	cm	50		1059	736
V 1936 No. 6	1/6	2.5	cm	40	The six possibilities of image reflection resulting from two-fold reflections at the four glass air surfaces of this objective are all located in front of the stop, and therefore can not disturb the image area	1128	737
V 1935 No. 2	1/6.2	10	cm	55		1083	738
V 1935 No. 16	1/6.3	2.5	cm	55		1094	739
Protar	1/6.3	210	mm	50		56	740
Wide-Angle Objective	1/6.3	66	mm	45	Tobogon. Cards No. 1241, 1226, and 1215 describe the same type of objective	1241	741
C. Zeiss	1/6.3	75.9	mm	45		1226	742
C. Zeiss	1/6.3	66	mm	45		1215	743
AEG	1/6.3	1.7	cm	100	Wide-Angle Objective for over 180°	1121	744
V 1937 No. 4	1/6.3	2.5	cm	35		1154	745
V 1937 No. 1	1/6.3	2.5	cm	35		1153	746
V 1935 No. 16B	1/6.3	2.5	cm	50	Perimetar	1098	747
V 1936 No. 18	1/6.8	1.6	cm	90		1143	748
Sphaerogon	1/7	4.1	cm	70		1117	749,750
Sphaerogon	1/8	36.2	mm	95		1114	751,752
Sphaerogon	1/8	36	mm	90		1113	753
Wide-Angle Objective	1/8	3.8	cm	90		1097	754
Goerz Wide-Angle Objective Dagor	1/9	10	cm	50	These objectives rendered good services up to 100°	827	755
Goerz Wide-Angle Objective	1/9	100	mm	40		617	756
M. Andre Levy	1/9	10	cm	55		1222	757
Protar	1/9	150	mm	35		158	758
New Type of Protar	1/9			35		120	759
New Type of Protar	1/9			35		119	760
Anastigmat	1/9	150.18	mm	35	Spherically and anastigmatically calculated for d and g'	99	761
Protar	1/9	150	mm	30		98	762
V 1935 No. 12	1/8	3.8	cm	90		1082	763
Protar	1/12.5	18	cm	50		324	764
Protar	1/12.5	150	mm	50		109	765
New Type Protar	1/14	180	mm	30	This card in original and duplicate	117	766,767
New Type Protar	1/14			35	Calculated, but not constructed	118	768
New Type Protar	1/15			50		105	769
Wide-Angle Lynkeioskop	1/15	100	mm	50		724	770
V 1931 No. 25	1/15	30	cm	30		951	771
R. & I. Beck, (Hill)	1/16			50		1068	772

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Rodenstock Pantogonal	1/18			80		126	773
Protar	1/18	390	mm	40		558	774
V 1932 No. 18	1/7.7	10.5	cm	45	With one aspheric surface	970	775
Protar	1/18	141	mm	50		159	776
Protar	1/18	182	mm	45	With decreased secondary spectrum	123	777
Protar	1/18	141	mm	40		110	778
Rodenstock Pantogonal	1/18			45		106	779
Protar	1/21	63	cm	30	With front stop	430	780
Hypergon	1/22	6	cm	67	Produced by Zeiss	725	781
Pantoscope	1/30	206.7	mm	40	Produced by the Busch Co	936	782

HIGH-SPEED OBJECTIVES

V 1935 No. 20	1/0.65	6.5	cm	10	Sections through the optical axis are not shown on this card. The compiler of these data remembers that this objective had an image field of approximately 15° at an aperture ratio of 1/0.65, with a negative field flattener. This was the objective of highest light-transmitting capacity ever constructed by the Zeiss works	1096	783
R-Biotar, (X-ray Biotar)	1/0.85	7.5	cm	6.5	This objective was constructed by the Janker Co ,Bonn, for X-ray motion picture photography, and proved to be very useful. It is similar to the objective described in German patent 607, 631 of the year 1932, and presents a good example of sensitivity with regard to correction of the objectives location. The card lists spherical longitudinal aberrations for image scales 1:14, 1:20	1156	784
R-Biotar, (X-ray Biotar)	1/0.85	12	cm	5	This drawing is shown on two cards. Image scales of spherical longitudinal aberrations are listed for 1/00, 1/20, 1/12, 1/9.5. See also data for Card 1135	1134	785,786
R-Biotar (X-ray Biotar)	1/0.85	12	cm	6.5	Image scales of spherical longitudinal aberrations are listed for 1/00, 1/20, 1/12, and 1/9.5. See also data on Card 1156	1135	787
V 1931 No. 35	1/0.99	5	cm	6.5	See Card 1156	927	788
Kapella	1/1	1	cm	5	Horace W. Lee	1089	789
Dr. Paul Rudolph	1/1	10	cm	5	This drawing on two cards	897	790,791
Kapella	1/1	1	cm	10	Horace W. Lee	1081	792
A. Jackenbroll	1/1	100	mm	5		1041	793
Pro-Anastigmat	1/1	35	mm	2.5	H. Ernemann, Dresden	325	794
Kapella	1/1.4	10	cm	10		1063	795
Minor	1/1.4	4	cm	15		1005	796
V 1930 No. 8	1/1.4	2.5	cm	15		871	797
Gramatzki	1/1.4	10	cm	10		945	798,799
V 1930 No. 9	1/1.4	2.5	cm	3	A telescope objective	866	800
Kapella	1/1.5	10	cm	5		789	801
Kapella	1/1.5	10	cm	5		788	802
Hugo Meyer, Goerlitz	1/1.5	10	cm	15		1225	803
M. R. Berthon	1/1.5	6.5	cm	5		621	804

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Chas. C. Minor	1/1.7					382	805
Biotar	1/1.8	5	cm	5	Petzval System, with a Smyth lens, and therefore designated a Biotar. Because of the short back focal length and the resulting limited usability, this objective was utilized only for cameras on a relatively small scale	564	806
Wm. Lee & Kapella	1/1.8	10	cm	10		852	807
Rodenstock	1/1.6	10	cm	10		1166	808
Symmetric Objective	1/1.8	100	mm	15	Patent applied for and refused	603	809
Kipro-anastigmat	1/1.9	9.5	cm	10	Ernostar type objective	1167	810
Jos. Schneider	1/1.9	100	mm	13		1243	811
V 1930 No. 5	1/1.9	2.5	cm	10		859	812
Zeiss Ikon	1/1.9	10	cm	10		853	813
Busch	1/2.48	198.44	mm	5	The focal lengths adjustable by adjusting the central component	1077	814
Feuillet	1/2	10.5	cm	5		1066	815
Zeiss Ikon	1/2	10	cm	18		1157	816
C. W. Frederick	1/2	100	mm	5		822	817
Dr. Paul Rudolph	1/2	100	mm	10		646	818
Leitz	1/2.5	100	mm	10		1253	819
Dr. Paul Rudolph	1/2.5	100	mm	5		604	820
H. D. Taylor	1/2	100	mm	25	Symmetric objective	339	821

BIOTESSARS, UNARS, HELIARS AND OTHER OBJECTIVES BASED ON THE COOKE LENS

V 1938 No. 16	1/1.5	7	cm	13		1236	822
V 1923 No. 3	1/1.75	8.5	cm	10	Similar to Biotar III	607	823
E. Leitz, Wetzlar	1/1.8	100	mm	20	Similar to Hektor	922	824
V 1937	1/1.9	1.25	cm	8	Similar to Biotar III	1170	825
V 1923 No. 2	1/1.9	7	cm	10	Similar to Biotar III	606	826,827
V 1922 No. 6	1/1.95	7.5	cm	10	Similar to Biotar III	599	828
W. Gehrke, Dresden	1/2	100	mm	10		608	829
V 1923 No. 6	1/2	85	mm	10	See also data on Card No. 608	609	830
Willy F. Bielicke, Berlin	1/2	100	mm	8		674	831
Optical Works, Ruedersdorf	1/2	10	cm	20		780	832
Kapella	1/2.5	25.4	mm	17		766	833
Bielicke	1/2.5	10	cm	20		979	834
Bielicke	1/2.5	10	cm	20		979a	835
V 1931 No. 19	1/2.8	5	cm	8		892	836
Zeiss Ikon	1/2.8	10	cm	20		976	837
Voigtlaender	1/2.8	10	cm	22.5	Heliar	1123	838
V 1938 No. 6	1/2.8	5	cm	21		1224	839
V 1938 No. 23	1/2.8	5	cm	20	See Card No. 1221	1249	840
V 1926 No. 3	1/2.9	14	cm	21	See Card No. 735	701	841
V 1926 No. 3	1/2.9	14	cm	21	Cards No. 701 and 735 describe the same test objective of the Heliar type	735	842
Cemented Dialyt, Form II	1/3			26	Composed of five lenses	680	843
Barton Booth	1/3			20	Heliar	637	844
L. B. Booth	1/3			20	Heliar. Compare with Card No. 637	552	845
V 1931 No. 8	1/3.2	2	cm	10	Biotessar, similar to the Heliar	394	846
Voigtlaender Triple Anastigmat	1/3.3				Basic patent for Dynar, Heliar and Ozyn. The latter was produced as a reproduction objective for a limited period only	4	847,848
Voigtlaender, Heliar	1/3.5	21	cm	21		563	849
Dialyt of 5 lenses	1/3.5	115.89	mm	26		673	850

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
V 1937 No. 26	1/3.5	5	cm	22½		1204	851
H. D. Taylor	1/4			15		141	852
Voigtlaender, Heliar	1/4.5	100	mm	21	Calculated for n = ∞ and n = 1:1	36	853
Voigtlaender, Triple Anastigmat	1/4	100	mm	26	This drawing is identical with Card No. 4 above. The remarks made in connection with that objective also apply to this card, which Zeiss therefore marked as No. 4	4	854
H. Harting	1/4			23		82	855
Rodenstock Eurygonal	1/4.3			22.5	Data taken from Phot. Kunst, 1906/07 p.377.	121	856
Unar	1/4.5	145	mm	22	Two curves of meridional coma for inclination of pencil of rays calculated for 14.6 and 20.9 and aperture ratio of 1:6.3	17	857
Jos.Schneider	1/2.9	10	cm	23		1147	858
V 1938 No. 17	1/2	6	cm	15		1239	859
V 1938 No. 11	1/2	5	cm	18		1233	860
V 1938 No. 7	1/2	5	cm	18		1214	861
Kapella	1/1.4	10.5	cm	5		1092	862
Ross	1/4.5	100	mm	25	See also Card No. 387. Ross Ltd, London, designated the objectives covered by this patent as "Xpress-Lens." Construction differs from Zeiss's Tessar in so far as the cemented component of the Xpress lens is composed of three lenses, whereas the Tessar has only two lenses in this component	546	863
Ross Xpress	1/4.5	6	in.	26		387	864
Heliar	1/4.5	15	cm	26		699	865
V 1936 No. 4	1/4.5	8.5	cm	10		1118	866
Astro-Unar	1/5	600	mm	6	Curve from original coma, aperture ratio 1/6 and inclination 5.17° are shown	58	867
H. D. Taylor	1/5			20	Aperture 120 mm	137	868
Astro-Unar	1/5.3	639.3	mm	6		50	869
Olor	1/6	500	mm	22.5	Made by Lacour-Berthiot	431	870
H. Harting	1/6			10		83	871
C.& H. C. Beck	1/6.3	100	mm	4		306	872
Unar	1/6.3	147	mm	21	The Beck Air-lens of the Unar was replaced by a converging cemented surface to aliminate disturbing reflections. This development led to the construction of the Tessar	18	873
Unar	1/6.3	145	mm	27	The Beck Air-lens of the Unar was replaced by a converging cemented surface to eliminate disturbing reflections. This development led to the construction of the Tessar	16	874

DOUBLE OBJECTIVES WITH COMPONENTS OF VARIOUS CONSTRUCTIONS

Rodenstock		240.87	mm	6		88	875
Dr. R. Steinheil				12	Single objective f = 527.1 Double objective f = 240.9	5	876
Dr. Paul Rudolph	1/3.2	10	cm	20		782	877
C. C. Minor	1/4	115	mm	10		569	878
Petzval	1/5			15	Cemented dialyt	112	879

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Ernst Leitz, Wetzlar	1/6			23	Single objective f = 378.25 Double objective f = 220.7	86	880
Dr. Paul Rudolph	1/3.8	10	cm	23		998	881
Aldis, 1896 III	1/4			15		195	882
Dr. Paul Rudolph	1/5	100	mm	15		587	883
Rodenstock Heligonal	1/6			15		125	884
Dr. Paul Rudolph	1/6	100	mm	26		589	885
Eastman	1/6	98	mm	20		715	886
Dr. Paul Rudolph	1/6	100	mm	25		824	887
Fred E. Altman, (Eastman)	1/6	10	cm	15		1004	888
Ernemann, Dresden	1/6.26	106.5	mm			399	889
Leitz, Periplan	1/6.3	200	mm	20		34a	890
Leitz, Periplan	1/6.5	200	mm	25		57	891
Leitz, Periplan	1/6.5	200	mm	32		34	892
Protar	1/6.5	199.1	mm	30		35	893
Unar-Doublet	1/6.5	183	mm	32		40	894
Protar	1/6.5	199.74	mm	27		46	895
Dr. Paul Rudolph, Tessar	1/6.8	15	cm	30	Not the standard Tessar type	469	896
Rudar	1/6.8	126	mm	30		471	897
Kapella	1/6.8	123.5	cm			1065	898
Dr. Paul Rudolph	1/7	100	mm	30		592	899
Rodenstock Imagonal	1/7			32		89	900
Rodenstock Imagonal	1/7			27	See also Card No. 89	124	901
Ernemann, Dresden	1/6.8	107.7	mm	30		400	902
E. Ross	1/7	98.02	mm	15		698	903
Eastman	1/7	98.02	mm	15	Figure I. This drawing similar to that on Card No. 698	713	904
Rudar	1/7.2	15	cm	30		495	905
Rudar	1/7.2	14.4	cm	30		496	906
Rudar	1/7.2	15	cm	25		511	907
Rudar	1/7.5	15	cm	30		489	908
Dallmeyer Stigmatic Lens III	1/7.5	15	cm	37		374	909
Leitz Periplan	1/7.8	200.16	mm	32	Second example requested by patent office	9	910
Leitz Periplan	1/7.8	200.3	mm	32		7	911
Bausch & Lomb	1/8	187	mm	22	This card in original and duplicate	289	912,913
Conrad Beck & Courthope Beck	1/8			25		128	914
Leitz Periplan	1/8			27	Data taken from British Journal of Photography, 1899, p. 266	33	915
Bausch & Lomb	1/8	177	mm	27	In original and duplicate	290	916,917
Bausch & Lomb	1/8			27	Modified drawing of Card 290. In original and duplicate	291	918,919
Protar	1/8	205	mm		For n = 1:1	41a	920
Protar	1/8	205	mm	28	Same objective as on the previous line. Data on this card a little more explicit	41	921
Voigtlaender	1/10	500	mm	17	Reproduction objective	570	922
H. D. Taylor	1/16			30		27	923

CONVERTIBLE OBJECTIVES

Apart from perfecting photographic objectives by means of more or less useful additions of optical means, i.e., by increasing the number of lenses without any structural restrictions for front and back components, the optical efficiency has also been increased by combining two systems of lenses, each of which in itself represents a useful photographic objective. Such objectives, composed of two single lenses, have, as a rule, a considerably larger aperture ratio and better correction of distortion than either of the two single lenses.

The more common possibilities of combining two separate systems of lenses are as follows: (1) Opposition of two symmetrical single lenses, equidistant from either side of the stop. These are the so-called symmetrical

Double Objectives. (2) The composition of two geometrically similar single lenses of different focal lengths, the arrangement of the single lenses to the stop corresponding to the similarity-ratio. These objectives are termed semi-symmetric. (3) Combination of two photographic lenses, not geometrically similar, into one double objective.

Symmetric objectives were constructed by Steinheil as early as 1865. No further details will be given at this time, and a description of a number of Convertible Objectives from the Zeiss files will be presented. Wherever necessary for better understanding, additional information will be given. In the previous sections of this compilation, the order of aperture ratios ranging from large to smaller ratios has been more or less followed; but in this section this order is no longer maintained, due to the fact that the aperture ratios of single objectives, double objectives, symmetric objectives and semi symmetric objectives do not permit this subdivision. The sequence of Zeiss's original card numbers has been used.

NOTE: The half angle of coverage is always indicated for the Double Objective only.

Name of Objective	Half Angle of Coverage Degrees	Remarks	Zeiss No.	Page
C. Reichert, Fritz Rollmorgen, Wien	22	The single lenses of this objective are Gauss-type lenses and consist of two Meniscuses, the interior one dispersing, the exterior one converging. The dispersing meniscus is composed of two lenses, cemented to each other and of opposite refraction power	1	924
Steinheil Orthostigmat	15		6	925
C. P. Goerz Double Anastigmat	20		14	926
Orthoprotar	20	Orthoprotars are very suitable as image measuring objectives, because of their excellent correction of distortion. They can be made in a way that the distortion practically amounts to zero for a variety of image scales; i.e., they are stationary orthoscopic	15	927
Goerz	27		54	928,929
Protar, Convertible Objective	35		62	930
C. P. Goerz	30	5-lens Convertible Objective	63	931
C. Reichert, Wien, Example I	15		64	932
C. Reichert, Wien, Example II	20		65	933
C. Reichert, Wien, Example III	20		66	934
E. Leitz	20		67	935
Protar	20	The Protar lenses were components of the protar sets. Maximum aperture ratios of the double objectives ranged from 1/6.3 to 1/7.7 depending on whether the objectives were symmetrical or not. This card in original and duplicate	70	936,937
Protar	30	This card shows Coma curves	70a	938
Dr. R. Steinheil	20		72	939
Spherical Convertible Objective	35	This is a symmetric objective with two aspherical exterior surfaces	73	940
Osker Simon, Dresde	30		75	941
Deformed Convertible Objective	35	See remark for Card No. 73	78	942
Deformed Convertible Objective		See remark for Card No. 73	79	943
Deformed Convertible Objective	30	See remark for Card No. 73	80	944,945
Oscar Heimstaedt, Wien			101	946
C. P. Goerz			102	947
H. D. Taylor	30		108	948
O. Heimstaedt	30		122	949
C. F. Lan-Davis			127	950
C. P. Goerz, double astigmat	17.5		129	951
C. P. Goerz, double astigmat	29		130	952
Ernst Gundlach, Berlin			132	953
C. P. Goerz, Example I	22	This type of lens was the basis for Goerz's Celor, Syntor, and Dogmar. With the Dogmar 1/4.5, this group of objectives achieved its highest optical capacity and with Dogmar 1/3.5 the highest degree of light-transmitting capacity. Dogmars 1/4.5 are made available in three different focal lengths, viz:- that of the double objective and those of the two single lenses	166	954

Name	Half Angle		Zeiss No.	Page
C. P. Goerz, Example II	22		167	955,956
C. P. Goerz, Example III	20		168	957
Dr. Schroder	12		193	958
Berthiot, Paris, Porigraphe Symmetrique	40		196	959
Orthoprotar	37	See remark pertaining to Card No. 15	226	960
Double Amatar	27	The double objective is holo-symmetric	238	961
Double Amatar	28	The double objective is holo-symmetric	239	962
Cristopher Graf	16	Original and duplicate	247	963,964
Goerz-Dogmar	16	Original and duplicate. Original more explicit. See remarks for Card No. 166	298	965 966,967
Goerz-Celor	24	See remarks for Card No. 166	301	968
Goerz-Celor	26	See remarks for Card No. 166	302	969
Double Protar	30		312	970
Convertible Objective	35	Second and next to the last lens of this double objective made of Fluorite	317	971
Graf-Lens, modified by Bausch & Lomb	23		320	972
Eastman	22		322	973,974
Maximar	25		326	975
Maximar	27		327	976
Maximar	24	Modification of previous Card No. 327	328	977
C. P. Goerz	15	Refer to Eder's Handbook, ed. 1913, p.112. For Ultra-violet Photography with the help of silver filters at λ = 313 $m\mu$	368	978
Orthoprotar	30	See remarks given for Card No. 15	370	979
Linear Anastigmat, Rietzschel	25	This card is out of Zeiss's consecutive numbering	353	980
Convertible Objective	17	With aspherical surfaces	384	981,982
Goerz, Dogmar	25	In duplicate. Three focal lengths available for front and back component of this objective	385	983,984
Goerz, Artar	15	A reproduction projective. Construction similar to the Dogmar	388	985
Eastman Kodak Co	23	Construction similar to Dogmar	410	986
Cooke, Aviar	25		422a	987
Cooke, Aviar	25	In connection with Cards No. 422a, 432, 432a, 445, and 445a, see copy of a report taken from The Photographic Dealer July, 1920 p. III, attached to Card No. 445	432	988
Cooke, Aviar	25		432a	989
Cooke, Aviar	25		445	990,991
Cooke, Aviar	25		445a	992
C. P. Goerz	27		455	993
Dr. Paul Rudolph	27		456	994
Convertible Objective I	27		464	995
Convertible Objective II	26		466	996
Convertible Objective III	25		468	997
Convertible Objective V 1919 No. 1	30		487	998
Rudar	35		488	999
Goerz	35		495	1000
Convertible Objective V 1919 No. 5	30		499	1001
Convertible Objective V 1919 No. 6	30		504	1002
Convertible Objective	30		505	1003
Convertible Objective V 1919 No. 8	30		507	1004
Convertible Objective V 1919 No. 9	33		508	1005
Rodenstock	27		513	1006
Convertible Objective	32		521	1007
Convertible Objective	37		522	1008
Convertible Objective V 1919 No.15	30		523	1009
Rodenstock, Double Anastigmat Eustigmat	20		525	1010
Convertible Objective V 1920 No. 1	30		528	1011
Convertible Objective V 1920 No. 3	30		530	1012
Convertible Objective	30	Construction similar to the Double Plasmat	534	1013
Rietzsehel, Dialyt	25	Double objective composed of two Gauss Lenses	537	1014
Meyer, Double Anastigmat	27	Construction similar to the Dagor	539	1015
Kodak Anastigmat	22	Construction similar to the Dagor	541	1016,1017
Kodak Anastigmat	25	Construction similar to the Dagor	542	1018
Convertible Objective V 1920 No. 5	30	Construction similar to the Double Plasmat	543	1019

Name	Half Angle		Zeiss No.	Page
Deformed Convertible Objective	27	The two exterior surfaces of the double objective are aspheric	545	1020
Kodak Anastigmat	25		546	1021
Convertible Objective	28		547	1022
Double Amatar, V 1920 No. 8	30	With compensation plate	548	1023
Kodak Anastigmat	24		549	1024
Protar		This shows lens specifications pertaining to drawing shown on Card No. 542	550	1025
Protar	27		561	1026
Goerz	27	Original form of the Goerz's Dagor	565	1027
Steinheil	23	Construction similar to Dogmar	566	1028
A. A. Smith, Bromley	50		588	1029
Rodenstock	25	Construction similar to Dogmar	594	1030
Gehrke, Dresden	35		600	1031
Convertible Objective V 1923 No. 7	30		610	1032
Rodenstock	26	Construction similar to the Dogmar	613	1033
Christopher Graf	5	Construction similar to the Dogmar	619	1034
V 1922 No. 4	30		622	1035
Taylor, Taylor & Hobson	28	Unsymmetrical Convertible Objective	623	1036
M. Zwillinger	21		658	1037
Taylor, Taylor & Hobson	25		659	1038
Taylor, Taylor & Hobson	15		660	1039
Rodenstock	24.5	Similar to the Dogmar	661	1040
Convertible Objective	36	See also V 1920 No. 4	662	1041
C. W. Frederick and F. E. Ross	25	Construction similar to Dogmar	666	1042
Du Motel	5	Construction similar to Dogmar	696	1043
Ames	5		720	1044
Dagor	37		722	1045
Quartz Anastigmat	20	For Ultra-violet Photography focal length = 100 mm calculated for λ = 340 $\mu\mu$	730	1046
Dagor	27		731	1047
Dogmar	23.5		732	1048
Geodar	30	Derived from the Dagor Objective	737	1049
Kodak, Anastigmat	24	Construction similar to Dogmar Construction data calculated by Zeiss	748	1050
Helostar	25	Construction data calculated by Zeiss	751	1051
Agfa Double Anastigmat	26	Construction data calculated by Zeiss	753	1052
Dogmar	20		759	1053
Kodak Anastigmat	23	Construction similar to Dogmar. Construction data calculated by Zeiss	767	1054
Goerz	24	Four-Lens Objective	774	1055
Kapella	30		792	1056
Geodar	30	With compensation plate. Object for photogrammetry	808	1057
C. P. Goerz	29	Similar to the Dogmar. Refer to British Journal of Photgraphy, 1898, p. 570	925	1058
Geodar	30	For Photogrammetry. For compensation plate 3 mm	930	1059
Jos. Schneider & Co	30		985	1060
V 1932 No. 9	30	This objective is fitted with a thick glass plate between objective and image for correction of dist rtion	986	1061
Meniscus Objective	20	With aspheric surface	987	1062
V 1933 No. 2	18	With two aspheric surfaces. Compare with Card No. 987	990	1063
Meniscus Lens	17	With one aspheric surface	1026	1064

(THE FOLLOWING ENTRIES BEGIN A NUMERICAL SEQUENCE OF ZEISS CARD NUMBERS. THESE ALSO ARE DESCRIPTIONS OF CONVERTIBLE OBJECTIVES)

Emil Busch, Rathenow	20		3	1065
Emil Busch, Rathenow		No data given. See Card No. 3	3a	1066
Hugo Meyer, Aristostigmat	25		10	1067
Planar	20	Double objective composed of two gauss objectives. See also Card No. 29a	29	1068
Planar		See Card No. 29	29a	1069

Name	Half Angle		Zeiss No.	Page
Apochromat Planar	20	A reproduction objective	37	1070
Rodenstock	30	Double objective composed of two gauss objectives	84	1071
Rodenstock	10	Projection objective. German registered design 262,201	100	1072
New Protar Objective	40		103	1073
New Protar Objective	25		104	1074
New Protar Objective	30		113	1075
New Protar Objective	30		114	1076
New Protar Objective			115	1077
New Protar Objective	25		116	1078
Meyer Aristostigmat	20	Composed of two different gauss objectives	151	1079
Orthoprotar	35		161	1080
C. P. Goerz	30		162	1081
C. P. Goerz		Same objective as above, with modified patent specifications	163	1082
C. P. Goerz			165	1083
Voigtlaender, Apochromat Collinear	5	A reproduction objective	194	1084
A. H. Rietzschel			199	1085
Ross, Homocentric	25		200	1086
Protar, Series IV	10		205	1087
Protar, Series IV		Slight modification of Card No. 205	207	1088
Double Amatar III	30		213	1089
Double Amatar III	35		214	1090
Double Amatar III	35	With Quartz Lens	219	1091
Protar	35	With Quartz Lens	220	1092
Double Amatar III	30		222	1093
Double Amatar III	30	Duplicate of the card above	222	1094,1095
Protar, Series VII		See also Card No. 224a	224	1096
Protar		See also Card No. 224	224a	1097
Protar, Series IV	30		237	1098
Reichert, Neucombinar	30	This card in original and duplicate	240	1099,1100
Convertible Objective	40		241	1101
Double Amatar	30		242	1102
Maximar	30		244	1103
Maximar (Ica)	35		245	1104
Maximar	27	Check calculation for objective shown on Card No. 244	246	1105
Maximar	27		248	1106
Reichert	21		249	1107
Hekla Anastigmat	25	Double objective composed of two gauss objectives	250	1108
Maximar	28		252	1109
Maximar		With barite crown of highest refraction power	253	1110
Maximar	27		254	1111
Staeble Objective	27	Double objective composed of two different gauss objectives	259	1112
Hekla Anastigmat II	28		261	1113
Goerz Tenastigmat	30	Similar to the Dogmar	267	1114
Graf	23-24	Similar to the Dogmar. This card in original and duplicate	288	1115,1116
Goerz Double Anastigmat Dagor	28	Similar to the Dogmar	297	1117
Hekla Anastigmat	28	Gauss double objective	315	1118
Hekla Anastigmat	28	Gauss double objective	329	1119
V 1913 XV	28	Gauss double objective	330	1120
Symmetrical Gauss Objective	28	Gauss objective	331	1121
Krauss Anastigmat	27	Gauss double objective	332	1122
V 1913 XVII	27	Gauss double objective	338	1123
Ernemann Double Anastigmat	27	Gauss double objective	371	1124
Staeblemerk, Choroplast	25	Gauss double objective	450	1125
Gauss Objective		With small spherical zones. Refer to Zentral zeitung f. Optik u. Mechanik, 1905, p. 68	467	1126
Ross, Homocentric	25		474	1127
Gauss Objective		With small spherical zones. See remark for Card 467	478	1128
Dr. Paul Rudolph, Symmetrical Objective	10		605	1129
Dr. Paul Rudolph		Gauss double objective	676	1130

Name	Half Angle		Zeiss No.	Page
Dr. Paul Rudolph	25	Gauss double objective	677	1131
Dr. Paul Rudolph		Gauss single objective	678	1132
Zeiss	5		771	1133
Kapella	15		805	1134
Gallus Objective	25		870	1135
New Protar Series IV	35		960	1136
Aspherical Objectives V 1936 No. 10	27	Double objective with aspheric external surfaces	1125	1137
Apo-Planar	15		1169	1138
Kapella	25		1209	1139

LENSES AND TELESCOPES, SUPERIMPOSED ON OBJECTIVES FOR VARIATION OF FOCAL LENGTH

The best universal objectives, as, for instance, the Tessars, are constructed unsymmetrically. It is, therefore, in the majority of cases impossible to photograph with individual components of these objectives, in contrast to convertible objectives in which photography is permitted with each of the component parts of the double objective.

When lenses are superimposed, they must be free of all disturbing flaws in order to avoid detrimental influences on the sharpness of the image of the photographic objective. In the great majority of cases these superimposed lenses are of simple construction; they are cheap, available, and suitable for vignetting. The superimposed lenses will introduce color defects into the image, and to avoid these the objective has to be stopped down more or less whenever this simple type of lens is superimposed. To achieve a presentable image field with a certain degree of sharpness, the astigmatism of the superimposed lenses must be eliminated so far as possible. The Distars and Proxars, the former for extending the focal length, the latter for shortening it, are calculated in such a way that the principal rays passing through the entrance pupil of the objective on which the additional lenses are superimposed do not cause additional astigmatism in the total combination of objective and superimposed lenses.

This consideration leads to the meniscus shape of these superimposed lenses.

By superimposing these lenses, the quality of the image is impaired. It is generally impossible to attain, with the total arrangement of objective and superimposed lens, an angle of coverage exceeding that achieved by the objective without the superimposed lens.

For this reason, no figures have been given in this section under the heading, "Half Angle of Coverage."

Name of Objective	Aperture Ratio	Focal Length		Remarks	Zeiss No.	Page
Tessar	1/4.5	15	cm	Figures pertaining to the Tessar are not given. Card No. 360 indicates -3 diopters, biconcave for the superimposed lens, which means that the lens has exterior surfaces of equal dispersing effect. On Card 362 the lens shows the same figure for the diopter, but in periscopic form, which means that the lens is a meniscus of a known type, viz: - Radii of curves: r_1 = 121 mm. In both cases the distance between the front surface of the Tessar and the rear surface of the superimposed lens amounts to 2mm. A comparison of the a and b curves clearly indicates that the biconcave superimposed lens has a more favorable influence on the aberrations represented by the a-curves than those of the periscopic superimposed lens. On the other hand, when this latter one is used, the b-curves are more favorable than those of the biconcave lens. By superimposing -3 diopters the focal length of 15 cm is increased to 25 cm.	360	1140
Tessar	1/4.5	15	cm		362	1141

Name	Speed	Focal Length			Zeiss No.	Page
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters, biconcave. Remarks for Cards No. 360 and 362 apply here	361	1142
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters, periscope. Remarks for Cards No. 360 and 362 apply here	363	1143
Tessar	1/4.5	15	cm	With superimposed lens plus one diopter Ostw. (This abbreviation stands for Ostwald and means that the respective lens corresponds to the Ostwald branch of the Tscherning-curve.) This superimposed lens decreases the focal length	366	1144
Tessar	1/4.5	15	cm	With superimposed lens plus one diopter Woll. (The abbreviation stands for Wollaston and means that the respective type of lens corresponds to the Wollaston branch of the Tscherning-curve.) For decreasing the focal length, Wollaston lenses are generally more curved than Ostwald lenses. Their effect on the a-curves is unfavorable, whereas effect on the b-curves is generally still more favorable than that of Ostwald lenses.	365	1145
Tessar	1/4.5	15	cm	With superimposed lens plus one diopter Woll. See remarks for Card No. 365	364	1146
Tessar	1/4.5	15	cm	With superimposed lens -1/5 diopter Woll.	369	1147
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters Aspheric Distar Objective	375	1148
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters Ostw.	367	1149
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters, Ostw. See Card No. 367	357	1150
Tessar	1/6.3	50	cm	With superimposed lens	628	1151
Tessar	1/4.5	40	cm	With superimposed lens	627	1152
Tessar	1/4.5	15	cm	With Distar lens -3.5 diopters Ostw.	379	1153
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters plano-concave	359	1154
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters plano-concave	358	1155
Tessar	1/6.3	13.5	cm	With superimposed lens -3 diopters Woll.	356	1156
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters Ostw.	355	1157
Tessar	1/4.5	15	cm	With superimposed lens -3 diopters Woll.	354	1158
Tessar	1/4.5	15	cm	With Distar lens -2 diopters Ostw.	378	1159
Tessar	1/4.5	15	cm	With Distar lens -1.5 diopters Ostw. See Card No. 367	377	1160
C. P. Goerz				Dispersing superimposed lens system. In an endeavor to avoid color defects which are bound to occur in connection with relatively simple lenses, these systems of two superimposed lenses of opposite refraction power were constructed. They are similar to Distars	590	1161
C. P. Goerz				Converging superimposed lens system. See the remarks above, but note that this system is similar to the Proxars	656	1162

With the use of Proxars and Distars, the camera extension and the focal length were considerably changed, which led in the case of many cameras to afocal or telescopic superimposed lens systems and/or superimposed telescopes. The camera extension set to ∞ was not changed, whereas the focal length was increased proportionate to the magnification of the superimposed telescope.

V 1935 No. 14, Superimposed telescopic	1/3.5	7.5	cm	This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm to 127.6 cm without changing the setting of the camera extension.	1084	1163

Name	Speed	Focal Length			Zeiss No.	Page
V 1936, No. 11, Superimposed telescopic with Tessar	1/3.5	7.5	cm	This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm to 127.6 cm without changing the setting of the camera extension	1124	1164
V 1936, No. 15				This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm to 127.6 cm without changing the setting of the camera extension	1136	1165
V 1935, No. 13, Superimposed telescopic with Tessar	1/3.5	7.5	cm	This form of Tessar was used for the "Rolleiflex" camera; the focal length was increased from 7.5 cm to 127.6 cm without changing the setting of the camera extension	1129	1166
Spectacle glass of the Ostwald type, +		6	diopters		281	1167
Spectacle glass of the Ostwald type, +		7	diopters		280	1168
Spectacle glass of the Ostwald type, +		8	diopters		279	1169
Spectacle glass of the Ostwald type, +		8½	diopters		278	1170
Spectacle glass of the Ostwald type, +		9	diopters		277	1171
Spectacle glass of the Ostwald type, +		9	diopters		276	1172
Spectacle glass of the Ostwald type, +		10 1/4	diopters		275	1173
Spectacle glass of the Ostwald type, +		10 1/4	diopters		274	1174
Spectacle glass of the Ostwald type, +		10 1/4	diopters		273	1175
Spectacle glass of the Ostwald type, +		11.15	diopters		272	1176
Spectacle glass of the Ostwald type, +		20	diopters		271	1177

Cards No. 1129 to 271, listed above, show the results of astigmatic calculation for the center point of the eye, assumed to be located at a distance of 25 mm from the interior vertex of the lens, and indicated for various diopters of lenses corresponding to the Ostwald branch of the Tscherning-curve.

APLANATS

Aplanats are objectives rendering good sharpness in the central area of the image at medium aperture ratios. They differ from Anastigmats inasmuch as their angular image field is considerably smaller; but it is still considerably larger than that of telescope objectives.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
British patent 215,262		13.5	cm	6	Construction similar to Steinheil's Aplanat	719	1178
Aplanat	1/8	13	cm	6		257	1179
Aplanat	1/8	13	cm	8		255	1180
Ica Aplanat, Helios	1/8	13	cm	8		256	1181
Aplanat No. 102	1/5	531.6	mm			210	1182
Peter Schnuell				10		85	1183
Aplanat	1/6.5	144	mm		Focal length of single lengths 264.4 mm	47	1184
Ultra-violet Aplanat	1/6.5	145	mm	10		31	1185
Ultra-violet Aplanat	1/8	156	mm	10		30	1186
Grabb's-Aplanatic						28	1187
Steinheil, "Rapidanti-planet"	1/6.5			12	Data taken from: A. Gleichen, Lehrbuch Der Geometrischen Optik, p. 473	11	1188
Steinheil, Periscope				12		20	1189
Goerz				10		21	1190

These objectives have a very good correction of longitudinal spherical aberration; they also comply satisfactorily with the sine condition, whereas a correction of the narrow oblique pencils of rays, inclined toward the axis, has generally not been considered.

These objectives have a very high degree of sharpness at the central area and only a small angular image field.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
Collimator Objective	1/15	2685	mm	2.5	Calculated for c, d, f, g'. For the sake of distinctness the departure from the sine condition and the longitudinal spherical aberration have been enlarged tenfold as compared with the scale generally used on Zeiss's cards; distance between optical axis and point of incidence has been drawn at five times the normal scale	376	1191
Collimator Objective	1/14	283	cm	2.5	For testing of photo-objectives	449	1192
V 1917 III	1/4.5	18	cm	2.5	Telescope objective consisting of two components. Used for machine gun cameras	459	1193
Objective composed of three lenses with two cemented surfaces	1/4.4	240	mm	2.5	German Patent 135,362, Fig. 4	483	1194
V 1933 No. 7	1/8	50	cm	3	Long Distance Objective	1019	1195
Projection Objective	1/3	30	cm	2.5	Composed of two lenses	639	1196
E-Objective (Astro-Objective)				2.5	Aperture ratio about 1/3	443	1197

The following comprise a group of objectives of various types of construction in which the a-curves, or the b-curves, or both the a- and the b-curves indicate aberrations of such an extent that the optical qualities of these objectives should be rather low.

I. G. Farben	1/1.9	10	cm	10		1088	1198
I. G. Farben Periscope Objective	1/6.3	105	mm	8		976	1199
Albert Ferdinand Shore	1/6.5	117	mm	5	Data given in patent specification seemed to be incorrect	966	1200
Felms	1/3.3	82	mm	5		967	1201
Isocele Lens	1/4.5	10	cm	4		955	1202
Societe Anonyme des Etablissements Optis	1/4	80.2	mm	4		643	1203
E. Heinrich Kopplin, Dresden	1/6.3	14	cm	5		527	1204
Gasc. & Charconnet	1/17.5	80	mm	5		517	1205
Paul Waechter, Friedenau	1/7.6	127	mm	6	Objective for instantaneous photography	299	1206

PETZVAL LENSES

Whenever high speed, good sharpness and only a small angular image field are required, the Petzval Lenses or, more explicitly, their modifications and further developments, have been successfully used. Longitudinal spherical aberrations, as well as departure from the sine condition, can be easily corrected at aperture ratio of

nearly up to 1/1, thus producing sharp image fields of 10-15°. The following objectives are all Petzval Systems of various compositions.

Name of Objective	Aperture Ratio	Focal Length		Half Angle of Coverage, Degrees	Remarks	Zeiss No.	Page
V 1937 No. 7	1/1.5	10	cm	6.5		1159	1207
D. L. Word, Projection Objective	1/1.6	10	cm	17	By adding a Smyth lens the image field is anastigmatically flattened to 30°	1220	1208
Biotar	1/1.8	8.5	cm	10	A projection system of high light intensity with an additional Smyth lens. This card shows the double objective with additional lens, as opposed to the double objective without additional lens, and only a minor change of the a-curves, whereas the b-curves indicate only about half of the image curvatures	225	1209
Zeiss Ikon	1/1.9	10	cm	15	Projection Objective	847	1210
Ikon	1/1.9	100	mm	15		838	1211
V 1937 No. 8	1/1.9	10	cm	10		1158	1212
C. Zeiss	1/1.9	10	cm	10	Projection Objective	1010	1213
W. Repp	1/2.2	100	mm	10		818	1214
W. Repp	1/2.2	100	mm	10		817	1215
Projection Optics Co	1/2.2	100	mm	5	Same as the preceding drawing	644	1216
Graf Optical Co	1/2.5	5	cm	10	Projection Objective. See also Card No. 1076	1079	1217
Projection Objective	1/2.5	5	cm	10	See also Card No. 1079	1076	1218
Ivan Gramatzki, Berlin, Friedenau	1/1.25	100	mm	10		899	1219
Warmisham and Kapella	1/3			10		655	1220
Warmisham and Kapella	1/3			5		654	1221
Busch, Portrait Double Objective	1/3	245	mm	10		386	1222
Petzval, Portrait Objective	1/3	186.3	mm	10	A Projection Objective	390	1223
Petzval, Projection Objective	1/3.3			10	Anastigmatic flattening of the image field for 30° nearly ideal with the additional lens	26	1224
Petzval, Portrait Objective	1/3.34	206.8	mm	10	A Projection Objective	392	1225
Petzval, Portrait Objective	1/3.4	189.3	mm	10	A Projection Objective	389	1226
Petzval, Portrait Objective	1/3.44	135.7	mm	5	A Projection Objective	391	1227
Zeiss Ikon, Projection Objective	1/2.5	12	cm	5		836	1228
A. Holmann	1/2.7	173.5	mm	5		1021	1229
A. Holmann	1/2.7	148	mm	7		1062	1230

In addition to drawings given under the title "Double Objective with Components of Various Constructions" the following objectives are also listed as,

DOUBLE OBJECTIVES WITH COMPONENTS OF VARIOUS CONSTRUCTIONS

M. R. Berthon	1/1.5	63	mm	8	For an aperture ratio of 1/1.5 the correction of the a-curves is poor	620	1231

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Dr. Paul Rudolph	1/1	10	cm	10	Data given in the patent specification indicate that this objective has an aperture ratio of 1/1.12. Lens diameters are insufficient for an aperture ratio of 1/1 as stated on this card	858	1232
Dr. Paul Rudolph	1/3.2	10	cm	10		784	1233
Dr. Paul Rudolph	1/2.9	100	mm	15		787	1234
Lacour-Berthiot, Paris	1/3.5	100	mm	15		559	1235
C. & H. C. Beck	1/6			5	b-curves and c-curves calculated for variation to two different locations of the stop	295	1236
Dallmeyer	1/5.6					197	1237
Busch-Rathenow	1/1.9	9.56	mm	10		1251	1238
Jos. Schneider, Kreuznach	1/2.9	10	cm	20		1339	1239
Jos. Schneider, Kreuznach	1/2.9	10	cm	24		1165	1240
Horace W. Lee, Kapella	1/1	1	cm	15		1086	1241
Kapella	1/4.5	10	cm	15		1055	1242
Ica Helios	1/8	13	cm	10	An Aplanat	263	1243
Leitz, Peripian				30		32	1244
Alfred Taylor	1/3.5	100	mm	2		616	1245
V 1938 No. 26	1/2.5	5	cm	18	This objective was termed Herar	1257	1246
V 1938 No. 21	1/4	8.5	cm	12	This objective was termed Herar	1245	1247
V 1938 No. 20	1/4.5	13.5	cm	6	This objective was termed Herar	1244	1248
V 1938 No. 9	1/3.5	8	cm	24	This objective was termed Herar	1231	1249
V 1937 No. 30	1/3.5	18	cm	25	This objective was termed Herar	1194	1250
V 1938 No. 10	1/2.8	8	cm	24	This objective was termed Herar	1232	1251
V 1938 No. 1	1/2	5	cm	22	This objective was termed Herar	1198	1252
V 1937 No. 29	1/3.5	8	cm	23	This objective was termed Herar	1193	1253
V 1937 No. 28	1/2.8	5	cm	20	This objective was termed Herar	1192	1254
Herar	1/3.5	7.5	cm	25		1190	1255
Herar	1/2.8	52.3	mm	20		1189	1256
V 1936 No. 17	1/3.5	7.5	cm	25	This objective was termed Herar	1173	1257
V 1938 No. 18	1/3.5	3.5	cm	25	This objective was termed Herar	1240	1258
V 1936 No. 16	1/2.8	8	cm	23	This objective was termed Herar	1136	1259
Aldis-Objective	1/8	77	mm	10	This objective was termed Herar	262	1260
Aldis Example I	1/7.8	150	mm	10		223	1261
Aldis Example III	1/7.8	156	mm	10		260	1262
Aldis Example II	1/7.64	168	mm	10		230	1263
H. L. Aldis				10	See data on Card No. 8	71	1264
H. L. Aldis, Photographic Objective	1/7.7	197.26	mm	15	See Card No. 71	8	1265
Anastigmat, Series IV	1/12.5	118.4	mm	10		55	1266
Single Meniscus				17	Single meniscus having a stop located directly in front of the vertex of the convex surface permits anastigmatic flattening for an image field of about 30°	25	1267
British Patent No. 6093/26				6	This meniscus has a stop at the concave surface. The image field is anastigmatic, but not flattened	810	1268

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
Polack, Paris	1/7	10	cm	5	This hyperchromatic objective is a triplet of good monochromatic spherical correction. By using flint glass for the two converging lenses and crown glass in the dispersing lens, the chromatic longitudinal aberrations become larger than those of an individual lens. By means of this, considerable color defect, an artistic softness and a better depth of focus are achieved	779	1269
C. & H. C. Beck	1/3.8			5	Data given in patent specification are obviously erroneous, as the diameters of the two exterior lenses do not permit the indicated aperture ratio	264	1270
V 1935 No. 11	1/2	5	cm	20	Tessar with aspheric front surface. The trace of rays of a meridional pencil is shown on a separate card, attached to this drawing	1085	1271 1272
V 1935 No. 10	1/2	5	cm	10	Tessar with aspheric front surface	1109	1273
V 1934 No. 10	1/2	5	cm	19	Tessar with aspheric front surface	1053	1274
V 1934 No. 9	1/2	5	cm	19	Tessar with aspheric front surface	1052	1275
V 1934 No. 8	1/2.8	5	cm	23	Tessar with aspheric front surface	1051	1276
V 1934 No. 6	1/2.8	5	cm	23	Tessar with aspheric rear surface	1050	1277
V 1934 No. 11	1/1.5	5	cm	18	Tessar with aspheric front surface	1035	1278

In addition to drawings already given as descriptions of Convertible Objectives, the following objectives are listed as:

SEMICONVERTIBLE OBJECTIVES

Eugene Lacour				10		81	1279
Gallus Objective	1/8.5	24	cm	23	A Swiss objective for Photogrammetry	854	1280
Voigtlaender 4-Lens Objective	1/14			10	4-Lens Objective	398	1281
Rudar Objective	1/8	25	cm	27	Construction similar to the Plasmat	472	1282
Rudar Objective	1/8	25	cm	35	Construction similar to the Plasmat	490	1283
Rudar Objective	1/9	252	mm	30	Construction similar to the Plasmat	498	1284
Dr. Paul Rudolph	1/10	265	mm	28	Construction similar to the Plasmat	473	1285
R. 45,642	1/9.75	15.6	cm	30	Construction similar to the Plasmat	491	1286
Rudar Objective	1/11	24	cm	25		497	1287
Rudar Objective	1/10	191	mm	30		494	1288
R.45,697	1/8.56	17	cm	35		492	1289
Lacour-Berthiot	1/3.5	96	mm	10		325	1290
Protar	1/8	244	mm	25	A Wide-Angle Objective	77	1291
Bambino Objective	1/2	10	cm	12	Inexpensive projection objectives	1007	1292
Bambino Objective	1/2	7	cm	15		1006	1293
Warmisham and Kapella Ltd., Anastigmat Objective	1/1.5			15	The British Journal of Photography of March 27, 1930, p. 17	860	1294

Name	Speed	Focal Length		Half Angle		Zeiss No.	Page
M. Lloyd Cassel Bishop	1/5	300	mm	5			
Hans Zaepernik	1/3.35	30	cm		Portrait objective	597	1295
P. A. & C. P. Goerz	1/2	150	mm	10		602	1296
C. W. Frederick Eastman	1/2.8	100	mm	10		636	1297
Optical Works, Ruedersdorf	1/4.3	65	mm	10		819	1298
Optical Works, Ruedersdorf	1/4	10	cm	10	Symmetrical objective with prism	593	1299
Unar	1/8	200	mm	30		684	1300
						39	1301

MAGNIFIERS

5-Fold Magnifying Picture Viewer		50	mm	25	Center of rotation of the eye is located about 50 mm in front of the objective nearest to the eye. Calculation for n_e shows a well flattened, anastigmatic image field at 50°. Chromatic magnification difference between C and F amounts to about 1%. f = 50 mm for small format 24 x 36 sq mm	1203	1302
Flektoskop		4.7	cm	15	The space to be viewed through magnifier is projected by the camera objective on the frosted surface of the lens pertaining to the magnifier; the rays are deflected by a prism to facilitate easier viewing. Distance between the center of rotation of the eye and the lens nearest to the eye amounts to about 20 mm	1202	1303

OBJECTIVES OFFERING EITHER CONFUSED OR INSUFFICIENT DATA

Tessar	1/6			30		23	1304
					This card shows distortion-curves of photographs taken with shear-jointed telescope-cameras, having a focal length of 20 mm. Distortion is calculated for cameras used with the shear jointed telescopes types "SF-14" and "SF-09"	406	1305
C. P. Goerz					No data given. See A. Gleichen, Geometric Optics, p. 429	14a	1306
C. P. Goerz					No data given	161	1307
C. Reichert and F. Kollmorgen, Wien					No data given. See Card No. 1, p.	1a	1308
V 1938 No. 5	1/2.8	5	cm	25	Tessar. Data not intelligible	1206	1309
Projection Objective	1/8	38	cm		b-curves not indicated. With strongly shortened extension	648	1310
Trans-Lux, Daylight Picture Screen Corp., New York	1/3	2.5	cm	18		1132	1311 1312
This card presents distortion curves for a Telescope Objective	1/50	3	m..		Insufficient data	407	1313
V 1933 No. 4	1/2	7	cm	18	Insufficient data	991b	1314
Data pertaining to Card No. 543					Card No. 543 not in this file	---	1315
Insufficient data pertaining to No. 235				25	Card No. 235 not in this file	235a	1316

Name	Speed	Focal Length	Half Angle		Zeiss No.	Page
Insufficient data pertaining to No. 501			25	Card No. 501 not in this file	502	1317
Insufficient data pertaining to No. 501			29	Card No. 501 not in this file	503	1318
Insufficient data pertaining to No. 893				Card No. 893 not in this file	---	1319
Insufficient data pertaining to No. 382				Card No. 382 not in this file	---	1320
Insufficient data pertaining to No. 734				Card No. 734 not in this file	---	1321
Insufficient data pertaining to No. 851				Card No. 851 not in this file	---	1322
Inter Office Notice pertaining to No. 322				Card No. 322 not in this file	---	1323

RECENT OBJECTIVES

The following objectives are a portion of those classified by the Zeiss Works during the period immediately before the war and for the earlier years of hostilities.

Identification of Objective	Aperture Ratio	Focal Length		Zeiss No.	Page
Jos. Schneider	1/5	10	cm	1401	1324
I. R. Objective	1/2	72	cm	1402	1325
Laack	1/1.35	3	cm	1402	1326
Zeiss Ikon	1/1.5	100	mm	1403	1327
V 1941 No. 6	1/2.8	35	cm	1404	1328
V 1941 No. 7	1/2.8	35	cm	1405	1329
Zeiss Ikon, Sonnar	1/2.8	9	cm	1406	1330
Arthur Warmisham, Kapella	1/2	10	cm	1407	1331
V 1941 No. 13	1/1	7	cm	1408	1332
V 1941 No. 15	1/1	15	cm	1409	1333
V 1941 No. 15	1/1	15	cm	1409	1334
V 1941 No. 14	1/2	25	cm	1410	1335
V 1941 No. 4	1/4.5	12.5	cm	1411	1336
V 1941 No. 5	1/3.5	3.5	cm	1412	1337
V 1941 No. 15	1/1	15	cm	1413	1338
V 1941 No. 17	1/12.5	67.5	cm	1414	1339
V 1941 No. 16, See Card No. 1415a	1/2	35	cm	1415	1340
V 1941 No. 16	1/2	35	cm	1415a	1341
V 1940 No. 9	1/5	100	cm	1416	1342
V 1941 No. 18	1/2.4	125	mm	1417	1343
V 1941 No. 19	1/1.5	30	cm	1418	1344
German Registered Design of 10-8-41	1/1.5	5	cm	1419	1345
German Registered Design of 10-15-41	1/1	7	cm	1420	1346
V 1941 No. 23	1/2	2.5	cm	1421	1347
Wide-Angle Objective	1/4	5	cm	1422	1348
V 1941 No. 2	1/5	1	m	1423	1349
V 1941 No. 19	1/1.5	30	cm	1424	1350
V 1941 No. 22. For finite scale n = 75.4				1425	1351
V 1941 No. 22	1/1.5	40	cm	1425	1352
	1/1.5	5	cm	1425b	1353
I. R. Objective	1/1.5	40	cm	1426	1354
V 1941 No. 26	1/1.5	40	cm	1427	1355
Zeiss Ikon	1/1.2	100	mm	1428	1356
Kodak Petzval Objective	1/2.8	10	cm	1429	1357
V 1939 No. 33	1/1.4	5	cm	1430	1358
V 1939 No. 33 (Duplicate)	1/1.4	5	cm	1430	1359
Telikon Teleobjective with Concave Air Space	1/6.3	10	cm	1431	1360
Telikon Teleobjective with Concave Air Space	1/6.3	10	cm	1432	1361
Tessar	1/3.5	3.5	cm	1433	1362
I. R. Biotar with Smyth Lens	1/1.5	15	cm	1434	1363
V 1942 No. 1	1/1	13	cm	1435	1364
V 1941 No. 24	1/2	10	cm	1436	1365

Name	Speed	Focal Length		Zeiss No.	Page
I. R. - Sonnar with Smyth Lens	1/1.5	15	cm	1437	1366
V 1942 No. 2	1/1	7.5	cm	1438	1367
Hugo Meyer, Goerlitz (Paul Schaeffer)	1/1.5	10	cm	1439	1368
Sonnar	1/1.4	5	cm	1440	1369
V 1942 No. 3	1/	7.5	cm	1441	1370
V 1942 No. 4	1/1.5	40	cm	1442	1371
G. Rodenstock	1/1.9	10	cm	1443	1372
V 1942 No. 8	1/1	7.5	cm	1444	1373
V 1942 No. 9	1/1.5	5	cm	1445	1374
V 1942 No. 7	1/1.4	5	cm	1446	1375
Tessar	1/12.5	67.5	cm	1447	1376
V 1942 No. 11. See Card No. 1467	1/1	5	cm	1448	1377
Biogon	1/2.7	35	cm	1449	1378
Zeiss Ikon	1/2	10	cm	1450	1379
V 1942 No. 13	1/1.5	30	cm	1451	1380
V 1942 No. 12	1/1.5	40	cm	1452	1381
Rodenstock	1/2	1	cm	1453	1382
Wide-Angle Objective	1/5.7	5	cm	1454	1383
V 1942 No. 14	1/3.5	50	cm	1455	1384
V 1942 No. 16	1/18	38	cm	1456	1385
Pleon	1/8	7.25	cm	1457	1386
I. G. Farben	1/1.4	10	cm	1458	1387
I. G. Farben	1/1.4	10	cm	1459	1388
I. R. Objective	1/1	5	cm	1460	1389
Zeiss Ikon, Wide-Angle Objective	1/2.8	10	cm	1461	1390
Meyer, Goerlitz (Paul Schaeffer)	1/1.5	10	cm	1462	1391
Zeiss. See also Card No. 225	1/1.8	10	cm	1463	1392
		Zetschr. f. Instrumentunkunde 31 ed. 11 Sep. Bk 9 pp. 265-270			
Zeiss Ikon, Sonnar	1/1.4	8.5	cm	1464	1393
V 1942 No. 5. For the Linhof Camera	1/2.8	13.5	cm	1465	1394
I. R. Objective	1/1	7.5	cm	1466	1395
I. R. Objective	1/1	5	cm	1467	1396
I. R. Objective	1/1.5	15	cm	1468	1397
V 1942 No. 27. I. R. Objective	1/1.5	15	cm	1469a	1398
V 1942 No. 21. I. R. Objective	1/1.5	15	cm	1469b	1399
V 1942 No. 21. I. R. Objective	1/1.5	15	cm	1469c	1400
V 1942 No. 21. I. R. Objective	1/1.5	75	cm	1469d	1401
V 1942 No. 20	1/1	6.5	cm	1470	1402
Biogon	1/2.8	3.5	cm	1471	1403
Sonnar	1/2.8	7.5	cm	1472	1404
Astro-Gesellschraft, Bielicke Co.	1/1.05	10	cm	1473	1405
Apo-Tessar	1/9	45	cm	1474	1406
V 1939 No. 40	1/2	5	cm	1475	1407
Busch	1/2.5	10	cm	1476	1408
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477a	1409
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477b	1410
V 1943 No. 1. I. R. Objective	1/1.5	15	cm	1477c	1411
Objective	1/2	68	mm	1478	1412
Zeiss	1/6.3	8	cm	1479	1413
Leitz	1/1.3	100	mm	1480	1414
V 1943 No. 4, Petzval	1/1.5	15	cm	1481	1415
V 1943 No. 4, Petzval	1/1.5	15	cm	1481a	1416
U. R. Objective B	1/1.5	15	cm	1482	1417
U. R. Objective B	1/1.5	15	cm	1482a	1418
				1482b	1419
Kapella	1/2.5	10	cm	1483	1420
Meyer Goerlitz	1/1.6	10	cm	1484	1421
Tessar	1/3.5	3.5	cm	1485	1422
U. R. Objective A	1/1	25	cm	1486	1423
Tessar	1/3.5	4	cm	1487	1424
V 1942 No. 15	1/3.5	50	cm	1488	1425
U. R. Objective B	1/1	25	cm	1489	1426
U. R. Objective A	1/1	9	cm	1490	1427
U. R. Objective	1/1	5	cm	1491	1428
Leitz U. R. Objective	1/1	9	cm	1492	1429

Name	Speed	Focal Length		Zeiss No.	Page
V 1944 No. 2 U. R. Objective	1/1	5	cm	(1493?)	1430
Kipro-Anastigmat. See also Card No. 1390	1/1.9	10	cm	1494	1431
I. G. Farben	1/1.5	100	mm	1495	1432
Optikolechna, Spolechnost	1/3.5	100	mm	1496	1433
Askania Teleobjective	1/3	100	mm	1497	1434
Kodak Teleobjective	1/3.8	100	mm	1498	1435
Kodak Teleobjective	1/3.8	100	mm	1499	1436
G. Rodenstock	1/2.5	10	cm	1500	1437
Telemetar	1/5	1	m	1503	1438

UNCLASSIFIED LENSES

Name of Objective	Aperature Ratio	Focal Length	Zeiss No.	Page
Rapidor	1/4.5	150 mm	579	1439
Biotessar	1/2.25	1.5 cm	757	1440
Sonnar	1/2	1 cm	1122	1441

DETAILED OPTICAL DATA

(Reference should be made to the Sample Card on the following page, which will serve as a guide to the use of the Lens Data Sheets. The German on the Sample Sheet has been translated; other sheets are in the original German.)

Sample Ziess Card

F-TS-6388-RF

49

Tessar (ursprüngl. Typus.)

Einzelobjektiv — Doppelobjektiv ($\beta = -0{,}1$)

Sphärische Korrektion

$\Delta s'$	$\Delta f'$	$\Delta s'$	$\Delta f'$
		−2,4	−11,6	+1,1	−12,2	−10,7	+1,7

Einfallshöhen — Ebenenwahl

Einfallshöhen			Ebenenwahl
17,5	21,7	23,3	−1,44 (+1,76)

Astigmatismus

Äquatorialwinkel	Meridionalwinkel	Äquatorialwinkel	Meridionalwinkel
		−4,6 −2,6	−2,1 −2,4	−3,1 −2,4	−4	+1,2,3

Frontwinkel — Vergrößerung

Frontwinkel	Vergrößerung
41,0	37,2	64,6	

Radien, Dicken und Abstände für $f = 100$ mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6
73,8	124	191	77,4	412	69	202	4,2	1,5	2,0	6,9	2,5	3,8

№ 18.

Tessar (ursprüngl. Typus)

Linse	n_d	$n_F - n_C$	ν
L_1	1,6125	0,0175	44,7
$L_2 = L_4$	1,6111	0,0170	56,8
L_3	1,5741	0,0170	56,8

Einzellinse — Doppelobjektiv

12,61
12,27
9,23
5,66
27,76

$u = 1$ — $u = 10$ — $u = 0$

ENLARGE TO 9"

TRANSLATION

ATI NO. 38399

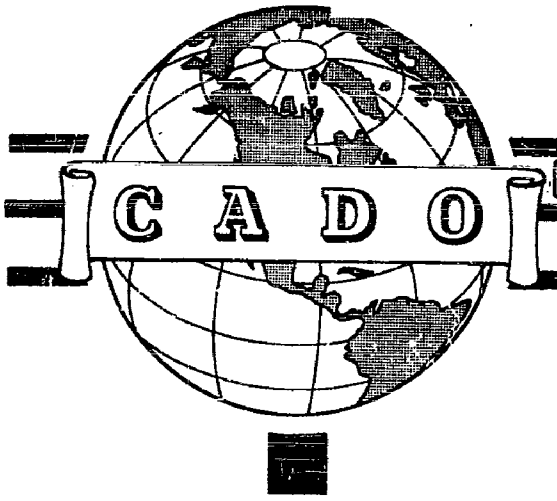
THE ZEISS INDEX OF PHOTOGRAPHIC LENSES

Volume II

November 1948

by

W. W. Merte



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3359

TRANSLATION

ATI NO. 38399

THE ZEISS INDEX OF PHOTOGRAPHIC LENSES

Volume II

November 1948

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250

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#3359
Inside front cover

ATI NO. 38399

THE ZEISS INDEX OF PHOTOGRAPHIC LENSES

Volume II

November 1948

by

W. W. Merté

Translated from the German
April 1949

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#3359

F-75-698-RE

50

Tessar 1:2,8 f=8,2 cm v. 23.2.24

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (Vz 25)

Δs' Δf'

Einfallshöhen Chromasie

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus (Vz) 15° 16 Vz 22° 25

Blende 4,0 : 8,2 mm im 1. Luftraum

Aequatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Blende 4,0 : 8,2 mm im 2. Luftraum

Aequatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d	d2	d3	d4	d5	d6	D1	D2				
39,6	∞	64,0	37,8	-165,6	16,0	69,5	3,7	11,2	0,3	4,9	3,9	4,5	2,0	32,1	40,0				

Tessar 1:2,8 f=8,2 cm v. 23.2.24

Linse | n_d | $\frac{n-1}{r}$ | $\frac{n_F - n_C}{r}$ | V

Linse	n_d	$\frac{n-1}{r}$	$\frac{n_F - n_C}{r}$	V
1	1,594 01	0,1935	0,16 0	
2	1,620 40	0,2264	0,13 3	
3	1,621 58	0,1508	0,12 1	
4	1,613 79	0,2006	0,13 0	

Einzellinse

Doppelobjektiv

Blende 4,0 : 8,2 mm im 1. Luftraum

Blende 4,0 : 8,2 mm im 2. Luftraum

11,4
11,11
6,11
6,01
22,11

a b

G

+10%

-10%

n = ∞ (Blende im 1. Luftraum)

n = ∞ (Blende im 2. Luftraum)

F-75-698-RE

51

Tessar 1:2,7 f. 8 cm (12,15) v. 7.11.22

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (Vz m) 4,6 11 m

Δs' Δf'

Einfallshöhen Chromasie

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus ( )

Aequatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Aequatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d	d2	d3	d4	d5	d6						
28,0	∞	61,0	31,1	-99,5	14,1	94,0	3,2	8,1	0,2	2,5	2,1	2,3	1,5						

Tessar 1:2,7 f. 8 cm (12,15) v. 7.11.22

Linse | n_d | $\frac{n-1}{r}$ | $\frac{n_F - n_C}{r}$ | V

Linse	n_d	$\frac{n-1}{r}$	$\frac{n_F - n_C}{r}$	V
1	1,591 20	0,1811	0,15 9	
2	1,620 17	0,2011	0,13 3	
3	1,613 33	0,2081	0,12 9	
4	1,621 84	0,1179	0,12 1	

Einzellinse

Doppelobjektiv

11,11
11,11
6,05
6,11
22,11

a b

G

+10%

-10%

F-TS-6398-RE

52

№ 769

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (47°)

Δs'	Δf'
-3.6	+3.2

Δs'	Δf'
-0.7	-0.4

Einfallshöhen | Chromasien

Einfallshöhen | Chromasien

Astigmatismus (45°)

Äquatorialbüschel	Meridionalbüschel

Äquatorialbüschel	Meridionalbüschel
-0.8	-0.5	-0.3	+0.2	+0.4	-3.2

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

32.4	33.0	33.8

Radien, Dicken und Abstände für f = 100 mm:

r_1	s_1	r_2	s_2	r_3	s_3	r_4	d_1	s_1'	d_2	s_2'	d_3	s_3'	d_4
3.8.6	1.72	6.2.5	0.9.4	3.7.6	11.4	42.2	10.9	1.3	9.4	1.2.5	1.6	0.5	0.4.1

l_1' 37.4 | l_1 33.4 | l_2 2.1 | l_2' 3.4 | l_3' 3.4

Linse | n_d | $n_g - n_d$ | ν

L_1	1.5.1.7.7	0.0.1.6.3	6.3.1
L_2	1.6.2.5.7.8	0.0.1.5.7.3	3.6.3
L_3	1.7.1.8.5.0	0.0.1.8.6.5	2.5.7
L_4	1.5.1.7.4.0	0.0.1.6.7.2	6.3.1

Einzellinse

Doppelobjektiv

11.11
12.12
8.13
6.11
28.17

F-TS-6398-RE

53

№ 768

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (47°)

Δs'	Δf'
-0.8	-0.5	+0.7	-0.6	-0.4	-0.3

Einfallshöhen | Chromasien

41.7	42.0	42.8

Astigmatismus (47°)

Äquatorialbüschel	Meridionalbüschel

Äquatorialbüschel	Meridionalbüschel
-0.5	-0.3	-0.2	-0.1	-0.3	-0.7

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

37.0	39.5	40.6

Radien, Dicken und Abstände für f = 100 mm:

r_1	s_1	r_2	s_2	r_3	s_3	r_4	d_1	s_1'	d_2	s_2'	d_3	s_3'	d_4
42.6	6.6.7	37.6	5.3.6	3.0.6	0.1.6	3.3.7	1.1.2	1.1.2	1.1.5	1.1.8	0.1.4	0.1.4	3.1.4

l_1' 31.0 | l_1 27.4 | l_2 2.1.4 | l_2' 2.9.4 | l_3' 2.9.4

Linse | n_d | $n_g - n_d$ | ν

L_1	1.6.8.7.7	0.0.1.6.3	5.6.1
L_2	1.5.2.5.7.7	0.0.1.6.1.9	5.1.1
L_3	1.6.6.5.5.5	0.0.1.7.1.1	3.5.7
L_4	1.6.2.7.7.4	0.0.1.6.7.3	5.6.1

Einzellinse

Doppelobjektiv

0.11
1.11
11.15
12.11
28.14

F-75-6398-RE

54

№ 764

Tessar 1:2.7 f. 7.5 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d'Ell'sche)

Einfallshöhen | Chromasie

Astigmatismus (d'Ell'sche)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

R_1	R_2	R_3	R_4	R_5	R_6	R_7	d_1	d_2	d_3	d_4	d_5	d_6	d_7
9.8	∞	61.7	36.7	93.6	51.1	99.1	2.9	0.1	1.9	1.7	1.1	4.7	7.6

Linse | n_d | $n_F - n_C$ | ν

Einzellinse | Doppelobjektiv

F-75-6398-RE

55

№ 631

1:2.7 f. 7.5 cm vm 46 124 (Versuch Nr. 2)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d'Ell'sche)

Einfallshöhen | Chromasie

Astigmatismus (d'Ell'sche)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

1:2.7 f. 7.5 cm vm 46 124 (Versuch Nr. 2)

Linse | n_d | $n_F - n_C$ | ν

L_1	1.59017	0.1225	61.6
L_2	1.61005	0.1264	56.2
L_3	1.62456	0.1501	57.1
L_4	1.51635	0.1230	64.6

Einzellinse | Doppelobjektiv

№ 797

F-73-6378-AE

56

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Einzellinse | Doppelobjektiv

№ 630

F-73-6378-AE

57

1 : 2.7, f = 73.6 mm (Versuch № 1) v. 25.1.24

Einzelobjektiv | Doppelobjektiv

№ 22.43 L. Sphärische Korrection (№ 22.43)

Öffnung 1 : 2.6 | Öffnung 1 : 2.7

Einfallshöhen | Chromasie

Astigmatismus (№ 57) u. Pic. 48

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Einzellinse | Doppelobjektiv

Öffnung 1 : 2.6 | Öffnung 1 : 2.7

F-TS-6398-RE

58

Nr 908

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsöffnung — Chromasie

Astigmatismus

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse — Doppelobjektiv

F-TS-6398-RE

59

Nr 869

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsöffnung — Chromasie

Astigmatismus

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse — Doppelobjektiv

K 1137

F-TS-6398-RE

60

Tessar 1:2.5 f=10cm Zeiss

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallsöffnen. | Chromasie.

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Tessar 1:2.5 f=10cm Zeiss

Einzelobjektiv

Doppelobjektiv

F-TS-6398-RE

61

V 1931 Nr 4 1:2.8 f=5cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallsöffnen. | Chromasie.

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Nr 879

V 1931 Nr 4 1:2.8 f=5cm

Einzellinse

Doppelobjektiv

F-TS-6398-RE

62

Nr 1217

Einzellinse

Doppellinse

Einzellinse

Doppellinse

Kommt nicht zur Ausführung

F-TS-6398-RE

63

Nr 929

Einzellinse

Doppellinse

F-TS-6398-RE

64

Tessar 1:2.8; f. 5cm mit Änderungen K2 v. 14.9.31

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einfallshöhen | Chromasie

Astigmatismus (Sagittalbruch / Meridionalbruch)

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

	r	d	n	ν
1	+9.0	2.0	1.516	64.2
2	−23.0	0.3		
3	+13.5	2.0	1.613	44.9
4	+42.0	0.3		
5	+6.6	2.0	1.613	44.9
6	+4.1	3.4		
7	∞	1.2	1.516	64.2
8	+2.5			

Tessar 1:2.8; f. 5cm mit Änderungen K2 v. 14.9.31

Linse	n_d	$n_g - n_d$	ν
1	+1.61594	+0.01306	59.0
2	+1.61794	+0.01414	36.6
3	+1.57103	+0.01262	42.7
4	+1.61794	+0.01343	59.3

Einzellinse | Doppelobjektiv

Ebene nicht Tangentialebene

№ 611

F-TS-6398-RE

65

Tessar Nr. 5, 1:2.8, f. 7.5 cm K.-Nr. 77.23

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Δs' / Δf')

Einfallshöhen | Chromasie

Astigmatismus (Sagittalbruch / Meridionalbruch)

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Tessar Nr. 5, 1:2.8, f. 7.5 cm K.-Nr. 77.23

Linse	n_d	$n_g - n_d$	ν
1	1.59017	0.01225	61.0
2	1.62800	0.01164	36.3
3	1.61756	0.01702	27.1
4	1.61638	0.01270	56.6

Einzellinse | Doppelobjektiv

F-TS-6378-RE

66

Typ H: 24, 1:2,8 f. 5 cm, v. 25.9.34

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' bis ...)

Δs'	Δf'

Δs'	Δf'
-12,0	-0,9
-0,9	-0,9
-0,9	-42,2
-42,2	-42,0
-42,0	-0,9

Einfallshöhen | Chromasie

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie
20,3	23,0
23,0	30,0

(-0,3 / -0,2)

Astigmatismus (Δs'-s'), ...

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel	Meridionalbüschel
-2,1	-2,1
-2,1	-2,2
-2,2	+0,0
+0,0	-0,9
-0,9	-2,0

Frontwinkel | Vorzeichnung

Frontwinkel	Vorzeichnung

Frontwinkel	Vorzeichnung
22,1	
22,2	
22,2	

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6	d_7	D_1	D_2
26,3	93,0	37,1	39,7	122,1	27,1	19,1	12,7	2,9	2,9	8,2	2,1	2,4	10,3	2,1	2,0	2,0	2,2	2,2

Focus Datum:

D = 3,0 3,1 3,2 3,3 3,4

Typ H: 24, 1:2,8 f. 5 cm, v. 25.9.34

39,7

Linse	n_d	$n_F - n_C$	ν
L_1	1,6[illegible]	0,0[illegible]	[illegible]
L_2	1,6[illegible]	0,0[illegible]	[illegible]
L_3	1,7[illegible]	0,0[illegible]	[illegible]
L_4	1,6[illegible]	0,0[illegible]	[illegible]

Einzellinse | Doppelobjektiv

L_1	22,19
L_2	11,43
L_3	5,20
L_4	4,99
ΣL_i	23,79

Komadarstellung

Imma...

F-TS-6398-RE

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Schutzsammelobjektiv f. Leica, Wetzlar v. 6.10.34

Lichtstarkes Objektiv 1:2,4, f = 135 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' bis ...) f = 137

Δs'	Δf'

Δs'	Δf'
-4,3	-12,4
-12,4	-11,1
-11,1	-12,1
-12,1	-12,1
-12,1	-11,7
-11,7	-11,7

Einfallshöhen | Chromasie

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie
33,5	-1,5
47,9	(+1,2)
55,5	-1,3

Astigmatismus (Δs'-s') f = 137

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel	Meridionalbüschel
-1,9	+0,2
+0,7	+0,7
+0,7	+0,3
-1,7	+1,4
+1,4	+2,1
+2,1	+1,7

Frontwinkel | Vorzeichnung

Frontwinkel	Vorzeichnung

Frontwinkel	Vorzeichnung
35,7	
44,0	
55,2	

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6	d_7	D_1	D_2
35,3	324,5	52,4	82,4	1132	44,1	69,5	4,27	0,8	4,55	4,79	6,94	4,72	4,72	11,6	36,1

№ 367

Schutzsammellinse f. Leica, Wetzlar v. 6.10.34. Lichtstarkes Objektiv 1:2,4, f = 135 mm.

32,8

Linse	n_D	$n_F - n_C$	ν
L_1	1,[illegible]	0,0[illegible]	[illegible]
L_2	1,[illegible]	0,0[illegible]	[illegible]
L_3	1,[illegible]	0,0[illegible]	[illegible]
L_4	1,[illegible]	0,0[illegible]	[illegible]

Einzellinse | Doppelobjektiv

L_1	11,11
L_2	11,12
L_3	9,31
L_4	6,13
ΣL_i	22,48

F-TS-6398-RE

11383

Tessar f/3,5 f = 100 Trn mit [illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f/3,5)

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus (f/3,5)

Aequatorialbüschel	Meridionalbüschel

Brennweitenbüschel | Vergleichung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
237	∞	781	245	∞	293	912	5.3	2.7	1.9	5.3	3.6	2.1

Für f = 250 Trn [illegible] der [illegible]

Tessar f/3,5 f = 100 mm mit [illegible]

Einzellinse | Doppelobjektiv

Linse | r1 | r2 | d

Sphärische Fehler

Astigmatismus

Verzeichnung

Farbenfehler

Bei Zeichnung 383

Bei Zeichnung 384

F-TS-6398-RE

Der Reduktionsfaktor für verschiedene φ bei Tessar f/3,5 f=25 cm mit [illegible]

φ	r − σ
0° 30'	100.1 0002.89
1° 0'	100.1 0003.57
1° 30'	100.1 0004.26
2° 0'	100.1 0005.14
2° 30'	100.1 0011.96
3° 0'	100.1 0021.43
3° 30'	100.1 0034.11
4° 0'	100.1 0049.66
4° 30'	100.1 0068.09
5° 0'	100.1 0089.39
5° 30'	100.1 0113.66
6° 0'	100.1 0140.89
6° 30'	100.1 0171.09
7° 0'	100.1 0204.25
7° 30'	100.1 0240.37
8° 0'	100.1 0279.45
8° 30'	100.1 0321.49
9° 0'	100.1 0366.49
9° 30'	100.1 0414.44
10° 0'	100.1 0465.35
10° 30'	100.1 0519.21
11° 0'	100.1 0576.02
11° 30'	100.1 0635.78
12° 0'	100.1 0698.49
12° 30'	100.1 0764.15
13° 0'	100.1 0832.75
13° 30'	100.1 0904.30
14° 0'	100.1 0978.80
14° 30'	100.1 1056.24
15° 0'	100.1 1136.63
15° 30'	100.1 1219.96
16° 0'	100.1 1306.24

Der sagittale Krümmungsradius ρ für verschiedene φ bei Tessar f/3,5 f=25 cm mit [illegible]

Bei Zeichnung 383

φ	r_s	Reduzierter Faktor
1° 0' 0"	100.3 0 3	100.44
11° 30' 0"	100.5 7 5	100.57
16° 25' 0"	100.8 8 5	100.19
17° 32' 0"	101.0 5 2	101.36
15° 7' 30"	101.0 9 6	101.21
15° 46' 0"	101.5 3 9	101.54
15° 45' 30"	101.9 1 3	102.13

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70

Nr. 1238

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv | Doppelobjektiv

F-TS-6398-RE

71

Nr. 867

Jos. Schneider & Co, Kreuznach, PA: Sch 83 426, 1:3.5, f: 10cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse | n_d | $n_g - n_d$ | ν

L_1 | 1.62 | 0.013 | 56.7

L_{2+3} | 1.61 | 0.021 | 38.8

L_4 | 1.60 | 0.016 | 46.5

Einzellinse | Doppelobjektiv

F-TS-6398-RE

72

Tessar 1:3.5 mit großem Bildwinkel, f = 10 cm, v. IV. 4. 26

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d. X rays)

Δs'	Δf'	Δs'	Δf'
		-9.4 · 10.3 · 8.7	-9.2 · 10.4 · 0.5

Einfallsöffnung | Chromasie | Einfallsöffnung | Chromasie

32.7	46.2	66.6	-137 (f=11) -196

Astigmatismus (Tg.6)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-3.0 · -3.0 · 0.6	-0.9 · 0.0 · -2.7

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

29.2	38.6	46.8

12.6 (f=) | 907.98 004.90 991.05 | 77.2° 731.77

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	Dicke
288.0	∞	71.40	22.6	∞	22.6	97.2	4.6	0.0	3.7	0.9	2.3	4.6	9.0	29.2

Tessar 1:3.5 mit großem Bildwinkel, f = 10 cm, v. IV. 4. 26

Linse	r	d	n	ν
1	4.69 717	0.21 858	1.516	64.0
2	7.5	1.96	0.01 610	41.2
3	1.01 648	0.01 308	1.616	36.8
4	2.82 377	0.01 1107	1.613	44.2

Einzellinse | Doppelobjektiv

41.43 · 8.74 · 8.17 · 41.27 · 38.16

a | b | a | b

G | G | G | G

+10% · -10%

K 1176

F-TS-6398-RE

73

O.A.S. Vs. Nr. 3; 1:3.5; f = 8 cm, v. 5. 6. 32

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d. X rays)

Δs'	Δf'	Δs'	Δf'
		-12.5 · -15.0 · -2.0 · -1.5 · -15 · -1.5	

Einfallsöffnung | Chromasie | Einfallsöffnung | Chromasie

33.7	46.8	51.2	-98

Astigmatismus (d. X rays)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

51.2	65.2

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
230	∞	65.8	23.7	85.4	68.7	83.3	5.2	0.3	5.2	2.2	5.2	1.7	7.3	7.8

O.A.S. Vs. Nr. 4; 1:3.5; f = 8 cm, v. 5. 6. 32

Linse	r	d	n	ν	w
1	4.62 [illegible]	0.21 [illegible]	1.5 [illegible]	57.6	5.8
2	1.02 [illegible]	0.01 [illegible]	1.6 [illegible]	44.5	4.6
3	2.82 [illegible]	0.01 [illegible]	1.6 [illegible]	44.2	4.6
4	1.02 [illegible]	0.21 [illegible]	1.5 [illegible]	57.6	5.8

Einzelobjektiv | Doppelobjektiv

12.67 · 8.17 · 8.67 · 41.27 · 38.16

a | b | a | b

G | G | G | G

+10% · -10%

K 1175

F-75-6398-RE

7K

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (82%)

Δs'	Δf'	Δs'	Δf'
		-11.5 -2.8 +1.5	-13.2 -2.4 +0.3

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		13.5 +2.3 22.7	-5.5 (+5.5) -5

Astigmatismus (82%)

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel	Meridionalbüschel
		+3.0 +5.0 +2.8 +4.3 +1.6 +7.7	-3.3

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

		31.7 52.0 57.0 60.1	1.2% 3.9% 5.4% 7.1%

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	L1	d2	L2	d3	L3	d4
24.3	∞	37.0	22.1	31.0	20.2	95.0	2.0	5.3	2.4	5.0	2.0	4.5	3.0

V: Nr. f 3.5 f= 8 cm v. 30.11.

Linse	r	d	n_d - d	ν
L1	+62.930	6.0	1.613	58.4
L2	+1.000	0.1	1.611	56.5
L3	+62.000	2.0	1.755	27.5
L4	+32.000	5.0	1.611	58.4

Einzelobjektiv. | Doppelobjektiv.

12.89
8.94
6.83
6.72
13.96

K 875

F-75-6398-RE

75

V 1930 Nr. 12 1:3.5 f = 5 cm v. 73, 74, 76

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (71,4) % d. X 79/80-93

Δs'	Δf'	Δs'	Δf'
		+1.2 +2.3 +1.8 +0.7 +2.5 +0.5	-1.5 -0.5 +0.5 -1.5 -0.5 +0.5

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		33.0 46.3 57.1	-7 -15.7 (-10) (-20) -18.0 -15.7

Astigmatismus (80%)

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel	Meridionalbüschel
		-1.5 +0.7 +0.5 -1.5 +0.5 -1.3	

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		27.7 32.5 38.7	1.2% 3.9% 5.4% 7.1%

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	L1	d2	L2	d3	L3	d4
24.3	∞	37.0	22.1	∞	-19.5	95.0	2.0	5.0	2.5	5.0	2.0	4.5	3.0

V 1930 Nr. 12 1:3.5 f = 5 cm v. 73, 74, 76

Linse	r	d	n_d - d	ν
1	+62.036	6.0	1.613	58.8
2	+1.000	0.1	1.611	57.7
3	+62.000	2.0	1.755	27.6
4	+32.000	5.0	1.611	58.4

Einzellinse | Doppelobjektiv

11.17
11.16
8.44
8.41
13.13

Korrektion auf f
Innen rot

K 874

F-75-6398-RE

76

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Einfallshöhen. | Chromasie.

Astigmatismus

Äquatorialbüschel. | Meridionalbüschel.

Frontwinkel. | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Einzellinse | Doppelobjektiv

K 1056

F-75-6398-RE

77

V 1934, Nr. 15, 1:3.5, f = 5 cm, R. v. 10.10.34 (Huber)

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (HM 10/34)

Einfallshöhen. | Chromasie.

Astigmatismus

Äquatorialbüschel. | Meridionalbüschel.

Frontwinkel. | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

F-TS-6398-RF

78

Tessar 1:3.5 f = 5 cm.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf)

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Sagittal / Meridional)

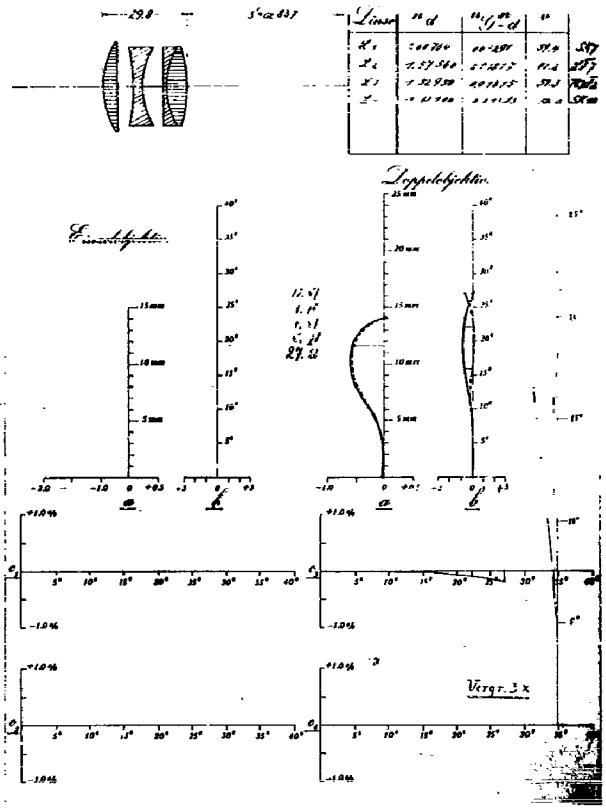
Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



Tessar 1:3.5 f = 5 cm.



F-TS-6398-RF

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Tessar 1:3.5 f = 5 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf)

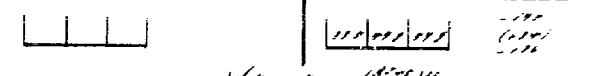
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Sagittal / Meridional)

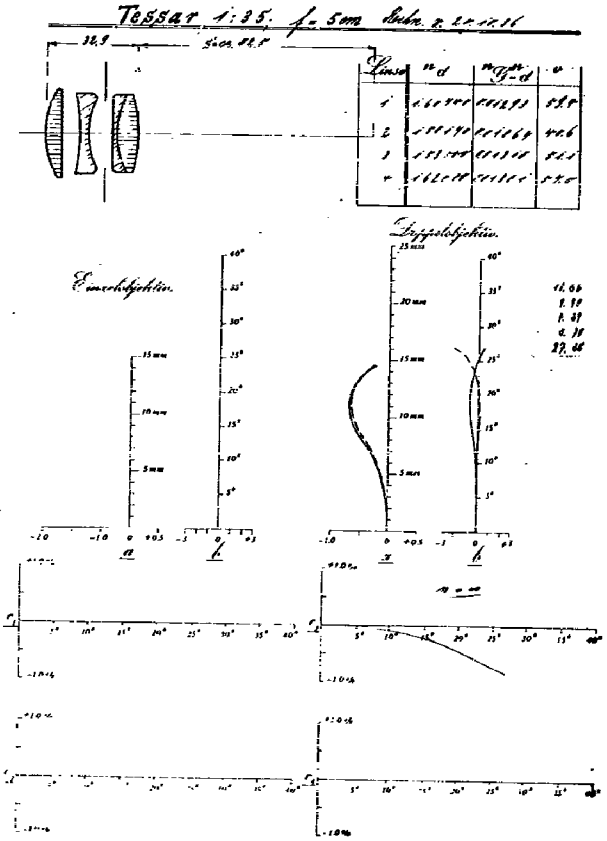
Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



Tessar 1:3.5 f = 5 cm



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80

Nr 236

Tessar 1:3,5 f = 50 mm ... Nr. ...

Einzellinse | Doppelobjektiv

Sphärische Korrektion (λ ...)

Δs' | Δf' | Δs' | Δf'

Chromasie | Einzellinse | Chromasie

Astigmatismus (λ ...)

Radien, Dicken und Abstände für f = 100 mm

Linse	n_g	$n_g - n_F$	ν
φ_1			
φ_2			
φ_3			
φ_4			

Einzellinse | Doppelobjektiv

F-TS-6398-RE

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Nr 245

vom 10. XI. 08

Tessar 1:3,5 f = 300 mm mit anormalem Hinterglied

Tessar 1:3,5 f = 300 mm mit anormalem Hinterglied v. 10. XI. 08

Doppelobj. für 5'

Einzellinse | Doppelobjektiv

Sphärische Korrektion (λ ...)

Δs' | Δf' | Δs' | Δf'

Einzellinse | Chromasie | Einzellinse | Chromasie

Astigmatismus (λ ...)

Radien, Dicken und Abstände für f = 100 mm

Linse	n_g	$n_g - n_F$	ν
φ_1	1,641		
φ_2	1,614	0,022 63	36,9
φ_3	1,518	0,013 05	51,7
φ_4	1,618	0,011 44	34,6

Einzellinse | Doppelobjektiv

F-TS-6378-RE

832

Tessar 1:3.5 f = 3.8 mm

Doppelobjektiv

Sphärische Korrection (l. XXIII) 21 – 19

Einfallshöhen | Chromasie

Astigmatismus (l. XXIII) 35 für s' / 32 für t' — 31 für s' / 29 für t'

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:3.5 f = 3.8 mm

Doppelobjektiv

Linse | n_g | $n_g - n_F$ | ν

I | 1.613 | 0.335 | 58.5
II | 1.614 | 0.283 | 51.9
III | 1.523 | 0.305 | 59.7
IV | 1.603 | 0.299 | 54.6

Einzelobjektiv

Doppelobjektiv

F-TS-6398-RE

833

Tessar 1:3.5 f. 100 mm Nr. 4 III. 28

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (28, 2=4)

Einfallshöhen | Chromasie

Astigmatismus (Typ 4)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

№ 596

Tessar 1:3.5 f. 100 mm Nr. 4 III. 28

Linse | n_g | $n_g - n_F$ | ν

L_1 | 1.6132 | 0.0335 | 58.5
L_2 | 1.6179 | 0.0283 | 51.9
L_3 | 1.5230 | 0.0305 | 59.7
L_4 | 1.6031 | 0.0299 | 54.6

Einzellinse

Doppelobjektiv

F-75-6398-RE

84

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einzellinse

Doppelobjektiv

Astigmatismus

Äquatorialbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

F-75-6398-RE

85

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Äquatorialbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

FT-6318-RE

86

Fujinon WR 3, 1:3.5, f= 5 mm ø 15.1.35

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einfallsloch | Chromasie

Astigmatismus (Δs' / Δf')

Äquatorialwinkel | Meridionalwinkel

Fenster | Verzeichnung

Radien, Dicken und Abstände für f= 100 mm

Fujinon WR 3, 1:3.5, f= 5 mm ø 15.1.35

Linse | nd | νd

Einzelobjektiv

Doppelobjektiv

a | b

1.7220

FT-6318-RE

87

Tessar 1:3.6 f= 17.6.

Einzelobjektiv

Doppelobjektiv f= 17.6

Sphärische Korrection (Δs' / Δf')

Einfallsloch | Chromasie

Astigmatismus (Δs' / Δf')

Äquatorialwinkel | Meridionalwinkel

Fenster | Verzeichnung

Radien, Dicken und Abstände für f= 100 mm

Tessar 1:3.6, f= 17.6 mm 15. 8. 05

1:3.6

Linse | nd | νd - ν | r

Einzellinse

Doppelobjektiv

Aufsprung k = 1:1

k = 1:5

k = 1:20

k = 1:∞

a | b

No 93

F-TS-6398-RE

89

Tronnier 1:3,6 f=110,0 A 1.924527 vom 29.1.33 Nr. 5

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (AN 3/.65

Δs'		Δf'	

Δs'			Δf'		
-7,1	-4,0	+1,51	-6,0	-0,1	-1,4

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
32,3	45,7	56,0	-2,17 +1,61 -1,95

Astigmatismus (AN 4/.29

Sagittalfläche		Meridionalfläche	

Sagittalfläche			Meridionalfläche		
-3,5	-4,6	-4,7	-2,8	-2,8	-6,7

Frontwinkel | Verzeichnung

Frontwinkel			Verzeichnung

Frontwinkel			Verzeichnung		
39,2	54,5	66,6	991,48	995,30	991,38

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l	d3	d4
28,9	∞	66,4	27,0	∞	27,0	46,7	5,00	5,84	4,18	6,25	4,17	4,26

Tronnier 1:3,6 f=110,0 A 1.924527 vom 29.1.33 Nr. 5

Linse	nd	νd	ω
L1	1,5794		59,2
L2			45,3
L3			54,7
L4			61,5

Einzelobjektiv

Doppelobjektiv

a

f

a

f

K 1039

F-TS-6398-RE

89

Tronnier 1:3,8, f=110mm R 1.924527 v. 29.8.33. Nr. 4.

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (AN 4/.49

Δs'		Δf'	

Δs'			Δf'		
-9,4	-9,8	+5,1	-7,4	-6,1	+12,6

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
34,9	42,9	52,6	-4,10 (+4,19) -2,17

Astigmatismus (AN 4/.19

Sagittalfläche		Meridionalfläche	

Sagittalfläche			Meridionalfläche		
-1,5	-1,3	+5,6	+1,5	+1,6	-2,7

Frontwinkel | Verzeichnung

Frontwinkel			Verzeichnung		
37,2	53,3	65,1	991,90	997,24	994,44

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l	d3	d4
28,6	∞	76,8	28,6	∞	28,5	48,8	5,00	7,11	4,15	7,11	4,66	5,15

Tronnier 1:3,8, f=110mm A 1.924527 v. 29.8.33. Nr. 4.

Linse	nd	νd	ω
L1	1,5410		60,9
L2	1,5410		46,1
L3	1,5225		54,5
L4	1,6136		59,5

Einzelobjektiv

Doppelobjektiv

a

f

a

f

F-TS-6398-RE

№ 625

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f. F. v. F.) p3

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f. F.) pq/p1

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

90

F-TS-6398-RE

№ 337

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f. F. v. F.) p3 (Aqu. p1)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f. F.) pq

Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

91

F-TS-6398-RE

92

Nr 954

Reform lichtstarkes Objektiv 1:2, f = 96,2 mm v. 27.2.32

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (A.S. 274) mit Blende 1:2 = 96,2/47,5

Δs'

Δf'

Einfallshöhen

Chromasie

Astigmatismus (A.S. 2830/30-46)

Tangential

Sagittal

Meridional

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Reform lichtstarkes Objektiv 1:2, f = 96,2 mm v. 27.2.32

Linse

Einzellinse

Doppelobjektiv

F-TS-6398-RE

93

Nr 955

Leitz-Wetzlar: Leica-Objektiv 1:3,5; f = 5 cm, v. 23.8.30

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (A.S. 50 / Nr. 119)

Δs'

Δf'

Einfallshöhen

Chromasie

Astigmatismus (A.S. 2)

Tangential

Sagittal

Meridional

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Leitz-Wetzlar: Leica-Objektiv 1:3,5; f = 5 cm, v. 23.8.30

Linse

Einzellinse

Doppelobjektiv

Vergl. 3.1

F-TS-6398-RE

94

V 1930 Nr. 10 1:2,7 f=5 mm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (λ Kp.)

Δs' | Δf'

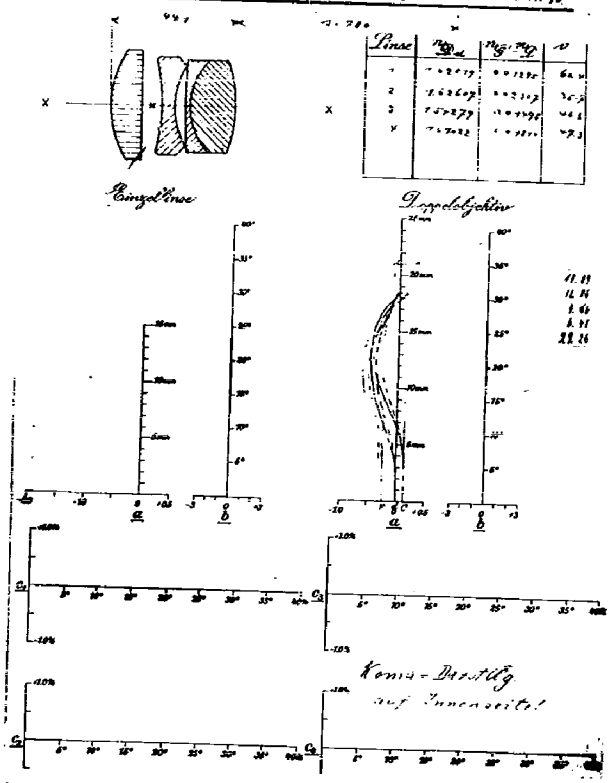
Einfallshöhen | Chromasie

Astigmatismus (Fl./Sg.)

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

95

Jos. Schneider 1:4,5 f. 105 mm № 4h 9h03 von 6433 Prospekt III

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (λ Kp.)

Δs' | Δf'

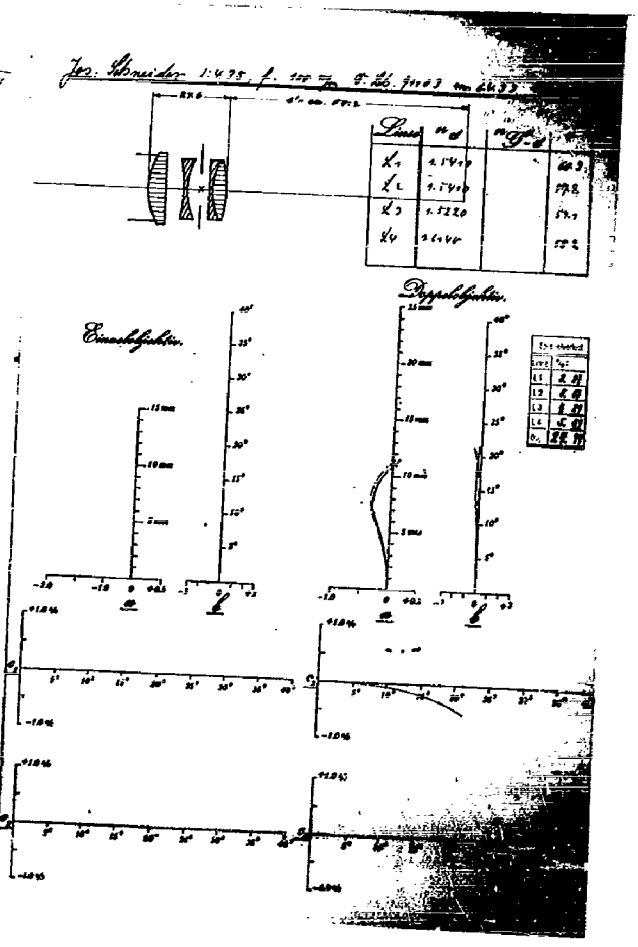
Einfallshöhen | Chromasie

Astigmatismus (Fl./Sg.)

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

95

№ 678

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection

Einzellinse.

Doppelobjektiv.

Radien, Dicken und Abstände für f = 100 mm.

F-TS-6318-RE

97

№ 2116

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection

Einzellinse.

Doppelobjektiv.

Radien, Dicken und Abstände für f = 100 mm.

F-75-6378-RE

98

Nr 1229

Doppelobjektiv.

Sphärische Korrektion

Astigmatismus

Einzelobjektiv.

Doppelobjektiv.

F-75-6396-RE

99

Nr 99

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion

Astigmatismus

Einzelobjektiv.

Doppelobjektiv.

F-TS-6388-RE

100

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsh. | Chromasie

Astigmatismus

Äquatorialhalbm. | Meridionalhalbm.

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6388-RE

101

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsh. | Chromasie

Astigmatismus

Äquatorialhalbm. | Meridionalhalbm.

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

L 1029

F-TS-6318-RE

102

Emmisser Kreuzpach 1:4,5 f=10cm A 1.924.527 u. 29.6.33

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (d.d. Mp. ...)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-10.5	-10.0	0.0	7.1	12.5	2.5

Einfallshöhen			Chromasie
26.7	36.3	44.6	3F (+16) 2.0

Astigmatismus (d.d. Mp. ...)

Sagittalwinkel	Meridionalwinkel

Frontwinkel	Vorzeichnung

Sagittalwinkel		Meridionalwinkel	
	2.0	+4.6	12.0 +0.6

Frontwinkel		Vorzeichnung
67.7	49.7	

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	L	d2	L	d3	d4	d5	A.F. in Stufe
38.7	158.0	6.4	23.3	1999	22.0	19.2	0.7	0.6	4.7	0.2	2.2	4.7	0.2	1 22.2

Emmisser Kreuzpach 1:4,5 f=10cm A 1.924.527 u. 29.6.33

Linse	n_d	n_F - n_C
1	1.62 0 0	0.0 1 0 3
2	1.62 1 0	0.0 1 0 3
3	1.62 1 0	0.0 1 0 3
4	1.61 0 3	0.0 1 - -

Einzelobjektiv

Doppelobjektiv

a b

a b

c d

F-TS-6318-RE

103

A. P. 1.552.073 H. J. Bielicke 1:4,5 f=18.8cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (A5.9 ...)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-0.6	-0.9	+3.6	-2.1	-7.9	+3.0

Einfallshöhen			Chromasie
25.7	36.3	44.5	

Astigmatismus (A5.9 ...)

Sagittalwinkel	Meridionalwinkel

Frontwinkel	Vorzeichnung

Sagittalwinkel		Meridionalwinkel	
-2.0	-6.0	-16.2	+3.2 -4.9 -6.3

Frontwinkel		Vorzeichnung
92.1	52.6	37.6

Radien, Dicken und Abstände für f = 100 mm.

R1	L	2	3	4	5	6	7		d1	L1	d2	L	d3	d4	d5	
25.9	15.0	68.1	3.5	-99.0	Lm.5	39.0			0.7	0.9	0.7	0.2	3.5	0.7	0.2	

A. P. 1.552.073 H. J. Bielicke 1:4,5 f=18.8cm

Linse	n_d	n_F - n_C	ν
L1	1.6 0 0 3	0.0 1 3 3	55.7
L2	1.7 0 0 2	0.0 1 0 7	29.8
L3	1.6 0 1 3	0.0 1 3 3	55.1
L4	1.6 1 5 3	0.0 1 - -	57.0

Einzellinse

Doppelobjektiv

a b

a b

c d

K 1127

F-75-6388-RE

104

Tessar 1:4,5 f=50 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen

Chromasie

Astigmatismus

Tangentialbüschel

Meridionalbüschel

Krümmung

Radien, Dicken und Abstände für f = 100 mm.

Tessar 1:4,5 f=50 cm

Einzelobjektiv

Doppelobjektiv

Linse

Lenses ! ! ! !

F-75-6388-RE

105

Tessar 1:4,5 f=50 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen

Chromasie

Astigmatismus

Tangentialbüschel

Meridionalbüschel

Krümmung

Radien, Dicken und Abstände für f = 100 mm.

Tessar 1:4,5 f=50 cm

Einzelobjektiv

Doppelobjektiv

Linse

Lenses ! ! ! !

F-TS-6398-RE

106

Tessar 1:4,5 f= 50 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf'

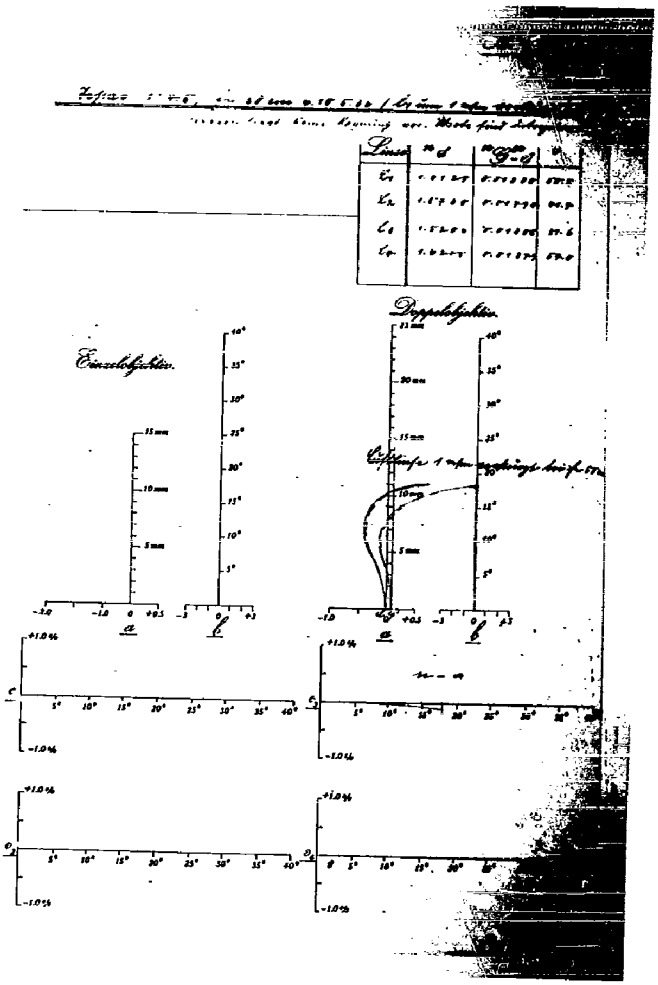
Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



F-TS-6398-RE

107

Tessar 1:4,5 f= 152,20 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs' | Δf'

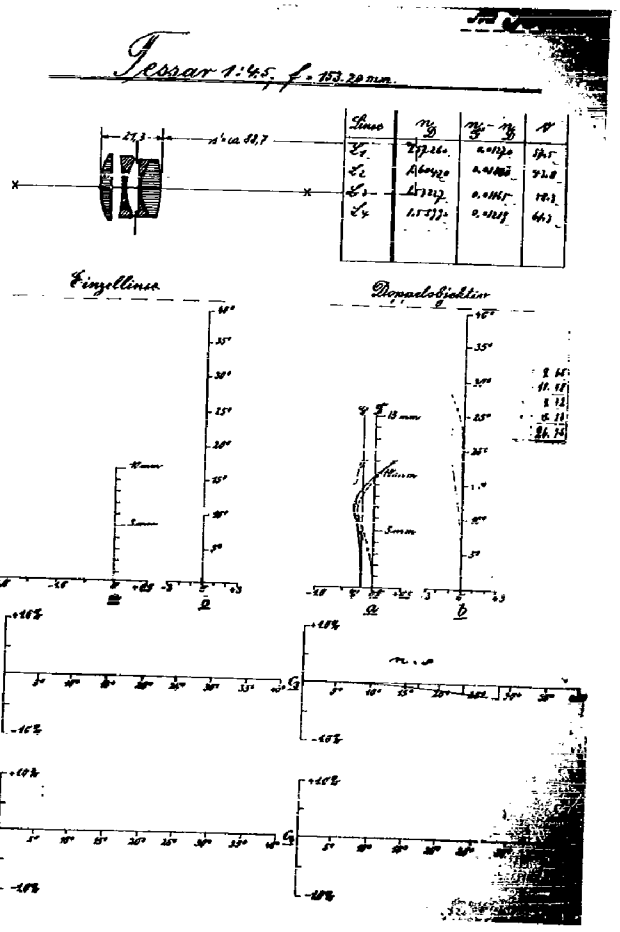
Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



F-TS-6398-RE

108

Tessar 1:4,5 f=150 mm ... Nr. 1924527 ... 29 I 33 ... 323

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A.S.A. 1,41)

Δs'	Δf'	Δs'	Δf'
		-14,8 -13,6 -6,4	+1,4 +4,2

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

20,1	36,8	44,4	-14 (+2,7) -5,5

Astigmatismus (A.S.A. 1,41)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2,5 -1,7	+3,4 -4,5 -2,4 +2,4

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

40,3	54,4	69,6

-tg = ∞

99,22 99,41 99,71

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
1,334	∞	-5,64	-2,34	-1,44	-1,22	-3,10	0,20	0,44	2,32	0,11	0,33	0,19

Tessar 1:4,5 f = ... mm ... Nr. 1924527 ... 29 I 33 ... Nr. 3

Linse	n_d	$n_F - n_C$	ν
L_1	1,524 10		60,4
L_2	1,614 15		36,1
L_3	1,522 21		58,1
L_4	1,614 16		36,6

Einzelobjektiv | Doppelobjektiv

a | b | a | b

$n = \infty$

F 11
A 4
S 42
C 71
24 11

F-TS-6398-RE

101

Tessar 1:4,5, f = 5[illegible] ... Nr. 15.11.39

Schopf-Einzelobjektiv $n = \infty$ | Doppelobjektiv $n = 5$ m

f = 296,2

F 32,20 1:4,5/A

Sphärische Korrection ( ) A.S.A. 32,41

Δs'			Δf'		
-18,8	-13,6	-4,0	-11,2	-13,6	-2,2
-20	-12	+14,5	-20	-12	+12,5

Einfallshöhen | Chromasie

25,5	36,2	44,5	-11,4 (+6) -10,5

Δs'			Δf'		
-16,2	-14,6	-2,2	-11,6	-10,2	-2,8
-14	-12	-8	-12	-10	-8

Einfallshöhen | Chromasie

25,5	36,2	44,5	-11 (+9) -10,5

F 11,34 Astigmatismus ( ) A.S.A. 1,93

Äquatorialbüschel			Meridionalbüschel		
-2,9	-2,5	+2,5	-2,5	-0,1	-1,3
-2,2	-1,0	+2,1	-1,5	-1,1	-2,2

Frontwinkel | Vorzeichnung

44,4	56,2	69,0

Äquatorialbüschel			Meridionalbüschel		
-4,1	-4,3	+2,1	-2,6	-2,5	-3,4
-4,6	-4,0	-3,0	-4,0	-3,0	-4,0

Frontwinkel | Vorzeichnung

44,4	56,2	69,0

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
1,34	∞	-5,2	-2,5	-1,5	-1,3	-3,8	0,2	3,0	-0,7	0,5	0,3	0,9

Tessar 1:4,5, f = 5[illegible] ... Nr. 15.11.39

Objektiv Nr. 2051495

Prüf. Photodefinition

Aus. 1:5,6 q 1:8,1, Platte 9 x 12.

Linse	n_d	$n_F - n_C$	ν
K_1	1,517 28		64,5
F_2	1,658 30		39,6
K_3	1,517 21		64,0
L_4	1,673 82		32,9

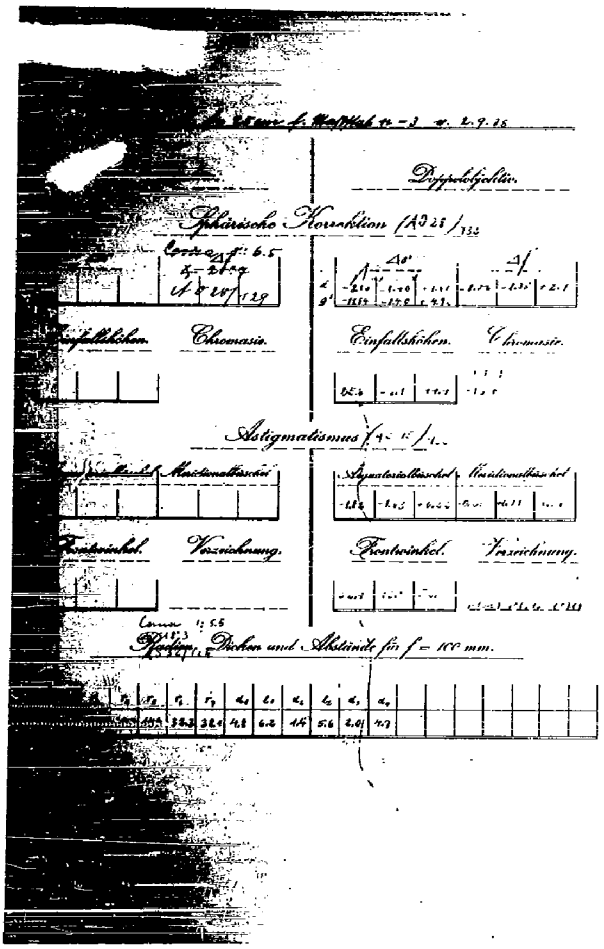
Doppelobjektiv $n = \infty$ | Doppelobjektiv $n = 5$ m

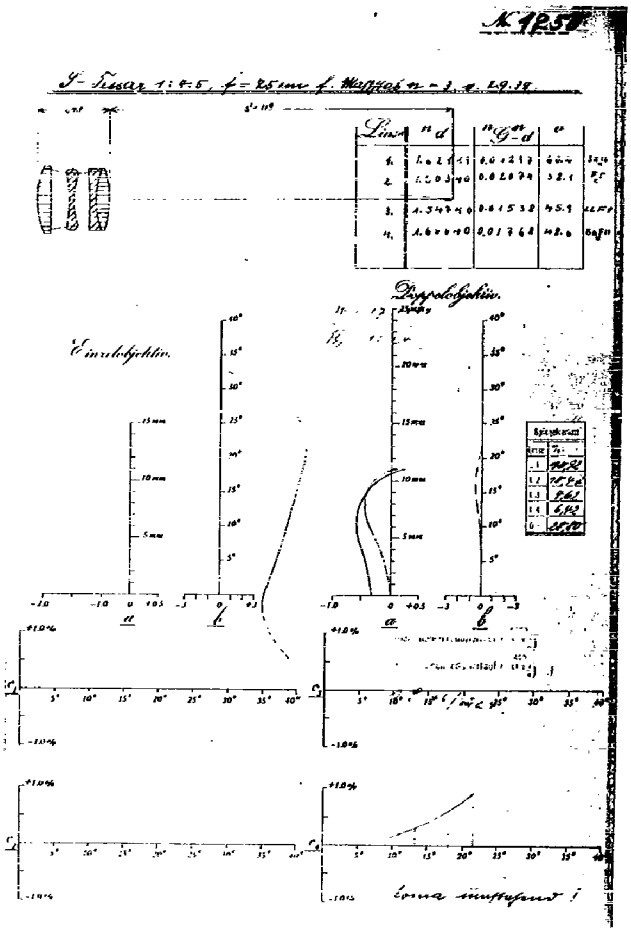
a | b | a | b

$n = \infty$ | $n = 5$

F-TS-6388-RE

110





F-TS-6398-RE

111

№ 206

Tessar 1:4,5 f = 150 mm v. ? F 09

Doppelobjektiv für G'

Einzellinse

Doppelobjektiv

Sphärische Korrection (R. XIII)

Δs'			Δf'			s'/s	s'o	Δs'			Δf'		
-6.5	-4.8	+8.7	-6.4	-4.8	+8.4		5.1	-9.3	-11.3	-2.7	-9.2	-11.5	-3.2

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

23.8	36.1	44.3	(-11)	(-5)	(-14) (-22)
			-12.1	-5	+2.2 +13.0

Astigmatismus (R. XIII) 110, 11

Aequatorialbauchbl.		Meridionalbauchbl.			s'/s	s'o	Aequatorialbauchbl.		Meridionalbauchbl.			
-2.7	-2.7	+2.7	-1.3	-1.3	-1.3		1.0	-3.2	-2.9	+1.9	-1.3	-0.5	-2.7

Frontwinkel | Zeichnung | Bed. | Frontwinkel | Zeichnung | Bed.

49	55.9	68	84	-83	-92	-116	-290	40	56	68	83	-92	-91	-113	-295
				-77	-91	-113	-282					-78	-90	-112	-279
				+4	+1	+3	+8					+4	+1	+1	+6

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	d4	D1	D2	D3
26.9	63.4	355	47.1	25	357		3.7	3.9	2.0	3.6	1.7	2.0	4.3	2.3	2.8	2.6

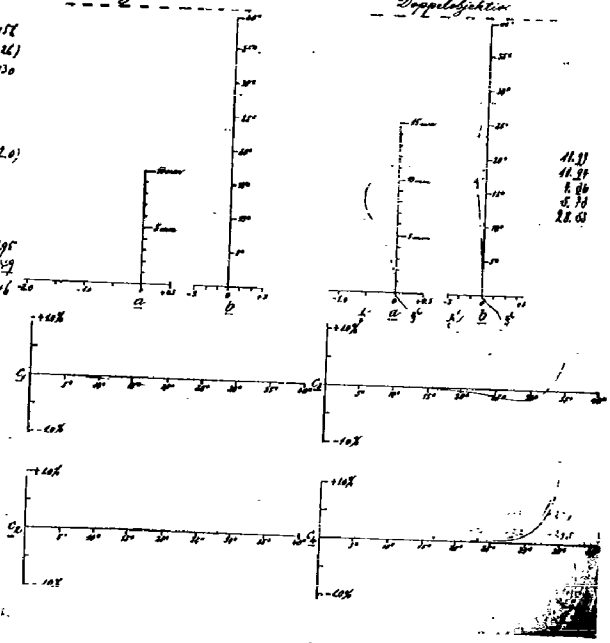
Tessar 1:4,5 f = 150 mm v. ? F 09

Linse	n_g	$n_g - n_C$	ν
L_1	1.62396	0.01398	57.1
L_2	1.62250	0.02069	39.6
L_3	1.62761	0.01303	51.9
L_4	1.62327	0.01502	53.2

Doppelobjektiv für G'

Einzellinse

Doppelobjektiv



F-TS-6398-RE

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№ 700

V 1926 Nr 1 und V 1926 Nr 2, 1:4,5, f = 15cm v. 5.2.26

Frontlinse | Einzellinse

V 1926 Nr 2

Doppelobjektiv

V 1926 Nr 1

Sphärische Korrection (cf R 19.7?)

Δs'			Δf'		
-3.9	-3.0	-3.9	-3.0	-3.0	-3.5
-2.3	+1.5	+1.5	-2.0	+1.7	+1.4

Einfallshöhen | Chromasie

36.7	46.1	49.5	1.27	
			(+1.01)	
			0.7	

Einfallshöhen | Chromasie

36.7	46.1	49.5	-.65	
			(1.27)	
			0.1	

Astigmatismus (cf R 19.7?)

Aequatorialbauchbl.			Meridionalbauchbl.		

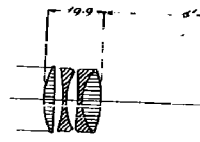
Frontwinkel | Zeichnung

42.5	48.0	49.5			

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	d4	D1	D2	D3
26	57.4	96.5	51.5	1118	34.5	33.5	3.5	3.7	1.9	3.4	1.6	1.9	4.1	2.2	2.6	2.5

V 1926 Nr 1 und V 1926 Nr 2, 1:4,5, f = 15cm v. 5.2.26



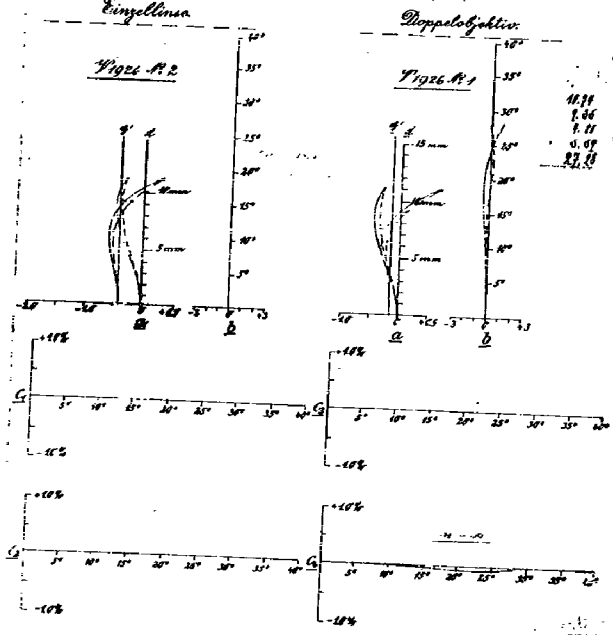
Linse	n_g	$n_g - n_C$	ν
	V 1926 Nr 1		
$L_1 - L_2$	1.61194	1.01393	55.9
L_3	1.63919	1.01531	46.9
	V 1926 Nr 2		
L_1	1.61191	1.01393	55.9
$L_2 - L_3$	1.63959	1.01531	46.9
L_4	1.61191	1.01393	55.9

Einzellinse

V 1926 Nr 2

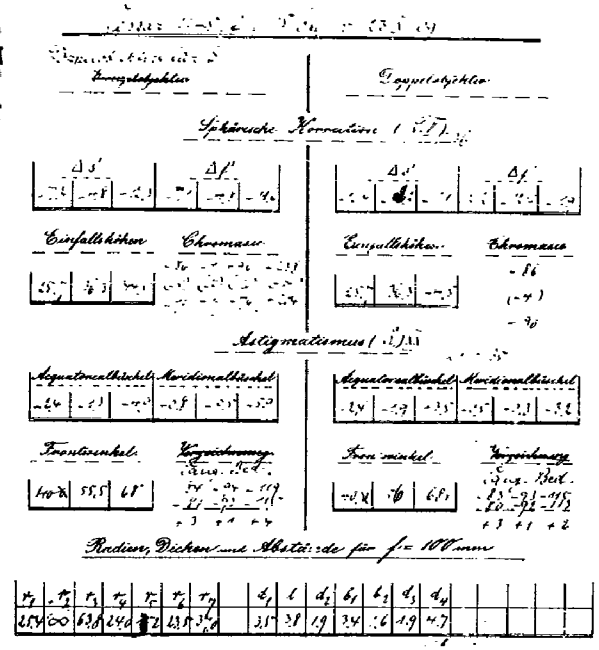
Doppelobjektiv

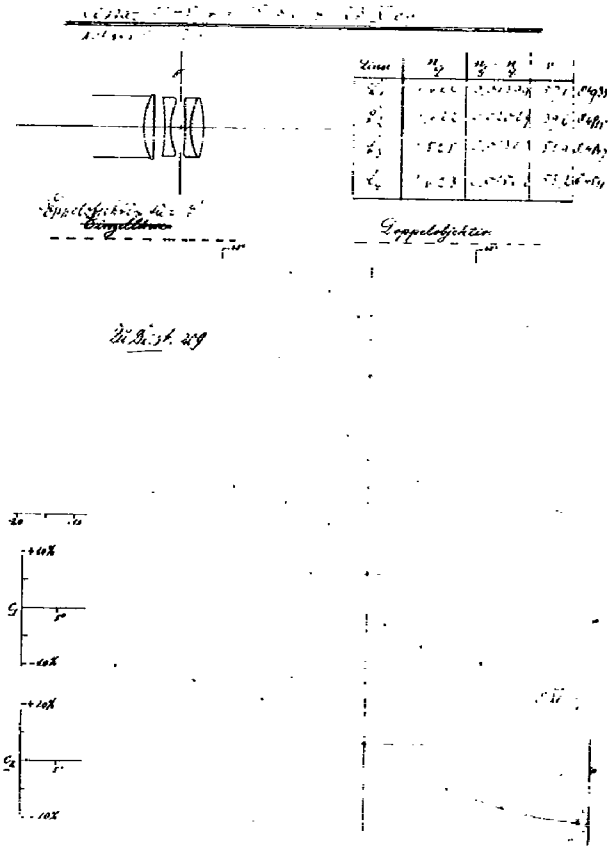
V 1926 Nr 1



F-TS-6398-RE

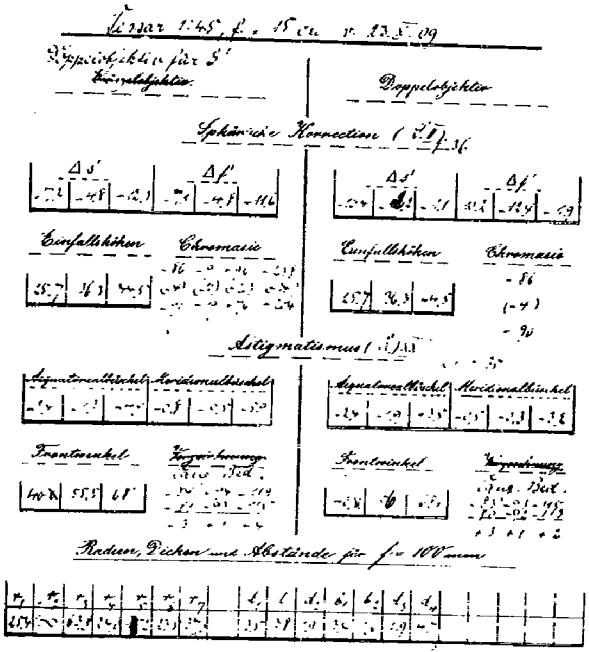
113

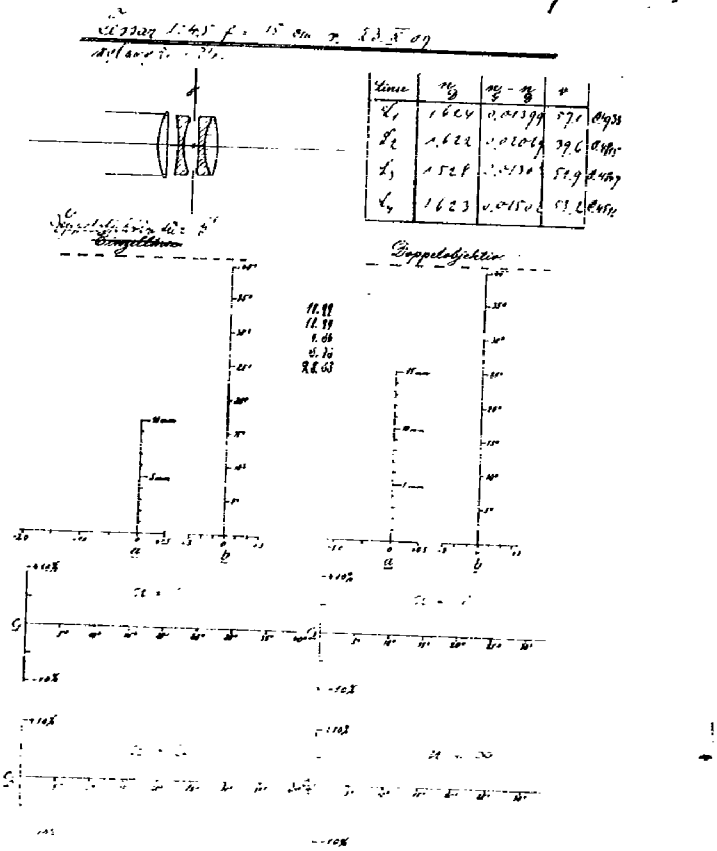




F-TS-6398-RE

114





F-TS-6398-RE

1/5

Objektiv 1:4,5 f= 50 cm Rohg. [illegible]

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion für [illegible]

Δs'

Δt'

Einfallshöhen

Chromasie

Astigmatismus für [illegible]

Sagittalbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r	d	n	ν	r	d	n		r	d	r	d	r	r		d	n	ν
88.6	7.50	1.75	27.5	170	11.5	1.5		3.5	93.5	23.5	1.5	7.5	6.4		13.4	1.49	63

Einzelobjektiv

Doppelobjektiv

Linse | n_d | n_F - n_d | ν

L1 | 1.6 4156 | 0.5417 | 57.2

L2 | 1.5891 47 | 0.5919 | 60.9

L3 | 1.7377 49 | 0.3128 | 27.7

L4 | 1.6161 1 | 0.5981 | 37.0

Coma o. anom. Tag!

F-TS-6398-RE

1/6

Astr. Linar 1:4,5 f. 15 cm - Rondel u. C. Frankfurt (M. [illegible])

Prüfungsschein 1917

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (d. 87 η s.)

Δs'

Δt'

Einfallshöhen

Chromasie

Astigmatismus (d. 88 ββ.)

Sagittalbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d	r9	d2	d3	n1	n2	ν
88.5	∞	42.5	32.6	177	10.2	12.7	3.9	0.4	28	7.1	7.5	1.5	46	11

(Astr. Linar 1:4,5, f. 15 cm - Rondel u. C. Frankfurt (M. [illegible]))

Prüfungsschein 1917

Linse | n_d | n_F - n_d | ν

L1 | 1.6 4156 | 0.5417 | 57.2

L2 | 1.5891 47 | 0.5919 | 60.9

L3 | 1.7377 49 | 0.3128 | 27.7

L4 | 1.6161 1 | 0.5981 | 37.0

Einzellinse

Doppelobjektiv

F-TS-6308-RE

Tessar 1:4,5 f 15 cm mit Anzeigeblatt ca. 18 x 24

Typ 0 Nr. 9 Zeiss Jena Nr. 109

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Öffnung) ca. 24 mm

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Öffnung) ca. 15

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

117

Tessar 1:4,5 f 15 cm mit Anzeigeblatt ca. 18 x 24

Typ 0 Nr. 9 Zeiss Jena Nr. 109

Linse	n_d	$\nu_d - \nu_F$	r_d
L_1	1.6225	0.0150	58.9
L_2	1.6221	0.0207	19.6
L_3	1.5278	0.0150	52.0
L_4	1.6171	0.0141	55.1

Einzellinse | Doppelobjektiv

11.97
11.99
1.66
6.15
24.77

n = ∞

F-TS-6398-RE

Tessar 1:4,5 f 15 cm v. 15. 1. 17

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Öffnung)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Öffnung)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

118

Tessar 1:4,5 f 15 cm v. 15. 1. 17 № 472

Linse	n_d	$\nu_d - \nu_F$	r_d
L_1	1.6225	0.0150	58.9
L_2	1.6221	0.0207	19.6
L_3	1.5278	0.0150	52.0
L_4	1.6171	0.0141	55.1

Einzellinse | Doppelobjektiv

11.97
11.99
1.66
6.15
24.77

n = ∞

№ 411

F-TS-6388-RE

119

Tessar 1:4.5 f. 163.3 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Abw. d. Sk.)

Δs'	Δf'	Δs'	Δf'
		11.5	12.5
		-6.1	-11.8

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		15.8	9.6

Astigmatismus (Bildfeldwölbung)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-1.4	-3.7
		-2.3	-2.2

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		47.3	57.5

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6
22.7	∞	57.9	49.1	25.7	9.1	16.3	3.5	1.1	1.4	2.2	1.2	3.0	5.8

Tessar 1:4.5 f. 163.3 mm

Linse	n_g	$n_g - n_b$	ν
L_1	1.57355	0.01117	55.3
L_2	1.57739	0.01771	42.6
L_3	1.61328	0.01332	37.6
L_4	1.61176	0.01451	36.6

Einzellinse. | Doppelobjektiv.

1.61
1.57
1.56
6.66
24.81

a b

+10% -10%

№ 413

F-TS-6398-RE

120

Tessar 1:4.5, f. 25 cm v. 24.11.16.

Erweiterter Bildwinkel

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Abw. d. Sk.)

Δs'	Δf'	Δs'	Δf'
		-11.8	-14.9
		-3.9	-8.3

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		25.6	16.2

Astigmatismus (Bildfeldwölbung)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-2.0	-0.5

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		70.1	76.2

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6
23.3	∞	65.1	12.5	14.4	11.0	19.2	2.8	5.4	1.6	5.6	1.3	4.6	5.9

Tessar 1:4.5, f. 25 cm v. 24.11.16.

Erweiterter Bildwinkel

Linse	n_g	$n_g - n_b$	ν
L_1	1.57124	0.01127	57.5
L_2	1.57995	0.01815	41.6
L_3	1.57887	0.01310	52.9
L_4	1.61177	0.01491	35.1

Einzellinse. | Doppelobjektiv.

2.66
2.28
2.08
6.66
21.68

a b

+10% -10%

№ 839

F-75-639B-RE

121

Einzelobjektiv | Doppelobjektiv

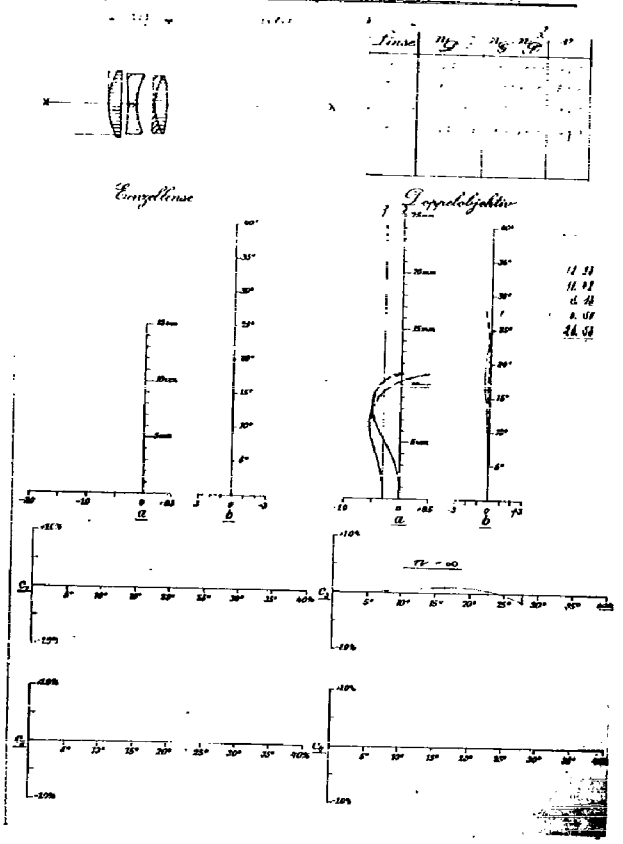
Sphärische Korrektion

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



№ 843

F-75-639B-RE

122

Einzelobjektiv | Doppelobjektiv

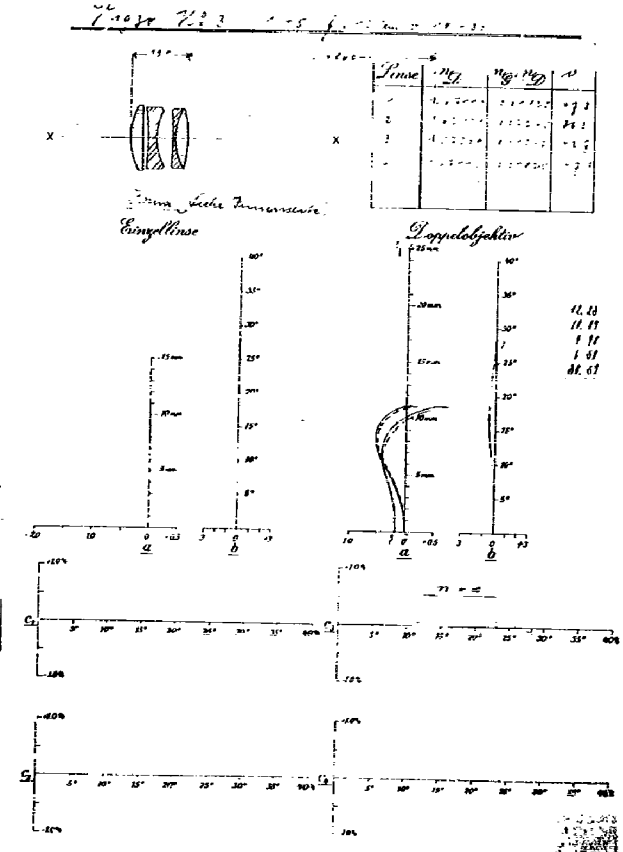
Sphärische Korrektion

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



№ 856

F-TS-6328-RE

123

V 1930, Nr. 4; 1:4.5; f = 13.5cm; v. 3.7.30.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (ΔS' 13 bis

Einzelobjektiv		Doppelobjektiv			
Δs'	Δf'	Δs'		Δf'	
		-2.0	-2.3	+2.3	-0.7	-2.3	+2.6

Einfallshöhen | Chromasien | Einfallshöhen | Chromasien

Einzelobjektiv			Doppelobjektiv		
			28.7	28.3	99.6

(4.6 / (+ 0.3 / - 4.9

Astigmatismus (ΔK = ½ s - s'

Einzelobjektiv				Doppelobjektiv			
Äquatorialbüschel		Meridionalbüschel		Äquatorialbüschel		Meridionalbüschel	
				-2.1	-2.0	+2.3	-2.1	-1.0	+0.8

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Einzelobjektiv		Doppelobjektiv		
		44.4	45.1	46.0

einm. 0.044 0.021
2.m -2.55 -4.5c

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	fr	fg
284.1	98.2	27.—	444	44.4	44.4	44.3	3.5	2.0	3.5	1.3	0.2	0.3	11.—				0.8	88.5	88.2

V 1930, Nr. 4; 1:4.5; f = 13.5cm; v. 3.7.30.

Linse	n_d	$n_g - n_d$	ν
L_1	1.62[illegible]	0.0[illegible]	49.3
L_2	1.61[illegible]	0.0[illegible]	36.3
L_3	1.62[illegible]	0.0[illegible]	49.3
L_4	1.62[illegible]	0.0[illegible]	49.3

Einzellinse | Doppelobjektiv

a | b

$T_2 = \infty$

C_1 | C_2

C_2

№ 833

F-TS-6329-RE

124

V 1929 Nr 13, 1:4.5, f = 10.5 cm v. 28.11.29.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (ΔS' 16 bis

Einzelobjektiv		Doppelobjektiv			
Δs'	Δf'	Δs'		Δf'	
		-2.0	-2.0	+2.2	-1.5	-2.7	+2.0

Einfallshöhen | Chromasien | Einfallshöhen | Chromasien

Einzelobjektiv			Doppelobjektiv		
			28.5	28.0	99.2

(2.1)

Astigmatismus (ΔK = ½ s - s'

Einzelobjektiv				Doppelobjektiv			
Äquatorialbüschel		Meridionalbüschel		Äquatorialbüschel		Meridionalbüschel	
				-2.7	-2.2	+2.1	-1.5	-1.0	+0.8

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Einzelobjektiv		Doppelobjektiv		
		44.1	45.5	46.2	47.0

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	fr	fg
284.6	∞	27.3	22.4	22.2	22.2	96.1	3.3	2.3	2.0	0.5	1.6	0.7	12.2	12.5	44.1	12.9	12.7

V 1929 Nr 13, 1:4.5, f = 10.5 cm v. 28.11.29.

Linse	n_d	$n_g - n_d$	ν
L_1	1.58[illegible]	0.0[illegible]	59.3
L_2	1.58[illegible]	0.0[illegible]	42.5
L_3	1.62[illegible]	0.0[illegible]	49.3
L_4	1.62[illegible]	0.0[illegible]	49.3

Einzellinse | Doppelobjektiv

a | b

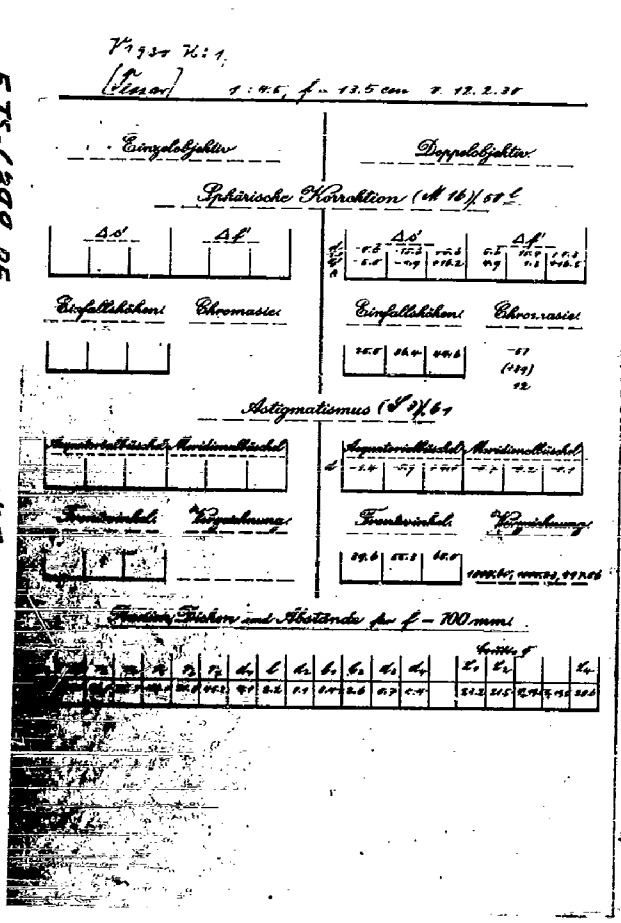
$T_2 = \infty$

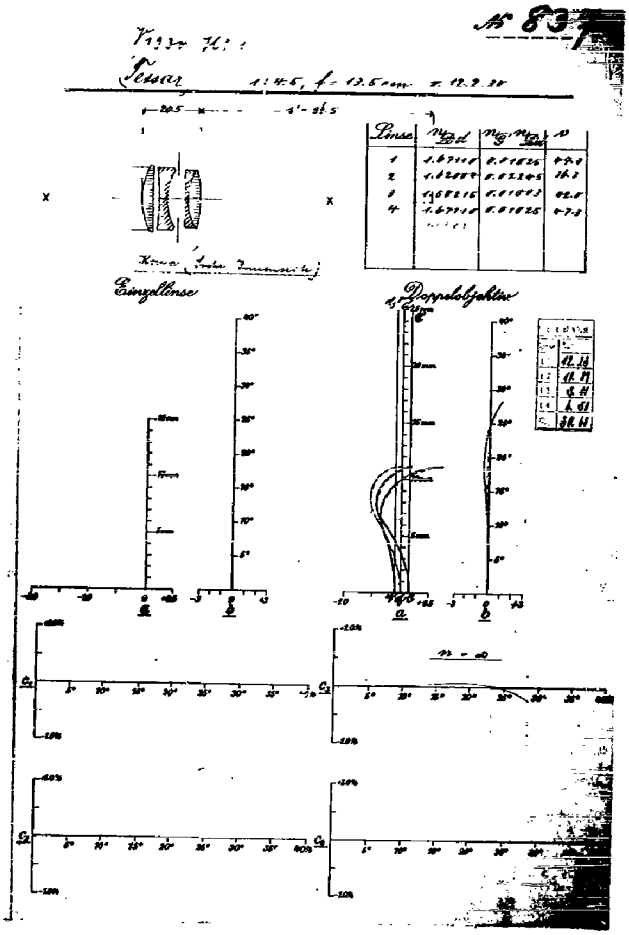
C_1 | C_2

C_2

F-TS-6378-RE

125





F-TS-6388-RE

126

Einzellinse / Doppelobjektiv

Sphärische Korrektion

Einzellinse — Doppelobjektiv

Einfallshöhen — Chromasie

Astigmatismus

Tangential — Sagittal

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6388-RE

127

№ 792

Einzellinse — Doppelobjektiv

Sphärische Korrektion

Einfallshöhen — Chromasie

Astigmatismus

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-75-6378-RE

128

№ 709

Goerz Anastigmat 1:7.5 f. 15 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f'; νγ)

Δs'		Δf'	

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (f; s')

Aequatorialbrachel	Meridionalbrachel	Aequatorialbrachel	Meridionalbrachel

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f' = 100 mm:

R_1	d_1	R_2	d_2	R_3	d_3	R_4	d_4	R_5	d_5	R_6	d_6	R_7	d_7	R_8	d_8	R_9	d_9	R_{10}	d_{10}

Linse | n_D | $n_F - n_D$ | $n_D - n_C$ | V

Eingellinse

Doppelobjektiv

F-75-6378-RE

129

№ 714

Kapella Ltd. E.P. № 209371 1:4.5 f. 10 cm

1. Beispiel

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f'; νγ)

Δs'		Δf'	

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (f; s')

Aequatorialbrachel	Meridionalbrachel	Aequatorialbrachel	Meridionalbrachel

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f' = 100 mm:

r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	r_5	d_5	r_6	d_6	r_7	d_7	r_8	d_8	r_9	d_9	r_{10}	d_{10}

Linse | n_D | $n_F - n_D$ | $n_D - n_C$ | V

Eingellinse

Doppelobjektiv

F-75-1398-RE

130

№ 12R

Skopar 1:4.5, f = 13.5 cm v. Voigtländer (Braunschweig) 1936

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	n	ν	nF	nC
180.5	305.8	1180.8	144.4	99.5	∞	88.3	4.2	4.5	2.7	4.6	2.0	4.7	1.51	60.2	1.51	1.51

Skopar 1:4.5, f = 13.5 cm v. Voigtländer (Braunschweig) 1936

Linse	$n_F - n_C$	ν
1		
2		
3		
4		

Einzellinse | Doppelobjektiv

F-75-1398-RE

131

№ 760

Voigtländer 1:4.5, f = 13.5 cm, Skopar, Braunschweig

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	n	ν
36.4	39.3	∞	19.22	2.2	3.1	19.2	5.1	1.1	9.2	9.2	1.1	3.7	1.5	1.5

Voigtländer 1:4.5, f = 13.5 cm, Skopar, Braunschweig

Linse	n_D	$n_F - n_D$	ν
1			
2			
3			
4			

Einzellinse | Doppelobjektiv

№ 772

F-75-6398-RE

1:3.2

Vigor R11, 1:4.5, f=10cm v. 7.9.27.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d. Fokus).

Δs'	Δf'

Einfallshöhen | Chromasien

Δs'			Δf'		
-2.3	-2.2	-1.2	-1.0	-1.0	-1.3

Einfallshöhen | Chromasien

35.0	24.3	44.5

Astigmatismus (d. Fokus): +2.8/+2.4

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2.9 -2.7 +2.3 +2.5	-2.7 +1.8 +2.5 +2.5

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

42.3	46.0	47.0 m

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l	d3	d4	n	n	n	n	n
125.0	87.8	61.6	44.3	112.8	27.5	36.0	2.3	0.5	1.0	0.5	1.0	0.5	2.2	2.2	1.0	1.0	1.0

Vigor R11 1:4.5, f=10cm v. 7.9.27

Linse	n_d	$n_F - n_C$	ν
I	1.52249	0.01370	66.8
II	1.69672	0.01703	39.9
III	1.61125	0.02037	56.0
IV	1.69672	0.01703	39.9

Einzellinse | Doppelobjektiv

I. II. I. II. II. III. I. II. II. II.

F-75-6398-RE

1:3.3

Doppel-Einzelobjektiv | Doppelobjektiv

Blende zwischen Fläche 2 u. 3 | Blende zwischen Fläche 4 u. 5

Sphärische Korrektion (S. 11, 11)

Δs'	Δf'

Einfallshöhen | Chromasie

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

42.5	46.3	47.0	999.65	999.58	997.48

42.3	46.8	46.0	999.62	997.94	999.38

Radien, Dicken und Abstände für f = 100 mm.

№ 464

Tessar 1:4.5, f = 15 cm von St. 7.11

Berechnung für die drei verschiedenen Blendenlagen.

Linse	n_D	$n_F - n_C$	ν
L1	1.57477		57.5
L2	1.57478		41.9
L3	1.57478		57.7
L4	1.61748		54.1

Einzellinse | Doppelobjektiv

I. II. I. III. I. II. I. III. II. III.

Blende zwischen Fläche 2 u. 3 (1.1 x 1.1) | Blende zwischen Fläche 4 u. 5 (1.1 x 1.1)

№ 42

F-75-6398-RE

194

Tessar 1:4,7 f 158,3 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (LB)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (LB)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:4,7 f 158,3 mm

Linse | n_e | $n_F - n_C$ | ν

L_1 | 1,51123 | 0,01102 | 63,6

L_2 | 1,61693 | 0,01755 | 55,9

L_3 | 1,51262 | 0,01125 | 60,1

L_4 | 1,61731 | 0,01125 | 37,2

Einzellinse | Doppelobjektiv

a | b | a | b

G | G

G | G

№ 92

F-75-6398-RE

135

Tessar 1:4,5 f 156 mm

Einzelobjektiv | Doppelobjektiv

Doppelobjektiv für $\frac{1}{2}$"

Sphärische Korrection (A 9325/5)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

(A 9325/5)

Astigmatismus (CD)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:4,5 f 156 mm

Linse | n_e | $n_F - n_C$ | ν

1 | 1,61259 | 0,01190 | 56,3

2 | 1,67139 | 0,01216 | 46,4

3 | 1,61477 | 0,01177 | 56,6

III | 1

Einzellinse | Doppelobjektiv

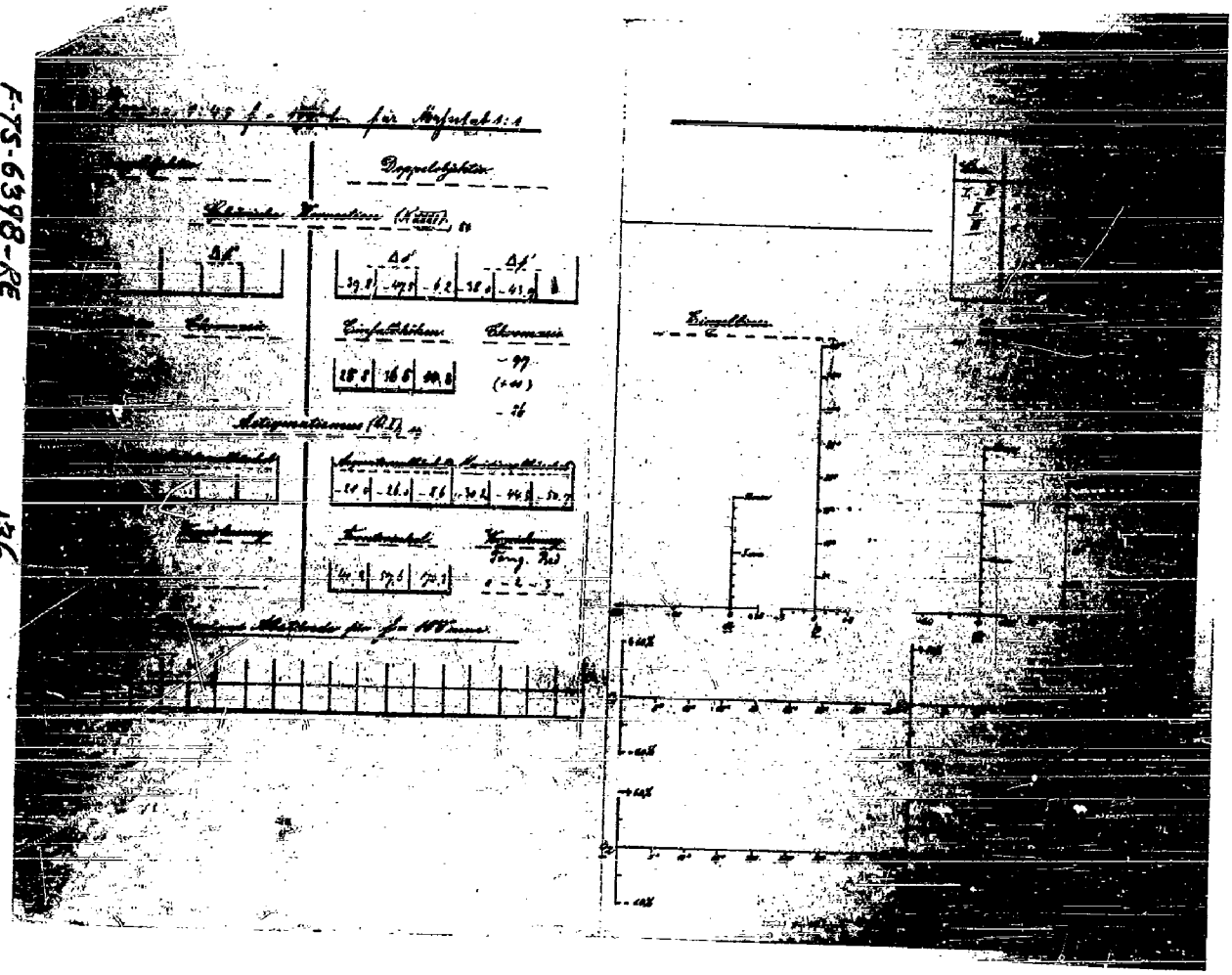
a | b | a | b

G | G

G | G

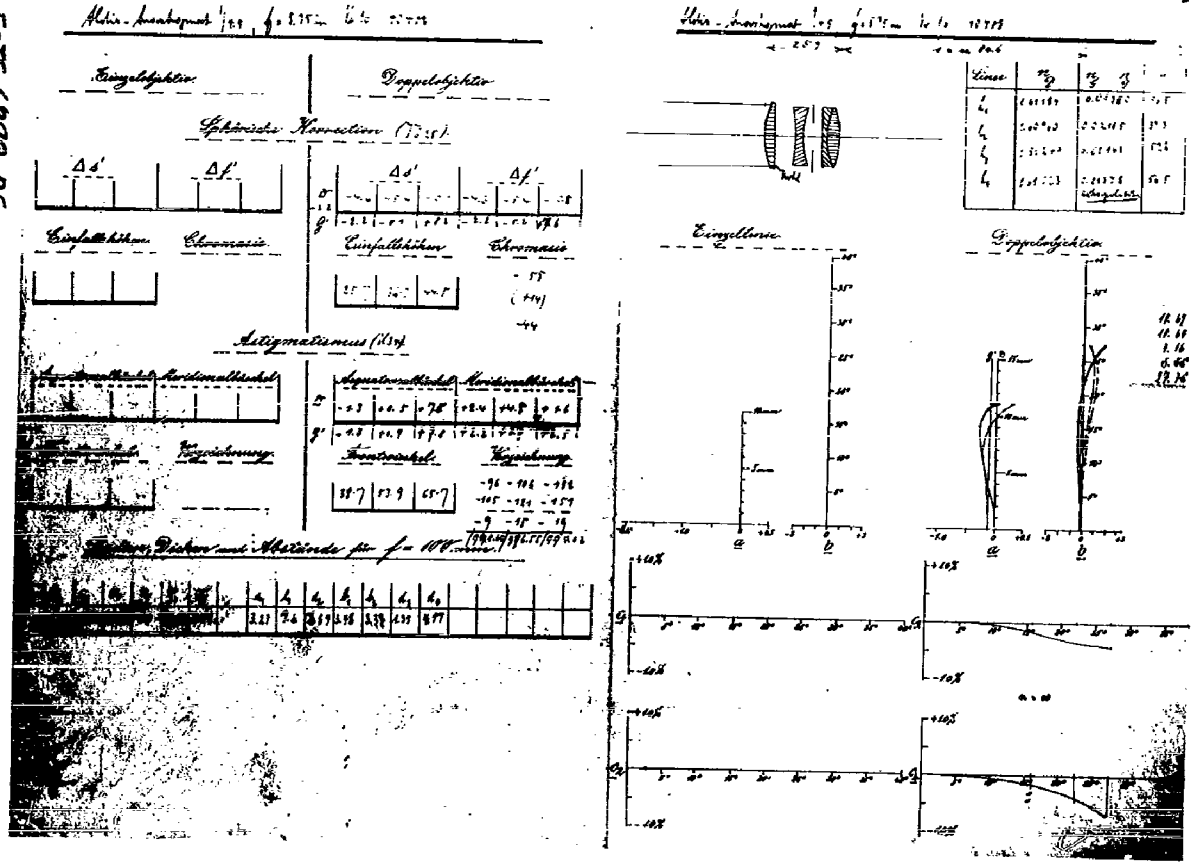
F-TS-6398-RE

136



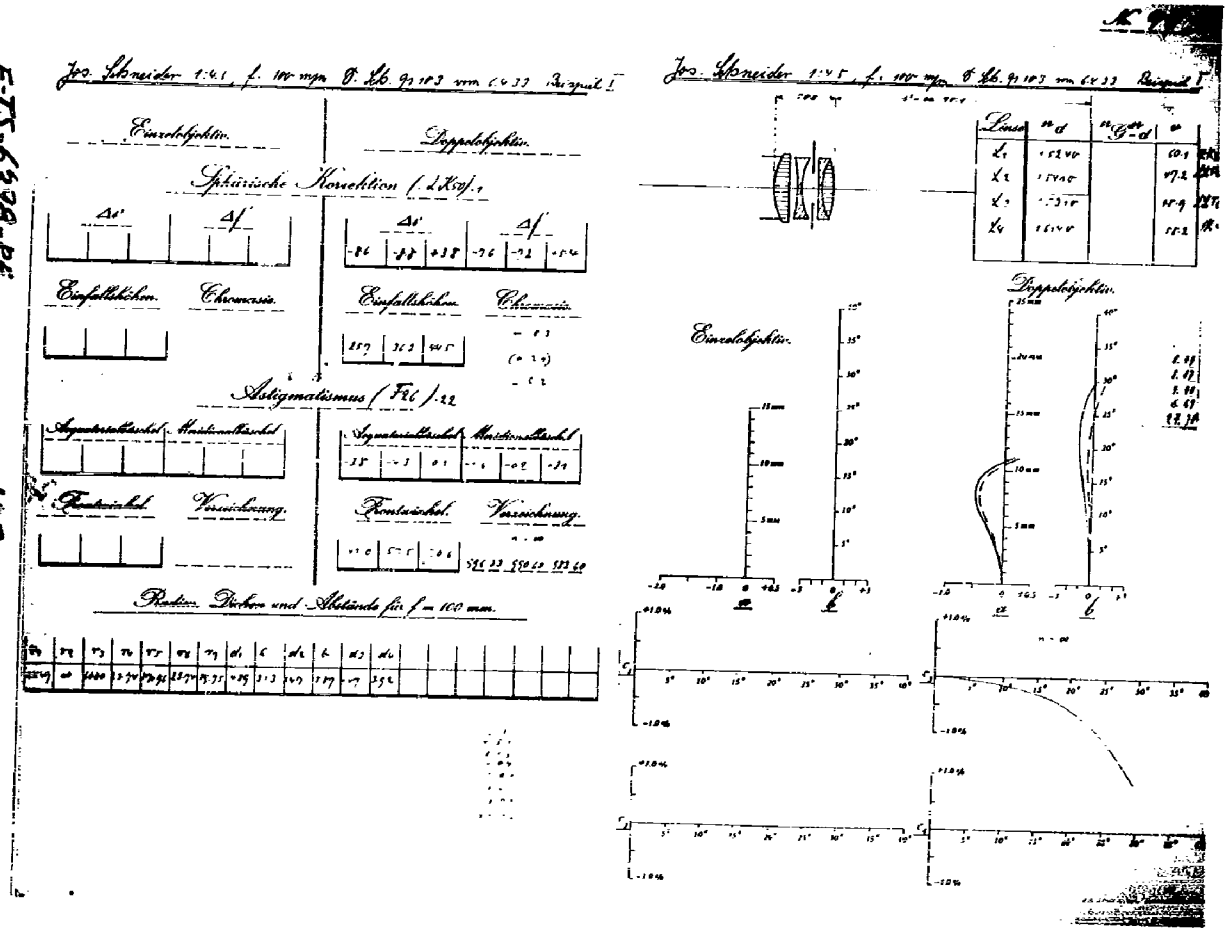
F-TS-6398-RE

137



F-TS-6398-RE

138



F-75-6398-RE

139

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasien

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

F-75-6398-RE

140

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasien

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

F-75-6398-RE

1941

Ussar 1:4,7 f= 105 mm v. 7.11.04

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Mm)

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus (Mm)

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f= 100 mm

Ussar 1:4,7 f= 105 mm v. 7.11.04

Linse n_D $n_F - n_C$ ν

Einzellinse

Doppelobjektiv

F-75-6398-RE

1942

Nr. 14

X-R-Tessar 1:4,5 f= 50 mm Blende 4 8 11 16

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Mm)

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus (Mm)

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f= 100 mm.

X-R-Tessar 1:4,5 f= 50 mm Blende 4 8 11 16

Linse r d n_D ν

Einzelobjektiv

Doppelobjektiv

F-75-6398-RE

143

J.-R.-Tessar 1:4,8; f=50mm. Reihe v. 24.11.36

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AR 24/4)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2,0 -4,0 +2,4	-7,2 -7,1 +2,4

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		24,3 34,3 42,3	+ 1,3 (+ 1,1) + 2,0

Astigmatismus (AR 24/4)

Einzelobjektiv Sagittenbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittenbüschel	Doppelobjektiv Meridionalbüschel
		-0,5 -1,7 -0,2 -0,5	

Einzelobjektiv Frontneigung	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontneigung	Doppelobjektiv Verzeichnung
		27,3 29,5	+0,24 +0,21

Radien, Dicken und Abstände für f = 100 mm.

Nr.	1	2	3	4	5	6	7		r_1	r_2	r_3	r_4	r_5	r_6
29,3	∞	54,5	22,6	115,4	14,1	33,8			3,6	4,3	2,7	5,4	1,3	3,3
		d_1	d_2	d_3	d_4	d_5								

Einzelobjektiv. Doppelobjektiv.

a b a b

K 1035

F-75-6398-RE

144

Tessar 1:4,8 f=100mm, N. 1924527 u. 29.1.33. Nr. 2.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AR 3/40)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-5,0 -4,1 -1,3	-4,3 -5,1 -0,3

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		24,1 34,8 44,7	-2,3 (-1,6) -2,9

Astigmatismus f. d. Nr. 3

Einzelobjektiv Sagittenbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittenbüschel	Doppelobjektiv Meridionalbüschel
		-1,6 -1,6 -1,6	-1,9 -1,3 -1,2

Einzelobjektiv Frontneigung	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontneigung	Doppelobjektiv Verzeichnung
		51,3 53,5 65,2	n = 00 +0,65 +0,78 +0,93

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6	
44,6	∞	37,03	63,89	∞	13,56	38,86	4,41	4,78	1,61	0,18	1,61	0,18	1,61

Tessar 1:4,8 f=100mm, N. 1924527 u. 29.1.33. Nr. 2.

Einzelobjektiv. Doppelobjektiv.

F-TS-6398-RE

Tessar 1:4,5 f. 110 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' Δf'

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:4,5 f. 110 mm

Linse	n_D	$n_F - n_C$	ν
L1	1.51427	0.01019	63.6
L2	1.75540	0.01601	45.6
L3	1.75615	0.02572	32.4
L4	1.51387	0.01281	57.2

Einzellinse | Doppelobjektiv

a b

G1 G2

+10% -10%

F-TS-6398-RE

A-Tessar 1:6 f. 50 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' Δf'

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

A-Tessar 1:6 f. 50 mm

Linse	n_D	$n_F - n_D$	ν
1	1.61196	0.01623	58.4
2	1.67281	0.01796	44.6
3	1.62379	0.01791	52.8
4	1.67949	0.01970	46.5

Einzellinse | Doppelobjektiv

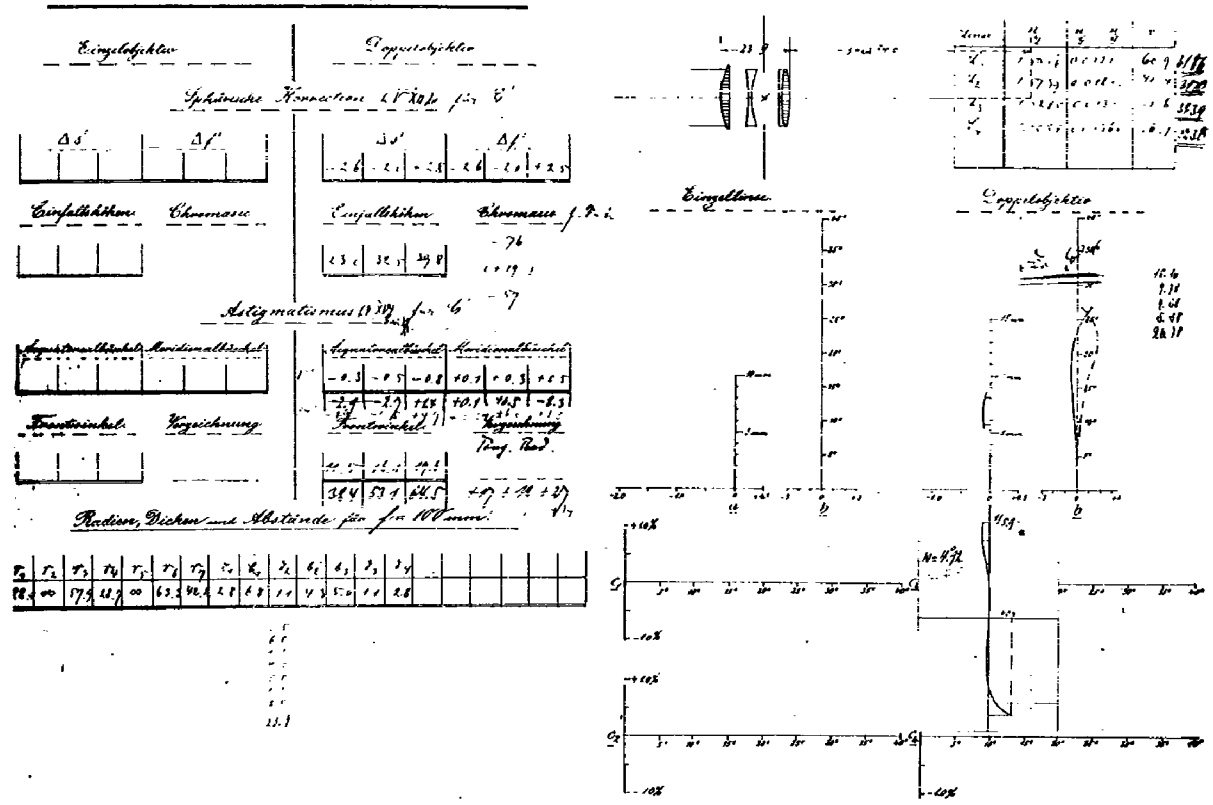
A-Tessar 1:6 f. 50 cm

Sphär. | Astigm.

Distortion

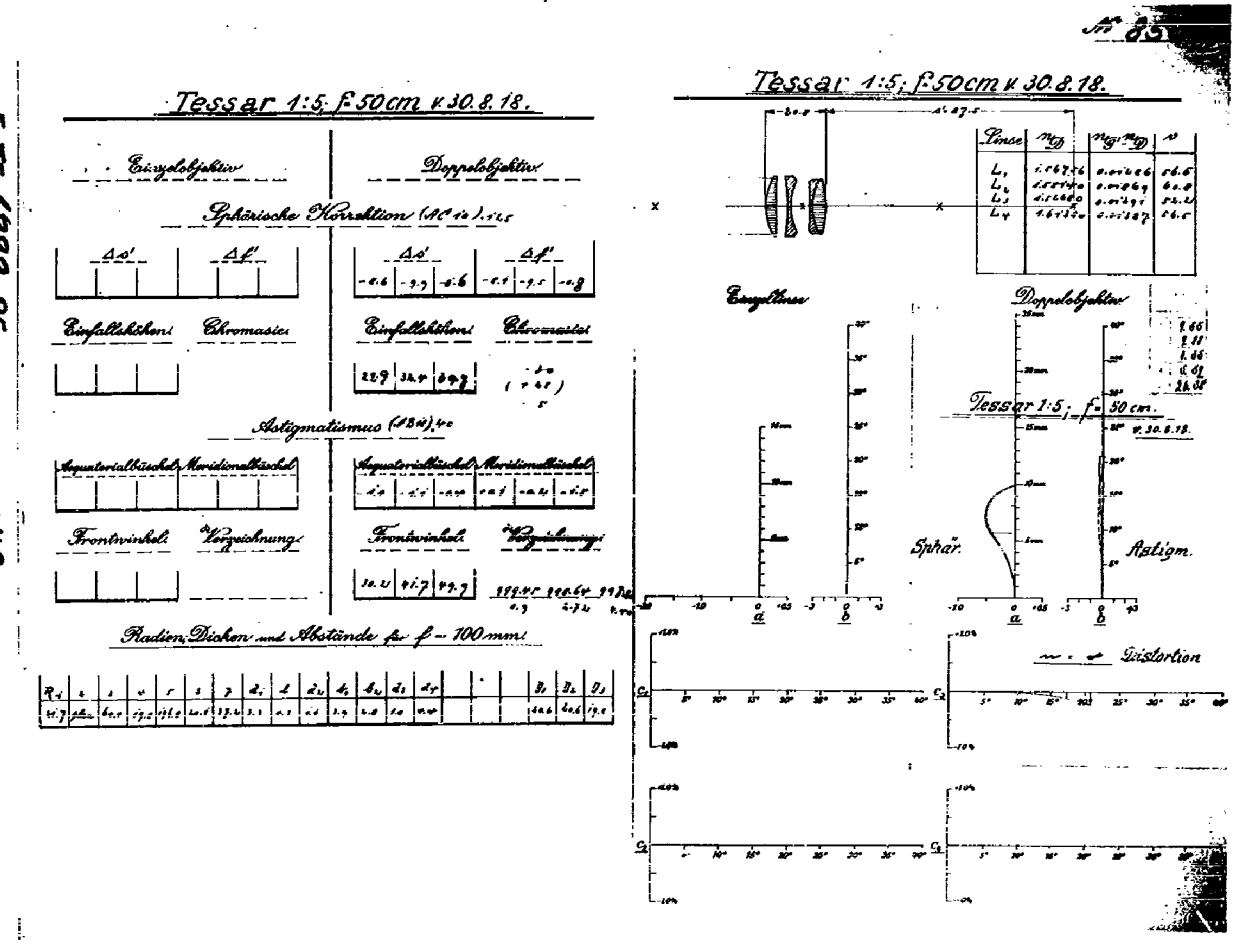
F-TS-6378-PE

1447



F-TS-6398-PE

1448



F-TS-6398-RE

149

Tessar 1:4,5 f = 5 cm

Doppelobjektiv für ∞

Gesamtobjektiv f = 145 mm

Sphärische Korrektion (T 1:4,5)

Einfallslothen Chromasie

Astigmatismus (T 1:4,5)

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:4,5 f = 145 mm

Linse n_D $n_F - n_D$ ν

L_1 1,61114 0,01138 58,5

L_2 1,61800 0,01716 44,4

L_3 1,61300 0,01025 58,4

L_4 1,61165 0,01701 44,6

Doppelobjektiv

Einzellinsen

F-TS-6398-RE

150

Tessar 1:5, f = 5 cm n. 24.5.17

Einzel- Einzelobjektiv n = ∞ f = 5 cm

Doppelobjektiv n = 3 m

(A.-E. 32,45) (A.-E. 32,45)

Sphärische Korrektion ( ) A.-E. 32,45

Einfallslothen Chromasie

Astigmatismus ( ) A.-E. 25,9 A.-E. 25,11

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:5, f = 5 cm n. 24.5.17

Objektiv Nr. 503529

Vergl. Rechnungsprotokoll Nrn. 1500 & 1501, Bl. 40 & 57.

Linse n_D $n_F - n_D$ ν

L_1 1,57127 57,3

L_2 1,58229 40,7

L_3 1,57272 52,1

L_4 1,57320 55,7

Doppelobjektiv, n = ∞

Einzellinsen

Doppelobjektiv n = 3 m

F-15-6398-RE

151

J-R-Tessar 1:5 f=50 cm. Rechn. v. 16.F.31.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2.6 -2.3 +0.6	-4.3 -2.3 +0.7

Einfallshöhen | Chromasie

Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
22.5 32.5 35.6	-11 +1.7 -2

Astigmatismus (Bildfeldwölbung / Bildfehler)

Sagittalwinkel	Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
		0.6 -2.1 -2.5 -5.1 -5.5 -6.0 -6.2 -7.1 -7.3	

Frontwinkel | Vorzeichnung | Doppelobjektiv Frontwinkel | Doppelobjektiv Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l1	d2	l2	d3	d4
2.08	∞	55.1	21.1	12.4	21.1	35.1		1.3	0.5	0.6	5.3	2.1	0.1

J-R-Tessar 1:5, f=50 cm. Rechn. v. 16.F.31.

Linse	r d	n d − n C	ν
L1	1.613,2.15		59.8
L2	1.50 0.2.5		40.6
L3	1.62.3.15		56.3
L4	1.62.1.33		60.1

Einzelobjektiv | Doppelobjektiv

a | b | a | b

	11.32
	3.79
	4.44
	6.18
	28.28

1.37

F-15-6398-RE

152

Astro-Tessar 1:5, f. 600 mm v. F. 41.

Einzelobjektiv | Doppelobjektiv für 5'

Sphärische Korrection (Δs' / Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-4.6 -2.1 +3.0	-4.6 -2.1 +2.1

Einfallshöhen | Chromasie

Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie 5'-5	6'-5
22.5 32.5 35.2		

Astigmatismus (Bildfeldwölbung / Bildfehler)

Sagittalwinkel	Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
		-0.3 -0.5 -0.5	-0.1 -0.3 -0.7

Frontwinkel | Vorzeichnung | Doppelobjektiv Frontwinkel | Doppelobjektiv Vorzeichnung

		-0.5 -0.7 -1.1	-0 -0 -0
			-0.5 -0.5 -0.8

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	l1	d2	l2	d3	d4	d5	d6
17.5	∞	55	25.1	∞											

.18318

Astro-Tessar 1:5, f. 600 mm v. F. 41.

Linse	n d	n d − n C	ν
K1	1.5 +0.03	-0.5.7	64.3
K2	1.5 +0.3	0.5.2.5	44.5
K3	1.5 2.7.0	0.1.3.0	37.0
K4	1.6.0.5.2.0	0.3.7.0	50.8

Einzellinse | Doppelobjektive für 5'

F-75-6398-RE

153

Tessar 1:2, f. 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (dl'/dl'²)

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus (dl'/dl'²)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
2.4	∞	10.0	19.7	20.3	0.4	17.2	2.6	1.1	0.6	5.9	1.5	1.0	0.9	0.1

F-75-6398-RE

154

Tessar 1:2, f. 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (dl'/dl'²)

Δs'	Δf'

Einfallshöhen | Chromasie

D	12.5	12.5	9.1
g'	12.1	12.2	9.1

Einfallshöhen

22.9	12.5	19.1

Astigmatismus (dl'/dl'²)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung

g	-1.1	-1.1
g'	-0.1	-1.1

Äquatorialbüschel

Frontwinkel

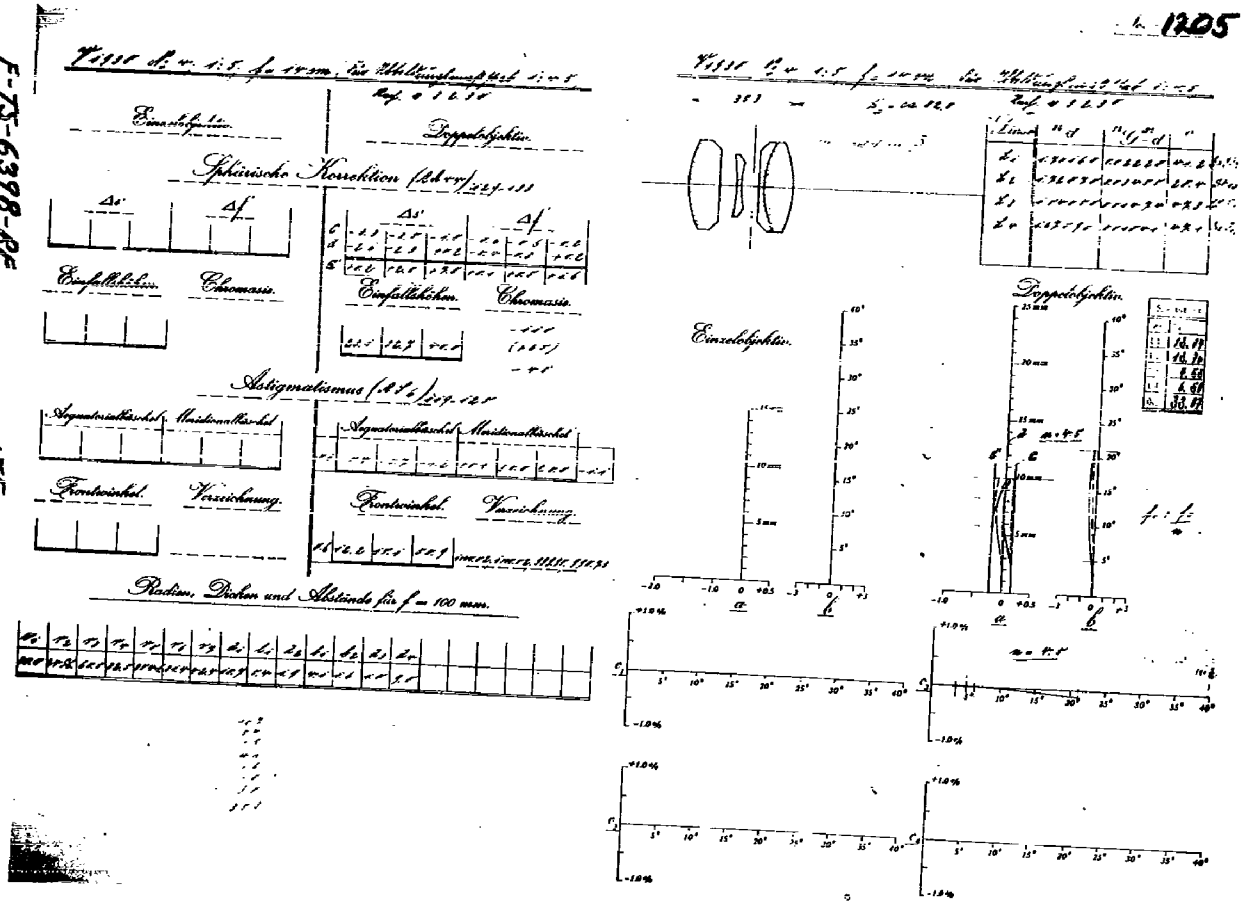
17.1	16.1

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
2.4	∞	12.8	19.3	19.8	0.7	17.0	3.1	1.1	1.1	7.2	1.5	1.1	1.1	0.1

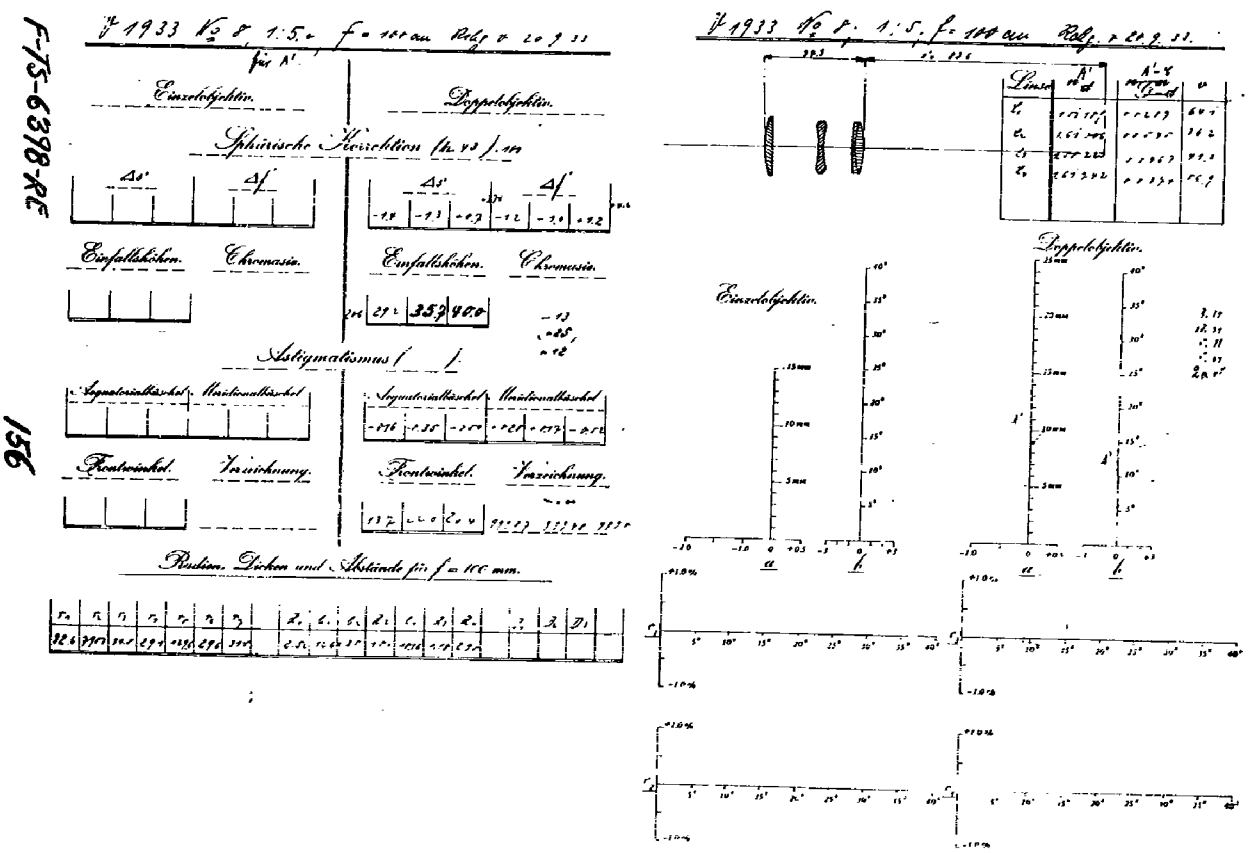
F-75-6398-RE

155



F-75-6398-RE

156



№ 1017

F-75-6378-RE

157

Tessar 1:5, f. 80cm Rechnung 12.12.1933

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (dB, N, f_{ges})

$\Delta s'$ $\Delta f'$ — Einfallshöhen — Chromasie

Astigmatismus (dB, N, f_{ges})

Äquatorialbüschel — Meridionalbüschel — Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm.

Tessar 1:5, f. 80cm Rechnung 12.12.1933

Linse — n_d — $n_F - n_d$ — ν

Einzelobjektiv — Doppelobjektiv

a — b

157

№ 417

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Tessar 1:5, f. 50 cm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (dB, N)

$\Delta s'$ $\Delta f'$ — Einfallshöhen — Chromasie

Astigmatismus (dB, N)

Äquatorialbüschel — Meridionalbüschel — Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Tessar 1:5, f. 50 cm

Linse — n_d — $n_F - n_d$ — ν

Linse	n_d	$n_F - n_d$	ν
L_1	1.5724	0.0117	57.5
L_2	1.6195	0.0185	41.6
L_3	1.5287	0.0130	51.9
L_4	1.6177	0.0141	55.1

Einzellinse — Doppelobjektiv

a — b

158

№ 883

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159

Tessar 1:5 f. 5… cm …

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (…)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (…) …

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Einzellinse

Doppelobjektiv

Coma | sagittal

№ 426

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Tessar 1:5 f. 545 mm vom 25.7.17

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (…) | Astigmatismus (…) …

Δs' | Δf'

Einfallshöhen | Chromasie

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Tessar 1:5 f. 545 mm vom 25.7.17

Linse	n_g	$n_g - n_g$	ν
L_1	1.53990	0.01153	59.4
L_2	1.58454	0.01872	40.5
L_3	1.58455	0.01302	59.9
L_4	1.62272	0.01501	56.2

Einzellinse

Doppelobjektiv

Coma | sagittal

F-75-6398-RE

161

Tinar 1:5 f = 81 mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (AC 32) 69

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (AC) 28

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7		d_1	d_2	d_3	d_4	d_5	d_6	d_7	E.W.
26,1	∞	77,1	23,0	244	25,6	85,1		2,7	2,9	1,6	3,6	4,5	4,6	9,5	10

Tinar 1:5 f = 50 mm

№ 462

Linse | n_d | $n_F - n_d$ | ν

Einzellinse

Doppelobjektiv

F-75-6398-RE

162

Tinar 1:5 f = 38 mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (AC 32) 69

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (AC) 21

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6	d_7	E.W.
84,0	∞	85,1	49,9	488	117,6	85,1	3,9	0,6	1,1	2,3	1,7	9,0	11,1	

Tinar 1:5 f = 38 mm

Linse | n_d | $n_F - n_d$ | ν

Einzellinse

Doppelobjektiv

161

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№ 1015

A Tessar 1:5, f = 50 mm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallshöhen — Chromasie

Astigmatismus

Sagittalbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv — Doppelobjektiv

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164

№ 434

Tessar 1:5, f = 50 cm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallshöhen — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzellinse — Doppelobjektiv

F-TS-6398-RE

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Tessar 1:5 f: 50 cm vom 16.9.49

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-0.5 -0.3 -0.2	-0.1 -0.2 -0.3	-19 -06 12	25 03 26

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		17.2 12.9 10.2	1.9 (1.23) -1.9

Astigmatismus (x') 1:7

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
-0.3 -0.2 0.0	0.0 0.07 0.2	-1.4 1.3 1.00	1.015 1.046 -0.57

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
	22.71 20.71 20.51	14.8 14.7 13.4	19.61 19.19 22.62

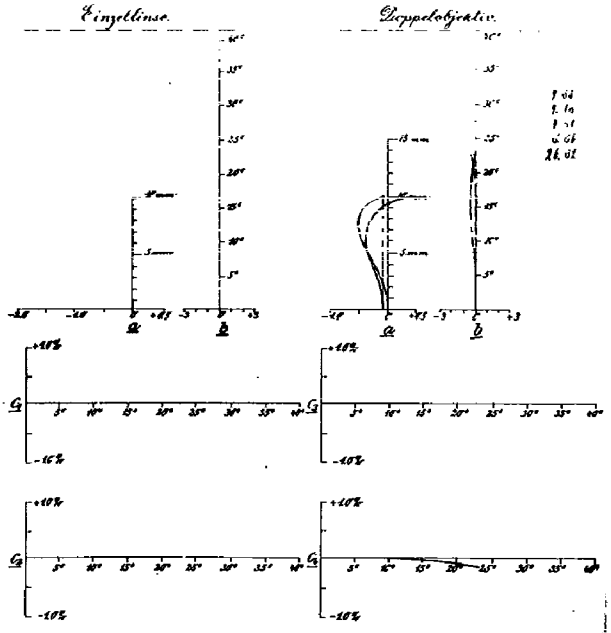
Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6	l'
22.1	∞	19.6	10.7	10.1	22.5	17.1	1.6	10.4	0.5	2.9	2.4	0.9	0.5	0.1

Tessar 1:2,7 f: 5.5 cm vom 16.9.49

Linse	n_d	ν_d	$n_F - n_C$	N
L_1	1.5469	0.6170	0.0166	
L_2	1.7283	0.2852	0.0222	
L_3	1.6161	0.3670	0.0179	
L_4	1.6134	0.5391	0.0167	

Einzellinse | Doppelobjektiv



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Tessar 1:5,4 f: 5.4 mm vom 2.10.49

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		1.6 0.7 0.4	5.0 0.1 0.6

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		1.4 -0 1.2	1.1 (1.07) 0.3

Astigmatismus (x') 1:7,2

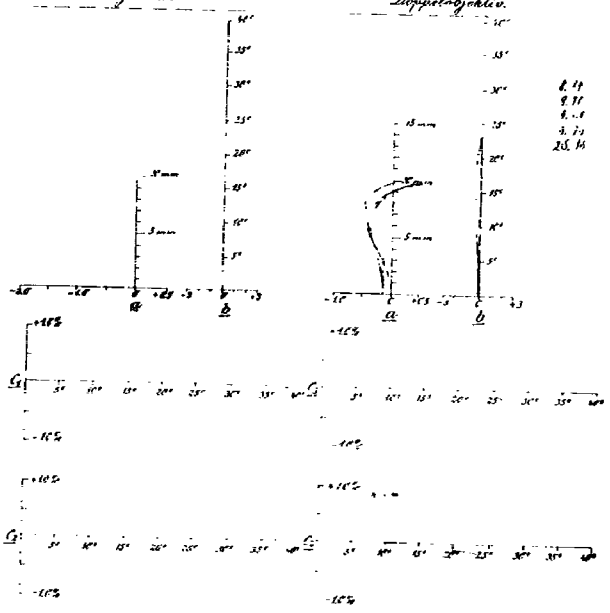
Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel : Meridionalbüschel
		1 : 0.2 0.1 : 0.2 0.3

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		10.2 -1.1 5.6°	19.7 19.13 19.6

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6	l'
12.1	∞	12.1	11.1	11.7	2.1	15.2	1.2	0.7	1.5	0.2	2.1	0.4	0.2	7.2

Einzellinse | Doppelobjektiv



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Tessar 1:2.8 / f = 5½.7 (mark 11.48, 50 a. w. 10.11.48)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1.B.7).58

Δs'	Δs'	Δs'	Δs'
		-2.5 -2.0	-6.2 -6.6 +4.8

Einfallshöhe | Chromasie | Einfallshöhe | Chromasie

		22.6	42.4	42.0

-104 (48) -96

Astigmatismus (T.28) 62-64

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2.7 -2.2	+2.8 +0.8 -0.7

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		44.3	58.4	64.0

1000.47 1000.07 777.48

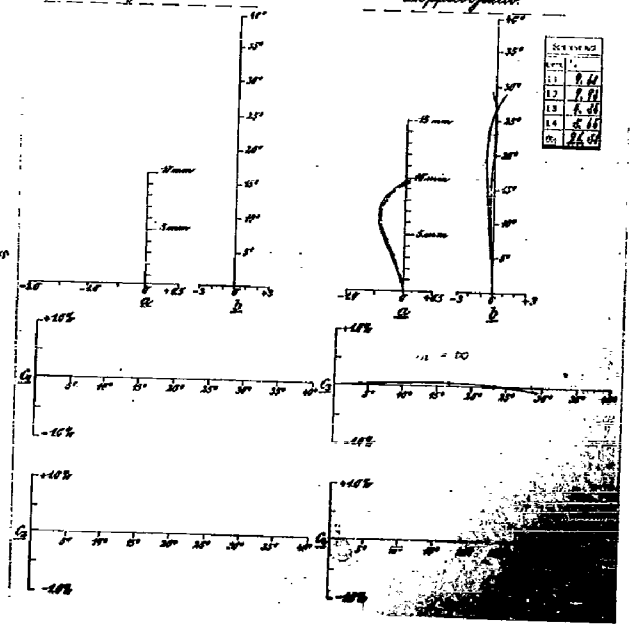
Radien, Dicken und Abstände für f = 100 mm:

Tessar 1:2.8 / f = 5½.7 (mark 11.48, 50 a. w. 10.11.48)

Skizze Nr. 28.371 mit der Bezeichnung Objektiv Tessar 1:2.8 f = 5½.7 mm Belichtung für Sonnenlicht für 6.48 offen.

Linse	r_n	$r_n - r_{n+1}$	d
L_1	41.748		8.58
L_2	1.554.50		44.6
L_3	1.5.1.92		52.0
L_4	2.5-0.2		54.9

Einzellinse | Doppelobjektiv



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Einzelobjektiv

Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse

Doppelobjektiv

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Joo. Schneider 1:5.4 $f = 100$ mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Joo. Schneider 1:5.4 $f = 100$ mm

Linse

Einzelobjektiv

Doppelobjektiv

M 350

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Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Tangentialfehler | Sagittalfehler

Fronteinfall | Bezeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse | Doppelobjektiv

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Zeiss 11/5.9

Nr. | Radien | Dicken | Glas | Abstand

Schnittw. 41,8

Schnittw. Bild 3,37

4,36

155,0

159,2

22,1

74,2

Schnittliste des Hinterglieds

4.III.19

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Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (r, B, W)

Einfallshöhen | Chromasie

Astigmatismus (f, B) 30°

Äquatorialbruchst. | Meridionalbruchst.

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

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№ 3

Tessar 1:5·6, f = 135 mm vom 21.4.02.

Zu D. R. P. Nr. 122494 Einzige Patentanspruch

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (r, w)

Einfallshöhen | Chromasie

Blende zwischen L_1 und L_2 Astigmatismus (f, B)

Äquatorialbruchst. | Meridionalbruchst.

Frontwinkel | Verzeichnung für w = 0°

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:5·6, f = 135 mm vom 21.4.02.

zu D. R. P. Nr. 122494 Einz. Patentanspruch

Einzellinse

Doppelobjektiv

Blende zwischen L_1 und L_2

Blende zwischen L_1 – L_2

w = 0°

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Tessar f/2,8 f= 8,2 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (SF) 64

Δs'			Δf'		

Einzelobjektiv: Einfallshöhen | Chromasie

Doppelobjektiv:

Δs'			Δf'		
1,3	2,7	+0,5	2,7	-1,2	-0,4
-2,5	-3,9	+2,5	-1,1	-0,6	+0,5

Einfallshöhen | Chromasie

11,0	-0,2	-1,1

Astigmatismus (SIII) 31°

Einzelobjektiv: Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Doppelobjektiv:

Äquatorialbüschel		Meridionalbüschel		Frontwinkel	Vorzeichnung
-4,9	-10,5	6,6	-2,1	9,4	+12,6
-9,1	-14,9	-2,2	-12,5	-1,9	+12,7

10,7	73,5	93,0	-1,- 92 - 114 -70 - 102 - 132 -47 - 66

Radien, Dicken und Abstände für f= 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
24	118	10,4	24,6	∞	10	47	3	0,15	1,15	2,5	1,5	1,15	4

Tessar 1:5,8 f= 15 cm

Linse	n_g	$n_g - n_y$	ν
I	1,6127	0,0150	57,2
II	1,6221	0,0206	39,6
III	1,6231	0,0125	57,2

Einzellinse | Doppelobjektiv

11,11
6,43
1,48
6,28
24,11

175

N 208

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Zeiss - B. u. L. - Tessar 1:5,8 f= 15 cm Nr. 23 XII 69

Doppelobjektiv für 8' Einzelobjektive

Doppelobjektiv

Sphärische Korrektion (SF) 64 1933/63

Δs'			Δf'		
-5,5	-3,0	+11,0	-5,5	-3,1	+10,8

Einfallshöhen | Chromasie

20,1	28,5	34,9

Δs'			Δf'		
-8,3	-9,9	-11	-8,5	-10,2	-15
-5,9	-5,0	+11,5	-6,5	-6,2	+11,0

Einfallshöhen | Chromasie

20,1	28,5	34,9

-121 -57 +46 +14,8
(46) (46) (-1) (-17)
-115 -57 +38 -0,5
-121
(+6)
-115

Astigmatismus (SIII) 31°

Einzelobjektiv: Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Doppelobjektiv:

Äquatorialbüschel		Meridionalbüschel		Frontwinkel	Vorzeichnung
-3,0	-4,7	+1,9	-1,6	-0,3	+1,1
-4,5	-6,2	+2,9	-3,8	-0,8	-1,0

41	57	69,5	-77 -96 -103 -72 -23 -144 -5 +2 +1

Radien, Dicken und Abstände für f= 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10
40,5	∞	73,5	49,5	89,2	23,2	95,6	2,5	0,9	6,6	2,2	1,0	1,6	3,2	1,8	4,2	0,5	4,6

Linse | n_g | $n_g - n_y$ | ν

$L_1 - L_4$	1,6127	0,0150	57,2
L_2	1,6221	0,0206	39,6
L_3	1,6231	0,0125	57,2

Doppelobjektiv für 8' Einzellinse

Doppelobjektiv

11,11
11,11
1,48
6,28
24,11

n = 1 | n = 5

n = 23 | n = 96

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Tessar 1:6.1 f 147 m/m

Doppelobjektiv für

Einzelobjektive | Doppelobjektive

Sphärische Korrection ( )

Δs' | Δf' | Δs' | Δf'

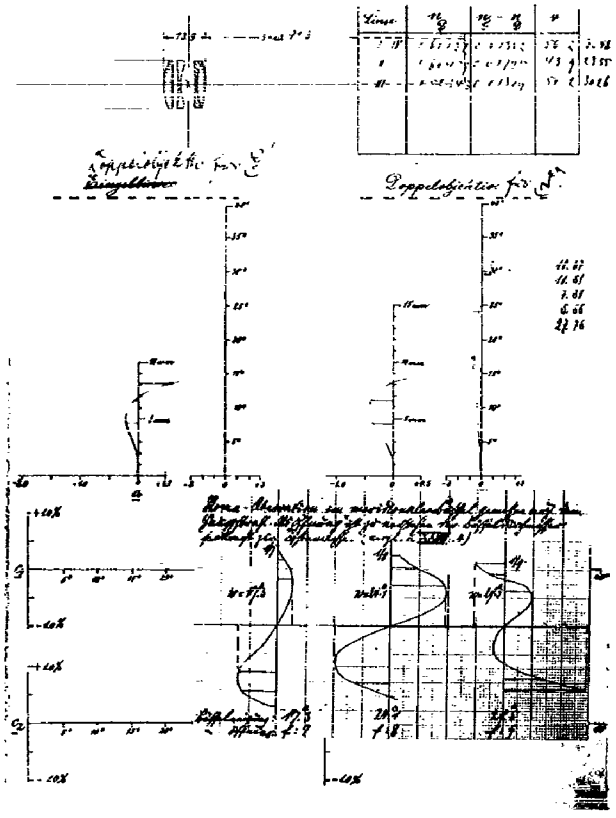
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( )

Aequatorialbildschl. | Meridionalbildschl. | Aequatorialbildschl. | Meridionalbildschl.

Krümmungsschl. | Vergütung | Krümmungsschl. | Vergütung

Radien, Dicken und Abstände für f = 100 m/m



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Tessar 1:6.1, f = 147 m/m

Einzelobjektive | Doppelobjektive

Sphärische Korrection ( )

Δs' | Δf' | Δs' | Δf'

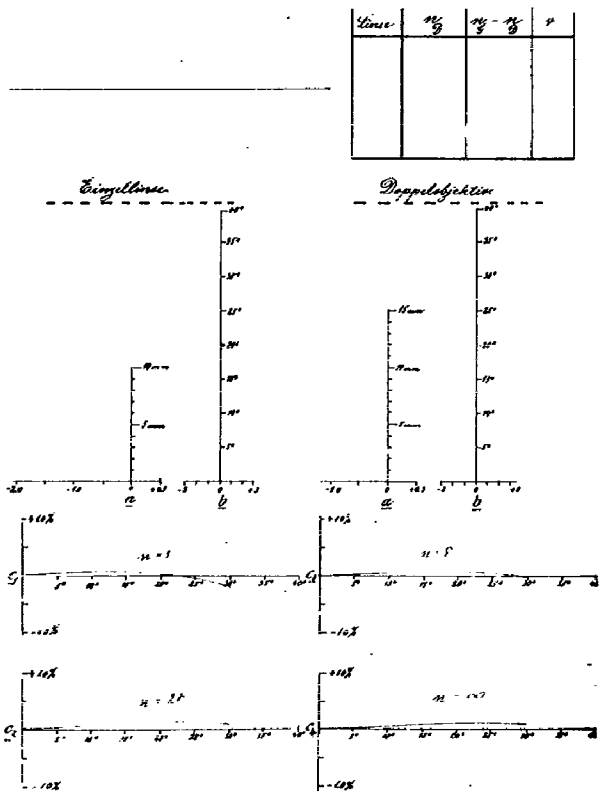
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( )

Aequatorialbildschl. | Meridionalbildschl. | Aequatorialbildschl. | Meridionalbildschl.

Krümmungsschl. | Vergütung | Krümmungsschl. | Vergütung

Radien, Dicken und Abstände für f = 100 m/m



F-TS-6398-RE

Abdruck

B. - Tessar (Amalia) 1:6,3, f. 150 mm v. 8.5.09

Einzelobjektive | Doppelobjektive

Sphärische Korrection (@ 280)

Einzelobjektive		Doppelobjektive			
Δs'	Δf'	Δs'		Δf'	
		-.77	.89	+.08	-.75	-.85	+.14

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
13.4	16.0	32.0	-.97
			(+.13)
			-.74

Astigmatismus (@ 130 es

Aequatorealbild | Meridionalbild

Aequatorealbild		Meridionalbild	
-.37	+.08	+22.1	-.08	-.32	-.90

Frontwinkel | Vergütung

Frontwinkel			Vergütung
49.1	70.9	57.6	-.86 - 1.26 - 2.67
			-.11 - .40 - .52
			-.5 - .5 + .15

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7		d1	d2	d3	d4	d5	d6
4.7	K	45.9	10.5	24.9	24.3	69.1		2.9	1.5	1.0	1.1	1.3	1.5	1.7

Abdruck

B - Tessar (Amalia) 1:6,3, f. 150 mm v. 8.5.09

№ 71

Linse	n_g	$n_g - n_g$	ν
L_1	1.7844	0.0155	53.0
L_2	1.6056	0.0190	44.0
L_3	1.5357	0.0135	50.9
L_4	1.6240	0.0200	57.1

Einzellinse | Doppelobjektive

0.16
11.69
1.17
5.13
22.11

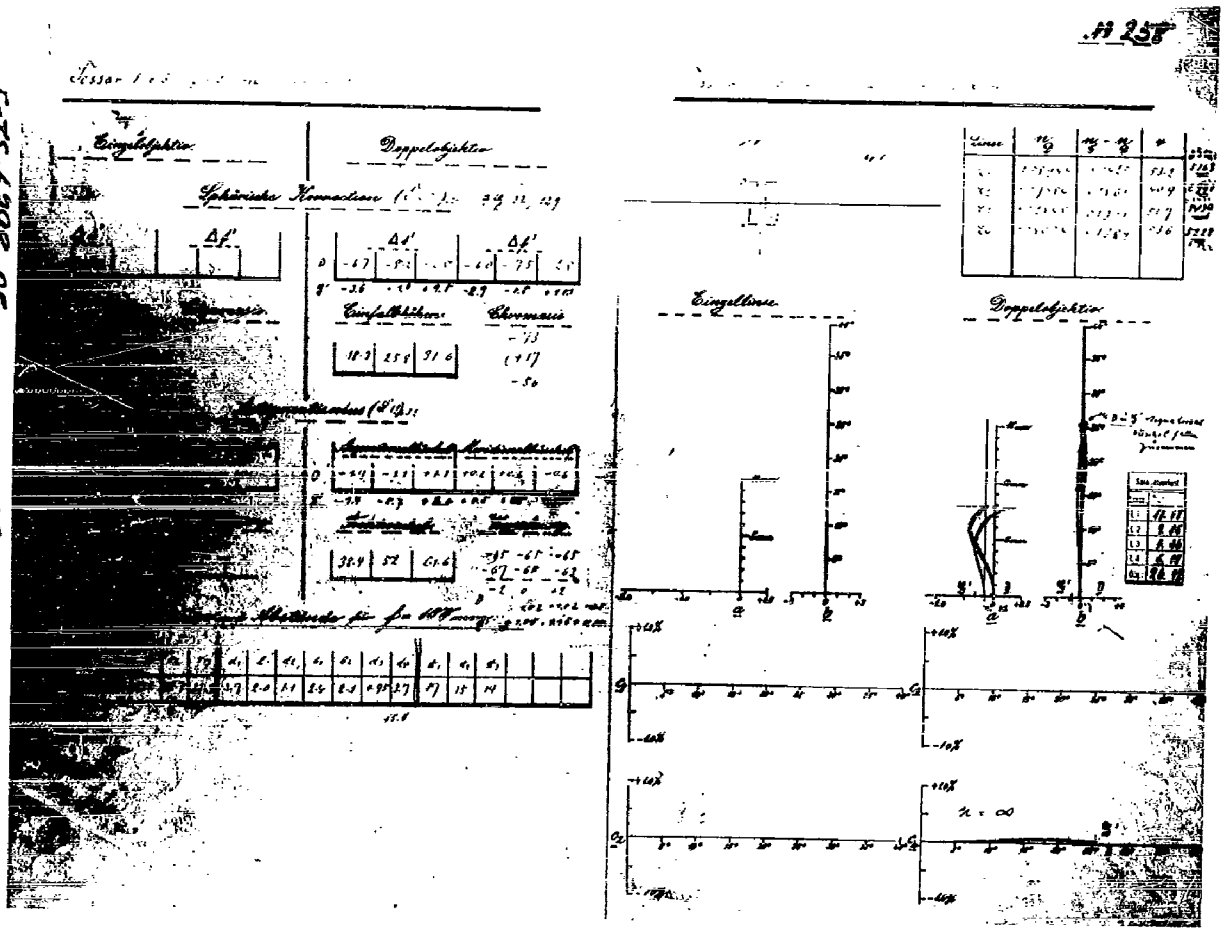
a b a b

+10% -10% +10% -10% +10% -10% +10% -10%

x = 0.0

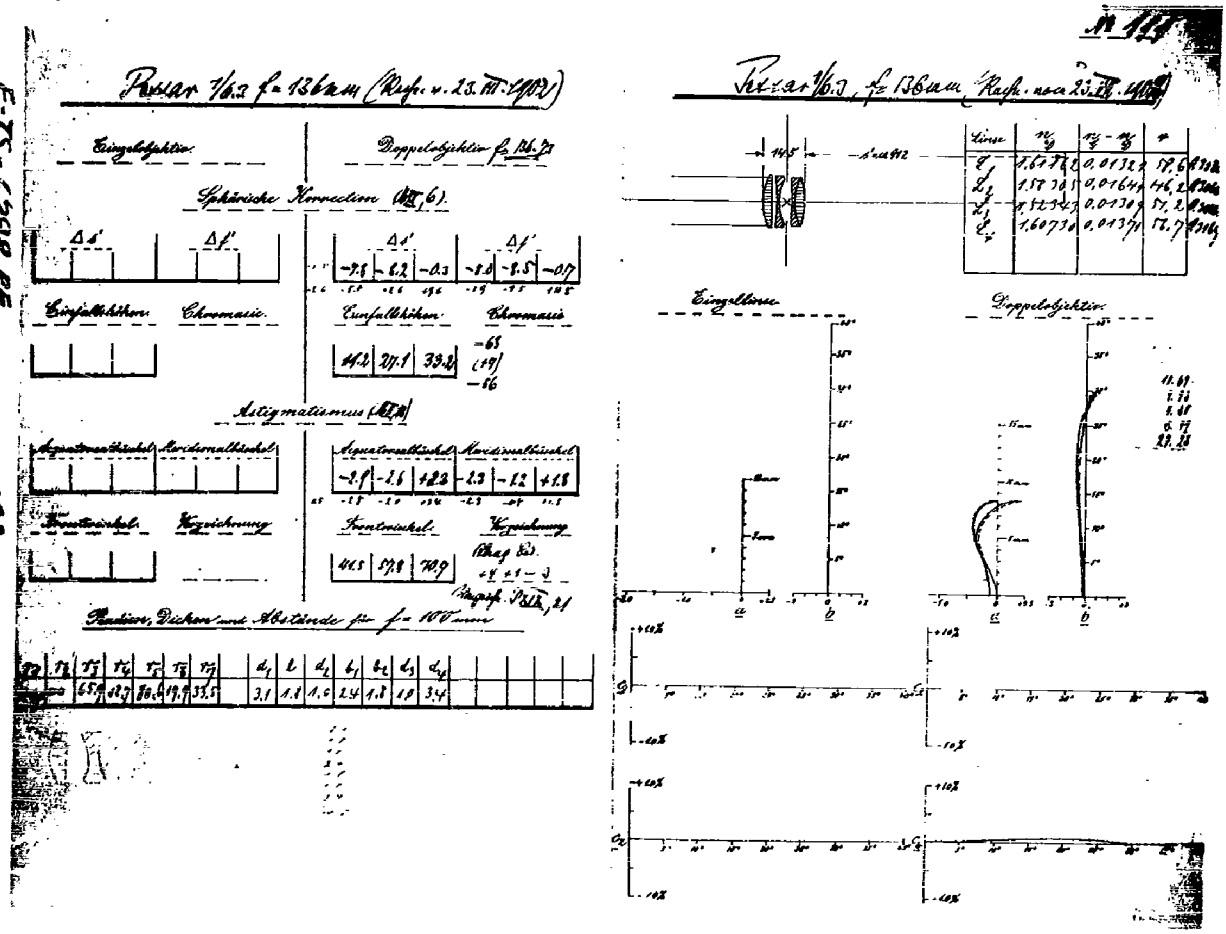
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F-TS-6398-RE

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F-TS-6348-RE

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R. Steinheil: D.R.P.A. vom 9. VIII. 06

F. P. 176247

Einzellichter | Doppellichter

Sphärische Korrection (f = 100 mm)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f = 100 mm)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

R. Steinheil: D.R.P.A. vom 19. VII. 1906.

E. P. 176247

Linse | n_g | $n_g - n_\beta$ | ν

Einzellinse | Doppellichter

a | b | a | b

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Tessar 1:6,3 f = 155 mm (Fraktion aus Bergkristall)

Einzellichter | Doppellichter f = 155 mm

Sphärische Korrection (f = 100 mm)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f = 100 mm)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

№ 84

Tessar 1:6,3 f = 155 mm (Fraktion aus Bergkristall)

Linse | n_g | $n_g - n_\beta$ | ν

Zerstreuung | Hartglas | Kronglas | Bergkristall

Einzellinse | Doppellichter

Sphär.

a | b | a | b

n = 1 | n = 5 | n = 35 | n = ∞

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183

Tessar 1:6,3 f. 135 mm Front- u. Hinterlinse aus Bayst. Kiel 13.II.1905

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (0,1 mm)

Δs'	Δf'	Δs'	Δf'
		-0,1 -0,3 -2,0	-0,8 +0,0 -2,4
		-3,0 -0,0 +1,1	-2,0 -0,1 +0,3 -3,5

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

26,1	32,0	-109 -36 +51 +161
		-71 -25 +45 +158

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Äquatorialbüschel			Meridionalbüschel		
-3,1	-3,5	+0,5	-1,5	-0,0	-1,3
-2,1	-1,6	+0,5	-1,0	-0,4	-1,3

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7	n1	n2	n3	n4
41,9	∞	41	29,3	187	82	32,2	3,5	1,0	1,2	2,2	2,2	1,2	3,0	1,71	1,5	1,6	1,5

Tessar 1:6,3 f. 135 mm Front- u. Hinterlinse aus Bayst. Kiel 13.II.1905

Wellenlänge (μμ)

Linie	n_g	$n_g - n_d$	ν	
Bayst. Kiel	1,5815	0,01198	53,5	1932
Kiel	1,5855	0,0118	54,3	1604
				1739
Bayst. Kiel	1,5815	0,01199	53,5	1932

Einzellinse | Doppelobjektiv

a | b

g 9,96
g 9,76
f 6,97
C 6,14
Zk 26

Abschrift

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184

Tessar 1:6,3 f. 135 mm Front- u. Hinterlinse aus Bayst. Kiel 13 III 1905

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (0,1 mm)

Δs'	Δf'	Δs'	Δf'
		-0,0 -7,3 -2,0	-5,8 -7,0 -2,4

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

13,2	26,1	32,0

Astigmatismus (0,1 mm)

Äquatorialbüschel | Meridionalbüschel

Äquatorialbüschel			Meridionalbüschel		
-3,1	-3,3	+0,1	-1,5	-1,0	-1,3

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Abschrift № 96

Tessar 1:6,3 f. 135 mm, Front- u. Hinterlinse aus Bayst. Kiel 13. III 1905

Linie	n_g	$n_g - n_d$	ν	
Y_1	1,5815	0,1199	53,5	1932
X_1	1,5855	0,1183	54,3	1604
X_2	1,5855	0,1198	54,1	1739
Y_2	1,5815	0,1199	53,5	1932

Einzellinse | Doppelobjektiv

a | b

g 9,96
g 9,76
f 6,97
C 6,14
Zk 26

F-75-6378-RE

185

1185

Tessar 1:6.3 f = 16.3 cm Prakt. u. Reihenkam. aus Bergheim Nr. [illegible]

Tessar 1:6.3 f = 16.3 cm Prakt. u. Reihenkam. aus Bergheim

Einzelobjektiv | Doppelobjektiv

Sphärische Konnexionen (Serie II)

Δs'	Δf'

Δs'	Δf'		Δs'	Δf'	
-21	-47	-31	-20	-47	-37

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

18.6	26.4	28.5

Astigmatismen (Serie II)

Äquatorialhöhenkehl	Meridionalhöhenkehl

Äquatorialhöhenkehl			Meridionalhöhenkehl		
-3.0	-2.7	+1.0	-0.5	+1.5	+4.7

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

41.0	37.0	70.0

Radien, Dicken und Abstände für f = 100

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	l_1	d_2	l_2	d_3	l_3	d_4
28.0	∞	18.5	17.5	45	16.2	35.5	2.9	2.0	1.2	2.5	2.1	2.2	3.3

Linse	n_e	$n_F - n_C$	ν	
Bergkristall	L_1	1.58125	0.01199	58.5
Meerschaum	L_2	1.57125	0.01201	41.8
Feuerbergkristall	L_3	1.53100	0.01121	57.1
Bergkristall	L_4	1.58125	0.01199	57.5

Einzellinse

Doppelobjektiv

	2.14
	2.76
	2.81
	6.41
	24.26

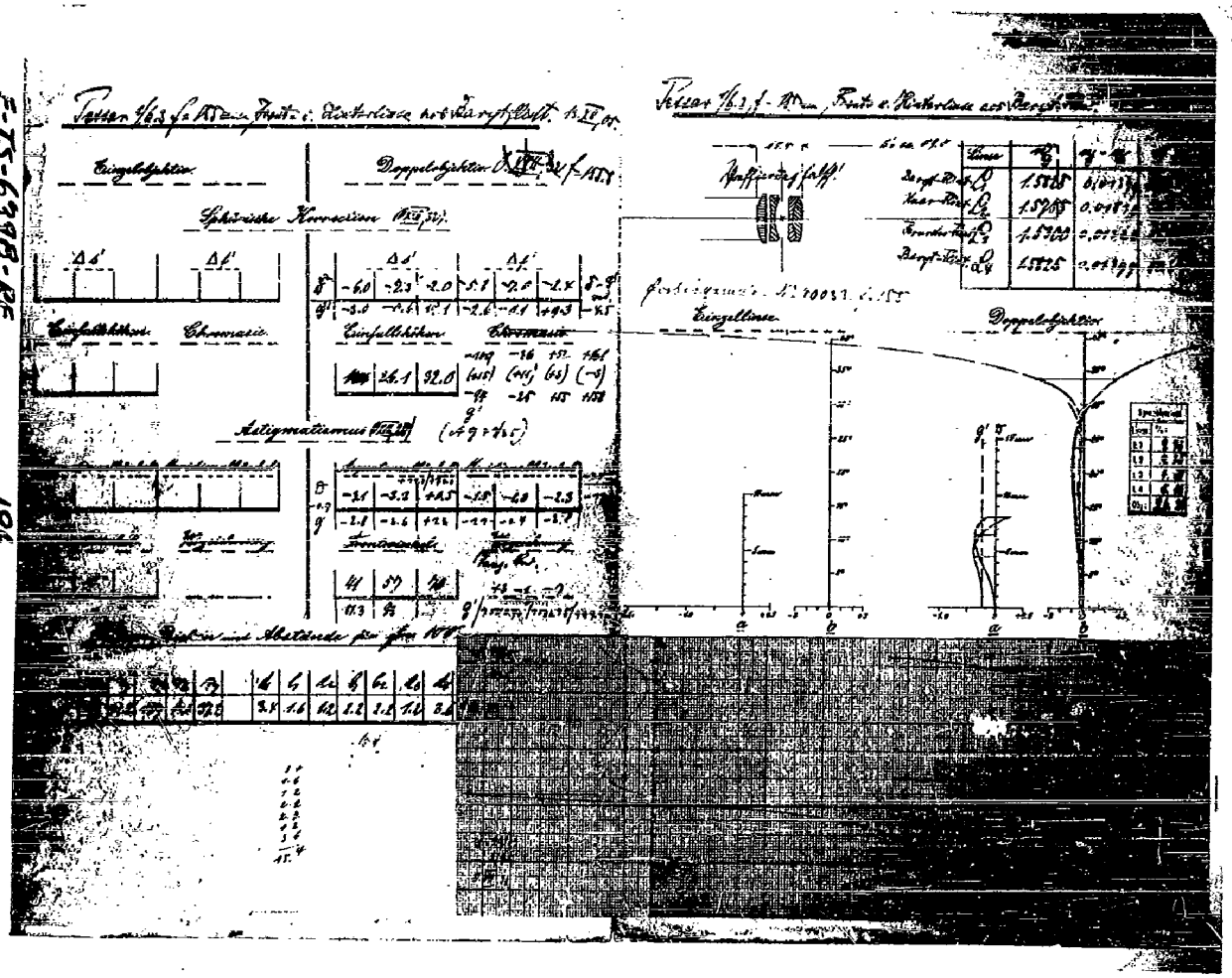
a b

c d

+10% −10% n = 1 n = 1

+10% −10% n = 2∞ n = ∞

1 : 5



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1871

Tessar 1/6.3. f. 126.6 mm.

Doppelobjektiv für Maßstab 1 : 1 — Einzelobjektive | Doppelobjektiv

Sphär. Korr. Nr. XXII, Sphärische Korrektion (M. XXII. 47)

Einzelobjektive Δs'			Einzelobjektive Δf'			Doppelobjektiv Δs'			Doppelobjektiv Δf'		
-12.5	-7.0	+10.0	-9.3	0.1	+16.1	-6.6	-6.8	+4.1	-6.0	-6.3	-4.1

Einzelobjektive Einfallshöhen			Einzelobjektive Chromasie	Doppelobjektiv Einfallshöhen			Doppelobjektiv Chromasie
18.7	16.5	12.5	−84 (+4) +10	18.7	16.5	12.5	−70 (+12) −58

Ast. Sys. Nr. I, II — Astigmatismus (M. II. 47)

Einzelobjektive Äquatorialbüschel	Einzelobjektive Meridionalbüschel		Doppelobjektiv Äquatorialbüschel		Doppelobjektiv Meridionalbüschel		
−1.9	−2.3	+4.8	+4.3	+2.6	−2.5		

Einzelobjektive Frontwinkel	Einzelobjektive Vorzeichnung Tang.	Sag.	Doppelobjektiv Frontwinkel		Doppelobjektiv Vorzeichnung Tang.	Sag.
18.8	15.8	9.0	20.5	16.6	6.0	f 3 −1 −3

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
100	49.5	81.5	111.1	22.3	26.5	∞	3.9	1.4	1.1	3.3	2.9	1.1	3.1

Tessar 1/6.3. f. 126.6 mm. Ersatz von 13.IX.38)

Linse	n_D	$n_F - n_C$	v	
L_1	1.61216	1321	58.6	1.0
L_2	1.60342	1392	43.9	2.4
L_3	1.61296	1230	58.5	1.1
L_4	1.60714	1351	59.3	1.4

Doppelobj. für Maßstab 1 : 1 — Einzellinse | Doppelobjektiv

11.11
11.11
8.11
6.11
23.11

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188

Tessar Nr. 12. 1:6.3 f. 12 cm v. 1.5.39

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (M. XII.) 1.39

Einzelobjektiv Δs'		Einzelobjektiv Δf'		Doppelobjektiv Δs'			Doppelobjektiv Δf'		
				-3.2	-3.6	+0.3	-0.2	-0.3	+1.1

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		12.3	10.9	10.3	−11 (+ 19)

Astigmatismus (M. II.) 1.39

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-0.2	-2.1	-0.2	-0.2		

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		2.5.2	3.5.2	0.0.0.3/4.4.4.3

Radien, Dicken und Abstände für f = 100 mm

r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_0	d_1	d_2	d_3	d_4	d_5	d_6	L_1	L_2	L_3	L_4
126.6	∞	176.0	24.6	117.2	27.5	77.6		1.1	4.3	4.1	30.1	4.3	1.1	4.3	11.6	11.6	11.6	11.6

Einzellinse | Doppelobjektiv

11.11
9.11
8.11
6.11
23.11

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189

Tessar 1:6,3 f = 150 mm v. 24. V. 09

Doppelobjektiv für Einzelbilder

Doppelobjektive

Sphärische Korrection (R. XXVII, 24)

Δs'			Δf'			s	s'	Δs'			Δf'		
-3,7	-2,6	+4,8	-3,7	-2,9	-2,1	-4,5		-6,1	-7,5	-7,1	-6,2	-7,9	-4,6

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

18,4 | 26,0 | 31,9 | (+2,1) (-2,3) (-6,) (-4,6) | -106 -52 +47 +87

Astigmatismus (R. XXX, 49)

Aequatorialbüschel | Meridionalbüschel

Aequatorialbüschel | Meridionalbüschel

-3,7 | +0,3 | +2,4 | -2,1 | 0 | -3,3

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung (Tang. Bed.)

48,5 | 69,7 | 87,0 | -110 -157 -242 / -108 -151 -253 / +2 -5 -11

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	d4	D1	D2	D3
21,1	∞	71,7	25,5	99,5	24,8	36,7	3,0	2,0	1,7	2,3	2,3	1,7	2,8	17,6	16,6	14,0

Tessar 1:6,3 f = 150 mm v. 24. V. 09

Linse	n_D	$n_F - n_C$	ν
$L_1 - L_4$	1,62274	0,01582	53,2
L_2	1,62280	0,02069	39,6
L_3	1,52360	0,01273	52,5

Doppelobjektive für Einzelbilder

Doppelobjektive

F-TS-6398-RE

190

Anastar 1:6,3 f = 150 mm v. 3. V. 09

Doppelobjektive für Einzelbilder

Doppelobjektive

Sphärische Korrection (R. XXVII, 36)

Δs'			Δf'			s	s'	Δs'			Δf'		
-2,5	-0,8	+6,3	-2,5	-0,8	+6,3	-5,1		-4,7	-5,2	-1,2	-4,7	-5,3	-1,3

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

18,5 | 26,1 | 32,0 | (-1,0) (-1,7) (+1,7) (-2,4) | -132 -76 -34 +33

Astigmatismus (R. XXX, 54)

Aequatorialbüschel | Meridionalbüschel

Aequatorialbüschel | Meridionalbüschel

-4,6 | +0,3 | +2,9 | -0,8 | -0,3 | -0,1

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung (Tang. Bed.)

48,5 | 69,5 | 86,5 | -117 -179 -303 / -154 -165 -269 / +3 +5 +11

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	d4	D1	D2	D3
24,7	173	52,3	24,1	72,1	30,4	38,1	3,1	2,1	1,7	2,4	2,5	1,7	2,9	17,2	16,2	14,4

Anastar 1:6,3 f = 150 mm v. 3. V. 09

Linse	n_D	$n_F - n_C$	ν
$L_1 - L_4$	1,62274	0,01582	53,2
L_2	1,62280	0,02069	39,6
L_3	1,52360	0,01273	52,5

Doppelobjektive für Einzelbilder

Doppelobjektive

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191

Tessar f/6.3 f = 148 mm. Weitwinkelaufnahme.

Einzellinse

Doppellinsige

Sphärische Konnection (Kl. XXVIII) / 28

Einfallshöhen | Chromasie

Astigmatismus (Kl. XXX) / 16

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Kennzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6398-RE

192

Sphärische Konnection (Kl. I) 51

Einfallshöhen | Chromasie

Astigmatismus (Kl. III) 32, 36

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Kennzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6366-PE

Gr. F. Lin. - Sam. (Zeiss) F:P 1:5,5 10 cm

1:6,3, f: 56,5 cm 2. Aufnahmeobjektiv

Typ: Doppel-Weitwinkel-Objektiv

Doppelobjektiv

(AgGe/75

Sphärische Korrektion (T=)

	Δd'			Δf'			
	-0,8	+0,9	+4,4	-1,2	+1,9	+6,8	1/10

	Δd'			Δf'			
t	-1,5	-1,7	-2,5	-1,5	-0,7	+2,5	
t'							

Einfallshöhen: 16,9 | 17,4 | 21,1

Chromasie:

Einfallshöhen: 18,4 | 18,0 | 21,8

Chromasie: -3,4 (+0,1) -2,3

Astigmatismus (T) =

Meridionalbüschel:

+1,1	+1,8	+18,4	+18,9

Äquatorialbüschel:

-4,6	-6,3	-4,9	-6,3	-19,3	-17,7

Bildfeld: Wölbung

Fokus: 46,5 (Scheitelwert/mm)

Fokus: 19,4 | 55 | 46,5

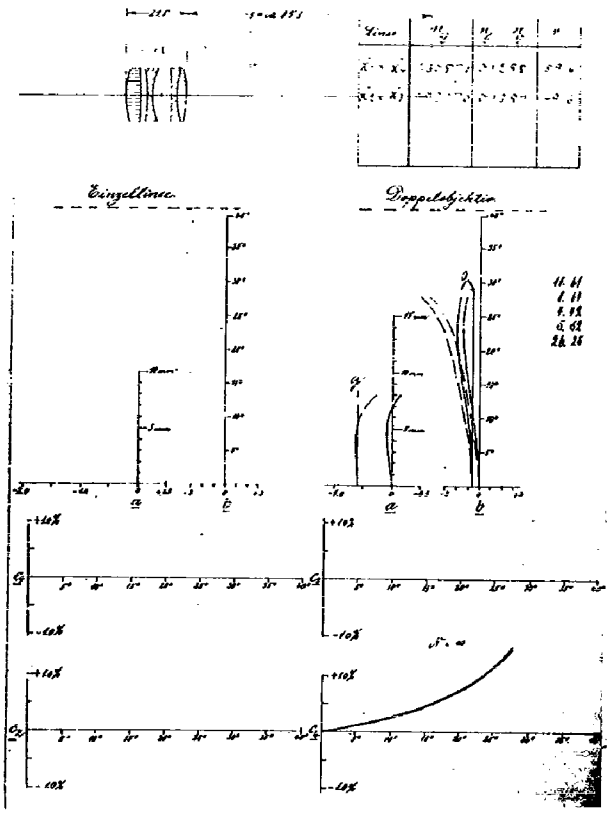
Wölbung:

-9,3	-11,2	-12,7
-7,3	-9,1	-10,7
+1,0	+1,8	+1,2

Distorsion und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv



F-TS-6396-RE

194

Tessar 1:6.3, f = 25 cm v. 6. X 09

Doppelobjektiv für 8"

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (S.F.)

Δs'			Δf'		
-0.3	-0.2	+0.1	-0.1	-0.0	+0.3

Einfallshöhen			Chromasie
22.3	25.9	31.8	-76 (-3) -79

Δs'			Δf'		
-2.1	-10.6	-5.1	-8.3	-10.7	-5.4

Einfallshöhen			Chromasie
18.3	21.9	31.8	-76 -0 +70 +194 (-3) (+1) (-11) (-32) -79 -14 +65 +162

Astigmatismus (S.III) 26

Aequatorialbüschel		Meridionalbüschel			
			-2.2	-2.1	+0.2

Aequatorialbüschel			Meridionalbüschel		
-2.2	-2.1	+0.2	-2.8	-0.9	+0.2

Frontwinkel	Vorzeichnung

Frontwinkel			Vorzeichnung
38.5	52.4	62.0	Tang. Sed. -66 -64 -62 -64 -63 -64 +2 +1 -2

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	D1	D2	D3
29.5	∞	92.0	18.6	73.3	20.4	32.5	2.8	1.9	1.5	2.2	2.2	1.3	2.5	17	15	14

Tessar 1:6.3, f = 25 cm v. 6. X 09

	n_D	$n_F - n_C$	ν	
L_1	1.62271	0.01250	53.2	1.62
L_2	1.61516	0.01694	37.6	1.62
L_3	1.62334	0.01586	53.2	1.62

Einzellinse — Doppelobjektiv

18.12
12.11
1.10
6.11
28.12

$n = \infty$

+10% -10%

1911

F-TS-6396-RE

195

Tessar 1:6.3, f = 15 cm v. 29.7.11

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (S.F.)

Δs'			Δf'		

Einfallshöhen			Chromasie

Δs'			Δf'		
-6.2	-7.7	2.4	-6.0	-7.7	3.0

Einfallshöhen			Chromasie
18.6	26.5	34.0	-100 -16 +55 +164 (+77) (+18) (-6) -88 -54 +60 +202

Astigmatismus (S.III)

Aequatorialbüschel		Meridionalbüschel			

Aequatorialbüschel			Meridionalbüschel		
-3.2	-3.5	+0.5	-2.5	-4.0	-2.4

Frontwinkel	Vorzeichnung

Frontwinkel			Vorzeichnung
49.0	57.0	70.0	-76 -55 -100 +51 +0 -5

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	D1	D2	D3
29.5	∞	92.0	18.6	73.3	20.4	32.5	2.8	1.9	1.5	2.2	2.2	1.3	2.5	17	15	14

Tessar 1:6.3, f = 15 cm v. 29.7.11 (Ausgabe 1922 mit Nr. 6)

(Laufend fabriziert seit 1911)

Linse	n_D	$n_F - n_C$	ν	
L_1	1.62344	0.01425	53.2	1.62
L_2	1.61684	0.01661	40.9	1.62
L_3	1.62648	0.01511	51.7	1.62
L_4	1.62034	0.01513	53.6	1.62

Einzellinse — Doppelobjektiv

18.11
2.12
2.11
6.11
28.12

+10% -10%

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196

Tessar 1:6.3 f. 82 cm mit geringer Verzeichnung von 25.6.08

Einzellinse | Doppelobjektiv

Sphärische Korrection (Nr. 19, 124)

Δs'		Δf'	
-9.0	-2.5	-6.2	-3.6
-3.2	-0.4	-3.2	-0.8

Einfallshöhen | Chromasie

18.2	25.5	34.6

-76 (-96) -60

Astigmatismus (Nr. 124)

Äquatorialbüschel		Meridionalbüschel	
-4.5	-0.7	+4.5	+3.8
-2.8	-0.6	+3.9	+3.2

Frontwinkel | Vorzeichnung

15.4	17.8	46.4

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6
4.89	11.5	11.0	3.6	2.3	4.0	2.1	2.4	4.0	1.7	1.9	3.9		

Tessar 1:6.3 f. 82 cm mit geringer Verzeichnung von 25.6.08

Linse	nF	nF - nC	ν
L1	1.537744	0.01485	57.2
L2	1.617924	0.01261	44.9
L3	1.611748	0.01311	57.7
L4	1.570754	0.01184	57.6

Einzellinse | Doppelobjektiv

Doppelobjektiv

1	11.11
2	8.11
3	8.11
4	8.11
5	22.11

196

.n176

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B – Tessar 1:6.3 f. 182 cm v. 29. XII. 08

Einzellinse | Doppelobjektiv

Sphärische Korrection (Nr. XIX, 135)

Δs'		Δf'	
-6.9	-2.6	-3.2	-6.7	-2.6	-3.7

Einfallshöhen | Chromasie

17.1	24.1	29.6

-90 (-12) -102

Astigmatismus (Nr. XIX, 11)

Äquatorialbüschel		Meridionalbüschel	
-2.6	-0.7	+5.0	+0.4	+2.0	-6.1

Frontwinkel | Vorzeichnung

41.3	57.6	70.0

Vorzeichnung: Tang. Bild: -10 -87 -116; -56 -29 -112; 0 0 +4

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6
21.6	12.0	11.2	2.8	6.0	1.9	2.4	2.7	1.9	1.1	2.2	1.6	1.1	3.7

B – Tessar 1:6.3 f = 182 v. 29. XII. 08

Linse	nF	nF - nC	ν
L1	1.619+2	0.01480	51.7
L2	1.622+0	0.0266+	39.6
L3	1.7149 3	0.01313	52.9
L4	1.62272	0.01502	53.2

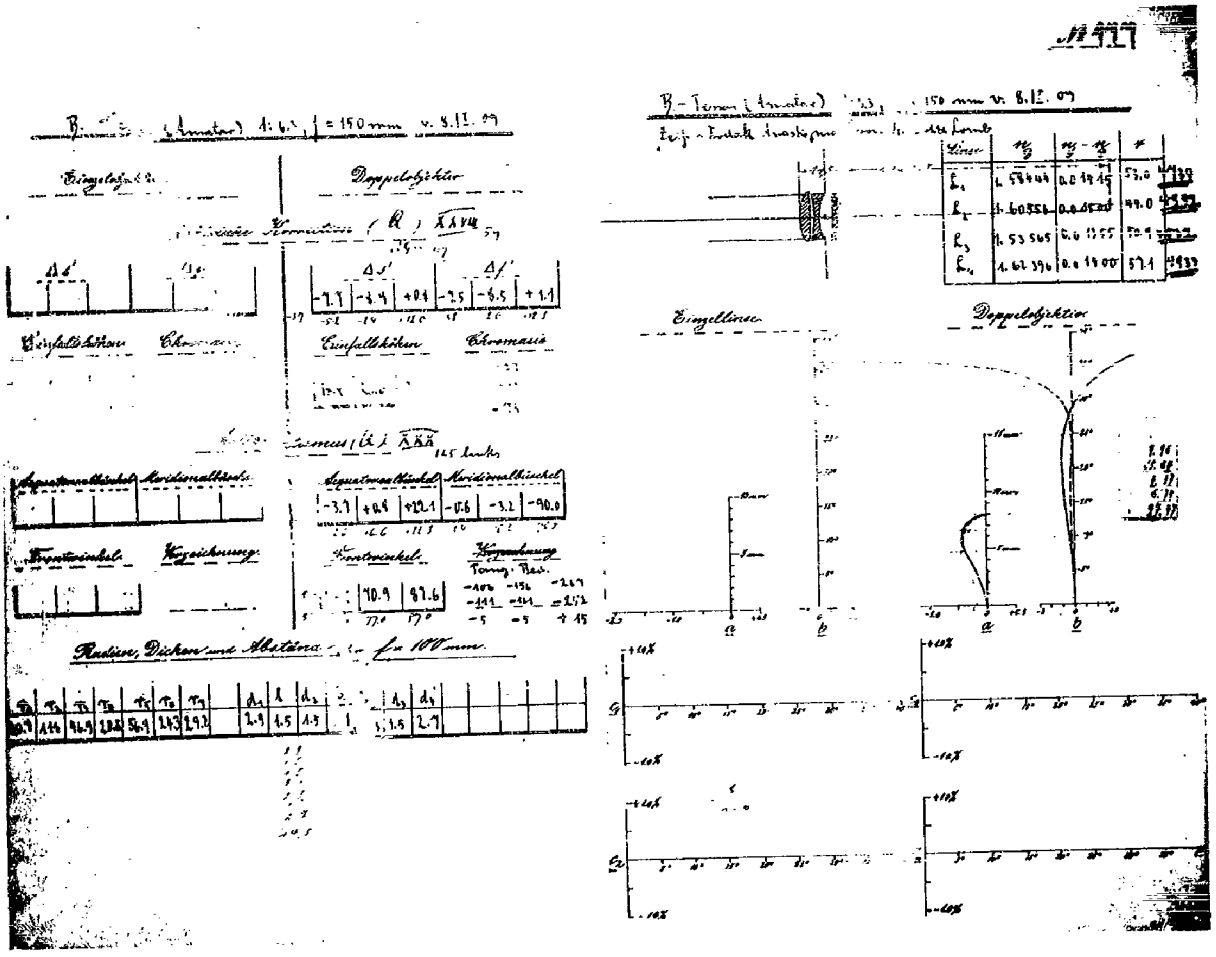
Einzellinse | Doppelobjektiv

Doppelobjektiv

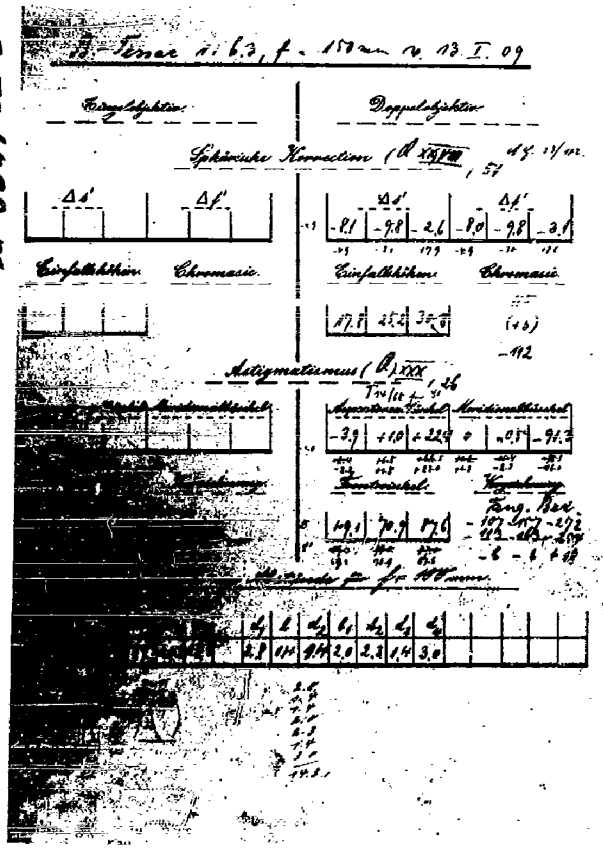
1	11.11
2	11.11
3	8.11
4	8.11
5	22.11

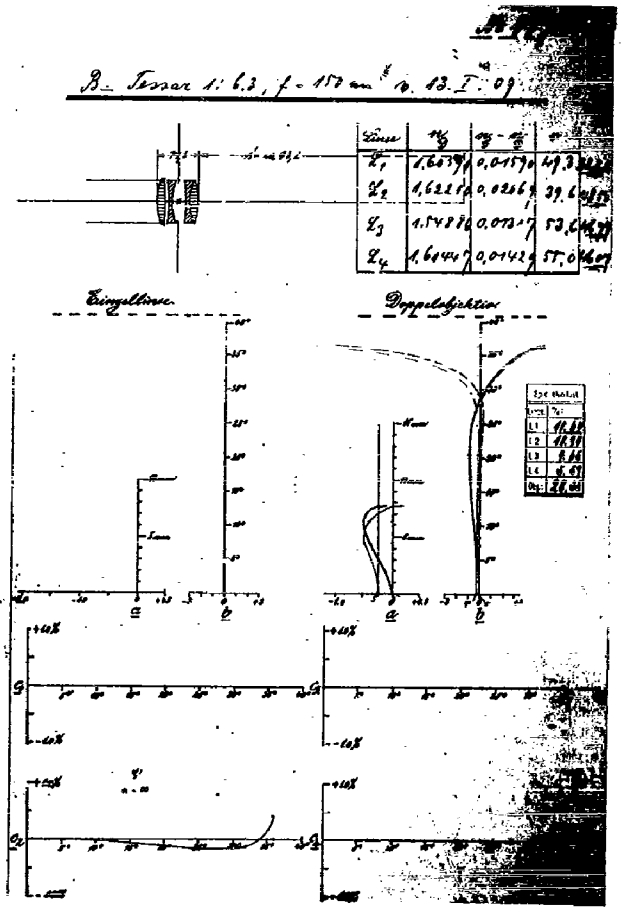
F-TS-6398-RF

861



F-TS-6198-RZ


B. Tessar 1:6.3, f = 15 cm v. 13. I. 09
Einzelobjektive
Doppelobjektive
Sphärische Korrection (A XIII)
Δs'
Δf'
Einfallsblau
Chromasie
Astigmatismus (A) XXX
Tiefe
Sagittalschnitt
Meridionalschnitt
Verzeichnung
Bildfeld
Blende


B. Tessar 1:6.3, f = 15 cm v. 13. I. 09
Einzellinse
Doppelobjektiv

F-75-6398-RE

200

Tessar 1:6.3 f=165.8 mm (Kürsch. & Steinheil aus Bergkrystall)

Tessar 1:6.3 f=165.8 (Front- & Rückenl. aus Bergkr.)

Einzellinse | Doppellichter

Sphärische Korrection (XIII)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (XIV)

Äquatorialwinkel | Meridionalwinkel

Frontwinkel | Kennzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-75-6398-RE

201

Tessar 1:6.3 f=164.4 mm (Kürsch. & Steinheil aus Bergkrystall)

Tessar 1:6.3 f=164.4 (Front- & Rückenl. aus Bergkr.)

Einzellinse | Doppellichter

Sphärische Korrection (XIII)

Δs' | Δf'

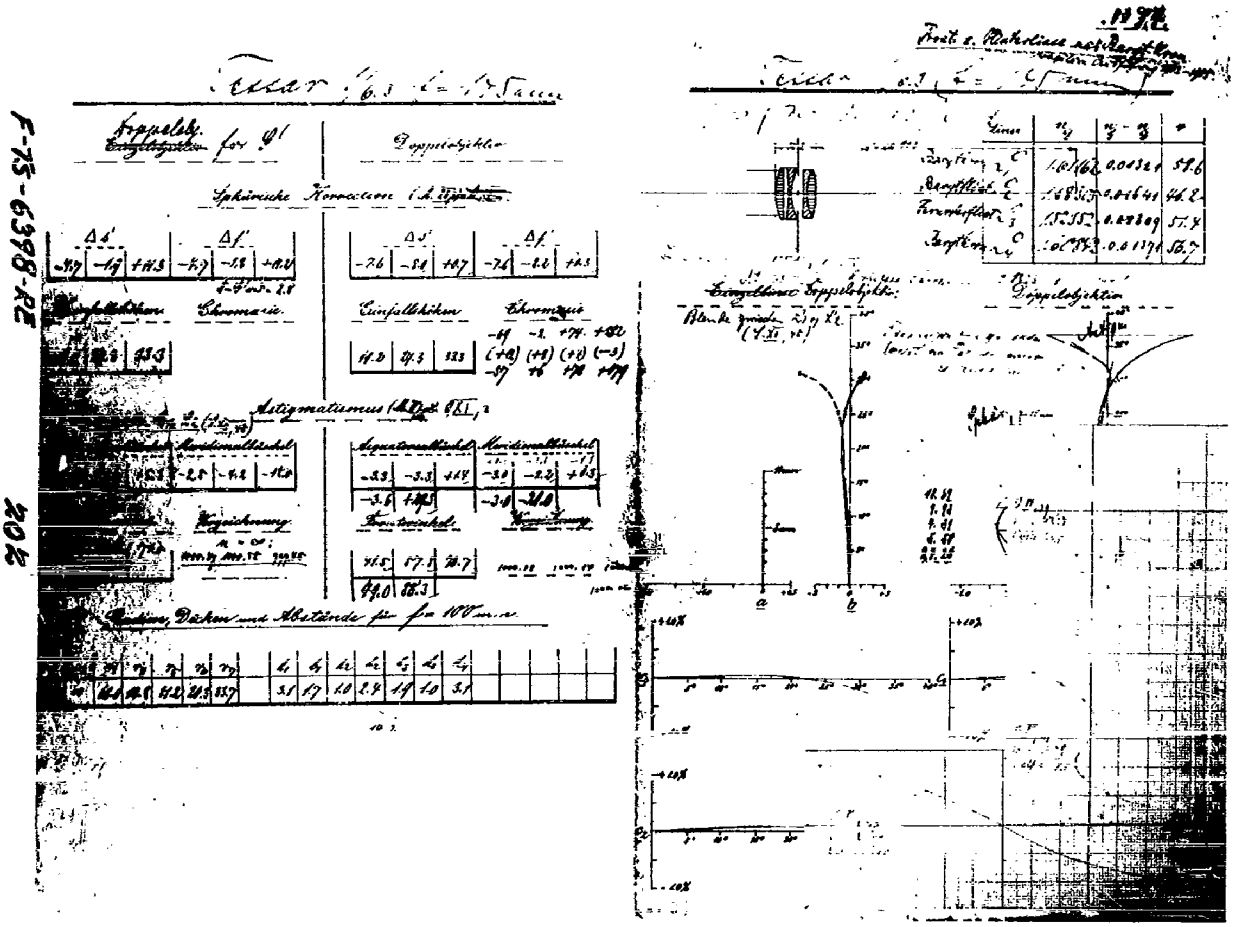
Einfallshöhen | Chromasie

Astigmatismus (XIV)

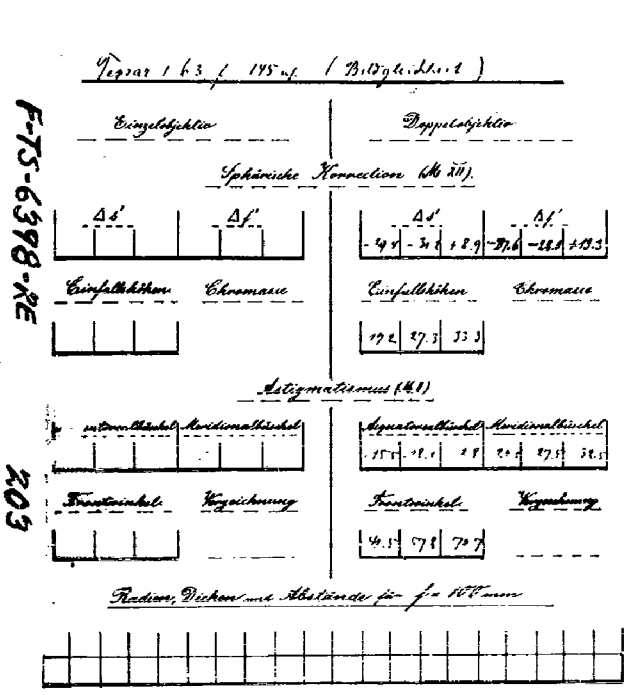
Äquatorialwinkel | Meridionalwinkel

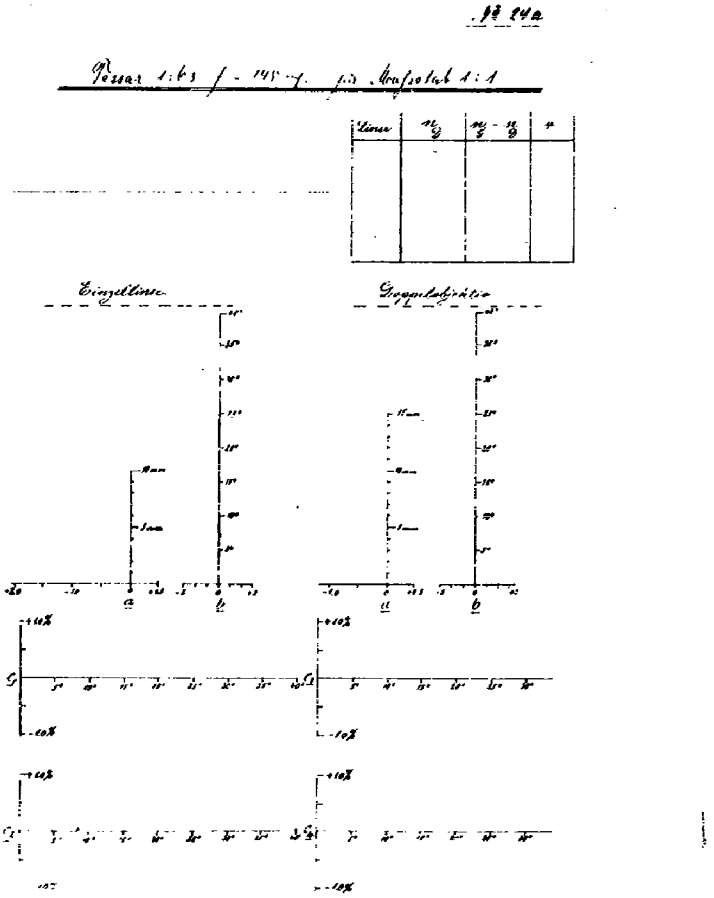
Frontwinkel | Kennzeichnung

Radien, Dicken und Abstände für f = 100 mm


F-TS-6398-RE
202
Einzelsichten
Doppelsichten
Sphärische Konnection (Bl. XII)
Einfallsblenden
Chromasie
Astigmatismus (Bl. XI)
Äquatorialbüschel
Meridionalbüschel
Kurventabelle
Bezeichnung
Einzellinse
Doppelsichten

202


F-TS-6398-RE
203
Einzelsichten
Doppelsichten
Sphärische Konnection (Bl. XII)
Einfallsblenden
Chromasie
Astigmatismus (Bl. XI)
Äquatorialbüschel
Meridionalbüschel
Kurventabelle
Bezeichnung


Einzellinse
Doppelsichten

F-TS-6398-RE

204

Anastar 1:6.3 f. 153 mm v. 13 I 09

Einzellichter | Doppellichter

Sphärische Korrection ($\bar{K}$ XIII / 1933 / 44

Einzellichter Δs'	Einzellichter Δf'	Doppellichter Δs'			Doppellichter Δf'		
		-1.6	-10.2	-2.0	-8.4	-9.9	-2.0

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
18.2	25.8	31.6	-15 (+4) -5

Astigmatismus (R_3 XIX, 16

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel		Meridionalbüschel	
-3.9	-4.4	-0.5	-1.6	+0.3	-0.5

Frontwinkel | Verzeichnung

Frontwinkel			Verzeichnung
44.8	58.3	91.0	Tang. Rad. -20 -22 -18 -19 +1 0 +3

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l	d3	l	d4
108.1	442	211.5	158.6	41.1	57.1		3.3	1.4	4.3	2.3	2.0	1.1	2.6

Anastar 1:6.3 f. 153 mm v. 13 I 09

Linse	n_d	$n_F - n_C$	ν
L_1	1.591 57	0.011425	53.1
L_2	1.607 [illegible]	0.013 [illegible]	[illegible]
L_3	1.594 81	0.013 17	53.6
L_4	1.611 [illegible]	0.013 [illegible]	57.5

Einzellinse | Doppellichter

F-TS-6398-RE

205

B-Tessar 1:6.3 f. 150 mm v. 15. I. 00

Doppel-Einzellichter $\bar{J}$ (1935/44)

Doppellichter

Sphärische Korrection ($\bar{A}$) XXVIII, 02

Einzellichter Δs'			Einzellichter Δf'			Doppellichter Δs'			Doppellichter Δf'		
						-0.8	-0.8	+1.3	-9.1	-9.1	+1.6

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
18.3	25.8	31.8	-49 (+12) -30

1939/[illegible] Astigmatismus (B_3 XXX, 27

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel		Meridionalbüschel	
-2.1	+0.1	+0.8	+0.3	-0.1	-0.6

Frontwinkel | Verzeichnung

Frontwinkel			Verzeichnung
49.1	50.1	87.1	Tang. Rad. -102 -101 -220 -102 -113 -214 -2 -3 +2.3

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l	d3	l	d4
104.9	117	46.4	204	62.7	34.6	158.3	2.9	1.5	1.5	2.1	2.3	1.4	2.6

B-Tessar 1:6.3 f. 150 mm v. 15. I. 09

Linse	n_d	$n_F - n_C$	ν
L_1	1.591 [illegible]	0.013 [illegible]	53.8
L_2	1.604 [illegible]	0.011 [illegible]	43.9
L_3	1.594 [illegible]	0.013 [illegible]	53.6
L_4	1.611 [illegible]	0.013 [illegible]	57.5

Einzellinse | Doppellichter

F-75-6396-RE

206

Tessar 1:6,3 f. 15,3 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (R.S.H.) / 21

Δs'	Δf'	s	s'
		-2,8	

Δs'		Δf'	
-3,9	-7,7	-3,9	-5,8	-7,7	-4,3

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

10,2	20,6	29,8

-5,3 (4,4) -4,9

Astigmatismus / 1

Aequatorialbüschel | Meridionalbüschel

Aequatorialbüschel		Meridionalbüschel	
-3,9	+0,3	+2,4	-2,1	-0,8	-3,3

Frontwinkel | Vergleichung

Frontwinkel | Vergleichung

48,5	70,0	87,0

Vergl. Bed.
-10,4 -11,3 = -2,2
-10,4 -13,7 = -4,9
+ 3 = 4
n=00 = 7

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	l3	D1	D2	D3
24,3	∞	7,2	10,3	9,8	-12,3	36,4	2,9	2,0	1,6	2,3	2,3	1,6	2,6	9,1	15,1	14,4

Nr. 3

Nr. 196

Tessar 1:6,3 f. 15,3 mm

Linse	n/n'	n'-n/r	v
L1	1,621	0,0150	53,2
L2	1,621	0,0206	39,6
L3	1,517	0,0135	64,1

Einzellinse | Doppelobjektiv

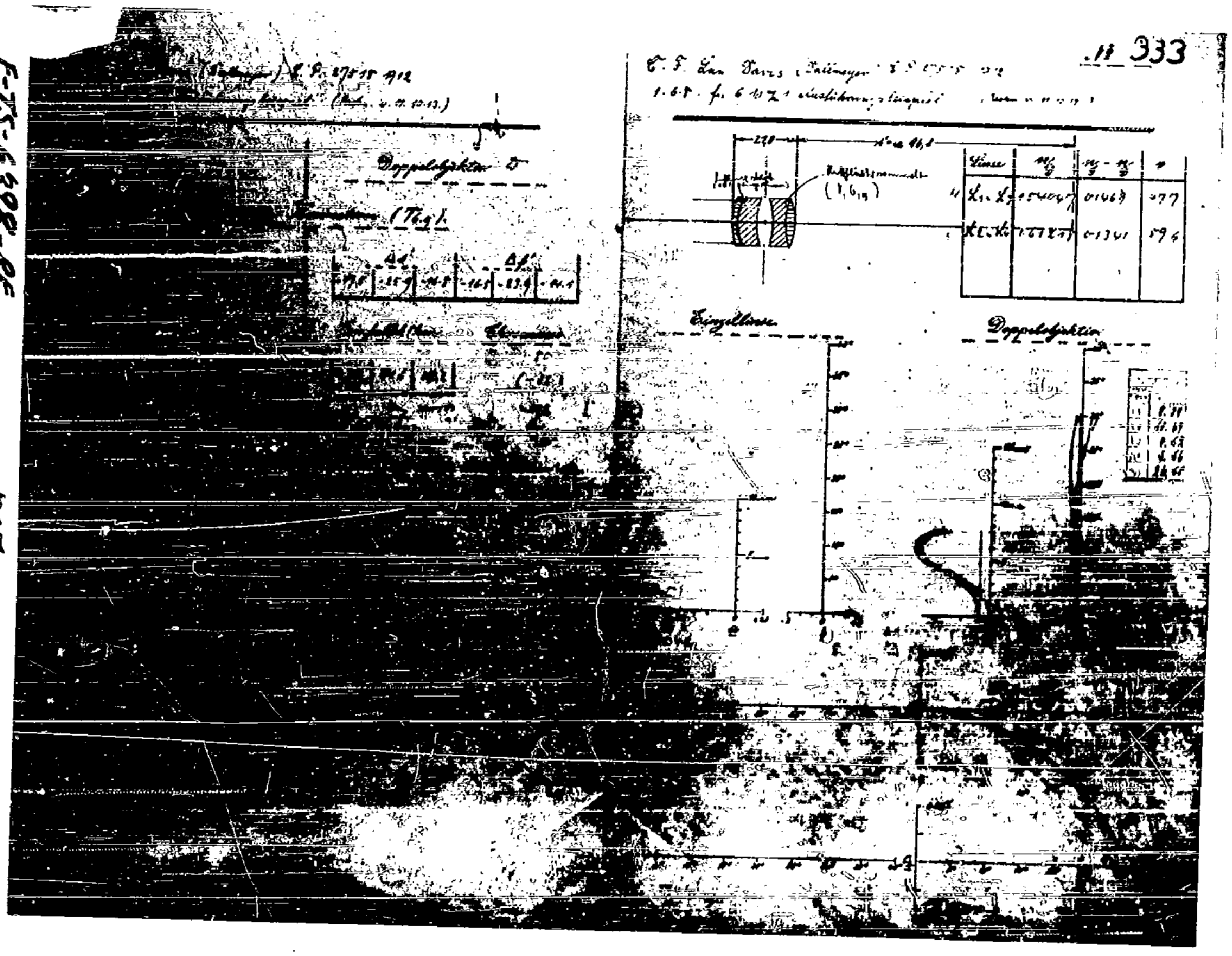
12,77
12,77
1,66
6,14
28,62

a b a b

+10% -10% +10% -10%

F-TS-6598-RE

207



F-TS-6398-RE

Objektiv 1:6,8 f = 200 mm v. Lacour-Berthiot Paris

Einzelobjektiv — Doppelobjektiv — Nr 44189

Sphärische Korrektion (Tf. 7, Fig. 44)

Δd'	Δf'

Einfallshöhen	Chromasie

Δd'	Δf'
-6.3 -0.1 -10.3	-7.3 -12.4 -14.2

Einfallshöhen	Chromasie
18.9 24.3 29.4	

Astigmatismus (Tf. 28, 62)

Sagittalbüschel	Meridionalbüschel

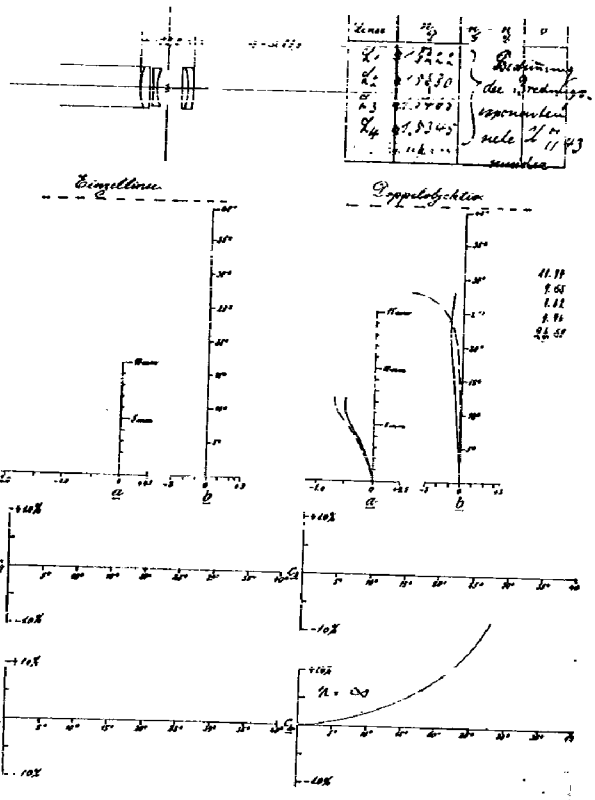
Sagittalbüschel	Meridionalbüschel
-3.3 -4.4 -3.2	-1.3 -3.4 -18.3

Einfallswinkel	Zeichnung

Hauptstrahlwinkel	Zeichnung Ang. Bild
39.7 53.3 67.3	-55 -99 -126 -65 -92 -99 +22 +21 +17

Radien, Dicken und Abstände für f = 100 mm

d_1	s	d_2	d_3	d_4	d_5	d_6	r_1	r_2	r_3	r_4	r_5	r_6	r_7	β_1	β_2	β_3
3.7	11.3	1.6	2.6	4.9	1.9	2.0	∞	119	96.0	18.3	∞	35.0	96.6	14.5	13.3	11.3



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Objektiv 1:6,8 f = 200 mm v. Lacour-Berthiot Paris 4938 (26 Tf. 14)

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (Tf. 31, Fig. 22/49)

Δd'	Δf'

Einfallshöhen	Chromasie

Δd'	Δf'
-0.9 +0.7 +0.6	-2.1 -0.7 +0.3

Einfallshöhen	Chromasie
14.4 19.0 23.3	-0.7

Astigmatismus (Tf. 32)

Sagittalbüschel	Meridionalbüschel

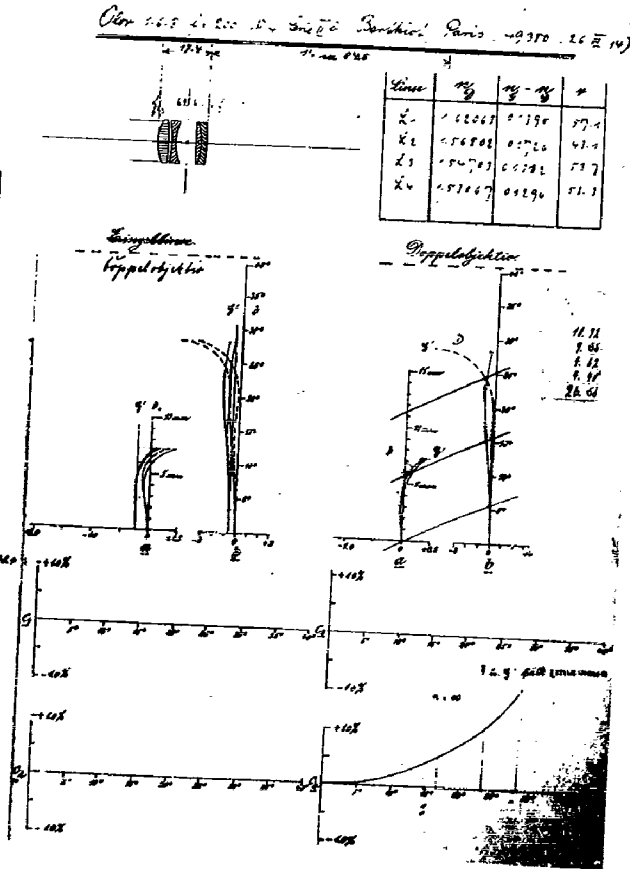
Sagittalbüschel	Meridionalbüschel
-3.4 -4.0 -2.5	-1.0 -1.3 -19.3

Einfallswinkel	Zeichnung

Hauptstrahlwinkel	Zeichnung
40.2 55.8 68.2	-75 -87 -114 -55 -69 -92 +0.3 +0.3 +0.3

Radien, Dicken und Abstände für f = 100 mm

d_1	s	d_2	d_3	d_4	d_5	d_6	r_1	r_2	r_3	r_4	r_5	r_6	r_7	β_1	β_2

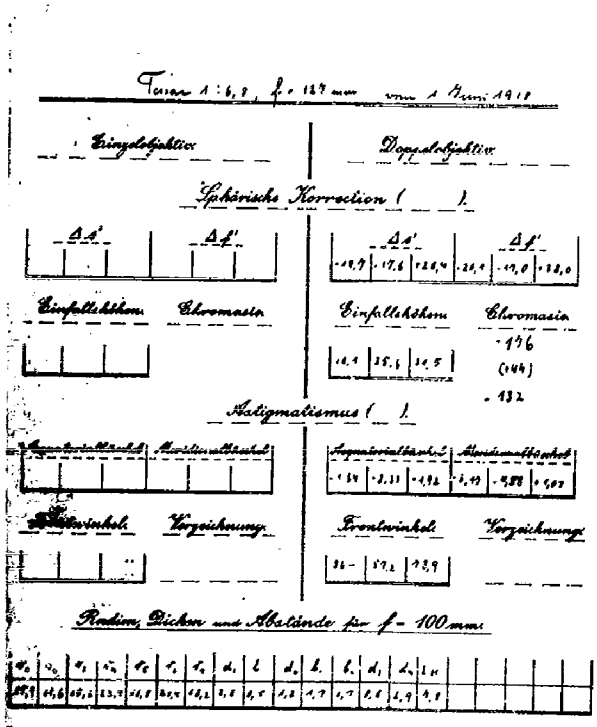


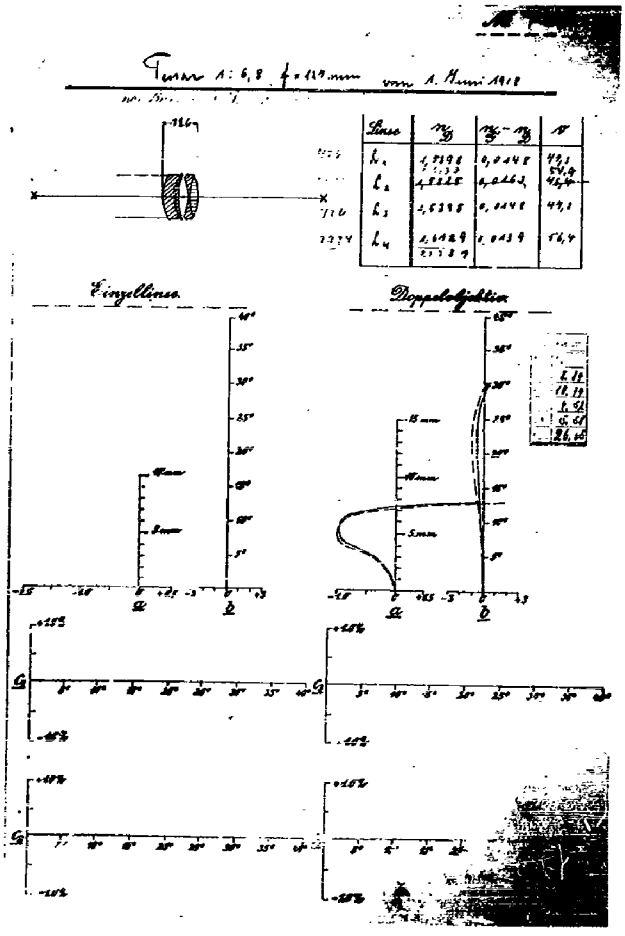
209

F-TS-6378-RE

2/10

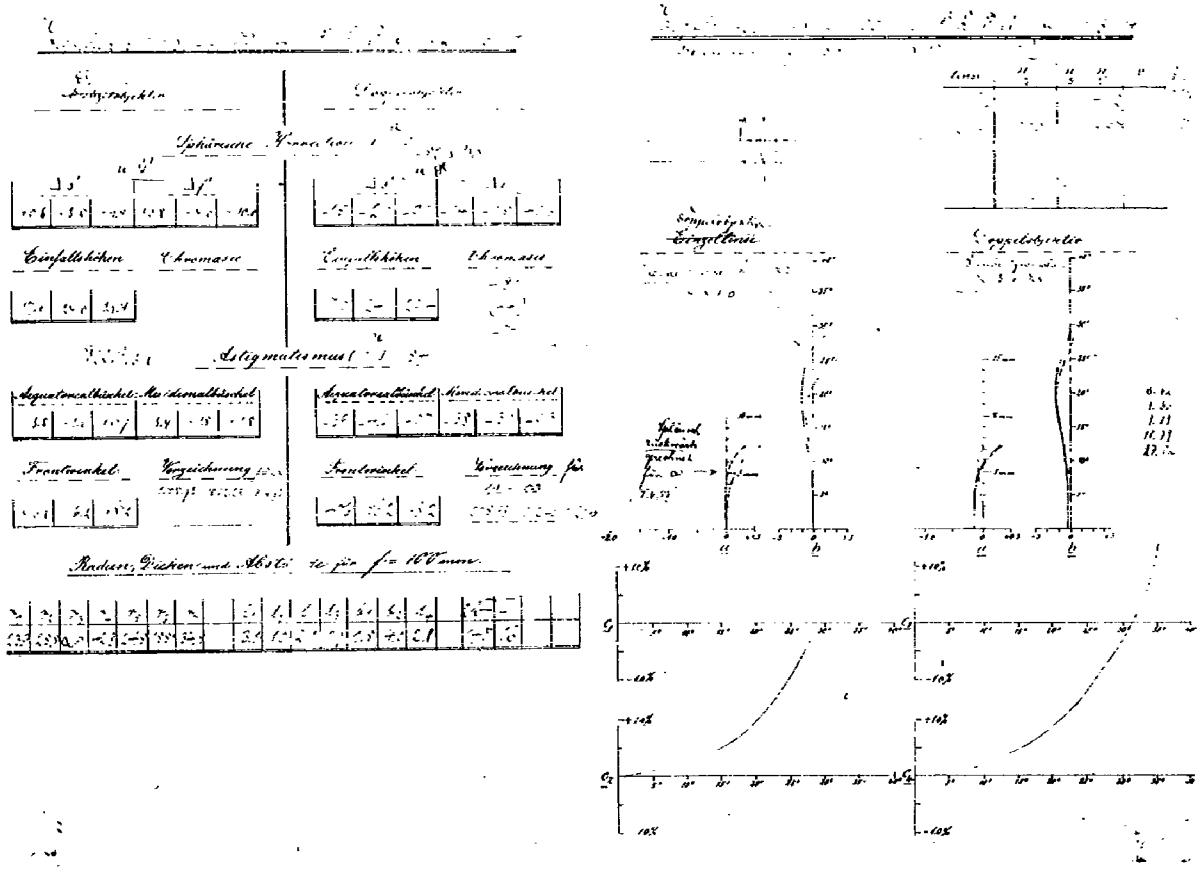
2/11





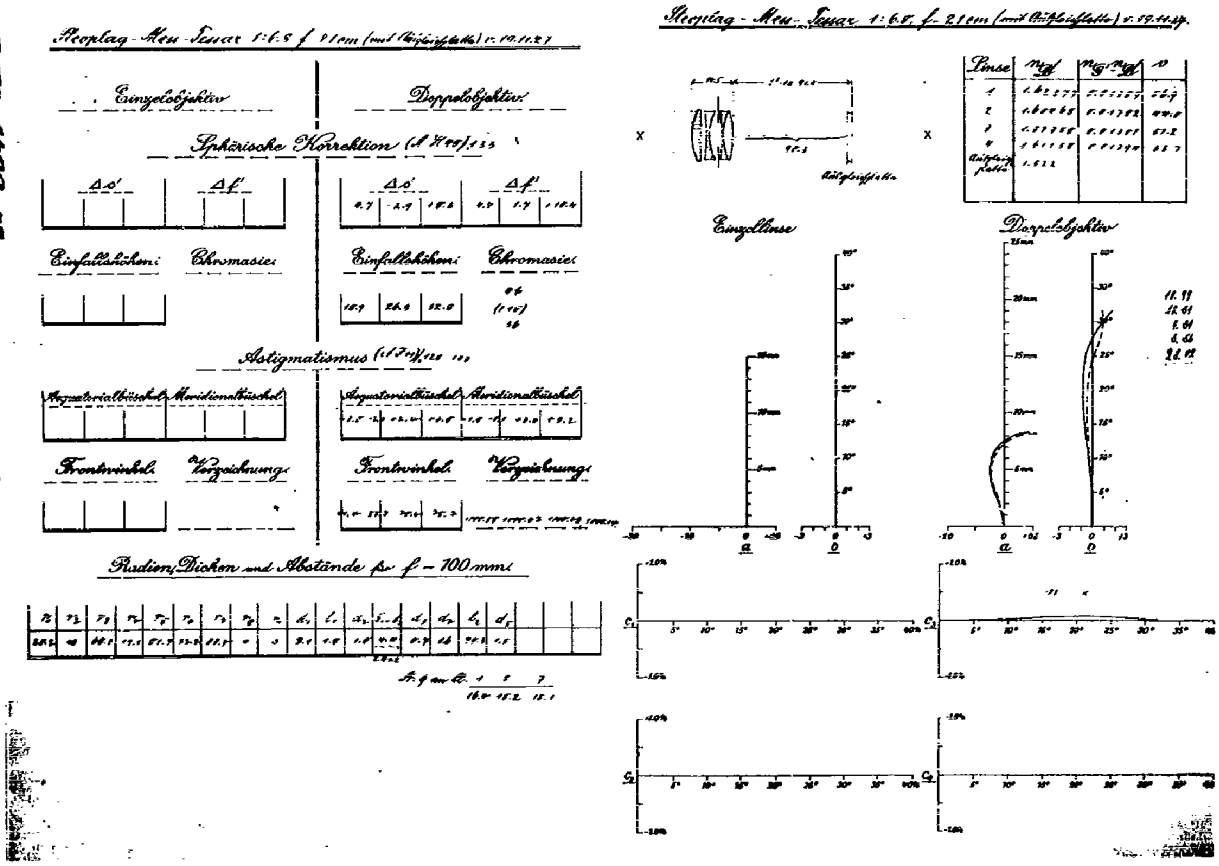
F-TS-6398-RE

2/12



F-TS-6398-RE

2/13



№ 203

F-TS-6398-RE

214

Tessar 1:2,8 f=135 mm für S.L.R. Zeiss Jena

Einzellichtlicht | Doppellichtlicht

Sphärische Korrektion

Δs'	Δf'

Δs'			Δf'		
-0,1	-0,7	-1,5	-2,5	-4,1	-7,5

Einfallsöffnung | Chromasie

Einfallsöffnung	Chromasie

15,9	24,6	27,5

Astigmatismus

Äquatorialwinkel	Meridionalwinkel

Äquatorialwinkel			Meridionalwinkel		
-1,9	-3,9	± 0	-2,5	-4,4	-8,7

Frontwinkel | Vergütung

Frontwinkel	Vergütung

Frontwinkel			Vergütung
4,5	5,9	7,9	

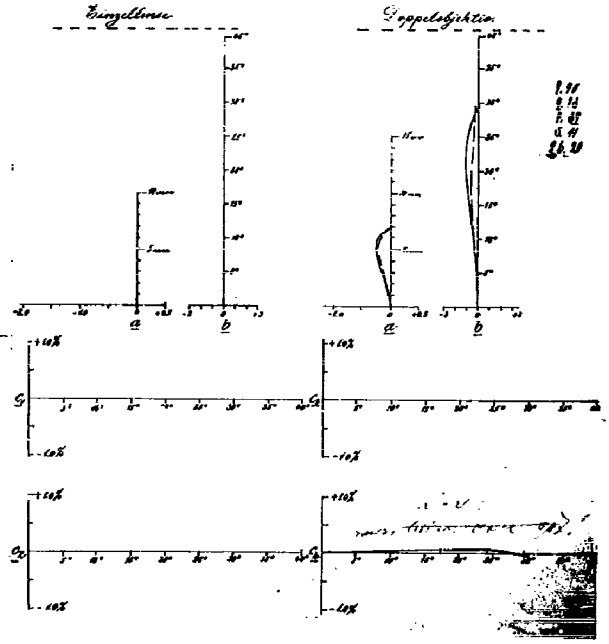
Vergütung: Farbe | Reflexion

-20 - 25 - 40
-65 - 76 - 95
76 - 91 - 97
94 - 100 -

Radien, Dicken und Abstände für f = 100 mm

	r_1	r_2	r_3	r_4	r_5	r_6	r_7		d_1	l	d_2	d_3	d_4	d_5	d_6		
	∞	46	169	1183	15,1	33,9			2,7	35	1,2	1,1	1,9	1,2	2,6		

Einzellinse | Doppellichtlicht



№ 111

№ 146

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215

Tessar 1:2,8 f=13,5 mm Spiegelreflex

Einzellichtlicht | Doppellichtlicht

Sphärische Korrektion

Δs'	Δf'

Δs'			Δf'		
-6,3	-7,1	-10,9	-6,1	-6,4	-11,3

Einfallsöffnung | Chromasie

Einfallsöffnung	Chromasie

16,0	22,6	27,8

Astigmatismus

Äquatorialwinkel	Meridionalwinkel

Äquatorialwinkel			Meridionalwinkel		
-2,7	-5,2	+8,5	-0,1	+1,5	-2,9

Frontwinkel | Vergütung

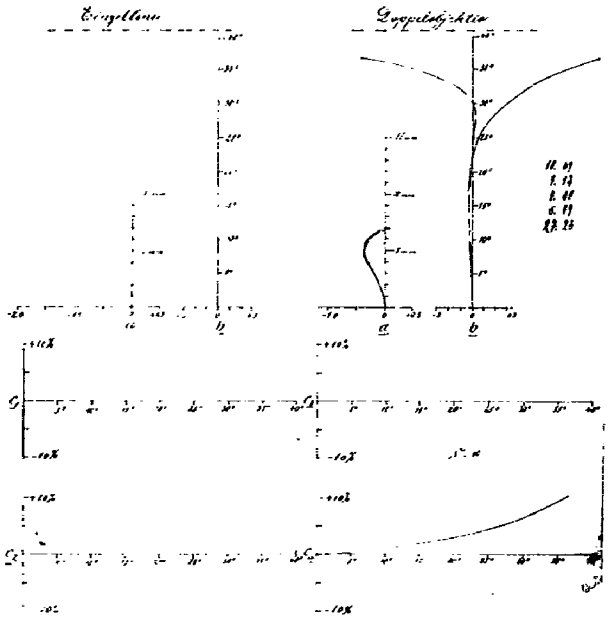
Frontwinkel	Vergütung

Frontwinkel			Vergütung
84	91	88	Vergütung Farbe Reflexion

Radien, Dicken und Abstände für f = 100 mm

	r_1	r_2	r_3	r_4	r_5	r_6	r_7		d_1	d_2	d_3	d_4	d_5	d_6	d_7		
	42	18	64	15,1	58	11,2	20		2,0	1,9	2,7	1,0	1,6	2,9	2,0		

Einzellinse | Doppellichtlicht



F-75-6398-RE

216

Tessar 1:7,7 f = 125,7 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1/100 f)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-1,6	-2,2	-1,0	+1,9	+1,4	-1,0

Einfallshöhen			Chromasie
14,7	20,1	25,3	vf (+31) hf

Astigmatismus (1/100 f)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-10,8	-15,8	-1,9	-18,4	4,3	+15,4

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		20,9	31,8	41,3	-17 -15 +4	116 108 +2	-117 -131 -6

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l1	d2	l2	d3	l3	d4
23,6	∞	61,3	23,9	107	61,8	14,8	2,4	11,2	1,2	2,0	11,2	11,2	7,2

Tessar 1:7,7 f = 125,7 mm

Linse	n	n/ν	ν
	1,613	1,5911	61,0
2	1,6	1,5911	57,9
3	1,613	1,5911	53,0
4	1,785	1,5911	26,0

Einzellinse | Doppelobjektiv

				11,65
				6,49
				3,78
				6,28
				24,26

711

F-75-6398-RE

217

Steenlag-Mess-Tessar 1:8, f = 21 cm. Rechg. 25.10.30.

mit 10 m/m dicker Ausgleichplatte

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1/100 f)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-3,9	-5,8	-5,2	-2,7	-4,9	-3,6

Einfallshöhen			Chromasie
14,3	20,4	25,0	

Astigmatismus (1/100 f)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2,4	-7,6	+2,6	+7,2	-7,6	-8,9

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		42,3	58,6	+3,2			

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	l1	d2	l2	d3	l3	d4	l4	d5	l5	d6
17,1	∞	72,4	16,4	193	19,6	33,1	2,2	1,6	0,3	1,7	1,3	2,1	0,6		12,0	12,1	12,8

Steenlag-Mess-Tessar 1:8, f = 21 cm. Rechg.

mit 15 m/m dicker Ausgleichplatte

Linse	n	n/ν	ν
	1,613	1,5911	61,0
2	1,613	1,5911	57,9
3	1,613	1,5911	53,0
4	1,785	1,5911	26,0

Einzellinse | Doppelobjektiv

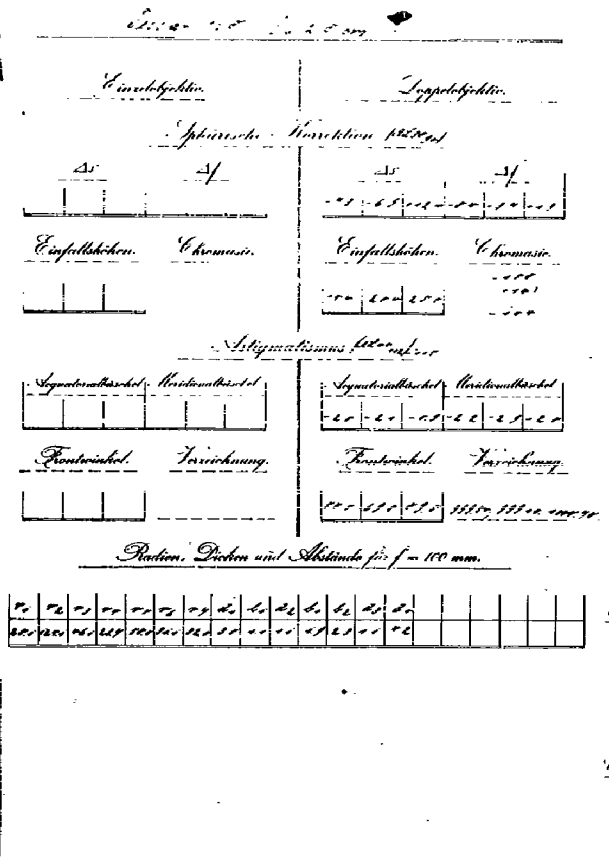
				8,11
				3,76
				8,11
				6,11

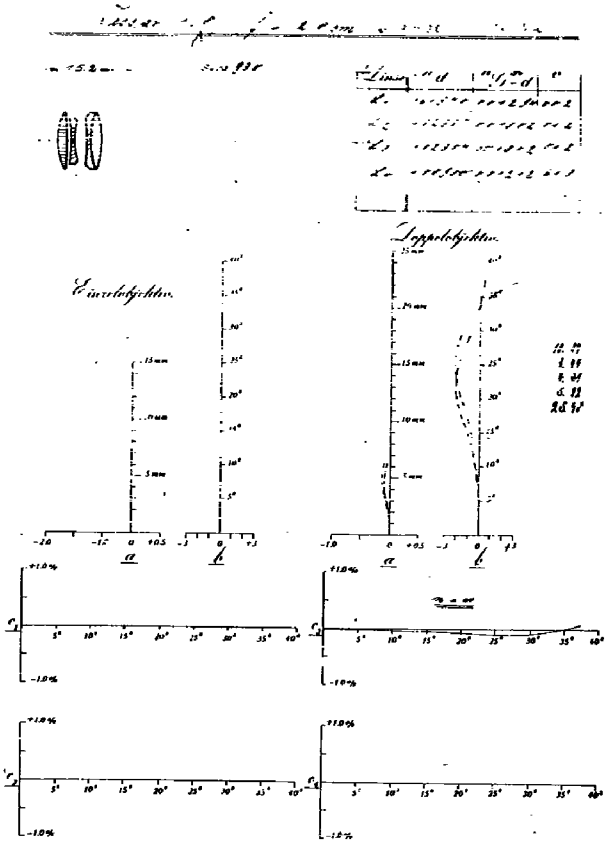
711

L 980

F-TS-6398-RE

218

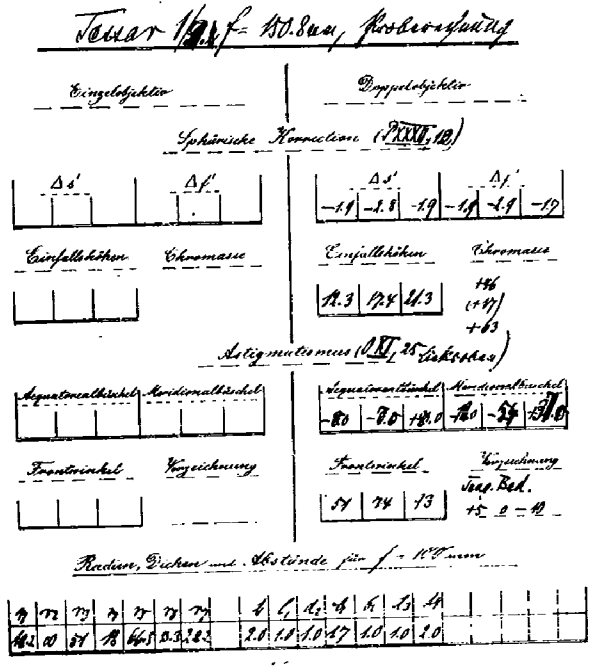


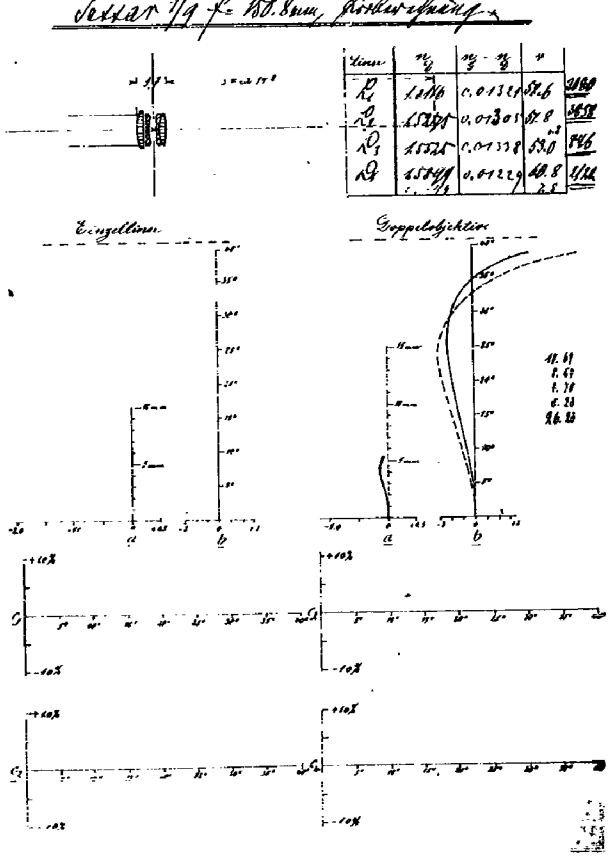


L 152

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Einzellinse | Doppellinse

Sphärische Korrection

Einfallshöhen | Ehrenmaße

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vergütung

Radien, Dicken und Abstände für $f = 100$ mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	s_1	s_2	s_3	s_4	s_5	s_6	L	$\frac{L}{f}$
177	∞	186	112	47	150	260	2.3	0.6	11	6.5	9.2	4.9	2.7		

Einzellinse | Doppellinse

Sphärische Korrection

Einfallshöhen | Ehrenmaße

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vergütung

Radien, Dicken und Abstände für $f = 100$ mm

F-TS-6398-RE

221

Einzellinse | Doppellinse

Sphärische Korrection

Einfallshöhen | Ehrenmaße

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vergütung

Radien, Dicken und Abstände für $f = 100$ mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	s_1	s_2	s_3	s_4	s_5	s_6	L
177	116	∞	22	446	228	58	2.1	1.0	5.8	1.5	1.0	1.0	

Einzellinse | Doppellinse

Vergütung:
$N = \infty$

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2122

Tessar 1/9 f= 140.2 mm Oberwochen

Einzellichten | Doppellichten

Sphärische Korrektion (XIII, 93)

Δs'	Δs''	Δs'	ε	Δs'	ε
		-9.1	-5.3	-8.4	-10.0	-5.3	-5.0

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

			13.2	18.6	22.9

Astigmatismus (XII, 6)

Aequatorialhöhe	Meridionalhöhe	Aequatorialhöhe	Meridionalhöhe
		-10.6	-18.2	13.4	-14.6	-12.6	16.6

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung Neg. Rad.

		51	74	87	-1 -7 -12

Radien, Dicken und Abstände für f= 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
46.7	93	68.5	21.3	53	56.7	31	2.1	1.1	1.1	1.8	1.1	1.1	2.5

Tessar 1/9 f= 140.2 mm Oberwochen

Linse	r	n_g − n_F	ν
L1	1.5116		61.2
L2	1.6033		38.2
L3	1.5736		57.4
L4	1.6171		54.7

Einzellinse | Doppellichtlinie

F-TS-6398-RF

2123

Tessar 1/9 f= 139.9 mm Oberwochen

Einzellichten | Doppellichten

Sphärische Korrektion (XIII, 93)

Δs'	Δs''	Δs'	ε	Δs'	ε
		-9.3	-6.9	-5.6	-8.8	-5.9	-1.6

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		13.2	18.6	21.8	ca. 1.53 .761 -1.4

Astigmatismus (XII, 7)

Aequatorialhöhe	Meridionalhöhe	Aequatorialhöhe	Meridionalhöhe
		-11.2	-13.3	-6.8	-9.7	1.0	19.2

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung Neg. Rad.

		51	74	93	+1 -6 -17

Radien, Dicken und Abstände für f= 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
46	80	63	22	43	34	221	2.1	1.1	1.1	1.8	1.1	1.1	2.5

Tessar 1/9 f= 139.9 mm Oberwochen

Linse	r	n_g − n_F	ν
L1	1.5111	0.01381	58.9
L2	1.6048	0.01903	38.8
L3	1.5328	0.01316	57.6
L4	1.6073	0.01371	57.9

Einzellinse | Doppellichtlinie

F-TS-6398-RE

Tessar 1:4 f = 142.2 mm, Zeiss-Jena

Einzellinse — Doppellinse

Sphärische Korrektion (PXIII/1)

Δs'	Δs''

Δs'	Δf
-3.1	-3.8 -1.8 -3.2 -3.9 -2.5

Einfallshöhen — Chromasie

Einfallshöhen	Chromasie
	13.1 14.8 22.1

-19 (-18) -19

Astigmatismus (PXIII/1)

Äquatorialbüschel	Meridionalbüschel

Äquatorialbüschel	Meridionalbüschel
-4.1 -3.1 -4.8 -4.3	-7.1 -7.1 -8.1 -7.1 -8.1 -7.1

Frontwinkel	Vorzeichnung

Frontwinkel	Vorzeichnung Feng. Red.
12.1 11.1 13.1	-13 -15 -16

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d	d2	d3	d4	d5	d6
114	∞	84	14	52.5	21.1	49.3	2.1	1.1	1.1	1.8	1.6	1.1	2.5

224

Tessar 1:4 f = 142.2 mm, Carl Zeiss Oberkochen

	r_ν	$n_g - n_F$	ν
I	1.9866	0.01324	58.6
II	1.6145	0.01103	58.8
III	1.5735	0.01109	59.2
IV	1.5165	0.01163	64.1

Einzellinse — Doppellinse

11.69 6.69 1.68 6.11 26.12

F-TS-6398-RE

Tessar 1:4 f = 146.1 mm

Einzellinse — Doppellinse

Sphärische Korrektion (PXIII/1)

Δs'	Δf'

Δs'	Δf
-1.9 -1.9 -0.1 1.7 -1.8 +0.5	

Einfallshöhen — Chromasie

Einfallshöhen	Chromasie
12.1 13.1 22.0	-1 (-14) -19

Astigmatismus (PXIII/1)

Äquatorialbüschel	Meridionalbüschel

Äquatorialbüschel	Meridionalbüschel
-1.5 -1.1 -15.6 -4.8 12.3 +21.3	

Frontwinkel	Vorzeichnung

Frontwinkel	Vorzeichnung Feng. Red.
7.1 -4.1 9.1.2	-14 -18 -15 -16 -18 -15 +6 +1 -9

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d	d2	d3	d4	d5	d6
19.8	∞	12.5	4.5	-2.1	18.2	28.0	2.1	1.0	1.0	1.7	1.0	1.0	1.8

225

Tessar 1:4 f = 146.1 mm

	r_ν	$n_g - n_F$	ν
I	1.5114	0.01124	17.6
II	1.5271	0.01101	17.8
III	1.5274	0.01130	17.2
IV	1.5799	0.01122	64.8

Einzellinse — Doppellinse

11.69 6.69 1.68 6.33 26.12

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2526

Tessar 1/9 f= 234.7 (westdeutsche Type 26)

Einzellichten | Doppellichten

Sphärische Korrection (XXII)

Δs'	Δs'	Δs'	Δs'	Δs'	Δs'
		-15.1	-11.6	+2.0	-13.1	-12.8	+3.2

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
12.8	18.1	21.3	+11 (-10) +26

Astigmatismus (XIV)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-0.3	+6.6	+17.4	+4.6	+13.8	+34.4

Frontenwinkel | Bezeichnung

Frontenwinkel			Bezeichnung
59.1	73.0	91.9	-10 -HL -HL -120 -HL -HL -40 -SK -BK

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
48.7	43.4	47.2	42.6	48.5	57.9		2.6	4.3	2.2	2.6	2.8	4.7	3.0

Tessar 1/9 f = 312 (Kriegsglas Type)

Linie	n'g	n'g - n'f	ν
I	1.6167	0.02198	36.9
II	1.5780	0.01372	57.5
h	1.5723	0.01263	57.6
g	1.5690	0.01229	60.1

Einzellinse | Doppellichten

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Tessar 1/9 f= 142.5 mm Kriegsausführung

Einzellichten | Doppellichten

Sphärische Korrection (XXII) 14 33/38

Δs'	Δs'	Δs'	Δs'	Δs'	Δs'
D	-7.8	-5.4	-7.4	-5.2	-6.3	-8.5
g'	-4.9	-13.	+12.	-1.9	+2.	

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
15.0	16.4	11.5	+11 (-1)

Astigmatismus (XIV, 24 Ebb.)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
D	-8.7	-8.7	+13.8	-14.1	-14.4	+22.5
g'	-9.7	-7.7	+9.8	-9.8.0	-9.2.	+15.0

Frontenwinkel | Bezeichnung

Frontenwinkel			Bezeichnung
51	74	93	Reg. Bed. -1 -9 -12

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
43	00	57	19	63	120	-30.2	2.1	1.1	1.1	1.8	1.1	1.1	2.5

Tessar 1/9 f = 142.5 mm Kriegsausführung

Linie	n'g	n'g - n'f	ν
D	1.6446	0.01721	38.6
d	1.5741	0.01305	57.8
C2	1.5734	0.01309	57.2
C3	1.5734	0.01309	57.2
C4	1.5704	0.01279	58.8

Einzellinse | Doppellichten

№ 418

F-73-6398-RE

Tessar 1:9 f. 50 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (3/72 cm).

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus (Ort).

Äquatorialbruchsch. Meridionalbruchsch.

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Tessar 1:9 f. 50 cm

Linse | n_d | $n_F - n_C$ | ν

Doppelobjektiv für 6

Einzellinse

Doppelobjektiv

F-73-6398-RE

Reproduktions-Tessar

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbruchsch. Meridionalbruchsch.

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Reproduktions-Tessar

Linse | n_d | $n_F - n_C$ | ν

Einzellinse

Doppelobjektiv

F-TS-6398-RF

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Reproduktions-Tessar No f 640 f. (15 IX. 01)

Doppelobjektiv für $\frac{4}{4}$'
Einzelobjektive

Doppelobjektiv für $\frac{8}{8}$

Sphärische Korrection (Ab XI. 01)

Δs'			Δf'		
-1.8	-0.4	+4.9	-1.9	0.6	1.77

	Δs'			Δf'		
$\frac{4}{4}$	-2.-	2.2	-2.2	-2.-	-2.-	+2.1
$\frac{8}{8}$	3.5	4.1	1.1	3.7	-9.-	-7.3

Einfallshöhen			Chromasie
11.3	16.0	19.6	$-b_1$ (-1) $-b_2$

Einfallshöhen			Chromasie
11.3	16.0	19.6	$-b_1$ (-1) $-b_2$

Astigmatismus ( )

Aequatorealbüschel	Meridionalbüschel

Aequatorealbüschel	Meridionalbüschel

Frontwinkel	Vergrößerung

Frontwinkel	Vergrößerung

Radien, Dicken und Abstände für $f = 100$ mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	l	d_2	l_1	l_2	d_3	d_4
68.7	∞	57.8	49.3	18.6	19.4	11.8	2.2	0.6	0.6	1.6	1.4	0.6	1.9

1276

Reproduktions-Tessar No f. 640 f. (15 IX. 01)

Linse	n_D	$n_F - n_C$	ν	
I.	1.52113	0.01129	60.9	1.522
II.	1.52409	0.01133	57.0	1.523
III.	1.60842	0.01371	56.9	1.609

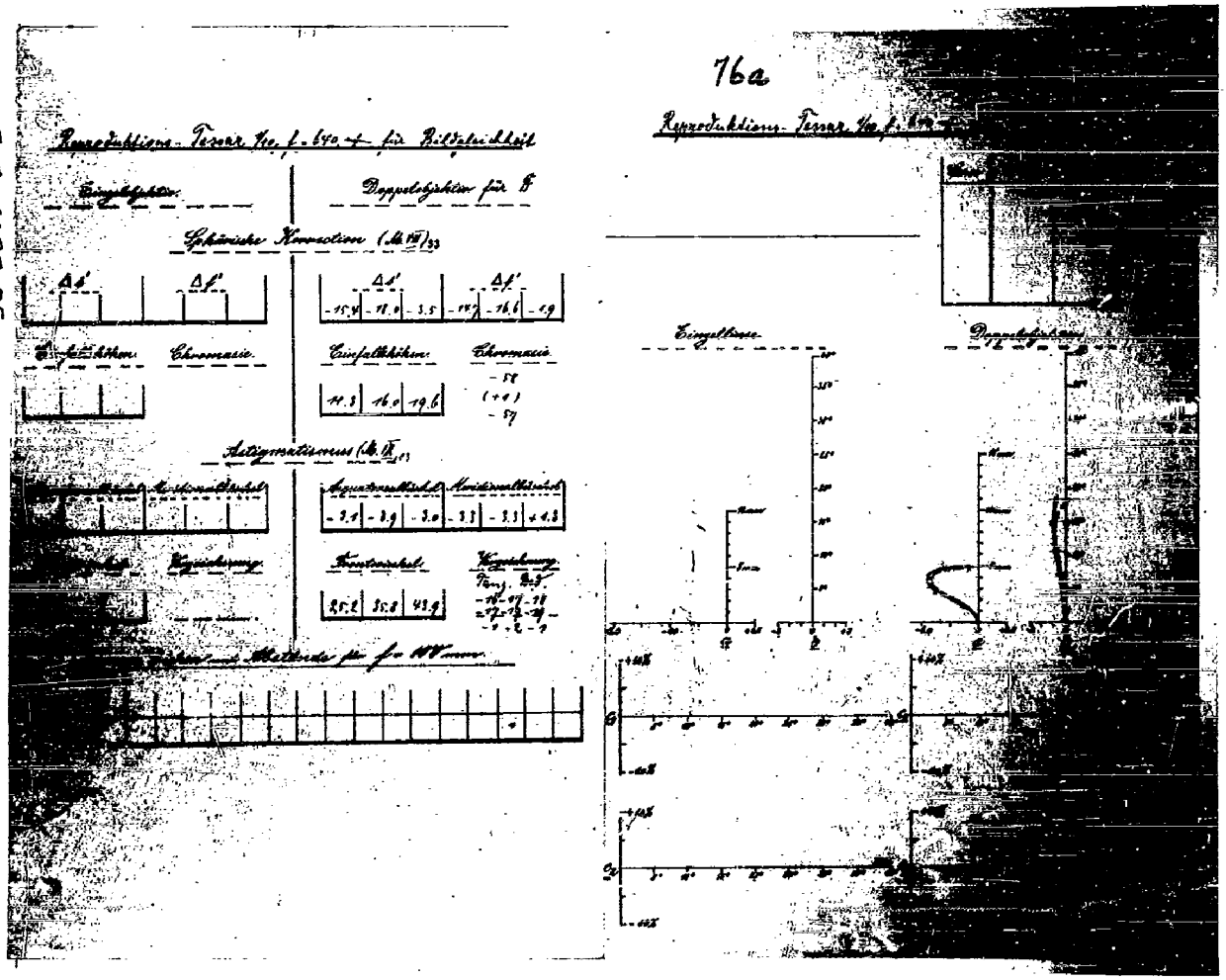
Doppelobjektiv für $\frac{4}{4}$'
Einzelobjektive

Doppelobjektive

18.11
2.11
1.01
6.02
26.11

23

F-TS-6398-RE



231

№ 778

F-73-6998-PE

Kapella Lis E P № 209371 f. 1932

1. Beispiel

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (-1,97 %)

Δs'	Δf'	Δs'	Δf'
		2,1 -11,9 -12,0 -6,0 -11,9 -12,0	

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		12,5 12,3 12,0	-1,1 (-1,10) -2,7

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2,6 -2,9 -2,8 2,1 -4,2 -4,9	

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		33,4 46,0 56,2	1,5 % 1,5 % 1,0 %

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
116,1	300,0	48,9	113,3	29,7	88,5	214,7	4,1	1,5	1,0	11,1	1,7	2,1	1,8

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Kapella Lis E P № 209371 f. 1932

2. Beispiel

Linse | | | | n

Einzellinse | Doppelobjektiv

11,11
2,11
1,11
1,01
24,11

232

№ 783

F-73-6998-PE

Apo Tessar f 1:6 f 60 mm, f. 1932

1. Beispiel

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs'	Δf'	Δs'	Δf'

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7

Apo Tessar f 1:6 f 60 mm, f. 1932

2. Beispiel

Linse | | | | n

Einzellinse | Doppelobjektiv

233

F-75-6398-RE

234

Tessar 1:16 f=21 cm für Alt Kleinbild 1:1 v. 9.7.35

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion f/4,5 f/5,6

Δs' | Δf' | Einfallsfehler | Chromasie

Astigmatismus f/4,5 f/5,6

Sagittenfehler | Meridianfehler | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Tessar 1:16 f=21 cm für Alt Kleinbild 1:1 v. 30.7.38

Linse | n_d | $n_F - n_C$ | v_d

Einzelobjektiv | Doppelobjektiv

a | b | c | d

F-75-6398-RE

235

Tessar 1:2,8 f=8,8 cm v. 18.2.37 mit Alt. Maßstab 1:1,5

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion f/4,5 f/5,6

Δs' | Δf' | Einfallsfehler | Chromasie

Astigmatismus f/4,5 f/5,6

Sagittenfehler | Meridianfehler | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 115 mm.

Tessar 1:2,8 f=8,8 cm v. 15.6.37 mit Alt. Maßstab 1:1,5

Linse | n_d | $n_F - n_C$ | v_d

Einzelobjektiv | Doppelobjektiv

a | b | c | d

F-15-6982-AE

296

V 1937 Nr. 20; 1:2,0, f = 11 cm v. 10.9.37 f. Abbildungsmaßst. 1:1,8

Einzelobjektiv. | Doppelobjektiv.

Sphärische Konstanten ($\frac{\Delta s'}{\Delta s}$).

Einzelobjektiv.		Doppelobjektiv.	
$\Delta s'$	Δf	$\Delta s'$	Δf
		+0.04	+0.08	+0.32	+0.64	+0.66

Einzelobjektiv.	Chromasie.	Doppelobjektiv.	Chromasie.
		2.0	0.4	10.0	−1.4 (1.33) − 3

Astigmatismus ($\frac{s's}{\Delta s}$).

Sagittenwinkel	Meridianwinkel	Sagittenwinkel	Meridianwinkel
		−0.04	−1.16	−1.40	−0.83	−0.14	−0.66

Fensterwinkel.	Verzeichnung.	Fensterwinkel.	Verzeichnung.
		19.5	19.3	20.2	Ausgleich Fenster 19°

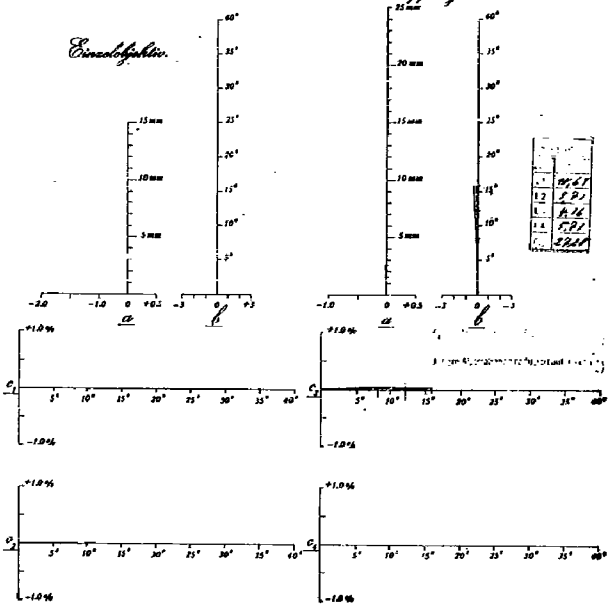
Radien, Dicken und Abstände für f = 100 mm.

R_0	r	d	n	r	t	d	d_1	l_1	d_2	l_2	d_3	d_4		r'_{ap}		D_r	s	s	w
(mm)	∞		1.613	61.6	1.2.6	1.2.6	12.6	3.0	4.3	0.6	2.3	3.0	0.5		83.3		1.2.4	11.2	13.4	1.6.7

V 1937 Nr. 20; 1:2,0, f = 11 cm v. 10.9.37 f. Abbildungsmaßstab 1:1,8

Linse	n_d	$n_F - n_d$	ν
L_1	1.6	0.0	60.4
L_2	1.7	0.0	42.7
L_3	1.6	0.0	47.8
L_4	1.6	0.0	55.9

Einzelobjektiv. | Doppelobjektiv.



F-75-6318-RE

237

V 1933 Nr 10, 1:1.8, f = 5 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Δs' Δf' | Δs' Δf'

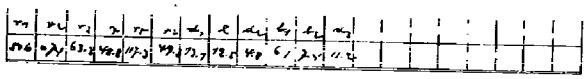
Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

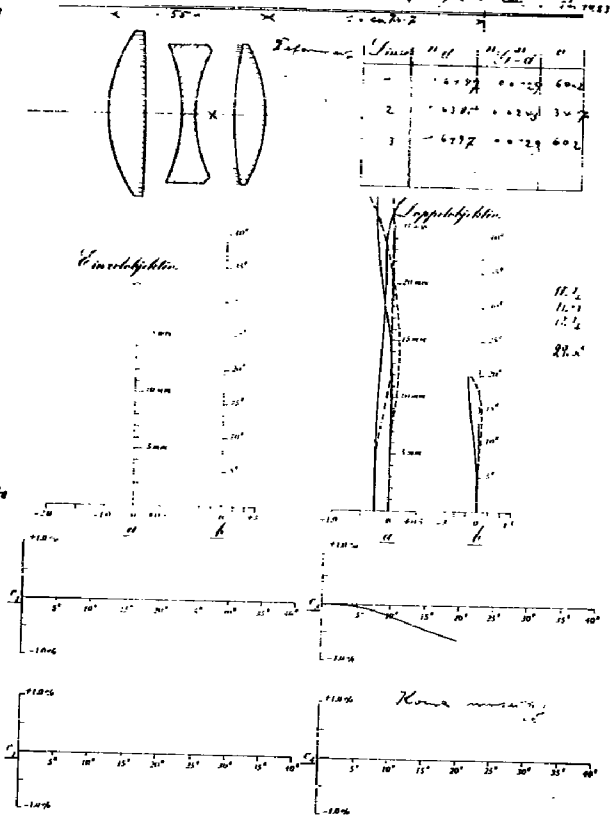
Astigmatismus

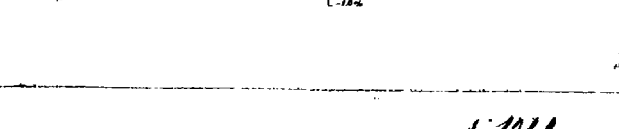
Sagittenwölbzahl. Meridionalwölbzahl. | Sagittenwölbzahl. Meridionalwölbzahl.

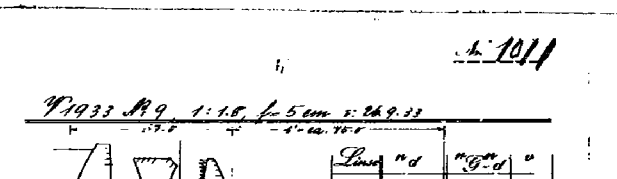
Frontwirkzahl. Verzeichnung. | Frontwirkzahl. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.









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F-75-6318-RE

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V 1933 Nr 9, 1:1.8, f = 5 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Δs' Δf' | Δs' Δf'

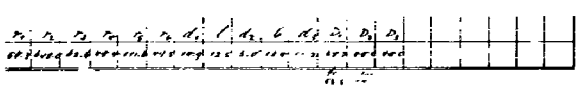
Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

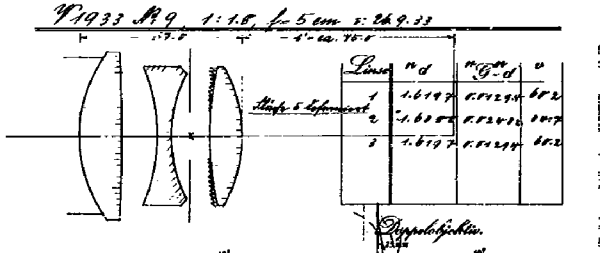
Astigmatismus

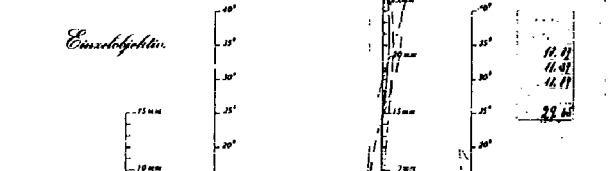
Sagittenwölbzahl. Meridionalwölbzahl. | Sagittenwölbzahl. Meridionalwölbzahl.

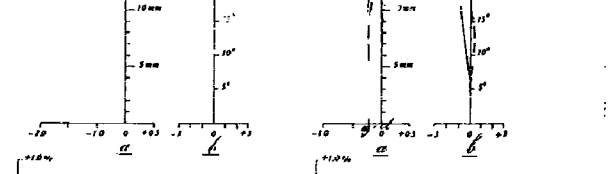
Frontwirkzahl. Verzeichnung. | Frontwirkzahl. Verzeichnung.

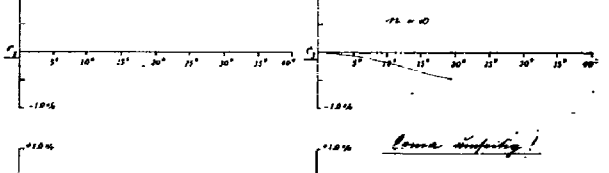
Radien, Dicken und Abstände für f = 100 mm.











F-TS-6398-RE

231

V 1932 No 5. 1:2. f = 5 cm. Bdg = 29.5.32

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (f' = 1 / 5)

Δs'	Δf'

Einfallshöhen. | Chromasie.

Δs'		Δf'	
-1.6	-2.7	-3.5	-4.5
1.7.3	1.7.3	1.7.2	1.7.2

Einfallshöhen. | Chromasie.

15.5	19.9	3.4.5

-12.5 (+3.9) -14.9

Astigmatismus (f' = 1) 21.32

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-2.6	-4.0	-6.5	-7.2	-8.1	-7.6

Frontwinkel. | Verzeichnung.

Frontwinkel.	Verzeichnung.
27.1	27.1	40.8	37.2.32 37.2.32 37.6.32

Radien, Dicken und Abstände für f = 100 mm.

12.5	67.4	49.7	24.9	11.4	27.4		11.9	72.0	6.7	3.3	7.3		13.6		33.8		10.7	

V 1932 No 5. 1:2 f = 5 cm. Bdg = 29.5.32

Einzellinse

Linse	n_d	n_F - n_C	ν
1	1.5137	0.0088	64.2
2	1.6398	0.0243	33.3
3	1.5137	0.0144	64.2

Doppelobjektiv

a b

Blende im 1. Linse

Blende im 2. Linse

F-TS-6398-RE

240

V 1933 No 12 1:2.0 f = 1 cm v. 9.12.33.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (f' = 1 / 5.7)

Δs'	Δf'

Einfallshöhen. | Chromasie.

Δs'		Δf'	
-7.5	-12.0	-2.0	-12.0	-19.0	-14.0

Einfallshöhen. | Chromasie.

17.2	21.0	22.0

-1.85 (+3.5) -11.0

Astigmatismus f / f'

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-0.8	-0.3	+2.5	-2.4

Frontwinkel. | Verzeichnung.

Frontwinkel.	Verzeichnung.
22.5	20.5	28.7.20 27.4.20

Radien, Dicken und Abstände für f = 100 mm.

26.7	62.2	29.4	12.2	6.2	17.1	7.3	9.1	2.2	10.3	12.3

Nr 1018

V 1933 Nr 12 1:2.0 f = 1 cm v. 9.12.33.

Linse	n_d	n_F - n_C	ν
1	1.6197	0.0129	60.2
2	1.6301	0.0243	34.7
3	1.6197	0.0144	56.2

Einzelobjektiv. | Doppelobjektiv.

a f

+10% -10%

14

L 1234

V. 1932 Nr. 12 1:2.0 f=2,5cm v. 11.2.32.

A 334 b
Einzelobjektiv

A 334 a
Doppelobjektiv

Sphärische Korrektion (A 514)/32

Δs'		Δf'	

Einfallsblenden | Chromasie

Einfallsblenden | Chromasie

Astigmatismus (F 25)/39

Sagittalwalkwinkel		Meridionalwalkwinkel			
-4.9	-5.4	-4.5	-0.6	-1.6	-2.3

Frontwinkel | Verzeichnung

25.2 | 14.5 | 4.5 | 999,7 999,2 994,9

Sagittalwalkwinkel		Meridionalwalkwinkel			
-11.4	-2.56	-3.37	+0.44	+0.44	+2.97

Frontwinkel | Verzeichnung

25.7 | 34.3 | 44.0 | 999.3 | 994.14 | 995.91

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	1234 d1 d2 d3 d4
145.3	∞	76.0	35.6	72.1	574.4	18.4	10.1	11.3	2.0	11.6	

	Länge	m d	m d²-d	°
y=3		467415	0.0 15493	47.1 mm
4		471732	0.0 32.39	28.1 m.

Doppelobjektiv.

Einzelobjektiv

a b a b

Spannweite
1 24.24
2 22.85
3 21.44
4 5 6
7 22.38

1:2.0 f=2,5cm v. 11.2.32.

+1.0% -1.0% +1.0% -1.0%

+1.0% -1.0% +1.0% -1.0%

2.11

1157

Wk. Opt. Anstalt
Kgl. Hofl. 914

F-15-6378-AE

V. 1932 Nr. 21 1:2.5 f=5cm Aufnahme v. 27.2.27

Doppelobjektiv 1:4.5
Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (A 833)/32 (A 834)/32 A 834/32

Δs'		Δf'	

Einfallsblenden | Chromasie

Einfallsblenden | Chromasie

Astigmatismus (A 834)/32

Sagittalwalkwinkel		Meridionalwalkwinkel			

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1 d2 d3 d4

V. 1932 Nr. 21 1:2.5 f=5cm Aufnahme v. 27.2.27

Einzelobjektiv

Doppelobjektiv

a b a b

+1.0% -1.0% +1.0% -1.0%

+1.0% -1.0% +1.0% -1.0%

L 1126

F-75-6398-RE

243

Kapelle 1:2,5 f. 10 – E 482 mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (d. Ref.)

Einfallsöffnen. Chromasie.

Einfallsöffnen. Chromasie.

Astigmatismus (d. R.E.)

Tangentialfläche Sagittalfläche

Tangentialfläche Sagittalfläche

Fenstereinbel. Verzeichnung.

Fenstereinbel. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Kapelle 1:2,5 f. 10 – E 482 mm

Linse

Einzelobjektiv

Doppelobjektiv

U 113

K 1225

F-75-6398-RE

244

Kapelle 1:2,5 f. 10 mm.

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (d. Ref.)

Einfallsöffnen. Chromasie.

Einfallsöffnen. Chromasie.

Astigmatismus (d. Ref.)

Tangentialfläche Sagittalfläche

Tangentialfläche Sagittalfläche

Fenstereinbel. Verzeichnung.

Fenstereinbel. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

A.-G. vorm. Kapelle 1:2,5 f. 10 mm.

Linse

Einzelobjektiv

Doppelobjektiv

L 1046

F-TS-6308-RE

2445

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (F 35,53).

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'		Doppelobjektiv Δf	
		-200	26.9	-9.8	-22.4	-30.7	-22.0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		46.1	65.3	80.0	

Astigmatismus (AN 33/1).

Einzelobjektiv Sagittenabstand	Einzelobjektiv Meridionalabstand	Doppelobjektiv Sagittenabstand		Doppelobjektiv Meridionalabstand	
		-5.7	-6.8	-4.0	-5.7	-7.1	-34.2

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung		
		44.0	42.6	74.0	992.34	982.30	962.90

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	L1	L2	d5	L3	d6	L4	d7	L5	d8
194.5	2137.5	247.4	266.5	49.2	∞	28.9	98.5	23.4	65.5	19.3	209.5	12.3	78.8	9.7	19.1	4.0	11.9	41.2	

Sucher-Triplet 1:2.6 ; F = 8 cm. Rechn. v. 15.2.35.

F-TS-6318-RE

2446

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AN 33/1).

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'		Doppelobjektiv Δf	
		-19.8	-13.3	+24.6	-19.6	-19.6	+48.2

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		99.3	62.9	76.6	-113 (+38)

Astigmatismus (AN 33/1 / AN 33/2) 56-57 / 56-57 -115

Einzelobjektiv Sagittenabstand	Einzelobjektiv Meridionalabstand	Doppelobjektiv Sagittenabstand		Doppelobjektiv Meridionalabstand	
		-3.6	-9.6	-2.9	-2.2	-1.6	-13.6

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung		
		36.8	96.5	69.2	1001.25	1001.27	996.65

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	L1	d5	L2	d6	L3	d7
96.5	20	44.5	36.8	952.2	47.3	3.57	8.20	2.85	2.74	9.80	6.01				

K 1073

Sucher-Triplet 1:2.6 ; F = 8 cm. Rechn. v. 15.2.35.

№ 56 F

F-TS-6398-RE

247

Typ 1921, № 3, Triplet 1:2.6, f = 65 mm v. 2.4.21

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d 17,30)

Δs' | Δf' | Δs' | Δf'

Einfallsöffnung | Chromasie | Einfallsöffnung | Chromasie

Astigmatismus (d 16,33)

Sagittalbildfehl | Meridionalbildfehl | Sagittalbildfehl | Meridionalbildfehl

Randstrahl | Verzeichnung | Randstrahl | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Typ 1921, № 3, Triplet 1:2.6, f = 65 mm v. 2.4.21

Linse | n_d | ν_d | r

Einzellinse | Doppelobjektiv

247

№ 1045

F-TS-6398-RE

248

J. G. Taylor 1:2.7, f = 18 mm v. 27.11.28 G 1.281.588

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d 8,17)

Δs' | Δf' | Δs' | Δf'

Einfallsöffnung | Chromasie | Einfallsöffnung | Chromasie

Astigmatismus (d 8,17)

Sagittalbildfehl | Meridionalbildfehl | Sagittalbildfehl | Meridionalbildfehl

Randstrahl | Verzeichnung | Randstrahl | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

J. G. Taylor 1:2.7, f = 18 mm v. 27.11.28 G 1.281.588

Linse | n_d | ν_d | r

Einzelobjektiv | Doppelobjektiv

248

№ 633

F-75-6398-RE

Trioplan 1:3.0 f. 8.7 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Astigmatismus)

Einzellinse | Doppelobjektiv

№ 632

F-75-6398-RE

Triplet 1:2.7 f. 7.5 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Astigmatismus)

Einzellinse | Doppelobjektiv

F-75-6398-RE

251

Sucher – Triplet 1:2,8 f = 7,5 cm Ref. [illegible]

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (10/12/32)

Einzelobjektiv.		Doppelobjektiv.	
Δs'	Δf'	Δs'	Δf'

Einzelobjektiv.	Chromasie.	Einzelobjektiv.	Chromasie.

Astigmatismus (8/12/[illegible])

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel	Meridionalbüschel

Randstrahl	Verzeichnung.	Randstrahl	Verzeichnung.

Radien. Dicken und Abstände für f = 100 mm.

Sucher – Triplet 1:2,8 f = 7,5 cm Ref. [illegible]

Linse | n_d | n_F-n_C | v

Linse	n_d	n_F-n_C	v
1			
2			
3			

Einzelobjektiv. | Doppelobjektiv.

F-75-6398-RE

252

Sucher Triplet 1:4,8 f = 7,5 cm mm Nr. 3. 38

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (10/32/[illegible])

Einzelobjektiv.		Doppelobjektiv.	
Δs'	Δf'	Δs'	Δf'
		-4,5 / +4,8 / +9,1	-3,9 / +0,94 / +16,0

Einzelobjektiv.	Chromasie.	Einzelobjektiv.	Chromasie.
		34,2 / 22,9 / 34,1	(+3) / (-1,7)

Astigmatismus (8/12/[illegible])

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel	Meridionalbüschel
		-2,0 / -5,0	-0,4 / -2,5

Randstrahl	Verzeichnung.	Randstrahl	Verzeichnung.
		34,3 / 46,4	[illegible]

Radien. Dicken und Abstände für f = 100 mm.

Linse 3 aus FK

3			

Einzelobjektiv. | Doppelobjektiv.

F-TS-6398-RE

253

Sucher triplet 1:2.8, f. 3.5cm. Rechn.: ...

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf')

Einzelobjektiv: Δs' | Δf'

Doppelobjektiv: Δs' | Δf'

Einfallslehm. | Chromasie.

Einfallslehm. | Chromasie.

Astigmatismus (Δs'/sin²u')

Sagittalwölbung | Meridionalwölbung

Sagittalwölbung | Meridionalwölbung

Frontneigung | Verzeichnung.

Frontneigung | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Sucher triplet 1:2.8; f. 3.5cm; Rechn.v. 24.6.37

Linse | n_d | ν_d | $G_{F'}$ | ν

L_1 | 1.6042 | 0.0114 | 60.9

L_2 | 1.6042 | 0.0221 | 38.3

L_3 | 1.6137 | 0.0170 | 56.7

Einzelobjektiv. | Doppelobjektiv.

a | b | a | b

C_1 | C_2 | C_3 | C_4

D_1 | D_2

N° 1016

Sucherobjektiv

V 1933 Nr 11 1:2.8 f. 7.5 cm v. 8.12.33

V 1933 Nr 11 1:2.8 f. 7.5 cm v. 8.12.33

55.7 | 1.1 | 60.2

Linse | n_d | ν_d | $G_{F'}$ | ν

1 | 1.6772 | 0.0271 | 40.2

2 | 1.6382 | 0.0243 | 34.7

3 | 1.6227 | 0.0285 | 58.7

Einzelobjektiv. | Doppelobjektiv.

a | b | a | b

C_1 | C_2 | C_3 | C_4

F-TS-6398-RE

254

V 1933 Nr 11 1:2.8 f. 7.5 cm v. 8.12.33

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs'/sin²u')

Einzelobjektiv: Δs' | Δf'

Doppelobjektiv: Δs' | Δf'

Einfallslehm. | Chromasie.

Einfallslehm. | Chromasie.

Astigmatismus (Δs'/sin²u')

Sagittalwölbung | Meridionalwölbung

Sagittalwölbung | Meridionalwölbung

Frontneigung | Verzeichnung.

Frontneigung | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

F-TS-6398-RE

255

Sucher Triplet 1:2.8 f=6cm v. 31. i 33 (C.A.F.)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion für x = 25/50/75 = 0 %

x	Δf	Δs'	Δf'
		-16.2 -9.2 +16.7	+0.0 +0.0 -15.7

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		47.1 50.0	71.8	-1.00 (+0.21) 1.07

Astigmatismus für x = 10/25/50/75/100 %

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		+1.0	2.0	- 2.0	- 10.0

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

		+0.0	50.2

1911.59 1933.74

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	f	s'	a	b
35.0	∞	47.0	35.1	-32.2	-107.2	7.4	7.9	2.0	2.7	7.7	57.9	35.0	14.0	20.7

Sucher Triplet 1:2.8 f=6cm v. 31. i 33 (C.A.F.)

Linse	n d	n(f) - n d	ν
1	1.69 + 0.0	0.012 15	54.1
2	1.62 + 0.0	0.012 03	36.3
3	1.52 + 0.0	0.011 08	63.5

Einzelobjektiv | Doppelobjektiv

11, 11
11, 11
11, 11
28, 14

F-TS-6398-RE

256

V 1931 Nr. 11
Sucher-Triplet 1:2.8, f=6cm v. 11.5.31.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AK = 1/2/3 = AL 11/11/11)

Δs'	Δf'	Δs'	Δf'
		-9.6	-8.5	+21.2	-12.6	-7.6	+6.0

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		44.8	67.6	70.8	-1.35 (+0.21) -1.06

Astigmatismus (x = 0/50/75/100 %) n = 0.9

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-5.8	-0.6	-0.9	-2.0

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

		39.0	46.2

1911.07 1911.15

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	f	s'	a	b
35.0	∞	49.0	35.0	-34.0	-97.2	7.4	7.9	2.0	2.0	6.9		35.0	14.5	27.9	29.7

V 1931 Nr. 11
Sucher-Triplet 1:2.8, f=6cm v. 11.5.31

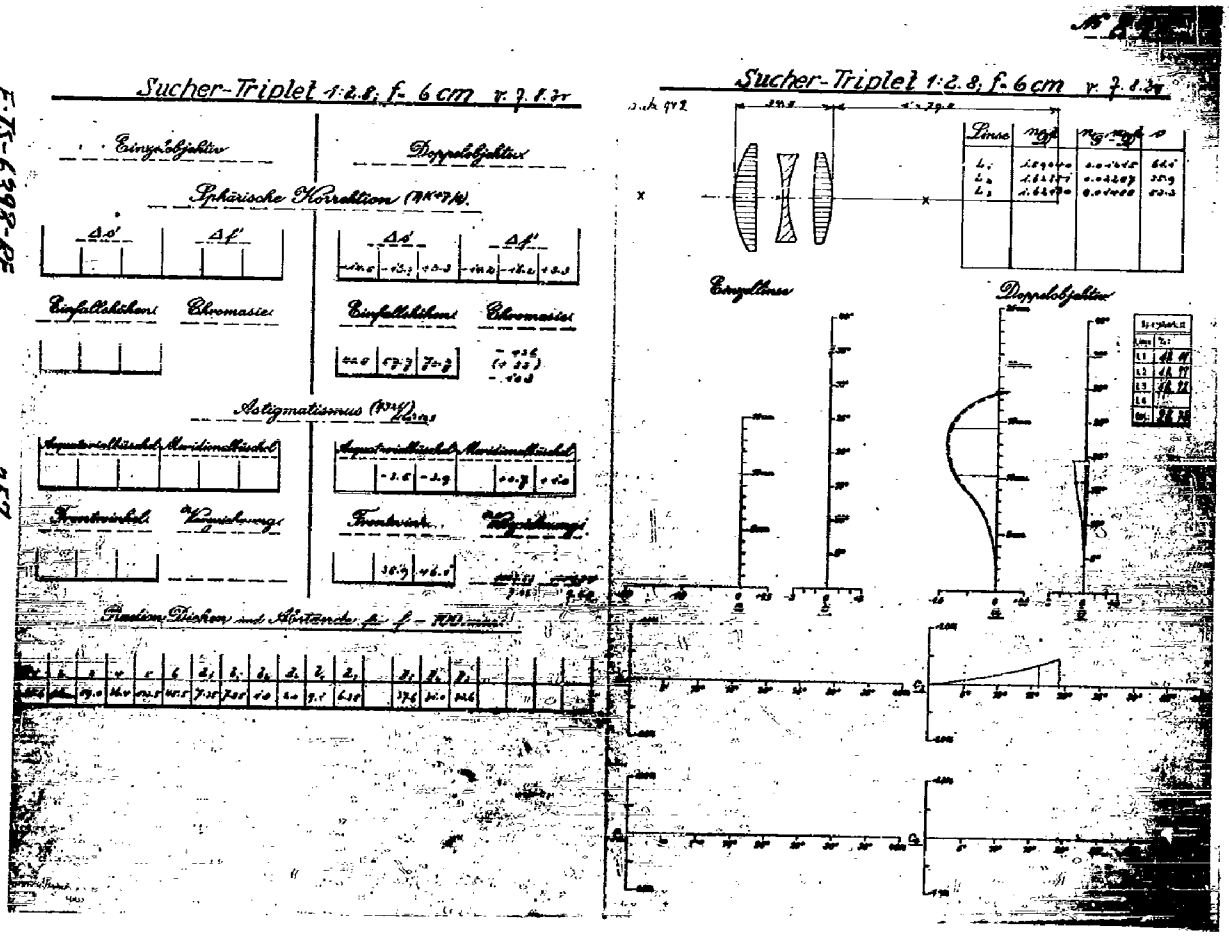
Linse	n d	n(f) - n d	ν
1	1.69 + 0.0	0.012 15	54.1
2	1.62 + 0.0	0.012 03	36.3
3	1.52 + 0.0	0.011 08	63.5

Einzellinse | Doppelobjektiv

11, 11
11, 11
11, 11
28, 14

F.S-6392-RE

257



№ 558

F-75-6398-RE

258

1:3, f=100, aus The British Journal of Photography v. 20. Feb. 1931

Beispiel I. (f'=99,6)

Einzellobjektiv

Doppelobjektiv

Sphärische Korrektion (dF 12.03)

Δs' Δs'

Einfallshöhen Chromasie

Astigmatismus (dF 11.31)

Meridionalbüschel Äquatorialbüschel

Verzeichnung

Koma, Bilder und Abstände für f'=100 mm:

1:3, f=100, aus The British Journal of Photography v. 20. Feb. 1931

Beispiel I. (f'=99,6)

Einzellinse

Doppelobjektiv

№ 557

F-75-6398-RE

257

1:3, f=100, aus The British Journal of Photography v. 20. Feb. 1931

Beispiel I. (f'=99,6)

Einzellobjektiv

Doppelobjektiv

Sphärische Korrektion (dF 12.03)

Δs' Δs'

Einfallshöhen Chromasie

Astigmatismus (dF 11.31)

Meridionalbüschel Äquatorialbüschel

Verzeichnung

Koma, Bilder und Abstände für f'=100 mm:

1:3, f=100, aus The British Journal of Photography v. 20. Feb. 1931

Beispiel I. (f'=99,6)

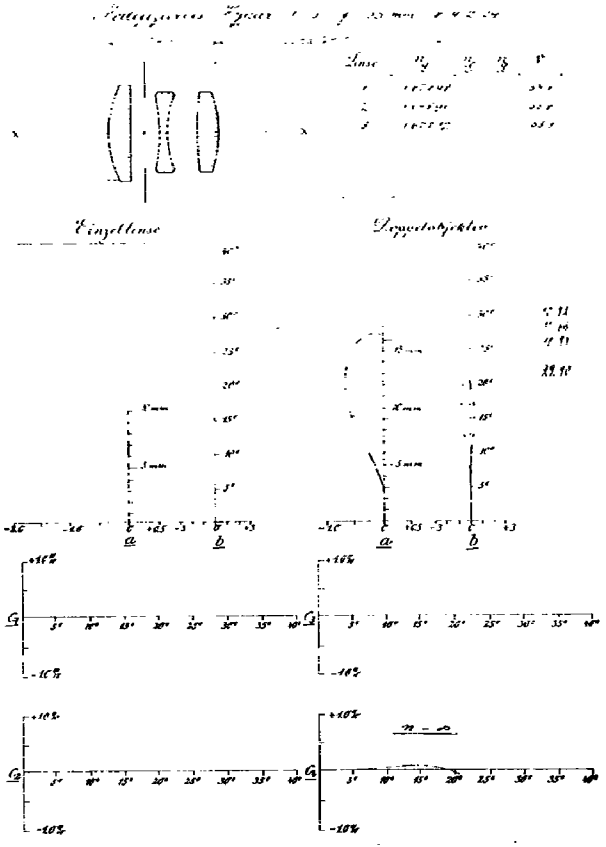
Einzellinse

Doppelobjektiv

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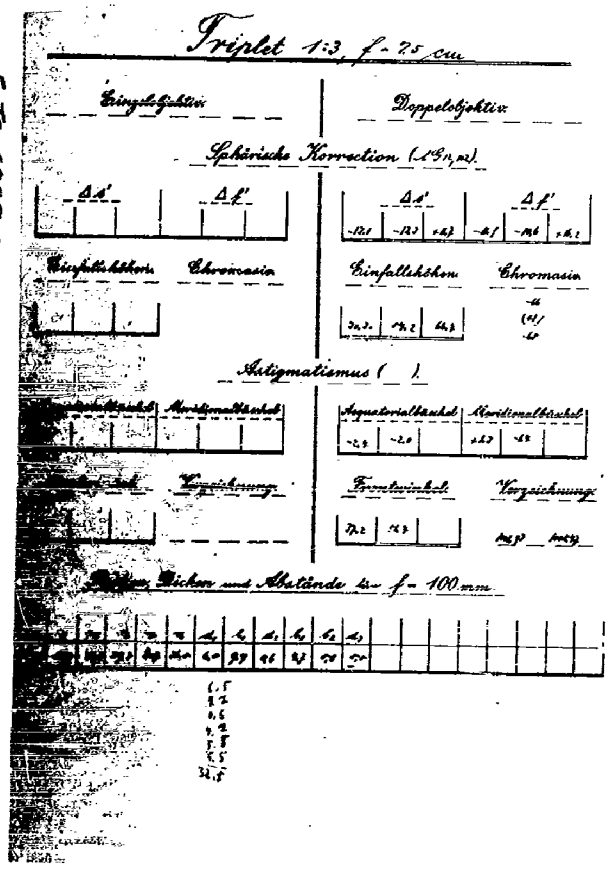
260

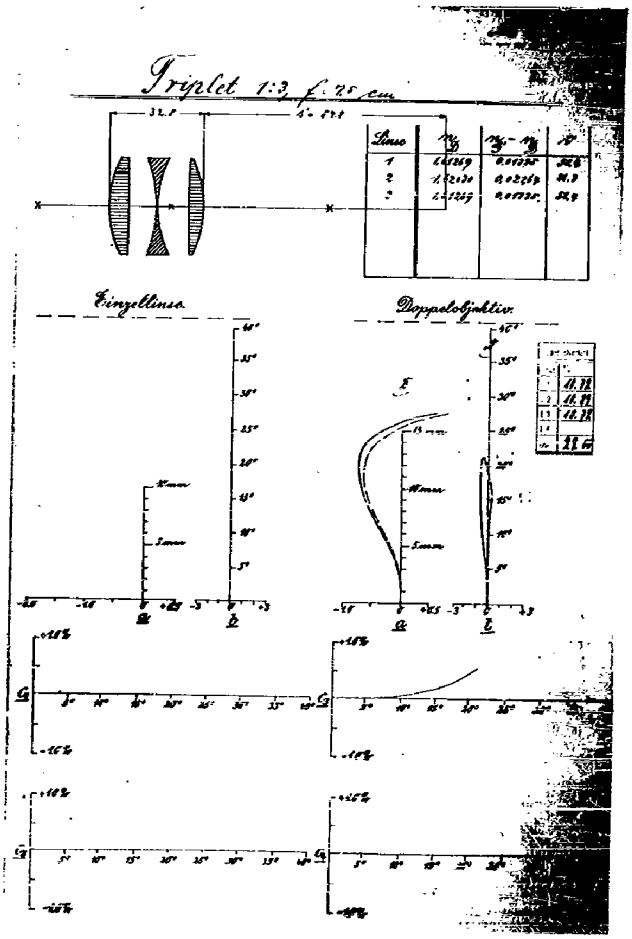




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C.P.S. Sucher-Triplet 1:3.1 f. 5cm Rechnung v. 10.10.20.

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Einzellinsen. | Doppellinsen.

Sphärische Korrektion (Öffnung).

Δs' | Δf' | Δs' | Δf'

-4.5 | -3.0 | +1.4 | -2.0 | -0.3 | +6.0

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

17.1 | 11.5 | 5.6 | -4.9 (+ 9) -4.0

Astigmatismus (Öffnung/Feld)

Sagittalbündel | Meridionalbündel | Sagittalbündel | Meridionalbündel

-3.0 | -3.1 | +1.8 | +6.6

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

39.9 | +6.6

Radien, Dicken und Abstände für f = 100 mm.

9.8	4	3	14	5	6	46	3.1	2.3	9.4	1	8.1	
17.1	∞	55.6	16.6	13.2	0.2	3.3	0.1	1.0	2.2	0.3	1.4	47.6

C.P.S. Sucher-Triplet 1:3.1 f. 5cm Rechnung v. 10.10.20.

Linse	n_d	$n_g - n_d$	ν
1	+1.62446	+0.01615	61.2
2	+1.61170	+0.01722	35.5
3	+1.62372	+0.01655	57.2

Einzellinsen. | Doppellinsen.

Sphärische Korrektion (Öffnung).

Astigmatismus (Öffnung/Feld)

Verzeichnung.

Busch - Glaukar, 1:3.1, f. 130 mm (ca. 1. Jan. 1913 an Busch a. Rh.)

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Einzellinsen. | Doppellinsen.

Sphärische Korrektion (Öffnung).

Δs' | Δf' | Δs' | Δf'

-10.4 | -11.0 | +5.8 | -2.9 | -10.2 | +6.9

-9.1 | -9.2 | +7.3 | -7.4 | -8.2 | +7.2

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

37.2 | 32.7 | 6.5 | -12.7 (+10) -10.7

Astigmatismus (Öffnung)

	Sagittalbündel		Meridionalbündel		
D	-5.8	-4.0	-3.0	-0.6	-2.4	-6.4
g	-6.3	-3.2	-3.7	+7.2	-3.3	-1.7

Frontwinkel | Verzeichnung

12.2 | 14.0 | 9.6 | -9.0 -9.2 -9.6 -9.7 -9.7 -9.6 -7 -5 -4

Radien, Dicken und Abstände für f = 100 mm.

10.1	4.2		4.1	1	4.6	0.1	1.6	0.3		16	0.2	0.3	0.2
16.4	4.2		5.9	10.4	0.6	1.5	5.9	1.5		34.0	19.0	17.0	34.0

Busch - Glaukar, 1:3.1, f. 130 mm (ca. 1 Jan. 1913 an Busch a. Rh.)

Linse	n_d	$n_g - n_d$	ν
L1	1.61250	0.1391	56.6
L2	1.62000	0.1261	36.2
L3	1.61250	0.1331	57.6

Einzellinsen. | Doppellinsen.

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Steinheil, München 1:12, f = 55 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d Fig 1)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-7.2 -6.9 +5.1	-6.5 -5.5 +6.5

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		14.0 19.1 24.9	

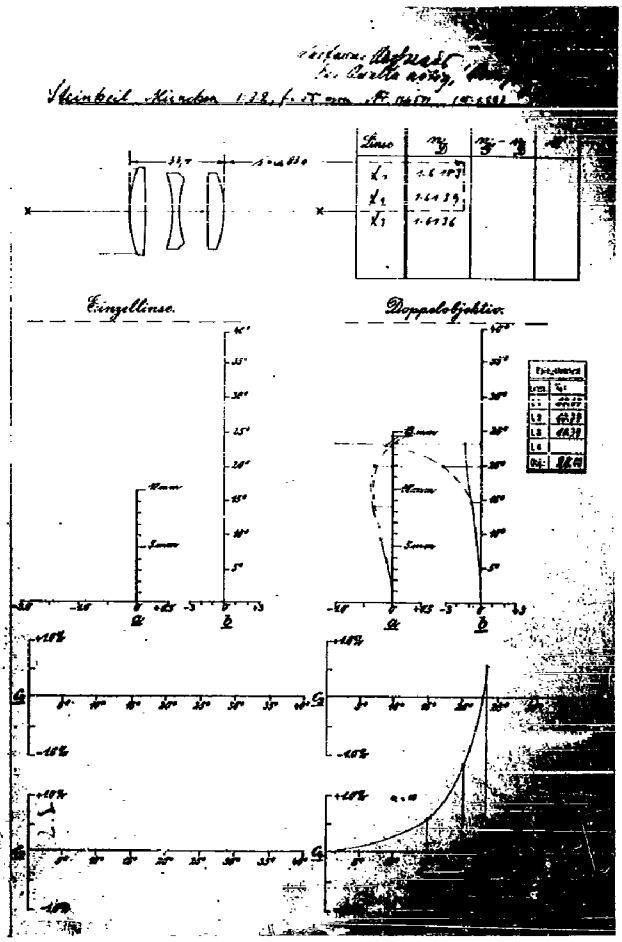
Astigmatismus (Blende 1:12)

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-3.5 -5.1 -5.9	-2.1 -2.5 -5.0

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		15.5 17.2 18.2	

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	n	νd
+68.-	252.	+44.8	100.7	71.2	172.-	5.9	5.5	8.1	5.0	2.0	1.7	48.9	55.9



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№ 742

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d Fig 1)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-11.7 -13.5 +4.2	-14.7 -10.0 +2.5

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		21.0 25.- 29.5	

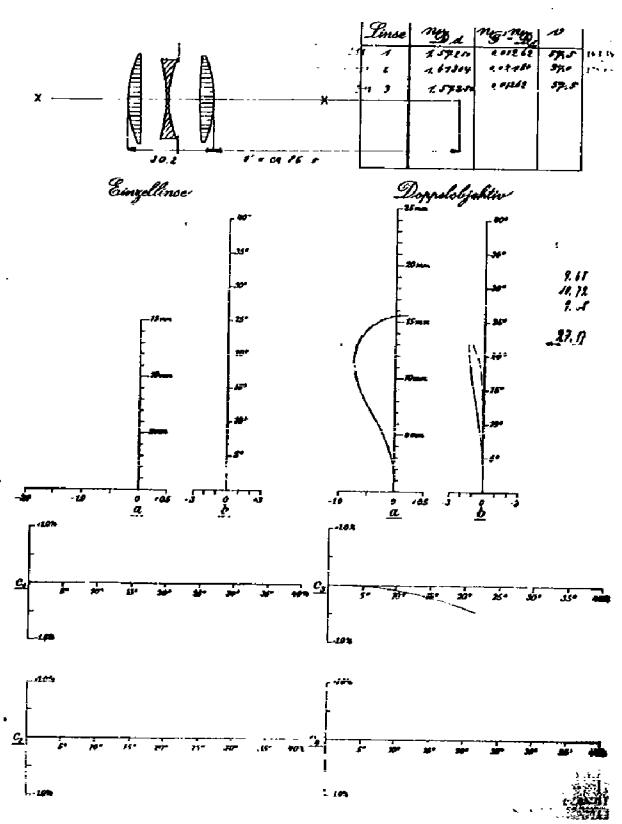
Astigmatismus ( )

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-2.1 -3.0 -4.9	-4.9 -6.3 -8.7

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		32.7 44.5 52.7	

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	n	νd
+58.	234.	+74.5	324.	488.	97.-	4.5	5.0	4.8	2.1	2.4	1.5	52.2



№ 629

F-75-6378-AE

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Triplet f: 2.2, f: 148 mm, α 41 24

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (-0.11 21.5)

Δs'	Δf'	Δs'	Δf'
		-10.9 -27.3 -2.1 -41. -14.8 +0.3	

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		14.5 13.5 11.5	-0.7 -1.7 -2.0

Astigmatismus (f'II) 21.5

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-0.1 -0.5 -0.7 -1.0 -2.0 -0.4	

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		14.1 13.0 12.2	11.10.05, 11.9.05, 11.8.05

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	d7	d8	d9
16.9	178.0	11.0	16.5	47.0	19.5	5.0	12.0	4.0	3.0	1.9	0.3	12.1	12.1	11.5

Triplet f: 2.2 f: 148 mm α 41 24

Linse	nd	νd	v
L1 – L2	1.61111	57.5	0.1
L3	1.6031	60.1	

Einzellinse. Doppelobjektiv.

2.16
11.16
2.66
21.11

+10% -10% G

F-75-6378-AE

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Epi-Objektiv 1:2.3 f=25cm Rechn. v. 6.6.1932

Einzelobjektiv. Doppelobjektiv.

Sphärische Korrektion (0.2 21.5)

Δs'	Δf'	Δs'	Δf'
		-9.4 -3.0 +0.0 -0.0 -0.0 +11.6	

Einfallshöhen	Chromasie.	Einfallshöhen	Chromasie.
		15.0 13.3 10.9	-1.41 -1.36 -1.05

Astigmatismus (0.2 21.5) 11.3 11.4

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		+0.0 -0.3 -0.0 -0.3 -1.3 -2.4	

Frontwinkel	Verzeichnung.	Frontwinkel	Verzeichnung
		11.3 10.2 9.1	11.9.05 11.8.05 11.7.05

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	d7
84.8	∞	91.8	38.8	198.5	19.3	9.6	19.0	0.6	0.3	5.2	5.1	

Epi-Objektiv 1:2.3 f 25cm Rechn. v. 6.6.1932

Linse	nd	νd	v
L1	1.61118	0.01156	57.0
L2	1.60790	0.01306	50.7
L3	1.64206	0.01391	46.0

Einzelobjektiv. Doppelobjektiv.

12.11
12.19
22.11

+10% -10% a b c

№ 872

Mikro-Projektions-Objektiv 1:3.3, f 5cm v 24.12.24.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'/sin²u' Δs'/sin u' - sin u)

Δs'	Δf'

Δs'			Δf'		
-4.7	-3.6	+12.0	-9.6	-5.6	+12.6

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

38.6	38.5	46.6

-199 (+22) -76

Astigmatismus (ΔT')25/63

Aequatorialbüschel			Meridionalbüschel		

Aequatorialbüschel			Meridionalbüschel		
-4.7	-3.6	-2.6	+4.2	+4.9	+6.7

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

38.9	44.8	49.8

1111.22, 999.88, 99 9.28

Radien, Dicken und Abstände für f = 100 mm:

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Mikro-Projektions-Objektiv 1:3.3, f=5 cm v 24.12.24

Linse	n_D	$n_F - n_C$	ν
1	1.62479	0.01303	56.9
2	1.60469	0.01361	58.7
3	1.62150	0.01494	53.1

Einzellinse | Doppelobjektiv

11.12
11.66
11.19
22.91

2.67

№ 601

Kino-Hypar 1:3.5 f=3.5 cm vm C.P. Goerz, Berlin
DR 328912 (1922)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (-Δs'/sin²u' Δs'/sin u' - sin u)

Δs'	Δf'

Δs'			Δf'		
-2.5	-1.5	+12.0	-6.6	-2.3	+15.4

Einfallshöhen | Chromasie

24.5	23.6	13.9

-193 -176

ΔT 22.45 Astigmatismus ( ) ΔT 28.41

Kante im 2. Lichtraum

Aequatorialbüschel			Meridionalbüschel		
-5.5	-4.3	-3.0	+2.5	+3.5	+5.0

Kante im 1. Lichtraum

Aequatorialbüschel			Meridionalbüschel		
-5.5	-4.3	-3.0	+2.5	+3.5	+5.0

Frontwinkel | Vorzeichnung

34.0	42.1	58.5

Frontwinkel | Vorzeichnung

34.1	42.2	47.2

Radien, Dicken und Abstände für f = 100 mm:

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Kino-Hypar 1:3.5 f=3.5 cm vm C.P. Goerz, Berlin
DR 328912 (1922)

Linse	n_D	$n_F - n_C$	ν
1	1.62496		57.2
2	1.60498		58.8
3	1.62212		53.1

Einzellinse | Doppelobjektiv

Kante im 2. Lichtraum | Kante im 1. Lichtraum

11.12
11.66
11.19
22.91

n = ∞ (Kante im 2. Lichtraum) | n = ∞ (Kante im 1. Lichtraum)

J. Sucher-Triplet 1:3.5, f: 7.5 cm v 4.6.35

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Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs'/sin²u)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-11.2 -7.9 +15.7 -9.1 -5.9 +16.9	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		34.9 46.5 57.9	

Astigmatismus (AO2/53) (AO3/39)

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-4.9 -6.5	-2.1 -8.3

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		34.2 53.3	10°1.13 10°2.37

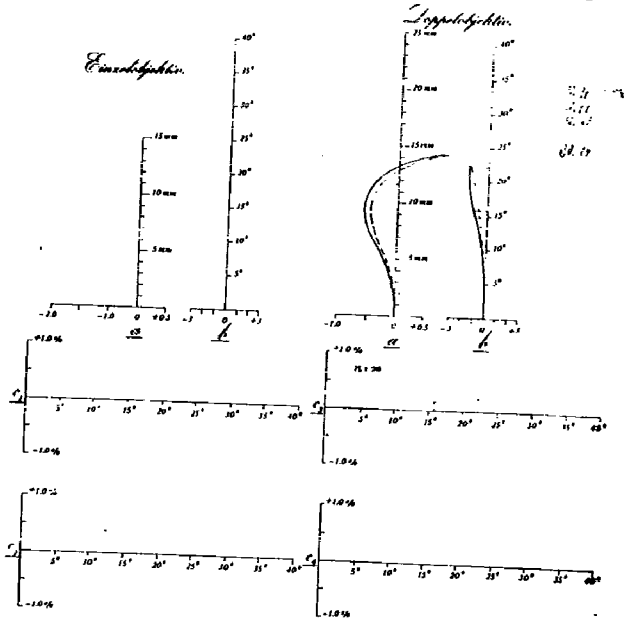
Radien, Dicken und Abstände für f = 100 mm.

r	2	3	4	5	6	d_1	l_1	a_2	D_1	r_7	r_8
23.3	31.6	80.6	31.1	31.8	58.5	6.9	2.9	4.6	50	50	∞

J. Sucher Triplet 1:3.5 f: 7.5 cm v 4.6.35

Linse	n_d	$n_F - n_C$	v
L_1	1.62.313	0.01388	37.0
L_2	1.6133	0.02179	37.1
L_3	1.61539	0.01841	49.2

Einzelobjektiv. | Doppelobjektiv.



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№ 1647

Sphärische Korrektion ( )

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-7.6 +9.0 -7.2 -2.0 -3.5 -6.1	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		32.5 40.- 47.5	

Astigmatismus ( )

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-3.2 -4.9 -6.2 -3.3 -6.3 +11.6	

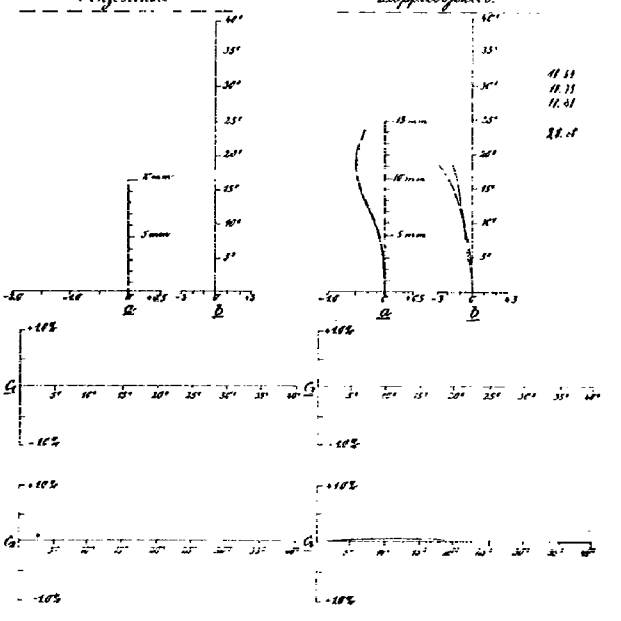
Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		22.9 37.6	+10.0 +10.1 +10.2

Radien, Dicken und Abstände für f = 100 mm:

r	r	r	r	r	r		d_1	d_2	d_3	d_4	d_5
22.1	∞	30.1	2.00	10.5	17		7.2	2.6	1.2	1.0	7.2	1.0

№ 1647

Einzellinse. | Doppelobjektiv.



№ 1022

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Einzelobjektiv — Doppelobjektiv

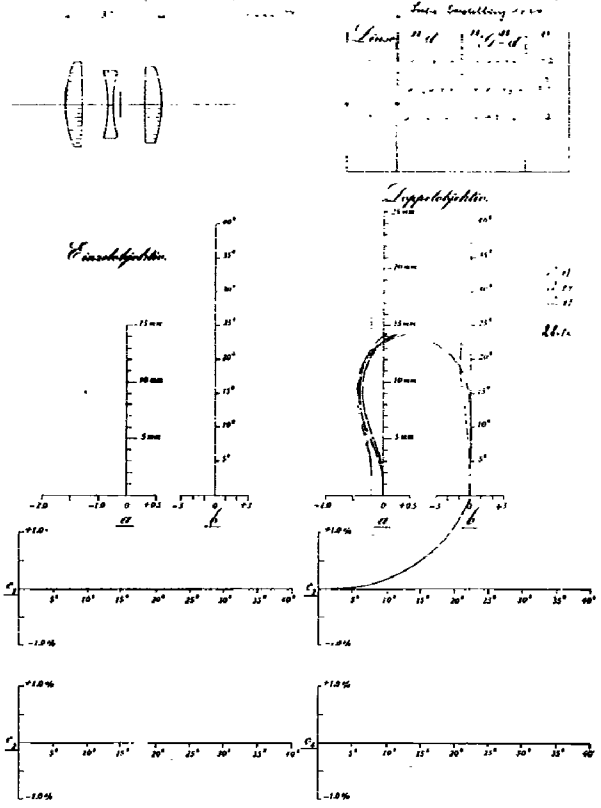
Sphärische Korrektion (Δs' / Δf')

Einfallsöffnung — Chromasie

Astigmatismus (Äquatorialbüschel / Meridionalbüschel)

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.



2/2

№ 626

F-Ts-6398-RE

V 1923 № 12, 1 : 3.5, f = 7.8 cm v. 21.11.23.

Einzelobjektiv — Doppelobjektiv

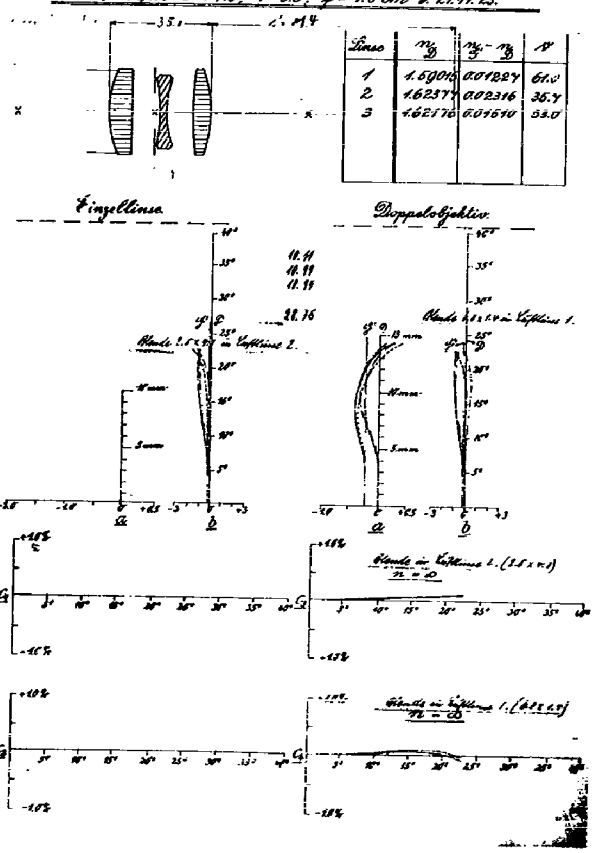
Sphärische Korrektion (Δs' / Δf')

Einfallsöffnung — Chromasie

Astigmatismus (Äquatorialbüschel / Meridionalbüschel)

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.



Linse	n_D	$n_F - n_D$	ν
1	1.6901	0.01824	61.0
2	1.62317	0.02316	36.7
3	1.62176	0.01610	53.0

Einzellinse — Doppelobjektiv

№ 672

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (λ = 546 µµ)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-16.7 | -10.3 | -4.0 | -1.0 | -4.1 | +0.7	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		33.0 | 46.2 | 53.3	-2.41 … -2.31 … +0.54

Astigmatismus (λ)

Einzelobjektiv Aequatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Aequatorialbüschel	Doppelobjektiv Meridionalbüschel
		-6.3 | -2.9 | -0.5 | -0.2 | +2.6 | +5.4	

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		23.2 | 40.2 | 53.8	-18.88 … +0.0 … +18.91

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	d_1	d_2	d_3	d_4	d_5	d_6
53.2	92.60	+22.8	+7.0	+40.6	33.2		2.0	1.5	1.27	0.23	0.14	3.73

Einzellinse

Doppelobjektiv

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (λ = 546)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-3.1 | -11.9 | -8.5 | -8.9 | -12.4 | -7.6		-3.2 | -13.0 | +2.6 | -9.6 | -12.5 | -7.7	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
33.1 | 46.2 | 53.3		16.8 | 46.8 | 54.63	

Astigmatismus (λ = 546) Blatt 4 45

Einzelobjektiv Aequatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Aequatorialbüschel	Doppelobjektiv Meridionalbüschel
-2.9 | -3.1 | -2.8 | +0.03 | +0.60 | -3.1		-2.8 | -4.8 | -0.9 | +0.1 | +0.4 | -1.8	

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
18.9 | 43.8 | 53.5		11.6 | 40.0 | 53.6	

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9
53.47	92.62	+22.84	+6.97	+40.61	33.21			

Einzellinse

Doppelobjektiv

№ 943

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V 1932 Nr 1 1:3.5, f=2.5cm v 20.1.32

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (M. 22/37-39)

Δs'	Δf'	Δs'	Δf'
		-6.8 -11.1 +1.6	-9.4 -12.0 +2.8

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		33.2 46.7 57.3	-11.3 (+0.7) -0.6

Astigmatismus (M 20) f 52 f-54

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-0.2 +2.0 +3.0	+2.1 +1.8 +1.3

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		17.1 22.9 29.0	11.11.37, 1111.38, 1112.38

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6		n	n'	n''	
211.5	1111.1	51.0	20.5	58.0	20.0	8	0.0	5.6	2.0	9.6	7.2		28.6	19.9	13.0	22.0

V 1932 Nr 1, 1:3.5, f=2.5cm v 20.1.32

Linse	n_d	$n_F - n_C$	ν
1	1.51653	0.01013	65.8
2	1.62017	0.02205	36.3
3	1.57501	0.01266	57.3

Einzellinse | Doppelobjektiv

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (M.)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus (M.)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5		n	n'	n''	

Einzellinse | Doppelobjektiv

Linse	n_d	$n_F - n_C$	ν

7

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (5 %).

Δs' | Δf'

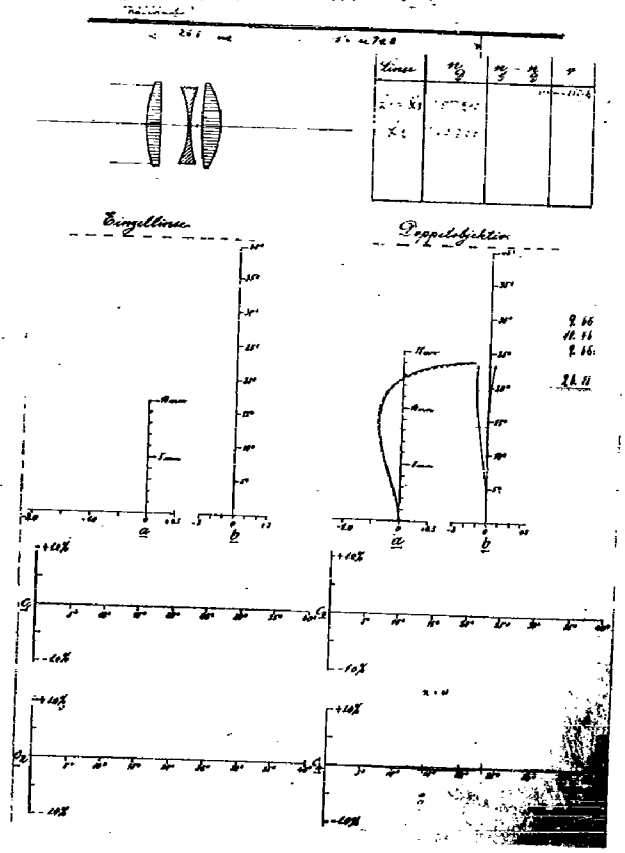
Einfallshöhen | Chromasie

Astigmatismus (5 %).

Sagittenwalkwinkel | Meridionalwalkwinkel

Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm.



M 1195

Epiolar 1:3.5; f = 43cm aus Gußglas; Rechn. v. S. 3. 36.

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Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (90 %).

Δs' | Δf'

Einfallshöhen. | Chromasie.

Astigmatismus (90 %).

Sagittenwalkwinkel | Meridionalwalkwinkel

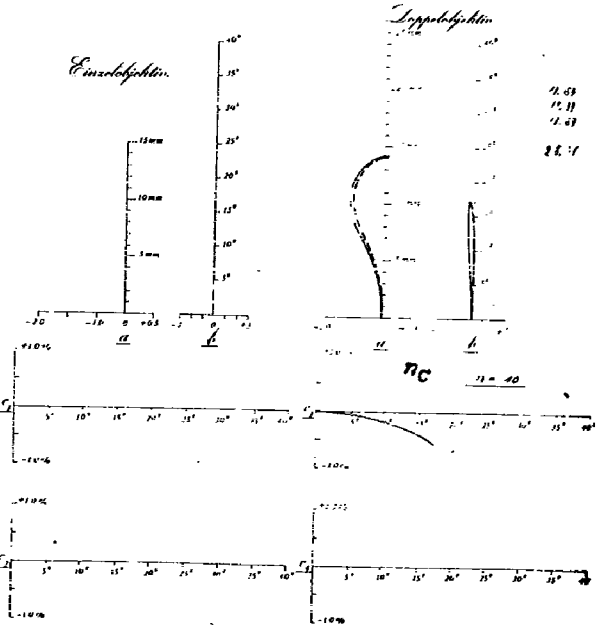
Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm.

Epiolar 1:3.5; f = 43cm aus Gußglas; Rechn. v. S. 3. 1936

Linse | n_d | $n_F - n_C$ | ν

L_1 | L_2 | L_3



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Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

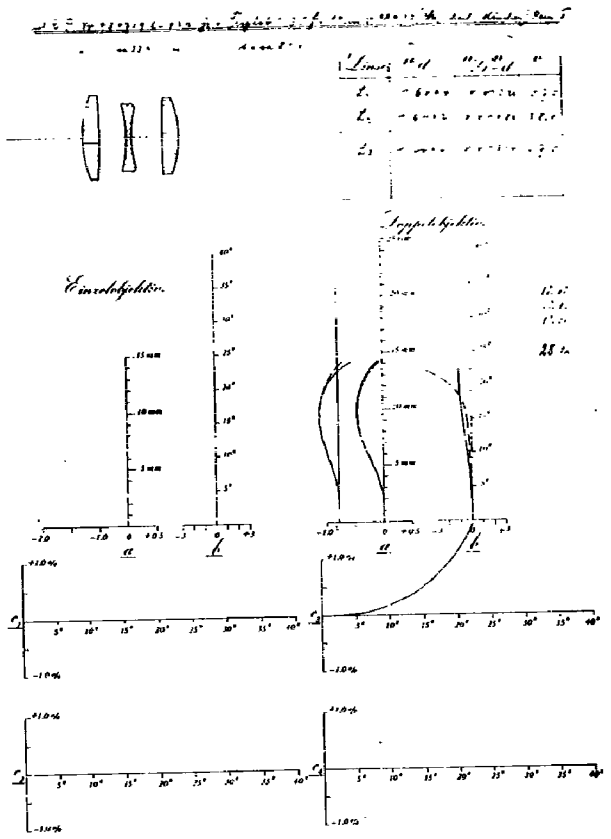
Einfallshöhen. Chromasie.

Astigmatismus

Äquatorialbüschel. Meridionalbüschel.

Frontwinkel. Verzeichnung.

Radien, Dicken und Abstände für $f = 100$ mm.



Triotar 1:3,5, $f = 21$ cm, $\nu = 23,8$, $n = 1,54$ m. Rand.

F-75-6398-RE

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Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

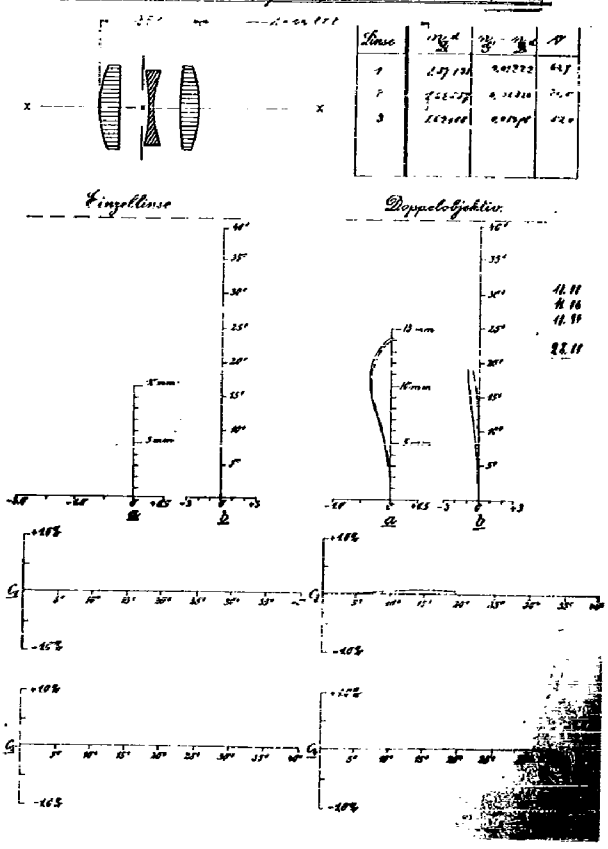
Einfallshöhen. Chromasie.

Astigmatismus

Äquatorialbüschel. Meridionalbüschel.

Frontwinkel. Verzeichnung.

Radien, Dicken und Abstände für $f = 100$ mm.



№ 651

F-75-6398-RE

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Projektionsobjektive aus Spiegelglas

Einzelobjektive — Doppelobjektive

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Projektionsobjektive aus Spiegelglas

Einzellinse — Doppelobjektive

№ 348

F-75-6398-RE

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Einzelobjektive — Doppelobjektive

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppelobjektive

F-75-6398-RE

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Sucher Triplet V 1923 Nr 13 1:3,5 f 75 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (-2,5 bis 2)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2,5 -0,3 -0,6 -0,7 -1,1 -0,6	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		22,1 14,2 7,1	-1,2 +0,5 +1,8

Astigmatismus (Bild)

Einzelobjektiv Aequatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Aequatorialbüschel	Doppelobjektiv Meridionalbüschel
		-0,5 +0,1 +0,1 +0,1 +0,3 +0,5	

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		9,2 7,1 4,3	+11,23 +12,79 +13,8

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	d7
36,6	-173	107,9	32,6	20,3	20,7	4,3	2,6	0,6	4,1	0,2	2,1	

Sucher Triplet V 1923 Nr 13 1:3,5 f 75 cm

Linse | n_g | $n_g - n_d$ | ν

1 (Luft) 1,51107 31,1
2 1,61659 0,01593 36,3
3 (Luft) 0,01107 31,1

Einzellinse. Doppelobjektiv.

11,23
11,21
11,21
22,17

G1 G2 G3

+10% -10%

F-75-6398-RE

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H. D. Taylor D.R.P. 81825 II Beispiel, Fig 13

Doppelobjektiv für b'

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (-2,5 bis 2)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-11,8 -12,6 -0,2 -10,8 -10,6 +6,2		-10,8 -12,6 -0,3 -9,2 +3,8 +3,6	-11,0 -3,8

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
22,8 14,5 7,2	-1,3 (+0,5) +1,8	22,8 14,5 7,2	(+0,5)

Astigmatismus (Bild)

Einzelobjektiv Aequatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Aequatorialbüschel	Doppelobjektiv Meridionalbüschel
		0,4 -0,7 -1,7 -0,8 -4,2 -11,2	

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		9,5 5,6 2,3	Farbg. Best. -7,1 -7,0 -7,4 -9,1 -6,9 -7,5

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
41,4	-15,7	19,8	21,3	-17,1	-5,9	4,9	1,1	1,2	3,3	0,4	1,7

H. D. Taylor D.R.P. 81825, II Beispiel, Fig 13

Doppelobjektiv für b'

Einzellinse Doppelobjektiv

Linse | n_g | $n_g - n_d$ | ν

1 1,61659 0,01593 36,3
2 (Luft) 0,01107 31,1

11,23
11,21
11,21
22,17

G1 G2 G3

+10% -10%

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Triplet (made: C. A. S. & Co. No. 3) 1:2.5 f= 10 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A = 1/13)

Δs' | Δf' | Δs' | Δf'

Einfallsöffnung | Chromasie | Einfallsöffnung | Chromasie

Astigmatismus (A = 1/1)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Triplet (made: C. A. S. & Co. No. 1) 1:3.5 f= 10 mm

Linse	n_d	$n_F - n_d$	ν
1	1.60906	0.01758	57.0
2	1.62003	0.02254	36.1
3	1.60877	0.01878	57.5

Einzelobjektiv | Doppelobjektiv

a | b | a | b

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Bellaptikon. Bäuerle & Traub 1:3.5 f= 333.6

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f 7/12)

Δs' | Δf' | Δs' | Δf'

Einfallsöffnung | Chromasie | Einfallsöffnung | Chromasie

Astigmatismus (1

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

1:3.5 f= 333.6 Bellaptikon. Bäuerle & Traub

Linse	n_D	ν_D	$n_F - n_D$	ν
K_1	1.52358	69.9		
K_2	1.62137	60.9		
K_3	1.62163	59.8		

Einzellinsen | Doppelobjektiv

a | b | a | b

№ 795

F.-Z.-6198-25

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection ( )

Einzellinse

Doppelobjektiv

Astigmatismus ( )

Radien, Dicken und Abstände für f = 100 mm.

№ 664

F.-Z.-6388-25

Projektions Triplet 1:3.6, f = 16 cm. v. 22.9.24.

(Sammellinsen auf Spiegelglas)

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (Mtz. 44)

Einzellinse

Doppelobjektiv

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.

№ 663

F-75-698-RE

Projektions Triplet 1:3.6 f = 15 cm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (1/50 w)

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus (f' = 1.075)

Äquatorialbruchst. Meridionalbruchst.

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1 r2 r3 r4 r5 r6 d1 d2 d3 l d1 a1 a2 a3

Projektions Triplet 1:3.6 f = 15 cm

(Sammellinsen aus Jenaglas)

Linse

Einzellinse

Doppelobjektiv

a b

№ 662

F-75-698-RE

Projektions Triplet 1:3.6 f = 15 cm

(Sammellinsen aus Jenaglas)

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (1/50 w)

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbruchst. Meridionalbruchst.

Frontwinkel Verzeichnung

Radien Dicken und Abstände für f = 100 mm

Projektions Triplet 1:3.6 f = 15 cm

(Sammellinsen aus Jenaglas)

Linse

Einzellinse

Doppelobjektiv

a b

№ 440

F-TS-6398-RE

Orikar 1:36 f

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Orikar 1:36 f

Einzellinse | Doppelobjektiv

№ 653

F-TS-6398-RE

Triplet aus Spiegelglas 1:36, f. 7,5 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Triplet aus Spiegelglas 1:36, f. 7,5 cm

Einzellinse | Doppelobjektiv

№ 650

F-75-678-RE

Projektionsobjektive für Meiller & Metzig

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Projektionsobjektive für Meiller & Metzig

Einzellinse | Doppelobjektiv

№ 479

F-75-678-RE

Projektionsobjektive für Meiller & Metzig

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Projektionsobjektive für Meiller & Metzig

Einzellinse | Doppelobjektiv

Epikar 1:3,7 F. 37 mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Ü 65)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-.71	-.7	-.71	-.11	-.11	-.11

Einfallshöhen	Chromasie
21.3	-.11
	-.11
	-.11

Astigmatismus (Ü 71)

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel			Meridionalbüschel		
-.83	-.84	-.7	-.77	-.11	-.11

Frontwinkel	Vorzeichnung

Frontwinkel		Vorzeichnung
32.7	+.7	33.4

Radien, Dicken und Abstände für f = 100 mm

274	∞	3.50	3.66	11.10	11.3	1.83	1.95	1.00	1.00	1.83	1.95		33.0	33.1	33.0		

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Epikar 1:3,7 F. 37 mm

Linse	n_g	$n_g - n_g$	ν
1	1.57327	0.00429	57.7
2	1.61720	0.00592	36.5
3	1.57327	0.00429	57.7

Einzellinse

Doppelobjektiv

8.16
12.12
9.56
22.0

C' und K' Buck d. P. vom 13.IV.12 (2 P nicht ab. 264)

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Ü 71)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-.96	-.78	-.87	-11.0	-.1	-.0

Einfallshöhen	Chromasie
20.7	-.19	21.6

Astigmatismus (Ü 71)

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel			Meridionalbüschel		
-.05	-.11	-.12	11.9	11.7	11.3

Frontwinkel	Vorzeichnung

Frontwinkel		Vorzeichnung
30.1	41.7	21.3

-N -40 -.07
-K -.10 -.11
+10 +.11 -.21

Radien, Dicken und Abstände für f = 100 mm

271	5.71	3.50	3.66	11.10	11.3	1.83	1.95	1.00	1.00	1.83	1.95		33.0	33.1	33.0		

F-TS-6398-PE

271

C' und K' Buck d. P. vom 13 IV 12 (2 P nicht ab. 264)
f = 3,7 (37 cm)

Linse	n_g	$n_g - n_g$	ν
I - II	1.61100		59.3
II	1.61900		37.7

Einzellinse

Doppelobjektiv

12.69
12.99
12.69
28.39

F-TS-6398-RE

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Zeiss-Triplet 1:4, f. 7.5cm v. 25.9.33

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Fig.)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Fig.)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Zeiss-Triplet 1:4, f. 7.5cm v. 25.9.33

Linse | n d | n' d' | v

Einzelobjektiv | Doppelobjektiv

a | b | a | b

F-TS-6399-RE

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Fig 31 Nr. 32 1:4, f. 8.5 cm Rahm v. 24.11.33

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Fig.)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Fig.)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Fig 31 Nr. 32 1:4, f. 8.5 cm Rahm v. 24.11.33

Linse | n d | n' d' | v

Einzellinse | Doppelobjektiv

a | b | a | b | c | b

F-TS-6398-RE

Wild (R 36), 1:4, f = 43 cm, v. 17.12.31

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (3 e/17)

Δs'	Δf'

Einfallshöhen | Chromasien

Astigmatismus (14 e/17)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Rasling, Dicken und Abstände für f = 100 mm:

r						d				l	

Wild (R 36), 1:4, f = 43 cm, v. 17.12.31

Linse	n_d	d	$n_g - n_d$	ν
1				
2				
3				

Einzellinse | Doppelobjektiv

300

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Kuet & Co., E. 303787, 1:4, f = 68.9 mm, v. 21.11.28

Einzellobjektiv | Doppelobjektiv

Sphärische Korrektion (4 e/17)

Δs'	Δf'

Einfallshöhen | Chromasien

Astigmatismus (7 e/17)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Rasling, Dicken und Abstände für f = 100 mm:

r						d				l	

Kuet & Co., E. 303787, 1:4, f = 68.9 mm, v. 21.11.28

Linse	n_d	d	$n_g - n_d$	ν
1				
2				
3				

Einzellinse | Doppelobjektiv

301

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Zeiß-Ikon: Epidiaskop-Objektiv 1:4, f: 40cm Rechnung Nr. 877 x 15.5.50

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Δs'	Δf'

Δs'			Δf'		
-0.7	-0.2	+0.1	-0.4	-2.8	+0.2

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
42.8	40.0	20.0	

Astigmatismus (Meridionalbüschel / Sagittalbüschel)

Äquatorialbüschel		Meridionalbüschel			

Äquatorialbüschel		Meridionalbüschel			Δs'
-4.3	-2.5	-14.4	+0.0	+0.0	-0.4

Frontwinkel | Verzeichnung

Frontwinkel		Verzeichnung		
26.9	25.3	+7.0	long	transv.

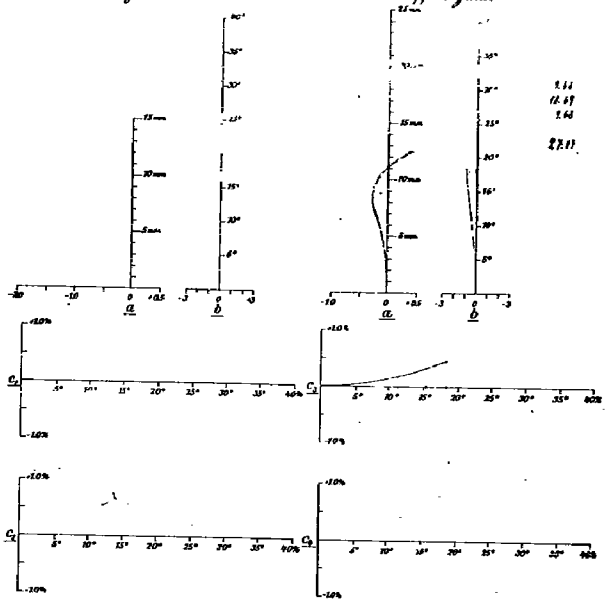
Radien, Dicken und Abstände für f = 100 mm

r_0	d_0	r_1	r_2	r_3	d_1	r_4	d_2	r_5	d_3	r_6	d_4	r_7
2.63	∞	57.5	32.9	401.4	38.9	3.5	9.2	1.3	6.9	8.4	2.5	

Linse | n_d | ν_d | $n_F - n_C$ | ν

L_1	1.613	44.2	0.0128	63.0
L_2	1.617	36.6	0.0167	46.1
L_3	1.613	44.2	0.0128	63.0

Einzelobjektiv | Doppelobjektiv



A 1067

F-TS-6398-RF

303

Teuillet T 749 258 1:4; f = 20 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Δs'	Δf'

Δs'			Δf'		
-18.6		5.9	-15.1	-15.0	-3.5

Einfallshöhen | Chromasie

Einfallshöhen		Chromasie
28.7	50.0	-11.7 (+0.0) -10.7

Astigmatismus (Meridionalbüschel / Sagittalbüschel)

Äquatorialbüschel	Meridionalbüschel

Äquatorialbüschel		Meridionalbüschel			Δs'
		-4.0	-6.0	+0.0	-1.5

Frontwinkel | Verzeichnung

Frontwinkel		Verzeichnung		
-2.5	-1.5	57.1		

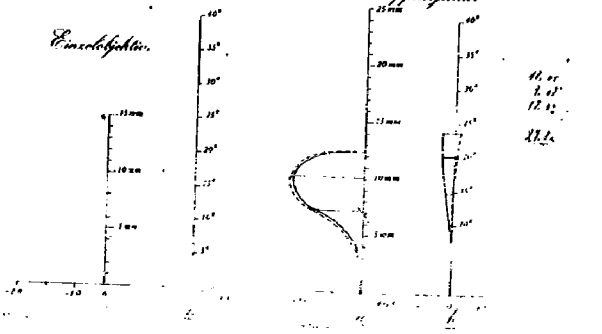
Radien, Dicken und Abstände für f = 100 mm

r_0	d_0	r_1	r_2	r_3	d_1	r_4	d_2
17.0	4.0	21.9	+1.7	19.5			

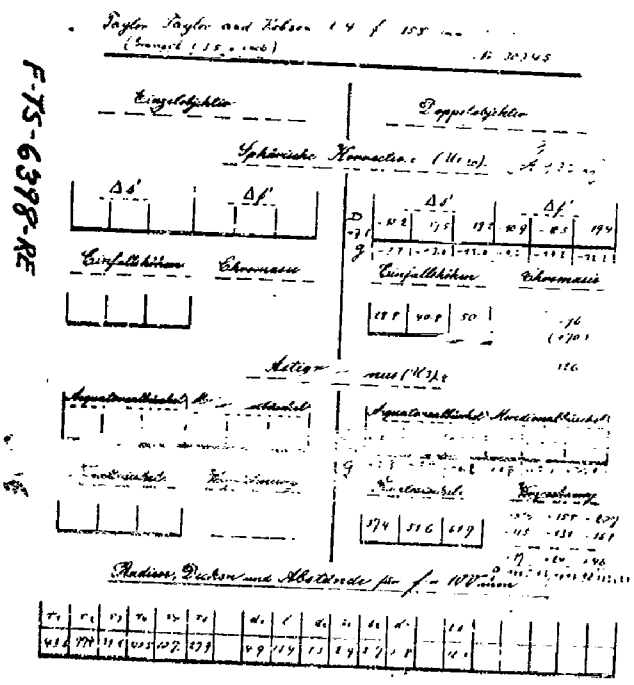
Linse | n_d | ν_d | $n_F - n_C$ | ν

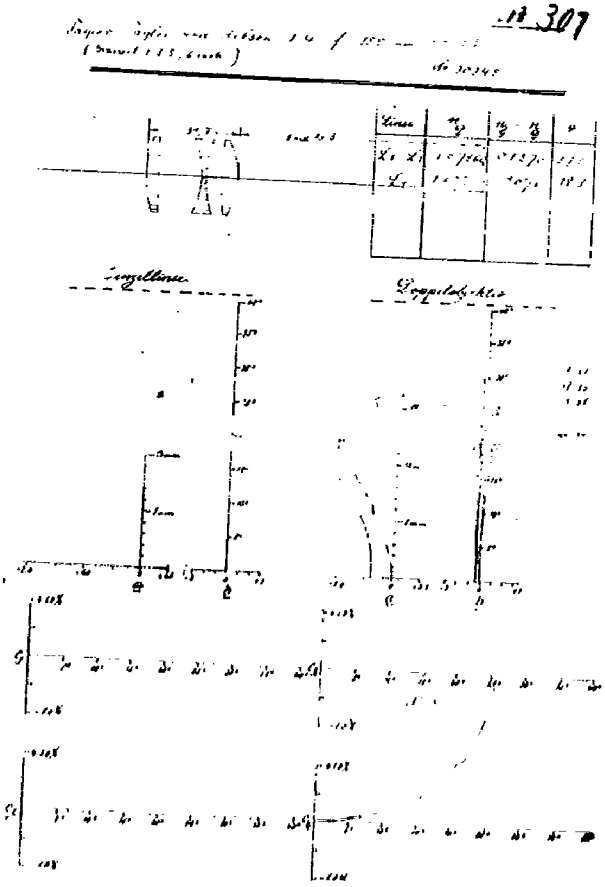
L_1	1.61	44.1	0.0128	63.0
L_2	1.57	36.7	0.0167	46.1
L_3	1.61	44.1	0.0128	63.0

Einzelobjektiv | Doppelobjektiv

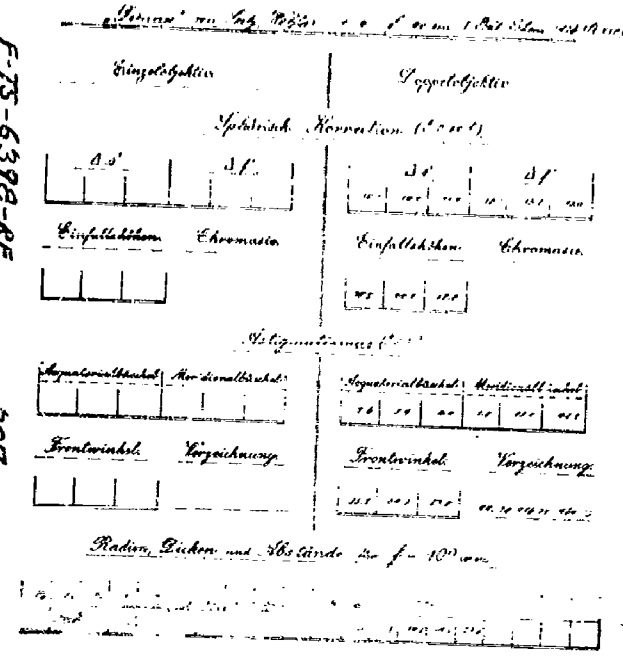


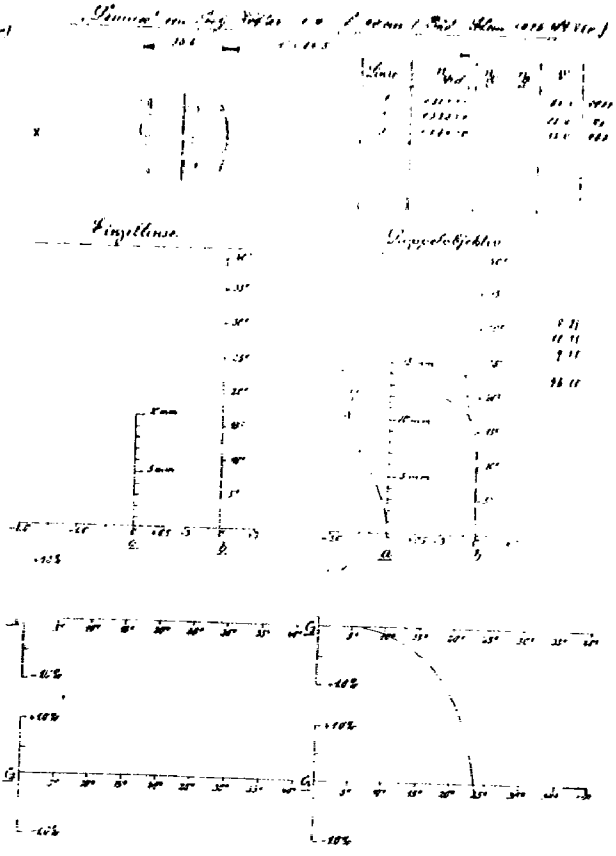
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№ 940

F-TS-6398-PE

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Öffn.)

Einfallsblenden

Chromasie

Astigmatismus (Fig.)

Tangentialblende

Meridionalblende

Vorzeichnung

Radien, Dicken und Abstände für f' = 100 mm

Linse

Einzellinse

Doppelobjektiv

F-TS-6398-PE

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Öffn.)

Einfallsblenden

Chromasie

Astigmatismus (Fig.)

Tangentialblende

Meridionalblende

Vorzeichnung

Radien, Dicken und Abstände für f' = 100 mm

Linse

Einzellinse

Doppelobjektiv

F-75-6378-RE

Projektions-Triplet 1:4 f= 38 mm Objektiv mit Blenden aus Kern Zeiss

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f'=38.2) 24

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-9.4 -11.1 -7.7	9.8 -11.6 -6.8

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		22.0	7.82	5.41

Astigmatismus (f'=38.2) 22 m 24 m

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-2.4 -3.3 -2.2	+1.0 -0.3 -1.8

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		27.9	29.1	29.5	29.5	29.1	29.2

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	n	ν	Δ	Δ			
117.3	23.9	31.3	32.3	104.2	61.2	6.2	3.3	6.3	2.3	2.3	1.1			26.4	12.5	23.8		

Projektions-Triplet 1:4 f= 38 mm Objektiv mit Blenden aus Kern Zeiss

Linse | n_g | n_F | n_C | ν

Einzellinse | Doppelobjektiv

F-75-6378-RE

Triplet 1:4.0; f= 38 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f'=38.2) 33

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-7.5 -5.0 +6.5	-5.5 -3.5 0.000

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		28.0	9.07	9.09	-1.0 +0.3 -0.9

Astigmatismus (f'=38.2) 33

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		0.00 -1.6	-0.5 0.03

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		23.5	28.6	1000.9.7 1000.07

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6		d1	d2	d3	d4	d5					
96.8	67.9	32.2	22.5	104.2	32.5		3.3	6.8	1.3	3.3	3.5		41.9	16.6	20.0	2.5

Triplet 1:4.0; f= 38 mm

Linse | n_d | n_g / n_F | n_C / n_d | ν

Einzellinse | Doppelobjektiv

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3/12

4 Taylor – 4 Taylor 1:4,0 f. 100 T.P. 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d. Fe. mm)

Δs'	Δf'	Δs'		Δf'	
		-76	-82	+48	76	-76	+0

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

42.1	17.2	15.4		(+0.4)	-1.5

Astigmatismus (d. Fe. mm)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-14	-7.5	-15.0	-6.4	-16.6	+0.0

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

11.2	6.5	5.2		+0.47	+0.35	+0.2	93

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	n1	n2	n3	ν1	ν2	ν3
47.77	125.7	40.54	67.18	34.60	75.81	6.18	5.05	0.25	10	3.3	3.18	1.54			

17.66

Einzellinse | Doppelobjektiv

Linse | n_F | $n_F - n_D$ | ν

L1	1.61756	0.01170	57.7
L2	1.61800	0.01670	55.1

11.47
11.87
11.98
11.97

a | b | a | b

F-TS-6398-RE

3/13

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d. Fe. mm)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (d. Fe. mm)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	n1	n2	n3	ν1	ν2	ν3
33.2															

№ 793

Linse | n_F | $n_F - n_D$ | ν

Einzellinse | Doppelobjektiv

11.81
11.1
11.47
11.71

a | b | a | b

F-TS-6388-RE

3/14

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv

Doppelobjektiv

F-TS-6388-RE

3/15

V 1937 Nr. 1 1:4,5 f = 2,7 cm mit 7 mm Glasweg

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

№ 896

F-TS-6398-RE

316

Tessar - Anastigmat 1:2,7 f = 12 cm = 22,7 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radius, Dicke und Abstände für f = 100 mm

Tessar 1:2,7 f = 12 cm (22,7 mm)

Einzellinse | Doppelobjektiv

F-TS-6398-RE

317

Triplet 1:4,5 f = 15 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Einzellinse C | Doppelobjektiv T

K 1119

F-75-6378-RE

3K0

V 1936 Nr. 8; 1:4.5; f = 8.5cm Rechn. v. 25.5.1936

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (500mm/mm)

Δs'			Δs'		
-7.1	-8.4	-1.3	-11	-7.1	+1.9

Δs'			Δs'		
-0.6	-0.1	-0.2	-0.6	-2.3	+7.0

Einfallsfehler | Chromasie

28.9	14.4	14.5

Einfallsfehler | Chromasie

42.3	21.4	20.9

Astigmatismus (500/500)

Segittalbild-Abst.			Meridionalbild-Abst.		
-1.9	-1.4	-1.3	+2.1	+1.5	+1.9

Segittalbild-Abst.			Meridionalbild-Abst.		
-1.3	-1.4	-1.1	+1.3	+0.6	-0.0

Frontwinkel | Verzeichnung

2.6	10.2	16.2

Frontwinkel | Verzeichnung

18.2	20.2	18.6

Radien, Dicken und Abstände für f = 100 mm.

R_0	d_0	d_1	R_1	R_2	d_2	R_3	R_4	R_5	d_3	R_6	d_4
28.9	31.6	39.0	42.3	24.0	4.8	42.2	8.1	42.2	1.8	1.6	0.4

d_1 = 28.3
Brennweite 33.3

V 1936 Nr. 8; 1:4.5; f = 8.5cm Rechn. v. 25.5.36

Linse	n_d	ν_d	r
LaF	1.74467	44.8	33.0
Quarz	1.57707	61.2	
LaF	1.74467	44.8	33.0

Einzelobjektiv | Doppelobjektiv

a | b | a | b

321

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C. P. Goerz. Gebrauchsmuster Nr. 773487 11.45 f. Ins. v. 12.8.1931
Zeiss-Ikon A.G.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A Fa. Z.)

Δs'			Δs'		

Einfallsfehler | Chromasie

Einfallsfehler | Chromasie

20.1	16.1	14.9

Astigmatismus (

Segittalbild-Abst.			Meridionalbild-Abst.		

Segittalbild-Abst.			Meridionalbild-Abst.		
-1.1	-1.4	-1.9	-2.1	-2.5	-2.1

Frontwinkel | Verzeichnung

Frontwinkel | Verzeichnung

2.6	7.2	12.2

Radien, Dicken und Abstände für f = 100 mm

C. P. Goerz. Gebrauchsmuster Nr. 773487 11.45 f. Ins. v. 12.8.1931
Zeiss-Ikon A.G.

Linse	n_d	ν_d
L_1	1.6150	–
L_2	1.5114	–
L_3	1.6150	–

Einzellinse | Doppelobjektiv

a | b | a | b

№ 861

F-TS-6398-RE

3262

Aufriss

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Einfallshöhen | Chromasien

Astigmatismus

Frontwinkel | Vergrösserung

Radien, Dicken und Abstände für f = 100 mm

Aufriss

Linse | Einzellinse | Doppelobjektiv

a | b | C_1 | C_2

377

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3263

V 1931 Nr 20 1:4,5 f = 3 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Einfallshöhen | Chromasien

Astigmatismus

Frontwinkel | Vergrösserung

Radien, Dicken und Abstände für f = 100 mm

V 1931 Nr 20 1:4,5 f = 3 cm

Linse | Einzellinse | Doppelobjektiv

a | b | C_1 | C_2

F-75-6398-RE

O.R.S. Pho-Ski 639; 1:4.5; f: 5cm; v. 12.9.30.

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (659 mm)

Δs' | Δs' | Δs' | Δs'

Einfallsfehler | Chromasie | Einfallsfehler | Chromasie

Astigmatismus (659 mm)

Tangentialbüschel | Meridionalbüschel | Tangentialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r	s	n	ν	δ	r₁	δ	d₁	δ	r₂	d₂			Bf	Hf	Sf
∞	22.0	1.519	72.0	0.05		9.7	4.0	0.1	5.0	0.5	6.5		68.6	1.0	22.5

O.R.S. Pho-Ski 639; 1:4.5; f: 5cm; v. 12.9.30.

Linse	r	s	n	ν	δ
L₁					
L₂					
L₃					

Einzellinse — Doppelobjektiv

12.9.30
12.9.30
12.9.30
22.9.30

324

324

F-75-6398-RE

Frauning, Bad Kreuznach, O.T. 32.0.32; 1:4.5; f: 100 mm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (1/4 mm) 32.0.32

Δs' | Δs' | Δs' | Δs'

Einfallsfehler | Chromasie | Einfallsfehler | Chromasie

Astigmatismus ( )

Tangentialbüschel | Meridionalbüschel | Tangentialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r	s	n	ν	δ	r₁	δ	d₁	δ	r₂	d₂			Bf	Hf	Sf
10.24	22.0	1.519	72.0	0.05		2.99	0.10	1.77	6.7	2.11	2.09		22.2	2.0	22.5

S.R.I. Kr. 5: 9.67

№ 812

Frauning, Bad Kreuznach, O.T. 32.0.32; 1:4.5; f: 100 mm

Linse	r	s	n	ν	δ
L₁					
L₂					
L₃					

Einzellinse — Doppelobjektiv

325

325

F-75-6398-RE

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Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (λ K = 7/65)

Δs' — Δf' — Einfallshöhen — Chromasie

Astigmatismus ( )

Äquatorialbüschel — Meridionalbüschel — Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1 r2 r3 r4 r5 r6 d1 L1 d2 L2 d3 f' : f | D1 D2 D3

Einzellinse — Doppelobjektiv

F-75-6398-RE

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Anastigmat 1:4·5, f: 10cm, v. 17. 9. 1930.

n. Angaben v. M. R. Richter

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (λ K = 7/39)

Δs' — Δf' — Einfallshöhen — Chromasie

Astigmatismus (λ K = 7/39)

Äquatorialbüschel — Meridionalbüschel — Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1 r2 r3 r4 r5 r6 d1 L1 d2 L2 d3 | r1 r2 r3

Anastigmat 1:4·5, f: 10cm, v. 17. 9. 1930.

n. Angaben v. M. R. Richter

Linse — n_g — $n_g - n_{g'}$ — ν

L_1 — L_2 — L_3

Einzellinse — Doppelobjektiv

F-TS-6398-RF

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Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion ( )

Astigmatismus ( )

Radien, Dicken und Abstände für f = 100 mm:

328

F-TS-6398-RF

Triplet 1:4.5, f = 5cm, v. 10.9.30. Pho. Ski 638

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm:

F-TS-6398-RE

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Einzel- Aktiv — Doppelobjektiv

Sphärische Korrektion ( )

Δs'	Δf'

Einfallsloch: Chromasie:

Δs'	Δf'

Einfallsloch: Chromasie:

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel

Frontwinkel: Verzeichnung:

Äquatorialbüschel	Meridionalbüschel

Frontwinkel: Verzeichnung:

Radien, Dicken und Abstände für f = 100 mm:

Einzellinse

Doppelobjektiv

F-TS-6398-RE

329

Triplet 1:4.5; f: 5cm; v. 10.9.30. Pho. Ski 638.

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (1.4 x + 2)/25

Δs'	Δf'

Einfallsloch: Chromasie:

Δs'	Δf'

Einfallsloch: Chromasie:

Astigmatismus

Äquatorialbüschel	Meridionalbüschel

Frontwinkel: Verzeichnung:

Äquatorialbüschel	Meridionalbüschel

Frontwinkel: Verzeichnung:

Radien, Dicken und Abstände für f = 100 mm:

Triplet 1:4.5; f: 5cm; v. 10.9.30. Pho. Ski 638.

Einzellinse

Doppelobjektiv

Zeiss Kinoplast Tessar 1:2.5 f 12 cm v. 2.11.25

F-75-6398-RE

330

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (λ 720 nm)

Δs'	Δf'

Δs'	Δf'
-2.5	-2.1
+0.2	-2.9
0.0	+0.0

Einfallshöhen | Chromasien

20.7	14.1	10.5

Astigmatismus (λ 720 nm)

Äquatorialbüschel	Meridionalbüschel		

Äquatorialbüschel		Meridionalbüschel	
2.0	+2.8	-2.0	+5.7

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

+11.5	19.2

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	s'	β
49.8	∞	22.2	60.5	64.5	18.9	22.2	31.4	4.3	12.3	0.9	0.1	0.9	2.0	28.2	49.4	28.1	

Zeiss Kinoplast Tessar 1:2.5, f = 12 cm v. 2.11.25

Linse			
1			
2			
3			
4			
5			

Einzellinse | Doppelobjektiv

Schneider-Xenar-Anastigmat 1:2.5 f = 25 cm

F-75-6398-RE

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Einzelobjektiv | Doppelobjektiv

1:5 Sphärische Korrektion (λ 720 nm) ∞

Δs'	Δf'
-0.5	-0.6
+1.0	-2.2
-2.2	-2.3

Δs'	Δf'
-1.8	-0.6
+3.0	-2.1
-2.2	-2.2

Einfallshöhen | Chromasien

21.4	8.3	0.0

Einfallshöhen | Chromasien

21.4	22.1	0.0

Astigmatismus (λ 720 nm) ∞

Äquatorialbüschel		Meridionalbüschel			
-1.1	-2.2	+2.2	+2.2	+0.3	+0.7

Äquatorialbüschel		Meridionalbüschel			
-1.7	-1.5	-0.3	0.0	-0.7	+0.4

Frontwinkel | Vorzeichnung

2.67	24.6	-2.2

Frontwinkel | Vorzeichnung

2.2	2.2	-2.2

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	d9	s'	β
32.5	∞	22.6	46.0	46.5	41.6	22.6	33.6	5.9	12.6	6.8	0.2	2.1	5.6	5.6	2.30	5.2	27.8	2.9

Schneider-Xenar-Anastigmat 1:2.5 f = 25 cm (v. 21.3.29)

Linse			
1			
2			
3			
4			
5			

Einzellinse 1:5 | Doppelobjektiv ∞

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Nr 372

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (U. 13, 9)

Δs' | Δf'

Einfallshöhen | Chromasien

Astigmatismus (U. 15, 3)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

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Nr 837

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (U. 13, 9)

Δs' | Δf'

Einfallshöhen | Chromasien

Astigmatismus (U. 15, 3)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

F-73-6998-RE

334

№ 826

Tessar 1:4,5 f = 10 cm. Rel. a. R. 1:4,5

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1 + 11) 77

Δs'	Δf'	Δs'	Δf'
		-2.6 -10.4 -3.2 -9.6 -13.6 -7.8	

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		21.6	36.6 74.4

Astigmatismus (17) 66 / 71

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

		-1.4	-1.7 -0.4	-2.3	-2.9 99.7

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

		34.3	64.3 66.3

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6		z_1	d	z_2	d_1	d_2	d_3	Σf_0	s	s_1	s_2
32.16	∞	3.85	22.0	44.7	-13.40		11.6	1.3	1.1	0.4	-0.4	2.6	33.84	4.33	42.16	42.16

Einzellinse

Doppelobjektiv

A. Kerber, Leipzig 145 mm

F-75-6398-RE

335

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (100 %)

Einfallshöhen Chromasie

Astigmatismus (Bd)

Aequatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

A. Kerber, Leipzig 145 mm

Einzellinse

Doppelobjektiv

Riegelstriepel 1:4,5, f = 36 cm v. H. (A. St. Peipholz)

F-75-6398-RE

336

Triepel
Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (70 %)

Einfallshöhen Chromasie

Astigmatismus (70 %)

Aequatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Riegelstriepel 1:4,5, f = 36 cm v. H. (A. St. Peipholz)

Einzellinse

Doppelobjektiv

№ 620

F-75-6388-RE

1231

M. R. Berlin, Franz. Pat. № 532 466, A: 1:5, f: 63 mm, w: 22° 22.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Δf'/2 f/m)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'		Doppelobjektiv Δf'	
		-24.5	-13.6	-33	-22.2	-39.4	-14.6

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		37.0	144.1	132.7	

Astigmatismus (dSm)

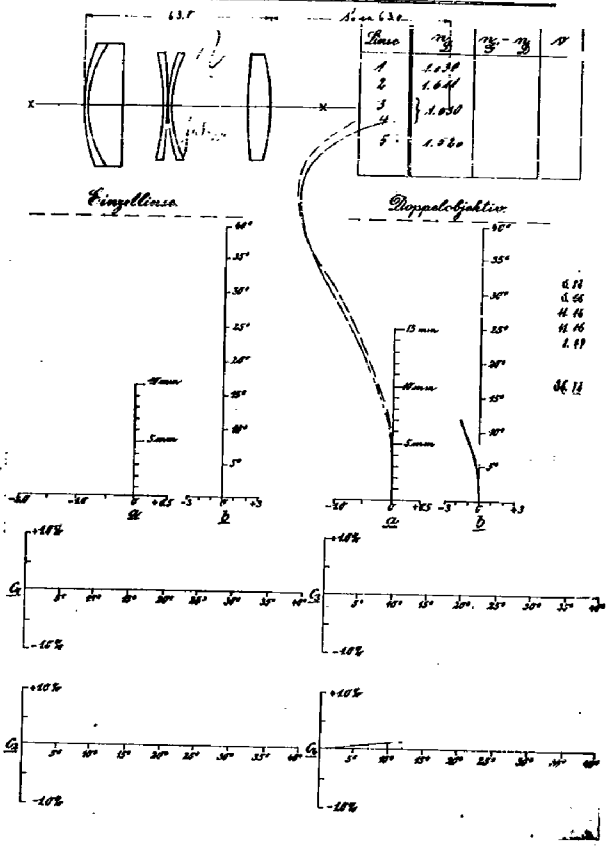
Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel		Doppelobjektiv Meridionalbüschel	
		-2.2	-4.0	-6.9	-2.1	-6.1	-2.7

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		12.1	22.8	22.9	

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16			
62.2	39.7	∞	82.3	122.2	56.8	39.3	174.4	74.5	1.33	115.8	78.8	1.43	8	1.12	22.8	3.45		

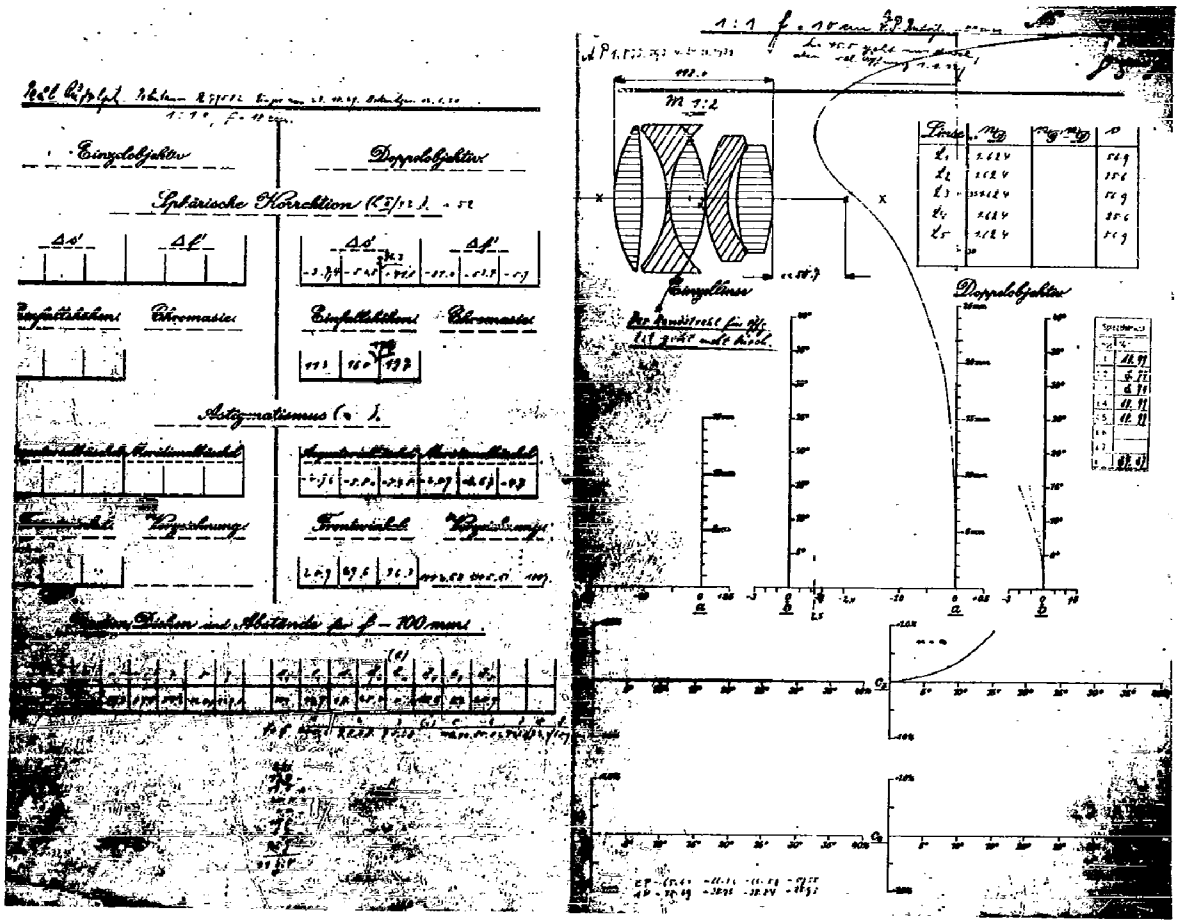
M. R. Berlin, Franz. Pat. № 532 466, A: 1:5, f: 63 mm, w: 24.5° 22.



1231

F-TS-6398/RE

12232



№ 784

F-TS-6398-PE

1233

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse — Doppelobjektiv

1238

№ 787

F-TS-6398-PE

1234

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse — Doppelobjektiv

№ 559

F-75-6378-RE

1235

Amerikanisches Patent № 1 [illegible] 1:2,5 f = 118 von Lucien Bull et Paris
vom 17 Jan. 1916

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1:2,5 f = 97)

	Δs'		Δf'			Δs'			Δf'		
s						+1,2	+2,2	+1,2	-1,6	+1,1	+1,5
s'						-1,21	-2,0	+2,7	-2,9	-0,2	+0,2

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

33,8 | 46,6 | 52,3 | 277 (443) 294

Astigmatismus (1:2,5 f = 97)

Äquatorialbüschel		Meridionalbüschel		Äquatorialbüschel		Meridionalbüschel	
s'				-2,2	-4,6	-4,2	+1,0	+2,5	+4,3
s''				-2,0	-3,1	-2,9	+0,1	+2,1	+0,2

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

34,6 | 42,6 | 56,5 | 99,5 | 99,38 | 99,15 | 99,5 | 99,38 | 99,15

Radien, Dicken und Abstände für f = 100 mm:

	r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11

11,7

Amerikanisches Patent № 1 [illegible] 1:2,5 f = 118, von Lucien Bull, Paris
vom 17 Jan. 1916

Linse	n_g	$n_g - n_g'$	ν
L_1	1,6138	11503	
L_2			
L_3			
L_4			

Einzellinse | Doppelobjektiv

a | b | a | b

11,
3,38
12,11
3,11
82,66

1235

№ 295

F-75-6398-RE

1236

[illegible] Patent № [illegible] 1:2,5 f = 100 mm [illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1:2,5 f = 100)

	Δs'		Δf'			Δs'			Δf'		
s						-4,0	-4,2	-2,3	-2,4	-2,6	-2,6
s'											

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

18,3 | 29,9 | 37,8

Astigmatismus (1:2,5 f = 100)

Äquatorialbüschel		Meridionalbüschel		Äquatorialbüschel		Meridionalbüschel	
s'							
s''							

Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

	r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10

Vorzeichnung für n = ∞ | Vorzeichnung für n = ∞

[illegible] Patent № [illegible] 1:2,5 f = 100 mm [illegible]

Linse	n_g	$n_g - n_g'$	ν
L_1			
L_2			
$L_3 - L_4$			

Einzellinse | Doppelobjektiv

a | b | a | b

11,11
3,38
1,9
1,9
82,65

F-Ts-6398-RE

1237

1/S.6

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Tscherning)

Δs' | Δf' | Δs' | Δf'

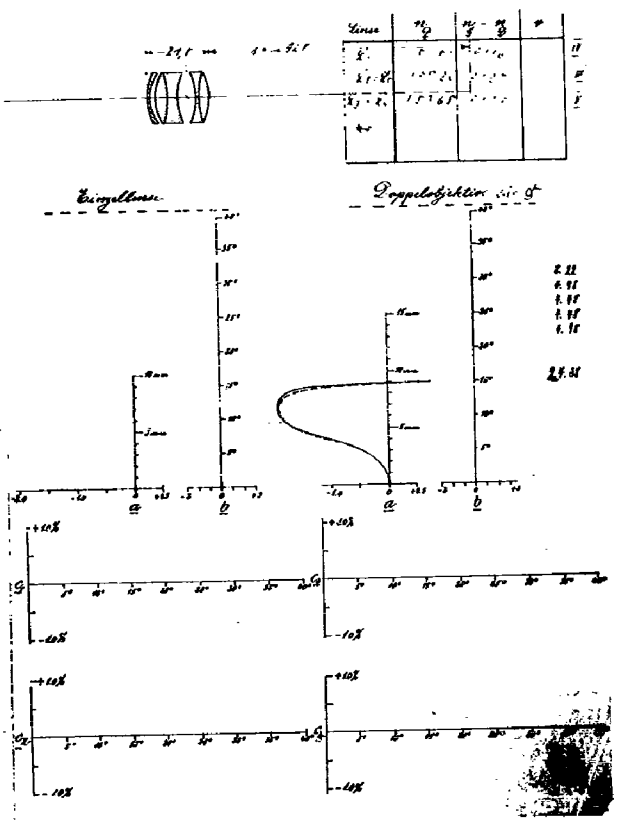
Einfallshöhen | Ehrenmasse | Einfallshöhen | Ehrenmasse

Astigmatismus (Δs') XXIX

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm



1237

F-Ts-6398-RE

1238

M 72.54

Busch-Rathenow 1:7,9 ; f = 9,56 Z. v. 28.4.37

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (12s/14).

Δf | Δs' | Δf'

-28,3 | -17,6 | -6,5 | -7,0 | -15,6 | -14,1

Einfallshöhen | Ehrenmasse | Einfallshöhen | Ehrenmasse

18,8 | 16,1 | 1115,2

Astigmatismus (Δs'/14).

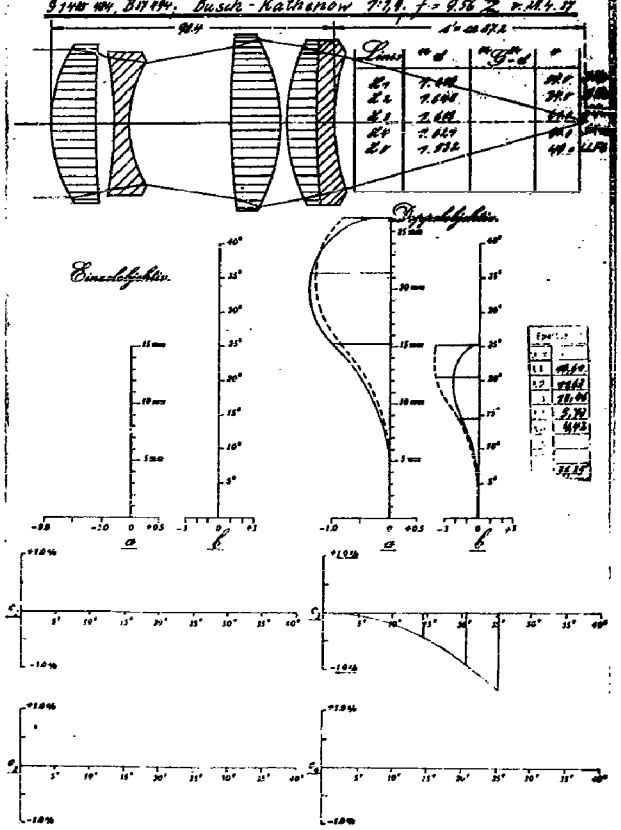
Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

-5,4 | -5,2 | -5,7 | -7,1 | -11,5 | -11,0

Frontwinkel | Vergütung | Frontwinkel | Vergütung

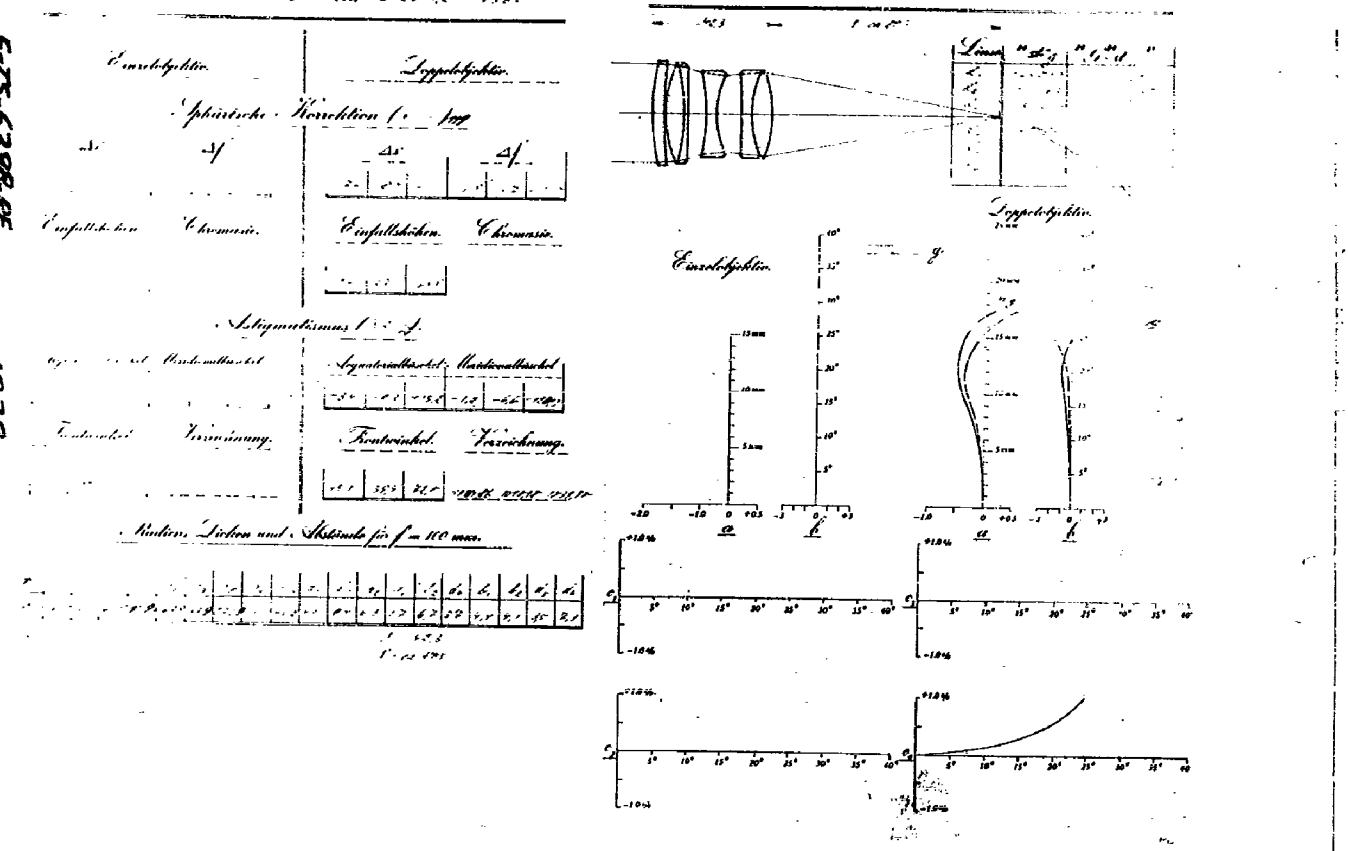
34,8 | 42,4 | 66,7

Radien, Dicken und Abstände für f = 100 mm



F-75-6398-RE

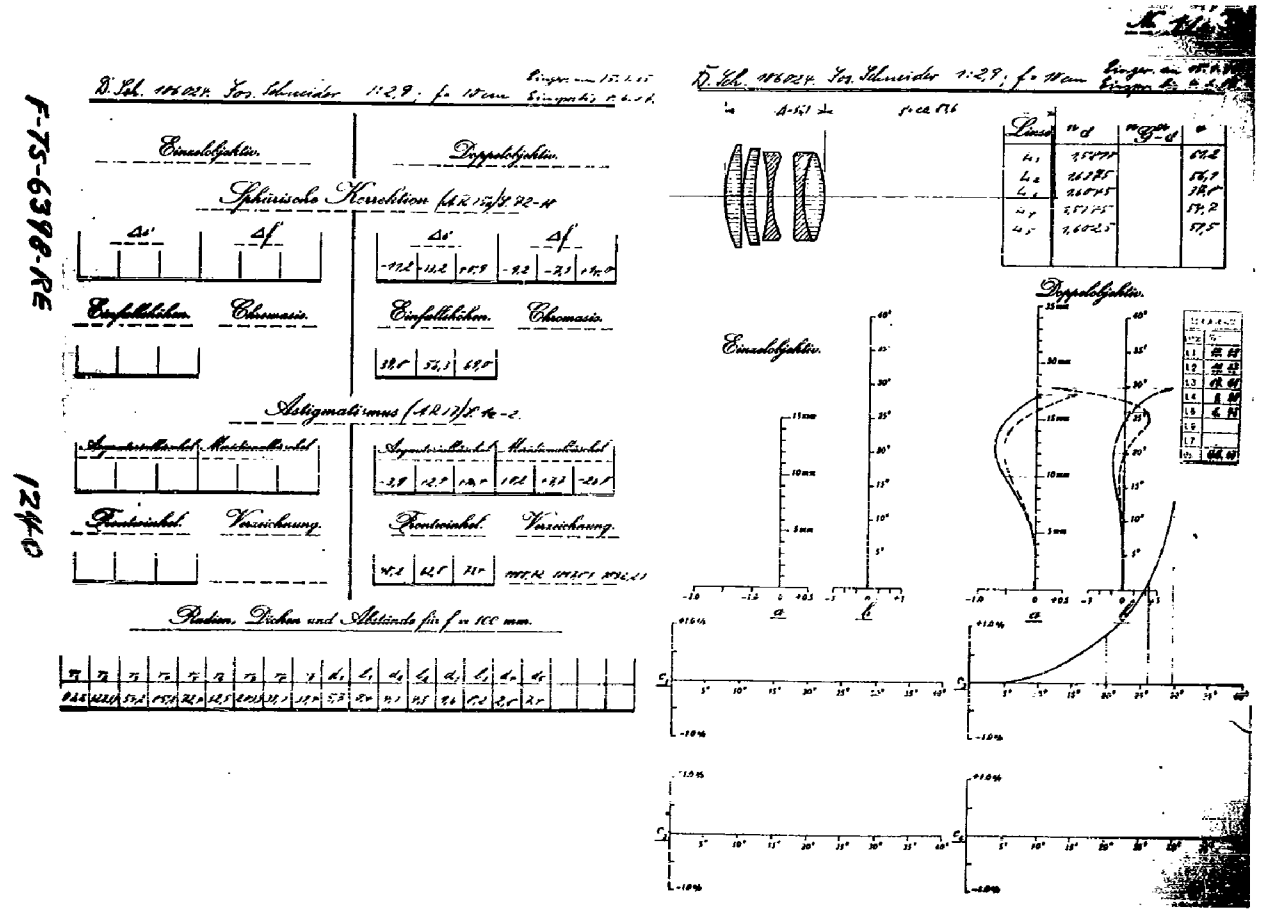
1239



1239

F-75-6398-RE

1240



F-75-6378-RE

1:2.41

E. 419552 Horace W. Lee (Kappella) 1:4.0 f. 4cm v. 14.11.1934

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (90%).

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (90%).

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung. | Frontwinkel | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv.
Die freien Durchmesser reichen für die vorgeschriebene Öffnung 1:1 nicht aus.

Doppelobjektiv.

K 1026

E. 419552 Horace W. Lee (Kappella) 1:4.0, f. 4cm v. 14.11.34

Linse | n_d | $n_F - n_d$ | v

12 III

F-75-6398-RE

1:2.42

Kappella E 407, 156 v. 15.II.34 1:4.5; f. 10cm.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion.

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus.

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung. | Frontwinkel | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

K 1055

Kappella E 407, 156 v. 15.II.34 1:4.5; f. 10cm.

Linse | n_d | $n_F - n_d$ | v

l3 = 10.3

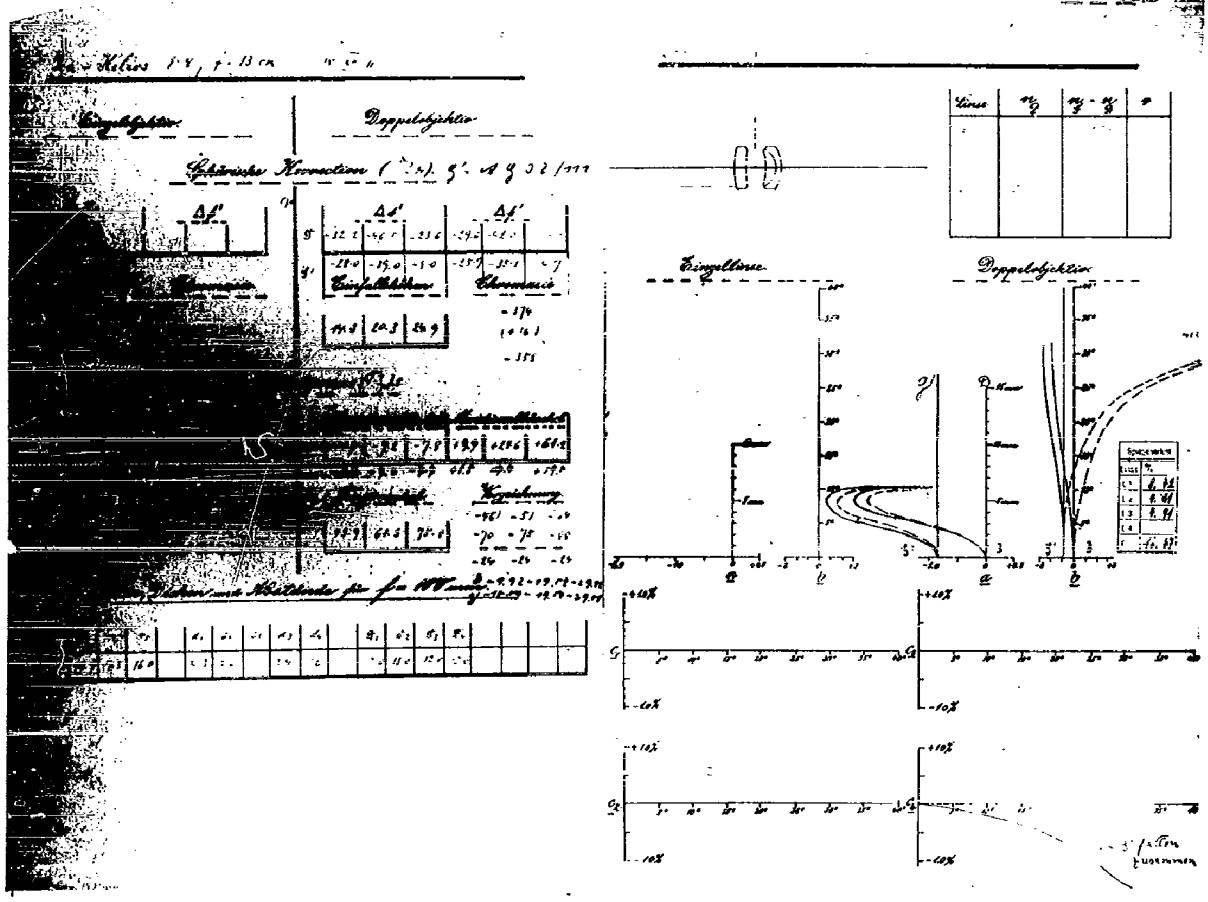
Einzelobjektiv.

l3 = 7.03

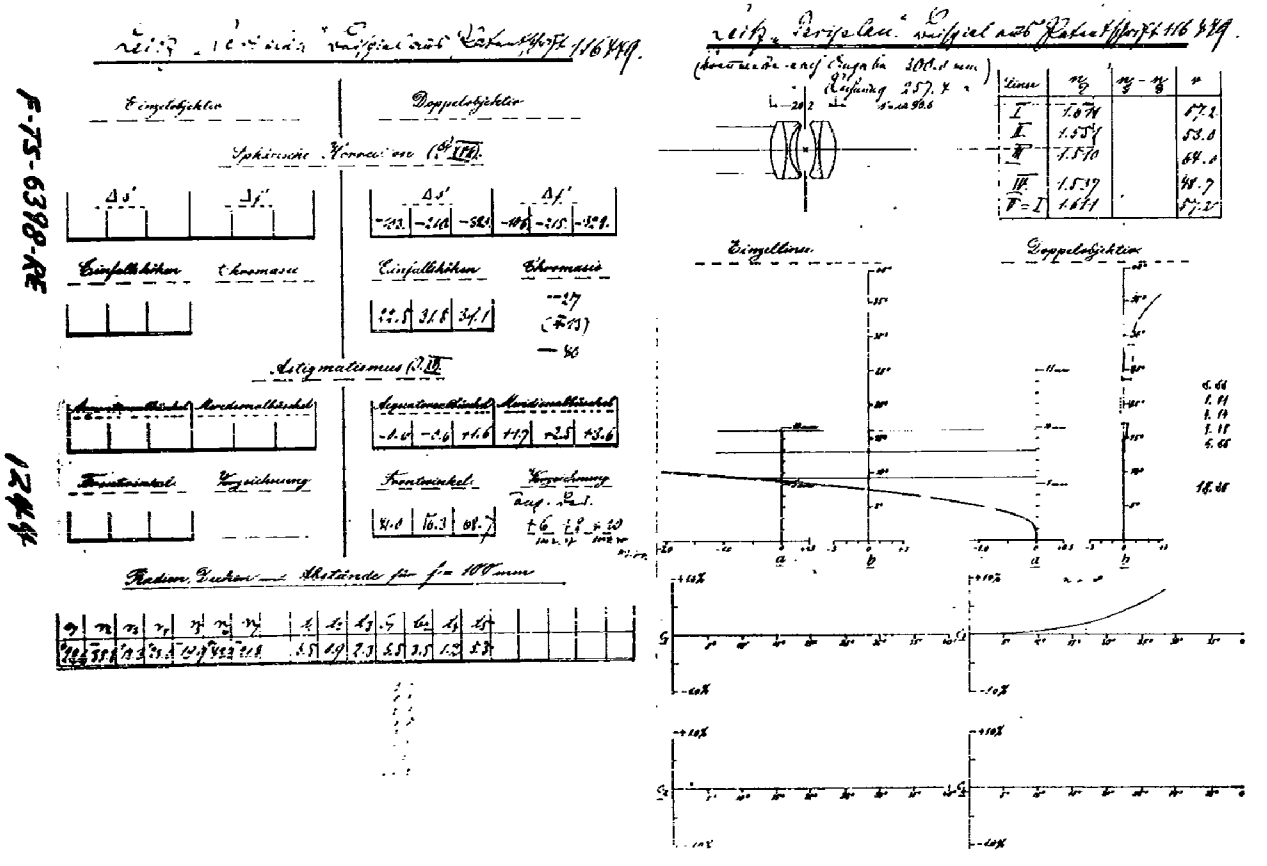
Doppelobjektiv.

In der Patentschrift E 407, 156 ist l3 mit 10.3 m angegeben. Durch Nachmessung der dieser Patentschrift beiliegenden Skizze ergibt sich eine Luftlinse von ca 7.03 m.

F-TS-6378-RE
12143



F-TS-6398-RE
12444



F-TS-6398-RE

12345

Alfred Taylor, Engl. Pat. N° 165923 vom 6. 1:3.5, f=100 mm, v. 12.9.21

Einzellinse — Doppelobjektiv

Sphärische Korrektion (ΔS' II, 12)

ΔS'	ΔS'		ΔS'	
	+2.5	+10.1	+2.4	+16.3	+19.5	+19.1

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

14.5	12.8	12.1		

Astigmatismus (ΔS' II, 12) für v

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel	Meridionalbüschel			
		-12.5	-22.5	-14.5	-15.5	-7.5	-12.5

Verzeichnung — Frontwinkel — Verzeichnung

12.7	14.4	14.5	11°12'05", 11°12'26", 11°12'15"

Radien, Dicken und Abstände für f = 100 mm

r	r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15
	∞	44.2	32.8	∞	34.2	35.6	92.4	10.6	17.4	3.6	2.4	6.2	1.3	6.2	
		4.2	0.8	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	

Alfred Taylor, Engl. Pat. N° 165923 vom 6. 1:3.5, f=100 mm

Einzellinse — Doppelobjektiv

Linse			
1	1.61488		60.3
2	1.61719		29.3

a — b — a — b

F-TS-6398-RE

12346

Taylor, Engl. Pat. N° 165923 vom 6. 1:3.5, f=100 mm, v. 12.9.21 mit Hinweis v. v. 1

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (A T II/12 (a) A T II/37 (b))

	Δs'	Δf'	Δs'		Δf'	
b	-12.9	-16.4	+2.3	-12.9	-16.0	-7.5
a	-13.1	-15.6	+1.7	-14.1	12.2	24.9

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

16.0	15.4	13.6	-10.6 (-11.4) -10.5	-8.9 (+9.2) -17.7

Astigmatismus (A T 6/10 (a) A T 6/11 698.99 (b))

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel	Meridionalbüschel			
b	-9.5	-2.0	-7.8	+0.8	1.9	-6.6
a	-5.6	-2.4	-1.9	+0.2	6.1	-2.6

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

15.0	15.8	12.4	11°10.36 (11°13.60)	11°12.63 (11°15.27)	11°10.4

Radien, Dicken und Abstände für f = 100 mm.

r	r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15
	∞	44.2	32.8	∞	34.2	35.6	92.4	10.6	17.4	3.6	2.4	6.2	1.3	6.2	
		4.2	0.8	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	

Linsenglas b: ... mm, n = ..., ν = ..., Pg = ...

12.4

N. 1257

Taylor, Engl. Pat. N° 165923 vom 6. 1:3.5, f=100 mm, v. 12.9.21 mit Hinweis v. v. 1

53.2 — 5.65

Linse				
1	1.5	1.579462	0.0 4427	44.2
2		1.7 1661	0.00868	29.6
3		1.73049	0.03479	28.3
4		1.69152	0.0 2334	47.3
5		1.52966	0.04.14	54.9

Einzelobjektiv — Doppelobjektiv

a — b — a — b

Taylor, Engl. Pat. N° 165923 vom 6. 1:3.5, f=100 mm, v. 12.9.21 mit Hinweis v. v. 1

Linsenglas a: 5 mm, n = 1.5, ν = 60.3, Pg = 0.543

Linsenglas b: 2 mm, n = 1.6, ν = 29.3, Pg = 0.596

Linsenglas b: 5 mm, n = 1.5, ν = 60.3, Pg = 0.543

Linsenglas a

F-TS-6398-RE

1247

V 1938 Nr. 29; 1:4; f=8.5cm; Rechn. v. 15.8.38

Einzellinse | Doppellinse

Sphärische Korrektion (STRAHL)

Einzellinse Δs'	Einzellinse Δf	Doppellinse Δs'	Doppellinse Δf
		-0.9	-0.5	+0.6	-0.5	-0.3	+0.6

Einzellinse Einfallshöhen	Einzellinse Chromasie	Doppellinse Einfallshöhen	Doppellinse Chromasie
		48.3	48.6	48.8	−0.5 (−1) +0.6

Astigmatismus (STRAHL)

Einzellinse Sagittalwinkel	Einzellinse Meridionalwinkel	Doppellinse Sagittalwinkel	Doppellinse Meridionalwinkel
		-1.3	-1.5	-1.4	-1.6

Einzellinse Feldwinkel	Einzellinse Verzeichnung	Doppellinse Feldwinkel	Doppellinse Verzeichnung
		27.7	29.0	+0.06 mm −3%

Radien, Dicken und Abstände für f = 100 mm.

Strahl Höhe 24.6

r1	r2	r3	r4	r5	r6	d1	d2	d3	l	d4					s'
∞	18.3	88.6	42.5	44.8		1.9	12.3	6.6	44.5	3.5				0.6	66.4

55 2

V 1938 Nr. 29; 1:4; f=8.5cm; Rechn. v. 15.8.38

Linse	n_d	n_F-n_C	ν
L1	1.6...	0.0...	49.9
L2	1.6...	0.0...	49.9
L3	1.5...	0.0...	49.6
L4	1.5...	0.0...	49.4

Einzellinse | Doppellinse

Spektrum

Spektrum	%
1	6.5
2	7.5
3	8.5
4	9.5
5	10.5
6	11.5

K 1244

F-TS-6398-RE

1248

V. 1938 No 20 1:4,5 f. 13,5 cm Rhg. v. 17.2.38

Einzellinse | Doppellinse

Sphärische Korrektion (STRAHL)

Einzellinse Δs'	Einzellinse Δf	Doppellinse Δs'	Doppellinse Δf
		-4.6	+0.5	-1.0	+1.7

Einzellinse Einfallshöhen	Einzellinse Chromasie	Doppellinse Einfallshöhen	Doppellinse Chromasie
		36.1	44.6

Astigmatismus (STRAHL)

Einzellinse Sagittalwinkel	Einzellinse Meridionalwinkel	Doppellinse Sagittalwinkel	Doppellinse Meridionalwinkel
		-1.8	-1.-	-2.6	+3.4

Einzellinse Feldwinkel	Einzellinse Verzeichnung	Doppellinse Feldwinkel	Doppellinse Verzeichnung
		42.1	47.1	100,11 −3,38	100,15 1,70

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	l	d4
23.1	∞	32.2	43.9	93.2	∞	1.3	3.8	4.9	5.3	2.-

V. 1938 No 20 1:4,5 f. 13,5 cm Rhg. v. 17.2.38

Linse	n_d	n_F-n_C	ν
1	1.67...		57.2
2	1.62...		44.9
3	1.74...		44.6
4	1.76...		46.5

Einzellinse | Doppellinse

Spektrum

Spektrum	%
1	6.5
2	7.5
3	8.5
4	9.5
5	10.5

K 1231

F-TS-6398-RZ

1249

V.1938 Nr. 9 1:2.5 f=8cm Rayn. v. 3.5.38.

Einzellichtk. | Doppellichtk.

Sphärische Korrektion (AS 32/72)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-12.9	-14.7	12.7	-12.4	-13.3	-14.0

Einfallshöhen			Chromasie
32.7	46.4	56.9	-1.4.2 (1.5.0)

Astigmatismus (AS 44/22)

Segmentalbüschel		Meridionalbüschel	

Frontwinkel	Verzeichnung

Segmentalbüschel		Meridionalbüschel		
-3.47	-3.37	-3.24	-0.55	-0.90	-2.14

Frontwinkel			Verzeichnung		
35.8	40.5	50.0	1.84.53	1.82.34	1.84.03

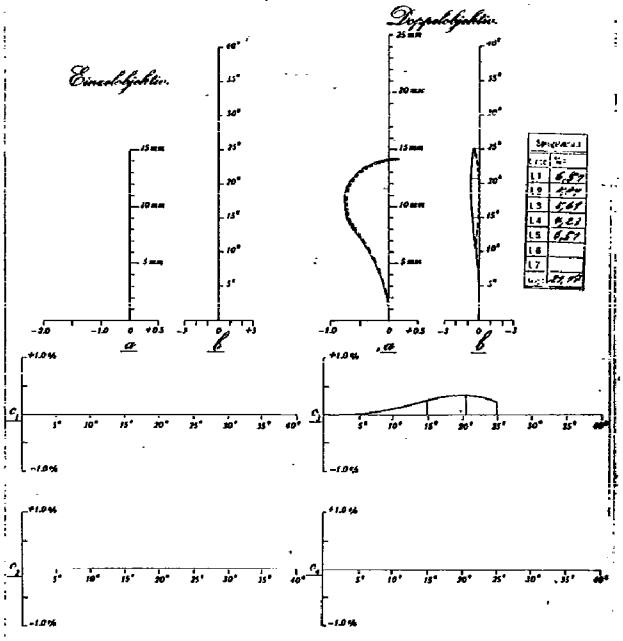
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6
83.8	∞	36.8	66.3	107	23.7	96.5	5.0	10.7	2.5	6.2	1.9	6.2

V.1938 Nr. 9 1:2.5 f=8cm Rayn. v. 3.5.38.

Linse	n_d	$n_F - n_C$	ν	
1+2	1.623145	0.01843	48.4	Kron
1	1.465550	0.00756	65.4	Fl
3	1.651895	0.01253	34.3	Fl.
4	1.651750	0.01107	52.2	Kron

Einzellichtk. | Doppellichtk.



1249

F-TS-6398-RZ

1250

V.1938 Nr. 50 1:3,5 f=8cm Rayn. v. 15.11.38.

Einzellichtk. | Doppellichtk.

Sphärische Korrektion (AS 32/72)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'			Δf'		
-7.0	-10.1	-14.7	-9.0	-10.1	-13.0

Einfallshöhen			Chromasie
38,0	46,5	57,0	-1.5.0 (1.5.5)

Astigmatismus (AS 44/22)

Segmentalbüschel		Meridionalbüschel	

Frontwinkel	Verzeichnung

Segmentalbüschel			Meridionalbüschel		
-2.8	-3.1	-3.4	-0.3	-0.7	-1.4

Frontwinkel			Verzeichnung		
31.8	36.6	43.3	1.85.1	1.84.4	1.84.2

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6
83.8	∞	39.8	273	111.2	31.1	58.5	4.8	5.6	1.5	3.6	1.4	5.2

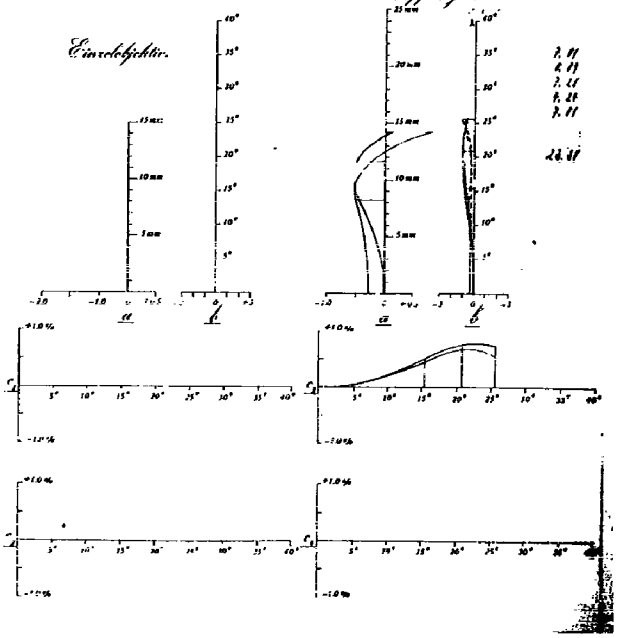
1.2.9
75.5

SS! Kle 15/12 K 1194

V.1938 Nr. 50 1:3,5 f=8cm Rayn. v. 13.12.37.

Linse	n_d	$n_F - n_C$	ν	
3	1.701402	0.02222	41.6	Kron
4	1.651511	0.01118	45.2	Fl
1	1.731054	0.01...	29.6	Fl
2	1.617758	0.01...1	52.6	Kron
5	1.701462	0.02...48	41.6	Fl

Einzellichtk. | Doppellichtk.



L 1232

F-TS-6398-RE

12.51

V 1938 Nr. 10 1:2,0 f. 5cm Rayon a. 11.5.38

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion /A3.36/32

Δs'	Δf'	Δs'	Δf'
		-17.7 -11.3 -0.7	-16.7 -12.3 +2.10

Einfallslichten. | Chromasie. | Einfallslichten. | Chromasie.

71.1 | 58.1 | 71.2 | -2.16 -2.11

Astigmatismus /A3.2/33.9

Sagittenwinkel	Meridionalwinkel	Sagittenwinkel	Meridionalwinkel
		-1.43 -1.74 -0.70	-2.45 -0.10 -1.58

Frontwinkel. | Vorzeichnung. | Frontwinkel. | Vorzeichnung.

53.4 -41.1 54.1 | 10.8.38 3°43' 32°33

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7
38.2	∞	32.9	27.9	24.3	-40.2	38.8	70.3	0.7	12.4	3.4	1.2	5.0	1.2	9.5

V 1938 Nr. 10. 1:2,0 f. 5cm Rayon a. 11.5.38

Linse	n_d	$n_C - n_d$	ν_d	
1	1.623115	0.010643	58.1	Glas
2	1.64550	0.008912	45.2	SK3
3	1.64853	0.015405	33.7	SF1
5	1.52991	0.013121	58.1	Glas

Einzelobjektiv. | Doppelobjektiv.

12.51

F-TS-6398-RE

12.52

V. 1938 Nr. 1. 1:2,0 f. 5 cm Rayon a. 1.2.38

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion /A3.14/32

Δs'	Δf'	Δs'	Δf'
		-11.4 -11.0 +12.5 -13.3 -1.1 -12.3	

Einfallslichten. | Chromasie. | Einfallslichten. | Chromasie.

57.3 | 51.3 | 79.2 | -3.11 (F 1.11)

Astigmatismus /A0.27/32

Sagittenwinkel	Meridionalwinkel	Sagittenwinkel	Meridionalwinkel
		-2.3 -3.5 3.1	0.3 1.1 1.1

Frontwinkel. | Vorzeichnung. | Frontwinkel. | Vorzeichnung.

42.8 41.1 11.1 | 23.12.38 33°2 -12.1

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	a	d_4	d_5	d_6
45.8	∞	45.2	33.2	23.6	39.2	-13.8	110	17.4	3.5	2.8	3.6	1.1	1.9	--

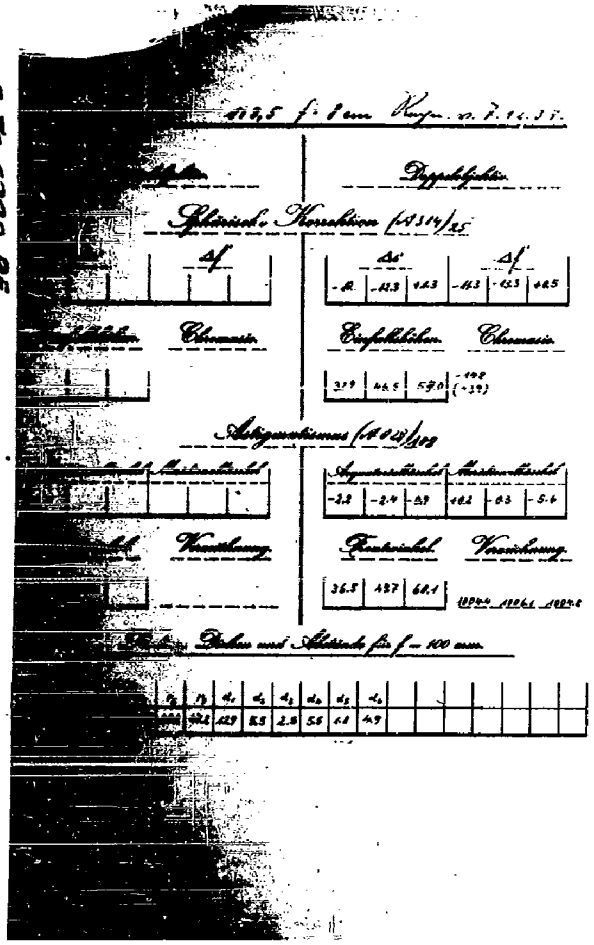
V. 1938 Nr. 1 1:2,0 f. 5cm Rayon a. 1.2.38

Linse	n_d	$n_C - n_d$	ν_d	Typ
1	1.70162	0.01238	41.2	Glas
2	1.96741	0.00895	16.6	SK18
3	1.66202	0.03887	16.5	SF18
4	1.70162	0.01238	41.2	Glas
5	1.51759	0.01267	52.2	NPK
6	1.70162	0.01238	41.2	Glas

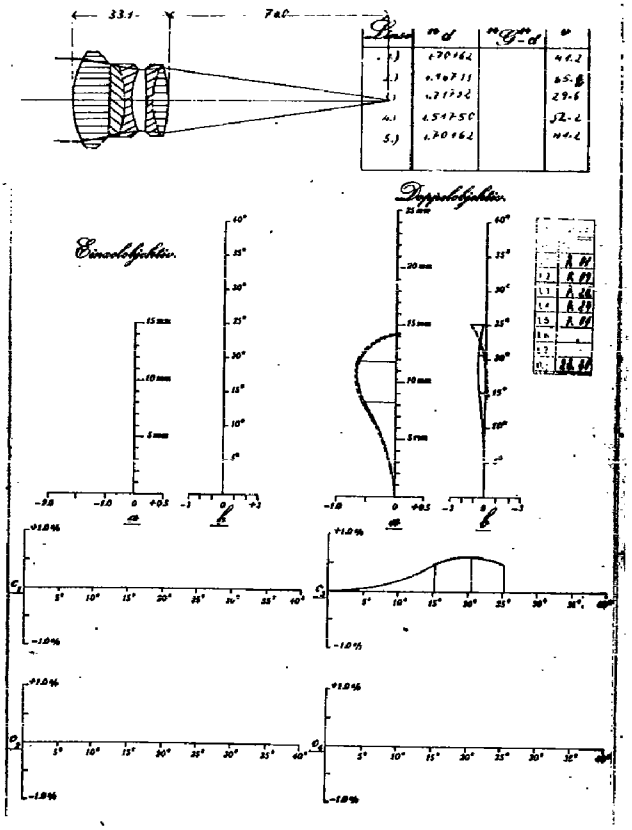
Einzelobjektiv. | Doppelobjektiv.

F-Z5-6398-RE

1253



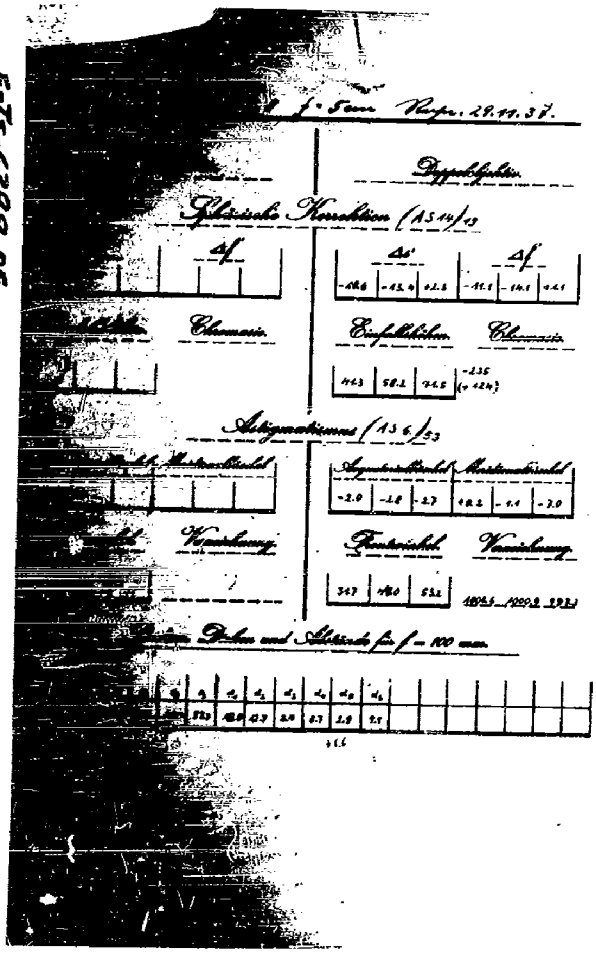
V. 1937 Nr. 29 1:3,5 f = 8 cm Rasp. v. 29.11.37



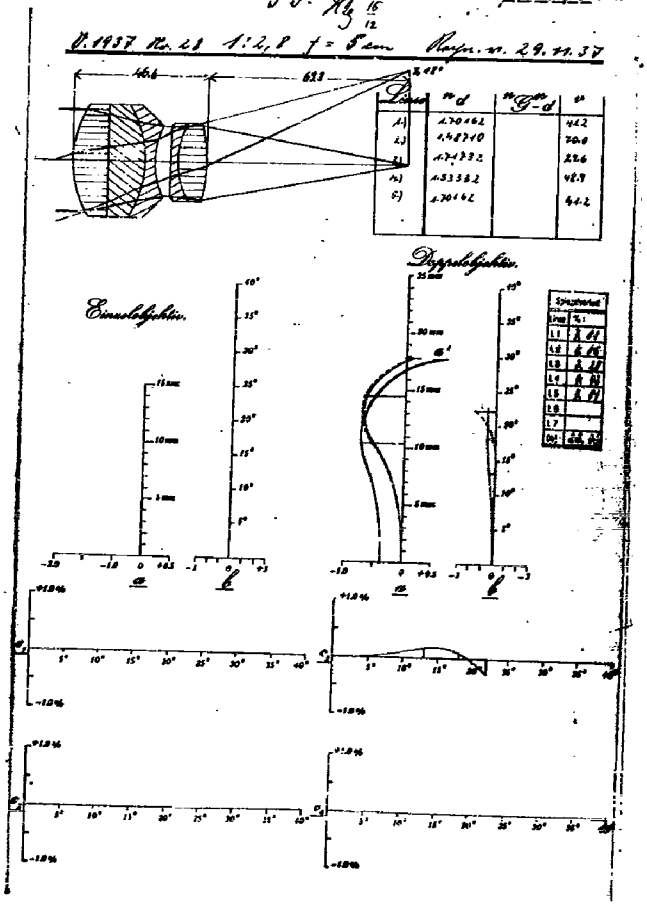
1253

F-Z5-6398-RE

1254



V. 1937 Nr. 28 1:2,8 f = 8 cm Rasp. v. 29.11.37



F-TS-6398-RE

1255

713.99 Muf 7 1:3,5 f=57,5mm

Einzellobjektiv

Doppellobjektiv

Sphärische Korrektion (KZ5/55

Einstellebenen Chromasie

Astigmatismus (KZ5/65

Segittalwinkel Meridionalwinkel

Bildwinkel Verzeichnung

Brennw. Dicken und Abstände für f = 100 mm

F-TS-6398-RE

1256

17.6.35.

Muf 3 1:2.8 f=52.3mm

Doppellobjektiv

Sphärische Korrektion (KZ3/55

Einstellebenen Chromasie

Astigmatismus (KZ4/65

Bildwinkel Verzeichnung

Brennw. Dicken und Abstände für f = 100 mm

Rechnung vom 17.6.35. № 1189

Objektivrechnung f=3.99 Muf 3 1:2.8 f=52.3 mm

Linse r d G d n

Einzellobjektiv

Doppellobjektiv

Bildwinkel

F-TS-6398-RE

1257

V 1936 Nr. 17 1:3.5 f = 3.5 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion f = 1.0

Δs'	Δf'	Δs'	Δf'
		-13.1 -11.1 +2.1	-12.1 -9.2 -9.3

Einfallshöhen. | Chromasie.

Einfallshöhen.	Chromasie.
33.1	46.1 51.1

Astigmatismus (AS 32/95)

Sagittenwinkel	Meridionalwinkel	Sagittenwinkel	Meridionalwinkel
		-7.3 -1.6 +2.1	+8.1 +6.4 -2.1

Frontwinkel. | Verzeichnung.

Frontwinkel.	Verzeichnung.
33.1	52.4 +0.1

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
32.8	∞	20.7	15.8	99.2	29.8	-45.7	5.8	1.8	2.5	5.8	1.9	0.3

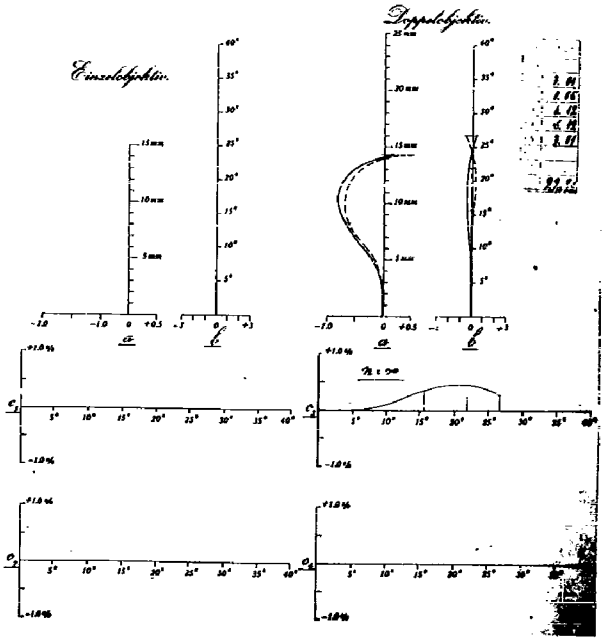
1257

1243 V 1936 Nr. 17 1:3.5 f = 3.5 cm Rechn. v. 10.12.36.

Linse	nd	νd	w
1	1.57442	57.8	90.2
2	1.00550	37.0	77.0
3	1.60323	60.8	87.8
4	1.57750	53.8	90.8
5	1.57442	57.8	90.2

Doppelobjektiv.

Einzelobjektiv.



1257

F-TS-6398-RE

1258

A 1240

V 1938 Nr. 18 1:3.5 f = 3.5 cm Rechn. v. 11.1.38

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AS 32/95)

Δs'	Δf'	Δs'	Δf'
		-15.1 -12.2 -2.7	-15.5 -19.3 -9.1

Einfallshöhen. | Chromasie.

Einfallshöhen.	Chromasie.
33.0 46.6 57.0	(n'=1) -11.8

Astigmatismus (AT 2/44)

Sagittenwinkel	Meridionalwinkel	Sagittenwinkel	Meridionalwinkel
		-9.31 -2.64 +8.59 -0.66	-2.49 +11.56

Frontwinkel. | Verzeichnung.

Frontwinkel.	Verzeichnung.
43.6 60.1	70.4

Radien, Dicken und Abstände für f = 100 mm.

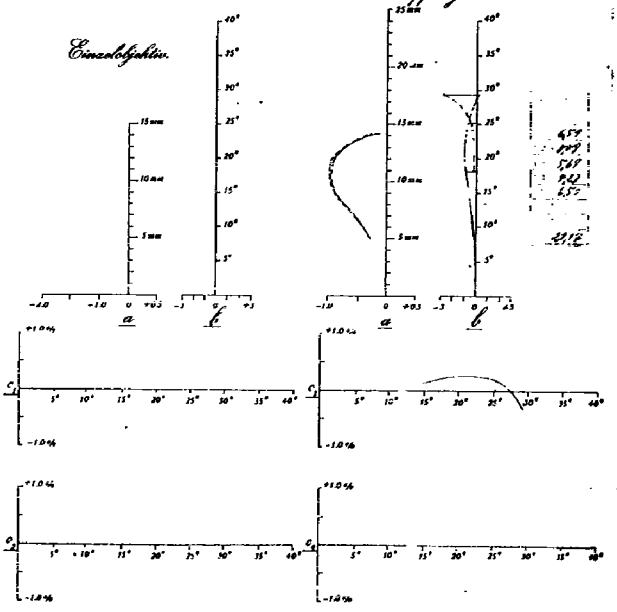
r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
32.8	∞	20.7	15.8	99.2	29.8	-45.7	5.8	1.8	2.5	5.8	1.9	0.3

V 1938 Nr. 18 1:3.5 f = 3.5 cm Rechn. v. 11.1.38.

Linse	nd	νd	w
1=5	1.57442	57.8	90.2
2	1.00550	37.0	77.0
3	1.60323	60.8	87.8
4	1.57750	53.8	90.8

Doppelobjektiv.

Einzelobjektiv.



Umrechnung nach 3.1.39 Versand v. № 1138

V 1936 Nr. 76 1:2,8 f=8cm Rechn. v. 15.9.36

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (1.22 f)

Einzelobjektiv.		Doppelobjektiv.	
Δs'	Δf'	Δs'	Δf'
		-16,6	-19,1 -59 -16,6 -19,1 +5,4
Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		9,12	+7,1 7 -

Astigmatismus f(11,2 - f(11,2 ...

Einzelobjektiv.		Doppelobjektiv.	
Sagittenwinkel.	Meridianwinkel.	Sagittenwinkel.	Meridianwinkel.
		-2,2	-1,1 -,- -,- -,1 -,-
Frontewinkel.	Verzeichnung.	Frontewinkel.	Verzeichnung.
		1,-	+,-,- -,-,- +,-,5

Radien. Dicken und Abstände für f = 100 mm.

r	r₂	r₃	r₄	r₅	r₆	r₇	d₁	d₂	r₈	r₉	r₁₀	r₁₁
1/r	∞	1/r₃	1/r₄	1/r₅	1/r₆	1/r₇	1/d₁	1/d₂	1/r₈	1/r₉	1/r₁₀	1/r₁₁

F-15-6398-82

1254

V 1936 Nr. 76 1:2,8 f=8cm Rechn. v. 15.9.36.

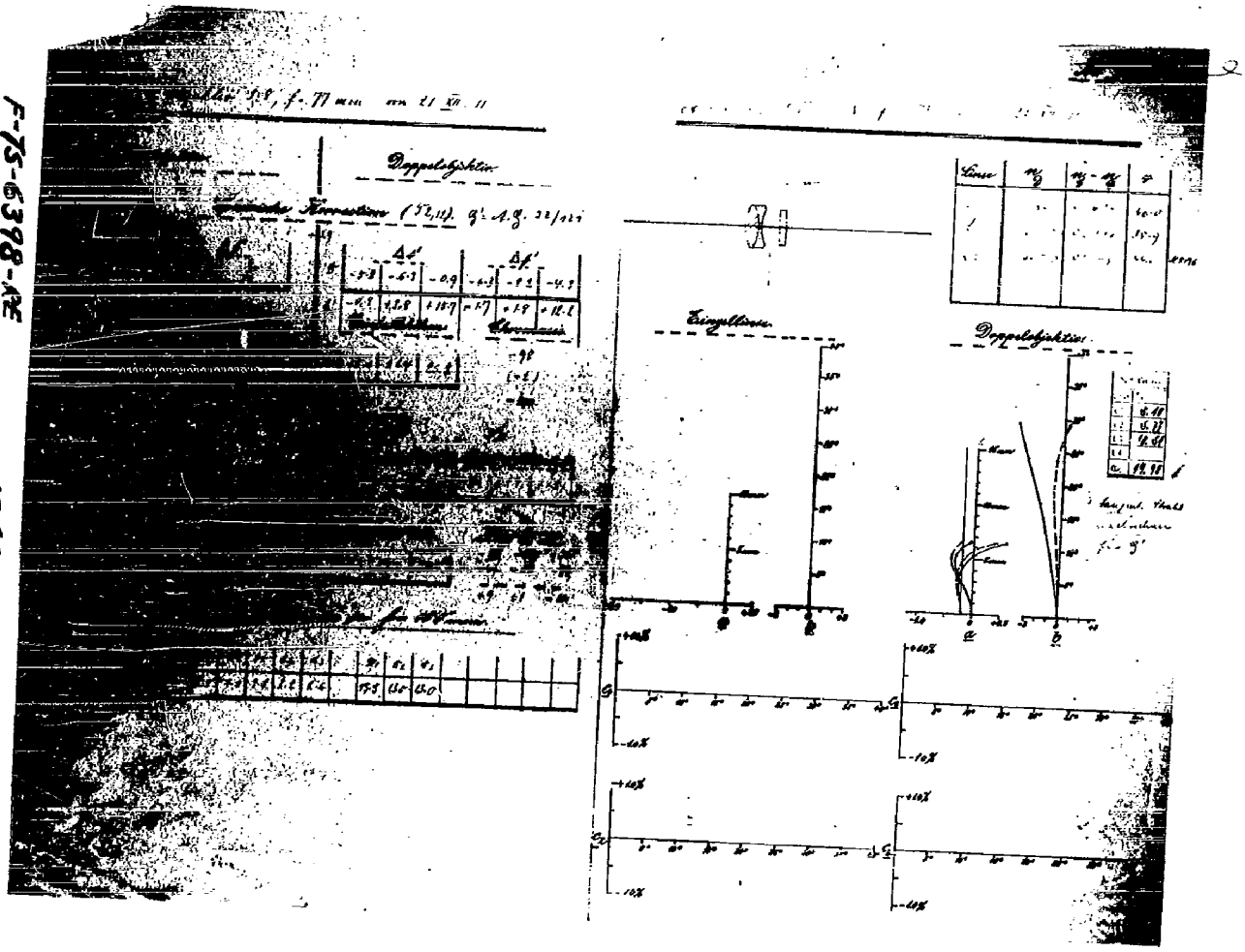
Linse	n_d	n_C - n_d	ν
1.	1,62 21 50	0,77 10 11	6,74
2.	1,62 21 -	0,77 10 11	6,74
3.	1,62 21 50	0,77 10 11	6,74
4.	1,62 21 50	0,77 10 11	6,74
5.	1,62 21 50	0,77 10 11	6,74

Einzelobjektiv. Doppelobjektiv.

12.1.39

F-75-9368-AE

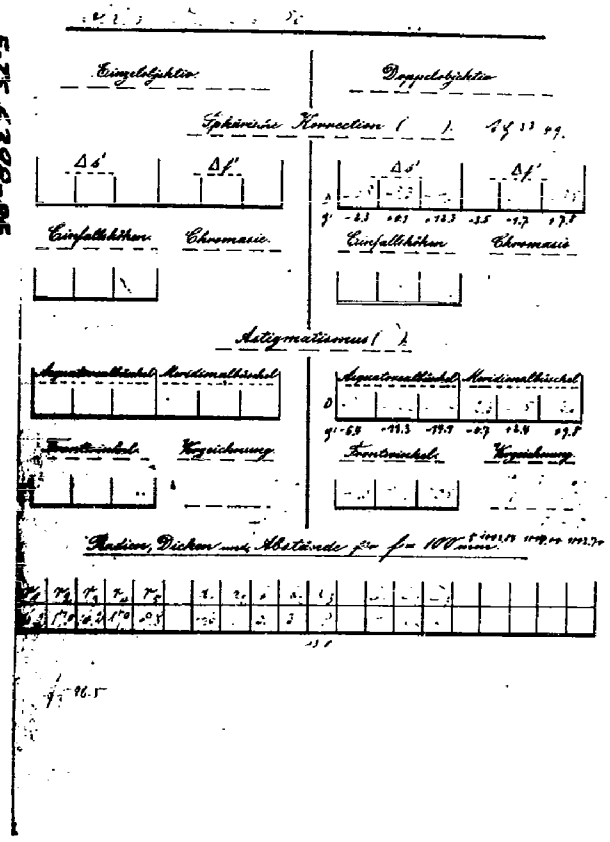
1260

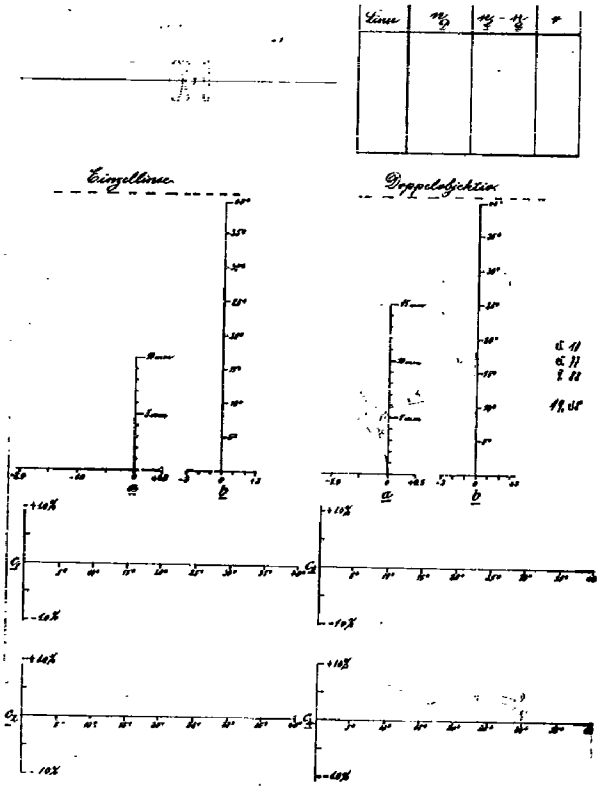


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1261

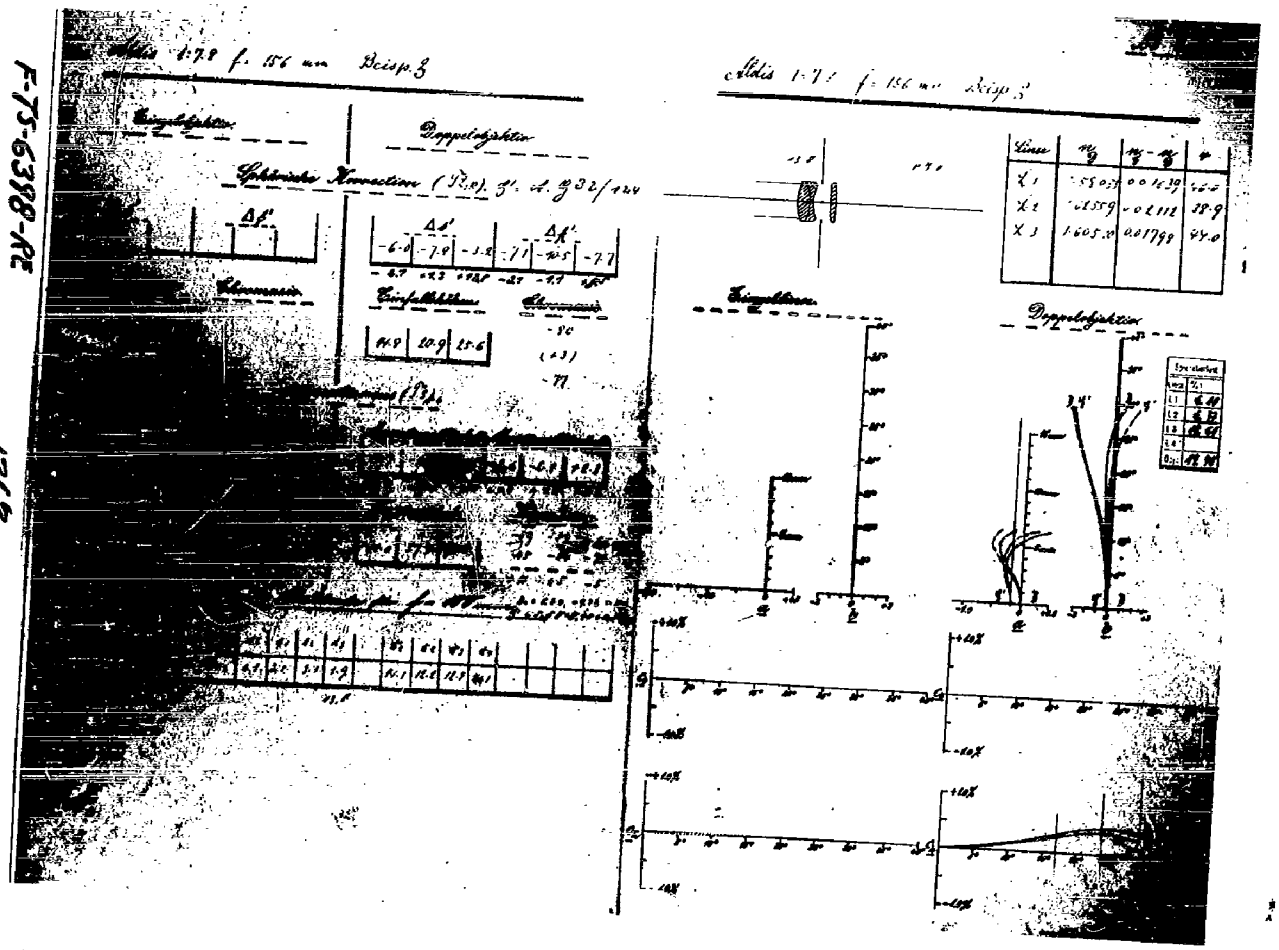
№ 229





F-75-638-AE

1262



F-TS-6398-RE

1263

Einzellinse | Doppelobjektiv

Sphärische Korrektion ( )

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus ( )

Meridionalwinkel | Sagittalwinkel | Kennzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

n_d n_F n_C τ_d τ_C r_1 r_2 r_3 d_1 d_2

$f_s' = 100$

Linse | n_d | $n_F - n_C$ | *

Einzellinse | Doppelobjektiv

η_1 η_2 η_3 η_4 η_5

$\eta = \infty$

1263

F-TS-6398-RE

1264

H. L. 1103

Fehler Bez. für Maßstab 1:1

Einzellinse | Doppelobjektiv für ∞

Sphärische Korrection ( )

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus ( )

Meridionalwinkel | Sagittalwinkel | Kennzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

H. L. 1103 ( )

Linse | n_d | $n_F - n_C$ | *

1 | 1.53777 | 0.0145

2 | 1.54760 | 0.0184

3 | 1.61122 | 0.0185

Einzellinse | Doppelobjektiv

η_1 η_2 η_3 η_4 η_5

F-75-6398-RE

1265

№ 8

Doppelobjektive

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vergleichung

Radien, Dicken und Abstände für f = 100 mm

F-75-6398-RE

1266

№ 51

Serie IV. № Anastigmat 1/12.5 f = 118.4

Linse | n_d | $n_F - n_C$ | ν

Einzelobjektive | Doppelobjektive

F-75-6388-RE

1267

Einfacher Aplanat

Einzelobjektiv I

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Einfacher Aplanat

Einzellinse I

Einzellinse I

Doppelobjektiv

F-75-6389-RE

1269

Englisches Patent

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Englisches Patent

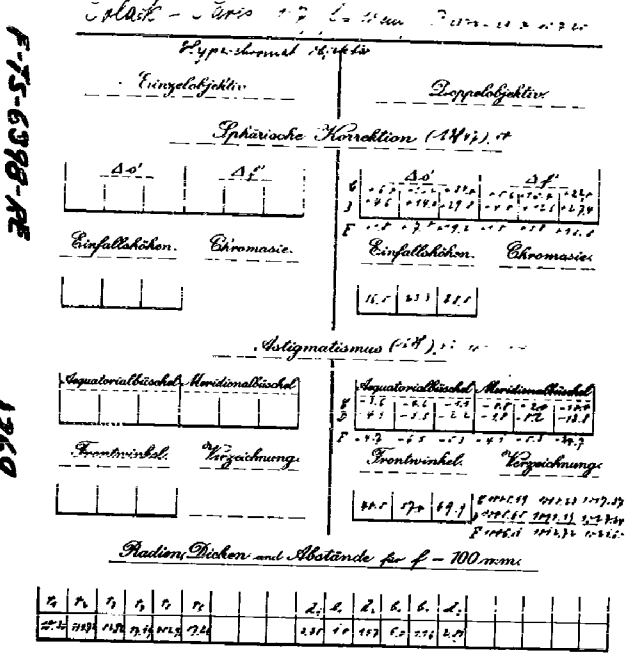
Einzellinse

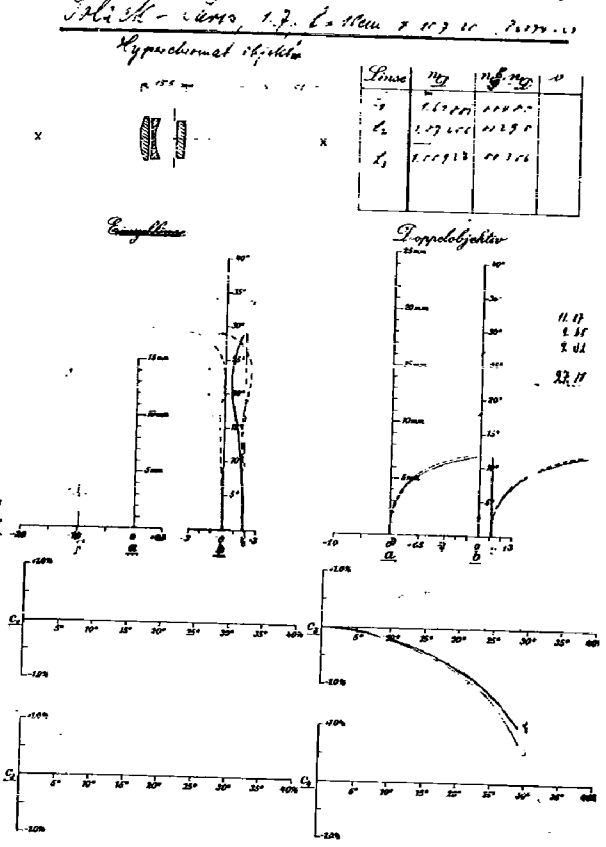
Einzellinse

Doppelobjektiv

F-75-6388-RE

1269

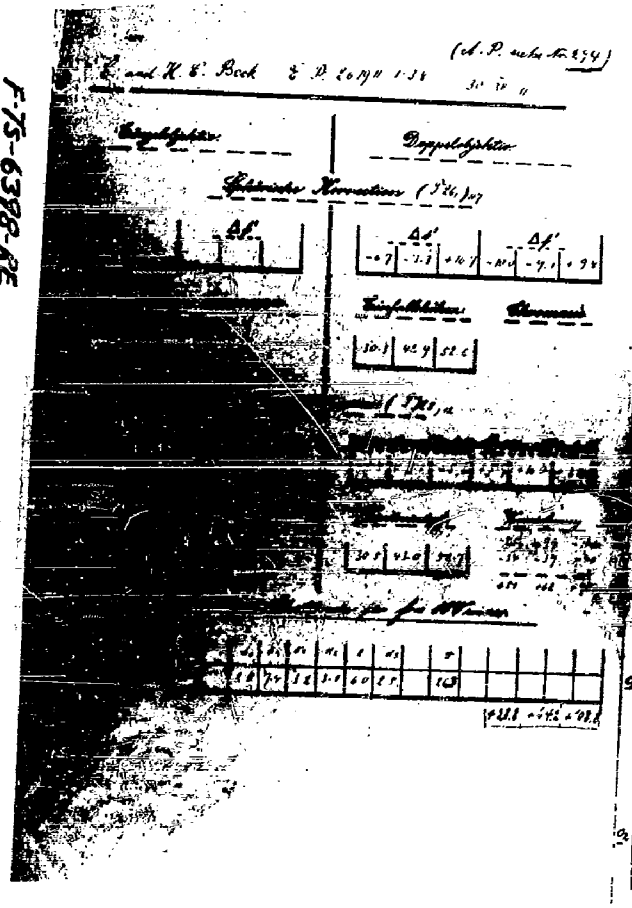


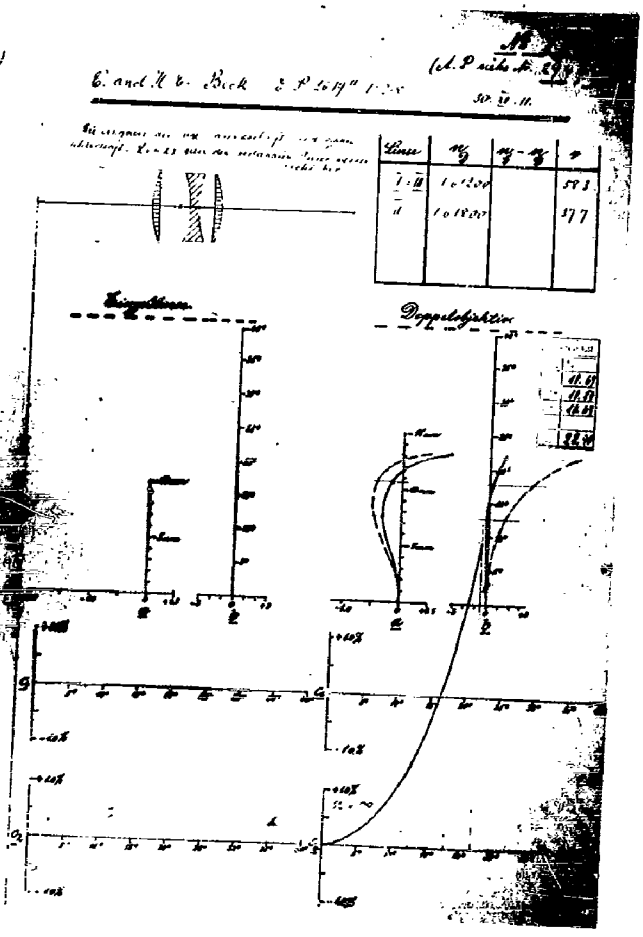


1264

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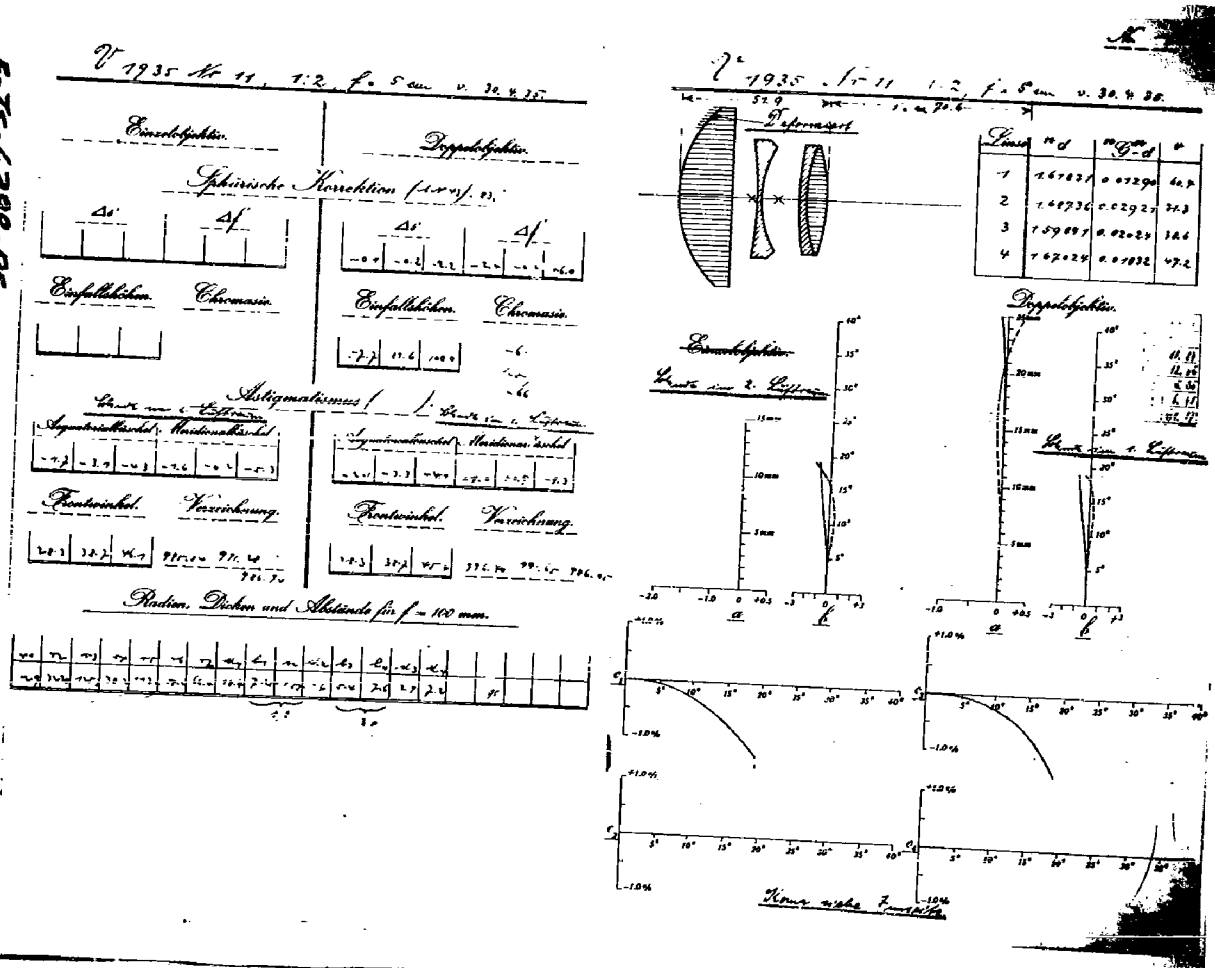
1270





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12711

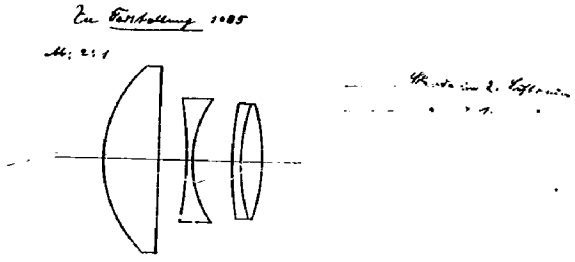


12711

1085

F-75-6398-RE

12772



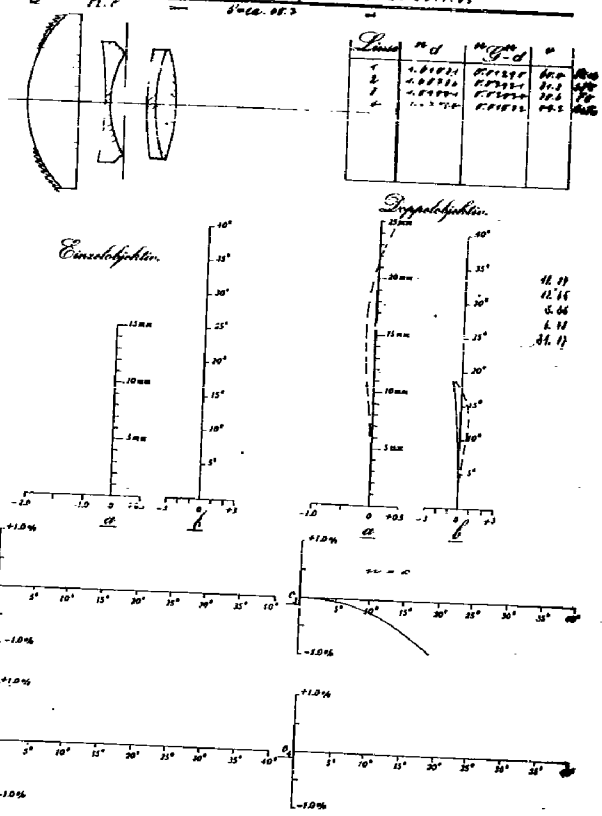
F-TS-6388-RE

12.73

Tessar

Tessar

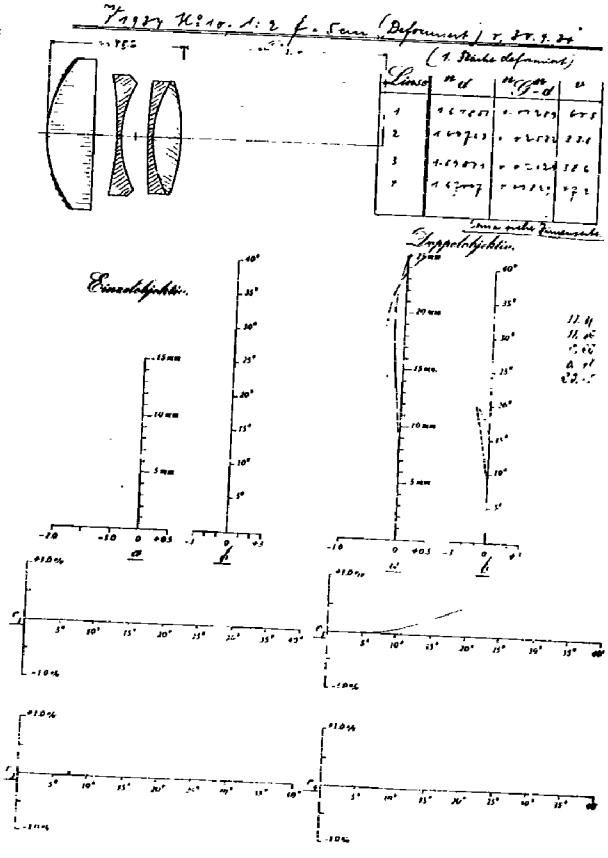
K 1109



F-TS-6388-RE

12.74

K 1053



K 1052

F-73-6398-RE

1275

Typ V 1934 Nr. 9 1:2 f = 5cm Rchg. v. 27.7.34

(4 Flächen deformiert)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'/sf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0.9 -0.6 -0.4 -0.9 -0.9 -0.2	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		59.9 62.9 102.8	-0.32 (-0.13) -0.19

Astigmatismus (Δs'/sf')

Einzelobjektiv Sagittalwölbung	Einzelobjektiv Meridionalwölbung	Doppelobjektiv Sagittalwölbung	Doppelobjektiv Meridionalwölbung
		-3.2 -8.2	+0.9 -3.2

Einzelobjektiv Feldwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Feldwinkel	Doppelobjektiv Verzeichnung
		39.9 41.4	-0.7% / -1.1%

Radien, Dicken und Abstände für f = 100 mm.

Nr.	r	d	n	ν	s	β	r₁	d₁	r₂	d₂	r₃	d₃	r₄	d₄	r₅	d₅	r₆	d₆	r₇
39.4	3.m.	+1.12	26.4	+1.16	38.2	62.1		-16.7	7.11	0.5	17.0	1.9	-1.6	28.9	12.6	0.2	13.1	3.2	3.2

Typ V 1934 Nr. 9 1:2 f = 5cm Rchg. v. 27.7.34

(4 Flächen deformiert)

Linse | n_d | n_F - n_C | ν

Einzelobjektiv | Doppelobjektiv

a | b | a | b

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1276

Deformiert.

V 1934 Nr. 8 1:2.8 f = 5cm Rchg. v. 6.4.34

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'/sf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		+2.9 -2.5 -2.5 17.2 -2.9 -2.6	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		93.0 77.5 71.0	-0.61 (-0.41) -0.63

Astigmatismus (Δs'/sf')

Einzelobjektiv Sagittalwölbung	Einzelobjektiv Meridionalwölbung	Doppelobjektiv Sagittalwölbung	Doppelobjektiv Meridionalwölbung
		-2.1 +1.1 -0.3	-17.1

Einzelobjektiv Feldwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Feldwinkel	Doppelobjektiv Verzeichnung
		41.2 42.7	1.1% 2.2%

Radien, Dicken und Abstände für f = 100 mm.

r	d	n	ν	s	β	r₁	d₁	r₂	d₂	r₃	d₃	r₄	d₄	r₅	d₅	r₆	d₆	r₇
39.5	3.m.	1.3	32.0	1.5	11.3	62.1		-16.7	5.5	1.7	1.2	1.2	1.1	1.5		2.5	33.0	2.5

Typ V 1934 Nr. 8 1:2.8 f = 5cm Rchg. v. 6.4.34

Deform.

K 1057

Linse | n_d | n_F - n_C | ν

Einzelobjektiv | Doppelobjektiv

a | b | a | b

Koma

1275

L 1050

Deformant

V 1934 № 6, 1:2.8, f = 5 cm Reg. № 9 5 34

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1277

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Rot/Violett)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (/)

Asymmetriefehler | Meridionalfehler

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse | n d | n/ν-d | v

Einzelobjektiv | Doppelobjektiv

a | b

Koma

L 1035

V 1934 № 11, 1:1.5, f = 5 cm v. 23.5.34 (1. Muster Deform.)

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Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Rot/Violett)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus

Asymmetriefehler | Meridionalfehler

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse | n d | n/ν-d | v

Einzelobjektiv | Doppelobjektiv

a | b

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Eugène Lacaze

Französisches Patent 330 344 vom 28. 12. 33

Einzellinsen | Doppelobjektive

Sphärische Korrektion (-1,5 mm / +3)

Δs'			Δf'		
-11,4	-13,6	-5,1	-9,4	17,3	13,6
-30,0	-38,0	+44,0	-30,2	-26,0	+12,0

Einfallslichten | Chromasie

41,5	16,3	20,0
25,0	32,6	41,0

Astigmatismus (-2 mm / +1)

Äquatorialwinkel	Meridionalwinkel		Äquatorialwinkel	Meridionalwinkel
-11,0	-17,6	-23,4	-10,4	-11,1	-11,4

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
47,3	66,8	81,7	Farbig Blau

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d	d1	d2	d3	d4	d5	d6
66,4	70,8	32,4	66,4	70,5	32,6	66,4	3,8	0,7	1,4	2	0,5	1	2

Eugène Lacaze

Französisches Patent 330 344 vom 28. 12. 33

Einzellinse | Doppelobjektive

Linse	n	n'	ν	ν'
I	1,5	1	59,2	
II	1,5	1	59,2	
III	1,5	1	59,2	
IV	1,5	1	59,2	

Einzellinse | Doppelobjektive

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Gallus-Objektiv 1:8,5; f = 24 cm

Einzelobjektive | Doppelobjektive

Sphärische Korrektion (-1,5 mm / +3)

Δs'	Δf'	Δs'		Δf'	
		-0,8	+0,1	+1,8	-0,9	+0,6	+2,2

Einfallslichten | Chromasie | Einfallslichten | Chromasie

13,4	18,9	61,6

+ 4,1 (- 4,4) + 2,7

Astigmatismus (-2 mm / +1)

Äquatorialwinkel	Meridionalwinkel		Äquatorialwinkel	Meridionalwinkel
			-0,2	+4,0	+11,4	+1,0	-0,3	-24,0

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		46,0	62,4	78,6	Farbig Blau

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11
46,0	62,4	78,6	19,3	30,0	49,4	66,0	62,0	2,0	0,6	1,0	0,4	0,6	0,4	0,4	0,4	0,4	11,0	2,7

Gallus-Objektiv 1:8,5; f = 24 cm

Einzellinse | Doppelobjektive

Linse	n	n'	ν	ν'
L1	1,5144	1,0	0,0132	59,4
L2	1,5144	1,0	0,0132	59,4
L3	1,5144	1,0	0,0132	59,4
L4	1,5144	1,0	0,0132	59,4

Einzellinse | Doppelobjektive

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12.81

Voigtländer + Sohn

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (SK) 22

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-19,6 -6,9 -7,9	-19,7 -6,4 -7,3		

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
9,7 13,8 16,9	= 155 = 2,61 = 51		

Astigmatismus (SK) 29 µm

Einzelobjektiv Äquatorialwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Äquatorialwinkel	Doppelobjektiv Meridionalwinkel
0 +0,0 +0,8 +4,6 +0,3 +0,5 +2,3			

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
47 66 82	-126 -115 -145		

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5
33,9	11,9	25,9	46,3	50,4	3,0	0,5	3,6	4,7	3,0

Einzellinse | Doppelobjektiv

12.81

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12.82

Rudolinse 1:8 25 cm vom 7. Aug. 18

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-15,8 -6,8 -8,6	-19,0 -21,9 -11,2	-14,8 -20,2 -9,5	-13,9 -21,8 -10,4

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
11,1 16,0 22,6		13,4 19,5 22,5	

Astigmatismus ( )

Einzelobjektiv Äquatorialwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Äquatorialwinkel	Doppelobjektiv Meridionalwinkel
0 -0,1 -0,1 -0,3 -1,4 -1,9			

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
24 54,1 69,5			

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	d1	d2	d3	d4
29,8	89,8	22,2	16,0	4,9	0,3	1,4	3,3

Rudolinse 1:8 25 cm vom 7. Aug. 18

Linse	n_g	$n_g - n_f$	ν
L_1	1,60 873		59,3
L_2	1,73 91		49,1
L_3	1,61 87		56,9

Einzellinse | Doppelobjektiv

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Reitalinse 1:8, f. 85 cm, v. 5.9.15

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (1915)

Δs'			Δf'		

Einfallshöhen | Chromasie

Astigmatismus (1915)

Tangential	Meridionalbildweite		Aequatorialbildweite	Meridionalbildweite

Vorzeichnung | Frontwinkel | Vorzeichnung

Radien und Abstände für f = 100 mm:

r	d	l	s

Reitalinse 1:8, f. 85 cm, v. 5.9.15

Linse	n_D	ν_D	d
L_1	1,6134	44,04	17,8
L_2	1,5955	44,91	17,8
L_3	1,6117	42,11	18,7

Einzellinse | Doppelobjektiv

a | b

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Reitalinse 1:9, R. 45642 (Reinpiel) f. 182 mm, v. 24.2.16

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Δs'			Δf'		

Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( )

Tangential	Meridionalbildweite		Aequatorialbildweite	Meridionalbildweite

Vorzeichnung | Frontwinkel | Vorzeichnung

Radien und Abstände für f = 100 mm:

r	d	l	s

Reitalinse 1:9, R. 45642 (Reinpiel) f. 182 mm

Linse	n_D	ν_D	d
L_1	1,6123	44,96	17,3
L_2	1,5998	44,79	17,3
L_3	1,6127	42,91	18,9

Einzellinse | Doppelobjektiv

a | b

№ 473

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (A D 6)

Δs'			Δf'		
-18,0	-17,4	+20,1	-16,6	-15,0	+12,4

Einfallshöhen			Chromasie
14,6	14,1	20,0	(-21) -189

Δs'			Δf'		

Einfallshöhen			Chromasie
13,-	12,7	-,-	-,- -,-

Astigmatismus ($\frac{U_{II}}{U_{III}}$)

Aequatorialbüschel		Meridionalbüschel			
-3,50	-3,16	-1,56	-4,25	-3,90	+0,25
-2,-	-3,-	-,-	-,-	-3,-	-,-

Frontwinkel			Vorzeichnung
47,0	46,3	44,6	

Aequatorialbüschel			Meridionalbüschel		
-,-	-,-	-,-	-,-	-,-	-,-
-,-	-,-	-,-	-,-	-,-	-,-

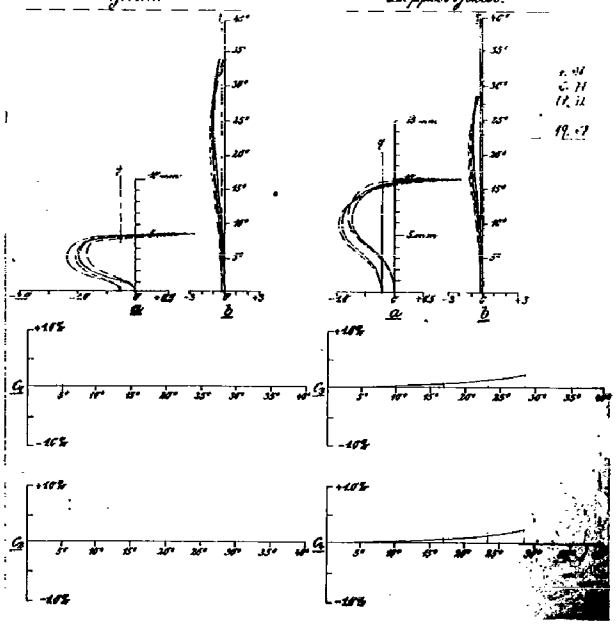
Frontwinkel			Vorzeichnung
53,6	53,7	52,-	

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	d_1	d_2	l	d_3	ΣH
		44,0	18,0	13,0	1,7	2,0	0,4	1,7	5,0

Linse	n_D	$n_F - n_C$	ν
L_1	1,61 [illegible]	[illegible]	54,6
L_2	1,[illegible]	[illegible]	56,9
L_3	1,[illegible]	[illegible]	56,9

Einzellinse | Doppelobjektiv



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R. 45642 II 42 h.I. f = 15,6 cm v. H.I.14

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ($\frac{s'}{U_{II}}$ $\frac{s'}{U_{III}}$)

Δs'			Δf'		
-15	-15	-16	-12,5	-13,1	-15
-15	-15	-14,3	-12,2	-13,3	-13,5

Einfallshöhen			Chromasie
14,9	14,5	12,5	(-16) -222

Δs'	Δf'

Einfallshöhen	Chromasie

Astigmatismus ($\frac{U_{II}}{U_{III}}$)

Aequatorialbüschel		Meridionalbüschel			
-1,6	-1,5	-1,5	-1,7	-2,-	-1,85
-1,-	-1,-	-1,-	-1,-	-1,-	-1,-

Frontwinkel			Vorzeichnung
46,-	45,-	44,-	

Aequatorialbüschel			Meridionalbüschel		

Frontwinkel			Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	d_1	d_2	d_3

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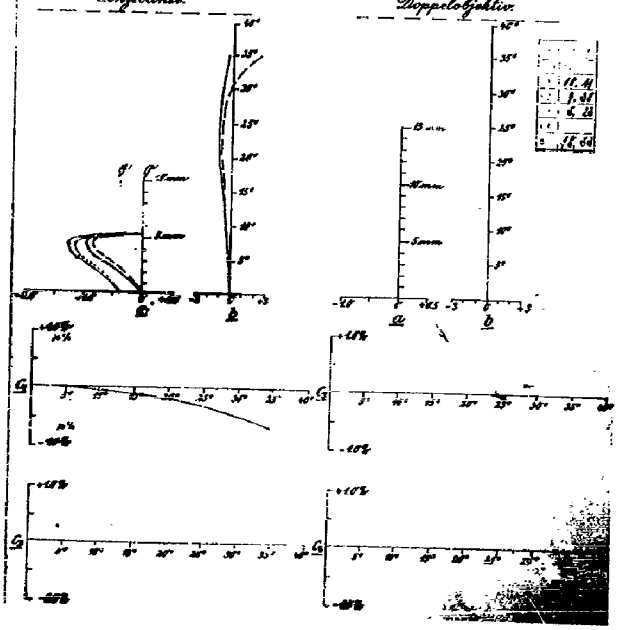
2,3

R. 45642 II 42 h.I. f = 15,6 cm v. H.I.14

1 : 9,75

Linse	n_D	$n_F - n_C$	ν
L_1	1,[illegible]	[illegible]	56,5
L_2	1,[illegible]	[illegible]	57,6
L_3	1,[illegible]	[illegible]	56,5

Einzellinse | Doppelobjektiv



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Zeichnerlinse 1:11, f. 24 cm, r. 18 11 11

Einzelobjektiv | Doppelobjektiv

g'(14 °/₀ / 70-75) Sphärische Korrection (11 11/cm)

Δs'			Δf'		
-0.5	-0.9	+3.7	-0.5	-0.5	+2.5
-0.5	+7.6	+22.6	-1.5	+6.5	+12.7

Einfallshöhen | Chromasie

45	42	42

+ 0.2
(-0.1)
-0.7

Δs'		Δf'	
0.0			
0.0	-0.1	-0.7	-0.5	+7.6	+12.7

Einfallshöhen | Chromasie

21.2	33.0	36.8

Astigmatismus (1 "

Äquatorialbüschel	Meridionalbüschel				
-0.9	-0.8	-0.5	-0.5	-0.2	+0.0
-0.2	+0.1	+0.3	+0.5	+1.0	+1.2

Frontwinkel | Vorzeichnung

-0.4	-0.7	14.1

Äquatorialbüschel		Meridionalbüschel	
-0.5			
0.0	+0.5	+1.0	+0.9	+5.0	+7.9

Frontwinkel | Vorzeichnung

32.2	53.0	62.1

Dicken, Dicken und Abstände für f = 100 mm

			2.1	4.9	2.0	0.1	1.0

Zeichnerlinse 1:11, f. 24 cm, r. 18 11 11

Linse	n_D	$n_F - n_C$	ν
L_1	1.51914	0.0078	64.0
L_2	1.61116	0.0192	37.1
L_3	1.61116	0.0188	38.0

Einzellinse | Doppelobjektiv

f	8.42
s'	6.31
sk	18.69
r	12.96

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Zeichnerlinse 1:11, f. 141 mm, r. 11 9 11

Einzelobjektiv | Doppelobjektiv

g'(14 °/₀ / 70-75) Sphärische Korrection (11 11)

Δs'			Δf'		
-0.9	-0.5	-0.3	-0.9	-0.0	-0.1
-10.1	-17.2	+0.6	-2.2	-2.2	-2.2

Einfallshöhen | Chromasie

45.9	45.4	45.9

Δs'		Δf'	
-10.1	-9.2	-7.1	-6.0	-2.2	-0.9

Einfallshöhen | Chromasie

21.8	29.1	37.1

Astigmatismus (0.1 11)

Äquatorialbüschel		Meridionalbüschel			
-0.2	-0.9	-0.3	-0.5	-0.0	-0.5
-0.2	-0.0	-0.5	-0.6	-0.6	-0.8

Frontwinkel | Vorzeichnung

49.0	49.6	49.49
50.0	50.0	50.02

Äquatorialbüschel		Meridionalbüschel	
-2.1	-2.2	-2.1	-2.2	-2.7	-2.9

Frontwinkel | Vorzeichnung

47.1	56.1	61.2

Dicken und Abstände für f = 100 mm

Zeichnerlinse 1:11, f. 141 mm, r. 11 9 11

Linse	n_D	$n_F - n_C$	ν
L_1	1.5246	0.0114	42.6
L_2	1.6107	0.0191	56.9
L_3	1.6105	0.0195	37.0

Einzellinse | Doppelobjektiv

f	8.42
s'	6.31
sk	18.69
r	12.96

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Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppelobjektiv

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Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

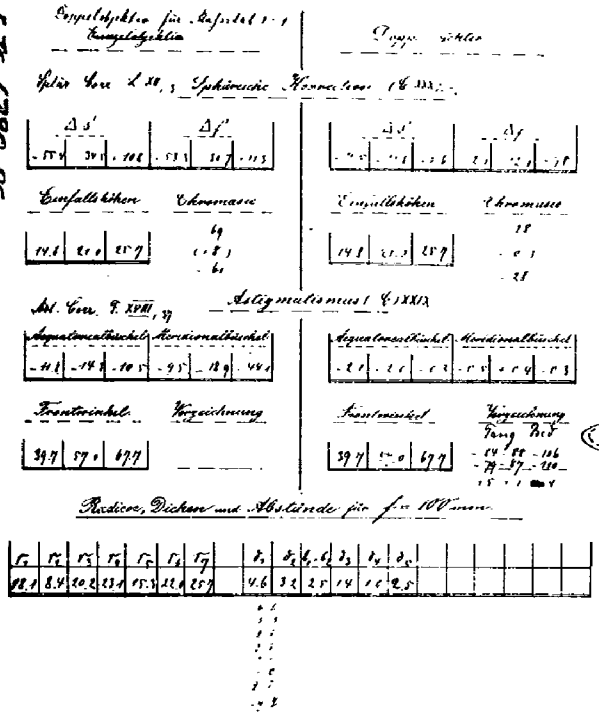
Astigmatismus

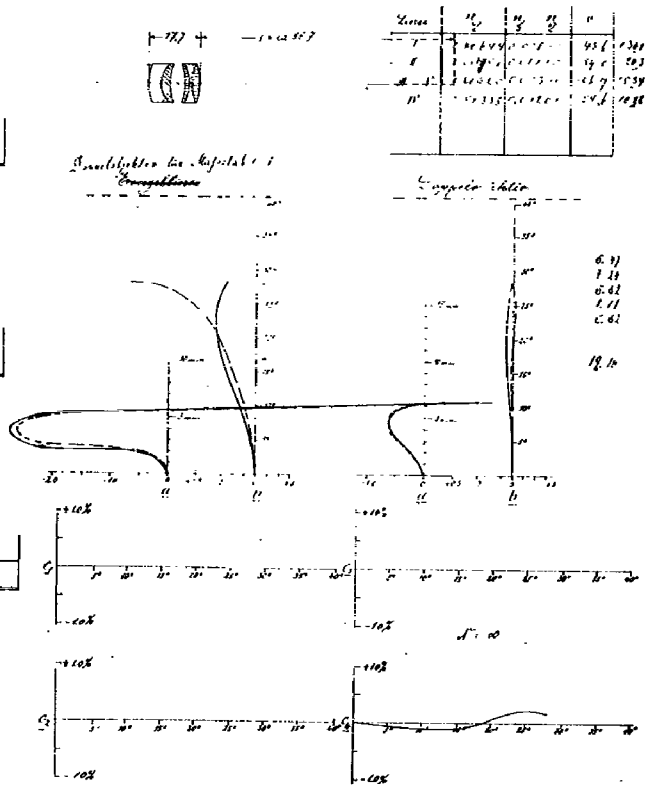
Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppelobjektiv

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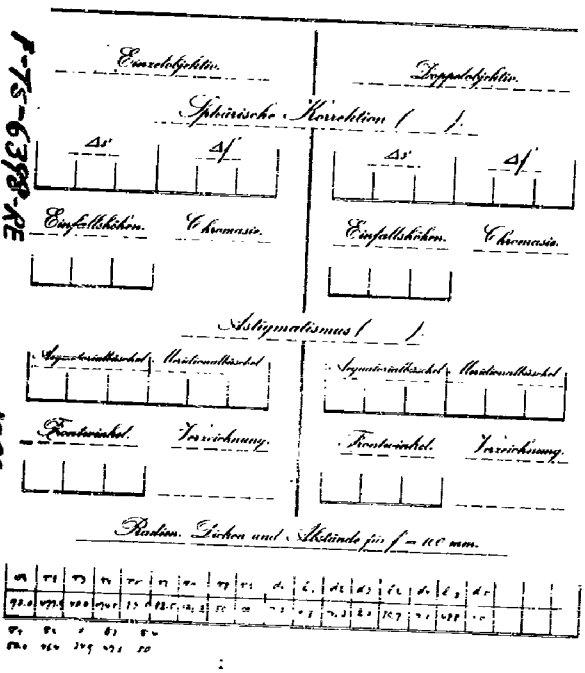
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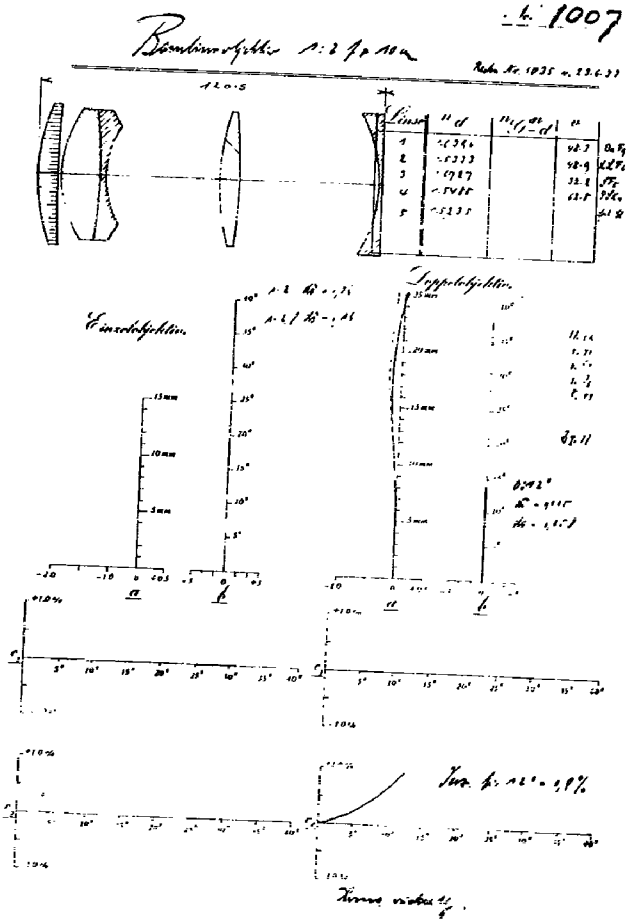




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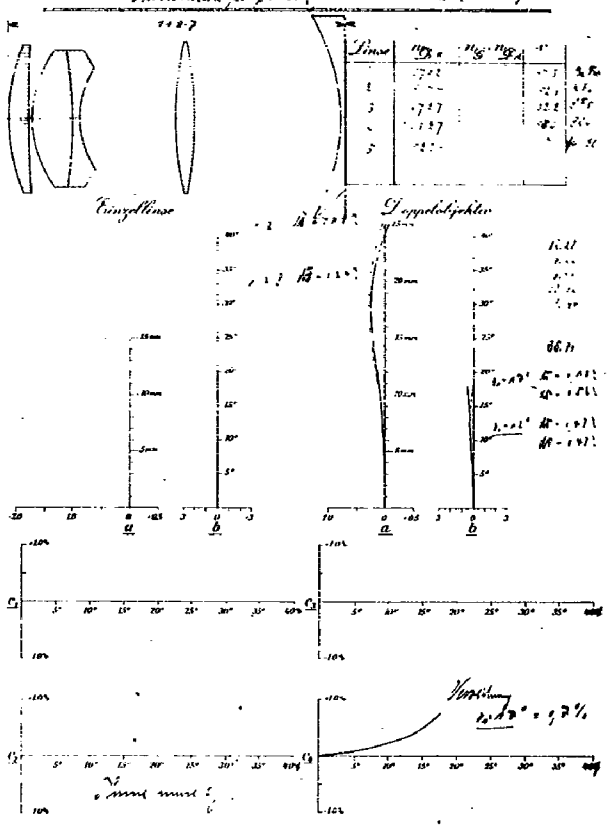
Nr. 1006

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für $f = 100$ mm



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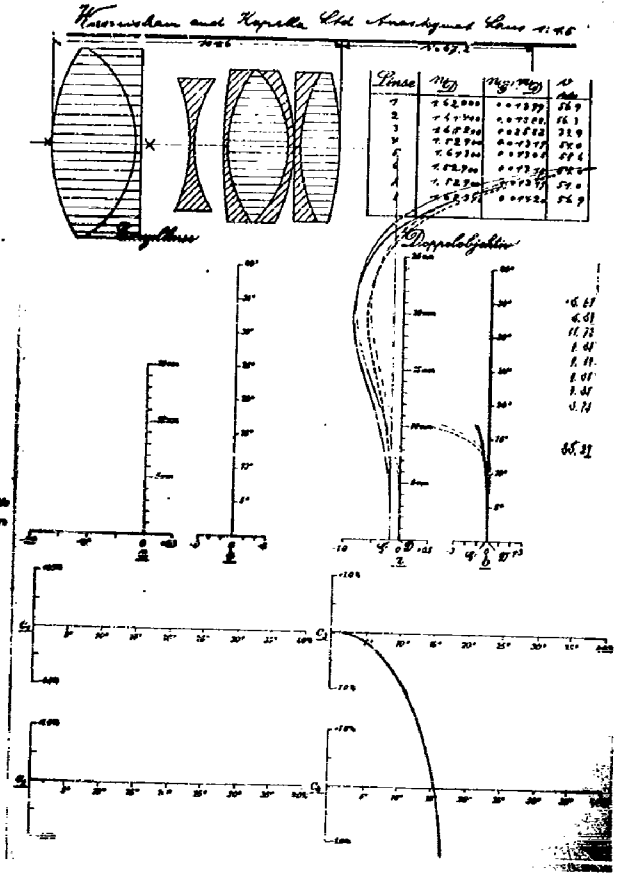
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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für $f = 100$ mm



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Tessar. Patent № 221517 v. 1920 1:6 f= 100 mm.
A. Lloyd Cassel Rudolph

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Öffnung)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Bildfeld)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f= 100 mm.

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5	D1	D2
169	116	1104	91.1	52.9	15	14.5	11.1	1.5	2.7	11.4	7.5

Tessar. Pat. № 5.317 v. 1925 1:2. f= 200 mm.
A. Lloyd Cassel Rudolph

Linse | n_d | ν_d | N

L1 1.5170 58.3
L2 1.6166 36.6
L3 1.5170 58.3

Einzellinse | Doppelobjektiv

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F-15-6398-RE

1296

Portraitobjektiv von Hans Lagrenek, 1:3.35, f= 80 mm (2 D Öffnung)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Öffnung)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Bildfeld)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f= 100 mm.

Portraitobjektiv von Hans Lagrenek, 1:3.35, f= 80 mm (2 D Öffnung)

Linse | n_d | ν_d | N

Einzellinse | Doppelobjektiv

№ 636

F-75-6398-RE

1297

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (Δs' — Δf')

Einfallshöhen — Chromasie

Astigmatismus (|)

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppelobjektiv

1297

№ 819

F-75-6398-RE

1298

Eastmann C. W. Frederick 1:2.8, f = 105 mm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (Δs' — Δf')

Einfallshöhen — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppelobjektiv

1298

№ 593

F-75-6398-RE

1299

Doppelobjektiv

Sphärische Korrection (d'Ocagne)

Δs'			Δs'	Δf'
+1.4	+0.5	+2.5	-1.4	+2.5	-1.1

Einfallshöhen | Chromasie

46.8	32.0	46.5

Einfallshöhen | Chromasie

Astigmatismus (d'Ocagne)

Aequatorialbüschel		Meridionalbüschel			
-2.4	-0.7	-7.2	-4.6	-4.2	-6.1

Frontwinkel | Verzeichnung

18°2	22°4	47°7

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8	d9	E.F.	B
44.6	44.4	162	118	∞	118	82.1	46.9	46.5	5.6	12	3.2	0.1	2.4	4.1	2.2	1.2	5.6	2.11	14.12

Doppelobjektiv

Linse | n_g | $n_g - n_g$ | ν

Astigmatismus (d'Ocagne)

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

1299

№ 684

F-75-6398-RE

1300

Doppelobjektiv

Sphärische Korrection (d'Ocagne)

Δs'		Δs'		Δf'	
		-3.0	-5.4	-6.2	-6.4	-12.4	9.2

Einfallshöhen | Chromasie

18.5	14.2	18.0

Astigmatismus (d'Ocagne)

Aequatorialbüschel		Meridionalbüschel			
-12.5	-12.4	-11.3	-2.1	-11.0	-1.4

Frontwinkel | Verzeichnung

41.0	52.5	31.0

Radien, Dicken und Abstände für f = 100 mm

Opt. Werke Rudolstadt 1:4 f. 16 cm

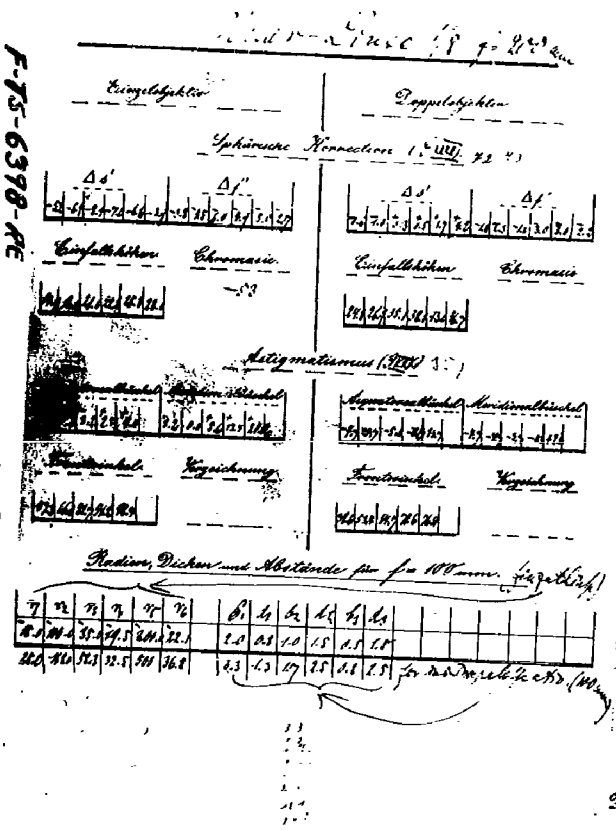
Linse | n_g | $n_g - n_g$ | ν

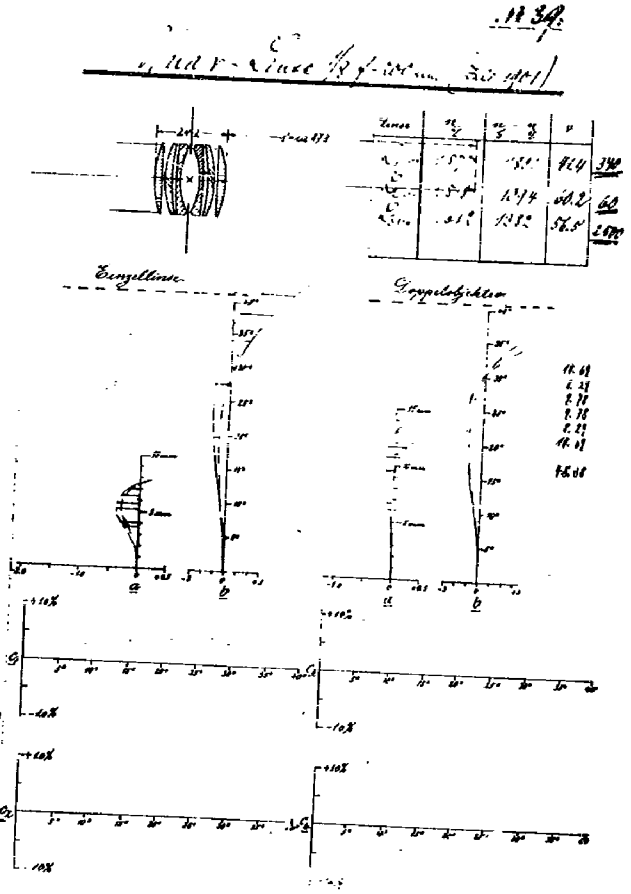
Einzellinse | Doppelobjektiv

1299

F-75-6398-RE

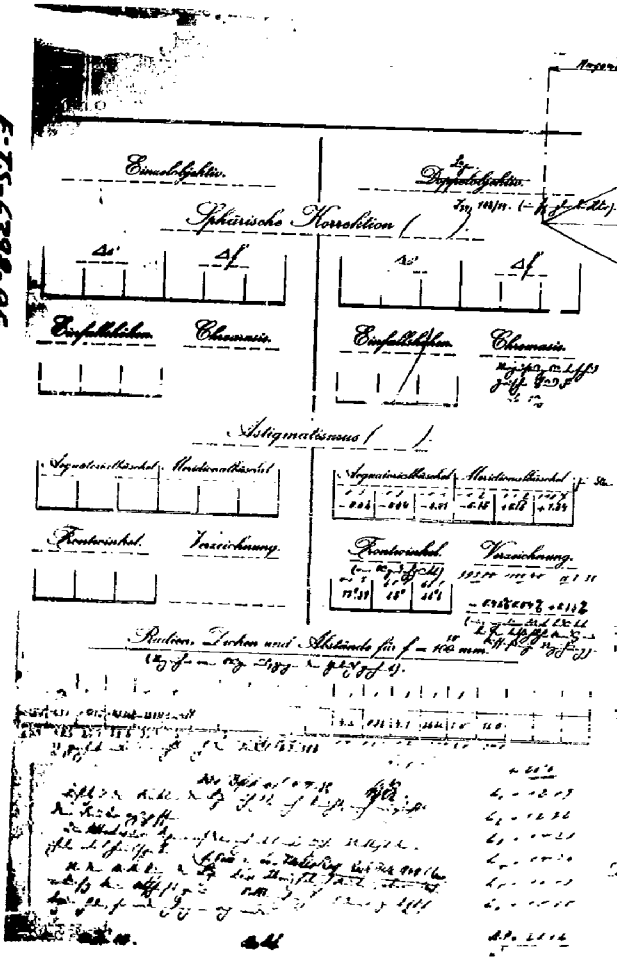
1301

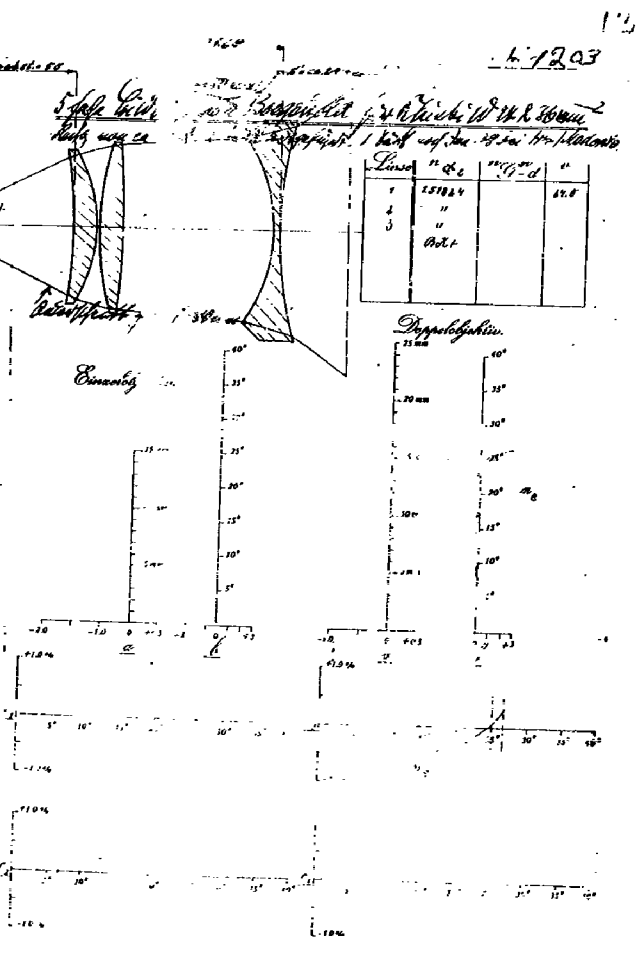




F-75-6398-RE

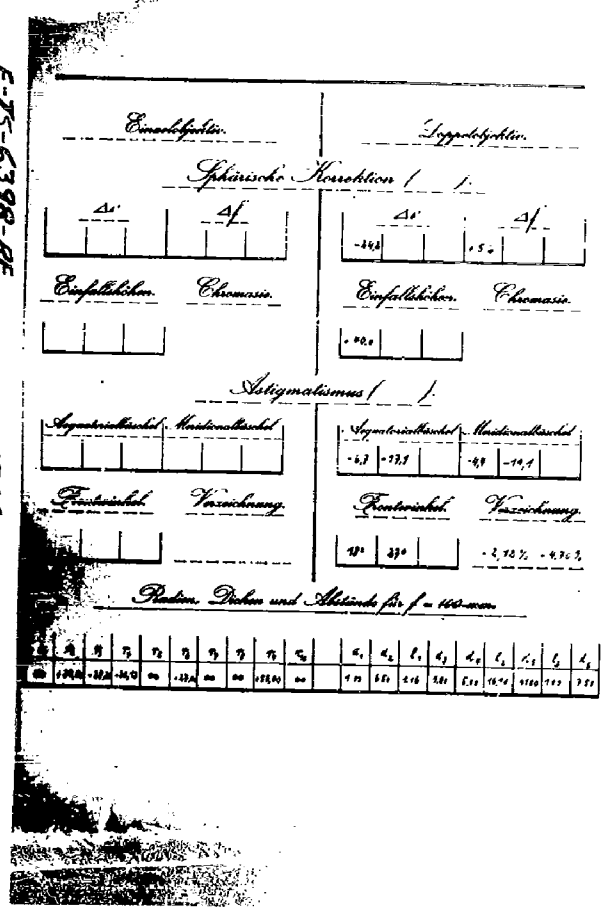
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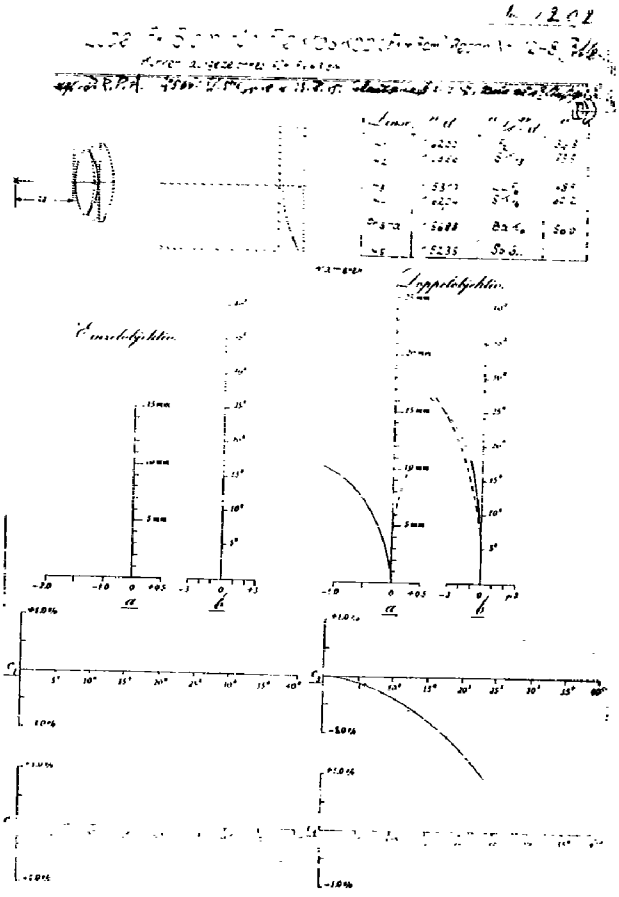




F-TS-6398-RE

1303

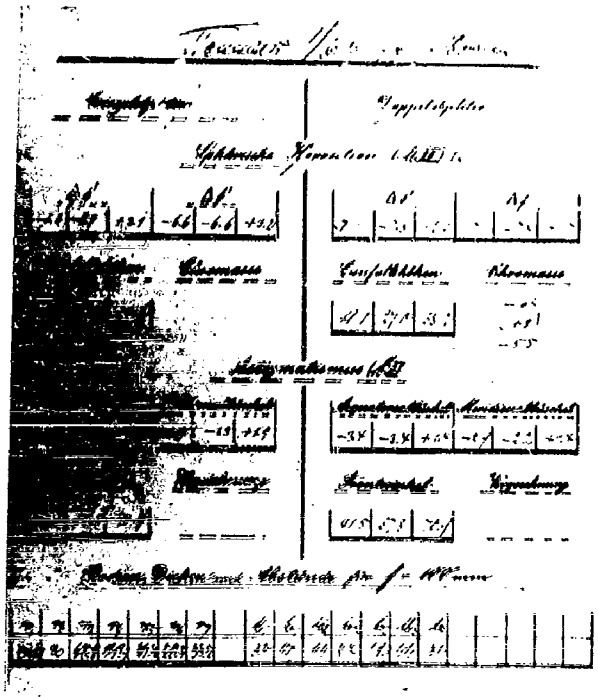


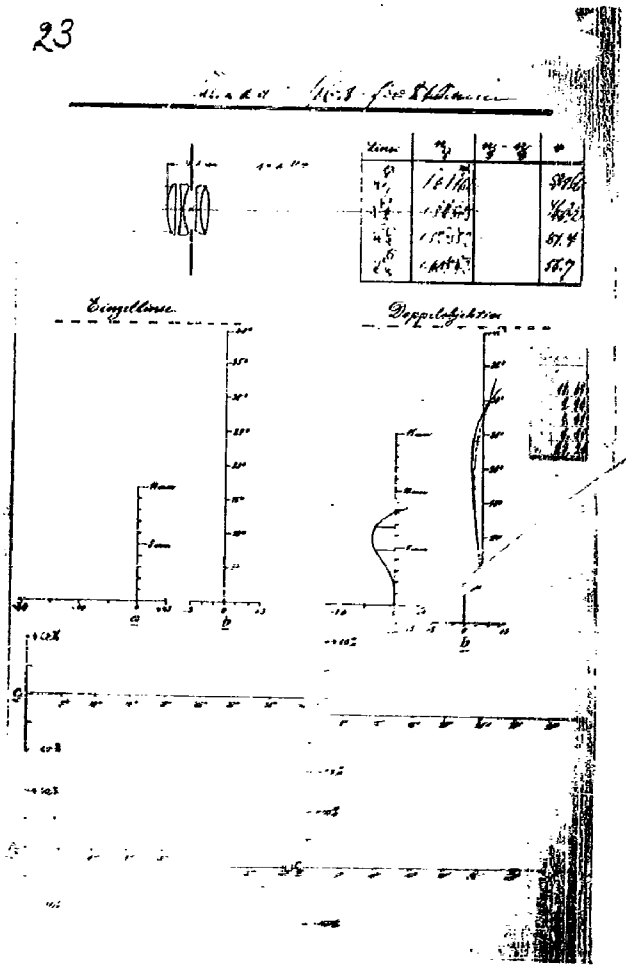


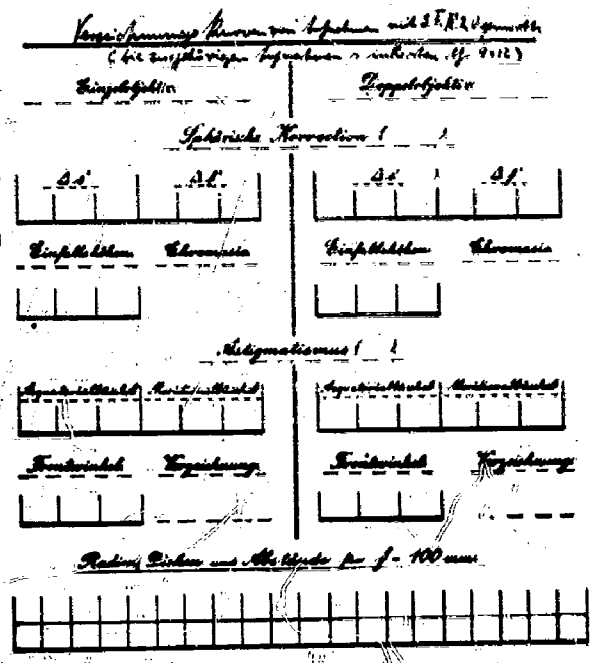
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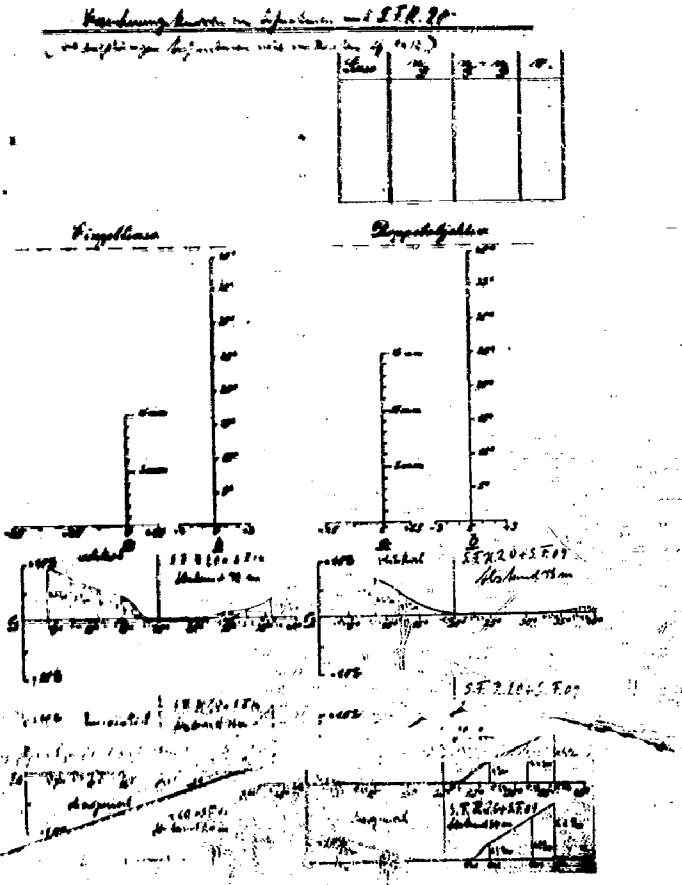
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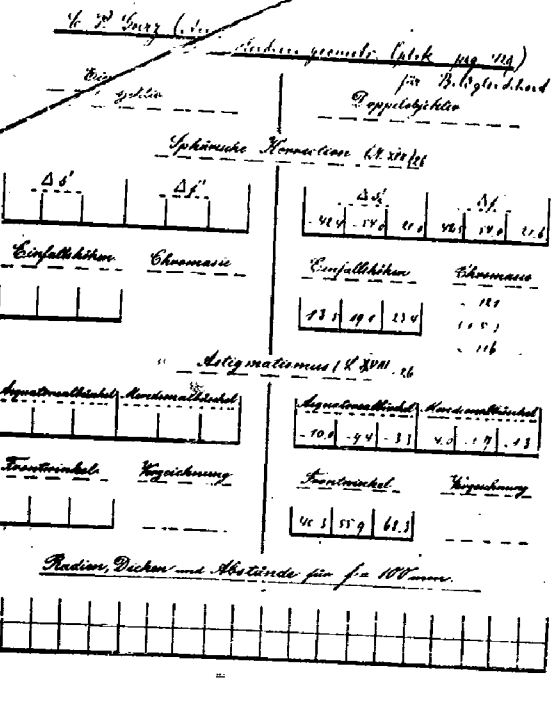
1304

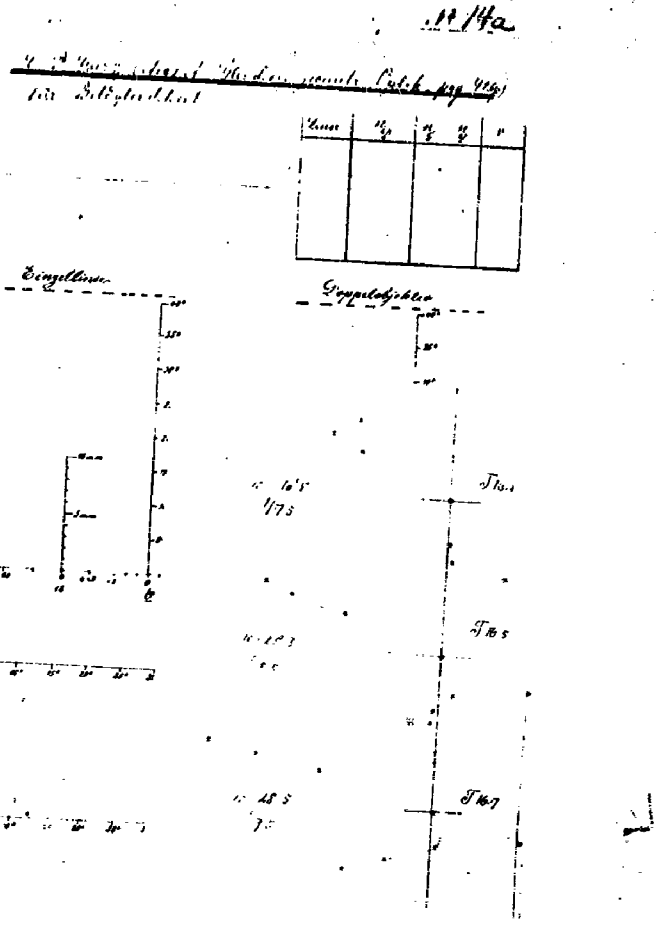








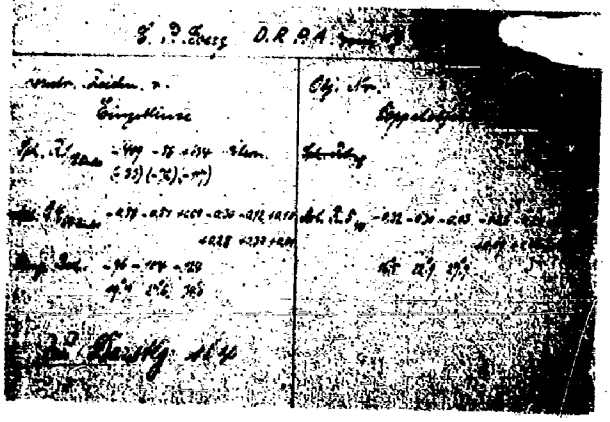




№ 161

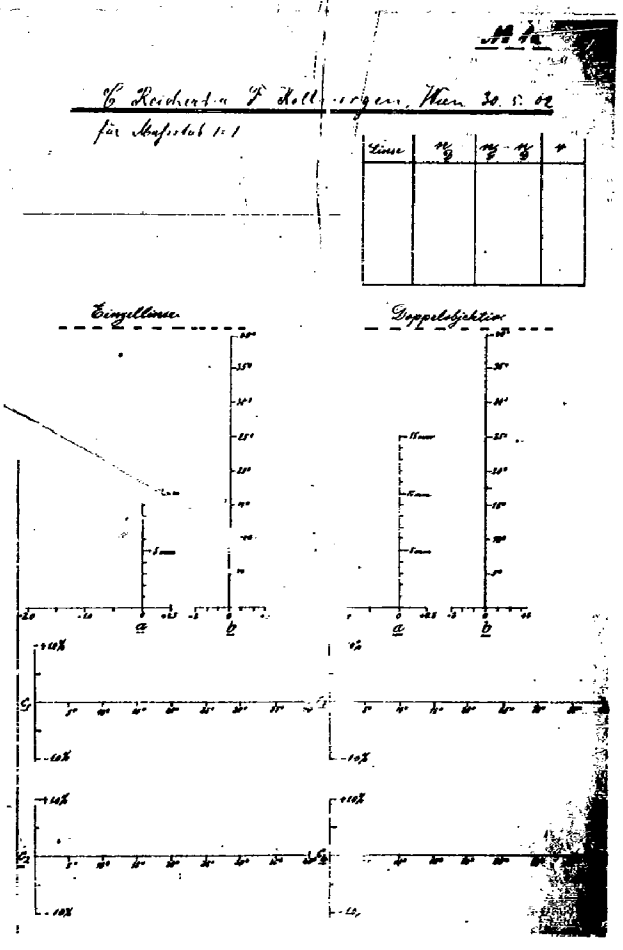
F-15-6376-AE

1307



F-15-6376-AE

1308



№ 1206

f-75-6318-RE

1308

1309

№ 648

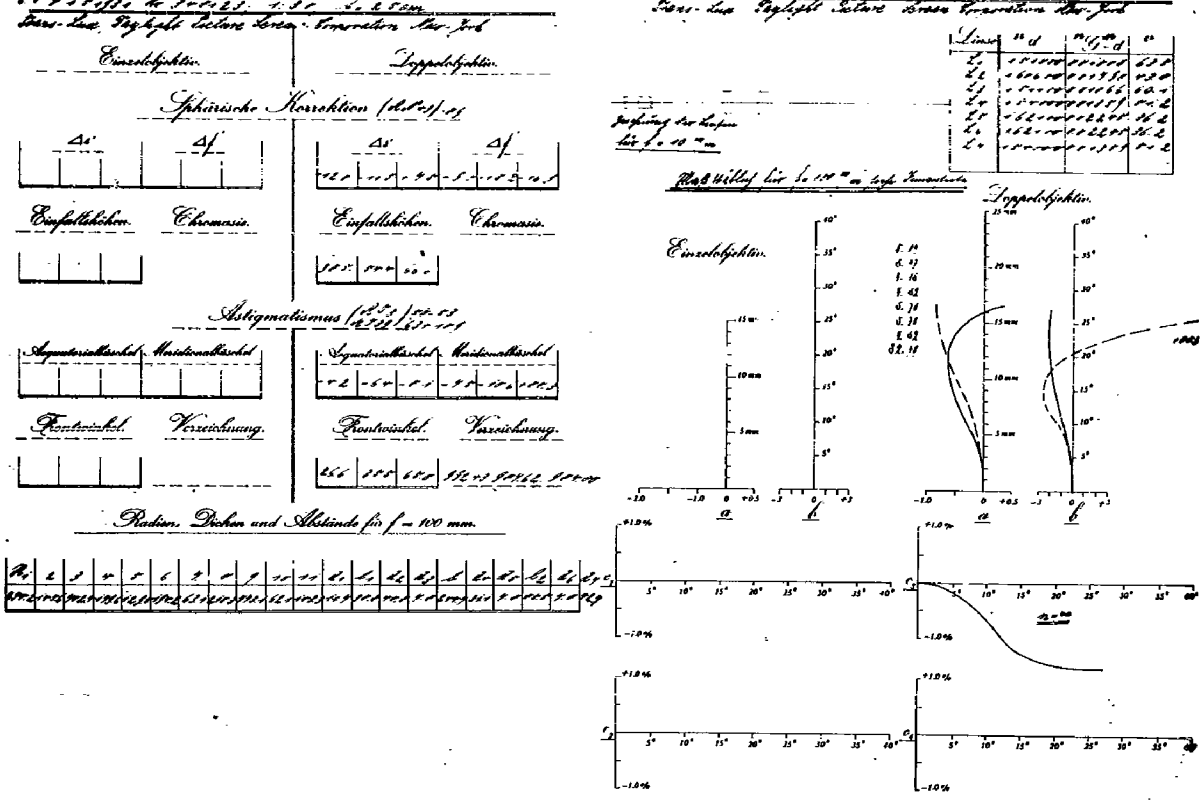
f-75-6318-RE

1310

1311

F-75-6398-RE

1311

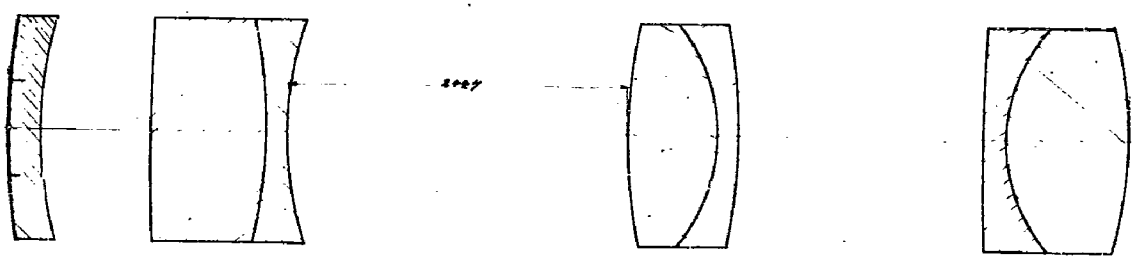


1311

1132

F-75-6398-RE

1312



№407

F-TS-6398-RE

1313

Vergrößerungsglas für Fernrohr f=10 f=3cm 7x

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Δs' Δf' | Δs' Δf'

Einfallsöffnung Chromasie | Einfallsöffnung Chromasie

Astigmatismus ( )

Aequatorialbüschel Meridionalbüschel | Aequatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung | Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f=100mm

Vergrößerungsglas für Fernrohr f=3cm 7x

Linse | n_d | n_F-n_C | ν

Einzellinse | Doppelobjektiv

F-TS-6398-RE

1314

№407

f 1933 No 4 1:8 f. 7x cm mit Glasänderungen

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs' Δf' | Δs' Δf'

Einfallsöffnung Chromasie | Einfallsöffnung Chromasie

Astigmatismus

Aequatorialbüschel Meridionalbüschel | Aequatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung | Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f=100 mm

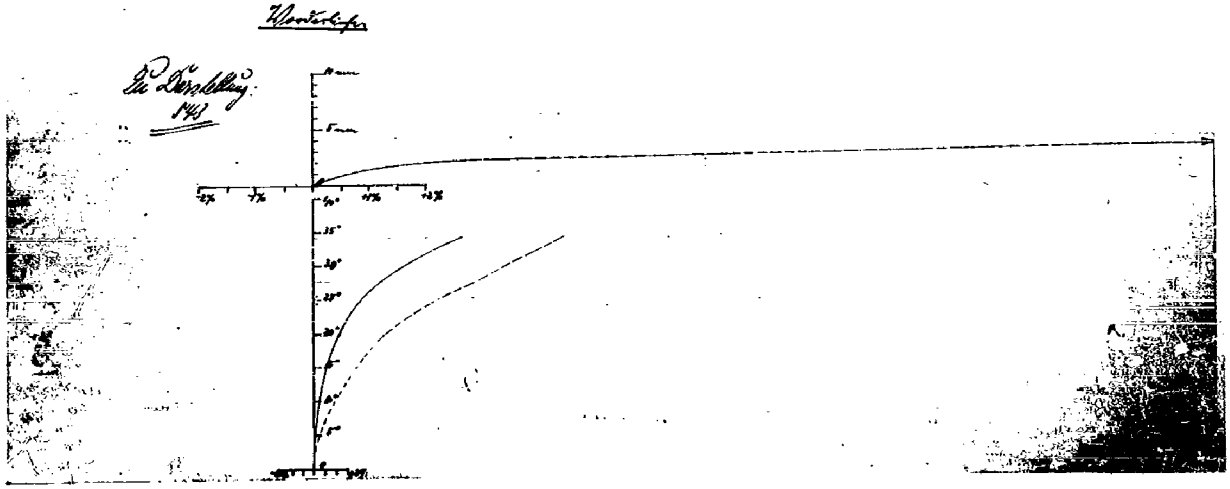
f 1933 No 4 1:8 f. 7x cm (mit Glasänderungen)

Linse | n_d | n_F-n_C | ν

Einzelobjektiv | Doppelobjektiv

F-TS-6328-RE

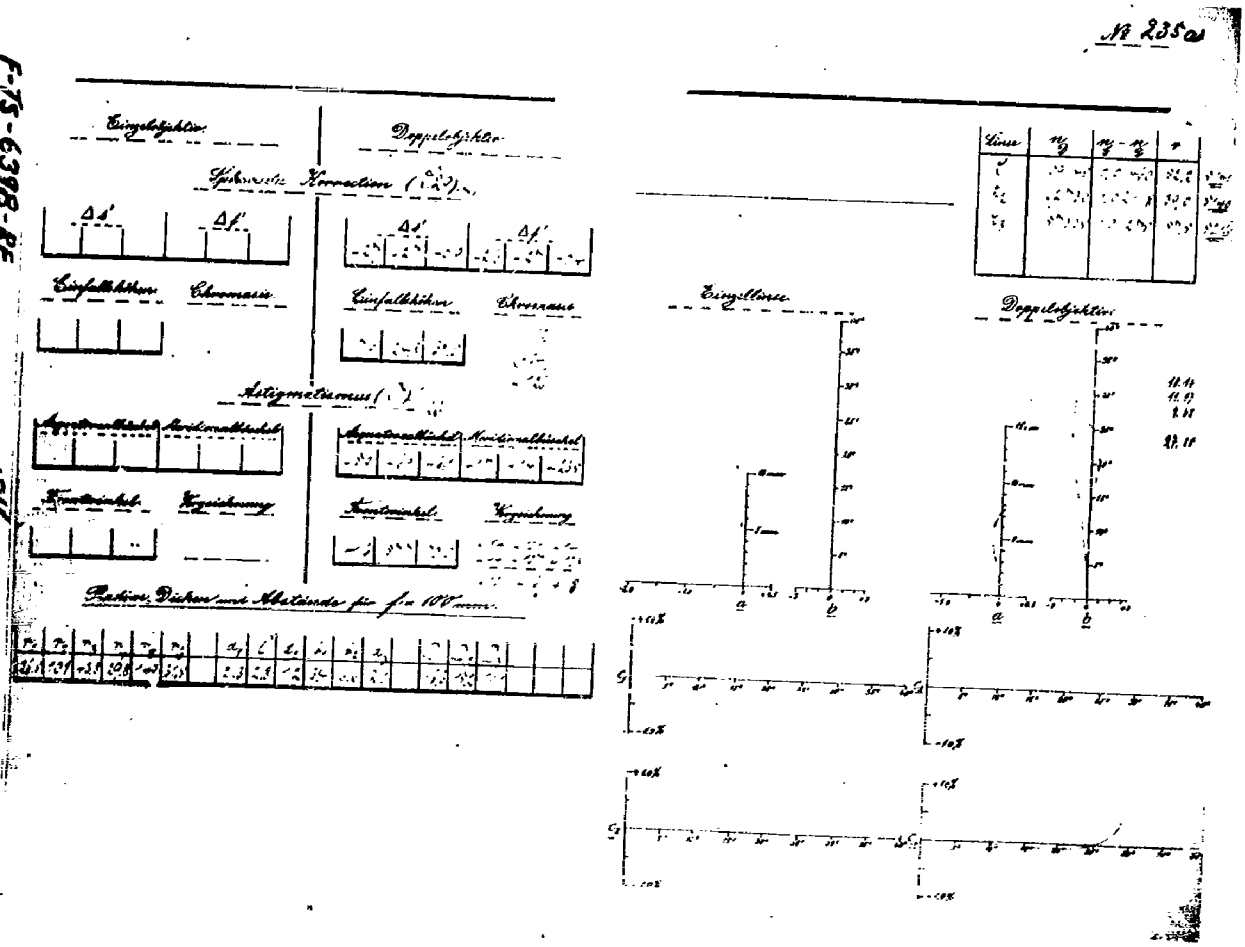
1315



1615

F-TS-6328-RE

1316



F-75-6388-RE

1317

Aufnahmeklasse I a Tafel Nr. 4 (Darstellung 501)

Einzelobjektiv C | Doppelobjektiv

Sphärische Korrection (Abb. 19 f.)

Δs'			Δf'		
	-0.8	-0.8	-22.7	-22.2	-23.1

Einfallshöhen | Chromasie

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (Abb. 20)

Sagittalbüschel		Meridionalbüschel	
	-2.3	-0.9	

Sagittalbüschel | Meridionalbüschel

Brennweiten | Verzeichnung

Brennweitenwinkel | Verzeichnung

Abstände für f = 100 mm

												x
	1.3	1.5	1.9	2.0	12.0							

Aufnahmeklasse I a Tafel Nr. 4 (Darstellung 501)

$\lambda_2 = 0.548$

Linse	n_S	$n_F - n_S$	ν
1	1.5747	0.01302	52.8
2	1.6701	0.02076	32.3
3	1.5741	0.01302	53.8

Einzelobjektiv C | Doppelobjektiv

1317

F-75-6388-RE

Aufnahmeklasse II a Tafel Nr. 4 (Darstellung 501)

$\lambda_2 = 0.548$

Einzelobjektiv C | Doppelobjektiv

Sphärische Korrection (Abb. 19 f.)

Δs'			Δf'		
-7.9	-20.2	+1.4	-19.5	-22.2	-2.5

Einfallshöhen | Chromasie

46	47.7	48.3

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (Abb. 20)

Sagittalbüschel		Meridionalbüschel	
	-2.5	-0.7	-1.0	+0.9	-1.9

Sagittalbüschel | Meridionalbüschel

Brennweiten | Verzeichnung

Brennweitenwinkel | Verzeichnung

Abstände für f = 100 mm

	1.2	1.5	1.7	2.0	12.0							

Aufnahmeklasse II a Tafel Nr. 4 (Darstellung 501)

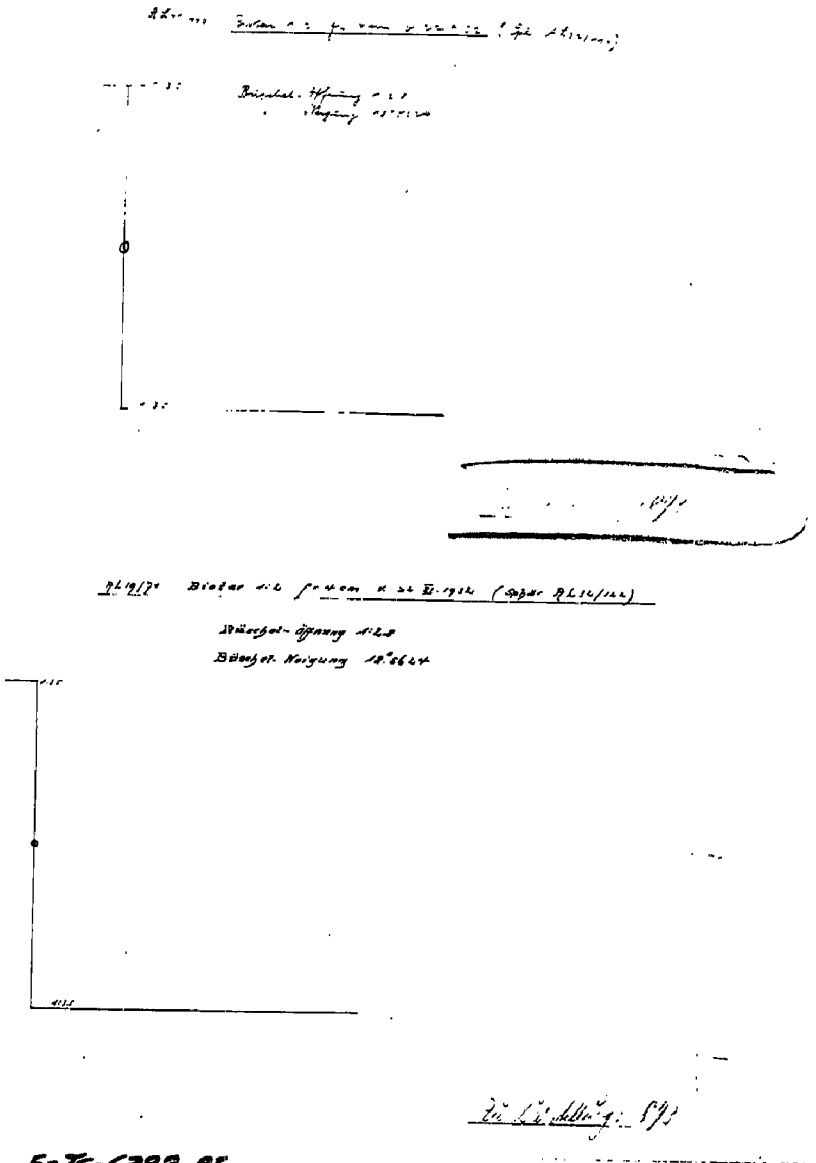
$\lambda_2 = 0.548$

Linse	n_S	$n_F - n_S$	ν
1	1.57970	0.01352	57.0
2	1.61190	0.02192	36.5
3	1.57970	0.01352	57.0

Einzelobjektiv C | Doppelobjektiv

1318

F-75-6388-RE



F-75-6398-RE

F-75-6398-RE

F-73-6398-RE

1321

Die Verstellung: 0,84

Vorderachse

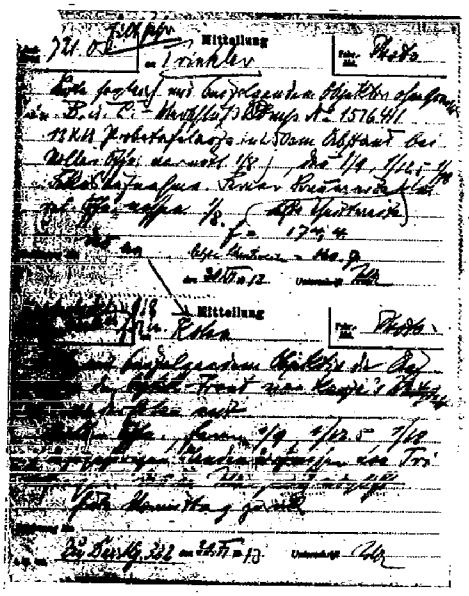
Hinterachse

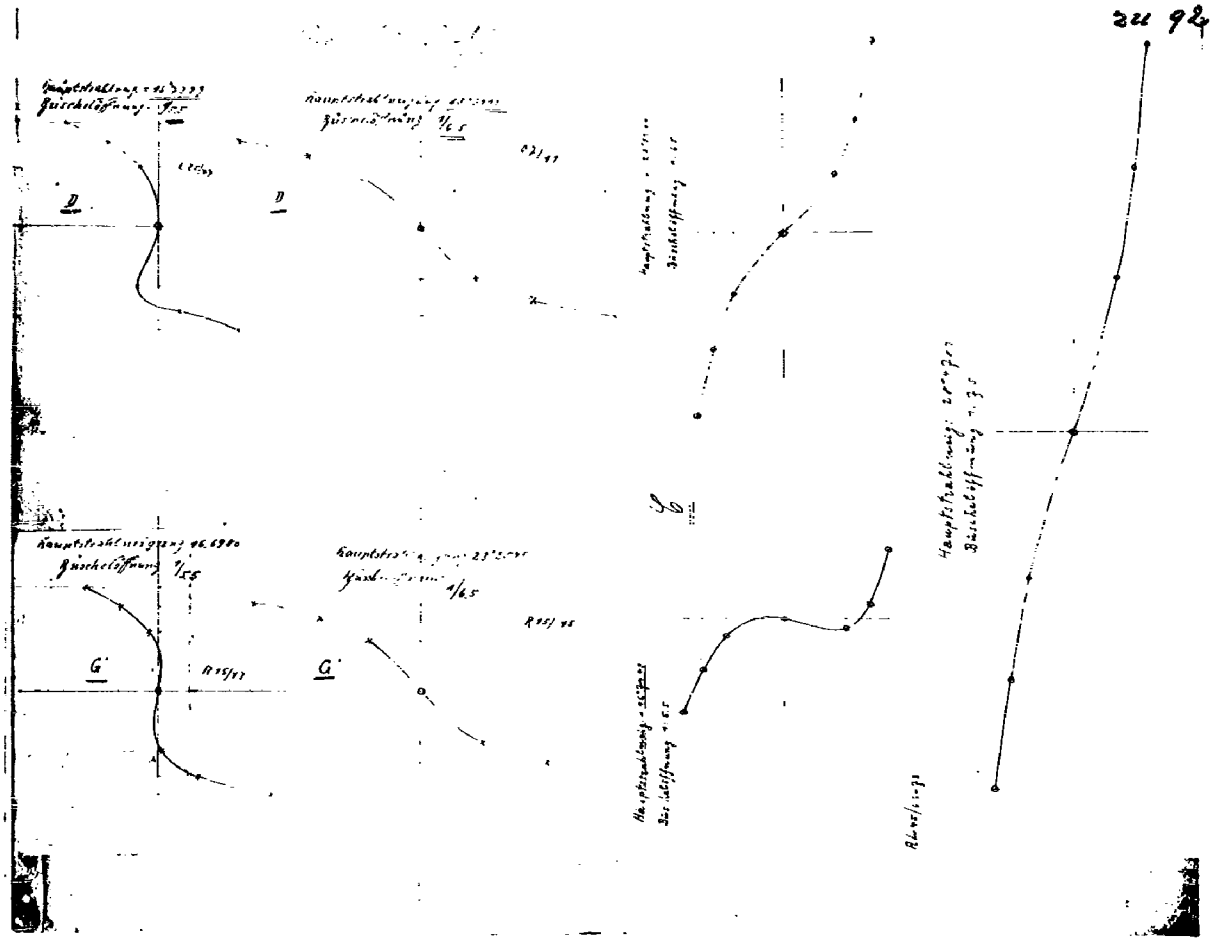
F-73-6398-RE

1322

F-75-6398-RE

1323





Zu Skizze 484

Zu Skizze 485

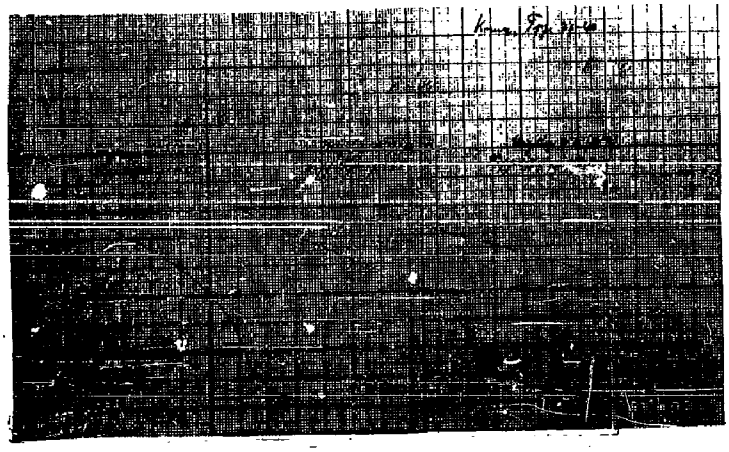
Kern a. D

Zu Skizze 485

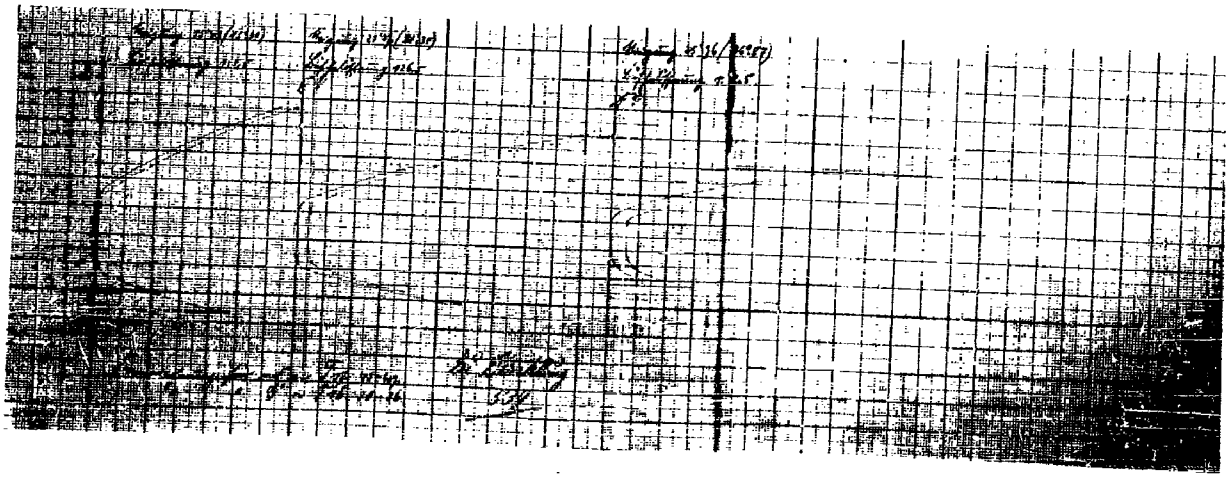
Büschel-öffnung 4:63
Büschelneigung 41°49'
(ΔNr 50-51)

Büschel-öffnung 4:5
Büschelneigung 32°20'
(ΔNr 51-53)

Büschel-öffnung 4:9
Büschelneigung 27°22'
(ΔNr 52-53)



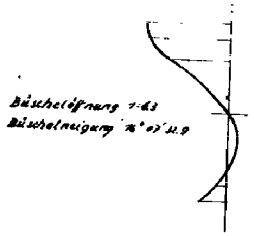
573

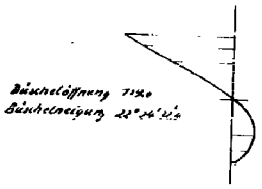


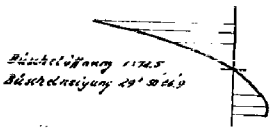
Jr 802

Coma AL 79/28-47

850







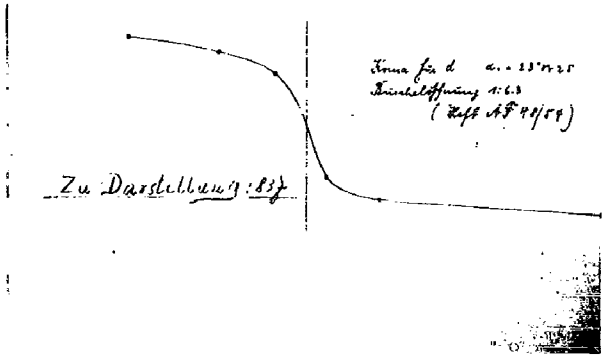
222783 852

Coma 3052/0-3

Büschel-Öffnung 1:46

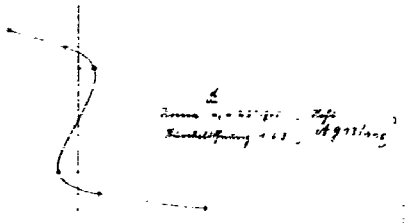
α - Neigung 11° 51'

881



Zu Darstellung: 83

887



Zu Darstellung: 84

914

Büschelöffnung 1. 4,5



Rdng = 9 VIII 177

2a Darstellung: 818

siehe auch Darstlg 18a sag.

916

Büschelöffnung 1:4,5

921

Die Darstellung: 8fach ϕ 15° 67'55 Büschelöffnung 1:4.5

Büschel 1:4.5 wird m. f. f. Abgestimmten

$f_{(Rand)} = 12{,}7$

$f_{(Mitte)} = 12{,}76$

Die Brennlinie f. [illegible]

923

ϕ 15° 67'55

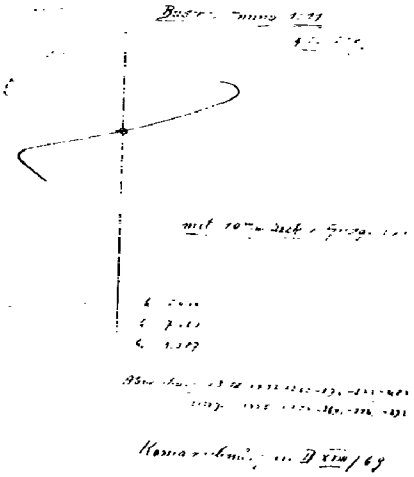
Büschel 1:4.5 wird vom opt. f. f. Abgestimmten

$f_{(Rand)} = 12{,}72$

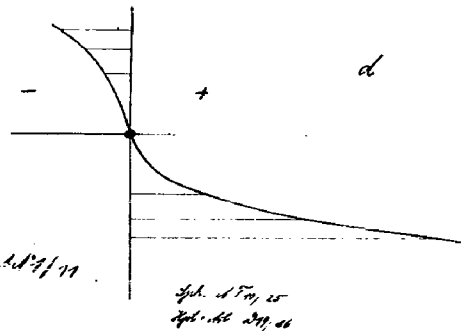
$f_{(Mitte)} = 12{,}73$

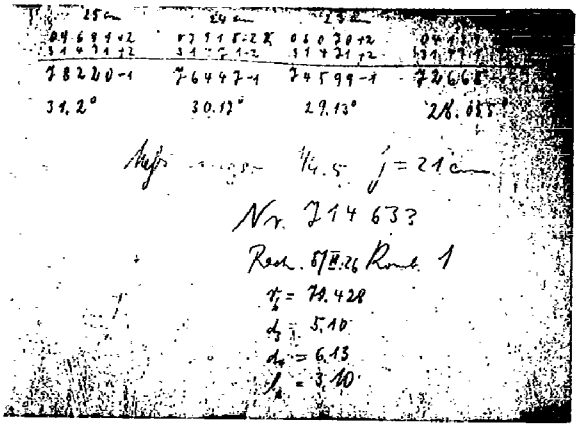
Die Brennlinie f. [illegible]

925

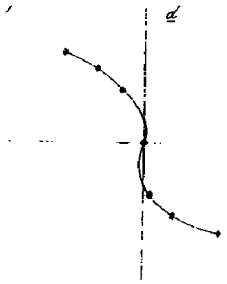


928



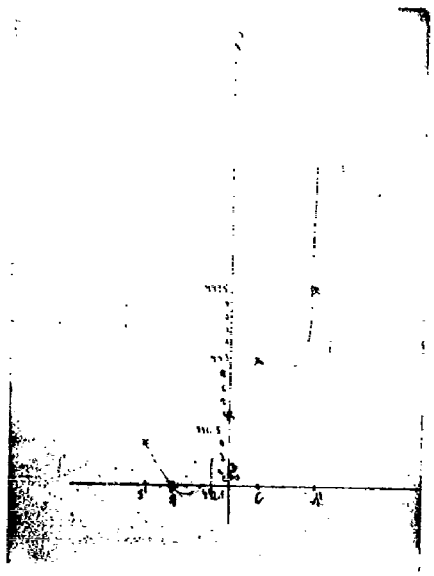


Coma 1:6.3
α = 14° 57' 55.9
A022, 06-09



Coma f:6.3
w = 74° 50 sx.g
AGLT/ 66-09





24893/I 946

Y 19 Jn Nr 13; 1:2; f. 4.5cm ZL 18/35

mit Ausnahmen

$k_1 = +0.3$ $k_2 = -0.3$

2° Blitzbelichtung
Sfl

Bücherl-Öffnung 1:4.8
Büchert-Neigung 12.8°/0
D 18/82-04

Bücherl-Öffnung 1:4.5
Büchert-Neigung 14.6°/0
R 15/66-60

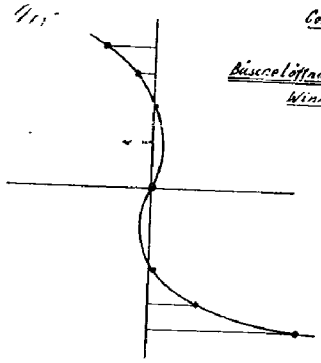
Bücherl-Öffnung 1:4.5
Büchert-Neigung 12.8°/0
D 18/83-90

9 76
Zu 975

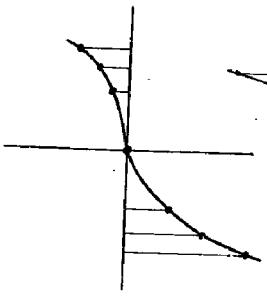
Zu Kurst. 975

Coma Fig. 54-57

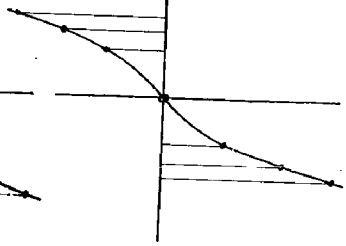
Büschelöffnung 1:40
Winkel: 22°40'33"



Büschelöffnung 1:54
Winkel: 24°35'40"



Büschelöffnung 1:70
Winkel: 25°55'07"



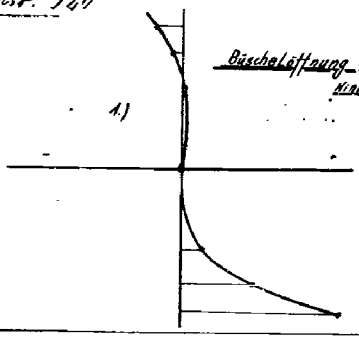
976

Zu Kurst. 980

Coma Fig. 4

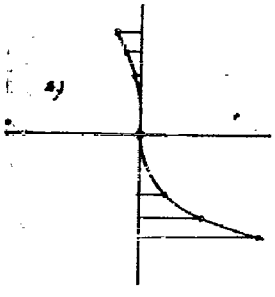
Büschelöffnung 1:40
Winkel: 17°50'16"

1)



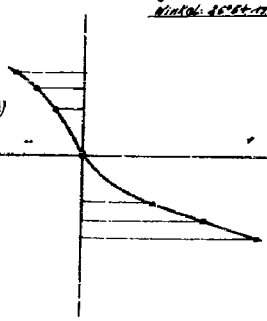
Büschelöffnung 1:66
Winkel: 21°16'26"

a)



Büschelöffnung 1:80
Winkel: 16°04'12"

b)



9[illegible]
9[illegible]
9[illegible]
9[illegible]
9[illegible]
99990
97960
[illegible]
0.701

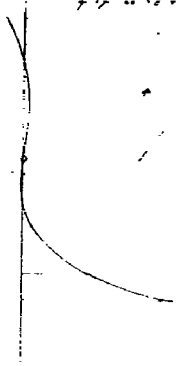
Öffnung auf Aufgaben

Zu Kurst. 980

Lü Dürst. 9:9

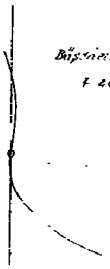
Tal/63

Büschelöffnung 1.4°
+ 17° 21' 46.1"



Tal/65

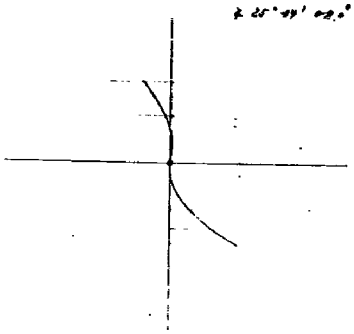
Büschelöffnung 1.5.6
+ 20° 46' 55.1'



Lü Dürst. 9:9

Tal/67.

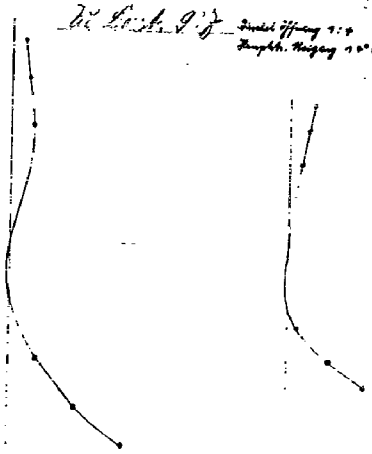
Büschelöffnung 1:7.0
+ 25° 49' 02.0°



Büschelöffnung 1:2.8
Hauptöffnung 1:2.1

Lü Dürst. 9:9

Büschelöffnung 1:7
Hauptöffnung 1:5.1

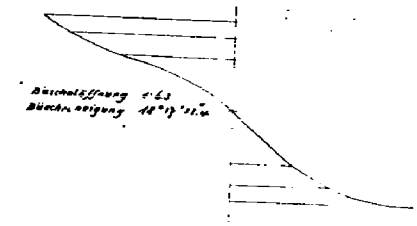


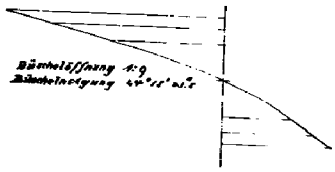
Büschelöffnung 1:8
Hauptöffnung 1:5.1

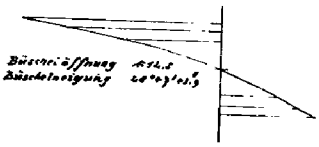


Coma

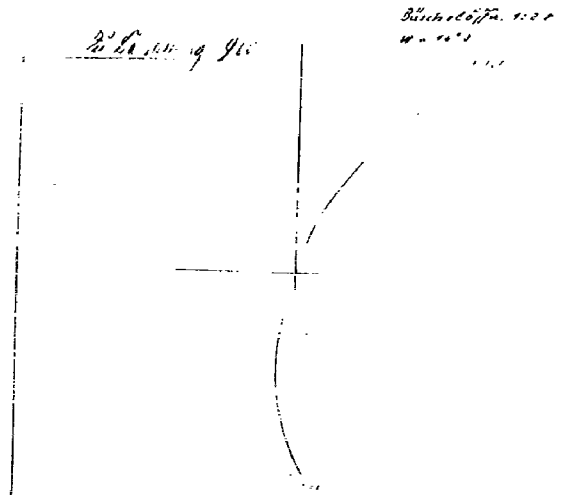
1005

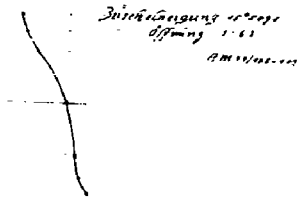


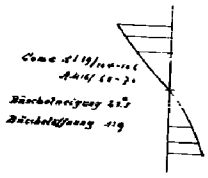




1021









Kurve 15°

Durchstoßpunkte der einzelnen Schalen an der Bremskante.
Bremskante selbst im Schnittpunkt der entsprechenden Schalen für r = d.

Obere Schale I	Stoßpunktwinkel	$\varphi_0 = 11{,}7°$	$y = 10{,}15$
Obere Schale II		$\varphi_0 = 13{,}2°$	$y = 10{,}26$
Hauptschale		$\varphi_0 = 9{,}1°$	$y = 10{,}21$
Untere Schale I		$\varphi = 14{,}1°$	$y = 10{,}22$
Untere Schale II		$\varphi = 11{,}7°$	$y = 10{,}23$
Untere Schale III		$\varphi = 12{,}8°$	$y = 10{,}24$

φ_0 = mit φ_0 wird der Stoßpunkt a der a. Fläche d. Schale

Kurve 10°

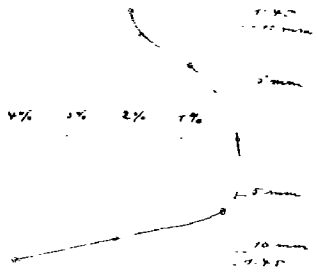
Obere Schale I	$\varphi = 8{,}0°$	$y = 9{,}97$
Obere Schale II	$\varphi = 8{,}0°$	$y = 9{,}98$
Obere Schale III	$\varphi = 8{,}1°$	$y = 9{,}96$
Hauptschale	$\varphi = 9{,}1°$	$y = 9{,}91$
Untere Schale I	$\varphi = 10°$	$y = 9{,}90$
Untere Schale II	$\varphi = 10{,}1°$	$y = 9{,}89$

Kurve 20°

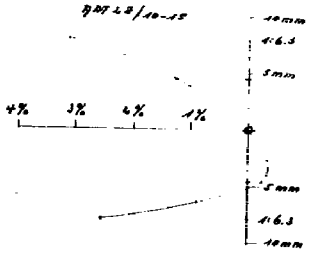
Obere Schale I	$\varphi_0 = 12{,}1°$	$y = 10{,}19$
Obere Schale II	$\varphi = 12{,}2°$	$y = 10{,}20$
Hauptschale	$\varphi = 12{,}2°$	$y = 10{,}21$
Untere Schale I	$\varphi = 12{,}0°$	$y = 10{,}20$
Untere Schale II	$\varphi = 11{,}9°$	$y = 10{,}19$
Untere Schale III	$\varphi = 12{,}1°$	$y = 10{,}18$

1056

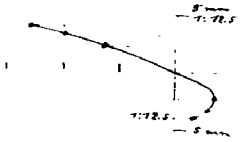
Büschelöffnung 1:4.5
Hauptstrahlneigung 10°04'22
Fig. 27.



Büschel-Öffnung 1:6.3
Hauptstrahl-Neigung 14°42'45
Fig. 28/10-15



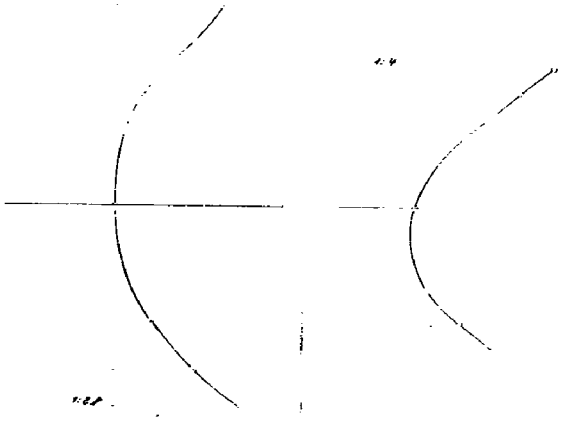
Büschelöffnung 1:12.5
Hauptstrahlneigung 19°14'11
Fig. 32



1057

Büschel-Öffnung 1:2.8
Hauptstrahl-Neigung 11°42'31

Büschel-Öffnung 1:4
Hauptstrahl-Neigung 15°49'18



Berechn. in AM 22/122-129

Berechn. in AM 22/122-131

Büschel-Öffnung 1:2
Hauptstrahl-Neigung 19°05'33

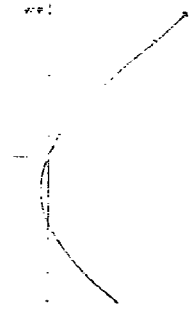


Berechn. in AM 22/127-133

1059

Büschel-Öffnung 1:4

Hauptstrahl-Neigung 45°



Berechnet in ÖZM 24/10 (Kunkel)
" ÖIng 17 483 (Hammer)

Zu L. Abb. 991

Di Berl. 1006

Zu 1006

1074

Blenden ($\varphi_0 = 7°$)

$\varphi_0 = 12°$

$\xi = 16,9°$ $\eta = 18,97°$
$\xi = 12°$ $\eta = 18,73°$
$\xi = 6°$ $\eta = 18,48°$
$\xi = 0°$ $\eta = 18,42°$
$\xi = -6°$ $\eta = 18,48°$
$\xi = -12,5°$ $\eta = 18,80°$
$\xi = -17,3°$ $\eta = 18,85°$

Blenden ($\varphi_0 = 7°$)

$\varphi_0 = 17°$

$\xi = 0°$ $\eta = 23,46°$
$\xi = 6°$ $\eta = 23,60°$
$\xi = 0°$ $\eta = 23,62°$
$\xi = -6°$ $\eta = 23,60°$
$\xi = -12,5°$ $\eta = 23,80°$
$\xi = -17,3°$ $\eta = 23,85°$

211 1007

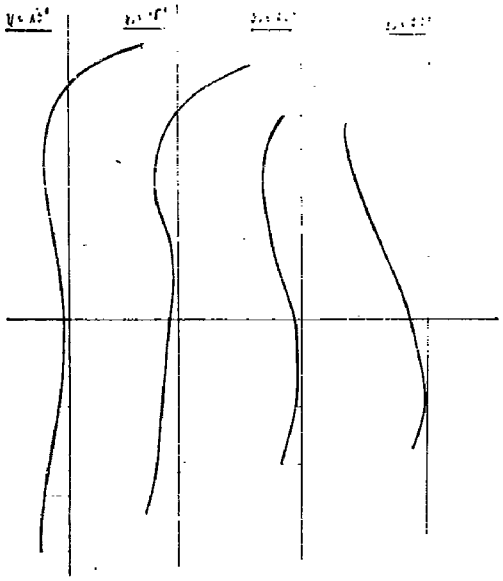
1076

211 1072

1083

ZU 1020

1092

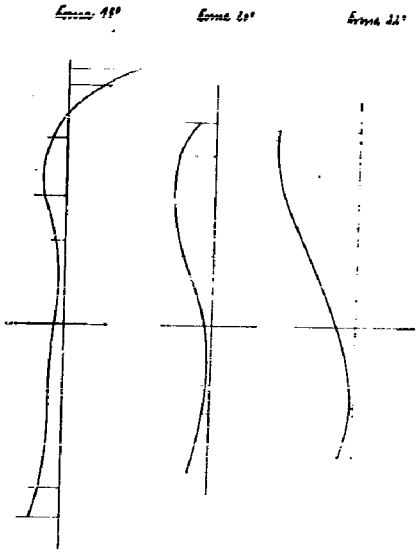


ZU Darst. 1044

ZU 1044

1115

ZU Darst. 1044



22 1850

1122

20 Herst. 1850

Hauptstrahlneigung 73°99

öffg 1:4

Deform

Blendenlage ...

Beleg im Amt ...

20 Herst. 1850

Hauptstrahlneigung 73°99

öffnung 1:8

Deform

Blendenlage 1.1 - 2.96

22 10 57

1124

20 Herst. 1851

Hauptstrahlneigung 73°99

öffg 1:4

Blendenl

20 Herst. 1851

Hauptstrahlneigung 73.99

öffg 1:4

Blendenl

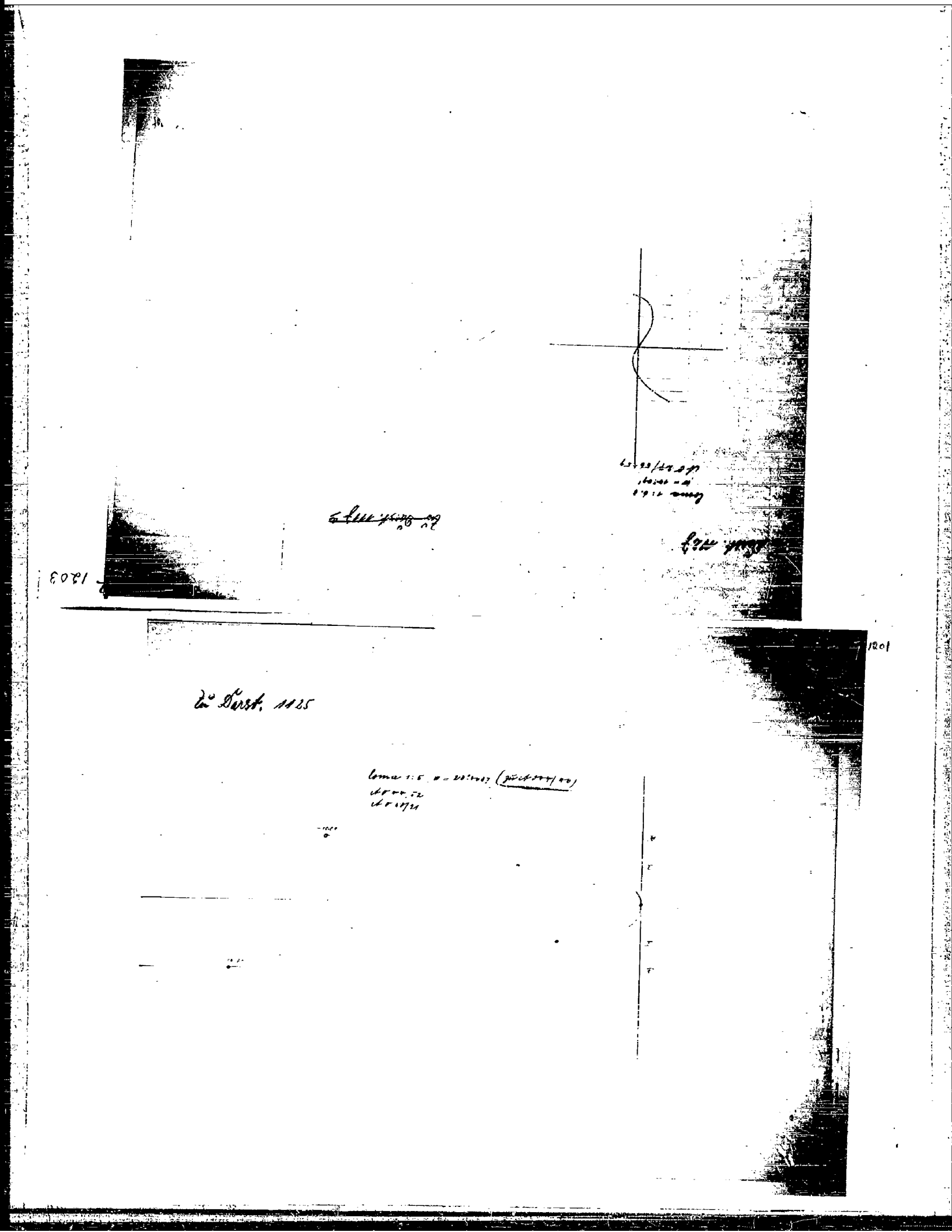
ZU 1052

1126

ZU 1053

1128

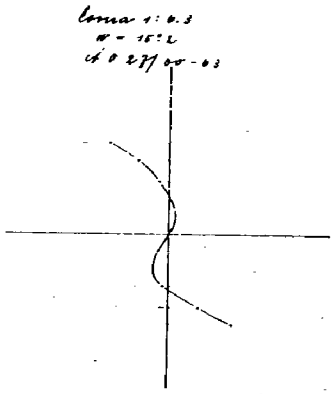
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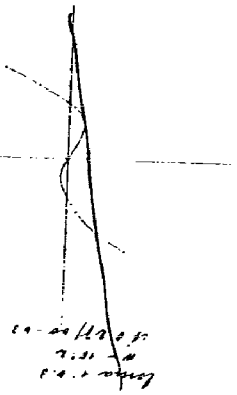


a

1206









Pg 17
No. 658
Proton

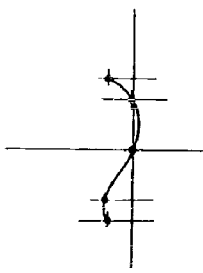
Zu Versk. 1128

Zu Versk. 1124

Zu Versk. 1142

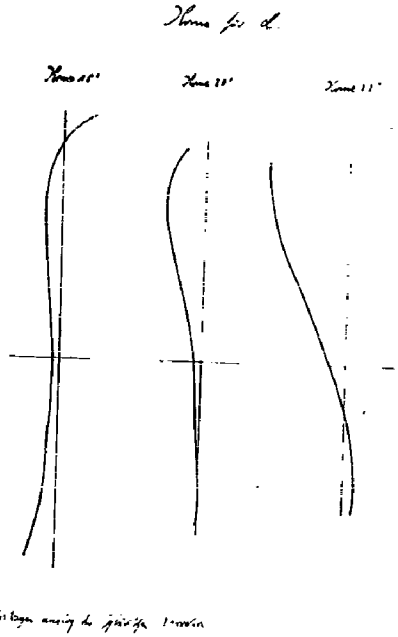
Büschel-Öffnung 1:0
" - Neigung 12°0'11"
Coma

Zu Versk. 1149

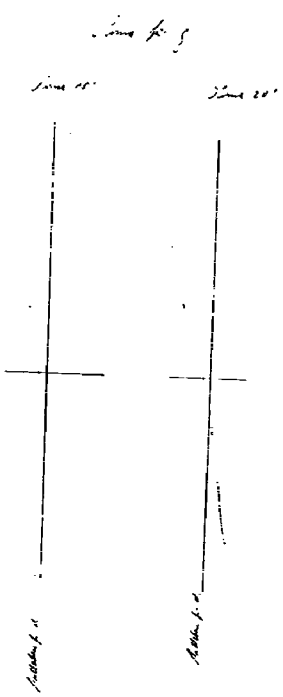


Büschel-Öffnung 1:0
" - Neigung 12°22.22'
Coma

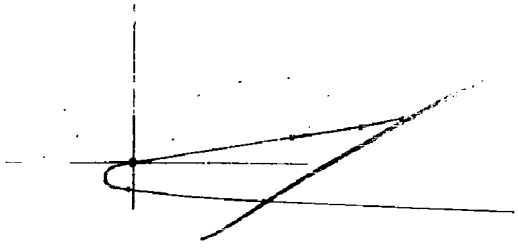
20 Versk. 1152



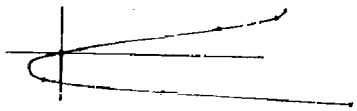
20 Versk 1152



~~20 Versk. 1154.~~

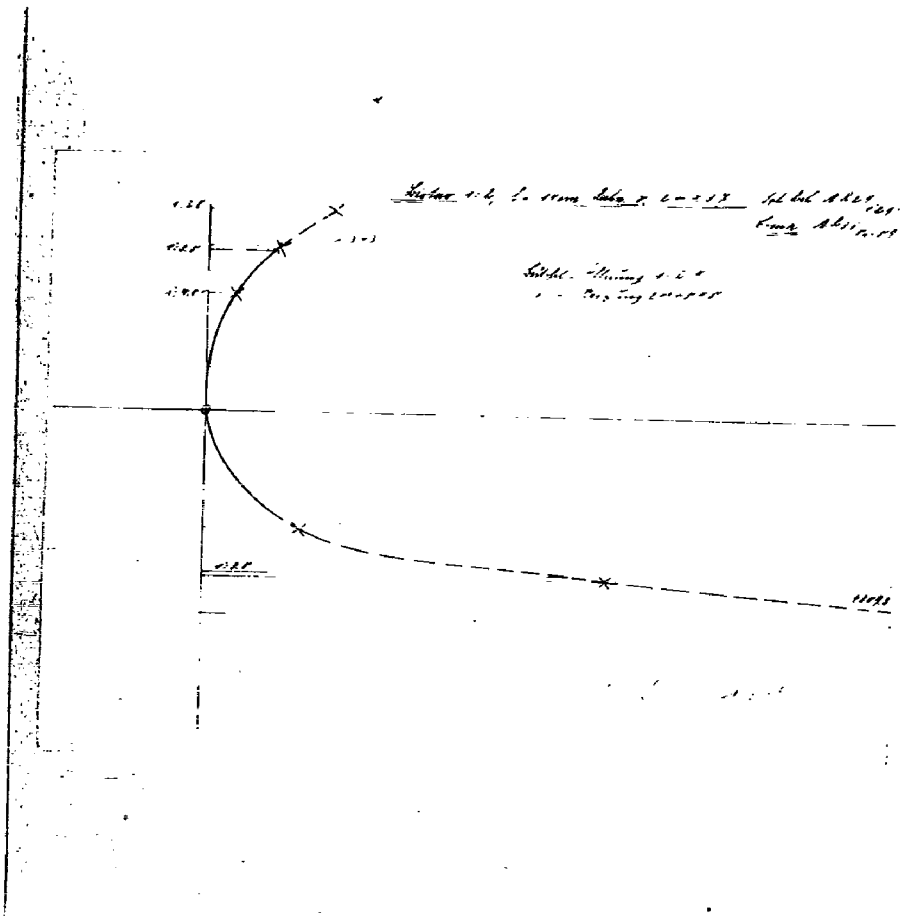


20 Versk. 1153



222 7773

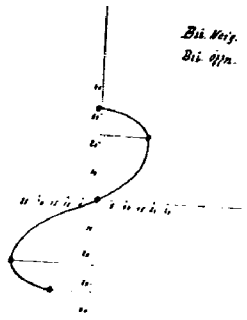
1254



222 7773

1256

1773



228 7774
1258

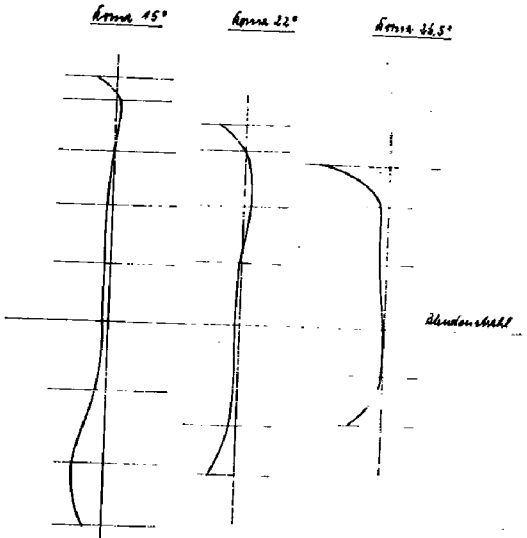
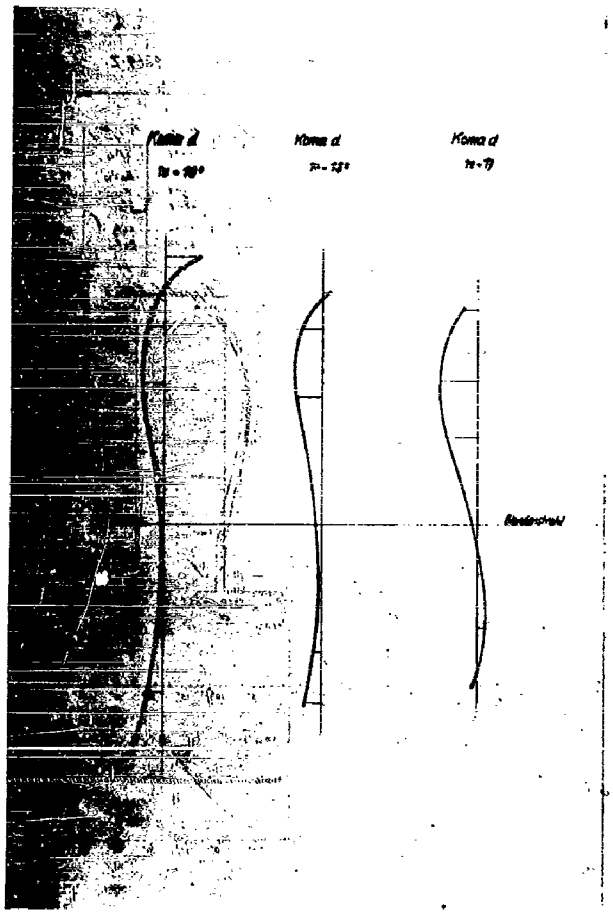
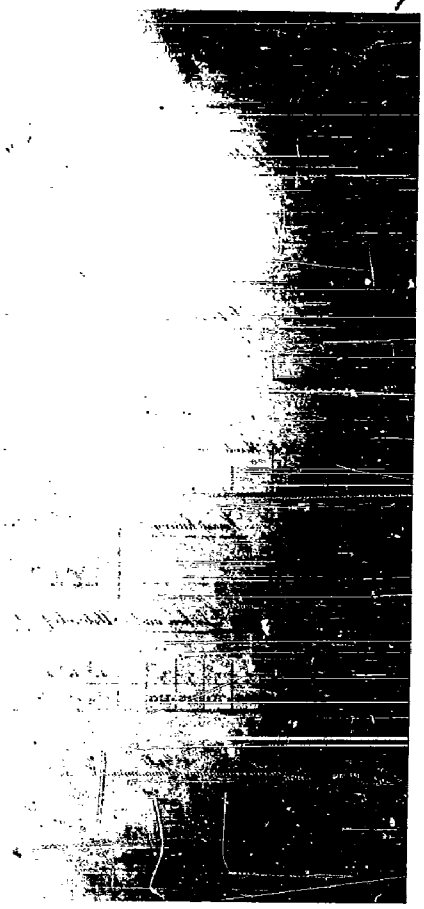


Bild Spreizklappe 17.10.57 Empfindlichkeit der statischen Druckmessung der Kurven für $\alpha = 15°$ und $\alpha = 22°$ [illegible]

zu 1179

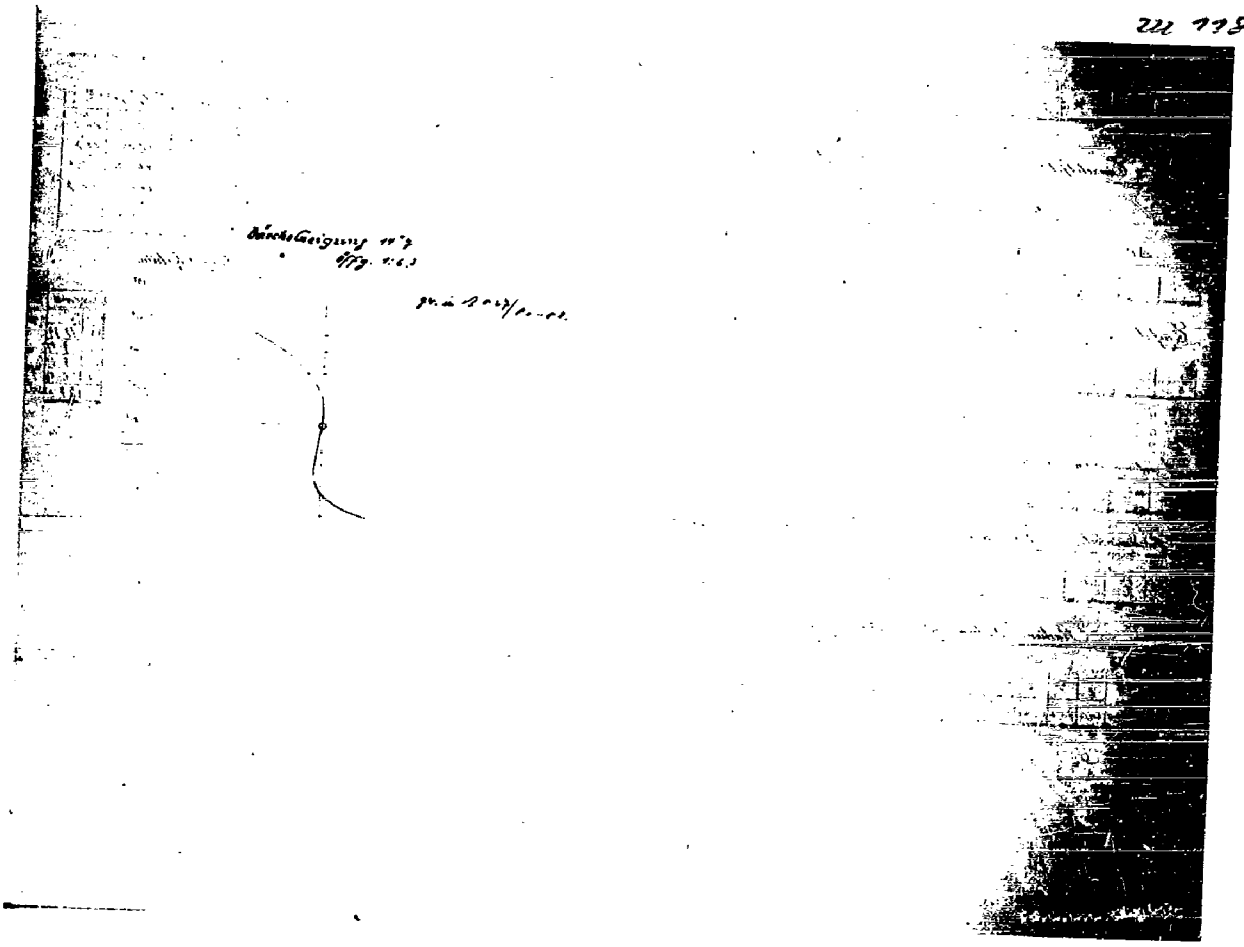
1261





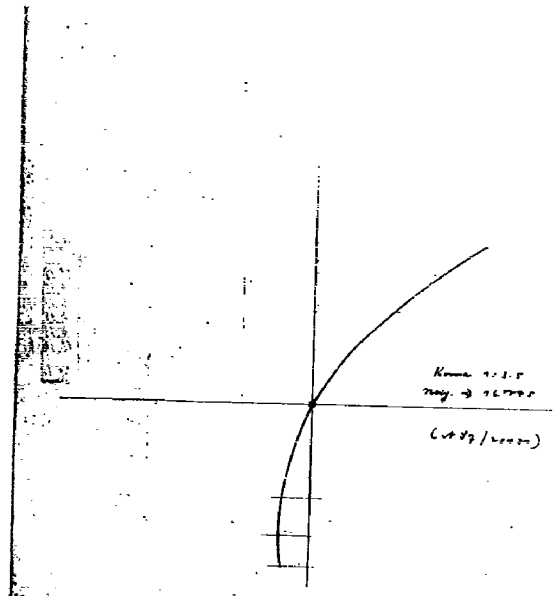
zu 1180

1266



221 1182

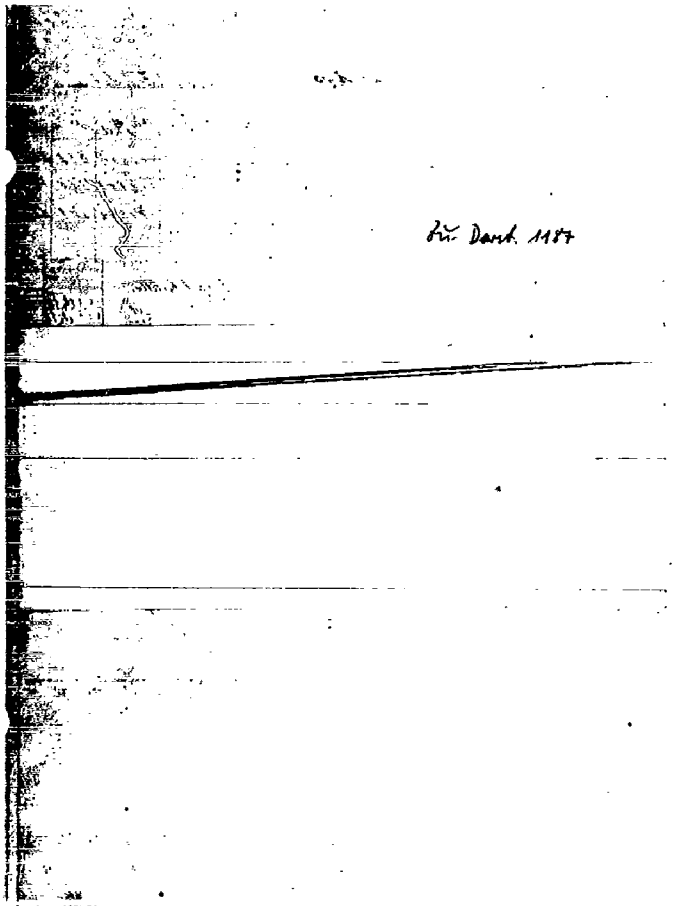
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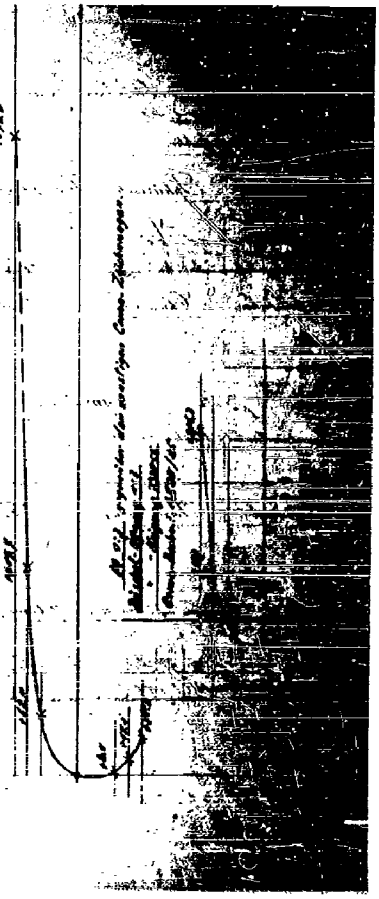




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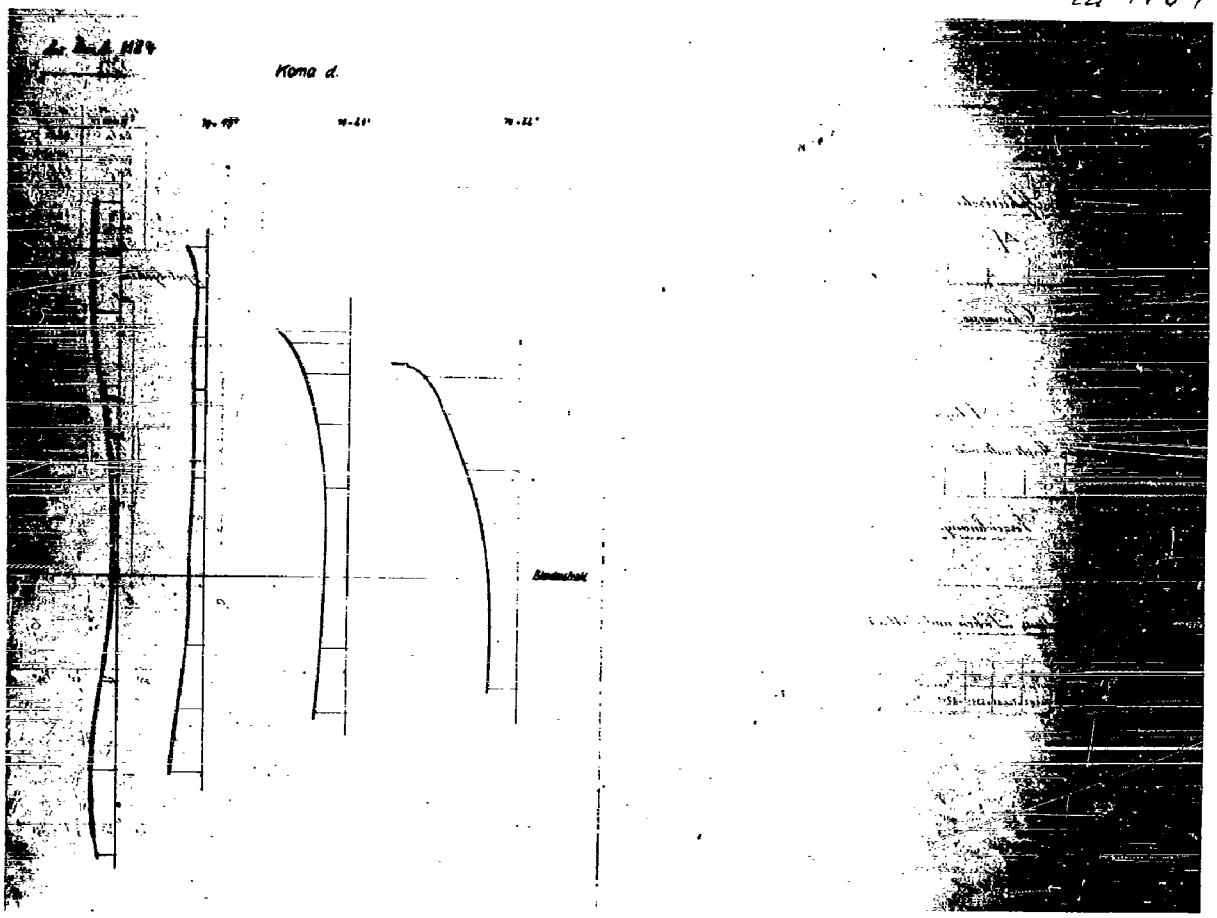
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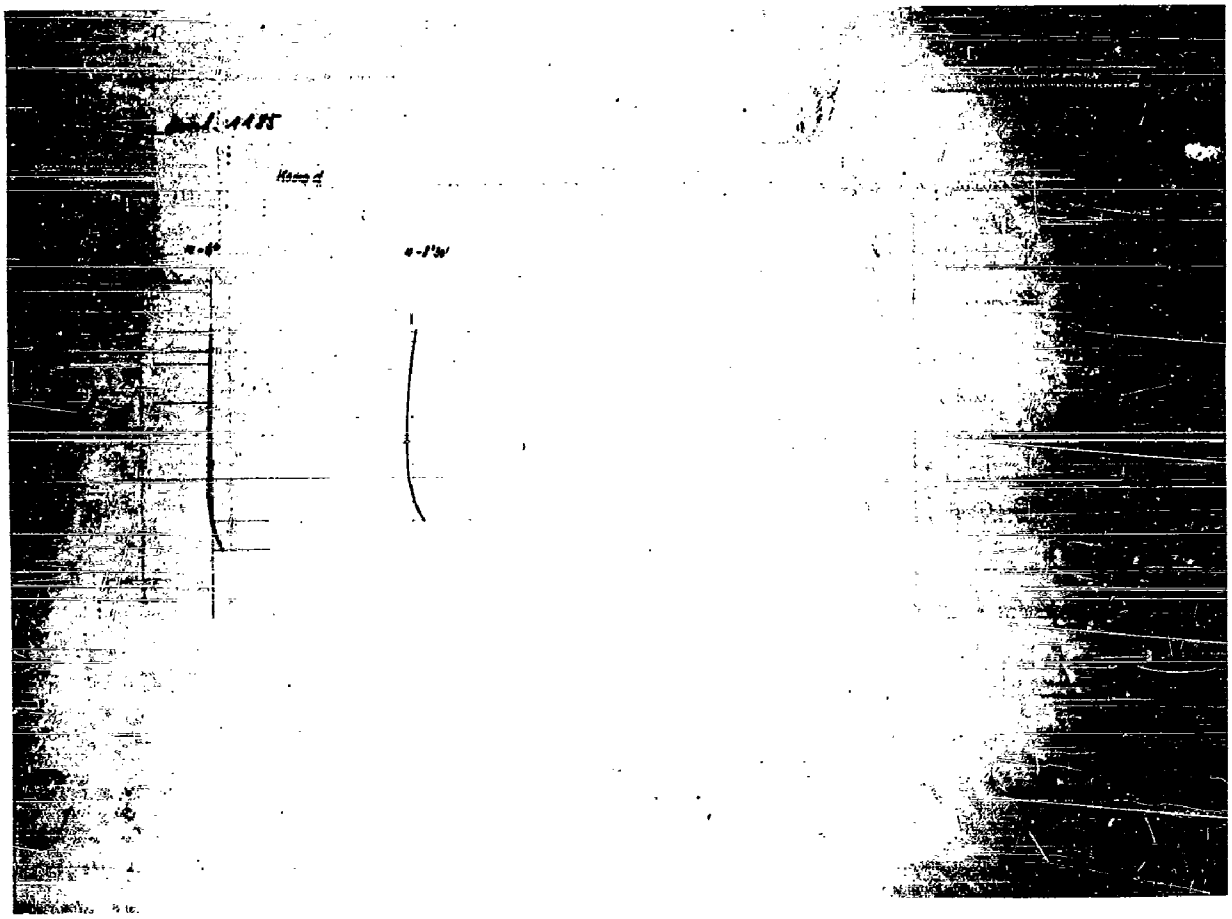
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1275

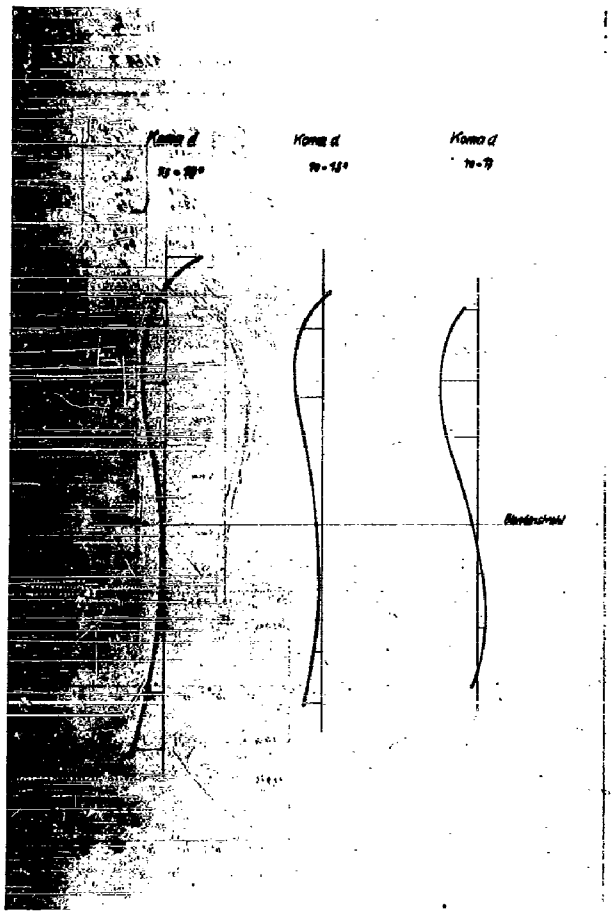


22 1185

1276

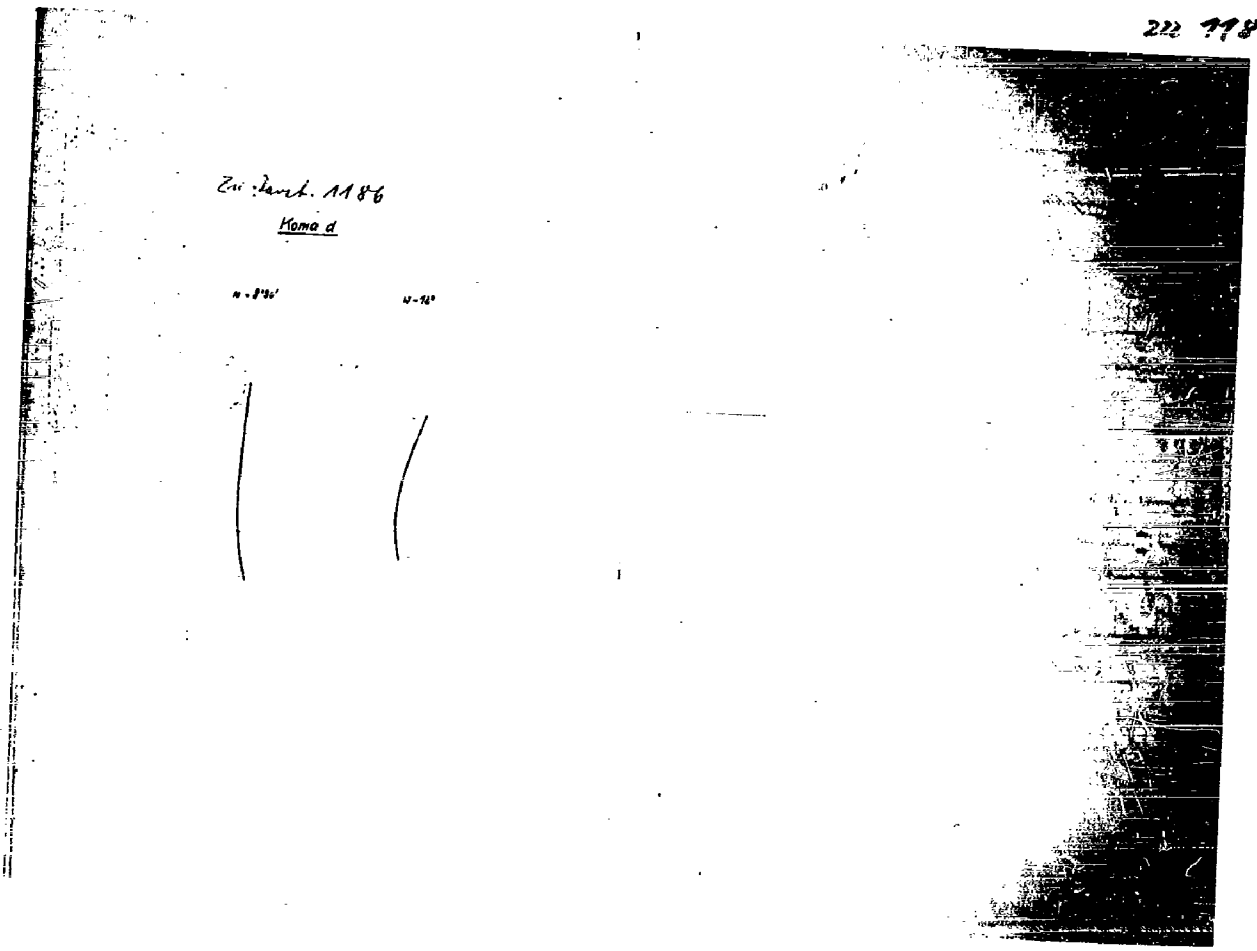


Zu Zeichn. 1185

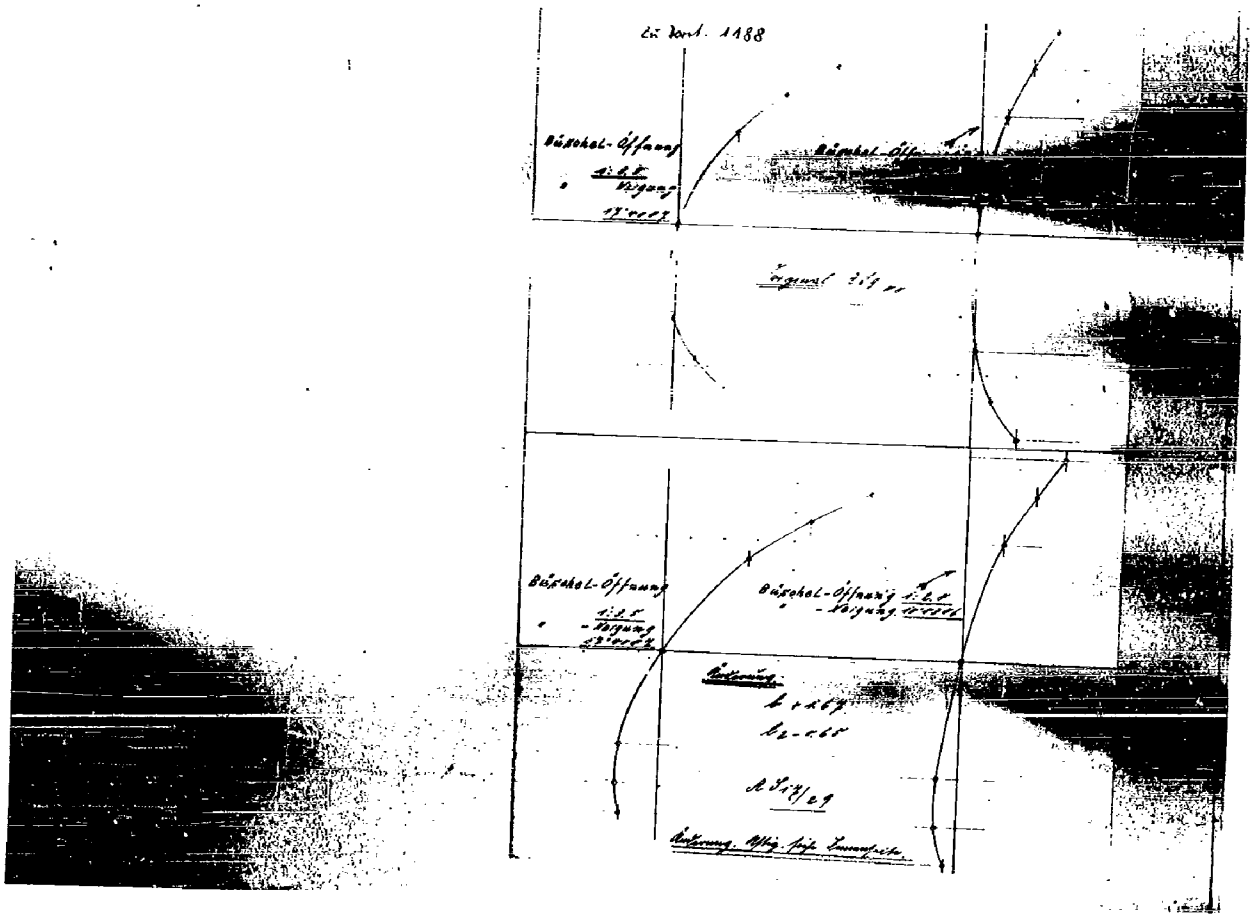




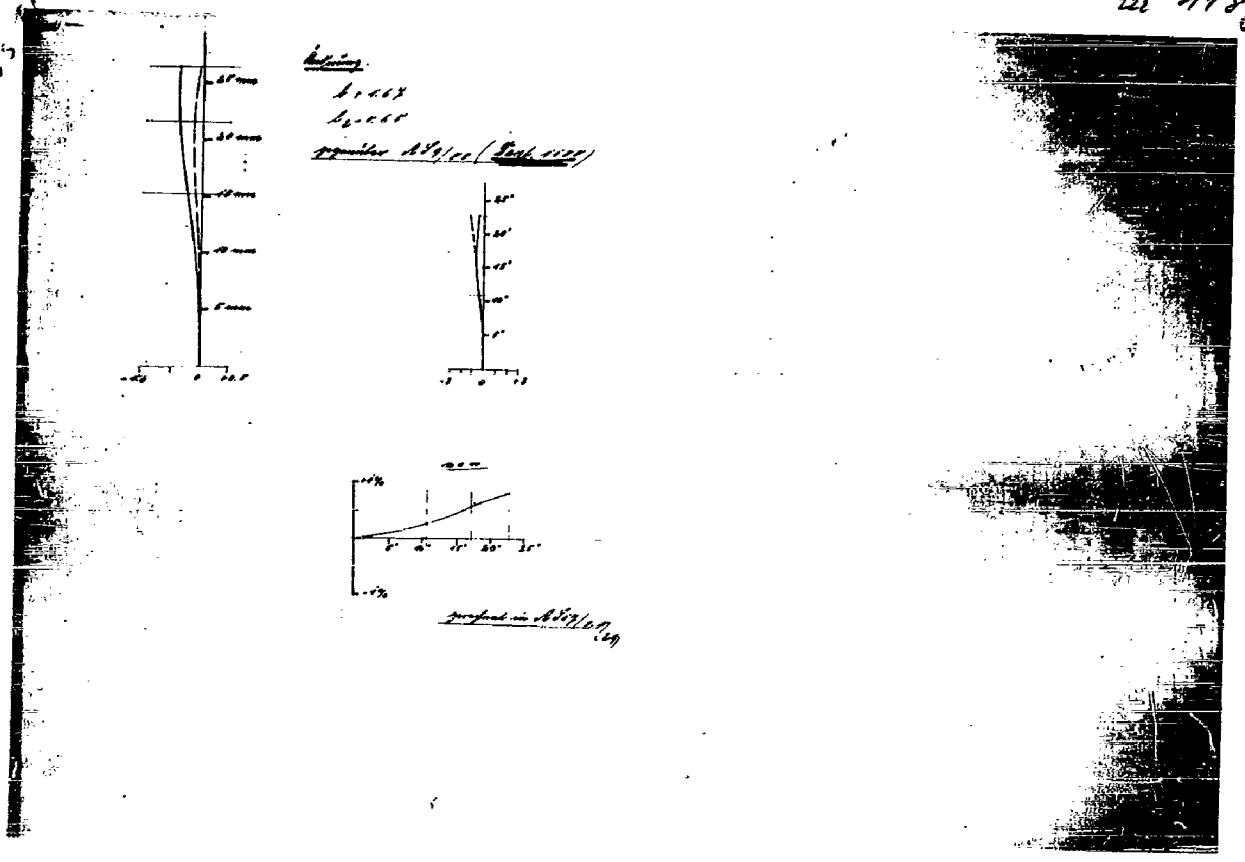
Zu Zeichn. 1186



222 1988

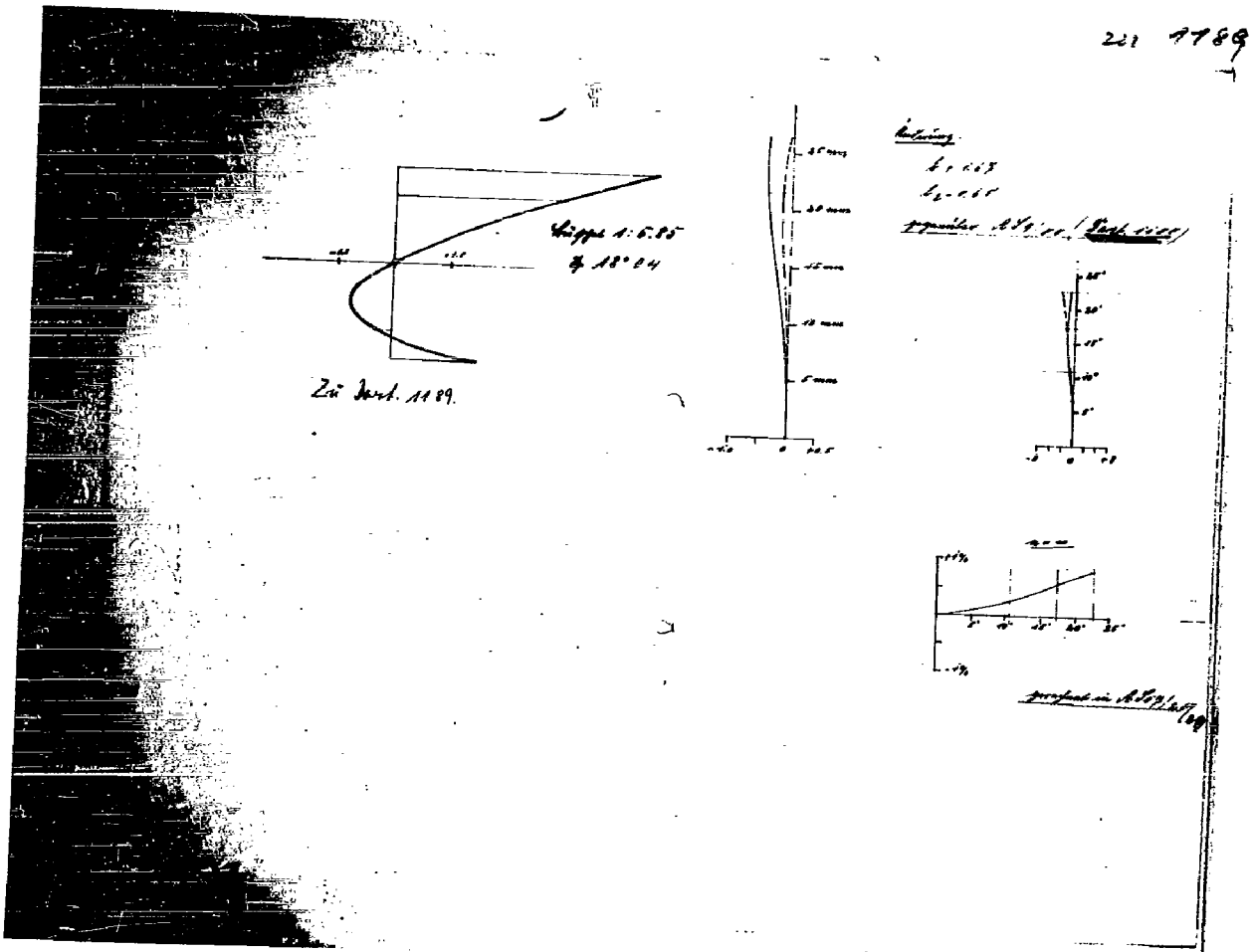


222 1989



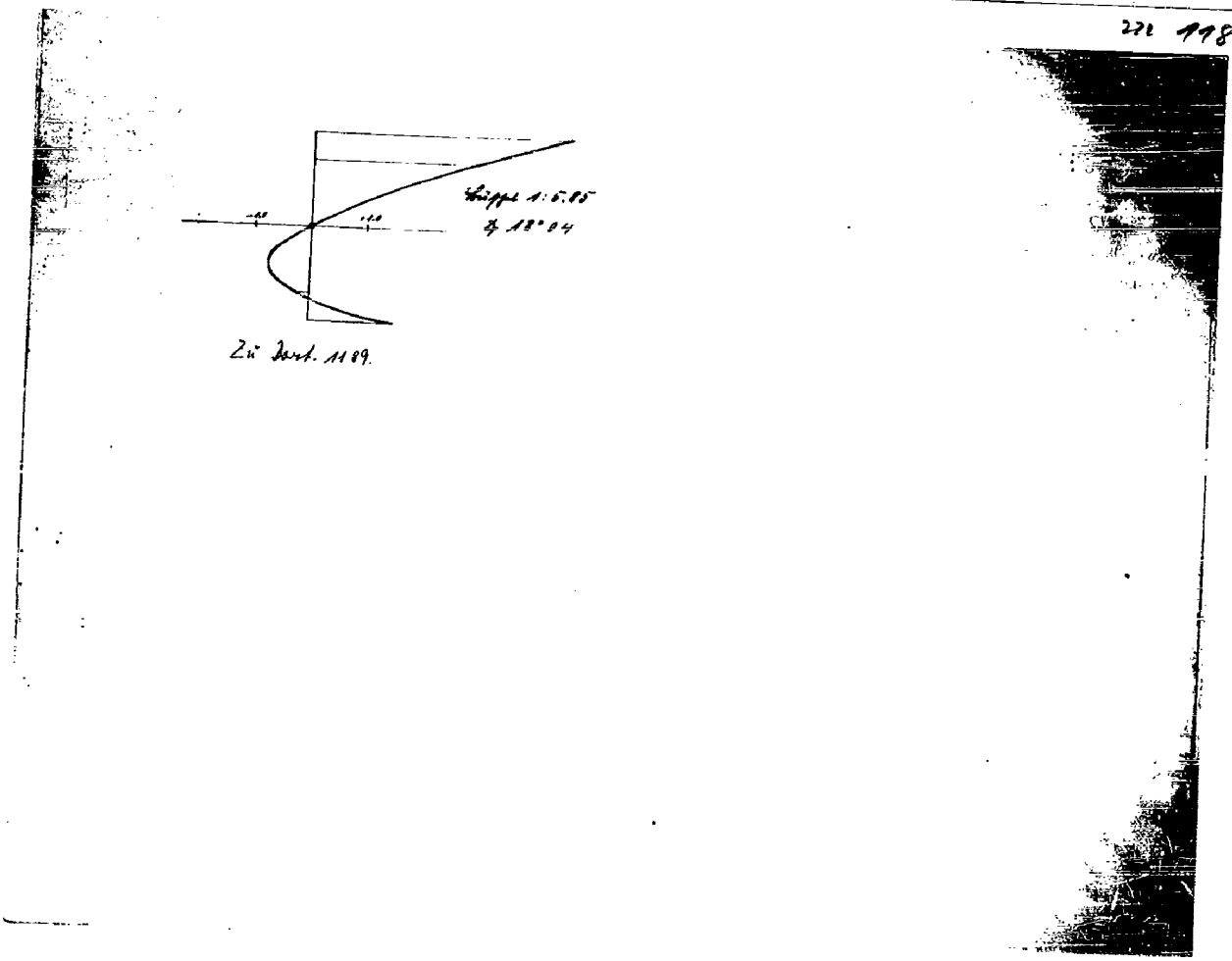
221 1189

1285



221 1189

1286

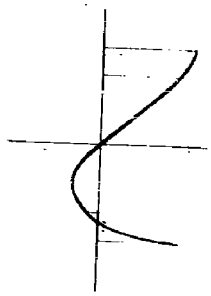


222 1190

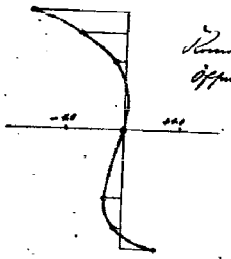
1288

Zu Band 1190.

Schiffel 1:5,9
φ 22°25



Zu Band 1192



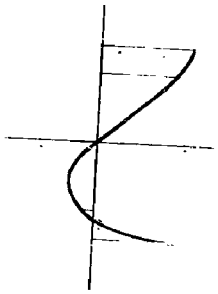
Kimm für φ 18°27
Höhenung 114,8

222 1192

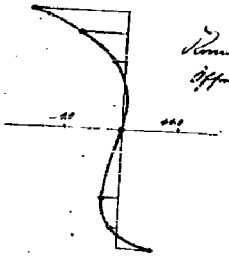
1291

Zu Band 1190.

Schiffel 1:5,9
φ 22°25



Zu Band 1192

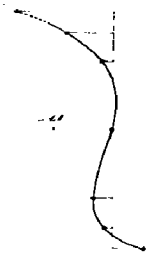


Kimm für φ 18°27
Höhenung 114,8

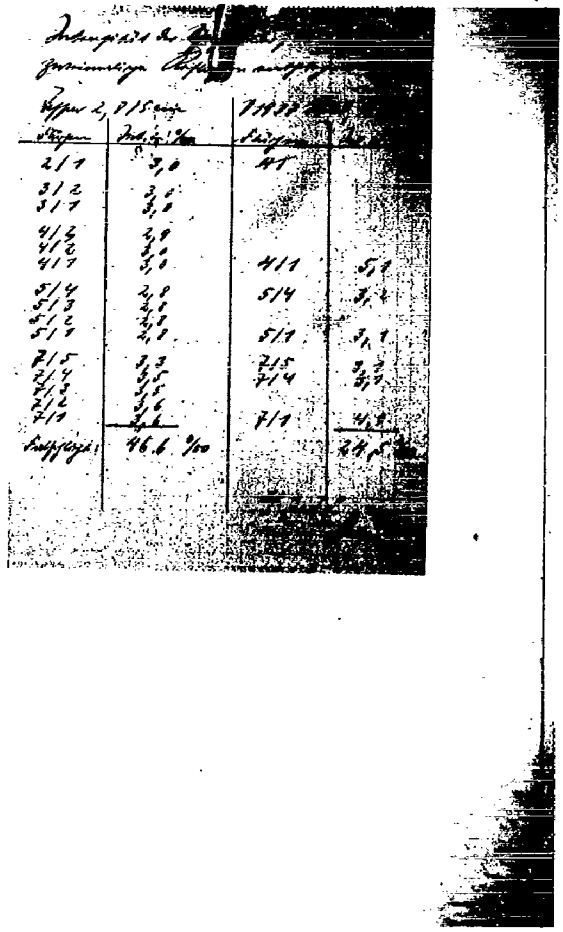
222 1892

1292

Zu Band. 1192



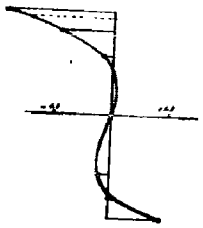
Linie pro 4 18'21
Öffnung 114,8



Zu 1193

1214

Zu Darst. 1193

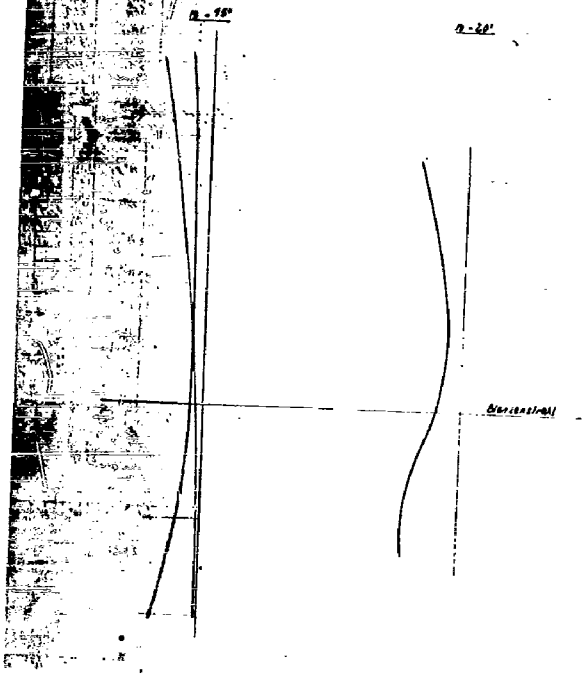


Raum für 4 20-cm Öffnung 1:5, 6.

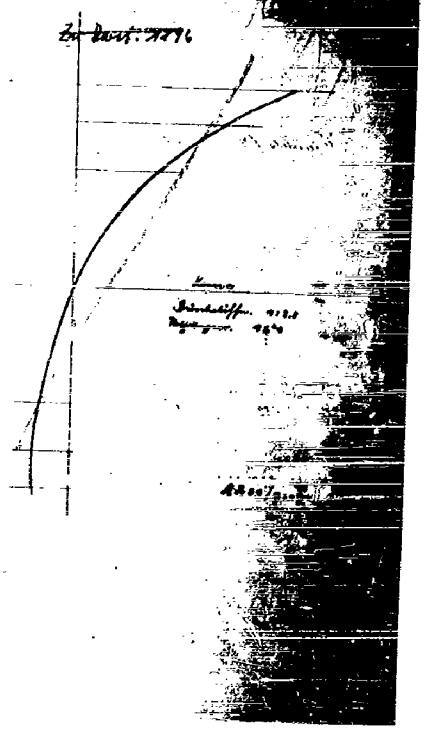
Zu 1195

1296

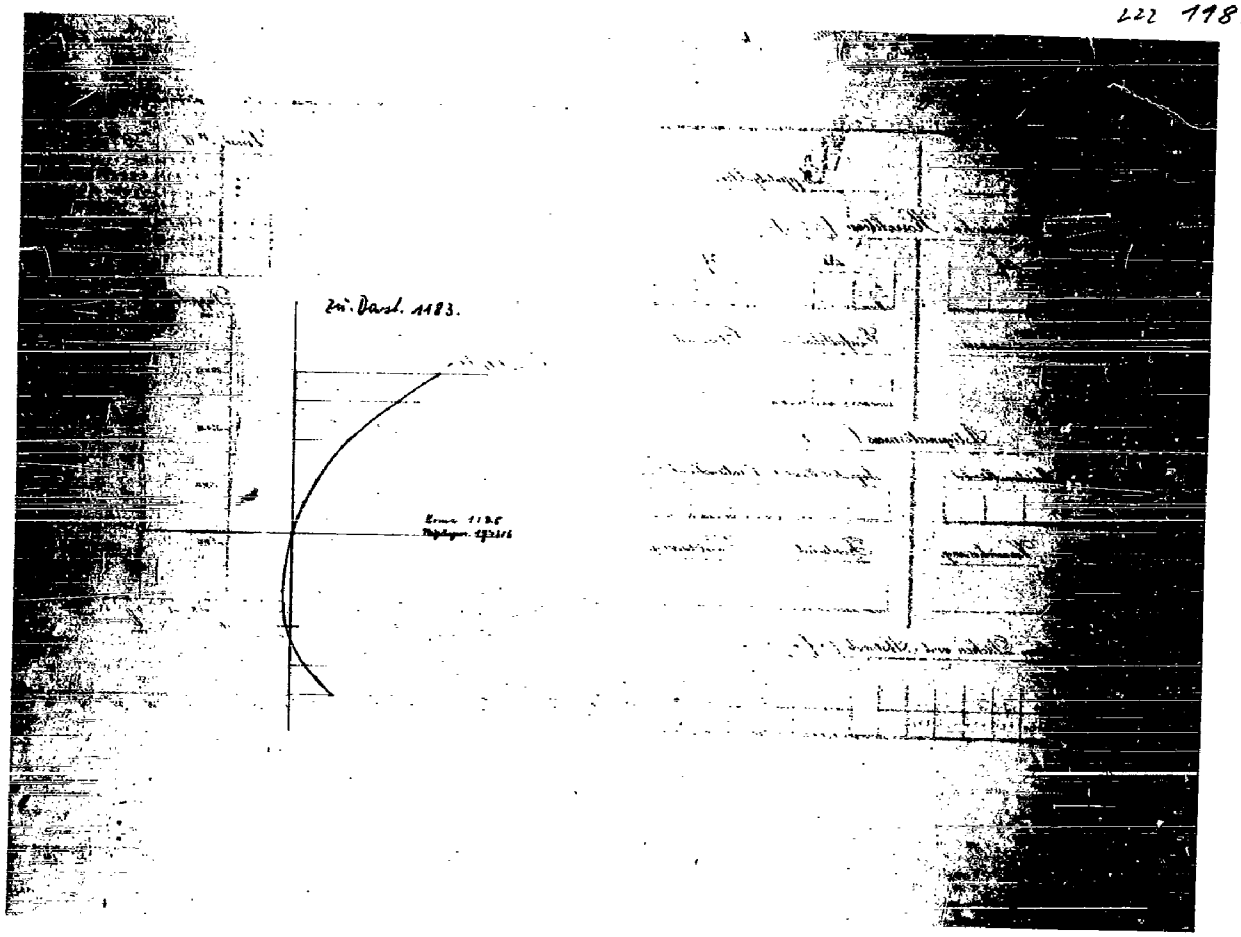
Zu Darst. 1195 Mond



Zu Darst. 1196

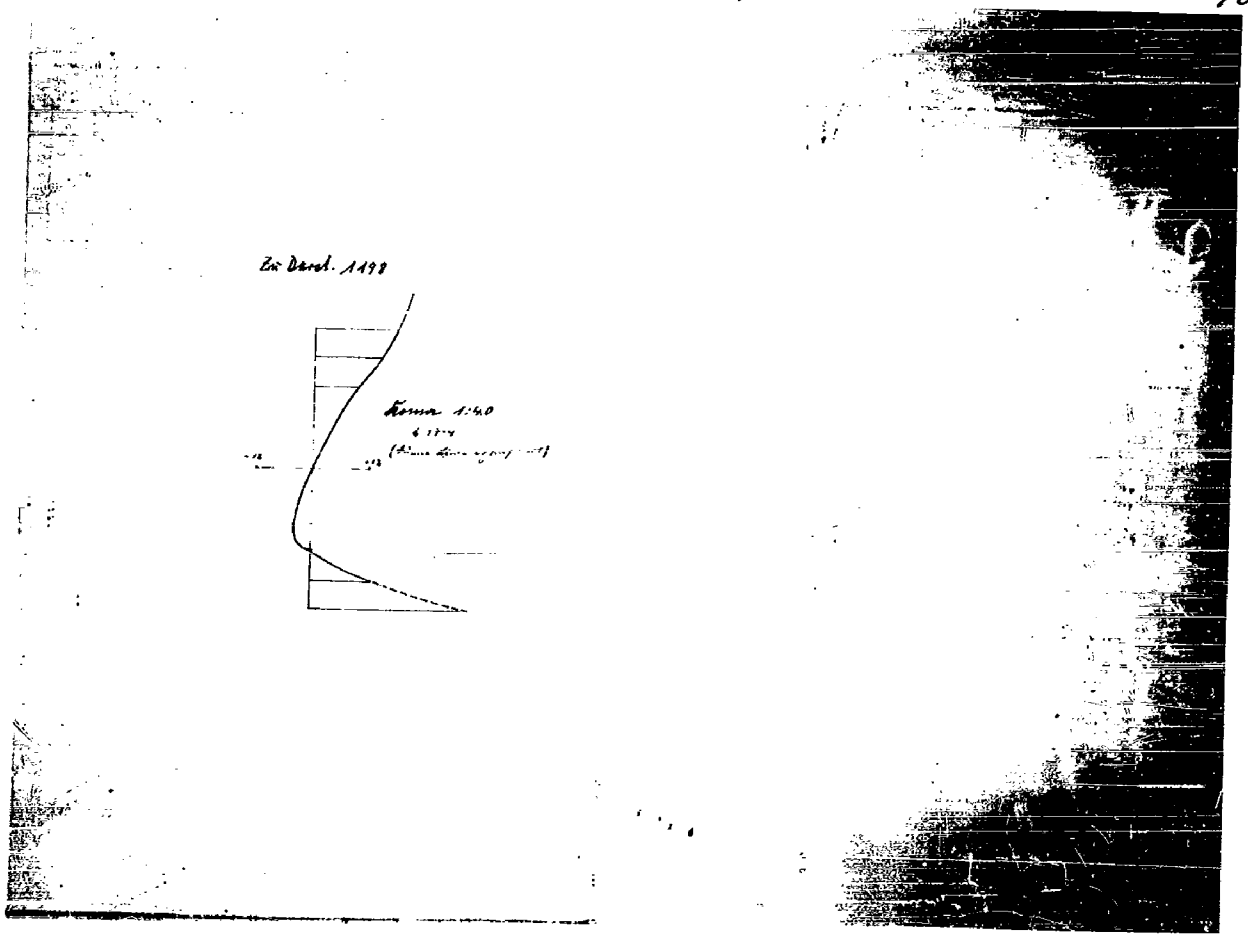


zu 1183.



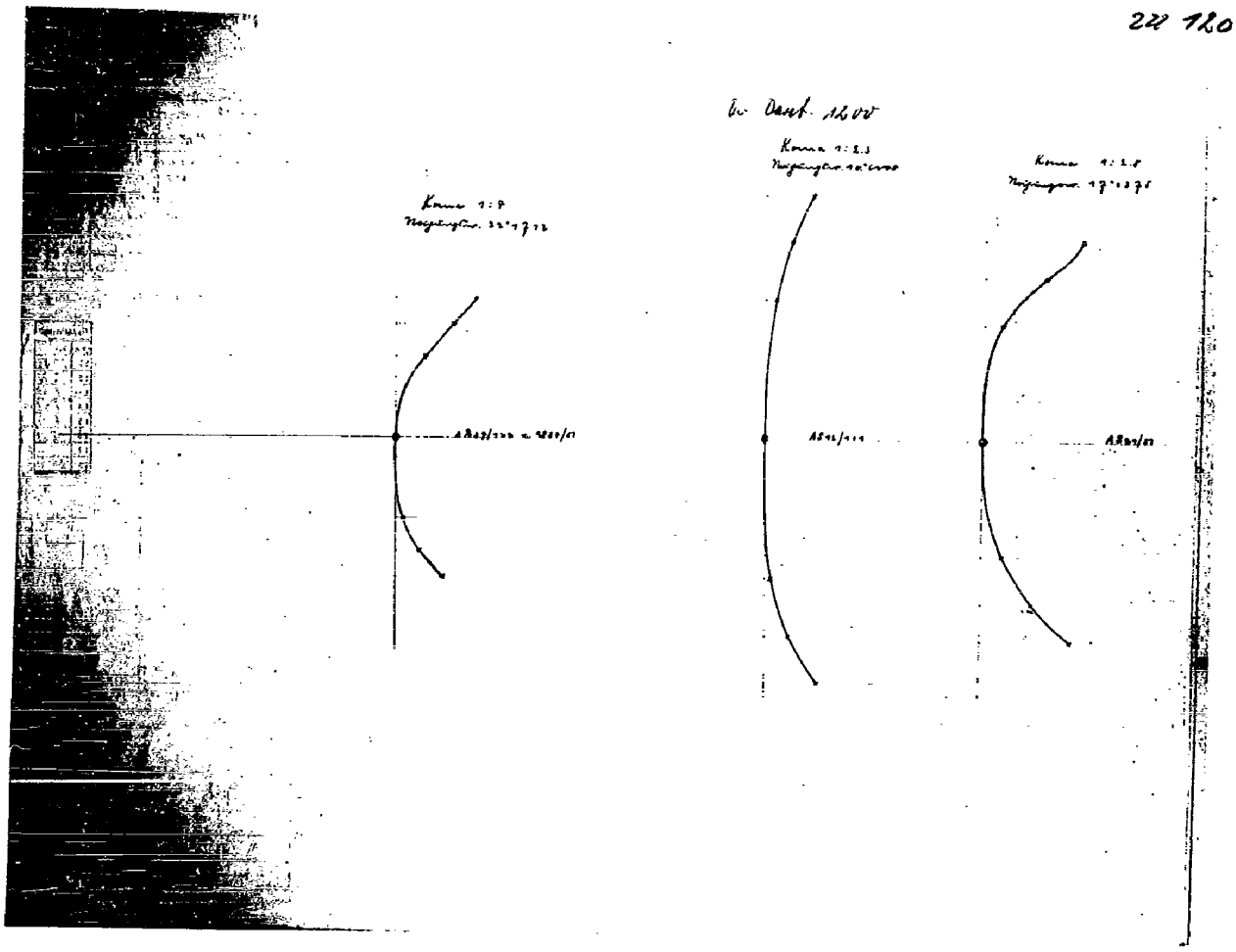
zu 1198

1300

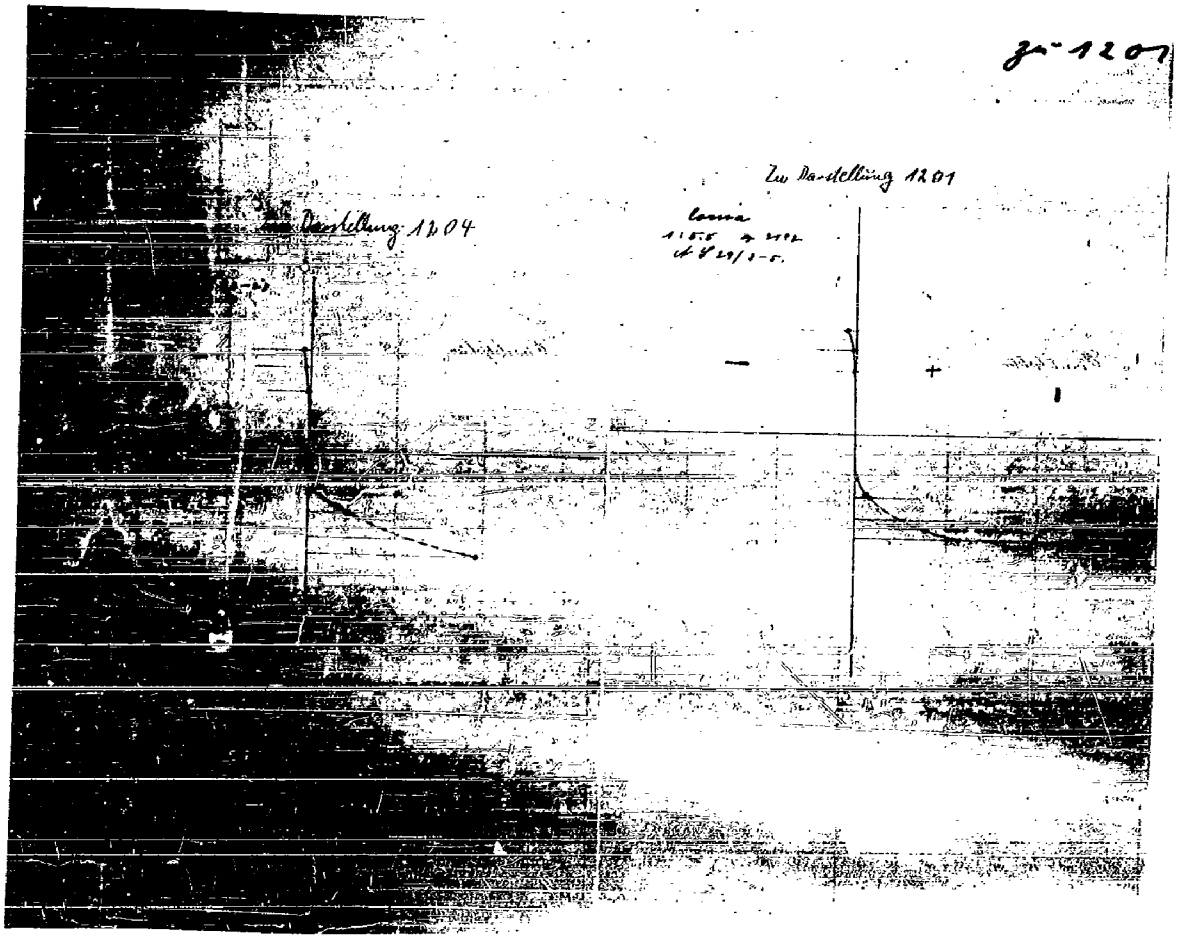


22 1200

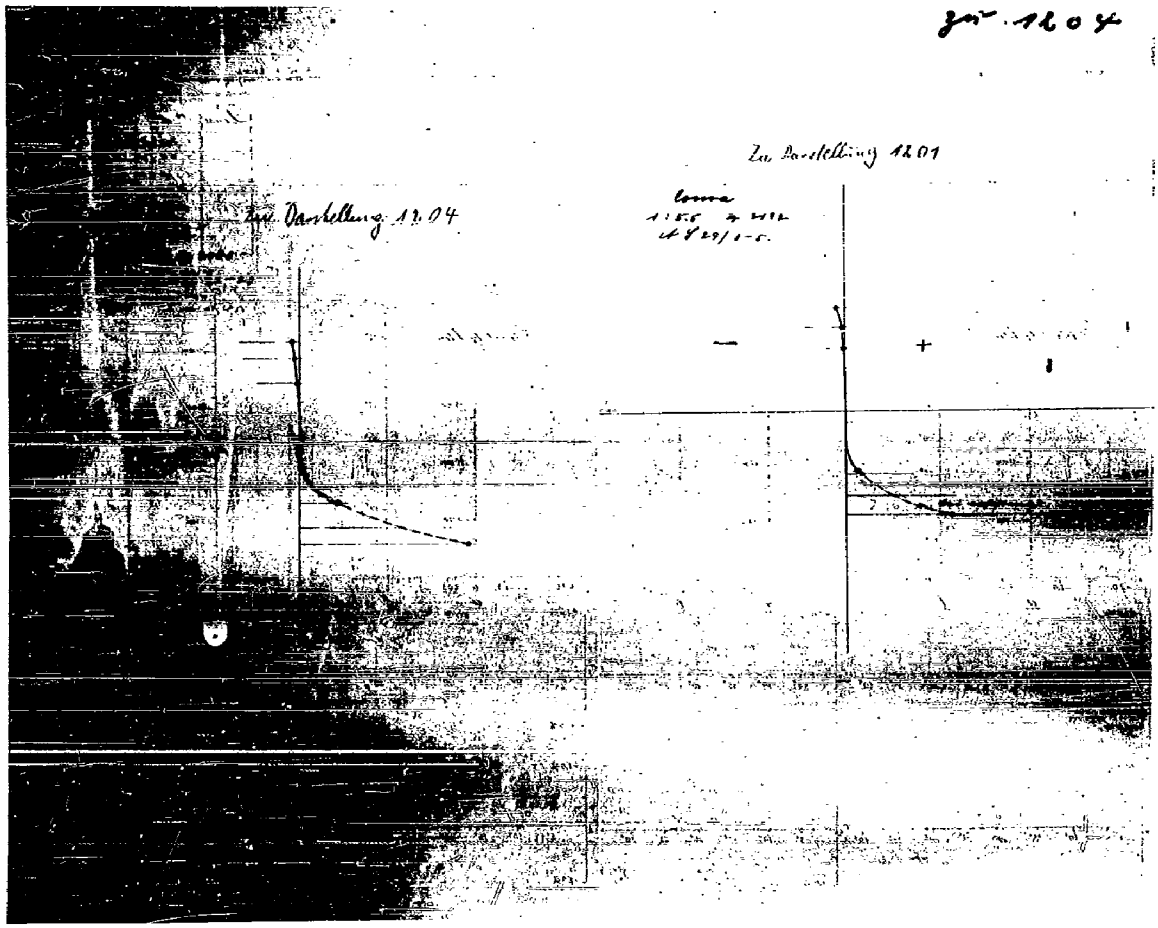
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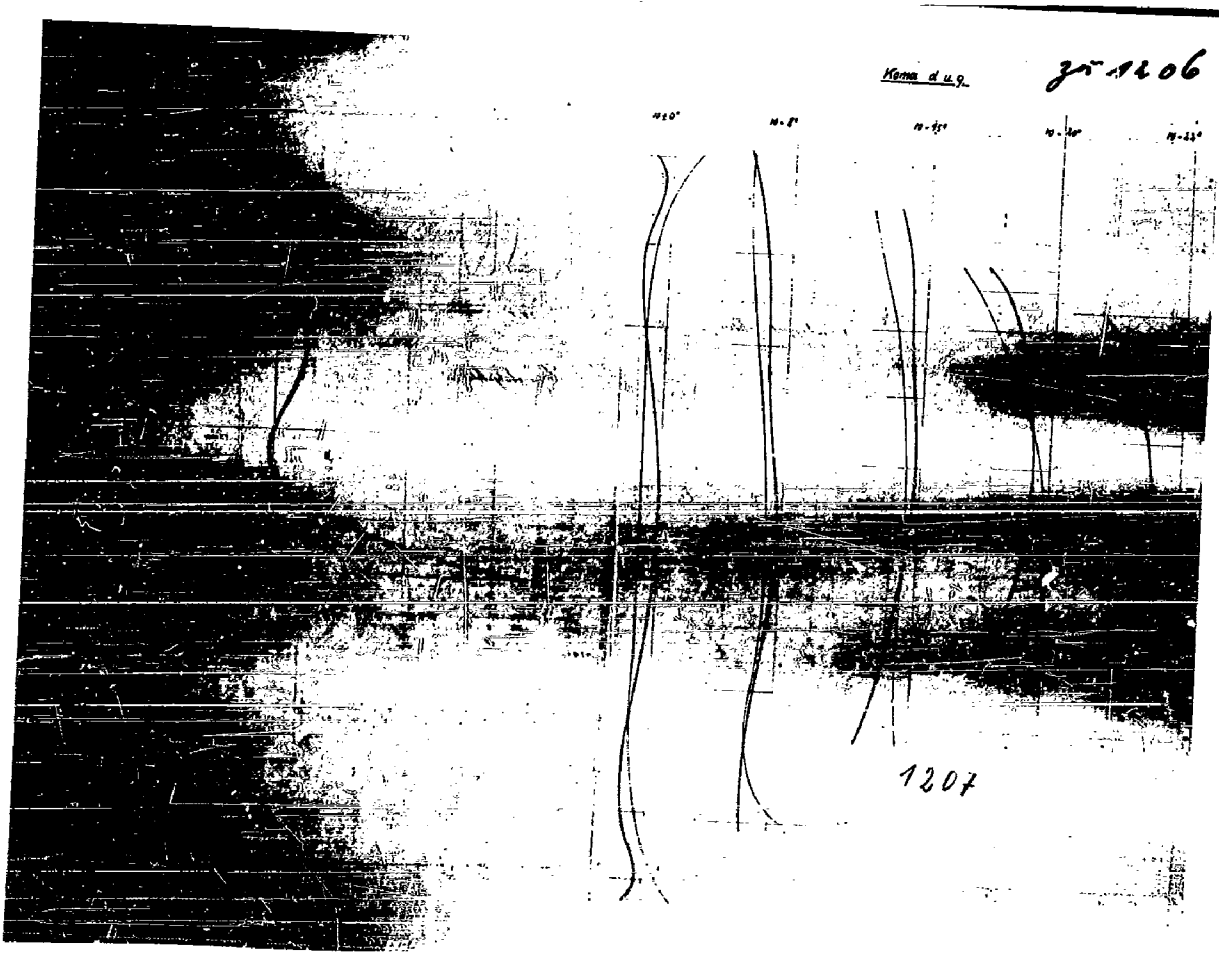
3-1201 1306



Zu Darstellung 12.04

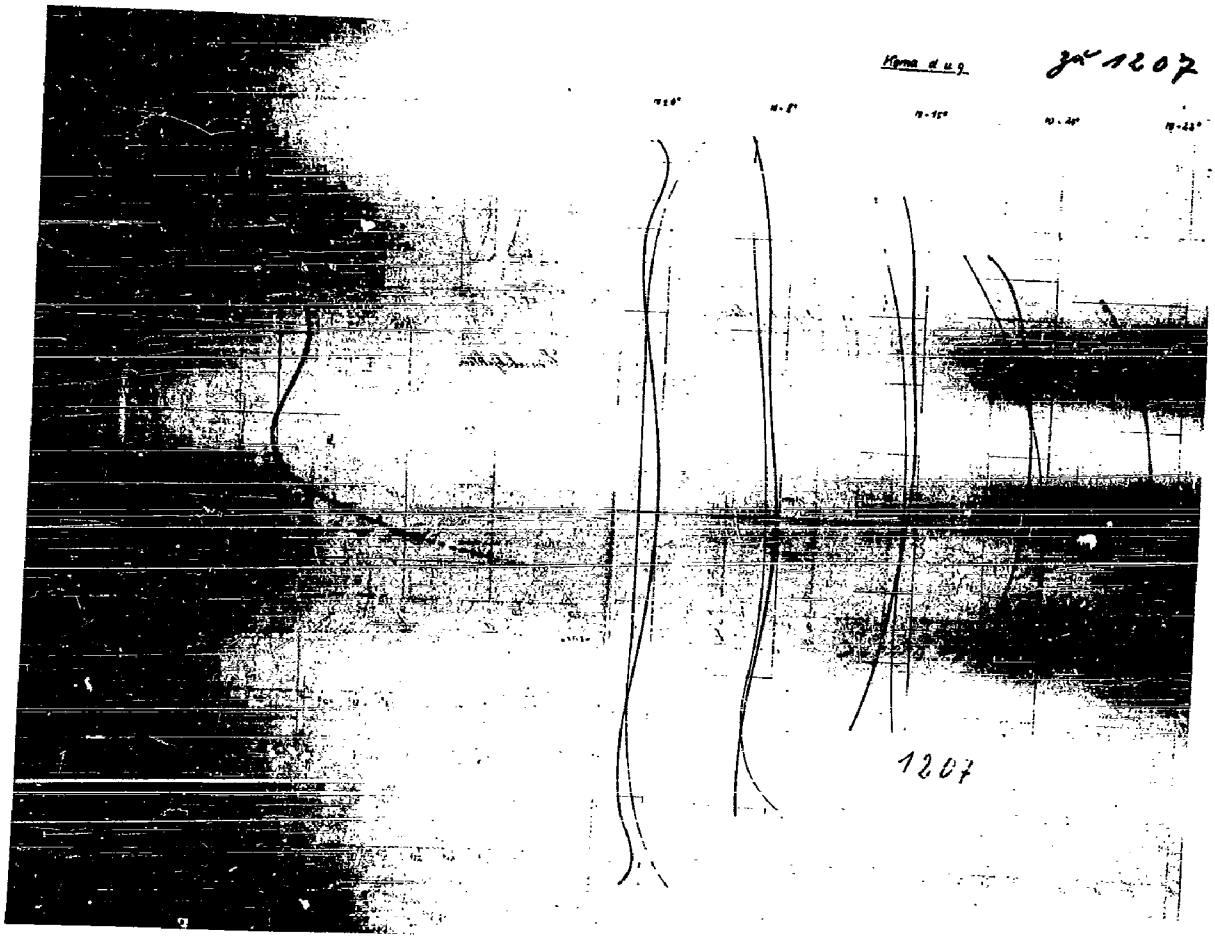


Kurve d u g.

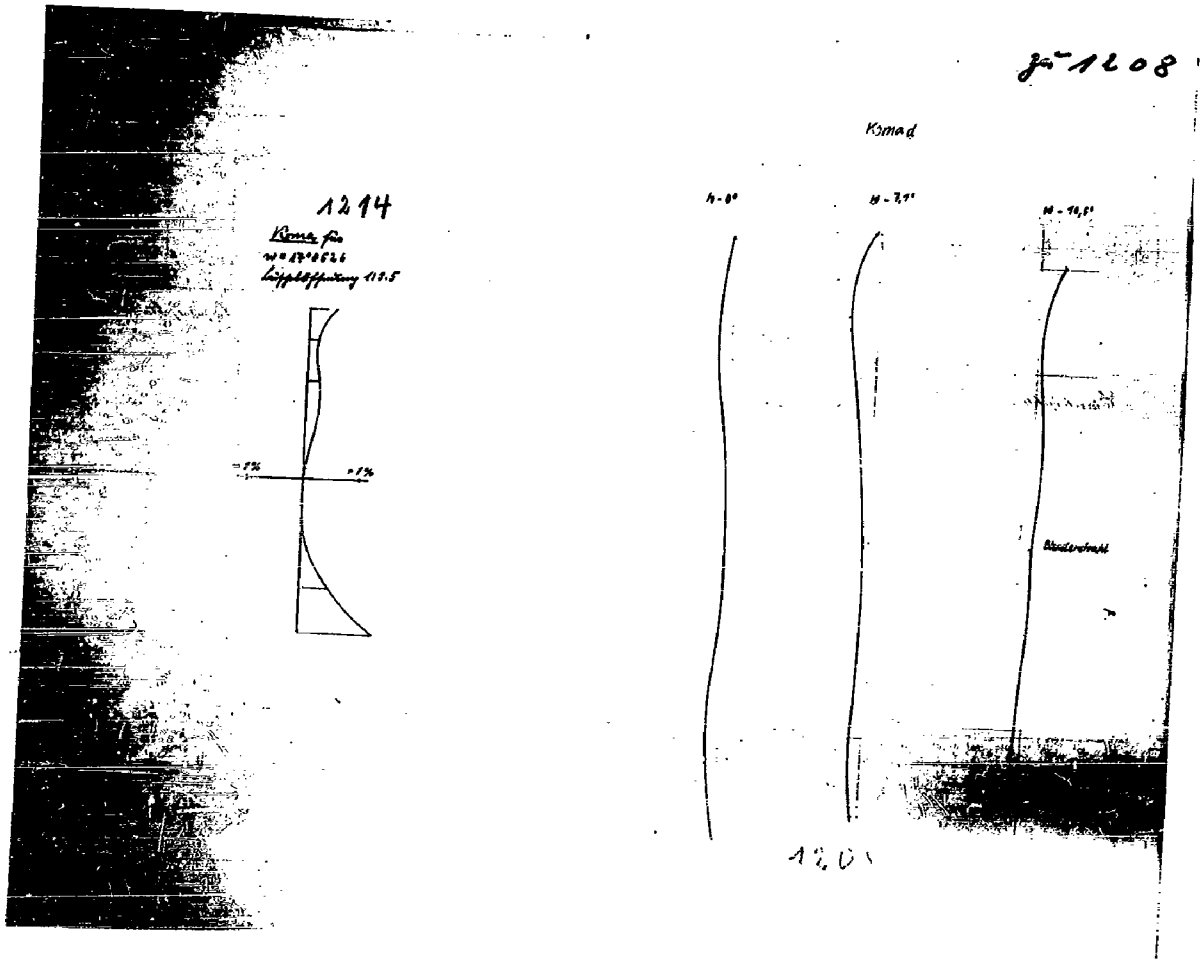


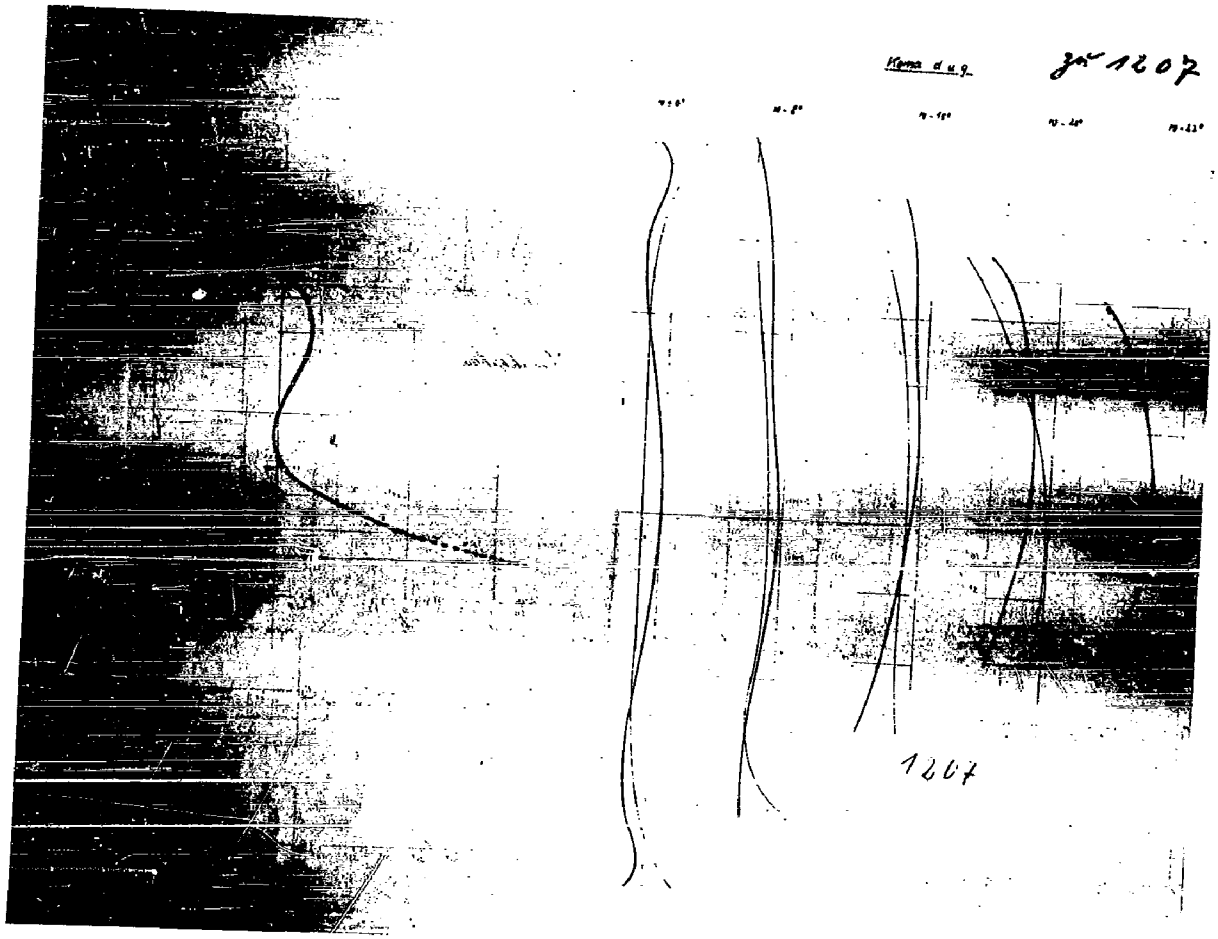
Kamm d u g

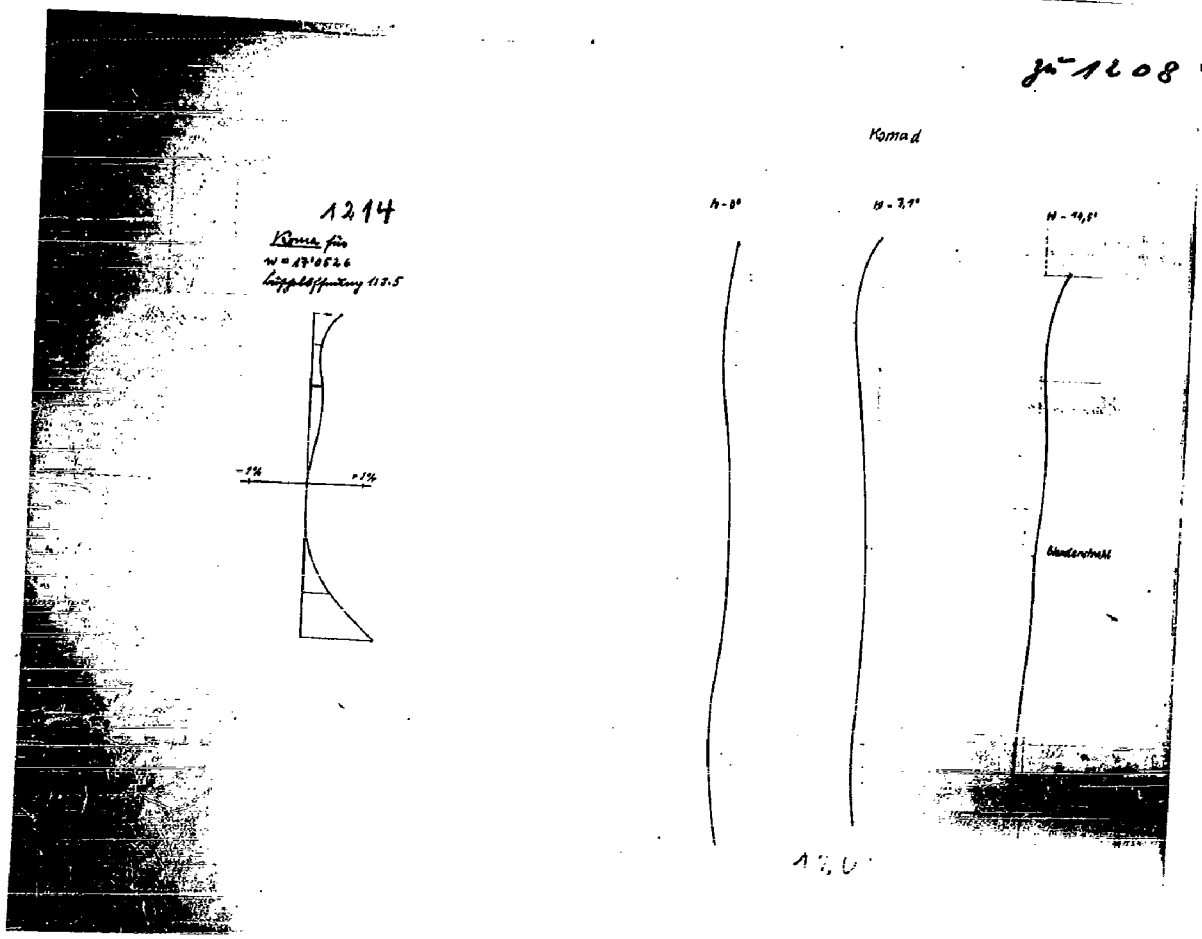
Nr 1207 1314

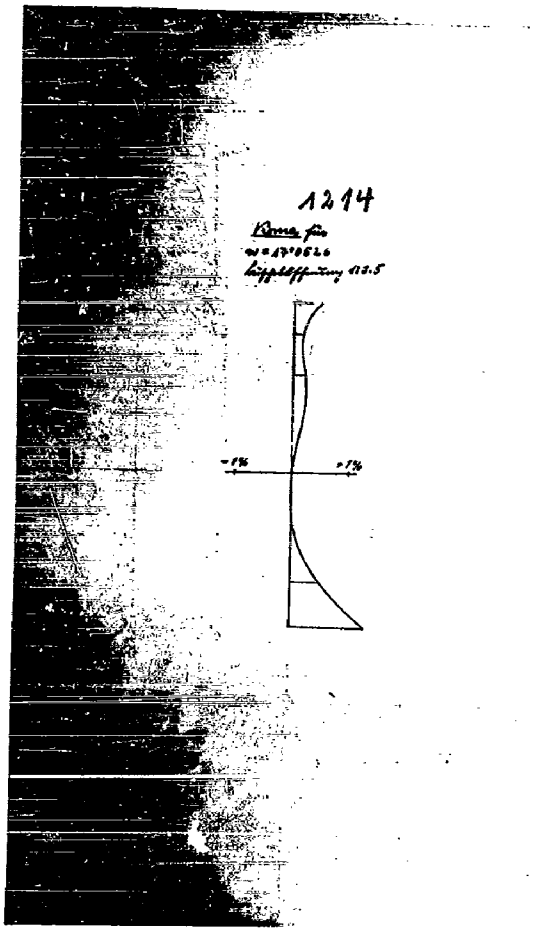


Nr 1208 1316




Komp d u g
Nr 1207
1314
1207

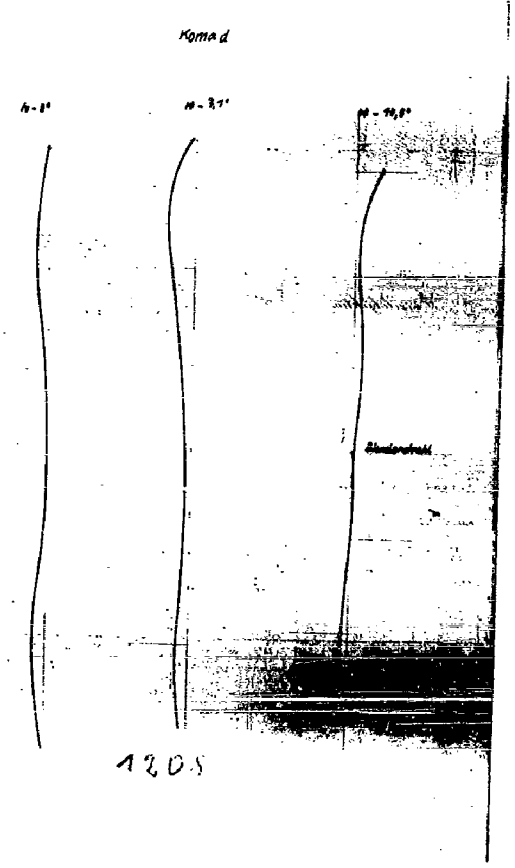

Nr 1208
1316
1214
Komp für
W = 13°05'26
Längsneigung 1:3,5
-1%
+1%
Komp d
Handrad
1208



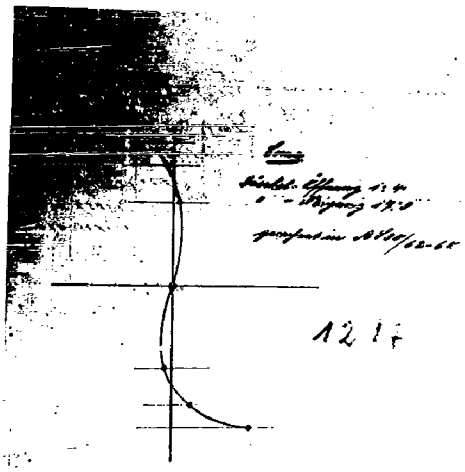
1214

Komb. für
w = 17°05'26
Kippabfassung 113.5

-1% +1%

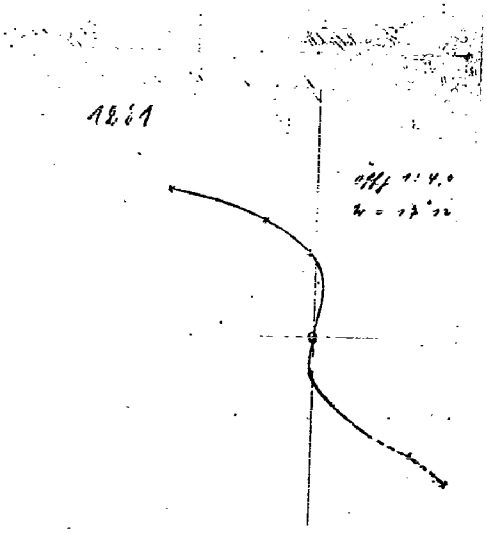


1205



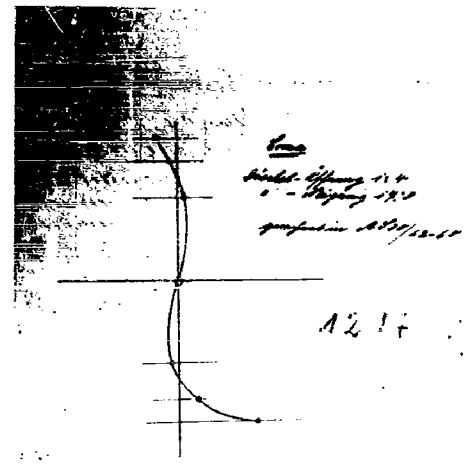
Komb
Kimbl. Öffnung 1:n
s - Neigung 1:n
geneigt in Achse/Gegen

1211

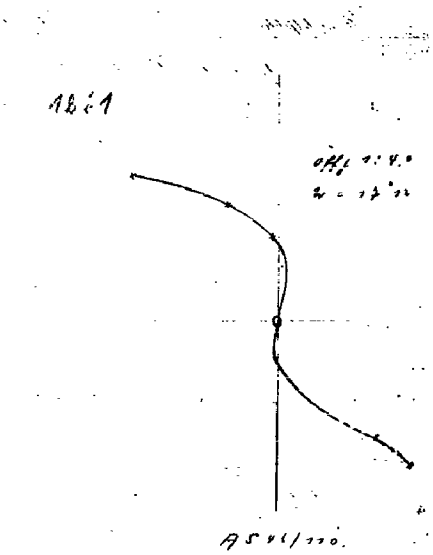


95 v.H. / 110.

3ª 1221 1332

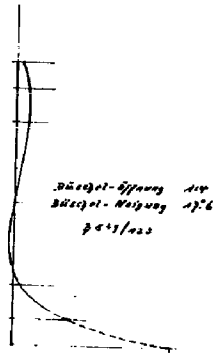


1:2,1

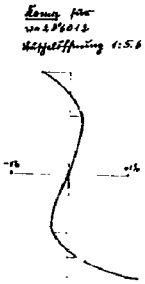


1:1

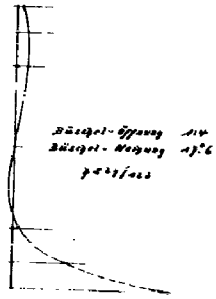
3ª 1224 1336



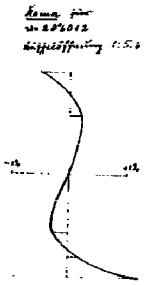
1124



1231



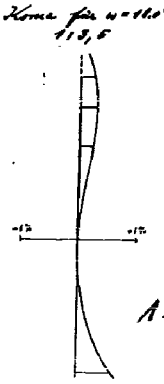
1224



1231.

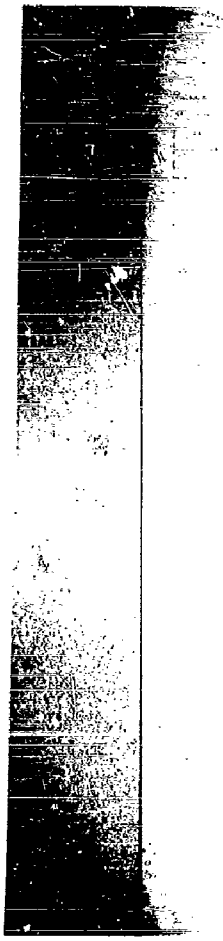


1232

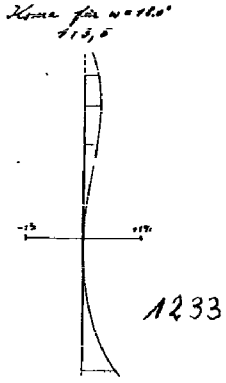


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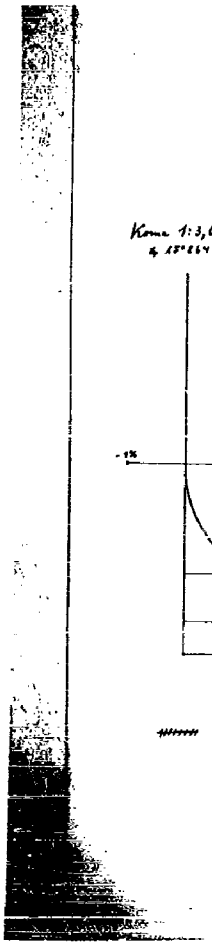
Zu 1233 1348

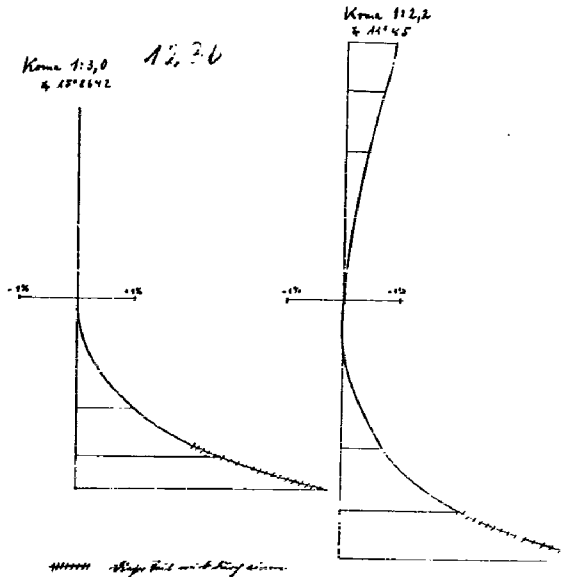




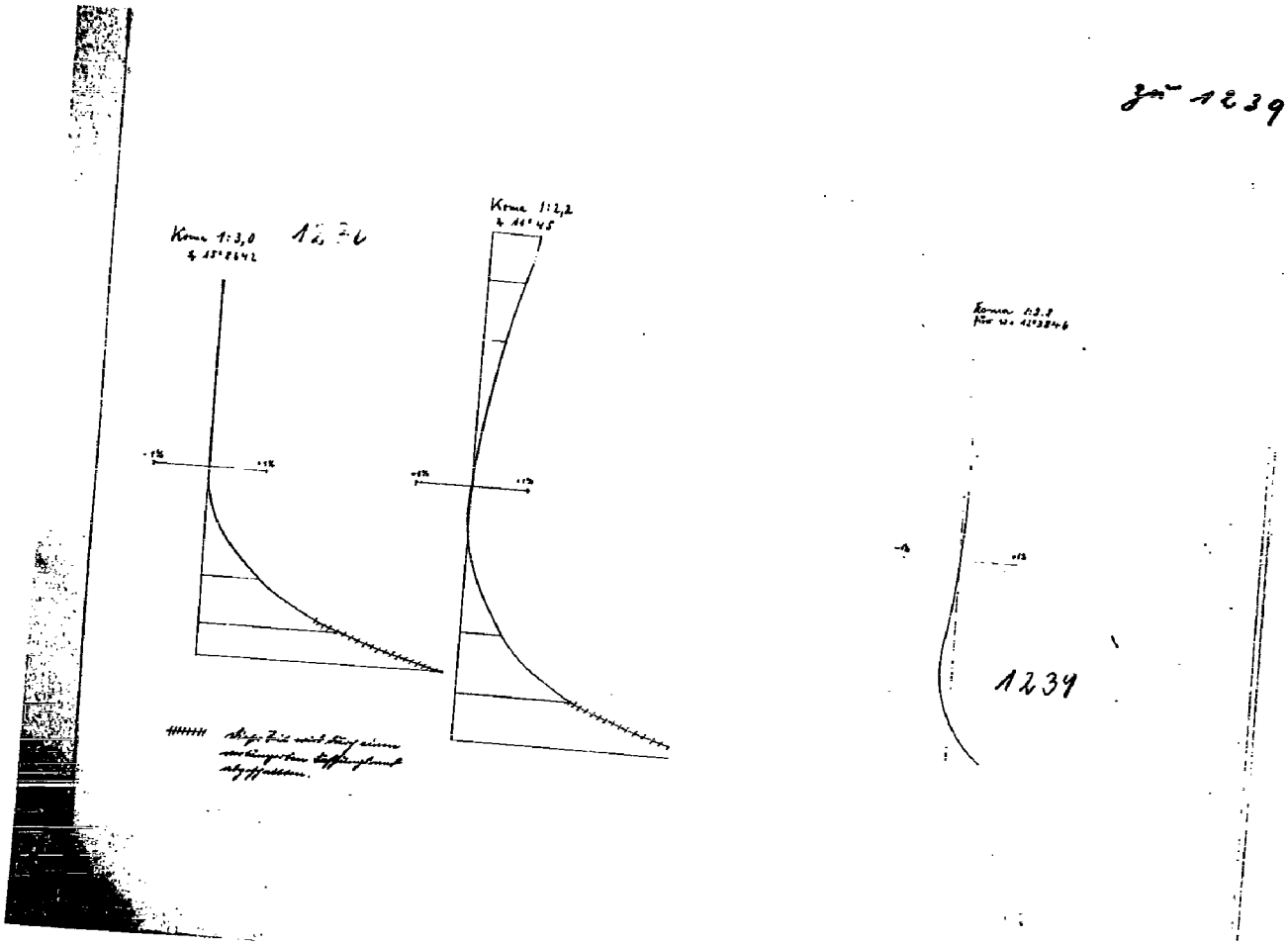


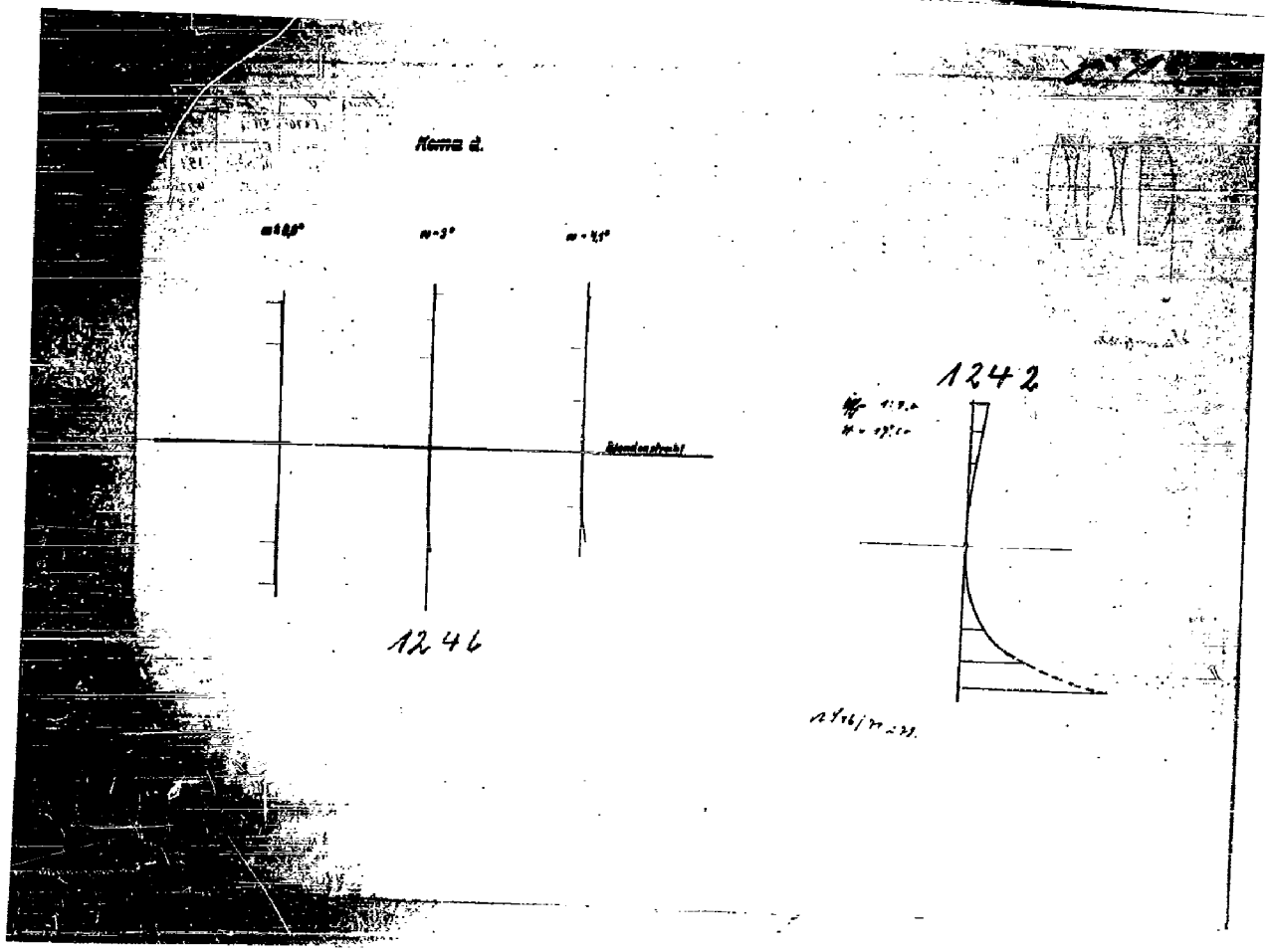
Zu 1236 1351

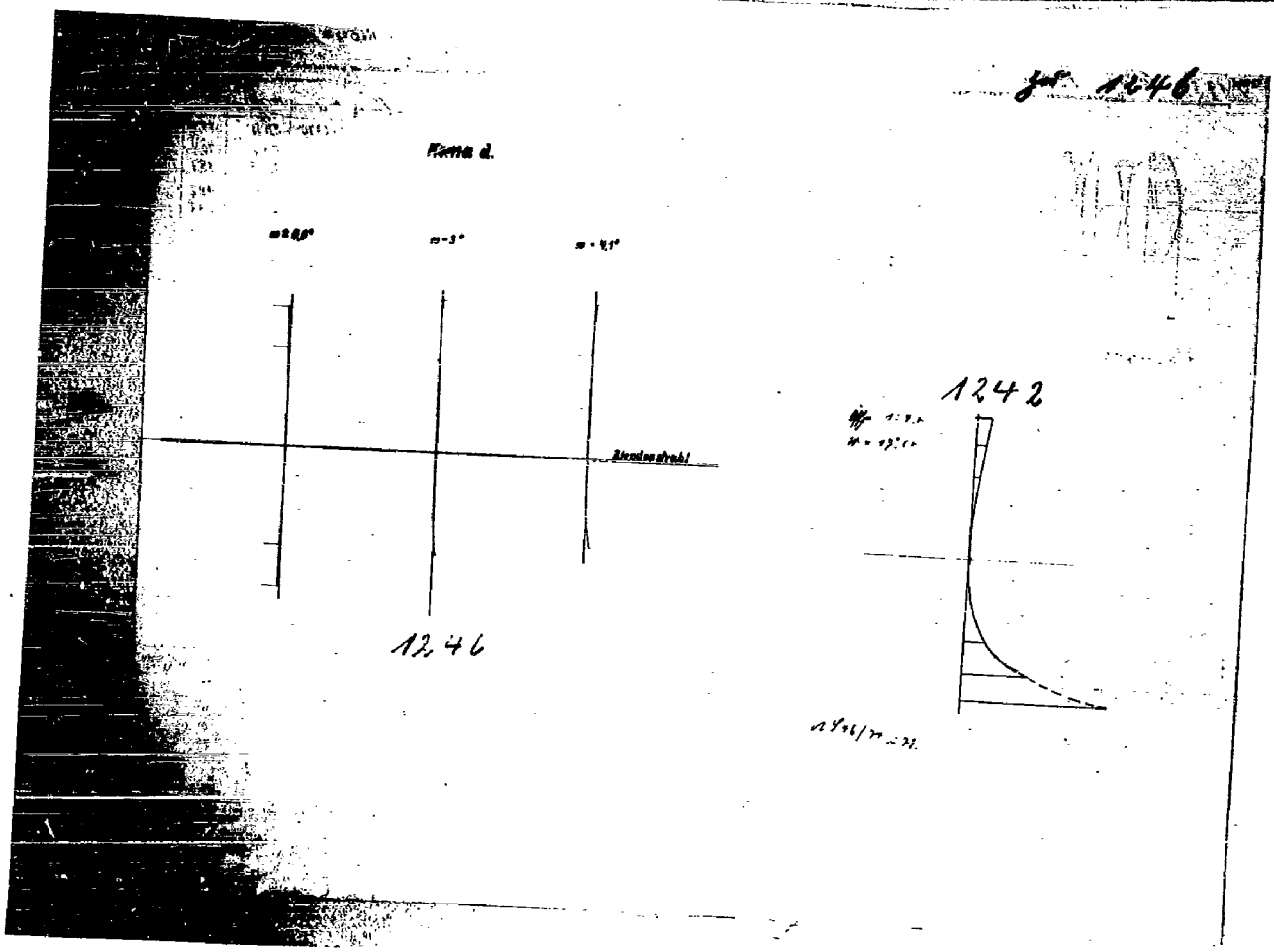


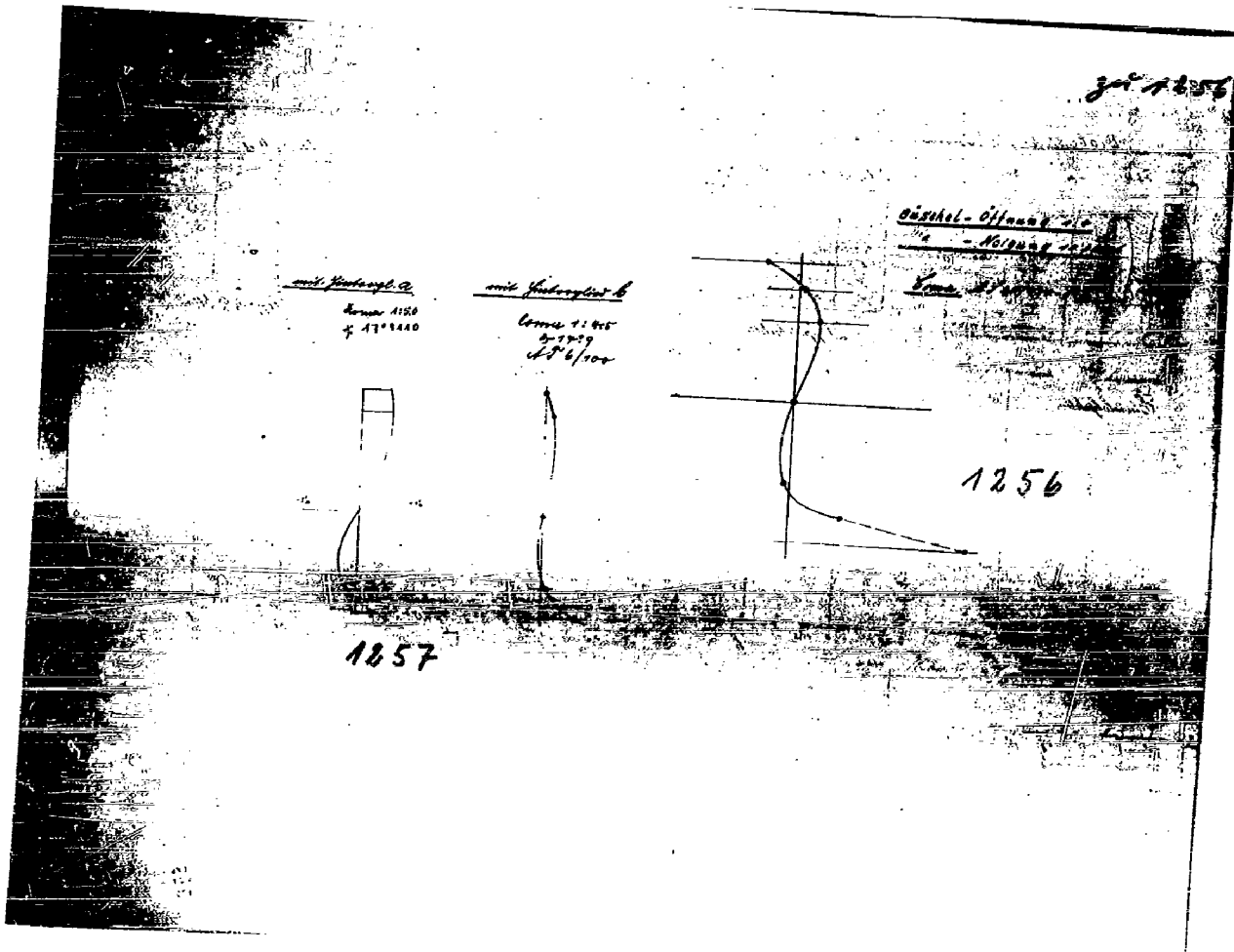


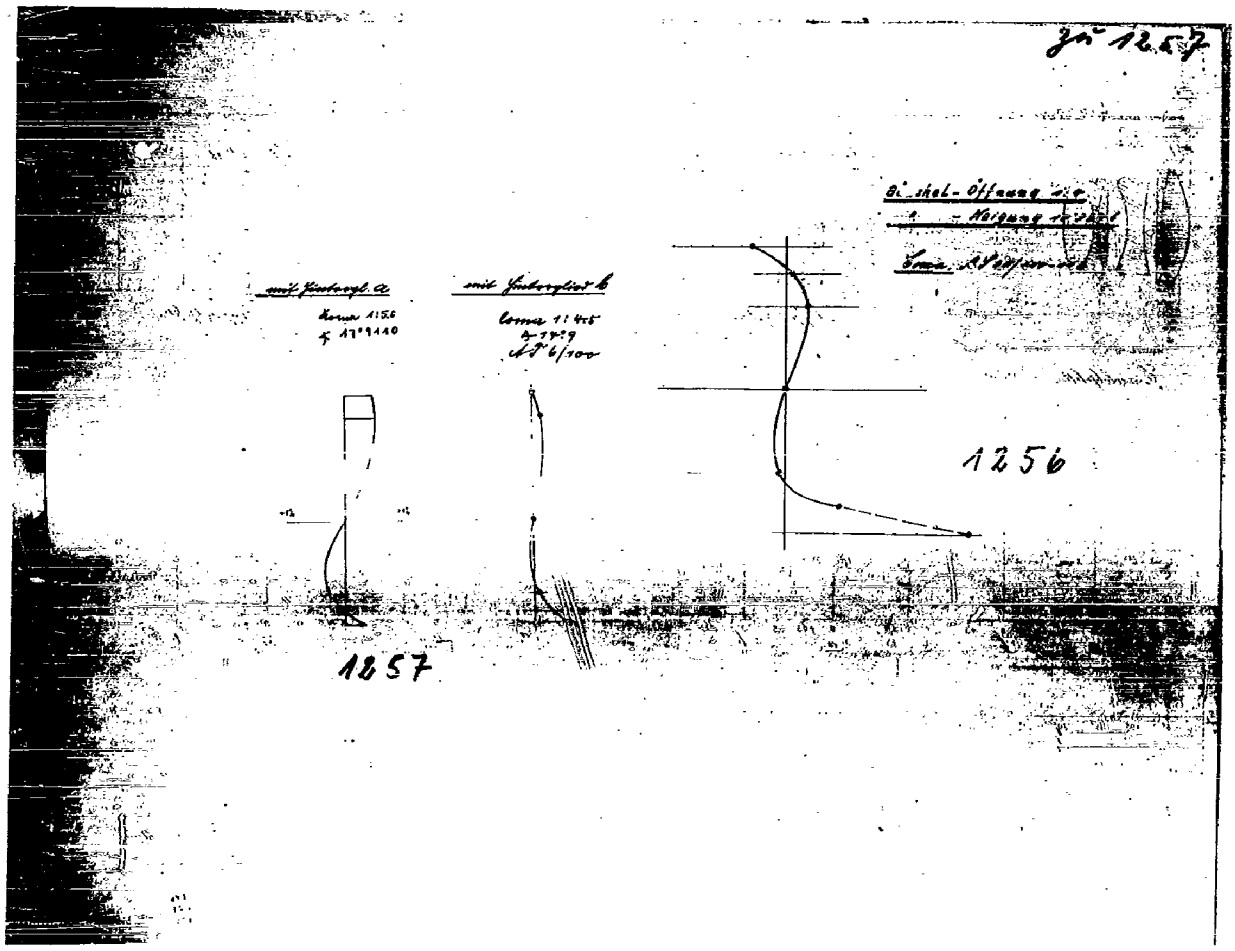



Kerne 1:3,0
Kerne 1:2,2
1236
1239


Kerne d.
1246
1242


1246
1242


1256
1257


Jn 1257
1377
mit Zinkvogl. a
Lenne 1:56
mit Zinkvogl. b
Lenne 1:46
1256
1857

F-1:3,6982-RE

924

F. Reichert's Zeiss-Reimarus Plan-Tessar

Einzellobjektiv | Doppelobjektiv

(H 28.14) Sphärische Korrektion (A 3 XVIII) 11 f = 114,9

Δs'			Δf'		
-2.9	-9.7	-9.8	-2.0	-8.6	-16.3

Einfallshöhen			Chromasie	
7.5	11.8	13.6	-7.5	(-0.6) -7.5

Δs'			Δf'		
-5.5	-7.4	+11.0	-1.5	-4.2	-7.0

Einfallshöhen			Chromasie	
14.1	14.4	14.4	-5	-5

(F 15.27) Astigmatismus (III)

Aequatorialbüschel		Meridionalbüschel			
+4.9	+2.6	+7.5	+1.0	-3.2	+3.9

Frontwinkel		Vorzeichnung	
42.2	66.6	87.6	n=0

Aequatorialbüschel		Meridionalbüschel			
+4.9	+2.5	+6.1	+4.8	+2.6	+5.8

Frontwinkel			Vorzeichnung
42.2	58.2	71.8	n=0

Radien, Dicken und Abstände für f = 100 mm

r	r1	r2	r3	r4	d1	d2	d3	d4	d5
87	21.3	21.8	91.0	12.8	9.2	6.0	0.9	0.4	1.5

$\sum \frac{d}{n} = 20.3046$

$\frac{1}{\sum \frac{d}{n}} = +630$

D. Reichert's v. - Rohr Plan-Tessar

(Abhandl. f. Feinmechanik № 12 (1924) Zeiss Ikon A.-G. Dresden)

Linse	n_g	$n_g - n_k$	r
L1	1.55852	0.01505	vr 1
L2	1.54760	0.00959	4
L3	1.61572	0.01576	vr 1

Einzellinse | Doppelobjektiv

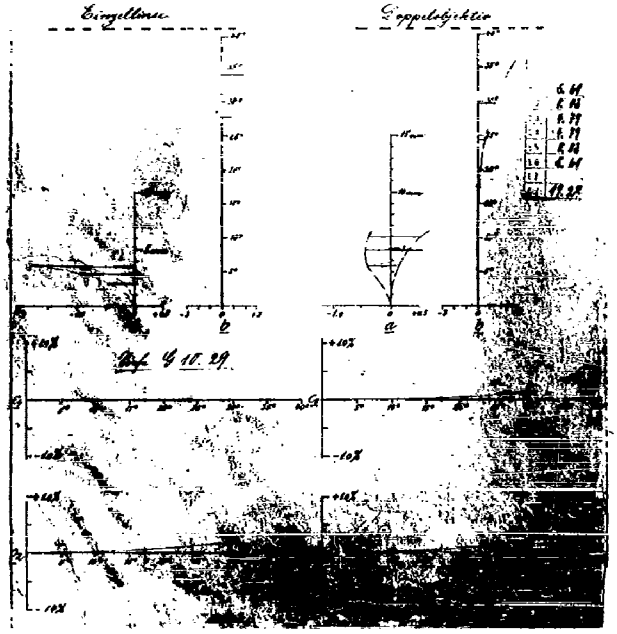


Bild 4 § 10.29

924

F-1:3,6982-RE

925

Steinheil, Orthostigmat (Ans. A. Steinheil, geometr. Optik)

1:7, f = 103

Einzellobjektiv | Doppelobjektiv

(H 28.10) Sphärische Korrektion (A 3 XVIII) 11 f = 102,9

Δs'			Δf'		
-15.8	-7.4	+21.8	-10.2	+4.4	+22.2

Einfallshöhen			Chromasie	
14.6	15.6	16.7	-12	(-10.8) -17.0

Δs'			Δf'		
-9.1	11.1	+6.5	-10.7	-15.0	-2.5

Einfallshöhen			Chromasie	
11.4	23.2	28.5	-14	(+3) -6

(F 15.29) Astigmatismus (XV) 98/99

Aequatorialbüschel		Meridionalbüschel			
-2.7	-4.4	-2.1	+1.6	+7.8	+11.1

Frontwinkel			Vorzeichnung
39.2	44.1	52.6	n=0

Aequatorialbüschel		Meridionalbüschel			
-3.5	-4.5	-3.1	+0.3	+4.7	+10.3
-3.4	-1.7	+4.3	+2.7	+10.7	+16.3

Frontwinkel			Vorzeichnung
39.5	58.2	69.4	n=0
45.8	66.8	74.0	

Radien, Dicken und Abstände für f = 100 mm

r	r1	r2	r3	r4	d1	d2	d3	d4	d5
87	21.3	21.8	91.0	12.8	9.2	6.0	0.9	0.4	1.5

$\sum \frac{d}{n} = 0.00107$

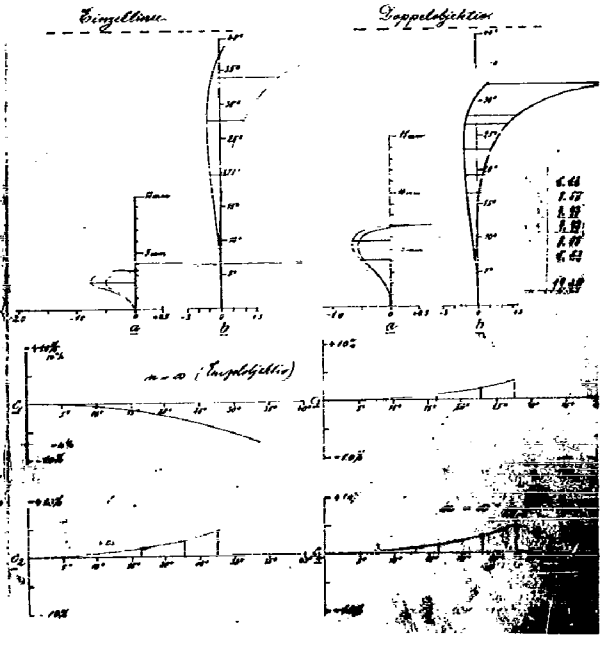
$\frac{1}{\sum \frac{d}{n}} = 500$ Doppelobjektiv

Steinheil, Orthostigmat (Ans. A. Steinheil, geometr. Optik)

1:7, f = 103

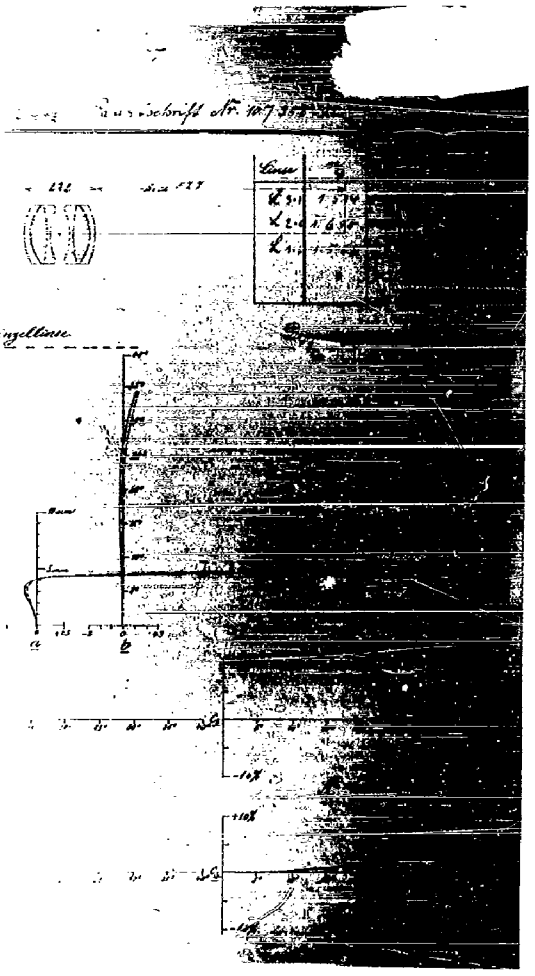
Linse	n_g	$n_g - n_k$	r
L1	1.57472	0.01603	vr
L2	1.61550	0.01197	vr
L3	1.60772	0.01551	vr

Einzellinse | Doppelobjektiv



F-TS-1798-RE





926

F-TS-6398-RE

926

Einzelobjektiv f = 5[illegible]

Doppelobjektiv f = 46.05

Sphärische Korrection K [illegible]

Δs'			Δf'		
-14.8	-10.8	+6.8	-11.4	-6.0	+1.8

Einfallshöhen			Chromasie
8.7	12.3	15.1	+.5 (-.04) -.57

Δs'			Δf'		
-9.4	-1.1	7.7	-10.0	-4.2	9.3

Einfallshöhen			Chromasie
15.3	21.6	26.5	+.39 (-.10) +.19

Astigmatismus K [illegible]

Aequatorialbüschel		Meridionalbüschel	
-8.3	-5.7	-5.4	-3.8	-1.5	+1.5

Brennwinkel			Bezeichnung
81.0	87.6	66.7	

Aequatorialbüschel		Meridionalbüschel			
-.76	-.48	-.39	-.22	.0	+.72

Brennwinkel			Bezeichnung
57.1	59.0	69.6	Jung Rud. -.12 -.39 -.09

Radien, Dicken und Abstände für f = 100mm

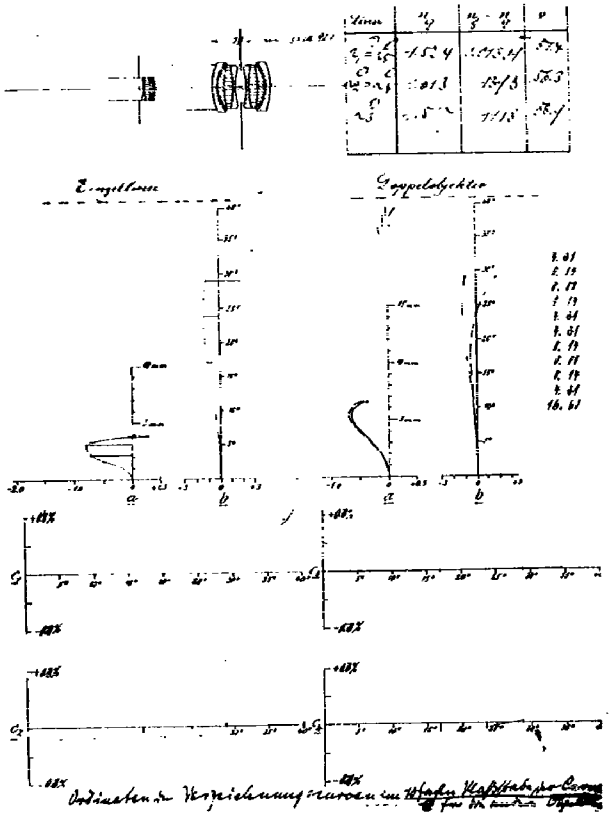
r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5
-12.4	-19.3	-11.3	-6.4	-2.11	-1.3	1.1	1.4	1.7	1.2	4.3	.7

$\sum \frac{d}{n} = 3.424$

$\frac{1}{\sum \frac{d}{n}} = 42.0$ Brennlinie

r1 r2 r3 r4 r5 r6 — d1 d2 d3 d4 d5

23 8 33 x 33 7 41 x 13 2.1 7 0 — 1.9 0 7 3.3 2 x (3 7 x 3



Indicatoren der Bezeichnung waren im Hafen Kapitäne [illegible]

927

S. K. P. 113691 publiziert 22.07

Brit. Pat. 15913.

N. Zeitschr. f. Photogr. Photogr. Arch. 1912 745.550. [Schaded Jahrg. 1, 1913]

Goerz Ed. Pd 3618 °3

F-TS-6398-RE

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Goerz. Ed Pd 3618 °3

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (f XVII).

Δs'			Δf'		
-11.3	-9.3	+5.3	+6.4	+2.4	+5.6

Einfallshöhen			Chromasie
11.3	16.0	19.6	

Δs'			Δf'		
-5.4	-3.3	+1.3	-6.5	-7.6	1.3

Einfallshöhen			Chromasie
20.1	22.6	35.9	+49.49 (-.259) +46.22

Astigmatismus f XVII. 47

Aequatorialbüschel		Meridionalbüschel			
-7.1	-5.4	-3.3	-0.8	+0.3	+1.5

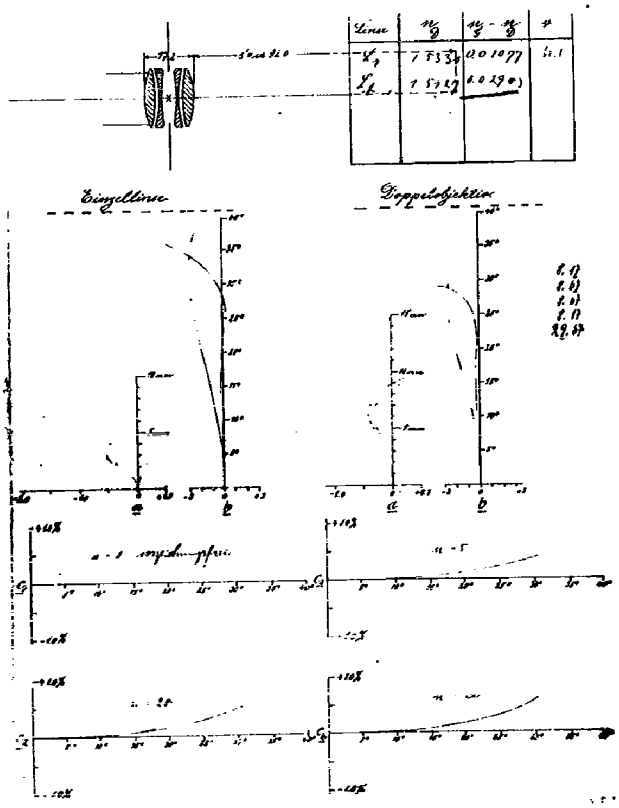
Brennwinkel			Bezeichnung
47.3	66.3	81.6	Jung Rud. -18. -12. -13.

Aequatorialbüschel		Meridionalbüschel			
-1.1	-1.0	-1.0	-1.2	-1.1	-1.0

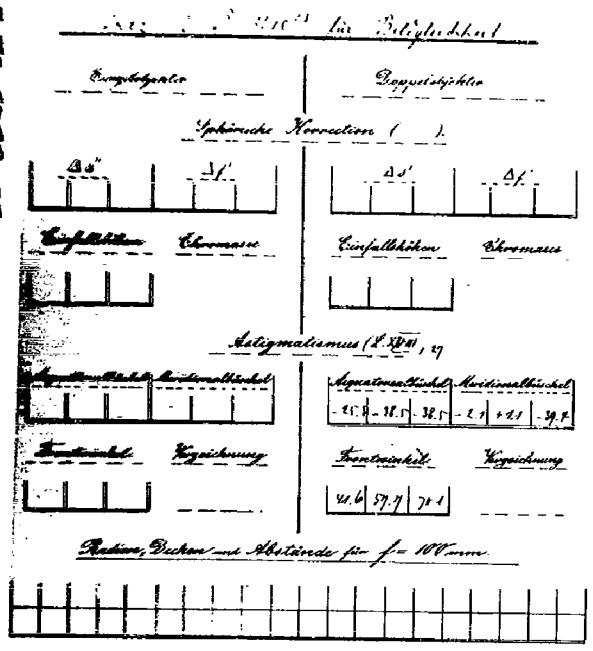
Brennwinkel			Bezeichnung
44.5	57.7	70.1	

Radien, Dicken und Abstände für f = 100mm

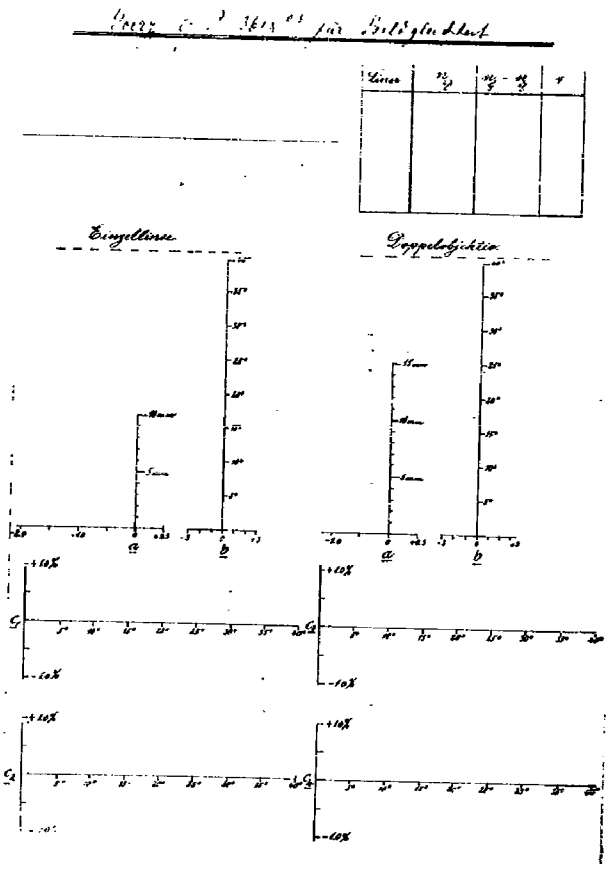
r1	r2	r3	r4	r5	r6	d1	d2	d3
35.	54.	17.	2.4	+.9	+.5	3.5		



№ 540



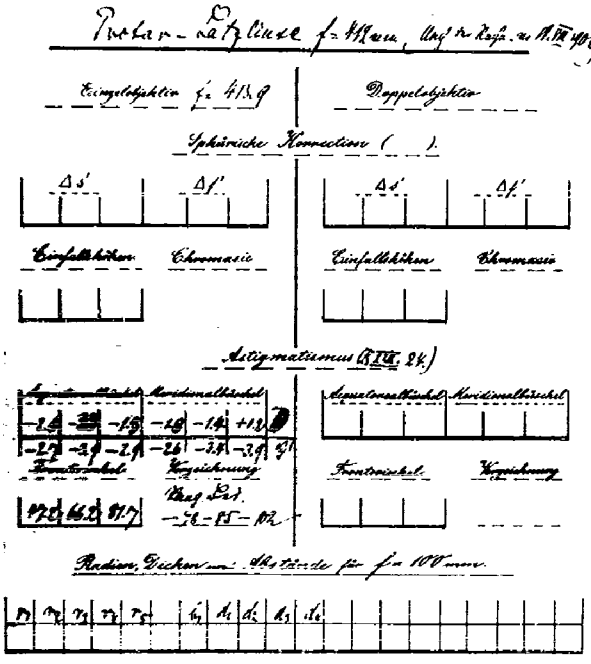
№ 544

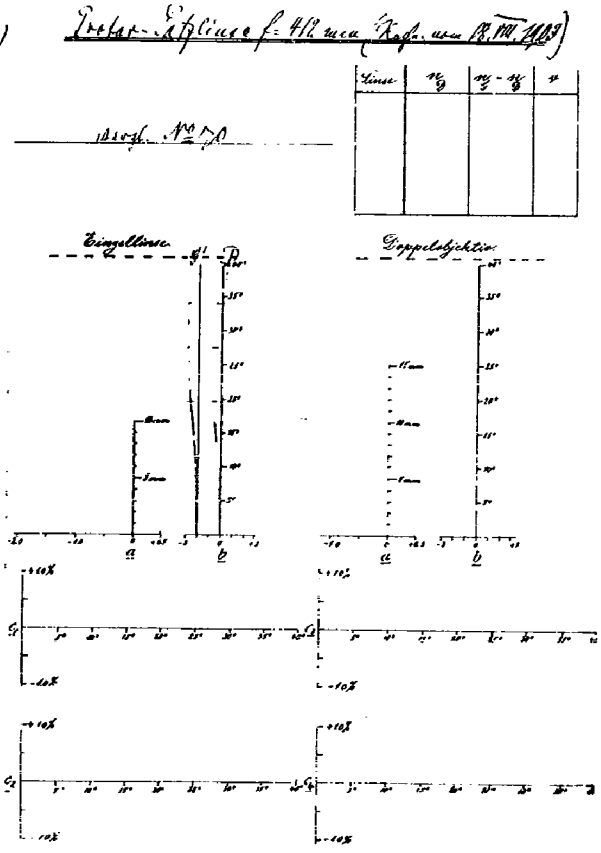


F-TS-6398-RE

924

№ 862.





F-TS-6328-RE

930

F-TS-6398-RE

1:63

C. P. Goerz Doppelanastigmat Serie III

Einzelobjektiv f = 11 cm

Doppelobjektiv f = 22 cm

Sphärische Korrektion (Fig. III 11)

Δs'		Δf'			
−12	−2.5	+11.5	−4.1	−0.5	+10.4

Einfallshöhen		Ebenmaße	
42	44	47	−13 −7.1 −1.45

Δs'	Δf'

Einfallshöhen	Ebenmaße

Astigmatismus (Fig. III 3)

Aequatorialbüschel		Meridionalbüschel		
−2.5	−4.4	−4.9	−2.6	−4.8	−7.2

Frontalbüschel	Bezeichnung
47.5	46.2	47.7	Zeiss Lot. −12 −98 −116

Aequatorialbüschel	Meridionalbüschel

Frontalbüschel	Bezeichnung

Radien, Dicken und Abstände für f = 100 mm (Doppelobjektiv)

r	r₂	r₃	r₄	r₅	r₆	r₇	r₈	r₉	r₁₀	r₁₁	r₁₂
24.4	−22.0	22.0	22.0	72.5	34.6	1.9	5.1	0.8	2.8	1.8	2.6	1.8

C. P. Goerz Doppelanastigmat

Linse | n_g | $n_g - n_F$ | v

K_1	1.5137	0.01186	64.6
F_2	1.6145	0.0122	36.3
K_2	1.5137	0.0105	64.0
K_3	1.5136	0.0116	63.9
F_3	1.6148	0.0157	37....

Einzellinse

Doppelobjektiv

F-TS-6398-RE

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1:63

D.R.P. 155525 ... 64

Zus. Anmeldt. R. 17047 VIIIa

Kapp. d. III. v. Ausg. d. 21. II. 04.

C. P. Goerz Doppelanastigmat Serie III

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Fig. III 11)

Δs'		Δf'			
−12.5	−17.4	−5.9	−1.6	−10.5	−5.3

Einfallshöhen		Ebenmaße	
38.7	40.2	41.0	−7.1 (−8.4) −11.7

Δs'		Δf'			
−8.6	−13.4	10.5	7.1	15.9	12.4

Einfallshöhen		Ebenmaße	
14.9	20.1	15.9	−6.1 (−6.) −6.6

Astigmatismus (Fig. III 7)

Aequatorialbüschel		Meridionalbüschel			
−2.5	−5.0	−8.7	−6.2	−5.4	+2.0

Frontalbüschel	Bezeichnung
47.2	46.3	47.6	Zeiss Bot. −12 −99 −119

Aequatorialbüschel	Meridionalbüschel
−4.0	−4.3	−2.6	−5.1	−5.2	+0.7

Frontalbüschel	Bezeichnung
40.4	46.2	48.5	

Radien, Dicken und Abstände für f = 100 mm

r₁	r₂	r₃	r₄	r₅	r₆	r₇	r₈	r₉	r₁₀
25.4	90.2	45.2	97.8	16.1	2.3	2.3	1.1	1.8	2.8

C. P. Goerz Doppelanastigmat

Linse | n_g | $n_g - n_F$ | v

K_1	1.497	0.00960	81.1
F_2	1.576	0.01167	41.3
K_2	1.612	0.01390	43

Einzellinse

Doppelobjektiv

F-TS-6398-RE

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F-75-6398-RE

935

Carl Reichert Wien 2 Beispiel

Einzellobjektiv | Doppelobjektiv

Sphärische Aberrationen (A' 100) s = m

Δs'			Δf'		
-75.5	-20.4	-3.3	-13.8	-18.7	-3.6
-8.2	+5.9	+7.5	-8.2	+1.7	+10.1

Einfallshöhen			Chromasie	
8.7	12.2	15.0	+2.4	(-5.3) -2.9

Δs'			Δf'		
-7.3	-1.3	+14.9	-1.4	-15.6	+21.9
-2.5	+11.6	+11.8	-2.5	+12.8	+65.6

Einfallshöhen			Chromasie	
12.1	25.5	31.3	+.49	(-.85) +.37

Astigmatismus (A' 10)

Äquatorialbüschel		Meridionalbüschel	
-3.6	-2.2	+0.9	-0.6	+2.5	+7.8
-4.5	-2.5	-1.4	-2.9	+3.5	-6.6

Äquatorialbüschel		Meridionalbüschel	
-2.3	-2.9	+0.5	-6.7	+7.5	+2.6
-2.3	-3.3	-1.9	-2.9	+2.4	-1.8

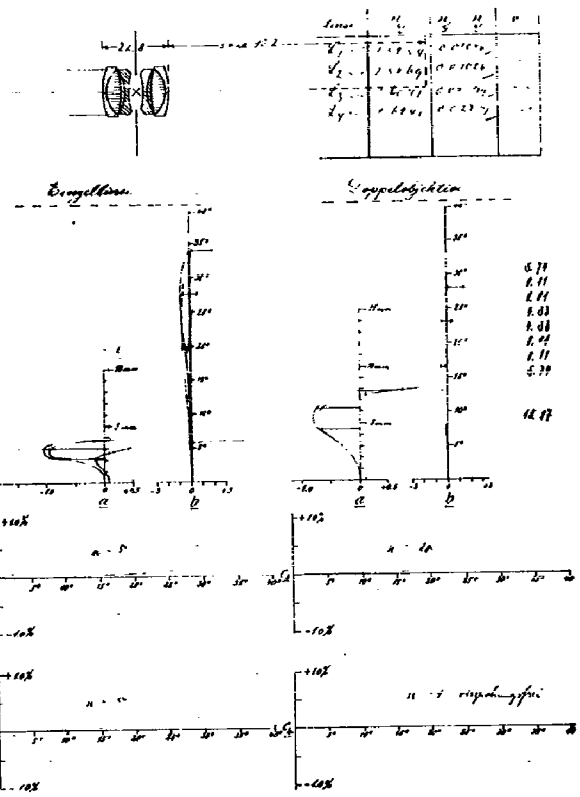
Feldwinkel	Vergleichung Tang. Bed.		
17.3	66.3	80.6	-94 -103 -125

Feldwinkel	Vergleichung	
39.8	55.5	67.4	+.29 +4.5 +9.35

Radien, Dicken und Abstände für f = 100 mm

24.5	44.4	27.6	10.2	2.5	1.2	1.5	5.0	1.2	

Carl Reichert Wien 2 Beispiel DRP 153525



F-75-6398-RE

934

Carl Reichert Wien 3 Beispiel

Einzellobjektiv | Doppelobjektiv

Sphärische Aberrationen (A' 100) s = m

Δs'			Δf'		
-8.6	-12.2	0	-7.9	-11.4	-0.6

Einfallshöhen			Chromasie	
7.0	9.9	12.1	+.60	(-.64) -.4

Δs'			Δf'		
-6.0	-7.9	-4.3	-6.3	-8.8	-5.9

Einfallshöhen			Chromasie	
12.4	19.5	24.3	-.64	(-.14) +.50

Astigmatismus (A' 10) s = m

Äquatorialbüschel		Meridionalbüschel	
-2.0	-0.8	+4.1	-0.4	+9.2	+34.3

Äquatorialbüschel		Meridionalbüschel	
-1.6	-0.9	+3.3	+0.3	+8.1	+30.1

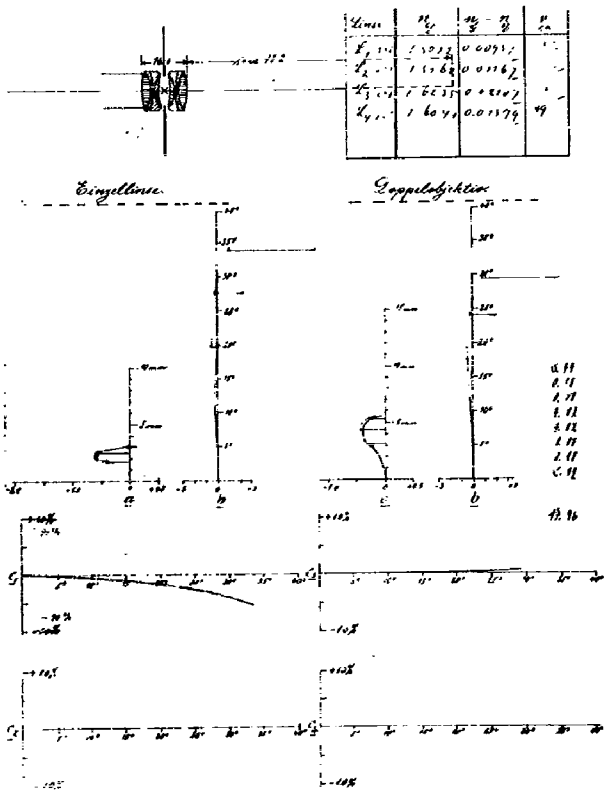
Feldwinkel	Vergleichung Tang. Bed.		
17.3	66.3	80.6	-72 -80 -96

Feldwinkel	Vergleichung	
14.8	58.0	72.9	

Radien, Dicken und Abstände für f = 100 mm

54.7	77.4	11.4	2.2	1.2	3.0	0.7	0.3	3.1	

Carl Reichert Wien 3 Beispiel DRP 153525



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Ernemann Werke A.G. Dresden

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (N XXIII, 18)

Δs'			Δf'		
-7.0	+3.5	+2.8	-10.2	+2.8	+7.7

Einfallshöhen			Chromasie	
10.7	15.7	18.5	(-4.1)	+13.4

Δs'			Δf'		
-7.0	-7.3	-7.5	+7.7	+7.8	+7.5

Einfallshöhen			Chromasie	
11.8	24.7	34.8	(-17.1)	+17.4

Astigmatismus (N XXII)

Äquatorialbüschel		Meridionalbüschel		
+7.4	-9.3	-9.5	-5.0	+0.4

Äquatorialbüschel		Meridionalbüschel		
-6.6	-11.6	+3.6	-4.4	-4.8	-0.8

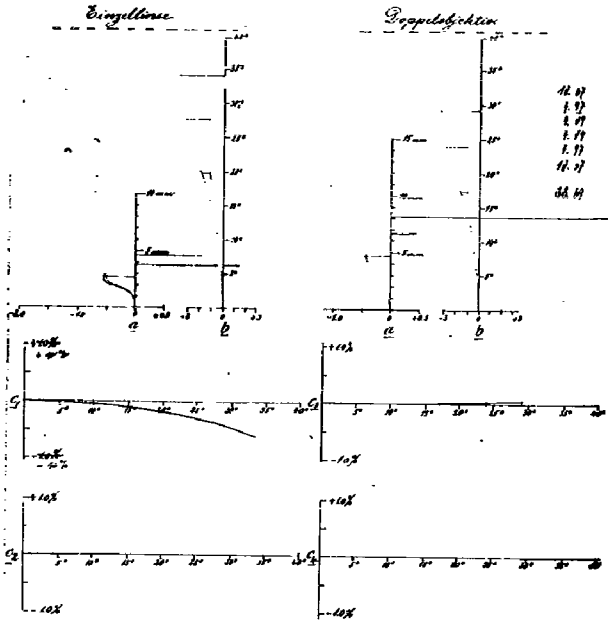
Frontwinkel	Kegelzeichnung
47.3	82.3	87.6	

Frontwinkel	Kegelzeichnung
41.5	57.6	74.3	-76-87-116

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5
23.8	9.8	∞	39.8	20.9	1.6	1.3	1.0	0.4	2.5

Einzellinse | Doppelobjektiv



№ 70

Protarlinse 1/12.5, f = 350 mm v. 16. F. 03

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (N XIII, 3 ... 37)

Δs'			Δf'		
-11.6	-9.6	+4.9	-15.9	-17.4	+4.1
-13.1	-7.2	+27.3	-11.7	-6.6	+23.4

Einfallshöhen			Chromasie	
25	42.3	46.4	(-42) (-17)	(-8) (-65)

Δs'			Δf'		
-14.1	-16.0	+1.1	-14.5	-17.5	-1.5
-9.1	-6.0	+19.6	-12.0	-7.7	+17.4

Einfallshöhen			Chromasie	
42.3	29.9	31.8	(-3) (-17)	(-38) (-37)

Astigmatismus (N XXII, 1, 9, 21, 34 ... 73)

Äquatorialbüschel		Meridionalbüschel		
-2.6	-3.2	-2.2	-2.0	-2.2	-2.0
-3.0	-4.0	-3.2	-3.0	-4.4	-5.0

Frontwinkel	Kegelzeichnung
49.8	76.9	69.6	-79-85-103

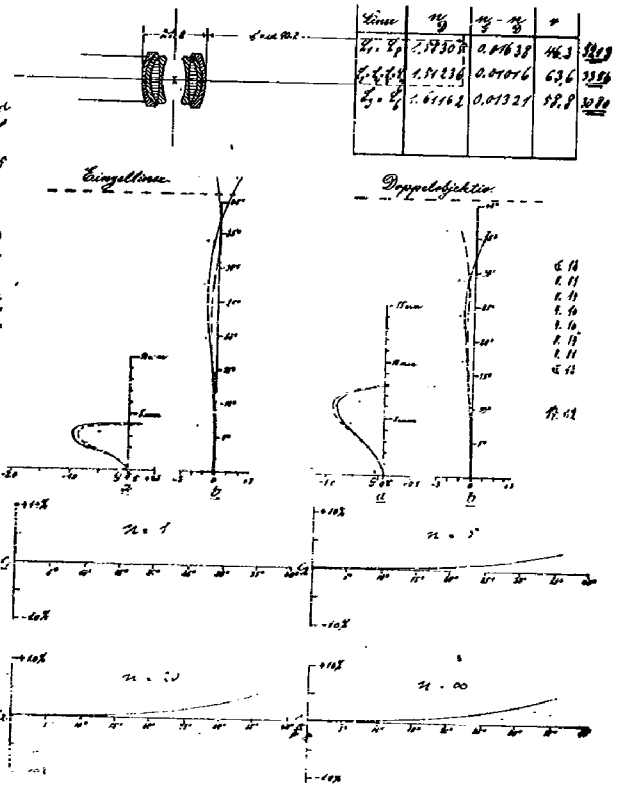
Radien, Dicken und Abstände für f = 100 mm (Doppelobj.)

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5
44.5	17.7	44.4	31.5	1.0	1.9	3.2	0.8	4.0	2.5

F-75-6398-RE

936

Protarlinse 1/12.5, f = 350 mm v. 16. F. 03



Z 22 8870

Projektionsweite $f = 350$ mm

Einzelobjektiv $f_D = 357.38$ mm

Doppelobjektiv $f = 260.559$ mm

sphärische Korrektion (I. VIII Bd. 37)

$\Delta s'$			$\Delta f'$			
-18.6	-17.6	+4.7	-15.4	17.4	+4.1	D
-18.1	-7.2	+17.3	-10.2	-6.6	23.8	g

Einfallshöhen — Ebenmaße

			-56	+44	+193	+59
9.3	23.2	46.2	(-11)	(-16)	(-56)	(-69)
			-98	-6	+107	+316

$\Delta s'$			$\Delta f'$			
-18.1	-16.8	+2.1	-18.9	-17.5	-1.5	D
-9.1	-6.0	+19.6	-8.0	-2.7	+17.4	g

Einfallshöhen — Ebenmaße

			-68	+58	+180	+381
18.3	28.4	41.8	(-3)	(-15)	(-48)	(-71)
			-68	+43	+132	+349

Astigmatismus β. VIII. $y = 21$

y' X. XIII. 34.73 $\nu_0 \cdot \nu_0$

Aequatorialwinkel		Meridionalwinkel				
-2.7	-3.4	-7.4	-7.3	-7.4	-0.1	D
-11.8	-4.1	-8.6	-9.2	-4.6	4.4	g

Aequatorialwinkel — Meridionalwinkel

-2.6	-3.2	-2.0	-2.0	-2.2	-2.0	D
-7.8	-4.1	-7.6	-7.1	-5.0	-8.4	g

Brennwinkel — Vorzeichnung — Brennwinkel — Vorzeichnung

97.3	64.1	44.6	-71 - 85 - 103	40.5	57.0	69.7	-71 - 85 - 103

-71 - 86 - 103 g' — -71 - 86 - 103

Radien, Dicken und Abstände für $f = 100$ mm

r_1	r_2	r_3	r_4	r_5	d_1	d_2	d_3	d_4	d_5
Br.	66	35	44.6	69.3	4.4	0.5	3.0	7.9	1.0

Projektionsweite $f = 350$ mm, [illegible]

Linse	n_1	n_2	n_3	ν
L_1 L_2	1.5725	1.00518		63.6
L_3	1.6116	1.01581		58.8
L_4	1.5430	1.01638		46.5

Einzellinse (vergl. Bem. 1 S. 2)

Doppelobjektiv

Projektionsabstand auf S. 3

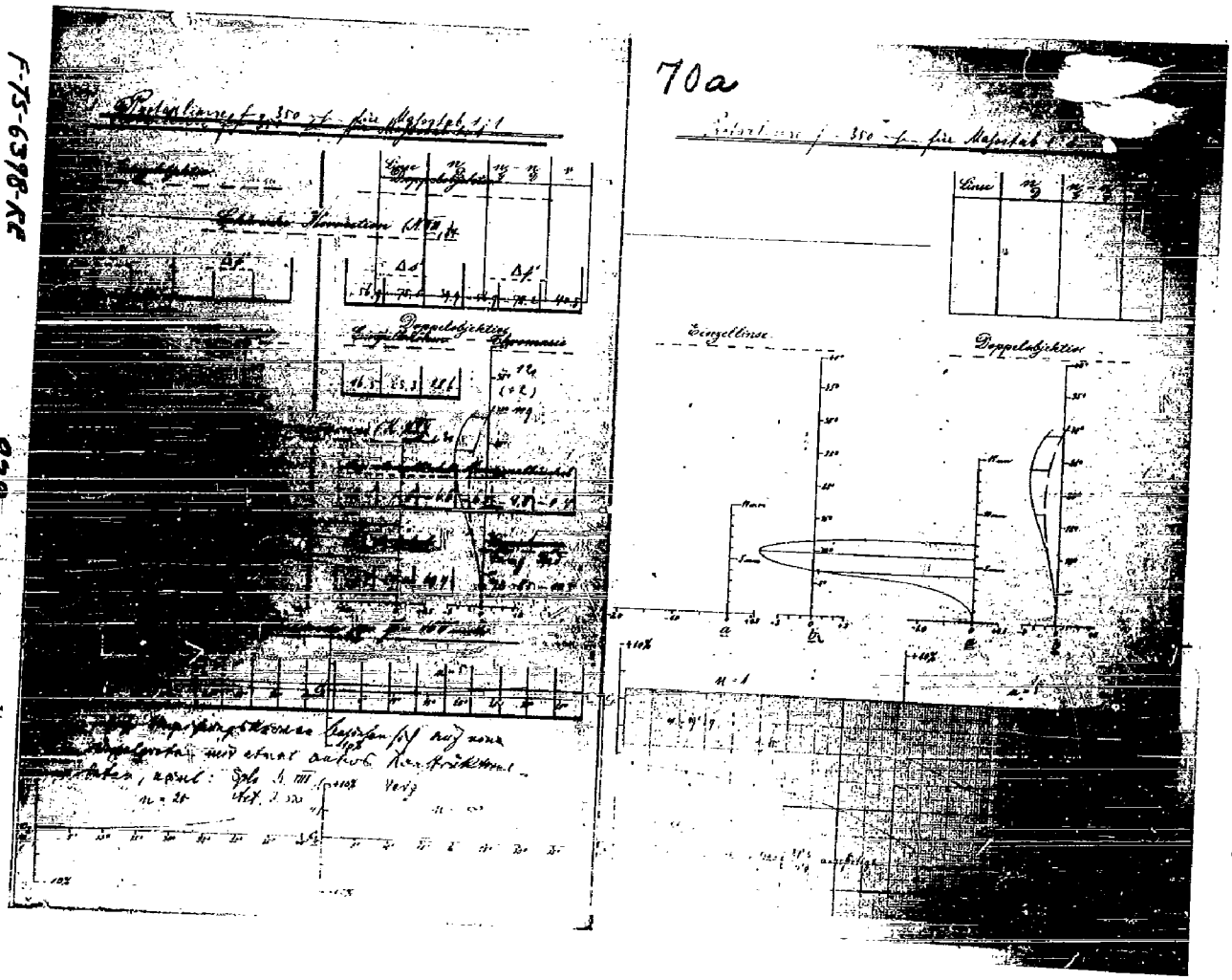
F-75-6378-RE

937

F-15-6398-AE

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70a



F-75-6398-RE

939

Dr. R. Steinheil engl. Pat. Nr. II, III u. IV v. 1.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (K XXIII, 54, 55 A. 731 ff.)

Δs'			Δf'		
+2.5	-13.5	-4.5	-9.5	+3.2	+0.5
+1.0	-9.5	+6.5	-1.9	+3.2	+0.5

Einfallshöhen | Chromasie

8.3	7.5	9.2

(-17 / -16 / 2.5)

Δs'			Δf'		
-7.7	-11.5	-7.7	-8.5	-12.5	-9.2
-3.5	-9.5	-3.5	-7.5	-9.7	-5.5

Einfallshöhen | Chromasie

9.2	13.0	16.0

(-15.2 / +1.7 / -15.5)

Astigmatismus (K XV, 56, 57)

Aequatorialwinkel		Meridionalwinkel			
+7.5	+19.5	+33.5	+19.3	-11.5	-29.7
29.3	29.3	33.5	19.3	19.2	29.7

Brennwinkel | Krümmung Ring. Bod.

62.2	66.2	81.7

4' - 101 - 118 - 134 / 9' - 96.0 - 99.5 - 116.31

Aequatorialwinkel		Meridionalwinkel			
+3.4	+14.4	+28.8	+8.4	-12.2	-31.5
3.4	14.4	28.8	8.4	12.2	31.5

Brennwinkel | Krümmung

41.0	58.9	68.3

4' 250 + 0.0 + 63 / 9' 250 + 0.0 + 63

Radien, Dicken und Abstände für f = 100 mm

10.0	49.0	93.5		0.5	0.6	1.0	1.7

F-75-6398-RE

940

Reformierter Satzobjektiv f = 144.6 mm

Einzelobjektiv: f = 260.14 | Doppelobjektiv f = 144.6

Sphärische Korrection (DRP 334 v. 9.34 - v. 36 / f 72 / 36)

Δs'		Δf'	
+1.1	+2.5	+2.5	+14.6

Einfallshöhen | Chromasie

11.1	17.1

+90 (-65) +27

Δs'		Δf'	
-8.7	-15.0	+1.5	+4.4

Einfallshöhen | Chromasie

24.0	33.9

Astigmatismus (DRP, vom Fabr. v. 30. v. 36.)

Aequatorialwinkel		Meridionalwinkel		
-2.6	-6.5	-6.0	-6.5	-8.6	-6.3
-4.1	-2.9		-6.5	+4.5	

Brennwinkel | Krümmung Ring. Bod.

57.5	66.0	81.4
16.0		

-78 - 76 - 54

Aequatorialwinkel		Meridionalwinkel			
-8.1	-6.0	-8.5	-5.8	-7.7	-8.8
-8.4	-1.1		-6.5	2.0	

Brennwinkel | Krümmung

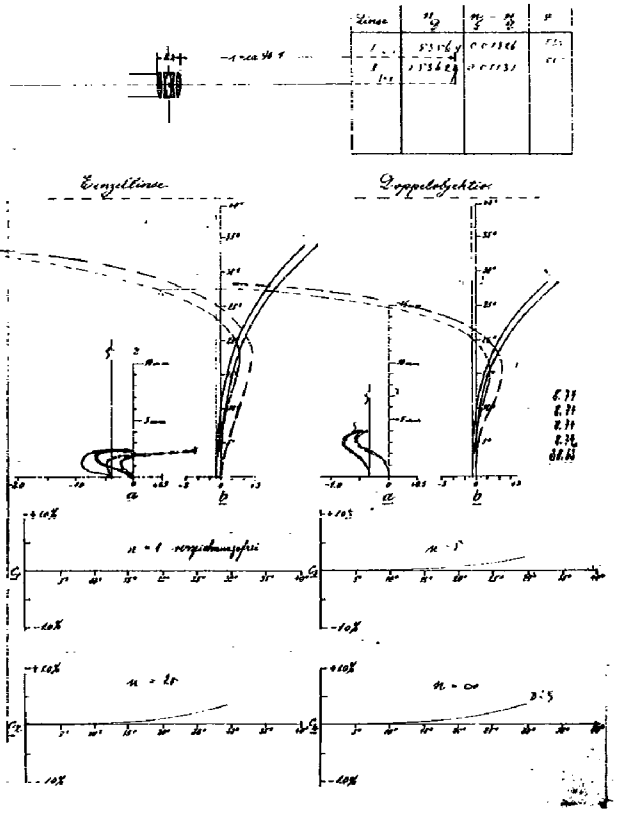
47.0	58.4	71.7
42.8	53.3	

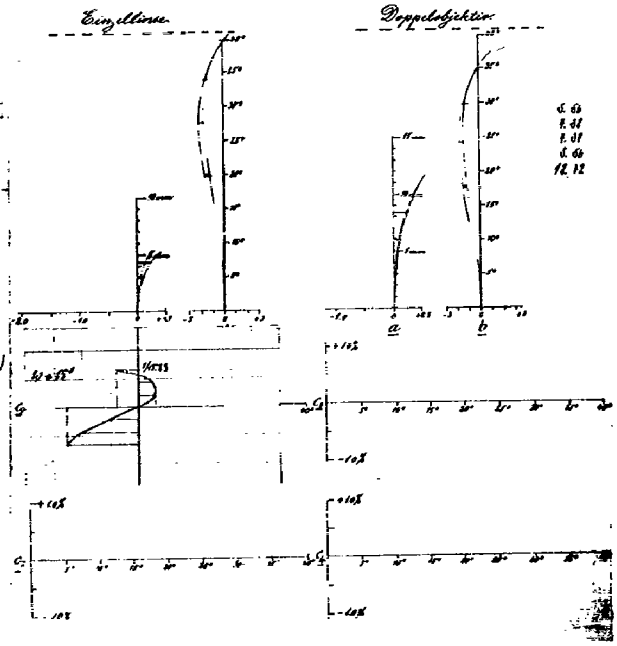
Radien, Dicken und Abstände für f = 100 mm (Doppelobjektiv)

Reformationskonzessionen (alte Fläche 3):

GHK - 6677 - 6

GF (61) - 7429 - 10





F-TS-6398-RE

941

Oskar Heinrich Dresden Tel.-Anm. v. 28 V 41

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (V 322) Nr. 36

Einzelobjektiv Δs'	Δf'	Doppelobjektiv Δs'	Δf'
-3.8 -6.0 -7.2	-3.2 -5.1 -7.0	-2.9 -3.3 -4.2	-5.6 -4.2 -5.2

Einzelobjektiv Einfallshöhen	Chromasie	Doppelobjektiv Einfallshöhen	Chromasie
9.8 13.8 17.0	+21 (-22.1) -41	16.6 23.5 28.9	+83 (-17) +66

Astigmatismus (7 XII 40, 63)

Einzelobjektiv Äquatorialbüschel	Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Meridionalbüschel
-4.3 -6.1 -6.5	-2.7 -5.1 -6.5	-2.8 -5.4 -6.0	-2.0 -3.1 -7.1

Einzelobjektiv Büschelwinkel	Kennzeichnung Farbg. Rot	Doppelobjektiv Feldwinkel	Kennzeichnung
44.6	-57 -95 -114	44.3	56.6

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	d1	d2	d3	n1	n2
9.1	27.4	22.6		3.6	2.2	1.3	1.61	1.6

Oskar Heinrich Dresden Tel.-Anm. v. 28 V 41

(Skizze v. Dresdner Opt. Nr. VIII Kapsel v. 1941)

Linse	n_g	$n_g - n_F$	ν
I	1.525	0.011	60.8
II	1.618	0.017	43.8
III	1.604	0.011	58.0
IV	1.621	0.013	56.0

Einzellinse | Doppelobjektiv

941

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1878

Objektiv Nr. 2 (Zeichnung vom 8.5.1939)

Einzelobjektiv f = 288.89 | Doppelobjektiv f = 143.68

Sphärische Korrektion (V XIII 42.)

Einzelobjektiv Δs'	Δf'	Doppelobjektiv Δs'	Δf'
+2.5 +3.8 +8.8	+2.9 +4.4 +5.7		

Einzelobjektiv Einfallshöhen	Chromasie	Doppelobjektiv Einfallshöhen	Chromasie
9.9 14.0 17.1	-13 (-57) -89		

Astigmatismus (XII 42.)

Einzelobjektiv Äquatorialbüschel	Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Meridionalbüschel
-2.3 -2.3 +0.3	-4.2 -1.6 +0.9		

Einzelobjektiv Feldwinkel	Kennzeichnung Farbg. Rot	Doppelobjektiv Feldwinkel	Kennzeichnung
42.3 66.2 81.7	-66 -72 -88		

Radien, Dicken und Abstände für f = 100 mm Sperrschliff

r1	r2	r3	r4	d1	d2	d3
21.2	38.6	21.8		2.8	1.1	3.4

Linsenschnitt (Skizze v. 18 V 1904)

Linse	n_g	$n_g - n_F$	ν
I	1.53	0.37	56.8
II	1.644		38.9

Einzellinse | Doppelobjektiv

F-TS-6398-RE

943

Reform-Nr. 2 Objektiv (Kriegsm. v. 13. II. 1909)

Einzellinse $f_1 = 281.1$ mm | Doppellinse $f = 145.65$ mm

Sphärische Korrection (s. XXIII, 27)

Δs'			Δf'			
+1.1	−1.2	−2.1	+1.6	+1.4	−1.2	D
+0.9	+1.1	+2.3	+1.9	+1.7	+1.4	gl

Einfallshöhen: 49 | 13.8 | 16.9

Chromasie: O −21 (−11) −19 | I −5 (−4) −6 | II +14 (+13) −14 | III +19 (−5) −17

Δs'			Δf'			
+1.0	+1.8	+1.9	+1.5	+1.6	+0.1	J
+1.9	+2.2	+2.3	+1.0	+1.6	+1.9	gl

Einfallshöhen: 17.6 | 24.9 | 30.5

Chromasie: O −22 (−5) −19 | I −7 (−7) −9 | II +1 (−9) −1 | III +14 (−11) +13

Astigmatismus (s. XXIII, 9)

Äquatorialwinkel		Meridionalwinkel			
−2.0	−1.8	+0.5	−1.5	−1.4	−0.2
−1.4	−1.8	+1.6	−1.9	+1.9	+3.2

Frontwinkel: 49.3 | 66.1 | 87.4

Vergleichung: Faug. Ed. −66 −73 −89

Äquatorialwinkel		Meridionalwinkel			
−1.6	−1.4	+0.5	−1.6	−2.6	−1.5

Frontwinkel: 42.2 | 58.5 | 71.7

Vergleichung:

Radien, Dicken und Abstände für $f = 100$ mm (Doppellinse)

r1	r2	r3	d1	d2	d3
39.0	21.8		3.0	1.0	3.9

$\frac{1}{f}(4k) = 7707 - 6$
$\frac{1}{f}(4-k) = 6715 - 9$

Reform-Nr. 2 Objektiv (Kriegsm. v. 13. II. 1909)

Einzellinse | Doppellinse

Eingellinse | Doppellinse

1

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Reform-Nr. Objektiv $f = 144.5$ mm (Kriegsm.)

Einzellinse $f_1 = 277.0$ | Doppellinse $f = 144.5$

Sphärische Korrection (s. XXIII, 15–18)

Δs'			Δf'		
+0.2	+1.4	+1.1	+1.0	+2.9	−2.3

Einfallshöhen: 9.1 | 14.1 | 17.2

Chromasie: −33 −23 −(−7) −12

Δs'			Δf'			
+1.1	−1.8	+1.2	+1.8	+1.1	+2.4	
+1.1	+1.1	+1.9	+3.3	+2.5	+2.2	

Einfallshöhen: 9.4 | 14.1 | 17.0

Chromasie: O −11 −19 −35 −7 | I (−1) (−3) (−5) (−8) | II −61 −50 −30 −25

Astigmatismus (s. XXIII, 12–15)

Äquatorialwinkel		Meridionalwinkel			
−2.3	−1.5	−0.8	−1.0	−1.2	−1.7
−1.7	−1.5	+1.1	−1.2	+0.6	+2.1

Frontwinkel: 49.3 | 66.1 | 81.7

Vergleichung: Faug. Ed. −67 −75 −90

Äquatorialwinkel		Meridionalwinkel			
−2.4	−2.5	−0.8	−2.0	−2.0	−1.4
−1.7	−1.4	+1.8	−1.1	2.0	+1.9

Frontwinkel: 41.0 | 57.7 | 71.6

Vergleichung:

Radien, Dicken und Abstände für $f = 100$ mm (Doppellinse)

r1	r2	r3	d1	d2	d3
36.2	19.2	11.8	3.2	1.0	4.1

Reform-Nr. Objektiv $f = 144.5$ mm (Kriegsm.)

Einzellinse | Doppellinse

Eingellinse | Doppellinse

№ 80a

F-75-6398-RE

9446

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f. f XIII. 48)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f XIII. 48)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

a | b

9445

№ 101

F-75-6398-RE

9446

V.R. Prof. Dr. Oscar Hemmstadt, Wien, v. 18. 5. 04

Einzelobjektiv f. 295.54 | Doppelobjektiv

Sphärische Korrection (f XIII. 48)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f XIII. 48)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

V.R. Prof. Dr. Oscar Hemmstadt, Wien, v. 18. 5. 04

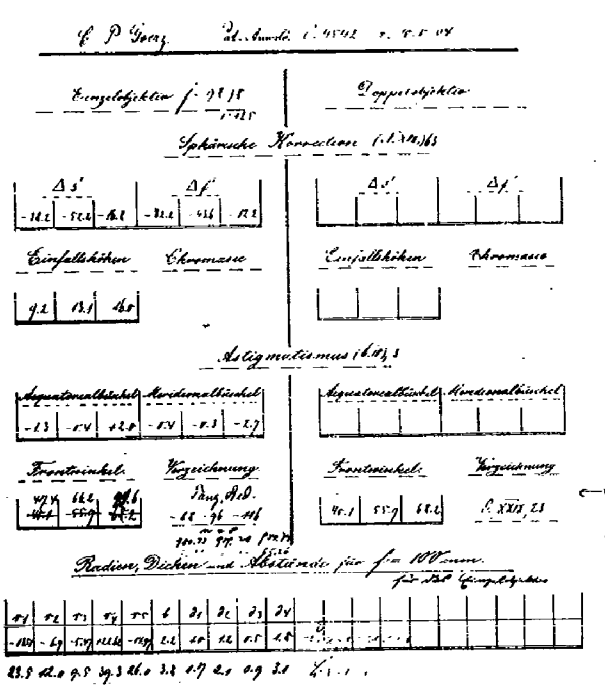
Einzellinse | Doppelobjektiv

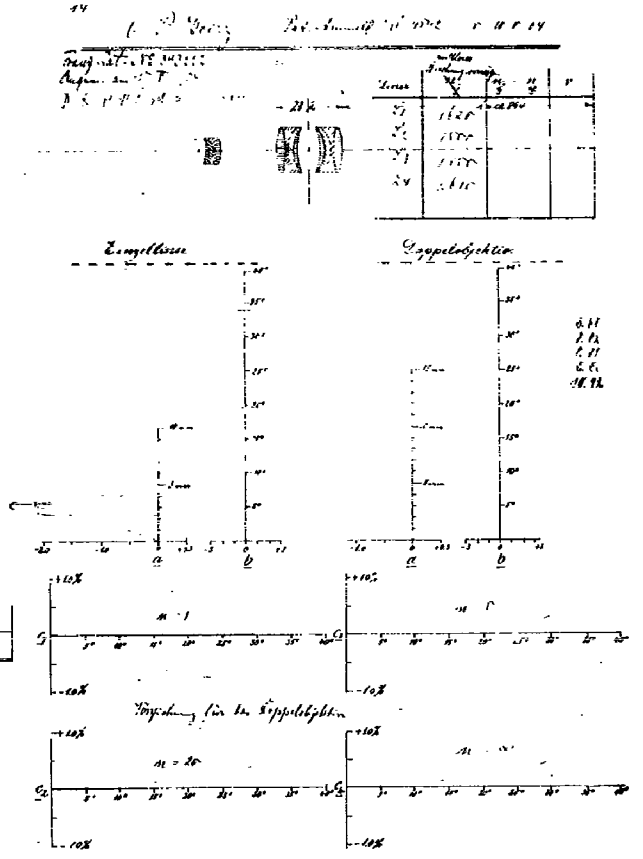
a | b

№ 102

F-TS-6398-RE

9447



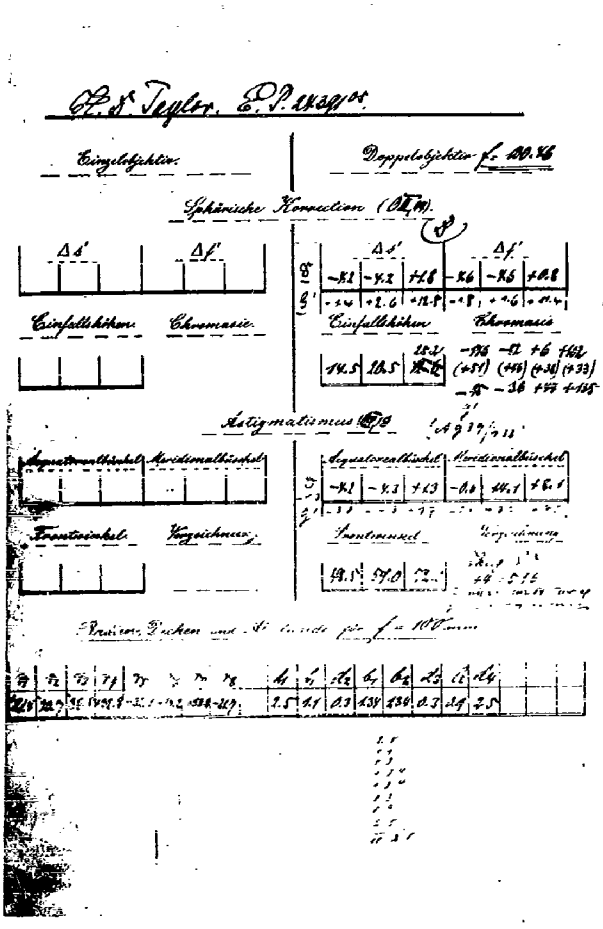


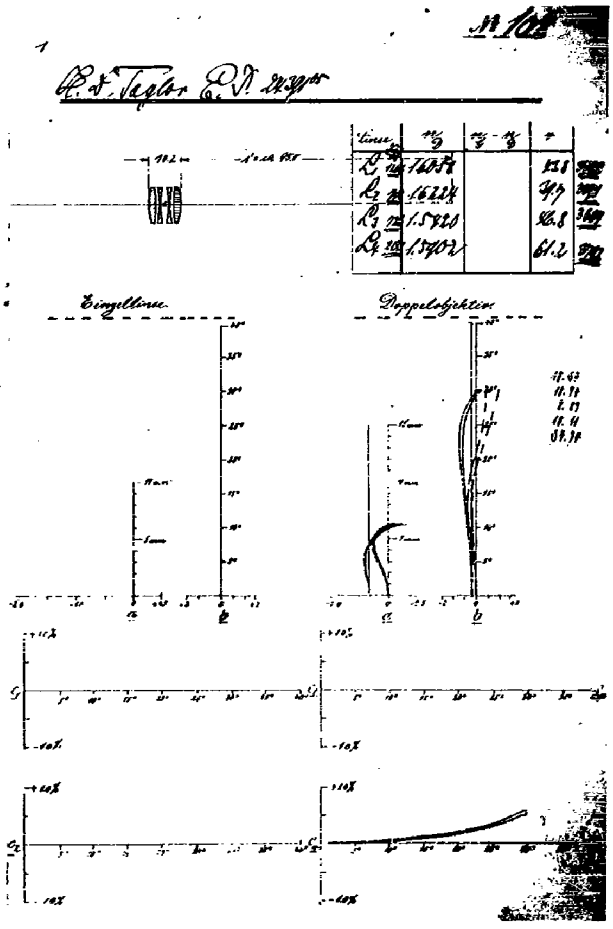
9447

№ 102

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9447





F-TS-6398-RE

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Nº 122

Skizze 1:25 (ohne Reichert)

A. Heimstädt. deutsche Patent-Anmeldung v. 18.V.06

A. Heimstädt (ohne Reichert) deutsche Patent-Anmeldung v. 18.V.06

Einzelobjektive

Doppelobjektive

Sphärische Korrection (Ø 11) / 29 f P. 5.50, 6

Einzellinse

Doppelobjektive

Astigmatismus (Ø 11) f. P. 50

Radien, Dicken und Abstände für f = 100 mm

9414

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950

Nº Leitz 127

E. P. Lau-Davis E. P. 18071 1906 Br. J. of Phot. 1907 S. 642

E. P. Lau-Davis E. P. 18071 1906 Br. J. of Phot. 1907 S. 642

Einzellinse

Doppelobjektive

Sphärische Korrection (P 5.50) / 21

Astigmatismus (Ø 11) f. 16

Radien, Dicken und Abstände für f = 100 mm

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C. P. Goerz Doppelanastigmat

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Ø XIII) 23 ; 25

Δs'			Δf'		
-5.9	-4.9	+7.9	-6.1	-6.1	+3.3

Einfallshöhen | Chromasie

5.8	8.2	10.0	-5.9 (-6.0) -17.9

Δs'			Δf'		
-4.1	-4.6	-4.2	-4.1	-5.3	+0.1

Einfallshöhen | Chromasie

10.5	14.1	18.2	

Astigmatismus (Ø XIII) 29 ; 28

Aequatorialbüschel		Meridionalbüschel		
-0.4	+2.0	+11.6	+9.7	+13.5	+33.2

Frontwinkel | Neigung Tang. Bed.

47.2	66.2	84.6	-69-77-93

Aequatorialbüschel		Meridionalbüschel		
+0.4	+2.7	+11.4	+4.6	+11.5	+29.1

Frontwinkel | Neigung Tang. Bed.

42.2	58.8	71.8	-69-77-93

Radien, Dicken und Abstände für f = 100 mm

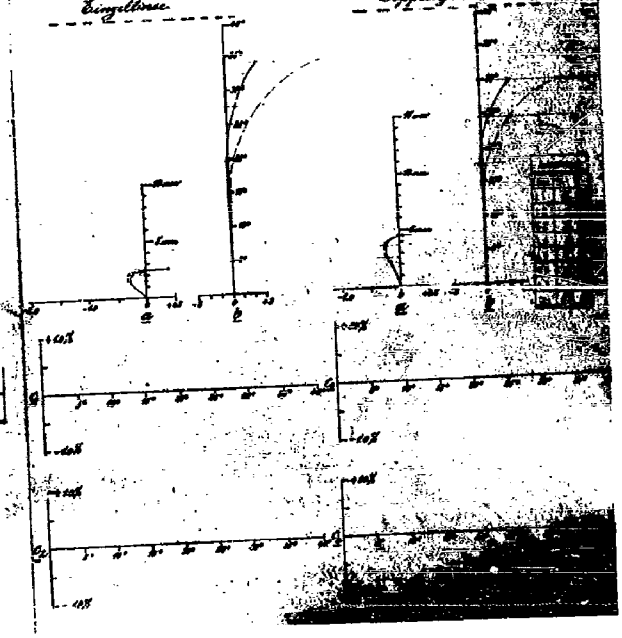
r1	r2	r3	r4	d	d1	d2	d3
173	70	168	182	11	1.0	2.1	4.1

C. P. Goerz Doppelanastigmat

Linse | n_g | $n_g - n_k$

G_1-G_2 1.607 4.4
L_1-L_2 1.571 0.4
L_3-L_4 1.607 2.4

Einzellinse | Doppelobjektiv



F-TS-6398-RE

952

C. P. Goerz Doppelanastigmat

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Ø XIII) 22 ; 24

Δs'			Δf'		
-11.4	-11.1	+4.9	-15.1	-17.4	+2.8

Einfallshöhen | Chromasie

7.9	10.9	13.4	

Δs'			Δf'		
-12.1	-7.1	+1.3	-3.8	-6.0	-0.5

Einfallshöhen | Chromasie

15.0	21.2	26.1	

Astigmatismus (Ø XIII) 39 ; 40

Aequatorialbüschel		Meridionalbüschel		
-1.7	-3.1	-1.0	-0.2	-0.9

Frontwinkel | Neigung Tang. Bed.

47.2	66.2	84.6	-14-93-111

Aequatorialbüschel		Meridionalbüschel		
-2.4	-2.8	-1.0	12.1	-0.7	-0.3

Frontwinkel | Neigung Tang. Bed.

40.5	57.4	77.9	-14-93-111

Radien, Dicken und Abstände für f = 100 mm

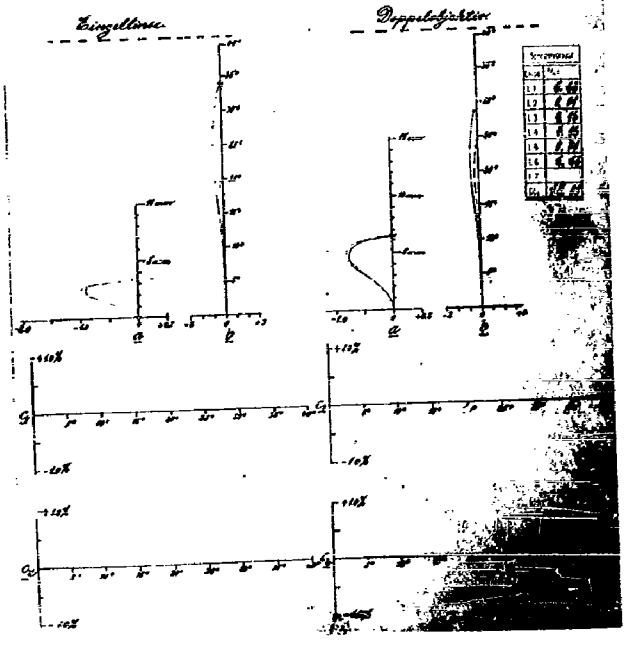
r1	r2	r3	r4	d	d1	d2	d3
173	74	163	220	7.3	2.1	1.5	3.2

C. P. Goerz Doppelanastigmat (Goerz-Hypar)

Linse | n_g | $n_g - n_k$

G_1-G_2 1.607 57.1
L_1-L_2 1.574 53.7
L_3-L_4 1.574 60.3

Einzellinse | Doppelobjektiv



№ 132

D.R.P. 194546.

Ernst Leitz, Berlin

F-TS-6398-RE

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Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (P XIII, 38

Δs' Δf' | Δs' Δf'

+0.5 +5.2 +14.6 +2.1 +7.8 +12.1

Einfallshöhen Chromasie | Einfallshöhen Chromasie

15.4 20.7 16.6 | +4.5P (-1.4) +3.9P

Astigmatismus (P III, 48

Aequatorialbüschel Meridionalbüschel | Aequatorialbüschel Meridionalbüschel

7.9 4.1 2.8 1.2 -5.6 -5.4

Frontwinkel Kennzeichnung | Frontwinkel Kennzeichnung Tang. Bed.

44.2 47.6 48.2 | -17% -3% -10% = -3 -3 = -6

Radien, Dicken und Abstände für f = 100 mm

r: 7.3 7.3 5.6 2.5 -7.1 -2.5 -4.5 -2.2 -1.6 -11.4 -7.0

d: 2.3 5.6 0.9 3.9 2.4 4.7 0.2 1.6 0.5

l: 2.6 0.7 0.4 3.7 2.4 4.7 0.2 1.6 0.5

s': 46.6

Ernst Leitz, Berlin (D.R.P.A. 31.V.46)

Linse | n_D | n_F - n_C | ν

1 - 2 | 1.6134 | 0.02107 | 37.1

3 - 4 | 1.5741 | 0.01166 | 48.3

5 - 6 | 1.5691 | 0.01252 | 47.8

f' aus der beiden letzten Flächen ist 200 mm abgeleitet

Einzellinse — Doppelobjektiv

a b | a b

+10% -10%

№ 166

A. P. Goerz, Optik für Kleinbild-Kameras, 1. Beisp.

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954

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (R I, 17 (Fig 33, 111)

Δs' Δf' | Δs' Δf'

-0.2 -0.5 +19.1 -2.0 -7.2 +5.2

Einfallshöhen Chromasie | Einfallshöhen Chromasie

32.2 45.3 55.6 | -7% (+2.1) -2%

Astigmatismus (P IV, 67

Aequatorialbüschel Meridionalbüschel | Aequatorialbüschel Meridionalbüschel

-2.4 -3.7 -4.0 +0.5 +0.1 -1.3

Frontwinkel Kennzeichnung | Frontwinkel Kennzeichnung Tang. Bed.

30.9 43.8 48.2 | -7% -8% = -11%

Radien, Dicken und Abstände für f = 100 mm

r: 7.1 7.1 5.4 2.1 -6.1 -2.1 -4.4 -2.1 -1.5 -11.1 -6.8

d: 2.2 5.4 0.8 3.7 2.3 4.5 0.2 1.5 0.5

l: 2.5 0.7 0.4 3.5 2.3 4.5 0.2 1.5 0.5

s': 46.2

Linse | n_D | n_F - n_C | ν

1 - 2 | 1.6134 | 0.01144 | 47.4

3 - 4 | 1.6134 | 0.01704 | 43.4

Einzellinse — Doppelobjektiv

a b | a b

+10% -10%

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C. P. Goerz D.R.P. 189118 I. Beisp.

Öffnungsverhältnis 1 : 3.5

Einzelobjektive

Doppelobjektive

Sphärische Korrection (A. T.) 6

Δs'		Δf'		Δs'		Δf'	
-0.1	-9.8	+0.4	-10.2	-44.0	-4.6	-2.4	-6.4	-3.0	-5.4	-8.2

Einfallshöhen: 33.0 | 46.7 | 57.2

Chromasie: -69 (-77) -104

Einfallshöhen: 16.5 | 23.4 | 28.6

Chromasie: -69 (-77) -104

Astigmatismus (A. T.) 12

Sagittenwalbhöhe	Meridionalbhöhe	Sagittenwalbhöhe	Meridionalbhöhe
		-2.7	-4.6	-5.2	-1.0	-4.1	-14.9

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung: Feny. Bed.

31.6 | 44.8 | 54.9 — -69 -82 -87 / -92 -109 -113 / -13 -9 -16

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	l1	d2	l2	l3	d3	l3	d4
43.8	70.4	17.9	16.4	44.7	44.9	21.2	34.4	5.2	1.6	2.8	5.0	7.0	1.8	3.6	5.7

12.0

C. P. Goerz D.R.P. 189118 I. Beisp.

Linse | n_1 | $n_1 - n_2$ | ν

Einzellinse | Doppelobjektive

a | b

S_1 | S_2 | C_1 | C_2

+10% | -10%

F-TS-6398-RE

956

C. P. Goerz D.R.P. 189118 I. Beisp.

Einzelobjektive

Doppelobjektive

Sphärische Korrection (A. T.) 6

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (A. T.) 3

Sagittenwalbhöhe	Meridionalbhöhe	Sagittenwalbhöhe	Meridionalbhöhe
		2.3	-4.3	-5.1	-0.8	-3.1	-14.1

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung: Feny. Bed.

31.4 | 44.3 | 54.9 — -70 -81 -107 / -92 -102 -112 / -11 -19 -12

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	l1	d2	l2	l3	d3	l3	d4
41.8	70.4	17.9	16.4	44.7	44.9	21.2	34.4	5.2	1.6	2.8	5.5	6.5	1.8	3.6	5.7

C. P. Goerz D.R.P. 189118 I. Beisp.

Linse | n_1 | $n_1 - n_2$ | ν

Einzellinse | Doppelobjektive

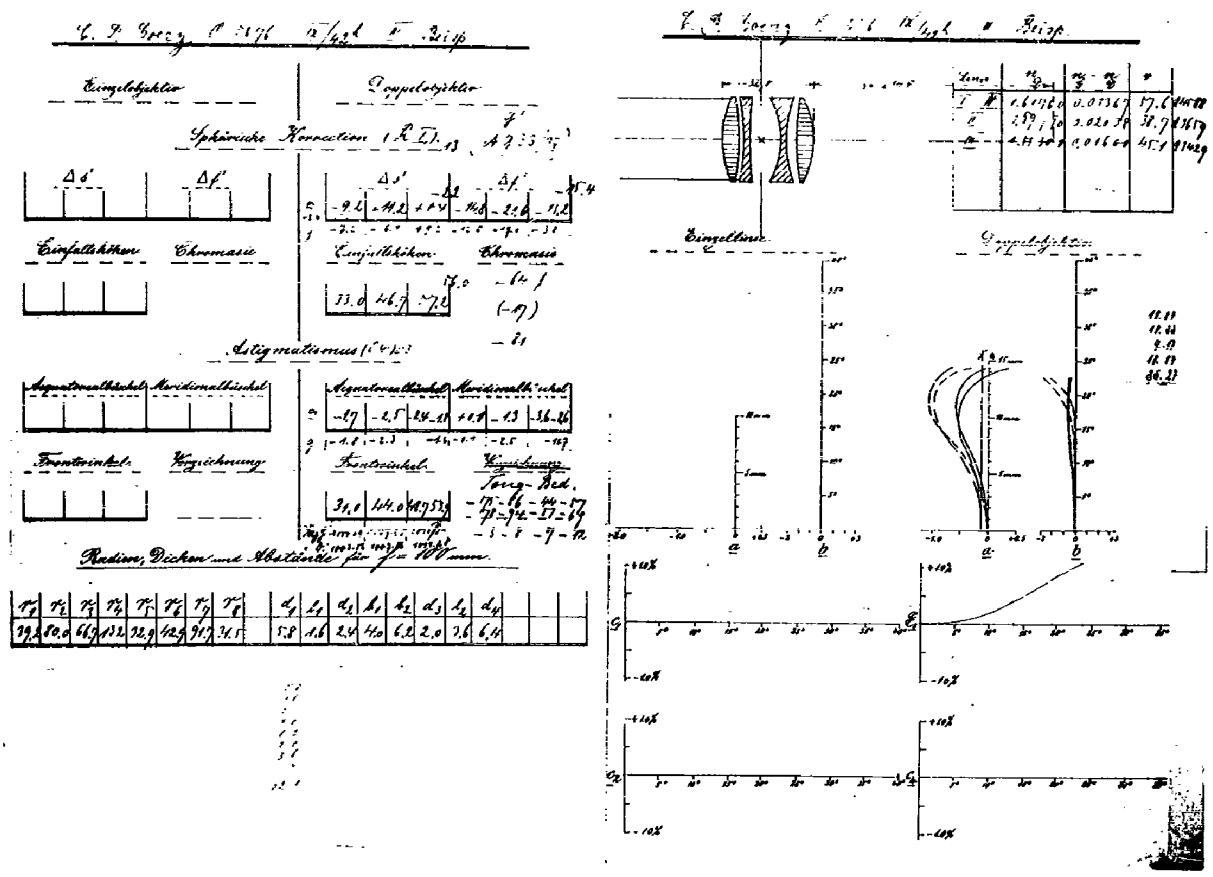
a | b

S_1 | S_2 | C_1 | C_2

+10% | -10%

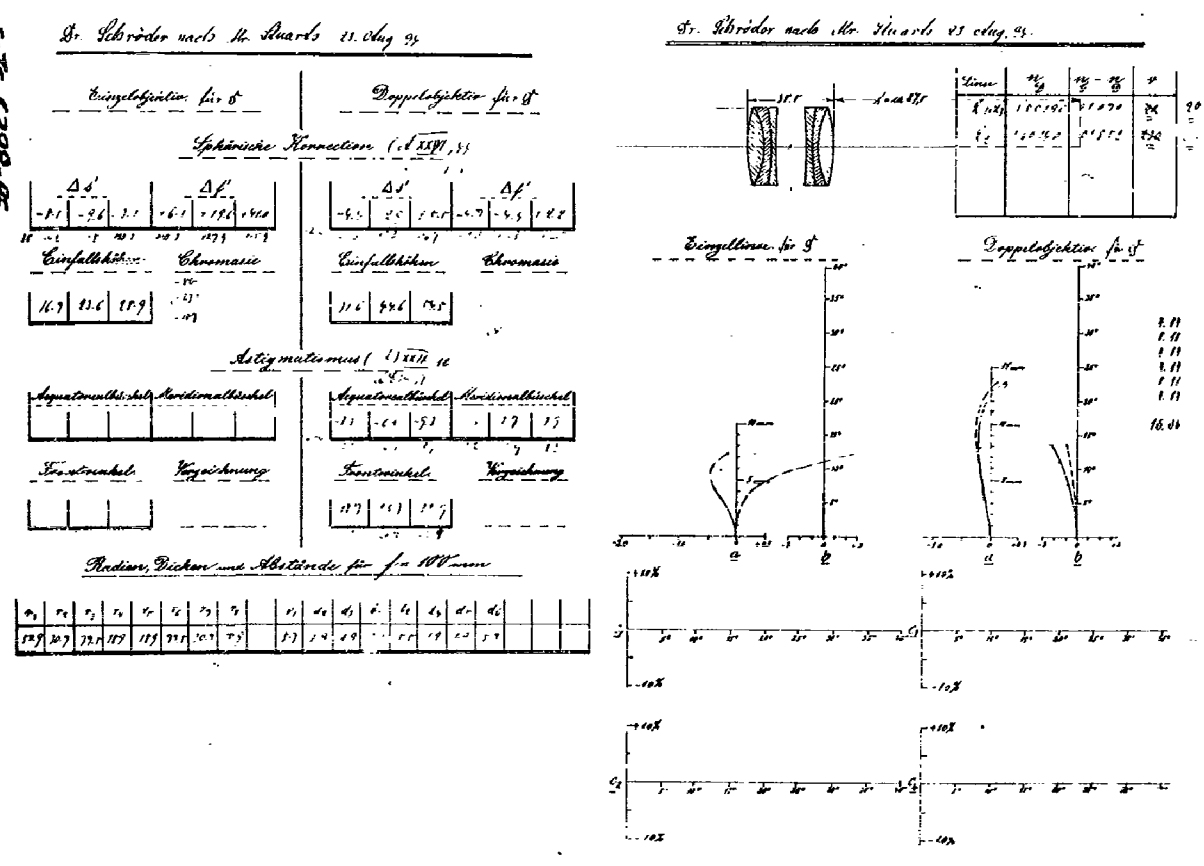
F-75-6398-RE

957



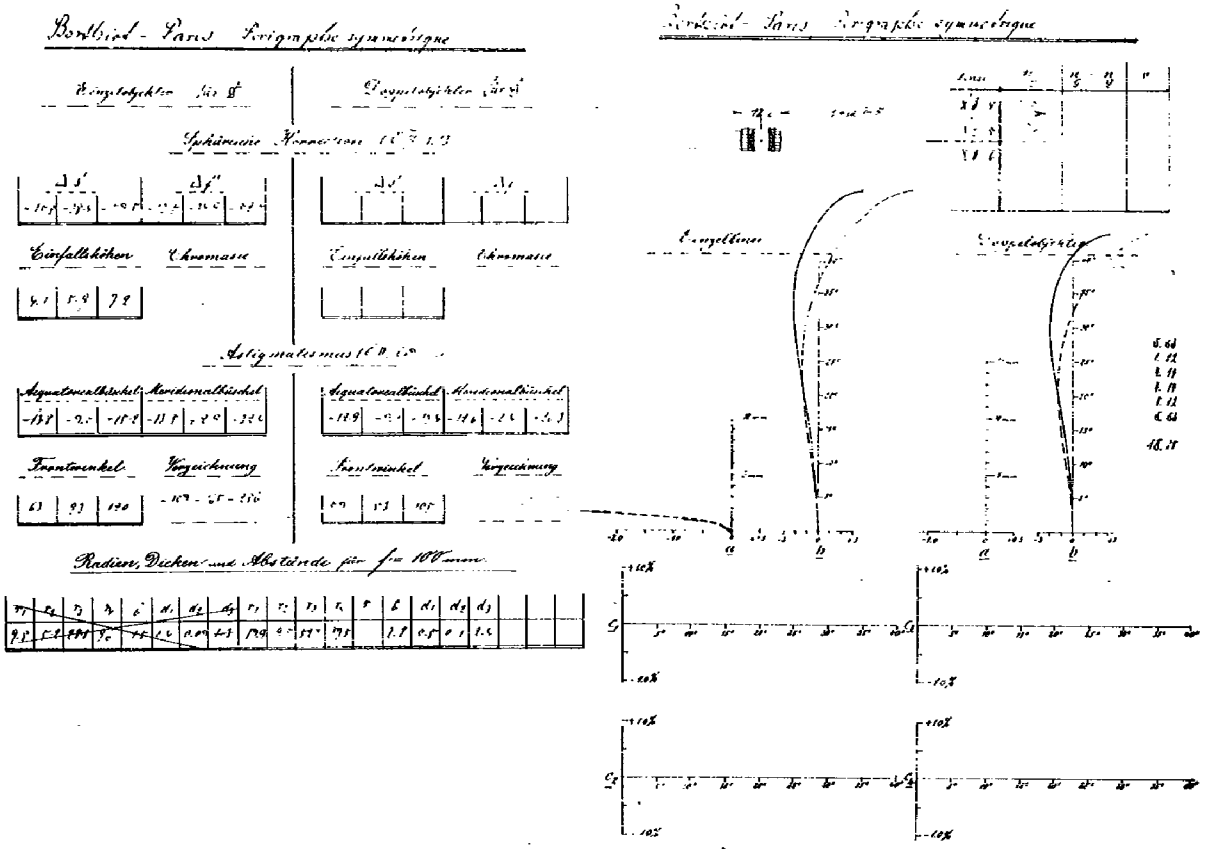
F-75-6398-RE

958



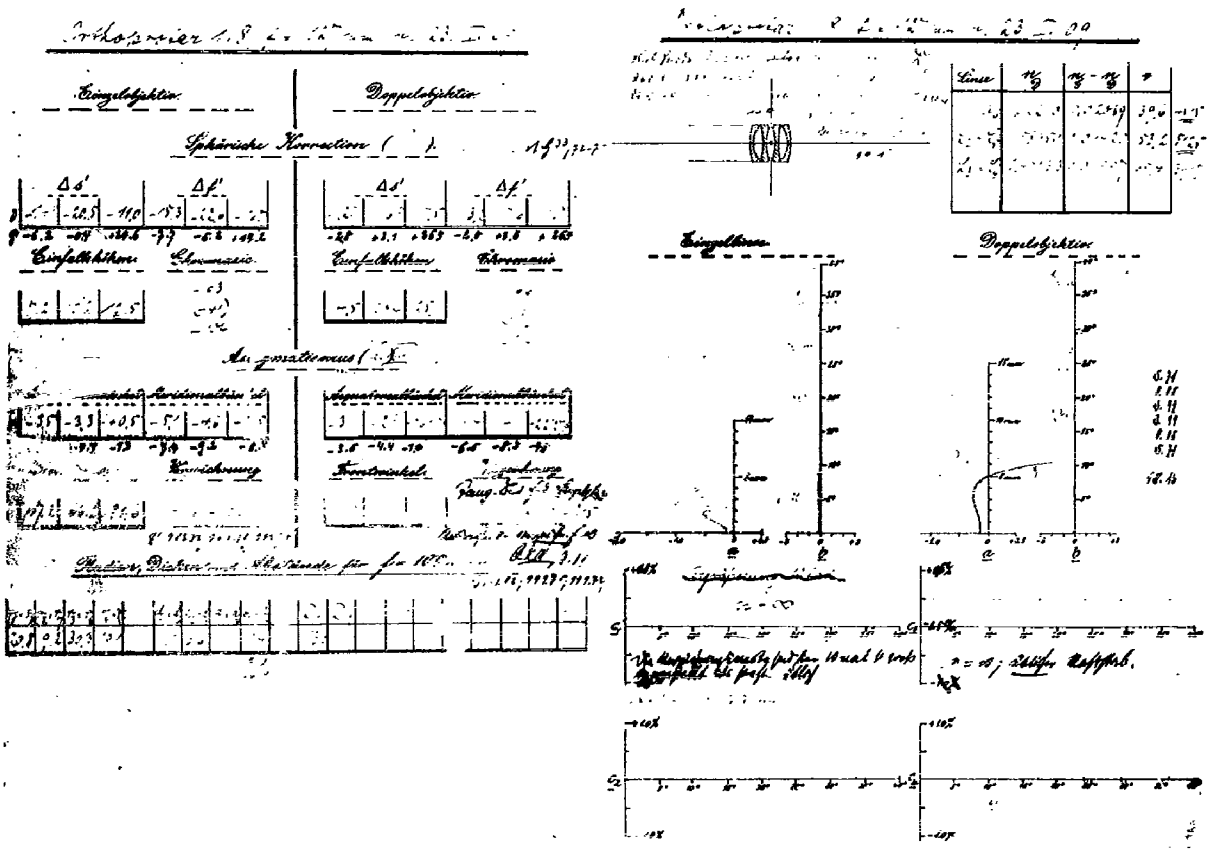
F-TS-6398-RE

959



950

F-TS-6398-RE



F-TS-6398-RE

961

Einzellinse | Doppellinse

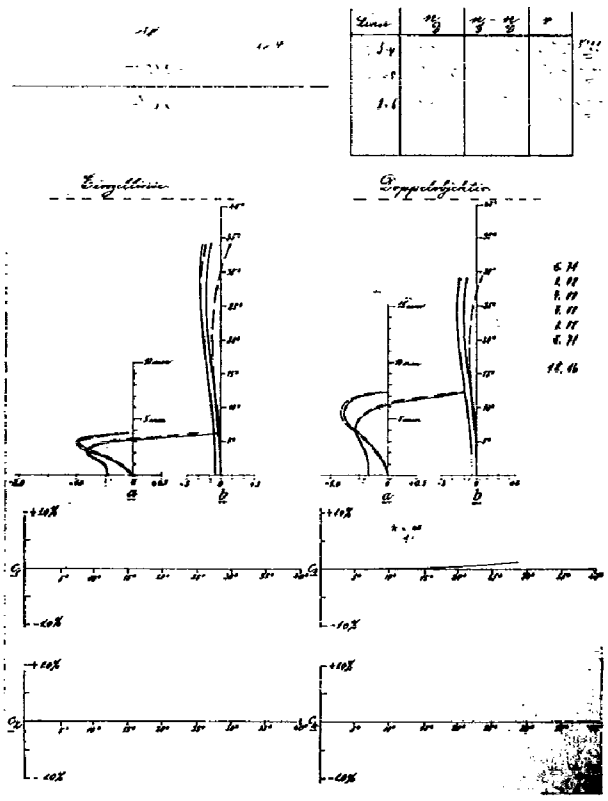
Sphärische Korrection

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Tangential | Sagittal | Tangential | Sagittal

Radien, Dicken und Abstände für f = 100 mm Doppellinse



961

F-TS-6398-RE

962

Doppel-Anastigmat f = 15 cm

Einzellinse | Doppellinse

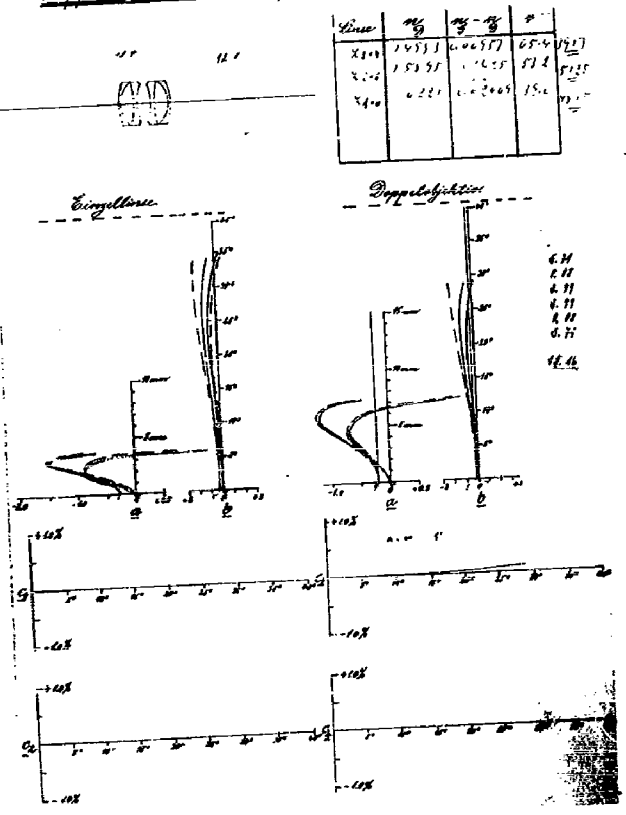
Sphärische Korrection

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Tangential | Sagittal | Tangential | Sagittal

Radien, Dicken und Abstände für f = 100 mm



№ 247

F-15-6388-RE

963

Einzellinse | Doppellinse

Sphärische Korrection

Astigmatismus

Einzellinse

Doppellinse

F-15-6398-RE

964

№ 247

Einzellinse | Doppellinse

Sphärische Korrection

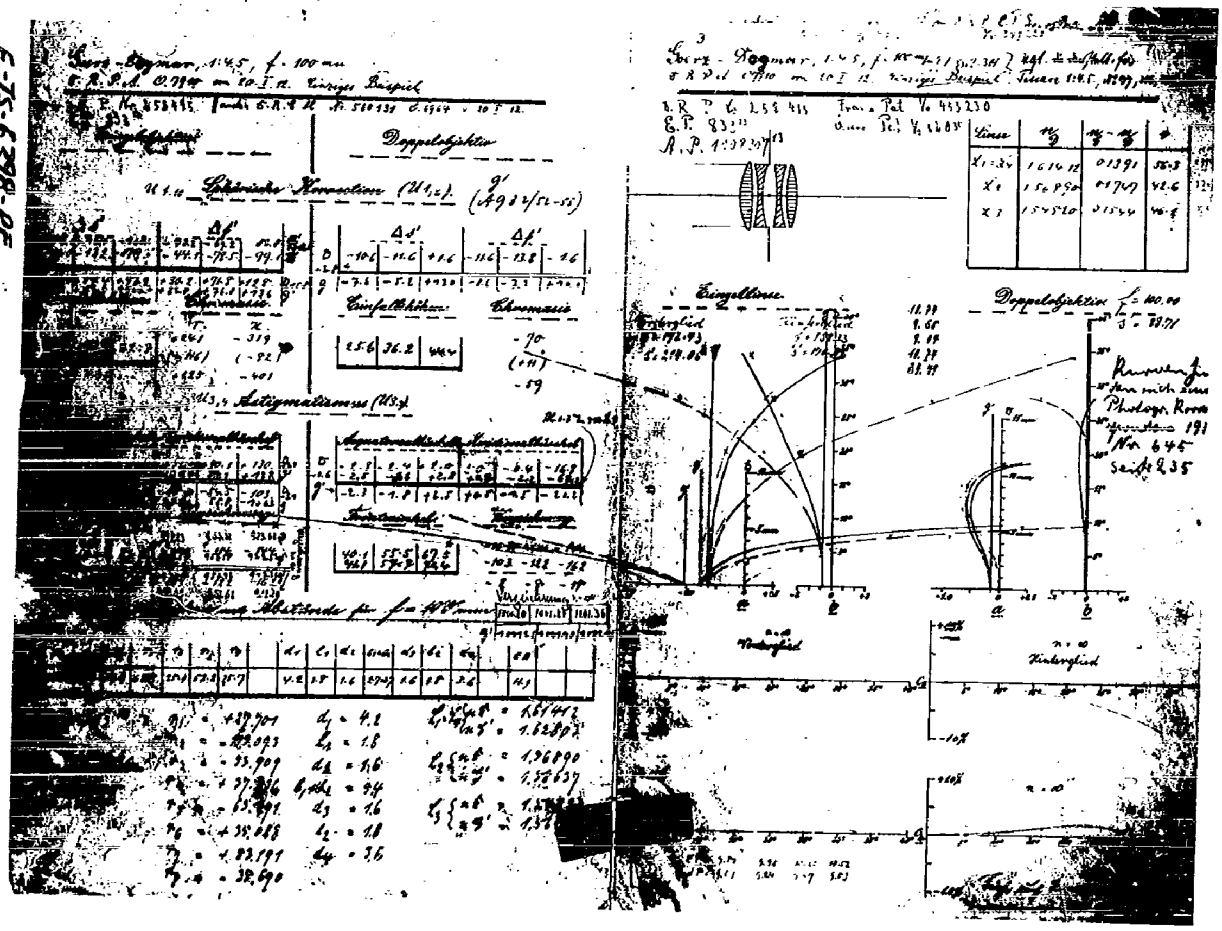
Astigmatismus

Einzellinse

Doppellinse

F-75-6378-AE

965



965

F-TS-6398-AE

996

Goerz-Dagmar 1:4.5, f=10cm. DRPA. 97990 a= 202.72

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs'/f')

Einzelobjektiv Δs'		Einzelobjektiv Δf'		Doppelobjektiv Δs'			Doppelobjektiv Δf'		
				-10.6	-11.6	+1.6	-11.6	-13.8	-1.6

Einzelobjektiv Einfallsöffnung	Einzelobjektiv Chromasie	Doppelobjektiv Einf.öffnung	Doppelobjektiv Chromasie
		25.8	38.1	44.7	-W (-11) -5S

Astigmatismus (Δs'/f')

Einzelobjektiv Asymmetriefehler	Einzelobjektiv Meridianfehler	Doppelobjektiv Asymmetriefehler	Doppelobjektiv Meridianfehler		
		-2.8	-2.4	+2.0	+1.9	-0.4	-10.8

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung		
		49.1	56.7	67.4	1907.40 1907.89 1907.46

Radien, Dicken und Abstände für f = 100 mm.

R0	d	1	2	3	4	5	6	7	8	R1	d1	R2	d2	R3	d3	R4	d4	R5	d5	R6
22.7	20.1	52.8	12.7	60.1	2.5	94.6	18.7			42	1.5	26	2.7	2.7	7.6	2.8	26			

Goerz-Hypar 1:4.5, f=10 cm. DRPA. 0.3000 a= 40.1.32

Linse	n_d	n_f-n_d	ν
L1	1.617421	0.011312	60.5	5.96
L2	1.5891.1	0.017346	42.6	1.86
L3	1.5491.51	0.01533	56.7	2.179
L4	1.617421	0.011312	60.5	5.96

Einzelobjektiv. | Doppelobjektiv.

a b a b

966

298

F-TS-6398-AE

967

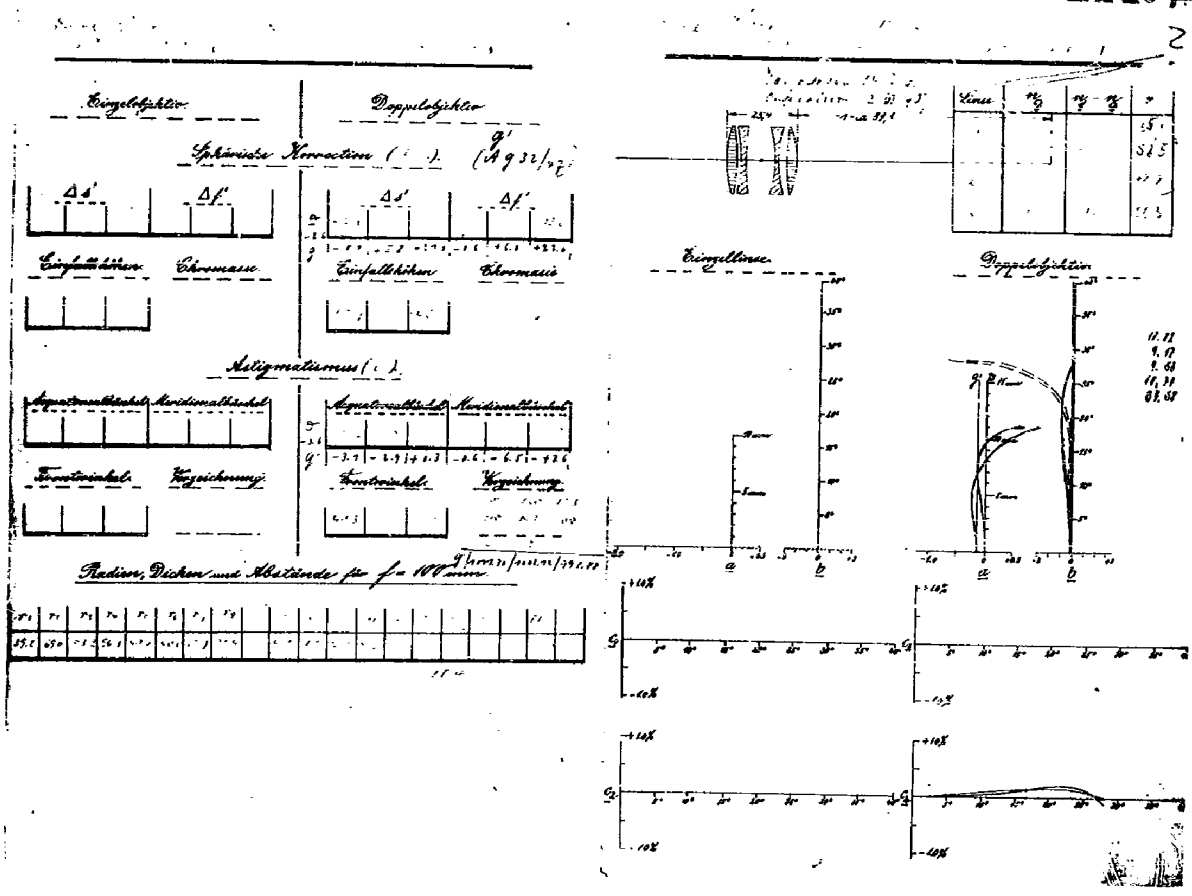
Goerz. 298

Ab-X Lage 43 mm K 44.2

967

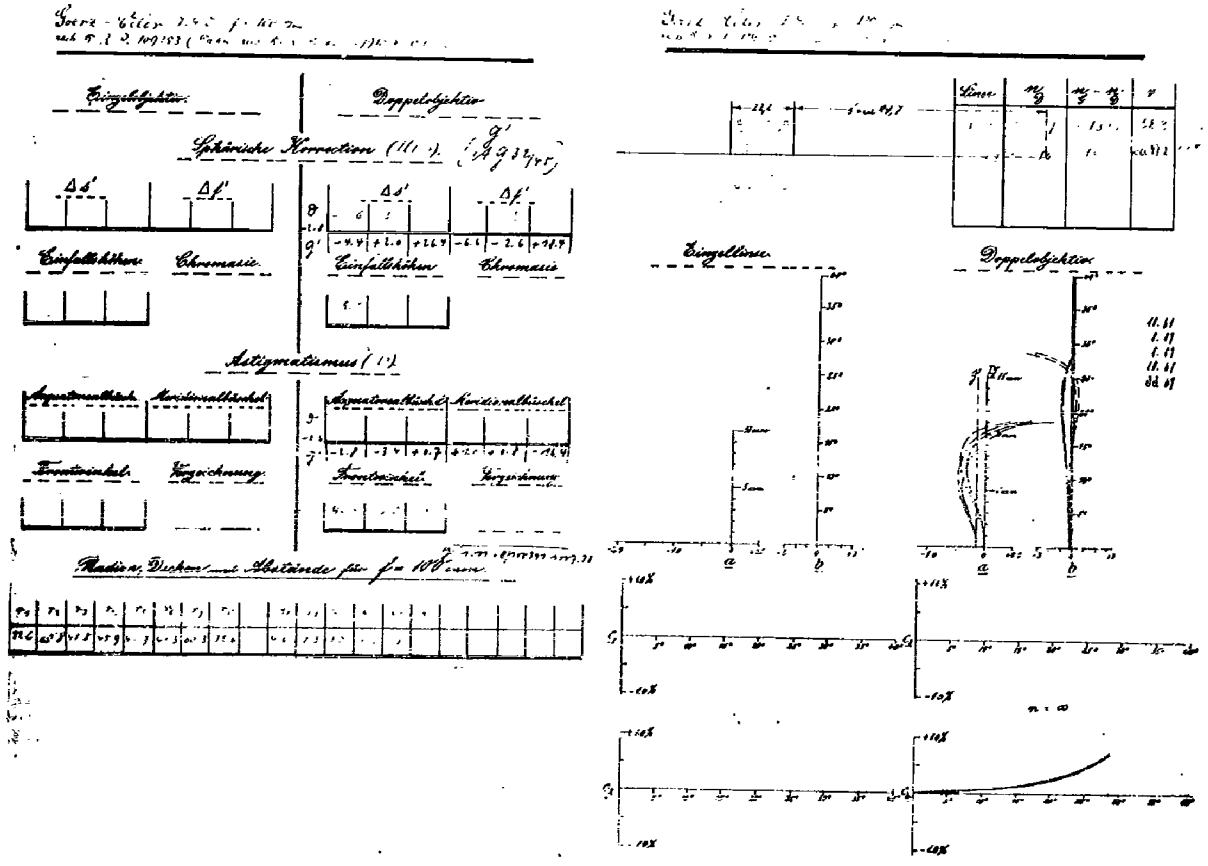
f-75-6398-AE

968



f-75-6398-AE

969



F-TS-6378-RE

970

Doppel-Protar 1:6.5, f. 180 mm v. 26.9.07.

Einzelobjektive | Doppelobjektive

Sph. u. Sphärische Korrektion (Bildw.)

Δs' | Δf' | Einzelbilder | Chromasie

Astigmatismus (Bildf.), Koma

Kurven, Dicken und Abstände für f = 100 mm

Doppel-Protar 1:6.5, f. 180 mm v. 26.9.07.

Linse | n_g | $n_g - n_g'$ | ν

Einzelbilder | Doppelobjektive

a | b | g | g_2

F-TS-6378-RE

971

Doppel-Protar 1:12.5, f. 225 mm v. 10.9.04

Einzelobjektive | Doppelobjektive

Sphärische Korrektion (Bildw.)

Δs' | Δf' | Einzelbilder | Chromasie

Astigmatismus (Bildf.)

Kurven, Dicken und Abstände für f = 100 mm

Doppel-Protar 1:12.5, f. 225 mm v. 10.9.04

Linse | n_g | $n_g - n_g'$ | ν

Einzelbilder | Doppelobjektive

a | b | g | g_2

971

N 317

F-75-6398-RE

912

Von Zeiss a. Ernst meniskoide Tessare 1:8 f. = 105 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (H. 7) 36

	Δs'			Δf'		
σ	-28	-40	-40	-28	-41	-30
g						

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
24.7	20.4	13.0	-13 (-15') -11

Astigmatismus (H. 7) 48 60

	Aequatorialbüschel		Meridionalbüschel		
g	-12	-00	-12	-3.0	-4.6	-0.4
s						

Fernwinkel | Kegelzeichnung

Fernwinkel			Kegelzeichnung (Comp. Sec.)
30.7	31.0	28.0	-3 -2 -3 -2 -3 -2 -3 -2 -3 -2 -3 -2

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	l1	d2	l1	d3	l3	d4	l4		
28	111	37.4	18.5	38.5	37.4	66.2	250	2.0	3.6	1.1	1.4	1.4	1.1	3.2	2.6	1.4	1.2

F-75-6399-RE

913

Eastman-Objektiv 1:8 f. 7 in. (ca. 175)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (H. 7) 38

	Δs'			Δf'		
σ	-3.2	-5.3	-6.3	-3.9	-5.1	-5.9
g						

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
19.5	21.0	26.8	-13.3 (-15') -11.8

Astigmatismus (H. 7) 48 61

	Aequatorialbüschel		Meridionalbüschel		
g	-3.4	-3.0	-0.2	-1.2	-6.3	-26.0
s						

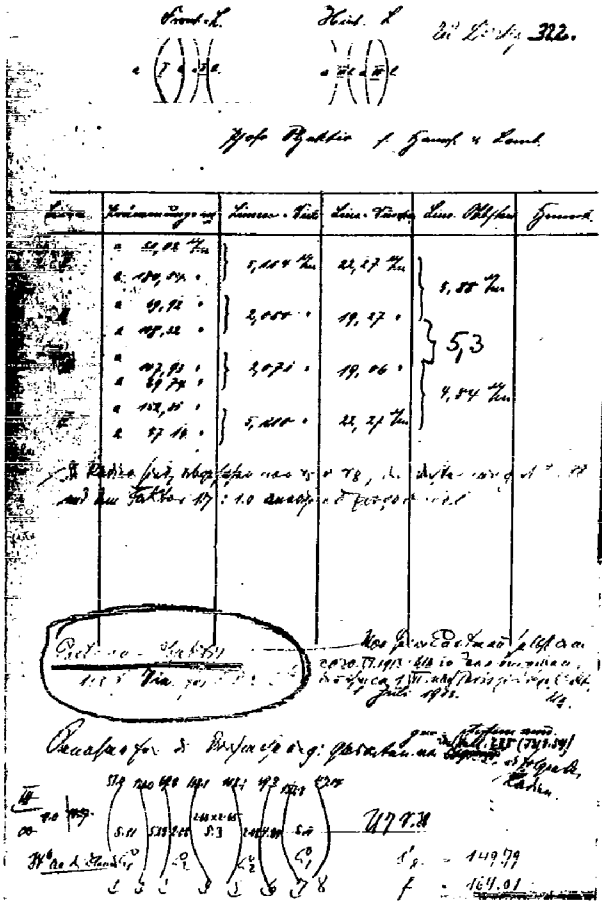
Fernwinkel | Kegelzeichnung

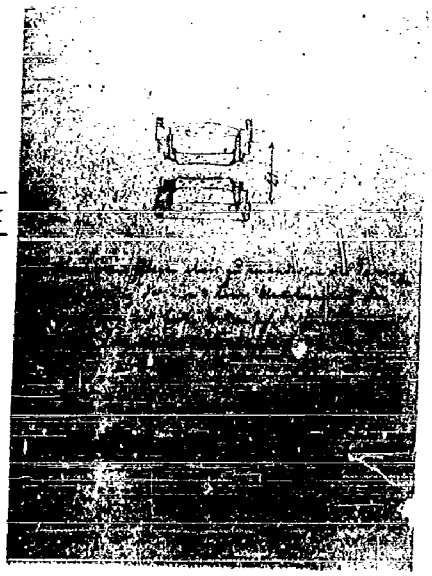
Fernwinkel			Kegelzeichnung (Comp. Sec.)
39.7	37.9	66.5	-1.4 -1.0 -1.4 -2.1 -3.6 -1.4

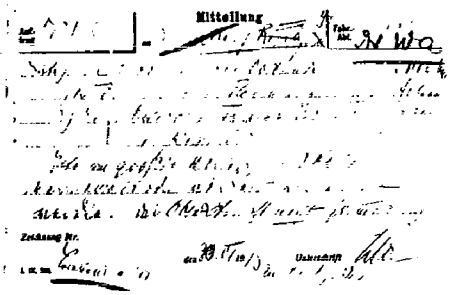
Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	l1	d2	l2	d3	l3	d4	l4		
31.1	110	41.2	18.8	61.8	-24	95.2	250	3.1	3.6	1.3	1.6	1.6	1.3	3.2	3.1	1.6	1.5

F-15-6980-RE







F-75-6318-RE

975

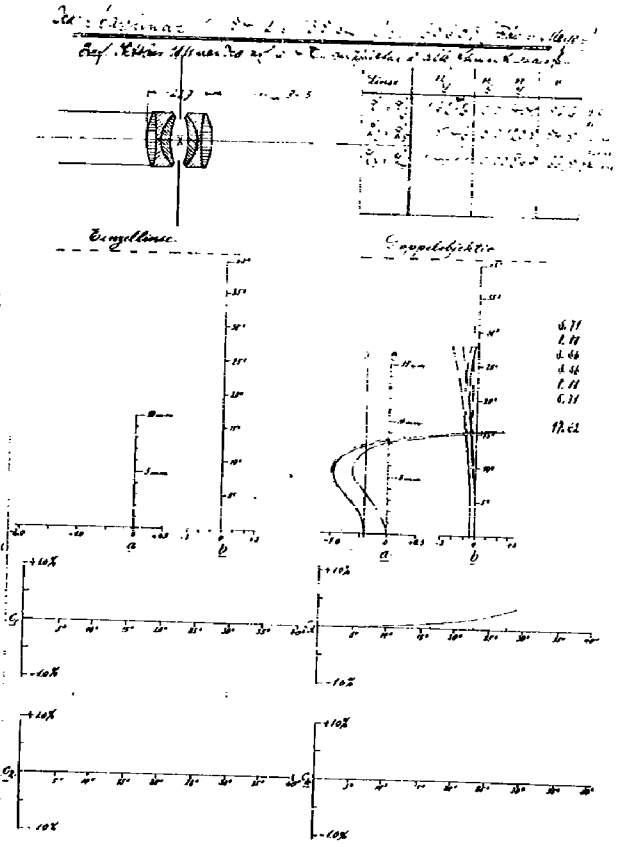
Maximar 1:8,4 f. 13 cm

Einzellichter | Doppellichter

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f = 100



F-75-6318-RE

976

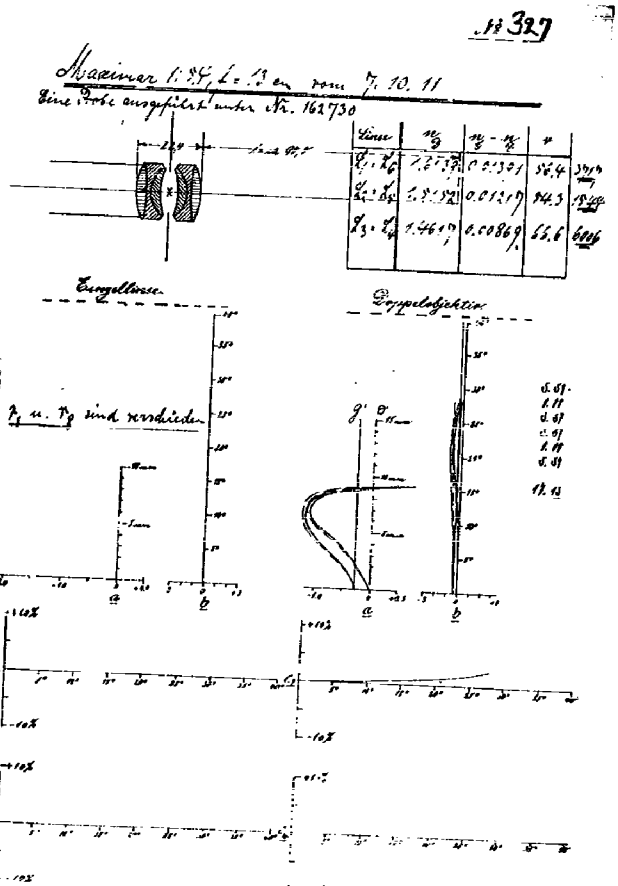
Maximar 1:8,4, f. 13 cm vom 7. 10. 11

Einzellichter | Doppellichter

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f = 100



F-75-638-AE

977

Maximar 1:5,4 f. 13 cm v. 12.8.13

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Nr. 1, 2, 3 + 6)

Δs'		Δf'			Δs'		Δf'		
-18.4	-11.3	+19.3	-18.6	-15.8	+20.0	-13.1	-6.2	+14.3	-26	+17.6

Einfallshöhen | Chromasie

10.6	15.0	18.4	-87 (-66) -107	21.0	10.4	2.4	-106 (-44) -102

Astigmatismus (Nr. 1, 3, 4)

Äquatorialbüschel		Meridionalbüschel			Äquatorialbüschel		Meridionalbüschel		
-1.7	-3.5	-1.6	-1.9	-2.0	-4.4	-2.4	-3.3	-2.1	-2.1	-3.9	-6.0

Feldwinkel | Vignierung

49.2	66.2	81.6	Rand Bel. -94 -165 -183	30.6	51.3	67.3	Rand Bel. -94 -203 -183

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	d1	d2	d3	d4	dk	lk
13.2	66.6	10.3	23.2		3.5	1.3	3.2	3.1	19.6	18.8

Änderung Nr. [illegible]

13328

Skizzenmaß 1:5,4 f. 13 cm v. 12.8.13

Eine Probe ausgeführt unter ofr. 33346

Linse	n_g	$n_g - n_F$	ν	
$L_1 + L_2$	1.5150	0.0080	64.1	2.4 mm
$L_3 + L_4$	1.6031	0.0089	60.6	1.6 mm

Einzellinse | Doppelobjektiv

Prüfgl. Ehr. 1913, 3. III. 4

F-75-638-AE

978

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Nr. 1, 2, 3)

Δs'	Δf'	Δs'		Δf'	
		-1.5	-0.5	-7.2	-4.0	-3.5	+3.6

Einfallshöhen | Chromasie

				7.1	4.0	3.5	

Astigmatismus (Nr. 1, 2, 3)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel		Meridionalbüschel	
		-1.2	-0.4	-2.1	-2.0	-3.4	-4.5

Feldwinkel | Vignierung

			47.5	52.2	57.5	Rand -94 -126 -147

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	d1	d2	d3	d4	dk	lk
13.1	44.5	21.7	44.9		4.1	2.1	3.1	3.1	21.5	21.5

Einzellinse | Doppelobjektiv

Nr 370

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Einzelobjektiv

Doppelobjektiv

Sphärische Konstanten ($\sqrt[4]{P}$)

Δs'		Δf'	

Δs'		Δf'	
-14	-13	-23	-36

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

29	33	40

Astigmatismus ($\sqrt[4]{1}$ $\sqrt[4]{2}$ $\sqrt[4]{3}$ $\sqrt[4]{4}$)

Aequatorialbüschel		Meridionalbüschel	

Aequatorialbüschel		Meridionalbüschel	
-32	-21	-39	-43	-36	-32

Brennweite | Bezeichnung

Brennweite | Bezeichnung

59.9	60.1	59.8

Radien, Dicken und Abstände für $f = 100$ mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	J_1	J_2	J_3
29.9	60.1	9.1	29.3	22.9	8.3	46.2	13.4	5.1	1.7	3.2	2.5	2.3	3.3	1.1	2.0	1.5	0.5	1.0

Linear-Anastigmat 1:4.8, f = 150 mm v. Rietzschel, München

Linear-Aplanat 1:4.8, f = 150 mm v. Rietzschel, München

Linse	n_g	$n_g - n_g$	ν
$L_1 \cdot L_2$	1.60917	0.01328	98.6
$L_2 \cdot L_3$	1.37157	0.01174	96.6
$L_3 \cdot L_4$	1.47687	0.00911	69.7
$L_4 \cdot L_5$	1.51196	0.01161	96.8

Nr 355

F-S-6398-RE

980

Einzelobjektiv

Doppelobjektiv

Sphärische Konstanten ($\sqrt[4]{6}$)

Δs'		Δf'	
-12.2	-12.4	-2.2	-24.6	-29.0	+13.3

Δs'		Δf'	
-22.4	-29.5	-3.9	-23.7	-32.8	-10.6

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

12.4	17.8	21.5

- 201
(- 91)
- 291

23.4	33.7	40.6

- 209
(+ 17)
- 192

Astigmatismus ($\sqrt[4]{1}$ $\sqrt[4]{2}$ $\sqrt[4]{3}$)

Aequatorialbüschel		Meridionalbüschel	
-8.1	-7.9	-7.8	-6.1	-9.6	-12.7

Aequatorialbüschel		Meridionalbüschel	
-4.3	-6.5	-7.0	-5.7	-9.2	-13.3

Brennweite | Bezeichnung

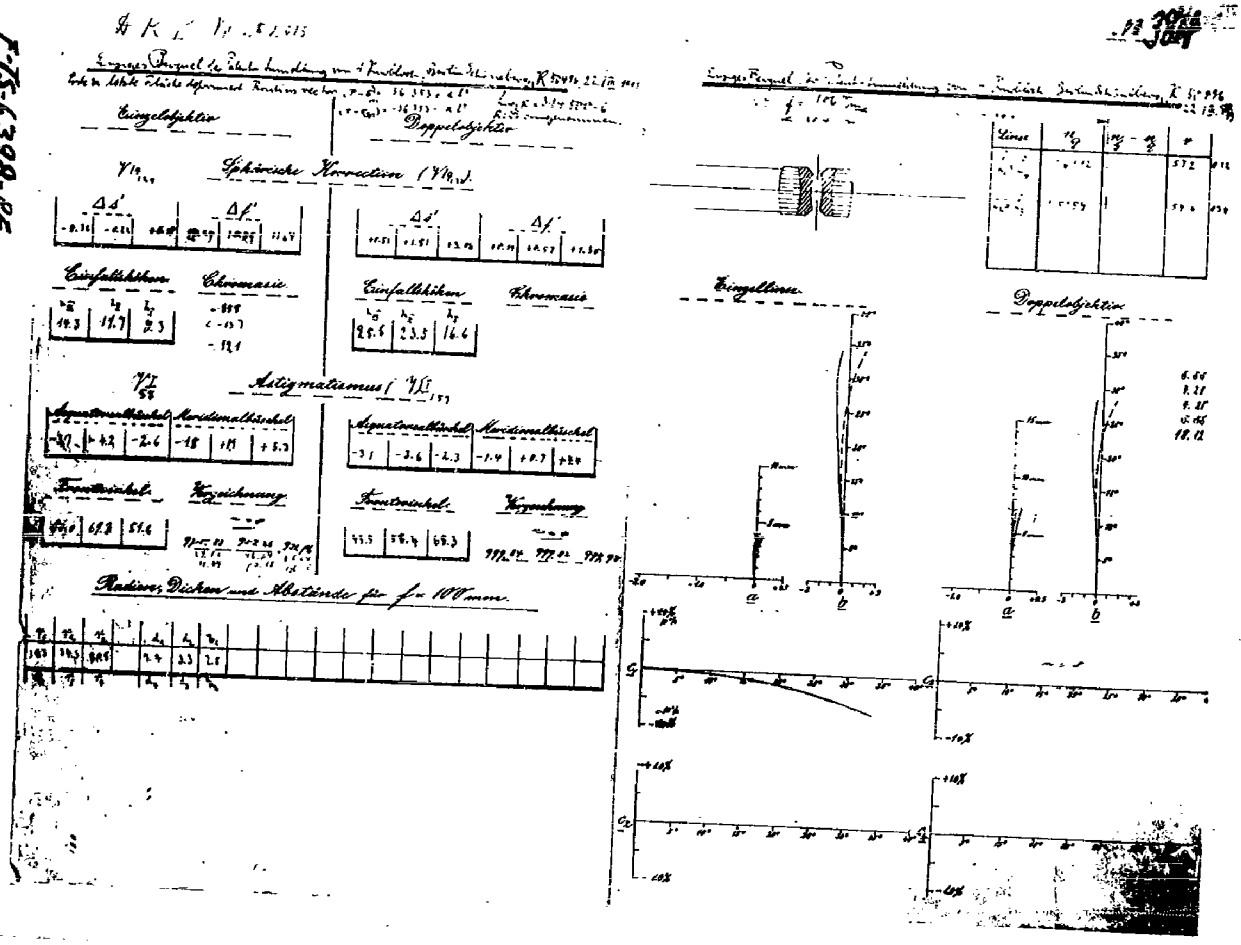
Brennweite | Bezeichnung

59.9	60.2	59.6

Radien, Dicken und Abstände für $f = 100$ mm.

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981



F-Z-1398-RE

982

Berichterstattung über die Patentanmeldung K 50496

(30.12.19, z. Zt. Kriegsurlaub)

Der Patentanspruch lautet auf ein einzig artiges Objektiv mit deformierten Flächen, wie sie in allen ihren speziellen Merkmalen in der Zeit um 1900 von Hrn. Prof. v. Rohr u. a. m. später von Hrn. Dr. Wandersleb berechnet und auch in größerer Zahl im Zeiss-Werk ausgeführt worden sind, in den Handel kamen. Welche Objektive wohl nicht gekommen. Wahrscheinlich liegen auch keine Verfügungen darüber vor, Herr Prof. v. Rohr wird immerhalb seinen Schriften noch einmal darauf zurückkommen). Wegen der Höhe der Herstellungspreise dieser Objektive wurden die damaligen Verhältnisse, die Herstellung keine Aussicht zu bieten, abgebrochen. Erst in letzter Zeit sind wieder Versuche und Anregungen in dieser Richtung unternommen worden, da die Anwendung des Abbé in der Herstellung von deformierten Flächen große Schwierigkeiten zu erfordern. Auf Grund des vorgelegten Berichtes wurde von einem Einspruch gegen die Anmeldung abgesehen. Es müssen noch abgewartet werden, was das Amtliche Patent verweigert wird. Gegebenenfalls können dann weitere Schritte (Nichtigkeitsklage, Einspruch) in Frage.

2/II. 14.

384

F-75-6378-AE

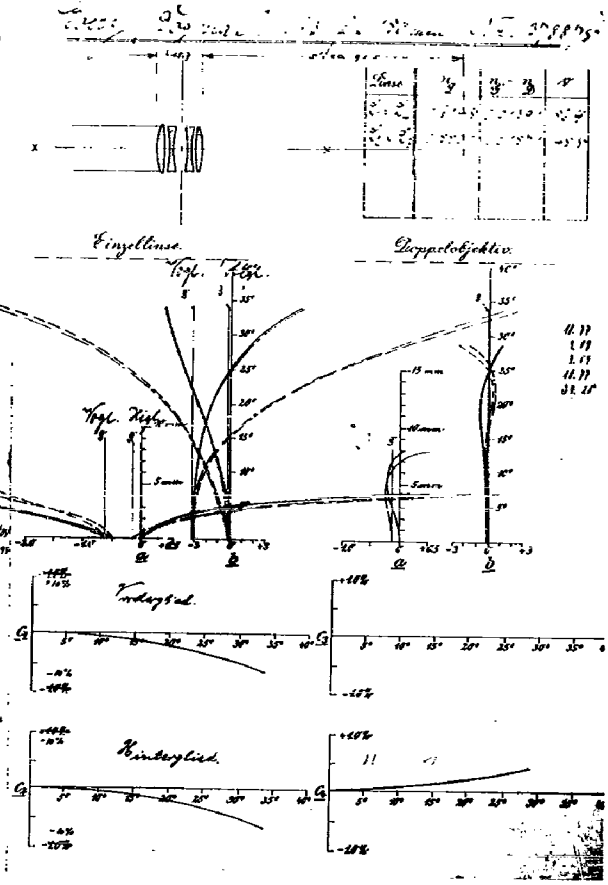
№ 383

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



983

F-75-6378-AE

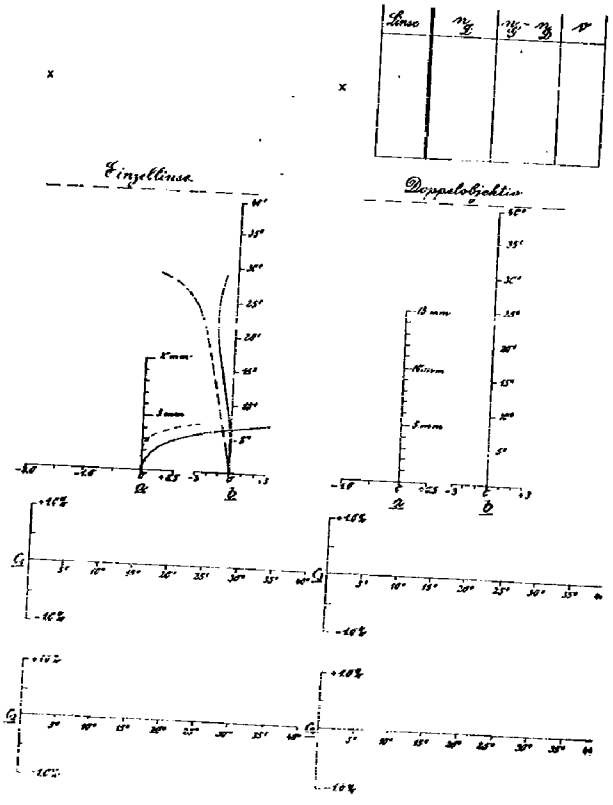
№ 385

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



984

FTS-6398-RE

Eastman Kodak Company (U.S.) f= 100 mm
D.P. 1160145 vom 10. Nov. 1915
(Gilbert & Haig – Kew Zeiss Lenses, New York)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Tiefe)

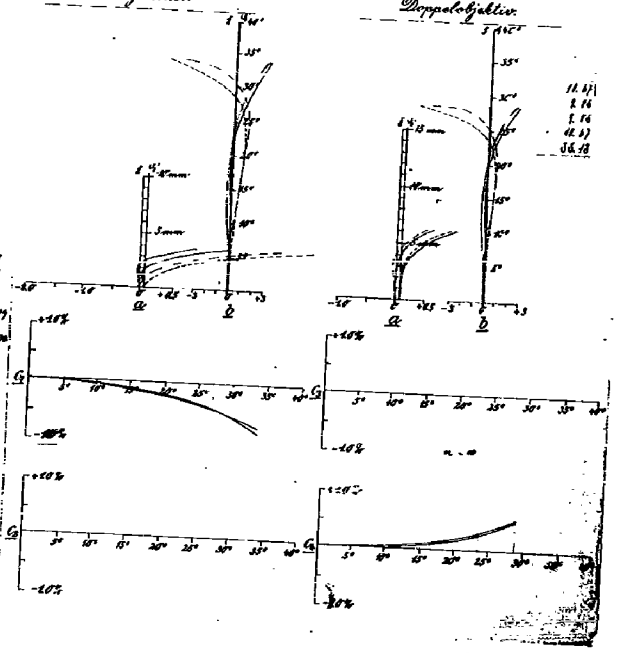
Einzelobjektiv						Doppelobjektiv					
	Δs'			Δs'-Δf'			Δs'			Δs'-Δf'	
Einfallshöhen				Chromasie		Einfallshöhen				Chromasie	

Astigmatismus (Tiefe)

Einzelobjektiv				Doppelobjektiv			
Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
Frontwinkel	Vorzeichnung			Frontwinkel	Vorzeichnung		

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv



Nr. 912

Base | n_g | $n_g - n_g$ | N

Base	n_g	$n_g - n_g$	N
$r_1 = r_4$	1.6165	0.0133	57.2
$r_2 = r_3$	1.5933	0.0165	46.0

986

FTS-6398-RE

Für Bildgleichheit

Goerz, Artar 1:12.5 f = 900 mm Nr. 306202

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Tiefe) 38 ; 39

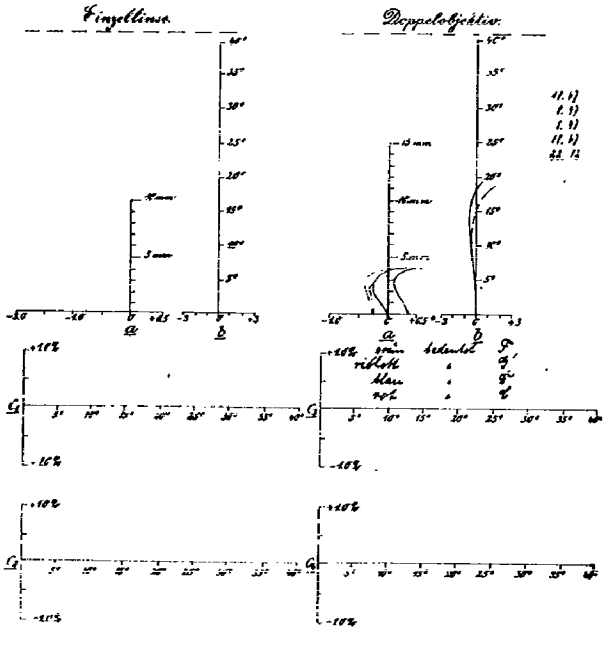
Einzelobjektiv						Doppelobjektiv					
	Δs'			Δs'-Δf'			Δs'			Δs'-Δf'	
Einfallshöhen				Chromasie		Einfallshöhen				Chromasie	

Astigmatismus (Tiefe)

Einzelobjektiv				Doppelobjektiv			
Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
Frontwinkel	Vorzeichnung			Frontwinkel	Vorzeichnung		

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv



Für Bildgleichheit Nr. 385

Goerz, Artar 1:12.5 f = 900 mm Nr. 306202

Base	n_g	$n_g - n_g$	N	
$r_1 = r_4$	1.5110	0.0123	58.9	1229
$r_2 = r_3$	1.5825	0.0123	51.0	1229

985

FTS-6398-RE

F-ZS-6398-RE

987

Sphärische Korrection

Einfallshöhen Chromasie

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

Zeiss Apian Lino 1:4,5, f = 8 1/4 inch.

Zeiss Apian Lino 1:4,5, f = 8 1/4 inch.

F-ZS-6398-RE

988

Sphärische Korrection (Mk. 257)

Einfallshöhen Chromasie

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

F-TS-6378-RE

986

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (d)

Δ s'

Δ f'

Einfallshöhen

Chromasie

Astigmatismus (dB)

Aequatorialbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

F-TS-6378-RE

990

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (dC)

Δ s'

Δ f'

Einfallshöhen

Chromasie

Astigmatismus (dB)

Aequatorialbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

F-75-6328-RE

901

445

Ernemann

Ihr Spezialgebiet [illegible]

[illegible] Anastigmat [illegible]

The anastigmat lenses which [illegible] from all others.

Ueber Axia [illegible].

It is difficult [illegible] ian greater demands on the [illegible], definition, and covering p[illegible] upon aperture of a lens [illegible] appreciate the exceptiona[illegible], it should be [illegible] adhered [illegible] that even the [illegible] ique is racing through the [illegible] ...tically exposed and sharp [illegible] are to be of service in [illegible].

[illegible] ...ilitary authorities we [illegible] ...mediately outclassed, [illegible] achieved this difficult [illegible] ...makes the perfect [illegible] ...rvice in photography where [illegible] is desired, such as press, [illegible] ...or these purposes it can [illegible]

F-75-6328-RE

902

341

Goerz Artar Lens 1:4,5, 84 ind. mit anast. Blendenreihe

Tiefenfeld, f = 405.91 Einzelobjektiv

Tiefenfeld, f = 405.91 Doppelobjektiv 1:6,47

A.S. 25,5° Sphärische Korrektion (A.S. 25°)

Δ s'		Δ s''	
+0.5	+0.2	+0.3	+0.2

Δ s'		Δ f'	
-0.6	-0.3	0.1	-0.5	-0.5	+0.2

Einfallshöhen Chromasie

15.5	15.7	15.5

(-0.7) -0.2

Einfallshöhen Chromasie

15.0	15.2	15.0

-0.4 (-0.1) -0.5

Astigmatismus (A.S. 25°)

Äquatorialbüschel		Meridionalbüschel	
+0.2	+0.1	+0.2	+0.3	+0.3	+0.1

Äquatorialbüschel		Meridionalbüschel	
-0.2	-0.6	-0.6	-0.4	-0.6	-0.1

Frontwinkel Vorzeichen

42.5	44.1	45.2	999.96	999.96	999.96

Frontwinkel Vorzeichnung

42.5	44.1	45.2	999.96	999.96	999.96

Radien, Dicken und Abstände für f = 100 mm.

F-75-6328-RE

902

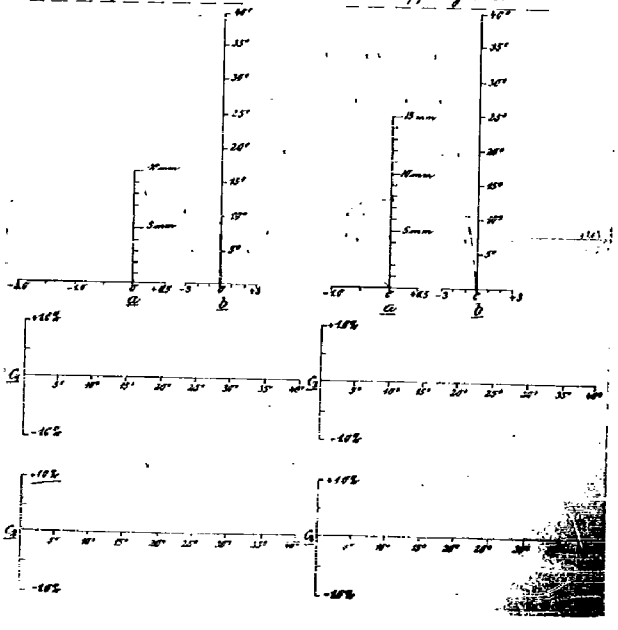
Goerz Artar Lens 1:4,5, 84 ind. mit anast. Blendenreihe

Linse	n_g	$n_g - n_f$	ν

x wie Einzelob. 445 x wie Einzelob. 445

Tiefenfeld Einzellinse

Tiefenfeld Doppelobjektiv



F-Ts-6390-RE

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Abl. m.)

Δs'		Δf'		Δs'		Δf'	
-12.9	-20.9	+22.6	-19.9	-19.9	+22.6	-20.6	-8.5	+18.6	-15.4	-19.5	+14.8

Einfallslothm. | Chromasie

12.3	+7.6	29.3

Ei-fallslothm. | Chromasie

23.6	24.2	19.4

Astigmatismus (Abl. m.)

Aequatorialfläche		Meridionalfläche			
-2.3	-2.7	-2.8	-2.5	-2.3	+2.0

Frontwinkel | Vorzeichnung

27.3	16.2	11.5

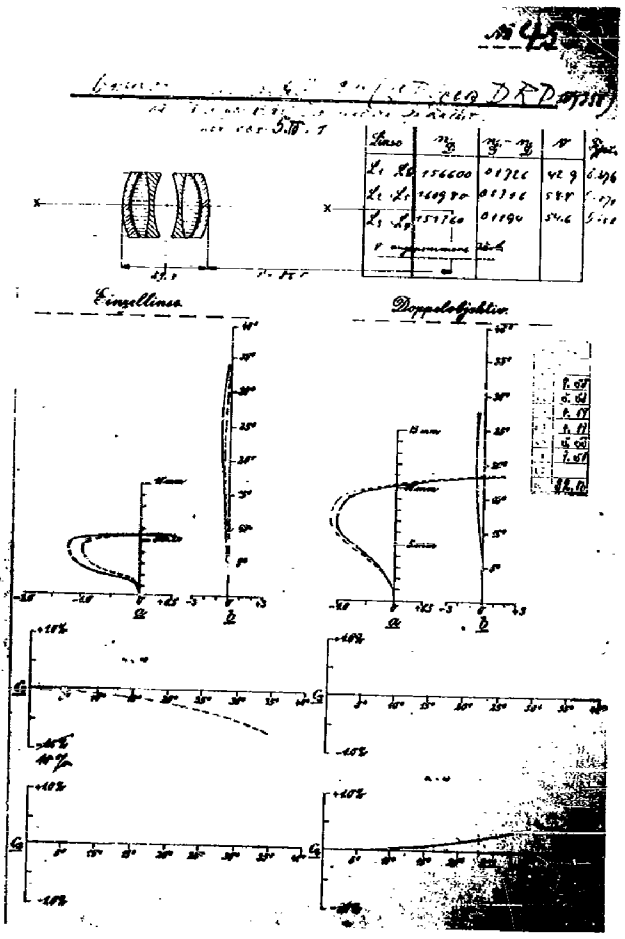
Aequatorialfläche			Meridionalfläche		
-2.2	-2.7	-2.5	-2.2	-2.7	-2.4

Frontwinkel | Vorzeichnung

29.6	17.2	12.0

Radien, Dicken und Abstände für f = 100 mm:

Einzellinsen | Doppelobjektiv



F-Ts-6390-RE

Einzelobjektiv f = 155.95 | Doppelobjektiv f = 114.8

Sphärische Korrection (A.P.L. f. m. 119)

Δs'		Δf'		Δs'		Δf'	
-18.7	-18.2	+24.6	-14.8	-14.5	+19.0	-11.5	-2.7	+24.9	-12.8	-10.1	+19.0
						-22.1	-7.9	+22.0	-22.0	-7.2	+19.0

Einfallslothm. | Chromasie

16.6	16.5	20.2

Einfallslothm. | Chromasie

13.5	13.8	14.3

Astigmatismus (Abl. 25 g.)

Aequatorialfläche			Meridionalfläche		
-18.1	-17.9	-5.9	-6.6	-6.0	-2.9

Frontwinkel | Vorzeichnung

17.6	16.1	12.0

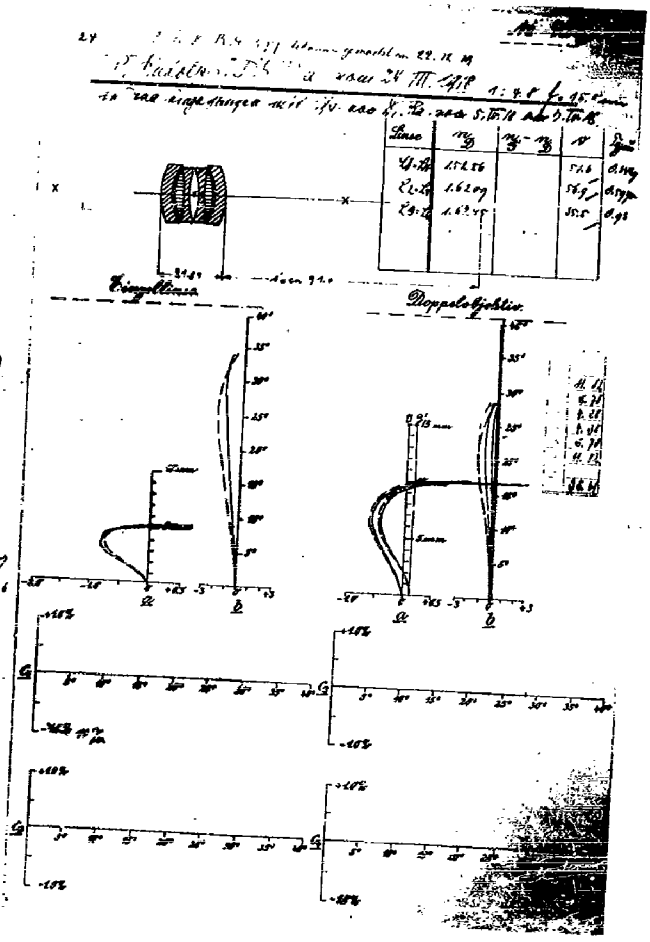
Aequatorialfläche			Meridionalfläche		
-6.5	-6.3	+6.1	-7.0	-6.5	-4.5
-8.3	-7.3	-2.2	-8.8	-6.4	-4.0

Frontwinkel | Vorzeichnung

9.0	11.6	6.0

Radien, Dicken und Abstände für f = 100 mm:

Einzellinsen | Doppelobjektiv



F-TS-6398-RE

995

Sehlinse 1:5, f = 12,5 cm

Einzellinse

Doppelobjektiv

Sphärische Korrection

Δs'			Δf'		
-18,0	-14,4	-8,6	-14,4	-11,0	-11,0
-2,8	+0,6	+2,8	-0,6	+0,6	+0,7

Einfallshöhen | Chromasie

18,0	18,1	18,1	-196 (-99) -198

Δs'			Δf'		
-11,1	-11,6	-10,1	-11,4	-12,7	-13,4
-2,1	+0,7	+2,3	-0,5	-0,7	+0,2

Einfallshöhen | Chromasie

23,1	23,7	24,0	+135 (+68) +133

Astigmatismus (AB)3

Sagittalbild		Meridionalbild			
0	-14,2	-13,6	-6,9	-9,1	-16,6
-6,2	-11,8	-10,9	-2,9	-11,2	-13,7

Frontwinkel | Vorzeichnung

44,6	46,4	47,5	g	133,30	132,71	134,17
			g'	137,32	90-22,22	91-2,17

Sagittalbild		Meridionalbild			
0	-6,2	-5,1	-11,1	-6,1	-9,2	-14,9
-6,2	-6,2	-11,2	-6,6	-10,0	-11,0

Frontwinkel | Vorzeichnung

34,1	34,6	36,0	g	111,30	110,0	110,33
			g'	117,32	117,82	117,67

Radien, Dicken und Abstände für f = 100 mm (Doppelobjektiv)

1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6
49,9	49,3	49,9	49,9	49,8	49,9	49,9	49,9	49,8	1,8	6,2	0,1	9,2	4,9	9,7	4,4	2,6	4,2	1,6

Sehlinse 1:5, f = 12,5 cm

Linse	r_D	$n_F - n_C$	ν
L_1	1,60 90	0,01 32	58,6
L_2	1,61 81	0,01 50	55,2
$L_1 + L_2$	1,6228	0,01 06	60,2
L_3	1,620	0,01 0	60,7

Einzellinse

Doppelobjektiv

F-TS-6398-RE

996

Sehobjektiv 1:5, f = 12,5 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (ΔS'-Δf')

Δs'			Δf'		
-16,3	-13,7	-7,9	-14,6	-13,7	-11,0

Einfallshöhen | Chromasie

18,5	16,2	17,9	-131 (-98) -133

Δs'			Δf'		
-11,9	-11,7	-7,0	-11,6	-13,5	-9,0

Einfallshöhen | Chromasie

22,1	22,7	23,0	-128 (-98) -38

Astigmatismus (AB)43

Sagittalbild		Meridionalbild			
-2,5	-3,7	-4,3	+3,4	+5,2	-6,7

Frontwinkel | Vorzeichnung

43,3	44,2	45,7	g	134,30	133,84	135,34
			g'	137,32	137,82	137,67

Sagittalbild		Meridionalbild			
-2,2	-3,4	-4,2	+2,2	+2,8	-4,8

Frontwinkel | Vorzeichnung

18,0	17,8	18,2	g	134,30	133,84	135,34
			g'	137,32	137,82	137,67

Radien, Dicken und Abstände für f = 100 mm (Doppelobjektiv)

1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6
49,9	49,3	49,9	49,9	49,8	49,9	49,9	49,9	49,8	1,8	6,2	0,1	9,2	4,9	9,7	4,4	2,6	4,2	1,6

Sehobjektiv 1:5, f = 12,5 cm

Linse	r_D	$n_F - n_C$	ν
$L_1 + L_2$	1,61 42	0,01 24	59,5
$L_2 + L_3$	1,6090	0,01	60,1
$L_1 + L_3$	1,5206	0,0106	62,6
$L_1 + L_2$	1,6600		57

Einzellinse

Doppelobjektiv

F-FS-6396-RE

997

Sehrohr B 1:5,5 f = 120 mm v 23,7 H.

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (AS etc.)

Einfallshöhen Chromasie

Astigmatismus (d.B.) n

Sagittalbüschel Meridionalbüschel

Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm: — Doppelobjektiv

Sehrohr B 1:5, f = 120 mm v 23,7 H.

Linse

Einzellinse

Doppelobjektiv

917

№ 487

F-FS-6396-RE

998

Sehrohr 1:5 150 mm v 24,8 H.

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (AS etc.)

Einfallshöhen Chromasie

Astigmatismus (d.B.) n

Sagittalbüschel Meridionalbüschel

Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm: — Doppelobjektiv

Sehrohr 1:5, 150 v 24,8 H. Type W.1

Linse

Einzellinse

Doppelobjektiv

F-TS-6398-RE

999

Rudorlinse 1:11, f. 22.5 cm, v. 5.1.29

Einzellinse | Doppelobjektiv

Sphärische Korrection (Mk II)

Δs'			Δf'		
-2.0	-2.9	+4.9	-7.5	-10.8	+2.7
-10.8	-12.7	+4.7	-7.7	-9.6	+5.1

Einfallshöhen | Chromasie

m 2	11.0	17.5	+9	(-14.5)	-9

Einfallshöhen | Chromasie

Astigmatismus (Mk II)

Sagittalfehler			Meridionalfehler		
-0.9	-3.6	0	-14.1	-3.7	+5.2
-12.7	-4.8	+2.3	-9.1	-4.2	+6.7

Äquatorialfehler | Meridionalfehler

Bildwinkel | Vorzeichnung

14.7	14.9	15.4

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	d1	d2	d3	l	n1	ν1	n2	ν2
+6	+3.1	+2.9	+11.2	1.2	0.7	2.0	0.4	1.5	60.0	1.6	36.8

Rudorlinse 1:11, f. 22.5 cm, v. 5.1.29

Linse	n_D	$n_F - n_D$	ν
L_1	1.5198	0.1499	47.2
L_2	1.6223	0.1501	29.2
L_3	1.6135	0.2107	19.1

Einzellinse | Doppelobjektiv

a | b

998

F-TS-6399-RE

Görz Patent 187158, f. 48 cm, v. 16.11.16

Einzellinse | Doppelobjektiv

Sphärische Korrection (Mk 16/70)

Δs'			Δf'		
-1.0	-0.3	+0.3	-0.5	-0.1	+0.3
-2.0	-0.8	+0.3	-0.9	-0.5	+0.5

Einfallshöhen | Chromasie

-0.5	11.4	16.0	-11	(-7.0)	-11.8

Einfallshöhen | Chromasie

Astigmatismus (Mk 16/70)

Sagittalfehler		Meridionalfehler		
-1.0	+0.5	-0.5	+0.1	+0.5

Äquatorialfehler | Meridionalfehler

Bildwinkel | Vorzeichnung

14.0	14.2	14.5

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	d1	d2	l	d3
+4.7	+3.1	+2.7	0.7	2.5	0.3	2.3

Görz Patent 187135, f. 48 cm, v. 14.11.16

1:12.3

Linse	n_D	$n_F - n_D$	ν
L_1	1.5726	0.0177	57.7
L_2	1.6198	0.0181	47.5
L_3	1.5861	0.0126	63.4

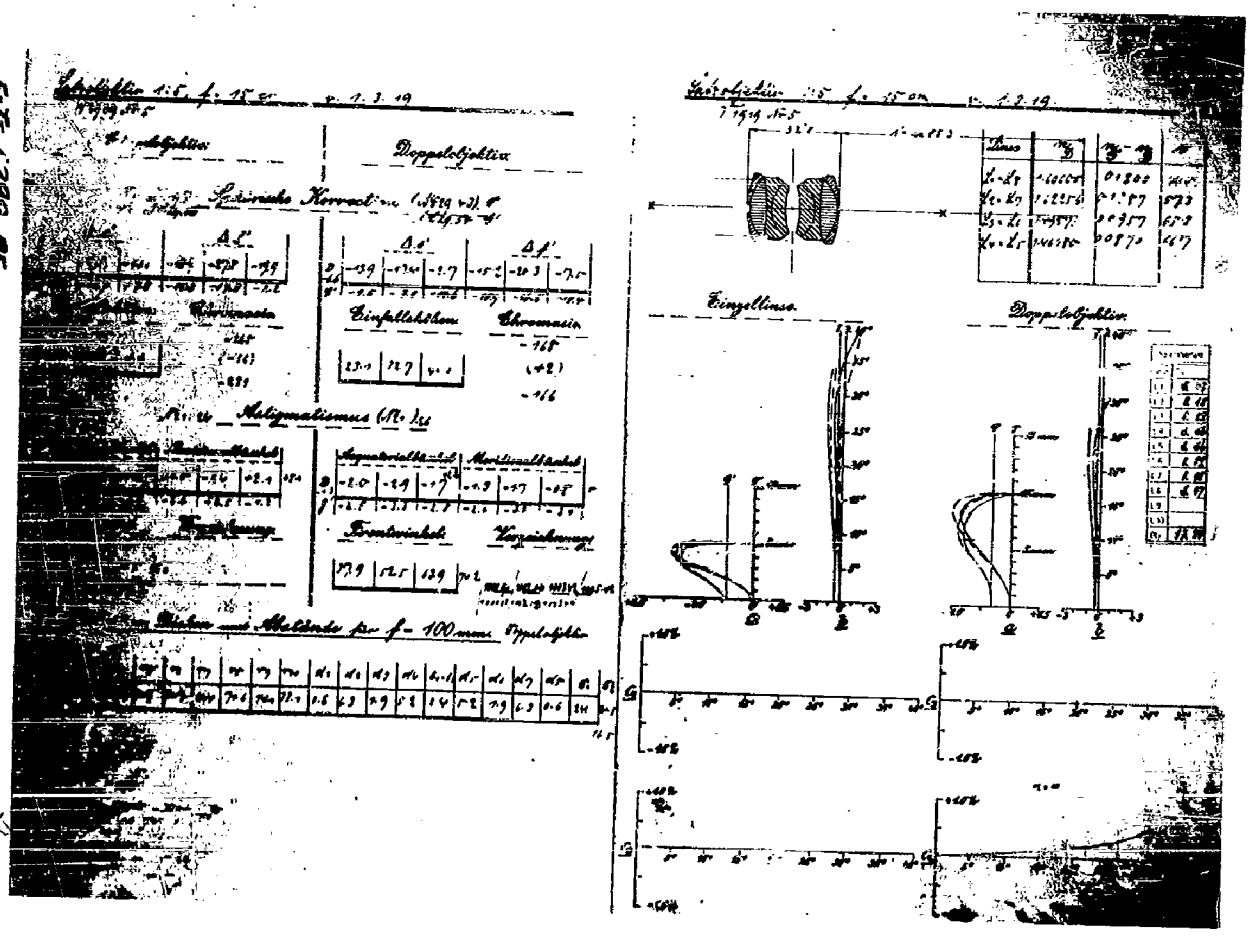
Einzellinse | Doppelobjektiv

a | b

1000

F-TS-6398-RE

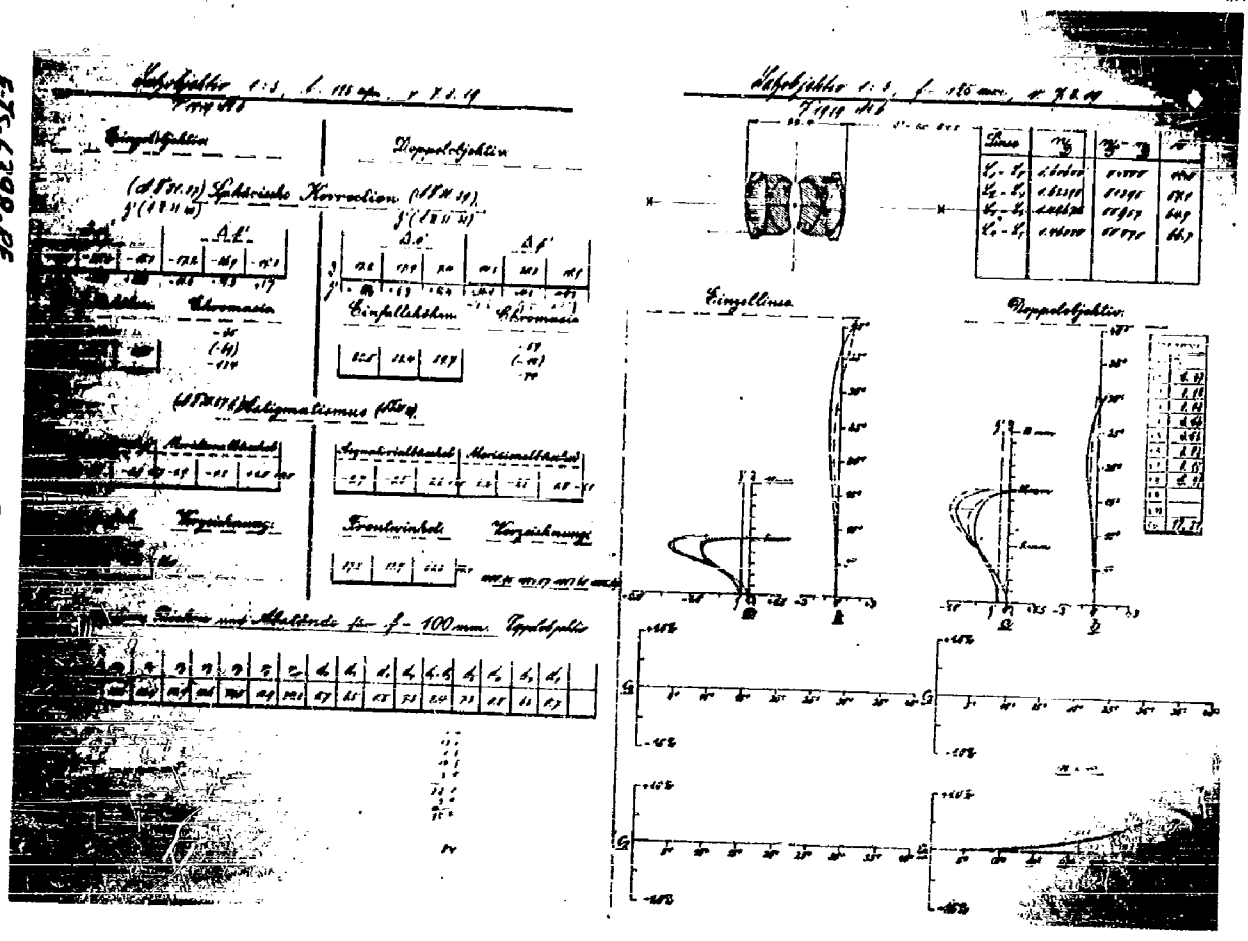
1001



1001

F-TS-6398-RE

1002



1002

F-TS-6398-RE

1003

Lehrobjektiv 1:5, f. 15 cm v. 11.3.19

Einzellinse

Doppelobjektiv

Sphärische Korrection (Ll.19) Lf. 30

Astigmatismus (Ast)

Einzellinse

Doppelobjektiv

F-TS-6398-RE

1004

Lehrobjektiv 1:5, f. 15 cm v. 14.19

Typ 19 Nr. 8

Einzellinse

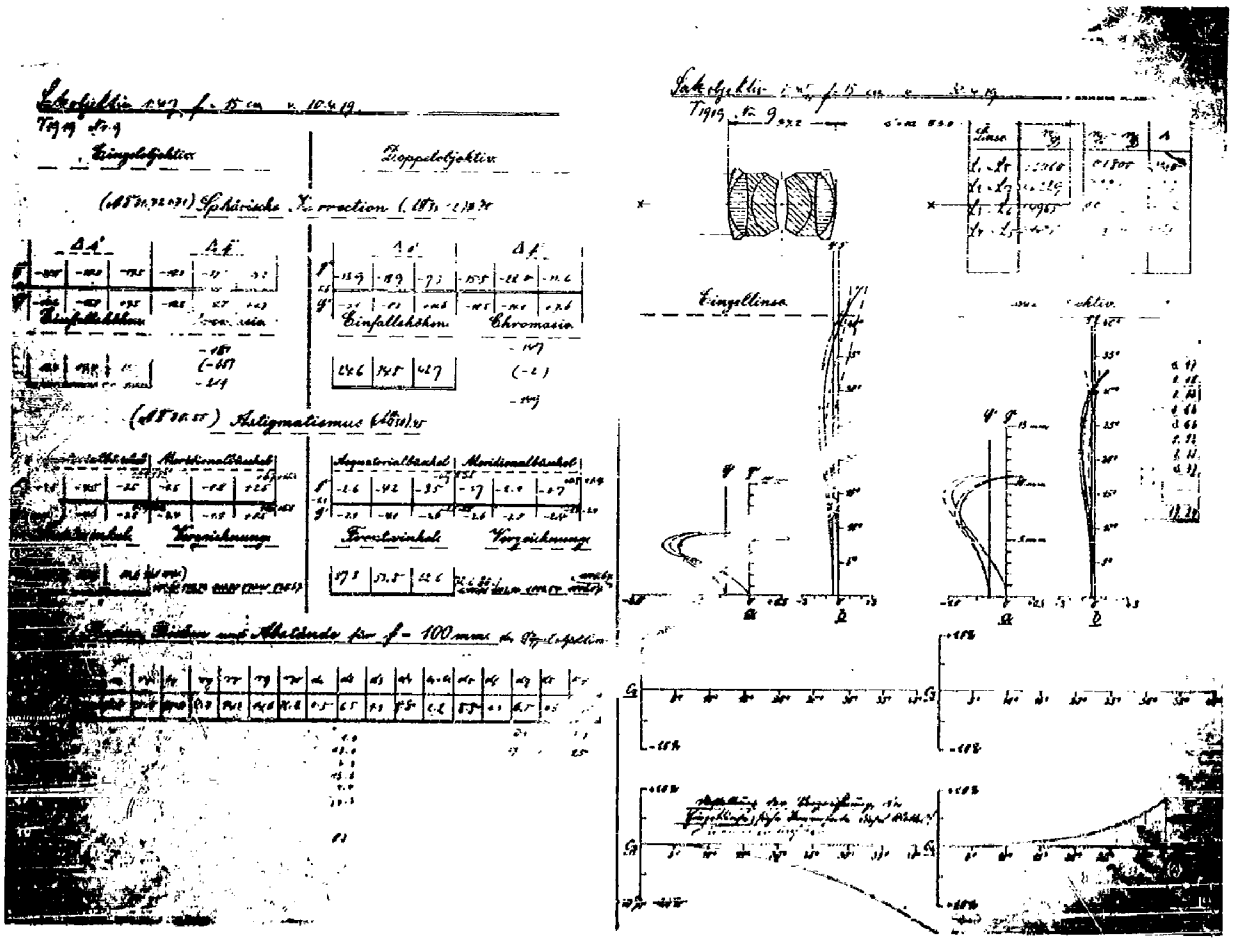
Doppelobjektiv

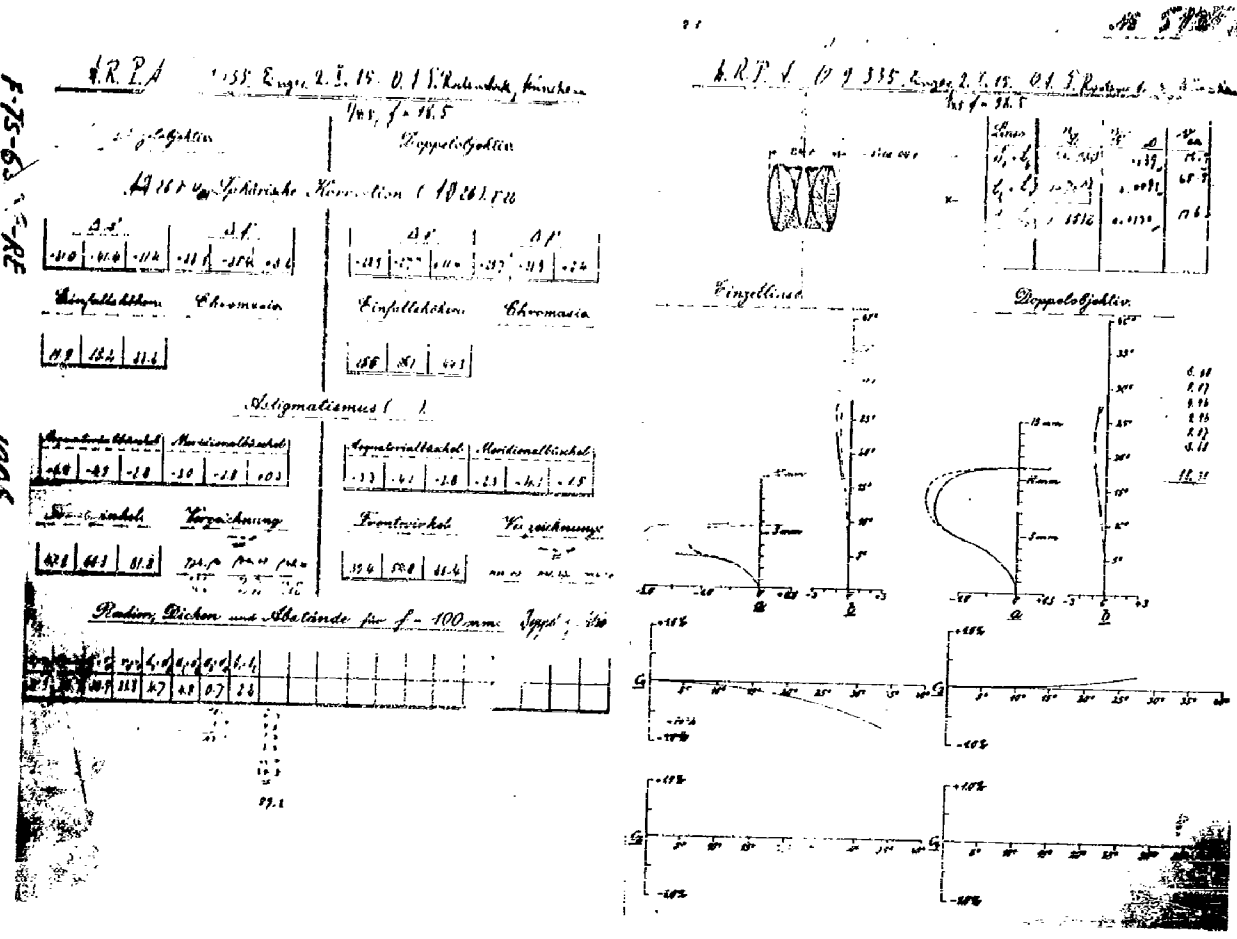
Sphärische Korrection (Ll.19)

Astigmatismus (Ast)

Einzellinse

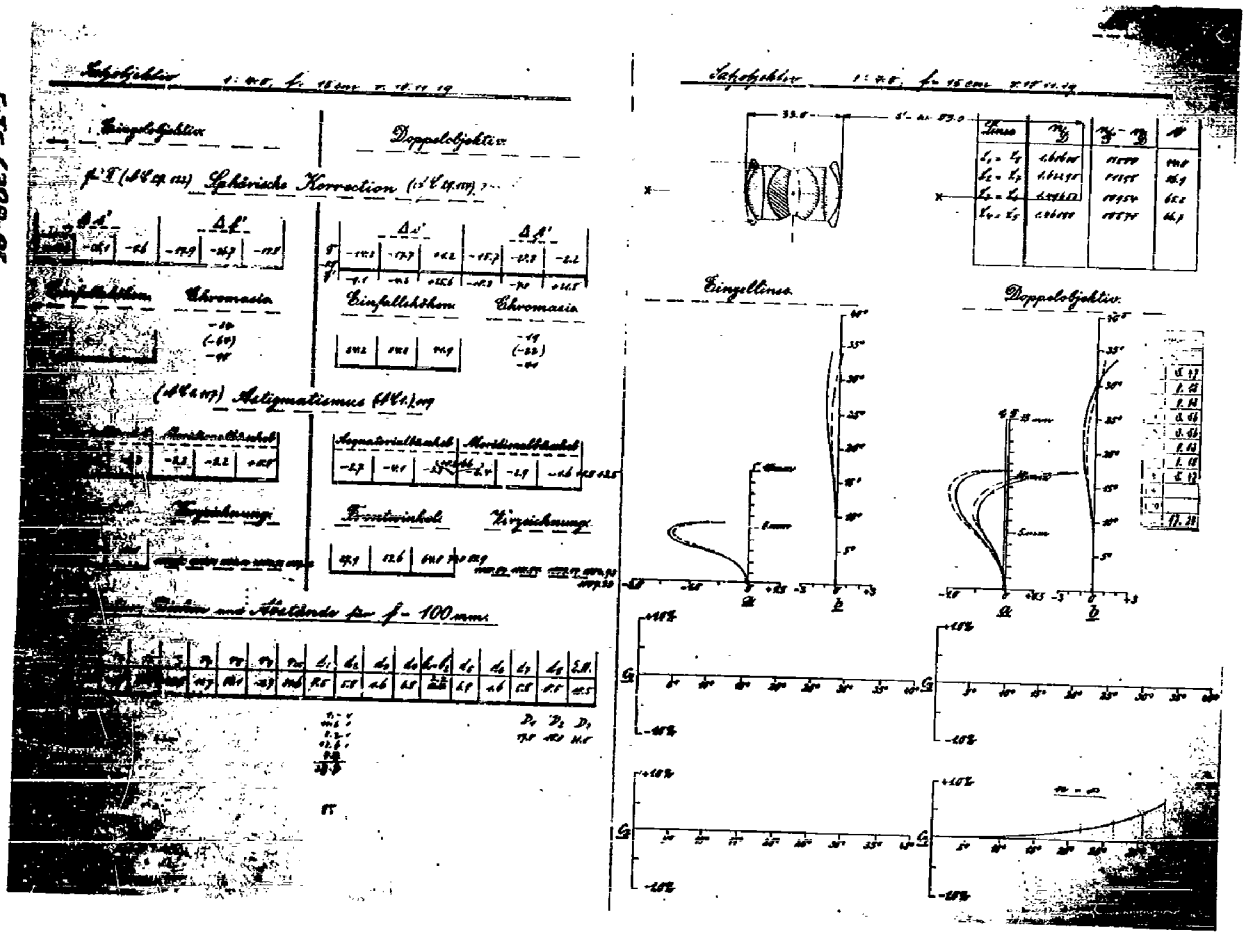
Doppelobjektiv





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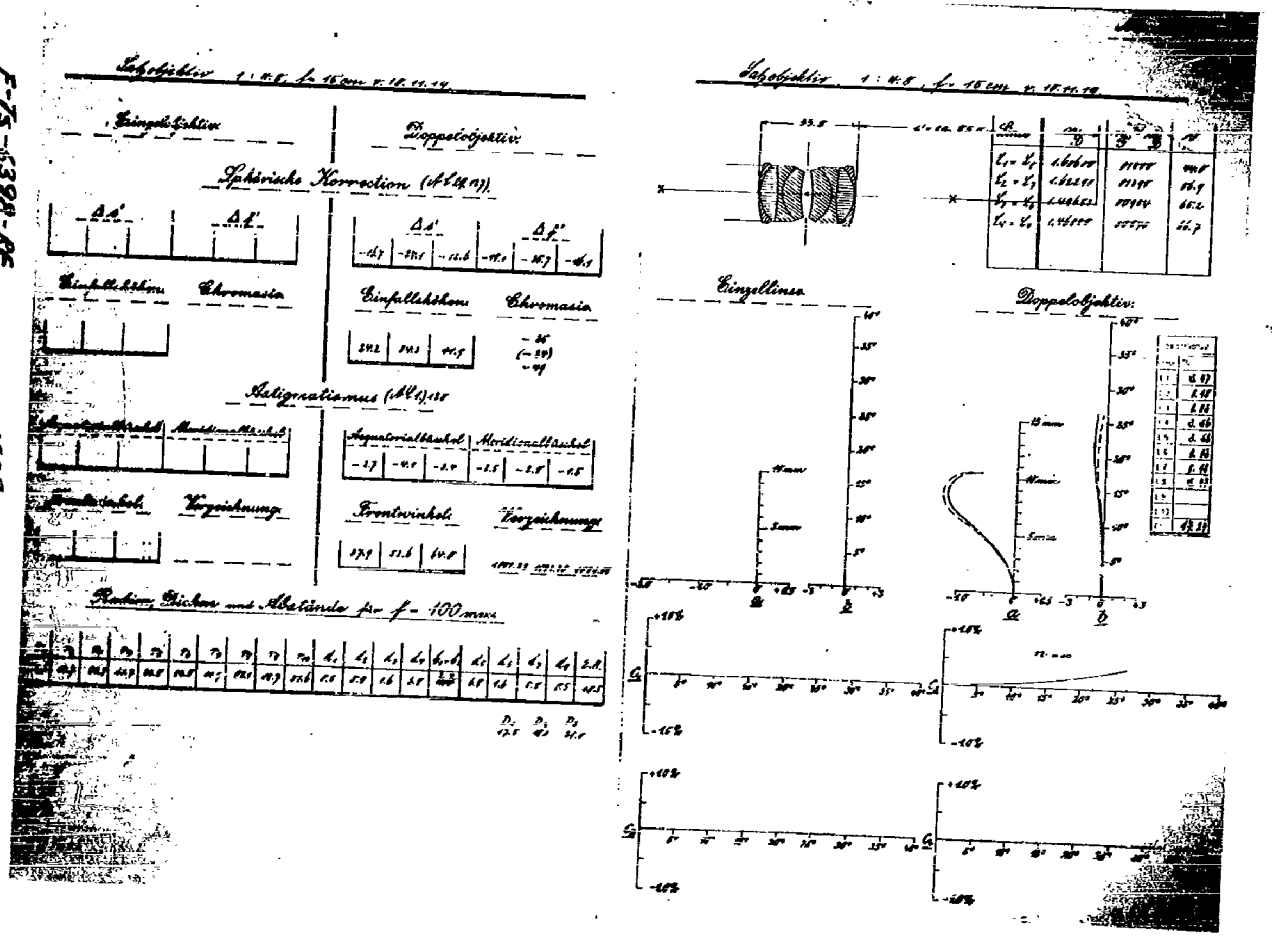
1007



1007

F-FS-6398-RE

1008



F-75-6398-RE

1009

Sehobjektiv 1:4,5, f. 15 cm u. 17 u. 19

Typ 19 Nr. 15

Einzelobjektiv | Doppelobjektiv

Astigmatismus (Bild) f. 17

Sphärische Korrection (Bild) f. 17

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (Bild) f. 19

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm: r1 r2 r3 r4 r5 r6 r7 d1 d2 d3 d4 d5 d6 d7

Sehobjektiv 1:4,5, f. 15 cm u. 17 u. 19

Typ 19 Nr. 15

Linse | n_D | ν_D | n_F − n_C | n_F − n_D

r1 − r2 | 1,6016 | 60,300 | 0,0106

r2 − r3 | 1,6229 | 58,198 | 0,0129

r3 − r4 | 1,6077 | 60,931 | 0,0109

r4 − r5 | 1,6168 | 60,870 | 0,0107

Einzellinse | Doppelobjektiv

1009

Nr 525

F-75-6398-RE

Doppelanastigmat „Eurhigmat" 1:7,2 f. 135 mm G. Rodenstock-Weinheim

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Bild n. 24)

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (Bild)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm: r1 r2 r3 r4 r5 r6 r7 d1 d2 d3 d4 d5 d6 d7

Doppelanastigmat „Eurhigmat" 1:7,2 f. 135 mm G. Rodenstock-Weinheim

Linse | n_D | ν_D | n_F − n_C | n_F − n_D

L1 | 1,517724 | 64,2 | 0,00736 | 0,0133

L2 | 1,517720 | 64,2 | 0,00840 | 0,0153

L3 | 1,517720 | 64,2 | 0,00840 | 0,0153

L4 | 1,517724 | 64,2 | 0,00736 | 0,0133

Einzellinse | Doppelobjektiv

1010

№ 528

F-TS-6398-RE

1011

Satzlinse V 1920 A 1 1:9,5 f = 245 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (A 8233 I.

Δs'			Δf'		
-261	-182	-84	-195	-74	G
-234	147	91	154	132	f

Δs'			Δf'		
-163	-111	-44	162	177	G
121	139	93	147	148	f

Einfallshöhen | Chromasie

72.2	71.9	220

(-82)
272

Einfallshöhen | Chromasie

229	338	419

-156
(+5)
-197

Astigmatismus (A 8234) I. A 8232 I.

Aequatorialbüschel			Meridionalbüschel		
-257	424	-409	-424	-430	+1.10

Aequatorialbüschel			Meridionalbüschel		
291	411	479	575	675	648

Frontwinkel | Verzeichnung

422	443	446

Frontwinkel | Verzeichnung

329	32.6	429

Radien, Dicken und Abstände für f = 100 mm für die Doppelobj.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
1143	224	787	114	347	147	114	787	229	1143	69	37	33	69	27	27	69	33	27	69

Satzlinse J 1920 A 1 1:9,6 f = 245 mm

Linse	n_g	$n_g - n_d$	V
$L_1 \cdot L_2$	1.61882	0.01111	56.7
$L_2 \cdot L_3$	1.62588	0.01704	36.7
$L_3 \cdot L_4$	1.51823	0.00728	64.1
$L_4 \cdot L_5$	1.69680	0.01287	55.5

Einzellinse. | Doppelobjektiv.

1011

№ 530

F-TS-6398-RE

1012

Satzlinse 1:9,6 f = 24 cm v. H. J. 20

Einzelobjektiv | Doppelobjektiv

AFS I Sphärische Korrection (AFS 9).

Δs'			Δf'		
-251	-152	+63	-144	-103	-55	G
135	139	73	147	187	115	f

Δs'			Δf'		
118	-119	75	-113	-110	116	G
116	61	41	42	89	101	f

Einfallshöhen | Chromasie

119	119	117

-141
(-99)
169

Einfallshöhen | Chromasie

164	117	115

146
(+9)
-139

Astigmatismus (AFS 9) II

Aequatorialbüschel			Meridionalbüschel		
-33	-91	22	-19	-117	-144	G
-129	-145	-142	-122	-138	002	f

Aequatorialbüschel			Meridionalbüschel		
139	-140	135	-185	119	-139	G
135	91	1.10	-121	137	135	f

Frontwinkel | Verzeichnung

473	464	516

Frontwinkel | Verzeichnung

177	178	175

Radien, Dicken und Abstände für f = 100 mm für Doppelobjektiv

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
1137	150	145	193	34	93	72	24	90										

Satzlinse 1:9,6 f = 24 cm v. H. J. 20

Linse	n_g	$n_g - n_d$	V
$L_1 \cdot L_2$	1.62429	0.01406	57.7
$L_2 \cdot L_3$	1.51988	0.01216	56.5
$L_3 \cdot L_4$	1.69861	0.00957	65.4

Einzellinse. | Doppelobjektiv.

1012

№ 534

Satzobjektiv 1:4,5; f. 145,7

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (4 Fig.)

Einfallshöhen | Chromasia

Astigmatismus (4 Fig.)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Einzellinse. | Doppelobjektiv.

Satzobjektiv 1:4,5; f. 145,7

Linse | n_D | $n_F - n_D$ | ν

r_1 r_2 | 1,64781 | 0,01744 | 57,7

r_2 r_3 | 1,57384 | 0,01924 | 37,4

r_3 r_4 | 1,58144 | 0,01824 | 40,1

Einzellinse. | Doppelobjektiv.

№ 537

A. Heb. Riebenbel, Dialyt 1:4,5, f. 15 cm

F-75-6398-RE

10/14

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (4 Fig.)

Einfallshöhen | Chromasia

Astigmatismus (4 Fig.)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

J. Heb. Riebenbel, Dialyt 1:4,5, f. 15 cm

Linse | n_D | $n_F - n_D$ | ν

r_1 r_2 | 1,57944 | 0,01491 | 61,2

r_2 r_3 | 1,61276 | 0,01684 | 37,9

Einzellinse. | Doppelobjektiv.

№ 589

F-Zs-6398-RE

10/5

Meyer Doppel Anastigmat 1:4,5 f 15 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (1911)

Δs'			Δf'		
-1,52	-1,35	-1,03	1,07	0,45	0,00

Einfallshöhen			Chromasie		
11,0	17,0	19,5			

Δs'			Δf'		
0,15	0,00	-0,03	0,25	1,80	0,00

Einfallshöhen			Chromasie		
14,1	17,8	19,5			

Astigmatismus (1911)

Aequatorialbüschel			Meridionalbüschel		
-1,4	-3,0	-4,0	-1,3	-2,2	-4,1

Frontwinkel			Verzeichnung		
17,1	16,3	21,6			

Aequatorialbüschel			Meridionalbüschel		
-0,3	0,5	-1,3	-2,4	-4,0	0,2

Frontwinkel			Verzeichnung		
17,1	17,1	21,0			

Radien, Dicken und Abstände für f = 100 mm: für d. Doppelobj.:

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5	d6	d7
156	42,5	90,4	104,5	6,0	0,5	2,5	2,0	10,5	0,5	10,5	

2,5
2,5
2,5
6
15,5

59,5

Meyer Doppel Anastigmat 1:4,5 f 15 cm

Linse | n_D | $n_F - n_D$ | ν

$L_1 - L_2$ 1,611 60 | 0,0 1160 | 57,4

$L_3 - L_4$ 1,615 54 | 0,0 1914 | 42,6

Einzellinse | Doppelobjektiv

1/13

№ 541

F-Zs-6398-RE

10/5

Kodak Anastigmat 1:6,3 f 150 mm

Einzelobjektive | Doppelobjektiv

Sphärische Korrection (1911)

Δs'			Δf'		
+2,03	+1,79	+1,44	+0,47	+0,23	-0,12
-0,5	-0,7	-0,2	0,0	0,0	+0,2
-2,1	-1,9	-1,82	-0,2	+0,8	+2,4

Einfallshöhen			Chromasie		
9,2	13,0	14,7			

Δs'			Δf'		
-2,7	-2,5	+1,8	-0,7	-2,5	+0,5
-0,2	+0,1	+0,2	-0,2	+0,2	+0,2

Einfallshöhen			Chromasie		
15,3	15,8	14,7			

Astigmatismus (1911)

Aequatorialbüschel			Meridionalbüschel		
+2,3	+0,0	+0,3	+0,8	+2,3	+0,1
-0,5	-0,4	-0,4	-0,4	-0,3	-0,2
-4,7	-1,8	-1,0	-2,0	-3,0	-0,3

Frontwinkel			Verzeichnung		
43,2	44,3	38,6			

Aequatorialbüschel			Meridionalbüschel		
-2,4	-1,4	+1,3	+1,1	-1,2	-2,7
-0,2	-0,3	+0,3	+0,5	-0,2	-0,2

Frontwinkel			Verzeichnung		
44,1	45,3	42,2			

Radien, Dicken und Abstände für f = 100 mm für 2,3 Doppelobj.:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	D1	D2	D3
156,0	41,2	44,7	53,1	99,1	44,7	41,2	156,0	0,8	2,5	0,2	1,6	0,4	0,2	2,2	2,0	13,5	4,0	10,5

Kodak Anastigmat 1:6,3 f 150 mm

Linse | n_D | $n_F - n_D$ | ν

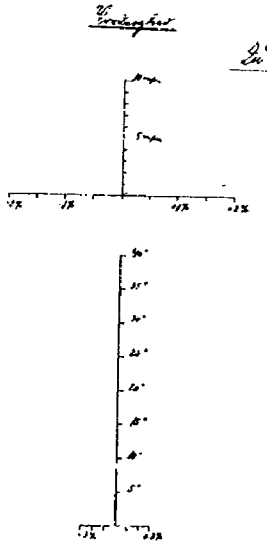
$L_1 - L_2$ 1,611 60 | 0,0 1160 | 57,4

$L_3 - L_4$ 1,615 54 | 0,0 1914 | 42,6

Einzellinse | Doppelobjektiv

Zeichnung folgt demnächst

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№ 542

F-75-6396-RE

Kodak Anastigmat 1:4,5 f = 181 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δf' in Abh. von h)

Δs'			Δf'			Δs'			Δf'		
+0,75	+0,25	+0,0	+1,5	+0,5	+0,0	-11,4	-11,5	+1,4	-11,6	+1,0	
-12,1	-7,7	-2,2	-4,3	-1,1	+1,1	-2,3	-1,1	+12,3	-1,3	-0,1	+1,-

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

22,0	18,4	22,2	24,7	18,3	17,5

-6
(-39)
-33

Astigmatismus (Abb.) 6-7

Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel		
+0,5	+18,1	+22,0	+2,1	+22,5	+2,1	-0,2	-1,3	+11,8	-1,3	-1,1	-13,5
-2,5	-15,0	-13,4	-8,5	-2,2	-5,4	-2,-	-2,-	-1,3	-1,2	-1,1	-11,1
-2,5	-15,0	-17,1	-14,-	-12,3	-11,-						

Meridionalbüschel | Pinselzeichnung | Frontalbüschel | Pinselzeichnung

44,0	44,3	44,-	44,0	44,5	44,7

S: 999,44, 999,5, 999,33
q: 999,3 999,14 999,00

Radien, Dicken und Abstände für f = 100 mm s. Abb. Objektiv

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	D1	D2	D3
44,2	84,1	999,9	999,7	12,2	4,25	5,05	11,2	4,1	1,5	1,2	2,9	2,9	1,2	1,6	41,1	2,10	2,15	1,85

Kodak Anastigmat 1:4,5, f = 181 mm.

Linse	n_D	$n_F - n_C$	ν
$L_1 - L_2$	1,61644	0,01661	57,4
L_1	1,57581	0,01761	44,7
L_2	1,64458	0,01678	47,5

Einzellinse | Doppelobjektiv

Gaußsche p.

Winkelsch. p. f. 100 mm-Syst.

F:3,5-6398-RE

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Satzlinse 1:3,5 V 1920 № 5 f=24 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f/5,4)

Δs'			Δf'		
-22,4	-26,1	8,4	12,1	7,6	7,6
-22,3	-26,1	3,4	11,7	12,5	12,4

Einfallshöhen			Chromasie
19,1	24,6	24,6	(f/5,4)

Δs'			Δf'		
11,5	11,7	11,4	11,1	11,1	11,1
11,5	11,7	11,4	11,1	11,1	11,1

Einfallshöhen			Chromasie
17,1	19,2	19,0	(f/5,4)

Astigmatismus (f/5,4)

Äquatorialbüschel		Meridionalbüschel			
-2,44	-2,4	-4,0	-2,7	-2,7	+0,7
-2,28	-2,4	-2,4	-2,7	-2,5	-0,7

Frontwinkel			Vorzeichnung
49,2	41,3	32,6	

Äquatorialbüschel		Meridionalbüschel			
-2,0	-2,1	-2,4	-2,5	-2,2	+4,15
-2,35	-2,4	-2,1	-2,5	-3,72	+4,44

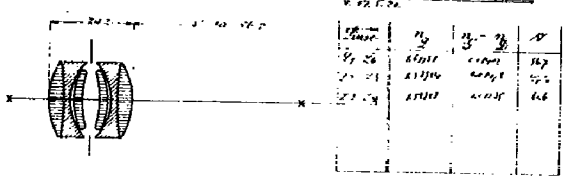
Frontwinkel			Vorzeichnung
34,7	17,1	41,2	

Radien, Dicken und Abstände für f=100 mm:

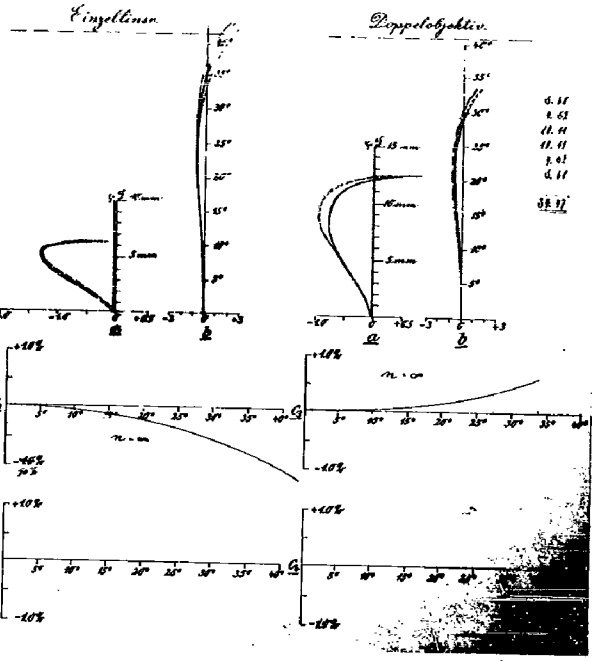
r	r	r	r	r	d	d	d	d	d	e
142,1	33,7	17,0	78,1	26,1	2,0	0,3	2,4	5,1	2,0	

für 2×2 Doppelobjektive

Satzlinse 1:3,5 V 1920 № 5 f=24 cm



Linse	n_D	$n_F - n_C$	ν
L_1	1,61111	0,01111	56,2
L_2	1,57304	0,01304	42,4
L_3	1,57333	0,01333	56,6



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Deformiertes Satzobjektiv 1:3,5; f=24,7

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f/5,4 u. 11)

Δs'			Δf'		
+2,6	+2,5	+2,7	+2,3	+2,2	+2,6
+2,0	+2,5	-0,1	+2,2	+2,0	-3,2

Einfallshöhen			Chromasie
12,6	18,1	12,1	(f/5,4)

Δs'			Δf'		
+3,6	+3,3	+3,0	+2,0	+2,3	+2,8

Einfallshöhen			Chromasie
12,7	16,4	14,6	(f/5,4)

Astigmatismus (f/5,4)

Äquatorialbüschel		Meridionalbüschel			
-2,95	-3,4	-2,3	+0,3	+0,5	-0,4

Frontwinkel			Vorzeichnung
49,2	41,3	41,6	

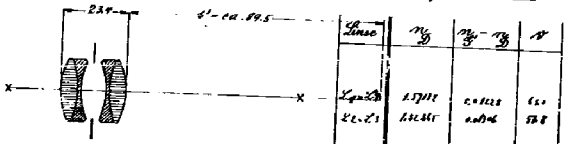
Äquatorialbüschel		Meridionalbüschel			
-2,6	-3,3	-3,0	+0,3	+0,6	-2,3

Frontwinkel			Vorzeichnung
44,5	18,5	42,4	

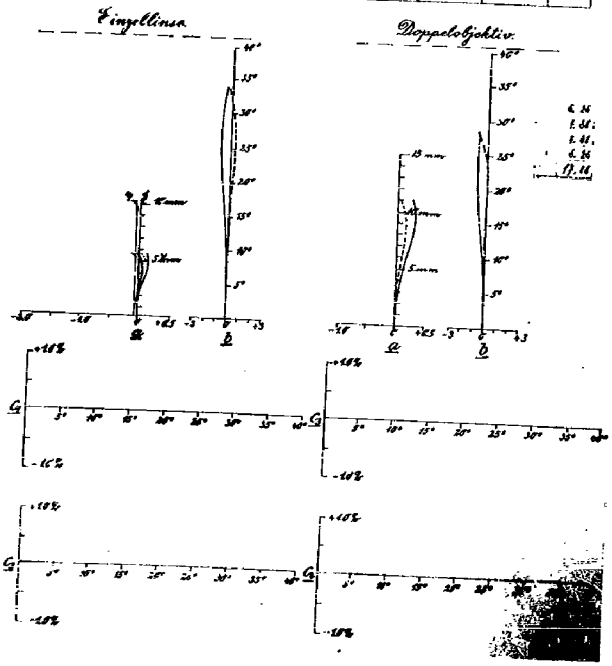
Radien, Dicken und Abstände für f=100 mm:

r	r	r	r	r	r	d	d	d	d	d	d
104,9	32,2	23,8	23,8	11,2	204,3	6,0	4,2	4,5	4,5	4,2	6,0

Deformiertes Satzobjektiv 1:3,5; f=24,7



Linse	n_D	$n_F - n_C$	ν
L_1	1,57111	0,01113	61,1
L_2	1,61311	0,01316	37,8



Satzlinse 1:5 f 1920 N. 5 f. 24 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Hfn.)

Δs'		Δf'			Δs'		Δf'		
h					h				

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus (Hfn.)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Satzlinse 1:5 f 1920 N. 5 f. 24 cm

Einzellinse | Doppelobjektiv

Linse	n_D	$n_F - n_C$	ν

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Deformiertes Satzobjektiv 1:4,5 f. 100.7

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Hfn.)

Δs'		Δf'			Δs'		Δf'		
h					h				

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus (Hfn.)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Deformiertes Satzobjektiv 1:4,5 f. 100.7

Einzellinse | Doppelobjektiv

Linse	n_D	$n_F - n_C$	ν

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F-73-6390-RE

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№ ~~545~~ 546

Kodak-Anastigmat 1:6,3 f. 90 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'₁, Δs'₂, Δs'₃ / Δs'm)

Δs'			Δf'		
+2,5	+2,0	+3,0	+2,3	+3,0	+3,0
+2,3	+1,4	+2,5	−0,3	−2,1	−2,3
−0,1	−12,1	−13,1	−0,3	−9,1	−13,3

Einfallshöhen | Chromasie

21,5	21,0	20,5	Werkstoff −246
21,5	21,0	19,6	Vergleich (−47)
			−315

Δs'		Δf'	
−1,0	0	+0,3	−1,2
−0,3	−2,1	+0,0	−0,8

Einfallshöhen | Chromasie

18,3	18,0	17,8

−6 (−3) −9

Astigmatismus (Δs'₁ − Δs'₂ = 2a)

Aequatorialbüschel		Meridionalbüschel			
+0,1	+0,0	+12,2	+2,4	+2,2	+0,1
−2,0	−13,1	−0,5	−0,5	−3,1	−12,1
−1,1	−6,7	−6,9	−0,1	−7,6	−6,6

Frontwinkel | Vorzeichnung

42,2	42,3	42,1	δ: Werkstoff
			φ: Vergleich

Aequatorialbüschel		Meridionalbüschel		
−2,5	0,4	+0,6	−1,0	+0,2	−1,8
−2,1	−0,8	+0,6	−0,6	−2,0	−2,2

Frontwinkel | Vorzeichnung

42,3	42,2	42,5	δ:	42,28	42,28	42,28
			φ:	41,98	41,98	41,98

Radien, Dicken und Abstände für f = 100 mm (f = 99,96)

r₁	r₂	r₃	r₄	r₅	r₆	r₇	r₈	r₉	d₁	d₂	d₃	d₄	d₅	d₆	d₇	d₈
42,3	84,0	24,6	24,0	23,0	44,1	52,4	44,4	2,01	4,4	4,4	2,4	2,4	4,4	4,8	2,4	

Linse | n_D | $n_F - n_C$ | ν

L₁	1,5163	0,0086	57,4
L₂	1,6727	0,0170	39,5

Einzellinse | Doppelobjektiv

Wertverlust für Einzelstück!

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F-73-6390-RE

1022

J. Stuart u. J. W. Hazeltine Sablinse 1:11, f. 100 mm, EP. Nr. 19,138, 911

siehe Berechnung S. 114, Linse 11

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'₁, Δs'₂, Δs'₃ / Δs'm)

Δs'			Δf'		
20,6	17,7	17,1	17,7	15,6	9,5
−0,7	−11,2	−12,2	−12,2	−11,1	−11,3

Einfallshöhen | Chromasie

18,5	17,5	17,2	(−11) 9

Δs'		Δf'	
−1,5	−0,1	1,−	11,0	12,6	9,1
−0,3	−2,0	+2,1	−0,3	−2,1	−0,9

Einfallshöhen | Chromasie

21,1	19,2	18,−	(−15) 19

Astigmatismus (Δs'₁ − Δs'₂ = 2a)

Aequatorialbüschel		Meridionalbüschel			
−2,1	3,3	−2	−2	11,7	11,7
−2,5	−2,1	−2,1	−2,3	−2,1	−2,3

Frontwinkel | Vorzeichnung

47,1	46,4	47,6	δ: 46,− 46,− 46,−
			φ: 46,2 46,22 46,22

Aequatorialbüschel		Meridionalbüschel			
−2,3	3,7	2,−	−2	12,7	12,7
−2,6	−2,8	−2,−	−2,2	−2,8	−2,6

Frontwinkel | Vorzeichnung

46,2	46,−	48,3	δ: 46,22 46,22 46,22
			φ: 46,22 46,22 46,22

Radien, Dicken und Abstände für f = 100 mm (f = 99,96)

r₁	r₂	r₃	r₄	r₅	r₆	d₁	d₂	d₃	d₄	d₅	d₆
83,4	39,7	17,3	17,7	17,−	5,3	0,5	4,7	2,−	2,−	5,−	

Linse | n_D | $n_F - n_C$ | ν

L₁	1,5163	0,0088	63,9
L₂	1,6091	0,0133	59,−
L₃	1,6−71	0,0113	38,4
L₄	1,6701	0,0181	41,9

Einzellinse | Doppelobjektiv

Wertverlust für Einzelstück!

Nr 548

Doppel-Anastigmat 1:6, f. 10 cm mit Ausgleichsblende = 11.9 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Fig. 83.)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-1 | 2.3 | 3.4	-1 | 1 | 1.5

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		10.6 | 6.5 | 7.5	+.23 | -.14

Astigmatismus (Fig. 84.)

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		1.2 | 1. | 1.8	0.3 | 1.2 | 1.4

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		41.4 | 42.4 | 42.1	mm mm mm

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5	n1	n2
33.2	77.4	3.8	12.8	13.2	0.8	0.3	2.8	0.8	7.5	1.71	1.5

9.3 / 71.1

Doppel-Anastigmat 1:6, f. 10 cm mit Ausgleichsblende = 11.9 cm

Linse | n_D | $n_F - n_D$ | ν

Linse	n_D	$n_F - n_D$	ν
$L_1 - L_2$	1.52 15	0.015 3	57.1
$L_3 - L_4$	1.52 39	0.013 6	57.1
$L_5 - L_6$	1.6419	0.0096	60.1

Einzellinse. | Doppelobjektiv.

1023

Nr 549

Kodak-Anastigmat 1:27, f. 169 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Fig. 83.)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		1.5 | -2.2 | -2.5	-4.5 | -1.4 | -0.6

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		11.3 | 14.6 | 16.5	

Astigmatismus (Fig.)

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-2.5 | -1.1 | +4.5	+0.3 | -0.5 | -0.4

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		44.4 | 47.8 | 47.4	mm mm mm

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
17.6	32.0	49.2	12.5	64.1	9.00	17.0	27.6	2.5	0.5	4.0	2.5	4.5	0.1	2.1	1.4

Kodak-Anastigmat 1:27, f. 169 mm

Linse | n_D | $n_F - n_D$ | ν

Linse	n_D	$n_F - n_D$	ν
$L_1 - L_2$	1.6 [illegible] 88	0.0132	57.4
$L_3 - L_5$	1.60336	0.0107	42.6

Einzellinse. | Doppelobjektiv.

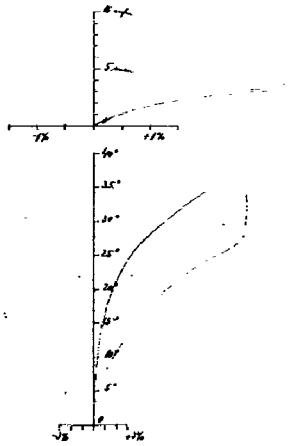
1024

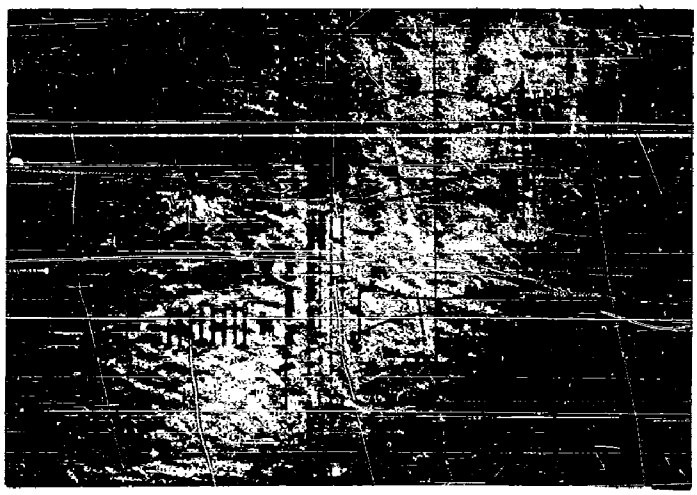
550

F-75-6398-AE

1075

Vorderlinse.





F-75-6390-RE

1026

Protarlinse 1:12,5 f=59 cm, N 9.11.12.
mit 0,574 und 0,113 ($L_3 = L_4$)

Einzellinse | Doppelobjektiv

Sphärische Korrection (λ 4,43)

Δs'			Δs'		
-0,2	-0,9	-1,0	-2,1	-0,1	-7,6
-1,0	-2,5	+2,5	-1,3	-2,1	+2,1

Einfallshöhen | Chromasie

2,3	2,1	1,7	-N (-Li) -Ni

Δs'		Δs'	

Einfallshöhen | Chromasie

Astigmatismus (λ 5,4 für s' N 22,5)

Aequatorialbüschel		Meridionalbüschel			
-2,7	-2,5	-2,3	-1,4	-0,3	+2,5

Frontwinkel | Vorzeichnung

49,3	44,2	41,7

Aequatorialbüschel		Meridionalbüschel			
-3,2	-2,5	-2,3	-1,6	-1,2	+1,4

Frontwinkel | Vorzeichnung

44,2	42,1	41,2

Radien, Dicken und Abstände für f = 100 mm.

2,8	14,7	0,5	4,6	0,17	4,5	1,8	1,8	1,8	0,5	7,1	1,6
+3,4	+4,7	-10,5	-4,6	-0,17	-4,5	-1,8	-1,8	-1,8	-0,5	+7,1	+1,6

Protarlinse 1:12,5 f=59 cm, N 9.11.12.
mit 0,574 und 0,113 (L_3 und L_4)

Linse	n_D	$n_F - n_D$	N
L_1	1,61251	0,01257	55,2
L_2	1,61715	0,01709	52,6
L_3	1,57135	0,01402	46,3
L_4	1,61491	0,01552	46,0

Einzellinse | Doppelobjektiv

1026

F-75-6390-RE

1027

Goerz Berlin D.R.P. Nr. 74437 v. 20.8.92.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (λ 4,3 N 1)

Δs'			Δs'		
-2,5	-4,1	-12,7	-2,1	-0,1	-19,1
-16,0	-4,1	-12,0	-10,3	-2,1	-4,7

Einfallshöhen | Chromasie

2,3	2,1	1,7

Δs'		Δs'	
-1,4	-1,1	-1,1	-1,1
-1,3	-1,1	-0,7	-1,1

Einfallshöhen | Chromasie

Astigmatismus (λ 5,2)

Aequatorialbüschel		Meridionalbüschel			
-2,1	-4,2	-2,3	-0,1	-0,1	-0,1
-2,3	-3,1	-1,3	-1,1	-1,1	-1,1

Frontwinkel | Vorzeichnung

49,1	44,3	41,6

Aequatorialbüschel		Meridionalbüschel			
-1,4	-1,1	-1,1	-1,1	-1,1	-1,1
-1,3	-1,1	-0,7	-1,1	-1,1	-1,1

Frontwinkel | Vorzeichnung

49,3	44,3	41,3

Radien, Dicken und Abstände für f = 100 mm.

2,8	14,7	0,5	4,6	0,17	4,5	1,8	1,8	1,8	0,5	7,1	1,6
+3,4	+4,7	-10,5	-4,6	-0,17	-4,5	-1,8	-1,8	-1,8	-0,5	+7,1	+1,6

Goerz Berlin D.R.P. Nr. 74437 v. 20.8.92.
1:6,7; f. 24 cm.

Linse	n_D	$n_F - n_D$	N
L_1	1,61370	0,01773	
L_2	1,58049	0,01778	
L_3	1,57497	0,01166	

Einzellinse | Doppelobjektiv

1027

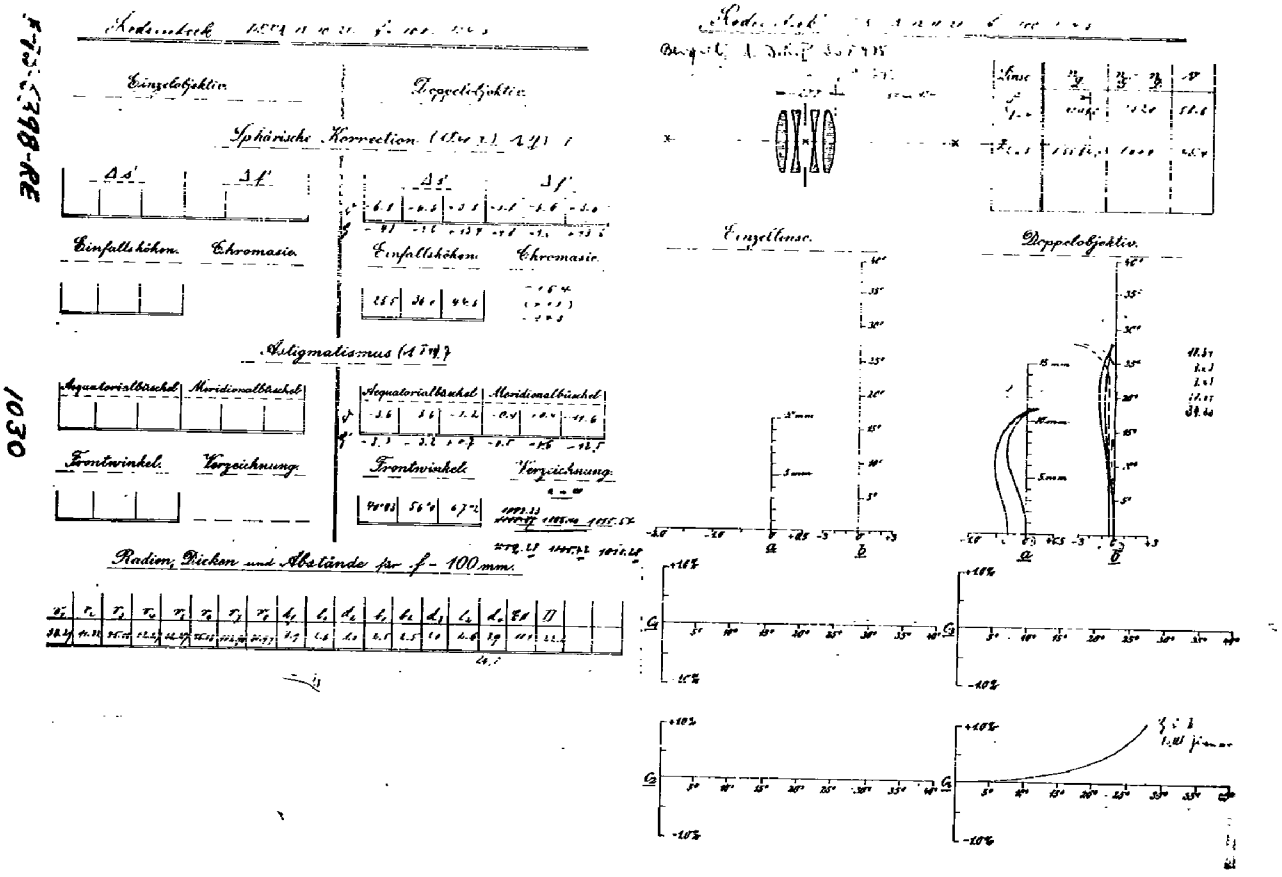
F-75-6398-RE

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1028

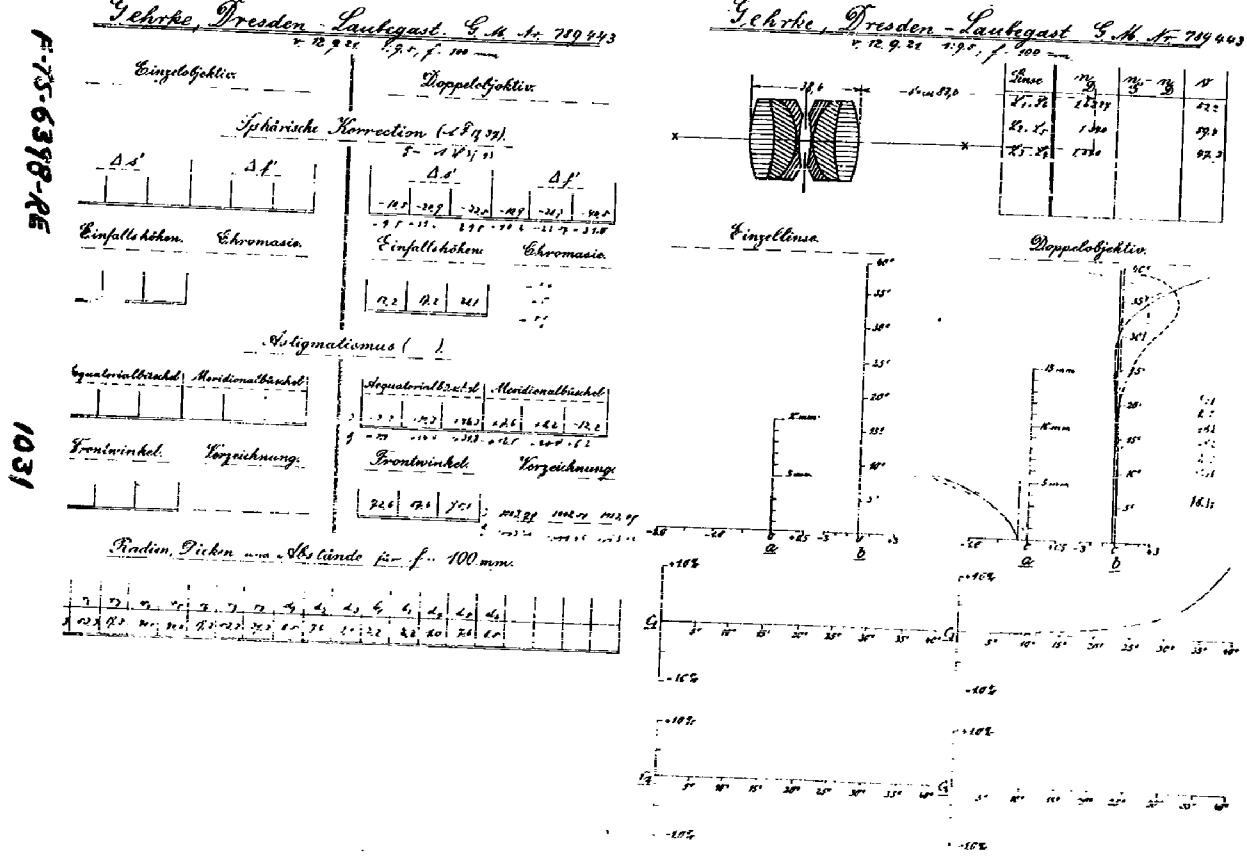
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1030

1036

№ 600



1031

№ 610

F-TS-6398-RE

10 32

Typ 23 · 12 f Sphärische Korrection

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f = 100)

Δs'			Δf'		

Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel		Meridionalbüschel			

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Typ 23 · 12 f Sphärische Korrection

Linse | Einzellinse | Doppelobjektiv

1172

№ 613

F-TS-6398-RE

10 33

Rotenturm f. R. Aktiengesellschaft

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs'			Δf'		

Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel		Meridionalbüschel			

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Rotenturm f. R. Aktiengesellschaft

Linse | Einzellinse | Doppelobjektiv

1173

№ 619

F-TS-6398-RE

1034

Chronoskopischer Graf ... f = ... mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d, F, C)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	s'F	s1	s2

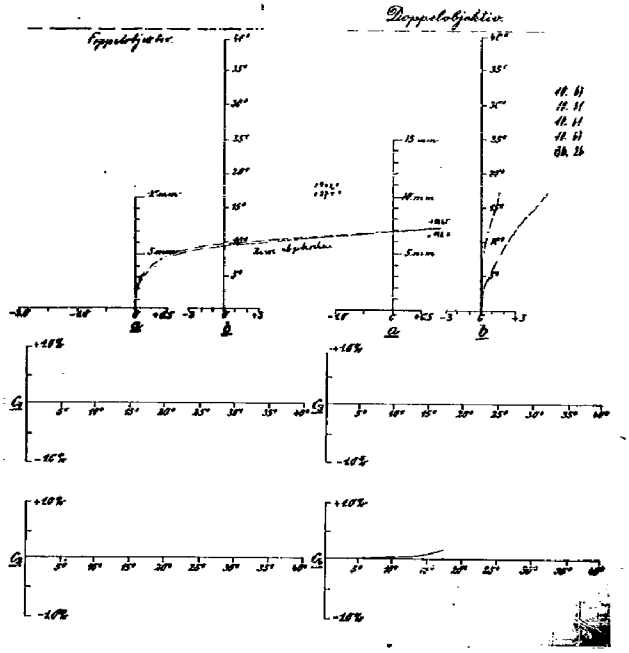
s'F

Chronoskopischer Graf ... f = ... mm

Linse	nd	νd − νF	ν

Doppelobjektiv

Doppelobjektiv



№ 622

F-TS-6398-RE

1035

V 1960 Hg g. 1:9,5; f = 22 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d, F, C)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

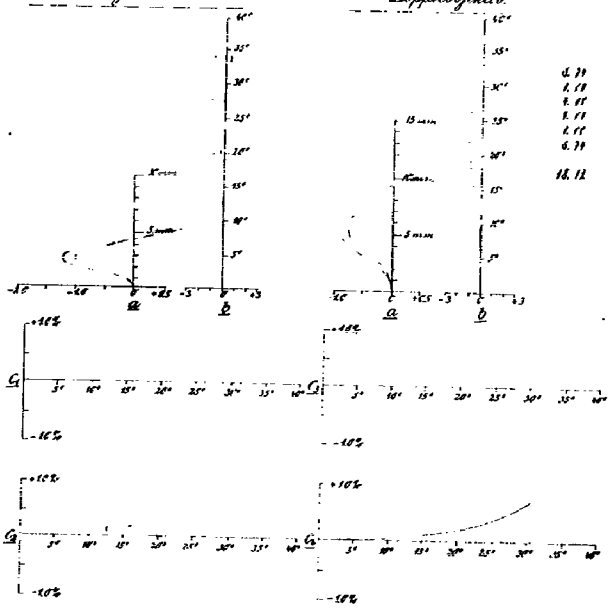
r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8

V 1960 Hg g. 1:9,5; f = 22 cm

Linse	nd	νd − νF	ν

Einzellinse

Doppelobjektiv



№ 623

F-75-6388-RE

1036

Taylor Taylor & Hobson & P. [illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d F 40) 30

Δ s'	Δ f'

Einfallshöhen | Chromasie

Δ s'	Δ f'
-0.9	-1.0 -0.8 -0.7 -0.7 -0.6

Einfallshöhen | Chromasie

23.6	17.0	6.5

Astigmatismus (d 2) 1:7/11

Aequatorialbüschel	Meridionalbüschel		

Frontwinkel | Verzeichnung

Aequatorialbüschel	Meridionalbüschel		
-2.2	-1.9	-4.9	-3.9	-3.5	-3.9

Frontwinkel | Verzeichnung

67.9	67.3	69.5

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16	r17	r18	r19
39.2	46.9	19.4	38.8	66.3	200	32.5	47.1	42.8	84.4	25	6.4	7.5	6.1	6.4	0.8	11.1	6.8	1.8

Taylor [illegible]

Einzellinse | Doppelobjektiv

Linse	n_d	n_F - n_C	V

Doppelobjektiv

1036

№ 658

F-75-6398-RE

1037

A P 1236 695 M. Zwillinger 1:7,5 f. 100

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d 577 nm)

Δ s'	Δ f'

Einfallshöhen | Chromasie

Δ s'		Δ f'			
d	-0.6	-0.3	+0.2	-0.2	-0.1	+0.3
g	-2.0	-2.0	+1.8	-2.0	+2.2	+1.6

Einfallshöhen | Chromasie

10.3	24.6	28.2

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel		

Frontwinkel | Verzeichnung

Aequatorialbüschel		Meridionalbüschel			
d	-1.9	-2.3	+2.3	-0.1	-1.0	+2.1
g	-1.8	-2.1	+2.9	-2.0	-2.5	+3.2

Frontwinkel | Verzeichnung

44.5	44.5	44.2

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15
22.2	34.8	17.0	34.4	34.5	116	40	32.2	2.3	12	0.5	2.1	2.0	0.5	2.3

A P 1236 695 M. Zwillinger 1:7,5 f. 100

Einzellinse | Doppelobjektiv

Linse	n_d	n_F - n_C	V
1			
2			
3			
4			

Einzellinse | Doppelobjektiv

№ 659

F-75-6398-RE

1038

T P 489140 Taylor Taylor & Hobson I Resp.

1:4,5 f= 100

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (455 m/)

Δs'	Δf'

Δs'		Δf'	
-,02	-,13	-,5	0

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Aequatorialbüschel		Meridionalbüschel	
-3,5	-2,5	+2,1	-0,6

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f= 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	l1	l2
38,0	45,0	93,0	11,1	23,1	93,1	42,0	38,1	8,0	2,0	2,0	2,2	1,0	1,0	5,0	2,0	

T P 489140 Taylor Taylor & Hobson I Resp.

1:4,5 f= 100

Linse | r | d | n

Einzellinse

Doppelobjektiv

a | b

G

+10%

-10%

№ 660

F-75-6397-RE

1039

T P 489140 Taylor, Taylor & Hobson I Resp.

1:4,5 f= 100

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (453 m/)

Δs'	Δf'

Δs'		Δf'	
-,15	-,58	+,45	-2,6
-,02	-,35	-,83	-,26

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Aequatorialbüschel		Meridionalbüschel	
-,1	-,5	+,47	0,0
-,5	-,3	+,26	+,03

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f= 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	l1	l2
92,1	41,1	92,6	11,2	11,2	24,1	11,1	11,1	2,0	11,1	0,7	1,1	0,7	2,0	2,6	

T P 489140 Taylor Taylor & Hobson II Resp.

1:4,5 f= 100

Linse | r | d | n

Einzellinse

Doppelobjektiv

a | b

G

+10%

-10%

№ 661

F-TS-6398-RE

1040

DRP Nr. 361405 Rodenstock München 1 Resp.

1:4,5 f: 100

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (Schnitt)

Δs'	Δf'	Δs'	Δf'
0 -22 -21 +0,1 -23 -25 +0,7			
5 -24 -24 +0,2 -26 -28 +0,8			

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

25,0	24,3	23,5	-1,3	-1,1	-0,9	-1,3	-1,1	-0,9
			-0,4	-0,4	-0,3	-0,4	-0,4	-0,3
			-1,2	-1,0	-0,8	-1,2	-1,0	-0,8

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
0 -2,1 -2,1 +0,3 -2,3 -2,1 -2,5			
5 -2,6 -2,6 +0,7 -3,0 -2,9 -3,2			

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

24,7	17,2	15,2	0	1,02	1,03
			5	1,05	1,08

Radien, Dicken und Abstände für f = 100 mm.

r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r
24,6	13,0	21,3	82,0	17,0	82,1	15,0	37,5	2,3	5,3	4,0	2,5	6,2	4,0	1,5	4,1	2,3	

DRP Nr. 361405 Rodenstock München 1 Resp.

1:4,5 f: 100

Linse | n_g | $\frac{n_g - n_F}{n_F - n_C}$ | ν

1	1,61900	0,01320	58,4
2	1,61733	0,01320	58,9
3	1,61733	0,01320	58,9
4	1,61900	0,01320	58,4

Einzellinse. — Doppelobjektiv.

0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
12,11	2,12	2,12	12,11	32,11													

1040

№ 662

F-TS-6398-RE

1041

Satzobjektiv 1:6,3 f: 102,90 (Linse V 1900 Nr.)

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (Schnitt)

Δs'	Δf'	Δs'	Δf'
-0,0 -0,2 +0,3 -0,5 -0,4 -1,1			

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

32	27	20	-0,8 -1,0		18,3	16,7	14,3	

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
-2,5 -2,7 -2,2 -0,7 +1,0 +2,0			

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

31,3	14,3	8,5		21,3	12,3	10,3	

Radien, Dicken und Abstände für f = 100 mm.

30,9	5,1	25,4	90,7	6,4	4,1	2,1	6,4										
30,9	14,3	9,2	37,2	2,1	2,8	4,0	2,3										

Satzobjektiv 1:6,3 f: 102,90 (Linse V 1900 Nr.)

Linse	n_g	$\frac{n_g - n_F}{n_F - n_C}$	ν
L1 - L2	1,61733	0,01320	58,9
L3 - L5	1,61900	0,01320	58,4
L6 - L7	1,61881	0,01307	60,4

Einzellinse. — Doppelobjektiv.

0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
6,11	1,11	1,11	1,11	1,11	1,11	4,11	12,11										

F-75-6398-RE

1042

AP 1306958 C. H. Frederick and F. L. Ref.

1:5.6, f= 10 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δ z, n)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2.3 -5.3 +6.1 -2.4 -5.3 +4.7	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		24.8 17.3 24 mm	-6 (-2.4) -2.4

Astigmatismus (l.

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-2.3 -8.5 +2.6 +2.2 +1.1 -8.6	

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		24.2 24.6 24.1	5°1.0 4°0.5 3°2.0

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
24.2	24.0	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	2.1	1.1	4.1	1.1	4.1	1.1	4.1	1.1	3.1

AP 1306958 C. H. Frederick and F. L. Ref.

1:5.6, f= 10 cm

Linse	n_d	$\frac{n_d-1}{\nu_d}$	ν_d
1	1.613 72	+0.03 72	44.3
2	1.613 39	+0.03 39	44.3
3	1.613 39	+0.03 39	44.3
4	1.613 72	+0.03 72	44.3

Einzellinse | Doppelobjektiv

1042

F-75-6398-RE

1043

Der Meidel. F. Pat. Nr. 552.020 1:4.5, f= 50 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δ z, n)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		+0.2 -0.3 +0.4 -0.2 +0.3 -0.3	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		24.0 24.1 24.2	2

Astigmatismus (l.

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-0.3 -0.4 -0.2 -0.4 -0.6 -0.6	

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		24.2 -0.4 62.9	+0.3 +0.1 -0.2

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
24.2	24.0	24.1	24.2	24.2	24.2	24.2	24.2	24.2	24.2	2.3	1.2	4.0	1.2	4.0	1.2	4.0	1.2	3.0

Der Meidel. F. Pat. Nr. 552.020 1:4.5, f= 50 cm

Linse	n_d	$\frac{n_d-1}{\nu_d}$	ν_d
1	1.6492	-	-
2	1.6039	-	-
3	1.6039	-	-
4	1.6492	-	-

Einzellinse | Doppelobjektiv

1043

№ 720

F-75-6398-RE

1044

Ames A. P Nr 1 482 503 1:8.3, f. 50 m/m

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (K.R. 75, 131)

Δ s'	Δ f'

Einfallshöhen | Chromasie

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	l1	d2	l2	d3	l3	d4
88.8	179.8	36.2	30.8	82.6	22.9	179.2	298.4	2.6	0.3	4.0	2.5	2.5	4.0	2.3	2.6

Ames A. P Nr 1 482 503 1:8.3 f. 50 m/m

Linse | n_D | ν_D | n_F − n_C | ν

Einzellinse

Doppelobjektiv

1044

№ 722

F-75-6398-RE

1045

Dagor 1:6.8, f. 30 cm. Zeiss-Ausführung

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (K.R. 74, 119)

Δ s'	Δ f'

Einfallshöhen | Chromasie

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	d1	d2	l2
178.2	80	141.7	182	5.4	0.4	2.2

Dagor 1:6.8, f. 30 cm. Zeiss-Ausführung

Linse | n_D | ν_D | n_F − n_C | ν

Einzellinse

Doppelobjektiv

№ 730

Quem - Anastigmat 1:6.3 f = 100

F-TS-6398-RE

1046

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Δs'	Δf'	Δs'	Δf'
-0.05 -0.01	+2.25 +1.55		

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
2.75 2.00			

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
+0.01 -0.79	-0.63 -0.05		

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
24° 10' ..	-2.52% -1.16%		

Radien, Dicken und Abstände für f = 100 mm.

r1	d1	r2	d2	r3	d3	r4	d4	r5	d5	r6	d6	r7	d7	r8
+3.53	0.40	0.00	0.10	-2.50	0.20	+2.22	0.35	0.00	0.10	-2.50	0.20	+2.22	0.35	0.00

Linse | n_g | $n_g - n_g$ | ν

Linse	n_g	$n_g - n_g$	ν
I	1.56 933		
II	1.53 073		
III	1.56 933		
IV	1.56 883		

Einzellinse | Doppelobjektiv

1646

№ 731

Dagor 1:6.8 f = 100

F-TS-6398-AE

1047

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Δs'	Δf'	Δs'	Δf'
+0.05 -0.00	+0.35 -0.00		

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
2.50 2.00	+0.45 +0.02		

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
+0.00 -0.03	+0.32 -0.10		

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
33° 45' ..	33° 45' -40.32‰ -32.35‰		

Radien, Dicken und Abstände für f = 100 mm.

r1	d1	r2	d2	r3	d3	r4	d4	r5	d5	r6	d6	r7	d7	r8
+3.50	0.40	0.00	0.10	-2.50	0.20	+2.22	0.35	0.00	0.10	-2.50	0.20	+2.22	0.35	0.00

Linse | n_g | $n_g - n_g$ | ν

Linse	n_g	$n_g - n_g$	ν
I	1.61 777	0.01 663	55.10
II	1.57 983	0.01 822	43.35
III	1.57 024	0.01 013	63.53

Einzellinse | Doppelobjektiv

№ 732.

Zeymer 1:3.5 f_0 = 100.1 (3.6.1923.)

F-TS-6388-RE

1048

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Einzelobjektiv				Doppelobjektiv			
Δs'		Δf'		Δs'		Δf'	
Einfallshöhen		Chromasie		Einfallshöhen		Chromasie	

Astigmatismus ( )

Einzelobjektiv				Doppelobjektiv			
Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
Frontwinkel	Verzeichnung			Frontwinkel	Verzeichnung		

Radien, Dicken und Abstände für f = 100 mm.

r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	r_5	d_5	r_6	d_6	r_7	d_7	r_8	d_8

Linse	n_D	$n_F - n_D$	ν
I			
II			
III			
IV			

Einzellinse

Doppelobjektiv

1047

№ 737

Gerdar 1:7.7 f_0 = 100

F-TS-6378-RE

1049

Gerdar 1:7.7 f_0 = 100

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( )

Einzelobjektiv				Doppelobjektiv			
Δs'		Δf'		Δs'		Δf'	
Einfallshöhen		Chromasie		Einfallshöhen		Chromasie	

Astigmatismus ( )

Einzelobjektiv				Doppelobjektiv			
Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
Frontwinkel	Verzeichnung			Frontwinkel	Verzeichnung		

Radien, Dicken und Abstände für f = 100 mm.

r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	r_5	d_5	r_6	d_6	r_7	d_7	r_8	d_8

Linse	n_D	$n_F - n_D$	ν
I			
II			
III			
IV			
V			
VI			

Einzellinse

Doppelobjektiv

№ 748

F-TS-6398-RE

1050

Zeiss Biotar 1:1,5 f = 13,5 mm (Prüfzeugn. 1934 ZF 15)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		0,0	0,0
		+0,4	+0,5
		+0,5	+0,6
		0,0	0,0
		+0,3	+0,4
		+0,4	+0,4

Einfallshöhen	Chromasie
16,2 16,5 16,8	

Astigmatismus (s'/s's')

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2,6	-2,1
		+1,0	+1,0
		+1,3	+1,7
		+2,7	+3,5

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		16,6	16,2
		16,2	16,2
		16,5	16,5

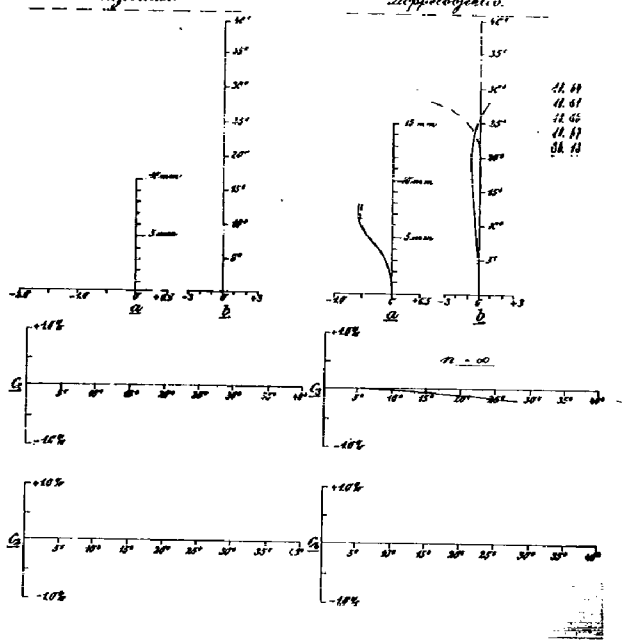
Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7	$\sum d$			
28,6	113,6	66,2	17,2	17,2	12,2	11,0	14,6	2,85	2,03	1,99	2,03	1,03	2,84	3,38	31,0	17,0	12,1	12,2

Zeiss Biotar 1:1,5 f = 13 cm (Prüfzeugn. 1934 ZF 15)

Linse	n_D	ν_D	$n_F - n_C$	N
L_1	1,60355	61,2	0,01320	64,9
L_2	1,60281	60,8	0,01319	64,5
L_3	1,60335	60,3	0,01318	63,9
L_4	1,61172	58,3	0,01324	61,9

Einzellinse | Doppelobjektiv



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1051

Zeiss Biotar 1:1,5 f = 13,5 cm Exakta (Prüfschein 1934 ZF)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0,7	-0,8
		-0,8	-1,2
		-1,9	-2,5
		-1,2	-1,9
		-1,9	-2,3
		-2,0	-2,3

Einfallshöhen	Chromasie
17,5 17,3 16,8	

Astigmatismus (s'/s's')

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-3,8	-3,5
		-2,7	-2,8
		-4,3	-4,9
		-3,4	-4,1
		-4,1	-4,5
		-4,2	-4,6

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		16,5	15,2
		15,2	15,2
		15,7	15,5

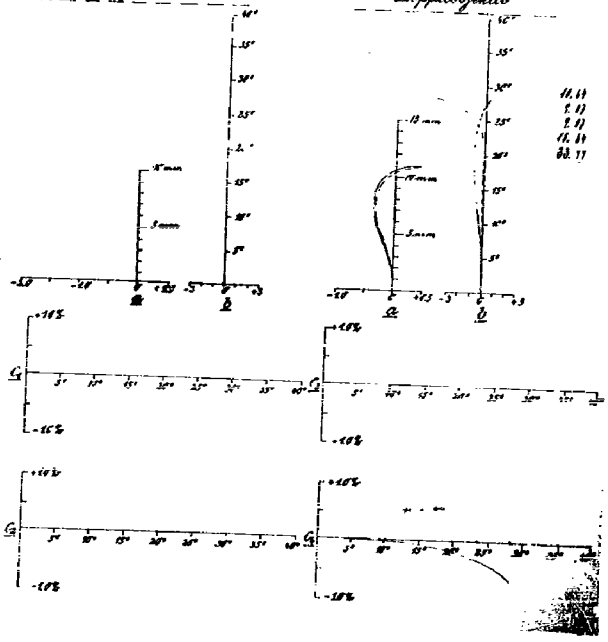
Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7				
33,9	81,1	13,3	16,1	16,1	13,3	18,1	33,1	1,71	2,33	1,93	2,03	1,03	2,71	3,80				

Zeiss Biotar 1:1,5 f = 13,5 cm Exakta (Prüfschein 1934 ZF)

Linse	n_D	ν_D	$n_F - n_C$	N
L_1	1,60355	61,2	0,01320	64,5
L_2	1,60281	60,8	0,01319	63,9
L_3	1,60335	60,3	0,01318	63,9
L_4	1,61172	58,3	0,01324	61,9

Einzellinse | Doppelobjektiv



№ 753

F-75-6398-RE

1052

Agfa-Doppel-Anastigm. 1:4,5 f= 13,5 cm Einfallsw. 45°

Agfa-Doppel-Anastigmat 1:4,5 f= 13,5 cm Einfallsw. 45°

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (·7 ff.)

Δs'	Δf'

Einfallshöhen | Chromasie

Δs'	Δf'
-1,01	-6,8 +2,5 -1,5 -1,5 +1,5

Einfallshöhen | Chromasie

Astigmatismus (·7 | 14

Aequatorialhalbachse	Meridionalhalbachse

Frontwinkel | Vorzeichnung

Aequatorialhalbachse	Meridionalhalbachse
-2,4	-1,4 +2,5 +1,3 -2,9 -1,9

Frontwinkel | Vorzeichnung

41,5	56,6	13,5

Radien, Dicken und Abstände für f= 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8
49,8	169	49,1	37,5	313	∞	62,5	29,4	0,2	0,4	0,13	0,27	0,03	1,07	7,5	9,14

Einzellinse

Doppelobjektiv

Finde | $\frac{n_d}{\nu_d}$ | $\frac{n_F}{\nu_F} - \frac{n_d}{\nu_d}$ | Δs'

r1	1,613 11	-1,611	43,8
r2	1,611 11	-1,611	44,2
r3	1,611 11	-1,611	44,2
r4	1,611 11	-1,611	43,8

11,11
1,11
1,11
11,11
38,14

1052

№ 754

F-75-6398-RE

1053

Dogmar 1:4 f= 13,5 cm, f. 45°

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ( )

Δs'	Δf'

Einfallshöhen | Chromasien

Δs'	Δf'
-1,8	0,7 0
-1,7	+1,1

Einfallshöhen | Chromasien

-1,7	-1,1

Astigmatismus ( )

Aequatorialhalbachse	Meridionalhalbachse

Frontwinkel | Vorzeichnung

Aequatorialhalbachse	Meridionalhalbachse
-1,1	-1,6 +1,1 -2,1

Frontwinkel | Vorzeichnung

71,1	-1,1

Radien, Dicken und Abstände für f= 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8
49,8	169,1	37,1	-119,4	71,4	13,1	139,9	23,6	1,1	0,5	0,1	0,6	0,1	1,1	7,1	9,1

Finde | $\frac{n_d}{\nu_d}$ | $\frac{n_F}{\nu_F} - \frac{n_d}{\nu_d}$ | Δs'

r1	1,611 11	1,611 11	12,1
r2	1,611 11	1,611 11	13,1
r3	1,611 11	1,611 11	13,1
r4	1,611 11	1,611 11	12,1

Einzellinse

Doppelobjektiv

11,11
11,11
11,11
11,11
38,11

F-75-6398-RE

1054

Nr. 967

Kodak-Anastigmat 1:6,3 f 13 cm · Cpfm. [illegible]

Kodak-Anastigmat 1:3,5 f=13 cm · Zeiss Nr. [illegible]

Einzellinse | Doppelobjektiv

Sphärische Korrection (1/4 [illegible])

Δs'	Δf'

Einfallshöhen | Chromasie

Δs'			Δf'		
-7.9	-17.1	-11.5	-7.0	-16.5	-10.2

Einfallshöhen | Chromasie

11.5	16.7	18.2	-1.5 / -1.1 / -0.3

Astigmatismus (1/4) [illegible]

Aequatorialbüschel	Meridionalbüschel				

Frontwinkel | Vorzeichnung

Aequatorialbüschel			Meridionalbüschel		
-2.3	-2.9	-2.3	-2.2	-4.8	-19.3

Frontwinkel | Vorzeichnung

6.5	11.5	17.3	999.14	999.15	999.16

Radien; Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
46.4	117.0	22.2	57.0	7.3	22.1	999	26.5	4.63	2.2	2.13	1.99	2.84	1.93	2.54

Linse | n_g | $n_g - n_C$ | V

L_1	1.51931	0.01332	57.7
L_2	1.61659	0.01898	36.8
L_3	1.60336	0.01722	47.1
L_4	1.62041	0.01736	36.3

Einzellinse | Doppelobjektiv

11.11
11.61
11.44
11.42
33.18

F-75-6398-RE

1055

Nr. 774

Kodak-Anastigmat 1:4,5 f=13,5 cm · C.P.G. Nr. 2099 [illegible]

Vierlinser 1:4,5 f=13,5 cm · C.P.G. [illegible]

Einzellinse | Doppelobjektiv

Sphärische Korrection (1/4 [illegible])

Δs'	Δf'

Einfallshöhen | Chromasie

Δs'			Δf'		
-10.7	-16.7	-11	-11.7	-16.3	-9.6

Einfallshöhen | Chromasie

11.7	15.2	18.1	-1.4 / -2.1 / -2.6

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel				

Frontwinkel | Vorzeichnung

Aequatorialbüschel			Meridionalbüschel		
-2.4	-4.9	-6.8	+0.2	-0.1	-12.9

Frontwinkel | Vorzeichnung

5.9.8	11.0	17.3	1999.11	1999.12	1999.13

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
43.9	103.4	21.9	53.3	5.8	17.4	25.8	31.2	4.1	1.8	2.3	1.93	2.6	5.9	3.3

Linse | r_g | $n_g - n_C$ | V

L_1	1.51931	0.01332	57.7
L_2	1.61659	0.01898	36.8
L_3	1.60336	0.01722	47.1
L_4	1.62041	0.01736	36.3

Einzellinse | Doppelobjektiv

11.14
1.66
1.17
11.11
33.13

F-75-6398-RE

1056

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzellinse

Doppelobjektiv

F-75-6398-RE

1057

Zeodax 1:8, f = 21 cm mit Ausgleichplatte v. 9.5.29

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Zeodax 1:8, f = 21 cm mit Ausgleichplatte v. 9.5.29

Einzellinse

Doppelobjektiv

№ 925

F-TS-6398-RE

1058

C. P. Goerz 1:4.1 f 244.2 mm. (Orthal Journal 1899 P. 57)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (P. 60 ff.)

Δs'	Δf'

	Δs'			Δf'		
D	0.7	19.6	18.5	2.5	7.7	16.3
S'	-1.0	13.5	410.1	7.0	10.9	110.4

Einfallshöhen	Chromasie

Einfallshöhen			Chromasie
18.5	7.1.6	76.3	+1.3 (r. F) 2.0.5

Astigmatismus (P. 29 ff.)

Aequatorialbüschel		Meridionalbüschel	

Aequatorialbüschel		Meridionalbüschel			
2.6	8.5	18.5	2.9	7.6	12

Frontwinkel	Verzeichnung

Frontwinkel			Verzeichnung
72.6	73.6	72.6	1777.50, 1780.05, 1782.50

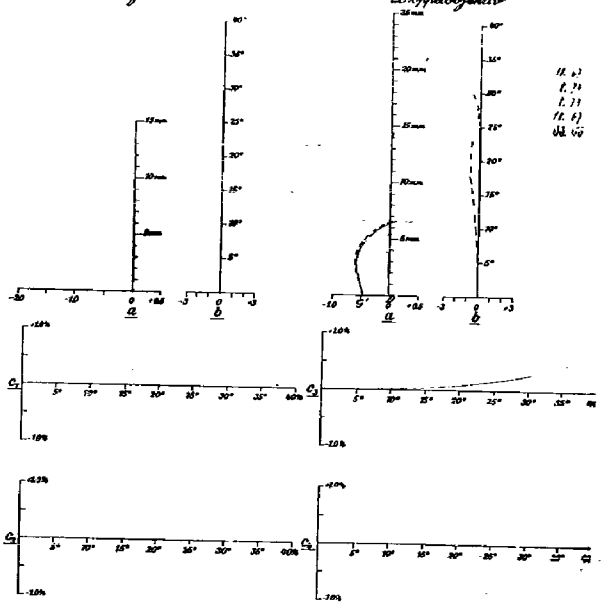
Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	f/#
20.0	10.0	16.0	29.6	29.6	16.0	69.4	20.0	2.4	0.7	7.9	2.5	2.0	1.9	2.7	2.1	12.2

C. P. Goerz 1:4.6 f 244.2 mm. (Orthal Journal 1899 P. 57)

Linse	n_d	$n_g - n_d$	ν
1	1.61720	0.01338	58.2
2	1.62588	0.01360	58.0
3	1.62588	0.01360	58.0
4	1.61720	0.01338	58.2

Einzellinse | Doppelobjektiv



1152

№ 930

F-TS-6398-RE

1059

Goerz 1:8 f = 12.5 cm für Ausgleichsplatte 3 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (P. 60 ff.)

Δs'	Δf'

	Δs'			Δf'		
	-12.6	-4.7	0	-1.3	-7.2	-7.1

Einfallshöhen	Chromasie

Einfallshöhen			Chromasie
24.4	24.4	25.0	+0.4 (r. F) -0.2

Astigmatismus ( ).

Aequatorialbüschel		Meridionalbüschel	

Aequatorialbüschel		Meridionalbüschel	
	1.7.7	-1.2	-7.7 -7.3

Frontwinkel	Verzeichnung

Frontwinkel			Verzeichnung
	74.0	41.6	999.9° 999.9°

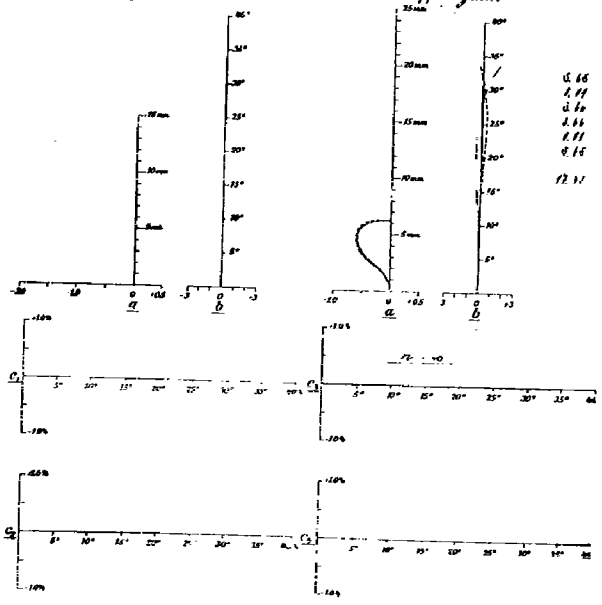
Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	f/#
-16.9	33.8	5.-	-10.8	173.4	8.3	14.6	-16.-	2.3	-7.-	2.4	2.4	2.3	2.3	0.8	1.3	7.4.4	6.2

Linse | n_d | $n_g - n_d$ | ν

Linse	n_d	$n_g - n_d$	ν
1	1.61720	0.01338	58.2
2	1.62588	0.01360	58.0
3	1.62588	0.01360	58.0
4	1.61720	0.01338	58.2
5	1.61720	0.01338	58.2
Kitt	1.572	(Spring-Kitt)	

Einzellinse | Doppelobjektiv



11

F-75-6398-RE

1060

Einsprung bis 9 VII 33

Jos. Schneider & Co., D Sch 190.30 v. 9 II 33, 1:6.8, f: 10cm; Weitwinkel

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion f/11.8 / 90°

Δs' | Δf' | Δs' | Δf'

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Astigmatismus f/11.8 / 90°

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung. | Frontwinkel | Verzeichnung.

Radien, Dicken u. Abstände für f = 100 mm.

r	s	s'	n	r	s	s'	n	r	s	s'	n	r	s	s'	n
32.0	10.0	90.0	1.5	40.3	0.2	89.8	1.0	11.0	11.9	7.0	1.6	4.0	0.0	1.6	96.0	0.0

Schneider v. 1.6.8 f: 10 cm Weitwinkel

Linse | n_d | n_F − n_C | ν

Einzelobjektiv. | Doppelobjektiv.

a | f | a | f

C_t | C_s

1061

V 1932 Nr. 9; 1:8, f: 15cm; Rechn. v. 10.5.32.

Dopp. Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (11.8°)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasien | Einfallshöhen | Chromasien

Astigmatismus (11.8°)

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r	s	s'	n	r	s	s'	n	r	s	s'	n	r	s	s'	n	r	s	s'	n
30.4	16.0	0.9	1.5	40.3	0.3	10.1	1.0	12.0	0.0	10	1.6	4.3	1.0	2.0	1.7	1.1	0.3	1.9	1.0

V 1932 Nr. 9; 1:8, f: 15cm; Rechn. v. 10.5.32.

Der radiale Hauptpunkt liegt um 0.2 mm vom Scheitel der Frontlinse entfernt.

Linse | n_d | n_F − n_C | ν

Einzellinse | Doppelobjektiv

a | b | a | b

C_t | C_s

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1062

Meyrisken-Objektiv 1:2,7 f. 3,5 cm v. 11.23 (14 Teile deformiert)

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs', Δf)

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie

Astigmatismus (Δs'_sag, Δs'_tan)

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel

Einzelobjektiv Feldwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Feldwinkel	Doppelobjektiv Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

$2r_0$	r_1	r_2	r_3	r_4	d_1	d_2	d_3	d_4	d_5	$2r_5$	r_6	r_7	r_8	r_9

Linse | n_d | $n_F - n_d$ | ν

Linse	n_d	$n_F - n_d$	ν

Deformant

Einzelobjektiv. | Doppelobjektiv.

a | b | a | b

Ω_1 | Ω_2 | Ω_3 | Ω_4

1064

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1063

Meyrisken-Objektiv 1:3,5 f. 6 cm v. 19.5.23 (Deformant)

Einzelobjektiv. Frontlinse | Doppelobjektiv.

Sphärische Korrektion (Δs', Δf)

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie

Astigmatismus (Δs'_sag, Δs'_tan)

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel

Einzelobjektiv Feldwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Feldwinkel	Doppelobjektiv Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

$2r_0$	r_1	r_2	r_3	r_4	d_1	d_2	d_3	d_4	d_5	$2r_5$	r_6	r_7	r_8	r_9

Linse | n_d | $n_F - n_d$ | ν

Linse	n_d	$n_F - n_d$	ν

Blende 1 = 3 deformiert

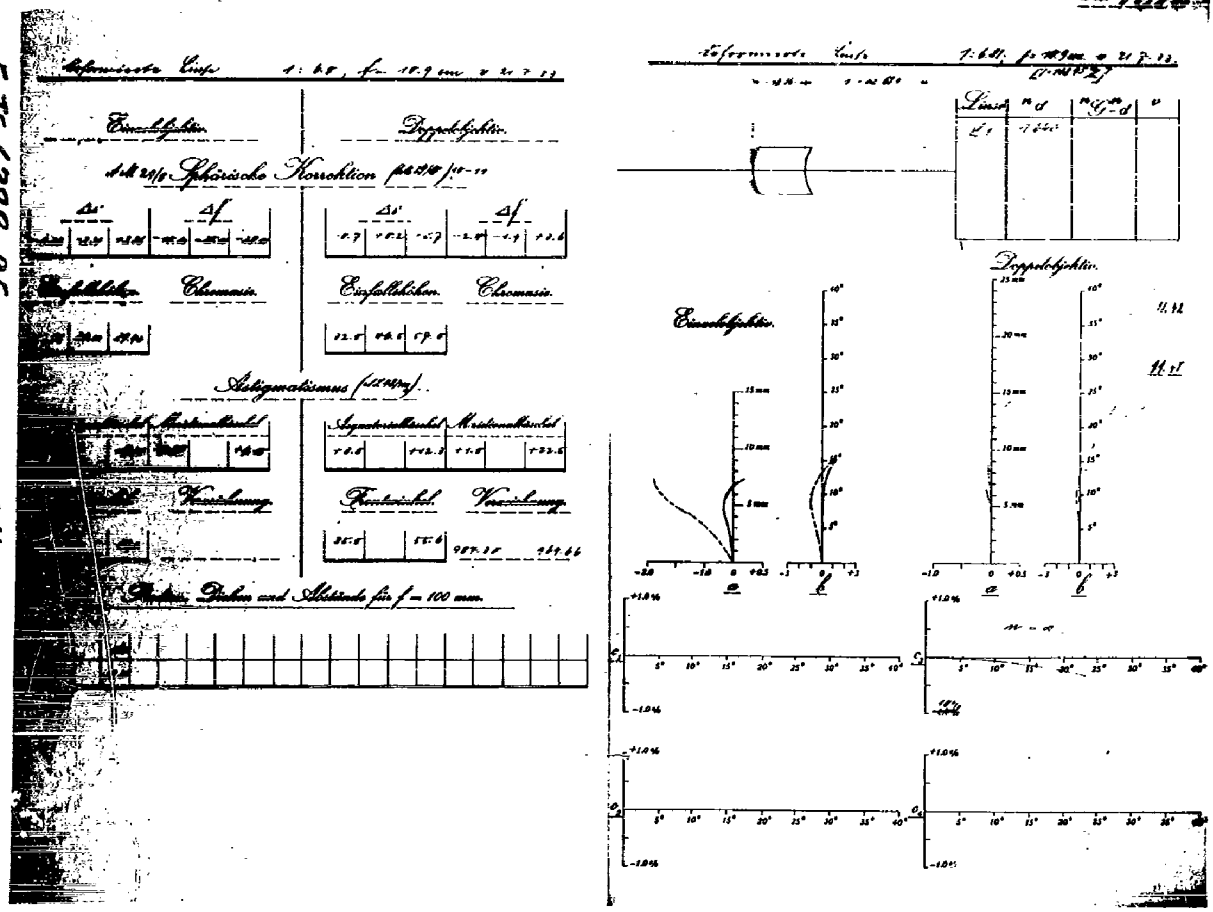
Einzelobjektiv. 2 (Frontlinse) | Doppelobjektiv.

a | b | a | b

Ω_1 | Ω_2 | Ω_3 | Ω_4

F-75-6398-RE

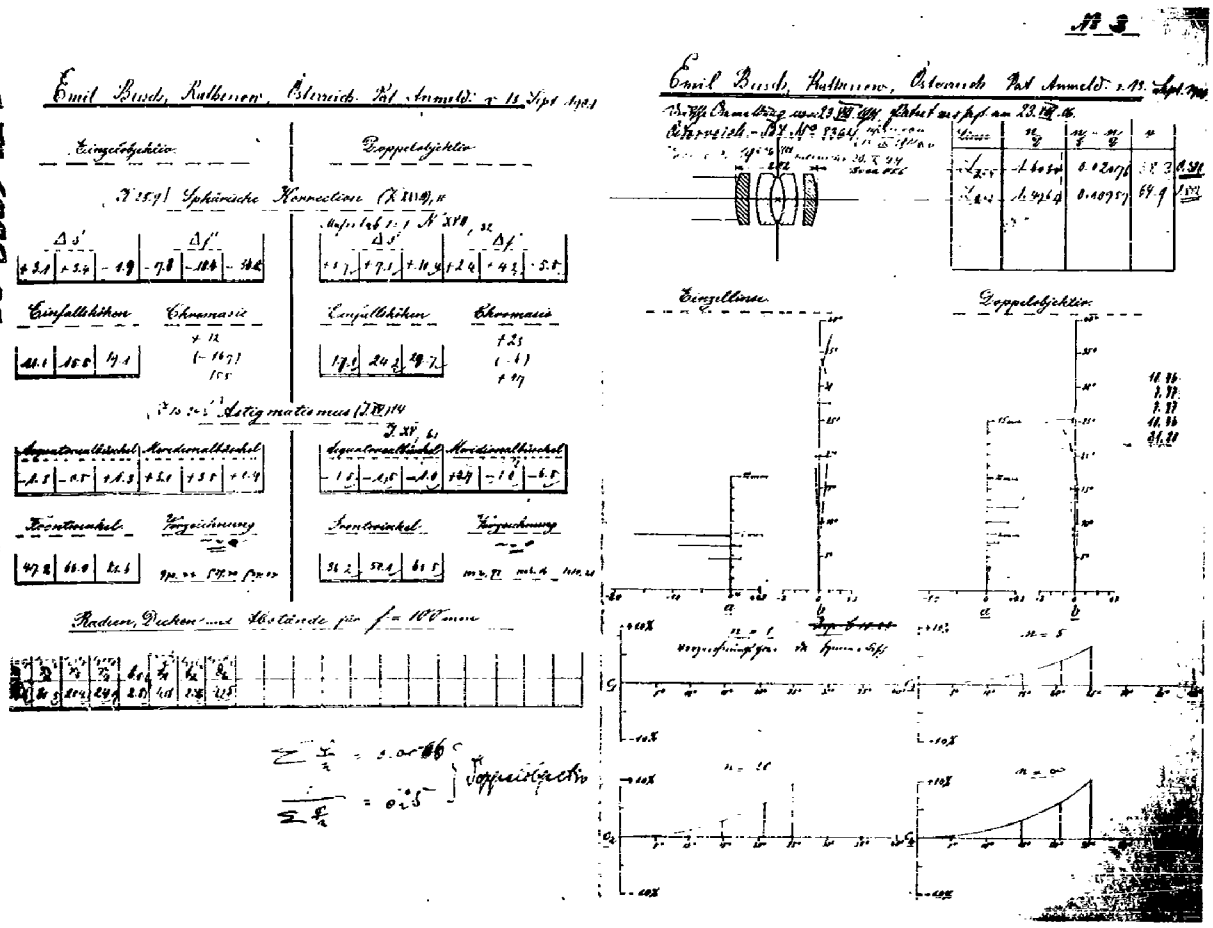
1064



1164

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1065



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Maßstab 1:1

Emil Busch Aktiengesellschaft Optische Werke Rathenow

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Fig. 1)

Δs'	Δf'	Einfallshöhen	Chromasie

Δs'	Δf'	Einfallshöhen	Chromasie
-79 -12 -42 -71 -12 -96		17.1 17.2 19.7	+ 56 (rr) + 36

Astigmatismus (Fig. 4)

Äquatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung

Äquatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung
-14 17 +48 +46 +134 -15		16 50 60	17 14.8 19.5

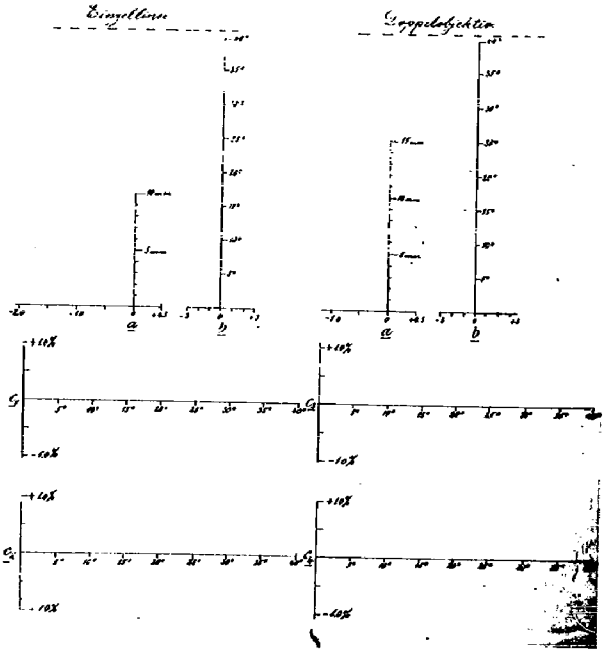
Radien, Dicken und Abstände für f = 100 mm

Maßstab 1:1

Emil Busch Aktiengesellschaft Optische Werke Rathenow

Linse	n_g	$n_g - n_{g'}$	ν

Einzellinse | Doppelobjektiv



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Duplikat

Hugo Meyer Aristostigmat 1:8 f = 240 m/m D.R.P. Nr. 55610

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Fig. 1)

Δs'	Δf'	Einfallshöhen	Chromasie

Δs'	Δf'	Einfallshöhen	Chromasie

R.F. 14. Astigmatismus (Fig. 4)

Äquatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung
-76 -72.8 -99.9 -0.0 -0.3 -13.9		93.3 66.2 84.5	

Äquatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung
-3.0 -0.4 -0.9 -2.3 -0.9 -3.0		93.2 88.7 72.0	

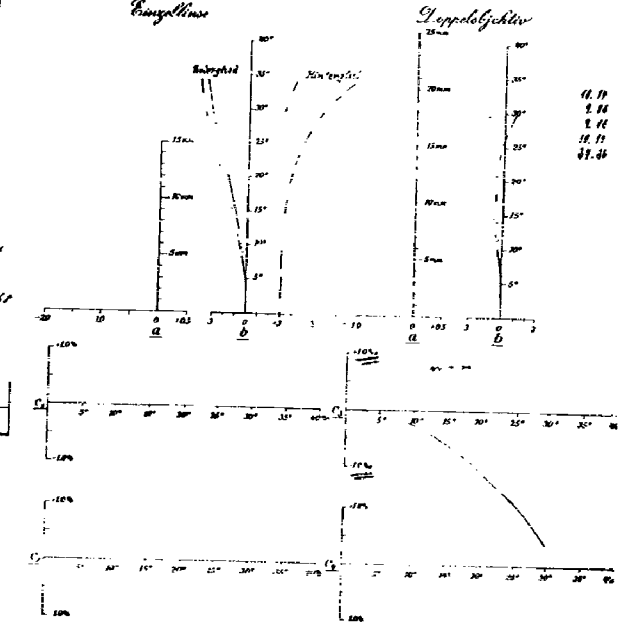
Radien, Dicken und Abstände für f = 100 mm

Duplikat № 10

Hugo Meyer Aristostigmat 1:8 f = 240 m/m D.R.P. Nr. 55610

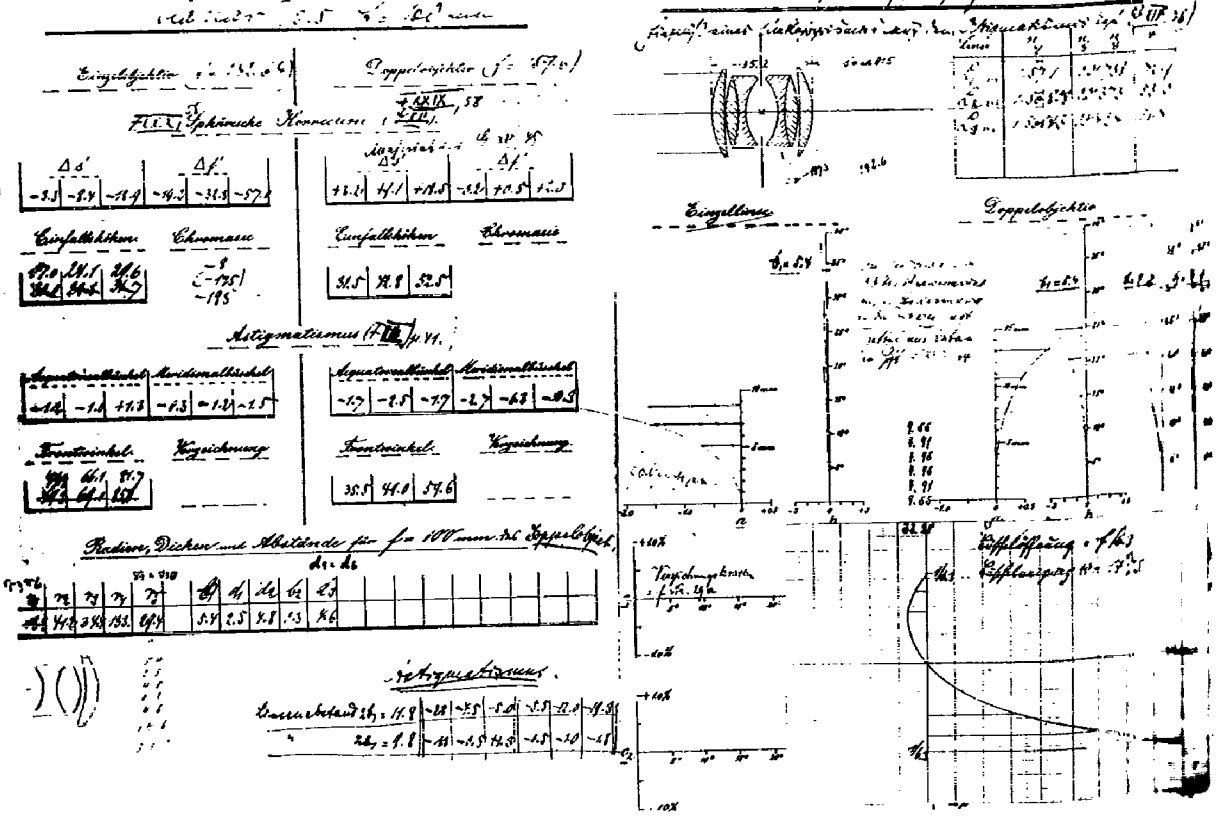
Linse	n_g	$n_g - n_{g'}$	ν

Einzellinse | Doppelobjektiv



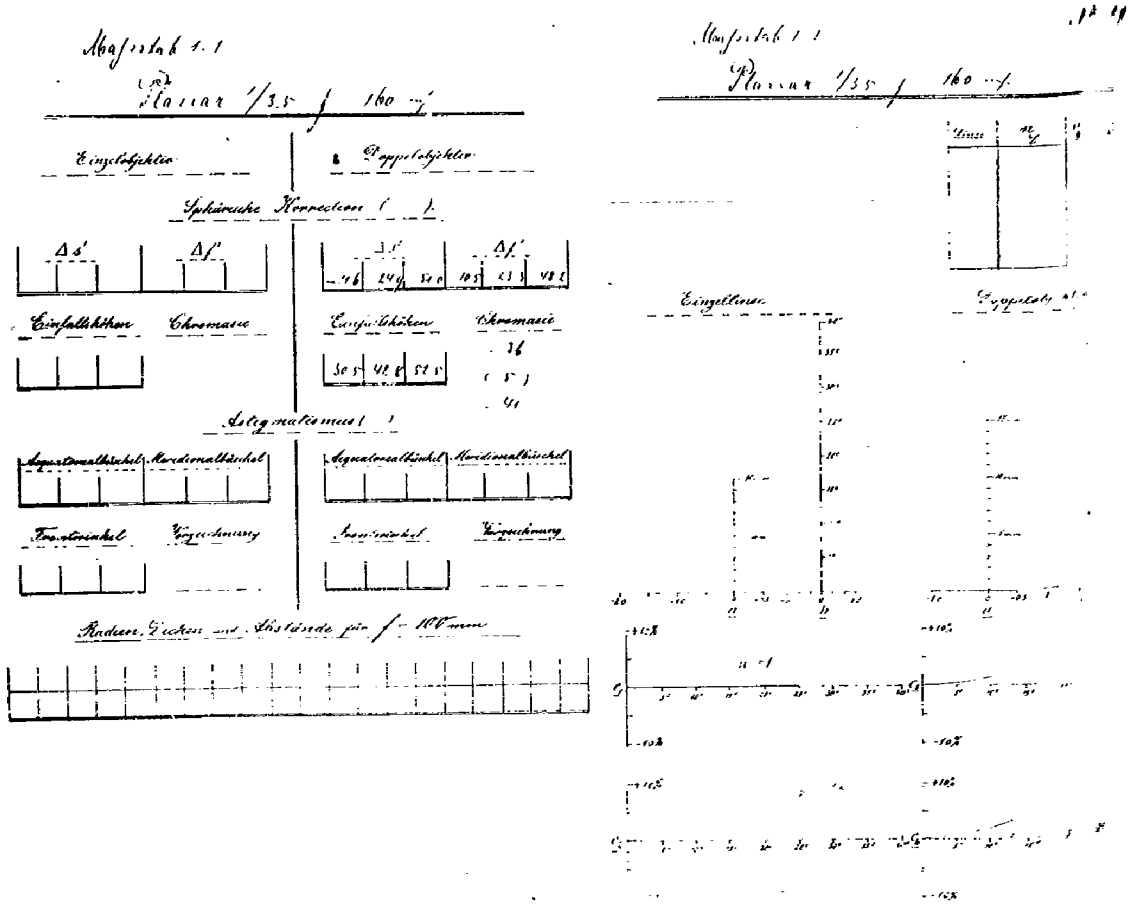
F-TS-6398-RE

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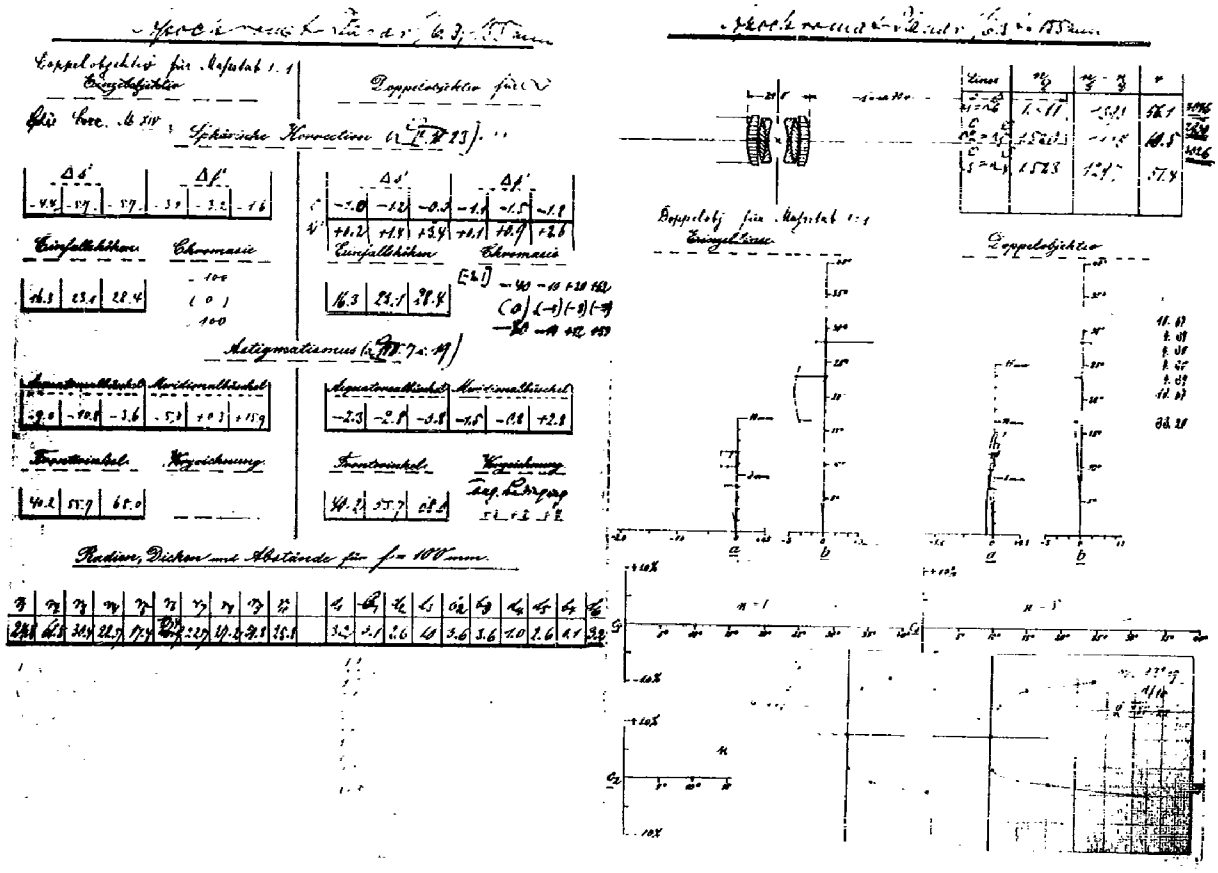
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1069



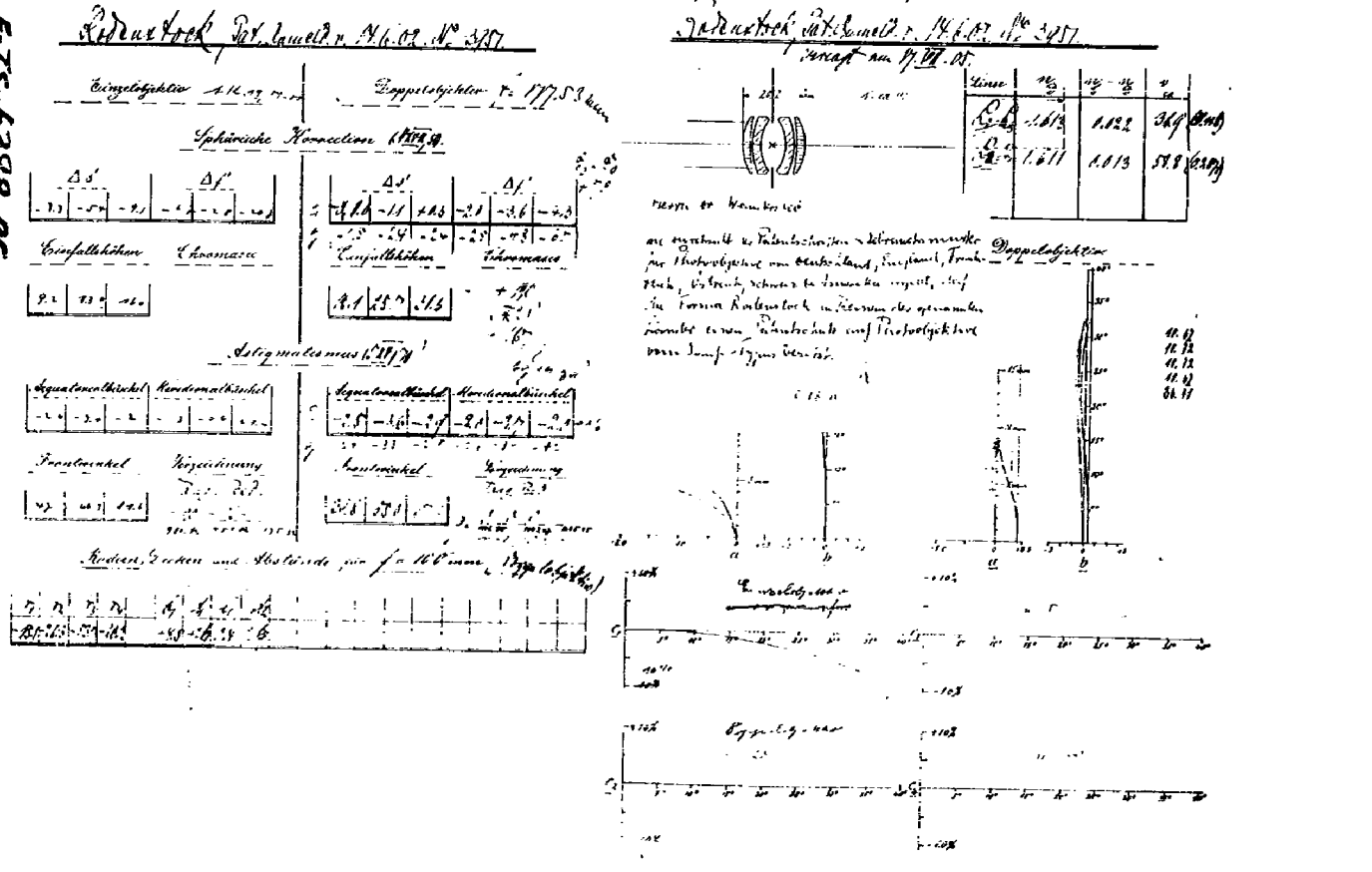
F-TS-6398-RE

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F-TS-6398-RE

1071



F-TS-6398-RE

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Rodenstock Projektiv Objektiv D.R.P. 182201

Einzellichtfeld — Doppellichtfeld f. 235.07

Sphärische Korrektion (Öffnung)

Δs'		Δf'	
Einfallslichten	Chromasie	Einfallslichten	Chromasie
		384	42.5	49.0	−326 (+CH) −382

Astigmatismus (Öffnung)

Äquatorialwalkwinkel	Meridionalwalkwinkel	Äquatorialwalkwinkel	Meridionalwalkwinkel
		−41 −75 −93 −82 +2.9 +112

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		396	55.0	69.5	tangent. Lösung −99 −107 −130 −99 −107 −130

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	l_2	d_3	l_3	d_4
222	821	363	201	280	383	825	289	25	43	36	30	10	36	43	26

Redenbach Projektiv Objektiv D.R.P. 182201

Linse	n_g	$n_g - n_f$	ν
L_1 L_2	1.521		60.2
L_2 L_3	1.620		36.2

Einzellinse — Doppellichtfeld

n = 1 vergrößert

n = 20 — n = ∞

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Neue Protarlinse D.R.P. vom 30.7.06 1. Beispiel

Einzellichtfeld — Doppellichtfeld

Sphärische Korrektion (Öffnung) S. 16, 33 – 35

Δs'		Δf'	
Einfallslichten	Chromasie	Einfallslichten	Chromasie
		8.7	12.3	15.0	104	17.6	30.2

Astigmatismus (Öffnung) S. 16, 25 u. S. 18, 26

Äquatorialwalkwinkel	Meridionalwalkwinkel	Äquatorialwalkwinkel	Meridionalwalkwinkel
		−43 −60 −62 −26 −1.7 +2.1

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		49.2	66.2	81.6	104	120	40.3	56.2	18.5	89.5	97.0

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	l_2	d_3	l_3	d_4
122	694	101	26.7		36	1.1	3.1	3.0		19.8	4.3				

Linse — n_g — $n_g - n_f$ — ν

L_1 L_2	1.61228	0.01384	56.5
L_2 L_3	1.53224	0.01243	55.1
L_3 L_4	1.44967	0.00957	65.0

Einzellinse — Doppellichtfeld

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№ 104

Neue Protarlinse D.R.P.A. vom 31.10.1905 1:4,5 Original

Einzellinse f = 247,8 | Doppellinse

Sphärische Korrektion (Δs' / Δf')

Δs'			Δf'		
-4,5	-1,2	-1,7	-13,2	-11,1	-8,4

Einfallshöhen | Chromasie

20,2	14,4	11,6

-2,6 (-2,4) -2,9

Δs'			Δf'		
-2,0	-1,4	-1,1	-1,2	-1,2	-1,2

Einfallshöhen | Chromasie

10,3	26,0	17,1

Astigmatismus

Aequatorialwinkel			Meridionalwinkel		
-4,8	-3,6	-2,5	-3,5	-2,1	13,9

Frontalwinkel | Vergleichung

17,3	16,0	17,7	Tang. Bed. -89 -96 -115

Aequatorialwinkel			Meridionalwinkel		
-3,4	-2,2	-1,2	-3,1	-1,4	-0,3

Frontalwinkel | Vergleichung

17,3	16,2	15,1

Radien, Dicken und Abstände für f = 100mm

Doppellinse

r1	r2	r3	r4	d1	d2	d3
+46,5	-61	-15,2		14,0	2,0	2,0

Doppelobjektiv

r1	r2	r3	r4	d1	d2	d3
25,1	63,1	11,4	26,8	1,4	1,4	3,6	3,8

Neue Protarlinse D.R.P.A. vom 30.11.06 1:4,5 Original

Linse	n_g	n_g - n_g'	ν
D1 - D2	1,6126	0,02059	39,3
D2 - D3	1,5831	0,01404	53,3
D3 - D4	1,6700	0,01491	56,3

Einzellinse für 5

Doppelobjektiv

1/11

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№ 113

Nach der Rechnung vom 5.X.06

Neue Protarlinse 1:12,5 Riss aufgeführt

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (B.K. 93,95)

Δs'			Δf'		
-13,8	-14,4	-12,0	-12,8	-12,4	-12,0

Einfallshöhen | Chromasie

9,2	13,0	16,0

Δs'			Δf'		
-11,0	-14,3	-5,9	-11,6	-11,6	-8,6

-5,6 -1,7 +1,67 -6,3 -2,9 +1,44 Δf'

Einfallshöhen | Chromasie

Astig...

Aequatorialwinkel			Meridionalwinkel		
-4,4	-3,7	-2,6	-3,0	-2,7	+1,1

Frontalwinkel | Vergleichung

17,8	16,2	15,6	Tang. Bed. -89 -92 -110

Aequatorialwinkel			Meridionalwinkel		
-3,2	-2,2	-1,1	-2,1	-2,5	-1,5

Δf' -9,3 -8,1 -5,6 -4,6 -5,9 -5,2

Frontalwinkel | Vergleichung

40,6	56,4	69,0	Tang. Bed. -89 -92 -114
46,6	56,4	68,7	-89 -93 -111

Radien, Dicken und Abstände für f = 100mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	d9
26,1	44,5	52,4	23,4	23,4	52,6	44,5	14,5	2,1	4,6	1,2	2,1	3,4	1,2	4,6	2,2	4,6

Neue Protarlinse 1:12,5 Riss aufgeführt

Linse	n_g	n_g - n_g'	ν
D1 - D2	1,626	0,02059	39,3
D2 - D3	1,583	0,01404	53,3
D3 - D4	1,669	0,01491	56,3

Einzellinse

1/5

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Kauf der Prüfung vom 12. II. 16

Neue Protarlinse 1:11.5 Nürgefasst unter der Nr. 85801 u. 85802

Einzellichter | Doppellichter

Sphärische Korrection (S. VII), 16

Δs'			Δs'		
-17.4	-22.5	-7.4	-17.0	-23.3	-11.9
-13.4	-18.3	-4.9	-14.0	-19.0	-6.6

Einfallshöhen | Chromasie

28	21.1	13.6	+54 (-38) -4		
15.5	20.9	26.9	+46 (-4) +16		

Astigmatismus (S. VII), 41

Aequatorialbildw.	Meridionalbildw.		
-2.7	3.0	2.15	5.8	6.2	10.2
-2.5	-6.0	-7.3	-5.7	-8.5	+10.0

Kontrastwinkel | Kugelabweichung Tang. Bed.

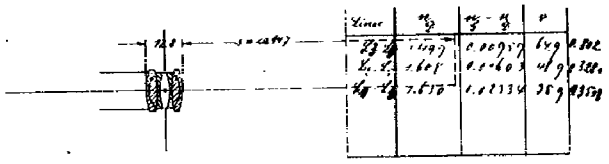
47.5	66.2	81.6	-66	-77	-91
42.3	58.5	72.0	-11	-75	-91

Radien, Dicken und Abstände für f = 100 mm

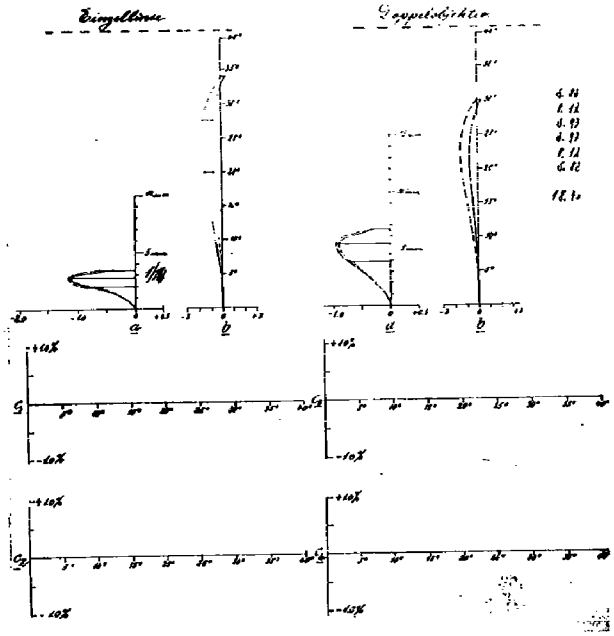
r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	S1	S2
42.0	58.4	17.9	17.5	58.4	9.0	16.0		0.8	2.8	11.1	1.7	1.7	1.1	2.8	0.8	18.5	23.3

Kauf der Prüfung vom 12. II. 16

Neue Protarlinse 1:11.5 Nicht nürgefasst unter der Nr. 85804 u. 85802



Linse	n_g	$n_g - n_{g'}$	ν
$S_1 - S_2$	1.6197	0.009917	64.9
$S_2 - S_3$	1.6051	0.011603	57.9
$S_3 - S_4$	1.6130	0.011334	58.9



16

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Kauf der Prüfung vom 12. I. 17

Neue Protarlinse 1:11.5 Nicht nürgefasst

Einzellichter | Doppellichter

Sphärische Korrection (S. VII), 294 56

Δs'			Δs'		
-17.6	-22.6	-7.4	-17.4	-23.4	-12.0
-15.6	-20.6	-5.8	-16.4	-22.5	-9.7

Einfallshöhen | Chromasie

28.2	21.7		+154 (-58) +116		
18.9	25.5	34.4	+70 (-25) +49		

Astigmatismus (S. VII), 42

Aequatorialbildw.	Meridionalbildw.		
-2.2	-2.8	-0.5	+5.0

Kugelabweichung Tang. Bed.

82	-87	-95

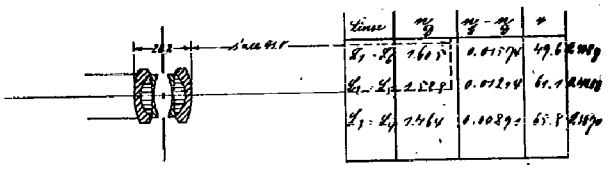
Kontrastwinkel | Kugelabweichung

Radien, Dicken und Abstände für f = 100 mm

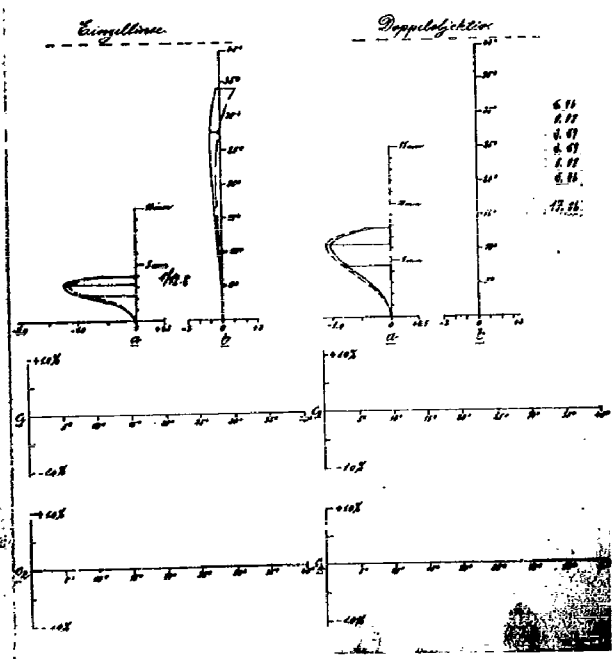
r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	S1	S2	S3
42.8	64.4	19.9	27.4	64.4	9.0	16.0		2.2	2.9	0.9	2.0	2.3	0.9	3.9	0.2	17.2	16.0	16.0

Kauf der Prüfung vom

Neue Protarlinse 1:11.5 Nicht nürgefasst



Linse	n_g	$n_g - n_{g'}$	ν
$S_1 - S_2$	1.6015	0.011574	49.6
$S_2 - S_3$	1.6284	0.012094	61.1
$S_3 - S_4$	1.7164	0.010894	65.8



11

F-TS-6398-RE

1078

№ 116

Nach der Rechnung vom 1. X. 07

Neue Protarlinse 1:12.5 Brennweite 1 unter der № 90430 bis 90690

Einzellinse | Doppellinse

Sphärische Korrection (P. II) 49 58 (49 5 - 7)

Δs'			Δf'		
-23.2	-19.5	-18.0	-11.5	17.5	-13.4

Einfallshöhen: 22 | 18.0 | 15.7

Ebenmaass: -114 (-7) -113

Δs'					Δf'
-7.5	-14.4	-10.4	-11.2	-11.0	-11.6

Einfallshöhen: 18.0 | 25.4 | 34.2

Ebenmaass: -103 (-5) -198

Astigmatismus (P. II) 47

Aequatorialbüschel			Meridionalbüschel		
-2.9	-5.5	-4.7	-0.1	+0.1	-0.4

Frontwinkel: 28.2 | 27.2 | 27.6

Vergütung: Neue Bed. -88 -96 -114

Aequatorialbüschel			Meridionalbüschel		
-8.1	-12	-7.6	-1.1	-1.1	+0.7

Frontwinkel: 40.7 | 55.7 | 62.0

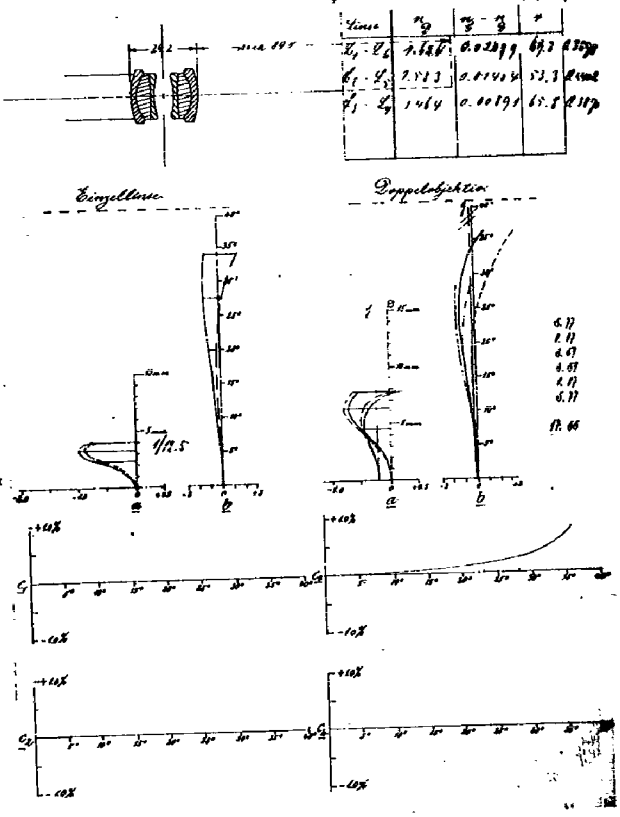
Vergütung: [illegible]

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	s'1	s'2	s'3
28.2	21.2	54.3	23.9	18.2	42.2	25.9	2.9	5.3	2.3	7.5	3.5	1.3	5.3	2.8	44.4

Linse | n_g | $n_g - n_F$ | ν

$L_1 - L_2$	1.5167	0.02399	63.2
$L_2 - L_3$	1.5113	0.01745	53.3
$L_3 - L_4$	1.464	0.00791	65.5



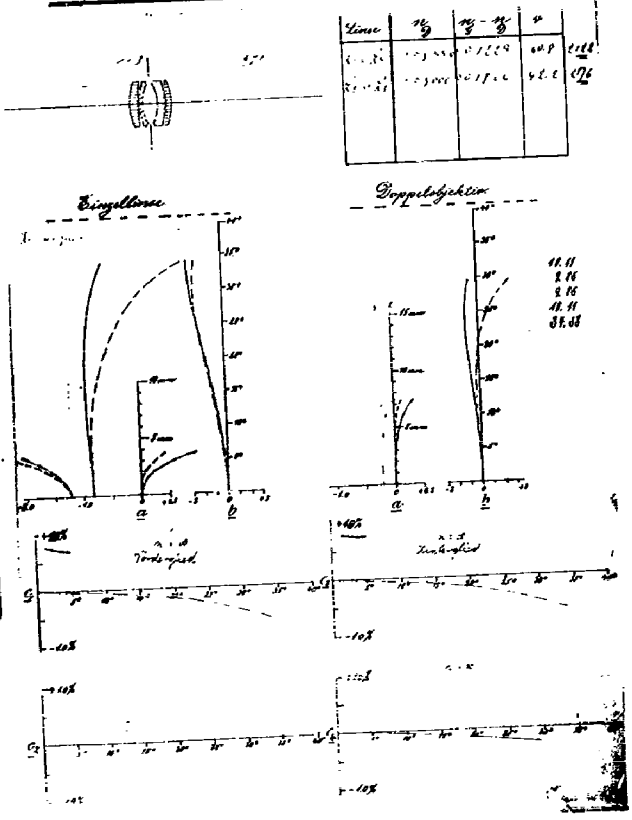
1079

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№ 151

Linse | n_g | $n_g - n_F$ | ν



F-TS-6898-RE

1080

Orthoprotar f=28 cm

Vorkriegsausführung = Serie II f = 420 mm

Einzellichter | Doppellichter

Sphärische Korrektion f = 281,73 mm

Δs'		Δf'		Δs'		Δf'	
				-2,1	-8,9	-10,8	-6,2	-11,1	-19,2

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

			18,5	17,9	24,7

-14,9
(-5)
-15,3

Astigmatismus (R LM, 25)

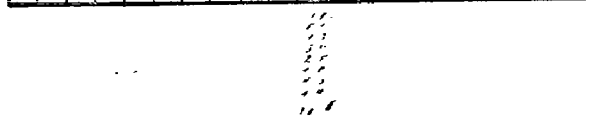
Äquatorealbüschel	Meridionalbüschel	Äquatorealbüschel	Meridionalbüschel
			-25 -23 -19 -11	-21 -2,1 -2,9 -2,8

Frontwinkel | Bezeichnung | Frontwinkel | Bezeichnung

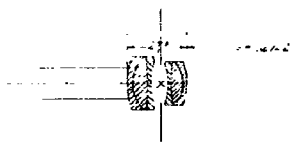
		46,9	46,8	46,5	Jang Rud. -1 -2 -1

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8
46,9	11,8	114	42,6	41,5	50	44,4	22,2	18	5,1	4,3	2,4	2,5	1,0	1,3	1,4

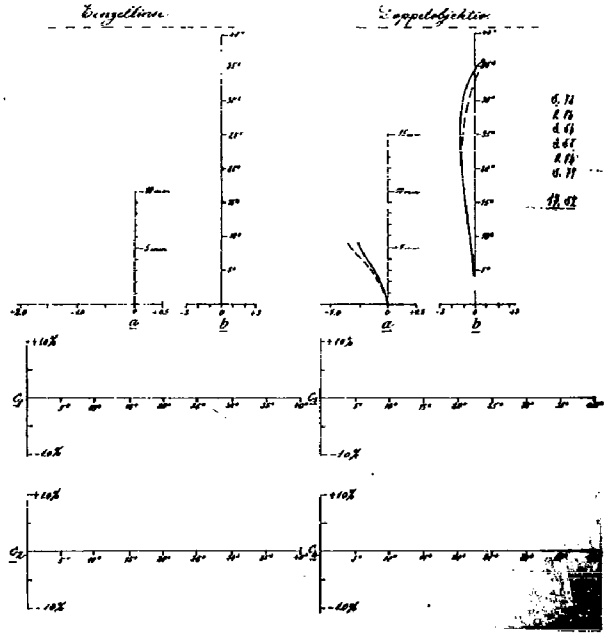


Orthoprotar f = 12 cm



Linse	n_g	$n_g - n_g'$	ν
L_1	1,61 24	0,02070	39,6
L_2	1,61 63	0,01731	51,6
L_3	1,61 03	0,00870	66,6
L_4	1,61 26	0,00877	66,6
L_5	1,62 57	0,01580	51,1
L_6	1,62 57	0,02440	39,1

Einzellinse | Doppellichter



F-TS-6898-RE

1081

C. P. Goerz' D.R.P. Nr. 55711 II f = 420 mm 18. III. 91

Einzellichter | Doppellichter

Sphärische Korrektion

Δs'		Δf'		Δs'		Δf'	

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

			16,4	23,1	28,8

Astigmatismus

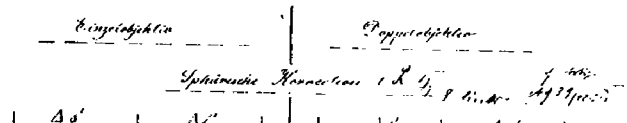
Äquatorealbüschel	Meridionalbüschel	Äquatorealbüschel	Meridionalbüschel

Frontwinkel | Bezeichnung | Frontwinkel | Bezeichnung

					Jang Rud.

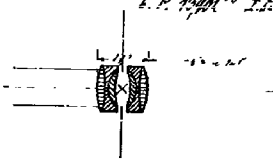
Radien, Dicken und Abstände

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8



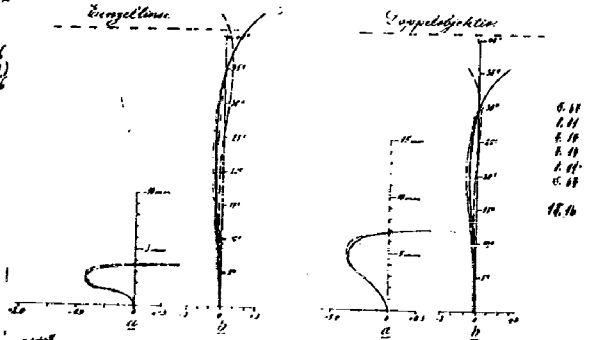
C. P. Goerz' D.R.P. Nr. 55711 II f = 420 mm 18. III. 91

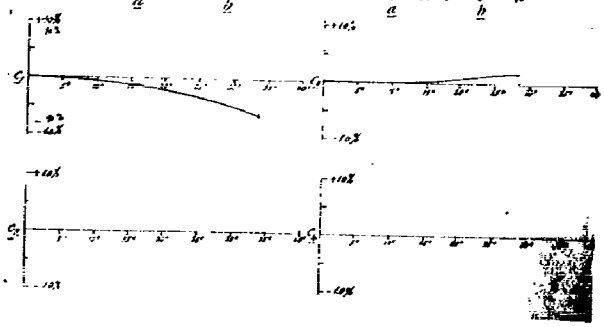
E.P. 1891 18 I. Kl.



Linse	n_g	$n_g - n_g'$	ν
L_1	1,610 2	0,01000	63,5
L_2	1,54 77	0,01320	53,6
L_3	1,66 69	0,01470	54,0

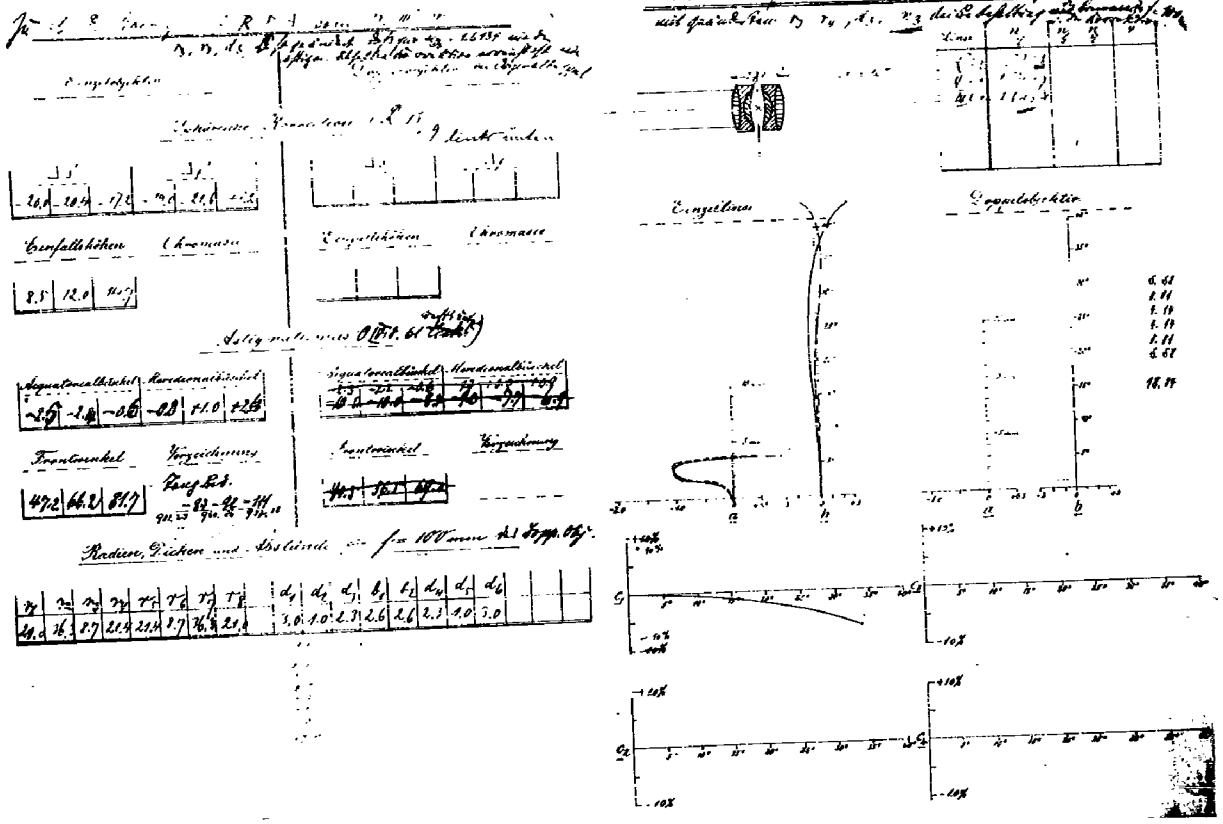
Einzellinse | Doppellichter





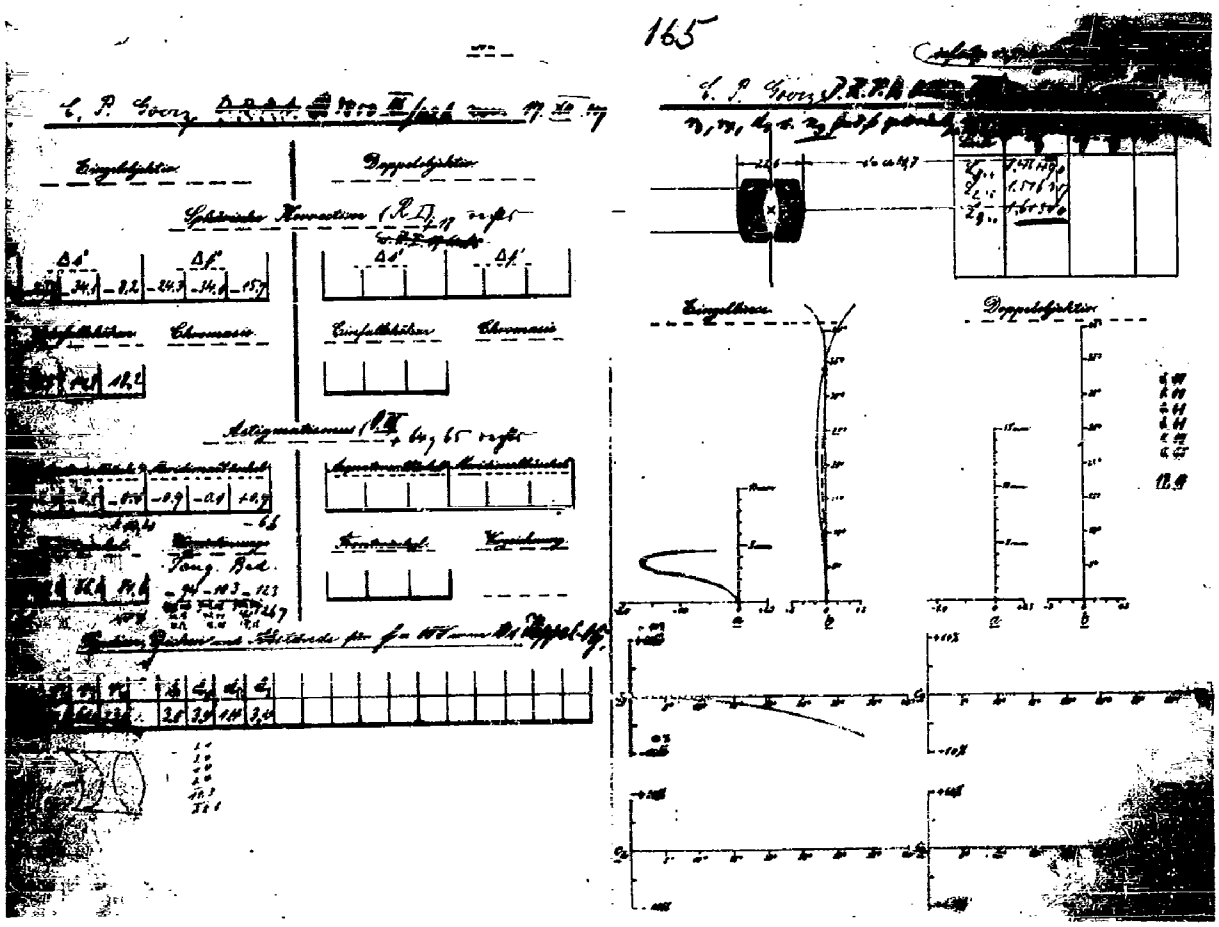
F-75-6398-RE

1082



F-75-6398-RE

1083



F-75-6398-RE

1084

№ 198

Doppel-Anastigmat Ultimar 1:9 mit Zeiss-Kardan der photogr. Ges. Leipzig 9 Kriegl 1906 № 2.9.xx

Doppel-Anastigmat Ultimar 1:9

Doppel-Anastigmat Ultimar 1:9

Einzellinse — Doppelobjektiv

Sphärische Korrektion (f = 10 cm)

Astigmatismus (f = 10 cm)

Radien, Dicken und Abstände für f = 100 mm

F-75-6398-RE

1085

№ 199

d K Rietzschel Münchberg № 11903 XI. 07

d K Rietzschel Münchberg № 11903 XI. 07

Einzellinse — Doppelobjektiv

Sphärische Korrektion (f = 10 cm)

Astigmatismus (f = 10 cm)

Radien, Dicken und Abstände für f = 100 mm

№ 240

F-TS-6398-RE

1086

Ross, Homocentric 1:4,5 f=100 mm general

Einzelobjektiv | Doppelobjektiv für 8°

Sphärische Korrektion (A, I, III, V)

Δs' Δf' | Δs' Δf'

Einfallshöhen Chromasie | Einfallshöhen Chromasie

Astigmatismus (II, IV)

Äquatorialbüschel Meridionalbüschel | Äquatorialbüschel Meridionalbüschel

Frontneigung Vorzeichnung | Frontneigung Vorzeichnung

Radien, Dicken und Abstände für f=100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
149	99.8	34.8	175	139	34.1	91.9	0.9	1.1	0.9	3.8	3.0	1.0	3.5	1.3	2.2	1.5

Ross Homocentric 1:4,5 f=100 mm general Objektiv

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppelobjektiv für 8°

№ 205

F-TS-6398-RE

1087

Serie IV Protarlinse 1:8 f=100

Einzelobjektiv für 8° | Doppelobjektiv

Sphärische Korrektion (A, II, V)

Δs' Δf' | Δs' Δf'

Einfallshöhen Chromasie | Einfallshöhen Chromasie

Astigmatismus (I, III)

Äquatorialbüschel Meridionalbüschel | Äquatorialbüschel Meridionalbüschel

Frontneigung Vorzeichnung | Frontneigung Vorzeichnung

Radien, Dicken und Abstände für f=100 mm

Serie IV Protarlinse 1:8 f=100

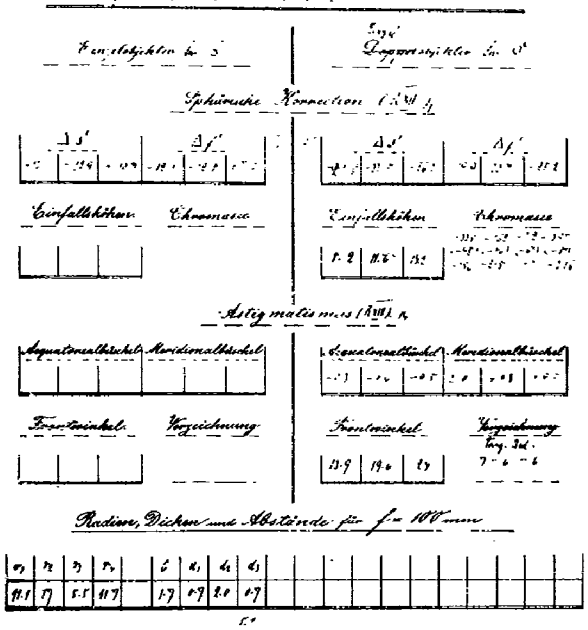
Linse | n_g | $n_g - n_g$ | ν

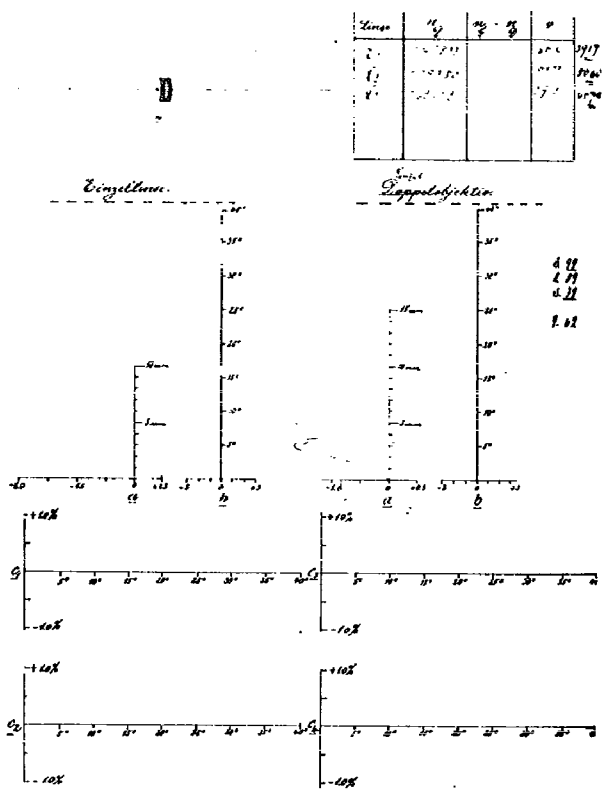
Einzellinse | Doppelobjektiv

№ 207

F-TS-6378-RE

1088

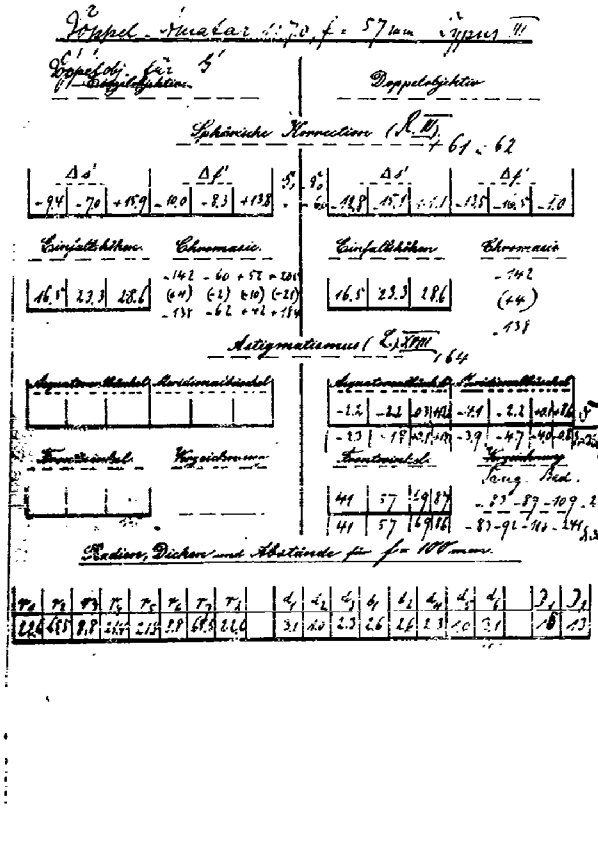


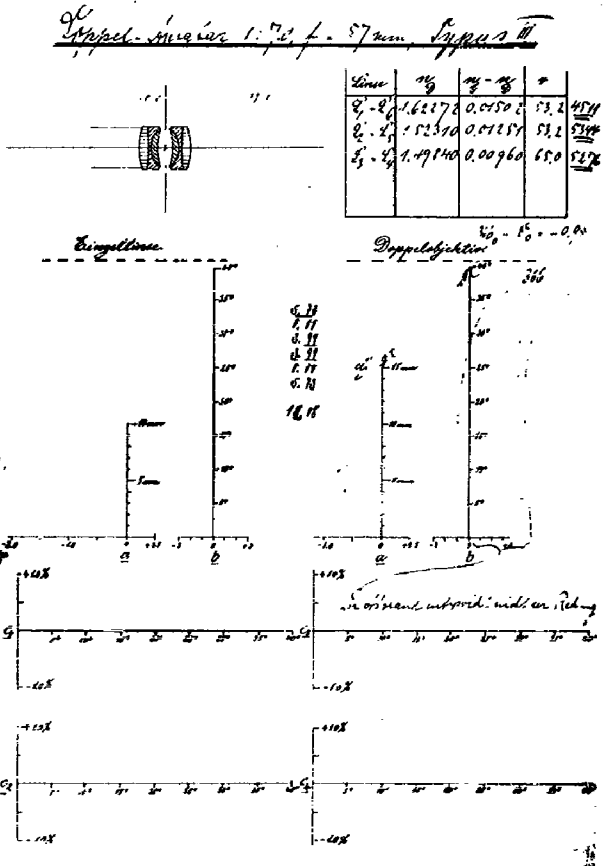


№ 213

F-TS-6398-RE

1089





F-TS-6378-RE

1090

Doppel-Amatar Typus III

Einzellinse für 5 | Vierel Doppellinse für 5'

Sphärische Korrection (S.T. 24 - 38 - 42)

Δs'			Δf'		
-4.7	-3.8	-0.3	-13.8	-10.4	-2.1
-5.7	-5.2	+19.4	-7.4	-0.6	+17.3

Δs'			Δf'		
-0.1	+1.3	-0.7	-0.6	-0.3	-5.8

Einfallsfehler | Chromasie

16.8	13.8	29.1	-16 -7 +36 -18	
16.8	13.8	29.1	-16 -7 +17 -47	

Einfallsfehler | Chromasie

8.3	14.7	4.3	-14 (-7) -25

Astigmatismus (S.T. XIII, 38 red. 46)

Aequatorialbüschel			Meridionalbüschel		
-2.0	-1.4	+1.4	-2.5	-1.7	+2.5

Aequatorialbüschel			Meridionalbüschel		
-2.3	-1.5	-1.9	-2.5	-1.0	-1.8

Frontwinkel | Kurve

40	56	68

Radien, Dicken

23.5	57.5	3.9	21.9	4.9	1.9	57.5

Zu Darstellung 2.14.

Abscissen der Einzellinse, 10 mal verkleinert

S XIII 39-50

Vierel Doppellinse für 5'

Linse	n_g	$n_g - n_g'$	ν	
$L_1 - L_2$	1.61128	0.01133	58.6	5mm
$L_2 - L_3$	1.54900	0.01169	56.2	4 "
$L_3 - L_4$	1.57581	0.00984	69.9	4mm

Einzellinse für 5

Vierel Doppellinse für 5'

1191

F-TS-6388-RE

1091

Doppel-Amatar Typus III mit Quarzlinse

Einzellinse für 5 | Vierel Doppellinse für 5'

Sphärische Korrection (S.T. 147)

Δs'			Δf'		
-11.1	-9.9	+7.5	-13.8	-10.5	-2.3

Δs'			Δf'		
-11.7	-9.5	+17.5	-12.0	-2.3	+7.5

Einfallsfehler | Chromasie

9.4	13.4	16.4	-77 (-77) -155

Einfallsfehler | Chromasie

9.5	13.5	16.5	

Astigmatismus (S.T. 45)

Aequatorialbüschel			Meridionalbüschel		
-2.4	+0.8	+14.8	-2.1	+0.4	+3.1

Aequatorialbüschel			Meridionalbüschel		
-2.5	-1.5	+13.1	-2.5	-1.1	-2.7

Frontwinkel | Vorzeichnung Parg. Bal.

72	92	103

Frontwinkel | Vorzeichnung

72	92	103

Radien, Dicken und Abstände für f = 100 mm für Doppellinse

44.7	81.5	9.5	22.9	2.9	1.6	3.0	1.9	1.6	1.9	1.6	1.9	1.6	1.9

Einzellinse für 5

Vierel Doppellinse für 5'

F-TS-6398-RE

1092

Protarlinse f=350 mm mit Quarzlinse Carl Zeiss

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsöffnung | Chromasie

Astigmatismus

Äquatorialwölbung | Meridionalwölbung

Brennweite | Vergrößerung

Radien, Dicken und Abstände für f=100 mm

Protarlinse f=350 mm mit Quarzlinse Carl Zeiss

Einzellinse

Doppelobjektiv

F-TS-6398-RE

1093

Doppel-Anastar, Typus III f:5,5 f=157,4 mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsöffnung | Chromasie

Astigmatismus

Äquatorialwölbung | Meridionalwölbung

Brennweite | Vergrößerung

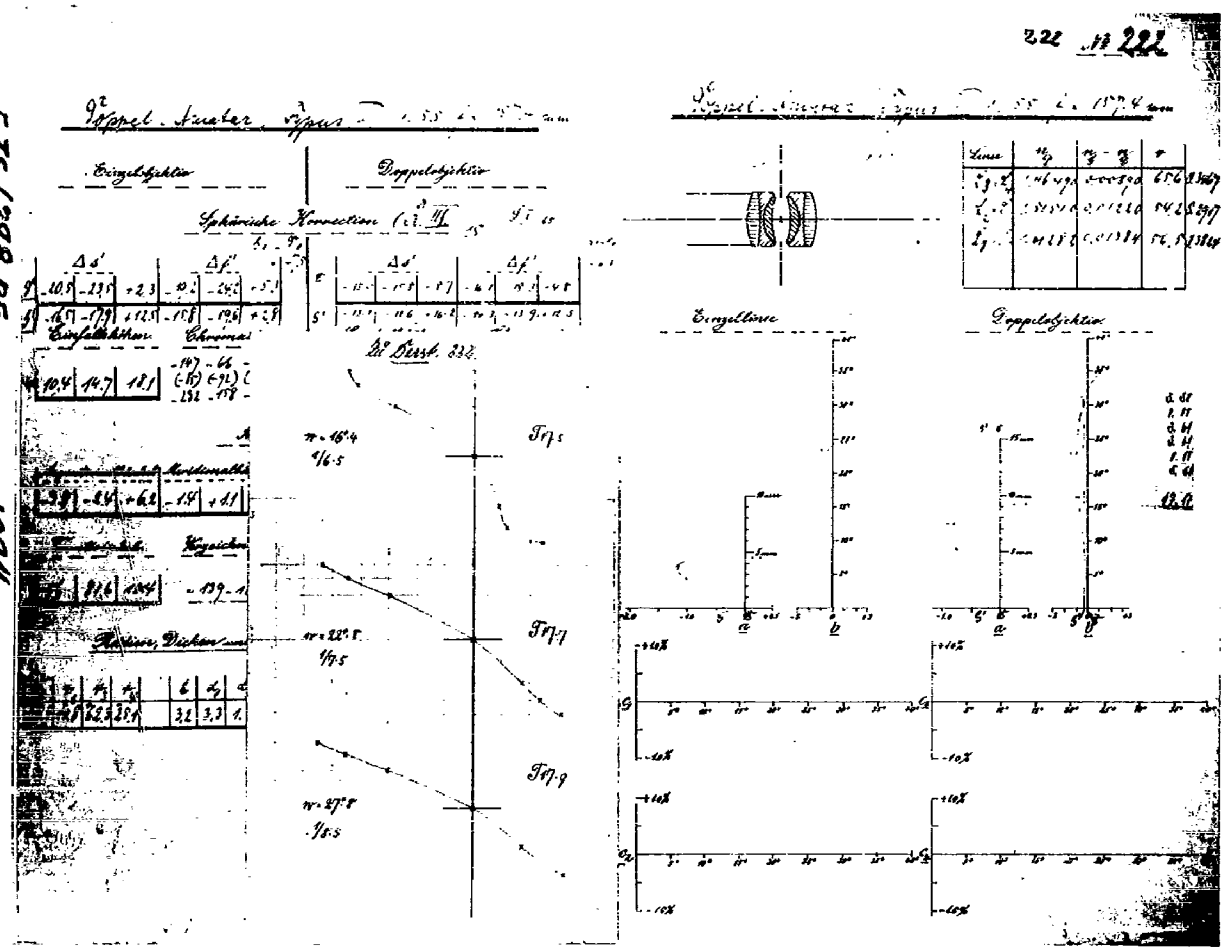
Radien, Dicken und Abstände für f=100 mm

Doppel-Anastar, Typus III f:5,5 f=157,4 mm

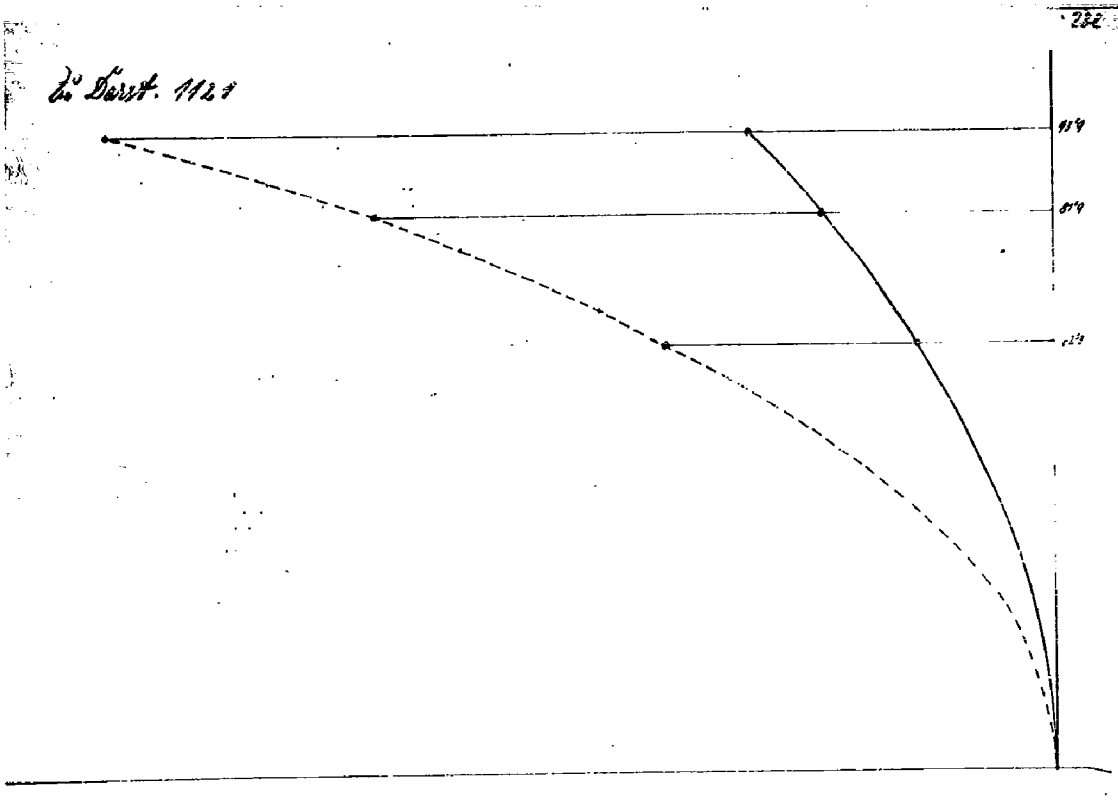
Einzellinse

Doppelobjektiv

F-TS-6398-RE
1094

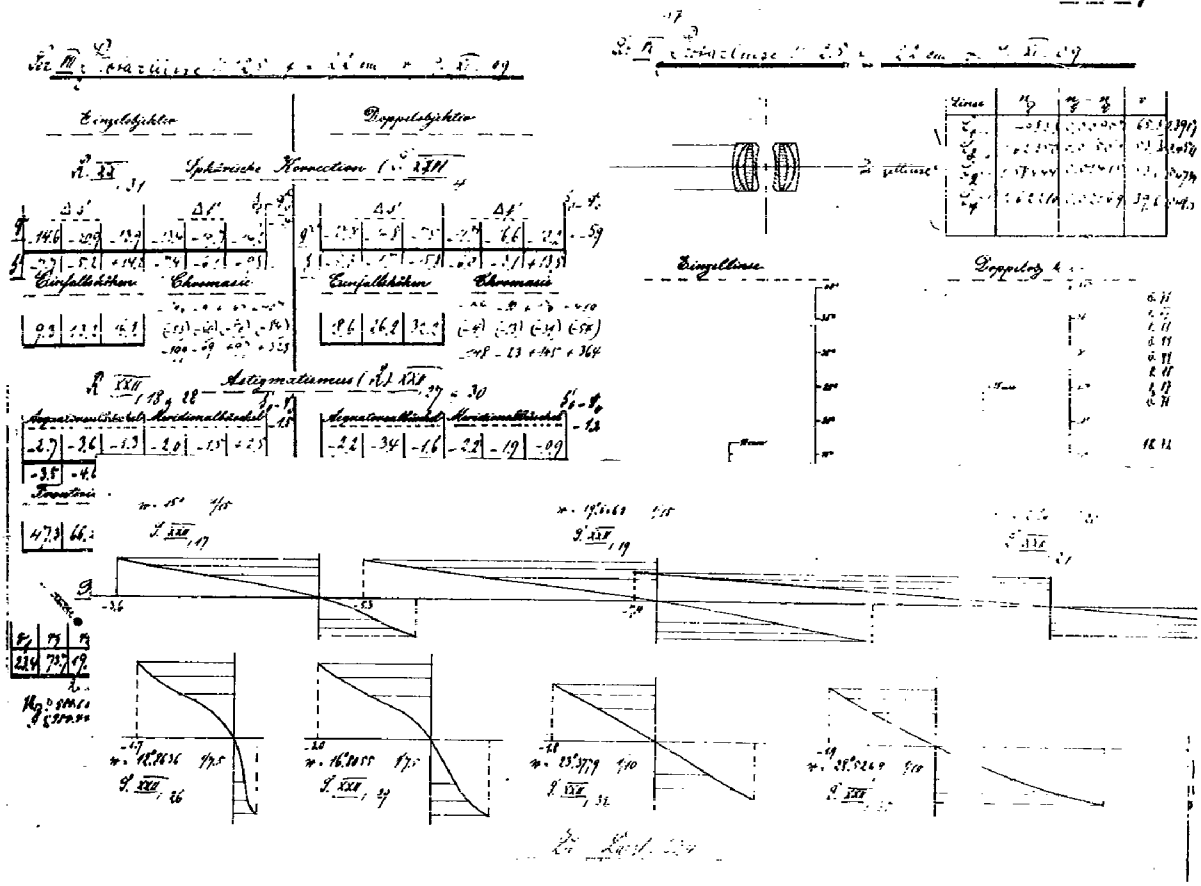


F-TS-6398-RE
1095



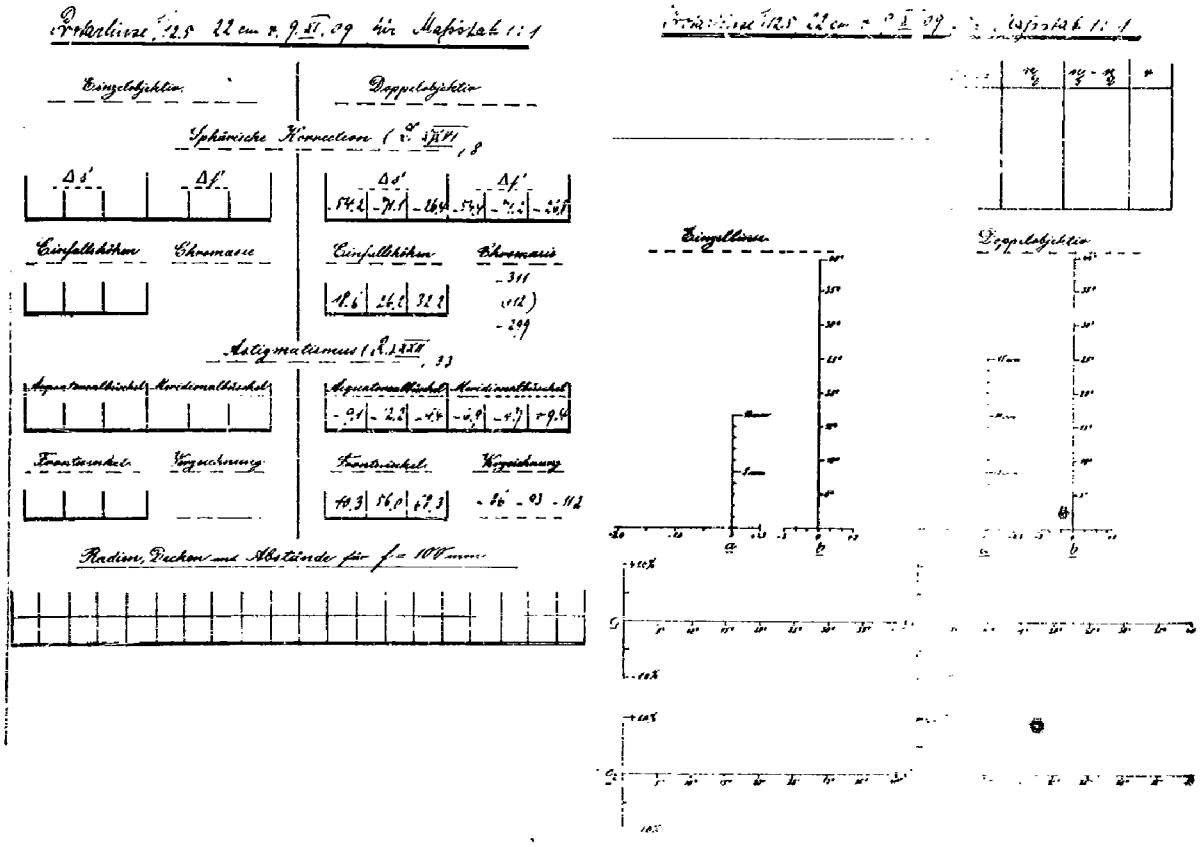
F-TS-6398-RE

1096



F-TS-6398-RE

1097



F-TS-6398-RE

№ 237

Einzellinse

Doppellinse

Sphärische Korrektion

Einzellinse

Doppellinse

1098

F-TS-6398-RE

№ 240

Reichert Kollektivobjektiv

Einzellinse

Doppellinse

Sphärische Korrektion

Einzellinse

Doppellinse

1099

F-75-6398-RE

1100

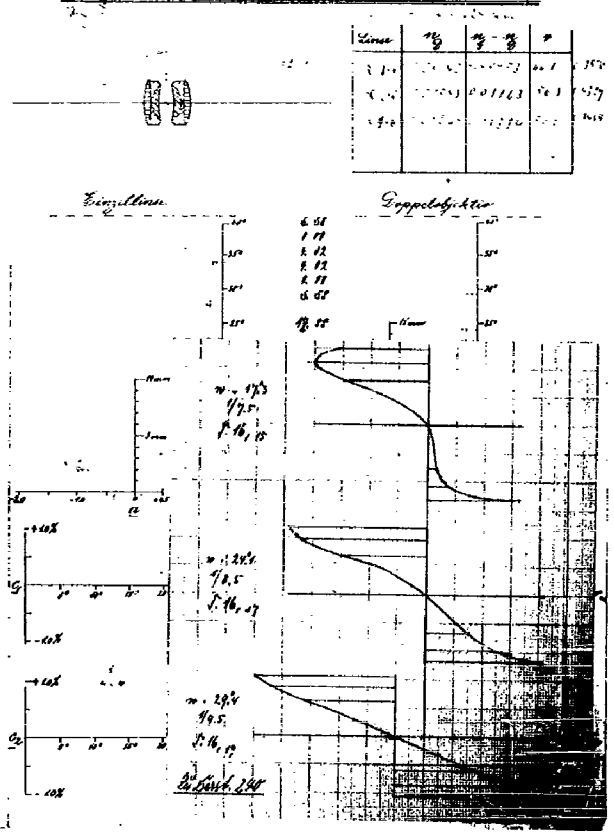
Reichert, Wien

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



1100

F-75-6398-RE

1100

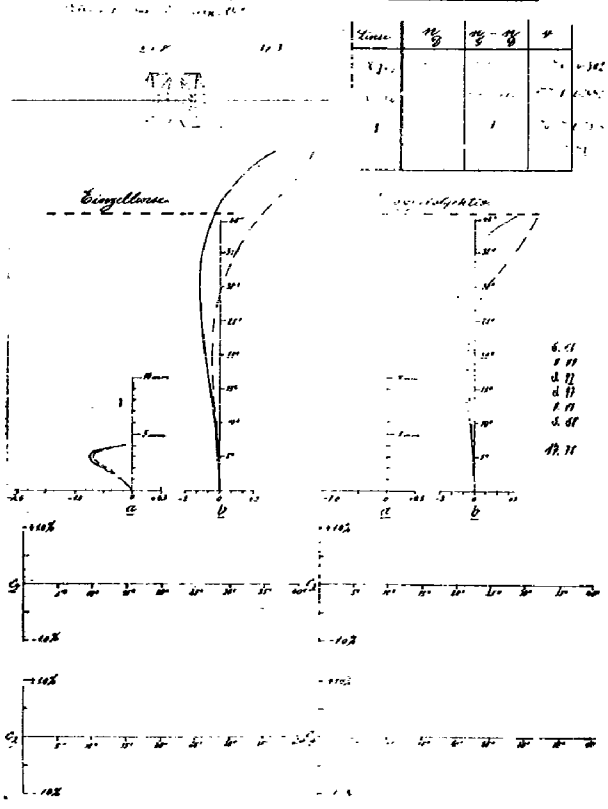
Jackisch

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

1102

11242

Doppelanastigmat Ica f. 17,3 cm Ostkreuzkopf

Doppelanastigmat Ica f. 17,5 cm

Einzellinse

Doppelobjektiv

Einzellinse

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Einzellinse

Doppelobjektiv

F-TS-6398-RE

1103

11244

Maximar 1:6,5 f. 18 cm Nr. 140804 v. Jan. 1911

Maximar 1:6,5 f. 18 cm Nr. 140804 v. Jan. 1911

Einzellinse

Doppelobjektiv

Einzellinse

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

F-TS-6398-RE

1104

Maximar f = 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Fca Maximar f = 100 mm

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppelobjektiv

№ 245

1104

F-TS-6398-RE

1105

Kontrollrechnung für f = 95 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (TS 11)

Einfallshöhen | Chromasie

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Fca-Rechnung für Maximar 1:6,8 f = 95 mm

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppelobjektiv

№ 246

F-TS-6398-RE

1106

№ 248

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

1116

F-TS-6399-RE

1107

Reichert, D.R.P.

№ 249

Reichert, D.R.P.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

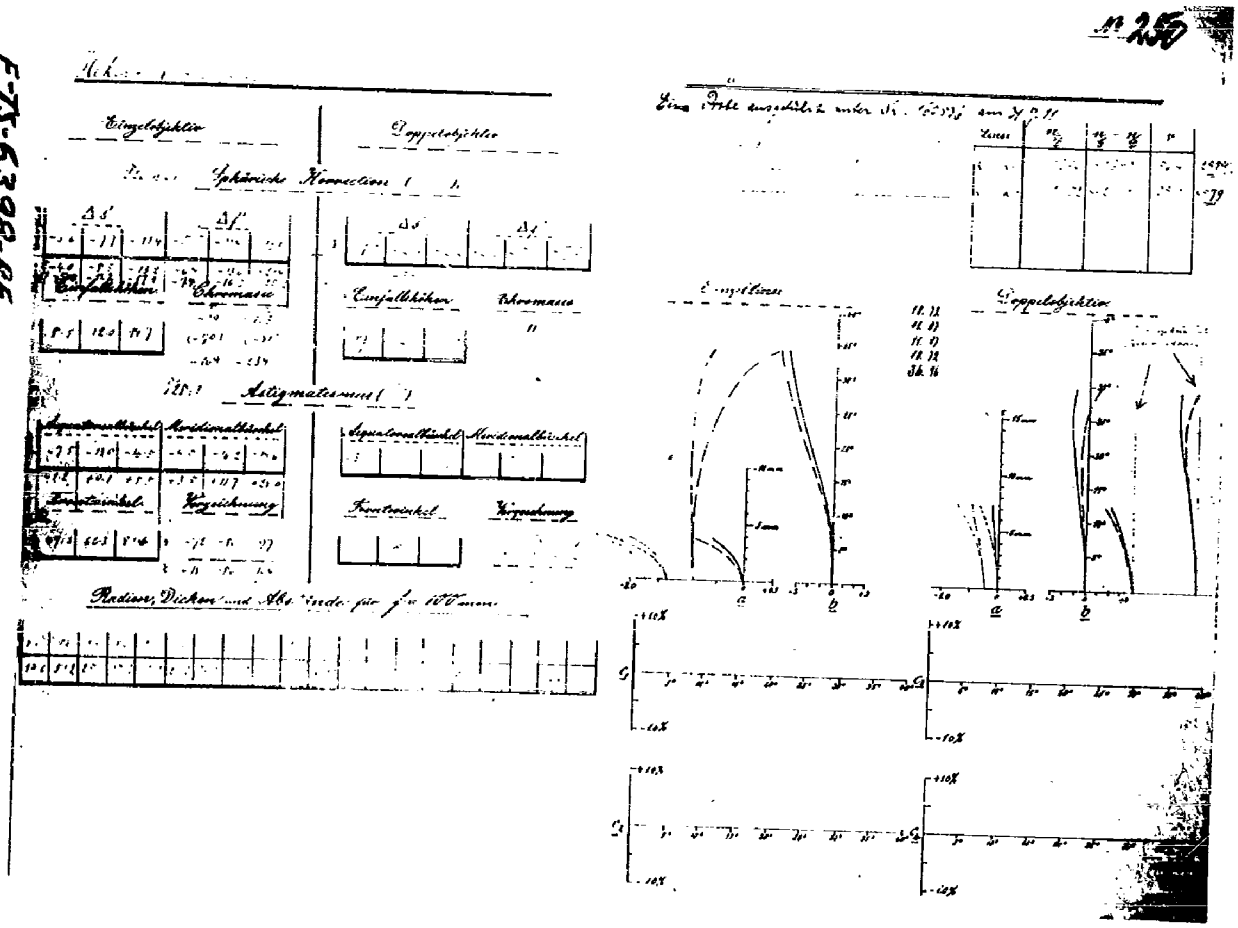
Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

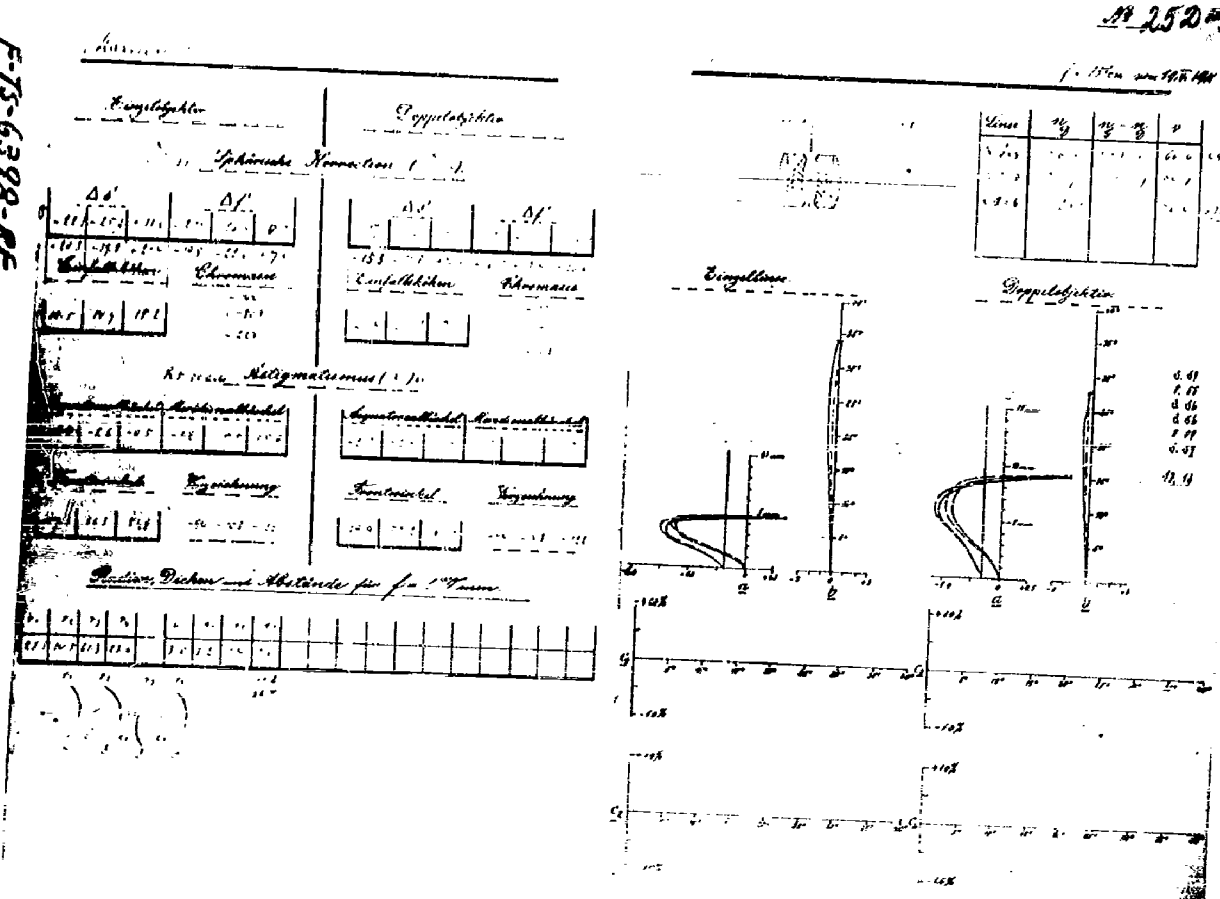
F-TS-6398-RE
1108

№ 250



F-TS-6398-RE
1109

№ 252



F-TS-6398-RE

1110

№ 253

Maximar

Einzelobjektiv | Doppelobjektiv

Fs 11 Sphärische Korrection (5 F).

Δd' Δf' | Δd' Δf'

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

Astigmatismus (Rs).

Äquatorialbildort | Meridionalbildort | Äquatorialbildort | Meridionalbildort

Bildlage | Vergrößerung | Bildlage | Vergrößerung

Radien, Dicken und Abstände für f = 100 mm.

Linse | n_g | $n_g - n_F$ | ν

Einzellinse | Doppelobjektiv

a b | a b

G_1 G_2

+10% −10%

1110

F-TS-6398-RE

1110

№ 254

Maximar f:2,5 (Konstruktion mit abweichender Glasart)

vom 23. VI. 1911

Linse | n_g | $n_g - n_F$ | ν

Einzellinse | Doppelobjektiv

a b | a b

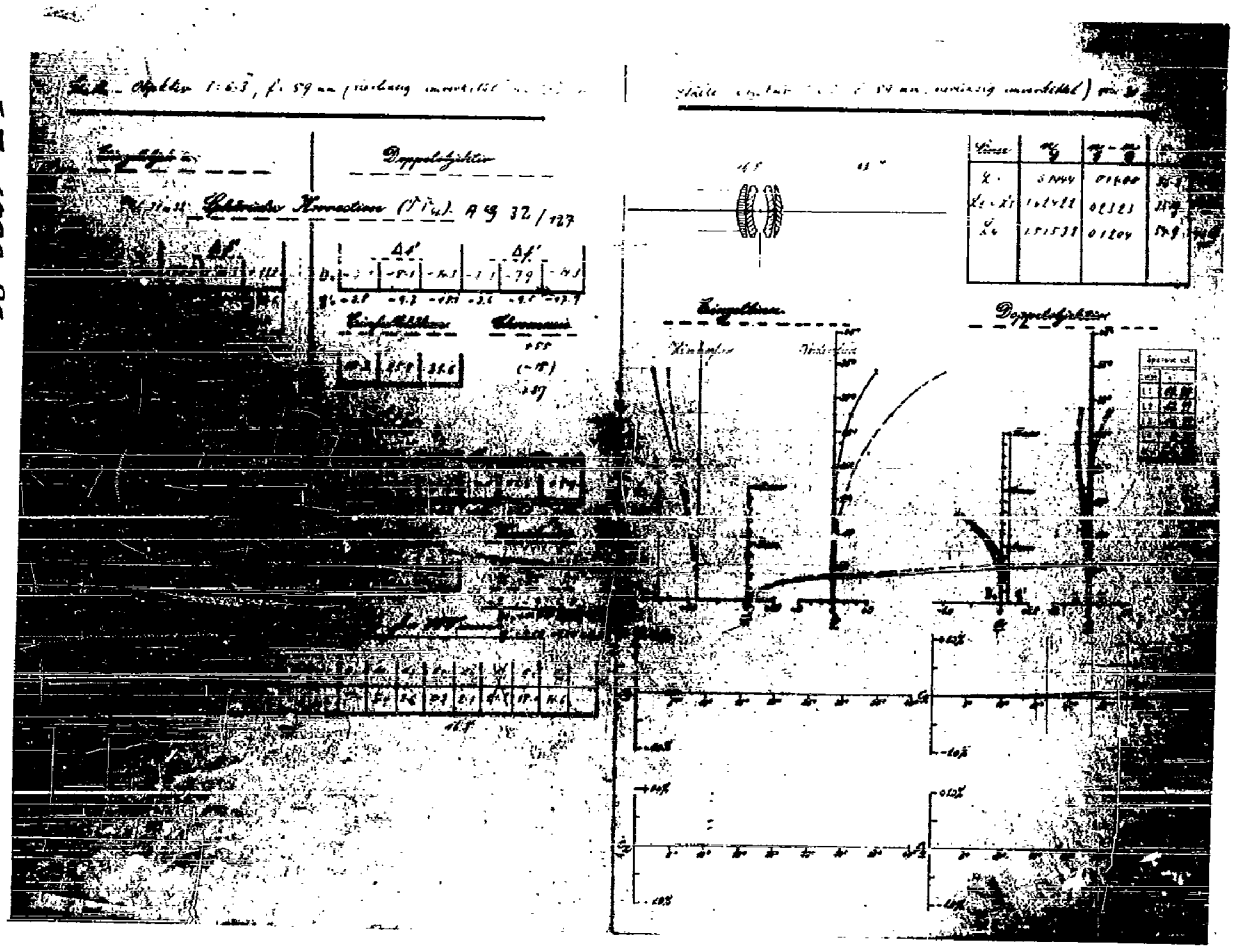
G_1 G_2

+10% −10%

1111

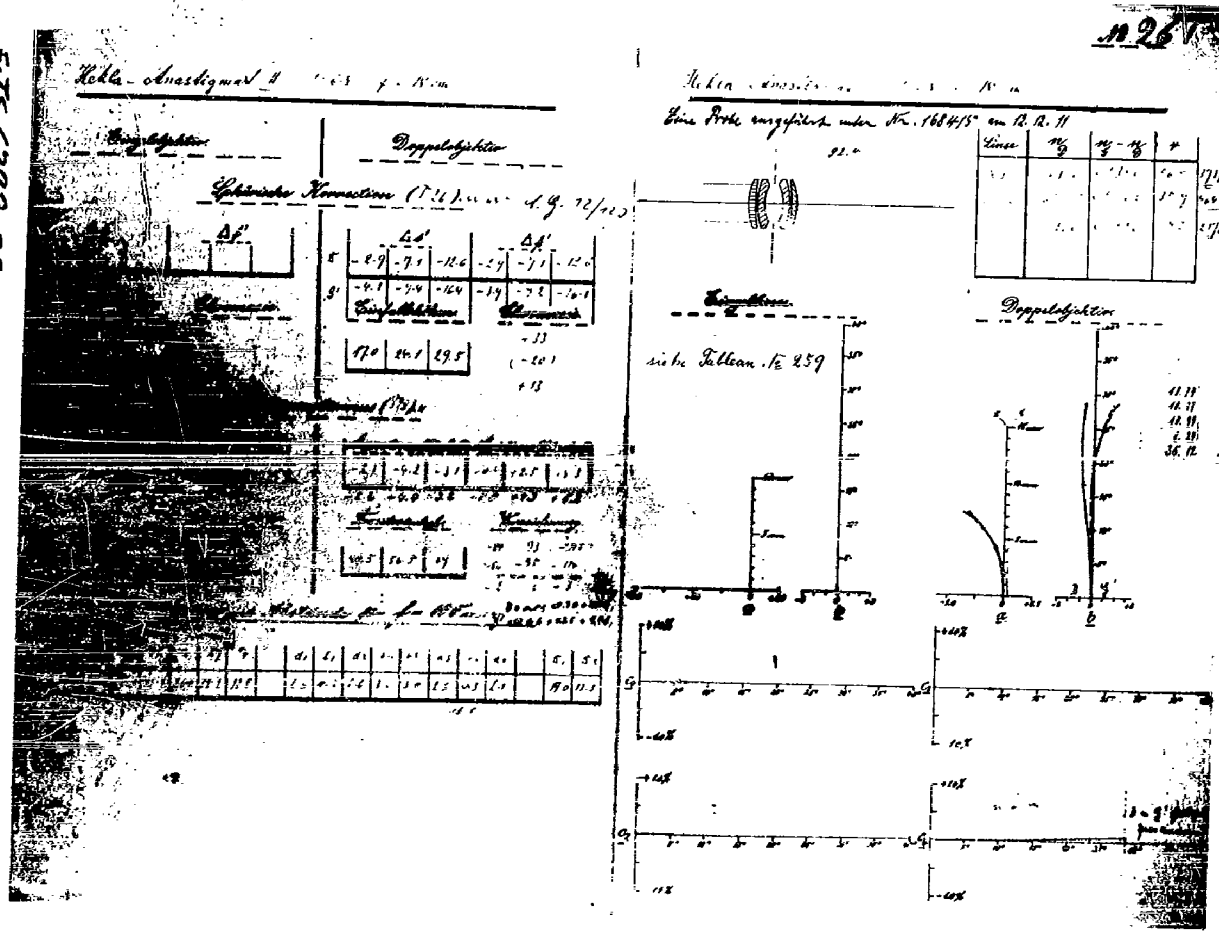
F-TS-6398-RE

1112



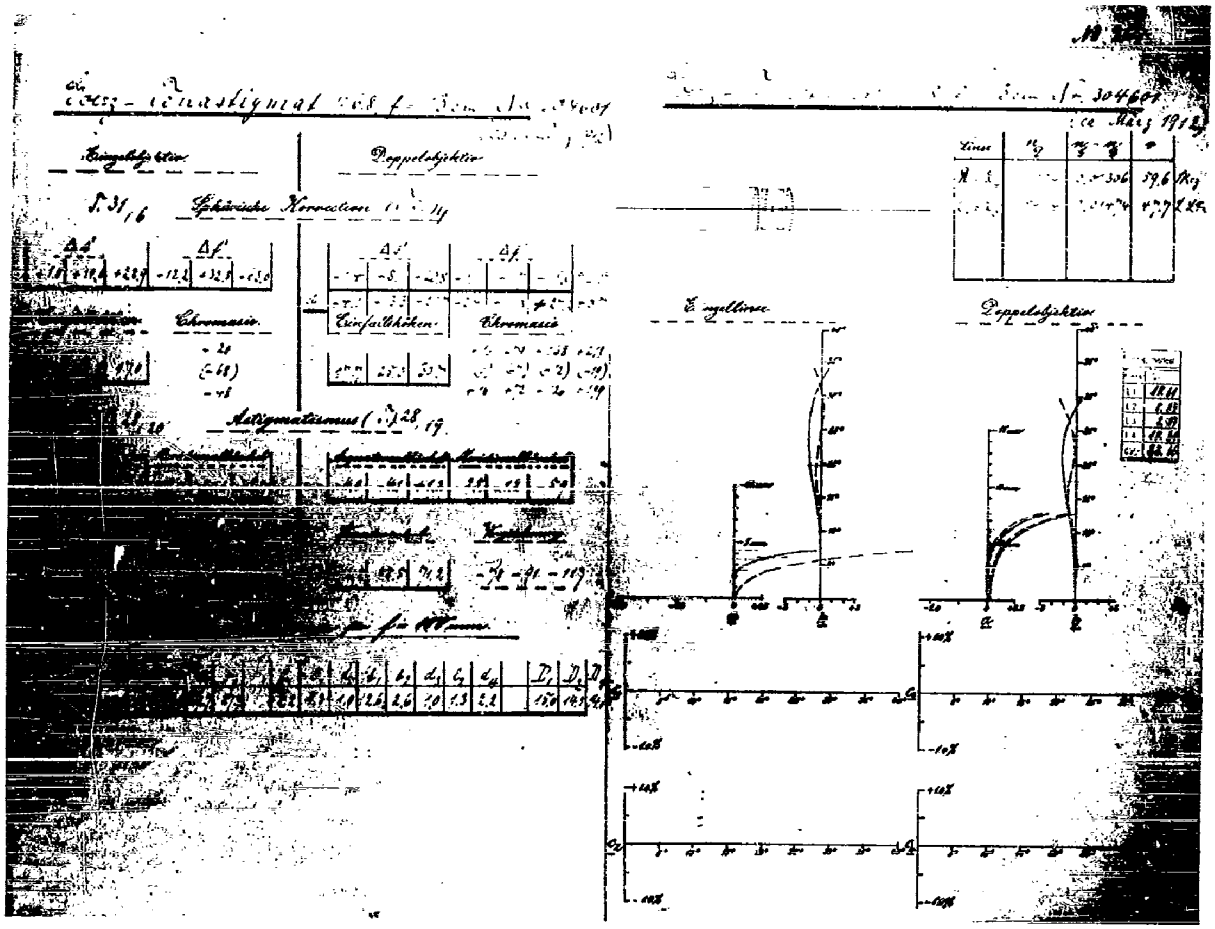
F-TS-6398-RE

1113



F-TS-6388-RF

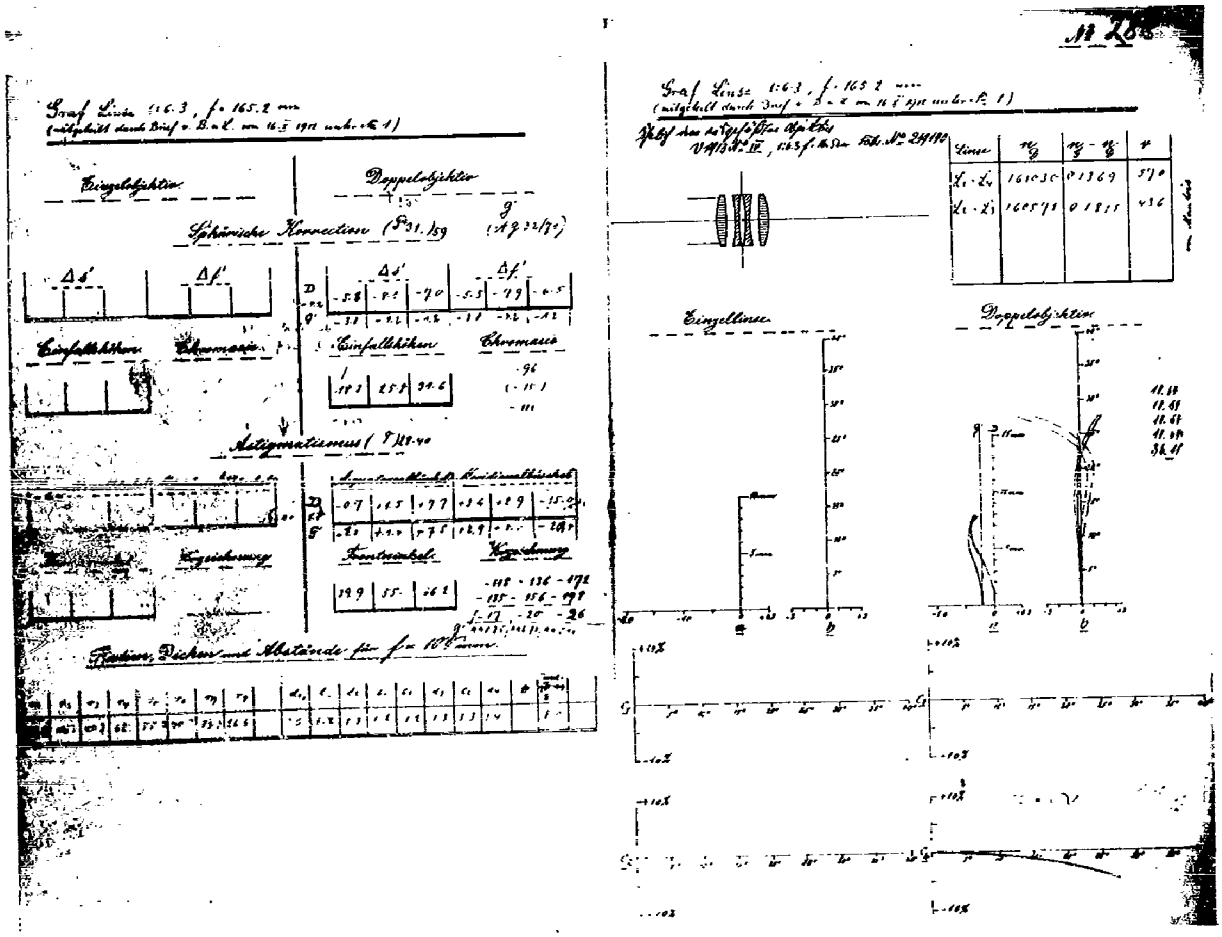
1114



1114

F-TS-6388-RF

1115



F-TS-6388-RE

1116

Abschrift

Zeiss Linse 1:6.3, f. 165.2 mm
(mitgeteilt durch Brief vom 8. 2. 39 mit Anl. Nr. 1)

Einzellinse | Doppelobjektiv

Sphärische Korrektion (Öffnung)

Einzellinse Δs'	Einzellinse Δf'	Doppelobjektiv Δs'		Doppelobjektiv Δf'	
		-5.6	-8.1	-7.0	-5.5	-7.9	-6.5

Einfallhöhen | Ebenmaß

Einzellinse Einfallhöhen	Einzellinse Ebenmaß	Doppelobjektiv Einfallhöhen	Doppelobjektiv Ebenmaß
		18.3	15.8	13.6	-76 (-15) -111

Astigmatismus (Öffnung)

Einzellinse Sagittenunterschied	Einzellinse Meridianunterschied	Doppelobjektiv Sagittenunterschied	Doppelobjektiv Meridianunterschied
		-0.7	+2.5	-2.7	+3.6	+2.9	-5.0

Verzeichnung | Koma | Verzeichnung

Einzellinse Koma	Doppelobjektiv Koma	Doppelobjektiv Verzeichnung
39.9	55.0	66.1	-111 -135 -97	-135 -156 -80	-172 -198 -26

Rechnung Dicken und Abstände für f = 100 mm

s' 94

Abschrift

Zeiss Linse 1:6.3 / 165.2 mm
(mitgeteilt durch Brief vom 8. 2. 39 mit Anl. Nr. 1)

Linse	n_g	$n_g - n_g'$	ν
$f_1 = f_4$	1.61030	0.01369	57.0
$f_2 = f_3$	1.60570	0.01815	43.6

Einzellinse | Doppelobjektiv

Blatt 111

1117

F-TS-6388-RE

Zeiss Doppelanastigmat Tessar 1:6.3 f = 165 mm Nr. 232412

Einzellinse | Doppelobjektiv

Sphärische Korrektion (Öffnung) 3 – 5

Einzellinse Δs'			Einzellinse Δf'			Doppelobjektiv Δs'			Doppelobjektiv Δf'		

Einfallhöhen | Ebenmaß

Einzellinse Einfallhöhen	Einzellinse Ebenmaß	Doppelobjektiv Einfallhöhen	Doppelobjektiv Ebenmaß

Astigmatismus (Öffnung) 32 – 20

Einzellinse Sagittenunterschied	Einzellinse Meridianunterschied	Doppelobjektiv Sagittenunterschied	Doppelobjektiv Meridianunterschied

Verzeichnung | Koma | Verzeichnung

Einzellinse Koma	Doppelobjektiv Koma	Doppelobjektiv Verzeichnung

Rechnung Dicken und Abstände für f = 100 mm

Blatt 297

F-TS-6388-RE

1117

Zeiss Doppelanastigmat Tessar 1:6.3 f = 165 mm Nr. 232412

Linse	n_g	$n_g - n_g'$	ν
$f_1 = f_4$	1.61039	0.01369	57.6
$f_2 = f_3$	1.60593	0.01838	43.0
$f_5 = f_6$	1.51633	0.00753	60.5

Einzellinse | Doppelobjektiv

.11315

F-TS-6398-RE

1116

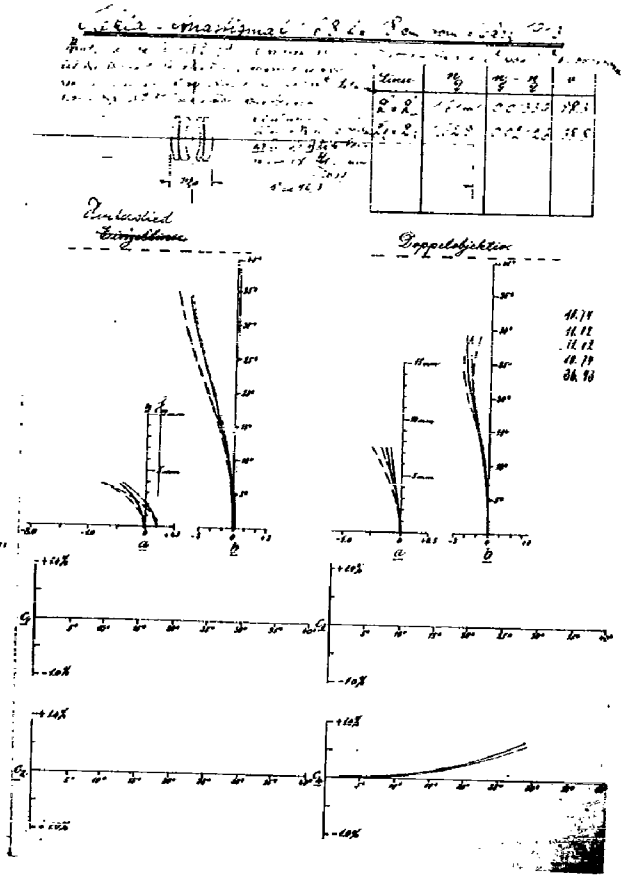
Hekla - Anastigmat 1:6,8 f= 18 cm

Einzelglied | Doppelobjektiv

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f= 100 mm



1117

.11329

F-TS-6398-RE

1119

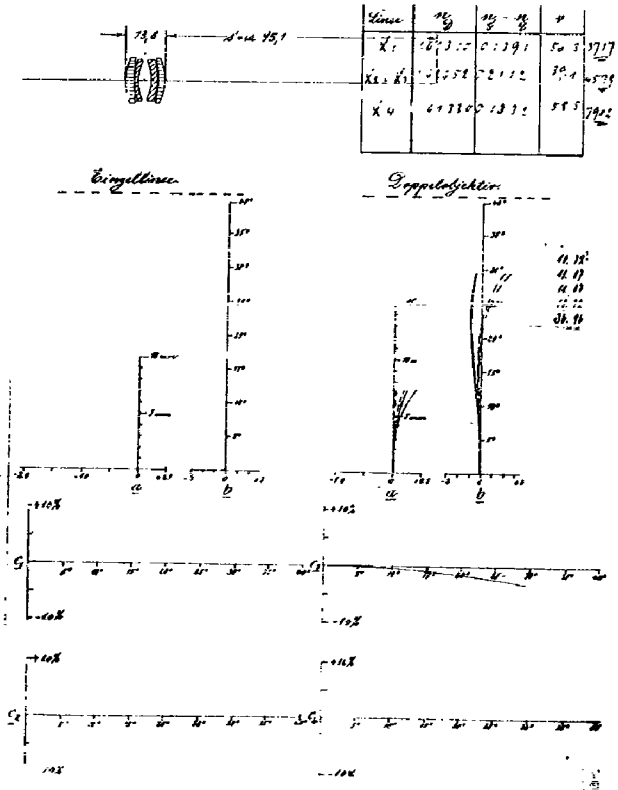
Hekla - Anastigmat 1:6,8 f= 18 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

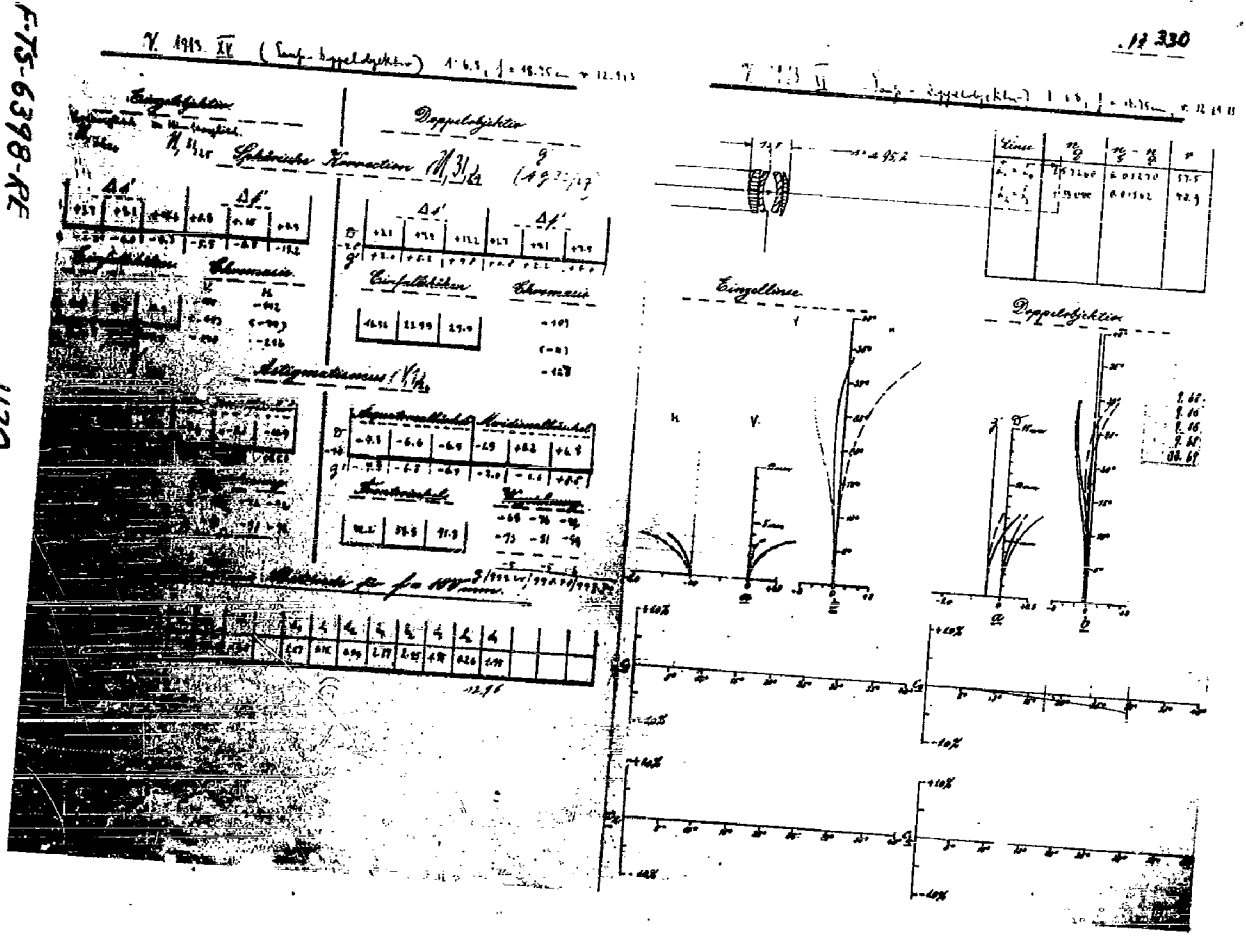
Astigmatismus

Radien, Dicken und Abstände für f= 100 mm



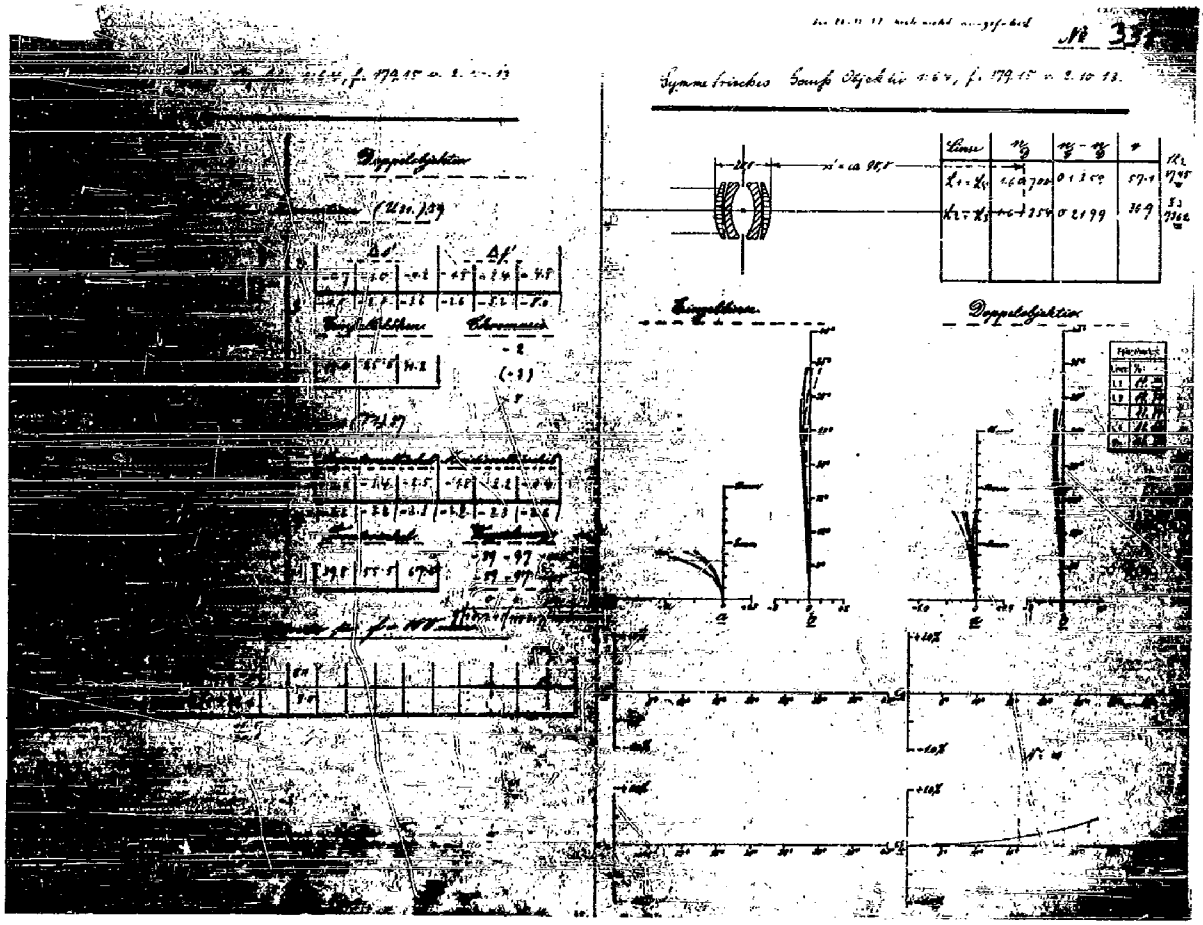
F-TS-6398-RE

1120



F-TS-6398-RE

11211



F-TS-6398-RE

1122

332

Einzelobjektiv — Doppelobjektiv

Sphärische Konvexion (Ksph).

Einfallshöhen — Chromasie

Astigmatismus (Ast).

Tangentialbüschel — Meridionalbüschel — Sagittalbüschel — Koma — Verzeichnung

Reflexe, Dicken und Abstände für f = 100 mm

Einzellinse — Doppelobjektiv

F-TS-6398-RE

1123

V. 1913 XII, 1:6·3, f = 18 cm, v. 15. X. 13

Einzelobjektiv (Hinterglas) — Doppelobjektiv

Sphärische Konvexion (Ksph).

Einfallshöhen — Chromasie

Astigmatismus (Ast).

Tangentialbüschel — Meridionalbüschel — Sagittalbüschel — Koma — Verzeichnung

Reflexe, Dicken und Abstände für f = 18 cm

338

V. 1913 XII 1:6·3 f = 18 cm v. 15. X. 13

Linse — r_g — $r_g - r_y$ — v

Einzellinse — Doppelobjektiv

F-TS-6378-RE

11.71

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f.d.C.)

Δs'	Δf'

Einfallshöhen	Chromasie

Astigmatismus (f.d.C.)	
Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	Sk	ek	qk
83.4	∞	73.9	44	45.5	33.9	∞	83.4	17	1.7	1.8	2.4	7.0	2.9	1.7	8.7	17.	15.	13.

Einzellinse | Doppelobjektiv

Linse	n_g	$n_g - n_g'$	ν
K1			
K2			
K3			
K4			

F-TS-6398-RE

11.71

Chroplast 1:4.5, 57 m Fr. Stollenwerk, München Nr. V5994

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f.d.C. 587,6 g)

Δs'	Δf'

Einfallshöhen	Chromasie

Astigmatismus (f.d.C. 587,6 g)	
Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	Sk	ek	qk
122	49.2	31.9	18.2	18.3	31.0	49.2	122	4.6	1.6	3.4	4.1	6.2	3.6	2.4	3.0	4.8	4.8	4.0	4.0	4.0	4.0	4.0	4.0

Chroplast 1:4.5, 57 m Fr. Stollenwerk, München Nr. V5994

Einzellinse | Doppelobjektiv

F-TS-6398-RE

1126

Sonnar-Objektiv 1:2 f=205 mm mit 14 sphärischen Flächen
Zentral-Zeiss für Optik-Abteilung 1935 Rist

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AB 14)

Δs'			Δf'		
+1,6	+1,5	+1,1	-2,0	-1,5	-1,5

Einfallshöhen | Chromasie

17,5	14,5	12,1

Astigmatismus ( )

Äquatorialbüschel	Meridionalbüschel				

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

s	r1	r2	r3	r4	r5	r6	r7	r8	r9	r10
10,4	6,4	28,5	19,2	21,5	1,9	0,2	1,6	6,2	2,1	

Sonnar-Objektiv 1:2 f=205 mm mit 14 sphärischen Flächen (E 44)
Zentral-Zeiss für Optik-Abteilung 1935 Rist

Linse	n_D	$n_F - n_D$	ν
L_1	1,6031		
L_2	1,6133		
L_3	1,7467		

Einzellinse | Doppelobjektiv

1126

F-TS-6398-RE

1127

Riss Homocentric Lens 1:5,6 f=10 mm Rechn. v. 4.36

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AB 26,1)

	Δs'			Δf'		
0	+2,4	+4,8	+7,2	+9,6	+9,8	+4,9
g'	+1,2	+2,4	+3,6	+4,8	+2,4	+1,2

Einfallshöhen | Chromasie

31,9	29,5	26,1

Astigmatismus (AB 12,1)

Äquatorialbüschel	Meridionalbüschel				
-2,2	-4,1	-5,9	-4,1	-2,3	-1,8
-1,1	-2,1	-3,2	-2,1	-1,1	-0,6

Frontwinkel | Vorzeichnung

31,1	59,1	67,5

Radien, Dicken und Abstände für f = 100 mm:

s	r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16
4,0	14,0	32,5	19,0	44,0	42,0	23,0	33,0	5,2	0,0	2,1	1,6	8,6	3,1	1,0	1,2	7,1

Riss Homocentric Lens 1:5,6 f=10 mm Rechn. v. 4.36

Linse	n_D	$n_F - n_D$	ν
$L_1 \cdot L_2$	1,6111		58,0
$L_3 \cdot L_4$	1,7005		55,1

Einzellinse | Doppelobjektiv

F.-Z.-6398-RE

1128

Genf - Objektiv 1:11,3 f. 210 mm mit 11 sphärischen Flächen (E. 171)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d B P W) o

Δs'			Δf'		
+3.6	+3.5	+4.6	-5.9	-15.4	-27.5

Einfallshöhen | Chromasie

44.2	44.5	47.7

Δs'		Δf'	

Einfallshöhen | Chromasie

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	d1	d2	d3	d4
42.1	100	42.1	2.9	4.6	2.7	4.4		

Genf Objektiv 1:11,3 f. 210 mm mit 11 sphärischen Flächen (E. 171)

Einbel-Zeichnung für Objektiv-Mechanik 1905, Nr. 15

Linse	n_g	$n_g - n_f$	ν
L_1	1.6014		
L_2	1.4967		

Einzellinse | Doppelobjektiv

	11.16	
	3.22	
	17.12	

11.9.

F.-Z.-6398-RE

1129

Nr 605

A.R.P 401 650

Symmetr. Objektiv 1:4,5, f. 180 mm v. Dr. Paul Rudolph v. 4.9.22 (Pat. D. 35110)

Einzelobjektiv | Doppelobjektiv

Sphär. Abw. Sphärische Korrection (d E P) 55

Δs'			Δf'		
-11.8	11.5	2.3	1.166	1.174	1.176

Einfallshöhen | Chromasie

31.9	32.1	32.2

Δs'			Δf'		
-11.4	162.5	1.157	-0.6	1.171	1.172

Einfallshöhen | Chromasie

56.5	76.6	119.0

Astigmatismus (d E) 55

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

				-4.7	5.7	7.5	5.5

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

32.2	32.0	32.0		16.6	16.5

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8
24.5	100	32.0	32.0	100	100	40.0	12.0	100	32.0	0.4	4.2	2.35	11.5	1.65	2.35	4.2	12.0

P_1 78.1 | P_2 52.2 | P_3 12.2

Symmetr. Objektiv 1:4,5, f. 180 mm v. Dr. Paul Rudolph v. 4.9.22 (Pat. D. 35110)

Linse	n_g	$n_g - n_f$	ν
$L_1 L_2 L_3$	1.621	1.014	60.3
$L_4 \cdot L_5$	1.743	1.015	49.3

Einzellinse | Doppelobjektiv

Einzelobjektiv 1:2,4, f. 115 mm ... Pat. mit f. 186 mm angegeben

	11.92	
	3.62	
	4.38	
	1.62	
	11.92	
	36.67	

11.9.

F-TS-6398-RE

1130

№ 676

Einzellinse

Doppelobjektiv

Einzellinse

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen Chromasie

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

1130

F-TS-6398-RE

13.1

№ 677

Einzellinse

Doppelobjektiv

Einzellinse

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen Chromasie

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6398-RE

11132

№ 678

Einzellinse

Doppelobjektiv

Einzellinse

Doppelobjektiv

11134

F-TS-6398-RE

11133

№ 771

Einzellinse

Doppelobjektiv

F-TS-6398-RE

11134

K 805

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Δs' — Δf'

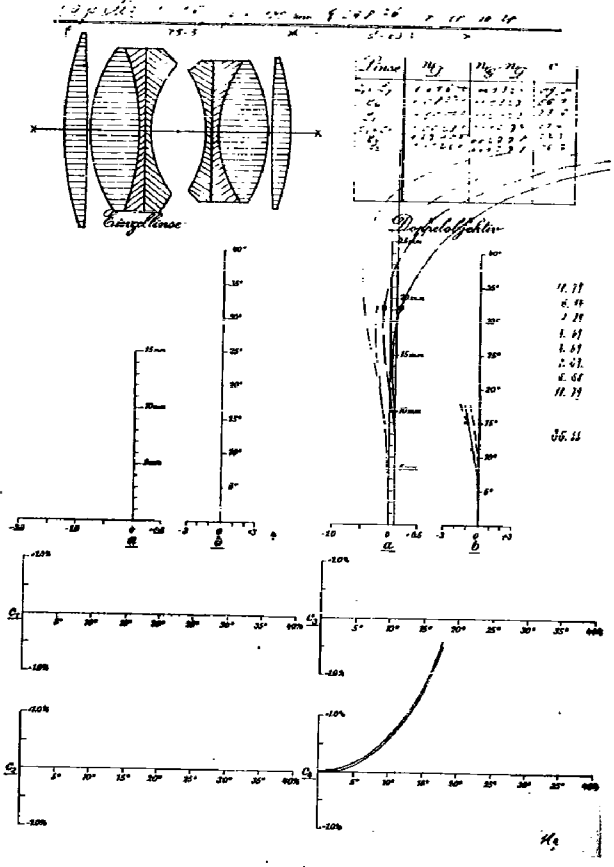
Einfallshöhen — Chromasie

Astigmatismus

Aequatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



11134

K 870

F-TS-6398-RE

11135

Gallus - Objektiv 1 : x - f = 16.2 cm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Δs' — Δf'

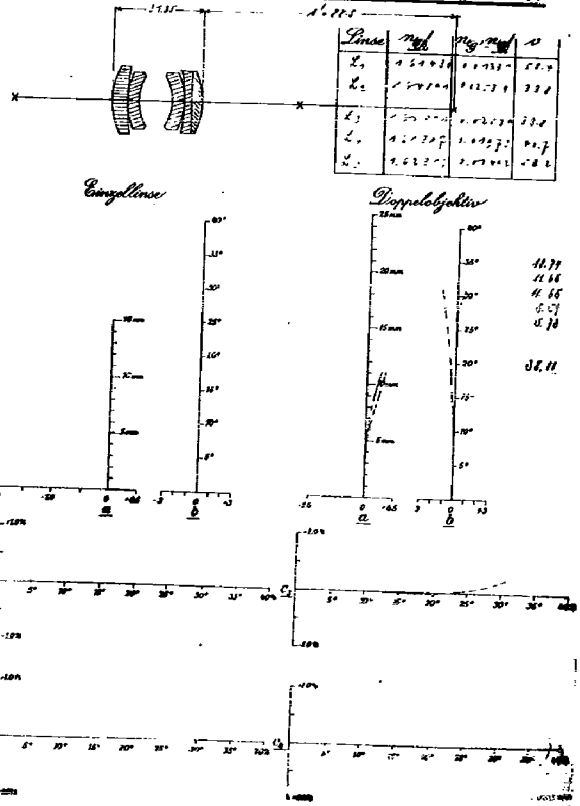
Einfallshöhen — Chromasie

Astigmatismus

Aequatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



F-Ts-6398-RE

1137

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

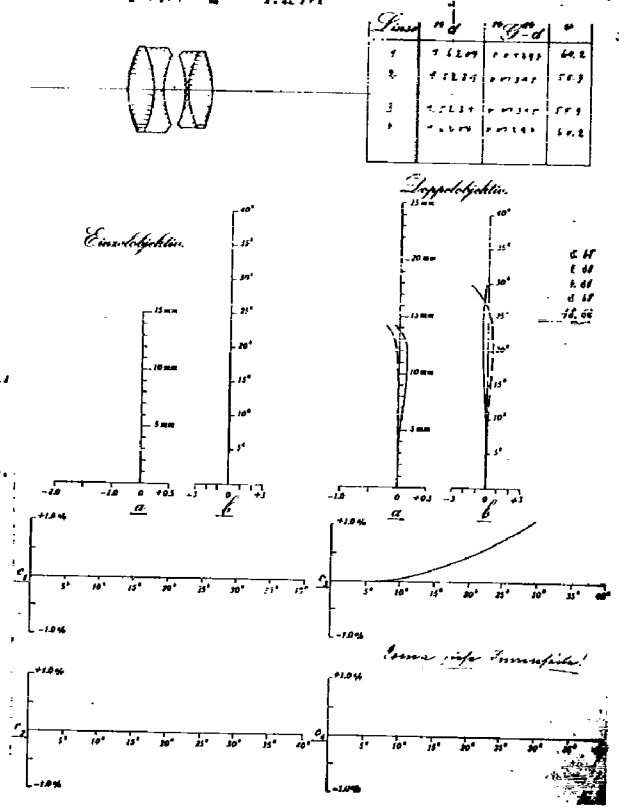
Einfallsblenden. | Chromasie.

Astigmatismus

Tangentialwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung.

Radien, Dicken und Abstände für $f = 100$ mm.



1141

№ 960

F-Ts-6396-RE

1136

Neue Protarlinse $f = 35$ cm Serie III

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallsblenden | Chromasie

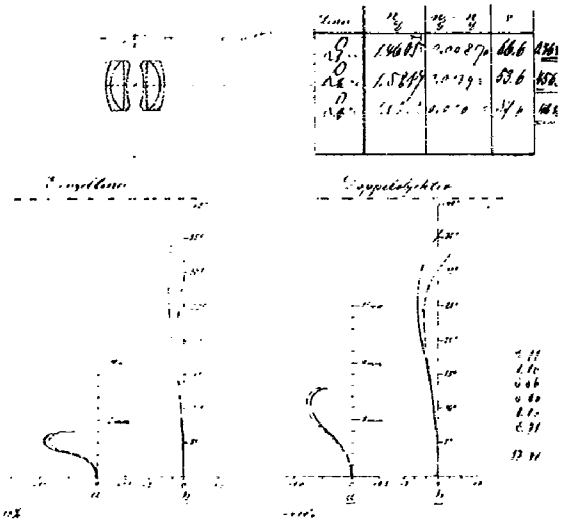
Astigmatismus

Tangentialwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Neue Protarlinse $f = 35$ cm Serie III



F-TS-6388-RE

1138

Apo-Ronar 1:9 f=105 mm v. 26.10.33

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (f 0,7 mm)

Δs' | Δf' | Einfallslichten | Chromasie

Astigmatismus (f 0,7 mm)

Sagittenfehler | Meridianfehler | Fernsichtbl. | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse | n_d | $n_F - n_d$ | ν

Einzelobjektiv. | Doppelobjektiv.

1139

F-TS-6389-RE

Sphärische Korrektion (f 0,7 mm)

Δs' | Δf' | Einfallslichten | Chromasie

Astigmatismus (f.

Sagittenfehler | Meridianfehler | Fernsichtbl. | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Kapella 1:2,8 f=10 cm

Linse | n_d | $n_F - n_d$ | ν

Einzelobjektiv. | Doppelobjektiv.

F-TS-6398-RE

11440

N 360

Tessar 1:4,5 15 cm, [illegible] mit Fernbaulinse

-3 D Zeiss-Tessar

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Tg.-St.)

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus (Tg.-St.)

Aequatorialbüschel hell	Aequatorialbüschel dunkel	Meridionalbüschel

Trennungswinkel | Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse	n_D	$n_F - n_C$	r

Einzellinse | Doppelobjektiv

a | b

+10% | -10%

n = ∞

F-TS-6398-RE

11441

N 362

Tessar 1:4,5 15 cm, [illegible] mit Fernbaulinse

-3 D Zeiss-Tessar

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Tg.-St.)

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus (Tg.-St.)

Trennungswinkel | Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse	n_D	$n_F - n_C$	r

Einzellinse | Doppelobjektiv

a | b

+10% | -10%

n = ∞

№ 361

F-75-6398-RE

1142

Tessar 1:6,3 13,5 cm in Compur mit Vorsatzlinse
– 3D Scheuer

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Tg.-)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Tg.-)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:6,3 13,5 cm in Compur mit Vorsatzlinse
– 3D Scheuer

Linse	n_g	$n_g - n_F$	r

Einzellinse | Doppelobjektiv

№ 363

F-75-6398-RE

1143

Tessar 1:6,3 13,5 cm in Compur mit Vorsatzlinse
– 3D Prototyp

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Tg.-)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Tg.-)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

Tessar 1:6,3 13,5 cm in Compur mit Vorsatzlinse
– 3D Prototyp

Linse	n_g	$n_g - n_F$	r

Einzellinse | Doppelobjektiv

№ 366

F-TS-6398-RE

1944

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (T. zu).

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

Astigmatismus (T. zu).

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Feldwinkel | Kennzeichnung | Feldwinkel | Kennzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_d | $n_F - n_C$ | v

Einzellinse | Doppelobjektiv

№ 365

F-TS-6398-RE

1944

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (T. zu).

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

Astigmatismus (T. zu).

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Feldwinkel | Kennzeichnung | Feldwinkel | Kennzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_d | $n_F - n_C$ | v

Einzellinse | Doppelobjektiv

№ 364

F-75-6388-RE

1146

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Öffnung)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Öffnung)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontneigung | Bezeichnung | Frontneigung | Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_F$ | ν

Einzellinse | Doppelobjektiv

№ 369

F-75-6388-RE

1147

Gesamtbrennweite f = 261.7

Einzel | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontneigung | Bezeichnung | Frontneigung | Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_F$ | ν

Einzellinse | Doppelobjektiv

F-TS-6398-RE

1148

Tessar 1:4,5 15 cm mit Tonnenlinse - 3 dpt
(Schwarzes Prüfblatt)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ($T'_s - s'$)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie

Astigmatismus ($T'_t - s'$)

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel

Einzelobjektiv Frontzirkel	Einzelobjektiv Kreuzeichnung	Doppelobjektiv Frontzirkel	Doppelobjektiv Kreuzeichnung

Radien, Dicken und Abstände für f = 100 mm

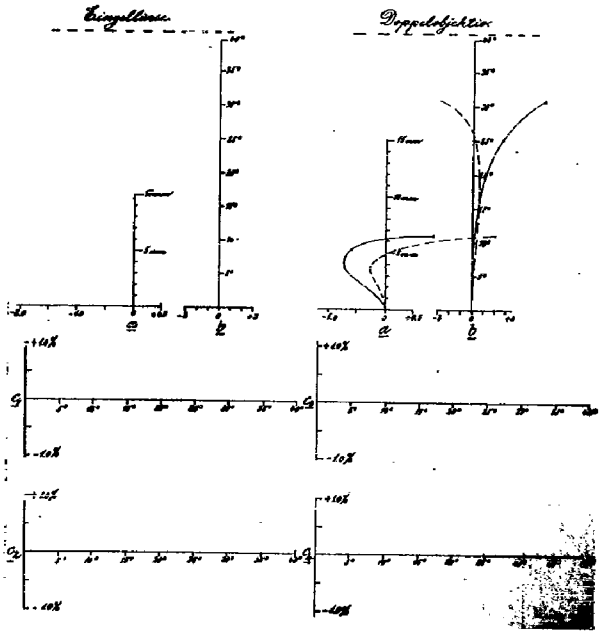
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_{01}	L_{01}	d_{12}	L_{12}	d_{23}	L_{23}	d_{34}	L_{34}	d_{45}	L_{45}	d_{56}
68.3	224	13.8	∞	17.2															

N 375

Tessar 1:4,5 15 cm mit Tonnenlinse - 3 dpt
(Schwarzes Prüfblatt) 6:1 Übersetzung 6:1,2 L

Linse	n_g	$n_g - n_r$	ν

Einzellinse | Doppelobjektiv



1148

F-TS-6398-RE

Tessar 1:4,5 15,5 cm mit Tonnenlinse
- 3 D Ostwald (Abänderung von Zeichnung Nr. 357)

Linse der Tonnenlinse 3 D

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ($T'_s - s'$)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie

Astigmatismus ($T'_t - s'$)

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel

Einzelobjektiv Frontzirkel	Einzelobjektiv Kreuzeichnung	Doppelobjektiv Frontzirkel	Doppelobjektiv Kreuzeichnung

Radien, Dicken und Abstände für f = 100 mm

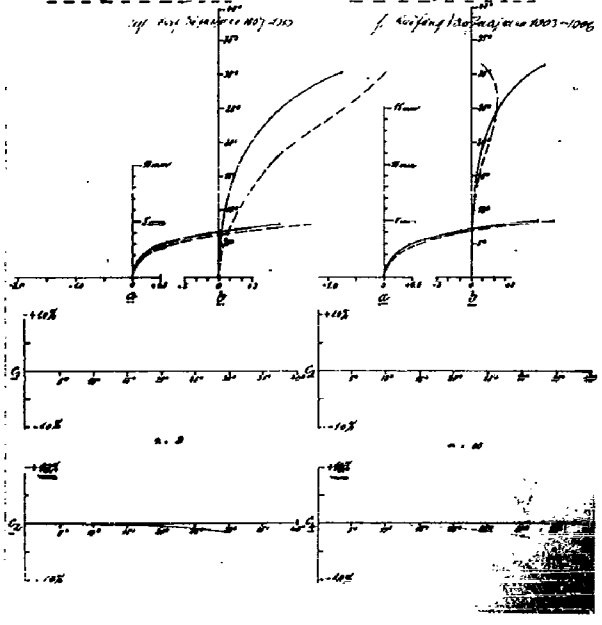
N 357

Tessar 1:4,5 15,5 cm mit Tonnenlinse
- 3 D Ostwald (Abänderung von Zeichnung Nr. 357)

Linse	n_g	$n_g - n_r$	ν

Linse der Tonnenlinse 3 D

Einzellinse | Doppelobjektiv



F-75-6378-RE

1150

Tessar f = 3 1:5 cm [illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f = 3)

Δs'	Δf'

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie

Astigmatismus (f = 3)

Aequatorealbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung

Aequatorealbüschel	Meridionalbüschel

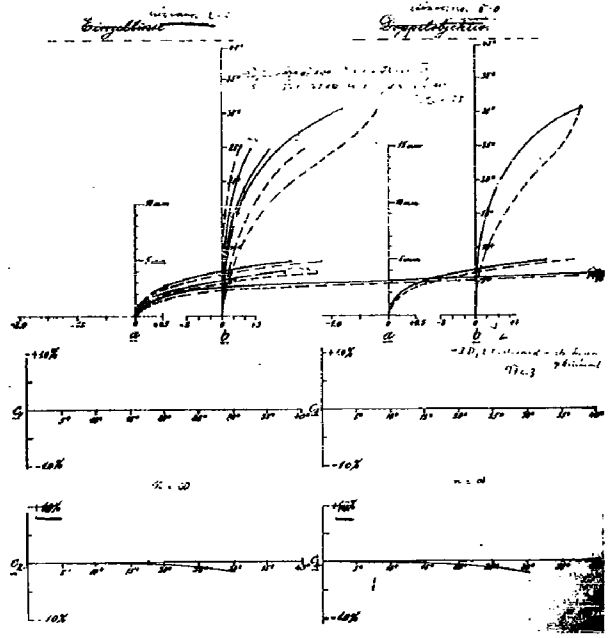
Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Tessar f = 3 1:5 cm [illegible]

Linse	n_d	$n_F - n_C$	ν

Einzellinse | Doppelobjektiv



F-75-6398-RE

1151

Tessar und Tessar 1:6,3, 50 cm, v. 1 II 11, N° 369 [illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f = 12)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'		Δf'	
0	12.5	22.2	26.8	17.9	32.0	43.2
40						
g'	11.9	11.0	28.9	10.0	29.0	32.1

Einfallshöhen	Chromasie
22.5	48.4	47.9	- 5.9 s - 2.2 s' - 3.9 t

Astigmatismus (f = 12)

Frontwinkel	Verzeichnung

Aequatorealbüschel	Meridionalbüschel
-5.5	-5.1	11.35	6.59	11.34	10.26

Frontwinkel	Verzeichnung
38.5	46.9	52.9	1.44.9 11.57.6 10.12.70

Radien, Dicken und Abstände für f = 100 mm

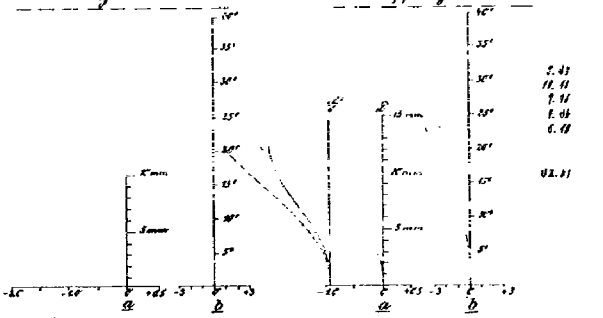
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9
43.5	43.6	22.2	∞	10.6	24.6	2.82	21.4	9.3.3	3.9	0.39	n.d.	3.6	1.10	3.75	3.35	1.71	0.6

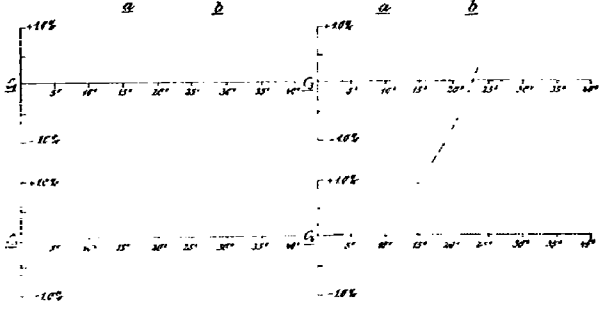
№ 628

Tessar und Tessar 1:6,3, 50 cm, v. 1 II 11, N° 369 944/45

Linse	n_d	$n_F - n_C$	ν
1	1.52110	0.01401	60.1
2	1.52107	0.01422	59.1
3	1.52230	0.00925	68.8
4	1.52700	0.01350	56.9
5	1.52162	0.01394	56.1

Einzellinse | Doppelobjektiv





№627

F-TS-6398-RE

11152

Tessar 1:4,5, 15 cm, № 20.11.11, λ = 370 – 700

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (18° cm)

Δs'	Δf'

	Δs'			Δf'	
	-16.1	-12.0	-10.3	-12.8	-4.5	-5.12
	-16.2	-23.1	-22.9	-24.3	-3.5	-2.7

Einfallshöhen | Chromasie

36.2	52.0	65.6

-454
(+419)
-335

Astigmatismus (18°/m)

Aequatorialbruchst.	Meridionalbruchst.

Aequatorialbruchst.			Meridionalbruchst.		
-1.95	-1.89	-1.50	-4.92	-3.73	-1.89

Frontwinkel | Vorzeichnung

34.30	50.10	62.00

100.17 | 119.85 | 109.29

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8	d9
83.8	18.0	33.6	∞	98.0	5.6	223.6	38.4	14.6	3.29	1.3	5.95	4.6	2.53	0.95	1.8	2.24	7.2

Tessar 1:4,5, 15 cm, № 20.11.11, λ = 370 – 700

Linse | n_g | $n_g - n_b$ | ν

1	52.4	0.0110	57.1
2	1.6	0.0133	57.1
3	1.6	0.0111	44.6
4	1.6	0.0139	51.6
5	1.6	0.0100	57.1

Einzellinse | Doppelobjektiv

E. 11
E. 11
E. 11
E. 11
E. 11

42.11

a | b | a | b

+10% | -10% | +10% | -10%

11154

№379

F-TS-6398-RE

11153

Tessar 1:4,5, 15 cm mit Distarlinse – 3,5 dpt. Distar.

Linse = 16,7 h

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (18°/m)

Δs'	Δf'

	Δs'			Δf'	
	-9.5	-12.0	-14.5	-17.0	-19.7	-22.5

Einfallshöhen | Chromasie

17.5	16.1	11.3

Astigmatismus (18°/m)

Aequatorialbruchst.	Meridionalbruchst.

Aequatorialbruchst.			Meridionalbruchst.		
-1.5	-2.1	-2.03	-2.8	-2.5	-2.3

Frontwinkel | Vorzeichnung

+3.4	0.1	-5.4

-14 -16 -19
-71 -81 -105
-19 -47 -111

Radien, Dicken und Abstände für f = 100 mm:

Tessar 1:4,5, 15 cm mit Distarlinse – 3,5 dpt. Distar.

Linse = 16,7 h

Linse	n_g	$n_g - n_b$	ν

Einzellinse | Doppelobjektiv

a | b | a | b

+10% | -10% | +10% | -10%

F-75-6378-AE

1154

Tessar 1:4,5 15 cm (vorm. Zeiss Jena) mit Vorsatzlinse
-3 D Frankfurt

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Zeiss)

Δs' | Δf' | Δs' | Δf'

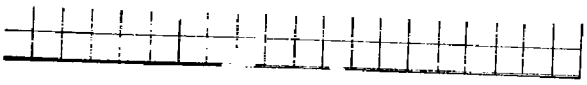
Einfallshöhen | Ehrenmasse | Einfallshöhen | Ehrenmasse

Astigmatismus (Zeiss)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

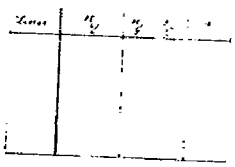
Frontwinkel | Vorzeichen | Frontwinkel | Vorzeichen

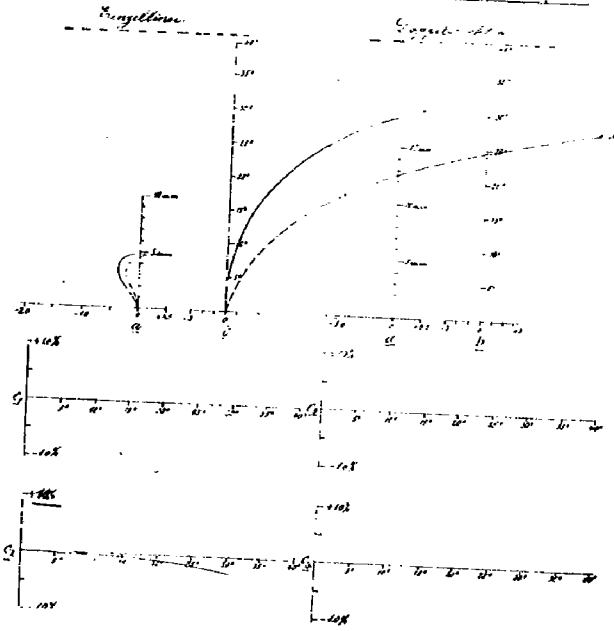
Radien, Dicken und Abstände für f = 100 mm



N 359

Tessar 1:4,5 15 cm (vorm. Zeiss Jena) mit Vorsatzlinse
-3 D Frankfurt





F-75-6378-AE

1155

Tessar 1:4,5 15 cm (vorm. Zeiss Jena) mit Vorsatzlinse
-3 D Frankfurt

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Zeiss)

Δs' | Δf' | Δs' | Δf'

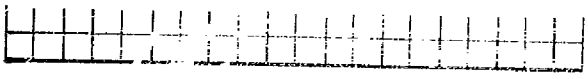
Einfallshöhen | Ehrenmasse | Einfallshöhen | Ehrenmasse

Astigmatismus (Zeiss)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

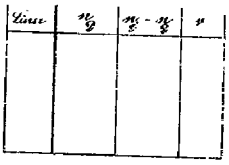
Frontwinkel | Vorzeichen | Frontwinkel | Vorzeichen

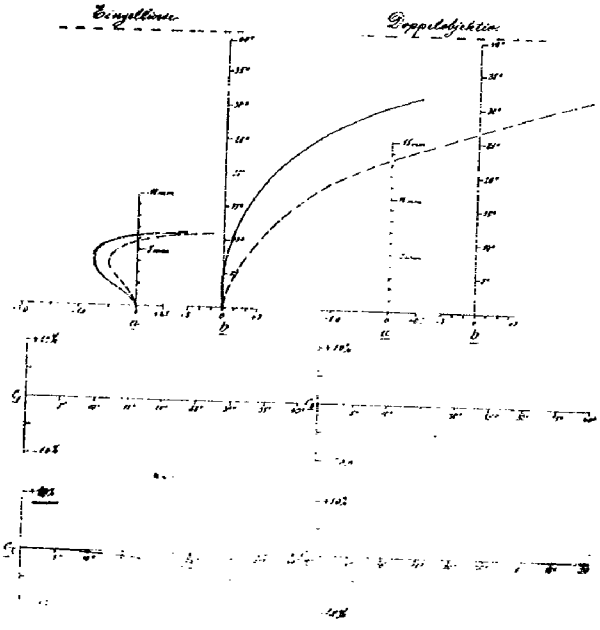
Radien, Dicken und Abstände für f = 100 mm



N 358

Tessar 1:4,5 15 cm (vorm. Zeiss Jena) mit Vorsatzlinse
-3 D Frankfurt





N 356

F-75-6356-RE

Tessar 1:2,8 f=15 cm (f=14,7 cm) mit Tonnenblende
– 3 D Zeiss

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs', Δf')

Δs' | Δf' | Δs' | Δf'

Eintrittspupille | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Δs')

Äquatorialwinkel | Meridionalwinkel | Äquatorialwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_F$ | ν

Einzellinse | Doppelobjektiv

a | b | a | b

+10% | -10% | +10% | -10%

9511

1154

N 355

F-75-6356-RE

Tessar 1:2,8 f=15 cm (f=14,7 cm) mit Tonnenblende
– 3 D Zeiss

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs', Δf')

Δs' | Δf' | Δs' | Δf'

Eintrittspupille | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Δs')

Äquatorialwinkel | Meridionalwinkel | Äquatorialwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_F$ | ν

Einzellinse | Doppelobjektiv

a | b | a | b

+10% | -10% | +10% | -10%

9511

F-TS-6398-RE

1158

Einzellichter | Doppellichter

Sphärische Konvection

Δs' | Δf'

Einfallshöhen | Ebenmaass

Astigmatismus

Aequatorialwinkel | Meridionalwinkel

Frontwinkel | Kegelschnitt

Radius, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppellichter

a | b

F-TS-6398-RE

1159

Einzellichter | Doppellichter

Sphärische Konvection

Δs' | Δf'

Einfallshöhen | Ebenmaass

Astigmatismus

Aequatorialwinkel | Meridionalwinkel

Frontwinkel | Kegelschnitt

Radius, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppellichter

a | b

F-75-6398-RE

1160

Tessar f 4,5 15 cm mit Distanzlinse = 1,5 fache Zahn

Linse f = 45 cm vergl. Darstellung N. 1,2

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Taw.)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'		Δf'	
+0,3	+0,7	+1,5	-1,0	-1,5	+1,1

Einfallshöhen	Chromasie
20,3	18,7	17,4

Astigmatismus (17/17)

Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung

Aequatorialbüschel		Meridionalbüschel	
-2,1	+3,2	+2,8	+0,7	+0,5	+0,9

Frontwinkel		Verzeichnung	
19,6	17,1	14,3	-6,8 -6,6 -7,0
			-7,5 -8,3 -10,0
			-13 -17 -23

Radien, Dicken und Abstände für f = 100 mm

r	r₁	r₂	d	d₁	d₂	d₃	CH	D
5,19	34,5	5,40	2,25	0,15	0,15	0,—	1,5	5,0

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppelobjektiv

a | b

G_1 | G_2 | G_3

F-75-6398-RE

1161

C. P. Goerz, Zentrovenendes Vorderlinsensystem

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d, g, ν)

Δs'		Δf'	
+0,7	+0,4	+1,2	+1,5	+1,0	-1,2

Einfallshöhen	Chromasie
6,6	7,4	11,2	+2,4 (-3,5) +4,5

Δs'	Δf'

Einfallshöhen	Chromasie

Astigmatismus (17/17)

Aequatorialbüschel	Meridionalbüschel
+0,2	+0,5	+1,4	+1,0	+1,0	+0,5

Frontwinkel	Verzeichnung
19,0	17,2	16,1	

Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r	r₁	r₂	d	d₁	d₂	d₃	CH	D
5,19	34,5	5,40	2,25	0,15	0,15	0,—	1,5	5,0

Linse | n_g | $n_g - n_g$ | ν

Einzellinse | Doppelobjektiv

a | b

G_1 | G_2 | G_3

F-75-6398-RE

1162

DPA ° 13227. Optische Anstalt C. P. Goerz.

Eingereicht am 13. 10. 33.

~~Einzelobjektiv~~ ~~Doppelobjektiv~~

Sphärische Korrektion (-4 bis +4)

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus ( )

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Beispiel 5 Beispiel 6 Beispiel 7

DPA ° 13227. Optische Anstalt C. P. Goerz.

Eingereicht am 13. 10. 33.

Beispiele

~~Einzellinse~~ ~~Doppelobjektiv~~

F-75-6398-RE

1163

V 1935 Nr. 14 Vorschaltfernrohr + Tessar 1:3,5 f=7,5

~~Einzelobjektiv~~ ~~Doppelobjektiv~~

Sphärischer Korrektion (-4 bis +4)

Δs' Δf'

Einfallshöhen Chromasie

Astigmatismus ( )

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm. Tessar und Tessar

Tessar

V 1935 Nr. 14 Vorschaltfernrohr + Tessar 1:3,5 f=7,5

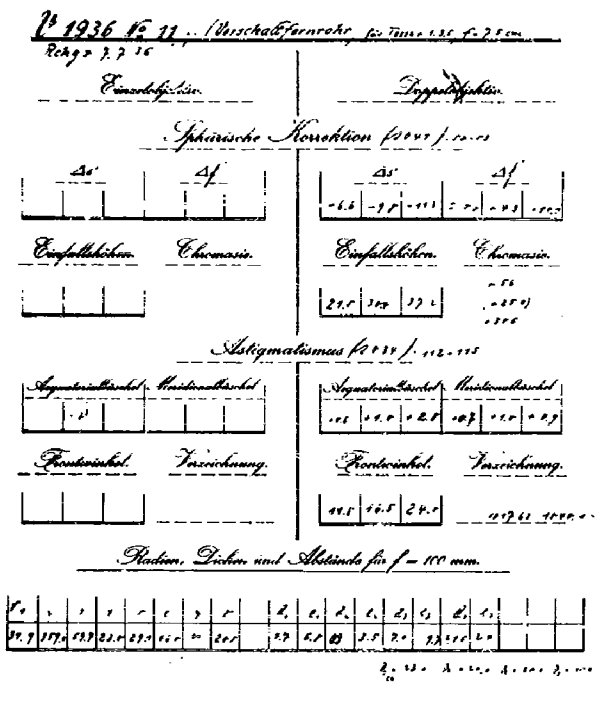
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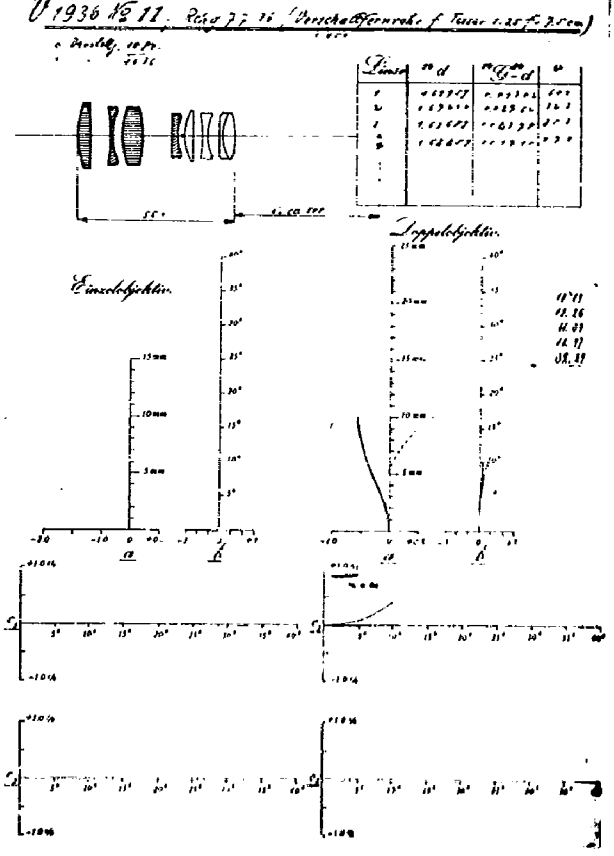
Einzelobjektiv

Doppelobjektiv

F-TS-6398-RE

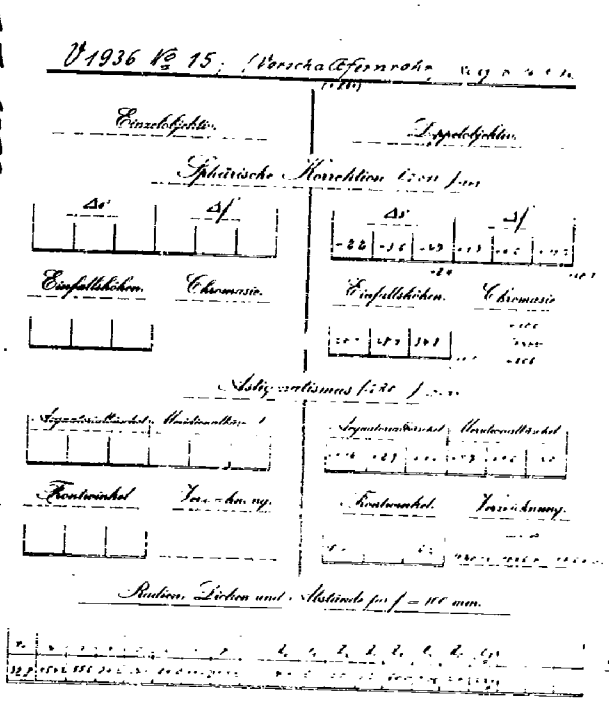
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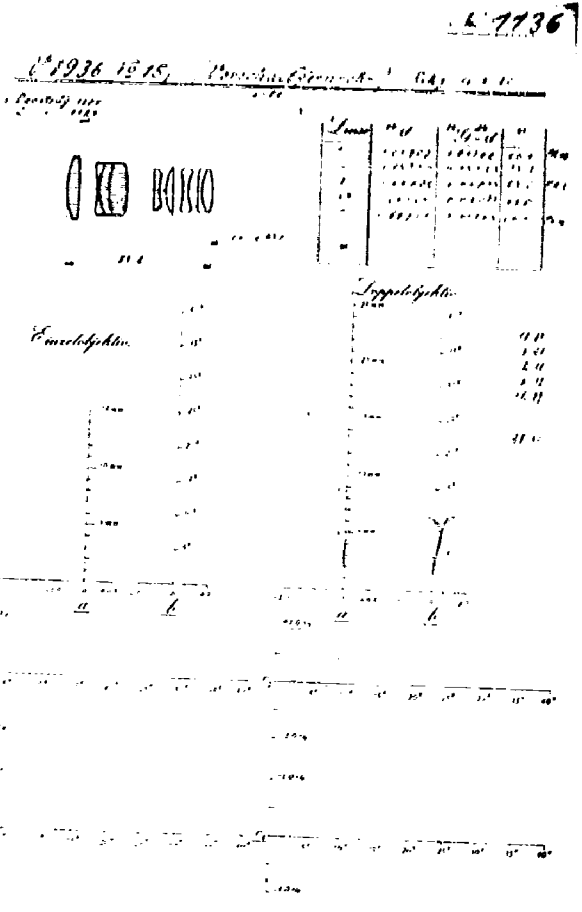




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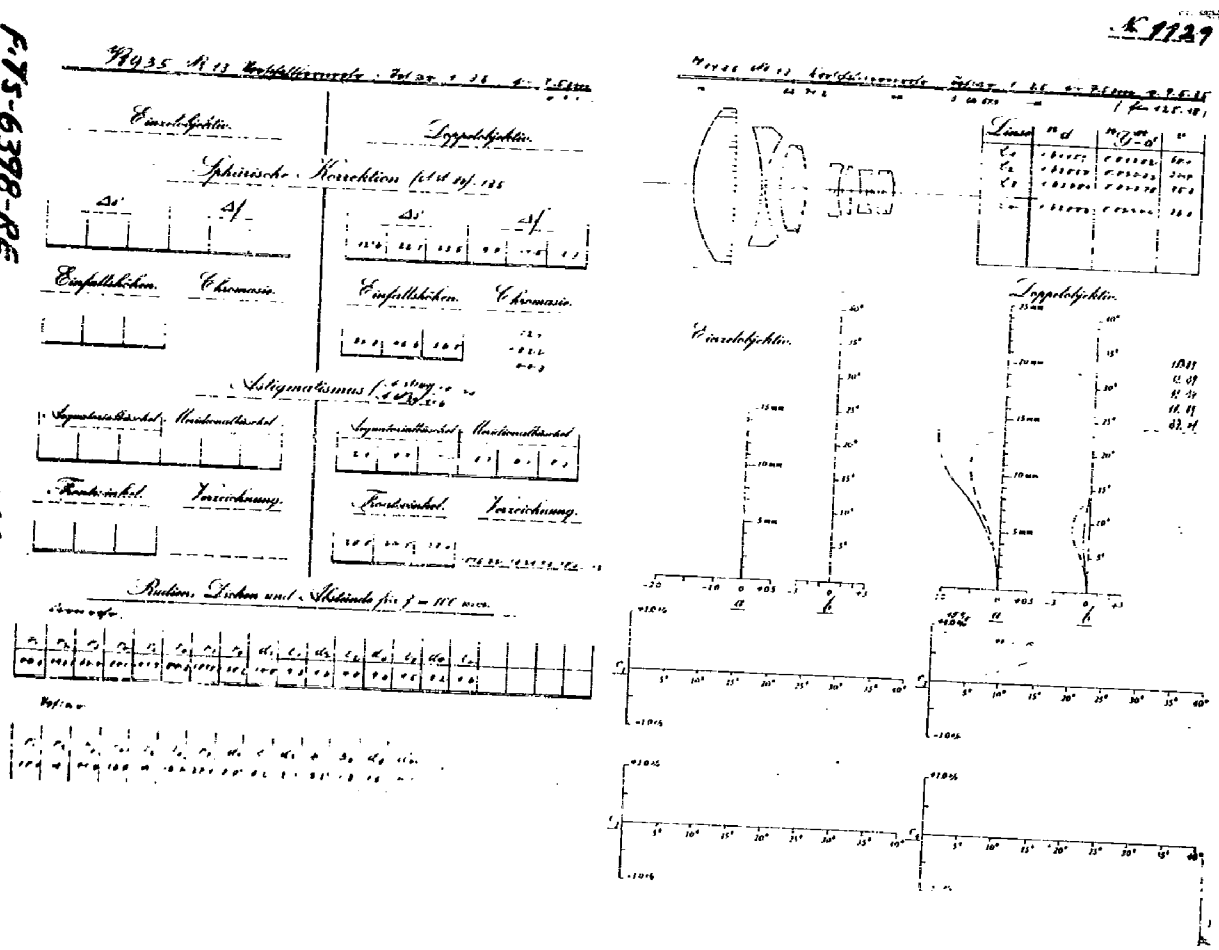
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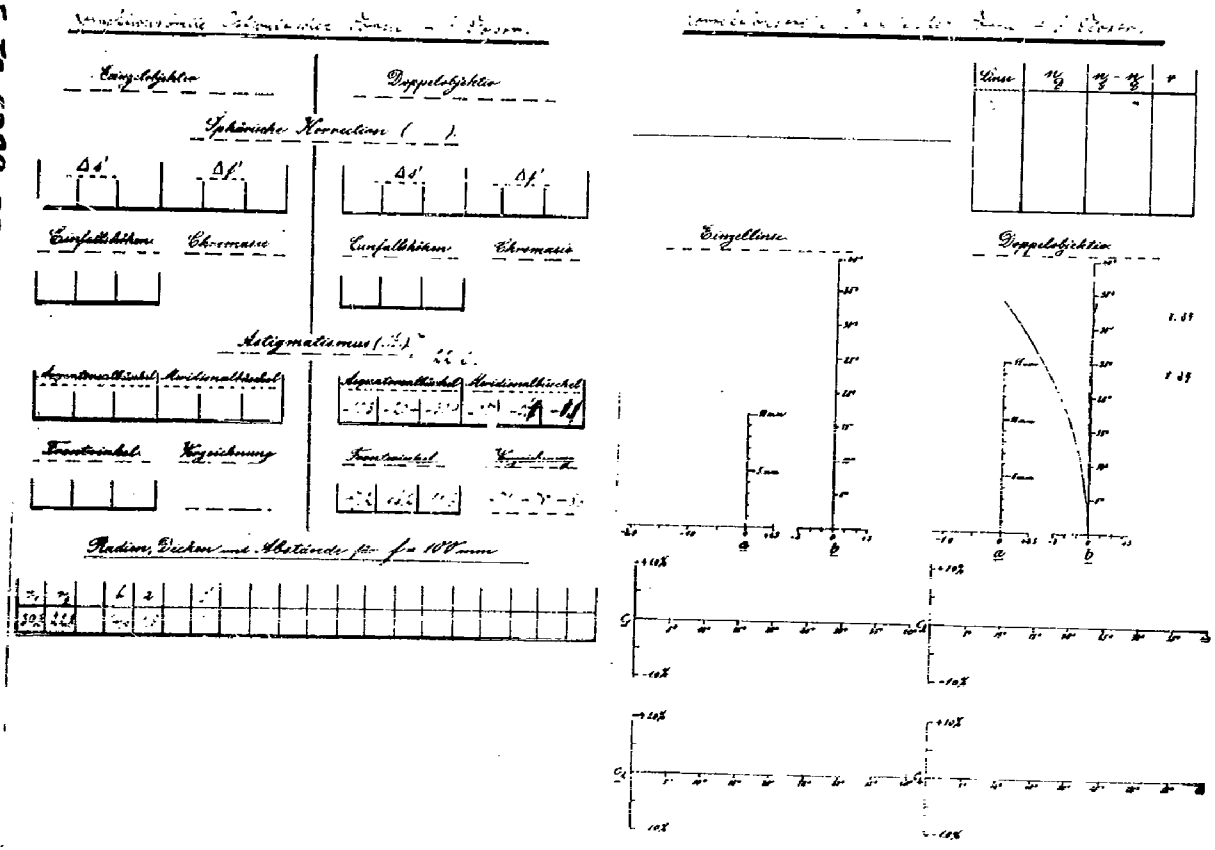
F-TS-6398-RE

1166



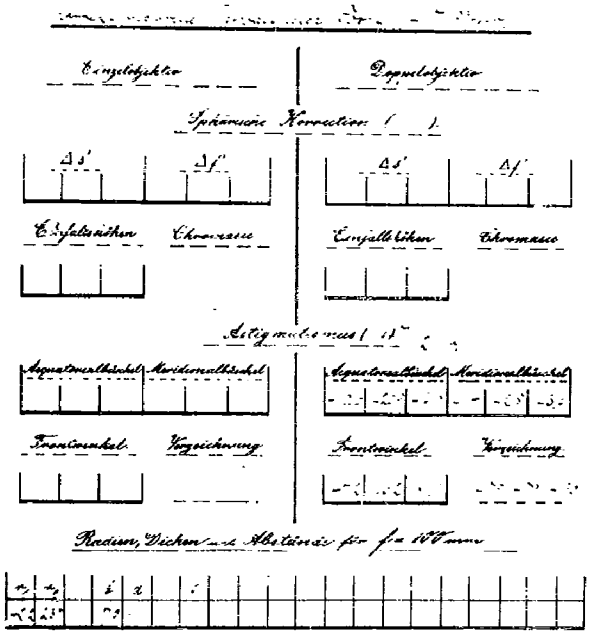
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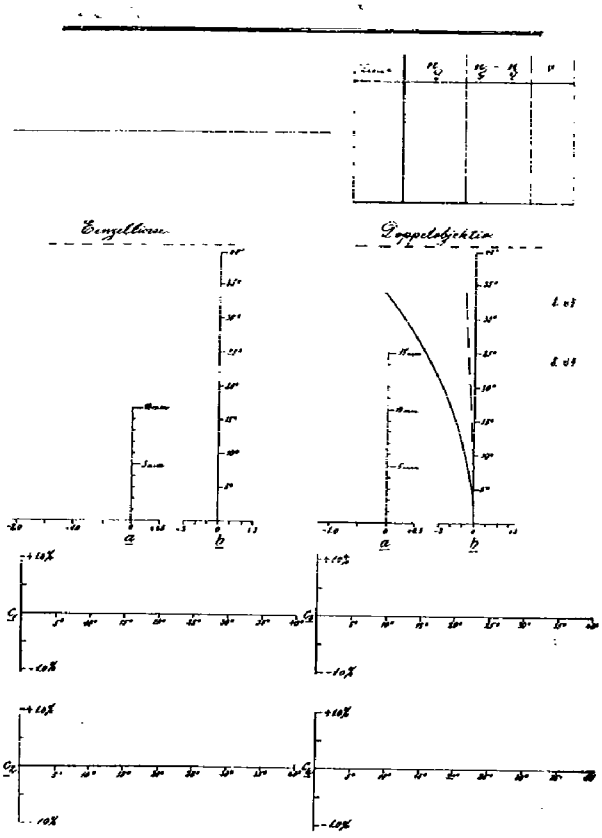
1167



F-TS-6398-RE

1168



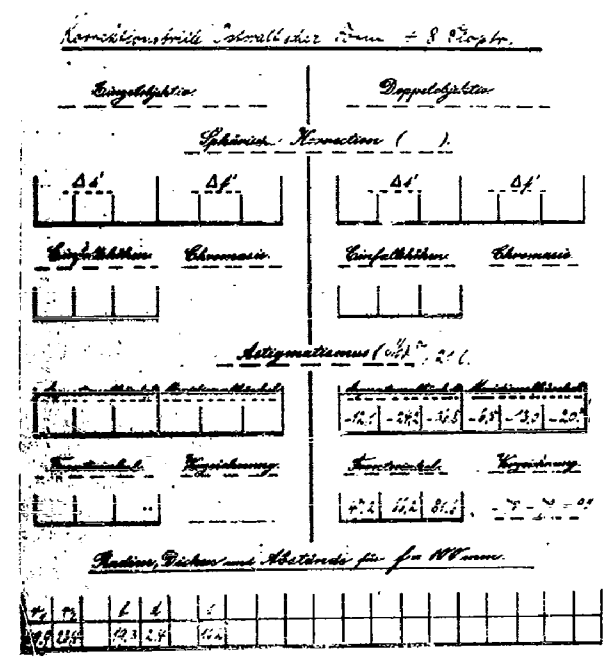


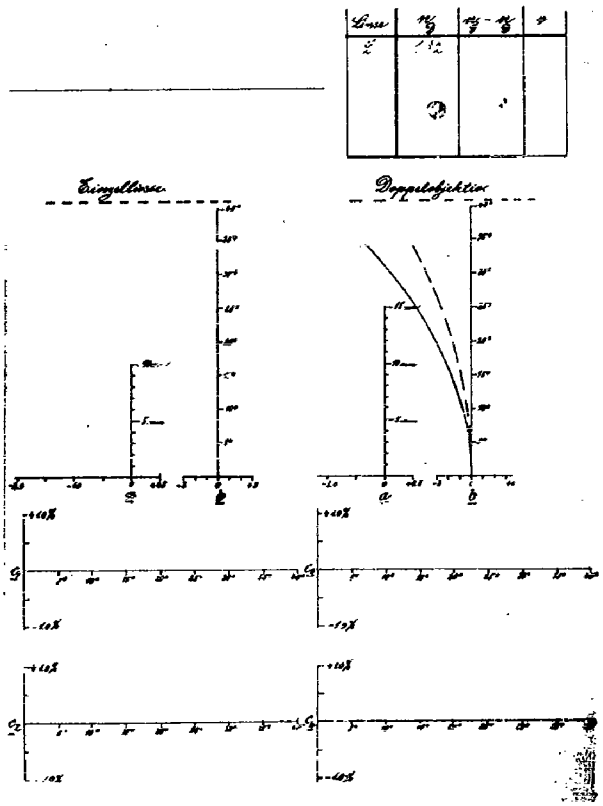
1.9

№ 279

F-TS-6398-RE

1169





F-TS-6398-RE

11.70

Korrektionsbrille Schmalfelder Form – 8½ Dioptr.

Einzellichter | Doppellichter

Elektrische Korrektion ( )

Δs' Δf' | Δs' Δf'

Einzelbildchen | Chromasie | Einzelbildchen | Chromasie

Astigmatismus (Abb.) 20 m.

-12,5	-14,0	-15,5	-8,0	-9°	-8°

Kurzschluß | Kippschwung

47,2	65,2	81,6	-85 -80 -101

Mittlere Prüfspannung Abstände für f = 100 mm

2	4	6	8
24	34	104	

M 278

Korrektionsbrille Schmalfelder Form – 8½ Dioptr.

Linse	m/2	y - y/2	n
2	1,5		

Einzellinse | Doppellichter

E. 89

B. 89

a b | a b

+10% -10%

F-TS-6398-RE

11.70

Korrektionsbrille Schmalfelder Form + 2 Dioptr.

Einzellichter | Doppellichter

Elektrische Korrektion ( )

Δs' Δf' | Δs' Δf'

Chromasie | Einzelbildchen | Chromasie

Astigmatismus (Abb.) 20 c.

-9,5	-11,3	-12,4	-7°	-5,5°	-5°

Kurzschluß | Kippschwung

47,2	66,2	81,6	-75 -80 -101

Mittlere Prüfspannung Abstände für f = 100 mm

2	4	6	8
24	34	104	

M 279

Korrektionsbrille Schmalfelder Form – 2 Dioptr.

Linse	m/2	y - y/2	n
2	1,5		

Einzellinse | Doppellichter

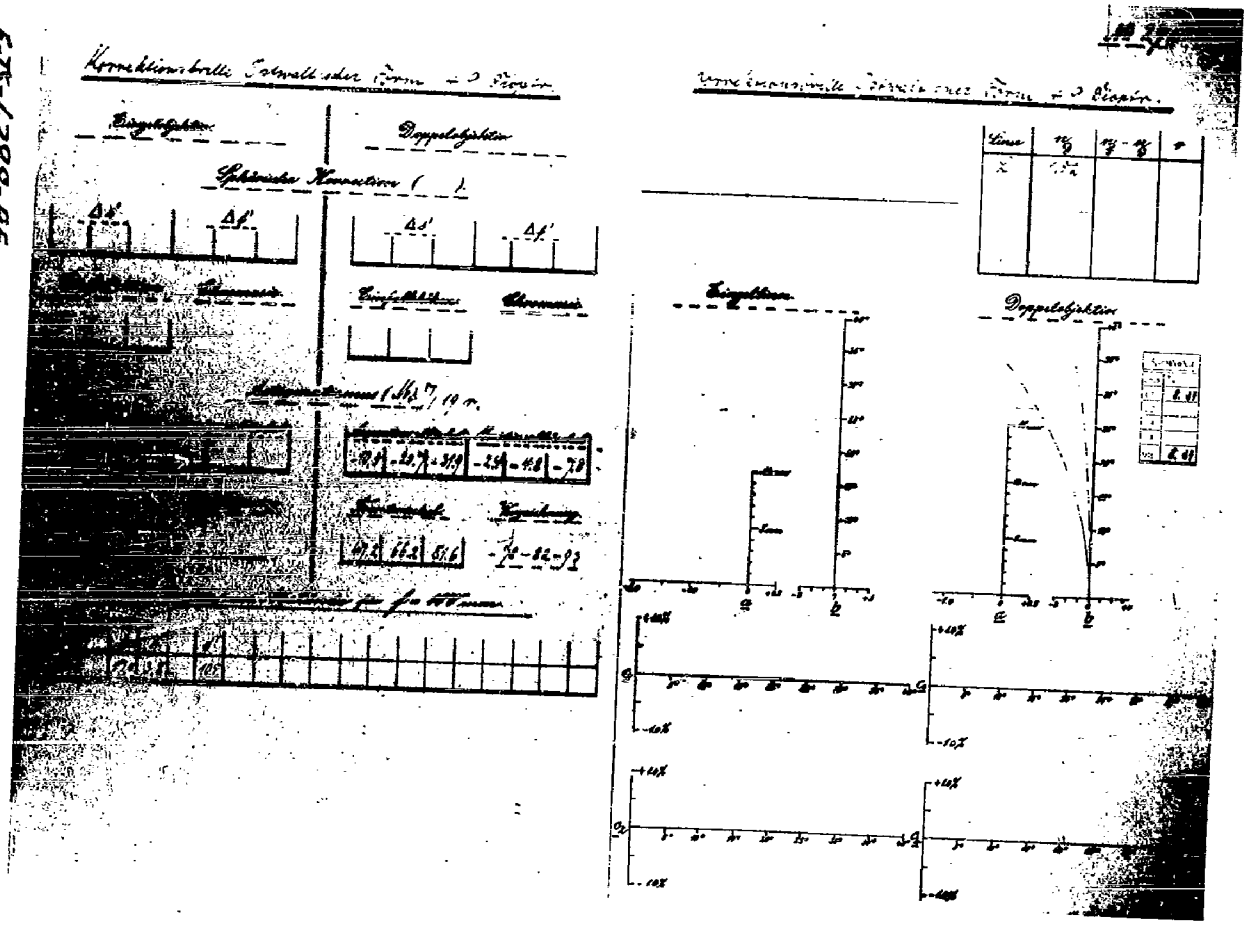
E. 89

a b | a b

+10% -10%

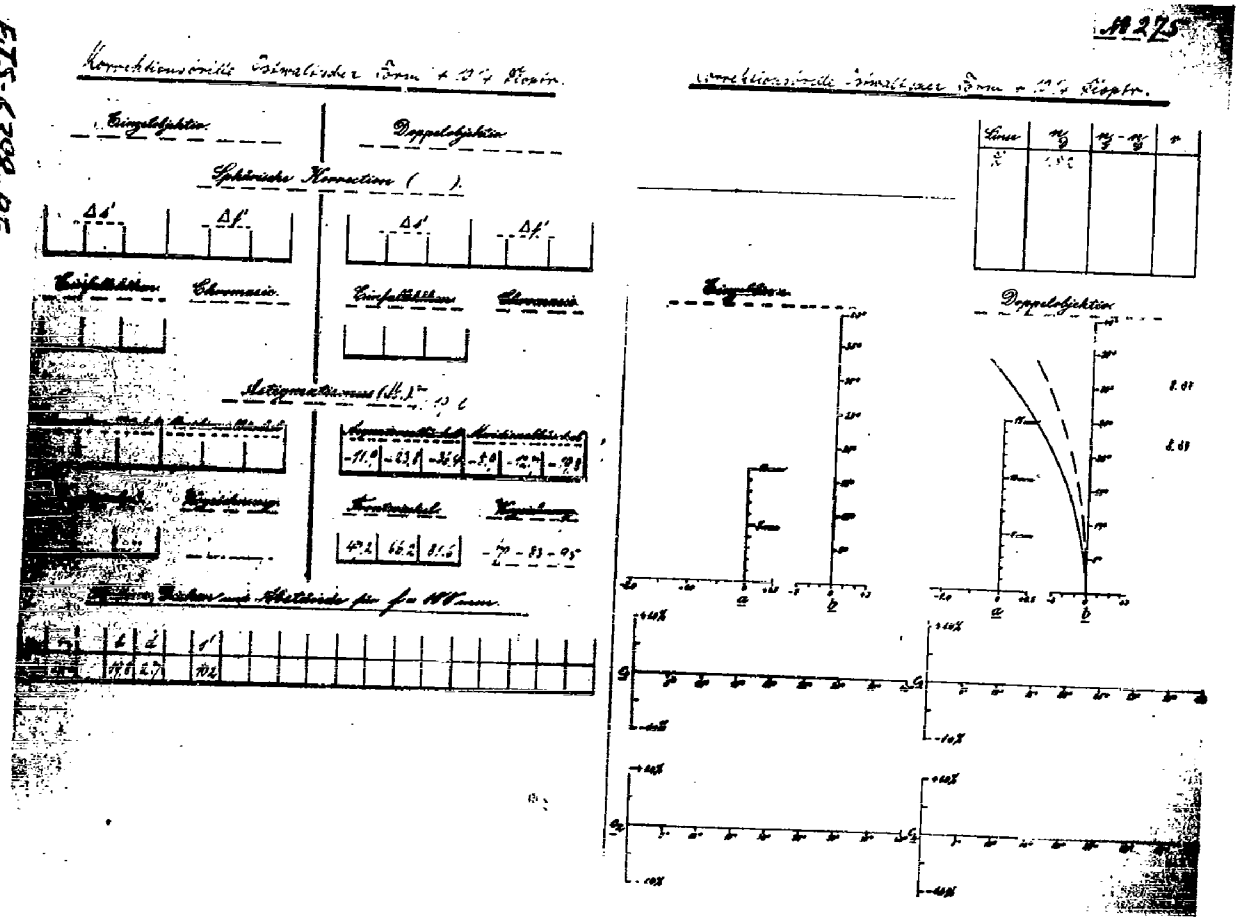
FTS-6398-PE

1172



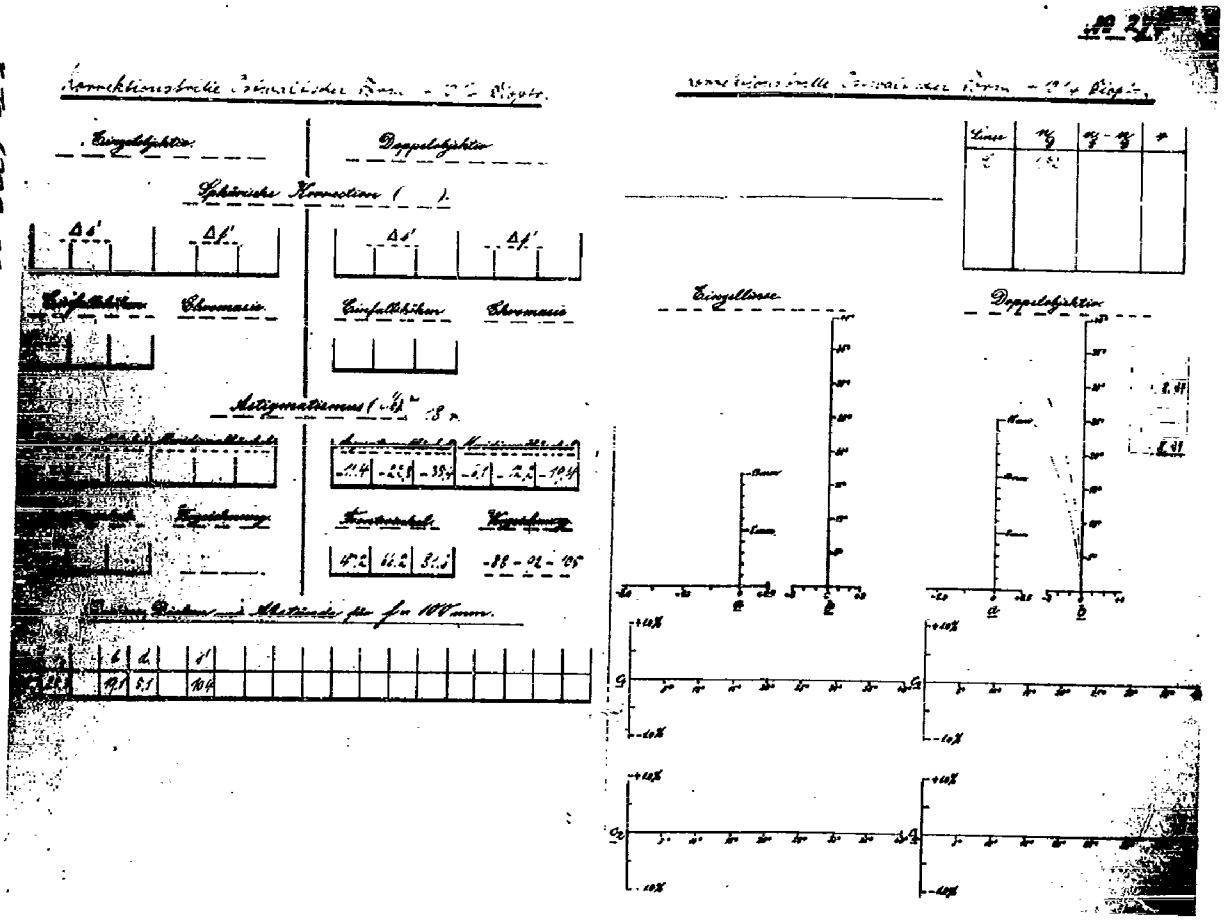
FTS-6398-PE

1173



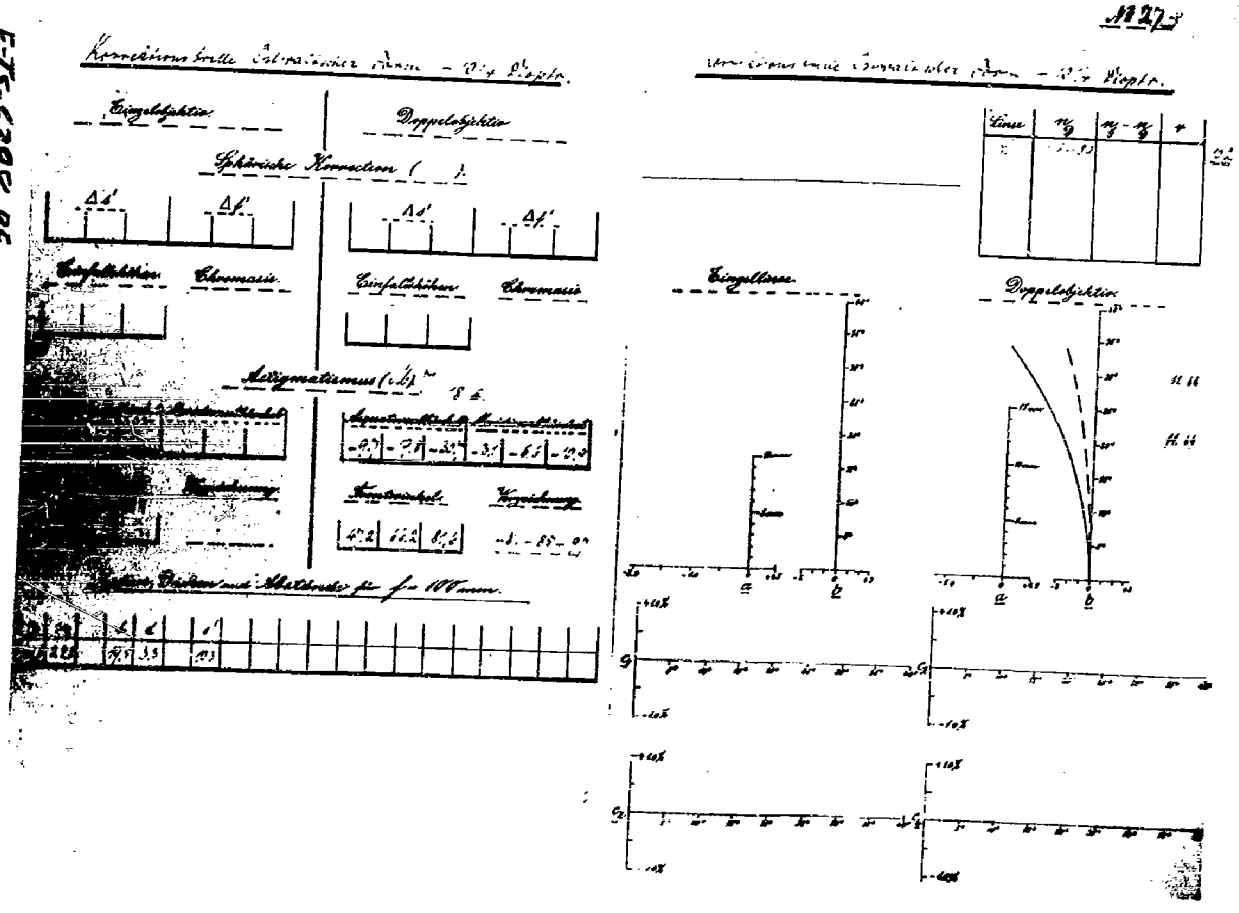
F-75-6398-RE

1174



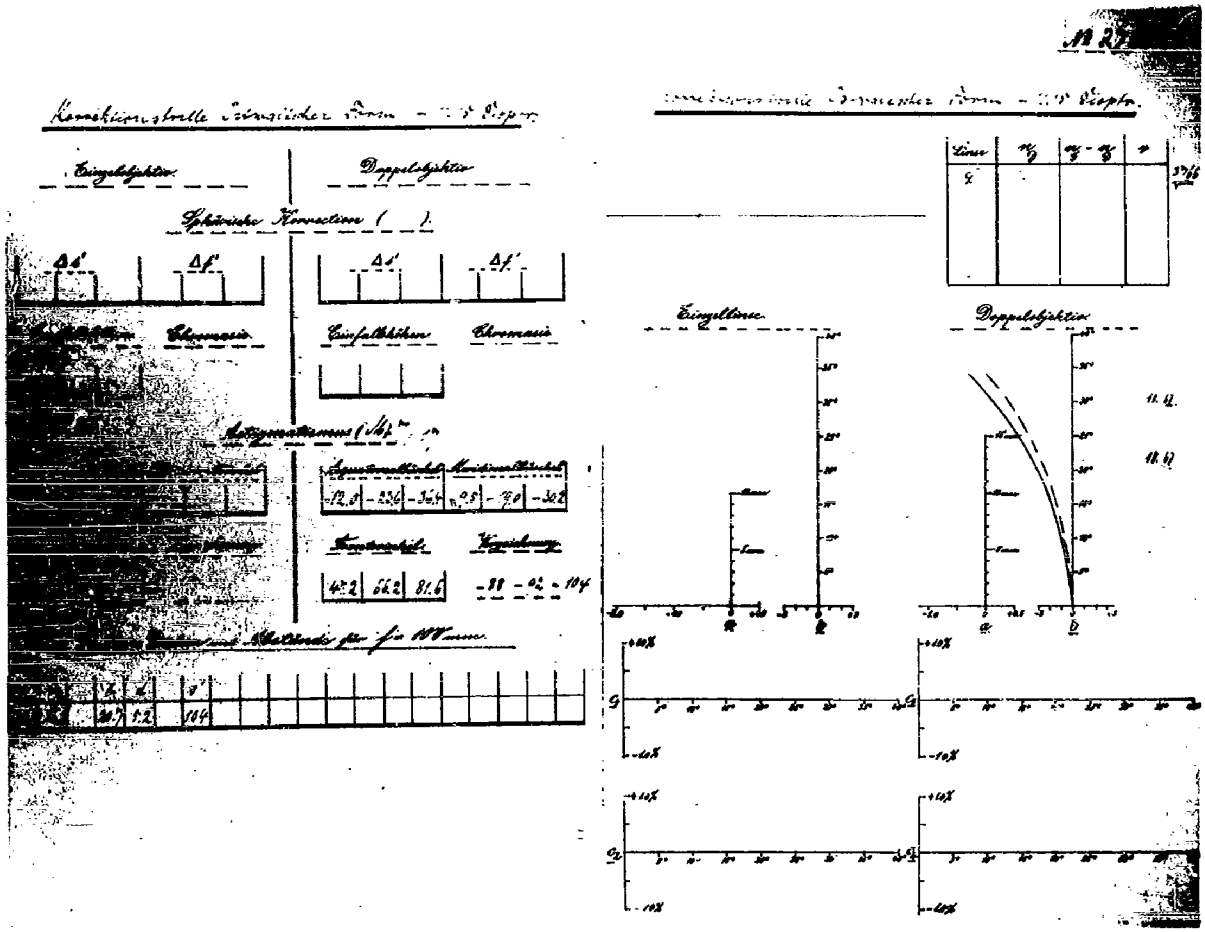
F-75-6396-RE

1175



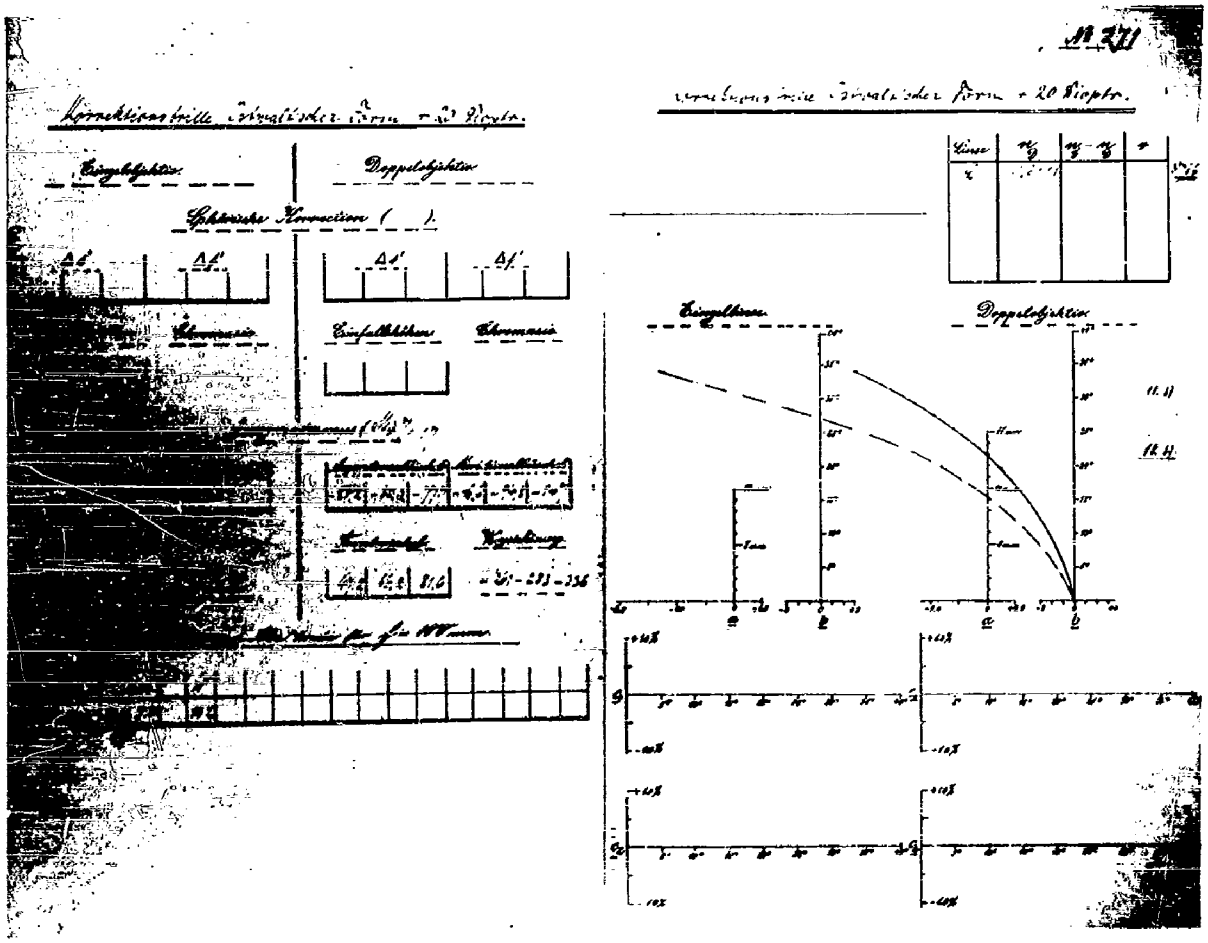
F-TS-6398-RE

11176



F-TS-6398-RE

11177



E. P. 217262 f. 135 –

E. P. 217262 f. 135 – Forme ... II a b

F-TS-6398-RE

11178

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (...)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( )

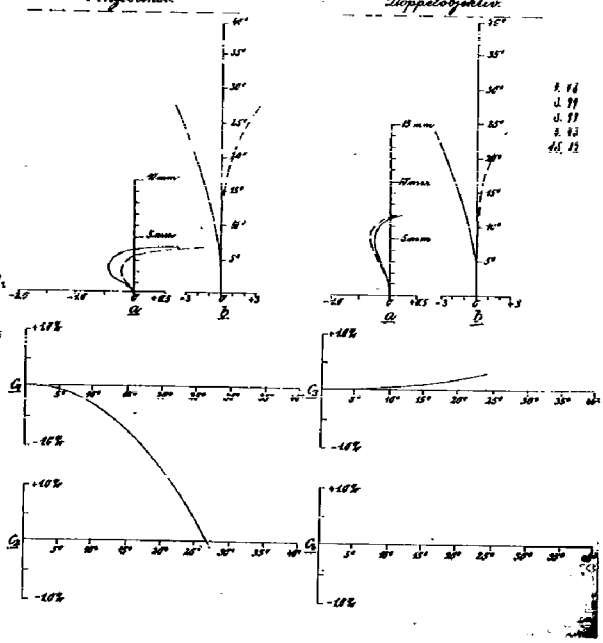
Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm. (...)

Linse	n_g	$n_g - n_\beta$	ν

Einzellinse | Doppelobjektiv



F-TS-6398-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (...)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

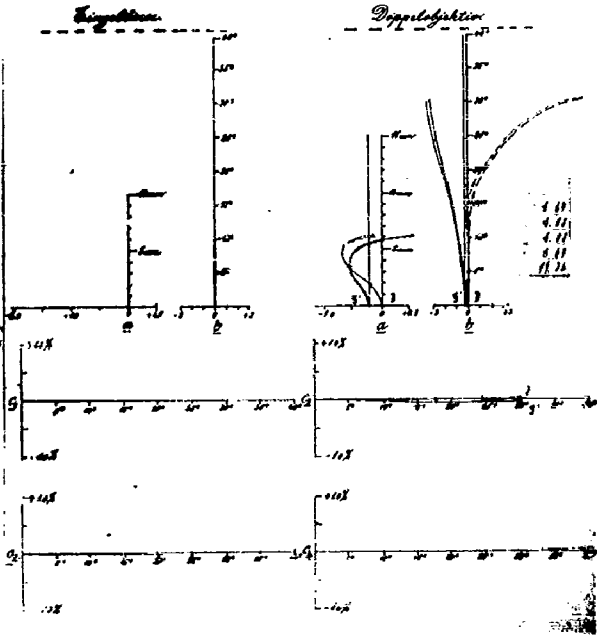
Astigmatismus (...)

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm. (...)

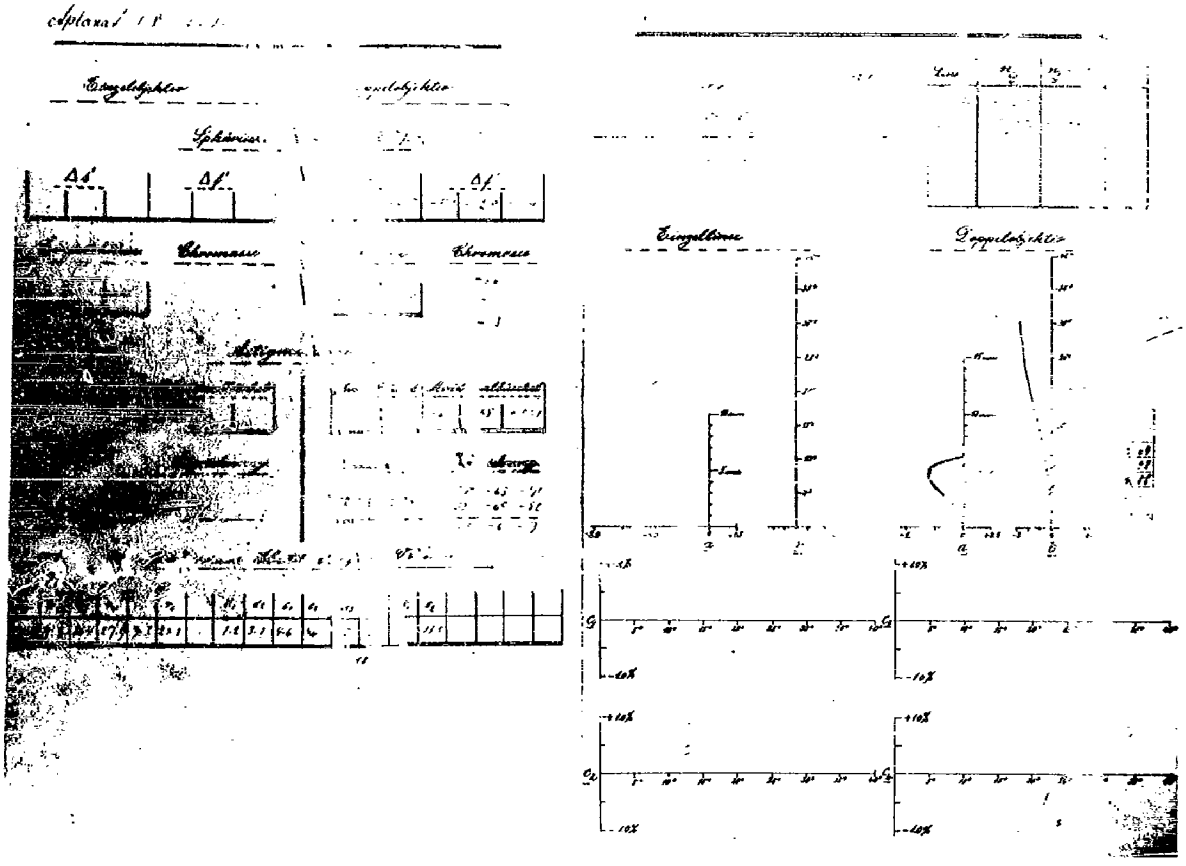
Linse	n_g	$n_g - n_\beta$	ν

Einzellinse | Doppelobjektiv

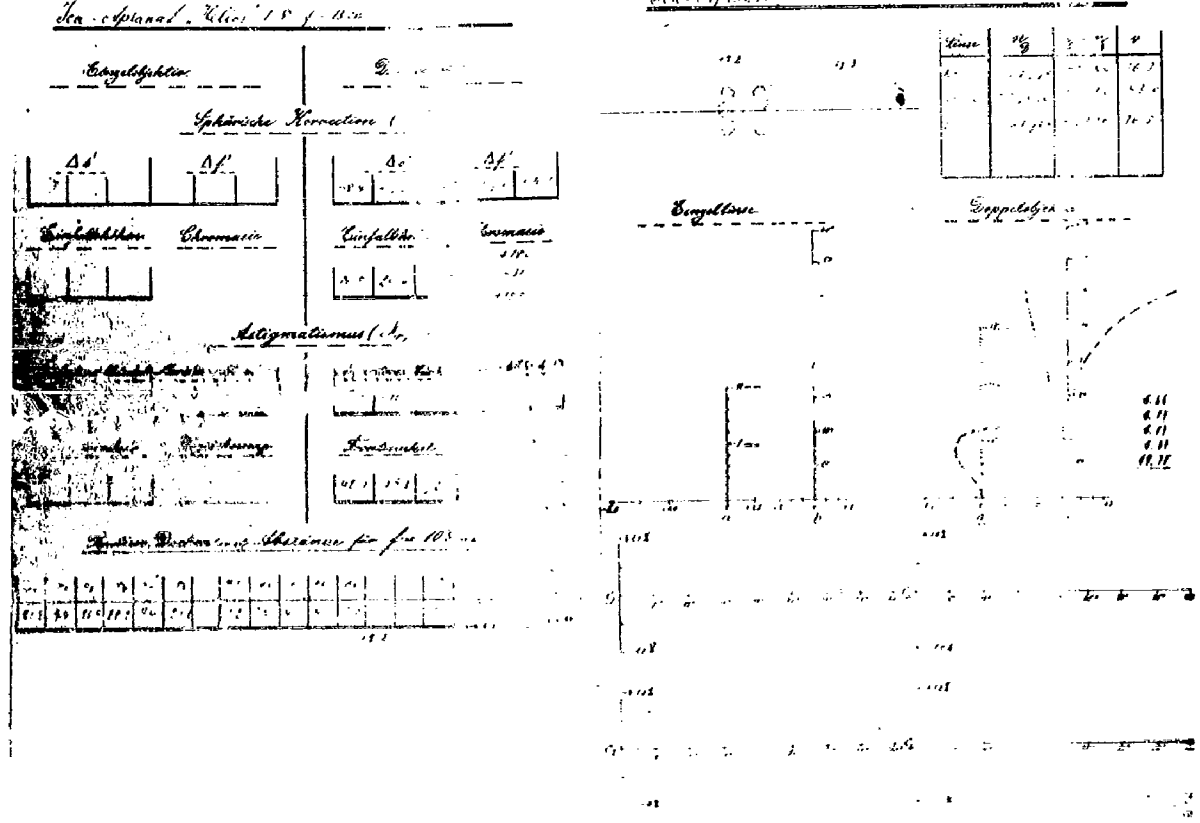


F-TS-6398-RE

1180

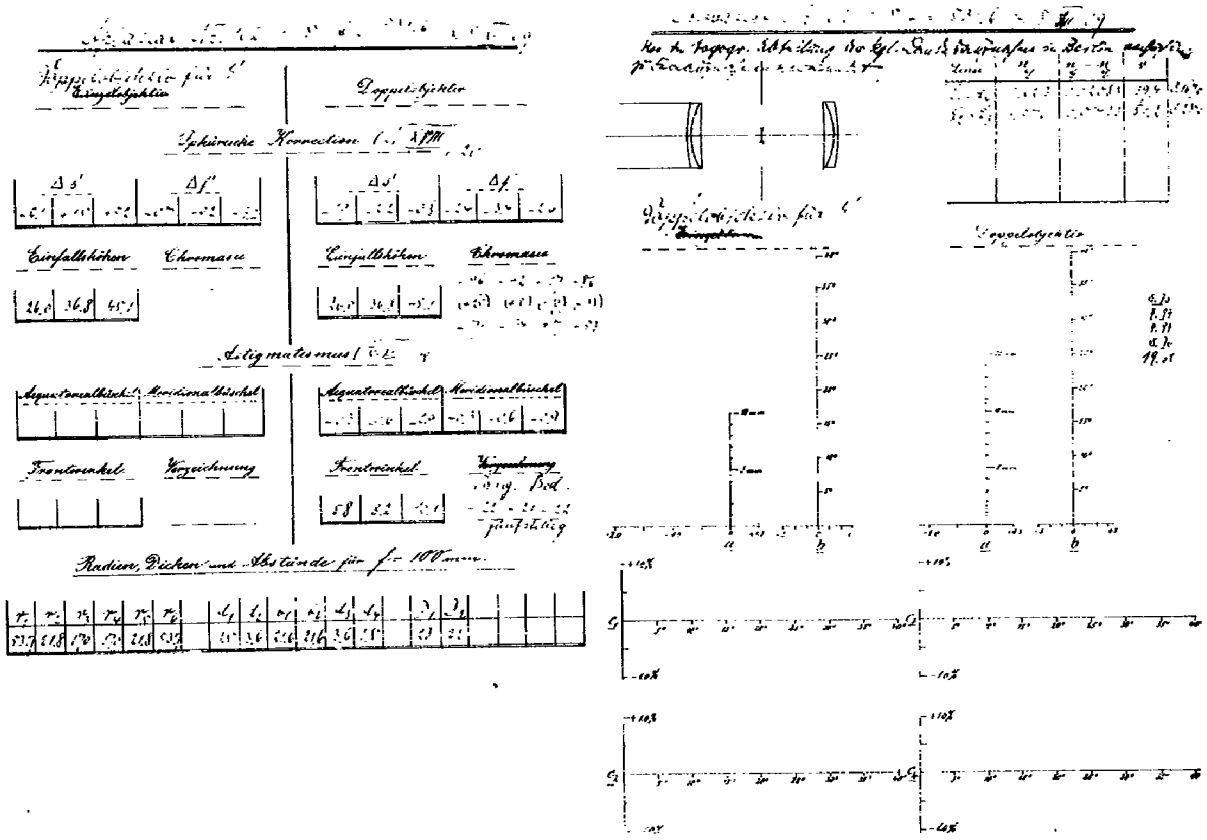


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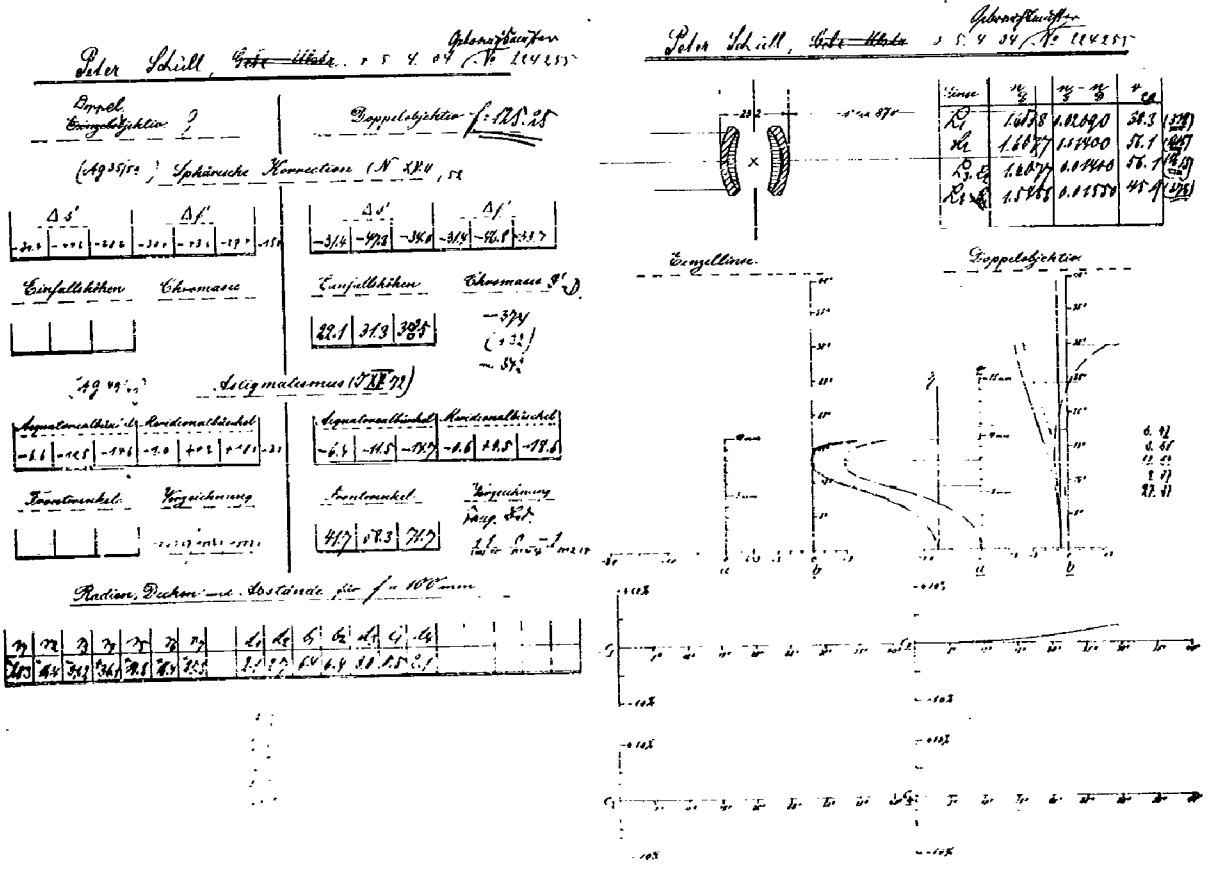
F-TS-6398-RE

11 B2



F-TS-6398-RE

11 B3



F-75-6398-RE

1184

Einzellichter | Doppellichter

Sphärische Korrection (δ' III) :

Δs' | Δf' | Δs' | Δf'

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

Astigmatismus ( )

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_d | $n_F - n_C$ | ν

Einzellinse | Doppellichter

F-75-6398-RE

1185

Einzellichter | Doppellichter

Sphärische Korrection (δ' III) :

Δs' | Δf' | Δs' | Δf'

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

Astigmatismus ( )

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Vergütung | Frontwinkel | Vergütung

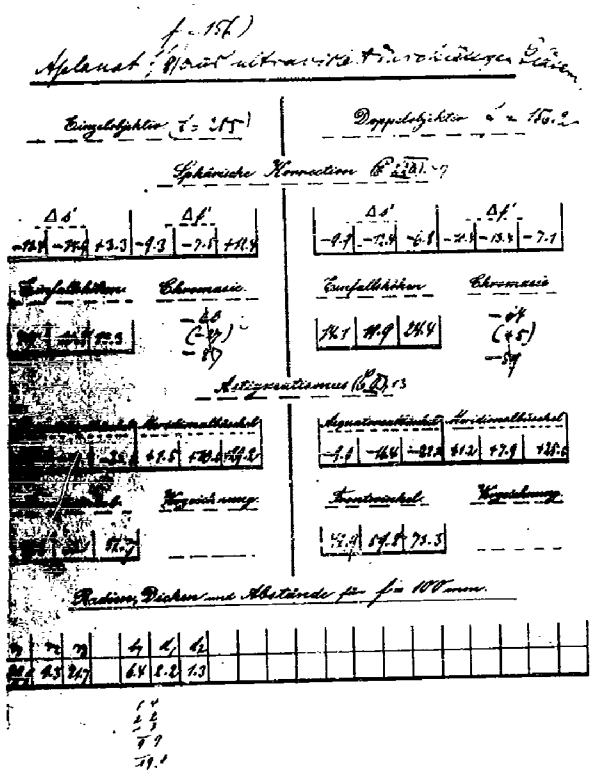
Radien, Dicken und Abstände für f = 100 mm

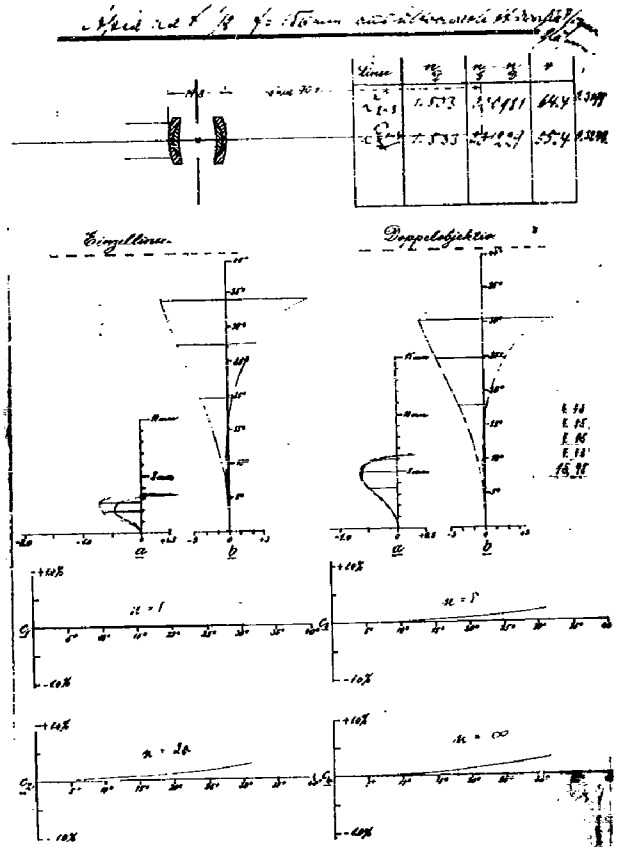
Linse | n_d | $n_F - n_C$ | ν

Einzellinse | Doppellichter

F-TS-6398-RE

1186

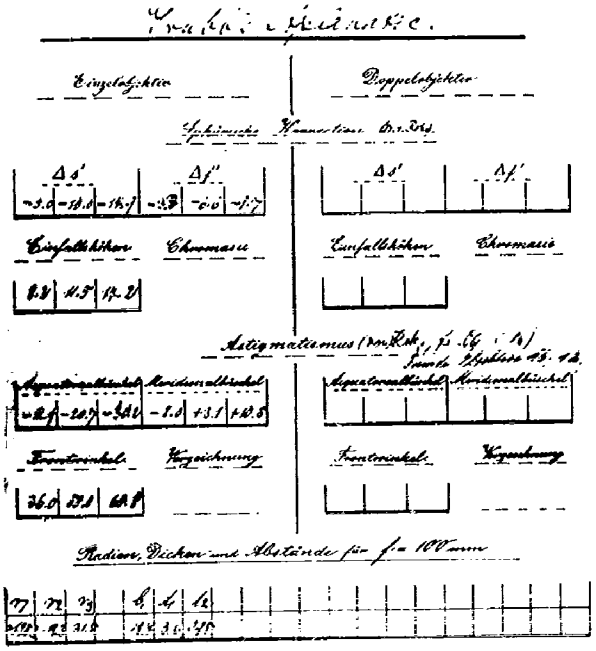


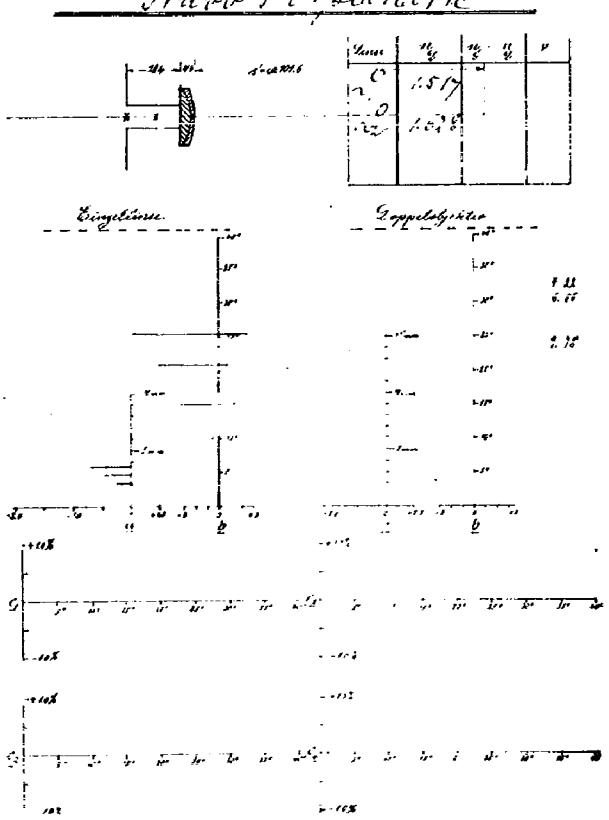


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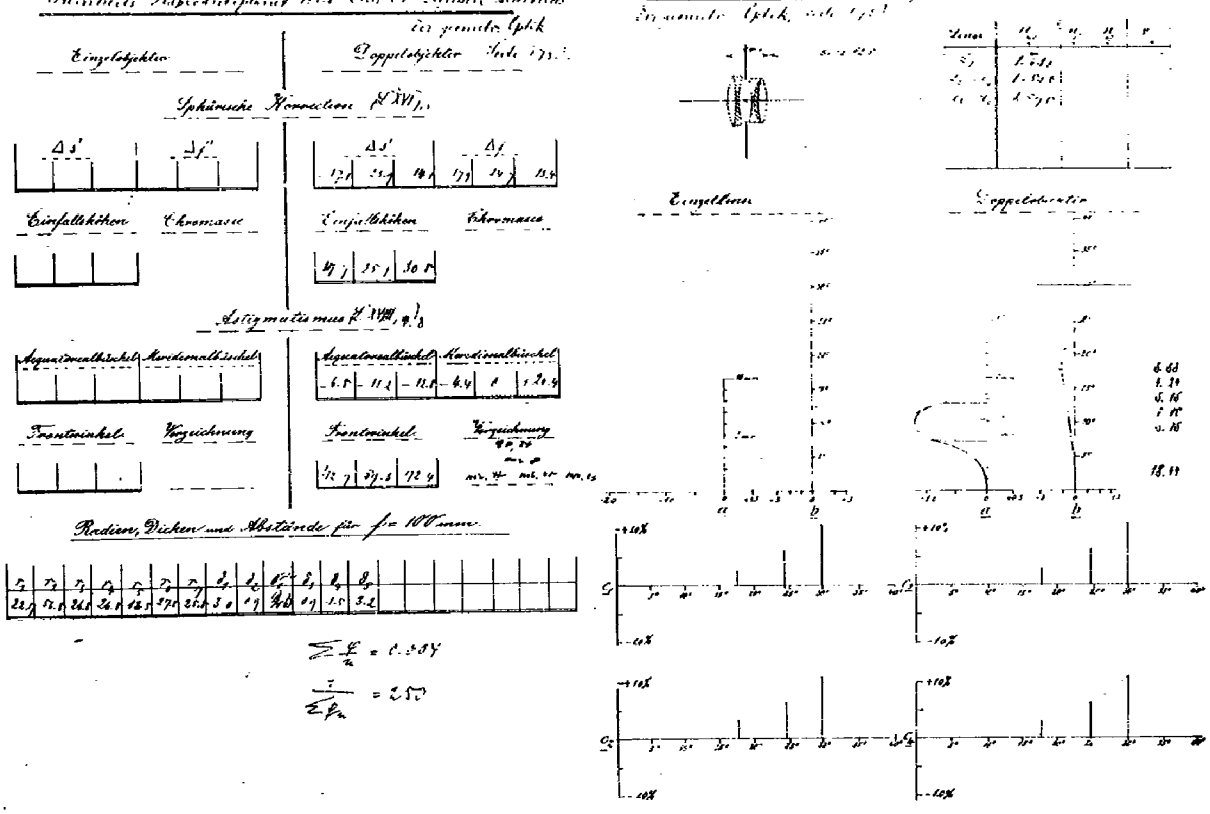
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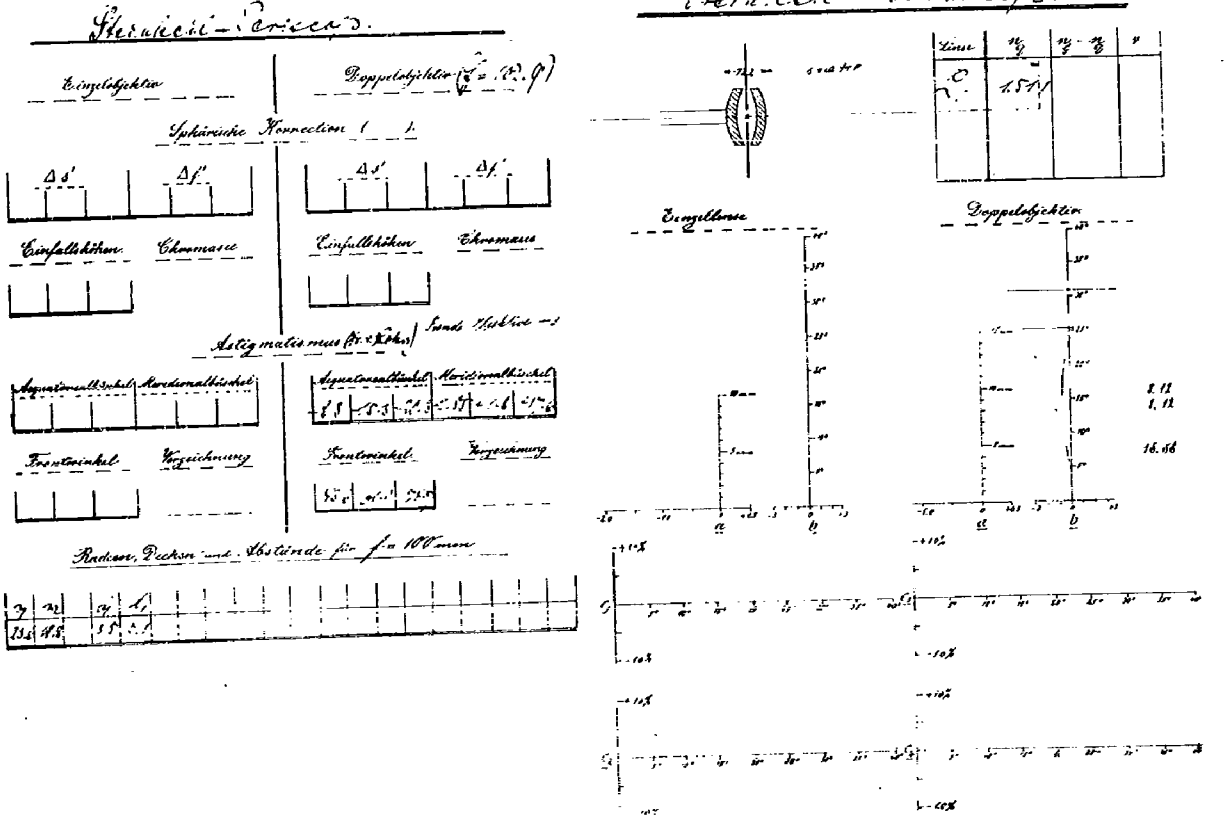
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1188



F-TS-6398-RE

1189



F-TS-6398-RE

1910

Einzellinse — Doppellinse

Sphärische Korrektion

Einfallsblenden — Chromasie

Astigmatismus für Einzellinse

Äquatorialwinkel — Meridionalwinkel

Frontenwinkel — Kugelbezeichnung

Radien, Dicken und Abstände für f = 100 mm

$\Sigma \frac{d}{n} = 0.0011$

$\frac{1}{\Sigma \frac{d}{n}} = 900$ Einzellinse

Doppellinse

Linse — n_d — $n_F - n_C$ — ν

L_1 — L_2 — L_3

Sphärische Korrektion

Einzellinse — Doppellinse

F-TS-6398-RE

1911

Sphärische Korrektion

Einzellinse — Doppellinse

Astigmatismus

Äquatorialwinkel — Meridionalwinkel

Frontenwinkel — Kugelbezeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse — n_d — $n_F - n_C$ — ν

L_1 — L_2 — L_3

Einzellinse — Doppellinse

F-TS-6398-RE

1192

Kollimatorobjektiv 1:8, f. 253 cm

für Stab Optik - Prüfung

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (-LB 30.13)

Δs'		Δf'	
+0.32	-0.56	-0.09	-0.31

Einfallshöhen | Chromasie

Δs'		Δf'	
-1.42	-1.17	-1.16	-3.47	-3.12	-3.59

Einfallshöhen | Chromasie

Astigmatismus (|)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r		d		Δd		n
65.3	54.4	23.6	133	17	1.5	1.5

Kollimatorobjektiv 1:8, f. 253 cm

für Stab Optik - Prüfung

Querschnitt für f = 100

Linse	n_D	$n_F - n_C$	ν
L_1	1.58262	0.01074	60.5
L_2	1.61263	0.01199	54.7

Einzellinse | Doppelobjektiv

a | b

G | G

F-TS-6398-RE

1193

Nr 450

Vogel II, 1:4.5, f. 15 cm v. 27.9.17

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (-LB 30.13)

Δs'		Δf'	

Einfallshöhen | Chromasie

Δs'		Δf'	
+0.5	+1.8	-0.9	+0.8	+0.8	-0.4

Einfallshöhen | Chromasie

15.6 | 16.3 | 19.5

-0.9
(-0.9)
-0

Astigmatismus (|)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r		d		Δd		n
65	54.4	23.6	133	17	1.5	1.5

Vogel II, 1:4.5, f. 15 cm v. 27.9.17

Linse	n_D	$n_F - n_C$	ν
L_1	1.51052	0.01046	65.4
L_2	1.62418	0.02099	39.2

Einzellinse | Doppelobjektiv

a | b

G | G

FTS-6388-RE

1194

3 fach verkittete Linsen mit 11 sph. Zonen 1:4,4 f. 240 mm
D. R. P. 335762 Fig. 4

Einzelobjektiv — Doppelobjektiv

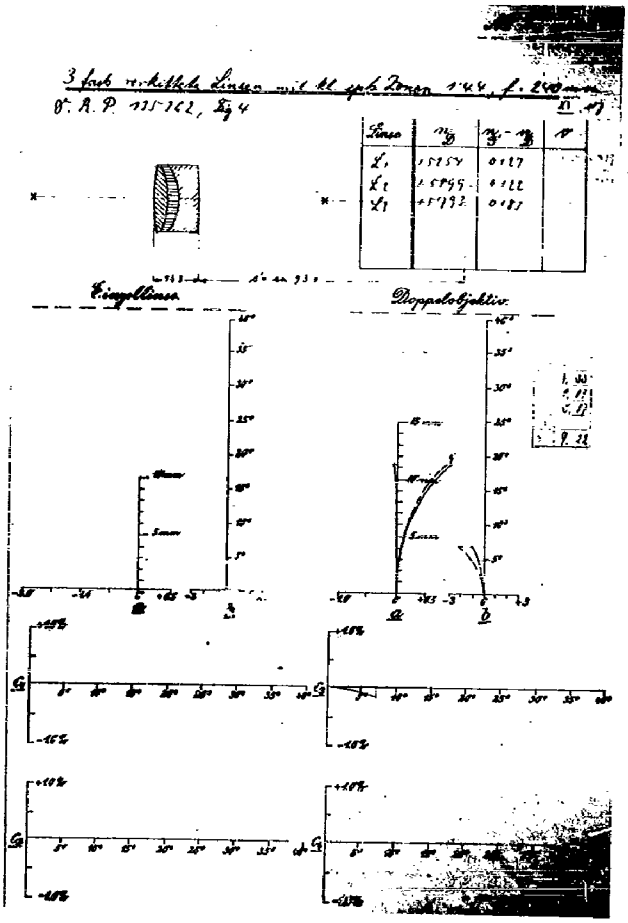
Sphärische Korrektion (c.d.B.f.)

Δs' Δf' — Einfallshöhen — Chromasie

Astigmatismus (d.B.f.)

Äquatorialbüschel — Meridionalbüschel — Verzeichnung — Frontwinkel

Radien, Dicken und Abstände für f = 100 mm.



1194

FTS-6388-RE

1195

Fernobjektiv Type 933 No. 7 1:4 f. 50 mm

Einzelobjektiv — Doppelobjektiv

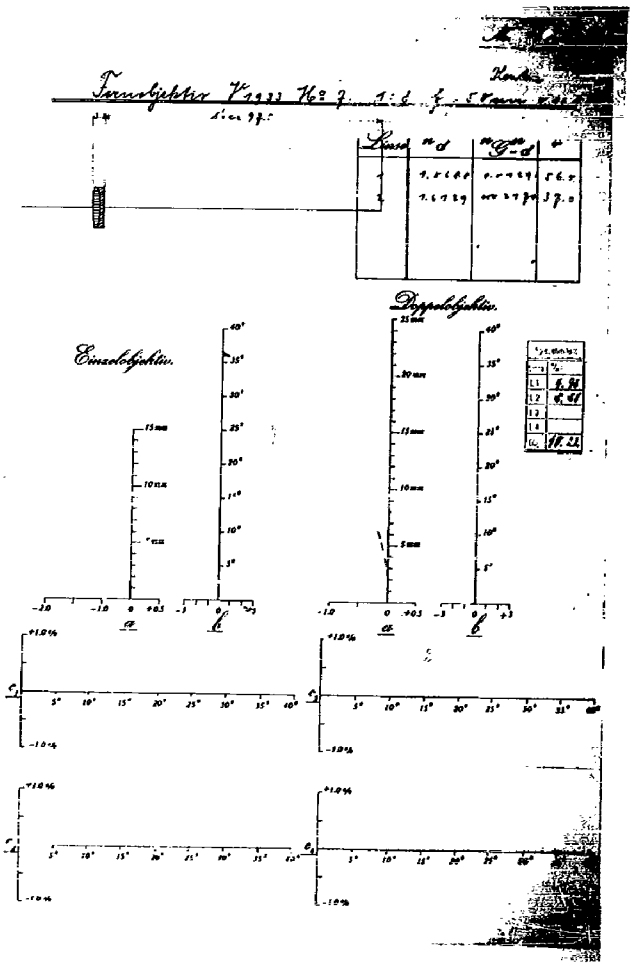
Sphärische Korrektion (Δs' Δf')

Einfallshöhen — Chromasie

Astigmatismus (Äquatorialbüschel — Meridionalbüschel)

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



№ 639

F-75-6398-RE

1961

Zweilinsiges Projektions-Objektiv 1:3 f=30 cm.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (M 22) e-s

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (F 30) e

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r	r	r	n_d	d	d	d
178.0	96.0	93.4	1.520	4.5	0.2	4.5

Zweilinsiges Projektions-Objektiv 1:3 f=30 cm

Linse	n_d	ν_d	r	ν
L_1	1.51	64.2		
L_2	1.62	36.3		

Einzellinse | Doppelobjektiv

a | b

F-75-6398-RE

1197

1196

18443

Z-Objektiv v. 20.12.57

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (ABZ) e-s

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus e

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Z-Objektiv v. 20.12.57

Querschnitt für f=500

Linse	n_d	ν_d	r	ν
L_1	1.51970	64.5		
L_2	1.64641	33.8		

Einzellinse | Doppelobjektiv

a | b

№ 1188

F-75-6398-RE

1188

§ 1321 747 IG Farben 1:4,5 f=10 cm v 27.12.34

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion f/4,5 50/54 s

Δs'	Δf'	Δs'			Δf'	
		-258	-142	-58	-236	-184	-32,0

Einfallshöhen | Chromasie. | Einfallshöhen | Chromasie.

		65,9	16,1	166,0

Astigmatismus f/4,5 60/ 34-24

Segmentalhöhe	Meridionalhöhe	Segmentalhöhe			Meridionalhöhe		
		-5,24	-6,18	-2,21	+0,14	+0,74	-4,45

Frontwinkel | Strichneigung | Frontwinkel | Strichneigung

		32,5	29,3	56,2	44,15	44,42	41,11

Radien, Dicken und Abstände für f = 100 mm.

R	s	s'	r	c	s	s'	c	a	a'	L_1	L_1'	L_2	L_2'	L_3	L_3'	d_1	d_2	d_3	L_1'	L_2'
64,8	97,1	17,2	52,4	96,1	-14,5	∞	92,1	42,55	-96,6	1,05	1,67	1,9	1,0	1,55	1,68	0,25	0,25	0,15	1,75	1,05

§ 1321 747 IG Farben 1:4,5 f=10 cm v 27.12.34

Linse | n d | n' - n d | ν

$L_1 + L_2$	1,520		64,9
$L_2 + L_3$	1,649		34,0
L_F	1,525		42,5

Einzelobjektiv. | Doppelobjektiv.

a | b | a | b

№ 976

F-75-6398-RE

1196

IG Farben Periskopobjektiv 1:6,3 f. 105 m/m vom 19.9.31

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion f/6,3 sf.

Δs'	Δf'	Δs'			Δf'	
		-91	-20	-7,5	-19,0	1,9

Einfallshöhen | Chromasie. | Einfallshöhen | Chromasie.

		15,7	2,4

Astigmatismus f/6,3 sf.

Segmentalhöhe	Meridionalhöhe	Segmentalhöhe			Meridionalhöhe		

Frontwinkel | Strichneigung | Frontwinkel | Strichneigung

		1,5	1,2	39°43	45°38

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	d_1	d_2	d_3	d_4	f
19,5	33,2	11,5	18,5	1,-	0,5	0,7	2,6	11,-

IG Farben Periskopobjektiv 1:6,3 f. 105 m/m vom 19.9.31

Linse | n d | n' - n d | ν

1	1,523	0,1301	59,6
2	1,523	0,1008	57,4

Einzelobjektiv. | Doppelobjektiv.

№ 966

F-75-6398-RE

1200

Albert Ferdinand Shore, E.P. 350 717 v. 18.6.31; 1:8.5, f: 117 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Albert Ferdinand Shore, E.P. 350 717 v. 18.6.31; 1:8.5, f: 117 mm

Linse

Einzellinse

Doppelobjektiv

№ 96[illegible]

F-75-6398-RE

1201

Films, Fr. 1. 812 851 v. 18.3.29; 1:3.3, f: 52 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Films, Fr. 1. 812 851 v. 18.3.29; 1:3.3, f: 82 mm

Linse

Einzellinse

Doppelobjektiv

F-TS-6398-PE

1202

№ 955

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen

Chromasie

Astigmatismus

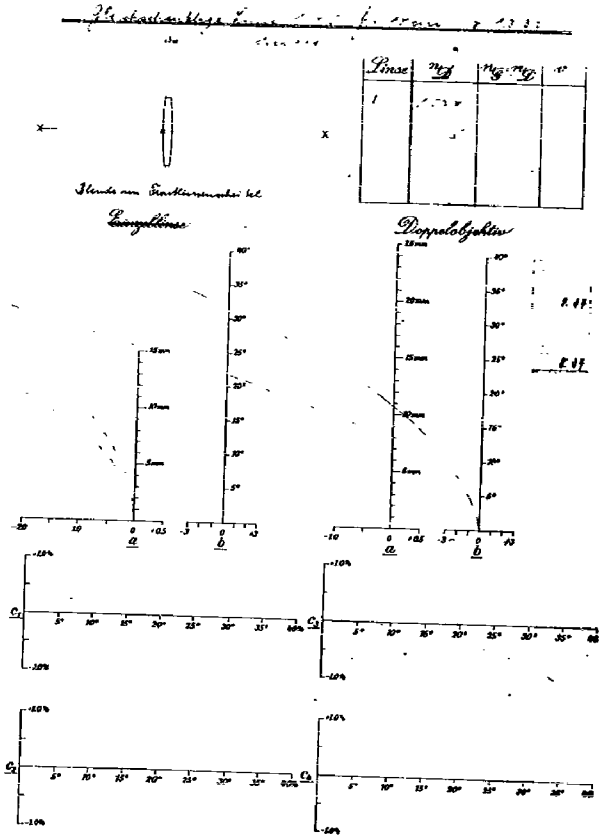
Äquatorialbüschel

Meridionalbüschel

Frontwinkel

Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm:



F-TS-6398-PE

1203

№ 643

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen

Chromasie

Astigmatismus

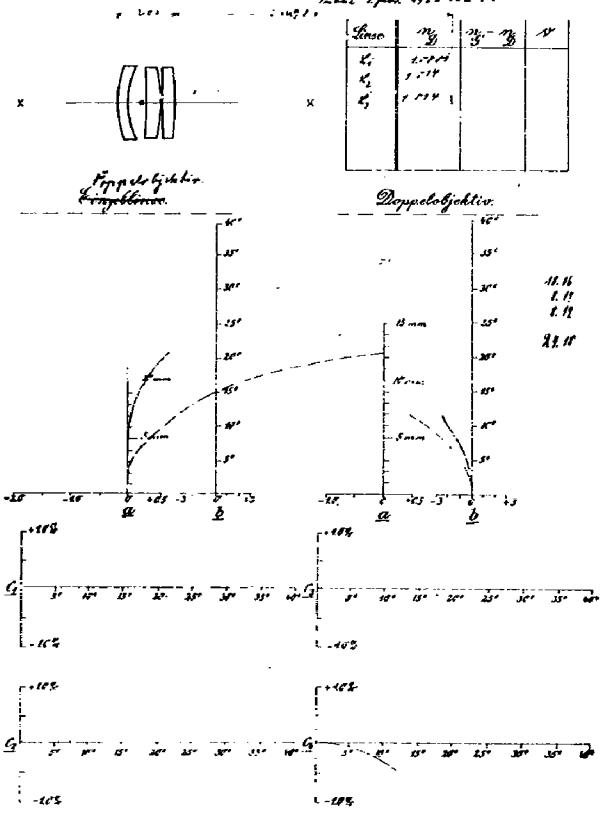
Äquatorialbüschel

Meridionalbüschel

Frontwinkel

Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm:



F-75-6398-RE

1204

Objektiv nach E. Heinrich Hoppler Dresden 1:6,3 f 10cm

aus einem Scheiben von d=3 mm n=1,5 ν

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Δs')

Δs'	Δf'	Δs'	Δf'
		-4,2 -8,7 -7,2 -4,5 -9,2 -18,7	

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		6,6	9,3

Astigmatismus (Δs's')

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-3,0 -14,7 -12,7 -7,3 -11,9 -24,4	

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		16,5	19,2

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	d1	d2/3	d3	d4
9,42	0,8	23,0	11,6	2,42	7,5	2,12	4,2	1,8

Linse | n | ν

f1 | 1,6111 | 60,11

f2 | 1,5891 | 61,24

f3 | 1,6111 | 60,11

Einzellinse | Doppelobjektiv

a | b | a | b

G | G | G | G

-10% | -10% | -10% | -10%

1204

F-75-6398-RE

1205

Lux a. Clarcamera 1:4,5; f. 10 cm 12 Bl. i. g. Lg. à Paris

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Δs's')

Δs'	Δf'	Δs'	Δf'
		-4,2 -8,7 -7,2 -4,5 -9,2 -18,7	

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		6,6	9,3

Astigmatismus (Δs's')

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-13,1 -18,2 -5,5	-9,9 -11,4 -15,8

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		13,2	15,1

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	d1	d2	d3	d4	d5	d6	d7
7,8	0,8	28,1	17,1	3,2	1,9	4,3	11,9	1,5	2,6	1,9	

Lux a. Clarcamera 1:4,5; f. 10 cm 12 Bl. i. g. d. g. à

Linse | n | ν

L1 L2 | 1,52(7?) | 61,9(5)

L3 L4 | 1,5(9)5 | 61,0(5)

Einzellinse | Doppelobjektiv

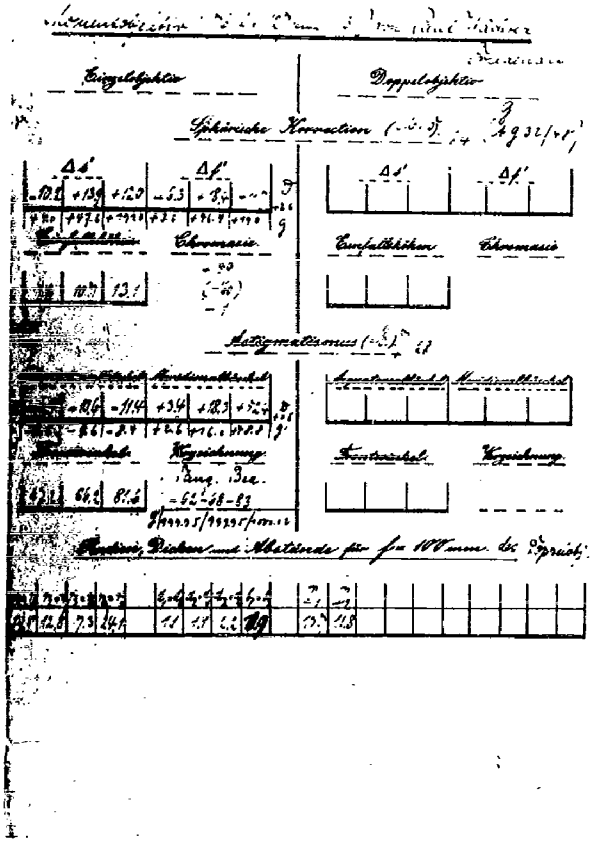
a | b | a | b

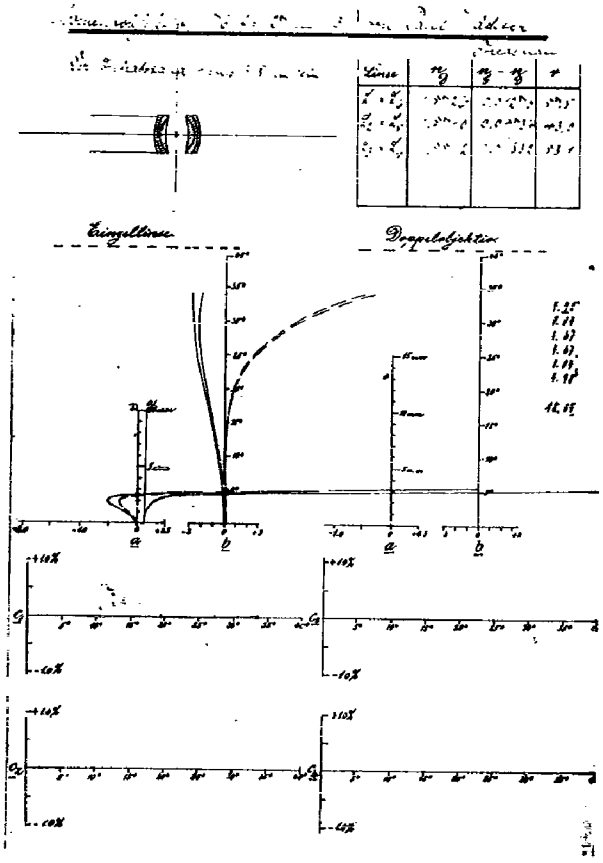
G | G | G | G

-10% | -10% | -10% | -10%

№ 1206

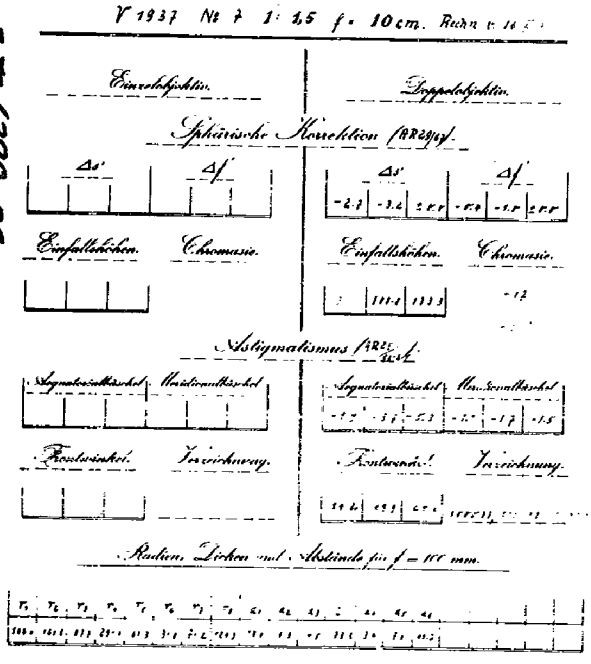
F-75-6398-RE

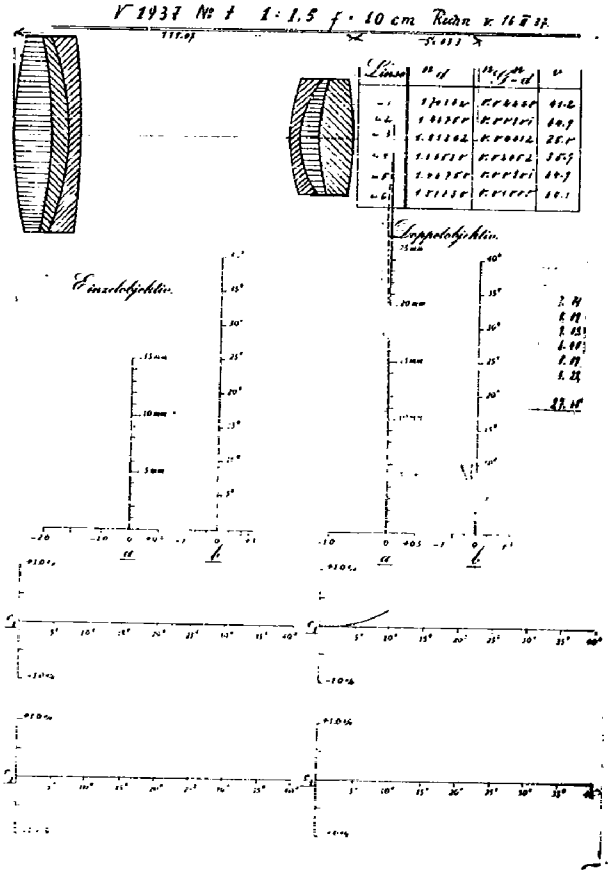




№ 1159

F-75-6398-RE





L 1220

F-75-6398-RE

1208

D. L. Word. ϕ 2076 190 f:16, f: 10cm f. Projektion v. 6.4.1937

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (λ 32 / 55)

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (λ 32 / 55)

Sagittalkurvenbl. | Meridionalkurvenbl. | Einfallshöhen | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

D. L. Word ϕ 2076 190 f:16, f: 10cm f. Projektion v. 6.4.1937

Einzelobjektiv. | Doppelobjektiv.

F-75-6398-RE

1209

Lichtstarkes Projektionssystem

Biotar 1:1.8 f = 8,5 cm mit Zusatzlinse

Doppelobjektiv mit Zusatzlinse | Einzelobjektiv | Doppelobjektiv ohne Zusatzlinse

Sphärische Korrektion (λ 546,1 / 643,8)

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (λ 546,1 / 643,8)

Sagittalkurvenbl. | Meridionalkurvenbl. | Einfallshöhen | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Lichtstarkes Projektionssystem

Biotar 1:1.8 f = 8,5 cm mit Zusatzlinse

Doppelobj. mit Zusatzlinse | Einzelobjektiv | Doppelobjektiv ohne Zusatzlinse

n = 1 | n = 5 | n = 20 | n = ∞

№ 847

F-TS-6398-PE

12/10

Zeiss Ikon Projektions-Objektiv f. i.g. f. 10cm v. 29.829.

Einzellinse

Doppelobjektiv

№ 85

F-TS-6398-PE

12/11

Einzellinse

Doppelobjektiv

A. 1858

F-75-6398-RE

1212

V 1937 No 8 1:1,9 f= 10 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf')

Δs' Δf' | Δs' Δf'

Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

Astigmatismus (Δs' / Δf')

Sagittenunterschied. Meridianunterschied. | Sagittenunterschied. Meridianunterschied.

Frontwinkel. Verzeichnung. | Frontwinkel. Verzeichnung.

Radien. Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4
84,6	178,1	∞	71,2	23,5	46,7	179	-52,4	44,8	241,1	23,4	2,2	7,8	3,4

f = 46,8

V 1937 No 8 1:1,9 f= 10 cm

Linse | n_d | ν_d

Einzelobjektiv. | Doppelobjektiv.

a b | a b

12.12

A. 1810

F-75-6398-RE

1213

E. Zeiss Proj. Objektiv 1:1,9 f= 10 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf')

Δs' Δf' | Δs' Δf'

-2,6 -2,7 | -1,3 -2,5 -2,1 -2,8

Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

Astigmatismus (Δs' / Δf')

Sagittenunterschied. Meridianunterschied. | Sagittenunterschied. Meridianunterschied.

Frontwinkel. Verzeichnung. | Frontwinkel. Verzeichnung.

Radien. Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4
82,6	214,4	∞	63,3	30,7	44,4	-74,6	31,5	31,5	33,5	11,6	2,4	7,4	3,4

E. Zeiss Proj. Objektiv 1:1,9 f= 10 cm

Linse | n_d | ν_d

Einzelobjektiv. | Doppelobjektiv.

a b | a b

№ 816

F-75-6398-RE

1214

W. Repp 1:2.2, f=100 mm, v. 2.5.22, A. 147 7267

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A. K.) f/98-107

Δs' | Δf'

Einfallshöhen | Chromasien

Astigmatismus (A. K.) f/98-107

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

W. Repp 1:2.2, f=100 mm, v. 2.5.22, A. 147 7267

Einzellinse

Doppelobjektiv

№ 817

F-75-6398-RE

1215

W. Repp 1:2.2, f=100 mm, v. 1.1.24, A. 147 9267

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A. K.) f/98-99

Einfallshöhen | Chromasien

Astigmatismus (A. K.) f/98-99

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

W. Repp 1:2.2, f=100 mm, v. 1.1.24, A. 147 9267

Einzellinse

Doppelobjektiv

F-TS-6398-RE

1216

№ 644

Projektion Optics Company

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

P-TS-6398-RE

1217

№ 1079

Graf Optical Co. Projektions-Objektiv 1:2.5; f. 5cm K 2.5.28 USP 1479251

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Graf Optical Co Projektions-Objektiv f:2.5; f. 5cm USP 1479251 K 2.5.28 u. EP 100949 u. 2.5.28

Einzelobjektiv

Doppelobjektiv

L 1076

F-75-6398-RE

1216

Proj.-Objektiv 1:2.5, f = 5 cm.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f.d.Mitte)

Δs'	Δf'

Δs'			Δf'		
-0.31	-0.32	-0.34	+0.28	+0.32	+0.46

Einfallsblenden | Chromasie

Einfallsblenden			Chromasie
-0.0	-1.5	10.0	+2.3 s -1.0 -7.7

Astigmatismus (f.d.Mitte)

Sagittalwinkel	Meridionalwinkel

Sagittalwinkel		Meridionalwinkel	
-2.2	-5.5	-0.2	+1.0

Frontwinkel | Verzeichnung

Frontwinkel		Verzeichnung	
20.0	22.-	0.0 to 1.0	2.5 to 3.0

Radien, Dicken und Abstände für f = 100 mm.

	1	2	3	4	5	6		d1	d2	d3	d4	d5
	28.5	25.0	1112.2	10.3	10.7	19.6		7.0	3.7	22.5	7.0	1.7

Proj.-Objektiv 1:2.5, f = 5 cm.

1212

Linse | n_d | n_(F-C)

Doppelobjektiv

Einzelobjektiv

1212

F-75-6398-RE

1219

Frau Gramatzki, Berlin-Friedenau 1:2.25 f = 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (in 1/10 mm)

Δs'	Δf'

Δs'			Δf'		
-25.5	-20.7	-13.2	-12.5	-3.5	+2.5

Einfallsblenden | Chromasie

Einfallsblenden			Chromasie
77.0	42.5	19.5	+2.7 s (-2.7 l) +2.7 m

Astigmatismus (3 Zo.)

Sagittalwinkel	Meridionalwinkel

Sagittalwinkel			Meridionalwinkel		
-3.5	-6.5	-9.3	-1.7	-4.7	-8.5

Frontwinkel | Verzeichnung

Frontwinkel			Verzeichnung		
27.6	29.3	26.5	1.7	1.6	1.5

Radien, Dicken und Abstände für f = 100 mm

	1	2	3	4	5	6	7		d1	d2	d3	d4	d5	d6		
	28.2	19.9	42.5	19.1	12.8	10.3	13.0		2.2	1.7	12.5	1.3	2.0	3.1	1.5	2.5	2.0

und 80% gemessen, (resp. 2.3 l.-m.)
Die rund die Normale nicht
soll wird, indem. 19.7.37

Frau Gramatzki, Berlin-Friedenau 1:2.25, f = 100 mm

ca. 83.7

Linse | n_d | n_(F-C)

Doppelobjektiv

Sagittalinse

1212

№ 655

F-75-6398-RE

1220

E. P. № 180949 v. 6 Juni 1922 Beispiel I.

Mr. Warmisham and Hapella

Einzelobjektiv. | Doppelobjektiv

Sphärische Korrection ($\Delta s'$, $\Delta f'$)

$\Delta s'$	$\Delta f'$	$\Delta s'$	$\Delta f'$
		-0,1 -0,3 -0,2 +0,1 +0,3 +0,6	

Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

			12,0	12,0	11,5

Astigmatismus (|)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-2,3 -2,1 -1,0 +1,0 +2,6 +1,0	

Frontwinkel. Verzeichnung. | Frontwinkel. Verzeichnung.

			10,5	12,1	12,6

Radien, Dicken und Abstände für $f = 100$ mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}
44,0	17,8	75,4	25,3	12,3	6,0	14,7	2,0	0,7	0,7	2,3	2,1

E. P. № 180949 v. 6 Juni 1922 Beispiel I.

Mr. Warmisham and Hapella

Hapelat 1:2

Linse	n_d	ν_d	$n_d - n_F$	ν
1	1,617			62,3
2	1,673			32,6
3	1,617			62,3
4	1,673			32,6

Einzellinse. | Doppelobjektiv.

1221

№ 654

F-75-6398-RE

E. P. № 180949 v. 6 Juni 1922. Beispiel II.

Mr. Warmisham and Hapella.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrection ($\Delta s'$, $\Delta f'$)

$\Delta s'$	$\Delta f'$	$\Delta s'$	$\Delta f'$
		-2,2 -2,1 -1,7 -1,0 -1,6 -1,3	

Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

			12,0	12,3	11,6

Astigmatismus (|)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-0,3 -0,3 -0,9 +1,0 +1,3 +1,0	

Frontwinkel. Verzeichnung. | Frontwinkel. Verzeichnung.

			16,6	22,3	16,2

Radien, Dicken und Abstände für $f = 100$ mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}
17,5	16,3	17,1	0,3	7,1	1,7	2,5	0,5	1,0	2,3	2,3	1,2	0,3	2,1

E. P. № 180949 v. 6 Juni 1922 Beispiel II.

Mr. Warmisham and Hapella.

Linse	n_d	ν_d	$n_d - n_F$	ν
1	1,617			
2	1,673			
3	1,673			
4	1,617			

Einzellinse. | Doppelobjektiv.

1222

№ 386

F-73-6398-RE

1222

Zeiss Protar-Doppel-Objektiv f = 2 ... mm

Nr 224103

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs'	Δf'

Δs'	Δf'
-4.8 -3.1 -2.1 -1.5 -0.7 -0.0	

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel	Meridionalbüschel
+2.0 +0.7 -0.4 -1.3 -2.3 -4.5	

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	n1	n2	n3
∞	48.5	48.5	11.4	38.2	48.2	11.8	6.1	2.2	3.0	15.2	1.5	3.0	4.0	1.515	1.613

Zeiss Protar-Doppel-Objektiv f = 2 ... mm Nr 224103

Einzellinse | Doppelobjektiv

Linse | n_D | $n_F - n_C$ | ν

$r_1 = r_2$ | 1.52...

$r_3 = r_4$ | 1.5800

Einzellinse

Doppelobjektiv

a | b

a | b

1222

№ 390

F-73-6398-RE

1223

Zeiss Protar-Doppel-Objektiv f = 30 = 18.3 mm für Projektion

Doppelobjektiv für ... | Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Δs'	Δf'
-1.0 -2.0 -2.5 -2.7 -2.0 -0.6	

Δs'	Δf'
-3.6 -3.2 -2.8 -2.3 -1.7 -0.9	

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel	Meridionalbüschel
-2.0 -2.3 -2.6 -3.0 -3.8 -5.3	

Aequatorialbüschel	Meridionalbüschel
-4.3 -3.8 -3.4 -3.0 -2.6 -2.3	

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	n1	n2	n3
56.5	48.5	47.1													

Zeiss Protar-Doppel-Objektiv f = 30 = 18.3 mm für Projektion

Einzellinse | Doppelobjektiv

Linse | n_D | $n_F - n_C$ | ν

$r_1 = r_2$ | 1.52...

$r_3 = r_4$ | 1.5800

Einzellinse

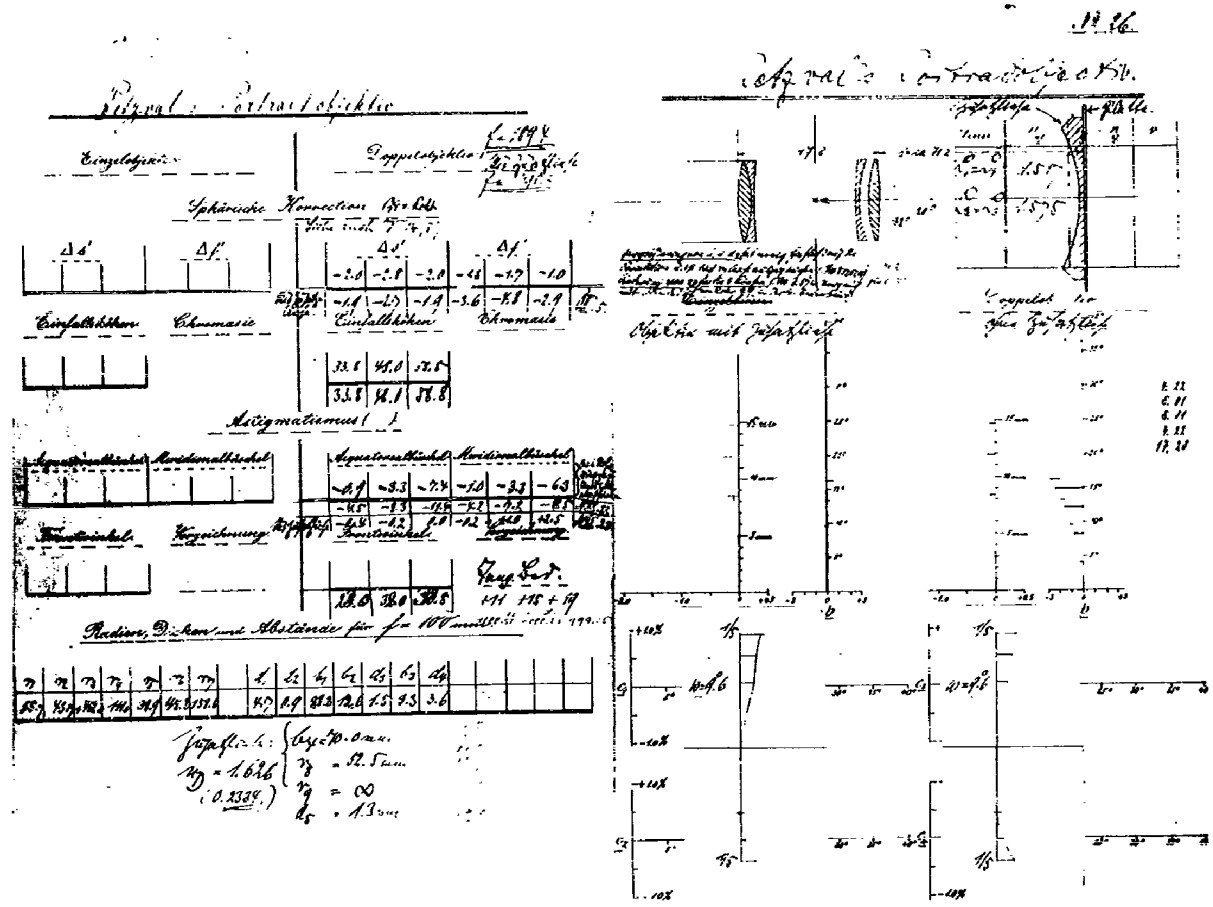
Doppelobjektiv

a | b

a | b

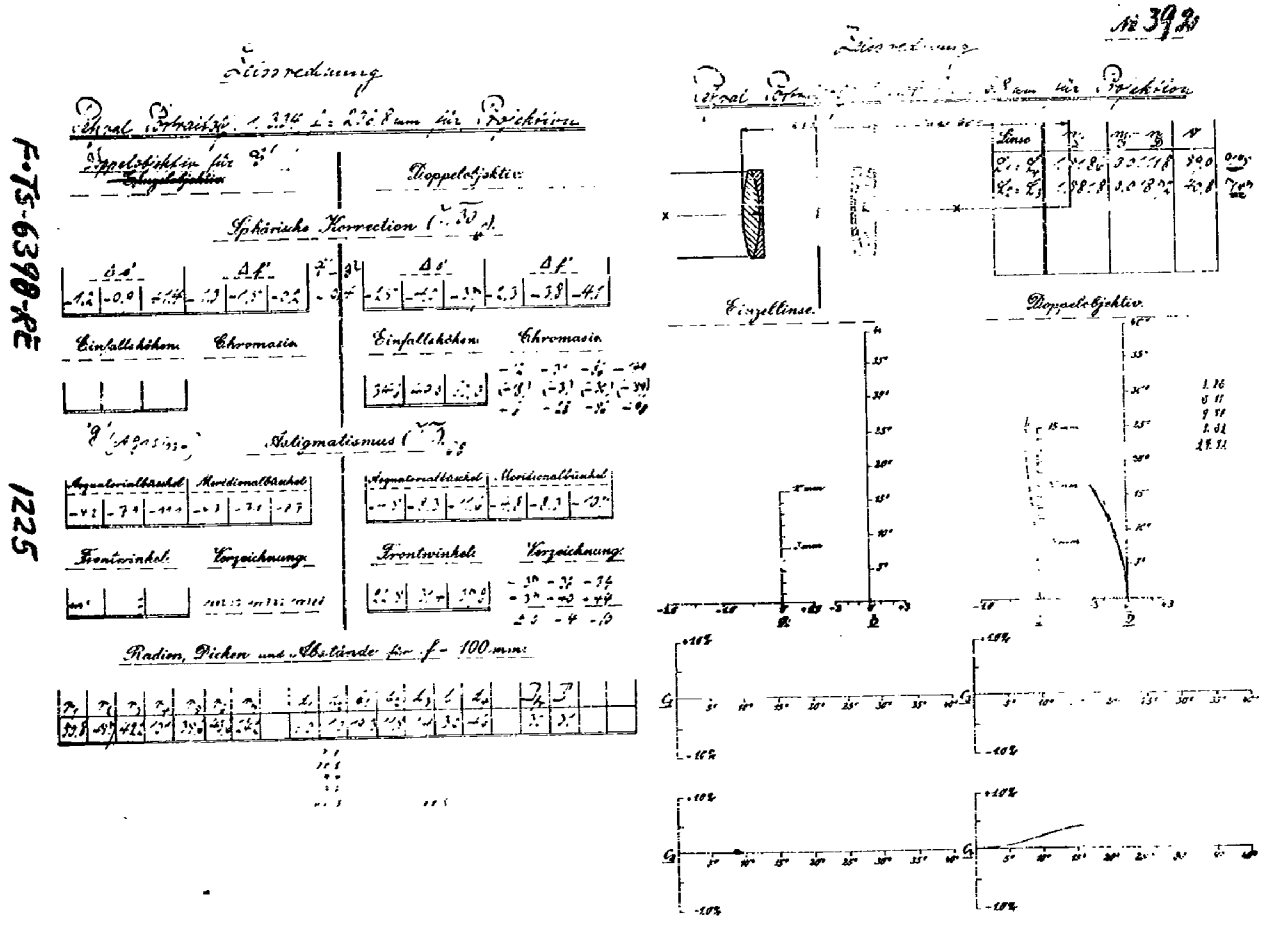
F-Ts-6398-RE

1224



F-Ts-6398-RE

1225



№ 389

F-TS-6398-RE

1226

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsblenden — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse

№ 391

F-TS-6511-RE

1227

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsblenden — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

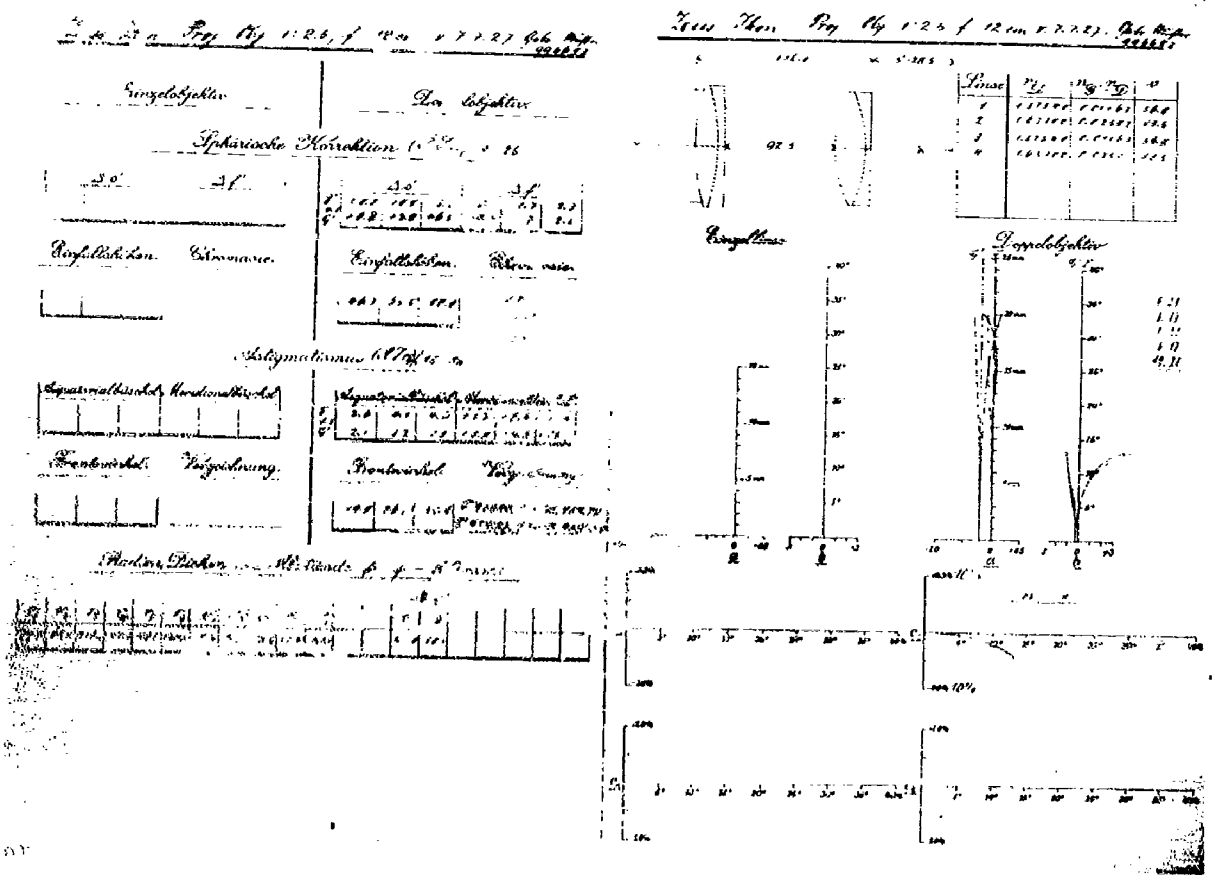
Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Einzellinse — Doppelobjektiv

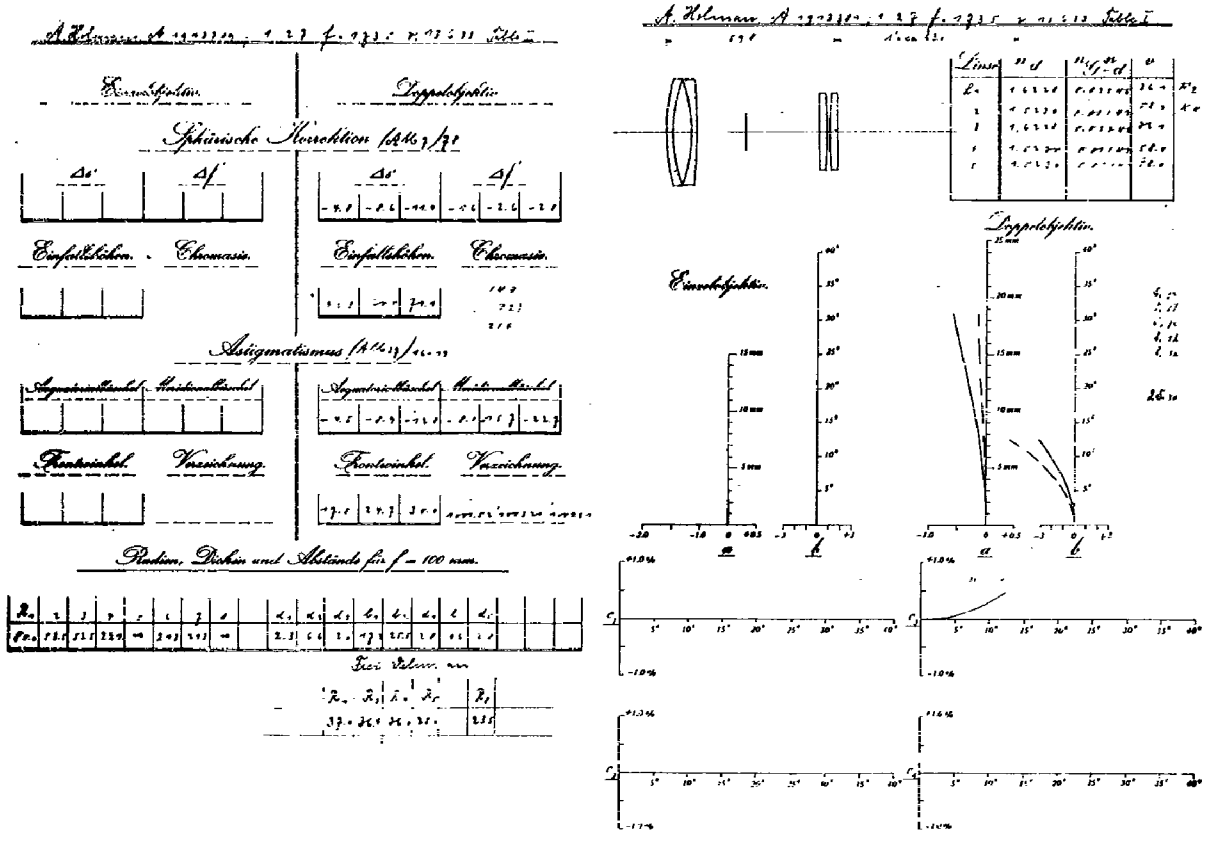
F-15-6348-RE

1228



F-15-6348-RE

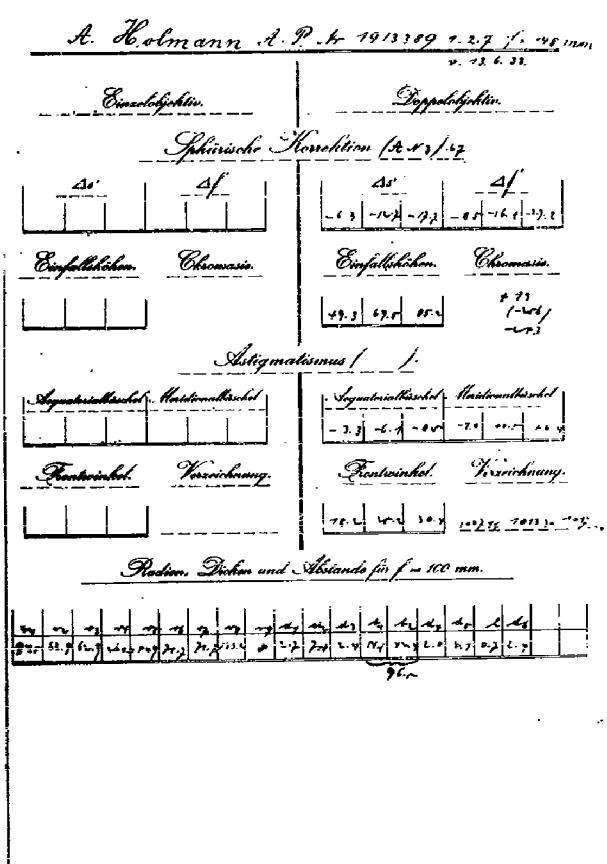
1229

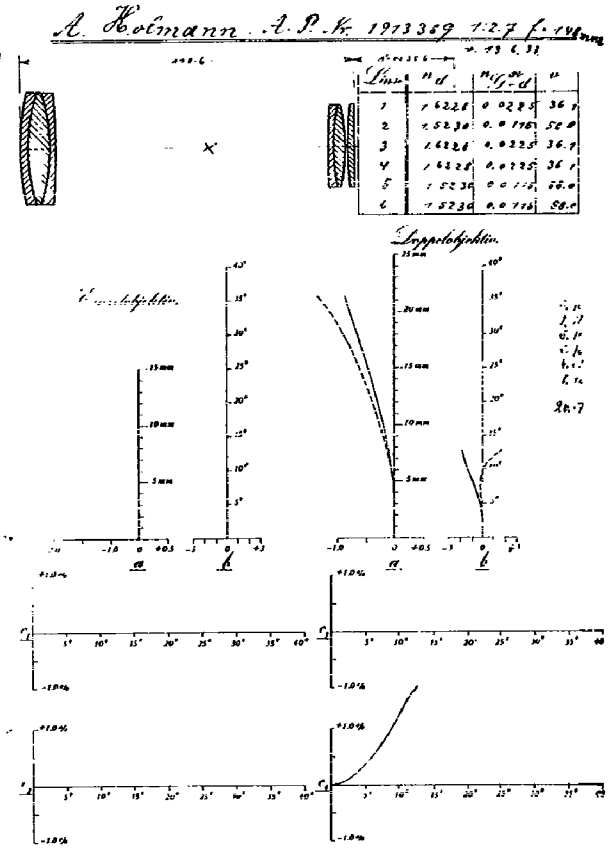


A. 1962

F.75-6398-RE

1230





F-75-6398-RE

537

538

537

F-TS-6398-RE

539

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (Tiefe $\lambda = 70$)

$\Delta s'$			$\Delta f'$		
-1.92	1.31	+0.9	-1.51	2.02	0.19

Einfallshöhen | Chromasie

22.9 | 18.3 | 12.3

	$\Delta s'$			$\Delta f'$	
s	-0.22	-1.83	-0.57	-1.19	-0.75	-0.55
s'	-0.47	-1.27	+0.43	-1.28	-0.43	-0.24

Einfallshöhen | Chromasie

23.8 | 21.4 | 19.15

Astigmatismus (Blende)

Äquatorialbruchst.			Meridionalbruchst.		
-0.9	-2.4	+0.9	-2.4	-2.4	+2.8

Frontwinkel | Verzeichnung

Äquatorialbruchst.			Meridionalbruchst.		
s'	-2.2	-2.7	-0.3	-2.8	-2.4	+0.8
s''	-2.2	-4.2	+0.1	-2.9	-2.2	+0.2

Frontwinkel | Verzeichnung

39 | 51 | 66

Radien, Dicken und Abstände für $f = 100$ mm

0.9	2.3	0.9	12.6	0.1	4.3	4.2	0.1	4.1	2.8	0
2.3	3.2	10.7	23.8	13.5	1.1	2.6	1.4	0.5	1.4	1.3

F. P. No 506 F/2

Linse	n_d	$n_F - n_C$	ν
$L_1 L_2$	1.62070	0.01796	36.9
$L_3 L_5$	1.57250	0.01479	57.3
$L_4 L_6$	1.60590	0.02250	59.3

Einzellinse | Doppelobjektiv

5-34

No 1075

F-TS-6398-RE

Ross Xpress 8¾ Inch. Wide Angle Xpress F/4 Fabr.-Nr. 126577 v. Ross Ltd London

1:4.0 f. 21 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Tiefe)

$\Delta s'$		$\Delta f'$			

Einfallshöhen | Chromasie

$\Delta s'$			$\Delta f'$		
-0.3	-0.1	+0.2	-0.3	-0.3	+0.6

Einfallshöhen | Chromasie

Astigmatismus (Blende)

Äquatorialbruchst.			Meridionalbruchst.		
-1.4	-2.3	-0.9	-1.6	-2.1	-0.4
-0.4	-1.1	-0.2	-2.9	-1.1	-0.3

Frontwinkel | Verzeichnung

Äquatorialbruchst.			Meridionalbruchst.		
-1.4	-0.2	-1.3	-0.4	-0.1	-1.3

Frontwinkel | Verzeichnung

42.3 | 44.6 | 22.4

Radien, Dicken und Abstände für $f = 100$ mm

0.9	2.3	0.9	12.6	0.1	4.3	4.2	0.1	4.1	2.8	0	0.9	2.3	0.9	12.6	0.1	4.3	4.2	0.1	4.1
2.3	3.2	10.7	23.8	13.5	1.1	2.6	1.4	0.5	1.4	1.3	2.3	3.2	10.7	23.8	13.5	1.1	2.6	1.4	0.5

Ross Xpress 8¾ Inch. Wide Angle Xpress F/4 Fabr.-Nr. 126577 v. Ross Ltd London

1:4.0 f. 21 cm

Linse	n_d	$n_F - n_C$	ν
L_1	1.620	0.018	36.3
L_2	1.620	0.018	36.3
L_3	1.575	0.015	57.3
L_4	1.61	0.016	57.3
L_5	1.603	0.021	38.0
L_6	1.603	0.021	38.0

Vorderglied | Hinterglied

Einzelobjektiv | Doppelobjektiv

Carl Zeiss Jena
Rema

F-TS-6398-RE

541

Doppel Hassel 1:4, f 10 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (1911)

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

Astigmatismus (1911)

Aequatorialbüschel. Meridionalbüschel.

Frontwinkel. Vorzeichnung.

Aequatorialbüschel. Meridionalbüschel.

Frontwinkel. Vorzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Einzellinse.

Doppelobjektiv.

Hasselkus 1:4, f = 100 mm E. 295519 v. 16.8.48

F-TS-6398-RE

542

Hasselkus 1:4, f = 100 mm E. 295519 v. 16.8.48

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrection

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

Astigmatismus

Aequatorialbüschel. Meridionalbüschel.

Aequatorialbüschel. Meridionalbüschel.

Frontwinkel. Vorzeichnung.

Frontwinkel. Vorzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Hasselkus 1:4, f = 100 mm E. 295519 v. 16.8.48.

Linse

Hintergl.

Vordergl.

Doppelobjektiv.

K 1102

F-TS-6398-RE

545

Orthometar 1:4,5 f = 27cm Rchg v. 75. 10. 35

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f = 27 / f = 1.2)

Δs' | Δf'

Einfallslothen | Chromasie

Astigmatismus (f = 27 / f = 1.2)

Äquatorialbüschel | Meridionalbüschel

Frontviertel | Verzeichnung

Rechen. Dicken und Abstände für f = 100 mm.

Orthometar 1:4,5 f = 27cm Rchg v. 75. 10. 35

Zweifacher Bildwinkel

Einzelobjektiv | Doppelobjektiv

Koma v. Fraunenhof

5"21 5"

F-TS-6398-RE

546

Meyer-Satz-Plasmat 1:4,5; f. 10cm PA.Nr. 76302

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f = 10 / f = 1.2)

Δs' | Δf'

Einfallslothen | Chromasie

Astigmatismus (f = 10 / f = 1.2)

Äquatorialbüschel | Meridionalbüschel

Frontviertel | Verzeichnung

Rechen. Dicken und Abstände für f = 100 mm.

Meyer-Satz-Plasmat 1:4,5; f. 10cm PA.Nr. 76302

Einzelobjektiv | Doppelobjektiv

V | H

Koma auf der Bildfläche

F-TS-6398-RE

5417

V 1935 № 18. 1:4.5; f = 27 cm Rechg. v. 27. 7. 35.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für f = 100 mm

Δs'	Δf	Δs'	Δf
		-7.9 -6.8 +0.9	-7.9 -6.8 +0.9
		-6.8 -4.1 +0.5	-6.1 -4.0 +0.3

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

		17.3	16.7	17.3

Astigmatismus für f = 100 mm

Sagittalbüschel		Meridionalbüschel		Sagittalbüschel		Meridionalbüschel	
-4.3	-9.3	+1.8	-8.5	-8.5	+1.5		
-3.9	-6.5	-9.3	-9.01	-7.6	-12.8		
				-2.2	-3.1	-2.5	-4.1	-2.5	-6.6	+0.3

Frontwinkel. | Verzeichnung. | Frontwinkel. | Verzeichnung.

93.2	89.7	87.1		37.2	93.5	89.7	+4.1

993.72 993.76 997.14 mm

Radien, Dicken und Abstände für f = 100 mm.

r₁	r₂	r₃	r₄	r₅	r₆	r₇	r₈	r₉	r₁₀	d₁	d₂	d₃	d₄	d₅	d₆	d₇	d₈	d₉	d₁₀
22.5	93.1	193.9	40.3	173.4	193.8	22.1	40.2	82.8	62.3	5.5	1.31	3.21	1.73	2.13	3.1	4.83	2.19	3.1	62.3

V 1935 № 18 1:4.5 f = 27 cm Rechg. v. 27. 7. 35.

Linse	r in d	d in f-d	n
L₁	1.61	+1.8	89.5
L₂	1.61	+1.8	89.5
L₃	1.61	+1.8	89.5
L₄	1.61	+1.8	89.5
L₅	1.61	+1.8	89.5
L₆	1.61	+1.8	89.5

Einzelglieder.

Vorderglied. | Hinterglied.

Einzelobjektiv.

Doppelobjektiv.

a | b | a | b

Tangensabweichung

5.2.17

F-TS-6398-RE

5418

Orthometar 1:4.5, f = 3.5 cm Rechg. v. 12.9.35

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für f = 100 mm

Δs'	Δf	Δs'	Δf
		-9.0	+0.5	+0.5	-1.5	+1.5

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

25.5	20.5	+0.3		

Astigmatismus für f = 100 mm

Sagittalbüschel		Meridionalbüschel		Sagittalbüschel		Meridionalbüschel	
				-2.3	+0.5		0.5	+0.3

Frontwinkel. | Verzeichnung. | Frontwinkel. | Verzeichnung.

			79.5	78.1	

1000.14 1001.40

Radien, Dicken und Abstände für f = 100 mm.

r₁	r₂	r₃	r₄	r₅	r₆	r₇	r₈	r₉	r₁₀	d₁	d₂	d₃	d₄	d₅	d₆	d₇	d₈	d₉	d₁₀
36.5	26.5	171.5	34.4	108.5	60.4	27.5	27.3	17.8	34.5	5.6	1.9	1.41	2.5	2.3	2.5	2.5	1.6	2.1	27.9

D = 25.6 f = 100. 1/2 = 50.4 1/2 = 49.2 S.F.

Orthometar 1:4.5 f = 3.5 cm Rechg. v. 12.9.35 Zeichnung

Linse	r in d	d in f-d	n
L₁	1.61	+1.8	89.5
L₂	1.61	+1.8	89.5
L₃	1.61	+1.8	89.5
L₄	1.61	+1.8	89.5
L₅	1.61	+1.8	89.5
L₆	1.61	+1.8	89.5

Doppelobjektiv.

Einzelobjektiv.

a | b | a | b

Tangensabweichung

Eine tiefe Innenseite!

1.2.37

F-TS-6398-RE

Orthometer 1:4,5, f: 21cm Rechnung v. 19. IV. 1933

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für L_3, f_{546}

Einzelobjektiv.		Doppelobjektiv.	
$\Delta s'$	$\Delta f'$	$\Delta s'$	$\Delta f'$
		-7,6 -7,7 -1,0 -7,3 -0,3 -3,6	

Einzelobjektiv.	Chromasie.	Einzelobjektiv.	Chromasie.
		46,6 36,0 64,4	-15 (-7) -40

Astigmatismus für L_3 und f_{546}

Einzelobjektiv.			Doppelobjektiv.		
Segittalwinkel	Meridionalwinkel		Segittalwinkel	Meridionalwinkel	
-0,5	42,0	111,5	-1,5	-1,3	-0,4
-4,5	-5,0	-5,5	-1,4	-1,1	-0,8

Einzelobjektiv.			Doppelobjektiv.		
Frontwinkel	Verzeichnung		Frontwinkel	Verzeichnung	
47,3	46,1	45,0	33,2	33,6	46,6

Radien, Dicken und Abstände für $f = 100$ mm.

N_d	r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	d_1	d_2	d_3	L_1	L_2	L_3	L_4	L_5	L_6
20,3	119,3	-41,0	47,4	94,4	17,3	49,4	46,3	19,9	118,1	43,2	3,7	0,8	0,2	0,1	2,3	1,3	1,5	4,3	0,8

d_1 d_2 d_3
L_1 L_2 L_3 L_4 L_5 L_6

5469

Orthometer 1:4,5, f: 21cm Rechnung v. 19. IV. 1933

Linse	n_d	$n_F - n_d$	ν
L_1	1,613 722	0,016 944	37,6
L_2	1,744 997	0,019 437	27,8
L_3	1,612 931	0,016 944	36,8
L_4	1,612 931	0,016 944	36,8
L_5	1,612 931	0,016 944	36,8
L_6	1,612 931	0,016 944	36,8

Tangentialfehler | Meridionalfehler

Einzelobjektiv. | Doppelobjektiv.

F-TS-6398-RE

Orthometer 1:4,5 f. 21cm v. 19.IV.33

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für L_3, f_{546}

Einzelobjektiv.		Doppelobjektiv.	
$\Delta s'$	$\Delta f'$	$\Delta s'$	$\Delta f'$
		-11,6 -11,1 -0,9 -11,8 -1,8 -2,8	

Einzelobjektiv.	Chromasie.	Einzelobjektiv.	Chromasie.
		25,6 36,0 49,3	-7,1 -5 -7,1

Astigmatismus für L_3 und f_{546}

Einzelobjektiv.			Doppelobjektiv.		
Segittalwinkel	Meridionalwinkel		Segittalwinkel	Meridionalwinkel	
			-2,0	-2,0	-0,8

Einzelobjektiv.			Doppelobjektiv.		
Frontwinkel	Verzeichnung		Frontwinkel	Verzeichnung	
			39,3	39,0	39,6

Radien, Dicken und Abstände für $f = 100$ mm.

N_d	r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	d_1	d_2	d_3	L_1	L_2	L_3	L_4	L_5	L_6
20,4	99,8	-42,2	43,4	91,3	32,6	42,4	-47,1	37,8	-22,9	57,9	2,5	0,8	3,0	0,3	3,2	3,3	3,7	2,9	1,8

d_1 d_2 d_3
L_1 L_2 L_3 L_4 L_5 L_6

5501

Orthometer 1:4,5 f. 21cm v. 19.IV.33

Linse	n_d	$n_F - n_d$	ν
L_1	1,613 722	0,016 944	37,6
L_2	1,744 997	0,019 437	27,8
L_3	1,612 931	0,016 944	36,8
L_4	1,612 931	0,016 944	36,8
L_5	1,612 931	0,016 944	36,8
L_6	1,612 931	0,016 944	36,8

Einzelobjektiv. | Doppelobjektiv.

F-75-6398-RE

551

Sucher-Objektiv 4:4,5 f. 7,5cm, Rechn. v. 7.12.32

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (9/11/32)

Δs'	Δf'	Einfallshöhen	Chromasie.

Δs'	Δf'	Einfallshöhen	Chromasie.
-14,5 -10,1 -5,5 -1,1 -1,5 -3,3		46,5 36,0 44,1	-2,9 (-0) -1,7

Astigmatismus (9/11/32)

Aequatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung

Aequatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung
-3,5 +1,0 -1,5 +4,6		84,4 76,8	

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
46,3	90,6	18,8	42,3	198,0	244,1	43,3	18,8	90,6	46,3	5,4	1,1	0,3	2,9	6,0	6,0	1,7	0,3	6,3	5,4

Einzellobjektiv.

Doppelobjektiv.

551

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Vergl. auch Darstellg. Nr. 451

Einzellinse

Doppelobjektiv

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (9/11/32)

Δs'	Δf'	Einfallshöhen	Chromasie.

Δs'	Δf'	Einfallshöhen	Chromasie.
-10,7 -7,1 -5,4 -12,3 -12,3 -19		35,6 -15,3 49,6	-4,67 (+0,5)

Astigmatismus (9/11/32)

Aequatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung

Aequatorialbüschel	Meridionalbüschel	Frontwinkel	Verzeichnung
-4,5 -2,7 -1,0 -3,6 -4,0 -7,6		79,2 57,2 64,5	

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
79	188,2	189,2	418,4	113,2	113,2	418,4	189,2	188,2	420,2	16,5	6,0	3,7	1,5	13,5	4,5	2,5	3,9	16,5

F-75-6398-RE

553

V 1935 Kg 75 1:4.5 f= 27 cm Rchg. v. 15.1.35

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1935) f=27

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus f=27 (1935)

Sagittalwinkel | Meridionalwinkel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

V 1935 Kg 75 1:4.5 f= 27 cm Rchg. v. 15.1.35

Linse | n_d | ν_d

Einzelobjektiv | Doppelobjektiv

a | b

Auf Fensterseite Kamera

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554

V 1935 Kg 4 1:4.5 f= 27 cm R. v. 1.6.35

(mit Weitwinkelzusatz)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1935) f=27

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (1935) f=27

Sagittalwinkel | Meridionalwinkel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

V 1935 Kg 4 1:4.5 f= 27 cm R. v. 1.6.35

(mit Weitwinkelzusatz)

Linse | n_d | ν_d

Einzellinsen Innenseite | Doppelobjektiv

a | b

№ 802

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Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

Kerna

№ 741

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Einzelobjektiv

Doppelobjektiv

Sphärisches Korrection

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse nach Frontwinkel

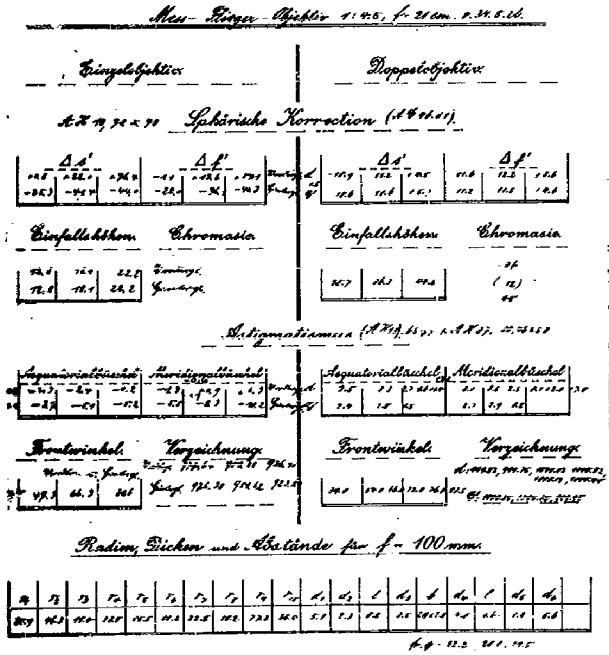
Doppelobjektiv

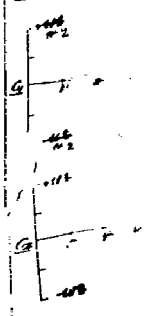
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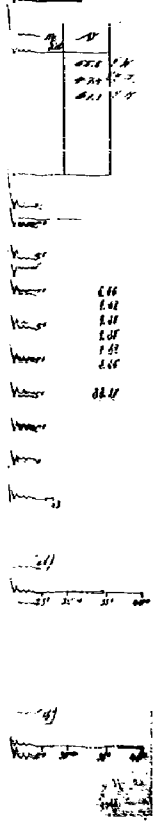
557

F-75-6398-RE

558



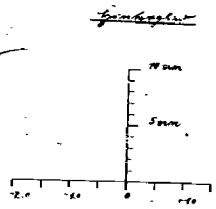


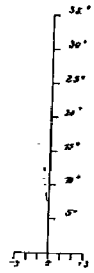


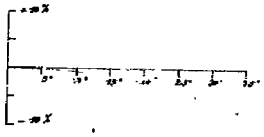
F-TS-6398-RE

559

738







$f_d = 354.1$

$f_L = 329.9$

560

F-TS-6398-RE

Typ 26 Nr 4 f:4,5 f. 21 cm A = 78.66

Einzelobjektiv							Doppelobjektiv						
$\Delta s'$			$\Delta f'$				$\Delta s'$			$\Delta f'$			
+0.5	-0.7	-7.0	-16.5	-12.7	+2.7	Tg Hptl	-1.7	0.7	1	+3	10.3	5.1	
-19.2	-69.8	-72.2	-18.8	-11.7	-12.2	Tg Rand							

Einfallshöhen Chromasie — Einfallshöhen Chromasie

16.8	19.1	22.2			

Astigmatismus (Tg)

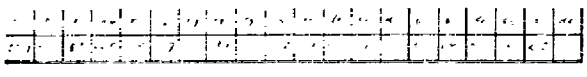
Aequatorialbüschel		Meridionalbüschel			
-2.5	-1.8	+0.3	-7.3	+7.5	+11.2
-3.6	-1.4	-2.7	-6.3	+-	-5.0

Aequatorialbüschel		Meridionalbüschel		

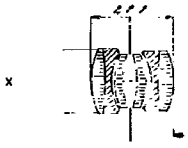
Frontwinkel			Vorzeichnung		
4.23	6.3	17.6	734.11	85.31	61.74
			573.76	56.61	42.7

Frontwinkel			Vorzeichnung		

Radien, Dicken und Abstände für f = 100 mm:



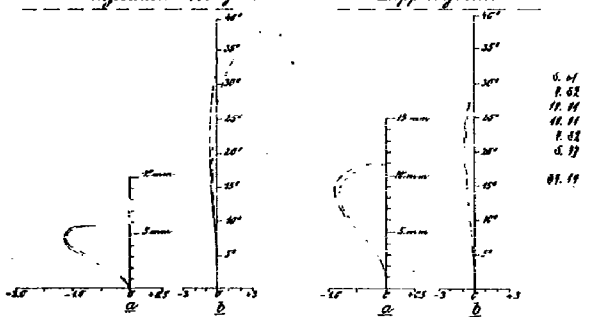
Typ 26 Nr 4 f:4,5 f. 21 cm A = 78.66

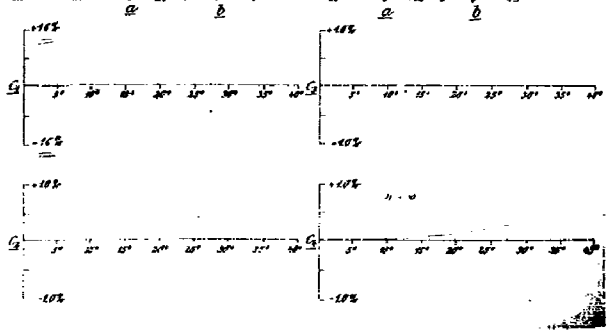


Linse	n_d	$n_F - n_C$	ν
L_1	1.61756	0.01391	55.1
L_2	1.71999	0.01963	29.9
L_3	1.57096	0.01204	61.1
L_4	1.51633	0.01206	64.1
L_5	1.65844	0.01468	39.9
L_6	1.60738	0.01388	56.8

$s'_F = 78.6$

Einzellinse Verkittet — Doppelobjektiv





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Satzlinse 1:4,5 f=15cm (Typ 1945 Nr. 3)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Typ 70)

Δs'			Δf'		
-12,1	-13,0	-12,0	-15,0	-14,3	-13,0

Einfallsblenden			Chromasie
22,3	19,2	15,9	-0,9 (-0,9) -0,7

Δs'			Δf'		
-12,9	-14,3	-0,46	-13,3	-17,5	-5,2

Einfallsblenden			Chromasie
17,1	24,3	19,9	-0,9 (-0,7) -0,3

Astigmatismus (1931) 20

Aequatorialbüschel		Meridionalbüschel			
-2,9	-2,5	+2,7	-2,5	-2,0	+2,4

Frontwinkel		Vorzeichnung
54,2	46,6	69,6	19,73 / 3,04 / 22,0

Aequatorialbüschel		Meridionalbüschel			
-2,2	-2,9	-2,9	-2,0	-2,4	+2,5

Frontwinkel		Vorzeichnung
57,9	54,1	65,5	17,53 / 3,03 / 20,57

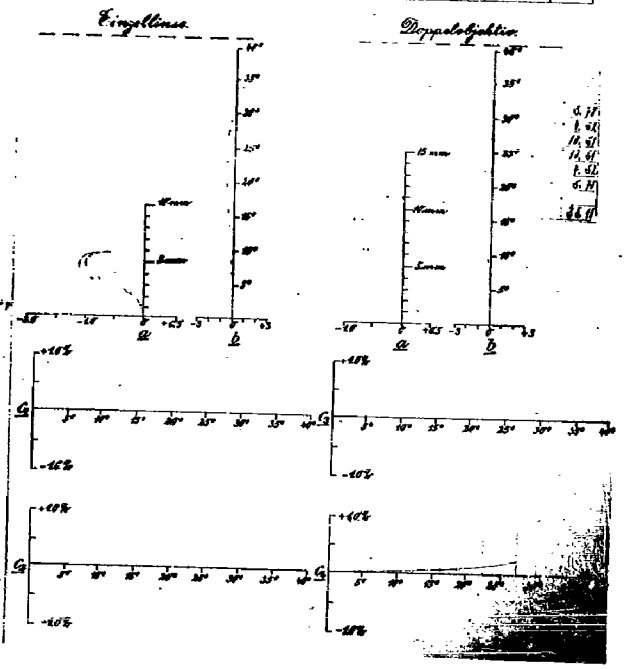
Radien, Dicken und Abstände für f = 100 mm:

r	s	r'	s'	r	s	r	s	r	Z_1	d_1	L_1	d_2	L_2	d_3	L_3	d_4	L_4	d_5	L_5
7,43	22,11	23,5	33,5	23,1	2,03	19,40	26,1	5,5	2,5	2,4	2,9	2,3	1,3	2,9	2,4	2,6	5,5

Satzlinse 1:4,5 f=15cm Typ 1945 Nr. 3

Linse	n_g	$n_g - n_g$	ν
L_1	1,61267	0,01934	56,9
L_2	1,62374	0,01739	47,1
L_3	1,62374	0,01739	47,1
L_4	1,62374	0,01739	47,1
L_5	1,62374	0,01739	47,1
L_6	1,61267	0,01934	56,9

Einzellinse | Doppelobjektiv



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Anastigmat 1:6, f. 1945 C. Z. Nr. 13742 von Jacobi

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Typ 7) 1945 Nr. 3

Δs'			Δf'		
-27,2	-11,9	-17,4	-22,4	-12,1	

Einfallsblenden			Chromasie
19,3	27,2	33,7	-2,2 (-3) -1,0

Δs'			Δf'		
-12,2	-21,1	-2,3	-12,5	-22,5	-0,2

Einfallsblenden			Chromasie

Astigmatismus (Typ 19 / Nr. 3)

Aequatorialbüschel			Meridionalbüschel		
-1,9	-1,9	-1,3	-1,9	+1,9	+2,3

Frontwinkel		Vorzeichnung
24,1	19,5	43,7	-71 -54 -102

Aequatorialbüschel			Meridionalbüschel		
-1,9	-1,9	-1,3	-1,9	+1,9	+2,3

Frontwinkel		Vorzeichnung
24,1	19,5	43,7	

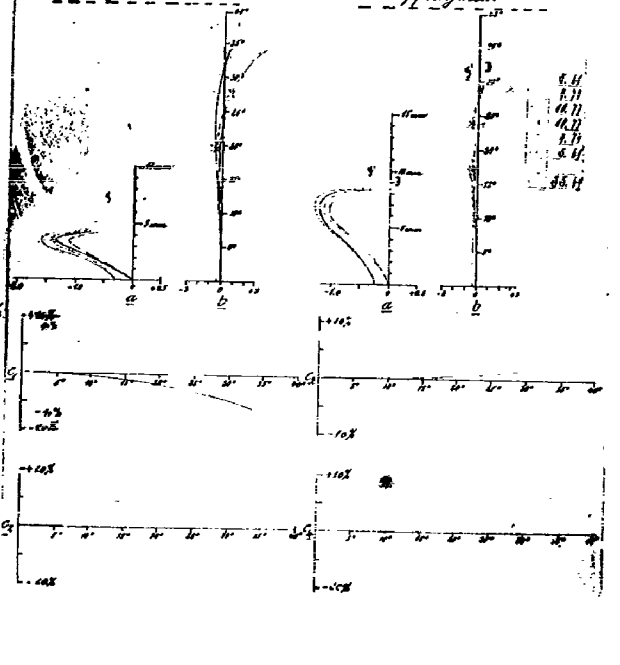
Radien, Dicken und Abstände für f = 100 mm:

r	s	r'	s'	r	s	r	s	r	Z_1	d_1	L_1	d_2	L_2	d_3	L_3	d_4	L_4	d_5	L_5
7,43	22,11	23,5	33,5	23,1	2,03	19,40	26,1	5,5	2,5	2,4	2,9	2,3	1,3	2,9	2,4	2,6	5,5

Anastigmat 1:6 f=15cm Typ 1945 Nr. 3

Linse	n_g	$n_g - n_g$	ν
L_1			61,2
L_2			46

Einzellinse | Doppelobjektiv



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Einzellinse

Doppellinsen

Sphärische Korrektion

Astigmatismus

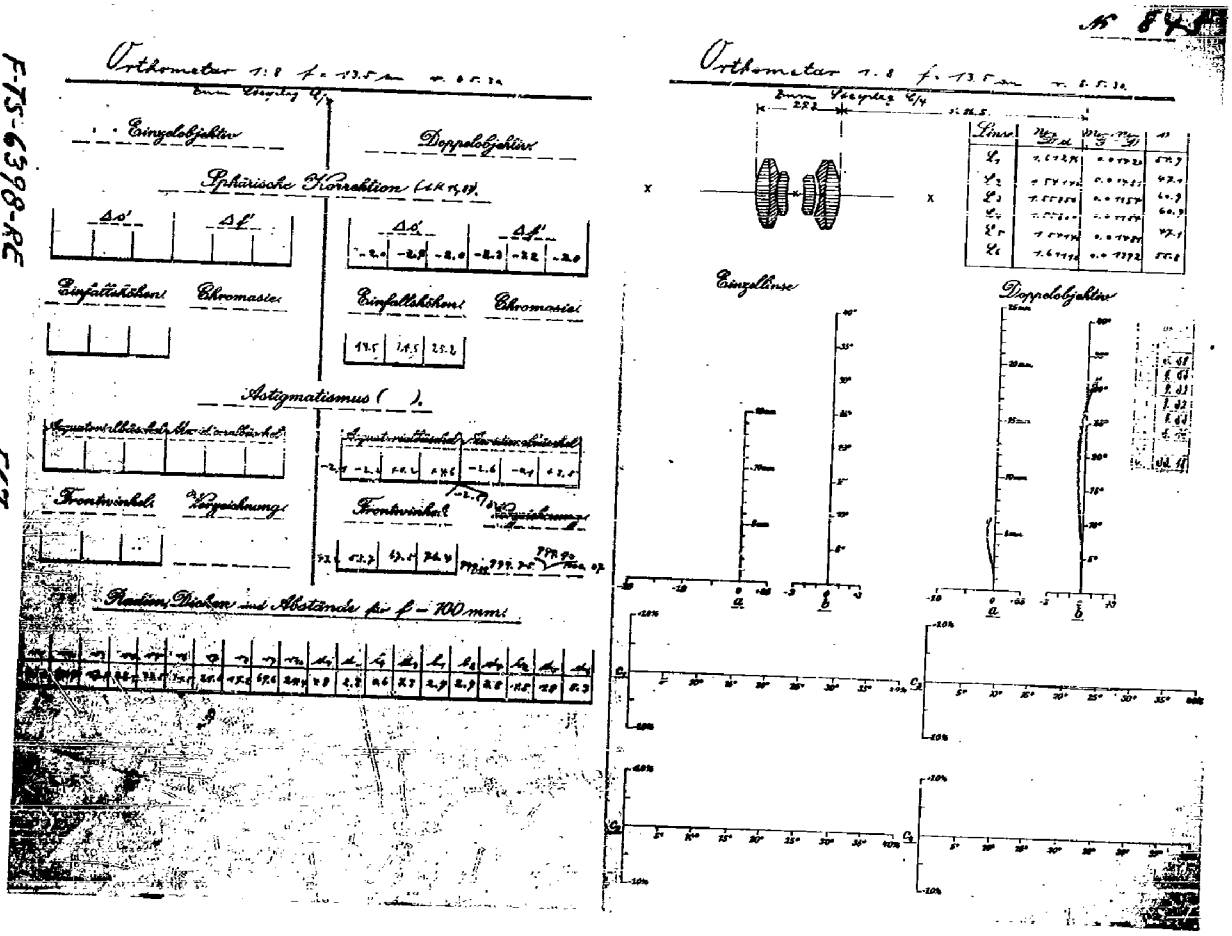
Radien, Dicken und Abstände für f = 100 mm

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Nr 898

Apochromat - Clairon 1:9; f= 100 mm

a. Jos. Schneider & Co. Kreuznach, Pat. 444594 v. 16.3.21. u. 2. 10.13 25/1024

Einzelobjektiv (A 10), f= 50 mm

Doppelobjektiv

Sphärische Korrektion (ΔZ 16 kg)

Δs'			Δf'		
-1.9	-0.3	-0.3	-2.3	-2.0	-0.3

Δs'			Δf'		
-1.0	-1.0	+0.3	-2.3	-4.5	+0.8

Einfallshöhen		Chromasie
6.4	9.5	11.1

-0.9
(-7.7)
-10.6

Einfallshöhen		Chromasie
12.8	18.2	22.0

-0.9
(-3)
-3.2

Astigmatismus (AK 20) 2.5

Aequatorialbüschel		Meridionalbüschel			
-1.9	-2.4	-2.4	-0.9	-1.0	-2.9

Aequatorialbüschel		Meridionalbüschel			
-1.7	-2.9	-3.1	-1.0	-0.9	-2.0

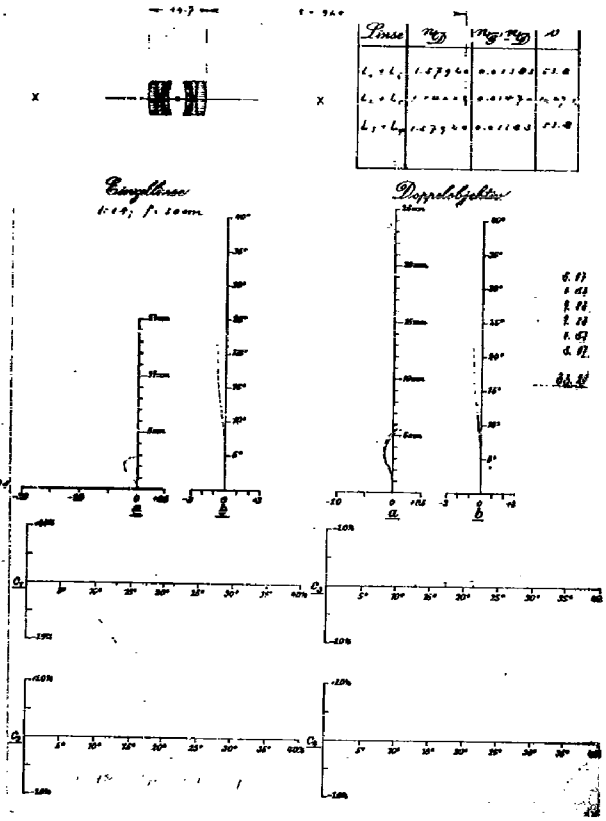
Frontwinkel		Vorzeichnung
30.2	41.0	47.4

Frontwinkel		Vorzeichnung
30.2	41.0	47.4

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10
84.9	198.3	198.1	16.6	224.9	162.4	16.6	198.1	198.3	224.9	3.4	2.2	0.4	4.0	0.05	6.05	4.0	0.9	1.6	3.4

d11	d12	d13	d14
11.9	10.8	16.4	11.0



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Nr 5

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Radarlinse 1:9,1, f. 255 (Abänderung zu 454) v. 8.19

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (ΔZ 8.11)

ΔZ 29.90

Δs'			Δf'		
-185	-139	-97	-177	-154	-103

Δs'			Δf'		
-183	-183	-63	-107	-146	-81

Einfallshöhen		Chromasie
12.7	17.9	20.9

(-9.1)
-10.9

Einfallshöhen		Chromasie
20.1	26.1	29.1

Astigmatismus (ΔKa) 2.0

Aequatorialbüschel		Meridionalbüschel			
-2.0	-2.0	-2.1	-1.9	-1.5	-1.1

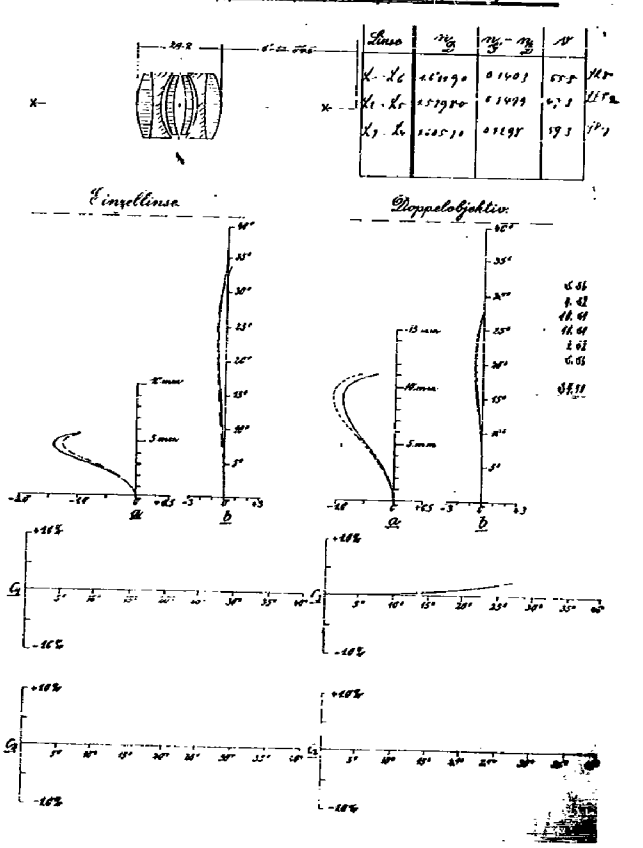
Aequatorialbüschel		Meridionalbüschel			
-1.1	-1.3	-1.5	-1.2	-1.7	-1.5

Frontwinkel		Vorzeichnung
27.1	41.2	51.6

Frontwinkel		Vorzeichnung
24.7	36.0	46.3

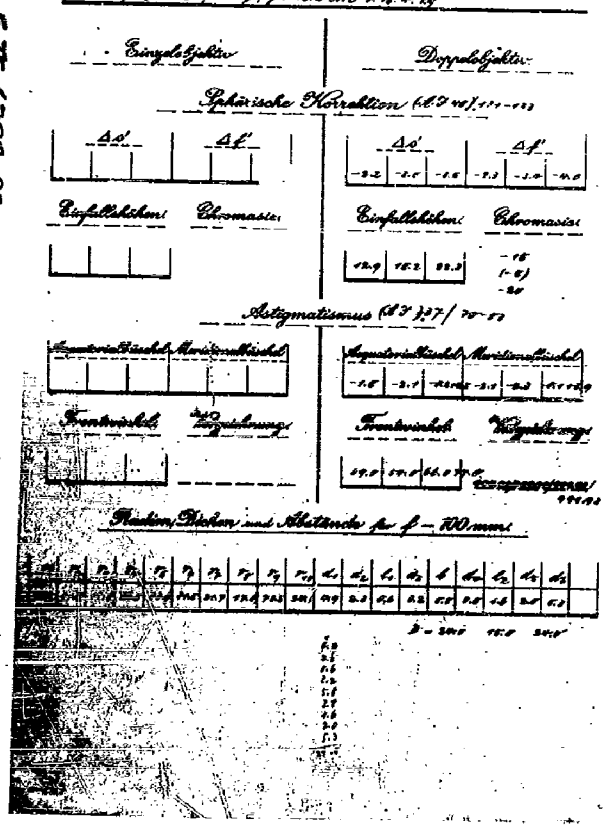
Radien, Dicken und Abstände für f = 100 mm, für d Triplelinse:

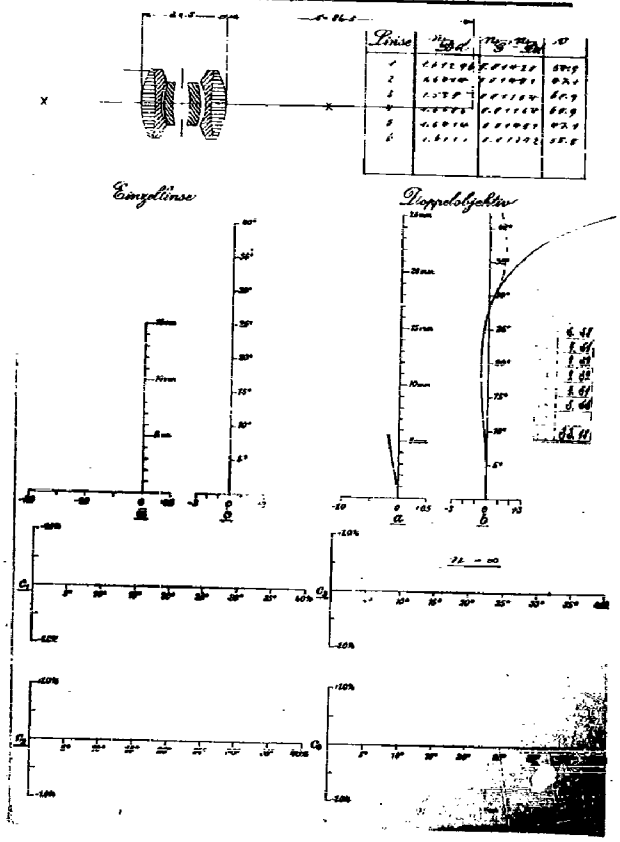
r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10
82	201.2	42.9	118.3	31.9	1.1	2.1	7.5	1.9	1.1	1.1									



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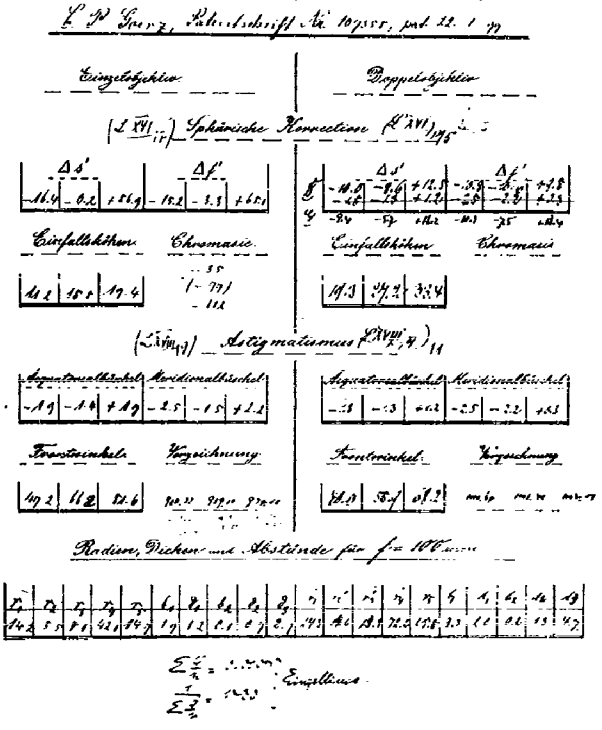
570

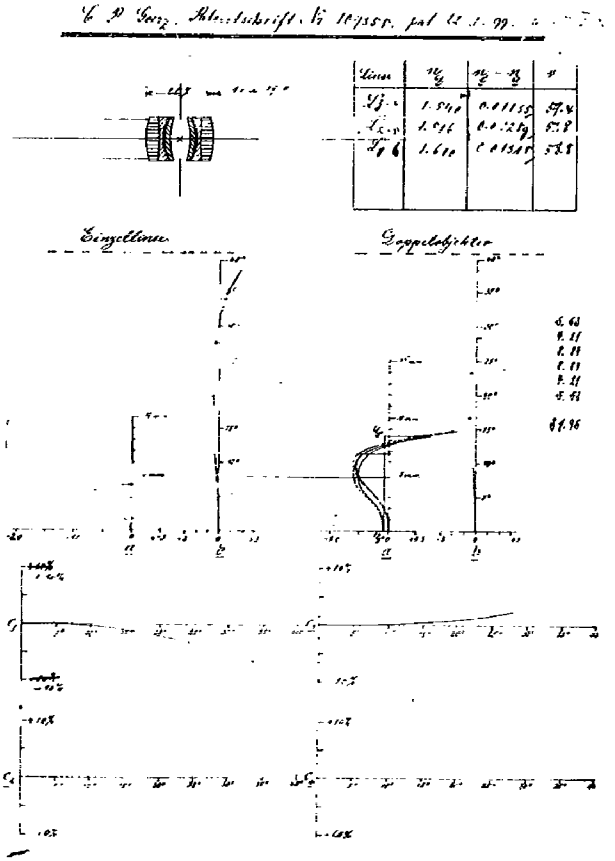




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F-TS-6398-RE

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Doppel Einzelobjektiv

Sphärische Korrektion (Δs'/f'=0)

Einfallshöhen | Chromasie

Astigmatismus (Δs'/f')

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6398-RE

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Doppel Einzelobjektiv

Sphärische Korrektion (Δs'/f')

Einfallshöhen | Chromasie

Astigmatismus (Δs'/f')

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzel Doppelobjektiv

F-TS-6398-RE

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Typ Nr 7 1:2,0 f=7,5 mm für

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δ f' / Δ s')

Δ f' | Δ f'

Einfallslothen | Chromasie

Astigmatismus (Δ s' m / Δ s' s / f' m)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Typ Nr 7 1:2,0 f=7,5 mm für

Einzelobjektiv | Doppelobjektiv

574

F-TS-6398-RE

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Eurygonlinse 1:11, f. 262 mm, Fuess, Meyer & Co. Berlin

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (-4,8 bis 12)

Einfallslothen | Chromasie | Einfallslothen | Chromasie

Astigmatismus (-4 bis 4)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Eurygonlinse 1:11, f. 262 mm, Fuess, Meyer & Co. Berlin

Einzellinse | Doppelobjektiv

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Bausch & Lomb Opt. Co. Rochester. Photographic Lens 6½", f: 14,5 Skala n. 13 R.S.

Daten einer Blendenreihe entnommen.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f, f', f'', ...)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (f, f', f'', ...)

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Bausch und Lomb Opt. Co. Roch. Photographic Lens 6½" f:14,5 n. 13.5. Sk.

Daten einer Blendenreihe entnommen!

Einzelobjektiv

Doppelobjektiv

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Sphärische Korrektion (f, f', f'', ...)

Einzelobjektiv | Doppelobjektiv

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (f, f', f'', ...)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv

Doppelobjektiv

F-TS-6348-RE

578

Einzelobjektiv | Doppelobjektiv

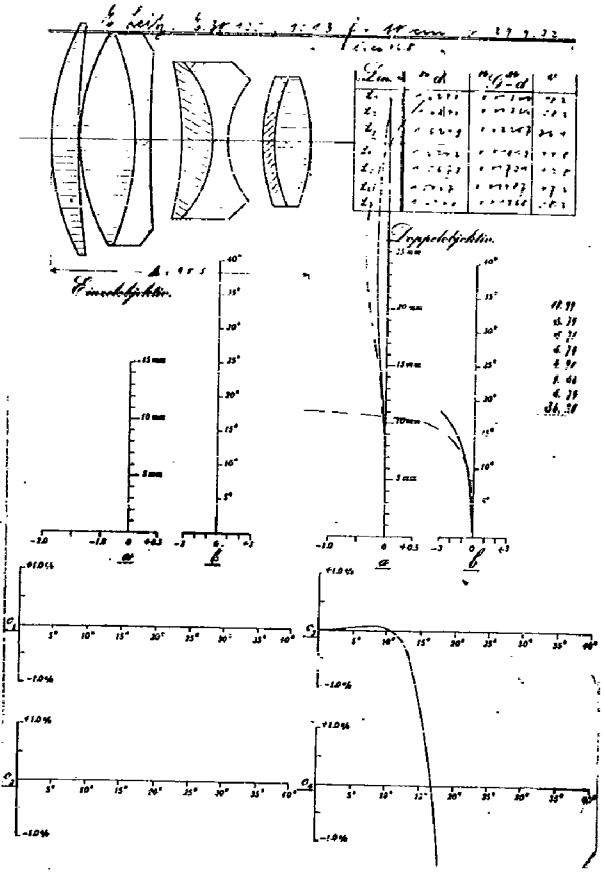
Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm



F-TS-6398-RE

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Einzelobjektiv | Doppelobjektiv

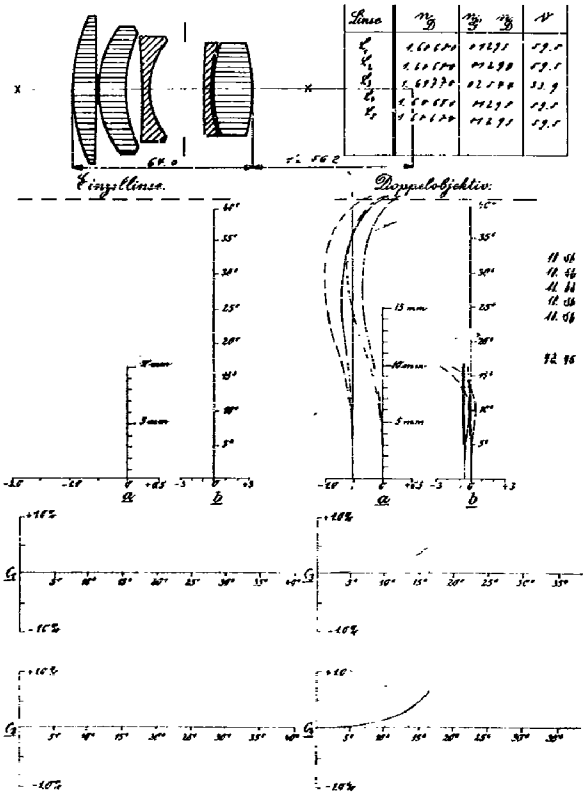
Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für $f = 100$ mm



№ 778

F-75-6398-RE

590

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

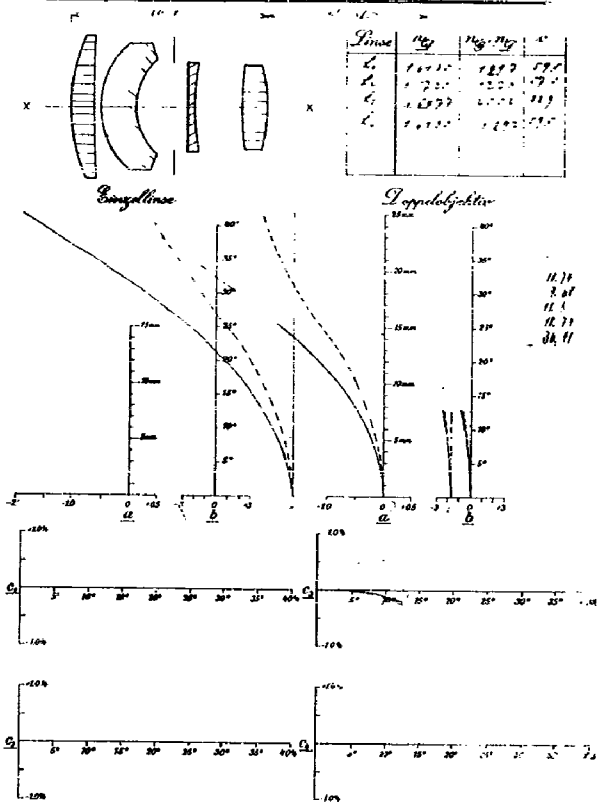
Einfallshöhen — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm



F-75-6398-RE

581

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

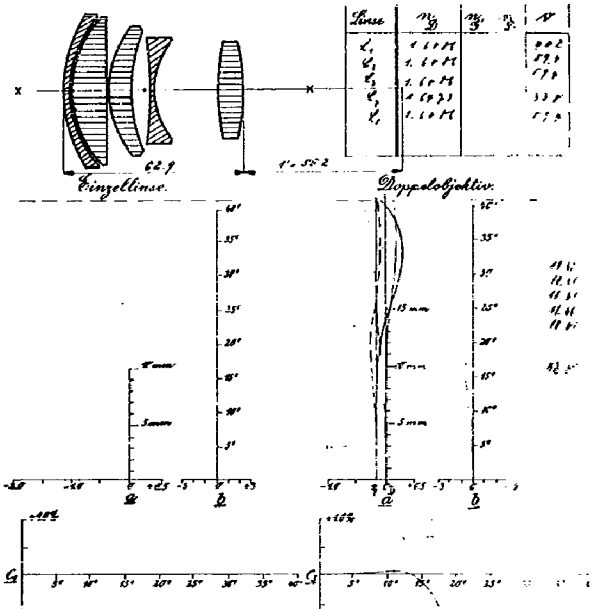
Einfallshöhen — Chromasie

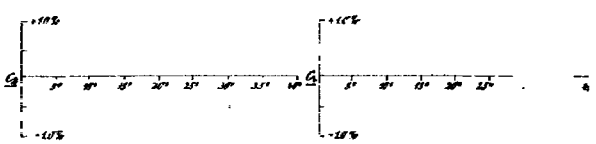
Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm





F-75-6398-RE

584

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallslichtchromasie

Astigmatismus

Frontwinkel

Radien, Dicken und Abstände für f = 100 mm

F-75-6398-RE

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallslichtchromasie

Astigmatismus

Frontwinkel

Radien, Dicken und Abstände für f = 700 mm

F-75-6398-RE

594

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Einzellinse

Doppelobjektiv

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

F-75-6398-RE

585

F-75-6398-RE

586

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (1/4 f.)

Δs'	Δf'

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie

Astigmatismus (1/4 f.)

Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung

Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzellinse

Doppelobjektiv

5-86

46-9

587

F-75-6398-RE

№ 728

Ernemann 1:2 f. 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' Δf')

Einfallshöhen | Chromasie

Astigmatismus (Δs' Δf')

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

F-TS-6388-PZ

588

Einzellinse

Doppelobjektiv

№ 776

C. P. Goerz 1:1,9 f = 10 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

F-TS-6388-PZ

589

Einzellinse

Doppelobjektiv

F-TS-6398-RE

590

Sonnar 1:2 f = 15 cm, Nr. 1697038 Zeiss Ikon 1925 IV

Einzellinse | Doppelobjektiv

Sphärische Korrection (Abb. 32), 40

Δs'	Δs'	Δs'			Δf'
		-0.5	-0.6	-0.5	-0.5	-0.5	-0.5

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

42.5	68.5	94.5	

Astigmatismus (Abb. 33), 40 : 9

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel		
		-2.7	-2.3	-2.5	-2.2	-2.1	-2.1

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

27.5	17	17	+ 10.5 + 23.5 = 34.0

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8
32.2	171.5	160.7	32.9	117.2	41.6	23.3	91.9	409.1	1.11	2.45	9.6	4.56	19.2	12.-	3.41	0.5

Sonnar 1:2 f = 15 cm, Nr. 1697038 Zeiss Ikon 1925 IV

Linse | n_D | $n_F - n_C$ | ν

L_1	1.517		64.5
L_2	1.613		37.0
L_3	1.517		64.5
L_4	1.613		37.0
L_5	(Luft)		

Einzellinse | Doppelobjektiv

11. 11
5. 65
d. 28
11. 65
11. 87
11. 61

570

F-TS-6398-RE

591

Sonnar. Zeiss P. Q. 6404 - 24 f. 11. 12. 24; 1:2.5 f = 100

Einzellinse | Doppelobjektiv

Sphärische Korrection (Abb. 32), 40

Δs'	Δf'	Δs'			Δf'
		-0.5	-0.7	-0.9	-0.8	-0.7	-0.9

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

42.5	68.5	94.5	

Astigmatismus (Abb. 33), 40 : 37

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel		
		-2.5	-2.3	-1.9	-1.7	-1.7	-1.7

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

29.5	40.5	45.5	+ 10.5 + 29.5 = 40.0

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8
44.7	148.8	98.8	39.8	135.-	22.8	22.8	91.5	444.5	1.11	3.33	11.-	4.44	15.-	12.-	3.33	0.5

Sonnar. Zeiss P. Q. 6404 - 24 f. 11. 12. 24 1:2.5 f = 100

Linse | n_D | $n_F - n_C$ | ν

L_1	1.517	0.0229	64.5
L_2	1.613	0.0165	37.0
L_3	1.517	0.0229	64.5
L_4	1.613	0.0165	37.0
L_5	(Luft)		

Einzellinse | Doppelobjektiv

11. 11
d. 65
d. 13
11. 65
11. 61
da. 11

590

F-TS-6398-RE

№ 598

Ernemann Dresden

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbruchsl. Meridionalbruchsl.

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

597

F-TS-6398-RE

№ 591

C. P. Goerz, Berlin

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbruchsl. Meridionalbruchsl.

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

593

F-TS-6398-RE

594

Ernemann 1:2 f. 10 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' Δs')

Einfallshöhen | Chromasie

Astigmatismus (Δs' Δt')

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Ernemann 1:2 f. 10 cm

Linse

Einzellinse

Doppelobjektiv

a | b

G1 | G2

№ 944

F-TS-6398-RE

595

Ernostar 1:1.4 f. 5cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' Δs')

Einfallshöhen | Chromasie

Astigmatismus (Δs' Δt')

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Ernostar 1:1.4 f. 5cm

Linse

Einzellinse

Doppelobjektiv

a | b

G1 | G2

№ 947

F-TS-6398-RE

596

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'	Doppelobjektiv. Δf
		-0,7 -2,0	-1,1 +0,04

Einzelobjektiv. Einfallsblenden	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallsblenden	Doppelobjektiv. Chromasie
		7,7	11:

Astigmatismus (/)

Einzelobjektiv. Sagittenfehlerwinkel	Einzelobjektiv. Meridionalfehlerwinkel	Doppelobjektiv. Sagittenfehlerwinkel	Doppelobjektiv. Meridionalfehlerwinkel
		-2,7 -2,1	-2,5 -0,5

Einzelobjektiv. Fensterwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Fensterwinkel	Doppelobjektiv. Vorzeichnung
		15° 28	17°,

Radien, Dicken und Abstände für f = 100 mm.

| r_1 | r_2 | r_3 | r_4 | r_5 | r_6 | r_7 | r_8 | r_9 | r_{10} | r_{11} | d_1 | L_1 | d_2 | L_2 | d_3 | L_3 | d_4 | L_4 | d_5 | L_5 | d_6 | L_6 | d_7 | L_7 | d_8 | L_8 | d_9 | L_9 | d_{10} | L_{10} | d_{11} | L_{11} | d_{12} | L_{12} | d_{13} | L_{13} | d_{14} | L_{14} | d_{15} | L_{15} | d_{16} | L_{16} | d_{17} | L_{17} | d_{18} | L_{18} | d_{19} | L_{19} |

№ 931

F-TS-6396-RE

598

V1930 Nr 7 1:1.4 f. 8.5cm v. 18.5.30.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A.P.) 1.01

Δs' | Δf'

Einfallshöhen | Chromasien

Astigmatismus ( ).

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

V1930 Nr 7 1:1.4 f. 8.5cm v. 18.6.30.

Einzellinse

Doppelobjektiv

Linse | n_d | $n_g - n_d$ | ν

№ 754

F-TS-6398-RE

597

V 1930 Nr 6, 1:1.4, f. 5cm v. 11.6.30.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1.1.4 fm-fs)

Δs' | Δf'

Einfallshöhen | Chromasien

Astigmatismus (1.1.4) fm - fs

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

V 1930 Nr 6, 1:1.4, f. 5cm v. 11.6.30.

Einzellinse

Doppelobjektiv

Linse | n_d | $n_g - n_d$ | ν

F-TS-6398-RE

600

Sonnar 1:4 f. 5cm

Format 24 × 36 mm

Rechn. Nr. 1227

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion / /

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0,4	-1,0	-0,2	-0,5	-0,1	-0,-

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		-10,5	-12,6	-13,-

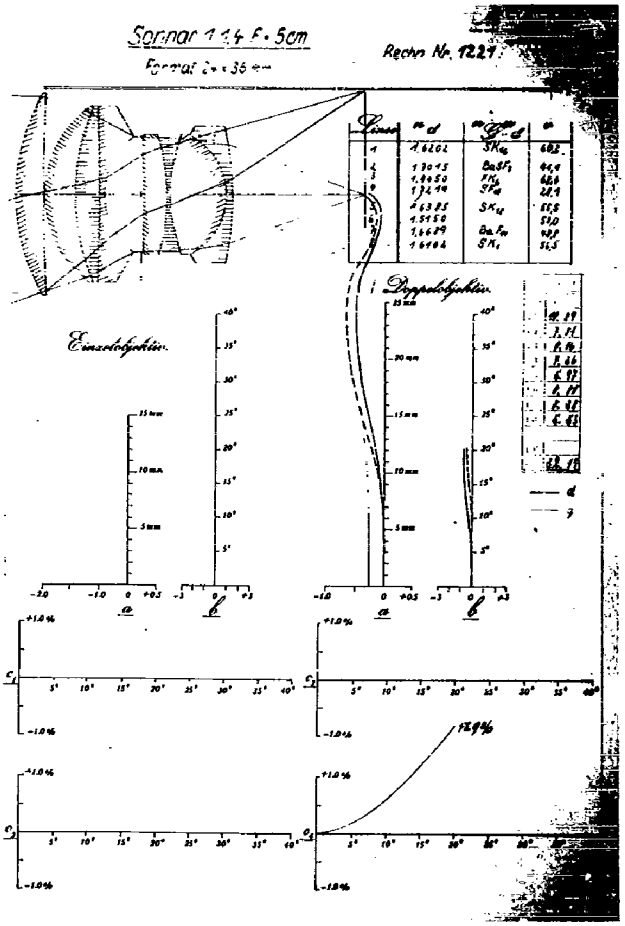
Astigmatismus / /

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-2,98	-3,71	-0,98	-1,76

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		15°	20°	1,2 %	1,9 %

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9
+39,04	+155,8	-42,76	+29,29	-150,6	-25,55	+9,6	-90,6	-38,01	-2,64	-0,41	9,8	0,49	44,1	2,9	2,9	11,5	2,0	1,2	26,0	2,5



№ 965

F-TS-6398-RE

601

Zeiß-Ikon: Sonnar 1:4, f. 2,5cm Rechn. Nr. 991 Z

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (0,4 2,5 /mm)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-1,0	-0,6	1,6	-2,3	-1,4	-1,0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		10,7	11,3	11,8	- 3,7 (1,4,6,6) - 9,9

Astigmatismus (0,4 /mm)

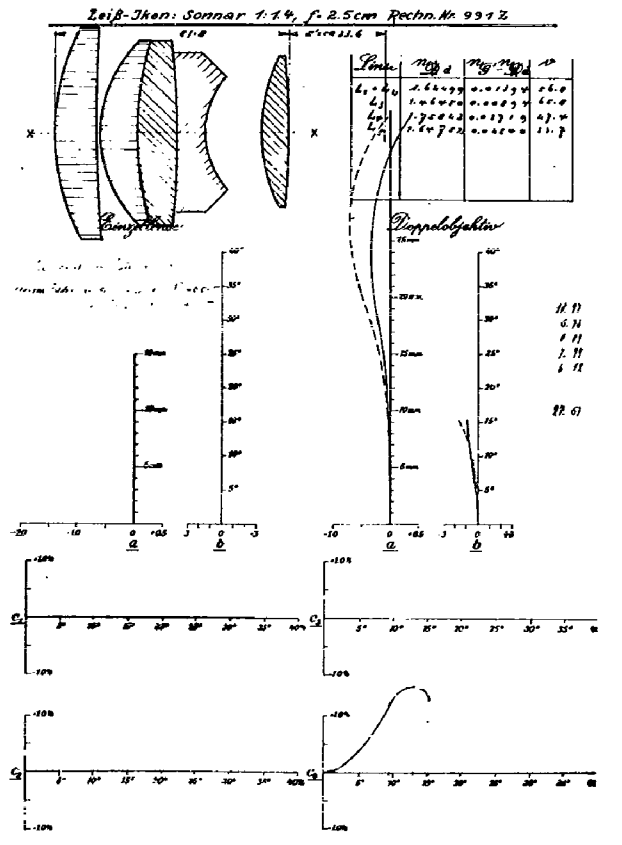
Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-1,1	-1,1	-1,0	-4,1	-2,3	-6,1

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		14,6	21,-	16,5	rund 1,2 bis rund 2,5

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	d_2	d_3	d_4	d_5	d_6	d_7
39,1	148,2	42,8	28,3	402,6	13,3	170,3	402,6	170,3	-0,8	11,-	12,4	170,3	170,6	1,6	9,6	

Zeiß-Ikon: Sonnar 1:4, f. 2,5cm Rechn. Nr. 991 Z



F-TS-6388-RE

604

Sonnar 1:1,5 f=5cm

Rechn 1772

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/).

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'	Doppelobjektiv. Δf
		-2	-0,3 -1,9 -1,0 -1,5 -2,8 -1,9 -5,3

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		+20,5	+19,7 +22,0 +30,5

Astigmatismus (/).

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel	Doppelobjektiv. Meridionalbüschel
		-0,6	+2,- -2,2 -1,3 -0,06 -0,5 -0,3 -0,5

Einzelobjektiv. Feldwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Feldwinkel	Doppelobjektiv. Verzeichnung
		8°	15° 20° 22°

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9
166,67	+22,90	+15,38	+72,37	∞	-22,91	+34,13	-15,91	-22,39	-90,32	9,1	0,6	14,9	3,0	1,9	15,6	3,0	14,9	2,0

Linse | n_d | ν_d | $P_{g,d}$ | ω

L_1	1,66089	58,4	0,5
L_2	1,66089	58,4	0,5
L_3	1,64950	60,9	0,5
L_4	1,72419	50,3	0,5
L_5	1,70365	41,5	0,6
L_6	1,66089	58,4	0,5
L_7	1,69893	54,3	0,5

Doppelobjektiv.

Einzelobjektiv.

12, 13
K 14
K 15
K 16
K 17
K 18
K 19
Cl 19
Sk 19

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603

Rdy. 1273

K 1160

Sonnar 1:1,5 f=15cm für 11/2 Kinolinsen

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/).

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'	Doppelobjektiv. Δf
		-1,1	-0,7 -1,- -1,0 -1,5 -1,3

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		15°	12,7 13,1

Astigmatismus (/).

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel	Doppelobjektiv. Meridionalbüschel
		-2,7	-2,1 -1,- -1,-

Einzelobjektiv. Feldwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Feldwinkel	Doppelobjektiv. Verzeichnung
		15°	2,-

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	d_{10}
+9,81	+3,11	+2,-	+3,71	+2,-	+3,-	+2,-	+2,-	+2,-	+2,-	+2,-	0,-	0,-	0,-	0,-	0,-	0,-	0,-	0,-	0,-	0,-

Linse | n_d | ν_d | $P_{g,d}$ | ω

L_1	1,6098	57,8	0,5
L_2	1,6098	57,8	0,5
L_3	1,6097	57,8	0,5
L_4	1,7273	49,1	0,5
L_5	1,6162	49,2	0,5
L_6	1,6098	57,7	0,5
L_7	1,6153	49,1	0,5

Doppelobjektiv.

Einzelobjektiv.

12, 13
K 14
K 15
K 16
K 17
K 18
K 19
Cl 19

F-TS-6398-RE

604

Nr. 1064

Sonnar 1:1.5 f=5cm

Einzellinse

Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

Nr. 1064

F-TS-6398-RE

605

Sonnar 1:1.5, f=5cm, Zeichnung Nr. 1109

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

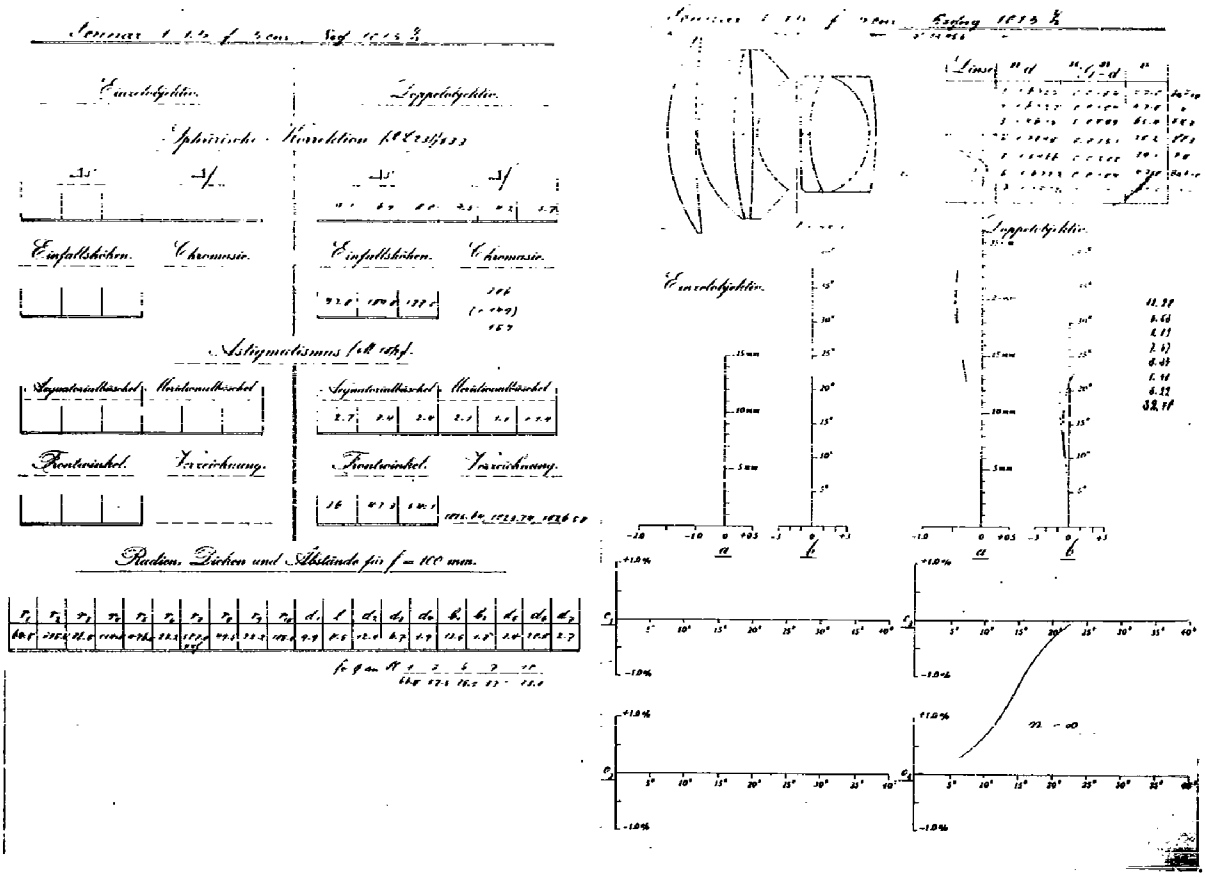
Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

973

F-TS-6398-RE

606



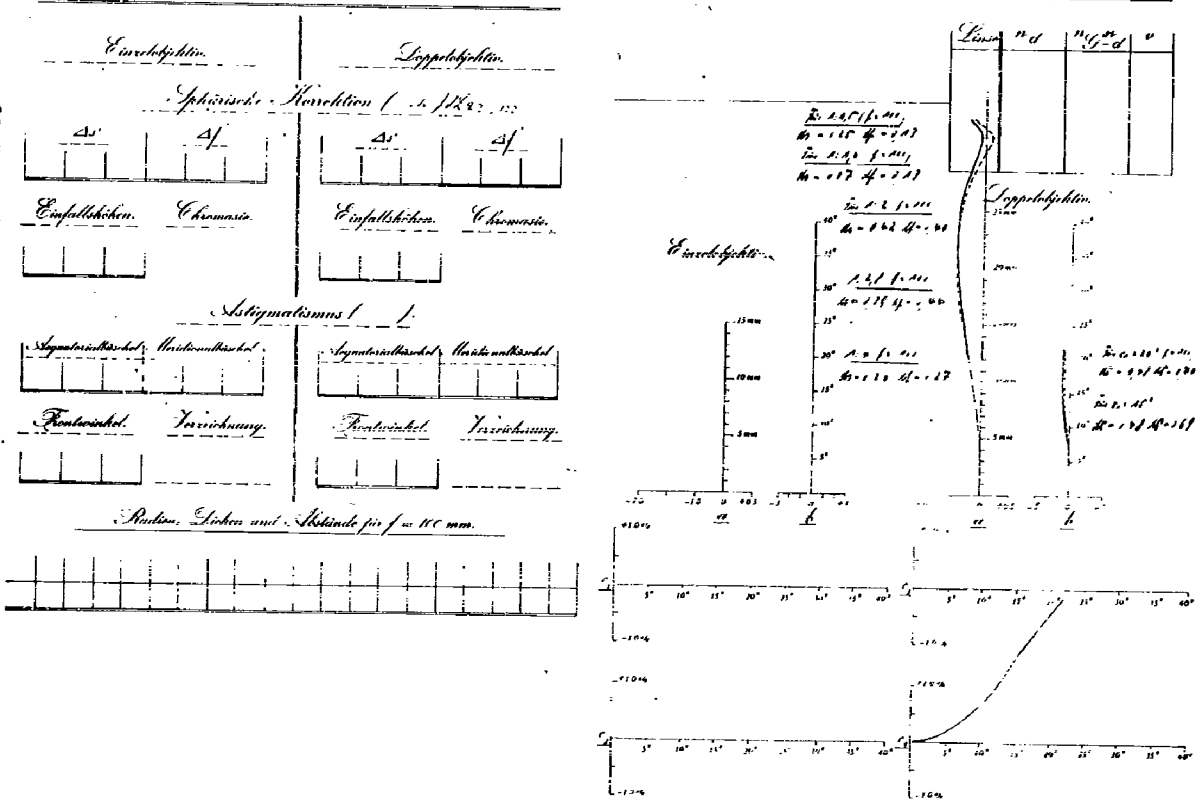
606

Duplikat

Sonnar 1:4,5 f=5 cm R. 10132 Nr. 973

F-TS-6398-RE

607



607

F-Ts-6398-RE

Sonnar 1:1.5, f=5cm, Kapsel 11632

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AN5) 117

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (ANN) 19

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r	d	r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	d_5	d_6	d_7	d_8	d_9
35.2	35.2	94.1	12.1	42.4	88.3	-17.3	2.0	73.4	9.3	0.4	42.4	2.4	1.9	44.5	1.9	8.3	46.4	4.6

Sonnar 1:1.5, f=5cm, Kapsel 11632

Linse | n_d | n_F-d | ν

Einzelobjektiv | Doppelobjektiv

a | b | a | b

607

F-Ts-6398-RE

Jena-Tessar, Serie I 1:1.5 f=10cm ... 98 ...

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AS1) M-J1

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (AS1) M-J1

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Jena-Tessar, Serie I 1:1.5 f=10cm ... 98 ...

Linse | n_d | n_F-d | ν

Einzellinse | Doppelobjektiv

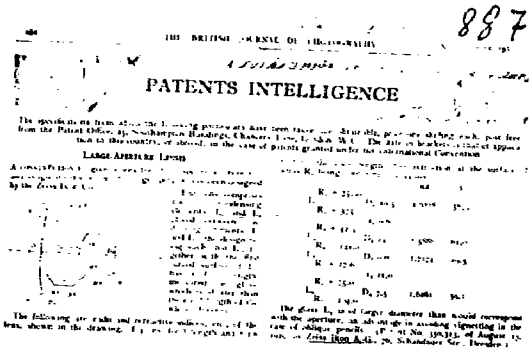
a | b | a | b

609

887

F-75-6398-RE

610



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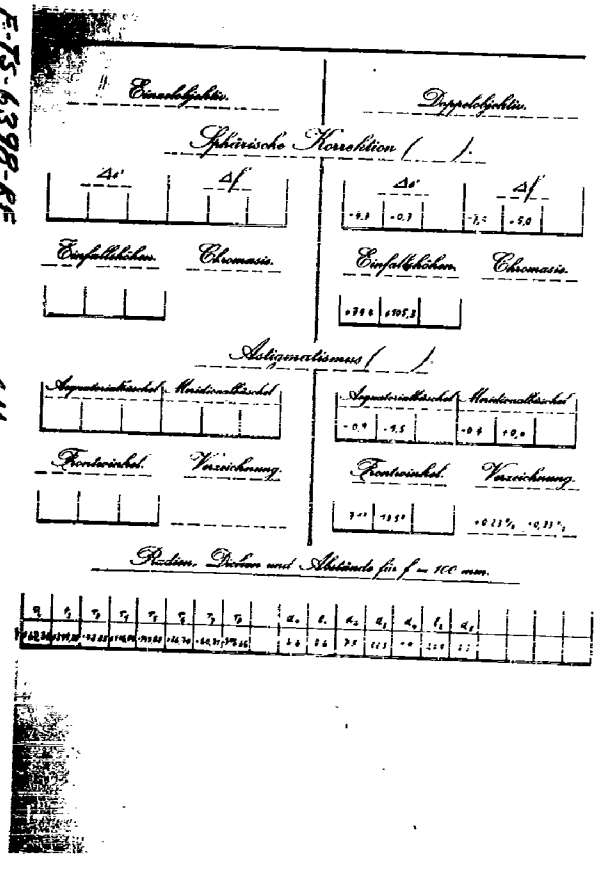
PATENTS INTELLIGENCE

LARGE APERTURE LENSES

610

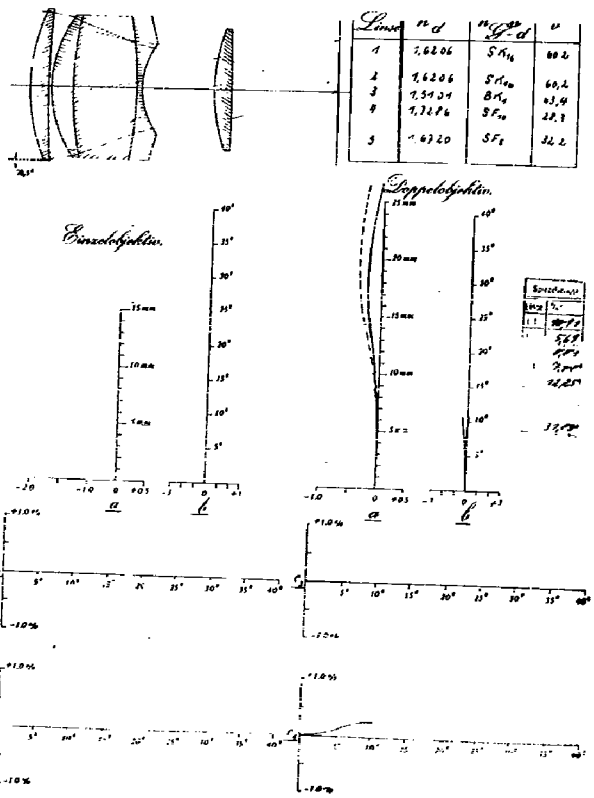
611

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Alinar 1:1,9 F = 9cm Recom. Nr. 1201

1208



F-TS-6398-RE

612

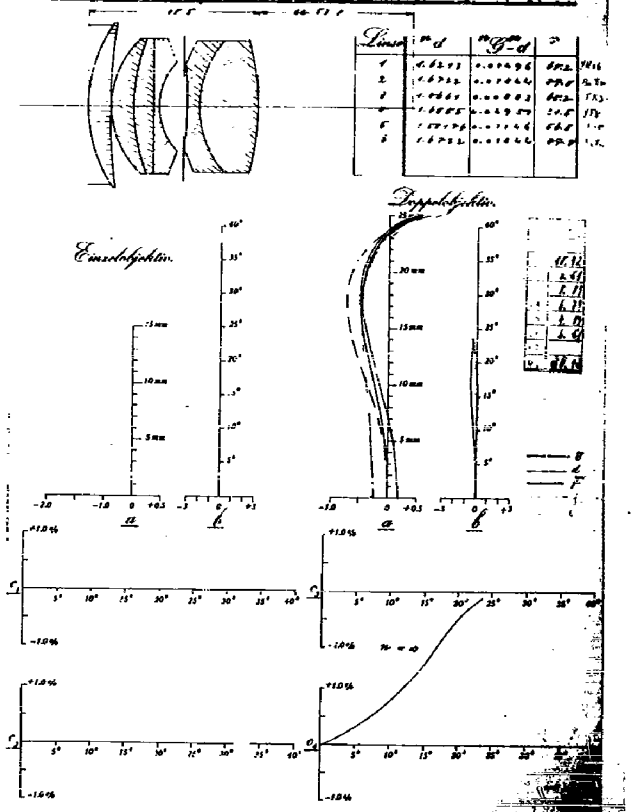
Sonnar 1:2 f=5cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.



F-TS-6398-RE

613

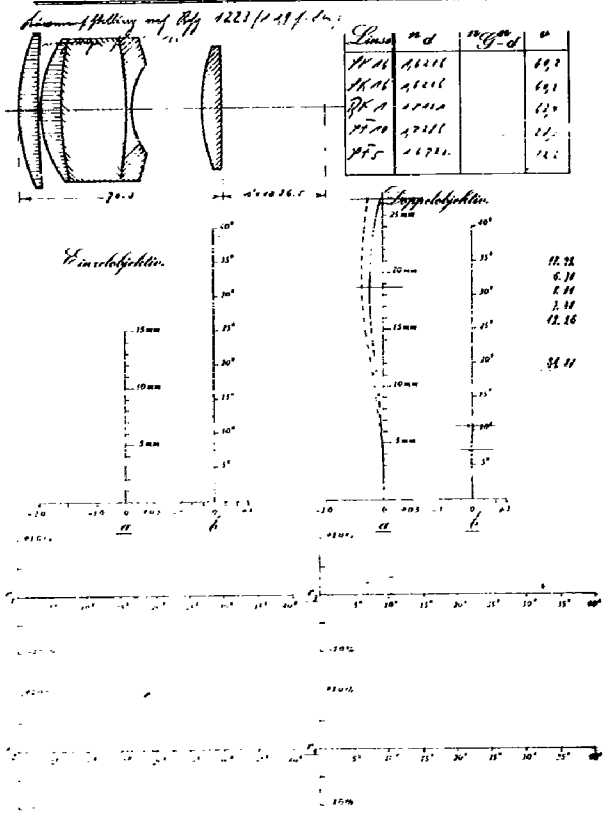
Projektionsanastigmat Sonnar 1:2,9 f=8cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.



№ 944

F-TS-6398-RE

Sonnar 1:2, f. 5cm, Rechnung Nr. 988 vom 12.12.1931

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (yz, sin u)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (y, x, sin u)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Sonnar 1:2, f. 5cm, Rechnung Nr. 988 vom 12.12.1931

Einzellinse

Doppelobjektiv

Linse | n_d | $n_g - n_d$ | ν

6 14

6 14

F-TS-6398-RE

Sonnar 1:2 f. 5cm v. 30.10.31 Rechn. Nr. 988/8

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (yz, sin u).

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus ( ).

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Sonnar 1:2 f. 5cm v. 30.10.31. Rechn. Nr. 988/8

Einzellinse

Doppelobjektiv

Linse | n_d | $n_g - n_d$ | ν

6 15

6 15

F-TS-6398-RE

616

№ 911

Sonnar 1:2 f. 5cm v. 3.9.37 Rech. Nr. 956

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einzelobjektiv: Δs' | Δf'

Doppelobjektiv: Δs' | Δf'

Einfallshöhen | Chromasien

Einfallshöhen | Chromasien

Astigmatismus ( ).

Äquatorialbüschel | Meridionalbüschel

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
52.6	178.8	32.8	-82.	30.2	22.2	34.2	2.200	7.7	0.2	9.1	5.1.8	4.4	12.7	5.2	12.3			

Sonnar 1:2 f. 5cm v. 3.9.37 (Rech. Nr. 956)

Einzellinse

Linse | $n_{e'}$ | $n_{F'}-n_{C'}$ | ν

1 | 1.6772+0 | 0.0122+0 | 56.8
2 | 1.6779+0 | 0.0122+0 | 56.1
3 | 1.6154+0 | 0.0088+0 | 61.2
4 | 1.6189+0 | 0.0123+0 | 57.2
5 | 1.6613+0 | 0.0144+0 | 57.7

Doppelobjektiv

11.11
1.63
2.11
1.73
12.11
31.71

a | b | a | b

C_2 | C_2

C_2 | C_2

616

F-TS-6398-RE

617

№ 888

Zeiss-Ikon Berlek 1:2 f. 100 mm Ref. v. (1:2.8)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einzelobjektiv: Δs' | Δf'

Doppelobjektiv: Δs' | Δf'

Einfallshöhen | Chromasien

Einfallshöhen | Chromasien

Astigmatismus (22°).

Äquatorialbüschel | Meridionalbüschel

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
47.6	173.5	38.-	72.6	131.6	62.5	47.3	124.4	1.5	4.3	2.5	2.4	1.7	2.3	1.5	2.5			

Zeiss-Ikon Berlek 1:2 f. 100 mm Ref. v. (1:2.8)

Einzellinse

Linse | $n_{e'}$ | $n_{F'}-n_{C'}$ | ν

L_1 | 1.6.233 | 0.0179 | 57.5
L_{1a} | | | |
L_2 | 1.6.7.10 | 0.0.0.0 | 61.7
L_3 | 1.72.2.0 | 0.0.6.7 | 49.4
L_4 | 1.6.9.3.0 | 0.0.3.0.3 | 57.5

Doppelobjektiv

11.53
0.11
1.11
1.49
12.31
31.53

a | b | a | b

C_2 | C_2

C_2 | C_2

F-TS-6398-RE

619

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-10.28 | -0.95	-21.96 | +2.76
Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		+20.90 | +9.25	

Astigmatismus (/)

Sagittale Bildweite	Meridionale Bildweite	Sagittale Bildweite	Meridionale Bildweite
		-7.91 | -7.93 | -7.60	-0.34 | -0.55 | -7.99
Fernsichtw.	Verzeichnung.	Fernsichtw.	Verzeichnung.
		-7.5°	2.0° | 2.2°

+0.35% +0.83% +0.91%

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	t_1	d_2	d_3	d_4	t_2	d_5	d_6	d_7
+40.57	+20.52	+9.55	+6.39	-24.55	+28.39	-32.30	-8.81	+11.39	-8.83	6.9	0.9	3.3	3.6	7.9	0.5	19.0	4.7	12.5

Sonnar 1:2 F=5cm

Format 24×36 mm

Nr. 1179

Rechn. 1263 vom Apr. 49.

Linse | n_e d | n_e ν_e-d | ν_e

Linse	n_e d	n_e ν_e-d	ν_e
L_1	+62.96	SK_{16}	60.3
L_2	+36.75	$Ba\,SF_2$	44.9
L_3	+54.83	LLF_2	45.0
L_4	+8773	SF_2	30.1
L_5	+1.00	SK_{16}	60.3
L_6	+57.50		56.0
	+80.[illegible]	$Ba\,F_{10}$	42.9

Einzelobjektiv. | Doppelobjektiv.

11. 49
3. 49
2. 49
5. 49
6. 49
8. 49
4. 46
44. 49

d
f

L 1 9.

F-TS-6398-RE

619

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
-8.44 | -8.27		-19.76 | +5.86	
Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		+64.66 | +18.03	

Astigmatismus (/)

Sagittale Bildweite	Meridionale Bildweite	Sagittale Bildweite	Meridionale Bildweite
-7.65 | -7.98 | -8.28		-0.67 | -0.39 | -0.13	
Fernsichtw.	Verzeichnung.	Fernsichtw.	Verzeichnung.
		19°	13° | 13.4°

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	t_1	d_2	d_3	d_4	t_2	d_5	t_3	d_6
+58.06	+30.9	+14.02	+8.80	-28.61	+34.85	-45.0	+37.5	-33.90		6.8	0.5	1.8	5.4	2.9	16.0	4.7	1.6	2.9	4.7

Sonnar 1:2 F = 7cm

Format 24×36 mm

Rechn. Nr. 1269 Z

v. 23. 5. 49

Nr. 1179

Linse	n_e d	n_e ν_e-d	ν_e
L_1	1.63316	SK_{16}	58.7
L_2	1.67019	$Ba\,F_{10}$	47.9
L_3	1.50158	K_{20}	56.8
L_4	1.6872	SF_2	34.3
L_5	1.5899	LLF_2	45.9
L_6	1.6649	$Ba\,F_{10}$	47.9

Einzelobjektiv. | Doppelobjektiv.

11. 49
3. 49
2. 49
5. 49
3. 49
6. 48
44. 49

g
C
d

F-73-6398-RE

6450

Sonnar 1 : 2 f = 8cm Rechn. 1184

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/).

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'	Doppelobjektiv. Δf
		-0,88 -1,0 0,0 -0,9 -2,8 -4,8	

Einzelobjektiv. Einfallsh.	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallsh.	Doppelobjektiv. Chromasie.
		70,0 90,0 93,2	

Astigmatismus (/).

Einzelobjektiv. Sagittenallbarkeit	Einzelobjektiv. Meridionalbarkeit	Doppelobjektiv. Sagittenallbarkeit	Doppelobjektiv. Meridionalbarkeit
		-1,95 -2,65 -1,26 -0,90 -0,31 -0,00	

Einzelobjektiv. Feldwinkel	Einzelobjektiv. Verzeichnung.	Doppelobjektiv. Feldwinkel	Doppelobjektiv. Verzeichnung.
		-5° 22° 26,5°	1,5 2,0 3,4

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9
-89,85	-78,85	+57,1	+56,9	+142,0	+120,3	-281,5	+49,4	-18,22	-32,49	6,38	12,6	2,80	9,75	4,36	9,69	6,39	20,04	44,0

Format 6×6

(Abgeg. mit Nr. 1184 Gl. aus reiner Kron-Flint)

Linse	n_d	ν_d	m
L_1	1,6204	SK_{16}	60,2
L_2	1,7015	$BaSF_2$	41,2
L_3	1,6695	FK_3	56,7
L_4	1,6600		57,6
L_5	1,6300	LLF_6	58,0
L_6	1,6600		57,6
L_7	1,6250	SSK_1	56,1

Die Abst. bei Stufe aus einfallsh. Doppelobjektiv. m. Stufe 1917; 1920 Nr. (s. 1917)

Einzelobjektiv.

Doppelobjektiv.

a b

F-73-6398-RE

6221

Sonnar 1:2 f = 1cm Rechn. 1266.

Abgeänderte Type nach Ihrer Skizze eingeg. mit Ihr. Brief v. 19.

Linse	n_d	ν_d	m
L_1 F_{11}	1,6669		47,6
SSK_3	1,6198		59,1
SF_4	1,72 13		29,3
SF_4	1,72 13		29,3

Einzelobjektiv.

Doppelobjektiv.

a b

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8
+69,9	+116,5	+56,5	+∞	-29,5	+29,5	∞		11,0	0,99	2,69	9,0	5,41	7,9	11,9	6,2

F-TS-6398-RE

622

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/).

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (/).

Sagittenfehler	Meridianfehler	Sagittenfehler	Meridianfehler

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Sonnar 1:2 f = 5 cm

Linse | n_d | ν_d | $P_{g,d}$

Einzelobjektiv. | Doppelobjektiv.

a | b | c

622

1020

F-TS-6398-RE

Sonnar 1:2, f = 5 cm v. 27.2.33 Rdy. 16 1232

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (mm) / ..

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (/).

Sagittenfehler	Meridianfehler	Sagittenfehler	Meridianfehler

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Sonnar 1:2 f = 5 cm v. 27.2.33 Rdy. 16 1232

Linse | n_d | ν_d | $P_{g,d}$

Einzelobjektiv. | Doppelobjektiv.

a | b | c

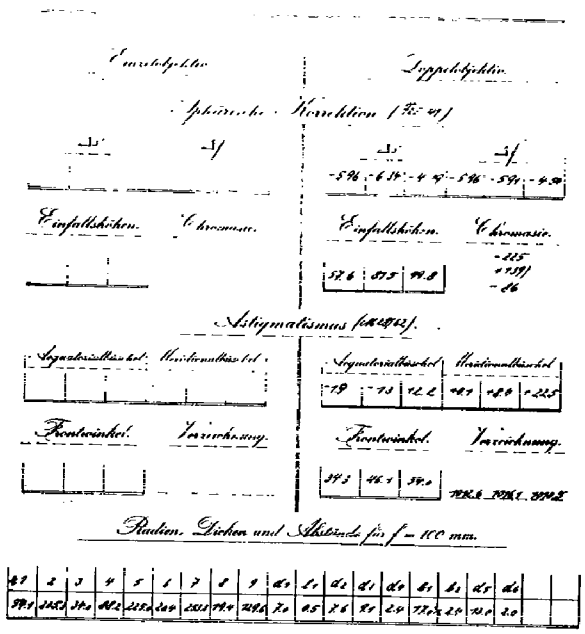
623

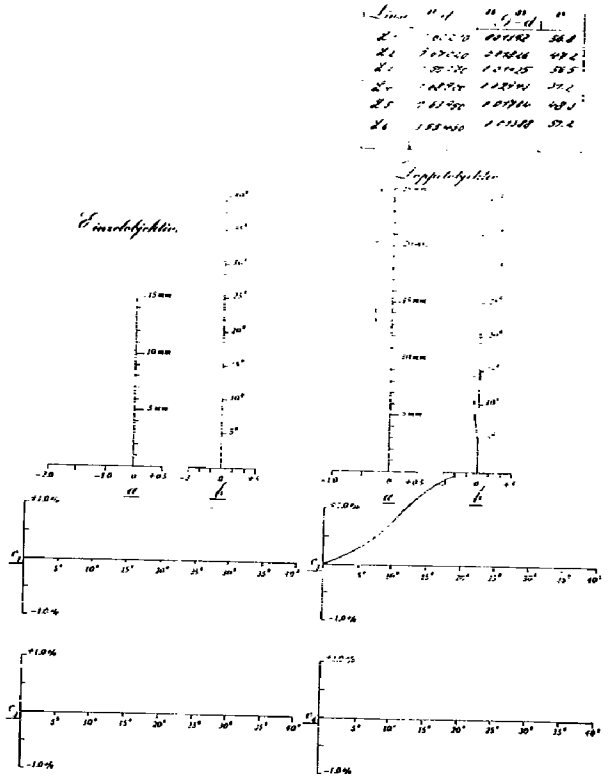
L 992

F-75-638-RE

624

Sonnar 1:2 f = 85 mm





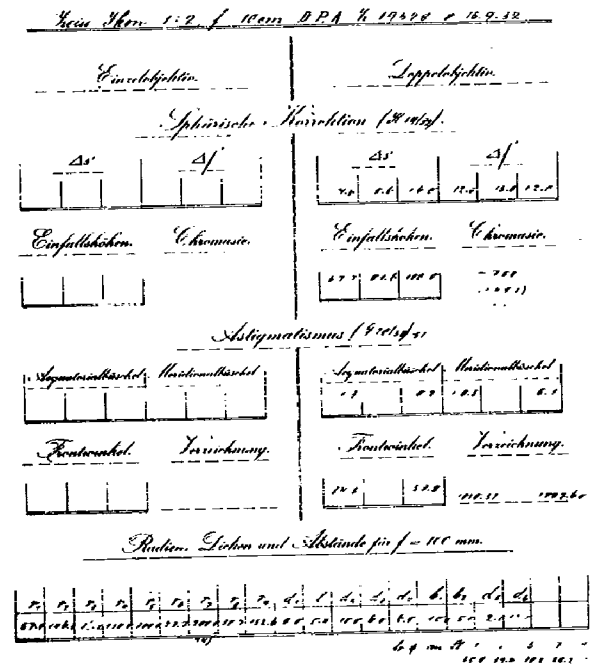
624

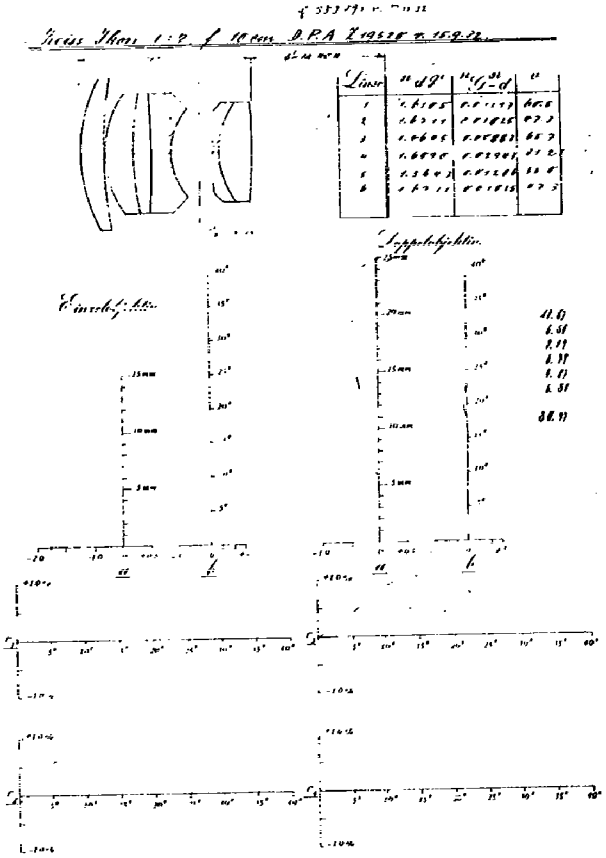
L 972

F-75-639-RE

625

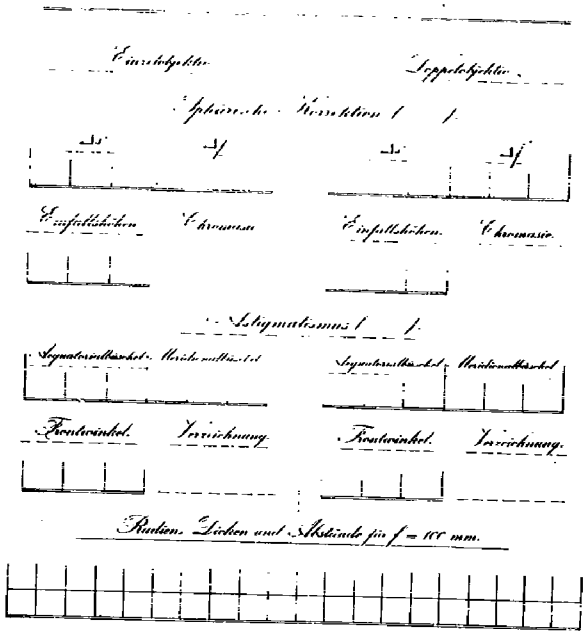
Zeiss Ikon 1:2 f 10 cm DRP Nr 194298 v. 16.9.32

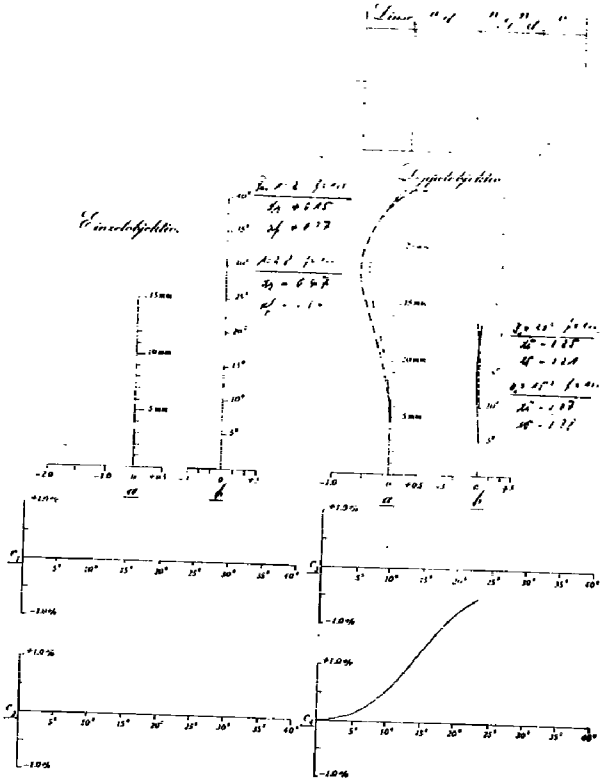




F-75-6398-RE

626

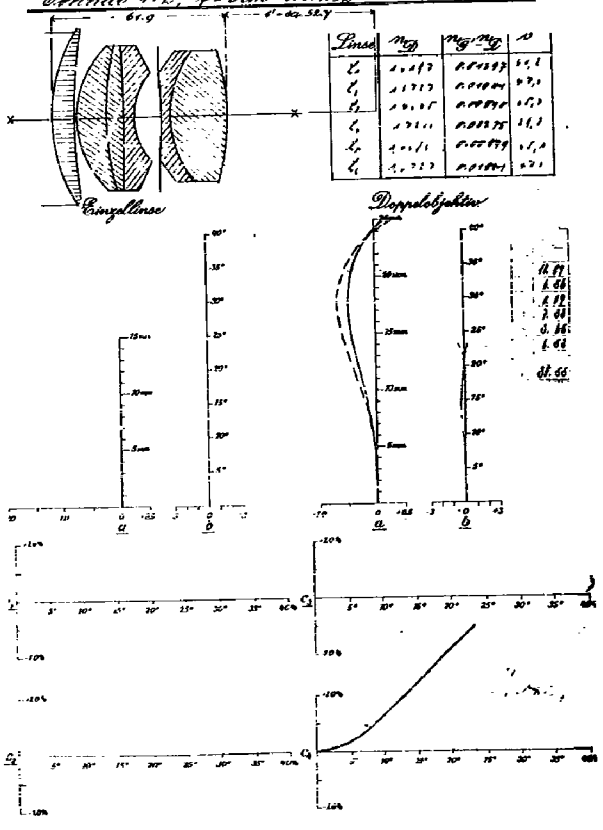




621

F-75-6398-RE

627



F-75-6398-RE

628

Nr 993

Rud. Nr. 9987

Sonnar 1:2, f = 5 cm, n_e 4 32 Reich 388 %

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ( ).

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( ).

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8	s'	Freie Öffnung
170.0	43 mm	166.6	112.8	64 mm	33.8	102.4	137.1	83.8	0.5	7.1	16.3	6.2	2.8	0.8	2.5	2.8	82.0	24.0

Sonnar 1:2, f = 6 cm, n_e 4 32

Linse | $n_{e'}$ | $n_{e'} - n_{e}$ | d

Einzellinse

Doppelobjektiv

Sonnar 1:2,5 f = 35 cm Rudow Nr. 10061 vom 8.5.37

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'/n'/f'=0.7)

Δs' | Δf' | Δs' | Δf'

-2.2 | -1.2 | -5.5 | -2.6 | -2.5 | -1.1

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

+0.2 | 0.5 | 1.0

Astigmatismus (Δs'/n'/f'=0.7)

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

-2.5 | -1.2 | +0.5 | -1.1 | -2.5 | -1.1

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

22.5 | 45.1 | 22.5

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	s'	Freie Öffnung
192.2	47.8	33.1	30.7	∞	25.8	69.2	19.1	21.1	94.6	10.3	2.1	7.6	2.9	1.2	4.0	12.2	87.1	24.1

F-75-6398-RE

629

Nr 1060

Sonnar 1:2,5 f = 3,5 cm Rudow Nr. 10061 vom 8.5.37

Linse | n_{d} | $n_{d} - n_{d}$ | ν

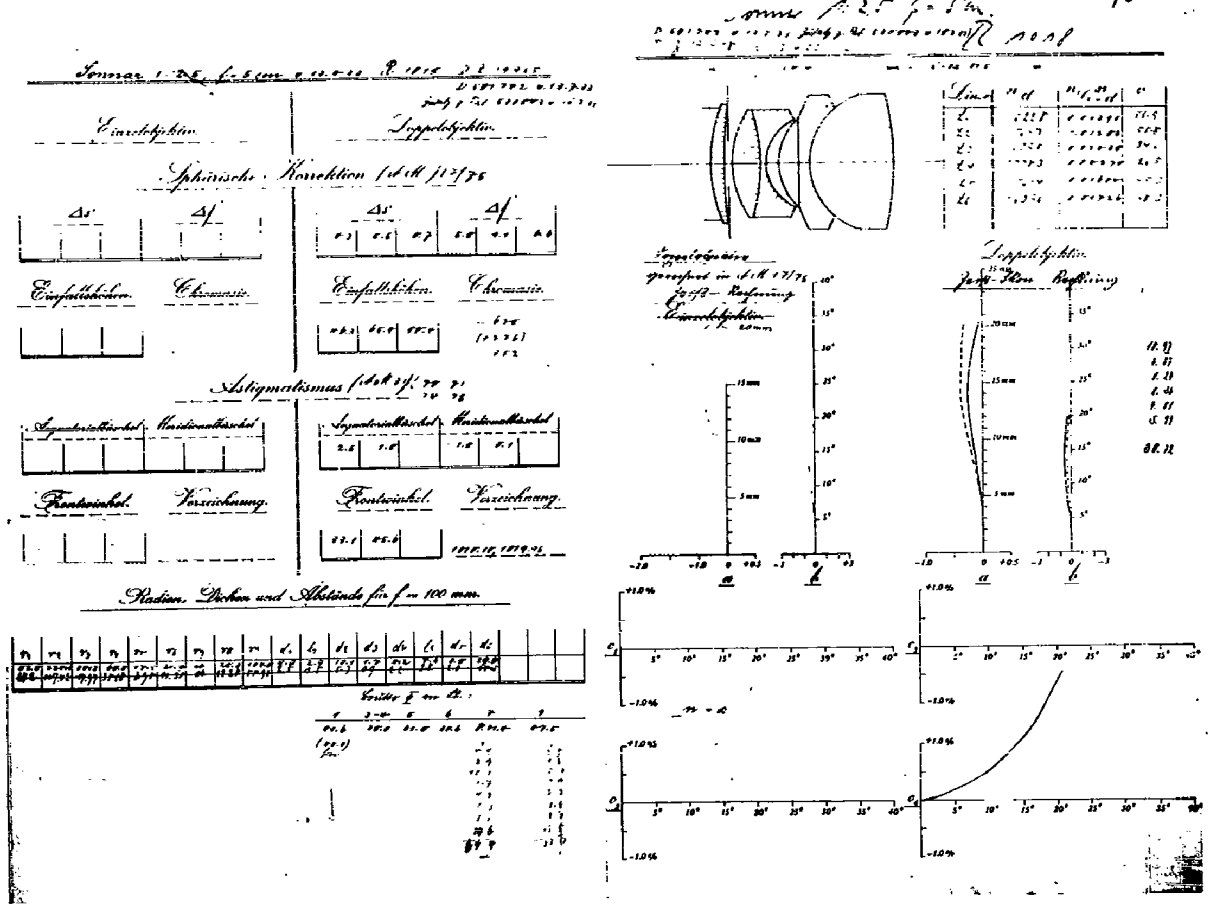
Einzelobjektiv

Doppelobjektiv

627

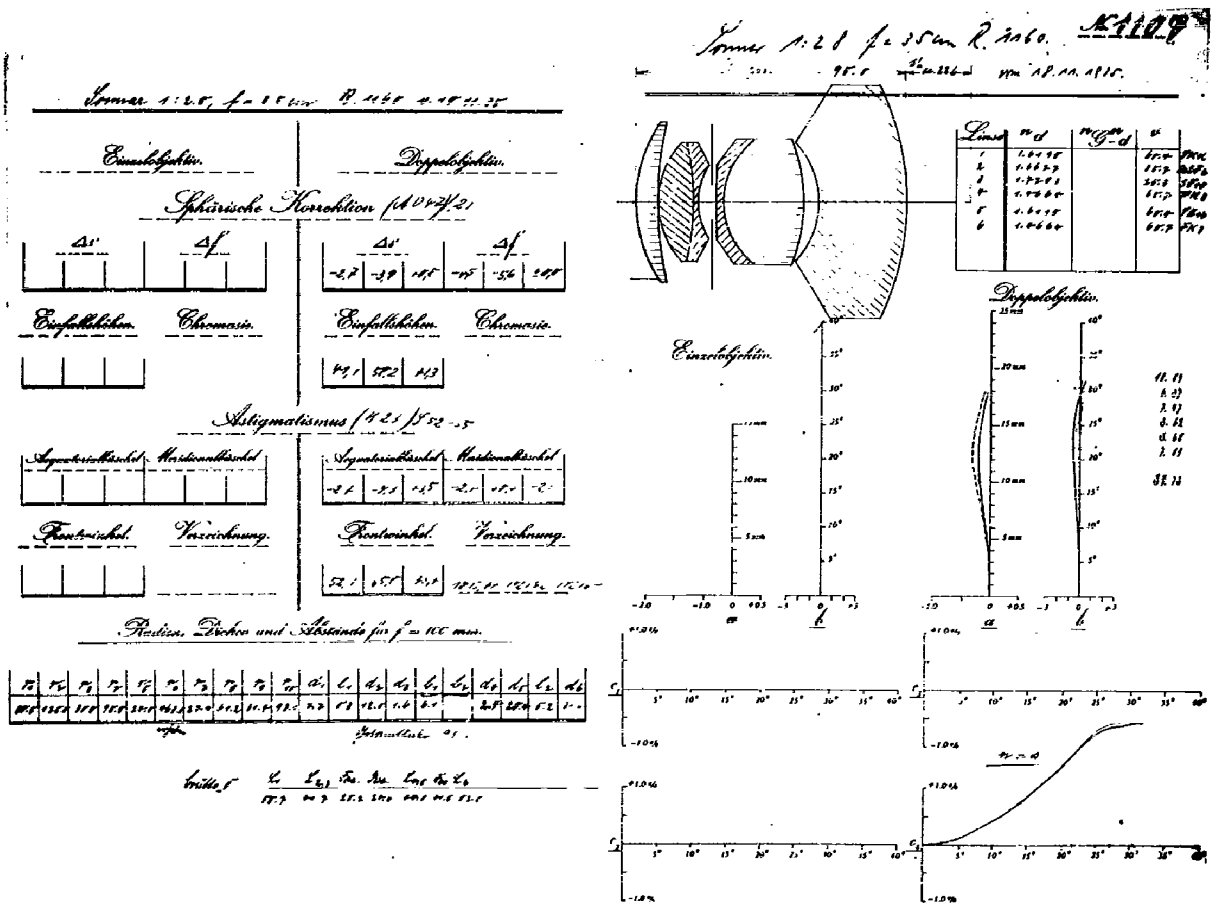
F-TS-6388-RE

630



631

F-TS-6388-RE



F-TS-6398-RE

632

Weitwinkelobjektiv 1:2.8, f = 5 cm, v. 13.10.33, Zeiss Ikon 1046

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AM 19)/31

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf
		5.4	0.4	-6.1	6.9	6.9	+0.7

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		44.4	47.5	49.9	-1.3 (-0.5)

Astigmatismus (AM 19)/31

Einzelobjektiv Sagittenstandbild	Einzelobjektiv Meridionalstandbild	Doppelobjektiv Sagittenstandbild	Doppelobjektiv Meridionalstandbild
		0.0	0.0	2.4	2.4	2.1	0.7

Einzelobjektiv Frontwirkung	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwirkung	Doppelobjektiv Vorzeichnung
		54.3	49.5	57.6	1012.8, 1022.9, 1038.4

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	L	d2	d3	d'	d4	d'4	D1	D2	D3
69.4	332.2	22.0	194.2	22.0	-0	87.4	0.3	5.4	0.2	0.3	10.7	1.7	5.3	46.5	38.8	32.0

Fig. 241

Weitwinkelobjektiv 1:2.8, f = 5 cm, v. 13.10.33, Zeiss Ikon 1046

Linse	n d	n_F - n_C d	v
1	1.5725	0.0142	57.8
2	1.5616	0.0105	60.8
3	1.6725	0.0213	32.2
4	1.6007	0.0129	44.2

Einzelobjektiv. | Doppelobjektiv.

11.33
1.34
6.33
11.34
12.34

a b a b

F-TS-6398-RE

633

Rechn. 1061 2.

Zeiss. Ikon, Sonnar 1:2.8, f = 7.6 cm v. 20.3.34.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AM 19)/31

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf
		-5.0	-5.8	13.6	-7.2	-7.6	+3.2

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		41.6	58.9	71.5	-1.99 (-0.53) -1.04

Astigmatismus ( )/ .

Einzelobjektiv Sagittenstandbild	Einzelobjektiv Meridionalstandbild	Doppelobjektiv Sagittenstandbild	Doppelobjektiv Meridionalstandbild
		-9.0	-6.5	-2.9	-4.3	-2.3	-0.6

Einzelobjektiv Frontwirkung	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwirkung	Doppelobjektiv Vorzeichnung
		30.9	38.6	49.0	1010.58, 1013.91, 1035.43

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	L	d2	d3	b	d4
68.2	315.8	29.0	137.9	22.5	00	81.6	5.35	0.56	9.03	1.95	16.7	5.26

Rechn. 1061 2.

Zeiss. Ikon, Sonnar, 1:2.8, f = 7.6 cm, v. 20.3.34.

Linse	n d	n_F - n_C d	v
L1	1.6725	0.0183	44.6
L2	1.5610	0.0155	60.9
L3	1.6725	0.0279	32.2
L4	1.6061	0.0173	43.7

Einzelobjektiv. | Doppelobjektiv.

11.33
1.34
6.33
12.34
12.34

a b a b

F-73-6398-RE

634

Tele-Sonnar 1:2.8 f=19cm ? 1165 v. 27.11.35

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ( ).

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( ).

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

7.6	16.4		

Radien, Dicken und Abstände für f = 100 mm:

r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7		d_0	d_1	d_2	d_3	d_4	d_5	d_6
0.85	13.4	12.1	61.9	-21.1	21.1	15.3	∞		6.1	1.1	2.1	1.4	7.6	2.0 3	2.2

Brechkraft	φ_1	$\varphi_{2,3,4}$	$\varphi_{5,6}$	φ_7
	1.8.8	18.2	11.2	1.1

Gesamtbrechkraft

Linse | n_{gj} | $n_{gj} - n_{dj}$ | ν

L_1	1.61300	0.01616	51.4
L_2	1.51673	0.01188	61.0
L_3	1.61170	0.01227	37.7
L_4	1.67110	0.01835	19.3

Einzellinse | Doppelobjektiv

(634)

F-73-6398-RE

635

Sonnar 1:2.8 f. 5 cm Jena Nr. 96[illegible] v. 4.[illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (-1.2 +2.4)

Δs'	Δf'	Δs'	Δf'
		-2.1 -2.2 +0.2	-2.6 -1.0 -6.8

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

17.3	18.4	21.6

Astigmatismus ( ).

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-0.2 -0.4 -0.8	-0.1 0 +0.2

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

+0.6	+4.8	11.0

Radien, Dicken und Abstände für f = 100 mm:

									3.0	0.6	9.4	11.0	3.0	7.4	5.0

Sonnar 1:2.8 f. 5 cm Jena Nr. [illegible] v. [illegible]

Linse	n_{gj}	$n_{gj} - n_{dj}$	ν
L_1	1.61300	0.01616	51.4
L_2	1.51673	0.01188	61.0
L_3	1.61170	0.01227	37.7
L_4	1.67110	0.01835	19.3

Einzellinse | Doppelobjektiv

(635)

F-TS-6398-RE

636

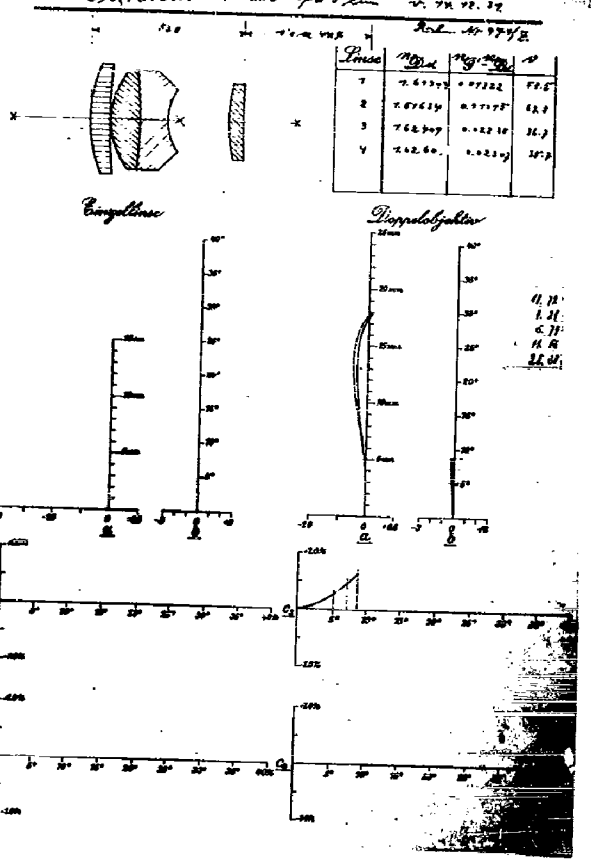
Sonnar 1:2.8 f. 5 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



636

F-TS-6398-RE

637

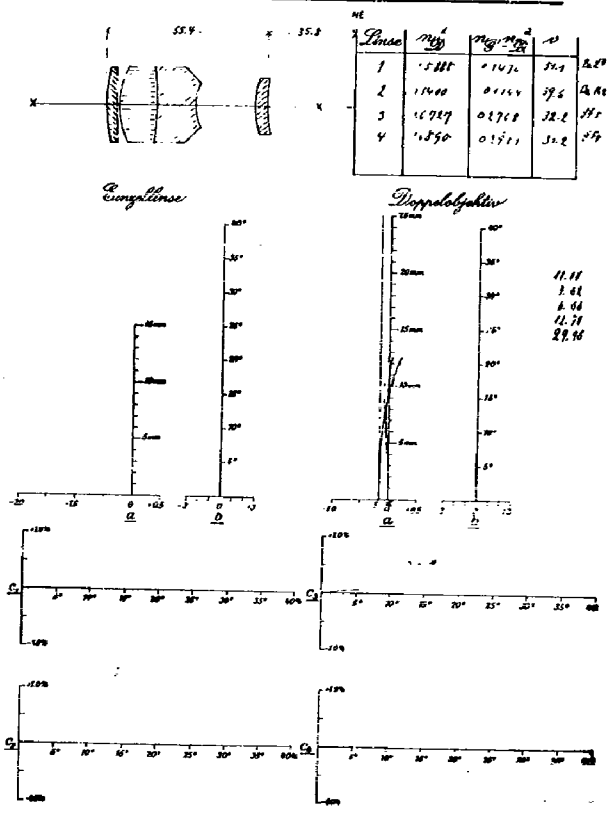
Sonnar 1:4, f. 7.5 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

639

Sonnar 1:4 F = 30 cm

Format 2,4 × 3,6 cm

Rechn. Nr. 1244 Z

4 1246

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ( ).

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0,6 -0,7	-1,0 -1,3

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		+35,3 +50,0	

Astigmatismus ( ).

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-0,1 -0,2	-0,1 -0,1

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		3° 4,1'	+0,14% +0,26%

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8
								2,7	0,2	10,9	3,9	11,2	3,3	1,0	14,3

Linse	n d	ν d	P d,g'	t'
1	1,6376	SK 11		55,9
2	1,4836	FK 5		70,9
3	1,6630	BaSF 2		35,3
4	1,5704	BaF 2		49,2
5	1,5530	PSK 3		63,3

Einzelobjektiv | Doppelobjektiv

a b a b

C1 C2 C3

F-TS-6398-RE

639

Sonnar 1:4 F = 13,5 cm

Format 2,4 × 3,6 cm.

Rechn. Nr.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ( ).

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-1,4 -0,7	-2,3 -1,9

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		+35,9 +50,0	

Astigmatismus ( ).

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-0,4 -0,1	-0,9 -0,9

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		6° 4'30"	

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8
								7,9	0,9	7,6	13,9	13,8	1,3	28,1	5,8

Linse	n d	ν d	P d,g'	t'
L1	1,5689			
L2	1,4892	FK 5		
L3	1,6056	F 5		
L4	1,6993	SK 4		

Einzellinse | Doppelobjektiv

A' C d F

a b a b

C1 C2 C3

F-TS-6398-RE

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Doppelobjektiv.

Sphärische Korrektion (/)

Δf | Δs' | Δf

Einfallslichem | Chromasie | Einfallslichem | Chromasie

Astigmatismus (/)

Sagittalbildschl. | Meridionalbildschl. | Sagittalbildschl. | Meridionalbildschl.

Bildwinkel | Verzeichnung | Bildwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Sonnar 1:4 f = 7,5 cm

Format: 6×6 cm

Rechn. Nr. 1307 Z

Linse | n_d | $\nu_{G'd}$ | ν

L_1 | 1,6990 | SK_{16} | 60,4

L_2 | 1,6179 | FK_3 | 65,2

L_3 | 1,6243 | F_1 | 36,8

L_4 | 1,7208 | SF_2 | 29,3

Einzelobjektiv.

Doppelobjektiv.

Spektrum

Linie	%
L 1	18,82
L 2	6,48
L 3	6,78
L 4	14,46
Rest	53,46

F-TS-6398-RE

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Doppelobjektiv.

Sphärische Korrektion (/)

Δf | Δs' | Δf

Einfallslichem | Chromasie | Einfallslichem | Chromasie

Astigmatismus (/)

Sagittalbildschl. | Meridionalbildschl. | Sagittalbildschl. | Meridionalbildschl.

Bildwinkel | Verzeichnung | Bildwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Sonnar 1:4 f = 30 cm

Rechn. Nr. 1244

Linse | n_d | $\nu_{G'd}$ | ν

1 | 1,6176 | SK_{16} | 59,7

2 | 1,7288 | FK_5 | 74,0

3 | 1,6693 | $BaSF_2$ | 33,2

4 | 1,5709 | BaF_2 | 49,2

5 | 1,5927 | PSK_3 | 62,6

Einzelobjektiv.

Doppelobjektiv.

F-TS-6398-RE

642

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/).

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-1,0 -1,0	-3,0 -3,0
Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		+35,1 +30,0	

Astigmatismus (/).

Einzelobjektiv Sagittenabweichung	Einzelobjektiv Meridionalabweichung	Doppelobjektiv Sagittenabweichung	Doppelobjektiv Meridionalabweichung
		-0,3 -0,5	-0,4 -0,7
Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		8,5° 12°	

Rechn. Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7		d_1	d_2	d_3	d_4	d_5	d_6		d_7	d_8			
+72,83	+57,93	+128,91	+71,30	+96,97	+69,31	+93,35		4,0	0,8	2,6	10,2	19,9	4,3		2,9	17,3			

Sonnar 1:4 f = 18 cm

Format 6×6 cm = 2,4×3,6 cm.

Rechn. Nr. v. 30.8.39

Linse	n_d	$n_{C'}-n_{F'}$	ν
L_1	1,5048		60,8
L_2	1,6134	FK_5	
L_3	1,6034	F_2	38,9
L_4	1,6644	$LaSF_2$	58,9

Einzelobjektiv. | Doppelobjektiv.

64

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643

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (/).

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0,16 -1,85	-1,45 -2,9
Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		50 36	

Astigmatismus (/).

Einzelobjektiv Sagittenabweichung	Einzelobjektiv Meridionalabweichung	Doppelobjektiv Sagittenabweichung	Doppelobjektiv Meridionalabweichung
		-0,38	-0,11
Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung
		25°	1,15°/₀

Rechn. Dicken und Abstände für f = 100 mm.

Sonnar 1:4 f 13,5 cm Rd. 1178

Linse	n_d	$n_{C'}-n_{F'}$	ν
L_1	1,5552		63,0
L_2	1,6975		57,0
L_3	1,6273		37,8
L_4	1,6340		23,0

Einzelobjektiv. | Doppelobjektiv.

f'

F-13-6398-RE

644

Sonnar 1:4, f = 7,5 cm, Rechn. Nr. 9317

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf)

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'			Doppelobjektiv Δf		
		-1,36	+1,0	-1,16	-2,2	-1,5	-2,9

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie	
20,0	42,0	52,0	-0,15	
			(-0,17)	
			-0,3	

Astigmatismus (Δs'/Δf')

Einzelobjektiv Sagittenwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittenwinkel		Doppelobjektiv Meridionalwinkel	
		-0,7	-0,2	-0,2	-0,1	-0,3	-0,7

Frontwinkel | Fernzeichnung

Frontwinkel			Fernzeichnung
+2,4	14,0	22,2	

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
0,80	13,4	26,8	22,3	-4,6	3,5	22,1	3,4	0,8	14,8	0,1	2,1	4,2	3,8

Sonnar 1:4, f = 7,5 cm, Rechn. Nr. 9317

Linse | nd | νd | n

Linse	nd	νd	n
1	1,5163	60,9	1,520
2	1,5163	60,9	1,520
3	1,6229	56,4	1,630
4	1,6779	55,0	1,680

Einzelobjektiv. | Doppelobjektiv.

F-13-6398-RC

645

Sonnar 1:4, f = 13,5 cm, Rechn. Nr. 10222

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs'/Δf')

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'			Doppelobjektiv Δf'		
		-1,6	-2,9	-1,7	-2,4	-3,5	-2,8

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie	
20,8	42,6	58,0	-0,5	
			(-0,5)	
			-1	

Astigmatismus (Δs'/Δf')

Einzelobjektiv Sagittenwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittenwinkel		Doppelobjektiv Meridionalwinkel	
		-0,26	-0,57	-0,66	-0,15	-0,66	-0,24

Frontwinkel | Fernzeichnung

Frontwinkel			Fernzeichnung
14,6	24,5	27,0	

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
0,85	33,0	14,9	23,0	7,3	14,1	47,6	3,3	0,4	7,5	7,2	2,8	7,5	

Sonnar 1:4, f = 13,5 cm, Rechn. Nr. 10222

Linse | nd | νd | n

Linse	nd	νd	n	
L1	1,5163	60,9	1,52	BK7
L2	1,5163	60,9	1,52	BK7
L3	1,6213	56,4	1,63	F9
L4	1,6779	55,2	1,68	SK3

Einzelobjektiv. | Doppelobjektiv.

№ 950

F-75-6328-RE

6 Bl.

Sonnar 1:4 f 13.5 cm Kirchn № 092 4. (№ XII 31)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f = 50)

Δs'	Δf'	Δs'		Δf'	
		-0.9	0.1	1.8	9.5	11.1

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

50.1	49.9	49.8	0.15 (f=100) -0.9

Astigmatismus (Strahlenbündel)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		1.1	0.2	0.3	1.1	-0.2	-0.3

Frontwinkel | Vergrößerung | Frontwinkel | Vergrößerung

12.6	15.0	22.5°	1:22.5, 1:22.5, 1:22.5

Radien, Dicken und Abstände für f = 100 mm:

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d	d_2	d_3	d_4	d_5	d_6	$\frac{f}{2}$	3	5	7
-49.0	253.2	22.0	38.5	17.0	30.5	54.0	3.5	0.4	10.7	11.3	6.8	18.0	3.3		28.0	24.1	19.0	18.0

Sonnar 1:4 f 13.5 cm Kirchn № 092 4. (№ XII 31)

Linse	n_{D1} / ν_1	n_{D2} / ν_2	D
1	1.51643 / 64.1	0.49 1513 / 64.1	5.4
2	1.61659 / 36.9	0.49 1613 / 36.9	3.4
3	1.62293 / 60.3	0.49 2113 / 60.3	4.8
4	1.64768 / 33.8	0.49 2468 / 33.8	2.9

Einzellinse | Doppelobjektiv

f 11
f 11
f 16
f 11
f 16

a b a b

C_{sa} C_t C_{sa} C_t

K 1058

F-TS-6398-RE

735

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einzelobjektiv

Doppelobjektiv

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.

135

K 1059

F-TS-6398-RE

736

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einzelobjektiv

Doppelobjektiv

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.

№ 1128

F-TS-6388-RE

737

V 1936 Nr 6, 1:6, f. 25 cm Rehg. v. 7.5.36

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion f:10 cm / f:13

Δs'	Δf'

Δs'			Δf'		
-4.5	-12.0	+0.2	-2.0	-11.0	+2.8

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
17.1	17.9	23.3	-0.8 (-0.3) -1.5

Astigmatismus f:10 cm / f:13

Segmentwinkel	Meridianwinkel

Segmentwinkel			Meridianwinkel		
-2.4	-4.5	+7.4	-1.4	-3.4	+13.3

Frontwinkel | Bezeichnung

Frontwinkel		
+7.0	+7.3	+7.0

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	e	d4	d5	d6	t				
+7.5	-20.6	-30.0	+9.0	-22.0	-40.0	+9.2	-23.2	10.1	0.4	+1.9	+2.5	2.1	1.5	+1.8	9.2				

V 1936 Nr 6, 1:6, f. 25 cm Rehg. v. 7.5.36

Linse	n d	n/n' - d	v
L1	1.6177		57.8
L2	1.6727		49.1
L3	1.6163		59.2
L4	1.6700		47.4
L5	1.6199		60.3
L6	1.6113		58.5

Doppelobjektiv.

Einzelobjektiv.

a b

№ 1083

F-TS-6398-RE

738

V 1935 No 2, 1:6.2, f = 10 cm, Rehg. v. 11.5.35.

Einzelobjektiv. | Doppelobjektiv.

Sphärisch Korrektion f:10 / f:13

Δs'	Δf'

Δs'			Δf'		
-19.0	-27.0	+9.6	-22.2	-35.6	+2.2

Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
32.5	26.2	32.2	-1.6 (-1.1) -1.5

Astigmatismus f:10 / f:13

Segmentwinkel	Meridianwinkel

Segmentwinkel			Meridianwinkel		
-2.3	-3.2	+38.5	-5.6	-2.9	+6.3

Frontwinkel | Bezeichnung

Frontwinkel		
+32.2	+31.5	+31.2

Radien, Dicken und Abstände für f = 11 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	d1	d2	d3	d4	d5	d6	d7	t
+8.2	-21.3	-32.3	+9.3	-23.3	-39.9	+9.2	-23.2	-39.9	+9.2	-23.2	-39.9	1.0	0.4	+1.9	2.5	2.1	1.5	+1.8	9.2

V 1935 No 2, 1:6.2 f = 10 cm, Rehg. v. 11.5.35.

Linse	n d	n/n' - d	v
L1	1.6177		57.8
L2	1.6727		49.1
L3	1.6163		59.2
L4	1.6700		47.4
L5	1.6199		60.3
L6	1.6113		58.5

Doppelobjektiv.

Einzelobjektiv.

a b

F-75-6398-RE

739

V 1935 Nr. 16; 1:6.3 f=2.5cm Rechn. v. 3.7.35

Einzellichter — Doppellichter

Sphärische Korrektion (Δs' / Δf')

Einfallslichten — Chromasie

Astigmatismus (Δs' / Δf')

Sagittalwinkel — Meridionalwinkel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

V1935 Nr. 16A 1:6.3 f=2.5cm Rechn. v. 3.7.35

Linse — n_d — ν_d

Einzellichter — Doppellichter

Kurven

739

F-75-6398-RE

740

Rechn. 1/10.3 f. 250mm

Doppel-Einzellichter — Doppellichter

Sphärische Korrektion

Einfallslichten — Chromasie

Astigmatismus

Sagittalwinkel — Meridionalwinkel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Rechn. 1/6.3 f = 250 mm

Linse — n_d — ν_d

Einzellinse — Doppellichter

140

№ 1241

F-75-6398-RE

741

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv.

Doppelobjektiv.

141

№ 1226

F-75-6398-RE

742

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv.

Doppelobjektiv.

142

L 1215

F-TS-6398-PE

7H3

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (λ = ν).

Δs' | Δf' | Δs' | Δf'

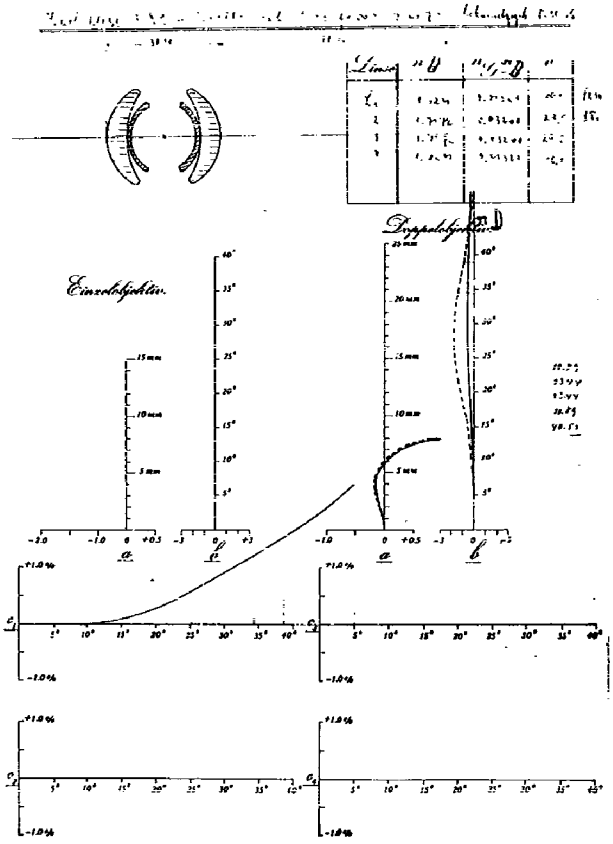
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (λ = 0,7 ν).

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



7H3

L 1124

F-TS-6398-PE

7H4

AEG No 600 528 1:6,3; f = 1 cm Bildwinkel über 180° v. 3,40 m

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (λ = ν).

Δs' | Δf' | Δs' | Δf'

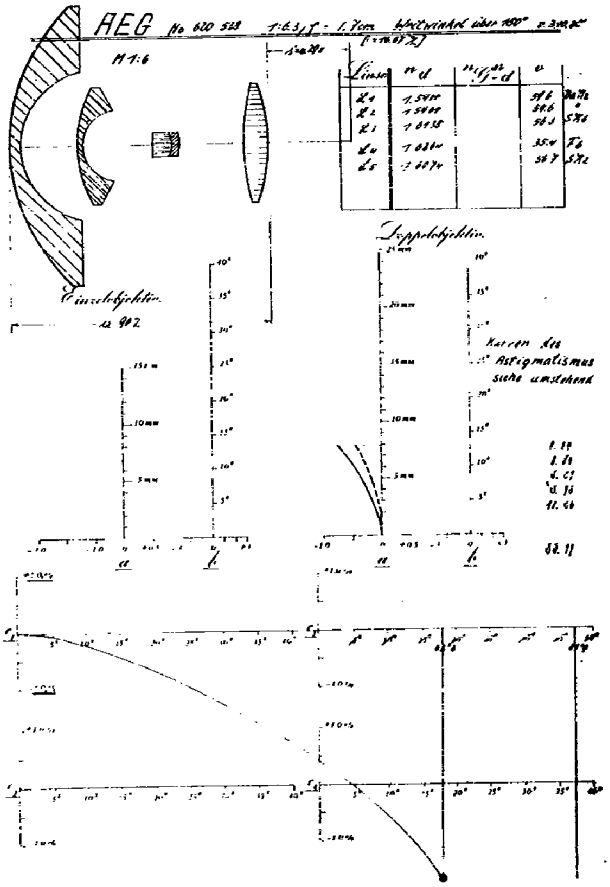
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (λ = 0,7 ν).

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



7H4

F-TS-6398-RE

745

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsblenden

Chromasie

Astigmatismus

Tangentialbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv.

Doppelobjektiv.

745-1

F-TS-6398-RE

746

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsblenden

Chromasie

Astigmatismus

Tangentialbüschel

Meridionalbüschel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv.

Doppelobjektiv.

F-TS-6398-RE

1947

T 1935 Nr 16 B 1:6,3 f. 2,5 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Δs' | Δf | Δs' | Δf

Einfallshöhen | Chromasie. | Einfallshöhen | Chromasie.

Astigmatismus

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Vorzeichnung. | Frontwinkel | Vorzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
42,7	23,3	36,4	147	21,7	51,5	8,5	23,2	-147,5	∞	3,4	11,5	2,4	12,4	2,1	1,5	6,0	2,74	93,42

T 1935 Nr 16 B 1:6,3 f. 2,5 cm Rechn. v. 23.9.35

Linse | n_d | ν_d | w

Einzelobjektiv. | Doppelobjektiv.

1947

F-TS-6398-RE

T 1934 No 28, 1:6,2 f. 1,6 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für A 0,3/90

Δs' | Δf | Δs' | Δf

Einfallshöhen | Chromasie. | Einfallshöhen | Chromasie.

Astigmatismus für 2 w = 90°

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Frontwinkel | Vorzeichnung. | Frontwinkel | Vorzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

1948

K 11943

T 1934 No 28, 1:6,2 f. 1,6 cm Rechn. v. 2.12.36

Linse | n_d | ν_d | w

Einzelobjektiv. | Doppelobjektiv.

1947

F-TS-6398-RE

Sphärisch

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsöffnungen

Chromasie

Astigmatismus

Tangentialwinkel

Meridionalwinkel

Konturwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse

Doppelobjektiv

Einzelobjektiv

748

749

F-TS-6398-RE

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallsöffnungen

Chromasie

Astigmatismus

Tangentialwinkel

Meridionalwinkel

Konturwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse

Einzelobjektiv

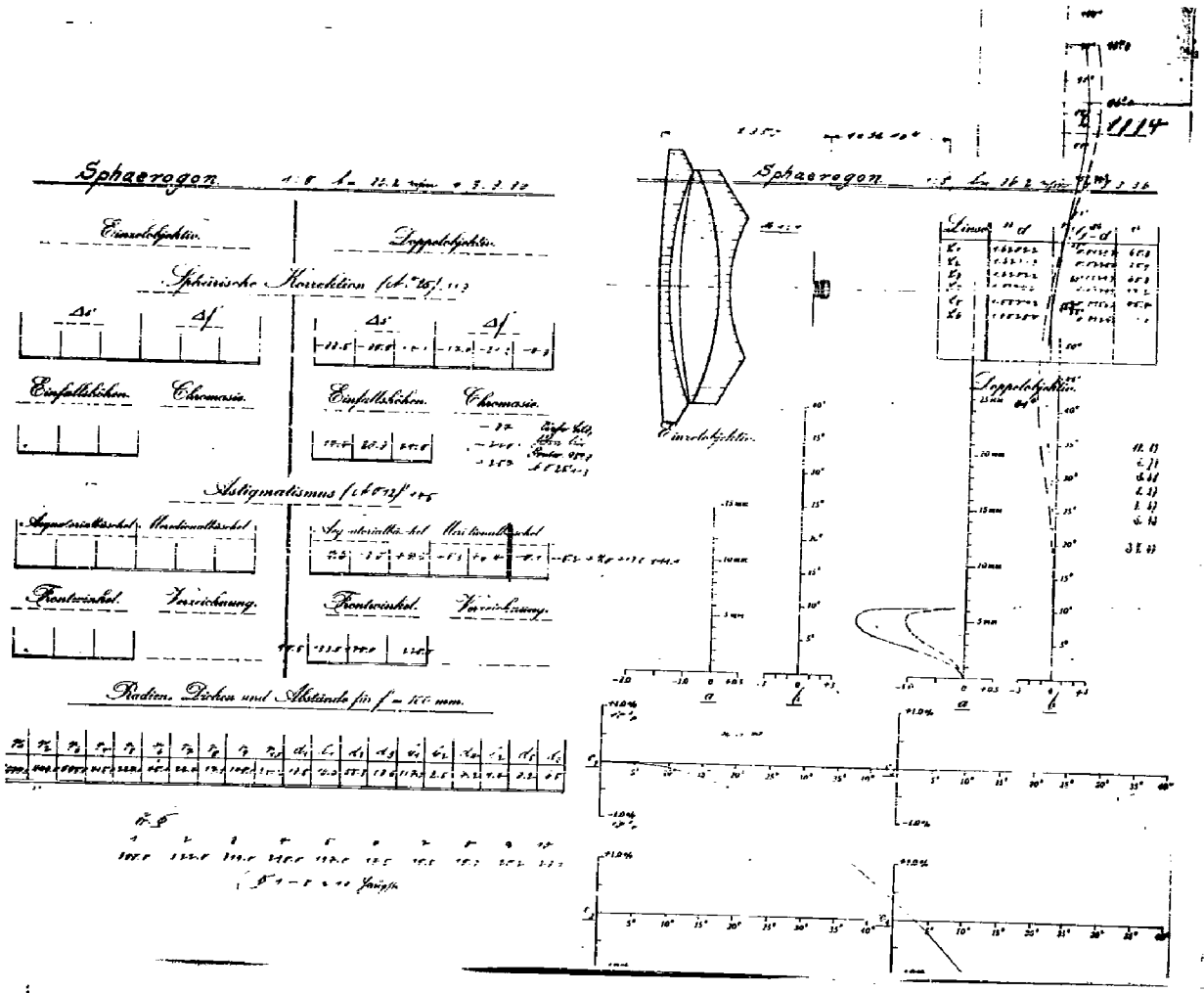
Doppelobjektiv

750

751

F-75-6398-RE

751

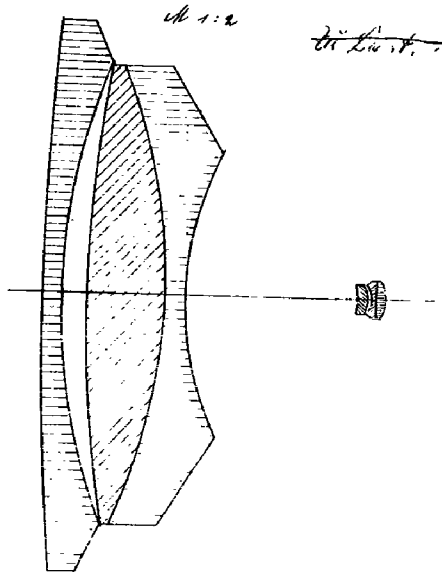


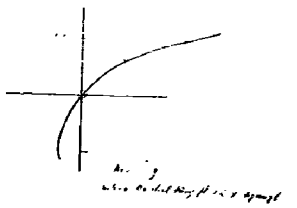
1114

751

F-75-6398-RE

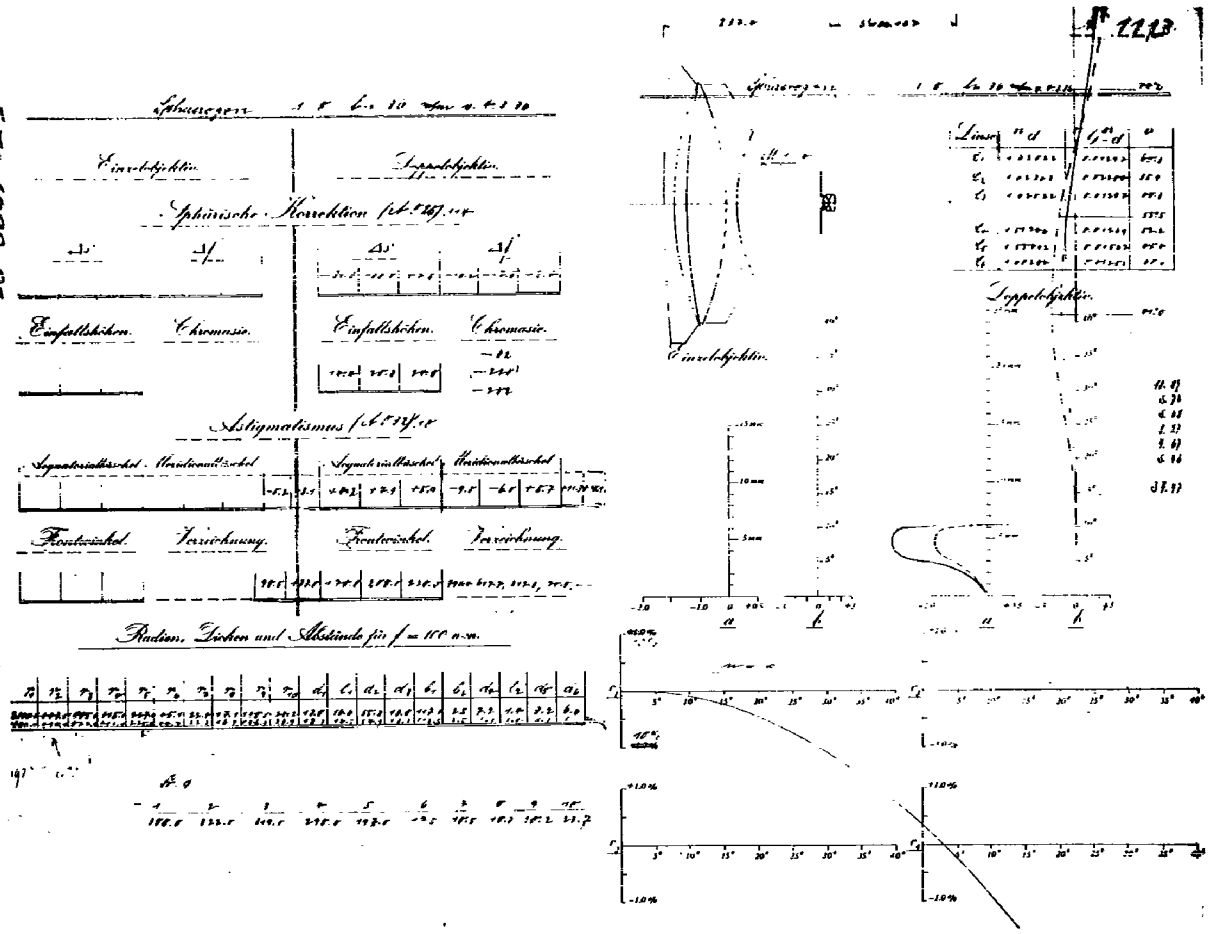
752





F-75-6378-RE

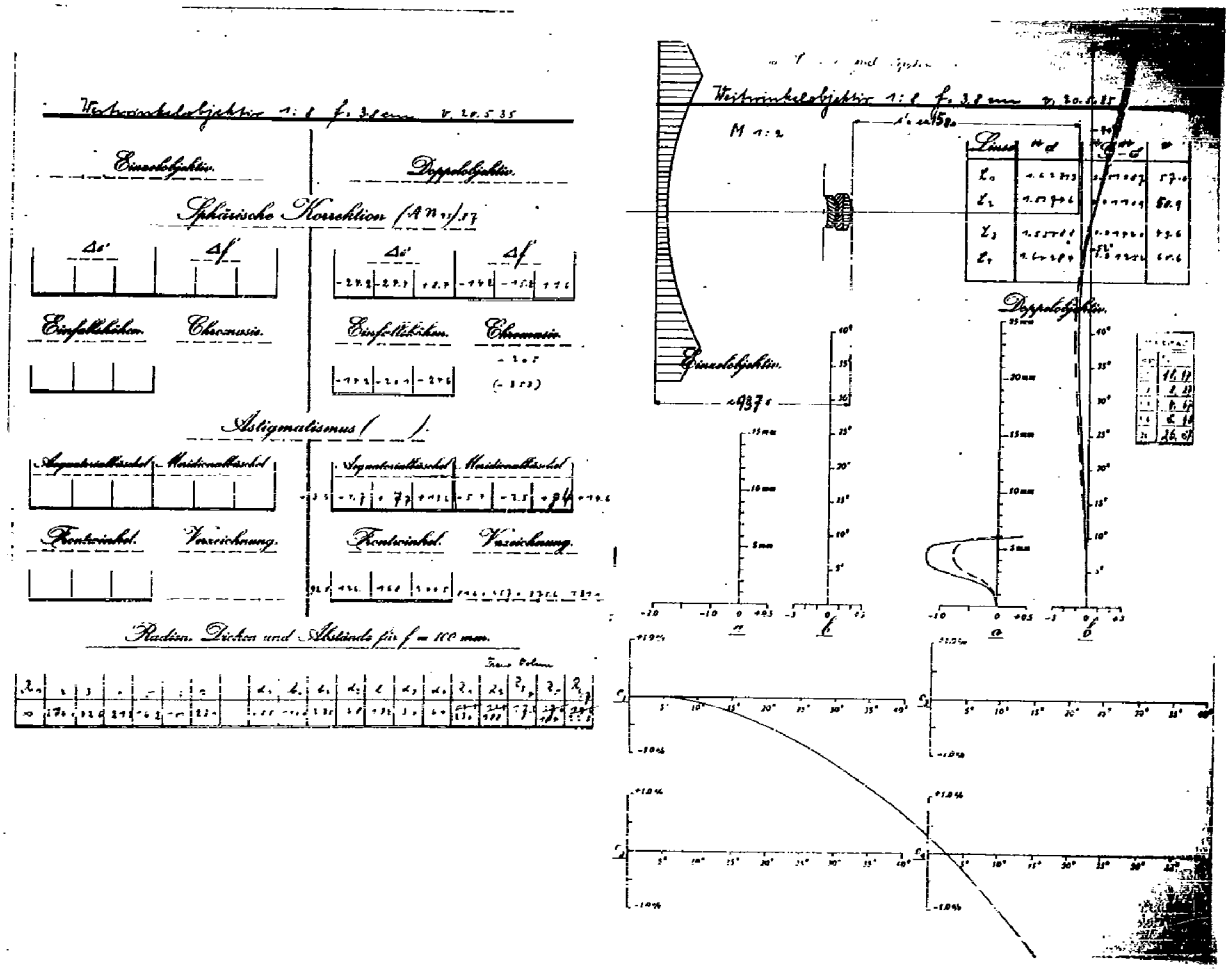
753



753

F-75-6378-RE

754



№ 827

F-TS-6328-RE

735

Görz: Weitwinkel-Dagor 1:9 f. 10 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (RE 49).

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2.7 -2.2 +1.3	-2.7 -0.9 +0.0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		14.0 12.1 12.24	-7μ (-6) -8

Astigmatismus (RE 49).

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		+9.8 -47 +49.5 -0.9 +0.3	-0.9

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		42.1 41.0 41.0	innen innen innen

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8	d9	D_1	D_2
79.5	448	48.0	42.4	88.0	+1.0	448	79.5	2.4	0.8	4.0	1.6	4.6	4.4	0.8	2.4	-	48.0	79.5

Görz: Weitwinkel-Dagor 1:9 f. 10 cm

Linse	n_g	$n_g - n_g'$	
L_1	1.52000	0.00000	64.0
L_2	1.61293	0.00000	37.0
L_3	1.61800	0.00000	63.4
L_4	1.61800	0.00000	63.4
L_5	1.61800	0.00000	63.4
L_6	1.52000	0.00000	64.0

Einzellinse | Doppelobjektiv

a b | a b

L 27
L 11
L 65
L 65
L 11
L 11
12.66

G1 G2 G3

F-TS-6398-RE

756

G. P. Görz, Weitwinkel 1:9 f = 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (RE 49) 100.

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-3.6 -3.0 +2.3	-0.6 -0.6 -3.7	-2.0 +0.6 -0.7	-3.0 -0.4 -0.0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
6.0 9.7 11.2		12.8 13.7 14.4	-6 (-3) -3

Astigmatismus (RE 49) 100

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
-0.6 -1.6 +0.0	-6.4 +0.0 -1.0	-1.3 -1.2.5 -3.4	-6.3 -3.4 +0.3

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
24.2 +24.8 +24.0	2×40.00 833 21 2×40.00	24.0 22.5 21.1	1000 11, 1000 11, 1000 11

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7	d8
49.7	37.6	49.8	83.0	43.0	49.5	49.5	49.7	2.0	0.8	4.0	1.4	4.8	4.4	0.8	2.4

D.R.P. 388636

№ 617

G. P. Görz, D. 13452, f = 4, RE 49.8, 0.4, 12.2, 12, 1:9, f = 10000

Weitwinkeltriplet

Linse	n_g	$n_g - n_g'$	
L_1	1.61177	0.00491	37.2
L_2	1.79991	0.00000	28.0
L_3	1.61800	0.00000	63.4

Einzellinse | Doppelobjektiv

a b | a b

L 27
L 11
L 65
L 65
L 11
L 11
12.66

G1 G2 G3

F-75-6398-RE

75 T

M. André Lévy F 816 614 1:9, f. 10cm v. 20.1.1937

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsblenden — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

M. André Lévy F 816 614 1:9, f. 10cm v. 20.1.1937

Doppelobjektiv — Einzelobjektiv

Doppelobjektiv

a — b

1937

F-75-6398-RE

75 R

Radien 1/9 f. 100 mm max 1/100 fg

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsblenden — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Radien 1/9 f. 100 mm max 1/100 fg

Einzellinse — Doppelobjektiv

a — b

N = 0

F-75-6398-RE

759

Auf der Rechnung vom 16. I. 07

Neues Protar 1:9 Ausgeführt unter der No. 90098

Einzellobjektive — Doppellobjektive

Sphärische Konvexlinse (P.V.) 16

Δs' Δf'

Einfallsöffnen — Chromasie

Astigmatismus (P.IV.) 16

Aequatorialbüschel — Meridionalbüschel

Frontwinkel — Vergütung

Radien, Dicken und Abstände für f = 100 mm

Auf der Rechnung vom 16. I. 07

Neues Protar 1:9 Ausgeführt unter der No. 90098

Einzellinse — Doppellobjektiv

a b

+10% −10%

f' = 100

154

F-75-6398-RE

760

Auf der Rechnung vom 3. I. 07

Neues Protar 1:9 Ausgeführt unter der No. 90085

Einzellobjektive — Doppellobjektive

Sphärische Konvexlinse (P.V.) 25

Δs' Δf'

Einfallsöffnen — Chromasie

Astigmatismus (P.IV.) 32

Aequatorialbüschel — Meridionalbüschel

Frontwinkel — Vergütung

Radien, Dicken und Abstände für f = 100 mm

Auf der Rechnung vom 3. I. 07

Neues Protar 1:9 Ausgeführt unter der No. 90085

Einzellinse — Doppellobjektiv

a b

+10% −10%

f' = 100

161

Fraunhofer 1/9, f = 150.18 mm

F-TS-6396-RE

761

Einzellinsen — Doppellinsen f = 150.18 mm

Sphärische Korrection (Blende 1:12.5)

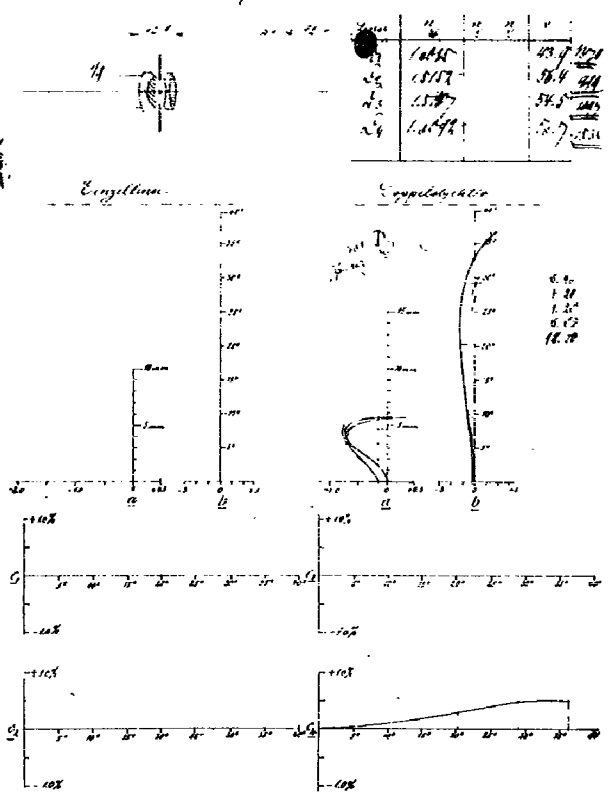
Δs' | Δf' | Einfallshöhen | Schnittweite | Einzellinsen | Schnittweite

Astigmatische Bilder (Blende 1:12.5)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Bezeichnung | Kranz Ebd.

Radien, Dicken und Abstände für f = 100 mm

Fraunhofer 1/9, f = 150.18 mm (Messung von 1873)



761

Steiner 1/9, f = 150 mm

F-TS-6396-RE

762

Einzellinsen — Doppellinsen f = 152.5

Sphärische Korrection (Blende 1:12.5)

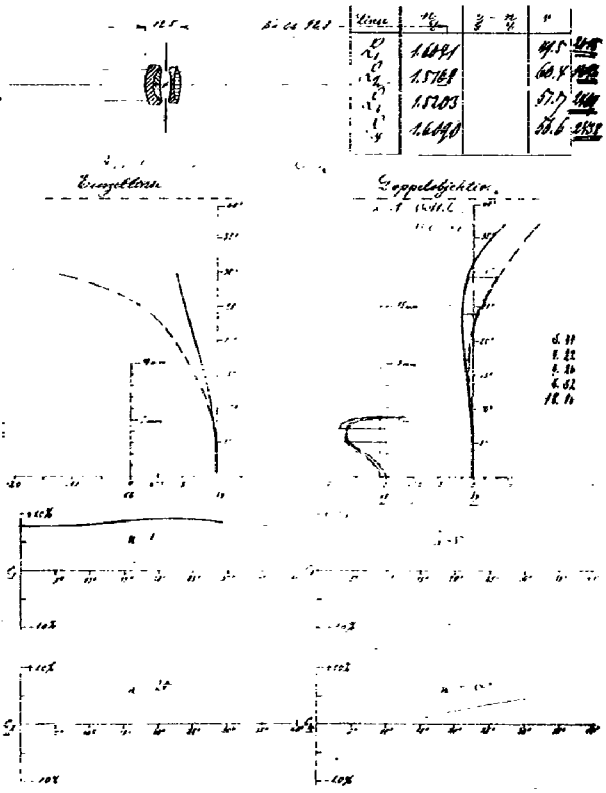
Δs' | Δf' | Einfallshöhen | Schnittweite | Einzellinsen | Schnittweite

Astigmatische Bilder (Blende 1:12.5)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Bezeichnung | Kranz Ebd.

Radien, Dicken und Abstände für f = 100 mm

Steiner 1/9, f = 150 mm (Messung von 1873)



762

F-TS-6398-RE

763

Tessar N: 12 f. 3.5 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Meridional)

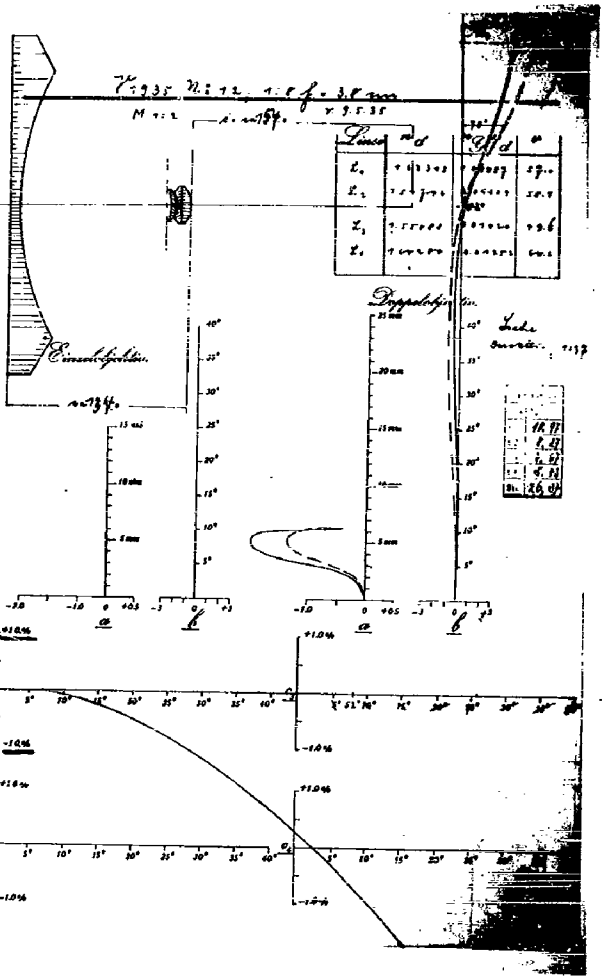
Einfallshöhen | Chromasie

Astigmatismus (Meridional)

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



F-TS-6398-RE

764

Protar 1:12.5, f. 18 cm N: 15. 7. 13

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (N. 39) 2

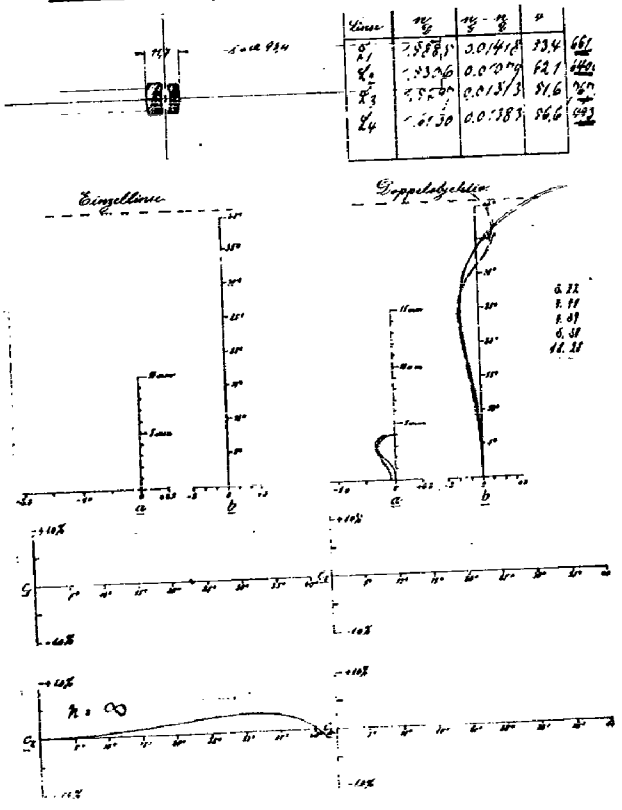
Einfallshöhen | Chromasie

Doppelobjektiv für d' | Astigmatismus (Ref. 5)

Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

765

Protar 1/2.5 f=150mm (D.R.P. No. 88.16)

Doppelobjektiv für 9 Einzelsysteme

Doppelobjektiv f 149.9

Sphärische Korrection (Bild 4)

Δs'			Δf'		
-3.7	-4.4	+6.3	-5.9	-4.5	+6.9

Einfallshöhen | Chromasie

9.2	13.0	16.0

Δs'			Δf'		
-7.6	-10.3	-3.3	-2.0	-10.5	-3.2

Einfallshöhen | Chromasie

9.2	13.0	16.0

Astigmatismus (Bild 2)

Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
-4.0	-0.8	+15.2	-5.6	-1.9	-8.8	-2.8	-7.6	+19.0	-5.1	-2.1	+11.0

Frontwinkel | Ergänzung

52.0	72.3	90.6

Ring Bd.

-21	-47	-185
-96	-134	-162
3	7	16

Frontwinkel | Ergänzung

50	70	91

Ring Bd.

-3	-7	-15

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
52.2	8.0	22.4	42.7	23.3	42.7	2.7	0.3	1.7	1.7	7.2	0.3

Protar 1/12.5 f=150mm (D.R.P. No. 288.16)

(Rep. vom 28.10.16)

Linse	n_g	$n_g - n_F$	v
L_1	1.6452	0.01458	53.3
L_2	1.6149	0.01476	39.2
L_3	1.6015	0.01285	53.7
L_4	1.6453	0.01469	55.8

Einzellinse | Doppelobjektiv

6.26
6.43
8.61
6.62
18.11

$u \cdot u' (y' - \bar{y})$ in Millimetern

764

F-TS-6398-RE

766

Kauf der Prüfung vom 8.I.07

Neues Protar 1:14 Ausgeführt unter der № 90084

Einzellinse | Doppelobjektiv

Sphärische Korrection (Bild 11)

Δs'			Δf'		
-3.8	-5.0	-2.9	-3.9	-5.0	-2.9
-2.9	-3.2	+6.2	-2.9	-3.2	+8.3

Einfallshöhen | Chromasie

7.2	11.5	14.2

Astigmatismus (Bild 14)

Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
-5.4	-1.8	+3.9	-3.9	-2.8	+5.4
-11	+1.3	+19.6	-11	+4.4	+19.8

Frontwinkel | Ergänzung

47.1	70.8	88.5
49.1	70.9	88.5

Ring Bd.

-103	-204	-287
-24	-134	-162
-3	-9	-11

Abstände für f = 100 mm

d1	d2	d3	d4	d5	d6	d7	d8	d9	d10
4.8	2.3	1.4	1.4	1.3	1.4	0.3	6.3	2.	

Neues Protar 1:14 Ausgeführt unter der № 90084

Kauf der Prüfung vom 8. I. 07

Fabrikationsnummer 90084 f = 150 mm

Linse	n_g	$n_g - n_F$	v
L_1	1.614	0.01458	59.2
L_2	1.516	0.01158	64.2
L_3	1.644	0.01337	50.9
L_4	1.609	0.01337	58.5

Einzellinse | Doppelobjektiv

6.43
1.11
8.11
6.62
18.11

№ 117

Nach der Rechnung vom 8. I. 07

Neues Protar 1:14 Ausgeführt unter der № 90084

F-75-6398-RE

Einzellichter — Doppellichter

Sphärische Konvexlinse (P. II)

Δs' Δf' — Δs' Δf'

Einfallsloth — Ehromasie

Astigmatismus (P. III)

Aequatorialschnitt — Meridionalschnitt

Frontwinkel — Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppellichter

№ 118

Nach der Rechnung vom 16. II. 07

Neues Protar 1:14 Neue ausgeführt

F-75-6398-RE

Einzellichter — Doppellichter

Sphärische Konvexlinse (P. II)

Δs' Δf' — Δs' Δf'

Einfallsloth — Ehromasie

Astigmatismus (P. III)

Aequatorialschnitt — Meridionalschnitt

Frontwinkel — Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse — Doppellichter

F-75-6398-RE

769

Heinr. Ernst" D.R.P.A. vom 30.VII.06

Einzelobjektiv — Doppelobjektiv f: 22,4

Sphärische Korrection

Δs'	Δf'	Δs'	Δf'
-2,6		-4,5	2,6	-2,0	12,3	-6,1

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

			2,1	11,1	11,1

Astigmatismus

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-32	-21	14,9	14,2	1,2	-2,1	-3,6	14,5	-3,1

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

		11,1	12	12,1	12,1	Prog. 12,1. -5 -11 -11 -36 -52

Radien, Dicken und Abstände für f = 100 mm.

	r_1	r_2	r_3	r_4	r_5	d_1	d_2	d_3	d_4	l_1	l_2
	2,8	14,6	-2,1	12,6	14,3	1,9	1,0	1,5	1,5	1,1	1,7

Heinr. Ernst" D.R.P.A. vom 30.VII.06

Linse	n_D	$n_F - n_C$	ν	
L_1	1,611970	0,012537	33,8	1,2
L_2	1,603,10	0,020726	22,3	1,2
L_3	1,514591	0,011866	51,6	3,2
L_4	1,611220	0,011844	52,7	1,2

Einzellinse — Doppelobjektiv f: 22,4

S. 14 S. 23 T. 22 A. 65 19. 07

G_1 G_2 +10% -10% $\lambda = \infty$

719

№ 724

F-75-6398-RE

770

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection ( )

Δs'	Δf'	Δs'	Δf'
-0,35	-0,27	-0,27	-0,35		

Einfallshöhen — Chromasie $\Delta s'_{C,F}$ — Einfallshöhen — Chromasie

1,63	1,11	1			

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
-0,35	-0,27	-0,35	-0,27				

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

53°	50'	42'			

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	d_1	d_2	d_3	l_1	l_2	l_3	l_4
2,2	14,8								

Weitwinkel-Lynkeiotop f: 45 f_3 = 100

Linse	n_D	$n_F - n_C$	ν
I	1,619150	0,012250	36,8
II	1,612236	0,019210	33,03

Einzellinse — Doppelobjektiv

S. 17 S. 11 T. 11 A. 17 19. 13

G_1 G_2 -10% +10%

№ 954

F-TS-6388-RE

771

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

№ 10

F-TS-6398-RE

772

E 225, 398, Rö. J. Beck (Hill) v. 4.12.24 1:16

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 111 mm

Astigmatismus des Doppelobjektives | Doppelobjektiv

F-75-6398-RE

773

Radiostat Pantagonal

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (R.U.)

Δ s'	Δ f'
-21	-178
-157	-92
-182	-221

Einfallshöhen | Chromasie

Einfallshöhen	Chromasie
6.5	9.2
11.2	

Astigmatismus (R.U.)

Aequatorialbüschel	Meridionalbüschel
-27.4	-21.2
-22.0	-18.0
-25.2	-7.2

Frontwinkel | Vorzeichnung

Frontwinkel	Vorzeichnung
57.3	78.2
92.0	-25 -107 -162
96.3	124.4
141.2	-36 -107 -167

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	d1	d2	d3	d4
2.00	0.65	1.22	2.00	2.07				

Radiostat Pantagonal

Einzellinse | Doppelobjektiv

11.77
9.86
6.61
19.66

F-75-6398-RE

774

Protar 1:18, f. 390 mm v. 3. III. 1909.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (R.U.)

Δ s'	Δ f'
14.2	-2.1
7.4	-10.2
-17.2	-5.7

Einfallshöhen | Chromasie

Einfallshöhen	Chromasie
6.7	2.4
0.1	(-) -6.4

Astigmatismus (R.U.)

Aequatorialbüschel	Meridionalbüschel
-4.3	-4.2
+0.3	-6.4
-4.3	+0.6

Frontwinkel | Vorzeichnung

Frontwinkel	Vorzeichnung
14.0	45.2
57.2	97.8 99.6

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
8.2	12.2	3.1	4.4	12.2	10.3	0.3	1.1	6.4	6.4	0.3	3.1

7.1

№ 558.

Protar 1:18, f. 390 mm v. 3. III. 1909.

Linse	r_D	r_F − r_C	V
L1	1.619070	0.011933	60.0
L2	1.622850	0.011874	56.3
L3	1.622990	0.01111	58.5
L4	1.62302	0.01098	60.2

Einzellinse | Doppelobjektiv

6.61
6.32
9.87
6.61
19.11

m. 3

7.11

№ 970

F-75-6398-RE

775

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( )

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vergeichnung | Frontwinkel | Vergeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

7/5

№ 159

F-75-6398-RE

776

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vergeichnung | Frontwinkel | Vergeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

1/1

F-TS-6378-RE

777

№ 109

Protar f. 18 f = 182 mm mit Prism. vor Ob

Protar f. 18 f = 182 mm mit Prism. vor Ob

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Δs', Δs'')

Δs' Δs''

Einfallshöhen Chromasie

Astigmatische Differenz (Δs'')

Aequatorealbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

F-TS-6378-RE

778

№ 110

Protar VII/18 f = 141 mm (Ref. vom 6.V.01)

Protar VII/18 f = 141 mm (vom 6.V.01)

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Δs', Δs'')

Einfallshöhen Chromasie

Astigmatische Differenz (Δs'')

Aequatorealbüschel Meridionalbüschel

Frontwinkel Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse

Doppelobjektiv

F-73-6398-RE

779

Rodenstock, Pantogonal 1/18 D.R.P. 167224

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (R.III)

Δs' Δf' — Δs' Δf'

Einfallshöhen Chromasie — Einfallshöhen Chromasie

Doppelobjektiv — Astigmatismus (R.IV)

Äquatorialbüschel Meridionalbüschel — Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung — Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Rodenstock, Pantogonal 1/18 D.R.P. 167224

Linse | n_g | $n_g - n_f$ | ν

Einzellinse — Doppelobjektiv

Sph. Korrektion — Astigmatismus

Verzeichnung

774

F-73-6378-RE

780

Protar 1:21, f = 65 m mit Weitwinkel

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (R.III)

Δs' Δf' — Δs' Δf'

Einfallshöhen Chromasie — Einfallshöhen Chromasie

Astigmatismus (R.IV)

Äquatorialbüschel Meridionalbüschel — Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung — Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

№ 436

Protar 1:21, f = 65 m mit Weitwinkel

Linse | n_g | $n_g - n_f$ | ν

Einzellinse — Doppelobjektiv

Sph. Korrektion — Astigmatismus

Verzeichnung

№ 725

F-75-6378-RE

781

Hypergon 1:22, f. 6 cm Kreis-Ausführung

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' Δf' | Δs' Δf')

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( ).

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	d1	d2	d3	d4
1.49	8.0	8.0	4.9	4.2	4.8	4.0	2.2

Hypergon 1:22, f. 6 cm Kreis-Ausführung

Linse	n_d	$n_g - n_d$	ν
1	1.67000	0.01008	48.2
2	1.51680	0.01161	64.2

Einzellinse | Doppelobjektiv

Doppelobjektiv

f. 11
f. 11
16.61

771

№ 936

F-75-6398-RE

782

Panoskop (Busch), 1:30, f. 206.7 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f'=10 f)

Δs' Δf' | Δs' Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (f'=20) f'=10 f

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Fr.-winkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	f
7.5	12.0	7.0	8.0	12.0	8.5	1.70	7.5	4.2	0.2	2.2	1.70	2.0	2.4

Panoskop (Busch), 1:30, f. 206.7 mm

Linse	n_d	$n_g - n_d$	ν
1	1.51821		
2	1.60734		
3	1.60729		
4	1.51821		

Einzellinse | Doppelobjektiv

f. 16
f. 17
f. 68
f. 93
16.16

F-TS-6398-RE

783

K 1096

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Einfallsblenden | Chromasie

Astigmatismus

Fernwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv. | Doppelobjektiv.

F-TS-6388-RE

783

K 1156

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Einfallsblenden | Chromasie

Astigmatismus

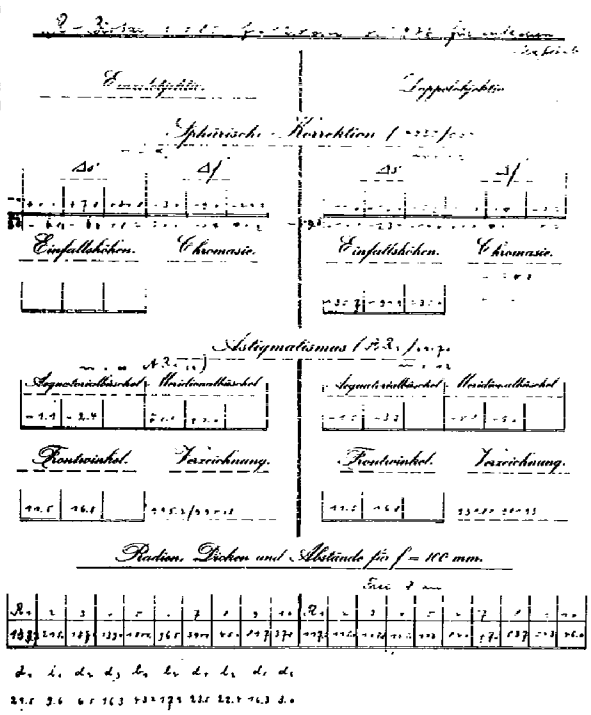
Fernwinkel | Vorzeichnung

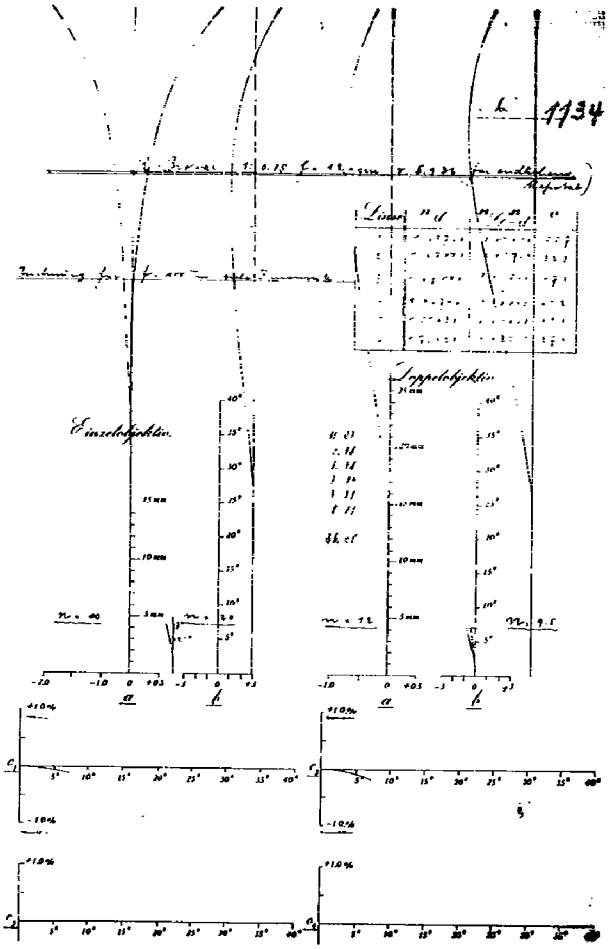
Radien, Dicken und Abstände für f = 100 mm.

Einzelobjektiv. | Doppelobjektiv.

F-TS-6398-RE

785





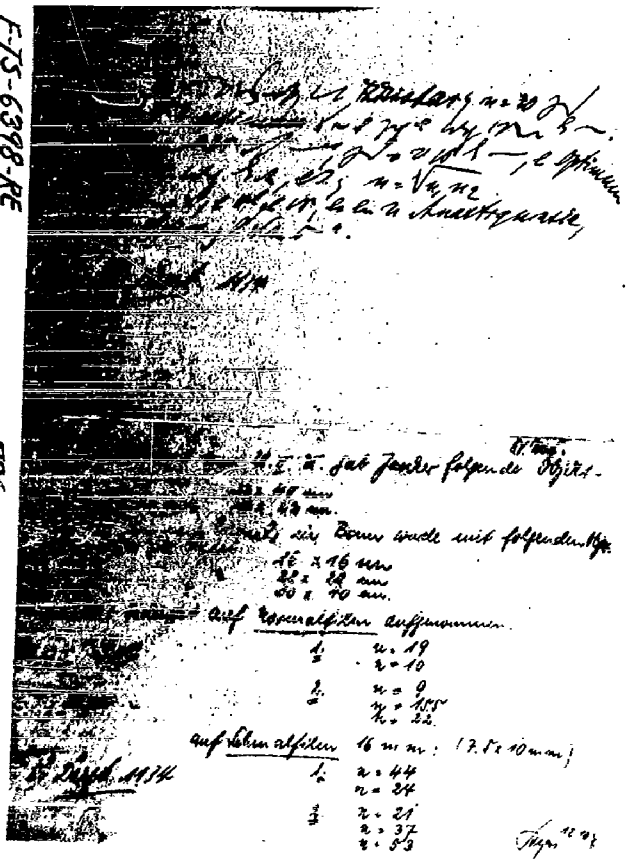
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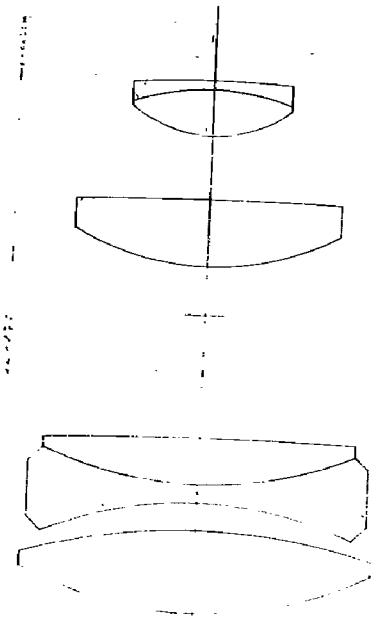
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1134

F-TS-6398-RE

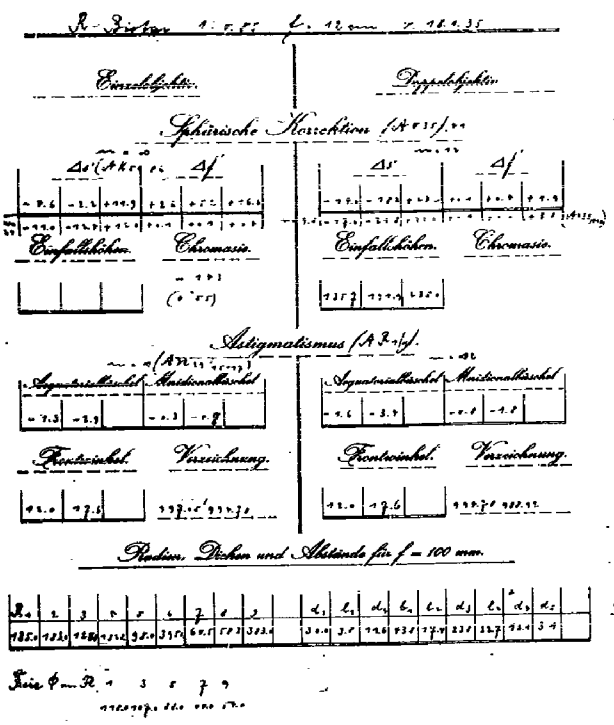
786

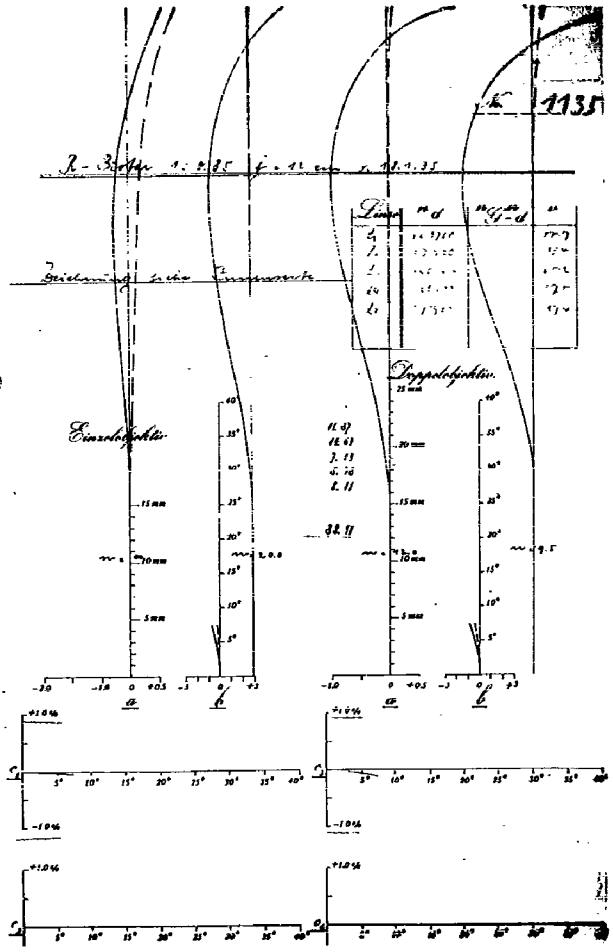




F-75-63'8-RE

787

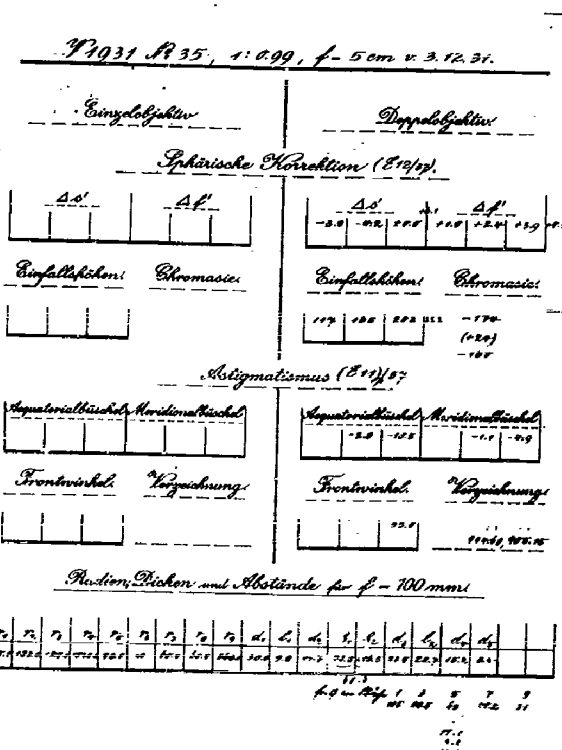


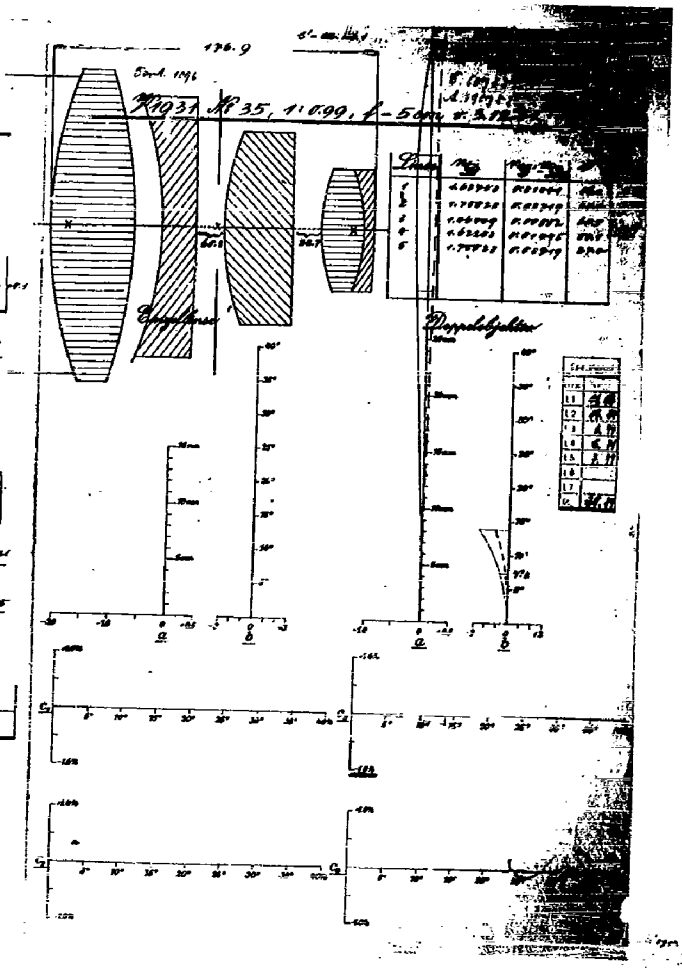


777

F-75-6398-RE

788





F-TS-6398-RE

E 419552 Horace W. Lee (Kapella) 1:1, f=10cm v 14.11.34

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AK 50)

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (AK 50)

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

R_1	d_1	R_2	d_2	R_3	d_3	R_4	d_4	R_5	d_5	R_6	d_6	R_7	d_7	R_8	d_8	R_9	d_9	R_{10}	d_{10}	R_{11}	d_{11}	R_{12}	d_{12}	R_{13}	d_{13}	R_{14}	d_{14}	R_{15}	d_{15}	R_{16}	d_{16}
157.5	31.0	73.3	11.4	154.4	19.2	23.5	11.1	∞	12.4	∧	7.2	3.2	1.4	3.2	1.4	∧	3.2	∧	1.4	3.2	1.4	∧	3.2	∧	1.4	3.2	1.4	∧	3.2	∧	1.4

D_1 | D_2 | D_3 | D_4

E. 419552 Horace W. Lee, Kapella 1:1, f=10cm v 14.11.34

AK 1039

Einzelobjektiv. Die prozentualen Durchmesserwerte für die Vergleichslinien sind nicht aus!

Doppelobjektiv.

a | b | c | d

790

F-TS-6398-RE

RA. 525158 • 12.6.31.

von Dr. phil. P. Rudolph, 1:1; f=10cm

Akt.-Z.: R 79582 IX/42h

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AK 50)

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (AK 50)

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

R_1	d_1	R_2	d_2	R_3	d_3	R_4	d_4	R_5	d_5	R_6	d_6	R_7	d_7	R_8	d_8	R_9	d_9	R_{10}	d_{10}	R_{11}	d_{11}	R_{12}	d_{12}	R_{13}	d_{13}	R_{14}	d_{14}	R_{15}	d_{15}	R_{16}	d_{16}
157.5	31.0	73.3	11.4	154.4	19.2	23.5	11.1	∞	12.4	∧	7.2	3.2	1.4	3.2	1.4	∧	3.2	∧	1.4	3.2	1.4	∧	3.2	∧	1.4	3.2	1.4	∧	3.2	∧	1.4

D_1 | D_2 | D_3 | D_4

~~RA 525158~~ 12.6.31.

von Dr. phil. P. Rudolph, 1:1; f=10cm

Akt.-Z. R 7958 IX/42h

CDRPA

AK 827

a | b | c | d

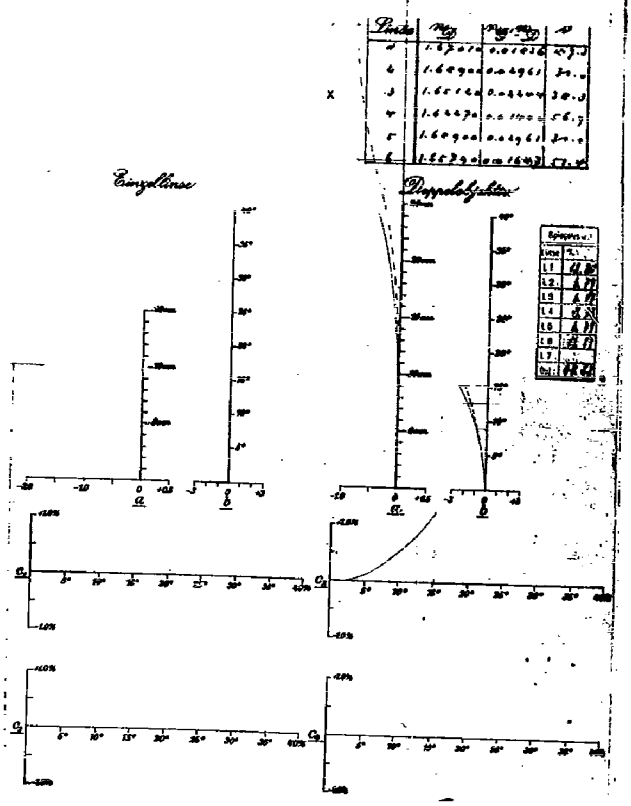
791

F-TS-6398-RE

791

~~DRP~~ ~~226168~~ 12.6.32.
von Dr. phil. P. Rudolph,
Akt.-Z. R 7958 2.
DRPA

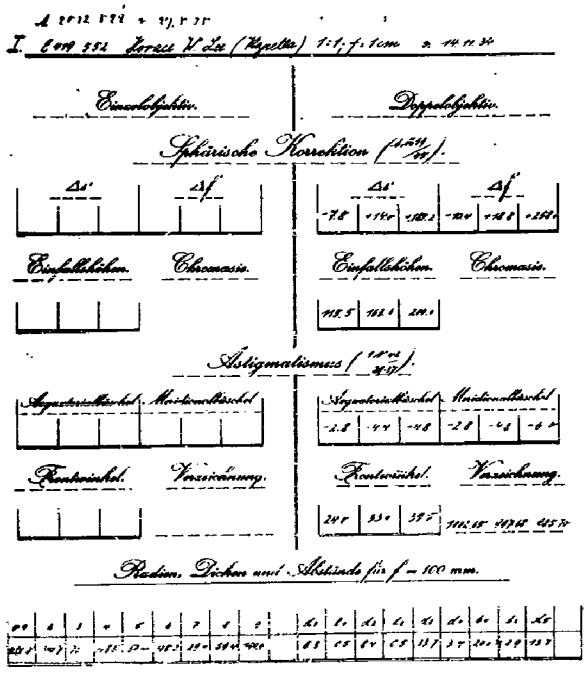
№ 897
1:1; f = 10 cm
IX / 42h

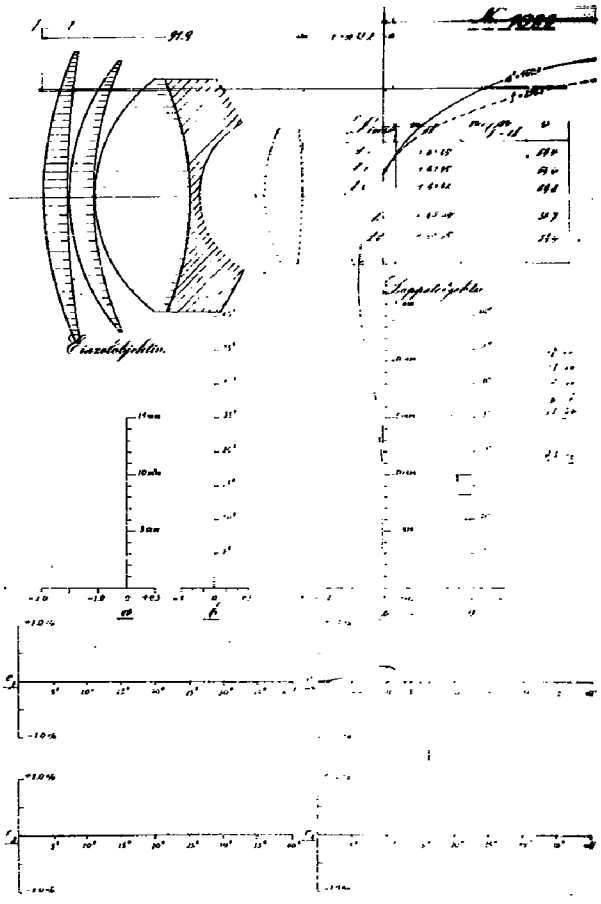


791

F-TS-6398-RE

792





F-75-6598-RE

793

A. Jackenstall 1:1.0 f=100 mm D.R.P. 321295 v. J. 34

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (A.Z.P.) f/1.5

Δs'	Δf'

Einfallshöhen — Chromasie

Astigmatismus (A.N.) f/1.33

Sagittalbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

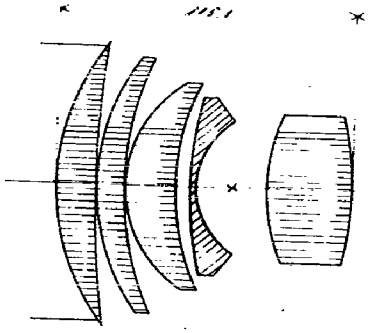
Radien, Dicken und Abstände für f = 100 mm.

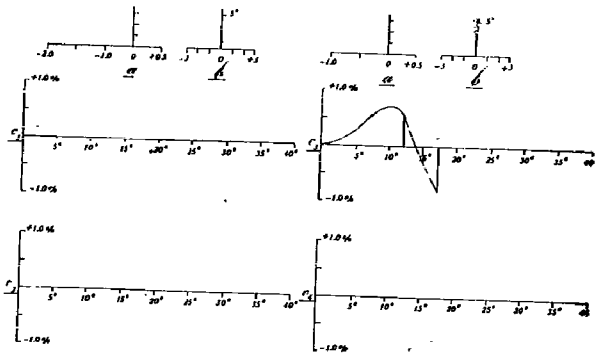
r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
98.3	35.8	36.5	111.4	42.8	57.0	42.8	31.5	15.8	1185.4	24.1	1.5	11.1	1.5	11.1	6.1	2.1	6.5	21.6

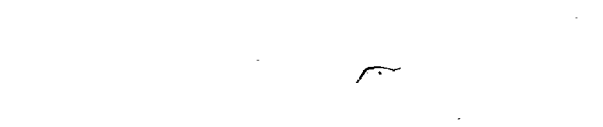
D.R.P. 326295 v. J. 34 — 1041

A. Jackenstall 1:1.0 f=100 mm

Fr. Cässl. 1041







193

F-75-6598-RE

Pr. Anastigmat 35 mm von H. Ermemann, Dresden

Nr. 24673

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (A.Z.P.) f/4.5

Δs'	Δf'

Einfallshöhen — Chromasie

Astigmatismus (A.N.) f/4.5

Sagittalbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
97.3	35.8	36.5	111.4	42.8	57.0	42.8	31.5	15.8	1185.4	24.1	1.5	11.1	1.5	11.1	6.1	2.1	6.5	21.6

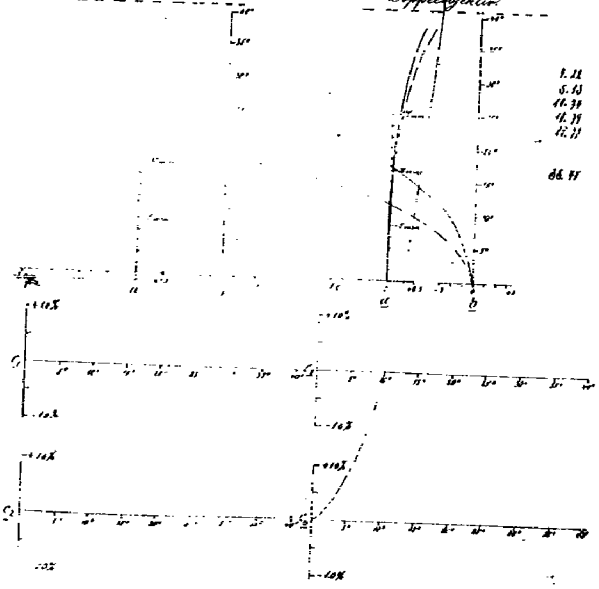
Nr 325

Pr. Anastigmat 35 mm v. H. Ermemann, Dresden

Nr. 24673

Linie	n_d	n_F − n_C	ν
r1	1.591 03		
r2	1.581 36		
r3	1.614 60		
r4	1.614 60		
r5	1.614 34		

Einzellinse — Doppelobjektiv



F-75-6398-RE

795

Kapella A 1955 617 1:2.4 f=10cm RA v. 17h 34

Einzelobjektiv. Doppelobjektiv.

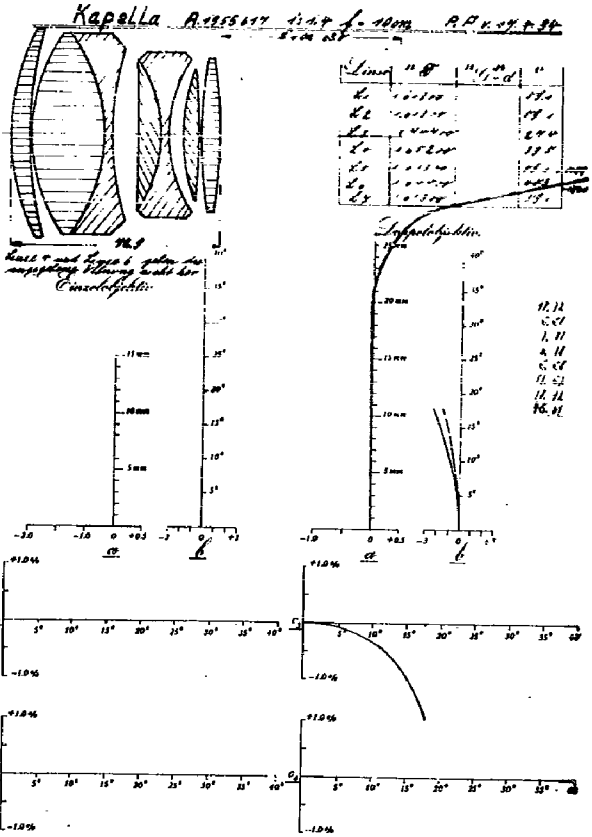
Sphärische Korrektion (RA 17h 34)

Δs' Δf' Einfallsh. Chromasie.

Astigmatismus

Sagittalhalbm. Meridionalhalbm. Fw. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.



701

A 1063

F-75-6398-RE

796

Minor 1:2.4; f=4cm. A 1 617 358 RA v. 7h 32m (δ = -3° 02')

Einzelobjektiv. Doppelobjektiv.

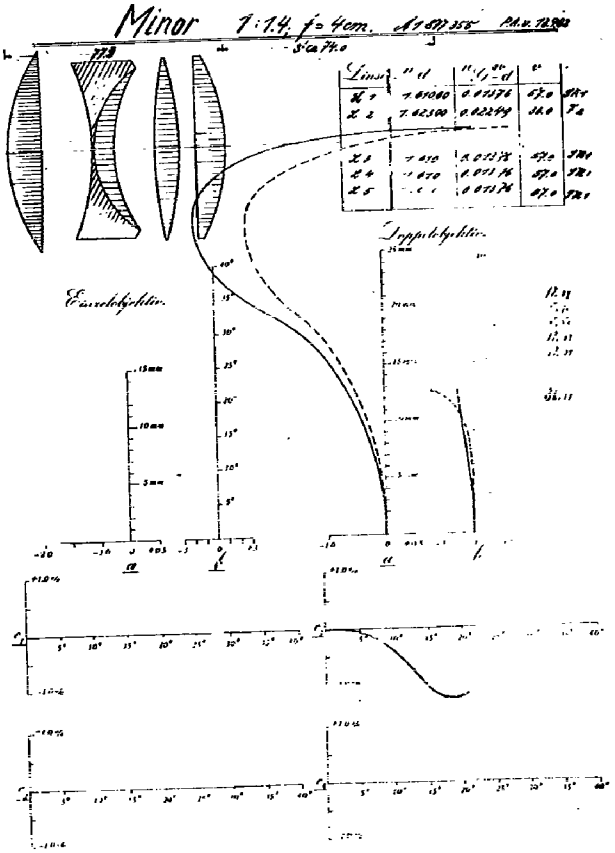
Sphärische Korrektion (RA 7h 32m)

Δs' Δf' Einfallsh. Chromasie.

Astigmatismus (RA 7h 32m)

Sagittalhalbm. Meridionalhalbm. Fw. Verzeichnung.

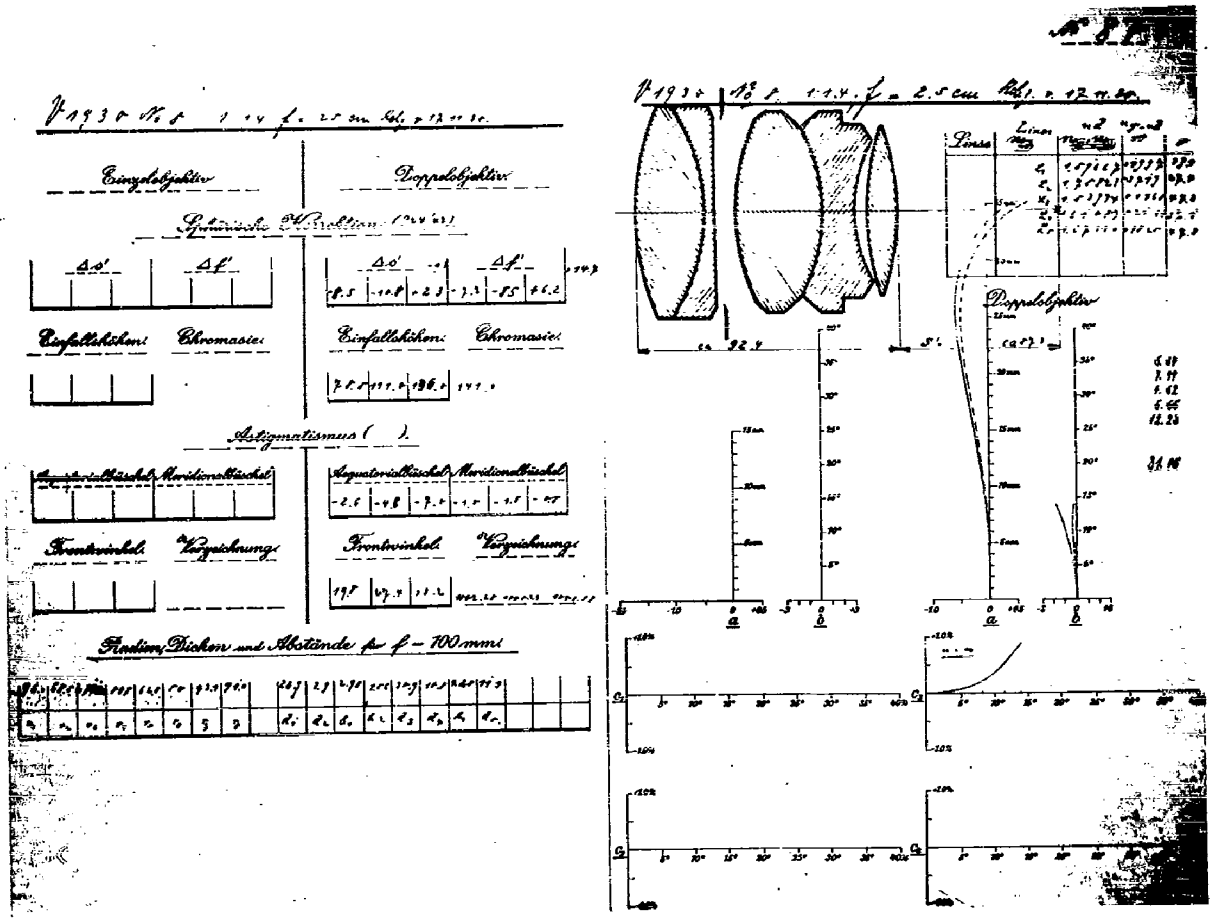
Radien, Dicken und Abstände für f = 40 mm.



796

F-TS-6388-RE

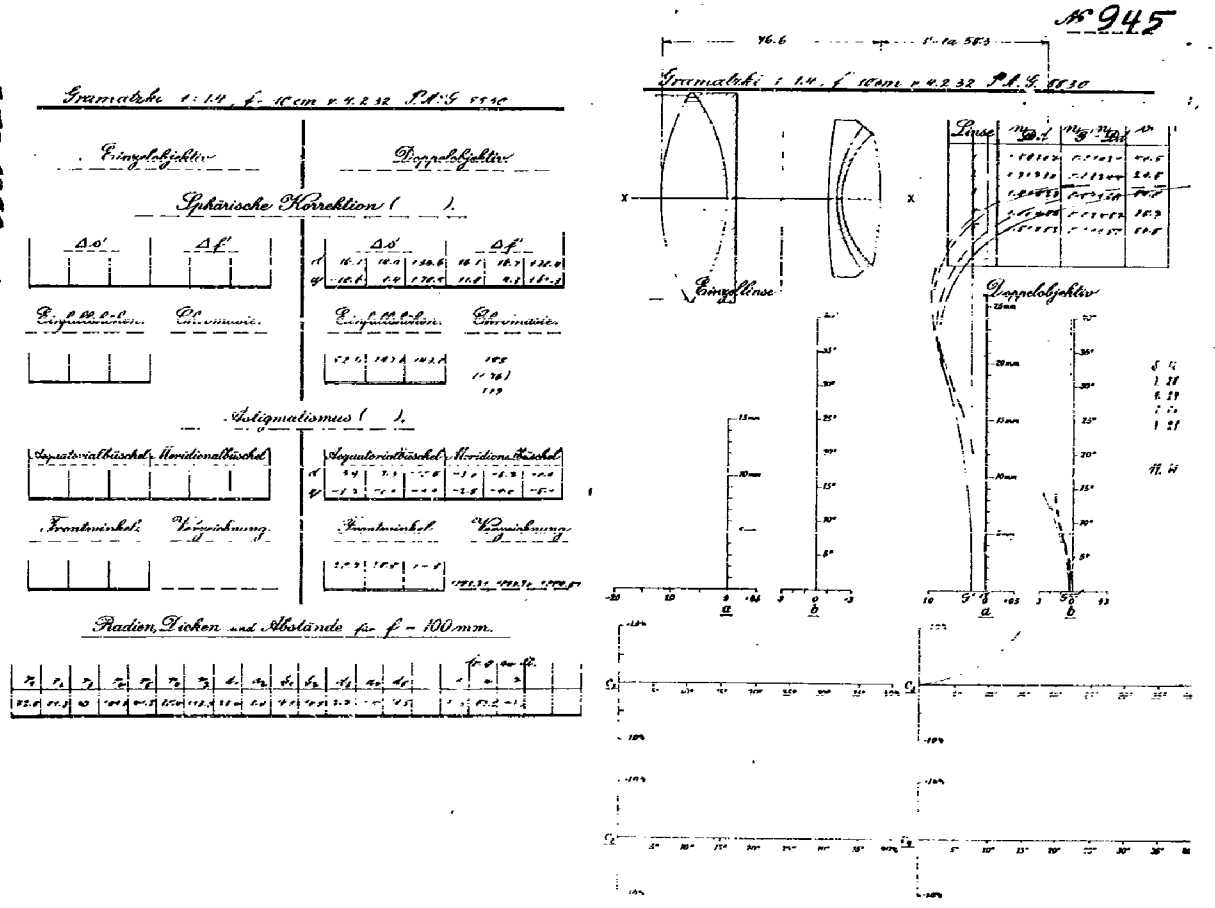
797



797

F-TS-6398-RE

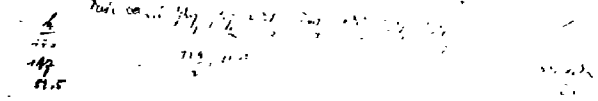
798



L 945

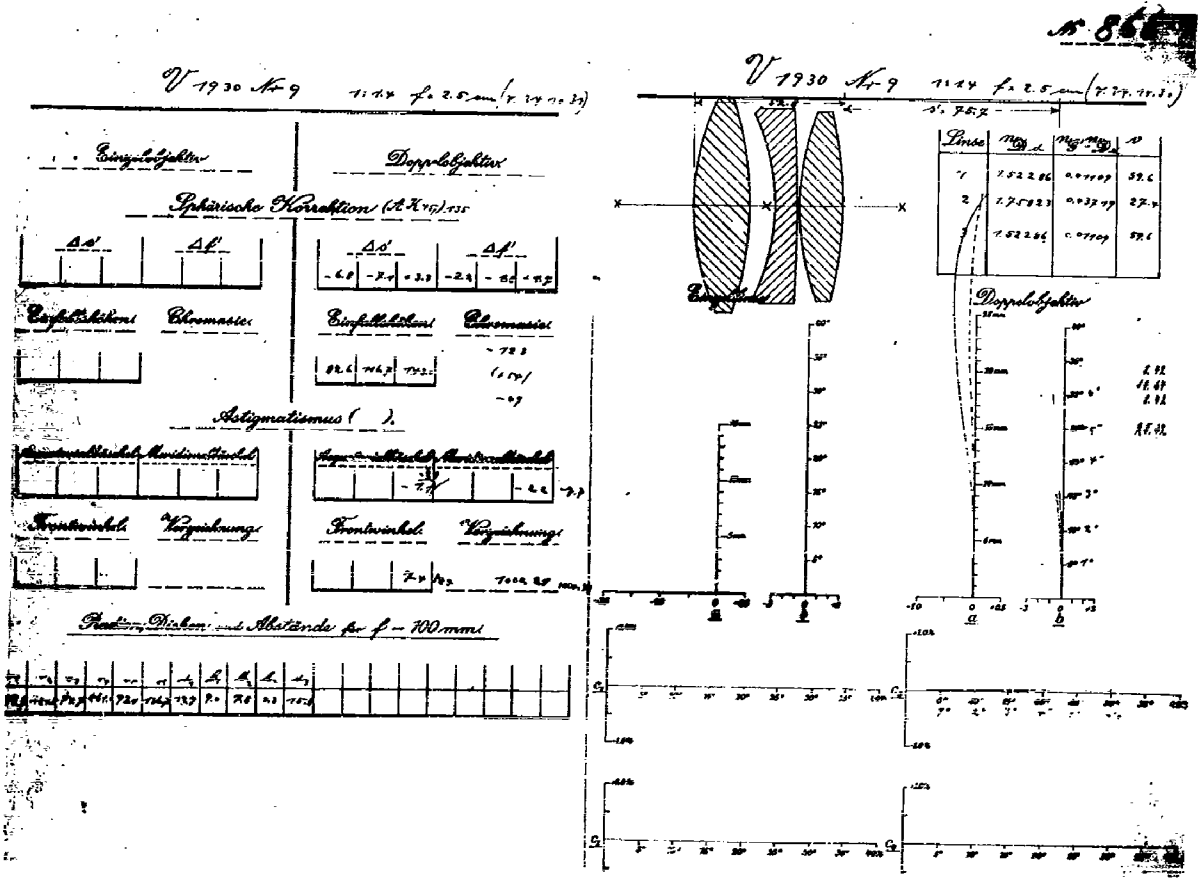
F-TS-6398-RE

799



799

№ 86



F-TS-6398-RE

800

F-75-6398-RE

801

№ 789

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsöffnen. — Chromasie.

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm:

Doppelobjektiv

F-75-6398-RE

802

№ 788

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Einfallsöffnen. — Chromasie.

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm:

Doppelobjektiv

F-75-6398-RE

803

Hugo Meyer Görlitz 1387503 1:5, f. 10cm v. 22.10.36
FP 903 679 (Soc. d'Opt. et de Mec. d. Haute Préc) fr. Offg 66.7

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (90/12 mm)

Δs' | Δf

Einfallslothm. | Chromasie

Astigmatismus (90/12 mm)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	d2	d3	d4	d5	d6	d7	d8	n1	n2	n3
9.2	-40.0	93.9	46.3	68.0	79.2	34.9	21.6	52.8	77.9	6.7	2.6	40.9	12.2	2.6	41.2	2.2	6.2				

Hugo Meyer Görlitz, 1387503 1:5, f. 10cm v. 22.10.36
FP 903 679 (Soc. d'Opt. et de Mec. d. Haute Préc) fr. Offg 66.7

Linse | n_d | ν_d | r | d

L1 | 1.617 | 63.4 | +0.0016 | 0.0
L2 | 1.617 | 36.8 | +0.0127 | 0.0
L3 | 1.617 | 63.4 | +0.0035 | 0.0
L4 | 1.617 | 63.4 | +0.0045 | 0.0
L5 | 1.617 | 63.4 | +0.0095 | 0.0

Einzelobjektiv | Doppelobjektiv

a | b

1403

№ 621

F-75-6398-RE

804

A. R. Jesthom Franz. Pat. № 837.480, 1:4.5, f = 45 mm x 24.6.22

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (25/2 mm)

Δs' | Δf'

Einfallslothm. | Chromasie

Astigmatismus (25/2 mm)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken u. Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	d2	d3	d4	d5	d6	d7	d8	n1	n2	n3
5.4	—	-22.5	162.5	5.4	103.2	9.5	4.5	3.6	14.1	0	1.9	2.6	14.1								

A. R. Jesthom Franz. Pat. № 837.480, 1:4.5, f = 45 mm x 24.6.22

Linse | n_d | ν_d | r | d

1 | 1.525
2 | 1.630
3 | 1.525

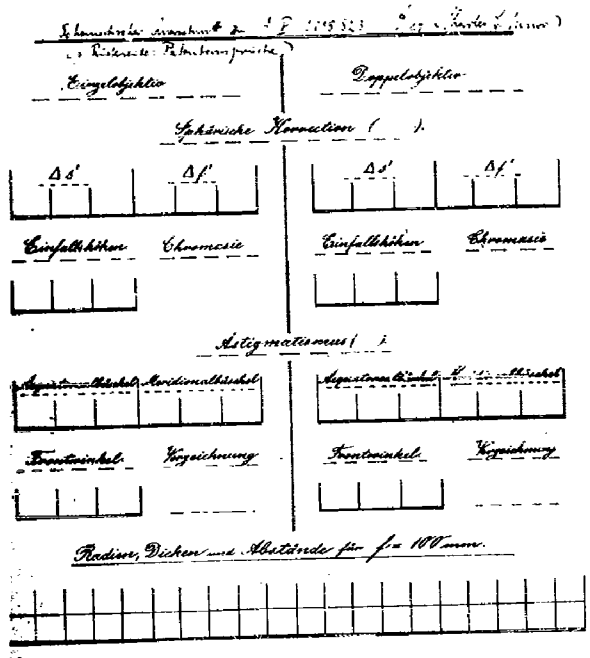
Einzellinse | Doppelobjektiv

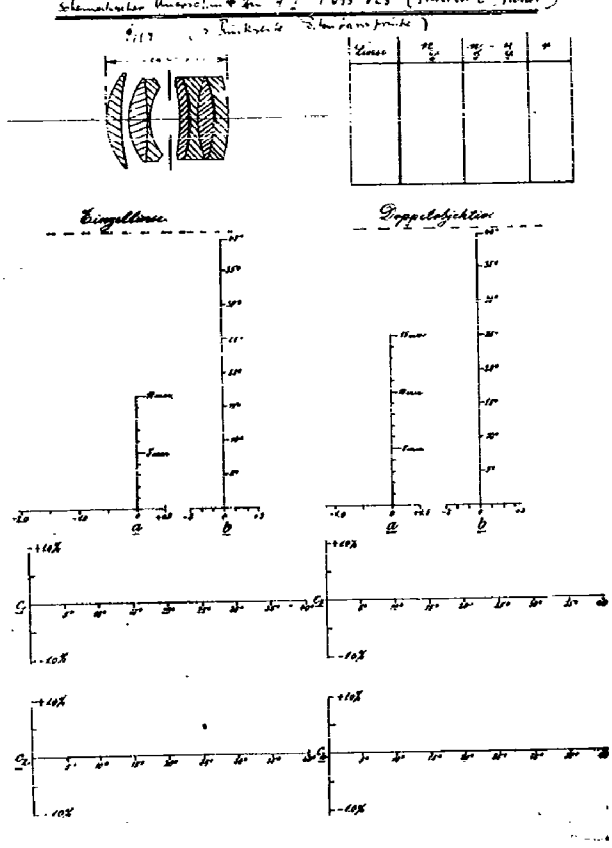
a | b

1.11
11.16
11.14
1.11
10.11

F-TS-6398-RE

805

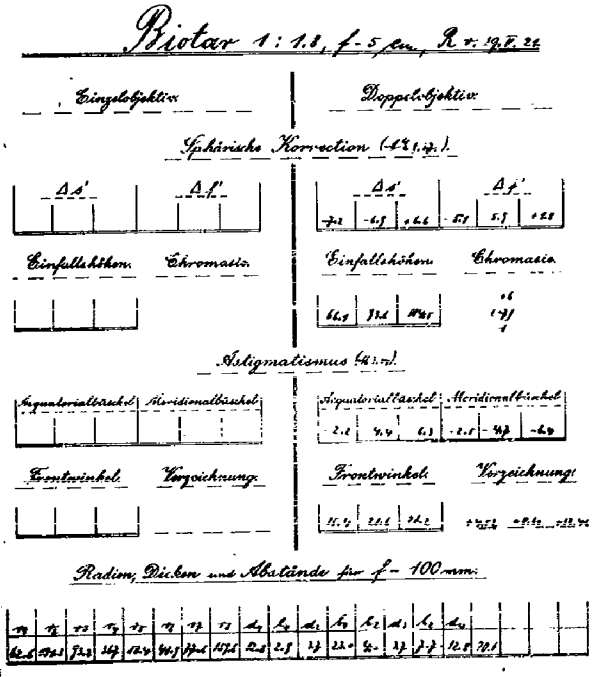


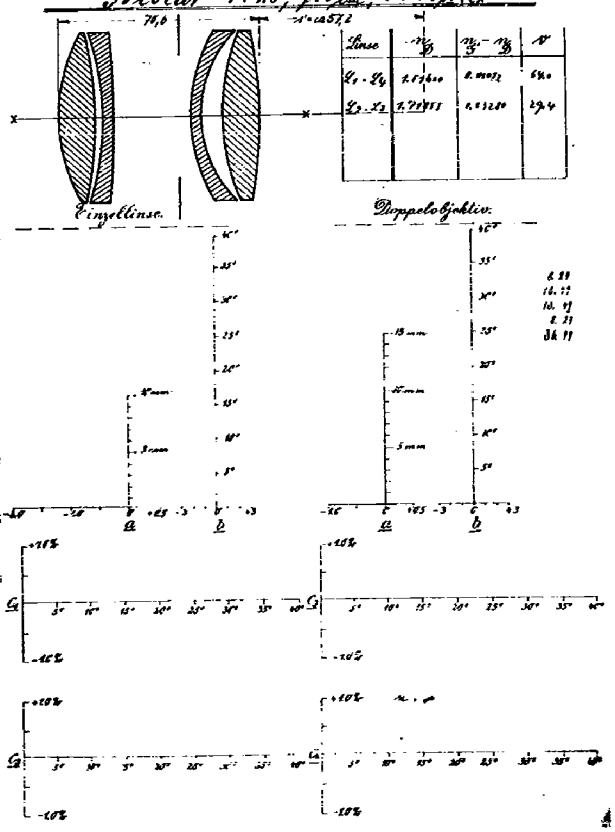


805

F-TS-6398-RE

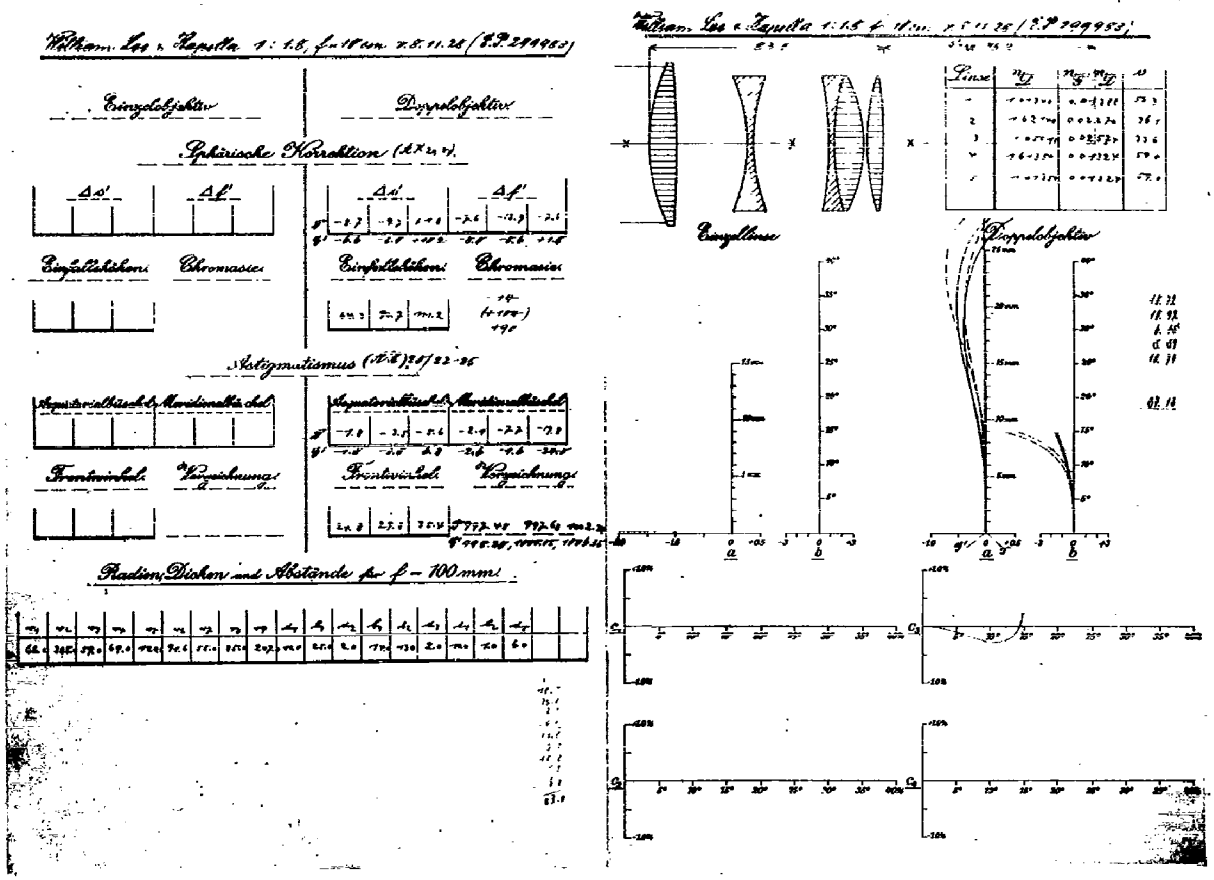
806





F-TS-6398-RE

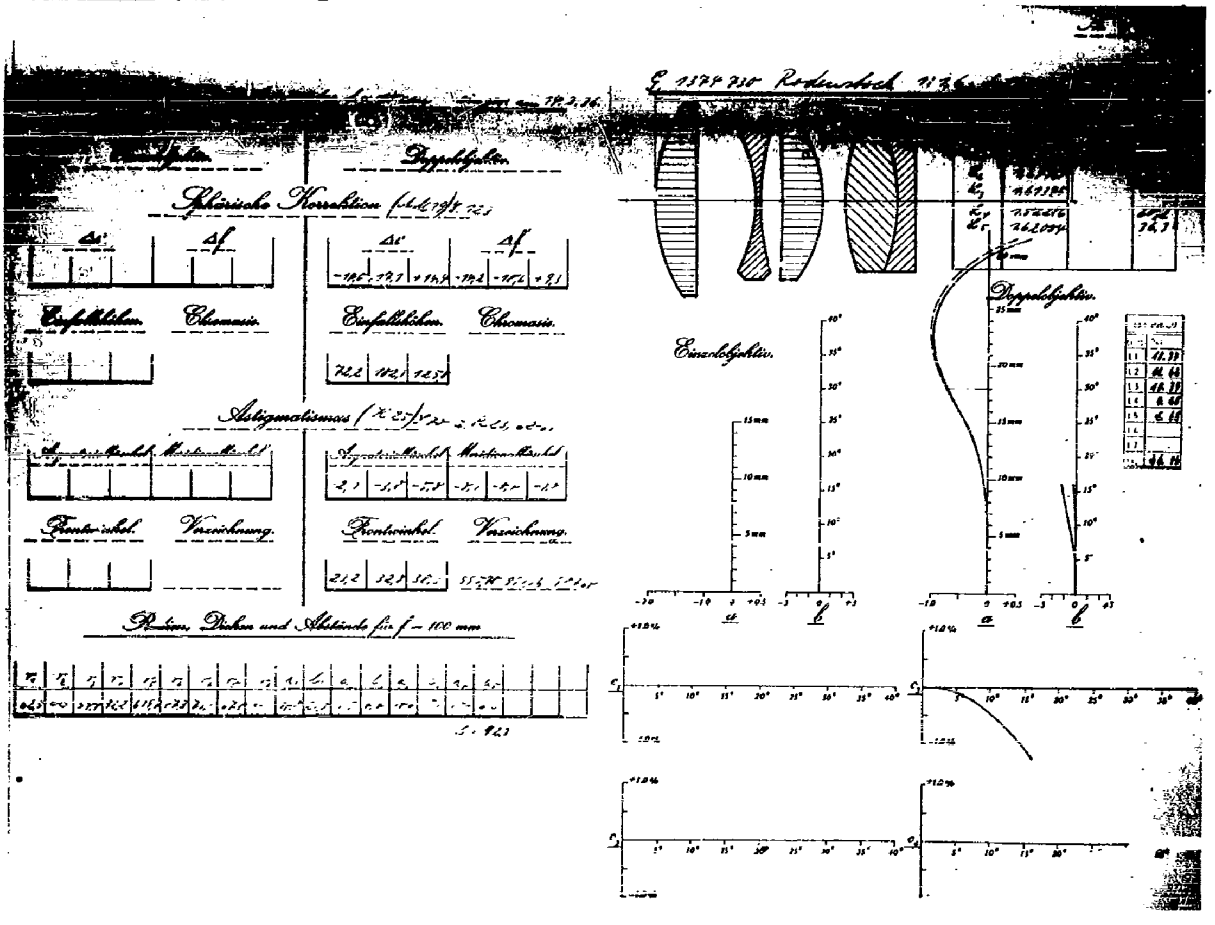
807



807

F-TS-6398-RE

803



№ 603

F-TS-6398-PE

809

Patent R. 65057 vom 4. v. R. Rudolph f 1:8 f = 100 mm v 4.9.22

Symmetrisches Objektiv

Einzelobjektiv

Doppelobjektiv

Sphär. u. sph. Korrektion (Bl. 2 u. 3)

Δs'			Δf'		
+1.4	+1.2	+1.1	+1.15	+1.12	+1.15

Δs'			Δf'		
+1.2	+1.2	+1.15	+1.0	+1.0	+1.15

Einfallshöhen | Chromasie

1.0	0.7	0.4	−.197 −.171 −.145

Einfallshöhen | Chromasie

0.6	0.3	0.15	−.174 (−.159) −.155

Astigmatismus (Bl. 2) 1:1

Aequatorialbüschel		Meridionalbüschel			

Aequatorialbüschel			Meridionalbüschel		
1.1	0.7	0.5	+0.6	+0.3	+0.10

Frontwinkel | Vorzeichnung

2.3	1.0	0.1	9.0 11 11.0 11.0

Frontwinkel | Vorzeichnung

2.3	1.1	0.2	11.0 12.0 11.0 12.0

Radien, Dicken und Abstände für f = 100 mm

r	r	r	r	r	r	r	r	r	r	d	d	d	d	d	d	d	d	d
48.4	48.4	0.20	11.6	48.2	48.2	11.6	48.7	48.7	48.2	15.8	15.8	0.21	9.6	0.3	4.8	0.3	9.6	15.8

D_1 D_2 D_3
1.0 1.4 1.1

Symmetr. Objektiv 1:1 f = 100 mm v F. F. Rudolph (Bl. 1 u. 2) vom 4.9.22

Linse	n_d	ν_d	N
L_1 L_2	1.61109	57.36	11.9
L_3 L_4	1.53395	47.53	9.3
L_2 L_3	1.62426	60.33	11.5

Einzellinse

1:2.6 f = 47.8 mm

Doppelobjektiv

6.11
1.62
4.12
4.12
1.62
6.11
05.22

a b

G

+10% −10%

F-TS-6398-PE

810

Kipro-Anastigmat 1:4.5 f. 95 cm Bl. 1 u. 2 Ref. v 11.1.23

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Bl. 1) 1:4.5

Δs'			Δf'		

Δs'			Δf'		

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (Bl. 2) 1:4.5 f = 100 mm

Aequatorialbüschel		Meridionalbüschel			

Aequatorialbüschel			Meridionalbüschel		

Frontwinkel | Vorzeichnung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Kipro-Anastigmat 1:4.5 f. 95 cm Bl. 1 u. 2 Ref. v 11.1.23

Linse	n_d	ν_d	N
L_1			
L_2			
L_3			
L_4			

Einzelobjektiv

Doppelobjektiv

1	12.22
2	12.22
3	06.22
4	12.22
5	06.22

a b

G

+12% −12%

F-TS-6398-RE

B 11

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

B 11

F-TS-6396-RE

B 12

Einzelobjektiv — Doppelobjektiv

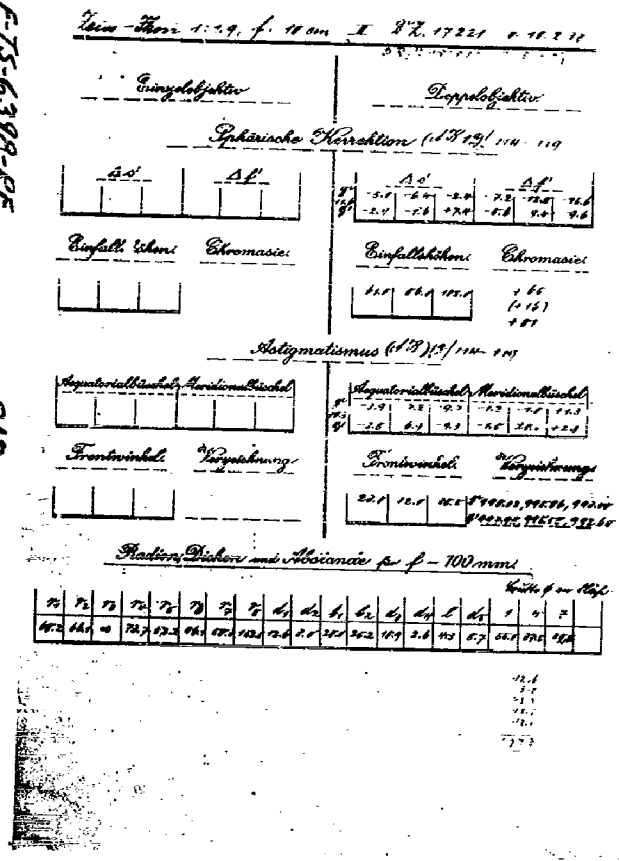
Sphärische Korrektion

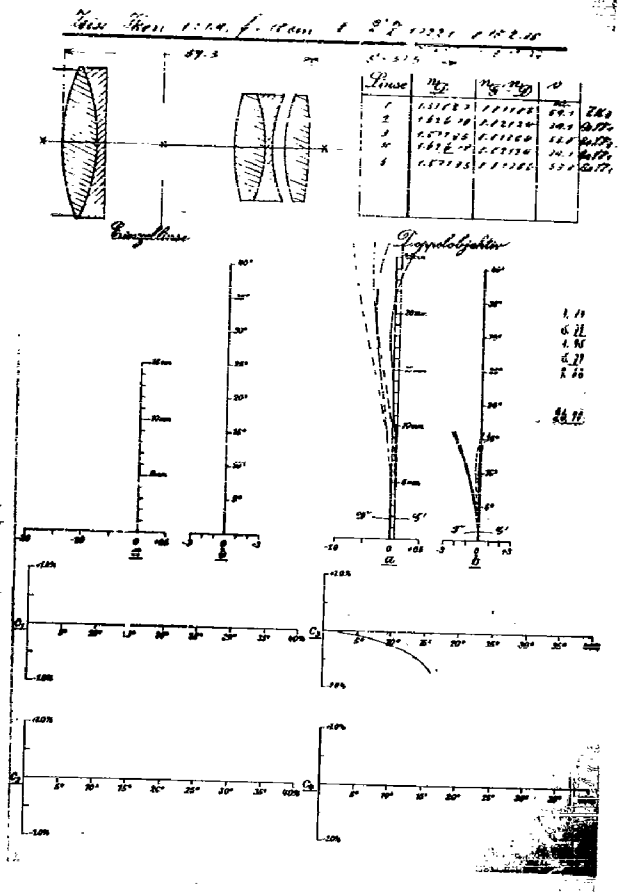
Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

F-TS-6398-RE

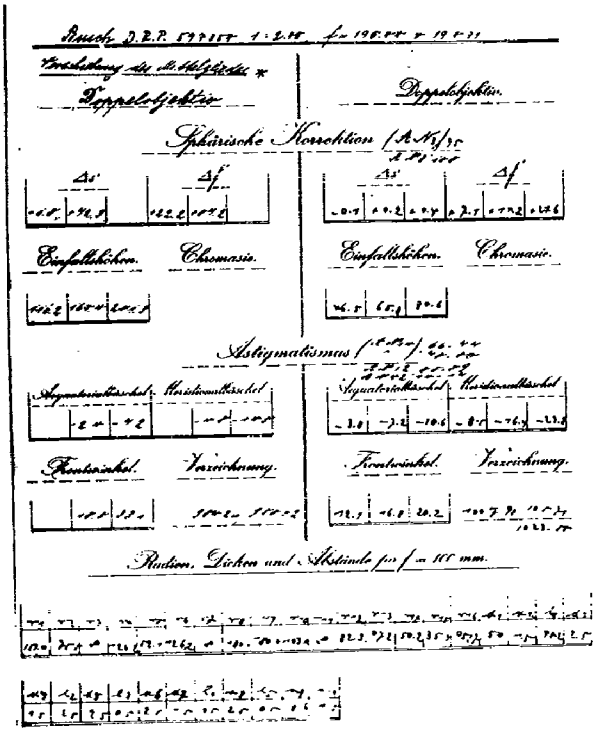
813

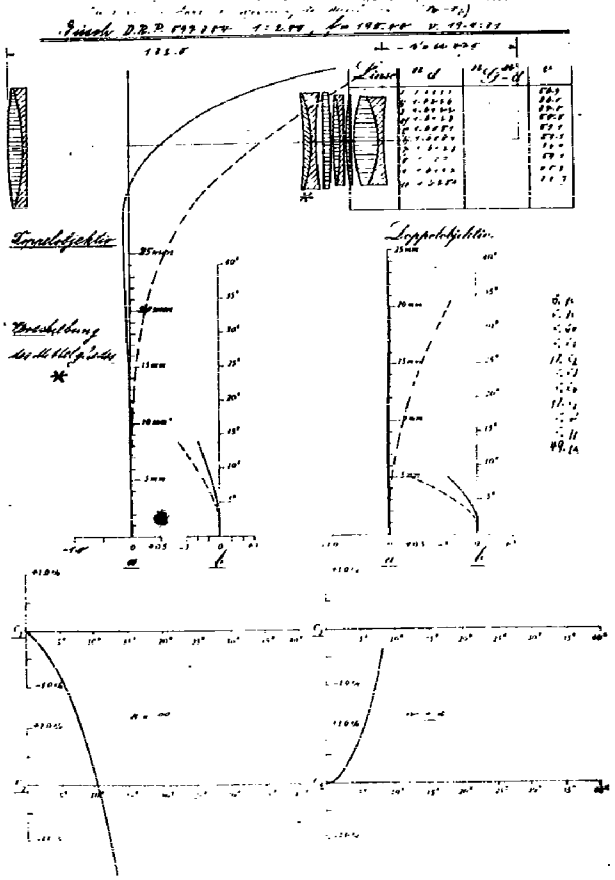




F-TS-6398-RE

814





K 1066

F-TS-6398-RE

815

Feuillet F 749 258 1:2 f=105 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Öffnung)

Δs' | Δf' | Δs' | Δf'

-4.7 | -14.6 | -18.6 | -1.0.5 | -3.- | -5.-

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

57.0 | 81.0 | 100.-

Astigmatismus (Öffnung)

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

-6.6 | -12.5 | -17.0 | -7.9 | -23.0 | -32.7

Fensterwinkel | Verzeichnung. | Fensterwinkel | Verzeichnung.

25.9 | 36.0 | 74.0

Radien, Dicken und Abstände für f = 100 mm

	1	2	3	4	5	6	7	8	9	d1	d2	d3	d4	d5	d6	d7	d8
	93.2	242.8	67.6	235.6	168.9	42.5	55.0	62.6	∞	6.7	22.6	12.9	7.9	4.8	18.1	0	7.6	7.9

Lens | n_d | n_F-n_C | v

L1 | 1.620 | 0.0170 | 60.3

L2 | 1.573 | 0.0180 | 57.8

L3 | 1.610 | 0.0170 | 57.1

L4 | 1.610 | 0.0170 | 44.6

L5 | 1.650 | 0.0330 | 33.8

Einzelobjektiv. | Doppelobjektiv.

f' | a | b

-5.0 | -1.0 | 0 | +0.5 | -.5 | 0 | +0.5

+10% | -10% | 5° | 10° | 15° | 20° | 25° | 30° | 35° | 40°

F-TS-6398-RE

816

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Öffnung)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Astigmatismus (Öffnung)

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

Fensterwinkel | Verzeichnung. | Fensterwinkel | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm

Einzelobjektiv. | Doppelobjektiv.

f' | a | b

+10% | -10% | 5° | 10° | 15° | 20° | 25° | 30° | 35° | 40°

F-TS-6398-RE

817

C. P. Goerz ... f = 100 mm ...

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf'

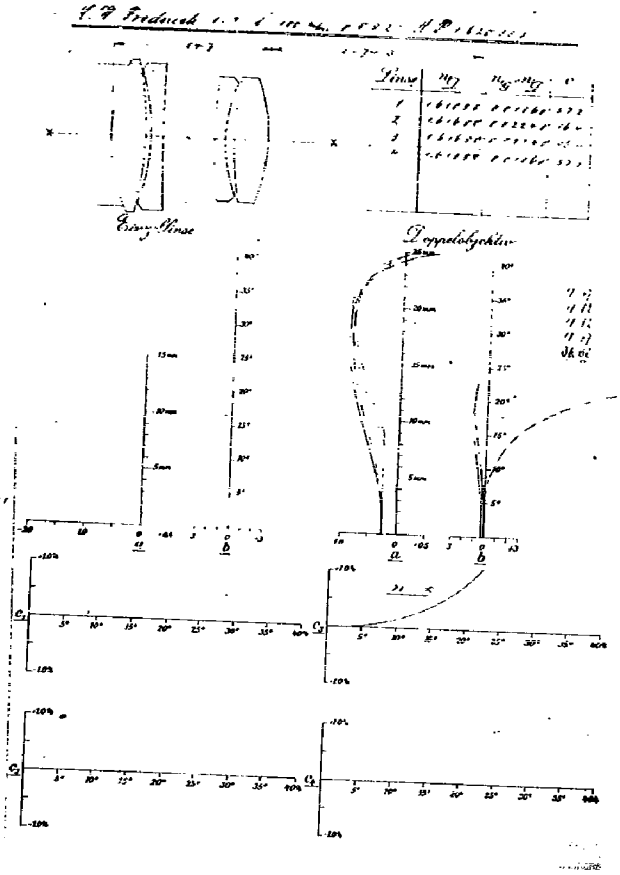
Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:



711

F-TS-6398-RE

818

Photographisches Objektiv ... f = 100 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf'

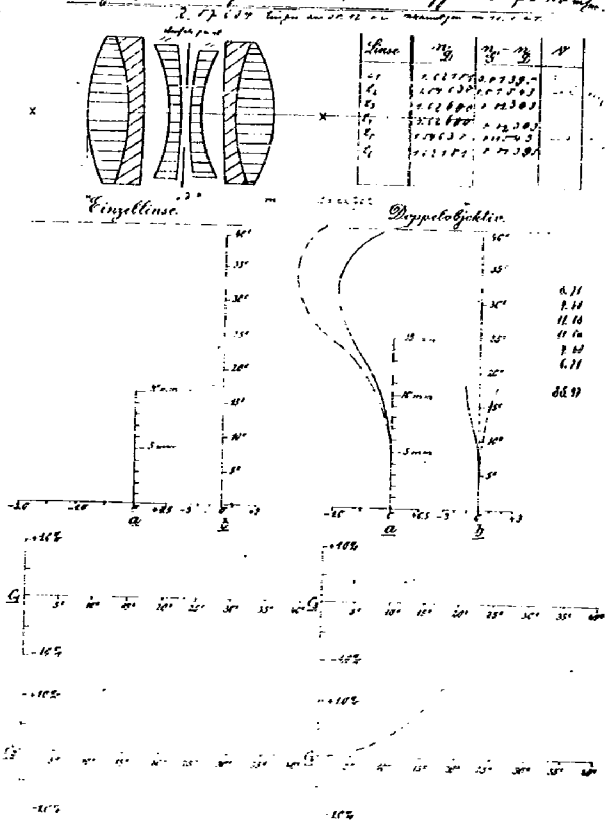
Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:



F-75-6378-RE

819

Leitz F 812 751 v. 7. Juni 1937 f. 100 mm

8 Objektive

Doppelobjektive

Sphärische Korrektion

Einzelobjektive

Doppelobjektive

Einzelobjektive

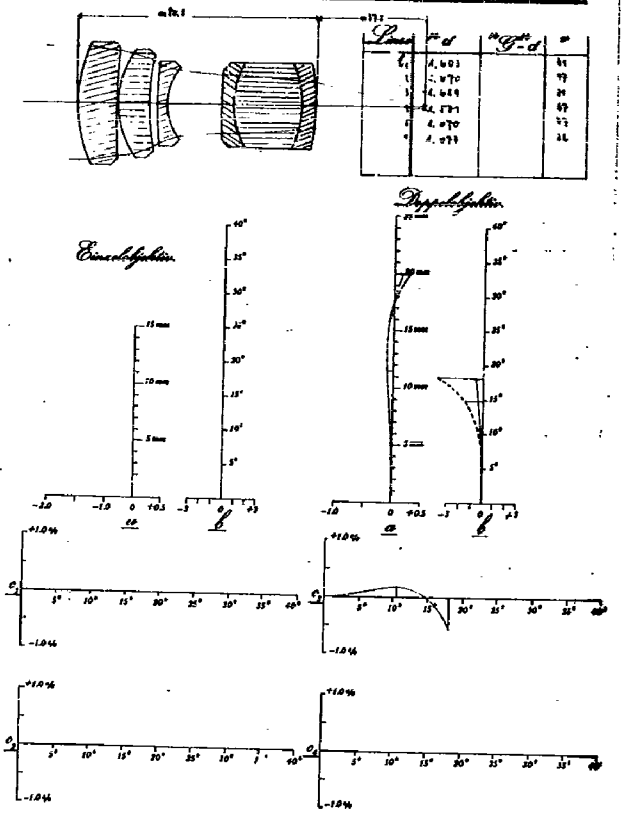
Doppelobjektive

Astigmatismus

Einzelobjektive

Doppelobjektive

Radien, Dicken und Abstände für f = 100 mm.



№ 1253

Leitz F 812 751 v. 7. Juni 1937 f. 100 mm

Linse

Einzelobjektive

Doppelobjektive

114

№ 604

F-75-6378-RE

820

Symmetr. Objektive 1:2,5 f. 100 mm v. Fa. P. Rudolph v. 4.9.22 (Zeiss Ikon)

Einzelobjektive

Doppelobjektive

Sphärische Korrektion

Einzelobjektive

Doppelobjektive

Einfallshöhen

Chromasie

Einfallshöhen

Chromasie

Astigmatismus

Einfallshöhen

Chromasie

Einfallshöhen

Chromasie

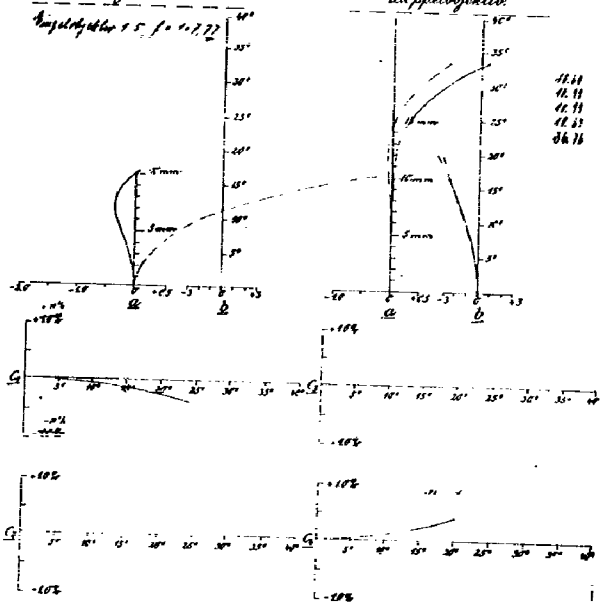
Radien, Dicken und Abstände für f = 100 mm:

Symmetr. Objektive 1:2,5 f. 100 mm v. Fa. P. Rudolph v. 4.9.22 (Zeiss Ikon)

Linse

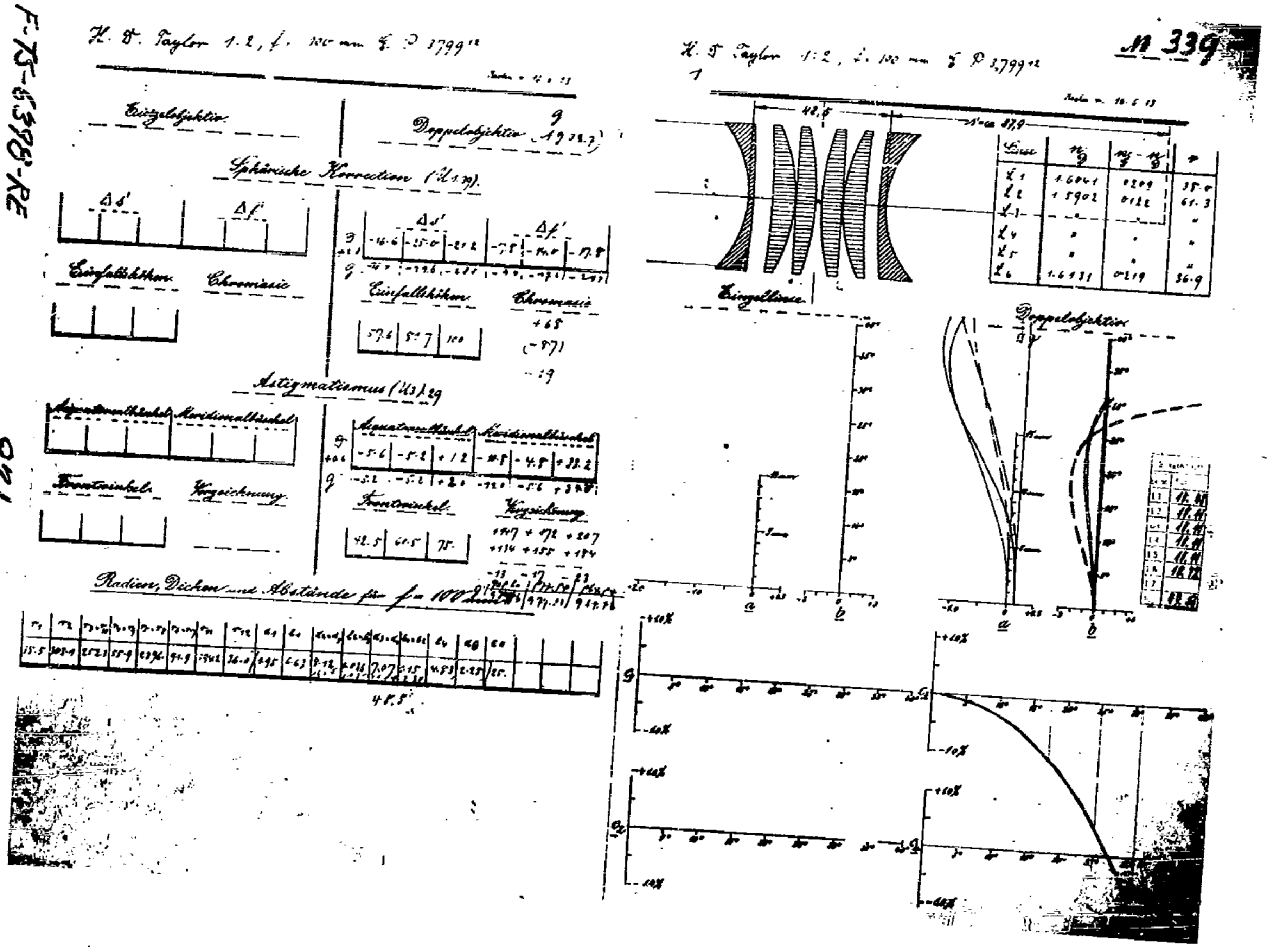
Einzellinse

Doppelobjektive



F-TS-6328-RE

821



N 339

821

V. 1933 Nr. 16 1:4,5 f=7cm Kilfen v. 6.7.38.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Bode/90)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-3.0 / +3.0	-3.0 / +3.0

Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

Einfallshöhen			Chromasie
24.8	41.5	133.0	-2.84 (f 152)

Astigmatismus (1776)/15

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel
-4.42	-4.49	-1.95 -4.44 -3.35	13.3

Frontwinkel. Vorzeichnung. | Frontwinkel. Vorzeichnung.

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
27.5	38.7	40.2	994	996.2	994

Radien. Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10
129	∞	13.7	47.8	24.7	32.5	138	98	35.2	36.4	102	14.4	0.3	17.1	4.4	6.3	2.1	1.7	11.2	4.7	12.5

822

V 1923 №3, 1:1.45, f=8.5cm, v. 6.4.23.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrection (Bl 76.49)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'

Einfallshöhen. Chromasie. | Einfallshöhen. Chromasie.

Einfallshöhen			Chromasie

Astigmatismus (Bl Fm) 22/21

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel

Frontwinkel. Vorzeichnung. | Frontwinkel. Vorzeichnung.

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung

Radien. Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	d2	d3	d4	d5	d6	d7	d8	D1	D2	D3
82.5	∞	14.5	11.5	47.5	12.8	47.8	12.6	14.5	10.3	12.5	1.5	1.9	9.4	6.8	3.5	2.5	1.5	11.5	10.1	12.7

F-75-C378-82

823

E. Leitz - Wetzlar. F. L. 109.30 = 79.2 3a. 1:1.9 f=

F-TS-6398-RE

824

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A. d. M.)

Δs'	Δf'	Δs'	Δf'
		D -0.1 -1.1 -3.6 -7.4 -13.6 -16.0	
		G' -0.9 +0.7 +0.1 -6.4 +4.3 +6.0	

Einfallsblenden | Chromasie | Einfallsblenden | Chromasie

		67.7	79.3

Astigmatismus ( ).

Tangentialbüschel	Meridionalbüschel	Tangentialbüschel	Meridionalbüschel
		D -2.4 -2.6 -3.4 +1.7 +2.9 -0.4	
		G' -1.3 -2.3 -3.9 +1.2 +2.3 -0.6	

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

		D 34.7	42.5
		G' 32.0	41.3

Radien, Dicken und Abstände für f = 100 mm.

E. Leitz - Wetzlar F. L. 109.30 = 79.2 3a. 1:1.9 f=

Einzellinse

Linse			
1	1.62	0.0214	58.2
2	1.62	0.0239	36.7
3	1.62	0.0156	58.2
4	1.58	0.0751	42.8
5	1.62	0.0715	58.2
6	1.62	0.0503	42.8

Doppelobjektiv

2a ... 4' fallen zusammen

a b a b

G_1 G_2 G_3

124

V 1937 Nr 15 1:1.9 f= 1.25 cm v. 24.8.37.

F-TS-6398-RE

825

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (A. d. M.) 132

Δs'	Δf'	Δs'	Δf'
		-4.0 +0.5 -1.8 -2.7 +1.6 -6.7	

Einfallsblenden | Chromasie | Einfallsblenden | Chromasie

		67.7	79.3

Astigmatismus ( ).

Tangentialbüschel	Meridionalbüschel	Tangentialbüschel	Meridionalbüschel
		-1.7 -2.8 -4.2 -0.3 -0.2 0.3	

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

		24.0	29.4

Radien, Dicken und Abstände für f = 100 mm.

V 1937 Nr 15 1:1.9 f= 1.25 cm v. 24.8.37.

Linse			
1	1.62	0.0187	58.2
2	1.73	0.0295	28.5
3	1.62	0.0773	42.8
4	1.74	0.0222	44.2
5	1.62	0.0582	58.8

Einzelobjektiv

Doppelobjektiv

16 f

G_1 G_2 G_3

№ 606

F-13-6378-RE

826

V 1923 № 2 1 : 19 f = 1 m = 15.223

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Fig. 64)

Δ s' | Δ f' | Δ s' | Δ f'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Fig. 67)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	s	s'	n
49.5	∞	14.6	92.0	∞	114.4	114.0	28.1	13.5	9.5	22.0	2.9	6.5	11.5	0.09	12.1	4.8	12.6	9.6	0.2

V 1923 № 2 1 : 19 f = 1 m = 15.223

Linse | n_d | n_F − n_C | ν

1 | 1.613 15 | 0.012 23 | 44.0
2 | 1.604 42 | 0.012 57 | 37.8
3 | 1.571 10 | 0.010 87 | 42.9
4 | 1.622 00 | 0.011 64 | 33.0
5 | 1.608 50 | 0.011 11 | 38.9

Einzellinse | Doppelobjektiv

a | b | a | b

G | G | G | G

n = n (λ) | n = n

+10% | −10%

731

606

F-13-6378-RE

827

Gl[illegible]

	Aequatorialbüschel				Meridionalbüschel			
	-0.9	-1.0	-1.1	-1.2	+1.3	+1.2	+1.0	+1.1
	1.6	-2.7	-2.9	-3.1	-1.3	-1.1	-1.3	-1.1
	-2.0	-2.0	-2.7	-2.8	-1.1	-1.1	-1.3	-1.2

	23.8	24.1	24.1	24.3	111.6	111.11	111.11	111.10
	24.1	23.8	24.1	24.2	111.11	111.11	111.12	111.9
	24.3	24.1	24.1	24.6	111.11	111.9	111.11	111.11

731

№ 599

F-TS-6398-RE

B20

V 1922 Nr 6 1:2,95 f: 21 cm x 30 x 30

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d = 100 mm)

Δs' | Δf' | Δs' | Δf'

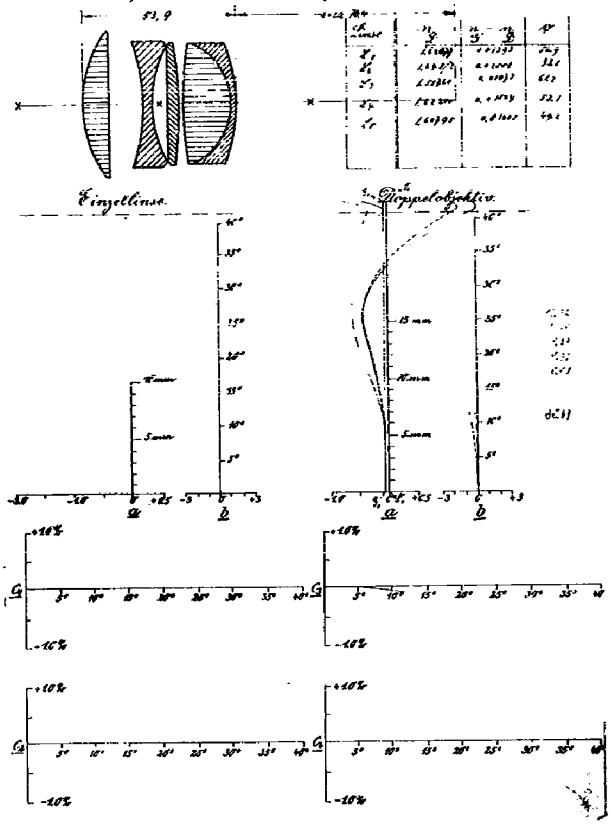
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (h' = x)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:



297

№ 608

F-TS-6398-RE

B29

W. Gehrke, Dresden Laubegast 1:2 f 100 mm. T.P.A. G. 546/29

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (d = 100 mm)

Δs' | Δf' | Δs' | Δf'

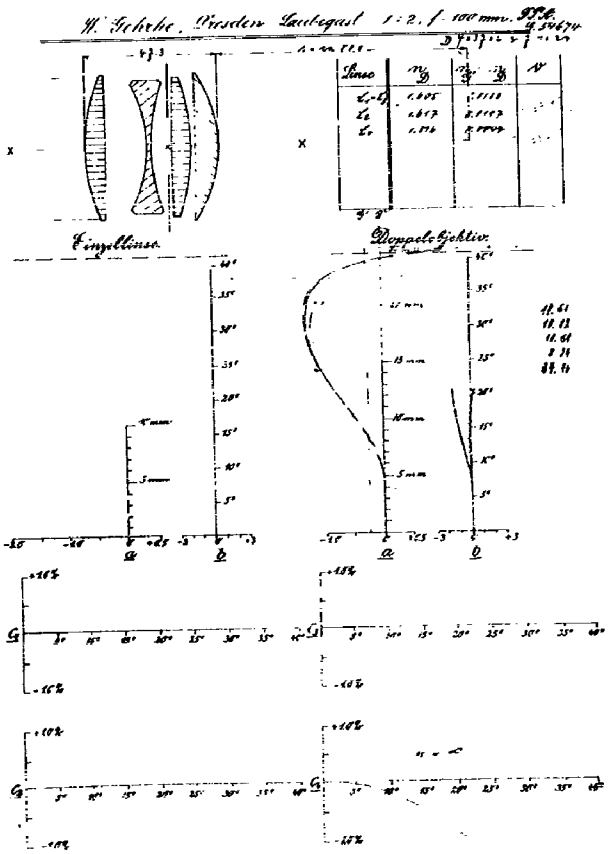
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (h' = x)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:



№ 609

F-75-6378-RE

830

V 1923 . 1:6 . 1:2 . f' 13 mm . v. 3.4.23 (Fortsetzung auf Blatt 610)

Einzellinse | Doppelobjektiv

Sphärische Korrektion (Δs' und Δf')

Einfallshöhen | Chromasie

Astigmatismus (Δs' und Δf')

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f' = 100 mm

Linse | n_g | $n_g - n_g$ | ν

Einzellinse

Doppelobjektiv

a | b

+10% | -10%

930

№ 674

F-75-6378-RE

831

D.P.A. B 112 672 Kl. 42 h Gruppe 11/02 Dr. - Tempelhof

Mikroskop-Objektiv 1:2, f = 4 mm

Einzellinse | Doppelobjektiv

Sphärische Korrektion (Δs' und Δf')

Einfallshöhen | Chromasie

Astigmatismus ( )

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f' = 100 mm

Linse | n_g | $n_g - n_g$ | ν

Einzellinse

Doppelobjektiv

a | b

+10% | -10%

F-TS-6398-RE

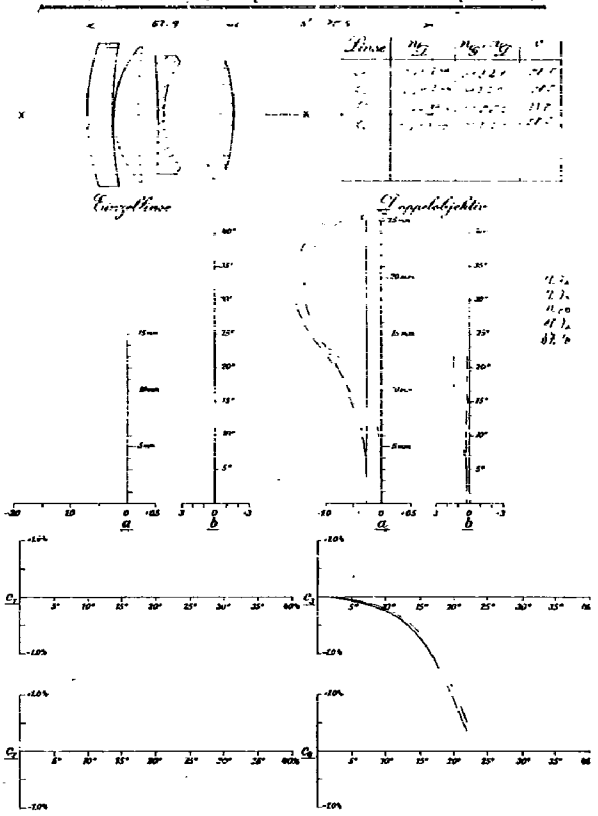
832

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

833

Kapella 1:2,5 f= 25,4 mm K.P. 693 000

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (sK = +0,4)

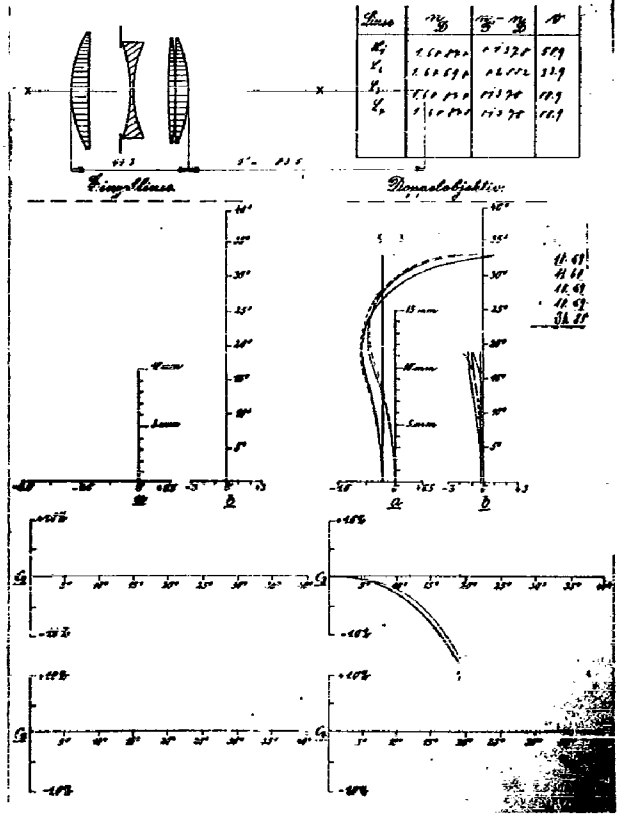
Einfallslothem | Chromasie

Astigmatismus (AS = 1,5 / 0,5)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

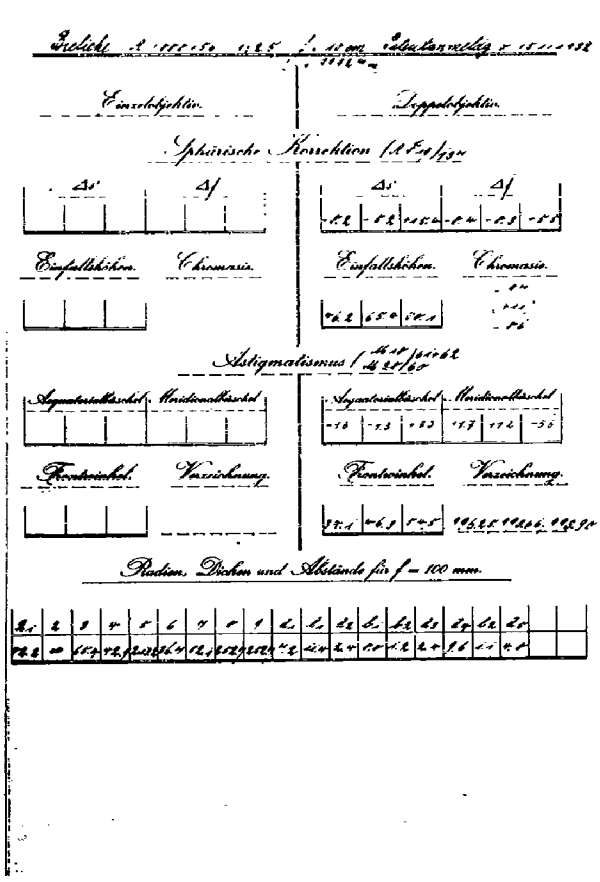
Radien, Dicken und Abstände für f = 100 mm

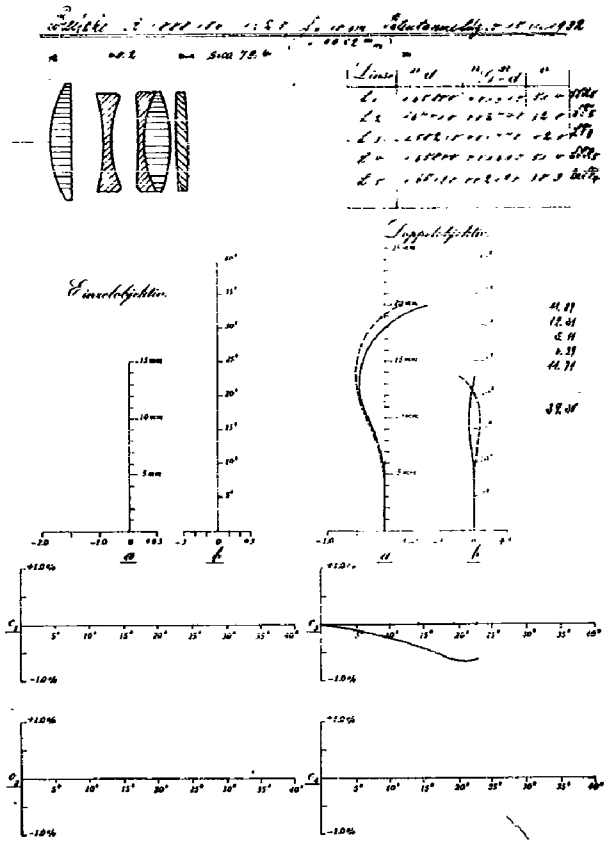


L 977

F-75-6370-RE

834



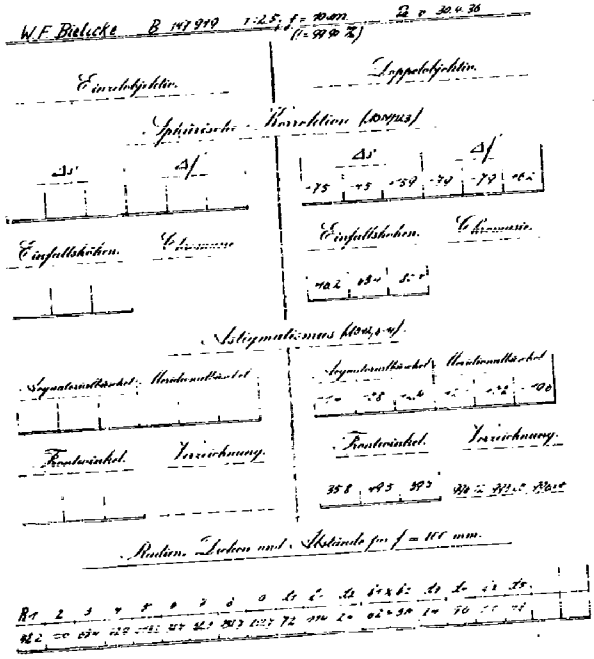


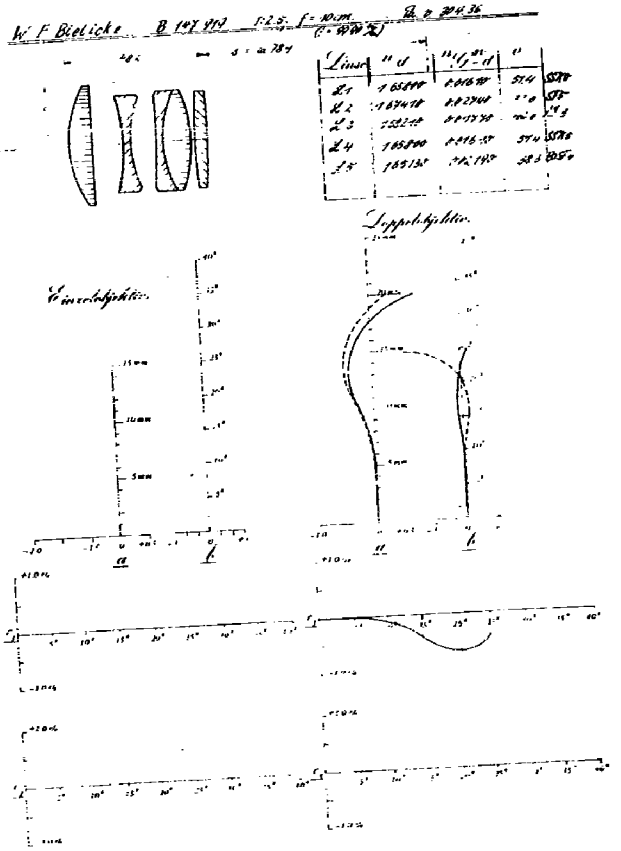
754

L 979a

F-75-6370-RE

835





F-75-6378-AE

836

V 1937 Nr 19. 1:2.7 f=5cm Rel. [illegible]

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (g=5)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0.3 -0.1 +0.0 +0.2 -0.2	-0.5 -0.4 +0.0 +0.2 -0.7

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

Astigmatismus (g=5)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-1.6 -1.3 -1.9 -2.1 -1.6 -1.0	

Frontwinkel. Verzeichnung.

Frontwinkel. Verzeichnung.

40.1 44.8 23.1 44.7 23.8 44.0

Radien, Dicken und Abstände für f = 100 mm

r	r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	d7
66.1	97.5	55.0	52.1	91.1	44.6	61.1	2.07	0.11	0.14	13.2	2.5	6.2	0.20	47.5

n1 = 1.614 n2 = 1.61 n3 = 1.613 n4 = 1.61

Gesamtlänge = 84.82 f.d.

Linse | n_D | $n_F - n_D$ | ν

L1 1.47411 47.3
L2 1.5000 59.6
L3 1.63980 34.6
L4 1.46445 65.2
L5 1.67411 47.2

Einzellinse

Doppelobjektiv

a b

C_1 C_2

C_1 C_2

F-75-6378-AE

837

Zeiß-Ikon, D.R.P. Z 19528 vom 15.9.32; 1:2.8, f=10cm.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (g=5)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0.5 -0.4 +0.2 -0.0 -0.6 +0.8	

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

41.0 42.2 31.1

Astigmatismus (g=5)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-0.3 -0.8 -0.6 -0.0 -0.4 -0.1	

Frontwinkel. Verzeichnung.

Frontwinkel. Verzeichnung.

39.6 40.4 41.2

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
91.2	90.8	54.9	184.9	19.1	494.8	17.1	118.3	7.0	0.4	16.8	1.0	20.0	1.0	2.0	16.0

Zeiß-Ikon, D.R.P. Z 19528 vom 15.9.32; 1:2.8, f=10cm.

Linse | n_D | $n_F - n_D$ | ν

L1 1.47411 47.3
L2 1.5000 59.6
L3 1.63980 34.6
L4 1.46445 65.2
L5 1.67411 47.2

Einzellinse

Doppelobjektiv

11.58
3.65
0.11
0.11
1.65
22.09

a b

C_1 C_2

C_1 C_2

C_1 C_2

F-TS-6396-RE

839

K/1224

Einzelobj. Abb. | Doppelobjektiv

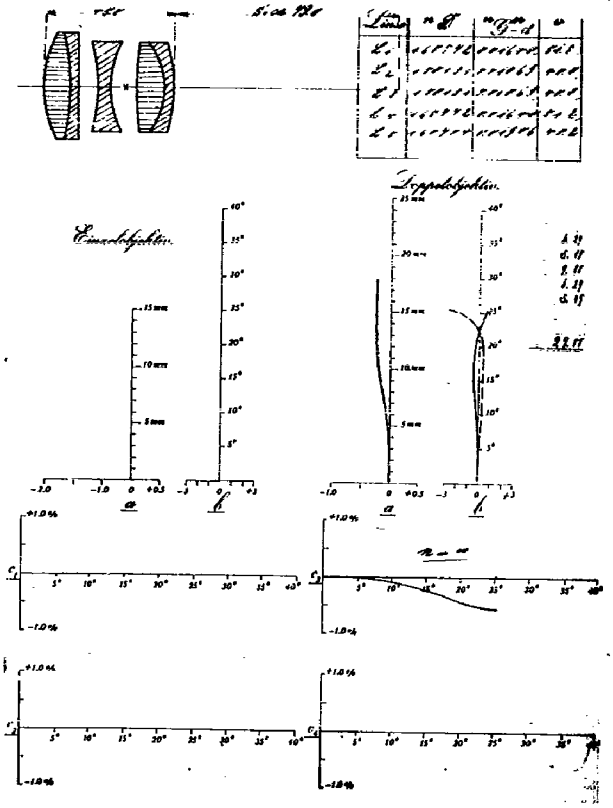
Sphärische Korrektion

Einfallsh. | Chromasie

Astigmatismus

Sagittalwinkel | Meridionalwinkel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



838

K/1224

F-TS-6398-RE

V 1938 Nr. 6 1:2,8 f=5cm v. 29.3.1938

Einzelobj. | Doppelobjektiv

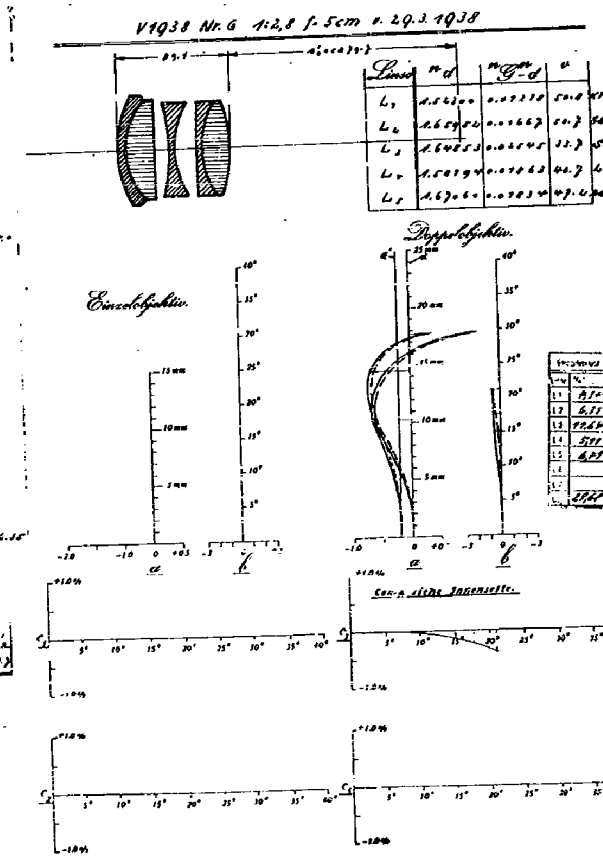
Sphärische Korrektion

Einfallsh. | Chromasie

Astigmatismus

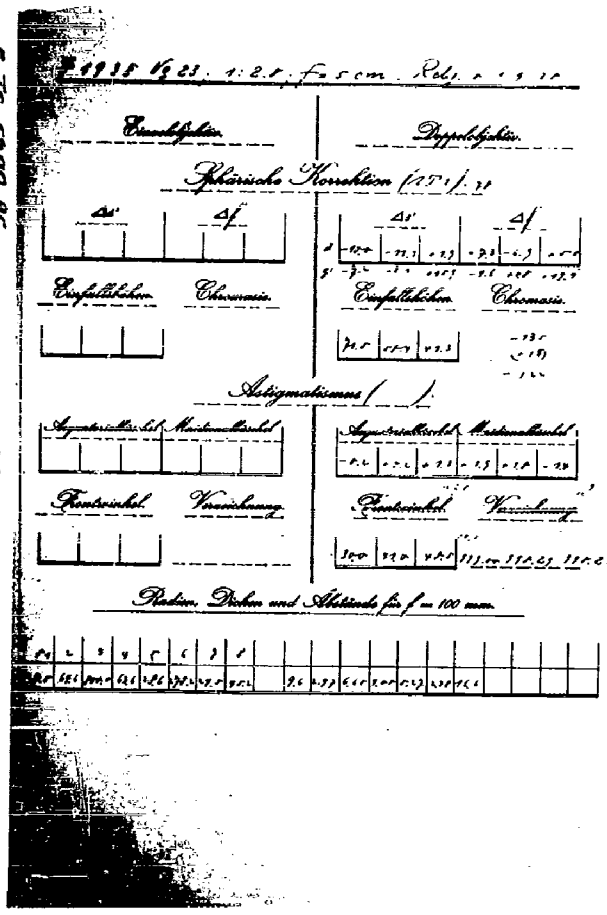
Sagittalwinkel | Meridionalwinkel | Frontwinkel | Verzeichnung

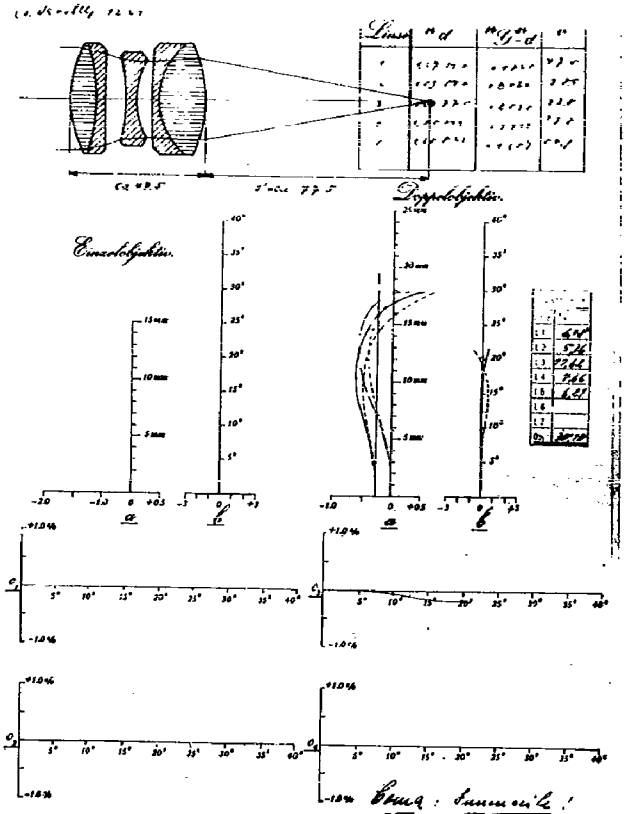
Radien, Dicken und Abstände für f = 100 mm.



F-TS-6390-RE

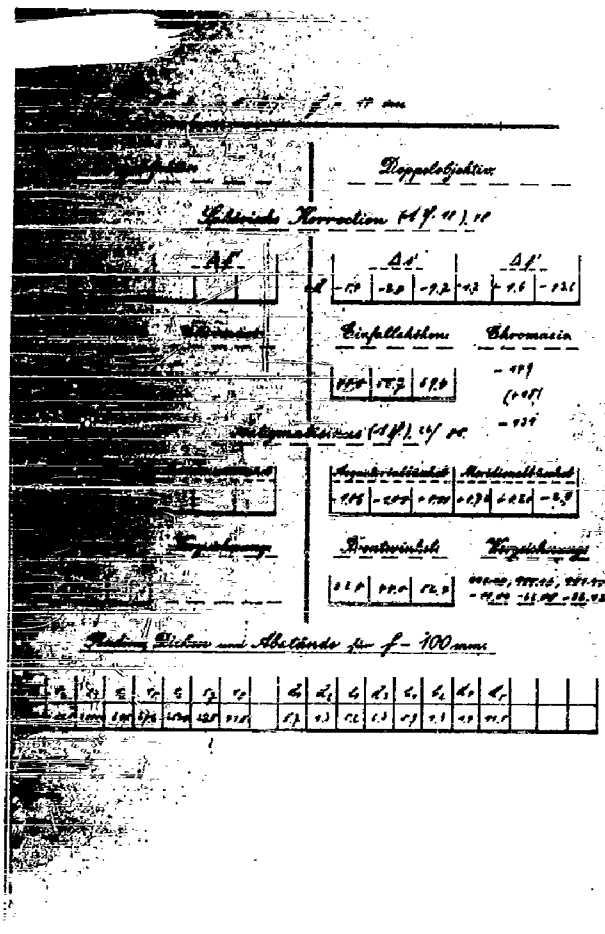
840

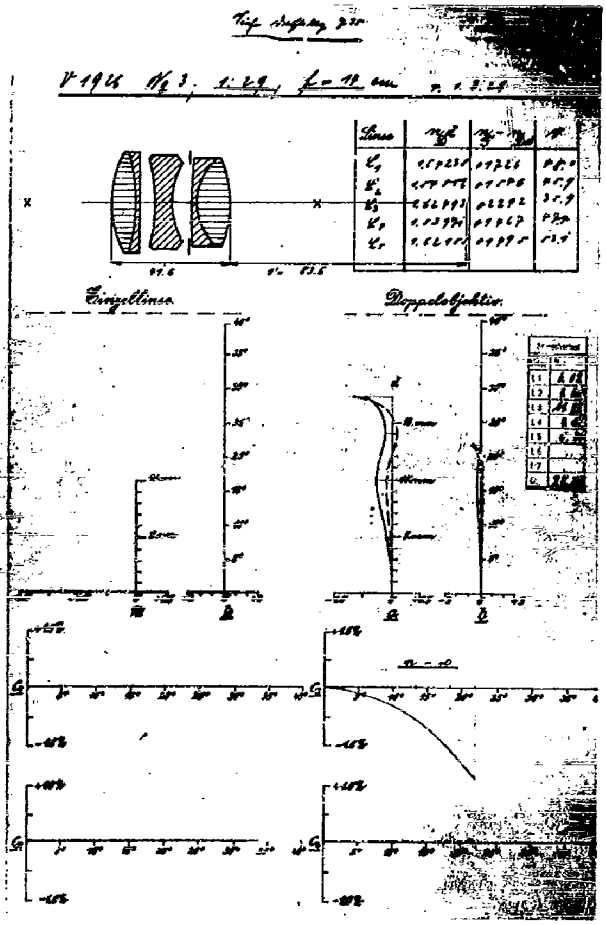




F-TS-6389-RE

841





F-75-6398-RE

842

Typ Fassung 201

V 1926 Nr. 1 2,9 f= 99 mm v 1 3 11

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (2y 62)

Δs'	Δf'	Einfallshöhen	Chromasie

Δs'			Δf'		
-23	-16	-09	-0,5	+0,2	-0,2

Einfallshöhen			Chromasie
14,0	11,6	6,4	-1% (-4) -1%

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel			Meridionalbüschel		
-1,1	-1,0	0,1	+1,8	-0,2	-1,2

Frontwinkel	Verzeichnung

Frontwinkel			Verzeichnung
32,0	9,00	-2,0	11,2 % 11,0 % 12,0 %

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16
32,5	64,9	0,08	64,0	48,3	64,2	24,0	11,5	6,8	1,3	11,6	6,3	4,8	2,2	2,0	8,6

Typ Fassung 201 — № 245

V 1926 Nr. 3 2,0 f= 99 mm v 1 3 11

Einzellinse — Doppelobjektiv

Linse	r	d	n - 1	ν
L1	+0,0 0,20	0,15	0,52	62,5
L2	0,20 0,04	0,10	0,52	62,5
L3	0,12 0,25	0,0292	0,52	33,9
L4	-0,1782	0,0052	0,52	33,9
L5	-0,2 0,17	0,0292	0,52	62,5

Einzellinse — Doppelobjektiv

4,13	3,46	11,11	1,03	0,11

22,22

F-75-6398-RE

843

Siehe V 1925 Nr. 6

Fünflinsiger verkitteter Dialyt, Form F

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (2y 22)

Δs'	Δf'	Einfallshöhen	Chromasie

Δs'			Δf'		
-0,1	-0,2	-0,3	-0,1	-0,1	-0,1

Einfallshöhen			Chromasie
11,1	10,0	7,1	

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel			Meridionalbüschel		
-0,3	-0,5	-0,3	-0,0	-0,3	-0,1

Frontwinkel	Verzeichnung

Frontwinkel			Verzeichnung
32,0	7,20	4,3	11,2 % 11,0 % 12,0 %

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16
0,2	0,0	13,2	3,5	0,0	2,1	4,5	1,1	0,8	2,5	0,0	0,3	0,1	1,3	0,3	0,3

Siehe V 1925 Nr. 6

Fünflinsiger verkitteter Dialyt Form F

Linse	r	d	n - 1	ν
1				
2				
3				
4				
5				

Einzellinse — Doppelobjektiv

11,13	8,14	1,03	0,15	1,13

22,11

F-TS-6378-RE

BHH

№ 9 d Patent Office v. 17 June 1911 polnaver Bürten Zirkle

Einzellobjektiv — Doppellobjektiv

Sphärische Korrektion (d. f. 18) 25

Δs'	Δf'

Einfallshöhen — Chromasie

Astigmatismus (d. B.) 15/25

Aequatorialbüschel	Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8
92.0	93.1	∞	43.5	33.1	83.4	31.2	32.1	2.5	7.5	5.2	1.1	4.5	2.4	1.5	2.5

№ 9 d Patent Office v. 17 June 1911 Bürten Zirkle f.

Linse

Einzellinse — Doppellobjektiv

a — b — G

+10% — −10%

F-TS-6382-RE

BHS

Englisches Patent № 151 586 v. 28.9.1920 (C. B. Berth.)

Einzellobjektiv — Doppellobjektiv

Sphärische Korrektion (d. f. 18)

Δs'	Δf'

Einfallshöhen — Chromasie

Astigmatismus (d. f.) 25

Aequatorialbüschel	Meridionalbüschel

Frontwinkel — Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8
92.0	93.1	100.2	44.5	35.0	87.1	31.5	33.1	2.5	7.5	4.5	2.5	4.5	2.5	1.5	2.5

Englisches Patent № 151 586 v. 28.9.1920 (C. B. Berth.)

Linse

Einzellinse — Doppellobjektiv

a — b — G

+10% — −10%

F-TS-6398-RE

846

V 7937 Nr. 8 1:3.2 f. 2 cm w 22.5 x 31

Einzellinse — Doppelobjektiv

Sphärische Korrektion (K XIII.)

Δs' Δf'

Einfallshöhen — Chromasie

Astigmatismus ( )

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f' = 100 mm

Linse | n_D | $n_F - n_C$ | ν

Einzellinse — Doppelobjektiv

Abb. 1 — Abb. 2

F-TS-6398-RE

847

Lipsanastigmat Triplet d. Sohn (Beispiel aus Patentschrift 124954)

Einzellinse — Doppelobjektiv

Sphärische Korrektion (K XIII.)

Δs' Δf'

Einfallshöhen — Chromasie

Astigmatismus (K III)

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f' = 100 mm

Triplet-Anastigmat Triplet d. Sohn Typ wie (Beispiel aus Patentschrift 124954)

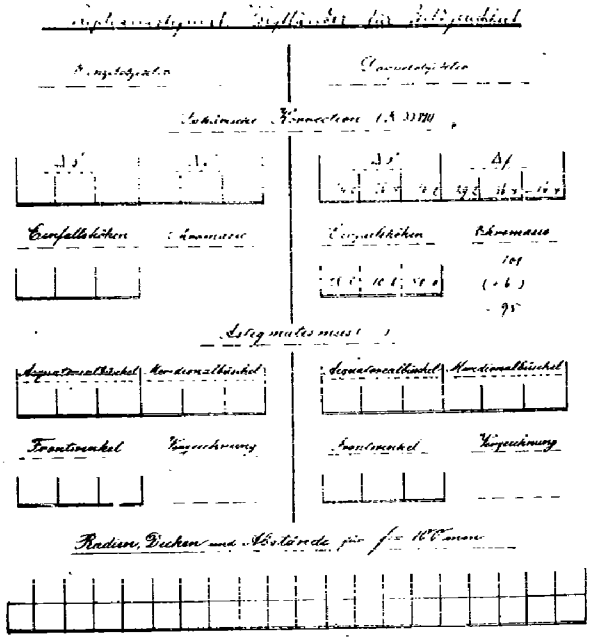
Linse | n_D | $n_F - n_C$ | ν

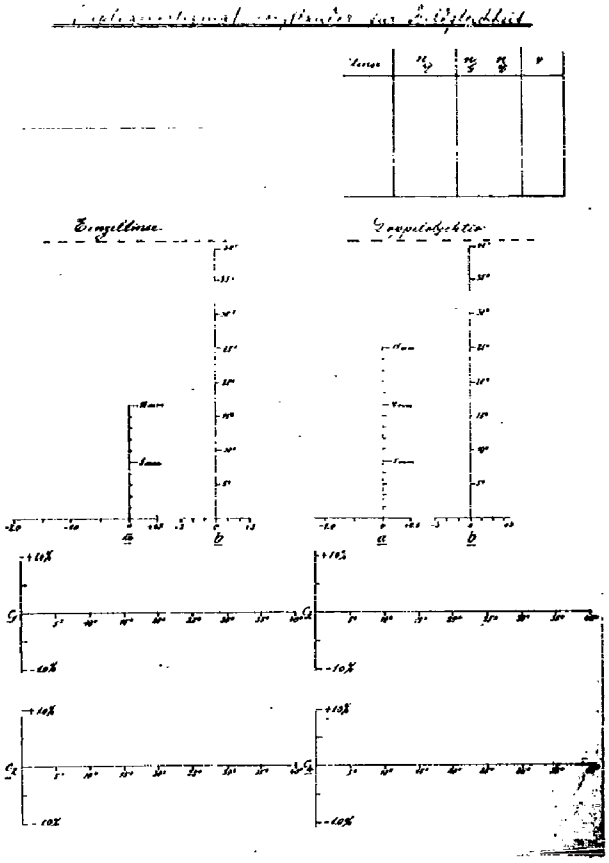
Einzellinse — Doppelobjektiv

Abb. 1 — Abb. 2

F-75-698-RE

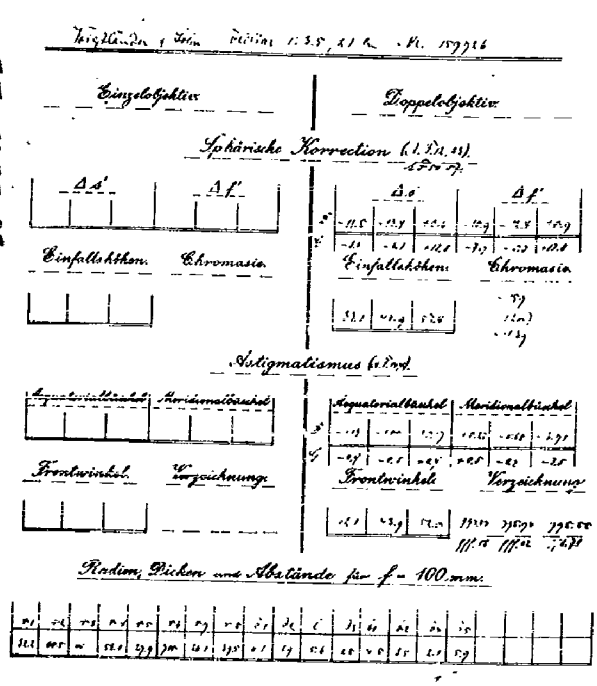
848

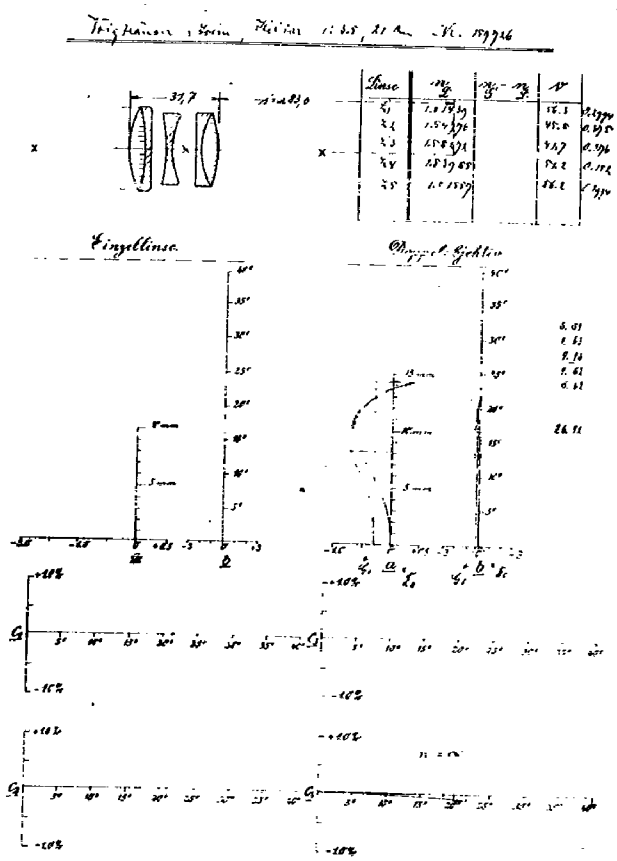




F-75-639-RE

849





L 673

F-75-6388-RC

850

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (R =)

Einfallshöhen Chromasie

Einfallshöhen Chromasie

Astigmatismus ( )

Äquatorialbüschel Meridionalbüschel

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Frontwinkel

Radien, Dicken und Abstände für f = 100

Doppelobjektiv

Einzelobjektiv

L 1204

F-75-6388-RC

851

Sphärische Korrection

Einfallshöhen Chromasie

Einfallshöhen Chromasie

Astigmatismus

Äquatorialbüschel Meridionalbüschel

Äquatorialbüschel Meridionalbüschel

Frontwinkel Vorzeichnung

Frontwinkel Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse

Doppelobjektiv

Einzelobjektiv

F-TS-6398-RE

852

J. D. Taylor E.P. 11077 Typ DRP 11779 Typ 2

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (K.K.)

Δs'	Δf'	Δs'	Δf'
		-7.3 -3.4 -2.0 -1.0 -0.5 -0.0	

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

		28.8 29.7 28.0	-4.0 (-7) -16

Astigmatismus (A.K.)

Äquatorialwalkwinkel	Meridionalwalkwinkel	Äquatorialwalkwinkel	Meridionalwalkwinkel
		-2.4 -4.0 -3.6 -4.8 -7.0 -8.4	

Frontwinkel | Bezeichnung | Frontwinkel | Bezeichnung

		41 58 44	Fang. Bed. -22.7 -37.6 -80.7 -30.7 -42.6 -73.2 -7.4 -7.2 +1.5

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d	d2	d3	d4	d5	d6
98	44.6	64.8	13.7	23.3	145	157	6.4	5.0	0.7	3.3	2.8	14.3	3.5

	l	l'
l1	+42.67	+0.141
l(=l2)	-30.08	+0.333
l3	+70.11	+0.143

Korrektionsfehler f. 99.96

H. J. Taylor [illegible] DRP 11779 Typ 2 Heft 1

Einzellinse | Doppelobjektiv

	r	d	n	ν
	17.0	1.200		
	-26.5	0.200		
	16.5	2.600		
	[illegible]	[illegible]		

Einzellinse | Doppelobjektiv

9.11
6.66
4.11
2.71
26.49

F-TS-6398-RE

853

Vorläufer Zeiss [illegible] (Kel Anmeld.)

Doppelobjektiv für Aufstellung 1 : 1

Einzellinse | Doppelobjektiv

Spitz Cone K XXIII, 14 Sphärische Korrektion (K.K.) [illegible]

Δs'	Δf'	Δs'	Δf'
-17.0 -5.1 +0.6	-13.1 -3.1 -1.6	-8.2 -6.6 -3.6	-8.2 -2.8 -0.9

Einfallsöffnen | Chromasie | Einfallsöffnen | Chromasie

28.5 37.5 46.0	-16 (-14) -14.7	26.5 37.5 46.0	-25 +2.0 -2.5

Astigmatismus (A.K.)

Äquatorialwalkwinkel	Meridionalwalkwinkel	Äquatorialwalkwinkel	Meridionalwalkwinkel
-26.5 -34.2 -35.6 -30.0 -11.3 19.1		-1.6 +1.5 +0.8 1.0 -2.8 -4.6	

Frontwinkel | Bezeichnung | Frontwinkel | Bezeichnung

28.1 19.6 16.0		31.5 37.6 46.5	Fang. Bed. -4.5 -17 -19

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d	d2	d3	d4	d5	d6
28.5	46.2	23.5	46.2	11.6	26.6	14.5	7.5	1.6	7.5	1.5	1.6	4.3	3.7	1.2

Trip. rad. Objektiv Zeiss Kel Anmeld.

Kleinstbildobjektiv Zeiss f = 45 mm 1:4.5 Kel Anmeld.

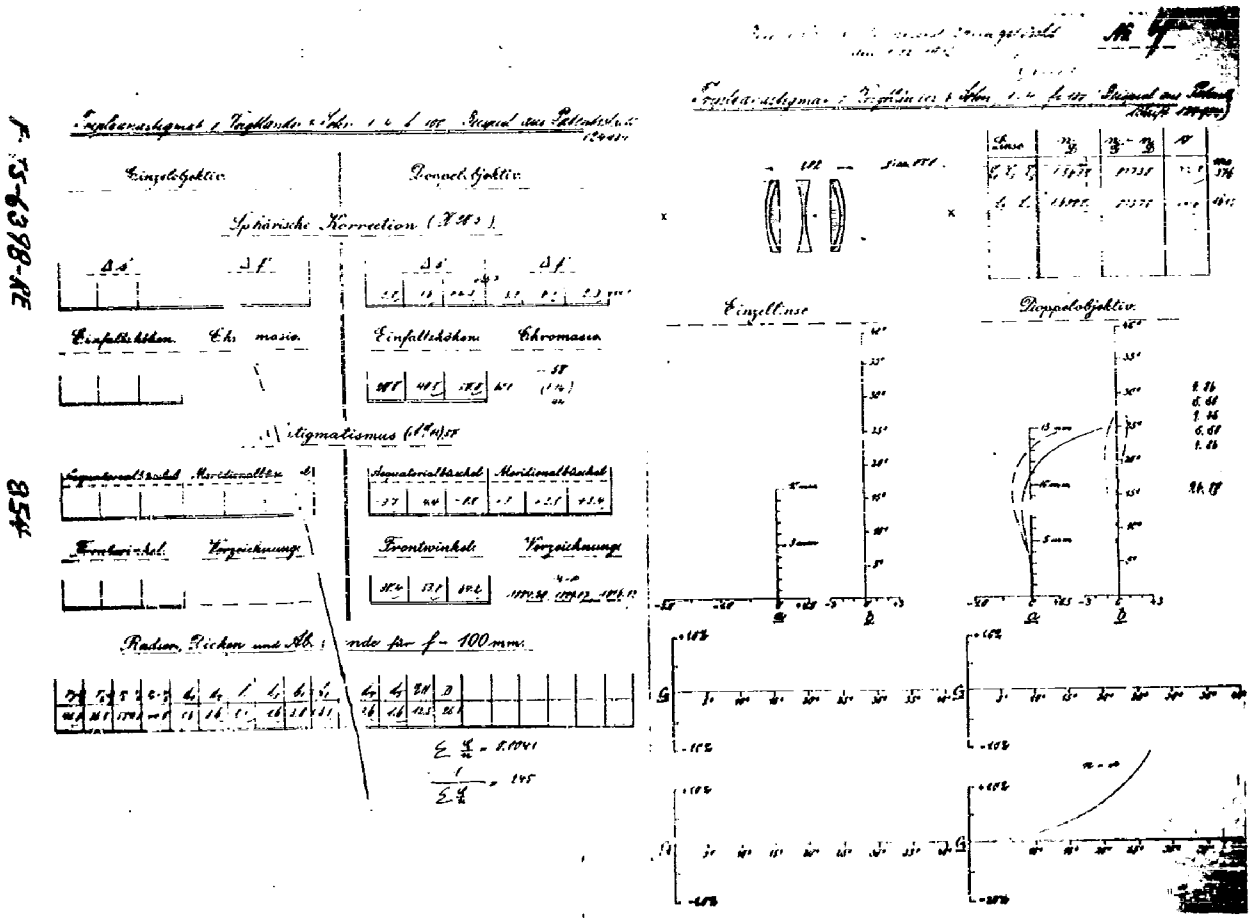
auf Grund D.R.P. 11544 [illegible]

	r	d	n	ν
I	1.577	0.457	1.51	
II	1.013	1.515	1.51	
III	1.536	1.149		
IV	1.614	0.346	1.61	
V	1.571	1.713	1.51	

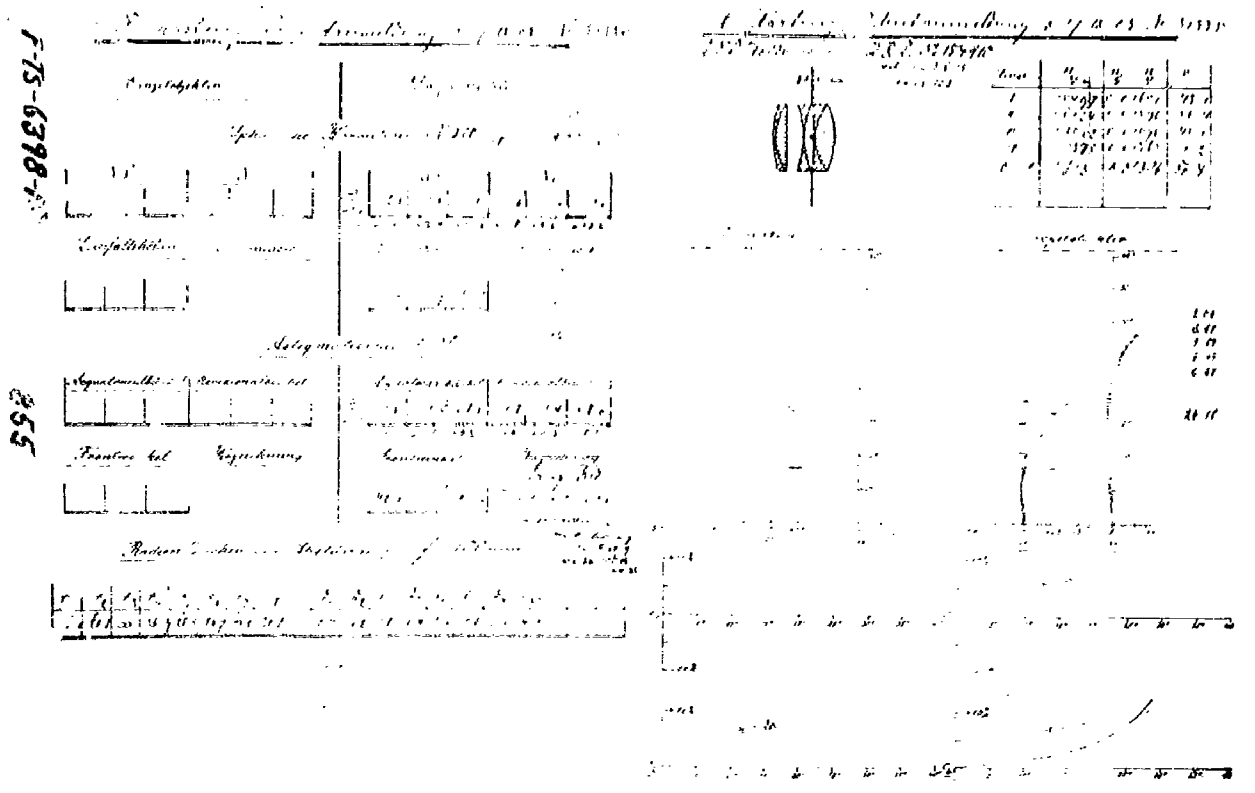
Doppelobjektiv für Aufstellung 1 : 1

Einzellinse | Doppelobjektiv

9.66
6.67
4.11
2.71
2.76
26.33


Einzelobjektiv
Doppelobjektiv
Sphärische Korrection
Einzellinse
Doppelobjektiv

954



F-75-6398-RE

856

Rodenstock „Eurygon“ 1:4,5 (f = 145 mm) [cf. Phot. Korr. 1957, S. 377]

Einzellinsen — Doppelobjektiv für Mkr.-Aufn.

Sphärische Korrection (R.XII.57)

Δs' | Δf'

	Δs'			Δf'		
f	-17.8	-12.6	+2.2	+8.5	-9.2	-17.2
f'	-18.2	-9.2	+1.2	+4.8	-12.2	-5.8

Einzelfehlerkurven — Chromasie

46.7	2.8	8.5	12.5

Astigmatismus (R.XII.57) (Δg 1%)

	Aequatorialbüschel		Meridionalbüschel		
f	-2.8	-3.2	-2.8	+4.5	+2.0
f'	-2.7	-2.7	-2.9	+3.4	+2.2

Kurvenbüschel — Kennzeichnung

42.1	49.5	69.1

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
36.3	118	45.4	28.8	42.8	57.0	241	35.7	5.5	1.9	1.5	3.5	3.5	1.9	2.1

Rodenstock „Eurygon“ 1:4,5 [Zeiss und Rodenstock Phot. Korr. 1957, S. 377]

P.R.P. 492 876, ausg. 8. VII. 1896 ab

Doppelobjektiv für Mkr.-Aufn. (f = 145 mm)

	n_d	$n_g - n_C$	ν
r1	1.6057		
r2 – r3	1.5813		
r4	1.5896		
r5	1.6134		
r6	1.6192		

Einzellinsen — Doppelobjektiv

Astigmatismus — Kurvenbüschel — Kennzeichnung

F-75-6398-RE

857

Rodenstock „Eurygon“ 1:4,5 f = 145 mm

Doppelobjektiv für Mkr.-Aufn. 1:4

Einzelobjektive — Doppelobjektiv (f' = 145 mm)

Spläd. Corr. R.XII.57, „Sphärische Korrection (R.XII.57)“

Δs' | Δf'

	Δs'			Δf'		
f	-17.6	-14.6	-9.4	-17.6	-12.4	-24.6
f'	-18.0	-8.8	+4.5	-9.1	-5.5	+4.3

Einzelfehlerkurven — Chromasie

24.8	35.1	42.8

24.8	35.0	42.8	

Spläd. Corr. R.XII.57 — Astigmatismus (R.XII.57)

	Aequatorialbüschel		Meridionalbüschel		
f	-19.6	-20.8	-24.9	-2.2	-2.3
f'	-5.3	-2.1	-6.4	-3.3	-2.2

Kurvenbüschel — Kennzeichnung

34.3	39.2	49.9

41.3	57.4	44.9

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	d6	d7
36.3	118	45.4	28.8	42.8	57.0	241	35.7	5.5	1.9	1.5	3.5	3.5	1.9	2.1

Planar 1:4,5 f = 145 mm

Einzellinsen — Doppelobj. für Mkr.

Astigmatismus — Kurvenbüschel

Kurvenbüschel 49.9

Kurvenbüschel 69.1

F-Ts-6398-RE

858

Einzelreihenmess. 1:2,8

D Rh. Lab 105543 Fa. Theaterkronenmach. 1:2,8 f=10cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AS 40)/7,6

Δs' | Δf | Δs' | Δf

-4,0 | -4,5 | +0,7 | -4,1 | +0,7 | +2,5

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

38,0 | 54,1 | +0,1

Astigmatismus (AS 40)/7,6

Sagittenabstand | Meridionalabstand | Sagittenabstand | Meridionalabstand

-2,5 | -1,7 | 10,5 | -5,9

Frontscheitel | Verzeichnung | Frontscheitel | Verzeichnung

49,2 | 59,5 | 1,0452 | 1,0142

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
48,5	122,6	28,1	69,2	12,4	0,5	32,5	22,5	23,9	42,2	0,1	2,4	0,2	1,2	6,6	2,7	0,1	3,5	9,6

Einzelreihenmess. 1:2,8

D Rh. Lab 105 [illegible] Fa. Theaterkronenmach. 1:2,9 f=

Linse | n_d | $n_{G'}-n_d$ | ν

L1 | 1,61281 | 44,9 | 20,0

L2 | 1,57250 | 44,2 | 20,8

L3 | 1,57250 | 44,2 | 20,8

L4 | 1,61281 | 44,9 | 20,0

L5 | 1,57250 | 44,2 | 20,8

L6 | 1,61281 | 44,9 | 20,0

Einzelobjektiv. Doppelobjektiv.

857

1239

F-Ts-6398-RE

859

V 1938 Nr. 17 1:2 f=6 cm Rechn. 6. 7. 38.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (AS 40)/7,6

Δs' | Δf | Δs' | Δf

-13,7 | -10,7 | 0,6 | -14,4 | -18,0 | +1,3

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

57,5 | 81,2 | 99,9 | -3,14 (1,133)

Astigmatismus (AT 6/18

Sagittenabstand | Meridionalabstand | Sagittenabstand | Meridionalabstand

-1,76 | -2,55 | -2,05 | -0,91 | -3,15 | -9,40

Frontscheitel | Verzeichnung | Frontscheitel | Verzeichnung

39,7 | 41,0 | 49,5 | 1,0615 | 1,0585 | 0,9915

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	d1	d2	d3	d4	d5	d6	d7	d8	d9
76,1	169	31,5	378	22,9	34,3	11,0	13,8	93,5	15,0	2,9	13,4	0,3	5,7	7,5	2,1	1,2	14,2	

V 1938 Nr. 17 1:2 f=6 cm Rechn. v. 6. 7. 38.

Linse | n_d | $n_{G'}-n_d$ | ν

1+5 | 1,67020 | 0,01834 | 42,4

2+6 | 1,57550 | 0,01215 | 44,3

3+4 | 1,64775 | 0,01537 | 33,8

Einzelobjektiv. Doppelobjektiv.

F-TS-6378-RE

860

L 1233

1938 Nr. 11 1:2,0 f=5cm Kap. v. 16.5.1938.

Einzellinsen — Doppellinsen

Sphärische Korrektion f A540/37

Δs'	Δf

Δs'			Δf		
-14.4	-12.4	+3.1	-15.6	-14.3	+7.6

Einfallshöhen — Chromasie

Einfallshöhen — Chromasie

53.2 | 51.0 | 53.0 — −1.73 (+1.83)

Astigmatismus f A527/-101

Sagittalfehler	Meridionalfehler

Sagittalfehler			Meridionalfehler		
-1.83	-2.51	-1.60	-8.15	-5.07	-8.41

Frontwinkel — Verzeichnung

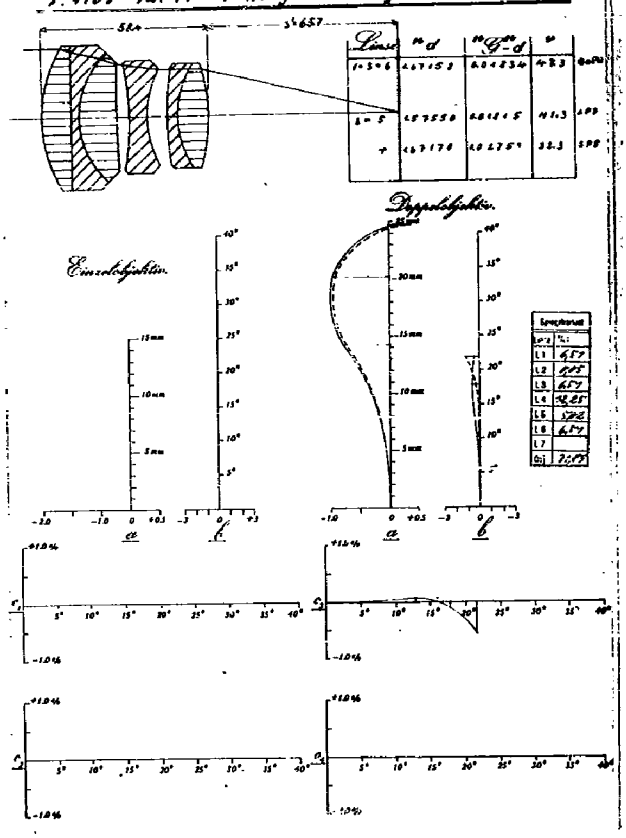
Frontwinkel — Verzeichnung

34.1 | 43.1 | 53.5 — 100:10 93:136 324:58

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8
49.5	∞	34.4	34.4	41.1	34.7	110	34.2	42.5	10.5	2.1	13.3	4.2	5.7	7.2	3.8	10.8

1938 Nr. 11 1:2,0 f=5cm Kap. v. 16.5.1938.



460

L 1214

F-TS-6378-RE

861

1938 Nr. V 1:2,0 f=5cm Kap. v. 6.10.38.

Einzellinsen — Doppellinsen

Sphärische Korrektion f 4540/1:2/25

Δs'	Δf

Δs'			Δf		
-12.2	-12.4	+7.2	-15.4	-16.2	+5.0

Einfallshöhen — Chromasie

Einfallshöhen — Chromasie

37.5 | 41.4 | 41.5 — −3.6 V

Astigmatismus f V. 5-A/1:3

Sagittalfehler	Meridionalfehler

Sagittalfehler			Meridionalfehler		
-1.0	-4.0	-1.7	-1.0	-1.7	-4.0

Frontwinkel — Verzeichnung

Frontwinkel — Verzeichnung

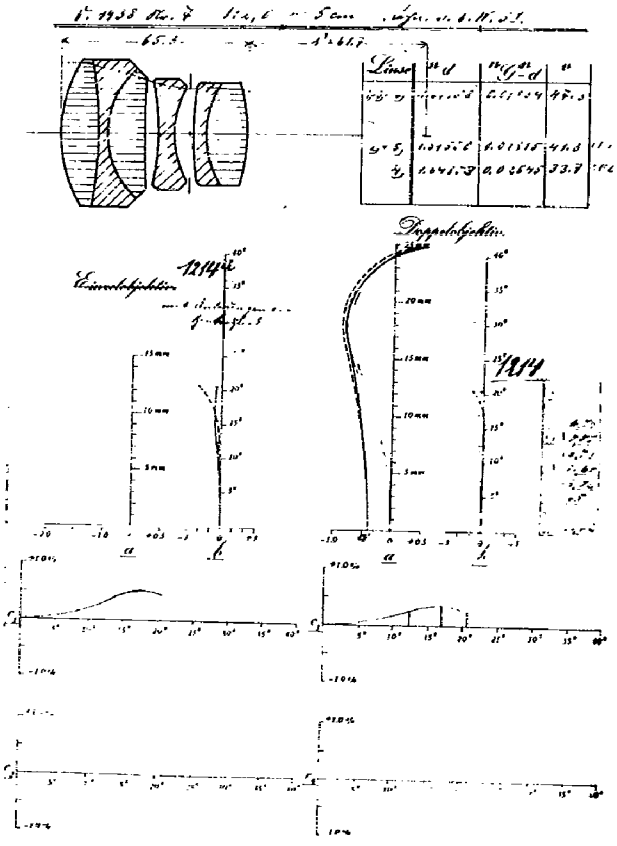
27.7 | 44.0 | 60.3 — 100:6 100:... 100:...

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	d1	d2	d3	d4	d5	d6	d7	d8
33.2	193	38.1	33.3	21.1	34.1	110	34.1	43.3	12.4	2.4	13.9	4.2	5.7	6.8	4.2	10.3

Abstand von Linse 1 bis Linse 2: 114.64.1 — 41.4

1938 Nr. V 1:2,0 f=5cm Aufn. v. 6.10.38.



L 1092

F-75-6388-RE

962

Kapella AP 1955 617 1:1.4, F. 10.5cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AM 63 / 73)

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (AM 62 / AM 72)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

R_1	d_1	R_2	d_2	R_3	d_3	R_4	d_4	R_5	d_5	R_6	d_6	R_7	d_7	R_8	d_8	R_9	d_9	R_{10}	d_{10}
58.6	5.7	239.8	3.015	42.9	61.8	33.0	198.2	116.6	0.92	30.9	3.1	9.9	1.2	8.8	3.1	5.0	9.3	9.5	4.2

Linse | n_g | $n_g - n_g'$ | ν

L_1	1.5726	0.0123	57.5
L_2	1.6774	0.0181	44.7
L_3	1.5144	0.0124	59.5
L_4	1.5114	0.0145	57.2
L_5	1.6150	0.0138	45.5

Die freien Durchmesser reichen für die vorgeschriebene Öffnung 1:1.4

Einzelobjektiv. | Doppelobjektiv.

a | b | c | d

F-75-6388-RE

963

Rost engl. Pat. 29857 v. 22. Dez. 1913, 1:4.5, f = 100 mm.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrection (AM 64)

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (AM 64)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	r_5	d_5	r_6	d_6	r_7	d_7	r_8	d_8	r_9	d_9	r_{10}	d_{10}
21.6	∞	64.1	11.7	111.2	2.8	11.5	3.5	4.7	2.9	1.2	2.7	1.2	1.5	1.9	4.7	24.4	1.2	11.5	

Rost engl. Pat. 27037 v. 22. Dez. 1913, 1:4.5, f = 100 mm.

Linse | n_g | $n_g - n_g'$ | ν

L_1	1.5726	0.0123	57.5
L_2	1.6774	0.0181	44.7
L_3	1.5144	0.0124	59.5
L_4	1.5114	0.0145	57.2
L_5	1.6150	0.0138	45.5

Einzellinse. | Doppelobjektiv.

a | b

962

№ 546

№ 387

F-75-6390-KE

964

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Einzellinse

Doppelobjektiv

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

№ 699

F-75-6390-KE

965

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Einzellinse

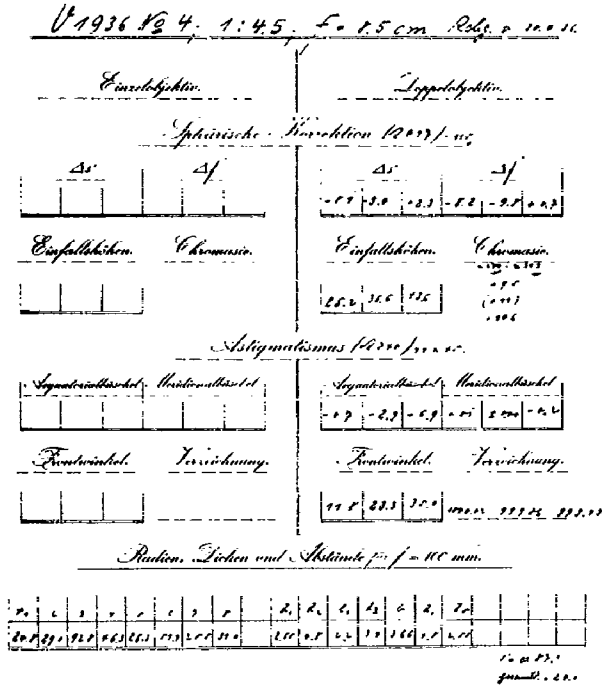
Doppelobjektiv

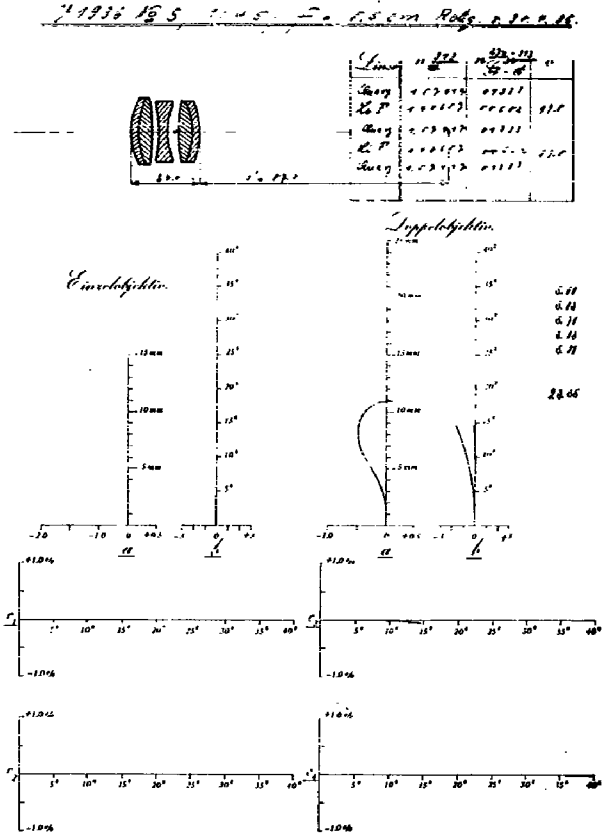
Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

F-13-6378-RE

866



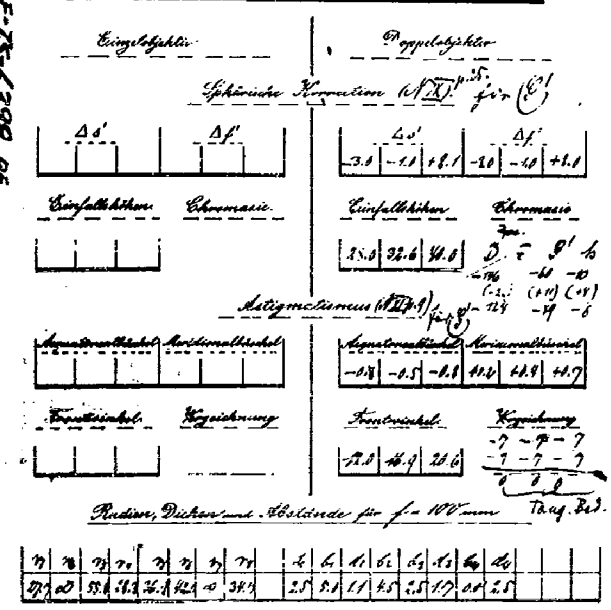


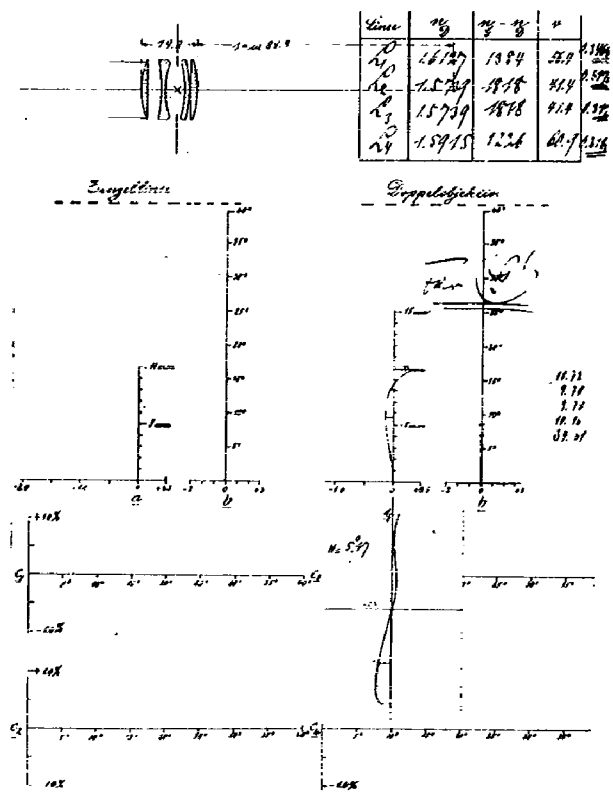
866

№ 58.

F-13-6378-RE

867





№ 137

H. & Taylor Dagor 1:4.5 No. [illegible]

F-7.5-6388-RE

868

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection f = 27

Δs'	Δf'

Einfallshöhen	Chromasie

Astigmatismus f = 27 x 1.66

Aequatorialbüschel	Meridionalbüschel

Frontneigung	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6

	f	q
l1	+ 88.6	ω 35°
l2 + l3	- 63.1	ω 41°
l4	+ 35.8	ω 13°

Gesamtbrennweite f = 10[illegible]

869

№ 50

Hektor-Meyer, Görlitz [illegible]

F-7.5-6388-RE

869

Sphärische Korrection f = 6[illegible]

Δs'	Δf'

Einfallshöhen	Chromasie

Astigmatismus f = 6[illegible]

Aequatorialbüschel	Meridionalbüschel

Frontneigung	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6

№ 431

Objektiv 1:6 f. 500 mm von Lacour Berthiot № 19

F-75-6378-AE

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (Young)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

Astigmatismus (Young)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	n1	n2	n3

Objektiv 1:6 f. 500 mm von Lacour Berthiot № 19

Linse	n_d	ν_d	P
L_1			
L_2			
L_3			
L_4			
L_5			

Einzellinse — Doppelobjektiv

Sphärische Korrektion — Astigmatismus — Verzeichnung

№ 83

H. Harting Fabrikansmeldung v. 17.11.05 № 3:336

D.R.P. 168.006 — D.R.P. № 94-[illegible]

F-75-6392-AE

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (Young)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen — Chromasie — Einfallshöhen — Chromasie

Astigmatismus (Young)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel — Verzeichnung — Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	r8	d1	d2	d3	d4	d5	n1	n2	n3

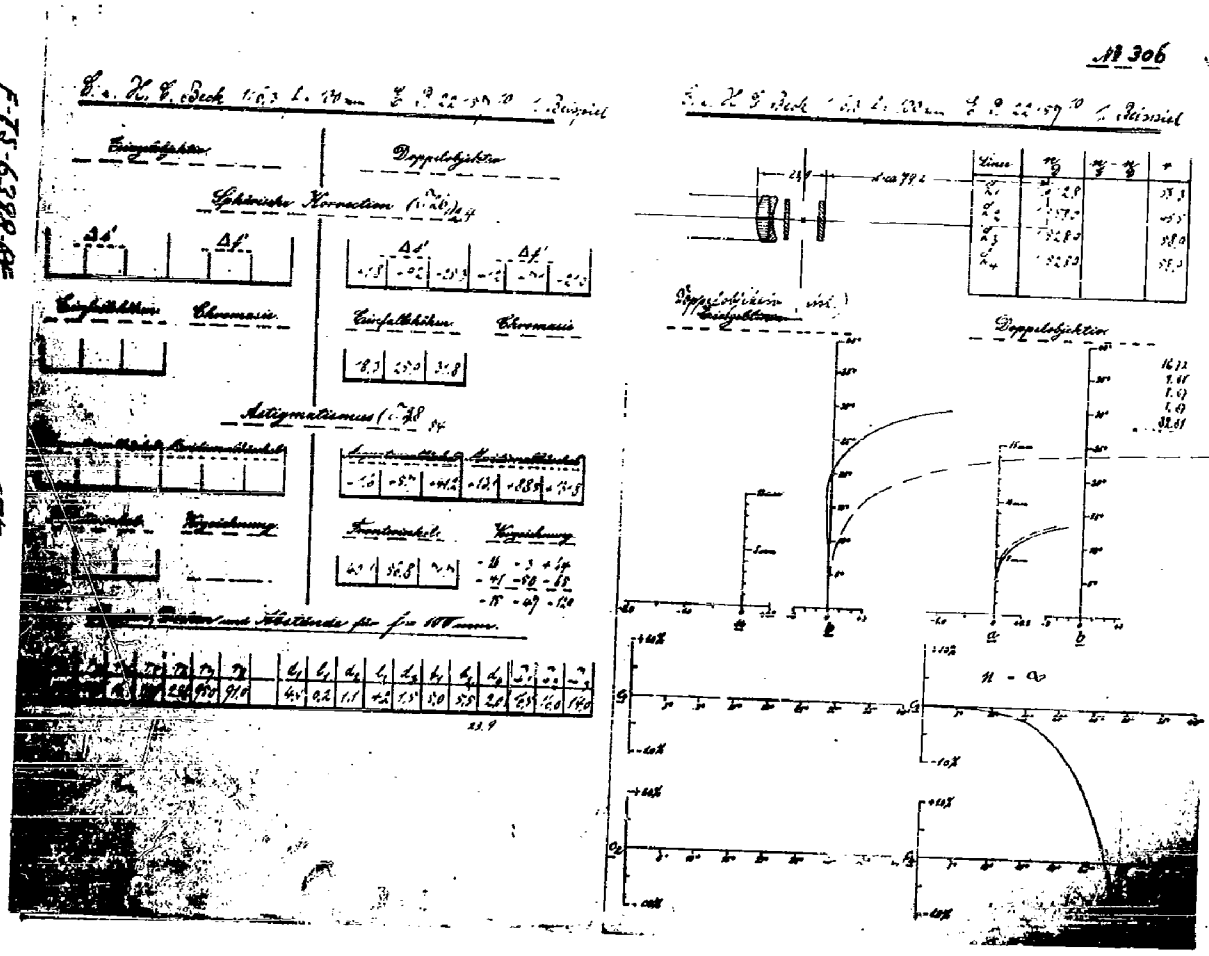
H. Harting Fabrikansmeldung v. 17.11.05 № 3:336

Linse	n_d	ν_d	P
I			
II			
III			
IV			
V	1.613	44.3	56.4

Einzellinse — Doppelobjektiv

Sphärische Korrektion — Astigmatismus — Verzeichnung

F-TS-6388-RE
878



F-Ts-6398-RE

B73

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

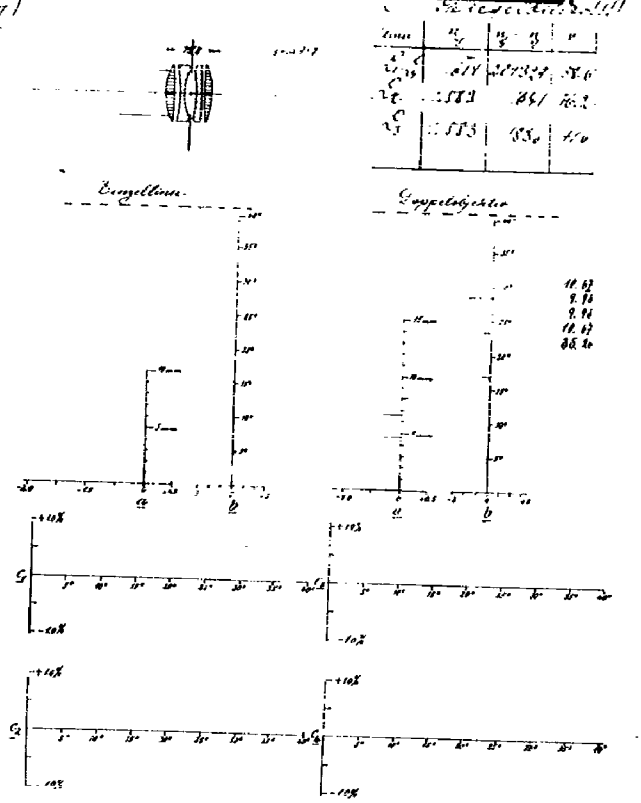
Einfallshöhen — Chromasie

Astigmatismus

Äquatorialhalbschnitt — Meridionalhalbschnitt

Frontwinkel — Vergütung

Radien, Dicken und Abstände für f = 100 mm



F-Ts-6398-RE

B74

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

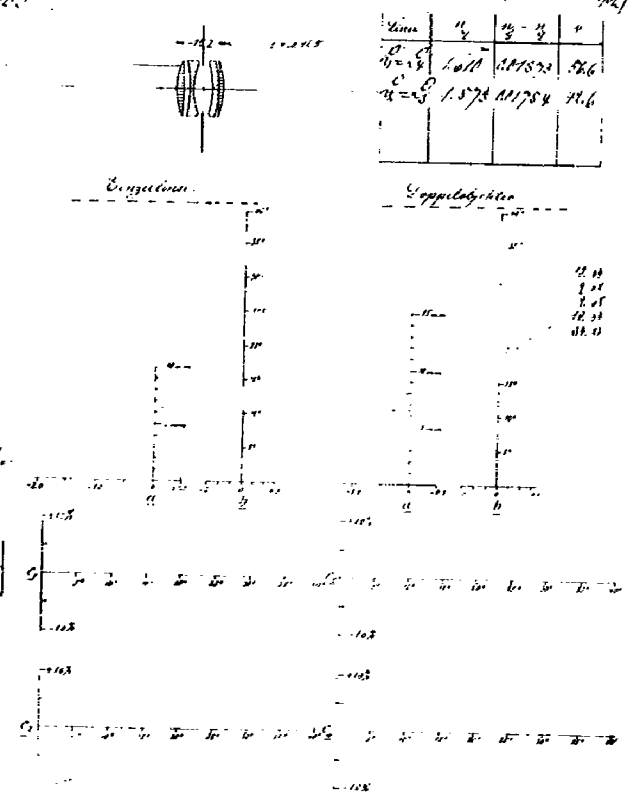
Einfallshöhen — Chromasie

Astigmatismus

Äquatorialhalbschnitt — Meridionalhalbschnitt

Frontwinkel — Vergütung

Radien, Dicken und Abstände für f = 100 mm



F-TS-6398-RE

875

Patentanmeldung Rodenstock e.Kfm. vom 15.6.1965

Einzellinse

Doppellichtstärke

Astigmatismus (Abb.)

Radien, Dicken und Abstände für f = 100 mm

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876

Dr. R. Steinheil Pat. Anmeld. St. 6209 IV/42h

Einzellichtstärke

Doppellichtstärke

(Fig. 2) Astigmatismus (Abb. 2)

Radien, Dicken und Abstände für f = 100 mm

Dr. R. Steinheil Pat. Anmeld. St. 6209 IV/42h

Einzellinse

Doppellichtstärke

№ 782

F-5-6386-NE

277

D Rudolph

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f' = 1)

Δs'	Δf'

Einfallshöhen | Chromasien

Δs'	Δf'

Einfallshöhen | Chromasien

Astigmatismus (f' = 1)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vergeichnung

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Vergeichnung

Radien, Dicken und Abstände für f = 100 mm

R	1	2	3	4	5	6	7	8	9	10	d_0	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8
32.5	98.5	19.5	∞	78.6	77.3	32.4	17.9	∞	31.2		2.5	1.0	9.2	1.0	5.0	2.3	2.2	7.7	6.0 mm

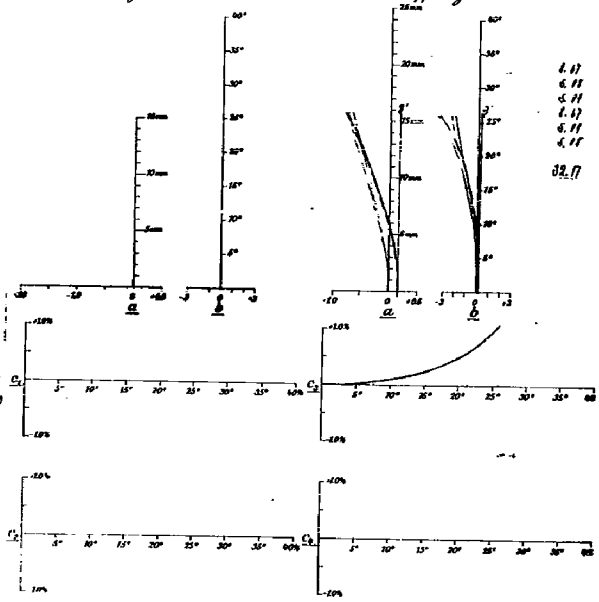
$E_0 = 33.1$, $S_2 = 24.1$, $S_3 = 25.9$, $S_4 = 28.6$

$S_{11} = 1.1$, $S_{12} = 1.58$ $B_2 = 2.25$

D Rudolph

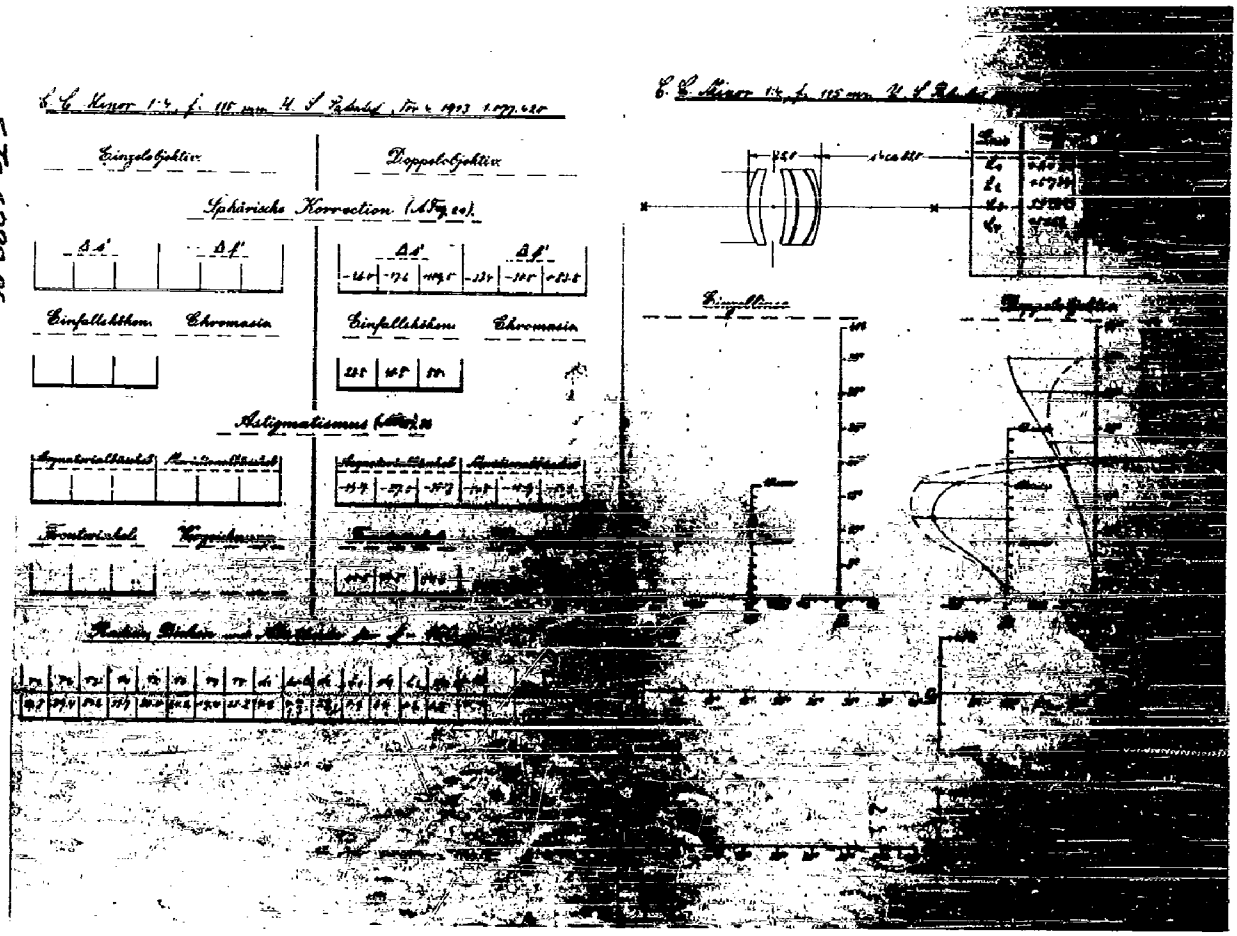
Linse	n_D	$n_F - n_D$	ν
1			
2			
3			
4			
5			
6			

Einzellinse | Doppelobjektiv



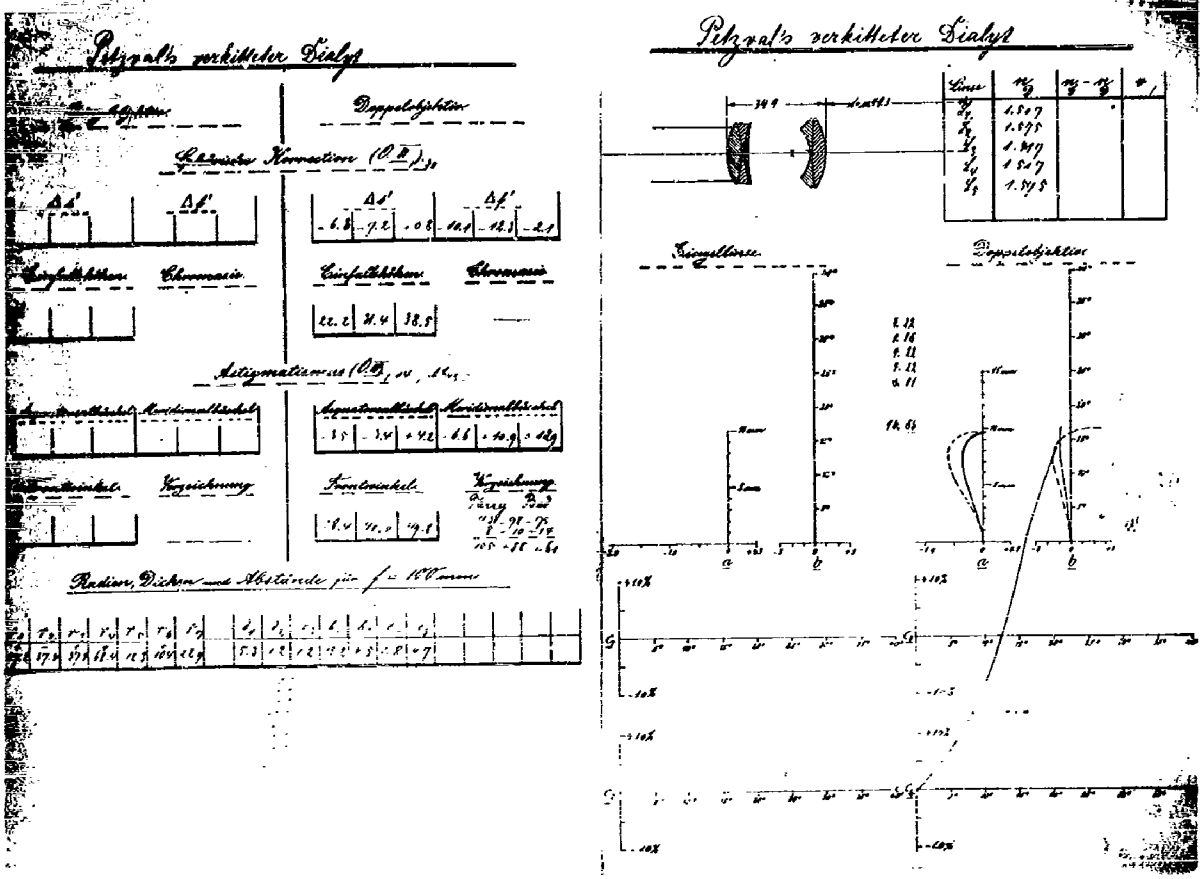
F-TS-6378-RE

878



F-TS-6378-RE

879



F-Ts-6398-42

Einzelobjektiv f= 9845 | Doppelobjektiv f= 9807

Sphärische Korrektion (f. XII 42, 53)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-2.1 -1.8 +1.5	-2.1 -1.5 +1.5	-1.8 -1.5 +1.3	-1.8 -1.4 +1.2

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
11.2 14.4 17.7		11.7 17.8 24.1	

Astigmatismus (f. 7 XII 28 u. 2 XII 29.)

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
-2.0 -1.5 +1.0	-2.1 -1.5 +1.5	-2.0 -1.5 +1.3	-2.2 -1.5 +1.7

Einzelobjektiv Frontwinkel	Einzelobjektiv Bezeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Bezeichnung
47.0 44.3 37.7	Hg. Betrg. -12 -101 -12.1	41.2 35.5 28.1	

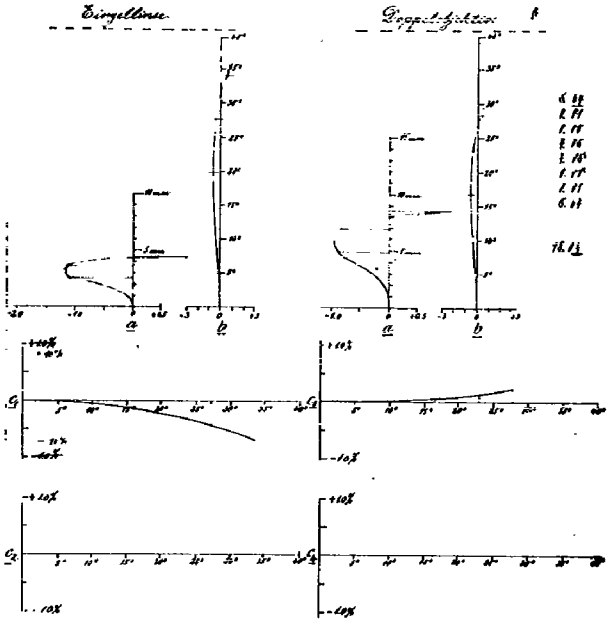
Radien, Dicken und Abstände für f= 100 mm (Doppelobj.)

r1	r2	r3	r4	r5	G1	d1	d2	d3	d4
24.4	16.6	37.7	33.6		2.6	2.1	1.0	12.1	3.1

Carl Zeiss Jena

Linse	nd	nF-nC	ν
1	1.523		58.3
2	1.533		59.2
3	1.525		60.2
4	1.617		36.8

Einzellinse | Doppelobjektiv



K 998

F-Ts-6398-42

1 : 3.5 f= 10 cm P.A. v. 5.10.31 v. Zeiss Tessar Nr. 532 xxx

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (f. 100 xx)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2.9 -2.0 -1.1	-2.0 -1.5 -0.5 -1.1

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		55.0 52.5 52.6	

Astigmatismus (f. 100 xx)

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel

Einzelobjektiv Frontwinkel	Einzelobjektiv Bezeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Bezeichnung
		46.0 42.0 40.1	

Radien, Dicken und Abstände für f= 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16
34.4	7.5	49.5	17.6	85.1	17.6	57.8	22.2	47.2	2.1	1.0	11.2	2.1	1.1	7.7	7.5

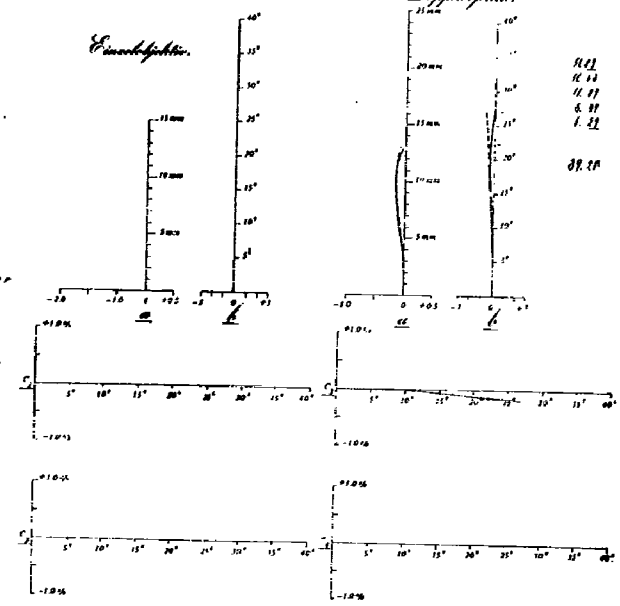
d1	d2	d3	d4	d5	d6	d7
0.8	1.0	0.8	2.0	1.0	1.0	7.5

Carl Zeiss Jena

1 : 3.5, f= 10 cm P.A. v. 5.10.31 v. Zeiss Tessar Nr. 532 xxx

Linse	nd	nF-nC	ν
1	1.617		57.0
2	1.617		57.0
3	1.617		57.0
4	1.617		57.0

Einzelobjektiv. | Doppelobjektiv.



F-TS-6398-RE

892

Sidis 1906 II

Einzel-Einzellobjektiv

Doppellobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Sidis 1906

Einzellinse

Doppelobjektiv

F-TS-6398-RE

883

P. Rudolph 1:5, f. 100 mm E.P. 161.094 v. 7.11.21 Fig. 2

Einzellobjektiv

Doppellobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

P. Rudolph 1:5, f. 100 mm E.P. 161.094 v. 7.11.21 Fig. 2

Einzellinse

Doppelobjektiv

F-TS-6378-RE

864

Zeichnung, Meridional

Doppelobjektiv

Einfallshöhen | Chromasie

Astigmatismus (Meridional)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Radienlehre

Einzellinse | Doppelobjektiv

№ 589

F-TS-6378-RE

885

Engl. Patent ... Paul Rudolph

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Chromasie)

Einfallshöhen | Chromasie

Astigmatismus (Meridional)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

№ 115

F-TS-6398-RE

886

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

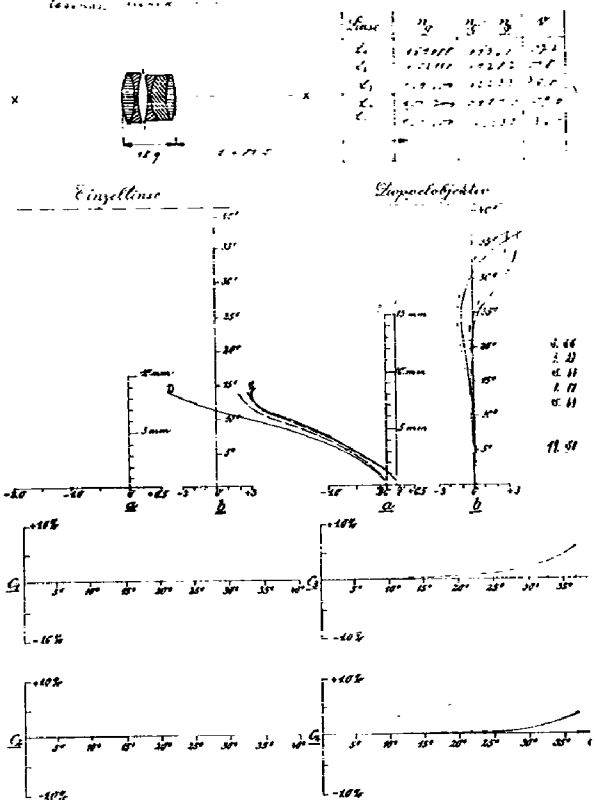
Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:



886

№ 824

F-TS-6398-RE

887

Fr. Deckglas 1:6, f = 100 mm, v. 19.8.26 D.R.P. ...

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

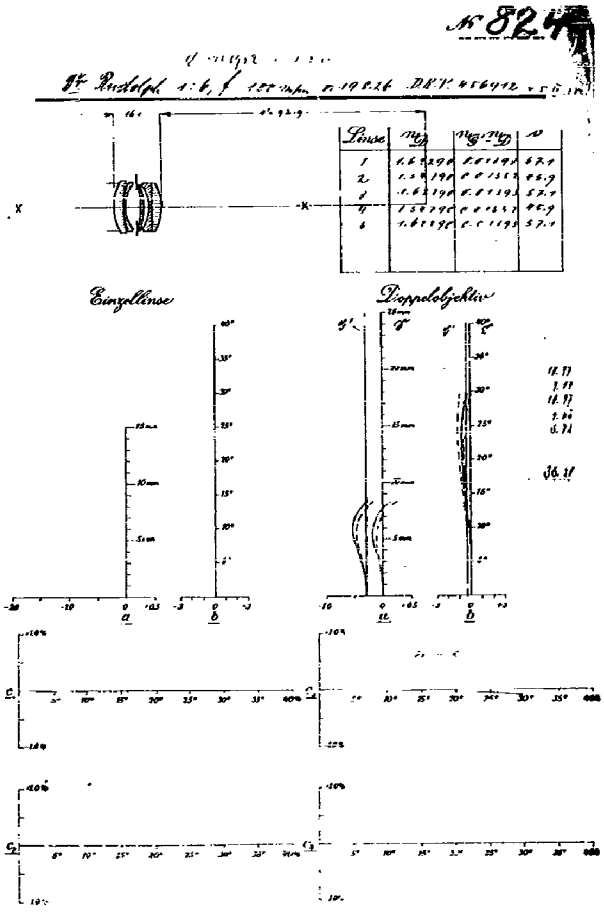
Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:



887

F-TS-6798-RE

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1140 nm)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (1140 nm)

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse	n d	$n_2 - n_1$ d	ν
L_1			
L_2			
L_3			
L^*			
L^{**}			

Einzelobjektiv

Doppelobjektiv

F-TS-6398-RE

Eastman Kodak: Pat. Ann. E 9511/72 (1:6.26, f=106.5)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (λ = 546,1 nm) (λ = 479,9 nm)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (λ = 546,1 nm)

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Eastman Kodak: Pat. Ann. E 9511/72 (1:6.26, f=106.5)

Öffnungsrad. im Pat.-Schrift nicht angegeben

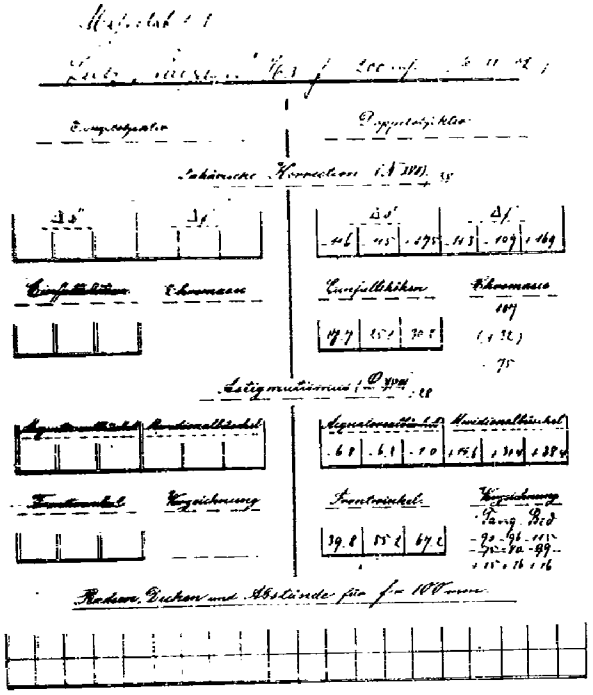
Linse	$n_2 - n_1$	$\nu_2 - \nu_1$	N
L_1			
$L_2 - L_3$			
L_4			

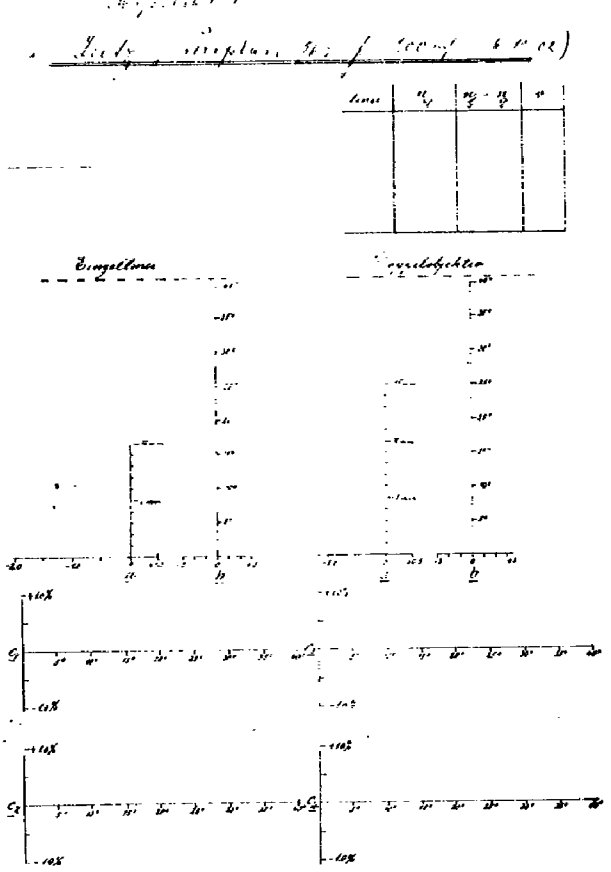
Einzellinse

Doppelobjektiv

F-TS-6398-RE

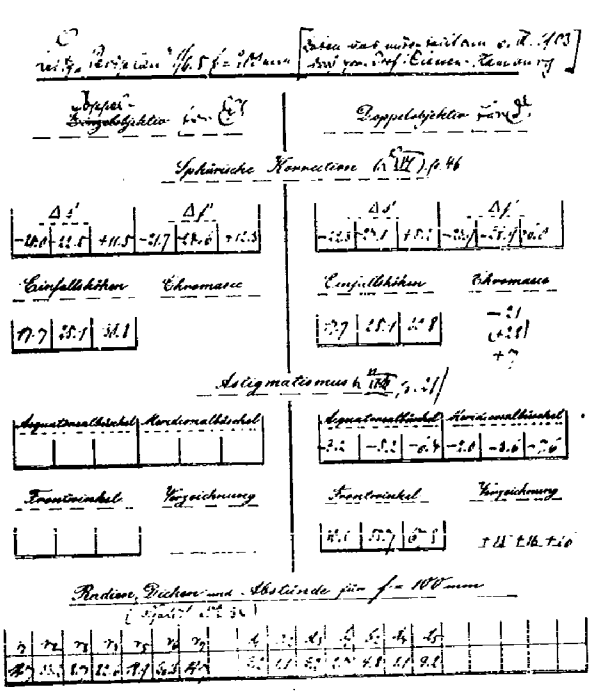
890

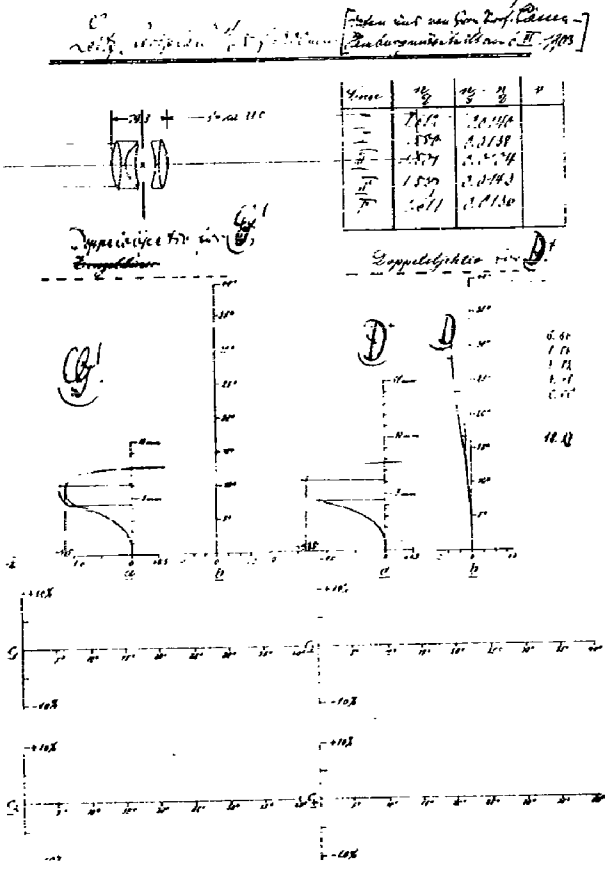




F-TS-6398-RE

891





F-Zs-6389-RE

№ 34

Zeiss Periplan f=5 f=100mm (Juni 1932)

Doppelobjektiv Gr. G'

Doppelobjektiv Gr. G

Sphärische Korrektion

Δs'			Δf'		
-2.7	-2.4	+2.1	-0.7	-1.0	+3.1

Einzelbilder: Ebenmaß

20.0	22.5	20.8

Astigmatismus

Δs'			Δf'		
-3.2	-2.4	-1.3	-2.8	-3.3	-3.0

Einzelbilder: Ebenmaß

17.7	18.1	20.8

-64 (+20) -39

Astigmatismus

Asymmetrie	Maximalbüschel		Asymmetrie	Maximalbüschel	
			-2.8	-3.4	-3.2	10.2	+0.9	-2.4

Kontrastwinkel: 34.8 | 50.2 | 67.2

Kennzeichnung: Tang. Rad.

+15 +16 +16 +15 +14% +12‰

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
32.0	27.7	22.4	18.9	16.3	14.7		3.4	4.1	3.2	2.7	5.8	4.1	5.8

Zeiss f=6.5 f=100mm (29.IV.37)

Doppelobjektiv Gr. G'

Doppelobjektiv Gr. G

Linse	n_D	n_F - n_C	v
I	1.6113		
L	1.5510		
F	1.7334		
II	1.6537		
T	1.6112		

Einzelbilder: Ebenmaß

18.2	18.6	21.3

-64 (-7) -71

Astigmatismus

Asymmetrie	Maximalbüschel		Asymmetrie	Maximalbüschel	
-2.1	-2.6	-2.9	-0.8	-0.8	-3.2

Kontrastwinkel: 34.2 | 19.8 | 61.3

Kennzeichnung: Tang. Rad.

-5 -1 -2 +2

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7
31.6	27.4	22.6	21.4	18.3	16.7	21.8	6.3	4.2	2.3	2.4	2.7	2.1	2.1

F-Zs-6388-RE

№ 36

Zeiss f/6.5 f=199.1 (29.IV.37)

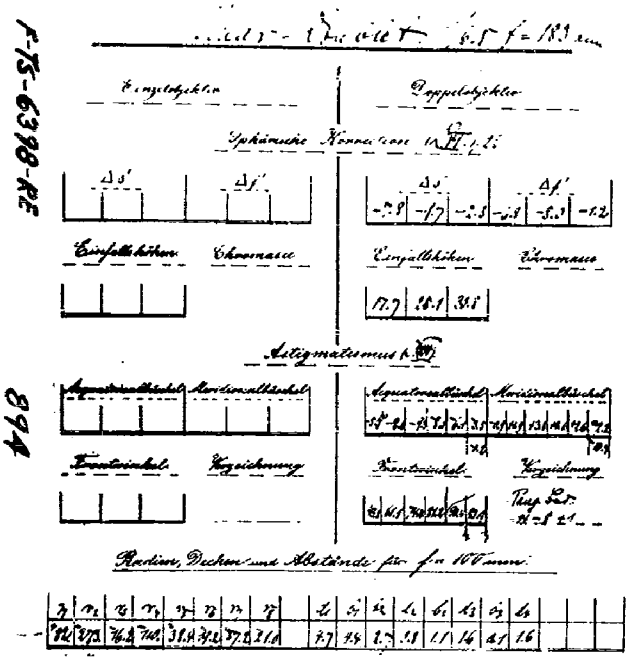
Doppelobjektiv Gr. G'

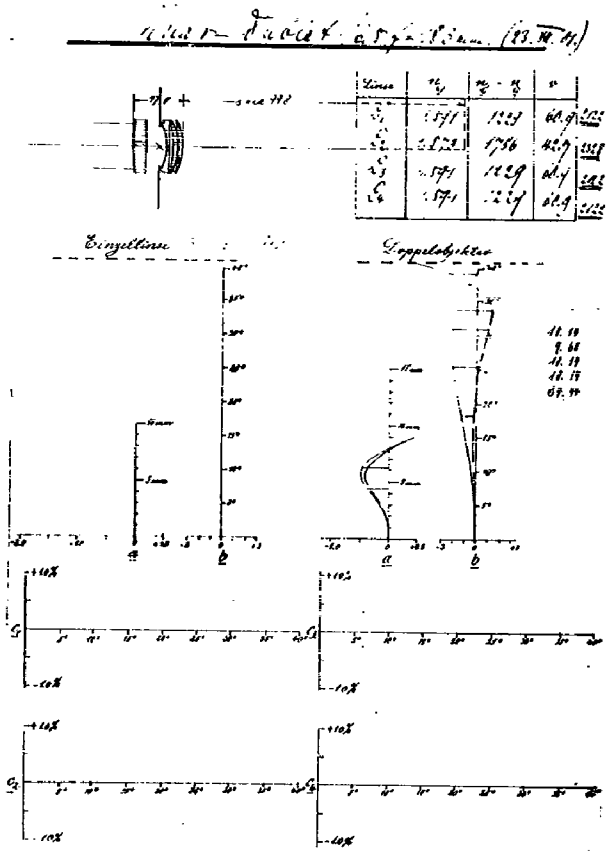
Doppelobjektiv Gr. G

Linse	n_D	n_F - n_C	v
I	1.6113		
L	1.5510		
F	1.7334		
II	1.6537		
T	1.6112		

F-75-6398-RE

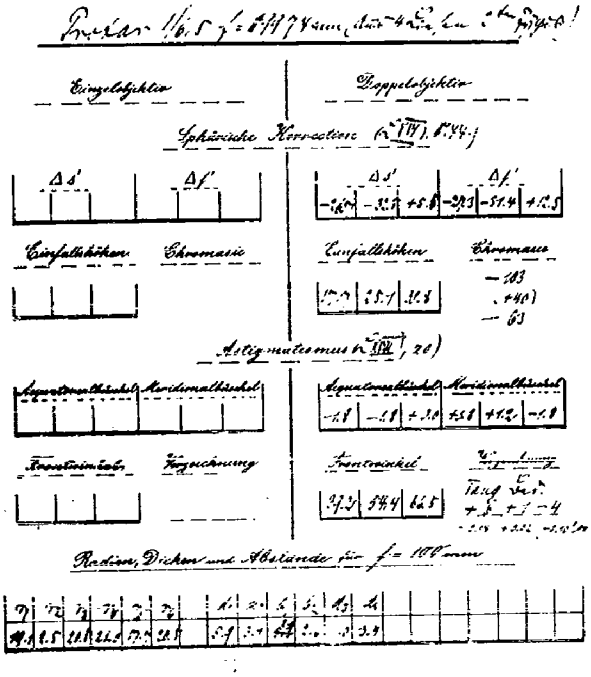
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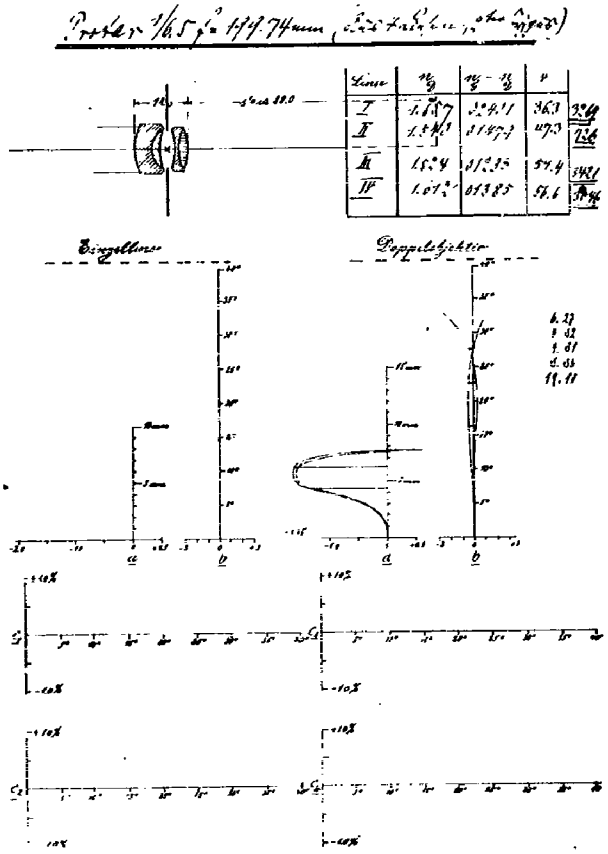




F-75-6398-RE

895





F-TS-6398-RE

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Dr. Rudolph, Jena

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs'	Δf'	Δs'	Δf'
		-11,9 -11,2 +1,6	-11,4 -11,1 +0,0

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		12,0 24,0 48,5	-17,5 (+7,8)

Astigmatismus (ABBE) -13,0

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-2,6 -2,2 +0,9	-4,5 -4,3 +4,8

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

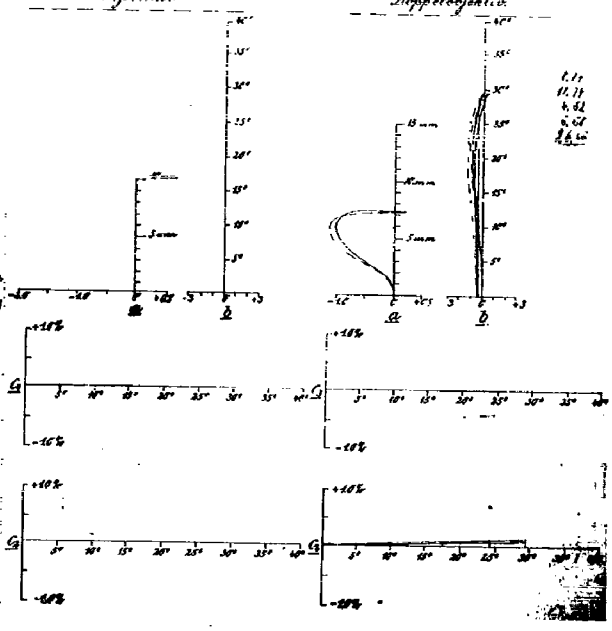
		44,0 58,6 44,5°	

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	d4		l3
158,0	44,6	156	28,3	46,3	20,4	12,4	3,8	0,6	5,2	4,9	4,7	2,0	2,9		3,4

Linse	nD	nF - nC	ν
L1	1,51111	0,0148	60,8
L2	1,61337	0,0173	50,9
L3	1,61598	0,0198	49,2
L4	1,64250	0,0179	37,9

Einzellinse | Doppelobjektiv



196

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847

Rudolph, Jena, 11.11.13

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

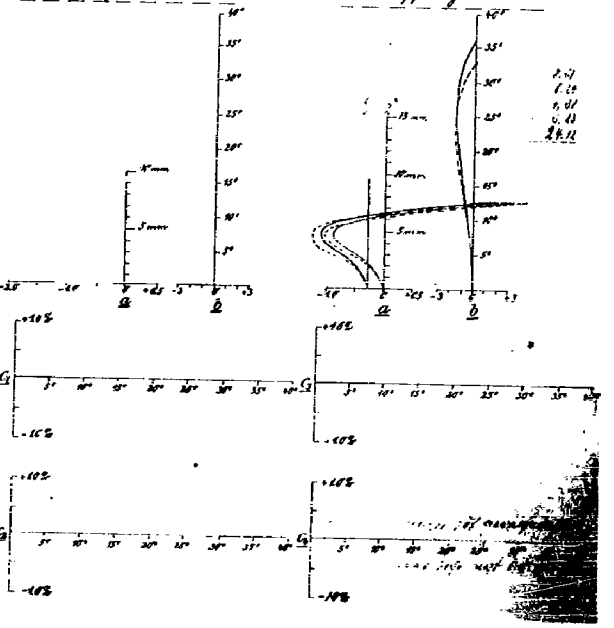
Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	l1	l2	d3	d4		l3

Linse	nD	nF - nC	ν

Einzellinse | Doppelobjektiv



K 1065

F-TS-6398-RE

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Kapella

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Doppelobjektiv

K 592

F-TS-6398-RE

819

J. Rudolph

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

J. Rudolph

Einzellinse | Doppelobjektiv

F-FS-6398-RE

900

Radiolarienstock, Imagonal Nr. Serie 1904, f. 503

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (Δs)

Δs' — Δf'

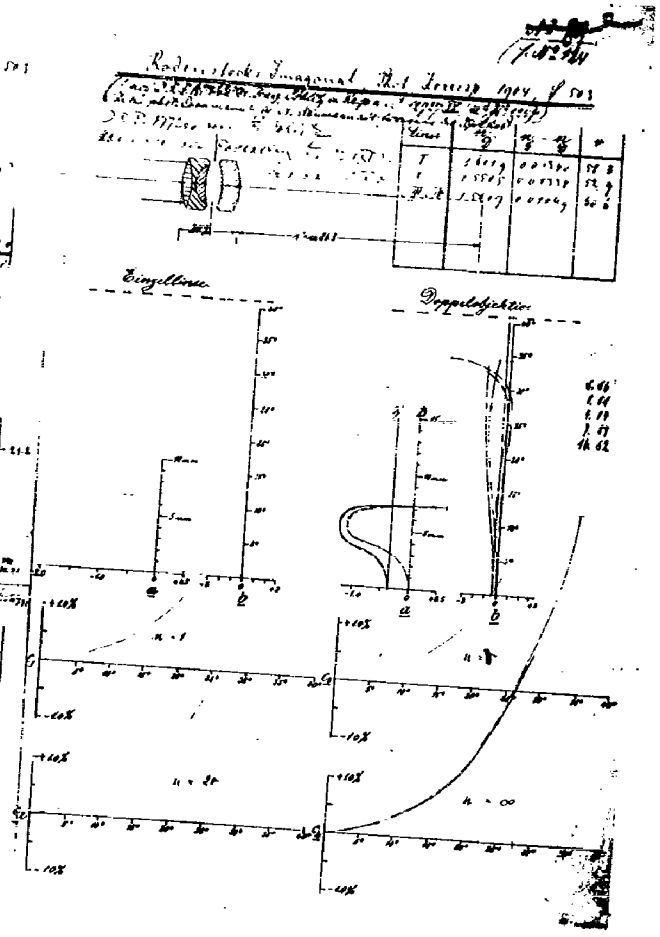
Einfallsblenden — Chromasie

Astigmatismus (Δs)

Äquatorialbüschel — Meridionalbüschel

Frontenwinkel — Projektionsrichtung

Radien, Dicken und Abstände für f = 100 mm



F-FS-6398-RE

106

Radiolarienstock, Imagonal

Einzelobjektiv — Doppelobjektiv

Sphärische Korrection (Δs)

Δs' — Δf'

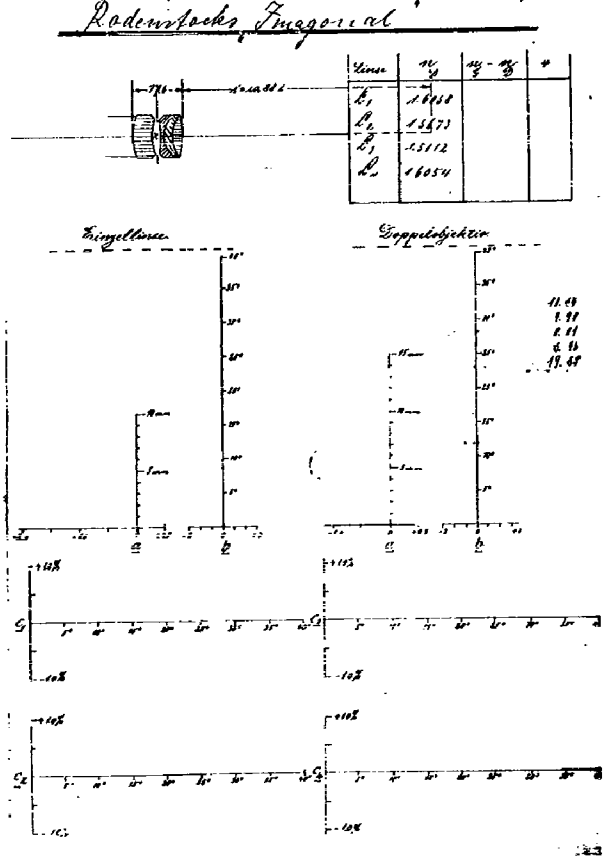
Einfallsblenden — Chromasie

Astigmatismus (Δs)

Äquatorialbüschel — Meridionalbüschel

Frontenwinkel — Projektionsrichtung

Radien, Dicken und Abstände für f = 100 mm



№ 400

F-75-6398-RE

902

Einzellinse — Doppelobjektiv

Sphärische Korrection

Einfallshöhen — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

№ 698

F-75-6398-RE

903

Einzellinse — Doppelobjektiv

Sphärische Korrection

Einfallshöhen — Chromasie

Astigmatismus

Äquatorialbüschel — Meridionalbüschel

Frontwinkel — Verzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

F-73-6382-RE

904

Einzellinse | Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Einzellinse | Doppelobjektiv

904

F-73-6398-RE

905

Einzellinse | Doppelobjektiv

Sphärische Korrection

Einfallshöhen | Chromasie

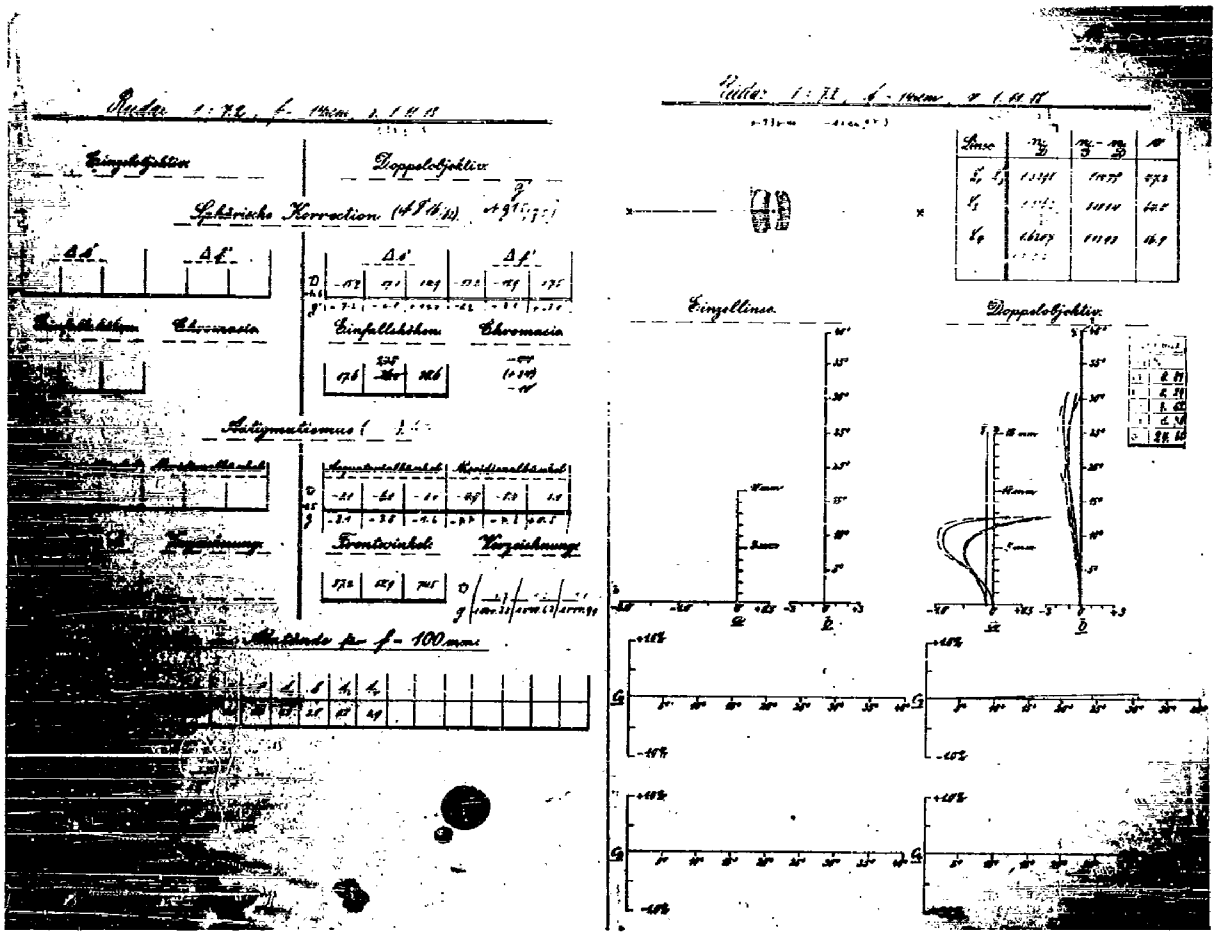
Astigmatismus

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Einzellinse | Doppelobjektiv

F-75-6398-RE

906

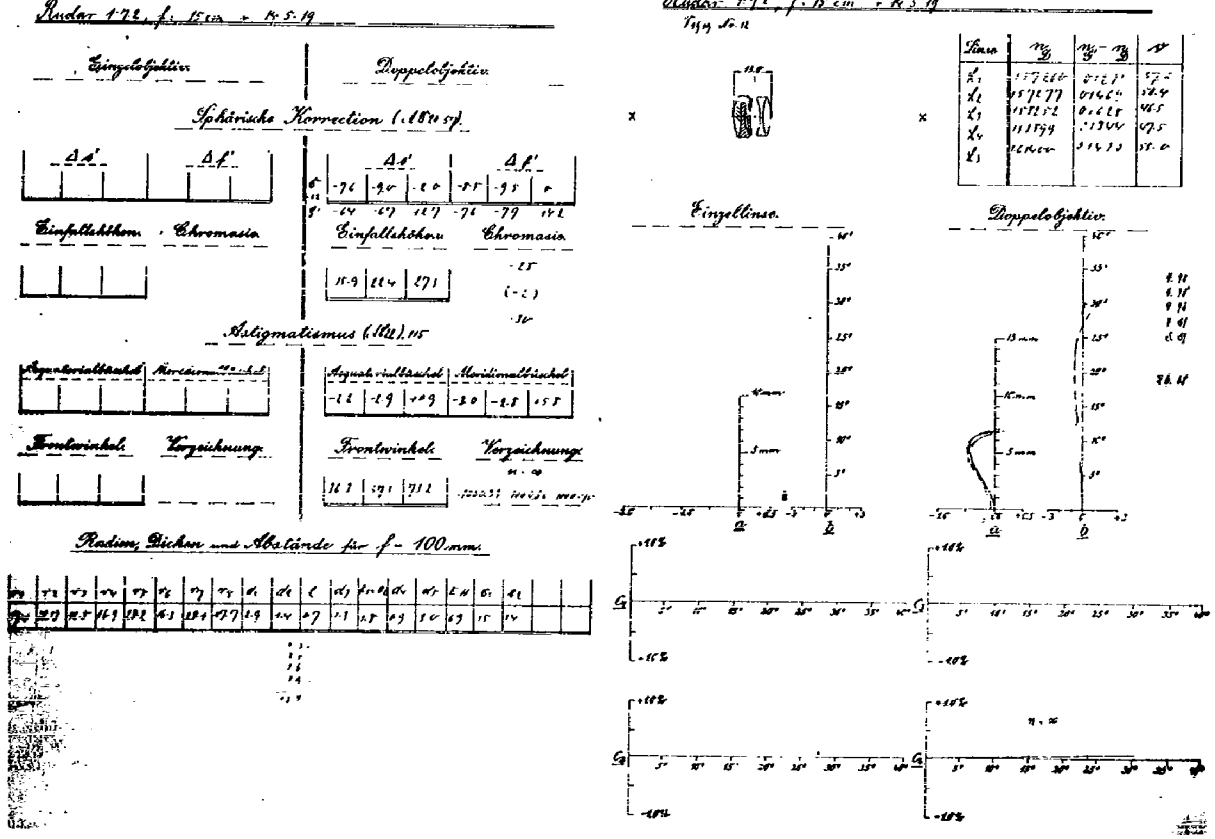


906

№ 571

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F-TS-6388-RE

906

Radion 1:7,5 f= 15 cm v. 11.12.11

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (1916)

Δs'	Δf'
Einfallshöhen	Chromasie

	Δs'			Δf'		
D	-1.5	-0.8	-0.51	-0.5	-0.3	0.7
d	-4.2	-0.9	0.5	1.3	0.5	0.5

Einfallshöhen: 15.3 | 11.1 | 2.8.3 — Chromasie: -1.9 (+0.4) -1.4

Astigmatismus (1916)

Aequatorialwinkel	Meridionalwinkel
Frontwinkel	Verzeichnung

	Aequatorialwinkel		Meridionalwinkel		
D	-2.3	-4.5	-0.1	0.5	0.4	0.2
d	-3.5	-5.2	-6.3	-5.5	-7.5	-7.3

Frontwinkel: 17.0 | 15.3 | 7.4.9 — Verzeichnung:

Radien, Dicken und Abstände für f= 100 mm:

	r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	d7
	44.7	42.6	57.3	12.0	28.1	-44.9	2.3	1	1.47	1.3	0.5	0.8	2.6

Radion 1:7,5 f= 15 cm v. 11.12.11

Linse	n_D	$n_F - n_C$	ν
L_1	1.53958	0.01144	47.3
L_2	1.53958	0.01175	46.3
L_3	1.53958	0.01079	47.1
L_4	1.61078	0.01393	46.9

Einzellinse. | Doppelobjektiv.

a | b

+10% | -10%

Dallmeyer Stigmatic Series II 1:7,5 f: 15 cm v. 20.6.14

Nr. 60376

F-TS-6388-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (1916)

Δs'	Δf'
Einfallshöhen	Chromasie

	Δs'			Δf'		
D	-2.4	-2.6	+0.3	-2.9	-2.2	+1.4
d	-3.2	-3.6	-0.3	-3.1	-3.2	+0.4

Einfallshöhen: 14.8 | 11.3 | 2.5.7 — Chromasie: -.5 (+1.8) +0.7

Astigmatismus (1916)

Aequatorialwinkel	Meridionalwinkel
Frontwinkel	Verzeichnung

	Aequatorialwinkel		Meridionalwinkel		
D	-1.8	+2.8	+4.1	+3.3	+6.5	-5.9
d	-4.1	+0.7	-2.3	-3.2	+0.2	-8.2

Frontwinkel: 11.7 | 7.8.3 | 3.1.4 — Verzeichnung: -7.7 -11.2 -7.4 / -4.1 -1.9 -8.3 / -3.5 -5.7 -10.2

Radien, Dicken und Abstände für f= 100 mm:

	r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6	d7		
	44.9	9.7	12.4	34.9	27.3	24.7	25.1	4.1	1.25	0.3	3.7	3.2	1.0	2.4		

Dallmeyer Stigmatic Series II 1:7,5 f: 15 cm v. 20.6.14

Nr. 60376

Linse	n_D	$n_F - n_C$	ν
L_1	1.50777	0.01226	44.4
L_2	1.54710	0.01276	46.5
L_3	1.54016	0.01177	47.4
L_4	1.60942	0.01374	46.8

Einzellinse. | Doppelobjektiv.

a | b

+10% | -10%

F-75-6398-RE

916

Leitz Periplan e Beispiel zur Berechnung auf Abbe-Basis

Doppelobjektiv (F)

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (XVII):

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (XVIII, 6)

Äquatorialwalkwinkel | Meridionalwalkwinkel

Äquatorialwalkwinkel | Meridionalwalkwinkel

Frontwinkel | Vergütung

Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

$\Sigma \frac{f}{n} = 3.0033$

$\frac{1}{\Sigma \frac{f}{n}} = 3.30$

Leitz Periplan e Beispiel zur Berechnung auf Abbe-Basis

(Zeichnung)

F-75-6398-RE

916

Leitz Periplan e Objektiv (Beispiel zum Schriftsatz v. Sept. 1901)

1:7.5, f = 100.3

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (XVII), 1

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus (XVIII, 2 u. XIX, 1)

Äquatorialwalkwinkel | Meridionalwalkwinkel

Äquatorialwalkwinkel | Meridionalwalkwinkel

Frontwinkel | Vergütung

Frontwinkel | Vergütung

Radien, Dicken und Abstände für f = 100 mm

$\Sigma \frac{f}{n} = 3.0035$

$\frac{1}{\Sigma \frac{f}{n}} = 3.33$

Leitz Periplan e Objektiv (Beispiel zum Schriftsatz v. Sept. 1901)

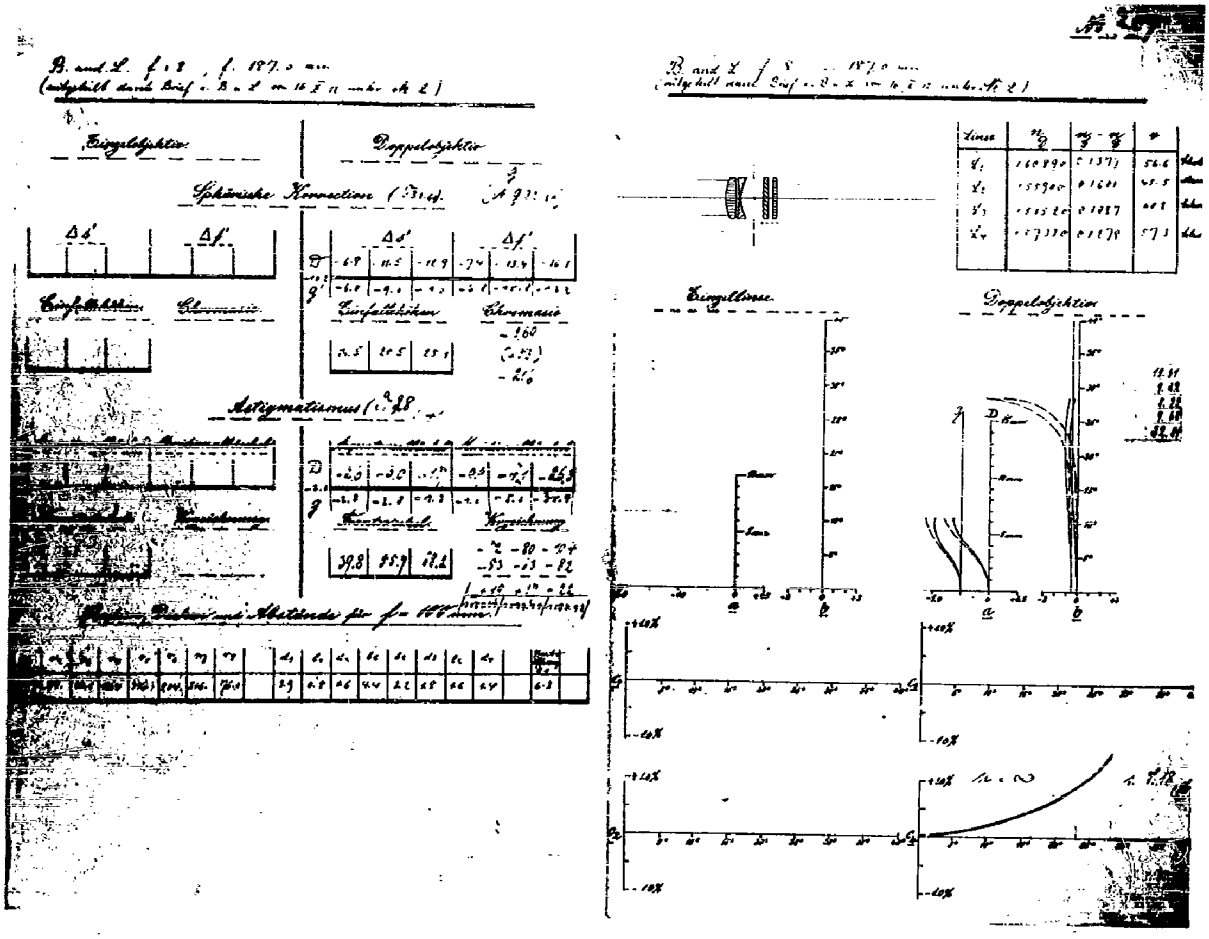
1:7.5, f = 100.

Einzellinse

Doppelobjektiv

F-73-6398-RE

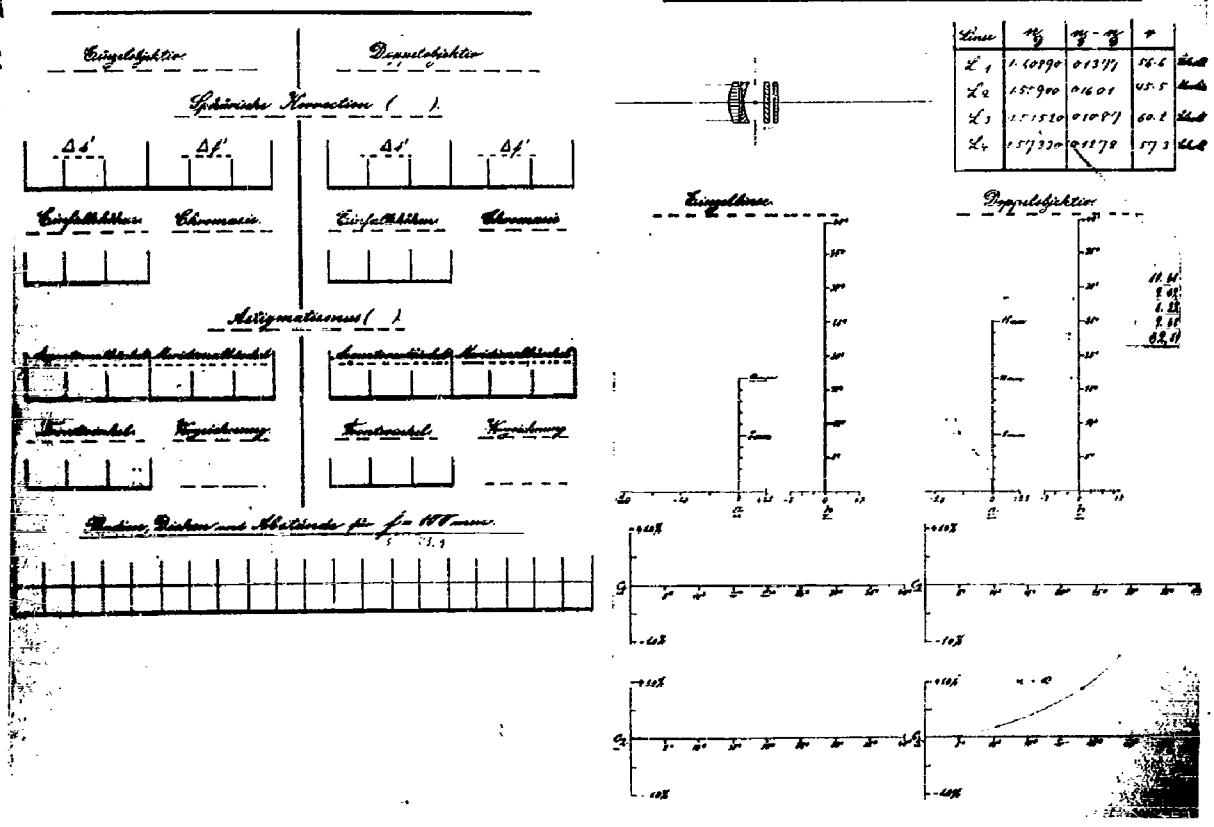
912



912

F-73-6398-RE

913



913

F-TS-6398-RE

914

Conrad Beck & Voeltzkow Berlin S.O.

Einzellobjektiv | Doppellobjektiv

Sphärische Korrection (Raum 4)

Δs' | Δs' | Δs' | Δs'

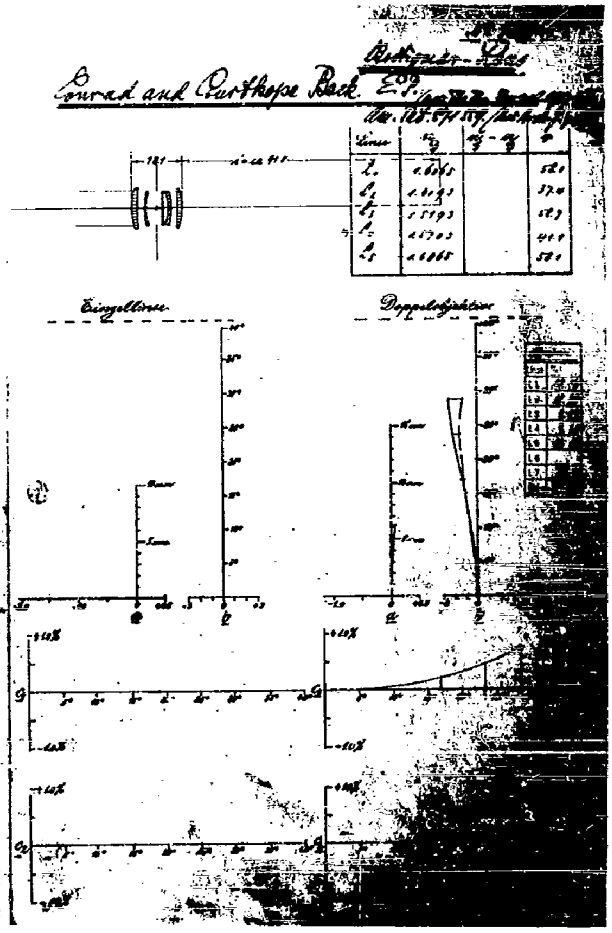
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Raum 4)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Brennweite | Vergütung | Frontscheitel | Vergütung

Radien, Dicken und Abstände für f = 100 mm



911

1899

Leitz, Periplan, Brit. Journal p. 266 1899

F-TS-6398-RE

915

Leitz, Periplan, Brit. Journal p. 266 1899

Einzellobjektiv | Doppellobjektiv

Sphärische Korrection (Raum 4)

Δs' | Δs' | Δs' | Δs'

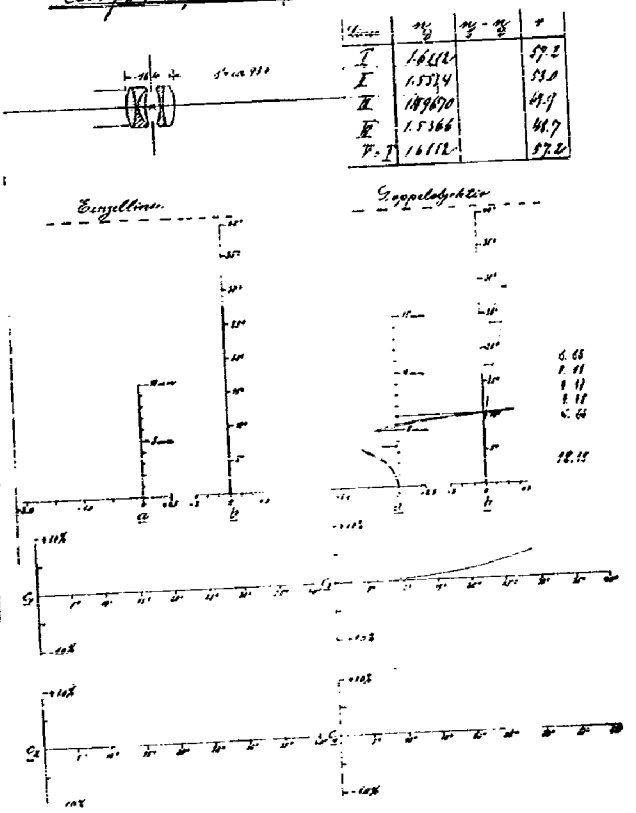
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus (Raum 4)

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

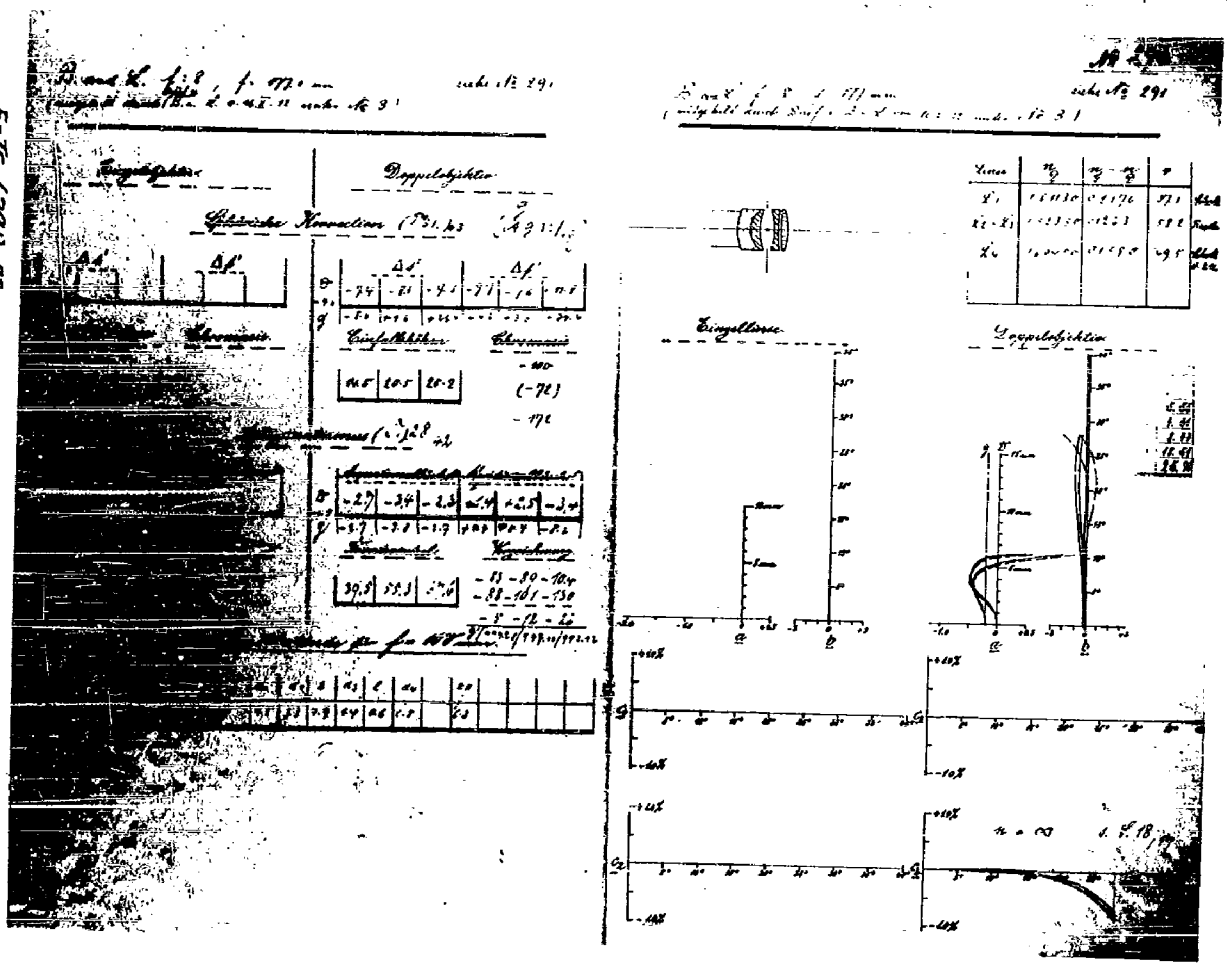
Brennweite | Vergütung | Frontscheitel | Vergütung

Radien, Dicken und Abstände für f = 100 mm



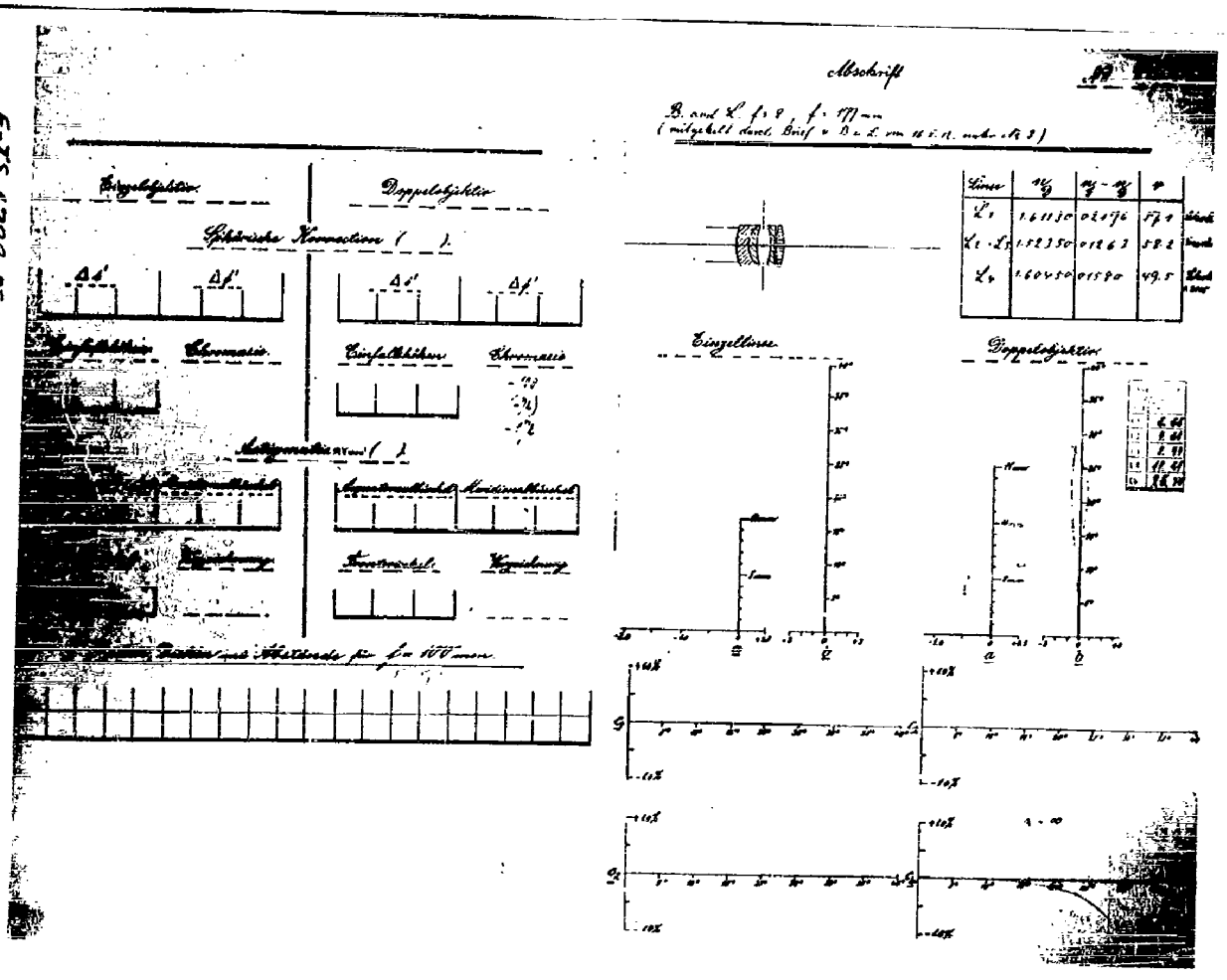
F-TS-6398-RE

916



F-TS-6398-RE

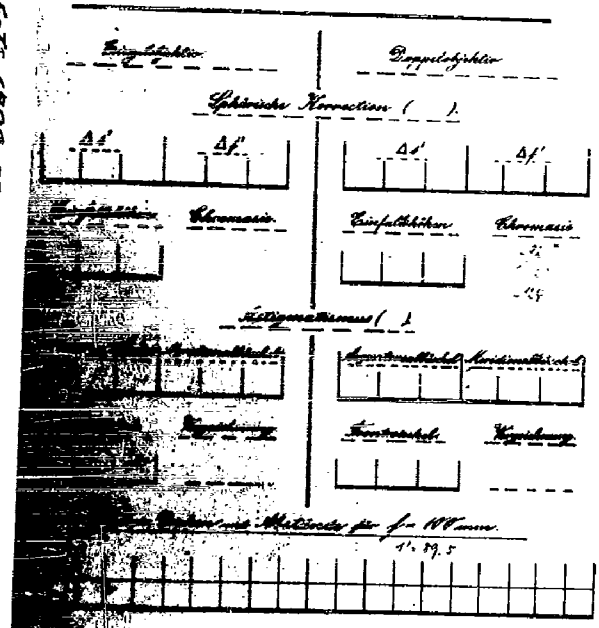
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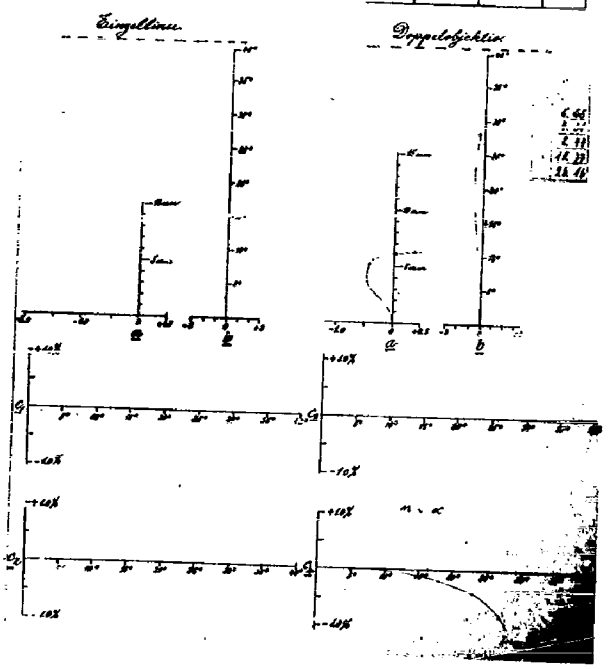
F-FS-6898-RE

Abschrift

B. u. L. f. 8 Nr. 3 Abänderung der Darstellung Nr. 290



Linse	n_d	$n_d - n_F$	r
L_1	1.611330	0.21976	17.1
L_2	1.623350	0.12603	57.0
L_3	1.623350	0.11641	58.2
L_4	1.615003	0.11569	58.3



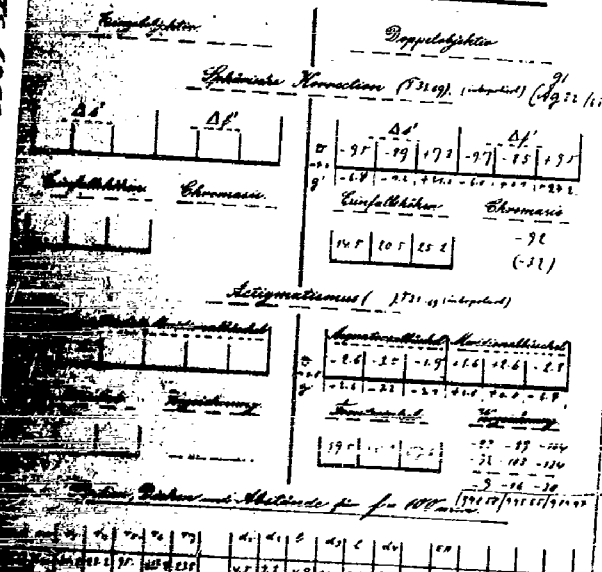
118

F-FS-6898-RE

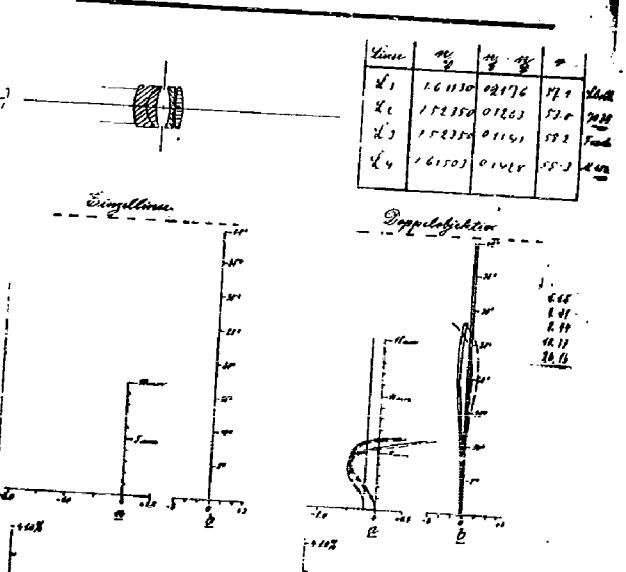
B. und L. f. 8 Nr. 3 Abänderung der Darstellung Nr. 290

B. und L. f. 8 Nr. 3 Abänderung der Darstellung Nr. 290

306

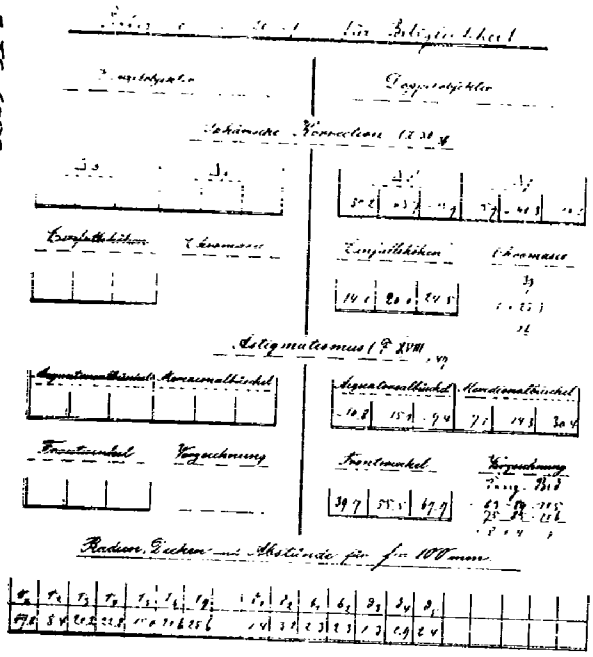


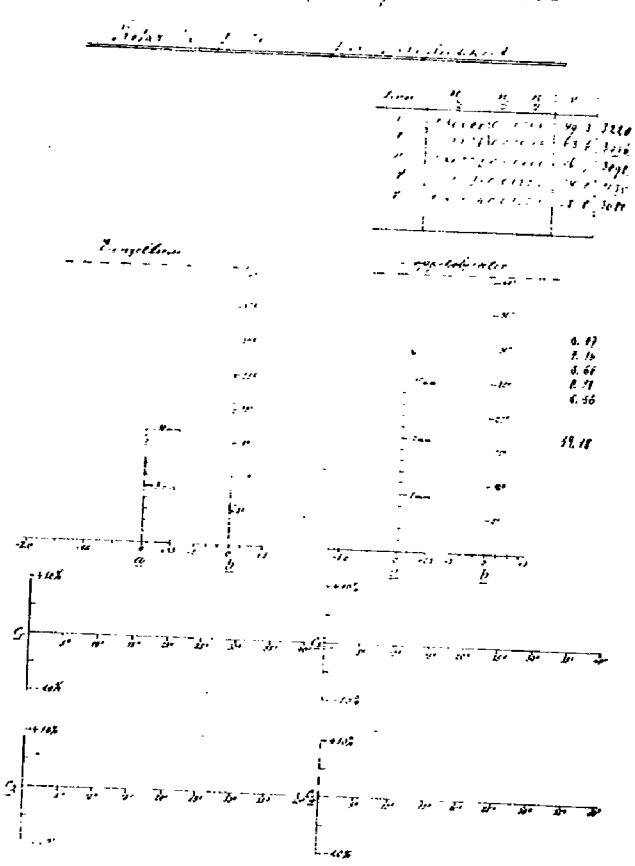
Linse	n_d	$n_d - n_F$	r
L_1	1.611330	0.21976	17.1
L_2	1.623350	0.12603	57.0
L_3	1.623350	0.11641	58.2
L_4	1.615003	0.11569	58.3



F-TS-6388-RE

920

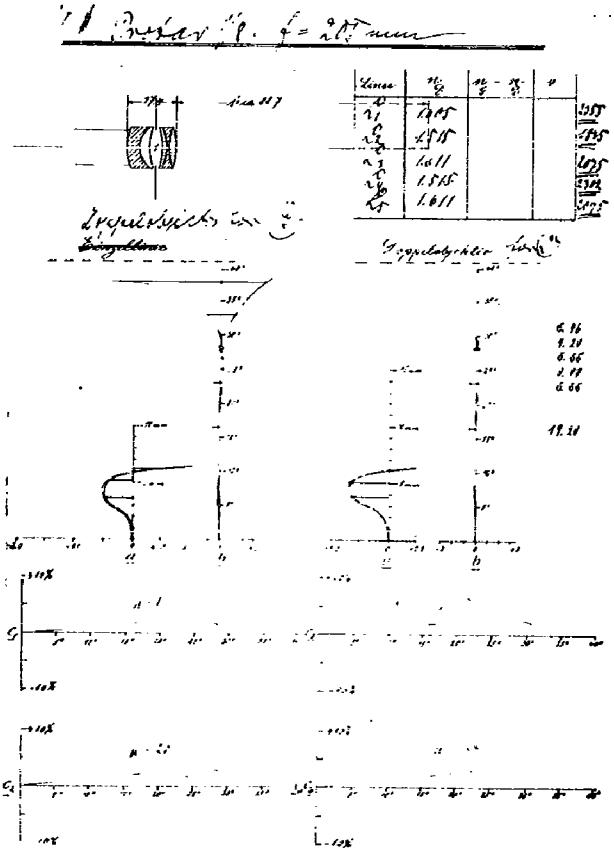




921

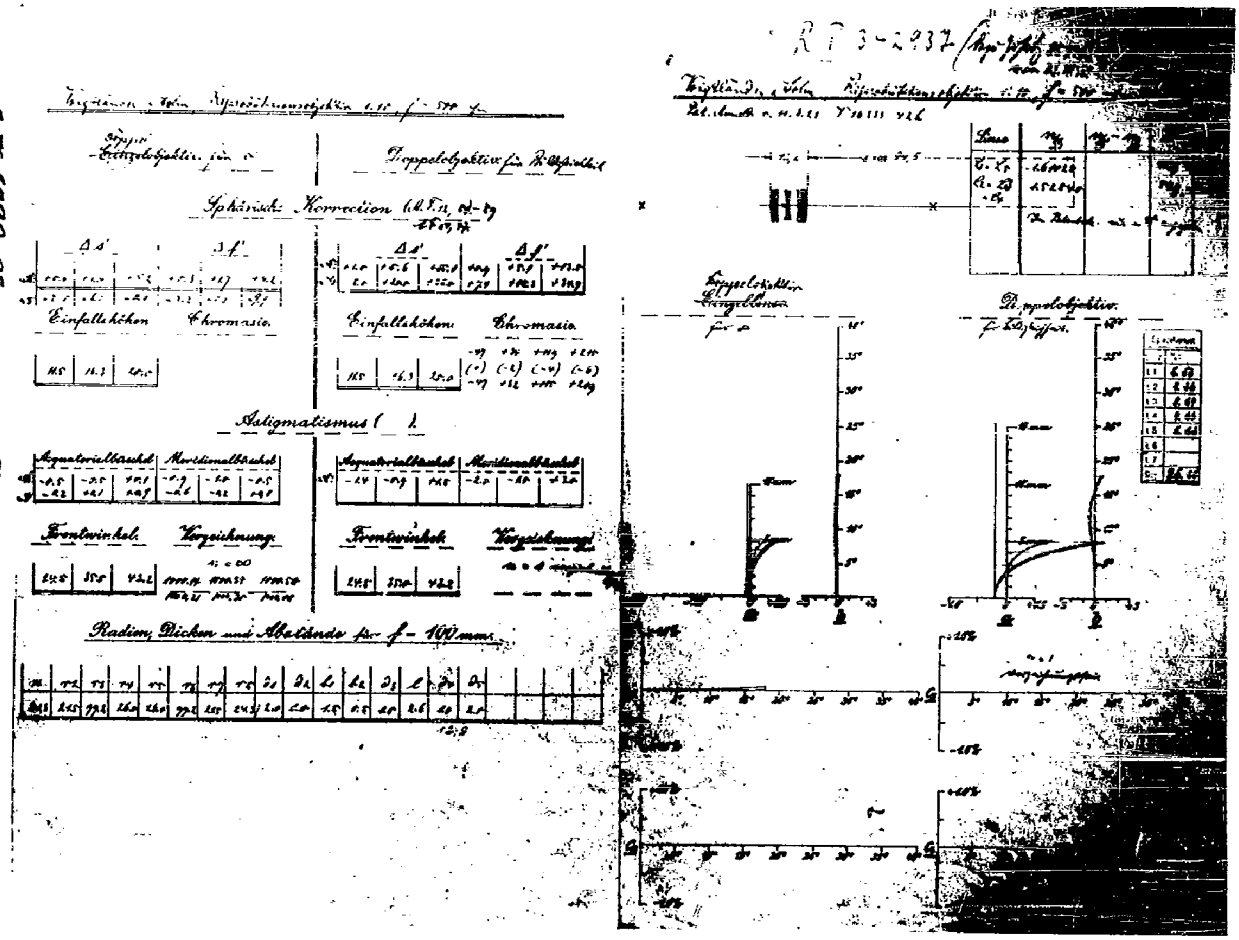
F-TS-6388-RE





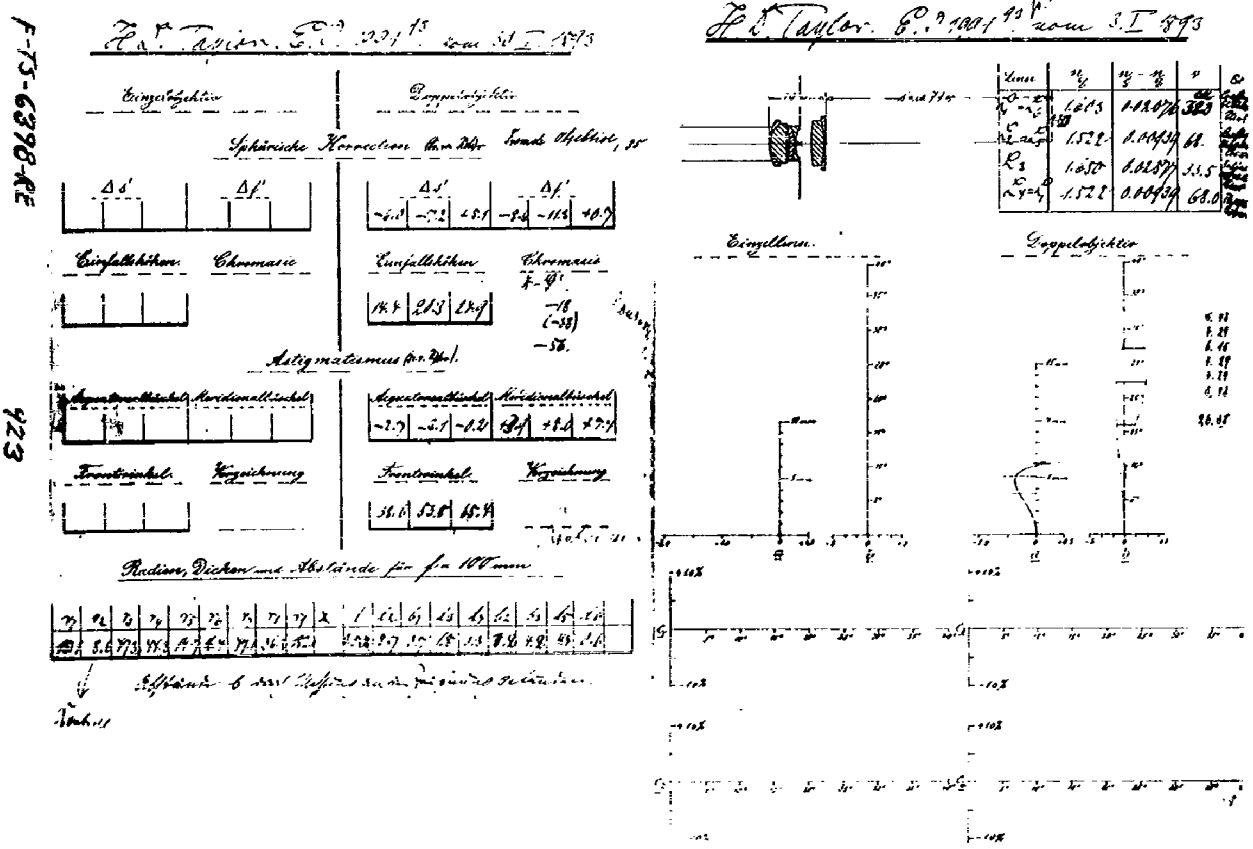
F-TS-6398-PE

922



F-TS-6398-PE

923



№ 336

F-75-6388-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

337

№ 346

F-75-6388-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

F-TS-6398-RE

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Taylor Taylor and Hobson

Cooke Anastigmat Ser. I. V. S. f 5.6 and No. 31355

(grosses und geteiltes Feld 11 mm Ø)

Einzellinse | Doppellinse

Sphärische Korrection (Ulr. eg.)

Einzellinse Δs'	Einzellinse Δf'	Doppellinse Δs'	Doppellinse Δf'
		-2.9 -1.6 -1.8	-2.6 -1.8 +1.7

Einzellinse Einfallshöhen	Einzellinse Chromasie

Doppellinse Einfallshöhen	Doppellinse Chromasie
23.1 33.7 40.0	

Astigmatismus (Us)$_{II}$

Einzellinse Äquatorialbüschel	Einzellinse Meridionalbüschel

Doppellinse Äquatorialbüschel	Doppellinse Meridionalbüschel
-3.0 -4.1 -3.3	-0.9 -11.2 -16.3

Einzellinse Frontneigung	Einzellinse Bezeichnung

Doppellinse Frontneigung	Doppellinse Bezeichnung
39. 53.9 65.	+134 - 148 - 183 +116 - 117 - 263 -18 - 39 - 80

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	d_1	d_2	d_3	d_4	d_5	d_6	d_7
22.0	69.3	69.2	38.5	40.2	16.3	4.7	8.4	3.2	1.5	5.0	5.4	10.0

Einzellinse

Doppellinse

F. 41
11.48
9.48
33.11

F. 10

F-TS-6398-RE

340

Projektions-Triplet f = 25 cm, 2:5 (1:3)

Doppel-Einzelobjektive | Doppelobjektive

Sphärische Korrection (Ulr. eg.) (Doppel)

Doppel-Einzelobjektive Δs'	Doppel-Einzelobjektive Δf'	Doppelobjektive Δs'	Doppelobjektive Δf'
-0.5 -0.6 -0.3	-0.4 -0.9 +0.7	-1.7 -0.3 -1.9	-0.6 -0.8 -1.4
-0.3 -0.2 +0.6	-0.3 -0.1 +0.3		

Doppel-Einzelobjektive Einfallshöhen	Doppel-Einzelobjektive Chromasie
22.1 24.0 19.2	

Doppelobjektive Einfallshöhen	Doppelobjektive Chromasie
25.8 25.5 20.7	

Astigmatismus (Us)$_{II}$

Doppel-Einzelobjektive Äquatorialbüschel	Doppel-Einzelobjektive Meridionalbüschel
-2.7 -2.3 +0.3	+0.3 +0.1 -0.1 -1.9
-2.9 -2.3 +0.1	+0.3 +0.1 -0.3 -3.4

Doppelobjektive Äquatorialbüschel	Doppelobjektive Meridionalbüschel
-2.1 -2.8 +0.3	+0.5 +0.6 -0.8

Doppel-Einzelobjektive Frontneigung	Doppel-Einzelobjektive Bezeichnung
32.0 30.0 28.2	III.2 III.4 III.6
31.7 34.7 29.0	III.10 III.16 III.18

Doppelobjektive Frontneigung	Doppelobjektive Bezeichnung
32.5 -0.5 32.1	-84 - 89 - 89 -34 - 51 - 70 -2 - 2 - 3

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	d_1	d_2	d_3	d_4	d_5	d_6	d_7
41.5	73.1	40.4	30.7	60.7	41.7	1.5	12.9	0.4	3.1	2.5	3.3	23.9

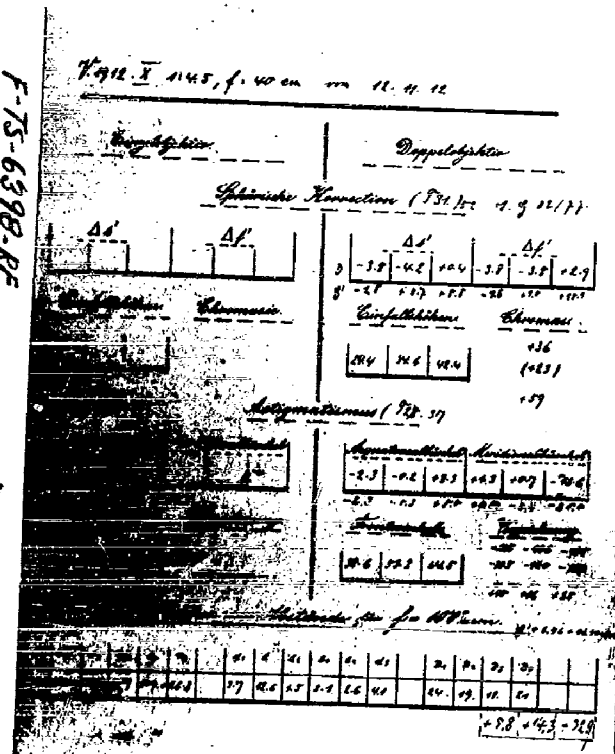
Einzellinse

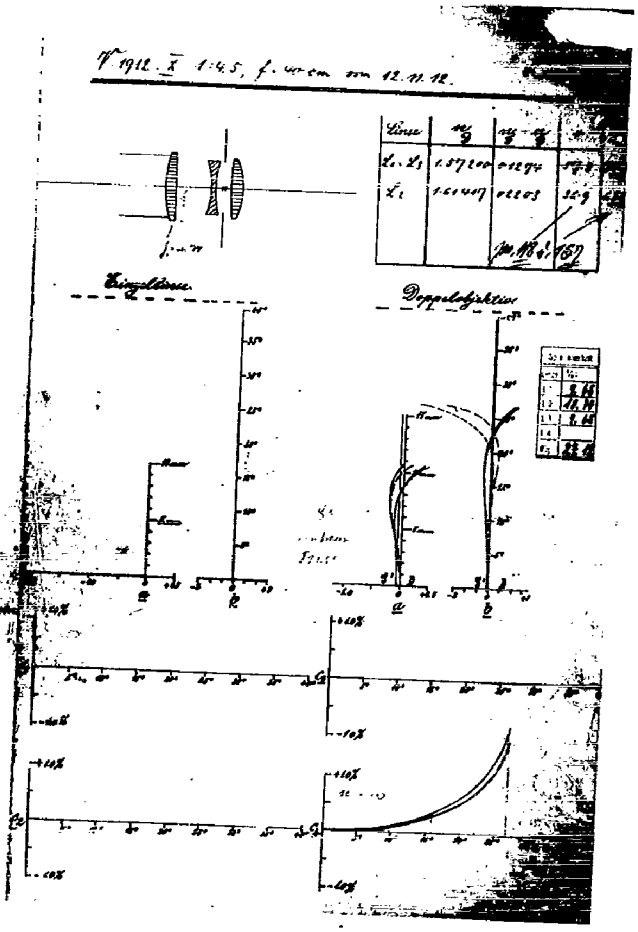
Doppellinse

F. 16
12.31
9.00
32.12

F. 10

F-15-6989-RF

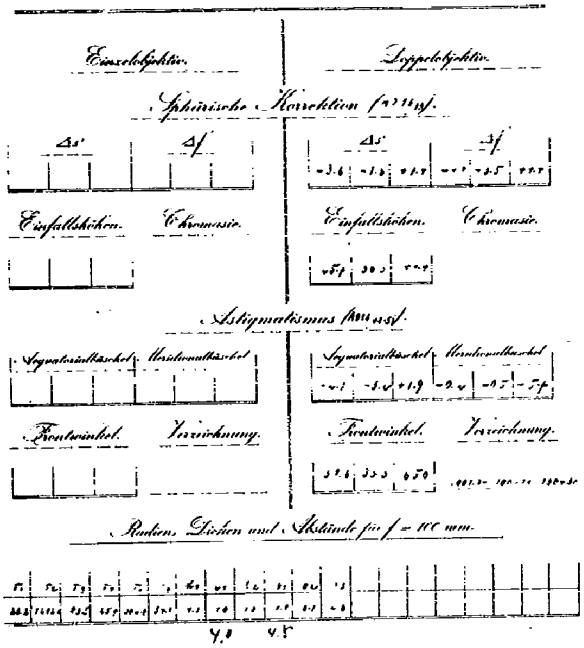

Doppelobjektive
Sphärische Konvexfläche
Einfallsblenden
Chromasie


Einzellinse
Doppelobjektive

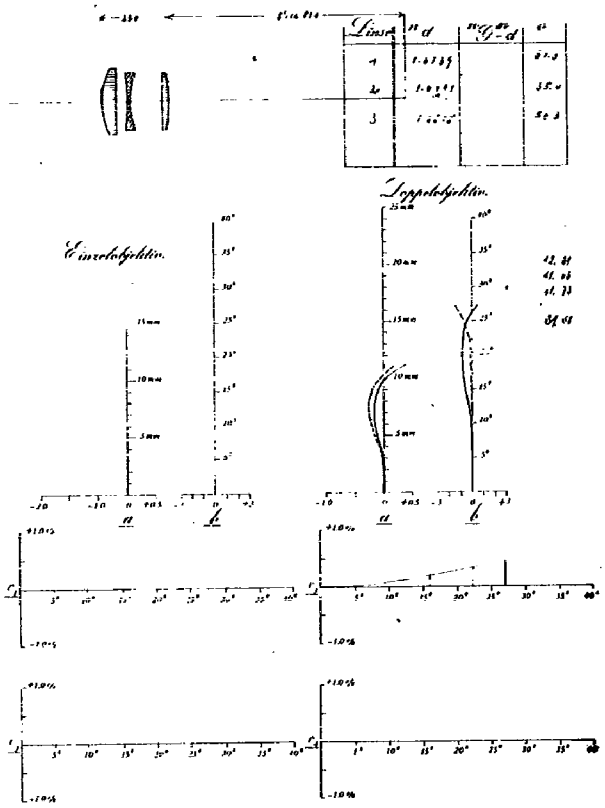
F-75-6398-RE

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A 1 987 118 Tronnier 1:4.5; f = 10 cm v. 15.1.35

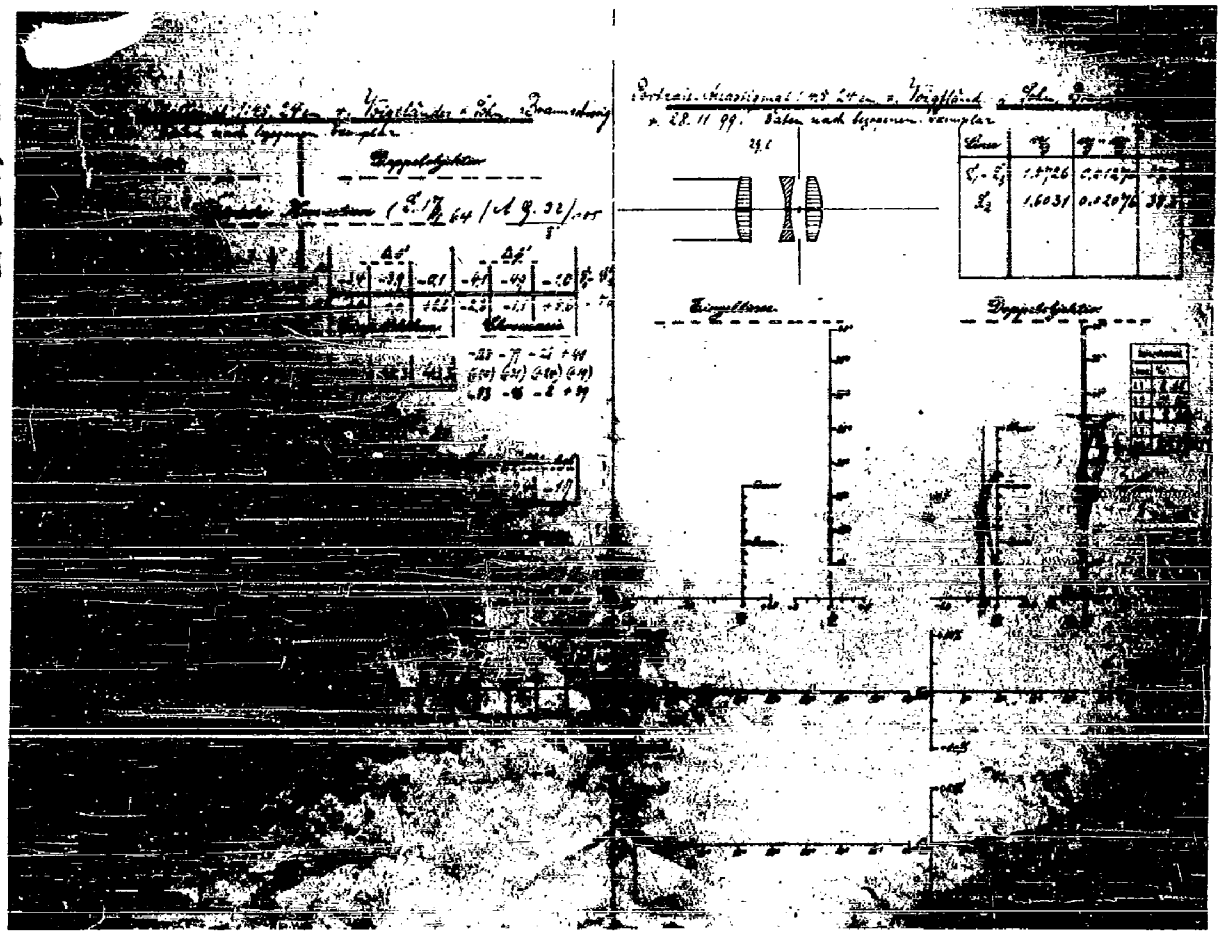


A 1 987 931 Tronnier 1:4.5; f = 10 cm v. 15.1.35.



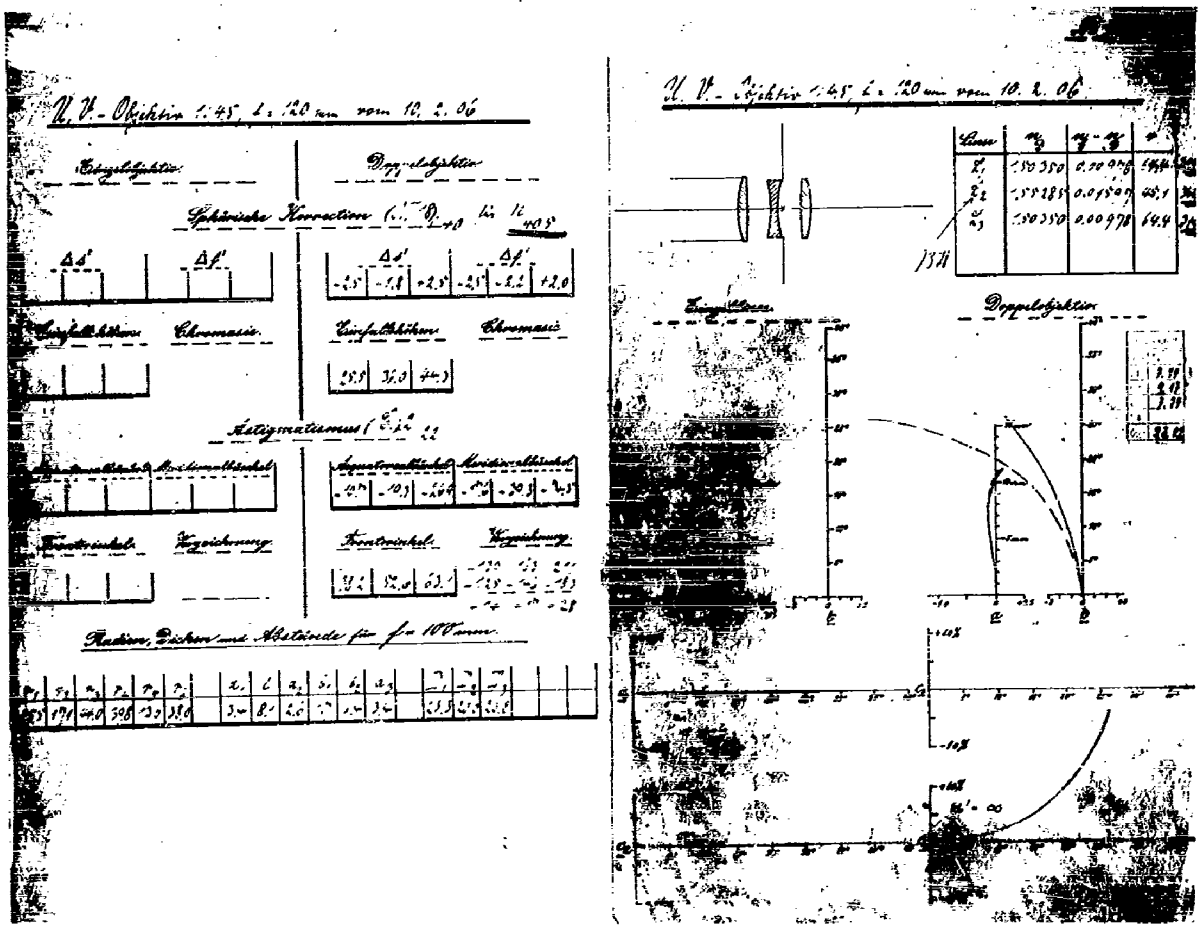
F-TS-6398-RE

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F-TS-6398-RE

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F-TS-6398-RE

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Taylor-Cooke Reihe für Achromate

Taylor-Cooke Reihe für Achromate 1/4.46

Einzellinsen

Doppellinsen

Sphärische Korrektion

Astigmatismus

Distorsion und Abtastfehler

Triplet 1:4.8, f=12cm für Abbildungsmaßstab 1:1

F-TS-6398-RE

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Triplet 1:4.8, f=12cm für Abbildungsmaßstab 1:1, Rechn. v. 16.7.34

Einzellinsen

Doppellinsen

K 1141

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J-R-Triplet 1:4,8, f=50 mm.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-3.4 -3.3	+2.2 -5.8 -2.5 +3.5

Einfallshöhen | Chromasie

Einzelobjektiv Einfallshöhen	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
	27.1 32.2	41.9

Astigmatismus (f=1)

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel
		-0.46 -0.85	+0.33 -0.30

Randwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Doppelobjektiv Frontwinkel	
23.8	25.8

Radien, Dicken und Abstände für f = 100 mm.

R	s	s'	s	s'	s	R'	r₁	r₂	r₃	r₄	R'
31.8	+77.5	12.2	3.81	11.8	28.4		27	15.6	12	9.7	3.4

J-R-Triplet 1:4,8, f=50 mm.

Linse	n_d	n_G'-d	ν
L1	1.57	0.01	64.2
L2	1.67	0.02	32.1
L3	1.61	0.02	58.8

Einzelobjektiv | Doppelobjektiv

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Triplet 1:4,8, f. 50 cm v. 16.11.26

Einzelobjektive | Doppelobjektiv

Sphärische Korrection

Einzelobjektive Δs'	Einzelobjektive Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
-4.2 -3.4	3.5 -4.4 -5.3 -3.5	-2.6 -3.2 +0.6 -3.7 -4.3 +0.2	

Einfallshöhen | Chromasie

Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
23.7	11.6

Astigmatismus

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel
-0.30 -0.54 -0.78	+0.35 +0.65 +0.40	-0.11 -0.61 -0.91	+0.27 -0.15 +0.40

Randwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Doppelobjektiv Frontwinkel	
17.1	23.8

Radien, Dicken und Abstände für f = 100 mm.

Triplet 1:4,8, f. 50 cm v. 16.11.26

Linse	n_D	n_F - n_D	ν
L1	1.5963	0.0104	64.0
L2	1.6202	0.0264	36.2
L3	1.5654	0.0100	56.0

Einzellinse | Doppelobjektiv

F-TS-6378-RE

347

Triplet 1:5, f. 70 cm

Einzelobjektiv für 6°

Doppelobjektiv für 6°

Sphärische Korrektion

Einfallshöhen

Chromasie

Astigmatismus

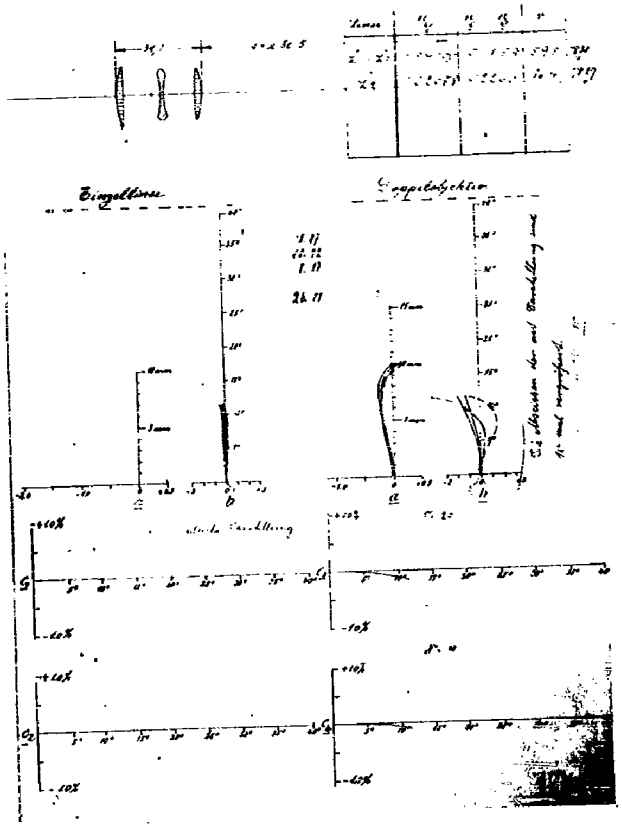
Äquatorialbüschel

Meridionalbüschel

Vorzeichnung

Frontwinkel

Radien, Dicken und Abstände für f = 100 mm



F-TS-6378-RE

350

Triplet 1:5, f. 85 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Einfallshöhen

Chromasie

Astigmatismus

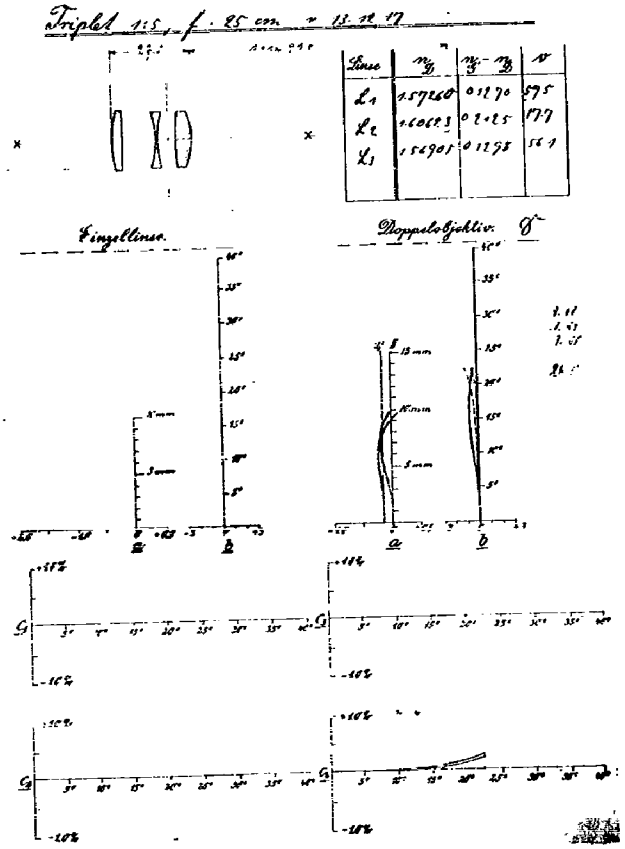
Äquatorialbüschel

Meridionalbüschel

Vorzeichnung

Frontwinkel

Radien, Dicken und Abstände für f = 100 mm



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F-TS-6398-RE

351

Triplet 1:5, f = 72 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Δs', Δf')

Δs'	Δf'	Δs'	Δf'
		-1.4	1.9	0.3	-5.4	5.8	-0.9

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		25.0	32.6	39.9	

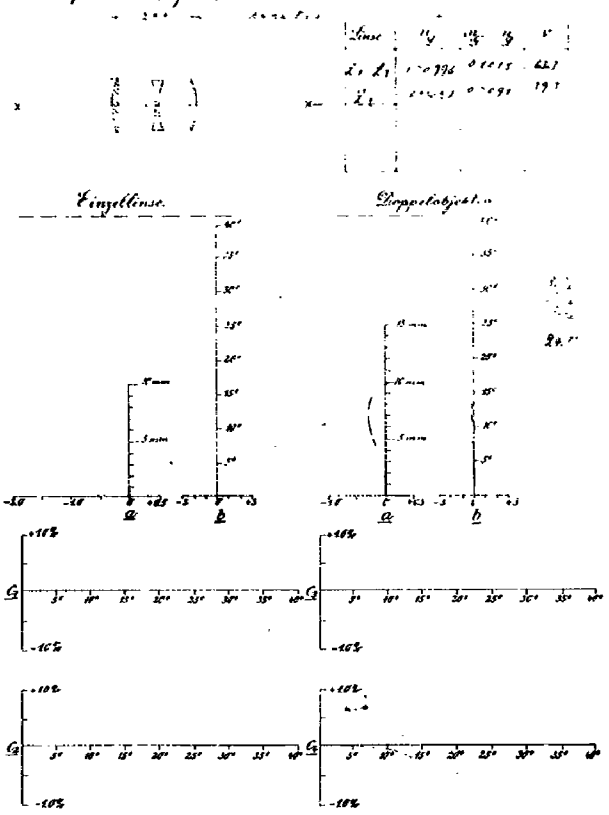
Astigmatismus (x', z')

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel		Meridionalbüschel	
		0.24	0.00	0.79	+0.66	-0.13	1.56

Frontwinkel	Verzeichnung	Frontwinkel		Verzeichnung	
		11.7	10.4	12.1	-19.71	-19.45	-19.90

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	e	d5	r6
158	35.6	114	69.7	77.5	104.9	8.8	3.9	2.3	0.1	8.1	0.9	3.9



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Ballen-Triplet 1:5, f = 70 mm

Doppel-Einzelobjektiv f = -9' | Doppelobjektiv f = 8'

Sphärische Korrection (Δs', Δf')

Δs'	Δf'	Δs'	Δf'
-0.16	-0.83	+0.49	-0.91	-0.26	+0.16	-1.18	-1.37	0.49	-2.16	-1.44	-0.58

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		13.1	12.7	10.6	

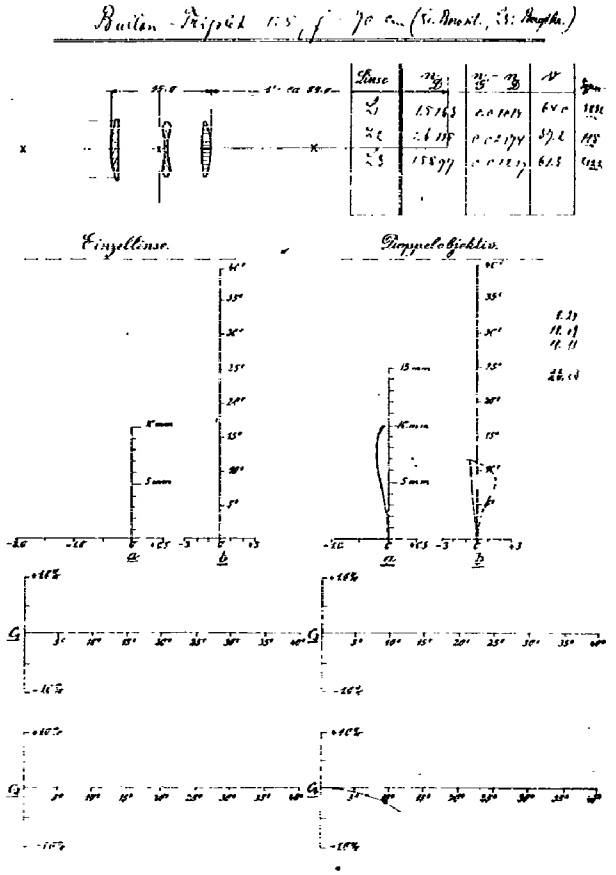
Astigmatismus (x', z')

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel		Meridionalbüschel	
		-2.2	-2.2	-0.3	+0.6	+0.6	0.1

Frontwinkel	Verzeichnung	Frontwinkel		Verzeichnung	
		11.6	13.6	15.6	11.2	9.4	11.6

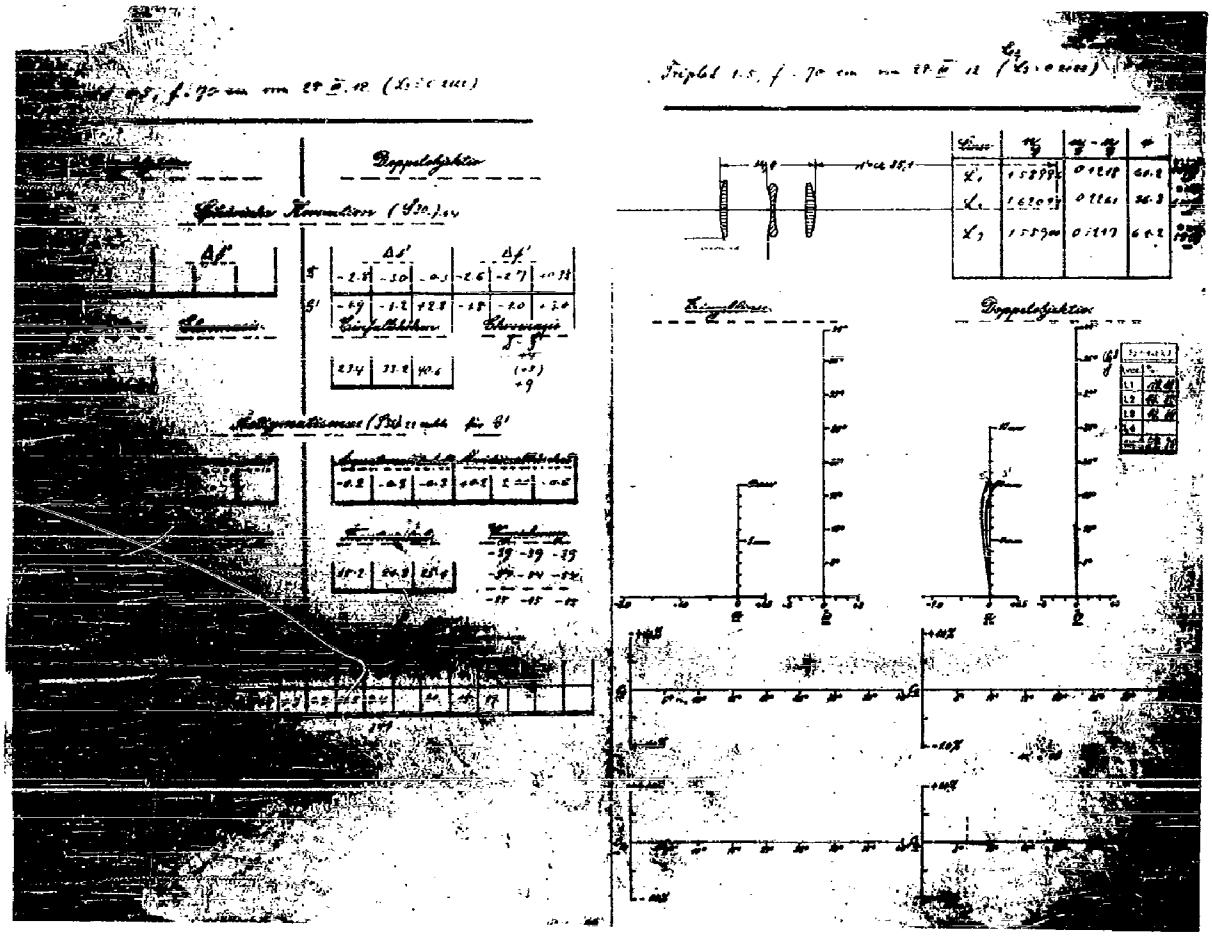
Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	e	d5	r6
348	∞	388	57.1	93.5	320	6.15	0.4	1.4	19.1	11.4	1.7	



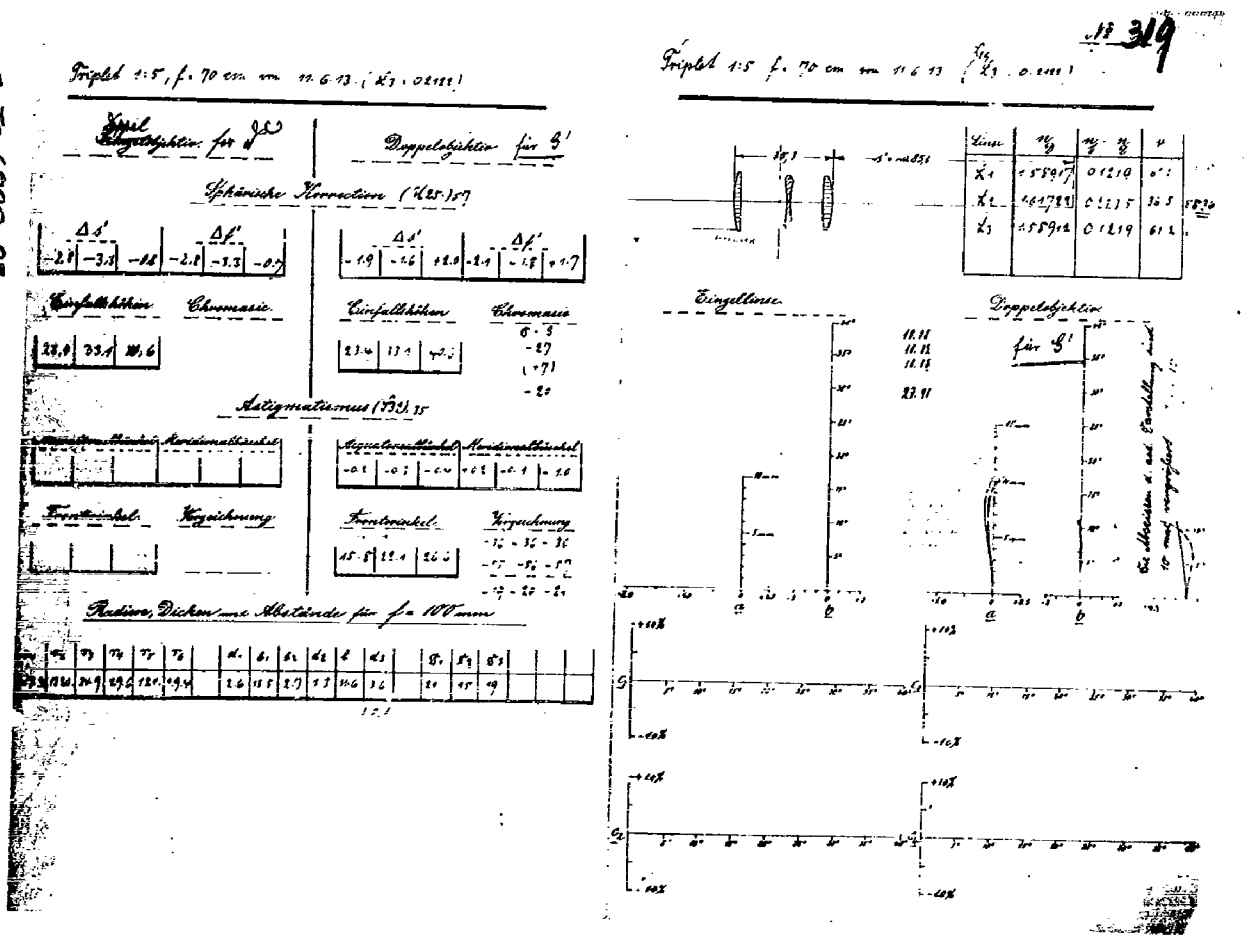
F-TS-6398-RE

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F-TS-6398-RE

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F-TS-6388-RE

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Ballontriplet 1:5, f = 30 cm

Doppel- Einzelobjektiv I' | Doppelobjektiv I'

Sphärische Korrection (H. 15 u.)

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

I | Astigmatismus (H. 17) u. 17

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

-0.24 | -0.27 | -0.15 | +0.10 | -0.15 | -0.16 | -0.18 | -0.11 | -0.08 | +0.05 | -0.08 | -0.03

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Ballontriplet 1:5 f 30 cm

Einfluss der Glasdurchsichtigkeit

Linse	n_d	$n_F - n_d$	ν
L_1	1.514 [illegible]	0.01 [illegible]	64.1
L_2	1.612 [illegible]	0.02 [illegible]	36.2
L_3	1.514 [illegible]	0.01 [illegible]	64.1

Doppelobjektiv I'

Doppelobjektiv II'

I: L_1 = 92.2, L_2 = 18.8

II: L_1 = 92.2, L_2 = 0.8

Maxima der Feldkrümmungen

a b

$n = \infty$ I

$n = \infty$ II

+10% G -10%

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Triplet 1:5, f = 150 cm v. 10.6.17

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (H. 15 u.)

Δs' | Δf' | Δs' | Δf'

-1.1 | +1.9 | +1.05 | -0.3 | +1.35 | +1.8

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

+δ

(+C)

+δ

Astigmatismus (H. 17) u.

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

-0.12 | -0.12 | +0.14 | +0.14

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Triplet 1:5, f = 150 cm v. 10.6.17

Linse	n_d	$n_F - n_d$	ν
L_1	1.514 [illegible]	0.01 [illegible]	64.0
L_2	1.612 [illegible]	0.02 [illegible]	36.9
L_3	1.514 [illegible]	0.01 [illegible]	64.0

Einzellinse

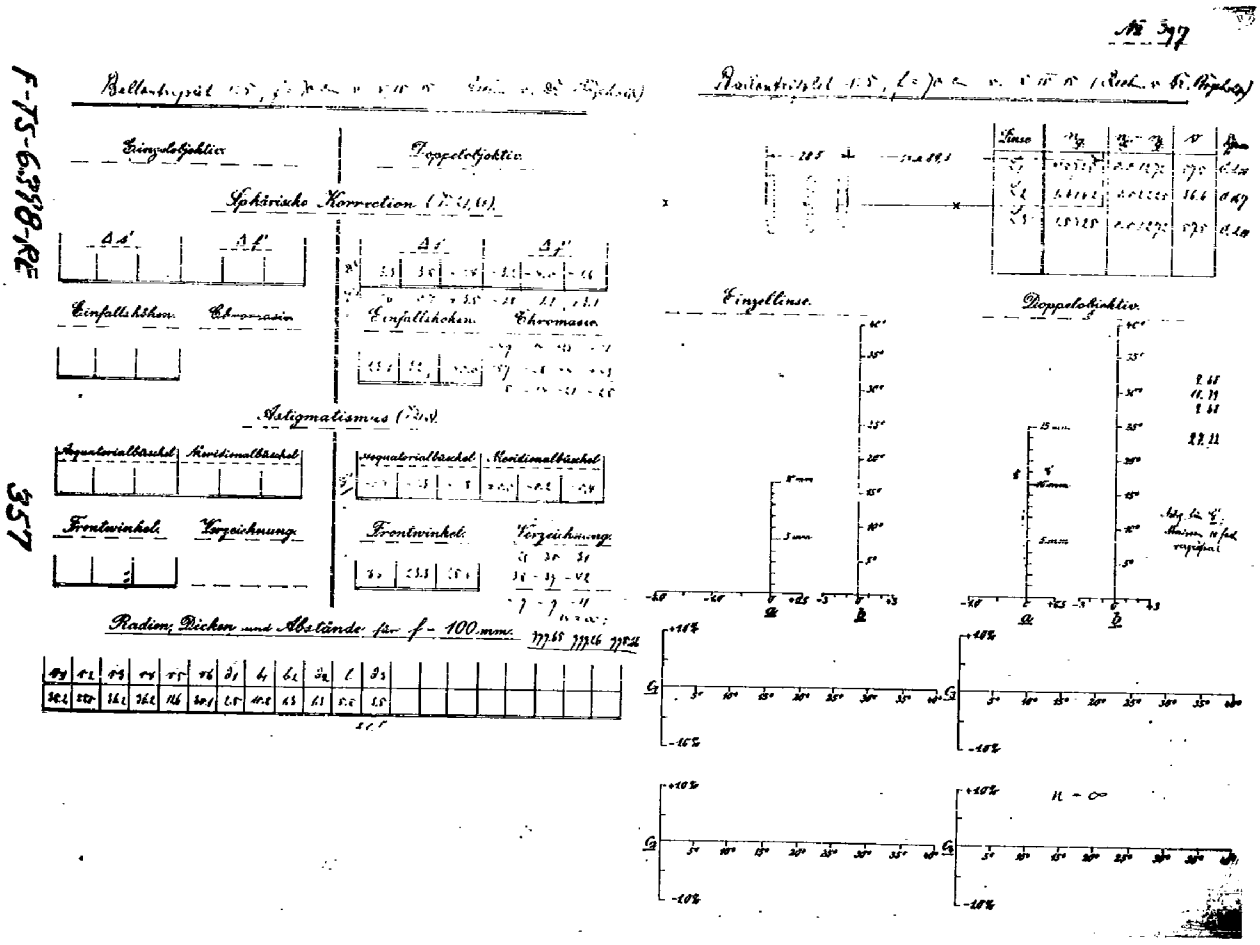
Doppelobjektiv

a b

+10% G -10%

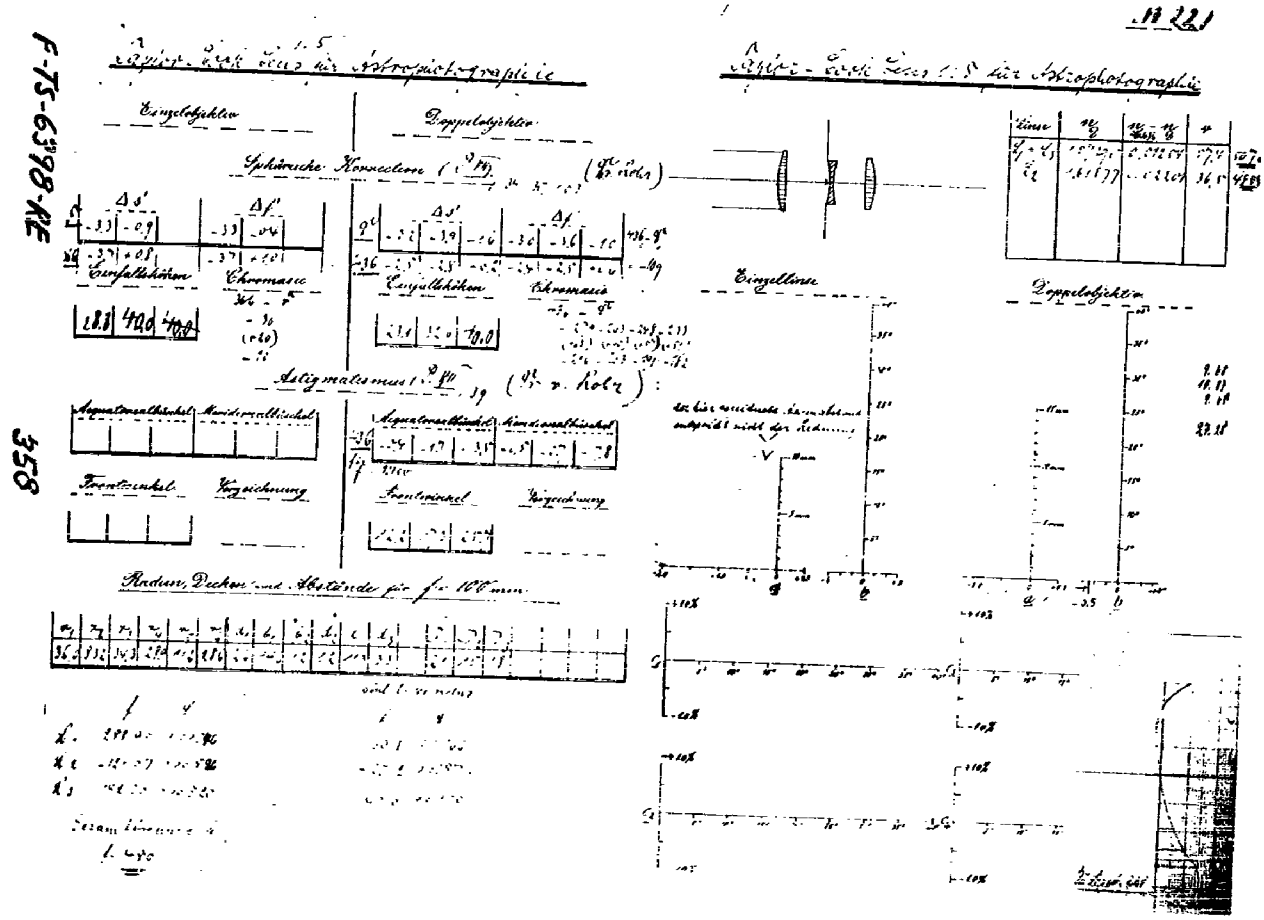
F-TS-6398-RE

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F-TS-6398-RE

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Doppelobj. für λ 366 — Einzelobjektiv — Doppelobjektiv

ν_d 71,129 Sphärische Korrection (ν_d 71,129) = 17

$\Delta s'$ | $\Delta f'$ — $\Delta s'$ | $\Delta f'$

Einfallshöhen | Chromasie — Einfallshöhen | Chromasie

Astigmatismus (ν_d 71,129)

Aequatorialwinkel | Meridionalwinkel — Aequatorialwinkel | Meridionalwinkel

Koordinatenwinkel | Kennzeichnung — Koordinatenwinkel | Kennzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

r_1	r_2	r_3	r_4	r_5	r_6	d_1	d_2	d_3	d_4	l	d_5	J
36,5	180,0	34,6	294	-113	28,7	2,6	14,7	1,3	1,3	11,4	3,4	21,0

Einzellinse — Doppelobjektiv

Linse	n_d	$n_F - n_C$	ν
L_1	1,57264	0,011799	66,6
L_2	1,61817	0,012246	36,5
L_3	1,57259	0,012278	57,4

$n = \infty$

Taylor Taylor and Hobson

Cooke chaslegmad Lens 1:5·6, 6 inche No. 288332

(previous n. gendrad 1:6·1, 160 mm v. 18.11.11.)

Einzellinse — Doppelobjektiv

Sphärische Korrection (ν_d 71,129)

$\Delta s'$ | $\Delta f'$ — $\Delta s'$ | $\Delta f'$

Einfallshöhen | Chromasie — Einfallshöhen | Chromasie

Astigmatismus (ν_d 71,129)

Aequatorialwinkel | Meridionalwinkel — Aequatorialwinkel | Meridionalwinkel

Koordinatenwinkel | Kennzeichnung — Koordinatenwinkel | Kennzeichnung

Radien, Dicken und Abstände für $f = 100$ mm

Taylor Taylor and Hobson

Cooke chaslegmad Lens 1:5·6, 6 inche No. 288332

(previous n. gendrad 1:6·1, 160 mm v. 18.11.11.)

Linse	n_d	$n_F - n_C$	ν
L_1	1,651010		
L_2	1,597610		
L_3	1,611140		

Einzellinse — Doppelobjektiv

$n = \infty$

№ 1112

F-75-6518-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einfallshöhen | Chromasie

Astigmatismus

Sagittalwölbung | Meridionalwölbung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzelobjektiv | Doppelobjektiv

№ 395

Ballen-Periskop 1:5,4 f = 715 mm (G: Brenn., K: Bildwölbung)

F-75-6518-RE

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Einzelobjektiv | Doppelobjektiv für 8°

Sphärische Korrektion (V: 21,49)

Einfallshöhen | Chromasie

Astigmatismus (V: 21,49)

Sagittalwölbung | Meridionalwölbung

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

№ 1067

F-TS-6398-RE

363

F. W. Gehrke A. P. Nr 1 660 575 v. 5.5 f. ... v. 31.5.32

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einfallshöhen | Chromasie

Astigmatismus (/)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

F. W. Gehrke A. P. Nr 1 660 575 v. 5.5 f. ... v. 31.5.32

Linse | n_d | $n_g - n_d$ | ν

Einzelobjektiv | Doppelobjektiv

a | b

№ 962

F-TS-6398-RE

364

J. S. Farben 1:5.5 f. 100 mm S. 18/1510 v. 18.5.32

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' / Δf')

Einfallshöhen | Chromasie

Astigmatismus (...)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

J. S. Farben 1:5.5 f. 95 mm S. 18/1510 v. 18.5.32

Linse | n_d | $n_g - n_d$ | ν

Einzellinse | Doppelobjektiv

a | b

F-TS-6388-RE

365

Triplet f. 6 f. 67 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion f. 4 = f. 100

Δs' | Δs | Δs' | Δs

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus f. 4 = f. 100

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Fehlwinkel | Verzeichnung | Restwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

r_0	r_1	r_2	r_3	r_4	r_5	d_1	d_2	d_3	d_4	d_5	d_6	n_d	ν_d	n_d	ν_d
23.9	666.3	30.4	17.6	96.7	22.9	1.6	7.7	1.3	0.9	9.5	2.8	1.5	60.4	1.7	27.6

Fig. 1

Triplet f. 6 f. 67 mm

Einzelobjektiv | Doppelobjektiv

365

E. Busch 1:6 f. 100 mm

E. B. Nr. 300461 = 16 m. Lp.

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs'-y)

Δs' | Δs' | Δs' | Δs'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( )

Sagittalbüschel | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

Fehlwinkel | Verzeichnung | Restwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

F-TS-6388-RE

366

E. Busch 1:6 f. 100 mm

E. B. Nr. 300461 = 16 m. Lp.

Linse	n_D	$n_F - n_D$	ν
L_1	1.51633	0.01009	64.2
L_2	1.59240	0.01739	33.2
L_3	1.51633	0.01009	64.2

Einzellinse | Doppelobjektiv

№ 423

F-TS-6398-RE

367

Triplet 1:6 f = 100 mm

Einzelobjektiv für 8°

Doppelobjektiv für 8°

Sphärische Korrection (-0,8/5,4)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (alt)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Triplet 1:6 f = 100 mm

Einzellinse für 8°

Doppelobjektiv

Linse | n_g | $n_g - n_g'$ | ν

l_1 | l_2 | l_3

Einzellinse

Doppelobjektiv

Maßstab n mal vergr.

№ 234

F-TS-6398-RE

368

Triplet 1:6 f = 100 mm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrection (-0,8/5,4)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (alt)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_g | $n_g - n_g'$ | ν

Einzellinse

Doppelobjektiv

№ 429

F-75-6388-RE

369

Triplet 1:6, 180 cm = 9,5 cm

Einzelobjektiv S' | Doppelobjektiv

Sphärische Korrection (cdBr) λ_g =

$\Delta s'$		$\Delta f'$		$\Delta s'$		$\Delta f'$	
-11	-07	102	93	-140	-009	191	103	018	116

Einfallshöhen | Chromasie

			193	173	226

Astigmatismus (Nos) λ_g

Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
				033	001	065	108	005	-53

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		32 9	8 3	11 4

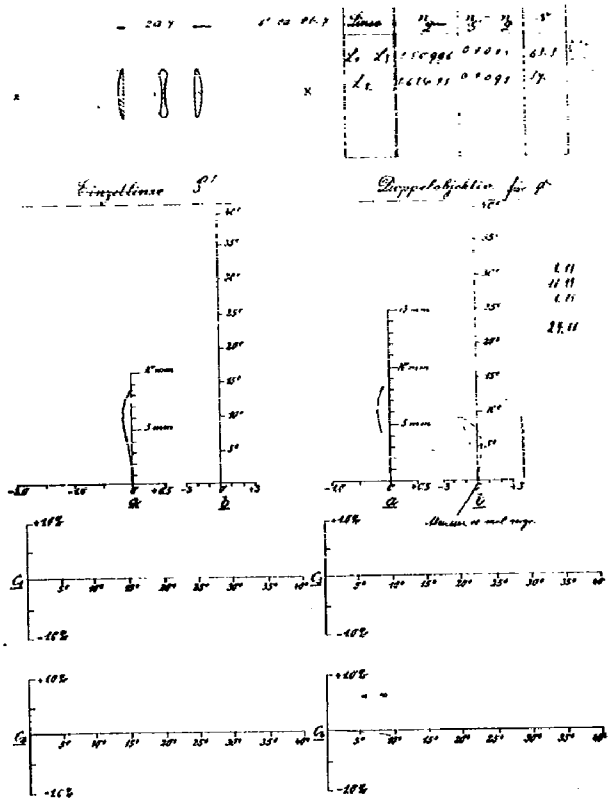
Radien, Dicken und Abstände für $f' = 100$ mm:

r_1	r_2	r_3	r_4	r_5	r_6	d_1	l_1	l_2	d_2	l	d_3	l_B
69.8	155.	104	65.4	86.6	64.3	2.2	10.9	2.3	6.3	44.3	6.9	5.4

Triplet 1:6, 180 cm = 9,5 cm

Linse	n_{λ_g}	$\nu_{\lambda_g} - \nu_{\lambda_B}$	ν
L_1	1.577870	0.01277	57.3
L_2	1.619936	0.01274	16.4
L_3	1.573149	0.01311	57.4

Einzellinse S' | Doppelobjektiv für S'



№ 428

F-75-6388-RE

370

Triplet 1:6, f = 240 cm = 12,6 cm

Einzelobjektiv S' | Doppelobjektiv

Sphärisches Korrection (cdBr) λ_g =

$\Delta s'$			$\Delta f'$			$\Delta s'$			$\Delta f'$		
-10.11	-0.35	+4.20	+0.41	+0.82	+1.09						
-10.11	-1.16	+3.58	+0.40	+1.74	+1.58	-0.44	-0.10	+2.65	-0.63	+0.96	+2.63
						-0.44	-0.10	+2.03	-0.63	+0.49	+0.13

Einfallshöhen | Chromasie

		11.8	12.4	11.6

Astigmatismus (cdg) λ_g

Aequatorialbüschel		Meridionalbüschel		Aequatorialbüschel		Meridionalbüschel	
-0.03	-0.01		0.03	0.14	0.09	0.17		0.18	

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		11.3	7.1	

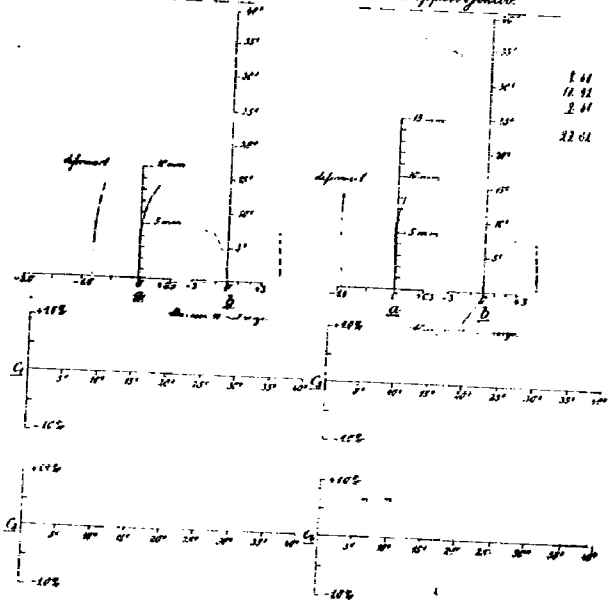
Radien, Dicken und Abstände für $f' = 100$ mm:

r_1	r_2	r_3	r_4	r_5	r_6	d_1	l_1	d_2	l	d_3	l_B	r_7	r_8	r_9
16.6	77.8	24.6	3.	17.8	15.8	0.9	11.5	1.3	4.6	9.0	0.3	3.2	4.7	1.1	1.5	1.1

Triplet 1:6, f = 240 cm = 12,6 cm

Linse	n_{λ_g}	$\nu_{\lambda_g} - \nu_{\lambda_B}$	ν
L_1	1.577870	0.01277	57.3
L_2	1.619936	0.01274	16.4
L_3	1.573149	0.01311	57.4

Einzellinse S' | Doppelobjektiv



F-TS-6389-RE

3771

Triplet 1:4 f. 100 = 10 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Ø17 x.)

Δs'	Δf'	Δs'		Δf'	
		-18	-14	+84	38	-52	+88

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

		893	894	895

-22
(-961)
-69

Astigmatismus (Koma)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel		Meridionalbüschel	
		-59	-54	90	103	142	120

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		1421	1777	7112

Radien, Dicken und Abstände für f' = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
89.7	77.4	169	164	819	679	37	2.9	2.3	3.1	3.9	0.9	9.4

Triplet 1:4 f. 100 = 10 mm

Linse	n_g	$n_g - n_F$	ν
L1 L3	1.51116	0.0083	57.2
L2	1.62590	0.0285	35.7

Einzellinse | Doppelobjektiv

3772

Triplet 1:4 f. 100 = 10 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (LBf1)

Δs'	Δf'	Δs'		Δf'	
2.5	1.8	-1	5.9	4.3	10.4

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel		Meridionalbüschel	
				0.3	-3.9

Frontwinkel | Vorzeichnung | Frontwinkel | Vorzeichnung

		11.0	11.2	-1.1

Radien, Dicken und Abstände für f' = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
19.3	17.3	30.6	29.2	18.2	19.1	4.3	1.1	1.1	1.1	1.7	1.6	10.4

Nr 427

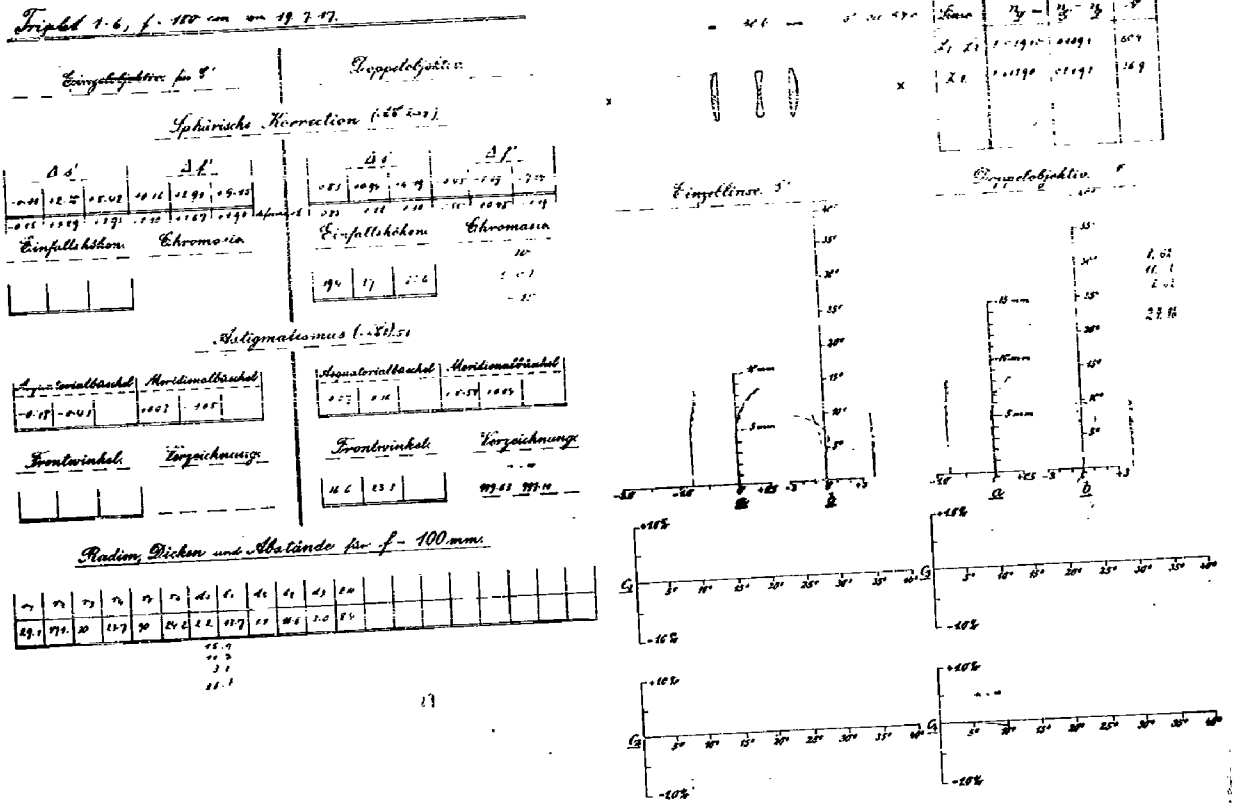
Triplet 1:4 f. 100 mm

Linse	n_g	$n_g - n_F$	ν
L1 L3	1.590	0.0132	61.5
L2	1.62150	0.0207	29.1

Einzellinse | Doppelobjektiv

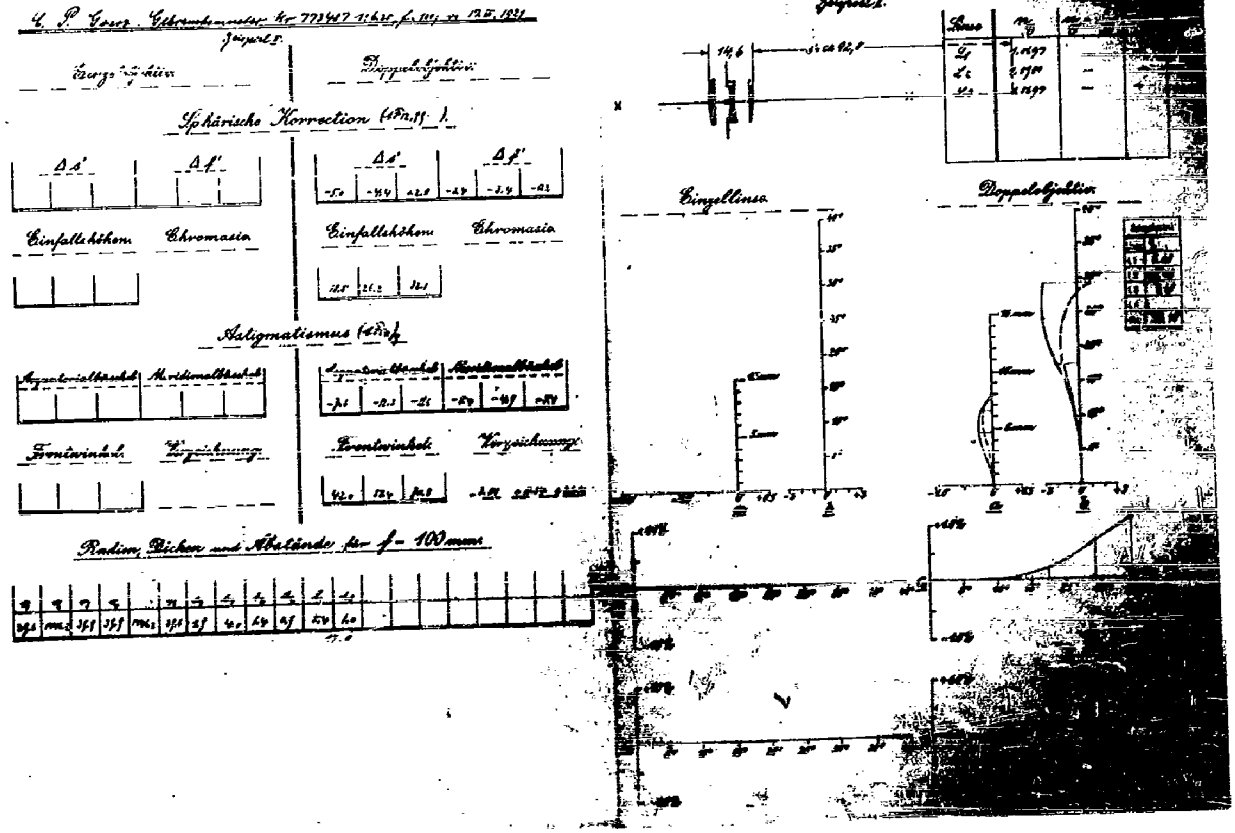
F-TS-6398-RE

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F-TS-6398-RE

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F-75-6378-PE

375

Triplet 1:4.5 f 135 mm [139.5] von Carl Zeiss, Jena

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Triplet 1:4.5 f 135 mm [139.5] von Carl Zeiss, Jena

Linse | d | n | ν

Einzellinse | Doppelobjektiv

F-75-6379-PE

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Triplet 1:4.5 f 135 mm [139.5] mit Sprossblende

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Triplet 1:4.5 f 135 mm [139.5] mit Sprossblende

Linse | d | n | ν

Einzellinse | Doppelobjektiv

F-TS-6398-RE

377

Ernastigmat 1:6.3 f 135 mm Rechn. Nr. 671

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d. Fig. Nr.)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-16 -11,2 +7,0 -0,9 +1,1 -6,1	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		18,7	-0,75	24,

Astigmatismus ( ).

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
		-0,9	-1,0	-2,6	-1,1	+1,1	-1,6

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		+2,1	43,3	45,9	999,67	+0,32	+0,32

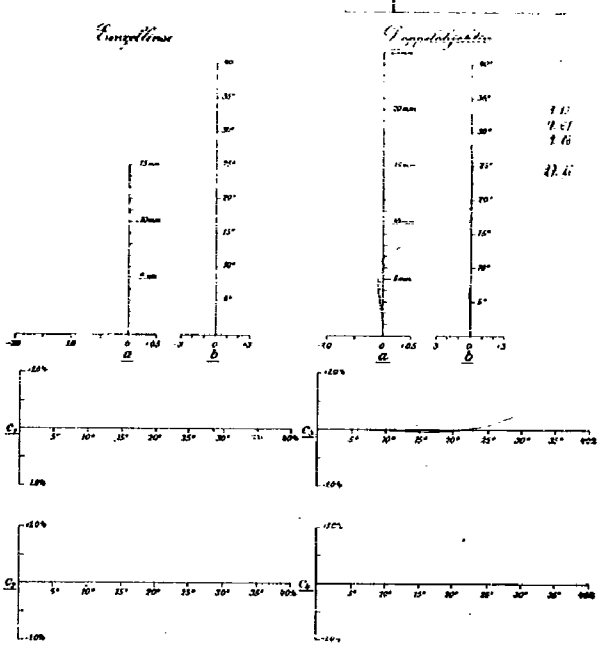
Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
99,9	49,9	-28,0	-44,4	∞	33,9	2,1	6,4	2,2	0,8	23,2	2,4

Linse | $n_{D,d}$ | $n_{F,d}-n_{C,d}$ | ν

Linse	$n_{D,d}$	$n_{F,d}-n_{C,d}$	ν
1	1,5209	0,01333	53,8
2	1,6030	0,01687	38,1
3	1,5191	0,01333	53,6

Einzellinse | Doppelobjektiv



F-TS-6398-RE

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J. G. Farbenindustrie 1:6.3 f = 10 cm

Kam. Bel. Nr. 672 v. 27.12.29

Typus: Einzelobjektiv Nr. 4 | Doppelobjektiv Nr. 4

Sphärische Korrektion (d. Fig. Nr.)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-10,4 -10,3 +7,2 -7,6 -7,4 +9,6	-10,4 -10,3 -7,3 -7,9 -8,3 -10,6

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
18,5	24,7	32,0	18,5	26,7	32,0	-13 +0,9 -7

Astigmatismus ( ).

Einzelobjektiv Äquatorialbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Äquatorialbüschel	Doppelobjektiv Meridionalbüschel
-3,2	-3,7	+0,7	+0,1	+0	-2,6	-3,3	-7,0	+0,5	-0,9	+0,2	-2,0

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		46,0	43,3	42,3	999,96	999,82	+0,16	+2,3	43,7	42,3	999,96	999,82	+0,16

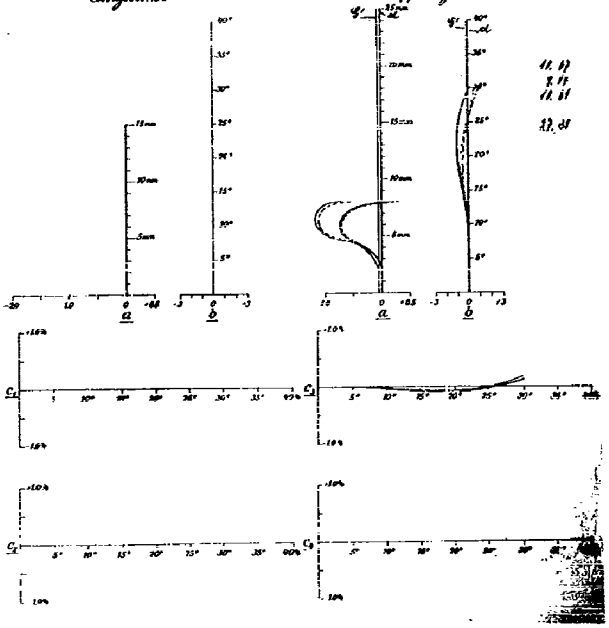
Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
111	∞	71,6	42,3	94,2	17,8	1,9	7,5	1,-	0,5	0,5	2,9

Linse | $n_{D,d}$ | $n_{F,d}-n_{C,d}$ | ν

Linse	$n_{D,d}$	$n_{F,d}-n_{C,d}$	ν
1	1,6772,0	0,01331	56,8
2	1,6[illegible]00	0,01649	37,3
3	1,60880	0,01309	58,7

Einzellinse | Doppelobjektiv



№ 963

F-TS-6318-RE

379

Radenstock, München, P.Ph. Ø 18693/42h 1:6.3, f: 10cm Proba-Nr. 1-42

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1:2,4 u. 4,5)

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus (1:4,5)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r	d	n	ν

Radenstock, München, P.Ph. Ø 18693/42h 1:6.3, f: 10cm Proba-Nr. 1943 k.

Linse	n_d	$n_g - n_d$	ν

Einzellinse | Doppelobjektiv

№ 877

F-TS-6318-RE

380

Radenstock 6/18693/42 1:6.3 f 10 cm v. 23.1.42

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (1:2,4/4,5)

Δs'	Δf'

Einfallshöhen | Chromasie

Astigmatismus (1:4,5/4,5)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r	d	n	ν

Radenstock 6/18693/42 1:6.3 f 10 cm v. 23.1.42

Linse	n_d	$n_g - n_d$	ν

Einzellinse | Doppelobjektiv

F-TS-6388-PF

Achromatischer U. V.-Anastigmat 1:6,3 f: 306 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' und Δf')

Δs'	Δf'

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung

Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6

Achromatischer U. V.-Anastigmat 1:6,3 f: 306 mm

Einzellinse | Doppelobjektiv

F-TS-6389-PF

Quarz-Anastigmat 1:6,3 f: 306,2 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' und Δf')

Δs'	Δf'

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie

Astigmatismus ( )

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Verzeichnung

Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6

Quarz-Anastigmat 1:6,3 f: 306,2 mm

Einzellinse | Doppelobjektiv

F-75-6382-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (Strahl. d. Öffn.)

Δs' | Δf'

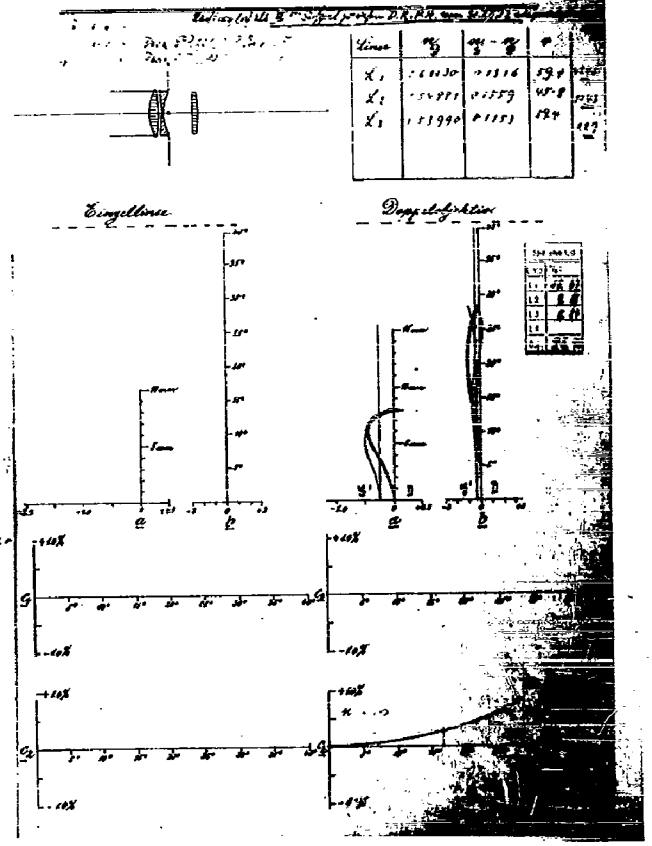
Einfallshöhen | Chromasie

Astigmatismus (Bild):

Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm



F-75-6398-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs' | Δf'

Einfallshöhen | Chromasie

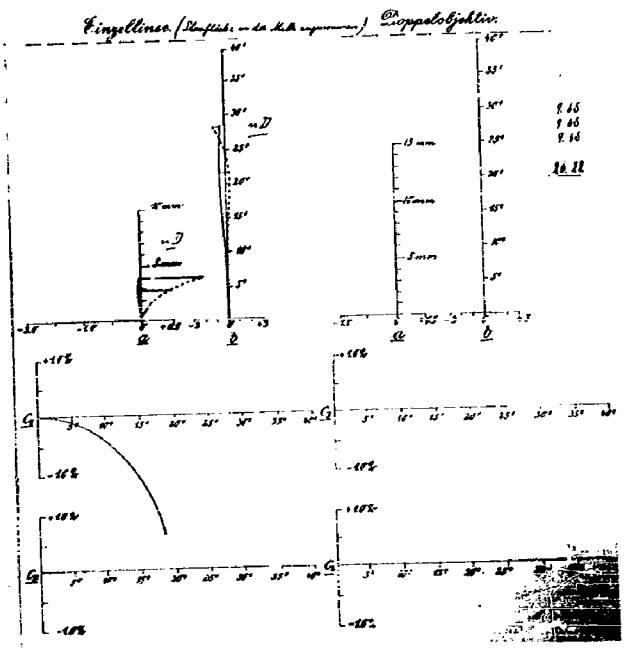
Astigmatismus

Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

Jantz-Quarz-Anastigmat 1:6.3 f = 100



F-75-6378-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (f/4.5)

Δs'	Δf'	Δs'	Δf'

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus ( ).

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r	d	n	ν

Reihe Serrurier: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

Achromatisches N.P. Anastigmat 1:4.1 f = 12 cm

Ausführung

Linse	n_D	$n_g - n_F$	ν

Einzellinse | Doppelobjektiv

a | b | a | b

No. 2 | No. 8

F-75-6379-RE

386

D.R.P. 71961 1:6.3 f = 18 cm (Fa. Schneider, Kreuznach)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f/4.5)

Δs'	Δf'	Δs'	Δf'
		-7.6	-13.0	-16.9	-9.0	-14.8	-24.2

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

18.3	25.9	31.7

Astigmatismus (f/4.5)

Äquatorialbüschel	Meridionalbüschel	Äquatorialbüschel	Meridionalbüschel
		-7.8	-7.-	-8.5	-7.1	-18.5	-45.6

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

39.1	7.2	5.0

Radien, Dicken und Abstände für f = 100 mm:

R	r	s	n	r	s			d	d	d	d	d	d
45.-	145.1	7.6	1.-	42.6	13.9			1.5					

D.R.P. 71961 1:6.3 f = 18 cm (Fa. Schneider, Kreuznach)

Linse	n_D	$n_g - n_F$	ν
L_1	1.613		
L_2	1.589		
L_3	1.619		

Einzellinse | Doppelobjektiv

a | b | a | b

F-TS-6316-RE

387

Taylor - Cook - Lense F = 2.9, f = 3.918

Doppel
Einzelobjektiv für S'

Doppelobjektiv für S'

Sphärische Konstanten (8" II) λ = 0.589

Δs'			Δf'		
-1.9	-1.1	+1.9	-3.1	-2.1	+1.9

Δs'			Δf'		
-2.1	-0.7	-1.4	-2.1	+0.7	-1.4

Einfallshöhen | Chromasie

11.3	11.9	11.1

Einfallshöhen | Chromasie

11.3	11.9	11.1

g'(Ag 35/3)

Astigmatismus (8" 1.5330 s)

Meridionalfehler			Meridionalfehler		
+1.6	-0.1	-1.1	+1.5	-1.1	+0.4

Äquatorialfehler			Meridionalfehler		
-0.3	-0.4	+0.7	+1.1	-1.1	-0.1

Winkel | Verzeichnung

Frontwinkel | Verzeichnung

5°	7'	8"

Radien, Dicken und Abstände für f = 100 mm

r₁	r₂	r₃	r₄	r₅	d₁	d₂	d₃	d₄	d₅	d₆
+28.9	16	35	74.3	66.6	3.5	1.0	1.3	7.2	3.5	1.1

auf f = 100 reduziert

f	φ	f	φ
+28.9	0.079	23.8	0.0420
-18.4	0.058	-18.8	0.0531
+48	0.147	41.7	0.0239

Gesamtbrennpunkt
f = 151.2

Taylor - Cook - Lense F = 2.9, f = 3.918

Linse	n_D	n_F - n_C	ν
K₂	1.5163	0.0085	64.1
F₂	1.6200	0.0177	36.4
K₁	1.5163	0.0085	64.1

Einzellinse | Doppelobjektiv

F-TS-6316-RE

Linse | n_D | n_F - n_C | ν

Einzellinse | Doppelobjektiv

№ 325

F-75-6398-RE

389

Triplet 1:6,3, f = 115 cm × 28,9 25 (und Spiegelglas)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (δf' 26/35 / δf' 50/75)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (δf') 24/30 / δf' 50/75

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_d | ν_d | n_F − n_C | ν

Einzellinse | Doppelobjektiv

L II, L III, L IV

28,86

379

№ 424

F-75-6398-RE

390

Triplet 1:6,3, f = 110 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (δf' 24/30)

Δs' | Δf'

Einfallshöhen | Chromasie

Astigmatismus (δf' 24/30)

Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Triplet 1:6,3, f = 110 cm

Linse | n_d | ν_d | n_F − n_C | ν

L1 | 1,51 000 | 0,01 001 | 64,0

L2 | 1,62 040 | 0,01 651 | 36,2

L3 | 1,51 940 | 0,01 300 | 64,0

Einzellinse | Doppelobjektiv

L III, L II, L I

28,11

№ 2218

F-TS-6398-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( ).

Einfallsblenden | Chromasie

Astigmatismus ( ).

Tangentialbüschel | Meridionalbüschel | Frontwinkel | Vignettierung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_d | $n_F - n_C$ | ν

Einzellinse | Doppelobjektiv

391

№ 2218

F-TS-6398-RE

392

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection ( ).

Einfallsblenden | Chromasie

Astigmatismus ( ).

Tangentialbüschel | Meridionalbüschel | Frontwinkel | Vignettierung

Radien, Dicken und Abstände für f = 100 mm

Linse | n_d | $n_F - n_C$ | ν

Einzellinse | Doppelobjektiv

392

F-TS-6378-RE

396

Triplet 1:6,3 110 cm v. 23.9.36

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (ΔBLw)

Δs'			Δf'		
-2.5	-2.6	-1.6	-1.9	-2.5	-1.5
-1.8	-2.2	-1.2	-1.8	-2.3	-1.2

Einfallshöhen | Chromasie

s'			Δs'			Δf'		
	-1.4	-2.6	-0.2	-1.4	-2.7	-0.3
	-1.2	-1.0	+0.5	-1.2	-1.1	+0.7

Einfallshöhen | Chromasie

18.1	25.9	32.8

s' - s
-1.4
(+1.2)
-0.2

s' - s'
-2.6
(+1.4)
-1.2

Astigmatismus (Ast)Lw

Äquatorialbrechkr.	Meridionalbrechkr.

s'	Äquatorialbrechkr.		Meridionalbrechkr.			
	-0.05	-0.25	-0.29	+0.05	+0.11	+0.17

Frontwinkel | Vorzeichnung

Frontwinkel	Vorzeichnung

Frontwinkel		
7.9	11.2	13.7

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	n
38.5	74.8	17.2	156	80.1	17.3	0.4	11.9	3.3	0.8	14.7	2.4	1.6

Triplet 1:6,3 110 cm v. 23.9.36

Linse	n_D	$n_F - n_C$	ν
L_1	1.51614	0.01014	64.2
L_2	1.62042	0.02267	36.3
L_3	1.56940	0.01200	60.0

Einzellinse | Doppelobjektiv

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Taylor-Cook-Kinoteil 1:6,3 f. 100 35

Triplet
Einzelobjektiv für 8' | Doppelobjektiv für 8'

Sphärische Korrection (ΔBLw)

Δs'			Δf'		
-6.3	-2.6	+11.4	-6.6	-3.7	+11.4
-10.5	-11.6	+1.5	-10.5	-11.7	+1.1

Einfallshöhen | Chromasie

18.5	26.3	32.8

Einfallshöhen | Chromasie s' - 8'

18.5	26.3	32.8

Astigmatismus (ΔBLw)

Äquatorialbrechkr.	Meridionalbrechkr.

Äquatorialbrechkr.			Meridionalbrechkr.		
-5.1	-8.5	-8.1	-7.3	-3.8	-3.1

Vorzeichnung

Frontwinkel

9.8	17.5	25

Vorzeichnung

Radien und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	n
3.0	17	1.0	2.7	2.3	0.7							

Auf f = 100 reduziert

f	φ
23.3	0.0492
14.3	0.0609
44.4	0.0221

Taylor-Cook-Kinoteil 1:6,3 f. 100 35 v. 26.7.39

Linse	n_D	$n_F - n_C$	ν
K_1	1.5163		59.6
K_2	1.6288		39.6
K_3	1.5186		59.5

Einzellinse | Doppelobjektiv für 8'

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Taylor-Cook-Linse f:6,3, f. 152 c

Doppel-Einzelobjektiv für 5°

Doppelobjektiv für 9°

Sphärische Korrection (B II f. 46 + 47)

Δs'		Δf'		s'ₘ - s'ₙ	Δs'		Δf'		s'ₘ - s'ₙ
-1.1	+1.1	+7.9	-0.9	+1.5	-1.9	-1.8	-1.1	-2.9	-1.9	+1

Einfallshöhen	Ebenmasse	Einfallshöhen	Ebenmasse δ'
18.9	19.5	15.6	10.3 / 10.6 / 10.9

(Ag 39/100)

Astigmatismus (δ'ssa, m)

Aequatorialbüschel		Meridionalbüschel			Aequatorialbüschel		Meridionalbüschel		
-8.9	-7.8	+8.9	-7.9	-5.2	-2.57	-1.1	-0.3	+0.3	-0.8	-0.11

Frontwinkel	Bezeichnung	Frontwinkel	Bezeichnung
		50 / 78 / 87	-10.1 - 14.0 - 36.1 / -9.5 - 13.9 - 9.16 / 7.8 + 9.1 + 14.7

Radien, Dicken und Abstände für f = 100 mm

r₁	r₂	r₃	r₄	r₅	r₆	d₁	d₂	d₃	d₄	d₅	d₆
22.9	90	17.9	17.9	29	19.1	3.5	0.1	1.3	2.4	1.9	0.9

bei f = 100 reduziert

	f	f'	f	f'	
d₁	+3.3	+0.861	25.2	0.0396	
d₂	-30.5	+0.119	-20.0	0.0500	
d₃	+69.9	+0.155	46.0	0.0217	

Gesamtbrennweite f = 152.0

Taylor-Cook-Linse f:6,3 f. 152 c m. Fl. f

Linse	n_g	n_g - n_F	n
d			
d₂			
d₃			

Doppelobjektiv Einzellinse

Einzellinse

Doppelobjektiv

12.91 / 11.19 / 12.49 / 39.18

a b a b

+10% -10%

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Einzelobjektive

Doppelobjektive

Sphärische Korrection

Δs'	Δf'	Δs'	Δf'

Einfallshöhen	Ebenmasse	Einfallshöhen	Ebenmasse

Astigmatismus

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Bezeichnung	Frontwinkel	Bezeichnung

Radien, Dicken und Abstände für f = 100 mm

r₁	r₂	r₃	r₄	r₅	r₆	d₁	d₂	d₃	d₄	d₅
1.00	0.23	0.73	0.73	0.32	0.24	0.1	0.1	0.1	0.1	0.1

Einzellinse

Doppelobjektive

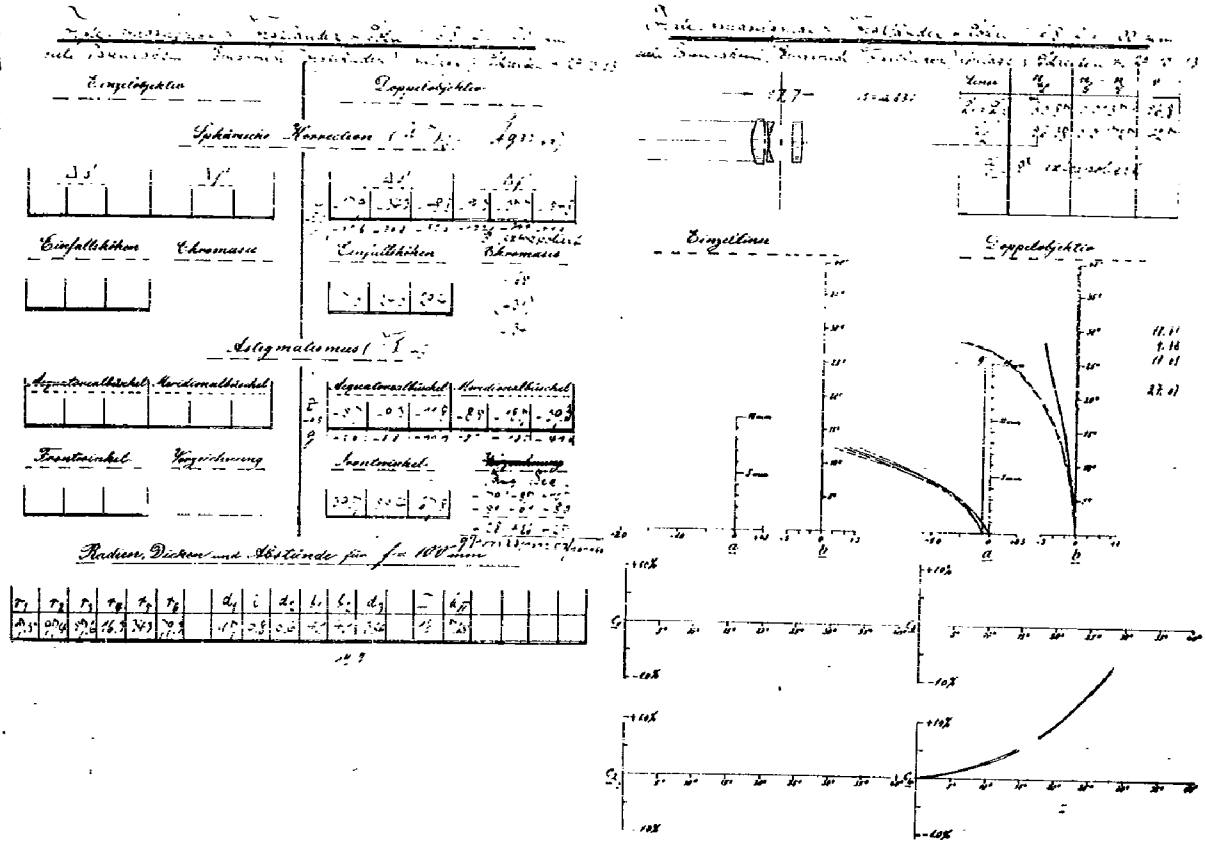
12.61 / 2.19 / 12.61 / 27.11

a b

+10% -10%

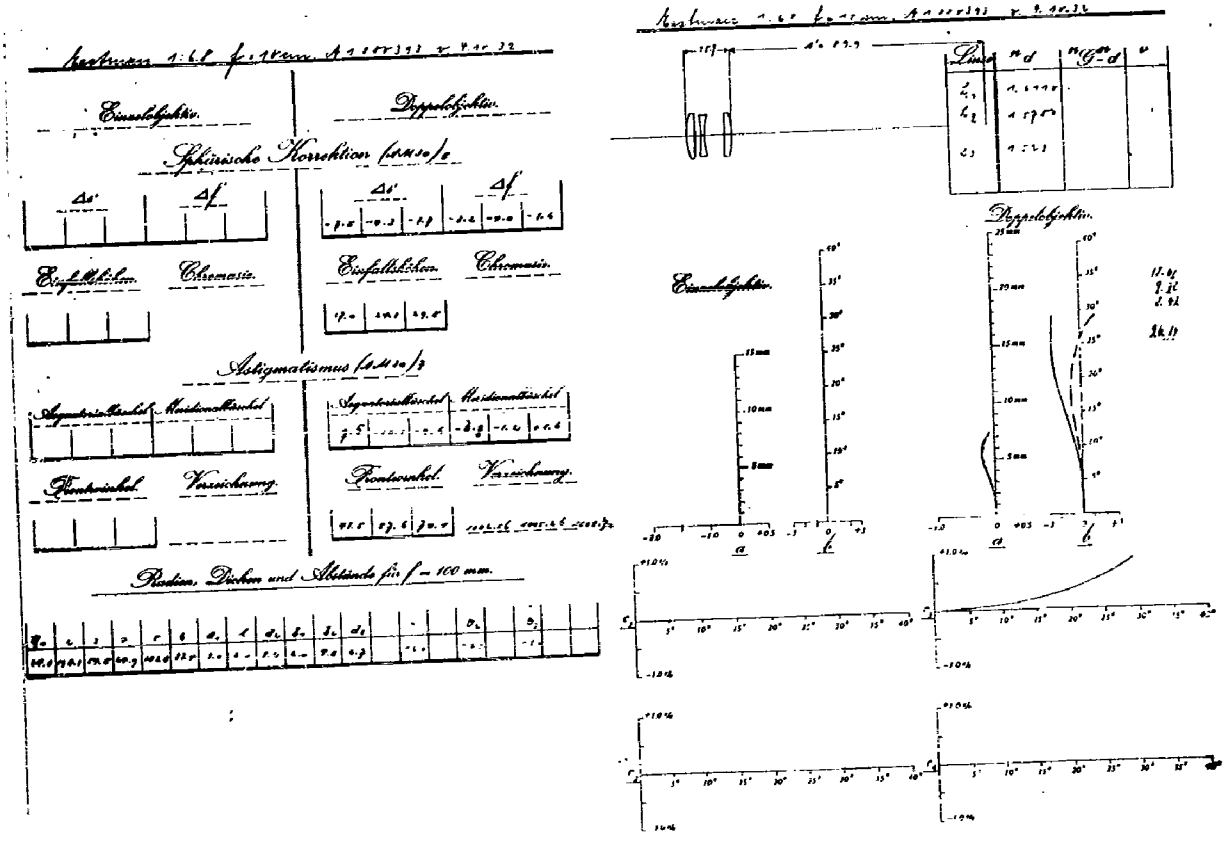
F-TS-6398-RE

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F-TS-6398-RE

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F-73-6398-RE

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V. 1912 IV, 1:6.8 f=93 mm vom 10.5.12

Einzelobjektiv | Doppelobjektiv

Sphärische Aberration (Öffnung 1:4.0 ... 1:6.8)

Δs' | Δf'

Einfallshöhen | Ebenmaass

Astigmatismus (= δ_23)

Tangentialbild | Sagittalbild

Verzeichnung

Koma und Abstände für f = 100 mm

	δA	l	δ2	l1	l2	δ1

V. 1912 IV, 1:6.8 f=93 mm vom 10.5.12

Linse	n_D	n_F − n_C	ν

Einzellinse | Doppelobjektiv

n = ∞

F-73-6398-RE

400

Goerz-Dagor-Anastigmat 1:6.8 f = 6 in.

Taylor, Taylor & Hobson No. 28867

Einzelobjektiv | Doppelobjektiv

Sphärische Aberration (Öffnung 1:4.5 ... 1:6.8)

Δs' | Δf'

Einfallshöhen | Ebenmaass

f = 5.28 cm

Astigmatismus

Verzeichnung

Koma und Abstände für f = 100 mm

	r1	d1	l1	l2	d2	C	d3	D1	D2	D3	D4

Goerz-Dagor-Anastigmat 1:6.8 f = 6 in.

Taylor, Taylor & Hobson Ltd. No. 28867, Graflex-Doppel-Anastigmat 1912

Linse	n_D	n_F − n_C	ν

Einzellinse | Doppelobjektiv

n = ∞

F-TS-6318-RE

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H. P. Taylor D.R.P. 41709, II. Beispiel Fig. 5

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (f. 55)

Δs'	Δf'	Δs'	Δf'
		-2.2	0	+10.2	-2.5	-0.8	-11

Einfallshöhen — Chromasie

Einfallshöhen	Chromasie
15.0	21.2	26.1	-19.5 (-9) -7.6

Astigmatismus (f. 55)

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel			Meridionalbüschel		
-3.2	-7.6	0	-1.6	+4.5	+10.5

Frontenwinkel — Vergeichnung

Frontenwinkel	Vergeichnung Tang. Bed.
74.7	78.6	79.0	-22 -22 -22

Empfang — Sonne

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
44.6	101	15.4	13.3	101.2	69.8	2.0	0.14	0.5	4.4	7.6	4.8

	l	φ
l1	+ 81.04	ω 49.1
l2	- 19.19	ω 51.8
l3	+ 116.79	ω 9.4

Gesamtbrennweite f. 100.81

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H. P. Taylor D.R.P. 41709, II. Beispiel Fig. 5

Einzellinse — Doppelobjektiv

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H. P. Taylor D.R.P. 41709, II. Beispiel, Fig. 3

Einzelobjektiv — Doppelobjektiv für ∞

Sphärische Korrektion (f. 100)

Δs'	Δf'	Δs'	Δf'
		-19.5	-13.0	-4.3	20.5	5.1	51.5

Einfallshöhen — Chromasie

Einfallshöhen	Chromasie
17.1	21.1	31.8	-12.9 (+9) -11.9

Astigmatismus (f. 100)

Aequatorialbüschel	Meridionalbüschel

Aequatorialbüschel			Meridionalbüschel		
-3.7	-5.9	-3.3	2.1	4.1	+7.0

Frontenwinkel — Vergeichnung

Frontenwinkel	Vergeichnung
69.5	70.2	70.6	

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
47.4	99.5	14.4	0.9	36.2	77.4	4.1	0.15	0.7	2.0	6.2	4.7

	l	φ
l1	+ 81.89	ω 49.1
l2	- 19.19	ω 51.8
l3	+ 116.79	ω 9.4

Gesamtbrennweite f. 100.81

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H. P. Taylor D.R.P. 41709, II. Beispiel, Fig. 3

Einzellinse — Doppelobjektiv

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Fig 3

Einzellinse

Doppellinse

Sphärische Korrektion (S.K.)

Einzellinse: Δs' | Δf' | Einfallshöhen | Chromasie

Doppellinse: Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (A.)

Einzellinse: Äquatorialbüschel | Meridionalbüschel | Frontenneigung | Kugelbezeichnung

Doppellinse: Äquatorialbüschel | Meridionalbüschel | Frontenneigung | Kugelbezeichnung

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	d_1	l	d_2	L_1	L_2	d_3
94	125	178	48	344	66	4.3	1.6	0.9	2.0	0.5	3.0

	f	φ
L_1	131.94	+0.758
L_2	−13.94	+0.718
L_3	89.75	+0.111

Brandbrunnweid f. 101.03

H. 142

Fig 4

Einzellinse

Doppelobjektiv

Fig 5

F-TS-6396-RE

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Fig 5

Einzellinse

Doppellinse

Sphärische Korrektion (S.K.)

Einzellinse: Δs' | Δf' | Einfallshöhen | Chromasie

Doppellinse: Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (A.)

Einzellinse: Äquatorialbüschel | Meridionalbüschel | Frontenneigung | Kugelbezeichnung

Doppellinse: Äquatorialbüschel | Meridionalbüschel | Frontenneigung | Kugelbezeichnung

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	d_1	l	d_2	L_1	L_2	d_3
94	62.3	36.1	8.6	194	132	1.9	2.2	0.3	3.9	0.9	2.2

	f	φ
L_1	91.94	+0.0877
L_2	−19.52	+0.0512
L_3	187.79	+0.0533

Sessa-Gemmweiler

Fig 6

Einzellinse

Doppellinse

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H. & J. Taylor E. P. 339[illegible] f. 100

Einzellinse | Doppellinse

Sphärische Korrection (0 III) 1.56

Δs' | Δf' | Δs' | Δf'

-7.5 | -11.4 | -13.8 | -3.1 | -13.4 | -16.4

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

-115 (-31) -116

Astigmatismus (0 III) 19

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

+5.2 | +9.2 | +18.7 | 16.6 | +16.9 | -36.3

Krümmung | Verzeichnung | Kontrast in % | Verzeichnung

+24.1 +27.1 +28.3

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
149	64	39.2	20.8	16.6	16.6	2.7	0.5	0.5	5.1	6.3	1.9

f1 = 23.69 0.04219

f2 = -21.73 0.04602

f3 = 19.95 0.05013

f = 63 0.01587

ff 0.06316

123. 0.08113

Neuanmeldung 197 cl

auf [illegible]

H. & J. Taylor E. P. 339[illegible] f. 100

Linse | n_g | $n_g - n_F$ | ν

1.51[illegible] | 0.01[illegible] | 56.7

1.51[illegible] | 0.01[illegible] | 55.6

1.65[illegible] | [illegible]

Einzellinse | Doppellinse

11.41 | 2.11 | 4.11 | 22.13

a | b | a | b

+10% | -10% | +10% | -10% | +10% | -10% | +10% | -10%

405

Nr 187

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H. & J. Taylor n. E. P. 169977 Fig. 3

Einzellinse | Doppellinse

Sphärische Korrection (R II) 32 links

Δs' | Δf' | Δs' | Δf'

-24.4 | -34.6 | -47.3 | -28.3 | 43.1 | 107

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

11.8 | 16.7 | 20.5

Astigmatismus (R II) 17 links

Sagittalwinkel | Meridionalwinkel | Sagittalwinkel | Meridionalwinkel

+13.0 | +19.0 | -19.3 | +17.4 | +16.1 | -14.9

Kontrastwinkel | Verzeichnung | Kontrastwinkel | Verzeichnung

40.0 | 17.4 | 6.9 | +32 + 31 +31

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
64.3	39.2	20.8	16.6	16.6	2.7	0.5	0.5	5.1	6.3	1.9

f1 = 23.69 0.04219

f2 = -21.73 0.04602

f3 = 19.95 0.05013

f = 63 0.01587

ff 0.06316

123. 0.08113

Neuanmeldung 197 cl

auf [illegible]

H. & J. Taylor n. E. P. 169977 Fig. 3

Linse | n_g | $n_g - n_F$ | ν

1.61[illegible] | 0.01[illegible] | 55.[illegible]

1.76[illegible] | 0.01[illegible]

1.61[illegible]

Einzellinse | Doppellinse

11.47 | 2.66 | 4.76 | 22.31

a | b | a | b

+10% | -10% | +10% | -10% | +10% | -10% | +10% | -10%

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H. D. Taylor E.P. 7661/26 1 Beispiel

Eingelobjektiv — Doppelobjektiv

Sphärische Konnektion (RT) in

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (RT) in

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r	n	d	f	φ
L1			95.47	0.0193
L2			-64.17	0.0414
L3			113.74	0.0588

Summe brennweite 99.94

H. D. Taylor E.P. 7661/26 1 Beispiel

Zeichnung | Zeile | n_y | $n_y - n_z$ | n

Eingellinse — Doppelobjektiv

a — b

11.61 | 8.71 | 11.61 | 22.95

G_1 ±10% | G_2 ±10%

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H. D. Taylor E.P. 7661/26 1 Beispiel

Eingelobjektiv — Doppelobjektiv des Gl.

Sphärische Konnektion (RT) in

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (RT) in

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

r	n	d	f	φ
L1			64.85	0.1402
L2			-33.36	0.2989
L3			104.07	0.0961

Summe brennweite 109.18

H. D. Taylor E.P. 7661/26 1 Beispiel

Zeichnung | Zeile | n_y | $n_y - n_z$ | n

Eingellinse — Doppelobjektiv

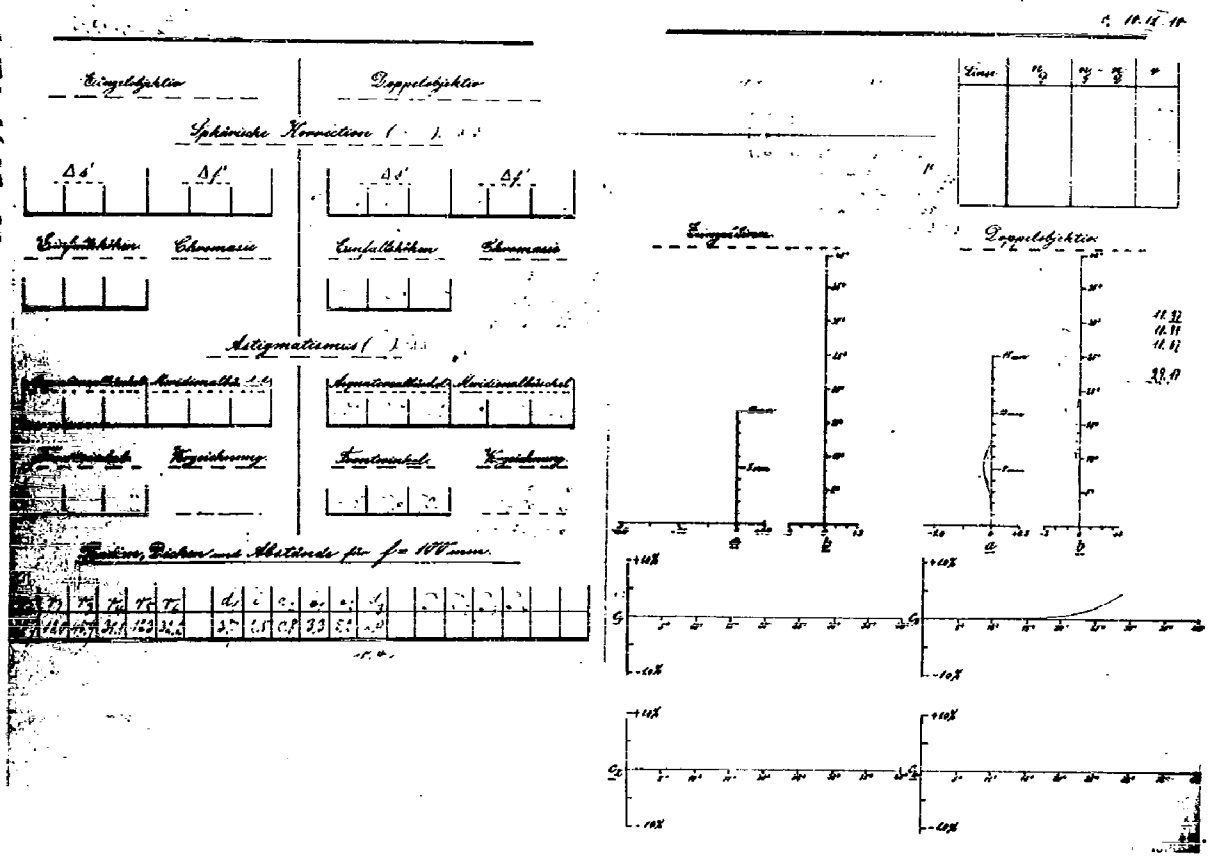
a — b

11.61 | 8.71 | 11.61 | 22.95

G_1 ±10% | G_2 ±10%

F-TS-6398-RE

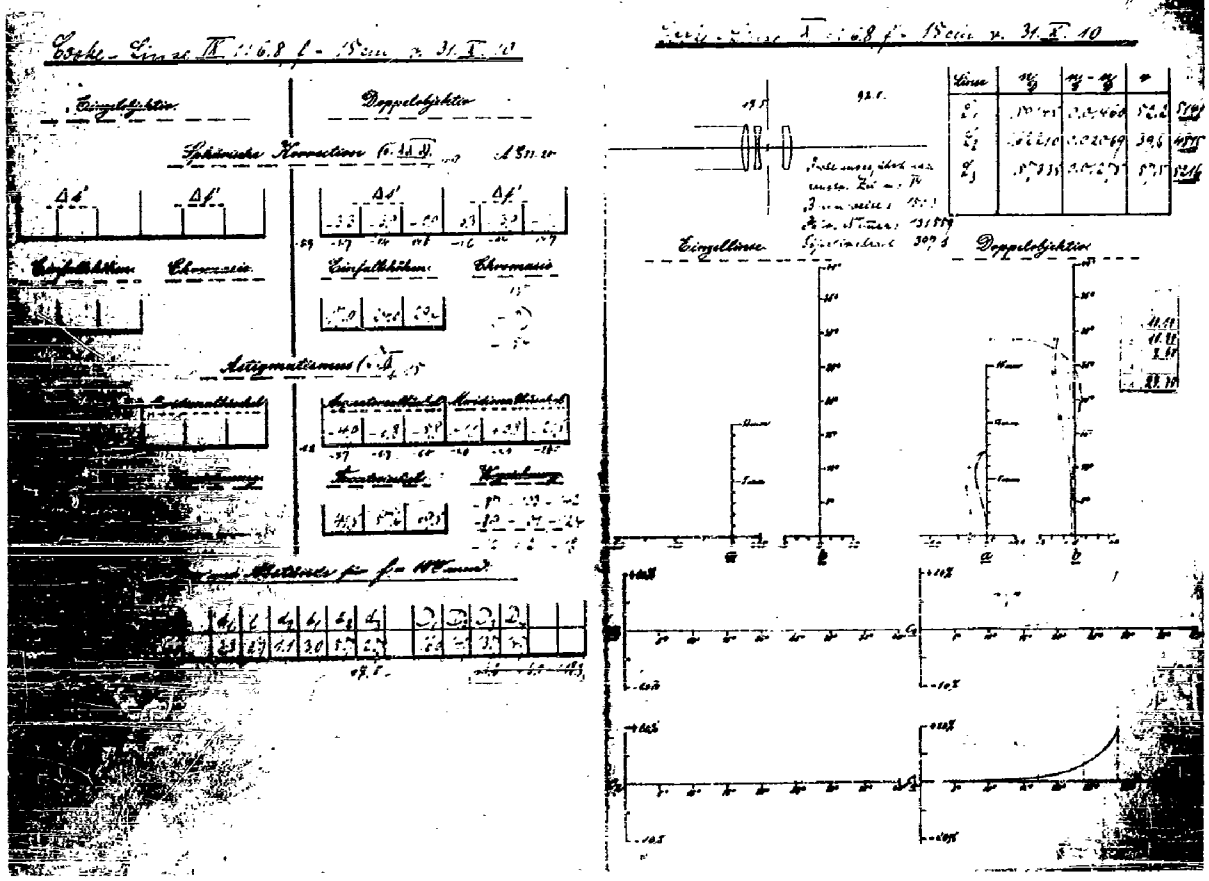
409



409

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№ 227

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrection

Δs' | Δf' | Δs' | Δf'

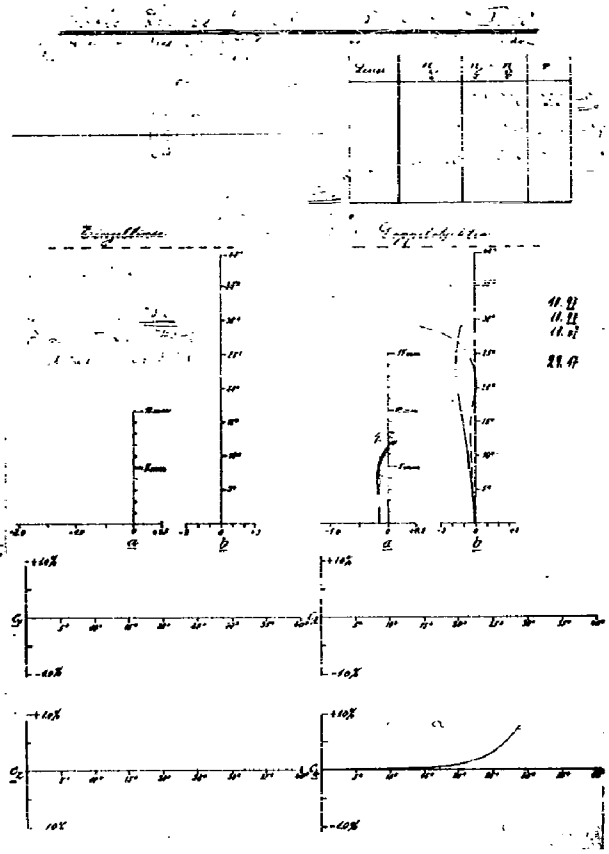
Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Astigmatismus

Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

Frontwinkel | Kegelöffnung | Frontwinkel | Kegelöffnung

Radien, Dicken und Abstände für f = 100 mm



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№ 308

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Zeiss Tessar und Hobson 1:7, f. 146 mm. Nr. 32272
(Gewicht 1:6.5, 5% incl.) (II. 11)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (III.11)

Δs' | Δf' | Δs' | Δf'

-2.4 | 4.3 | +1.6 | -5.2 | 6.4 | -0.4

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

16.6 | 13.5 | 19.7

Astigmatismus (III.11)

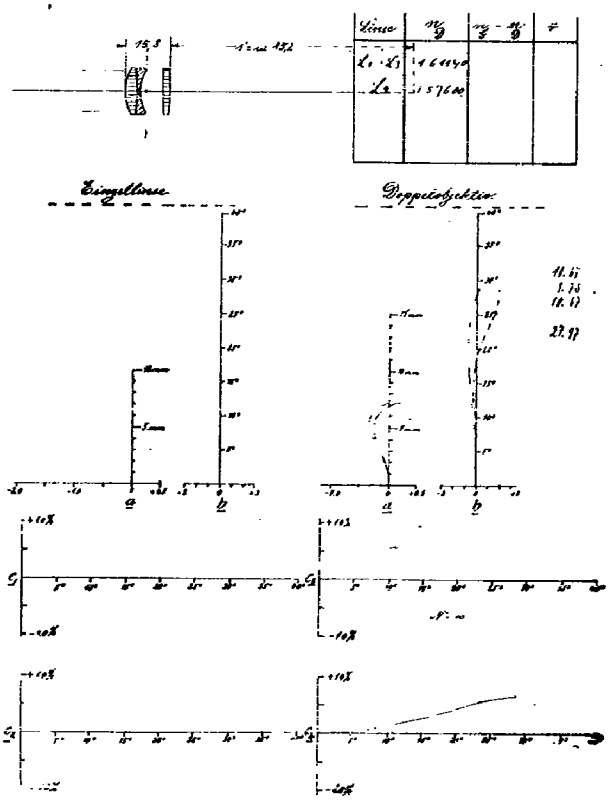
Aequatorialbüschel | Meridionalbüschel | Aequatorialbüschel | Meridionalbüschel

-2.4 | -1.4 | +0.8 | +0.8 | +4.3 | +0.8

Frontwinkel | Kegelöffnung | Frontwinkel | Kegelöffnung

40.4 | 16.6 | 49.0 | -7.9 - 8.6 - 10.2 / -6.8 - 9.1 - 10.5

Radien, Dicken und Abstände für f = 100 mm



412

№ 3114

F-75-6398-RE

413

Einzellinse | Doppelobjektiv

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

№ 393

F-75-6398-RE

414

Einzellinse | Doppelobjektiv

Sphärische Korrection

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm

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Sonderobjektive für M.G.-Kamera C/10 1:7,5 f. 9cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (s. Zeichnung)

Δs'	Δf'

Einfallshöhen	Chromasie

Δs'	Δf'
-1.7	-11.4	-0.2	-3.5	-0.3	-1.3

Einfallshöhen	Chromasie
11.0	11.7	11.6	(-3.0) -0.1

Astigmatismus (s. Zeichnung)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung

Äquatorialbüschel	Meridionalbüschel
-2.0	-1.5	-0.4	+0.3

Frontwinkel	Vorzeichnung
11.0	11.5	22.5 22.0 23.5

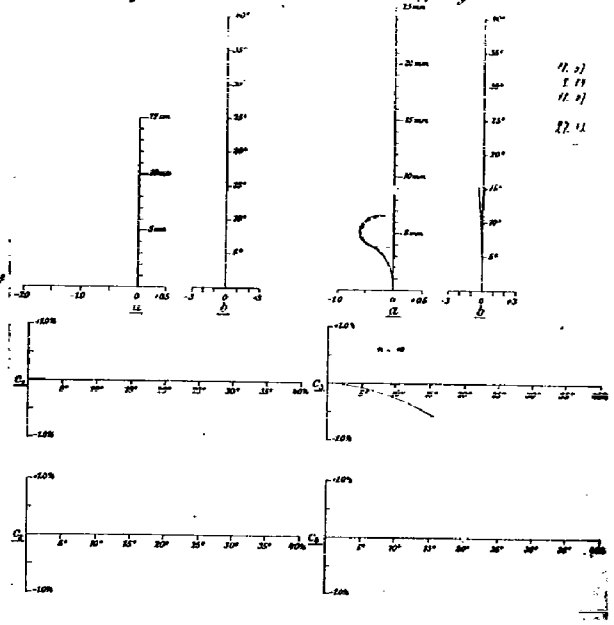
Radien, Dicken und Abstände für f = 100 mm:

	1	2	3	4	5	d_1	d_2	d_3	d_4	d'
f=1	∞	-23.3	57.0	-114.0	40.0	1.8	0.2	1.0	0.6	1.9

Sonderobjektive für M.G. Kamera C/10 1:7,5, f. 9cm

Linse | n_d | ν_d | r

Einzellinse | Doppelobjektiv



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Taylor, Taylor & Hobson. Englisches Patent No. 17737 vom 22.7.35

f = 100, 1:2.2

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (s. Zeichnung)

Δs'	Δf'

Einfallshöhen	Chromasie

	Δs'			Δf'	
F	-2.1	-1.0	+3.4	-2.2	-1.3	+2.8
G	-0.8	+1.3	+2.6	-0.5	+2.2	+2.5

Einfallshöhen	Chromasie
11.0	11.2	11.0

Astigmatismus (s. Zeichnung)

Äquatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung

	Äquatorialbüschel		Meridionalbüschel	
F	-4.0	-4.1	-1.1	-1.1	-1.0	-3.3
G	-2.5	-1.2	-0.7	-0.5	-1.3	-1.3

Frontwinkel	Vorzeichnung
44.5	44.2	44.0

Radien, Dicken und Abstände für f = 100 mm:

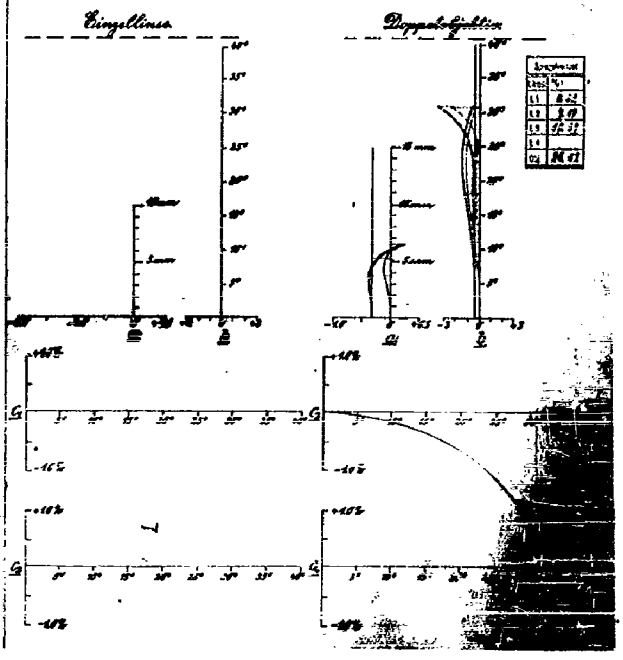
	1	2	3	4	5	d_1	d_2	d_3	d_4	d'

Taylor, Taylor & Hobson, englisches Patent No. [illegible]

f = 100, 1:2.2

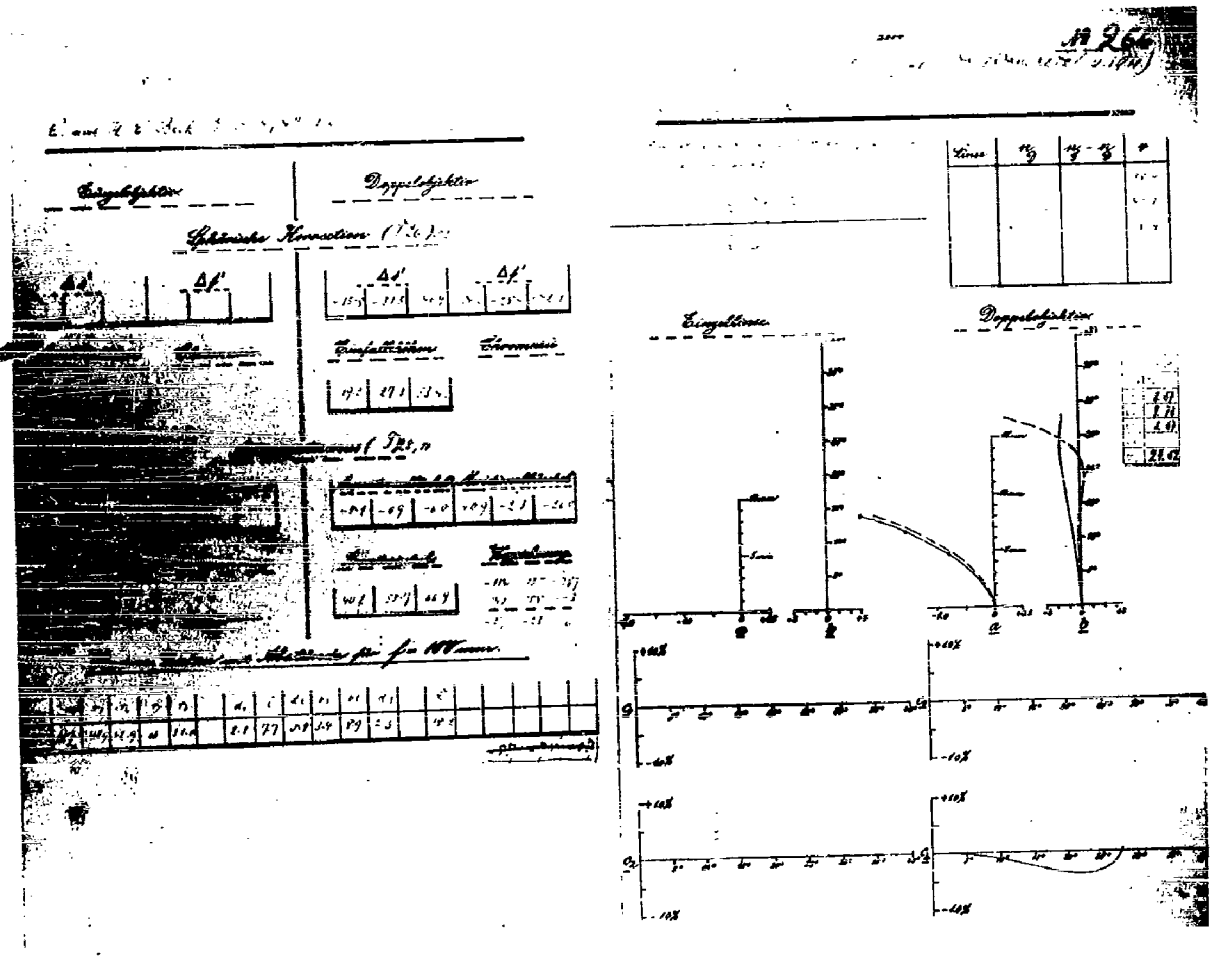
Linse | n_d | ν_d | r

Einzellinse | Doppelobjektiv



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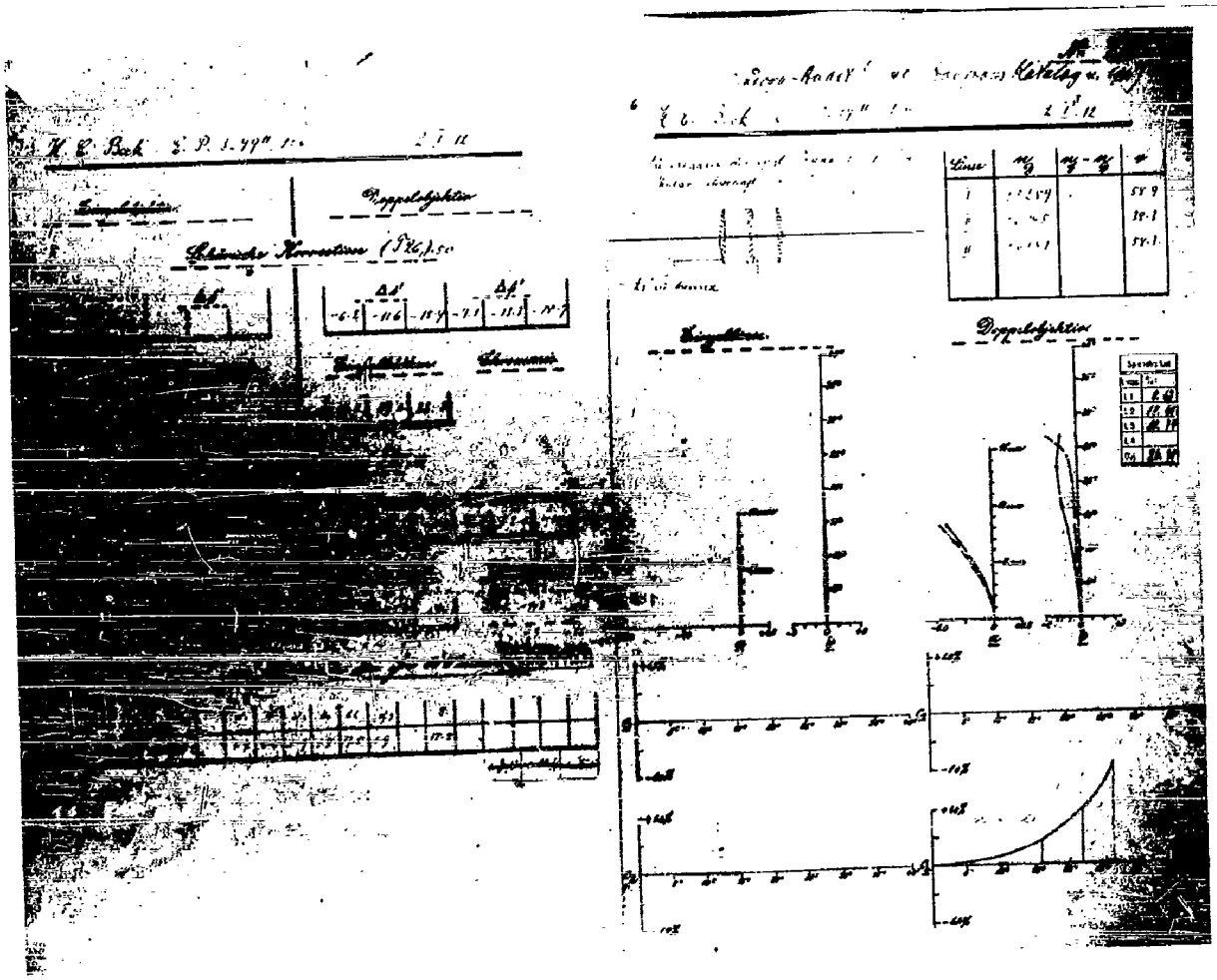
417



417

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F-TS-6388-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δ l' – l' ...)

Einzelobjektiv			Doppelobjektiv		
Δ o'	Δ l'		Δ o'	Δ l'	
Einfallshöhen	Chromasie		Einfallshöhen	Chromasie	

Astigmatismus (l' Sa')

Äquatorialbüschel	Meridionalbüschel		Äquatorialbüschel	Meridionalbüschel	
Frontwinkel	Verzeichnung		Frontwinkel	Verzeichnung	

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

Linse | n_g | $n_g - n_g$ | ν

F-TS-6388-RE

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Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (l' Sa' ...)

Einzelobjektiv			Doppelobjektiv		
Δ l'	Δ l'		Δ l'	Δ l'	
Einfallshöhen	Chromasie		Einfallshöhen	Chromasie	

Astigmatismus (l' Sa' ...)

Äquatorialbüschel	Meridionalbüschel		Äquatorialbüschel	Meridionalbüschel	
Frontwinkel	Verzeichnung		Frontwinkel	Verzeichnung	

Radien, Dicken und Abstände für f = 100 mm

Einzellinse | Doppelobjektiv

Linse | n_g | $n_g - n_g$ | ν

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Heliar 1:7,9 f=135 mm (Reichsheim 1926/56)

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d, F, e, d')

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (F, e)

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	n, ν
28,5	199,8	130,5	35,3	199,8	15,8	2,8	1,8	4,3	2,0	12,3	11,3	11,1

Heliar 1:7,9 f=135 mm (Reichsheim 1926/56)

Linse	n_d	$n_d - n_f$	ν
1	1,51118	0,01133	59,1
2	1,61659	0,01131	44,1
3	1,51118	0,01126	59,1

Einzellinse | Doppelobjektiv

f' 135,1
f 135,0
f' 135,1

421

A 830

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422

Taschmann 1:8, f=100 mm v. 7.2.28 U.S.A. Pat. 1.665.965

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (d, F, e, d')

Δs' | Δf' | Einfallshöhen | Chromasie

Astigmatismus (d, F, e, d')

Äquatorialbüschel | Meridionalbüschel | Frontwinkel | Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	n, ν
28,9	199,8	130,5	35,3	199,8	15,8	2,8	1,8	4,3	2,0	12,3	11,3	11,1

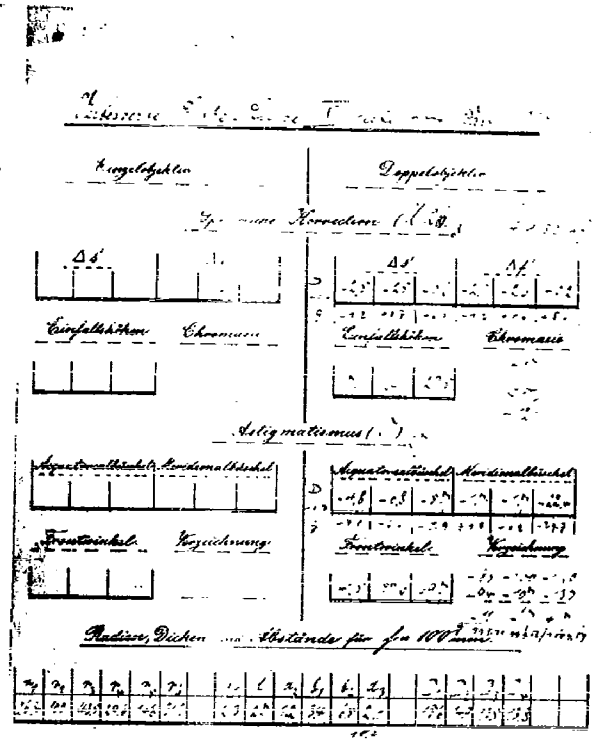
Taschmann 1:8, f 100 mm v. 7.2.28 U.S.A. Pat. 1.665.965

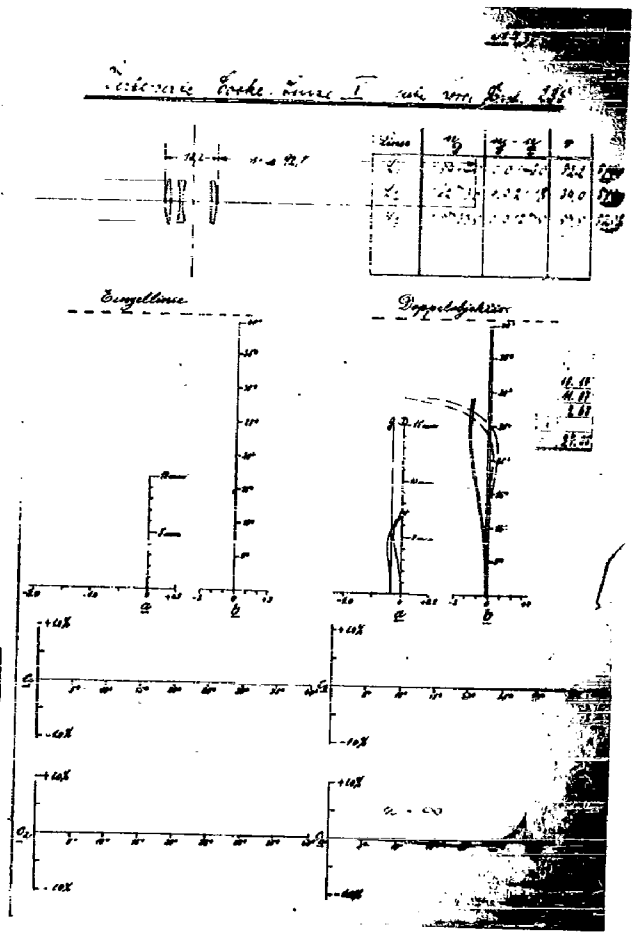
Linse	n_d	$n_d - n_f$	ν
1	1,51118	0,01133	59,1
2	1,61659	0,01131	44,1
3	1,51118	0,01126	59,1

Einzellinse | Doppelobjektiv

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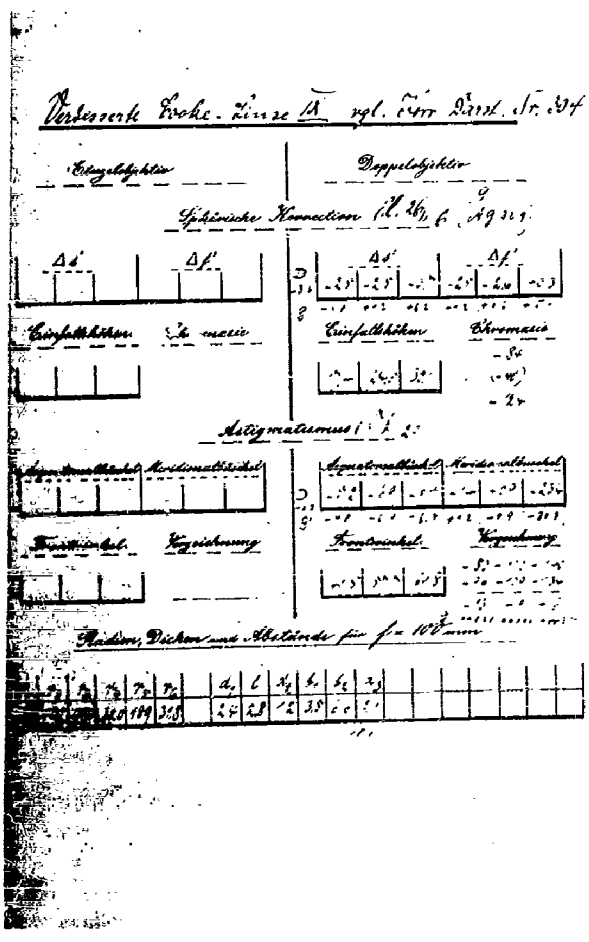
423

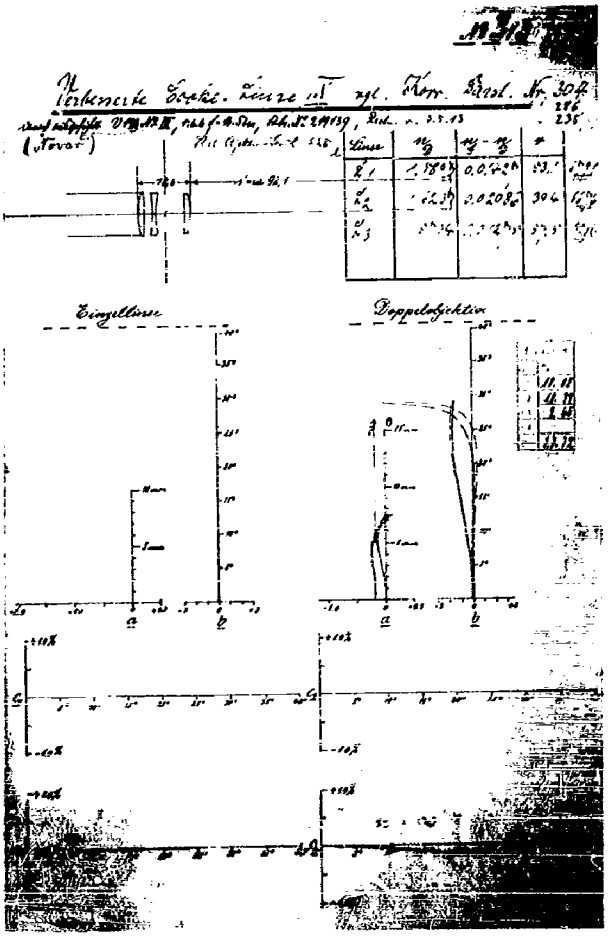




F-TS-6398-RE

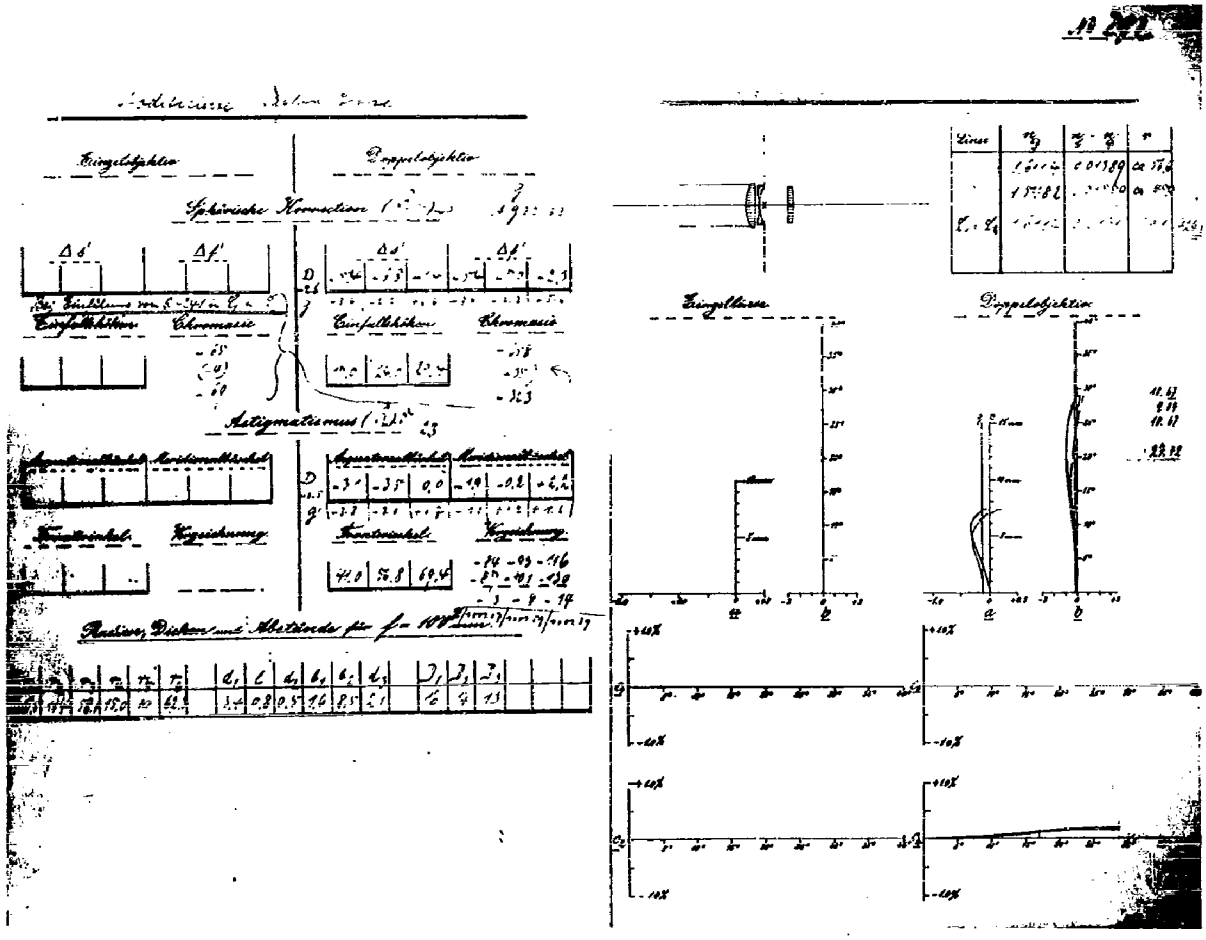
424





F-TS-6392-RE

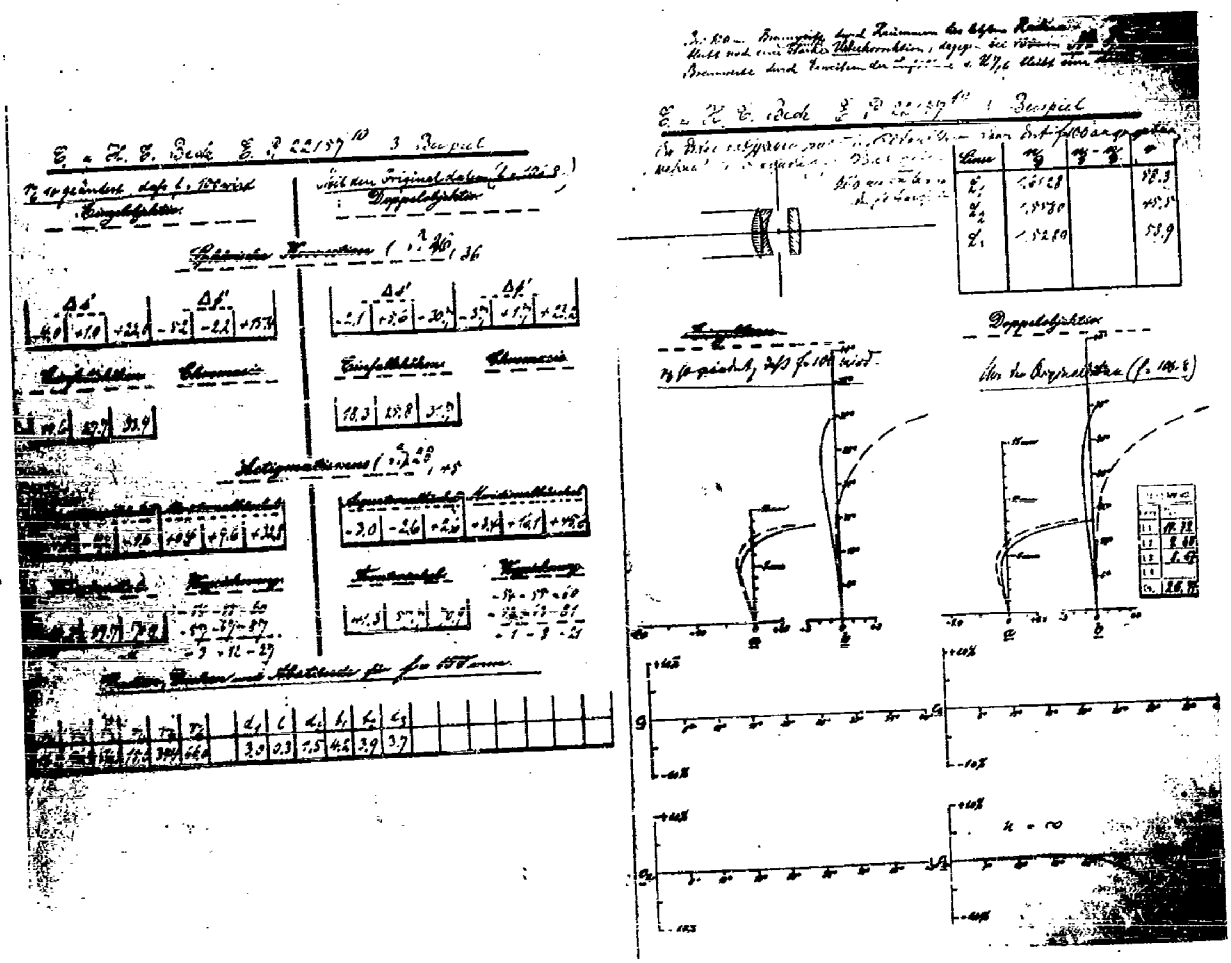
425



425

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F-TS-6398-RE

Triplet 1:5 f = 23 cm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (λ 578 µ)

Δs'	Δf	Δs	Δf'

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie

Astigmatismus (λ 578 µ)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm:

Triplet 1:5 f = 23 cm

Einzellinse. | Doppelobjektiv.

Linse | n_D | $n_F - n_C$ | ν

L_1			
L_2			
L_3			

Einzellinse. | Doppelobjektiv.

a | b

F-TS-6398-RE

Triplet 1:5.3 f = 200 mm 1.5.19

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (λ 578 µ)

Δs'	Δf'

Δs	Δf'
+7.7	+9.0 -0.3 -2.9 -3.5 -1.8

Einfallshöhen	Chromasie

Einfallshöhen	Chromasie
10.0 19.6 24.1	-.105 (-.11)

Astigmatismus (λ 486 µ) -.90

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-0.14 -1.4 -0.44 -1.54 +2.40 +0.80	

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		15.7 16.0 43.4	1003.71 1002.30 1000.91

Radien, Dicken und Abstände für f = 100 mm:

Triplet 1:5.3 f = 200 mm 1.5.19

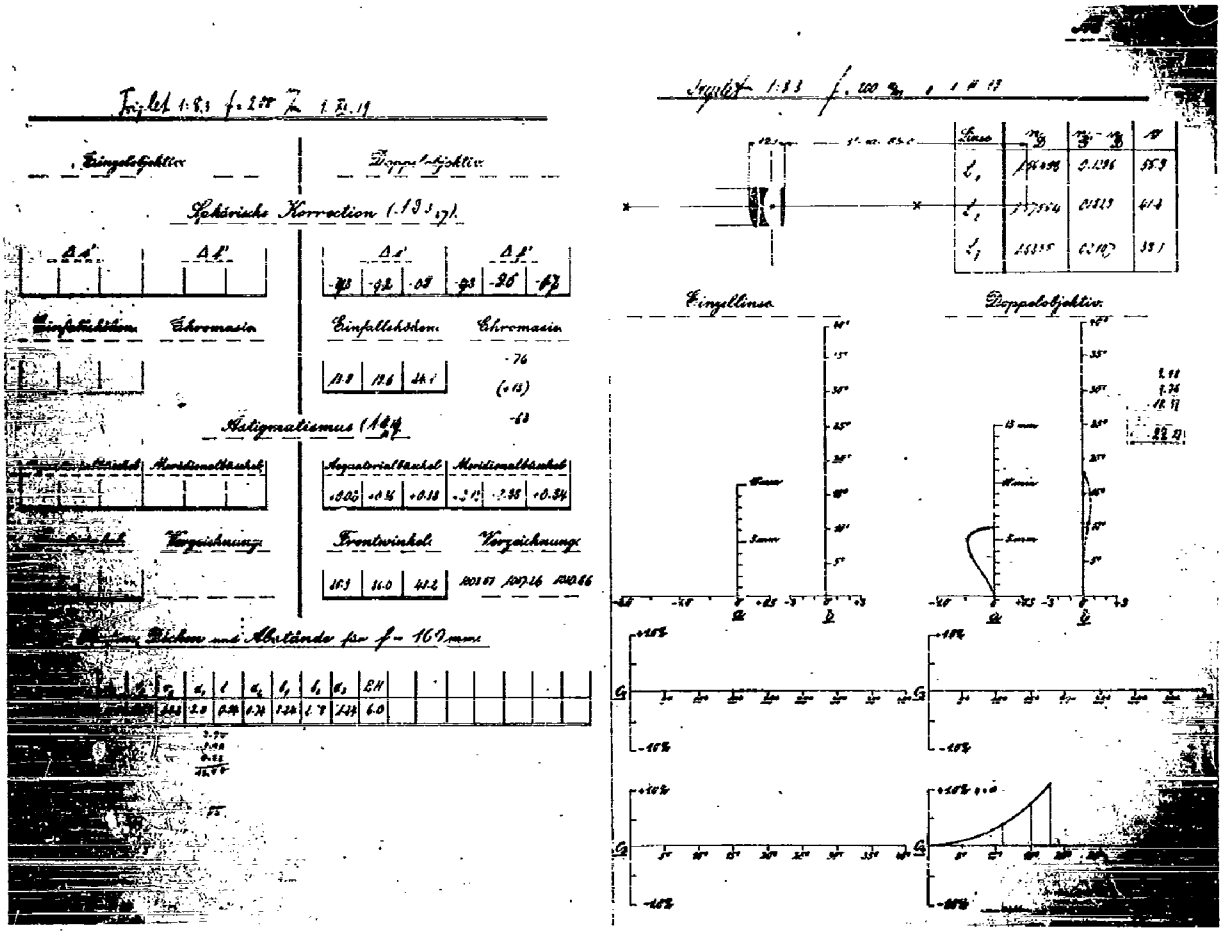
Linse	n_D	$n_F - n_C$	ν
L_1	1.66458	0.1296	55.9
L_2	1.67554	0.1819	41.0
L_3	1.6031	0.1155	58.3

Einzellinse. | Doppelobjektiv.

a | b

F-TS-6398-RE

429

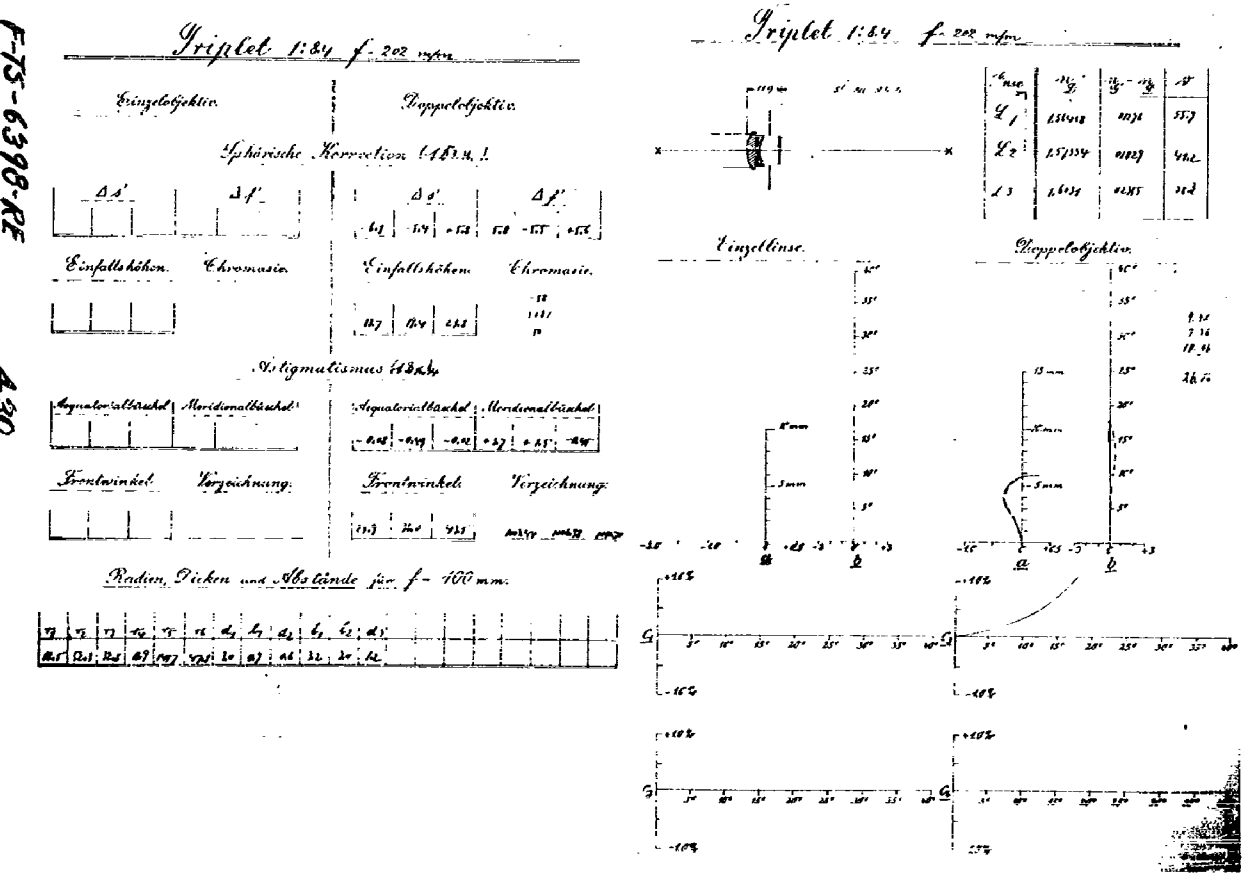


429

№ 532

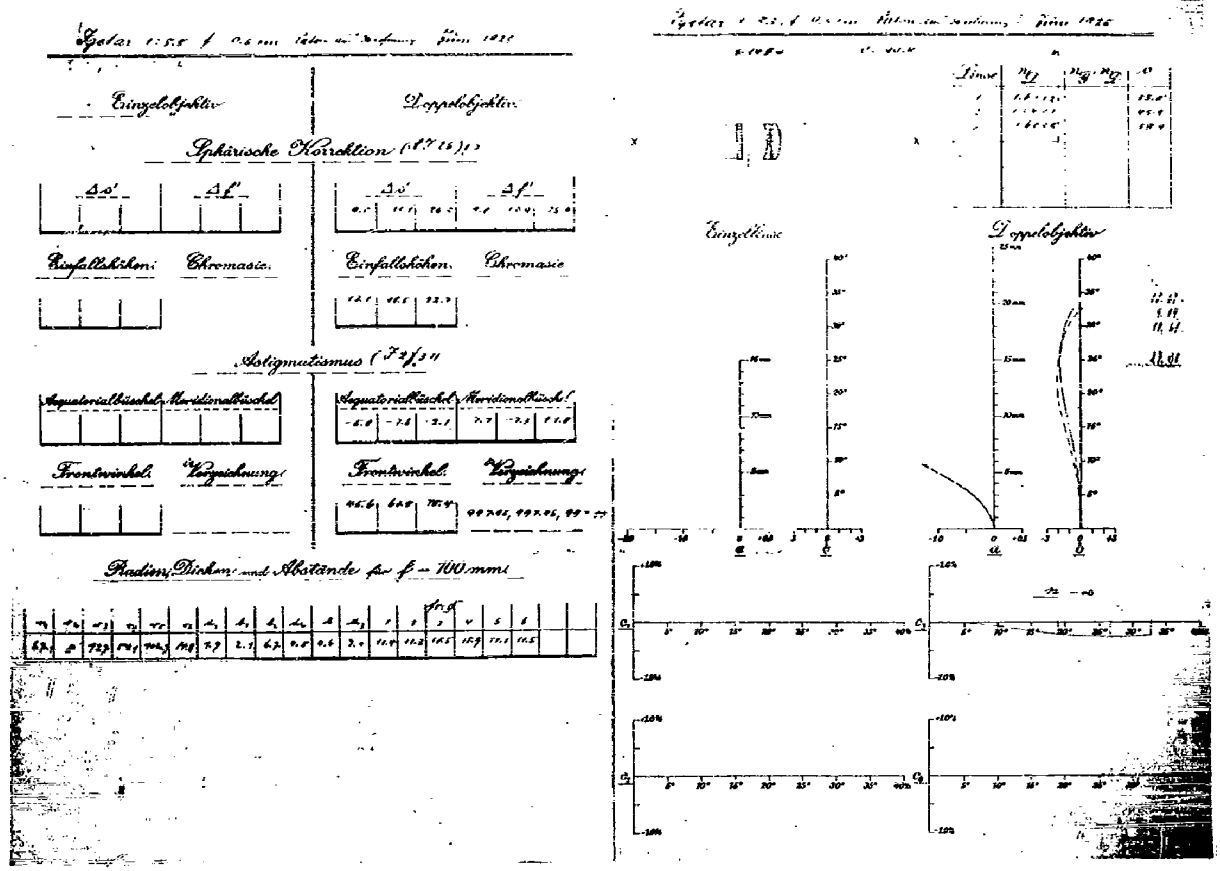
F-TS-6398-RE

430



F-TS-6398-RE

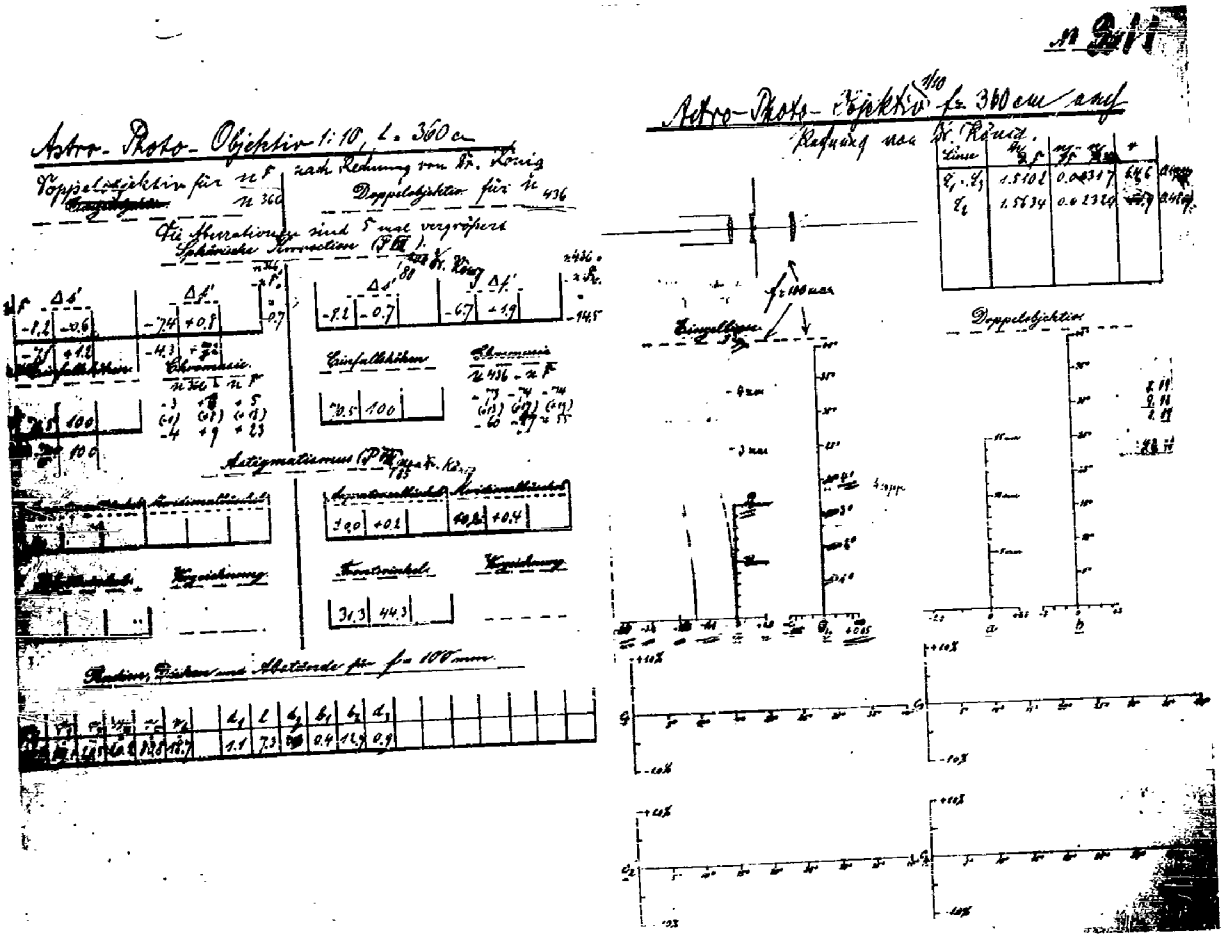
431



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№420

F.75-6318-RE

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Triplet 1:2.5 f 40 cm vom 1.5.17

Einzelobjektiv | Doppelobjektiv

Sphärische Korrection (f/2.8)

Δs'	Δf'	Δs'	Δf'
		15	16

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		14	133

Astigmatismus (f/2.8)

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		05	14

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		137	177

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	f
93.5	413.	53.0	11.7	619.	65.8	0.5	0.3	0.9	0.9	3.3	0.1	100

n_d 1.5 / 1.6 / 1.7 / 1.9

Einzellinse | Doppelobjektiv

a b

+10% 0 -10%

4.33

№1105

F.75-6318-RE

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Triplet 1:1.5 f 70 mm

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion f/2.8

Δs'	Δf'	Δs'	Δf'
		-0.1	-0.3

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		7.7	10.0

Astigmatismus f/2.8

Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel	Meridionalbüschel
		-0.7	-0.2

Frontwinkel	Vorzeichnung	Frontwinkel	Vorzeichnung
		9.5	43

Radien, Dicken und Abstände für f = 70 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6	f
63.36	9.6	33.8	11.2	17.1		3.2	1.0	2.2	1.2	1.1	0.5	70

Triplet 1:1.5 f 70 mm

Linse	n_d	ν_d
L1	1.51680	64.2
L2	1.62041	60.3
L3	1.51680	64.2

Einzelobjektiv | Doppelobjektiv

a b

+10% 0 -10%

4.34

4.3.d

F-T5-6398-R5

435

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion

Δs'

Δf'

Einfallshöhen

Chromasie

Astigmatismus

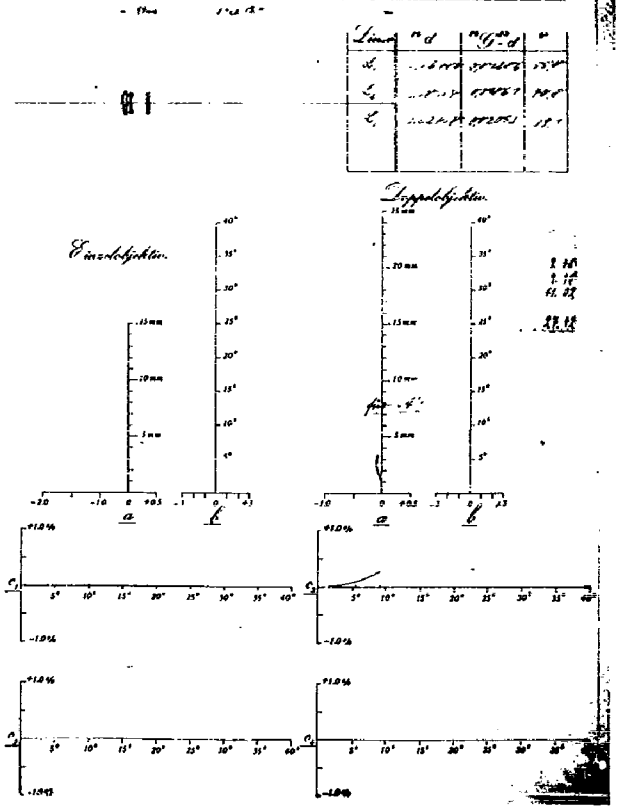
Tangentialwinkel

Meridionalwinkel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



F-T5-6398-R5

436

Doppelobjektiv

Einzelobjektiv

Sphärische Korrektion

Δs'

Δf'

Einfallshöhen

Chromasie

Astigmatismus

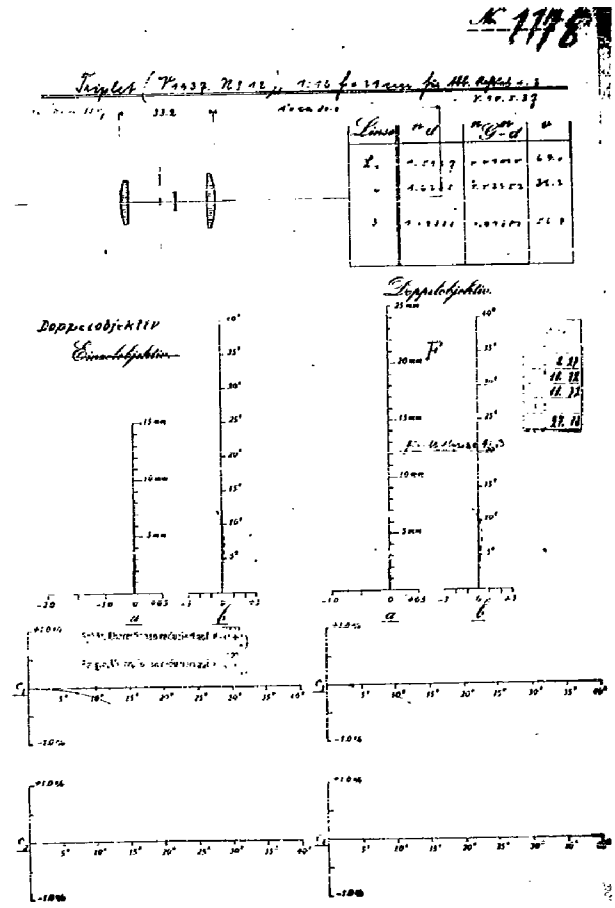
Tangentialwinkel

Meridionalwinkel

Frontwinkel

Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.



F-75-6398-RE

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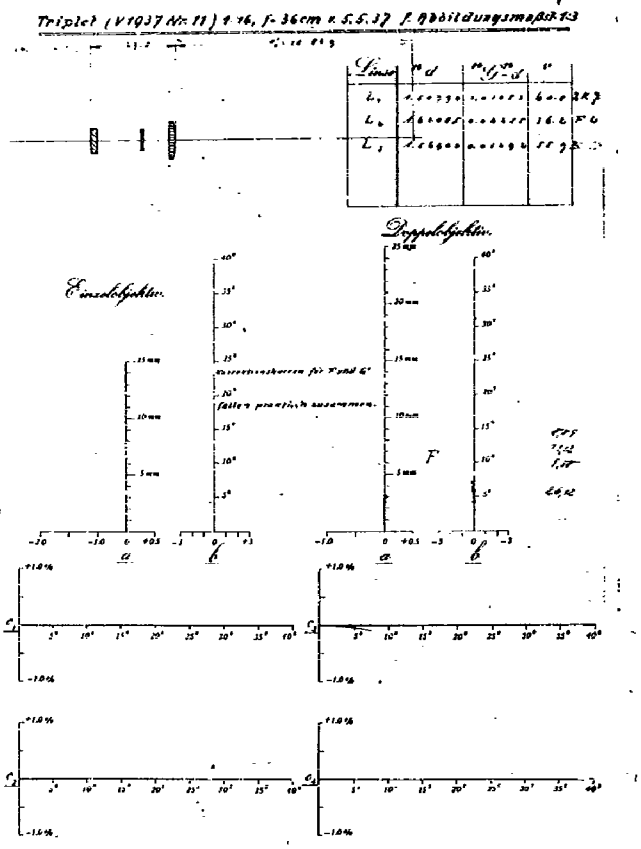
Triplet (V 1937 Nr. 11) 1:6, f=36cm

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



F-75-6398-RE

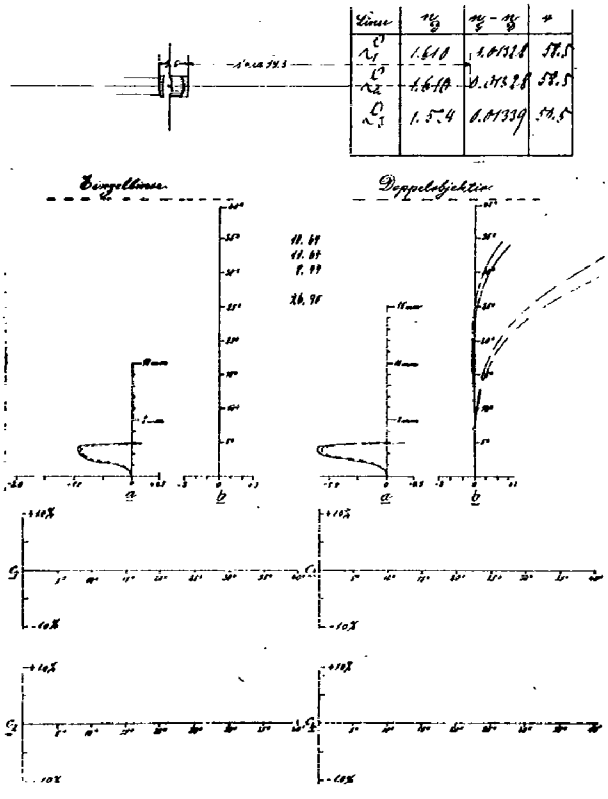
438

Doppelobjektiv für 111.91

Sphärische Korrektion (R 1000 n. 42)

Astigmatismus

Radien, Dicken und Abstände für f = 100 mm



№916

F-T3-6389-RE

439

Triplet f: 90 f': 142.5 mm v: 24.9.37

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion (Δs' = f(Δs))

Δs' | Δf' | Δs' | Δf'

Einfallshöhen | Chromasien | Einfallshöhen | Chromasien

Astigmatismus ( ).

Äquatorialbüschel | Meridionalbüschel | Äquatorialbüschel | Meridionalbüschel

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm:

r1	r2	r3	r4	r5	r6	d1	d2	d3	d4	d5	d6
323	94	512	52.1	8.9	44.8	0.25	4.4	0.15	0.86	11.84	0.2

Triplet f: 90 f': 142.5 mm v: 24.9.37

Objektquerschnitt

Linse			
1	+0.99744	0.00977	65.2
2	-0.9993	0.01203	84.6
3	+0.99944	0.00951	65.2

Einzellinse | Doppelobjektiv

a | b | a | b

C1 | C2 | C1 | C2

F-75-6390-RE

1324

Jos. Schneider: 4:5; f = 10cm; D Sch 108 156; v. 4.10.35

Einspruch bis 13.6.47

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion ($\frac{\text{FWH}}{35}$).

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'		Doppelobjektiv. Δf'	
		-4.7	-0.8	+73.7	-3.0	+0.6	+74.3

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		23.0	32.6	40.0	

Astigmatismus ($\frac{\text{FWH}}{45}$).

Einzelobjektiv. Sagittenastwinkel	Einzelobjektiv. Meridionalastwinkel	Doppelobjektiv. Sagittenastwinkel		Doppelobjektiv. Meridionalastwinkel			
		-2.0	-4.0	-7.3	40.8	-0.4	+2.4	+3.8	+4.4

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel				Doppelobjektiv. Vorzeichnung			
		36.5	52.8	64.5	72.8	99%	99	1.75	94.3	83	9/16

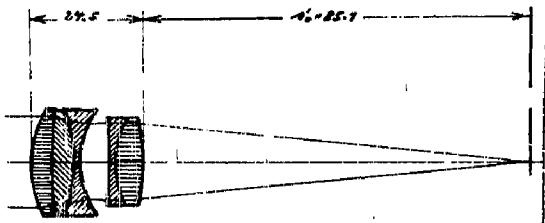
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	d_3	d_4	d_5	d_6	s'_0
23.6	+15.2	37.4	19.4	∞	38.8	45.5	4.4	0.9	1.5	4.6	1.6	1.5	6.0	85.7

No. 1407

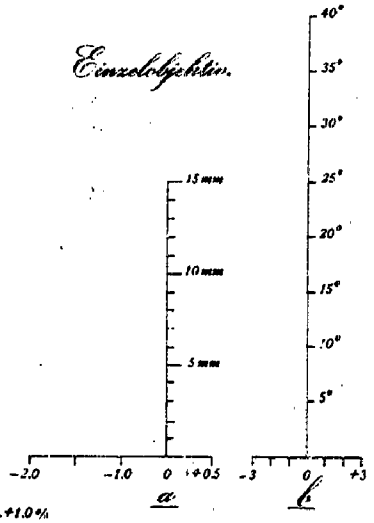
Jos. Schneider: 4:5; f = 10cm; D Sch 108 156 v. 4.10.35

Einspruch bis 13.6.47

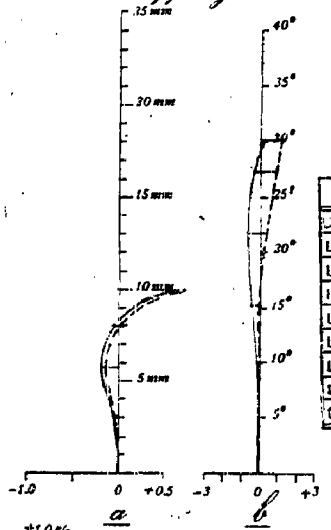


Linse	n_d	$\nu_{G'-d}$	r'
L_1	1.67+71		50.8
L_2	1.49593		7a.a
L_3	1.64055		47.a
L_4	1.59043		aa.7
L_5	1.67+71		50.8

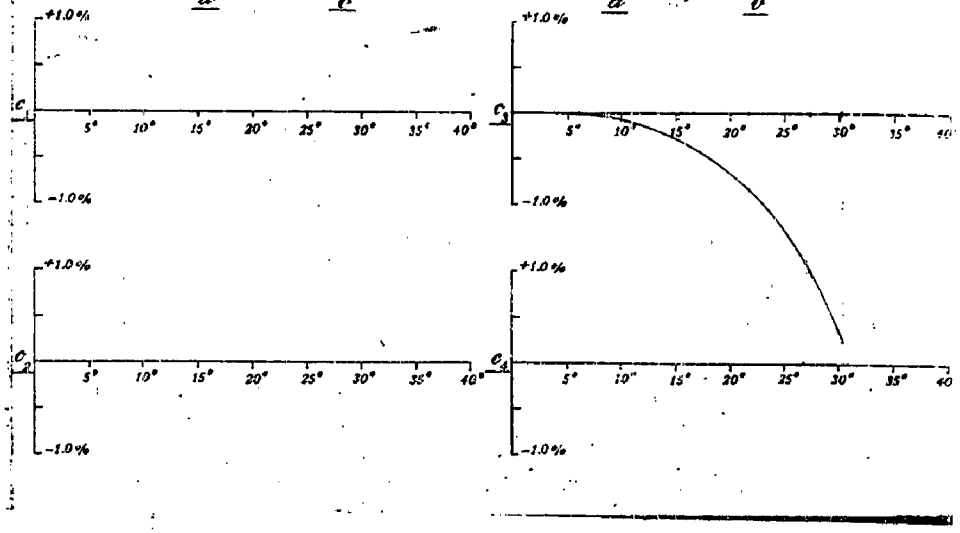
Einzelobjektiv.



Doppelobjektiv.



Spektralbereich	
L1	6.56
L2	a.a3
L3	5.96
L4	5.43
L5	6.56
L6	
L7	
Gr	44.25



F-Ts-6348-RE

1325

No. 1402

7. R. Objektiv 1:2.0. f = 72 cm. Rckg. v. 16. v. 07.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (2 T 49) / 15

Einzelobjektiv.		Doppelobjektiv.		
Δs'	Δf	Δs'	Δf	
		−0.9	−0.6	−0.3	+0.3	+0.2	−0.4	mm
		−0.5	−0.2	+0.2	+0.2	+0.0	−0.2	Fm

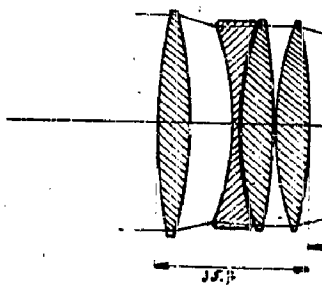
Einzelobjektiv.		Doppelobjektiv.	
Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		17.0	19.1	21.2	(± −)

Astigmatismus (2 T 49) / 15

Einzelobjektiv.			Doppelobjektiv.		
Sagittalschnitt	Meridionalschnitt		Sagittalschnitt	Meridionalschnitt	
				−0.5	+0.8	mm
Frontwinkel.	Vorzeichnung.		Frontwinkel.	Vorzeichnung.	
				2.3		mm

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	s_1	d_1	r_3	r_4	s_2	r_5		z_1	l_1	z_2	l_2	z_3	l_3	z_4	d_2	d_3	d_4	D	D_n
142.5	+0.2	69.20	2.5	7.5	+3.9	0.9	+0.2	mm	1.3	0.3	1.0	0.33	mm	0.3	1.5	−0.6	0.2	2.5	0.2	mm

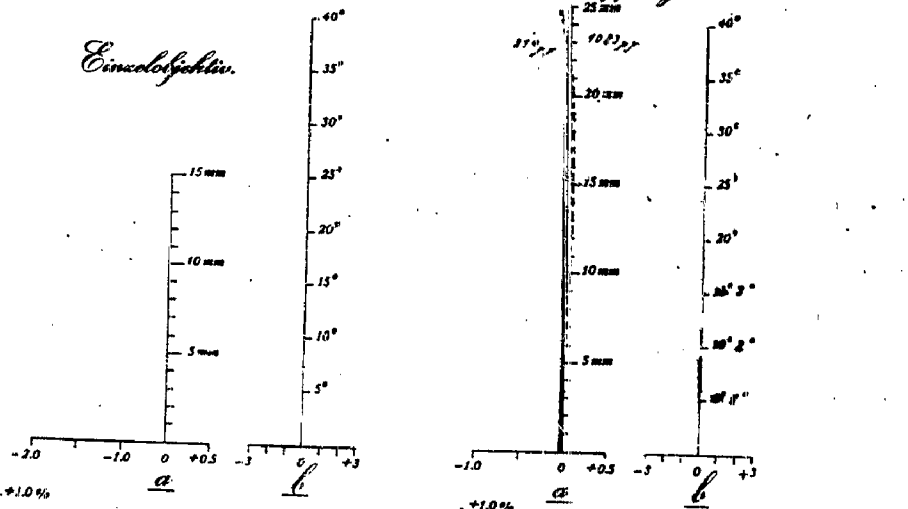


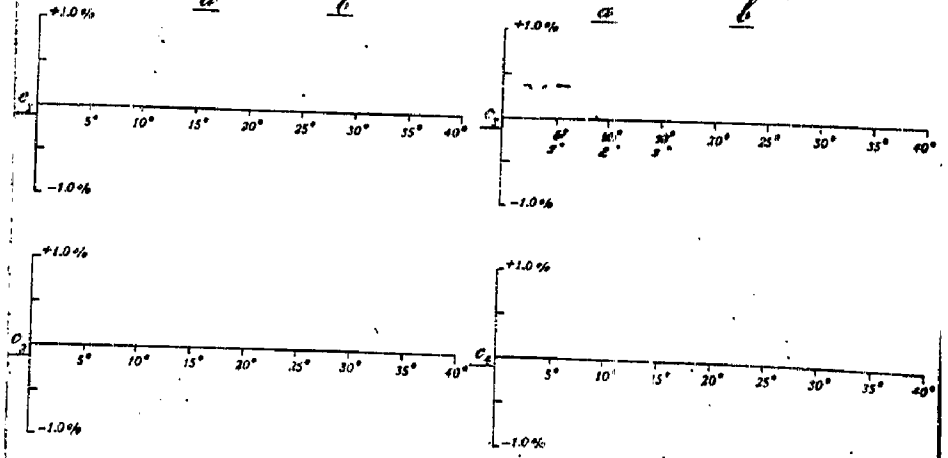
Linse	n_d	$n_{F_n} - n_{C_n}$ / $n_F - n_C$	r	
1	1.47			
2	1.22		2.5	
3	1.57			
4	1.57			

35.5

5 = ca 89.5

Einzelobjektiv. | Doppelobjektiv.





F.TS-6378-RE
1326

Laack Ö 48.3-38 1:4.35 f. 3 mm PA. v. 19.5.38

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (48.0 / 49.)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-6.7 -8.5 -0.5	-6.9 -9.5 +1.2

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		85,5	121.0 144.0

Astigmatismus (48.3 / 49.-49.)

Einzelobjektiv. Sagittenwölbung	Einzelobjektiv. Meridionalwölbung	Doppelobjektiv. Sagittenwölbung	Doppelobjektiv. Meridionalwölbung
		- 3.3 - 6.7 - 9.1	- 5.6 -11.7 21.5

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
		26.6 32.2 42.7	23.2 27.2 / 28.6

Radien, Dicken und Abstände für f = 100 mm.

R_1	2	3	4	5	6	7	8	9	10	11	d_1	l_1	d_2	l_2	d_3	l_3	l_4	d_4	l_5
82.1	327	97.5	∞	64.7	29.5	40.5	56.7	223.3	69.1	82.0	22.3	1.6	16.4	7.6	2.2	23.1	8.4	16.4	0.2

d_5 d_6
16.4 2.2

Freie Schnittweite = Rückw. Brennweite

1 2 3 4 5 6 7 8 9 10 11
74.2 72.2 66.6 63.9 62.2 47.3 47.6 55.1 55.4 54.9 58.6

Laack Ö 48.3-38 1:4.35 f. 3 mm PA. v. 19.5.38

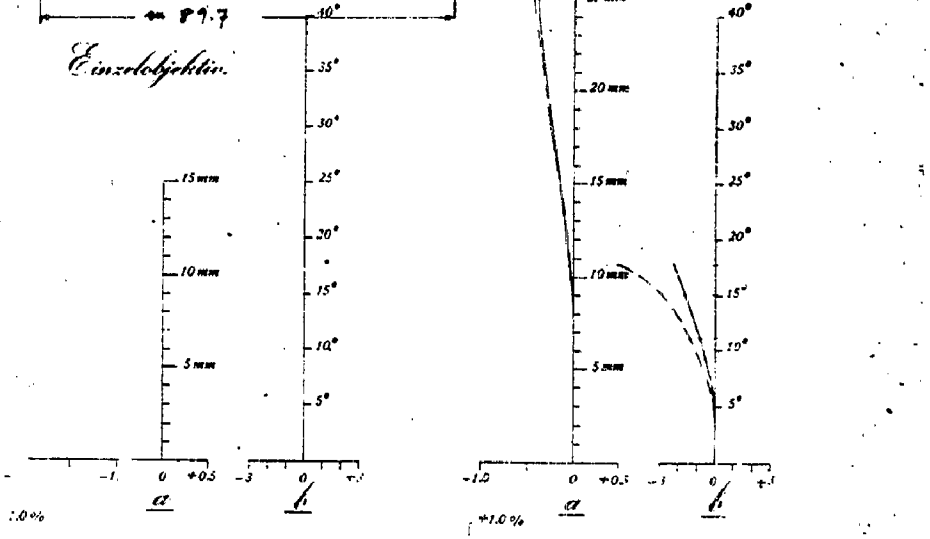
s' = 62.8

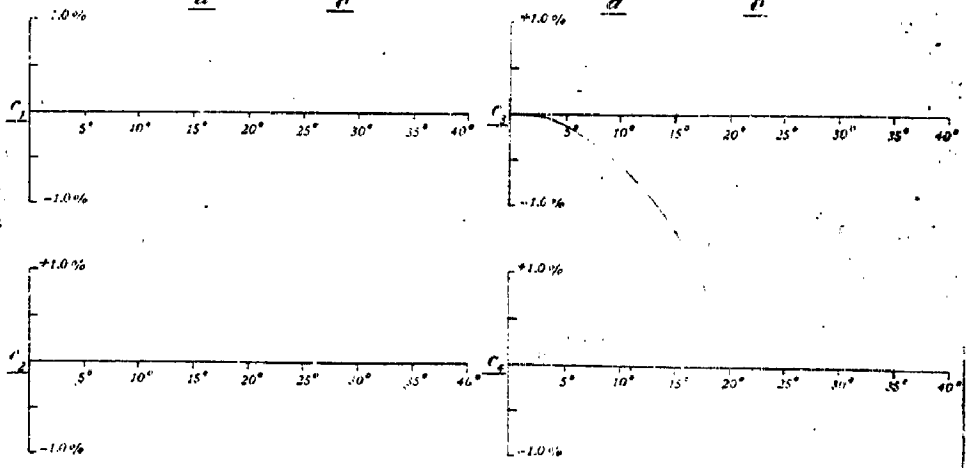
Linse	n_d	$\frac{n_F - n_C}{n_d}$	v
1	1.6230		57.9
2	1.6230		57.9
3	1.5730		45.3
4	1.6490		33.8
5	1.6116		55.6
6	1.6490		41.5

s = 89.7

Einzelobjektiv.

Doppelobjektiv.





Nr. 7403

Zeiss Ikon Ernostar 4,5/55 Nr. 21.12.36. 1:4,5 f = 100 mm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für f = 100 mm

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'		Doppelobjektiv. Δf'	
		-0,2	-0,8	+2,5	-0,7	+0,5	+2,2

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen			Doppelobjektiv. Chromasie
		22,2	18,1	13,5	

Astigmatismus für f = 100 mm

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel		Doppelobjektiv. Meridionalbüschel	
		-1,8	-2,5	-2,2	-1,6	-2,2	-3,2

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel			Doppelobjektiv. Vorzeichnung
		22,9	22,6	21,5	10°22'22	10°16'33	10°15'15

Radien, Dicken und Abstände für f = 100 mm

R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	R_{12}	d_1	L_1	d_2	d_3	d_4	b	d_5	d_6
45,5	27,5	14,0	22,2	plan	2,5	14,5	51,4	42,2	22,2	27,2	plan	9,2	4,8	11,2	2,4	2,8	15,6	3,2	20,0

D = 25,2
f' = ca 102,2

d_3	L_2	d_4
2,4	4,1	4,5

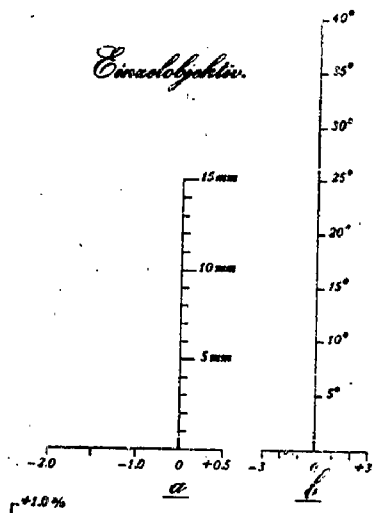
Zeiss Ikon Ernostar 4,5/55 Nr. 21.12.36. 1:4,5 f = 100 mm

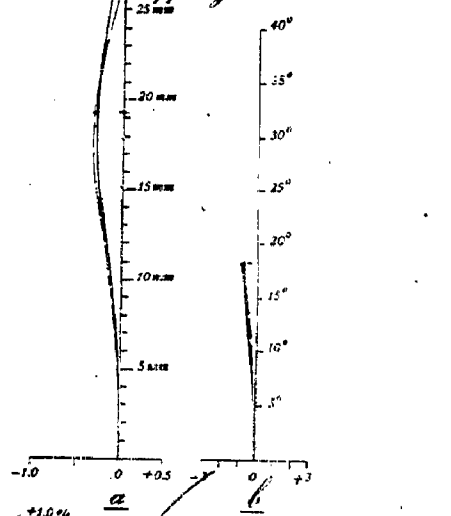
D = 25,2
f' = ca 102,2

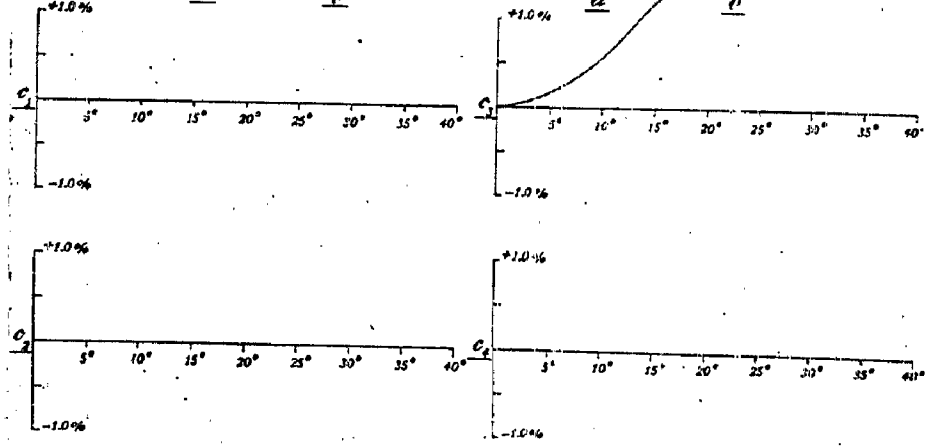
Linse	n_d	$n_F - n_C$	α
L_1	1,6167		60,3
L_2	1,6167		60,3
L_3	1,7495		35,2
L_4	1,7219		29,2
L_5	1,5725		41,2
L_6	1,6167		60,3
L_7	1,6093		56,9
L_8	1,6167		60,3

Doppelobjektiv.

Einzelobjektiv.







L 1404

V1941 N:6 1:2,8 f=35cm Rechn.v. 16.5.41.

F-75-6398-RE

1928

Einzelobjektiv.

Δs'		Δf'	

Einfallshöhen | Chromasie.

Doppelobjektiv.

	Δs'			Δf'		
α	-1.0	-0.7	+1.0	-1.0	-1.2	-0.7
s'	-0.5	-0.2	+3.3	-0.3	±0.0	+1.6

Einfallshöhen | Chromasie.

+0.6	57.8	70.9

$G'_o - G'_u$
-1.71
(+0.34)
-1.36

Astigmatismus (AX4)/34

Einzelobjektiv.

Sagittalwinkel			Meridionalwinkel		

Frontwinkel | Verzeichnung

Doppelobjektiv.

Sagittalwinkel			Meridionalwinkel		
-1.4	-1.1	+2.5	-0.6	-0.4	+0.3

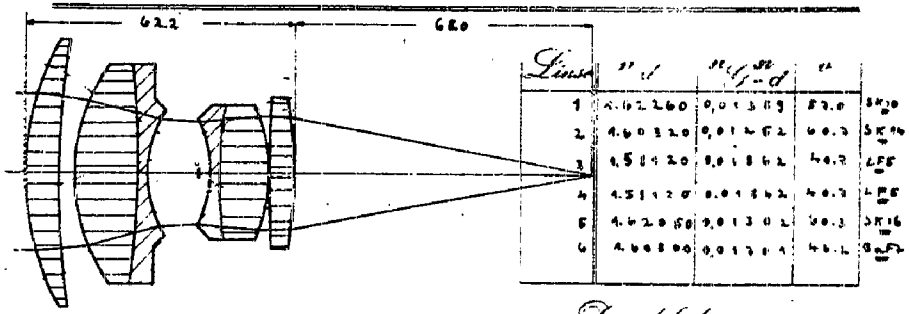
Frontwinkel | Verzeichnung

39.0	44.3	57.8

1003.51 1005.47 1006.95

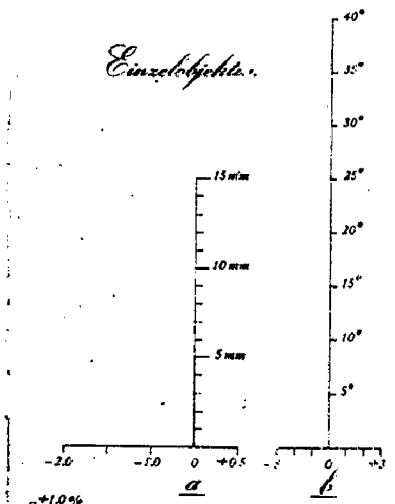
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	e_1	d_m	d_2	l_{b_2}	β_2	d_{l_3}	d_{l_4}	e_2	a_{l_4}
62.0	220.	42.1	204.5	26.4	27.1	409	36.4	1.50	93.5	3.8	3.1	15.0	2.2	12.8	2.4	1.2	41.5	0.1	5.9

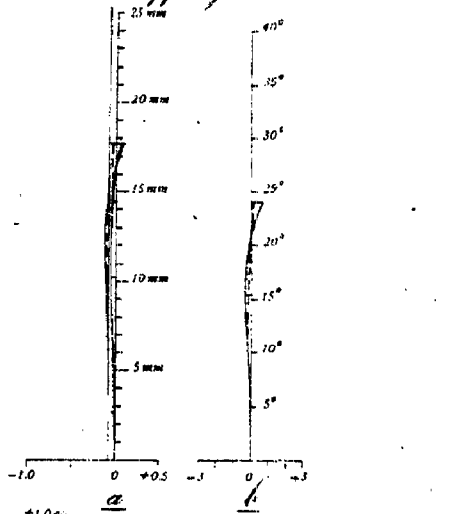


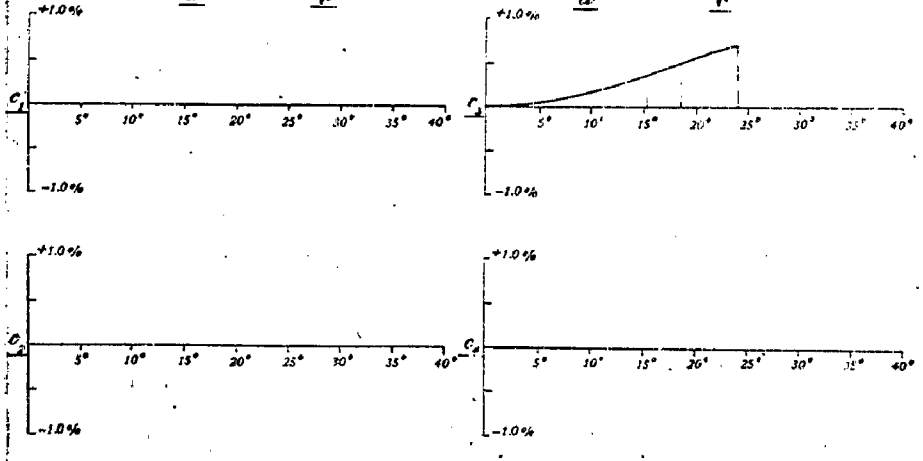
Linse	r	d	e	n
1	62.2	6.0	0.1	57.0
2	66.0	2.0	0.1	60.3
3	45.1	2.0	0.1	40.3
4	45.1	2.0	0.1	40.3
5	66.0	6.0	0.1	60.3
6	66.0	0.1	0.1	60.3

Einzelobjektiv.



Doppelobjektiv.





L 1405

V 1941 No 7 1:2,8 f=35cm Rechn.v. 24.5.41.

F-TS-6398.52

1524

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AX10) 116

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'		Doppelobjektiv. Δf'	
		-0.8	-0.5	+0.5	-0.5	-0.7	-1.5
		+0.8	+1.4	+3.3	-0.5	-0.6	-1.1

Einzelobjektiv. Einfallshöhen.	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen.			Doppelobjektiv. Chromasie.
		40.7	57.6	70.5	$a'_o - a$
					-1.8
					(+1.8)
					±0.0

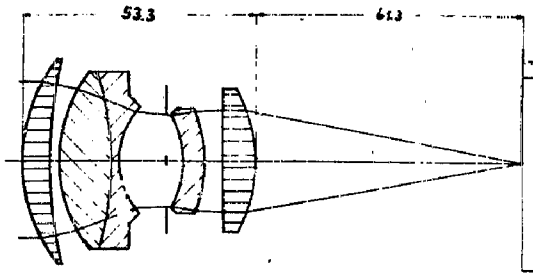
Astigmatismus (AX19) 108-111

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel			Doppelobjektiv. Meridionalbüschel		
		-0.6	-0.3	+2.2	-0.5	-0.9	-0.4

Einzelobjektiv. Frontwinkel.	Einzelobjektiv. Verzeichnung.	Doppelobjektiv. Frontwinkel.			Doppelobjektiv. Verzeichnung.
		35.8	44.0	53.4	1083.61 1084.43 1084.42

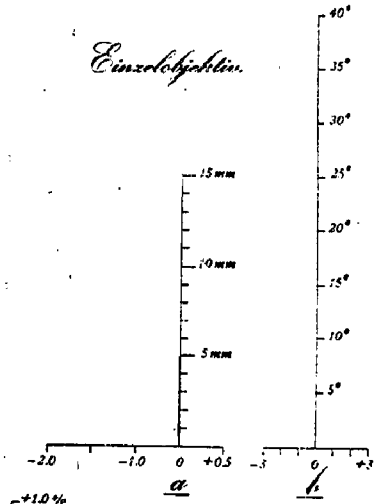
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_1	ℓ_1	d_2	d_3	ℓ_3	ℓ_2	d_4	ℓ_4	d_5	
37.3	181.5	32.4	67.0	17.8	21.2	32.2	140.	23.0	0.3	2.2	12.00	4.6	10.2	11.0	4.4	3.9	3.7	53.3

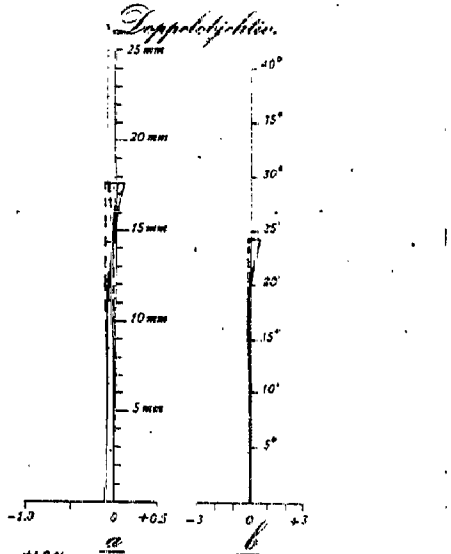


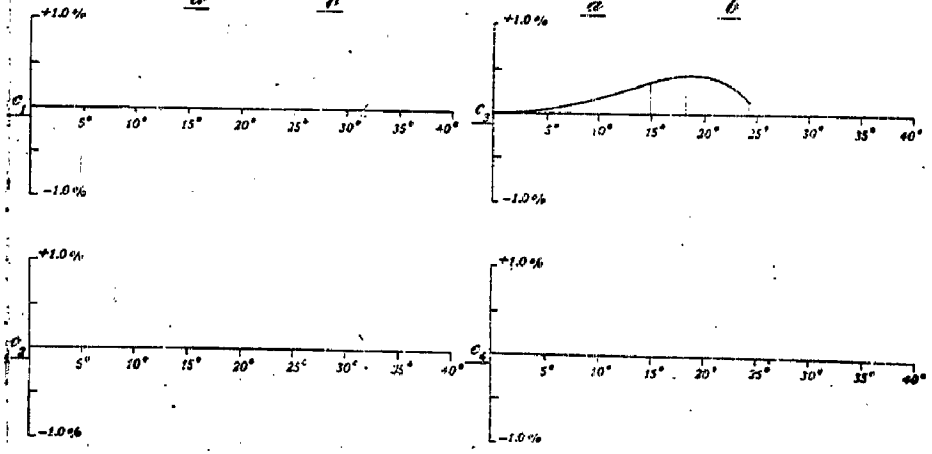
Linse	n_e ν_e	n_d ν_d $n_d - d$	n_g ν_g $n_g - d$	v	
1	1.66890	1.67842		47.2	$S_{4,5}$
2	1.60278	1.61254		60.3	$S_{1,2,3}$
3	1.51230	1.52116		53.9	P_3
4	1.61666	1.62620		36.6	P_4
5	1.59120	1.60043		56.4	N_{10}

Einzelobjektiv.



Doppelobjektiv.



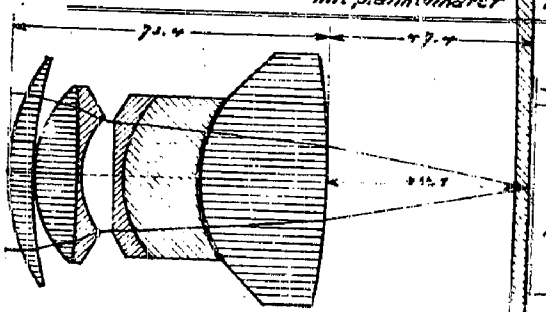


L. 14-06

F-TS-6398-RE

Zeiss-Ikon: Sonnar 1:2.8; f=9 cm Rechn.Nr. 1397/II v. 29.3.40 m. plankonkaver Druckplatte

Zeiss-Ikon: Sonnar 1:2.8; f=9 cm, mit plankonkaver Druckplatte Rechn.Nr. 1397/II v. 29.3.40



Linse	r in cm	n / ν	d in cm
L_1	1.6644		0.5 BaSF2
L_2	1.6643		4.6 BaSF6
L_3	1.7238		2.8 SF1
L_4	1.5720		0.5 K5
L_5	1.6664		4.2 BaF1
Kitt	1.5370		
L_6	1.6196		4.2 BaF2
L_7	1.5163		6.4 BK7

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (PW 46/27)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		−6.2	−7.6
		−7.4	−8.7
		−10.5	−11.8

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		47.3	58.4
		71.5	

Astigmatismus (PW 46/27)

Einzelobjektiv. Sagittalwölbung	Einzelobjektiv. Meridionalwölbung

Doppelobjektiv. Sagittalwölbung	Doppelobjektiv. Meridionalwölbung
−3.3	−4.4
+0.7	−0.7
−0.6	+7.0

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung

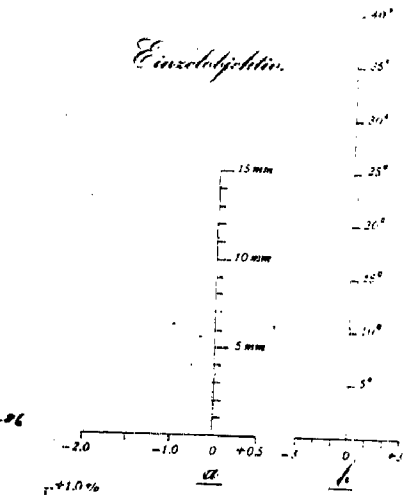
Doppelobjektiv. Frontwinkel	Doppelobjektiv. Vorzeichnung
51.5	60.2
76.8	

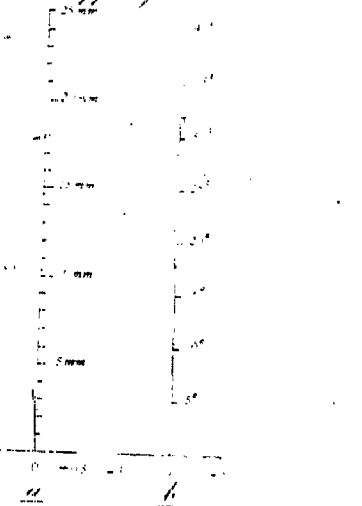
1:2.0

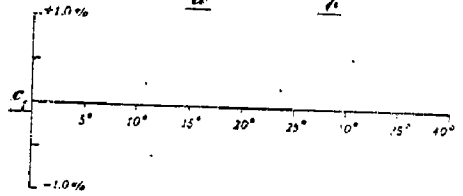
Radien, Dicken und Abstände für f = 100 mm.

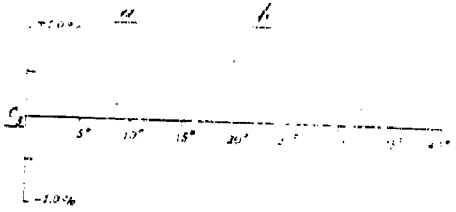
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	
45.0	99.0	27.6	120.8	20.4	∞	37.6	44.9	32.9	47.8	833.5	∞	n_1
												0

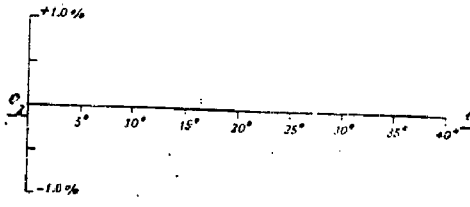
d_0	l_0	d_1	d_2	l_1	d_3	d_4	d_5	d_6	l_2	d_7
2.0	0.1	9.9	4.7	7.6	2.0	47.6	0.7	29.4	44.7	3.5

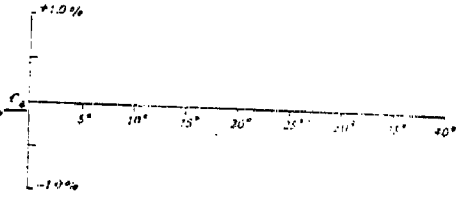












Arthur Warnisham, Leicester, England, assignor to Kapella Ltd.
1:2; f= 10cm; USA-Patent 2 130 760 vom 20.9.1938

F.75-6398-AE

Beispiel 2

Einzelobjektiv.	Doppelobjektiv.

Sphärische Korrektion ($\frac{\Delta V_{23}}{\Delta f}$).

Einzelobjektiv.		Doppelobjektiv.	
$\Delta s'$	Δf	$\Delta s'$	Δf
		-2.3 | -0.3 | +7.0	+0.7 | +3.7 | +4.3

Einzelobjektiv.		Doppelobjektiv.	
Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		57.7 | 57.7 | 100.0	-67 (+48) -13

Astigmatismus ($\frac{\Delta W_1}{\Delta \sigma_{33}}$).

Einzelobjektiv.		Doppelobjektiv.	
Segmentalbüschel.	Meridionalbüschel.	Segmentalbüschel.	Meridionalbüschel.
		-0.4 | +1.0 | +3.6 | +0.6 | +0.8 | -1.4	

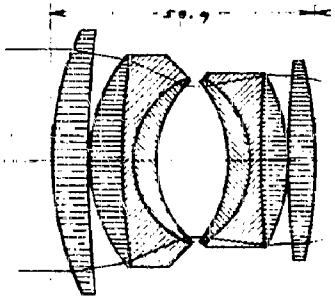
Einzelobjektiv.		Doppelobjektiv.	
Frontwinkel.	Tangierung.	Frontwinkel.	Tangierung.
		39.5 | 52.0 | 59.8	997.38 993.96 989.70.

Radien, Dicken und Abstände für $f = 100$ mm.

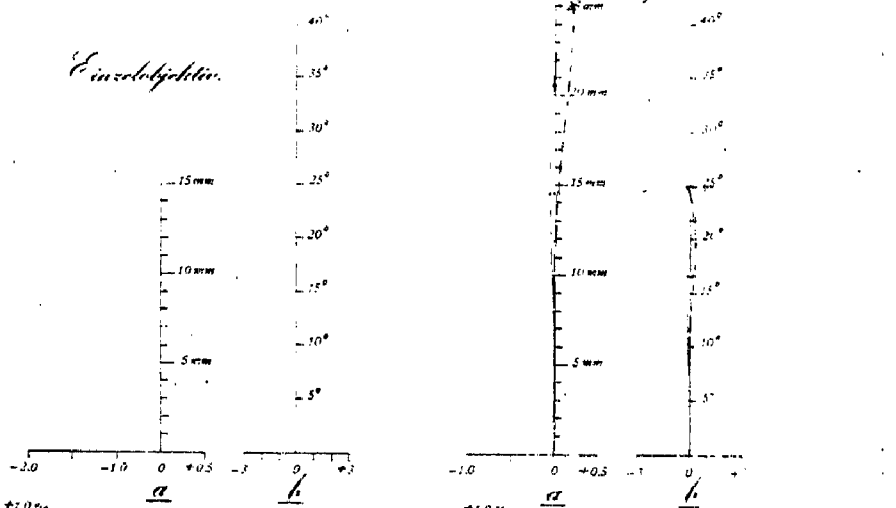
R_1	2	3	4	5	6	7	8	9	10	11	12	σ'
67.2	112.2	63.2	37.0	902.9	20.9	139.4	128.8	27.3	200.0	38.7	240.3	77.7

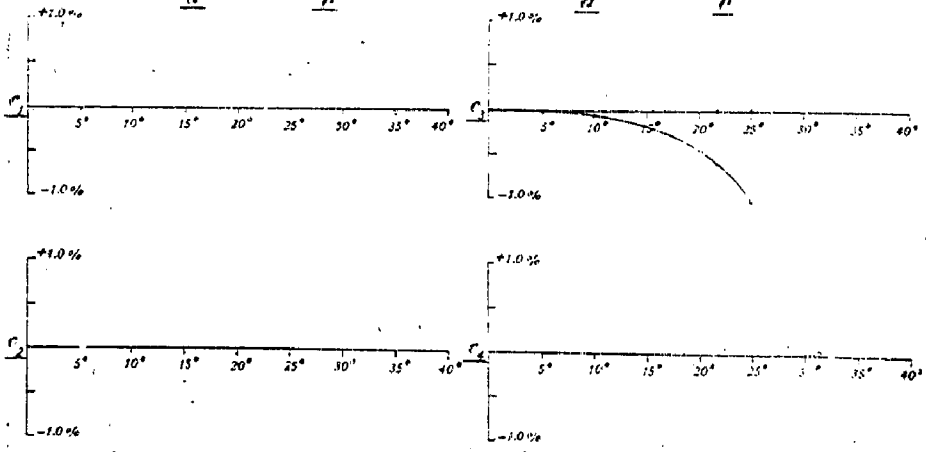
d_1	l_1	d_2	d_3	d_4	δ	d_5	d_6	d_7	l_2	d_8
8.2	0.1	6.4	4.0	5.4	16.0	5.4	3.0	5.5	0.7	6.0

Arthur Warnisham, Leicester, England, assignor to Kapella Ltd.
1:2; f-10cm; USA-Patent 2 130 760 v. 20.9.38; Beispiel 2



Linse	n_d	ν_d	
L_1	1.6435	59.3	SK2
L_2	1.6229	60.4	SK6
L_3	1.6058	38.2	F5
L_4	1.6253	33.5	SK9
L_5	1.6254	33.5	SK9
L_6	1.6058	38.2	F5
L_7	1.6229	60.4	SK6
L_8	1.6229	60.4	SK6





F-75-6348-AE

V 1941 N° 13 1:1 f = 7cm Rechn.v. 7.8.41.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion $(A \times 24)/_{100}$

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		− 2.3 / − 4.9	− 1.4 / + 0.0
		+ 6.1 / + 8.8	+ 0.8 / + 1.7
		+ 1.6 / + 3.0	− 2.1 / + 2.7

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Einfallshöhen.			Chromasie.
41 5.2	46 2.9	49 9.6	$a'_2 - a_2$
			− 2.5
			(− 4.9)
			− 3.6

Astigmatismus $(A \times 31)/_{100}$

Segmentalbüschel	Meridionalbüschel	Segmentalbüschel	Meridionalbüschel
		± 0.0	− 0.3
		− 0.9	+ 4.4
		+ 0.7	− 2.5

Frontwinkel. | Verzeichnung. | Frontwinkel. | Verzeichnung.

Frontwinkel.			Verzeichnung.
23.8	38.2	43.4	992.86 984.44 984.53

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	d_1	l_1	d_2	d_3	l_2
43.4	44.4	59.5	∞	35.8	46.2	81.3	68.0	148.1	82.6	344.6	95.5	23 3.4	117.2	551.4	12.4	0.1	26.2	6.2	11.4

l_2	d_4	d_5	l_3	d_6	d_7	l_4	d_8	l_5	d_9
18.3	6.0	26.9	0.1	24.5	3.4	0.1	20.3	33.7	4.1

F-75-6348-AE

1332

L 1403

V 1941 N° 13 1:1 f = 7cm Rechn.v. 7.8.41.

für f=50mm 1941

M 1:2

Linse	n_d	$n_F - n_d$	ν	
1	1.6697 0	0.0 1 8 4 1	49.1	$B_1 P_1 a$
2	1.6447 0	0.0 1 3 3 5	58.4	$S_1 P_1 a$
3	1.5732 0	0.0 1 0 1 1	44.4	$L_1 P_1 a$
4	1.6932 0	0.0 3 1 0 5	30.4	$S_1 P_1 S$
5	1.6391 0	0.0 1 4 5 2	55.3	$S_1 P_1 S$
6	1.6697 0	0.0 1 8 4 1	49.1	$B_2 P_2 a$
7	1.6732 0	0.0 2 3 6 5	32.5	$S_2 P_2 S$
8	1.6932 0	0.0 3 1 0 5	30.4	$B_2 P_2 S$
9	1.6391 0	0.0 1 4 5 2	55.3	$S_2 P_2 S$

Einzelobjektiv. | Doppelobjektiv.

a | b | a | b

δ | δ'

F-TS-6398-RE

1333

V1941 N=15 1:1 f=15 cm Rechn.v. 25.8.41.

Einzelobjektiv. Doppelobjektiv.

Sphärische Korrektion (AX24) 110

Δs'	Δf

Δs'			Δf		
-0.9	+0.8	+5.1	+2.7	+4.0	+1.7

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

115.-	163.1	199.8

Astigmatismus (AX9) 100

Sagittalbüschel	Meridionalbüschel

Sagittalbüschel			Meridionalbüschel		
+2.9	+5.6	+8.2	+3.1	+6.0	+8.6

Frontwinkel. Vorzeichenregel.

Frontwinkel. Vorzeichenregel.

22.6	30.7	34.5

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	d_1	t_1	d_2	d_3	t_2	t_3
112.0	116.0	57.3	155.2	34.3	46.3	38.3	73.6	93.4	488.4	102.4	393.3	60.8	123.3	13.3	0.1	2.4.0	3.6	11.1	12.7

d_4	d_5	t_4	d_6	t_5	d_7	t_6	d_8
5.8	2.4.0	0.1	20.6	0.4	19.5	33.7	2.3

V1941 N=15 1:1 f=15 cm Rechn.v. 25.8.41.

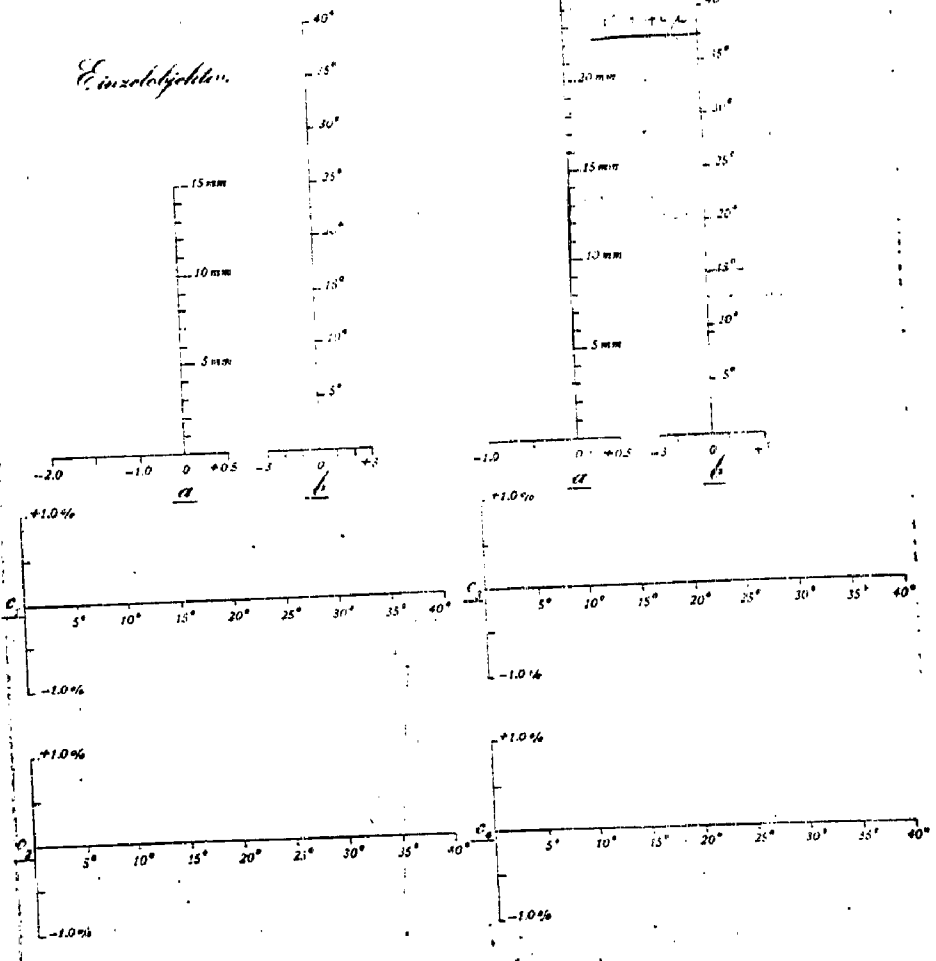
L. 1409

für f=50 mm 1823

Linse	n d	ν d
1	1.67000	47.0
2	1.64440	58.4
3	1.57500	44.4
4	1.65865	56.1
5	1.63999	55.6
6	1.66850	47.3
7	1.69983	47.2
8	1.78470	25.7

M 1:2

Einzelobjektiv. Doppelobjektiv.



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1334

1941 N:15 1:1 f=15cm

Einzelobjektiv. aus Röhre

Doppelobjektiv. nach Smyth Linse

Sphärische Korrektion /AX 24/922

Einzelobjektiv. Δs'			Einzelobjektiv. Δf'		
-0.5	+0.4	+0.7	+2.5	+2.9	-2.0

Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
-1.2	-0.9	+2.8	+2.9	+3.7	-0.7

Einfallshöhen.			Chromasie.
114.5	141.8	198.5	

Einfallshöhen.			Chromasie.
114.5	141.8	198,5	

Astigmatismus /AX 9/916

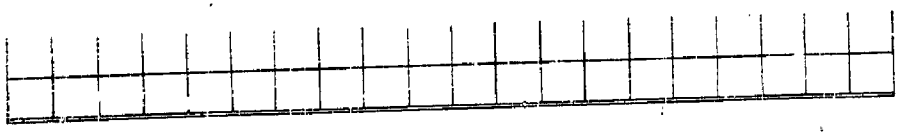
Sagittalbüschel			Meridionalbüschel		
-0.2	+0.4	-0.2	-0.2	+0.6	+1.2

Sagittalbüschel			Meridionalbüschel		
+3.0	+3.8	+3.6	+2.8	+5.6	+8.4

Frontwinkel.			Verzeichnung.		
22.6	30.7	36.5	98.01	97.20	95.33

Frontwinkel.			Verzeichnung.		
22.6	30.7	36.5	98.01	97.16	96.08

Radien, Dicken und Abstände für f = 100 mm.



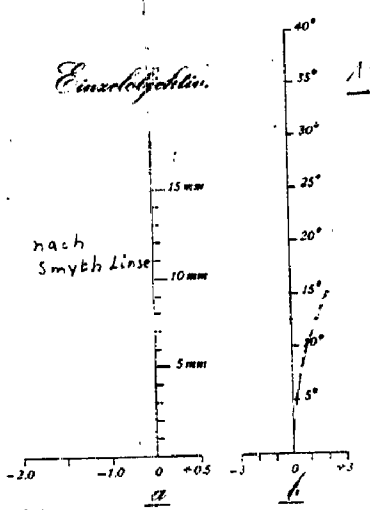
Zu Darstg. 1409

1409

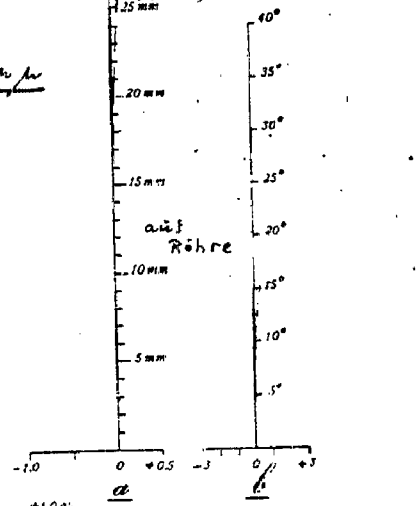
1941 N:15 1:1 f=15cm

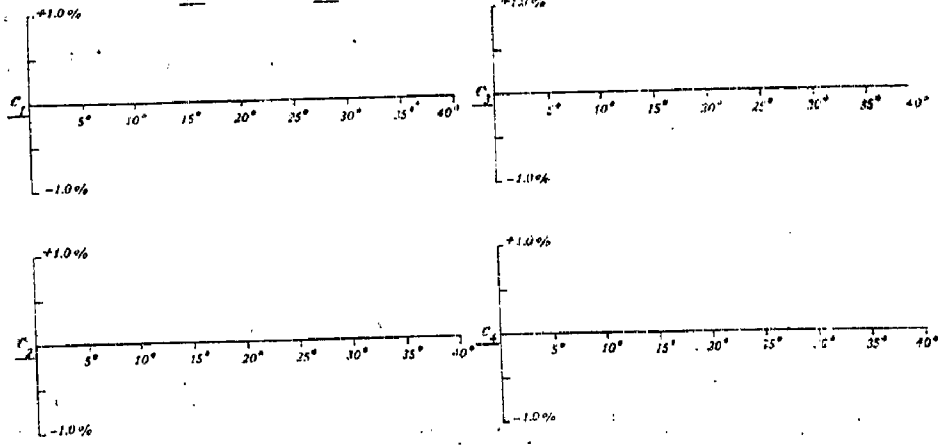
Linse	r_{vorn}	d	r_{hinter}	d

Einzelobjektiv. /0.14 μ/μ



Doppelobjektiv.





F-TS-6398-RE

1335

№ 1410

V 1941 Nr. 14 1:2 f = 25 mm Rechn. v. 10.8.41.

Einzelobjektiv. Doppelobjektiv.

Sphärische Korrektion (d=25) f = 25 mm

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'		Doppelobjektiv Δf'	
		-2,5	-2,4	+1,6	-1,1	-0,8	+2,0

Einzelobjektiv: Einfallshöhen | Chromasie

Doppelobjektiv: Einfallshöhen | Chromasie

52,0	0,0	100,2

Astigmatismus (d=7/8) f = 44,72/2 mm

Einzelobjektiv: Sagittalbüschel | Meridionalbüschel

Doppelobjektiv: Sagittalbüschel | Meridionalbüschel

-1,2	-0,2	-1,8	+0,3	+1,5	+1,6

Einzelobjektiv: Frontwinkel | Verzeichnung

Doppelobjektiv: Frontwinkel | Verzeichnung

19,8	21,5	22,1	100,2 mm 100,42 mm 100,10

Radien, Dicken und Abstände für f = 100 mm.

R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	R_{12}	d_1	L_1	d_2	d_3	L_2	L_3	d_4	d_5
44,2	308,3	32,0	plan	29,2	29,5	44,0	47,2	104,1	107,2	plan	plan	4,1	0,1	15,2	1,6	11,2	1,1	2,0	11,6

L_2	d_2	L_3	d_3
1,11	2,6	15,5	1,6

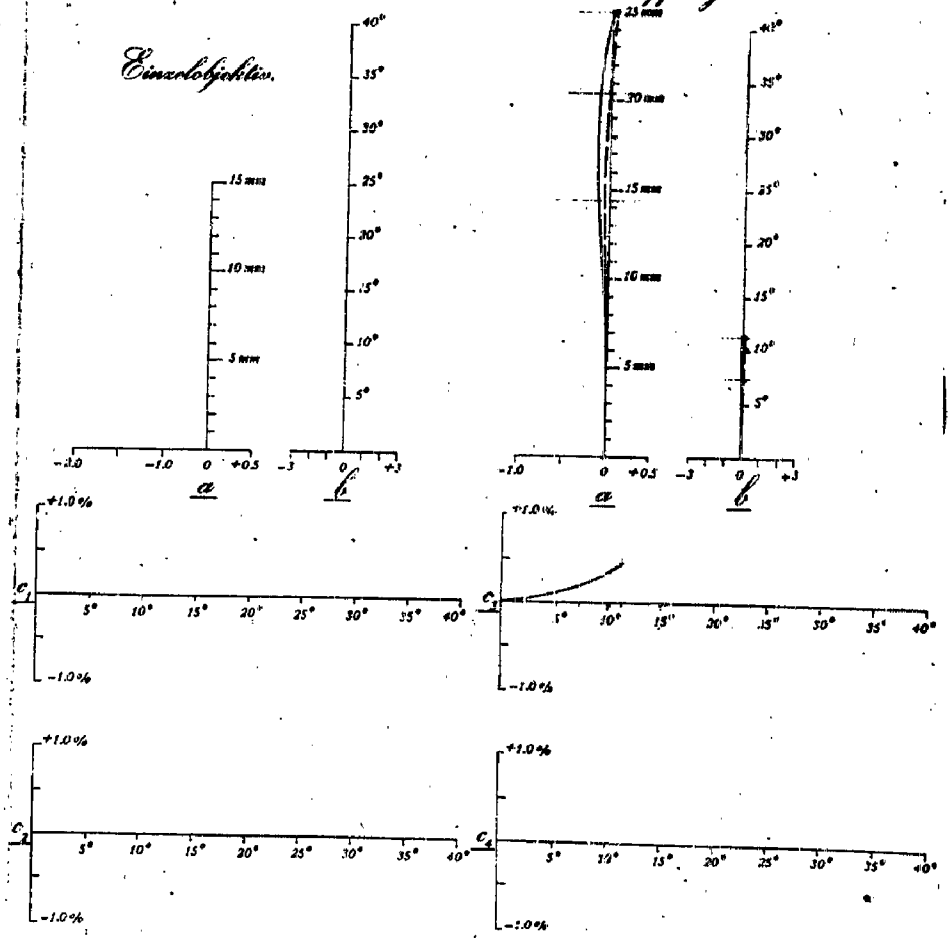
f = 100,0
Δ = 69,2
L = 15,2

V 1941 Nr. 14 1:2 f = 25 mm Rechn. v. 10.8.41.

Δ = 69,2 L = 15,2 16

Linse	n d	ν G – d	α
L_1	1,61742	0,37	60,3
L_2	1,61742	0,37	60,3
L_3	1,52554	0,37	55,3
L_4	1,61742	0,37	32,8
L_5	1,68264	0,37	55,2
L_6	1,61742	0,37	32,8

Einzelobjektiv. Doppelobjektiv.



No. 7411

V 1941 № 4 1:4,5 f = 12,5 cm Rechn. v. 20.2.41.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (4 7 2 3/5 140

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'		Doppelobjektiv. Δf'	
		-5,2	-0,2	+1,4	-5,8	-3,9	+2,0

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen			Doppelobjektiv. Chromasie
		25,6	36,8	44,4	-2,3 (-1,2) +3,5

Astigmatismus f 4 7 5/5 160

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel		Doppelobjektiv. Meridionalbüschel	
		-1,0	-1,6	+0,2	-1,0	+1,3	+2,0

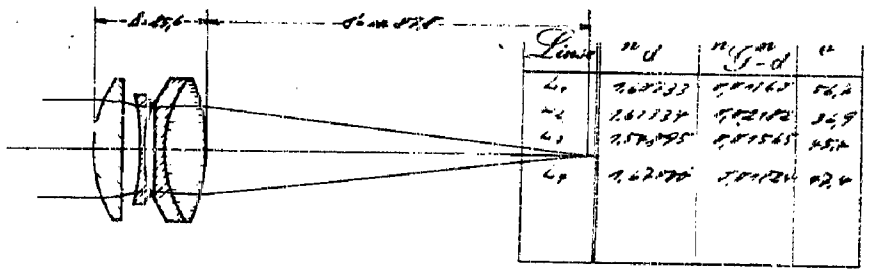
Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel			Doppelobjektiv. Verzeichnung
		57,5	44,7	28,4	+0,2% +0,5% +0,8%

Radien, Dicken und Abstände für f = 100 mm.

R_1	R_2	R_3	R_4	R_5	R_6	R_7	d_1	l_1	d_2	d_3	l_2	d_4	d_5
29,2	15,7	45,0	69,2	30,0	69,2	44,7	4,4	2,6	7,5	0,8	2,6	2,2	9,5

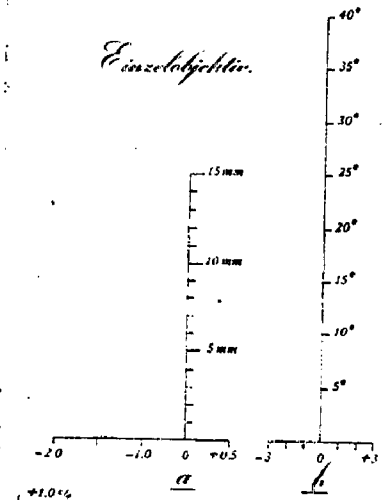
Δ = 25,6
f' = 82,8

V 1941 № 4 1:4,5 f = 12,5 cm Rechn. v. 20.2.41.

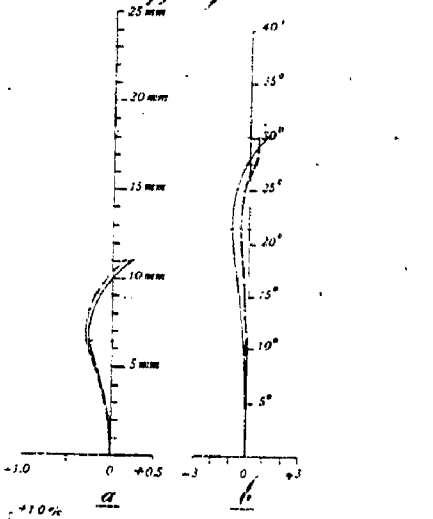


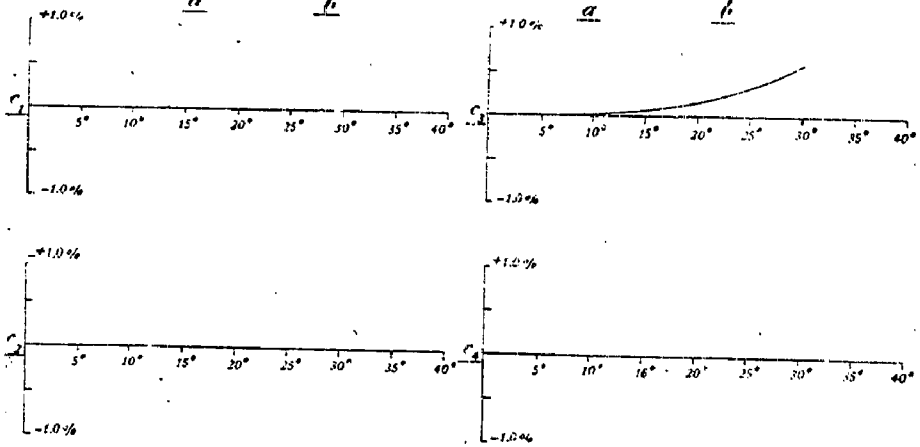
Linse	n_d	n_{F-d}	ν_d
L_1	1,603233	0,016163	56,2
L_2	1,617337	0,021152	36,9
L_3	1,576695	0,015165	45,2
L_4	1,622770	0,015124	52,4

Einzelobjektiv.



Doppelobjektiv.





1422

F.S.-6398-Af

1251

V 1941 № 5 1:3,5 f = 3,5 cm Rechn. v. 12.2.41

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für $\lambda = 577{,}1$ mμ

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		−6,6	−2,2	+9,7	−5,0	−2,0	+4,0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		32,7	46,0	52,3	−2,5 (−2,0) −0,5

Astigmatismus für $\lambda = 577{,}1$ mμ

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
		−5,2	−2,9	+2,2	+4,7	−2,3	−8,0

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		12,5	16,9	22,5	14,3	23,6	29,0

Radien, Dicken und Abstände für f = 100 mm.

R_1	R_2	R_3	R_4	R_5	R_6	d_1	d_2	d_3	d_4	d_5	d_6
36,2	29,3	42,0	17,3	124,9	96,0	2,0	2,0	2,0	2,9	4,6	6,6

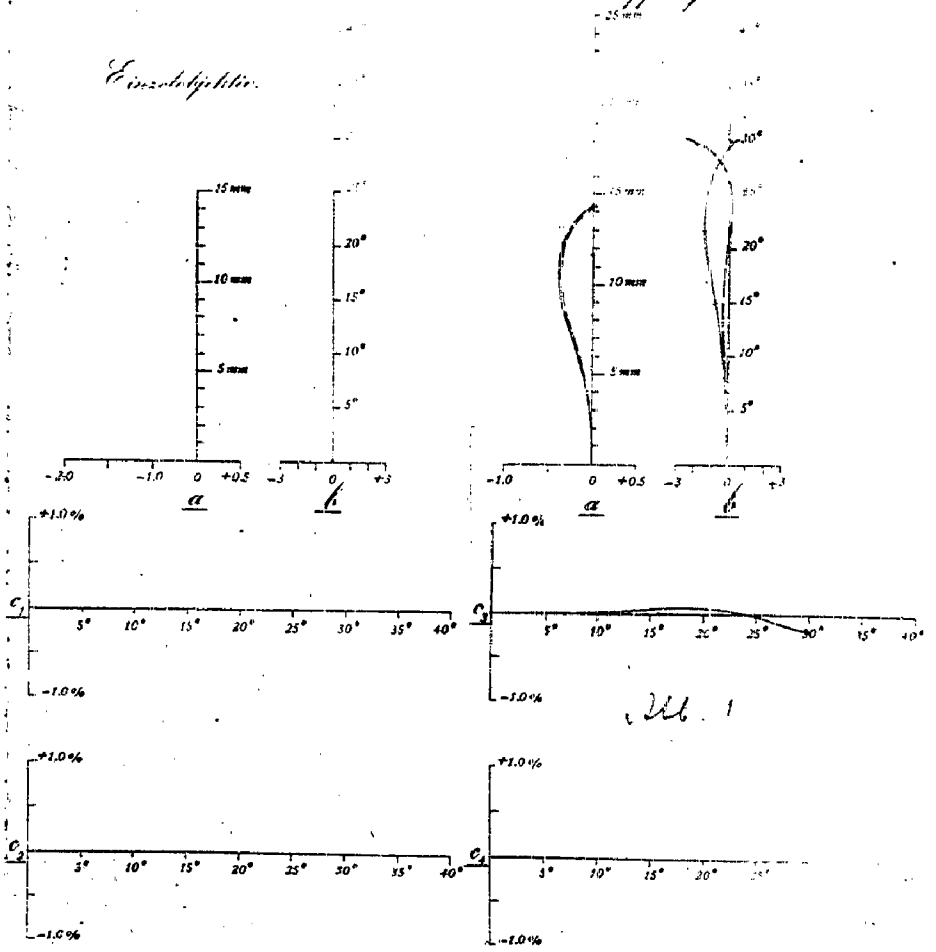
$\beta = ca.\ 37,2$
$\varphi = ca.\ 17,2$

V 1941 № 5 1:3,5 f = 3,5 cm Rechn. v. 12.2.41

$\beta = ca.\ 37,2$ | $\varphi = ca.\ 17,2$

Linse	r	d	n	ν	
L_1	+26,44	+0,265	1,523	59,0	SK 4
L_2	+14,20	+0,055	1,649	33,8	SF 2
L_3	+20,65	+0,134	1,523	59,0	SK 4

Doppelobjektiv.



Bl. 1

1:1 f=15 cm Rechn.v. 15.9.41

V 1347/75

1:1 f=15 cm Rechn.v. 15.9.41

Nr. 14-13

Objektivsatz V 1347 BIII (Mittelteil) und Br. Linsen aus Glühlicht- und Br. Konstruktion – Gelbfilter

F-Nr. 63782

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion /AXL4//135

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-0.5	+0.5	+1.3	+1.0	+3.6	-1.3

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie.
		197.0	161.0	113.5	β'-ν=ν₀ − 0.3 (−14.0) − 20.4

Astigmatismus /AX9//126-133

Einzelobjektiv. Sagittalfläche	Einzelobjektiv. Meridionalfläche	Doppelobjektiv. Sagittalfläche	Doppelobjektiv. Meridionalfläche
		+2.5	+9.4	+2.5	+7.9

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
		22.5	36.7	985.42	959.78

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	Hilfsmaße a	Hilfsmaße b	r_{15}	r_{16}
110.0	109.0	56.4	153.0	153.0	33.9	46.0	131.0	131.0	34.0	92.0	448.0	99.0	381.4	∞	∞	54.5	119.5
d_1	L_1	d_2	L_2	d_3	L_3	d_4	L_4	d_5	L_5	d_6	L_6	d_7	L_7	d_8	L_8	d_9	
15.1	0.1	15.5	0.0	7.5	18.8	5.7	0.0	15.5	0.1	10.5	0.1	19.1	11.1	1.0	9.1	2.0	

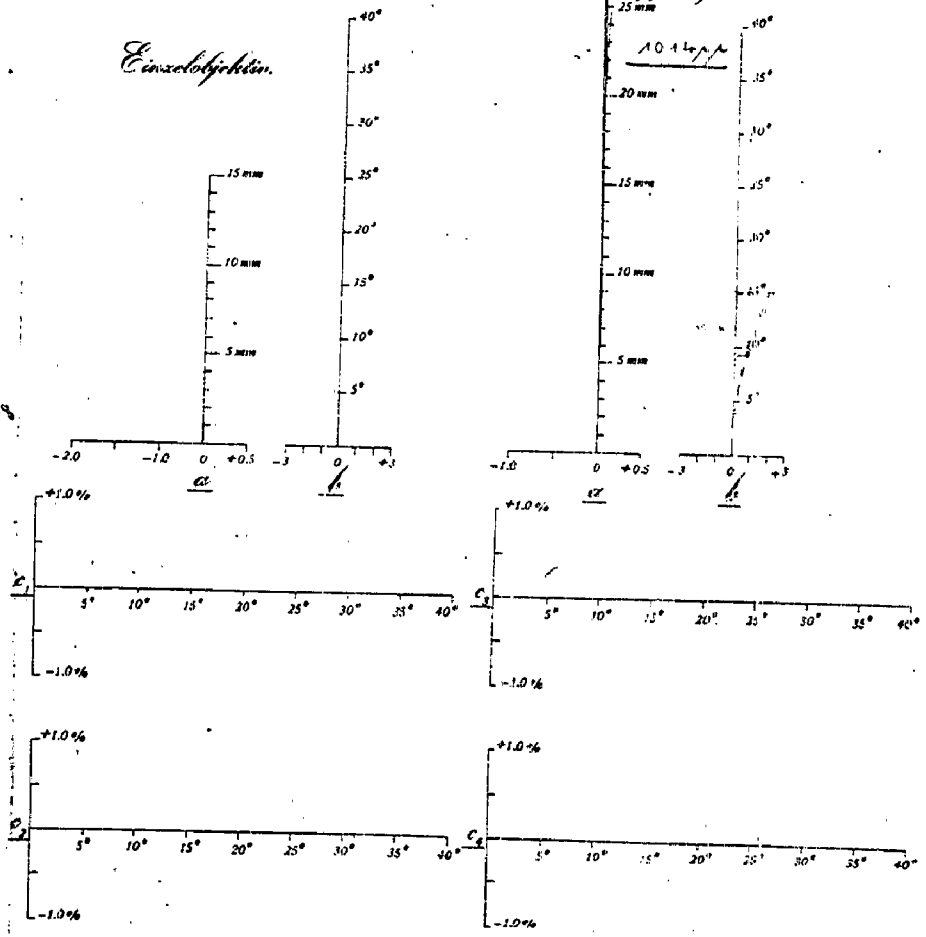
M 1:2

99.5

Linse	n_d	ν_d	$n_f - n_d$	n_e	
1	1.603 00			43.0	BaF 13
2	1.614 40			38.4	SK 4
3	1.573 00			41.4	LF 7
4	1.699 65			30.1	SF 15
5	1.653 19			35.6	SK 16
6	1.699 50			43.5	BaF 10
7	1.649 43			41.1	BaSF 9
8	1.784 64			26.2	SF 11

Einzelobjektiv.

Doppelobjektiv.



XIX/45 Nr. 34:14

V 1941 No 17 1:12,5 f=67,5cm. Rechn. v. 22.9.44

F-15-6788-RE

1339

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (1944 / 1938) für

Δs'	Δf'

Δs'			Δf'		
-1,8	-1,6	+2,5	-1,6	-1,3	+0,7
-1,1	-0,6	+2,0	-1,0	-0,3	+2,4
-0,3	+0,0	-3,6	-0,5	+0,8	+4,4
+0,6	+0,5	-11,4	+0,0	+1,8	+6,8
-0,2	+1,2	+4,9	+0,6	+1,1	+5,2
+1,5	+2,9	+7,3	+1,1	+2,5	+7,2

H'
C
d
D
L
F

Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		9,2 / 13,1 / 16,0	H'-C: -1 (+3) +2

Astigmatismus (1942 / 1944) für

Segmentorialbüschel	Meridionalbüschel	Segmentorialbüschel	Meridionalbüschel
		-0,28 / -0,44	-0,41 / -0,30

F

Frontwinkel.	Verzeichnung.	Frontwinkel.	Verzeichnung.
		9,7 / 13,7	10% 5% 7,5% 10%

F'

Radien, Dicken und Abstände für f = 100 mm.

r1	2	3	4	5	6		d1	L1	d2	L2	d3							
51,8	98,2	50,6	79,2	77,2	38,5		1,5	0,49	0,8	4,2	1,2	Zus.	8,44					

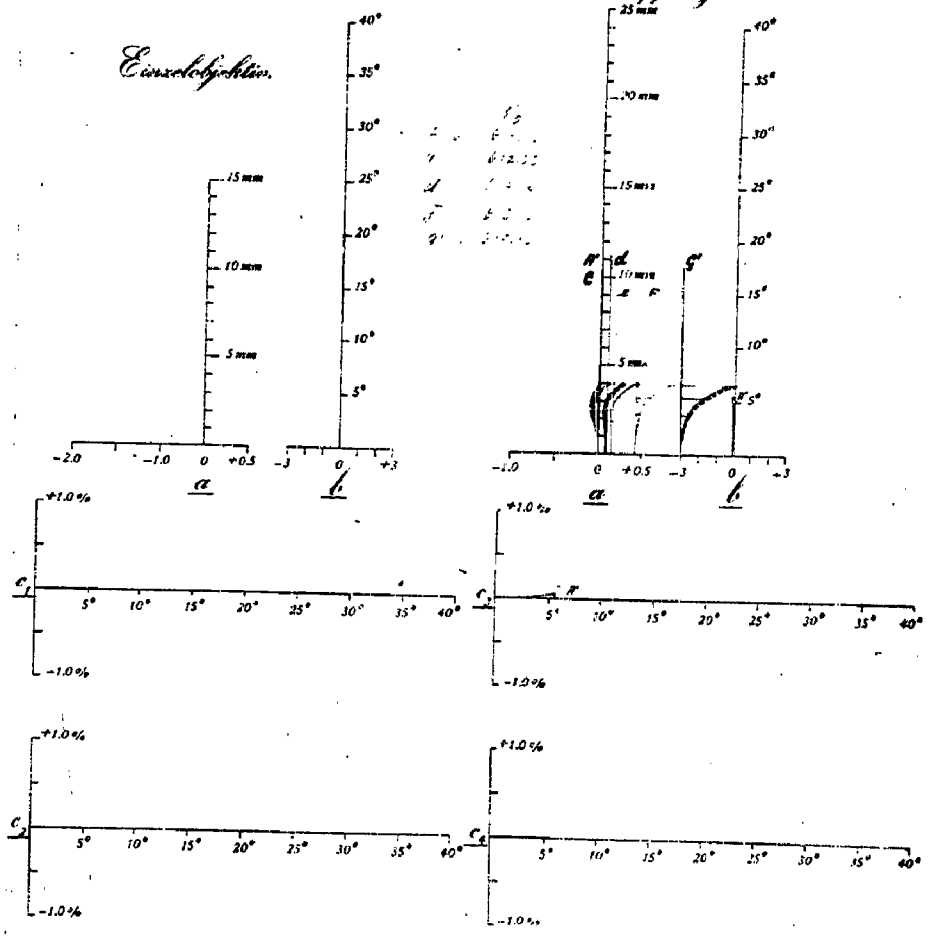
V 1941 No 17 1:12,5 f=67,5cm. Rechn. v. 22.9.44

s' = 90,9

Linse	n_d	n_F - n_d	v	
L1	1,61826	0,07365	56,7	SK2
L2	1,57982	0,07745	42,6	LF1
L3	1,60742	0,07696	46,3	BaF1

Einzelobjektiv.

Doppelobjektiv.



L 1495

V 1941 № 16, 1 : 2, f = 350 mm v. 27.8.41

F.75-6398-PE

1940

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AK 27/39

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'			Doppelobjektiv Δf		
		-5.1	-2.6	+12.8	-7.6	-4.6	+15.9

Einzelobjektiv Einfallshöhen			Einzelobjektiv Chromasie	

Doppelobjektiv Einfallshöhen			Doppelobjektiv Chromasie	
57.8	61.5	100.0	-7.4 (+4.6) -4.8	-2.06 (+0.74) -1.32

Astigmatismus (AK 27/39) 32-37

Einzelobjektiv Sagittalbüschel		Einzelobjektiv Meridionalbüschel		

Doppelobjektiv Sagittalbüschel			Doppelobjektiv Meridionalbüschel		
-1.87	-1.94	-2.84	-0.46	-1.20	-2.26

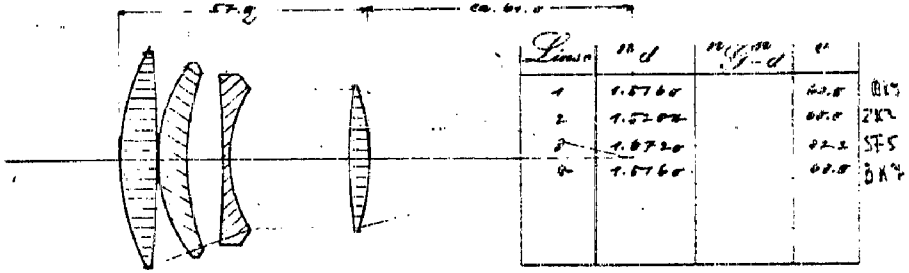
Einzelobjektiv Frontwinkel			Einzelobjektiv Verzeichnung		

Doppelobjektiv Frontwinkel			Doppelobjektiv Verzeichnung		
15.2	21.2	25.5	1000.06	1001.65	1002.9

Radien, Dicken und Abstände für f = 100 mm.

r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	d_2	d_3	d_4	d_5	d_6	D_1	D_2	P	D_3	P'	D_4
47.6	142.4	25.0	57.6	256.2	29.5	111.0	63.0	0.5	6.0	6.6	2.1	1.9	29.4	4.7	13.8	90.0	44.0	38.5	82.8	33.0

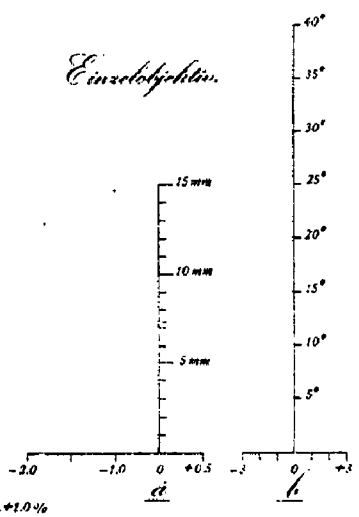
V 1941 № 16, 1 : 2, f = 35 cm v. 27.8.41

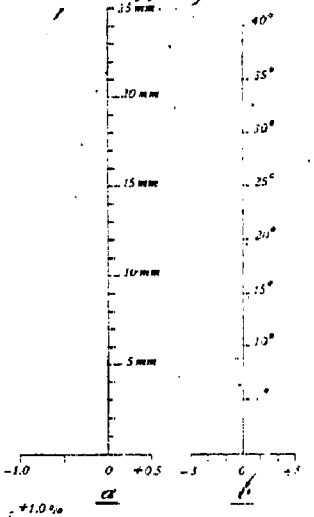


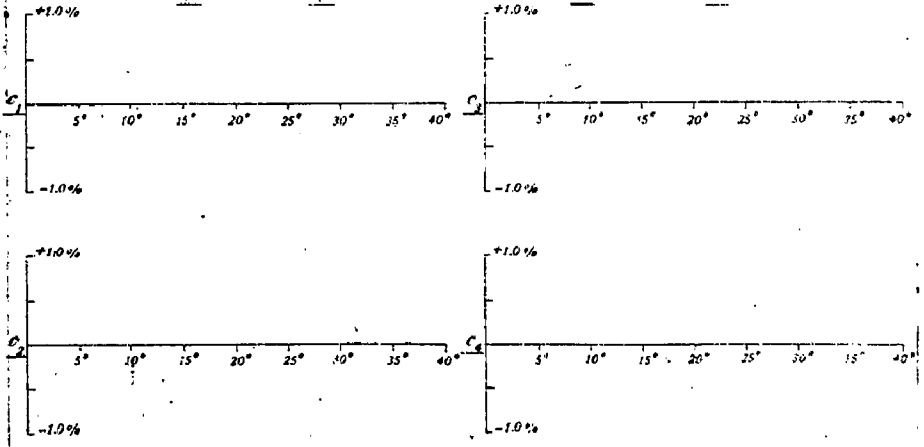
Linse	n_D d	$n_{F'} - n_{C'}$ d	ν_d	
1	1.5766		62.8	BK7
2	1.5208		60.6	ZK2
3	1.6726		32.2	SF5
4	1.5766		62.8	BK7

Doppelobjektiv.

Einzelobjektiv.







F-75-63 P8-RE

1941

Ultron 1:2 f=35 mm No. 1415a

Ultron 1:2, f = 35 mm, M. 27.8.41 (d = 2 mm Spritzguß)

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (HZ 22)/1944

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		−5.9 | −4.5 | +7.8	−8.3 | −6.3 | +18.5

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		67.8 | 61.5 | 19.8	−87 (+53) −28

Astigmatismus (HZ 37)/52-63

Einzelobjektiv. Sagittalwinkel	Einzelobjektiv. Meridionalwinkel	Doppelobjektiv. Sagittalwinkel	Doppelobjektiv. Meridionalwinkel
		−1.9 | −2.8	−1.2 | −1.2

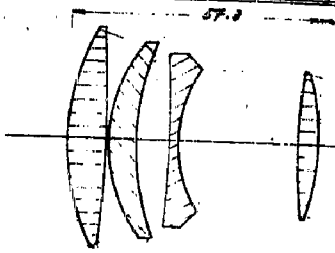
Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Vorzeichnung
		21.8 | 25.3	1941.87, 1942.45

Radien, Dicken und Abstände für f = 100 mm.

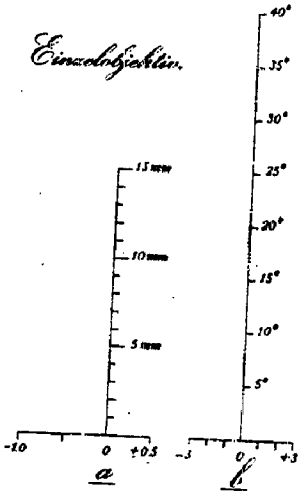
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	d_3	l_3	d_4
67.8	109.8	85.0	87.5	208.2	29.5	111.3	52.8	9.1	6.8	6.6	8.1	1.9	27.6	4.7

Linse | n_d | $n_{G'-d}$ | ν

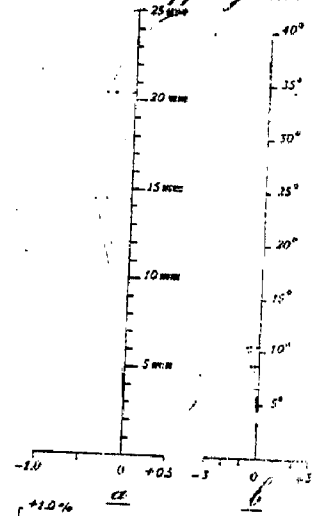
Linse	n_d	$n_{G'-d}$	ν	
1	1.57165		61.8	BK7
2	1.62028		60.0	LaK...
3	1.67220		32.2	SF6
4	1.57160		61.8	BK7

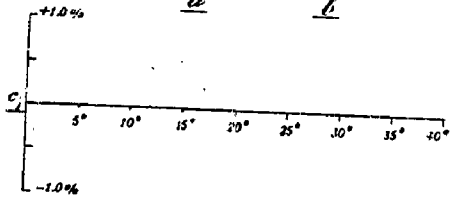


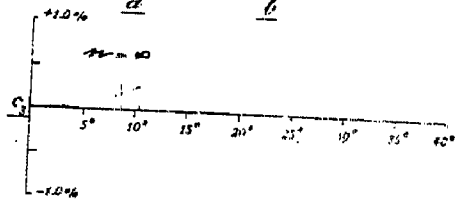
Einzelobjektiv.

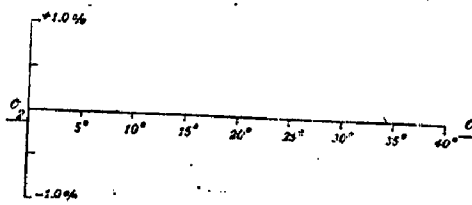


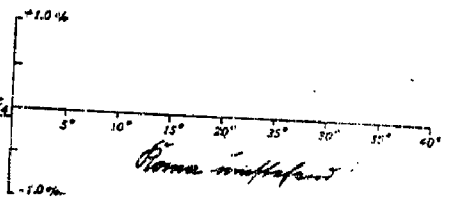
Doppelobjektiv.











Bitte wenden

F-75-6398-KE

V 1940 Nr. 9. 1:5 f = 100 cm Rechn. v. 19.6.40

Einzelobjektiv.

Sphärische Korrektion (d4 + ff).

Δs'	Δf

Einfallshöhen | Chromasie.

Doppelobjektiv.

Sphärische Korrektion (d4 + ff).

Δs'	Δf
-0,2	-0,3 -0,3 +0,3 +0,5 +0,5

Einfallshöhen | Chromasie.

23,2	22,8	19,1

-7,9 (+7,2) -1,2

Astigmatismus (d4 + ff) / ff = +2,2

Sagittalwinkel	Meridionalwinkel

Frontwinkel | Vorzeichnung

Sagittalwinkel | Meridionalwinkel

-0,1	-0,3	-0,5	-0,5	-0,3	-0,6	-2,0	-5,1

Frontwinkel | Vorzeichnung

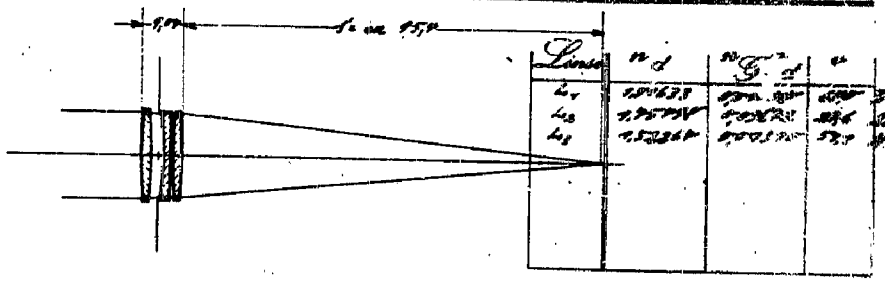
2,2	3,0	4,2	7,2

Radien. Dicken und Abstände für f = 100 mm.

R_1	R_2	R_3	R_4	R_5	R_6	d_1	d_2	d_3	d_4	d_5
19,6	+29,5	25,1	55,5	11,6	∞	2,5	2,0	1,0	0,2	4,0

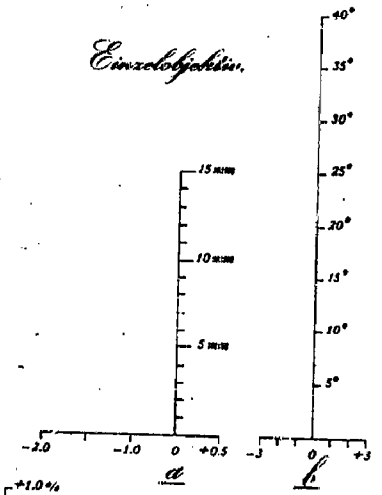
f' = 100,5
Δ = 3,0

V 1940 Nr. 9. 1:5 f = 100 cm Rechn. v. 19.6.40.

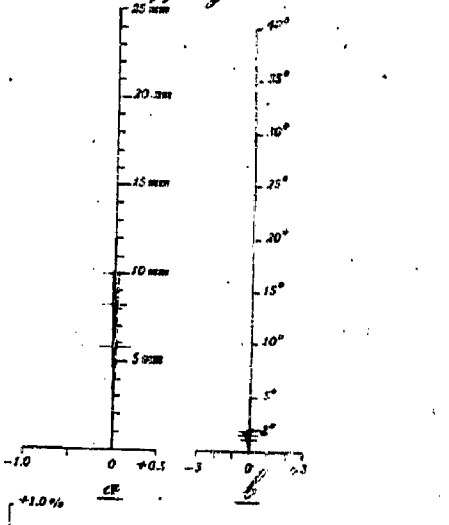


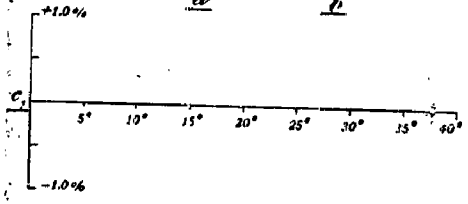
Linse	n_d	ν_d	r_d
L_1	1,5163	64,1	242
L_2	1,7552	27,6	1176
L_3	1,5725	57,7	242

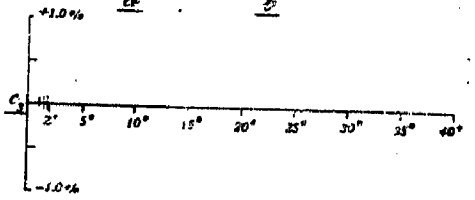
Einzelobjektiv.

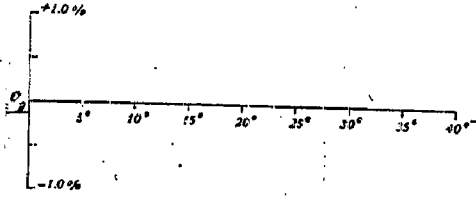


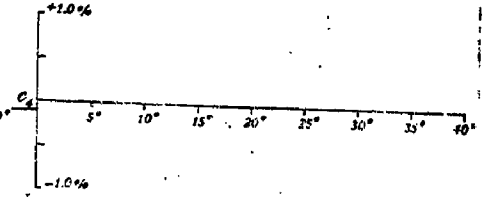
Doppelobjektiv.











L 8417

F-73-639-PF-1373

Vi 1941 No 18, 1:2.4, f = 125 mm v. 2. 10. 41

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (AX 17) / 9 L

	Δs'	Δf'

d	Δs'		Δf'		
	-4.0	-4.9	-7.3	-5.3	-6.7	-8.5

Einfallshöhen.	Chromasie.

Einfallshöhen.			Chromasie.	
+0.0	69.8	83.4	-19 (+14) -C	-0.46 (+0.82) -0.76

Astigmatismus (AX 17) / 126 - 129

Sagittalwinkel	Meridionalwinkel

Sagittalwinkel		Meridionalwinkel	
-0.87	-0.93	-0.22	-0.47

Frontwinkel.	Vorzeichnung.

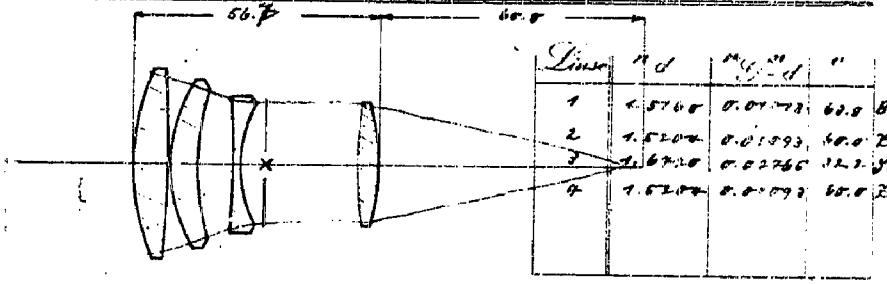
Frontwinkel.		Vorzeichnung.	
10.6	15.2	1888.4	1007.8

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	d_3	l_3	l_2	d_4	D_1	D_2	R_4	D_3	R_5
62.5	280.6	35.2	67.8	107	29.6	117.8	69.5	8.6	0	6.6	8.2	1.9	5.7	24.8	4.7	84.0	48.0	82.2	89.0	35.0

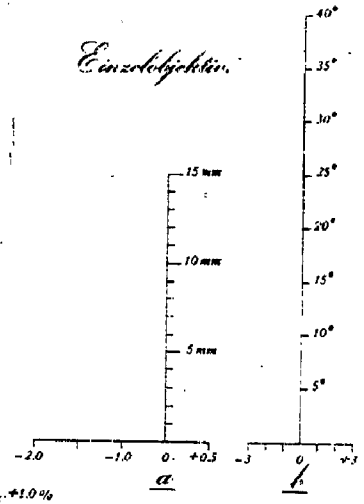
$D_4 = 36.0$

Vi 1941 No 18, 1:2.4, f = 125 mm v. 2. 10. 41

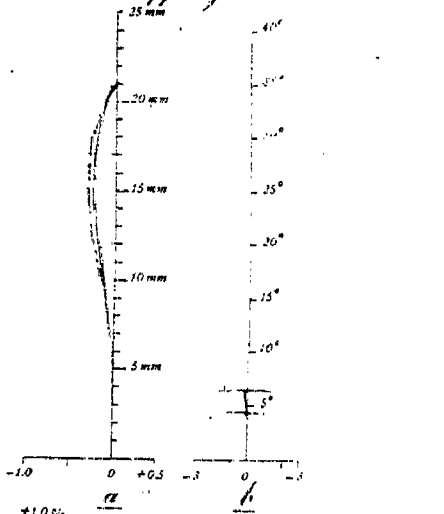


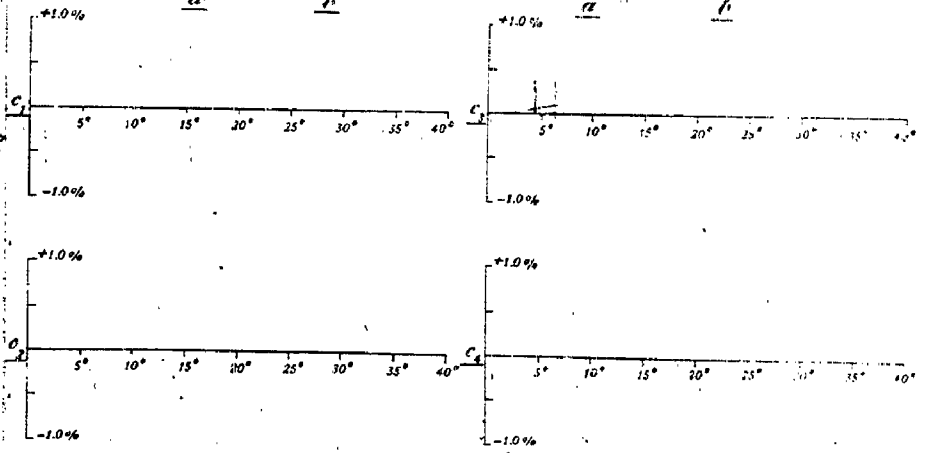
Linse	n_d	$n_{C'} - n_{F'}$	v'	
1	1.5760	0.01718	60.8	BK7
2	1.5200	0.01893	60.0	ZK2
3	1.6726	0.02766	32.2	SF6
4	1.5200	0.01893	60.0	ZK2

Einzelobjektiv



Doppelobjektiv





ZY-8689-52-4

4461

L. 1413

V 1947 K 19. 1 : 1.5 f = 30 cm. Rdy. vom 9. 12. 47

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (1 x 2 / 1 x 3 / 1 x 4)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-3.5 -3.0 +2.5 -0.5 -0.2 +3.5	

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Astigmatismus (1 x 3 / 1 x 4)

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel
		-1.5	-0.5

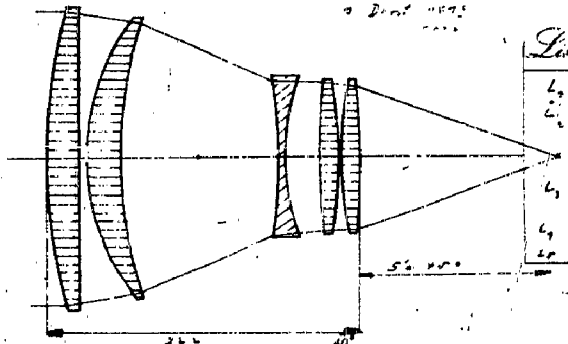
Frontwinkel. | Verzeichnung. | Frontwinkel. | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	s	s'	r	δ	γ	β	ϑ	ε_0	ϑ_1	ℓ_1	R_2	ℓ	R_3	ℓ_2	R_4	ℓ_3	R_5
12.53	60	5.27	100.0	31.5	5.5	13.3	11.9	5.2	1.49	7.5	1.5	2.5	16.7	1.5	3.5	2.2	0.2	2.2

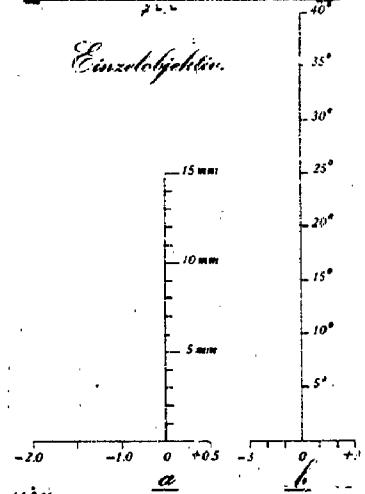
$\vartheta_1 = 64°$ $\vartheta_2 = 63°$ $\vartheta_3 = 44°$ $\vartheta_{ges} = 51°$

V 1947 K 19. 1 : 1.5. f = 30 cm. Rdy. v. 3. 12. 47.

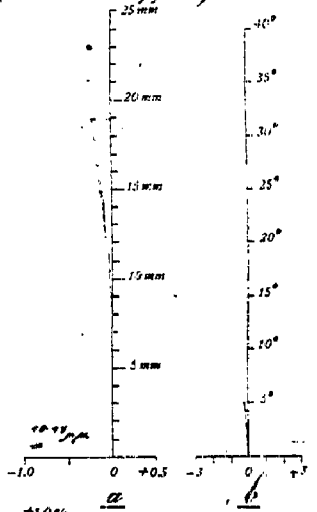


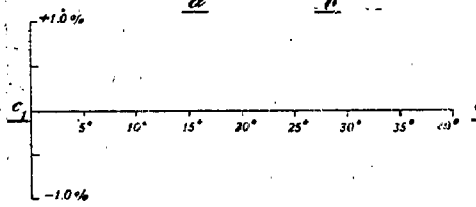
Linse	n_d	ν_d	$P_{g,d}$	ε_d	
L_1	1.6163	57.2	0.5426	0.3	SK 3
L_2					
L_3	1.7283	28.3	0.6028	2.3	SF 11
L_4	1.6163	57.2	0.5426	0.3	SK 3
L_5					

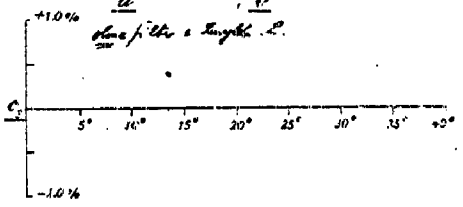
Einzelobjektiv.

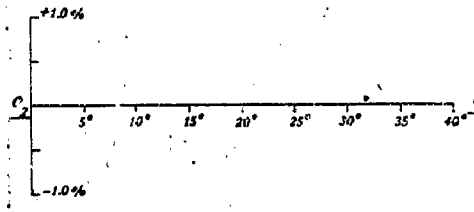


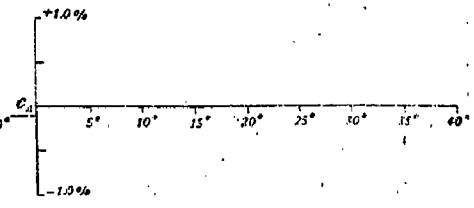
Doppelobjektiv.











L 1419

1:1.5 $f = 5$ cm. Rob. v. 8. 10. 22.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (12×23) / 100 – 102

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf
		−0.73 −0.62 +0.69 −2.39 −7.01 +2.02	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		74.6	104.3	132.2	

Astigmatismus (12×7) / 73–81

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel
			−9.9		−9.2

Einzelobjektiv Fensterwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Fensterwinkel	Doppelobjektiv Vorzeichnung
			49.5		

Radien, Dicken und Abstände für $f = 100$ mm.

1	2	3	4	5	6	7	8	9	r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	r_5
92.84	∞	10.34	77.01	52.48	93.91	102.20	42.97	94.38	5.6	2.51	2.8	12.55	12.54	2.01	3.8	4.85	9.40	1.85

133°

$\Omega_1 = 41°$; $\Omega_2 = 43°$; $\Omega_3 = 37°$; $\Omega_4 = 35°$; $\Omega_5 = 35°$

1:1.5 $f = 5$ cm. Rob. v. 8. 10. 22.

Linse	n_d	n_{F_1}		
L_1	1.69	69		
L_2	"	"		
L_3	1.62	62		
L_4	1.69	69		
L_5	1.69	69		

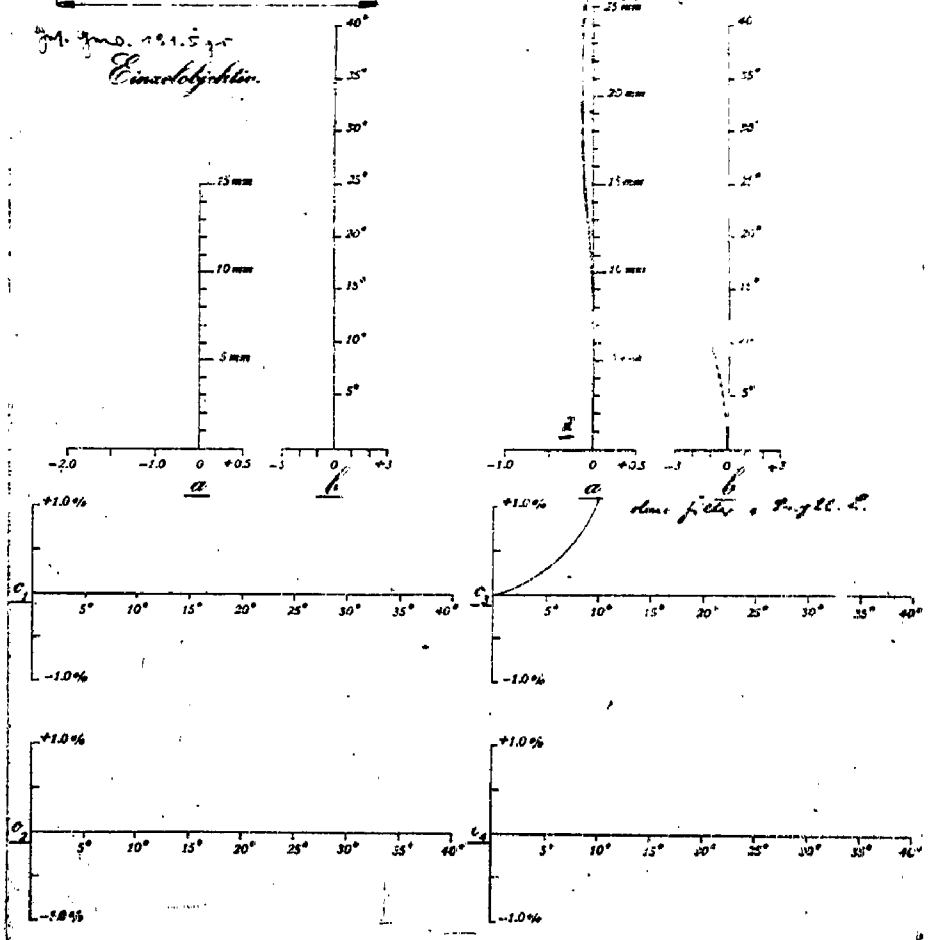
5' = 2.3

93.9

Gl. Nr. 1421. 5 gr

Einzelobjektiv.

Doppelobjektiv.



ohne Filter + 2 gr. Ch.

1:1 f=7cm für n=6 Rechn.v 15.10.41.

F-75-6380-R2

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AX 41)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'			Doppelobjektiv. Δf		
		-4.5	-3.3	+7.3	-1.6	-3.1	-9.3

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen			Doppelobjektiv. Chromasie.
		118.3	168.2	207.7	s'F − s'C = −5.8 − 7.7

Astigmatismus (AX 35)

Einzelobjektiv. Sagittalbüschel		Einzelobjektiv. Meridionalbüschel			Doppelobjektiv. Sagittalbüschel			Doppelobjektiv. Meridionalbüschel		
					-0.4	+0.2	+0.8	-1.3	-0.7	+0.8

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel			Doppelobjektiv. Vorzeichnung		
		45½°	30.9	35.9	990.43	985.80	980.90

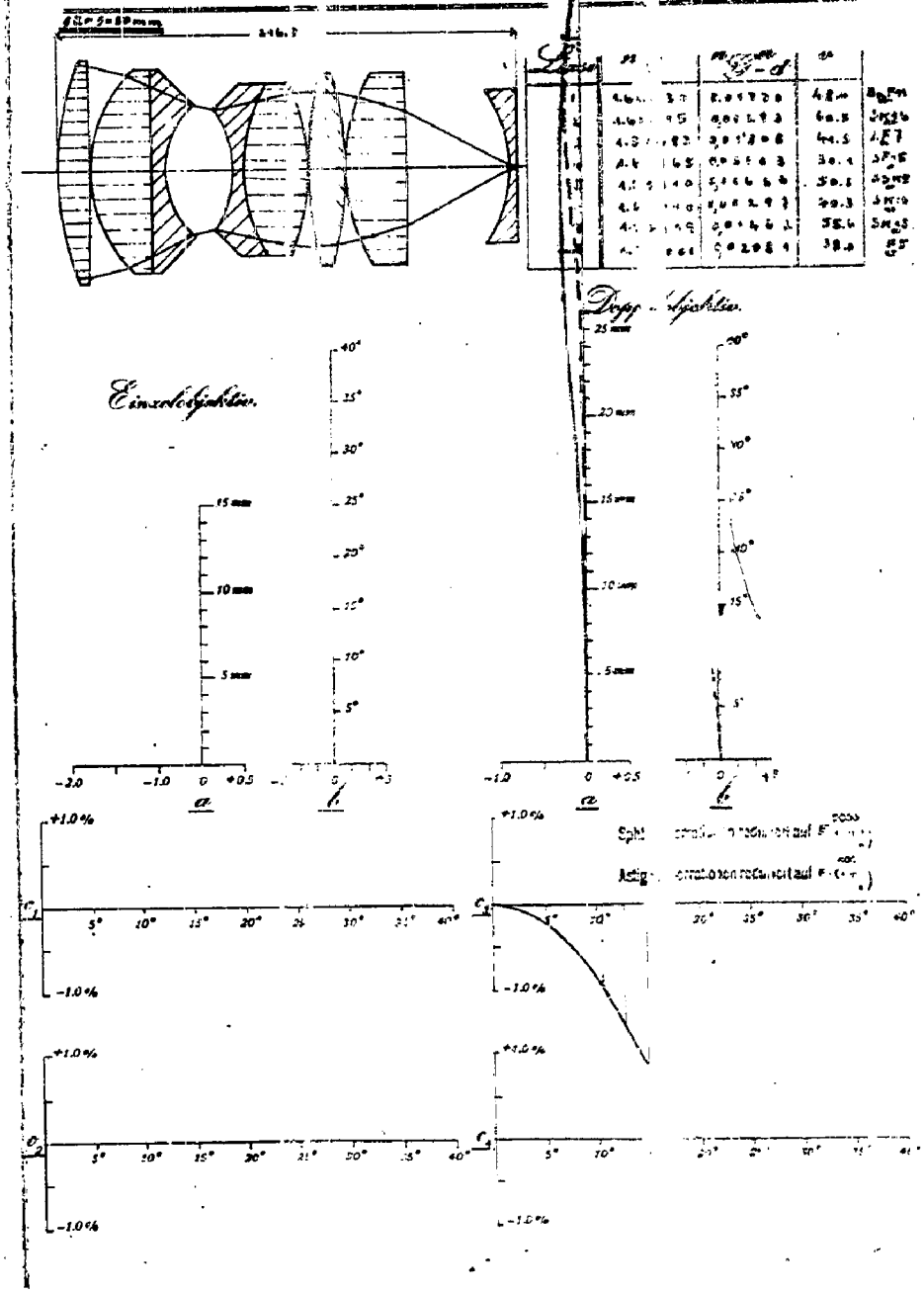
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	d_1	ℓ_1	d_2	d_3	ℓ_2	ℓ_3
119.1	444.4	65.4	00	44.4	53.8	30.9	49.4	119.5	468.9	84.5	436.6	6.5	00	15.4	0.1	49.3	6.4	12.2	11.5

d_4	d_5	ℓ_4	d_6	ℓ_5	n_1	ℓ_6	d_7
5.1	49.4	0.1	49.9	0.2	49.3	48.5	3.7

K 1420

1:1 f=7cm für n=6 Rechn.v 15.10.41.



L. 1421

V 1941 N: 23 1:2 f=2,5 cm Rechn.v. 3.11.41.

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1347

Einzellobjektiv. | Doppellobjektiv.

Sphärische Korrektion (AW 39) / 108

Einzellobjektiv. Δs'	Einzellobjektiv. Δf'	Doppellobjektiv. Δs'	Doppellobjektiv. Δf'
		−4,4 −5,1 +1,8	−4,0 −5,7 −4,7

Einzellobjektiv. Einfallshöhen	Einzellobjektiv. Chromasie	Doppellobjektiv. Einfallshöhen	Doppellobjektiv. Chromasie
		53,8 21,8 100,7	

Astigmatismus (AX 35) / 84

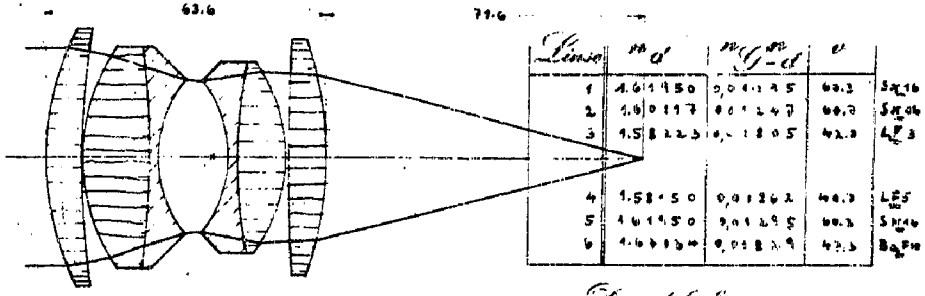
Einzellobjektiv. Sagittalbüschel	Einzellobjektiv. Meridionalbüschel	Doppellobjektiv. Sagittalbüschel	Doppellobjektiv. Meridionalbüschel
		−2,5 −1,3 +0,2	−1,3 −1,3 −1,2

Einzellobjektiv. Frontwinkel	Einzellobjektiv. Verzeichnung	Doppellobjektiv. Frontwinkel	Doppellobjektiv. Verzeichnung
		42,4° 55,1 62,8	99,35 98,60 99,38

Radien, Dicken und Abstände für f = 100 mm.

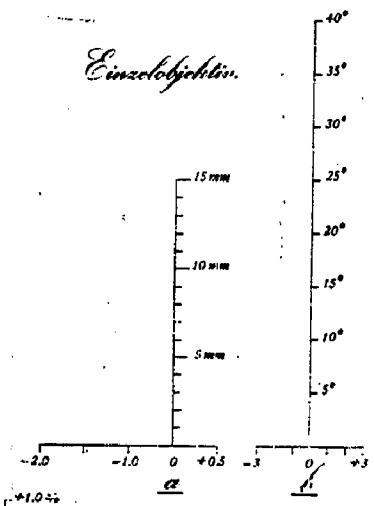
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	d_2	d_{3_1}	d_{3_2}	d_{4_1}	d_{4_2}	d_4	d_5	d_6	d_7
86,93	338,3	44,39	248,5	28,14	212,4	46,73	13,64	51,57	83,18	5,2	0,2	18,3	1,8	12,4	3,5	2,3	18,9	0,5	8,5

V 1941 N:23 1:2 f=2,5 cm Rechn.v. 3.11.41

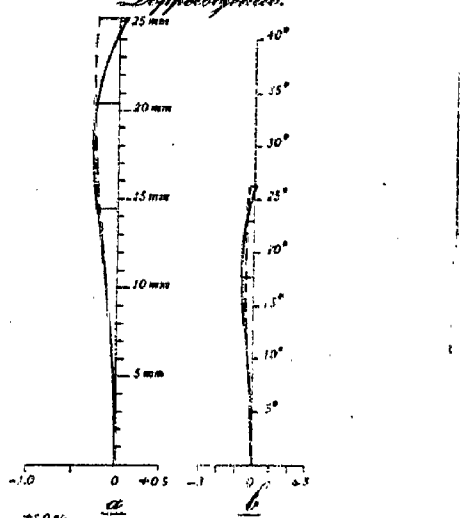


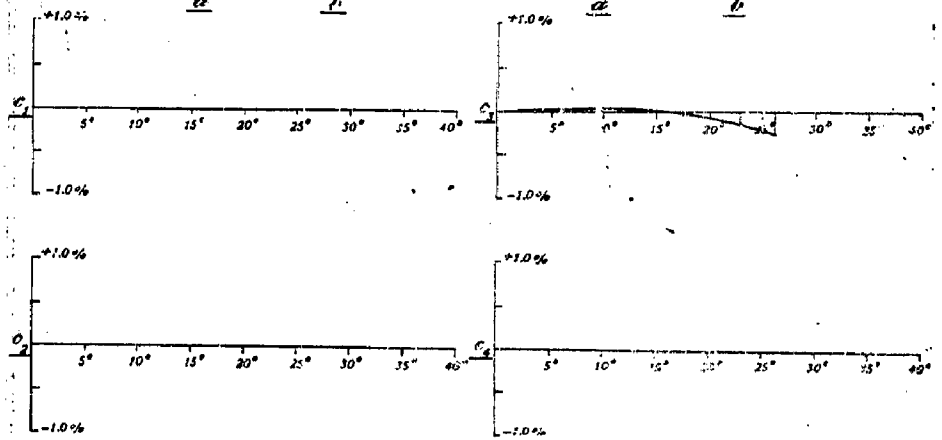
Linse	n_d	ν	
1	1,611250	60,3	S_{K16}
2	1,6	60,7	S_{K04}
3	1,5	49,3	L_{F3}
4	1,581500	40,9	L_{E5}
5	1,611500	60,3	S_{K16}
6	1,6	49,3	S_{K}

Einzellobjektiv.



Doppellobjektiv.





Weitwinkel 1:4, f = 5cm. Rechng. v. 1.11.41

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Weitwinkel 1:4, f = 5cm. Rechng. v. 1.11.41

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (d'r, s'/s)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie

Astigmatismus

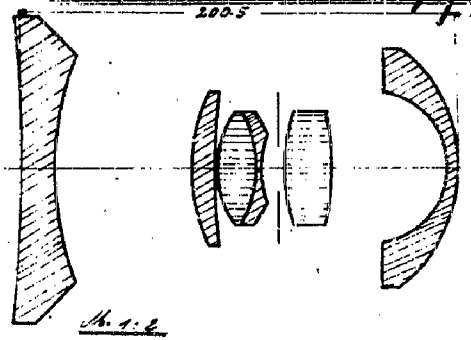
Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung

Radien, Dicken und Abstände für f = 100 mm.

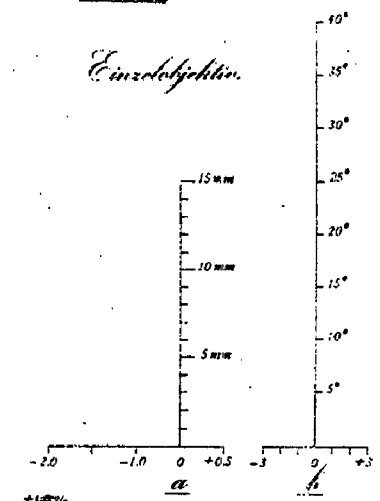
r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	l1	d2	l2	d3	d4	b1	b2	d5

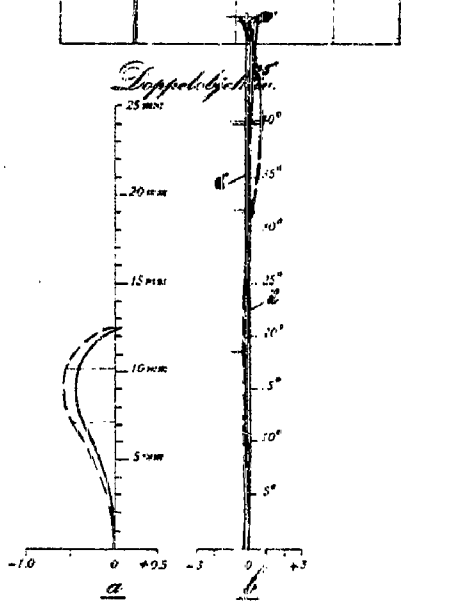
l1	d6

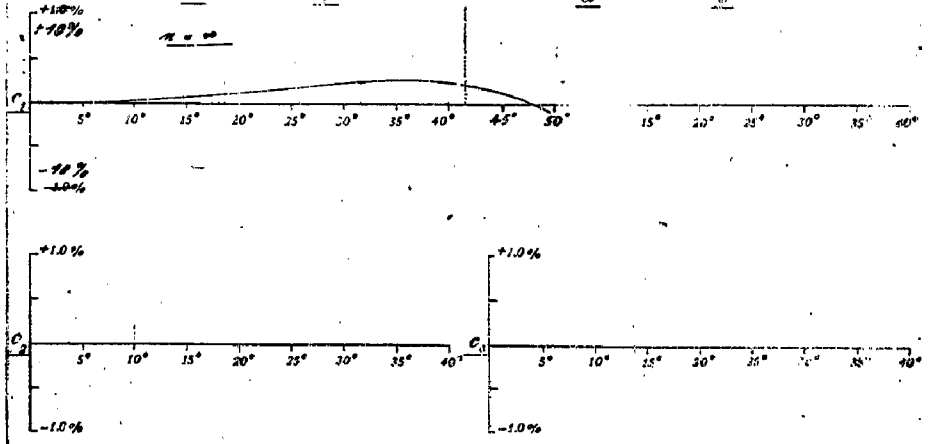


Linse	n_d	ν_d	r
L1			
L2			
L3			
L4			
L5			
L6			

M. 1:2







F-TS-6398-RE

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L 1423

Vi941 Nr 2, 1:5, f = 1 m, w. 27.1.41

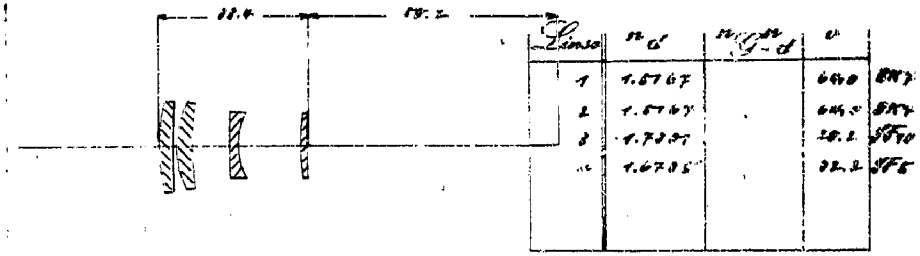
	Einzelobjektiv.		Doppelobjektiv.		
Sphärische Korrektion (AX5/16					
	Δs'	Δf'	Δs'		Δf'	
c	−1.0	−1.2	−0.7	−1.2	−1.0	−1.4
d	−0.6	−0.6	+0.5	−0.8	−0.7	+0.7
e	−0.2	+0.7	+1.5	−0.4	−0.7	+1.0
	Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.		
			23.7	32.6	46.0	$\frac{a-b}{+9}$ (+20) +29
Astigmatismus (AX 63/95-99						
	Segmentwinkelhöhe	Meridionalhöhe	Segmentwinkelhöhe	Meridionalhöhe		
c	−0.1	−0.1	−0.1	+0.6	+0.5	−0.9
d	−0.2	−0.2	±0.0	+0.5	+0.5	−0.8
e	−0.2	−0.2	±0.0	+0.4	+0.3	−0.7
	Frontwinkel.	Exzentrizität.	Frontwinkel.	Exzentrizität.		
			18.3	22.4	29.6	1001.68 1002.10 1001.22

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	d_3	l_3	d_4	D_1	D_2	F_2	D_2	F_2
44.6	171.1	28.8	75.0	249.6	16.4	94.6	54.0	3.1	0.4	3.6	0.9	7.9	14.7	7.6	20.8	20.8	79.5	74.5	78.6

D_2 73.2

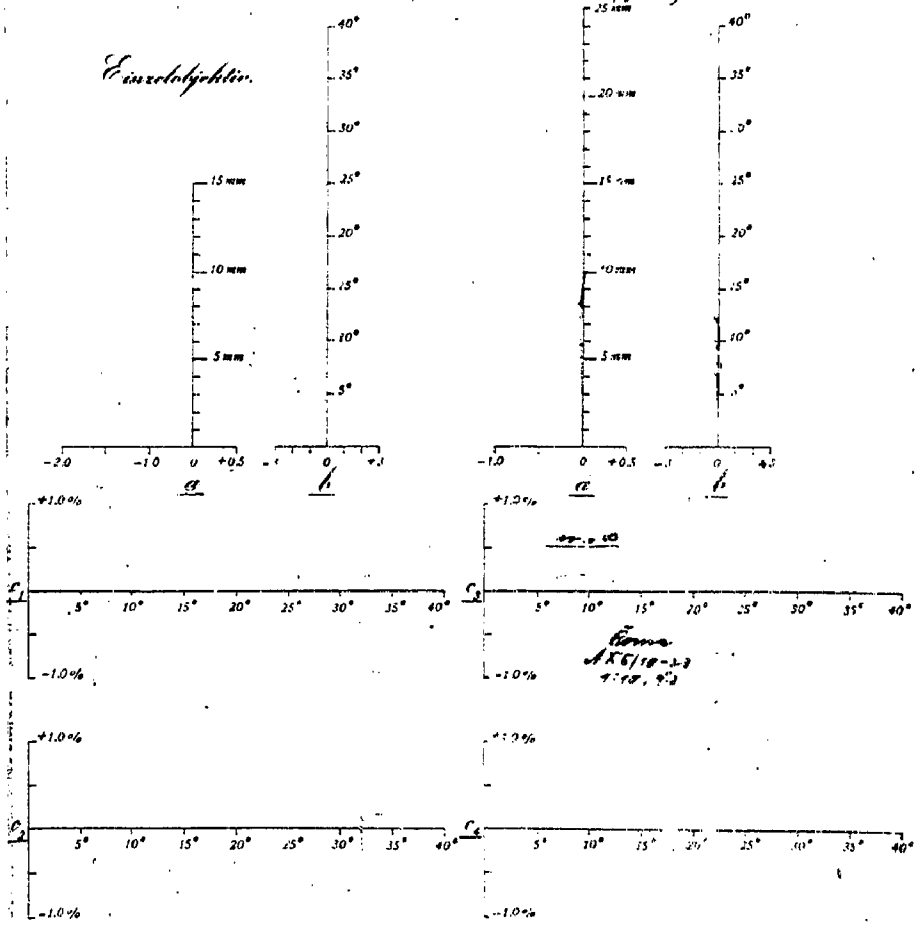
Vi941 Nr 2, 1:5, f = 1 m, w. 27.1.41



Linse	n_e	ν_e	D_e	
1	1.5767		64.0	BK7
2	1.5767		64.0	BK7
3	1.7237		28.2	SFL6
∞	1.6725		32.2	SF6

Doppelobjektiv.

Einzelobjektiv.



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1350

V 1911 No. 19, 1:7.5, f = 30 cm, Rolf, n. 2 m. m.

mit Zusatzglied
Einzelobjektiv

ohne Zusatzglied
Doppelobjektiv

Sphärische Korrektion (Strahlen. Lage (Ry))

Δs'		Δf'		Δs'		Δf'	

Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.

Astigmatismus (Strahl/Lage)

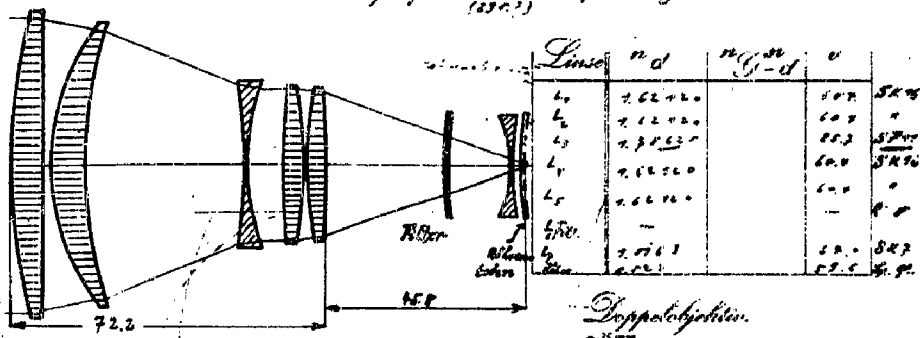
Sagittenwinkel	Meridionalwinkel	Sagittenwinkel	Meridionalwinkel

Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung

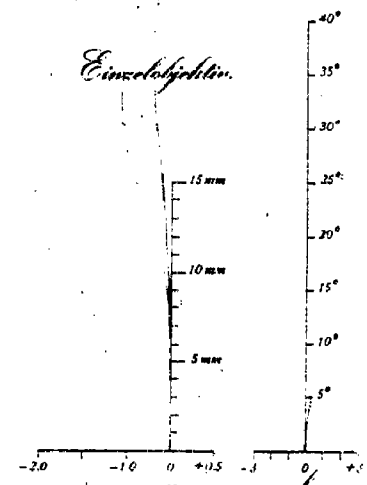
Radien, Dicken und Abstände für f = 100 mm.

Zusatzglied.

Filter Linse Smyth. Linse Röhre



Einzelobjektiv.

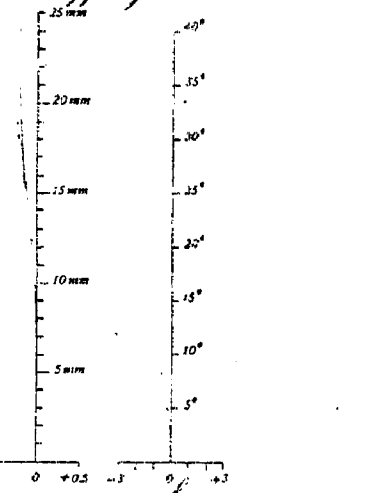


a b

1079 µµ

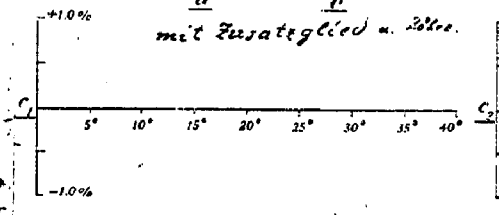
auf Röhre.

Doppelobjektiv.

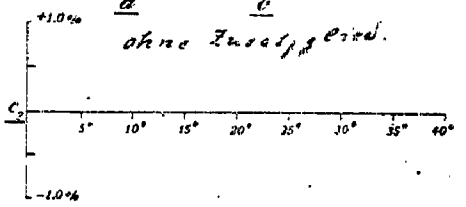


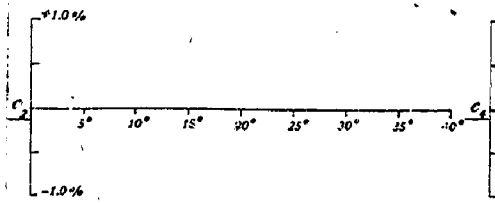
a b

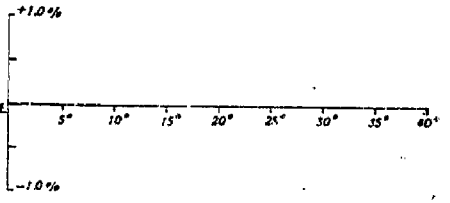
mit Zusatzglied u. Röhre.



ohne Zusatzglied.







zu Darstellg. I. 1425

V 1941. No. 22.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (h' u' C d)

Einzelobjektiv Δs'			Einzelobjektiv Δf'		
-2.8	-3.3	+3.8	-14.2	-11.8	+22.3

Doppelobjektiv Δs'			Doppelobjektiv Δf'		
-3.4	-2.8	+4.1	-4.7	-3.8	+7.5

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Einfallshöhen			Einfallshöhen		
76.1	107.7	137.9	76.1	107.7	137.9

Astigmatismus ( )

Sagittalbüschel. | Meridionalbüschel | Sagittalbüschel | Meridionalbüschel

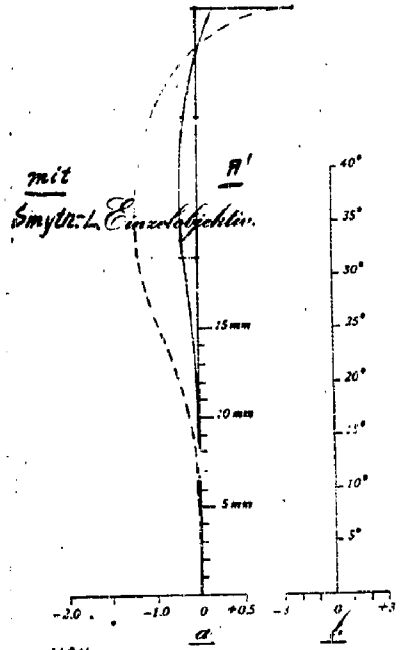
Frontwinkel. | Verzeichnung. | Frontwinkel. | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

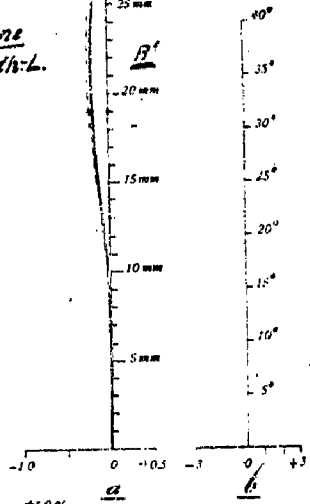
V 1941 No. 22. für endlichen Maßstab (n = 75.4)

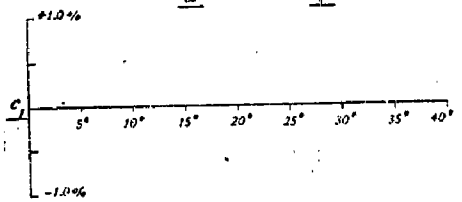
Linse	a	d	G	d	e
		R'			

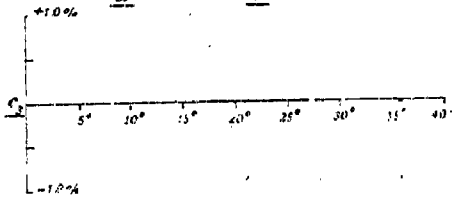
mit Smyth-L. Einzelobjektiv.

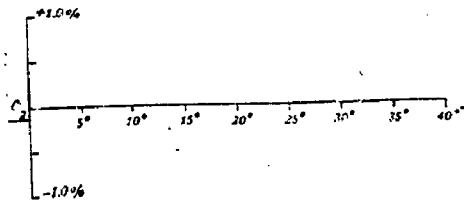


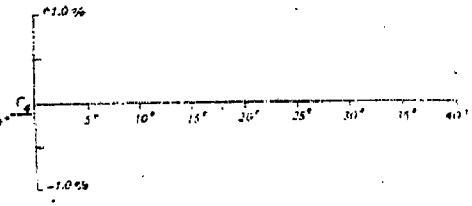
ohne Smyth-L.











Zu Bericht v. 1425

V 1941. No. 22.

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (Fr. Zeiss)

Einzelobjektiv.					
$\Delta s'$			$\Delta f'$		
-3.8	-3.3	+3.8	-14.2	-10.8	+22.3

Einzelobjektiv.					
$\Delta s'$			$\Delta f'$		
-3.4	-2.8	+4.1	-4.7	-3.8	+3.7

Einfallshöhen.			Chromasie.
76.1	107.7	131.9	

Einfallshöhen.			Chromasie.
76.1	107.7	131.9	

Astigmatismus ( )

Segmentwinkel	Meridionalwinkel				

Segmentwinkel	Meridionalwinkel				

Frontwinkel.	Vorzeichnung.

Frontwinkel.	Vorzeichnung.

Radien, Dicken und Abstände für $f = 100$ mm.

| | | | | |

L 1425

F-75-6378-RE

Tessar No 22 1:4.5 f = 40 mm Zeiss K 25.10.44

ohne Zusatzglied

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion für x+2/30

Δs'		Δf'			
3.9	-2.7	+3.5	-11.8	-7.6	+24.8

Δs'		Δf'			
-3.3	-2.8	+3.6	-3.9	-3.6	+2.3

Einfallshöhen	Chromasie
73.0	+0.3.3 +24.5

Einfallshöhen	Chromasie
75.4	+0.2.3 +7.7.5

Astigmatismus / /.

Sagittalbüschel	Meridionalbüschel
+2.5	+2.6

Sagittalbüschel	Meridionalbüschel
-1.0	-1.9

Frontwinkel	Verzeichnung
72.0	+0.2.3

Frontwinkel	Verzeichnung
72.0	+0.3.29

Radien, Dicken und Abstände für f = 100 mm.

r_n	2	3	4	5	6	7	8	9	10	d_1	l_1	d_2	l_2	d_3	l_3	d_4	l_4	d_5
74.6	∞	50.5	92.9	+12.3	43.7	74.3	+7.2.8	89.9	246.5	8.1	1.9	7.7	+7.4	13.0	1.5	7.8	4.8	0.2	4.8

Φ 68.0 63.5 32.0 5.6.0 33.5

Zusatzglied

r_n	r_2	r_3	r_4	r_5	r_6	l_2	d_2	l_3	d_3	l_4	d_4
22.1	443.2	20.8	64.3	-20.7	+0.7	22.2	+1.0	+2.7	0.5	1.7	0.8
Linse		Kitt	Zypres	Linse			2.6	3.2		2.3	2

Tessar No 22 1:4.5 f = 40 mm Zeiss K 25.10.44

(395.6)

Linse	r_n	d_n	n_e / ν_e - d_e	n_e
1	+1.0.2.7			60.7
2	+1.6.1.2			60.4
3	+1.7.2.2.2			29.3
4	+1.6.7.4.4			60.4
5	+1.6.7			60.4
6	Kitt			—
7	+1.5.7.6.3			+0.0
8	+1.5.2.3.0			59.6

995

732

Einzelobjektiv

Doppelobjektiv

a b

+1.0% -1.0%

mit Zusatzglied d. Reihe

ohne Zusatzglied

F-75-6388-RE

1353

1:1.5 f = 5 cm

Einzelobjektiv		Doppelobjektiv	
Sphärische Korrektion (/)			
Δs'	Δf'	Δs'	Δf'
Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
Astigmatismus (/)			
Sagittalstrahlbüschel	Meridionalstrahlbüschel	Sagittalstrahlbüschel	Meridionalstrahlbüschel
Frontwinkel	Verzeichnung	Frontwinkel	Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Linse	n_d	ν_d	$n_F - n_C$
1			
2			
3			
4			

Einzelobjektiv

Doppelobjektiv

a

b

a

b

c_1

c_2

c_3

c_4

F-Tessar 1:2,8 f=8,5 cm

1934

1:1,5 f=40 cm. Rdf. v. 26.11.47.

mit Zusatzglied. — Einzelobjektiv.

ohne Zusatzglied. — Doppelobjektiv.

Sphärische Korrektion (s. Kurve) / Bl. 33

mit Zusatzglied						ohne Zusatzglied					
Δs'			Δf'			Δs'			Δf'		
-2,3	-1,3	+0,7	-1,3	-5,9	+33,0	-1,3	-1,3	+0,4	-1,3	-4,5	+0,6

Einfallshöhen / Chromasie

mit Zusatzglied			ohne Zusatzglied		
35,7	106,2	33,9	33,8	103,8	31,9

Astigmatismus (s. Kurve) / Bl. 32

mit Zusatzglied				ohne Zusatzglied			
Sagittalbüschel		Meridionalbüschel		Sagittalbüschel		Meridionalbüschel	
F	-0,12						
	+3,0		+2,9	-1,8		-1,7	

Frontwinkel / Vorzeichnung

mit Zusatzglied				ohne Zusatzglied			
		12,5				12,5	

Radien, Dicken und Abstände für f = 100 mm.

r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	r_{17}	r_{18}	r_{19}	r_{20}
100,0	∞	57,91	+28,0	33,84	6,93	-27,4	111,3	1,1	0,2	7,9	133,4	0,6	5,21	41,0	+0,03	100,0	+0,04	67,7	67,7	67,7

d_0	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	d_{10}	d_{11}	d_{12}	d_{13}	d_{14}	d_{15}	d_{16}	d_{17}	d_{18}	d_{19}
0,04	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

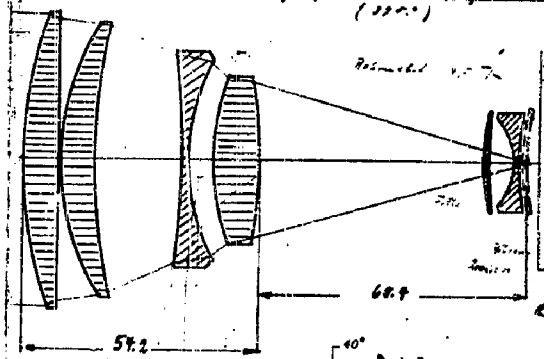
γ_1 5,5° $\quad \beta_1$ = 11,4 $\quad D_1$ = 19,5° $\quad \beta_2$ = 17°

Zusatzglied

β_2 = 27,5° $\quad \beta_1$ = 23,0°

F. R. Hyde 1:1,5 f = 40 cm. Rdf. i. 46.25.47.

(332.)



Linse	n_d	$n_G - n_d$	ν
L_0	1,617		63,4
L_1	1,617		63,4
L_2	1,617		63,4
L_3	1,617		55,0
L_{2+3}	—		—
L_4	1,617		63,4

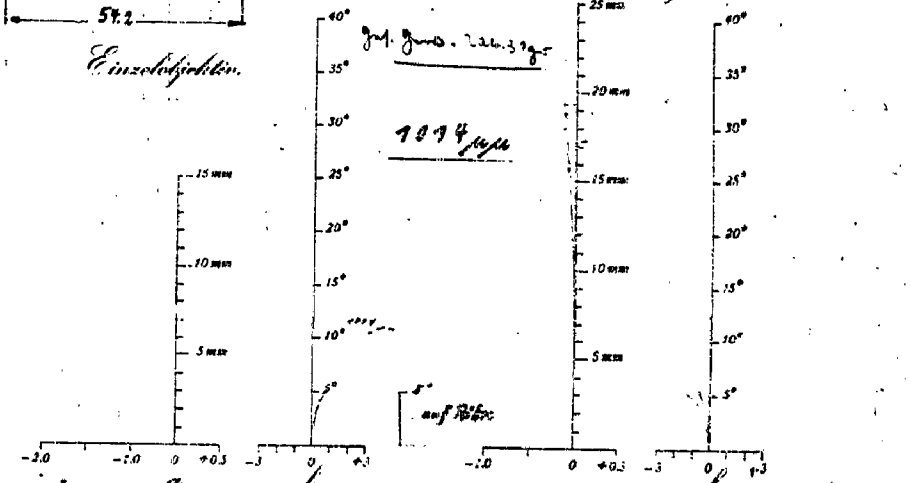
57,2

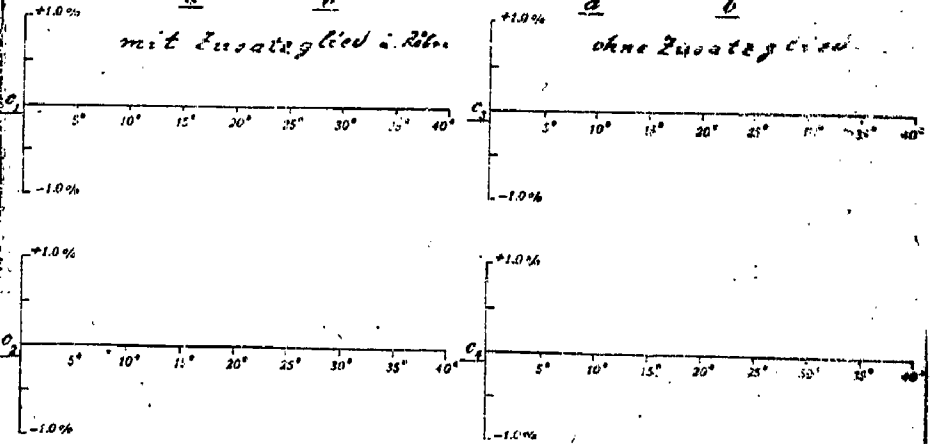
68,4

Einzelobjektiv. — Doppelobjektiv.

Jul. Jacob. 226.37 g-5

1934 Hyde





F-TS-6398-RE

13555

Tagor-Objektiv 1:6,5 f = 47 mm

ohne Filter und Symmetrale

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (Δ s')

Δf		Δs'		Δf	

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

Astigmatismus

Segmentalbüschel	Meridionalbüschel	Segmentalbüschel	Meridionalbüschel

Frontwinkel | Bezeichnung

Frontwinkel | Bezeichnung

Radien, Dicken und Abstände für f = 100 mm.

R							d	l	d	l	l	d	l	d	l	d

| | | | | | | | | | | | | | | | |

Nr. 1498

Zeiss-Ikon 1:1.2 f. 100 mm F 82.6125 v. 30.8.37

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AT 5/6 f.)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'		Doppelobjektiv Δf'		
		-6.4	-6.6	+1.6	-16.8	-14.8	-7.8

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie.
		96.2	136.9	166.7

Astigmatismus (AT 35 f. 30-31)

Einzelobjektiv. Sagittalwinkelabschnitt	Einzelobjektiv. Meridionalwinkelabschnitt	Doppelobjektiv. Sagittalwinkelabschnitt		Doppelobjektiv. Meridionalwinkelabschnitt	
			-1.5	-2.6		-6.8	-7.8

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
			48.2	25.8	795.30 / 986.87

Radien, Dicken und Abstände für f = 100 mm.

R_1	2	3	4	5	6	7	8	d_1	l	d_2	d_3	d_4	l_a	l_2	d_5
72.5	460	538	1378	279	32.9	102.5	279.9	21.4	0.54	76.7	16.1	12.8	45.0	8.6	12.8

Frei ϕ an Rädern

1	2	3	4	5	6	7	8	9	10
83.4	89.9	73.6	62.4	56.7	40.4	34.2	29.9		

Zeiss Ikon 1:1.2, f. 100 mm v. 30.8.37 F 82.6125

M 1:2

Linse	n_d	ν_d	$G-d$	ϕ
1	1.6116			47.5
2	1.6163			40.2
3	1.6467			64.9
4	1.7551			23.5
5	1.7041			34.8

Einzelobjektiv.

Doppelobjektiv.

a. b. a. b.

c_1 c_2 c_3 c_4

+1.0% −1.0%

5° 10° 15° 20° 25° 30° 35° 40°

F.75.6398-25

DK 151952 Kodak 1:2.8. f=10cm (Petzvalobjektiv) o.13.3.47

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (443)/75

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		+0.4 +0.2 +1.0	-0.6 -0.4 +1.2

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		41.2 58.5 72.0	

Astigmatismus (443)/68-73

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
		-2.0 -3.0 -5.5	+0.1 -0.7 -3.0

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		28.1 29.0 27.3	994.0 986.0 977.1

Radien, Dicken und Abstände für f = 100 mm.

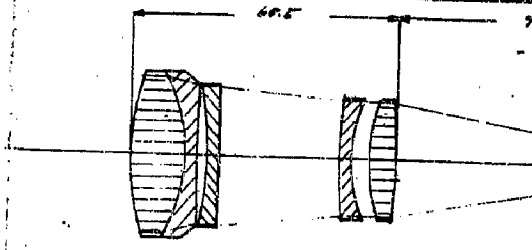
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_1	d_2	l_1	d_3	l_2	d_4	l_3	d_5	D_1	r_3	D_2
60.5	38.5	69.8.0	62.9	104.9	186.2	85.7	142.5	446.0	12.0	2.0	2.0	2.0	27.5	3.0	4.0	6.0	38.0	38.0	24.0

D_{1-2} 26.0 D_{2-3} 26.0

A 1429

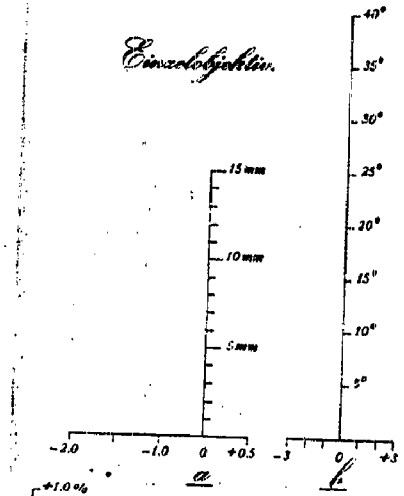
F 446 217 = 18 m 38
F 446 221 = 10 9.47

DK 151952 Kodak 1:2.8. f=10cm (Petzvalobjektiv) o.13.3.47

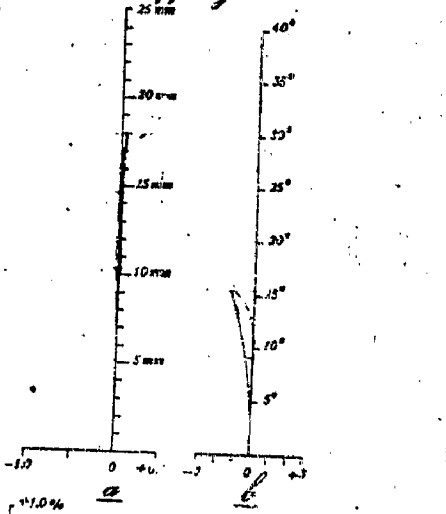


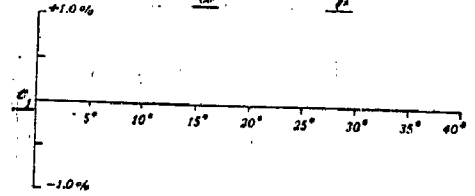
Linse	n_d	$n_g - n_d$	
1	1.6199		57.2
2	1.6728		38.0
3	1.6134		43.6
4	1.6164		36.6
5	1.5409		47.2

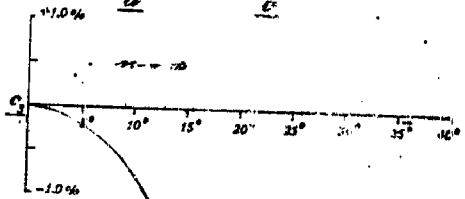
Einzelobjektiv.

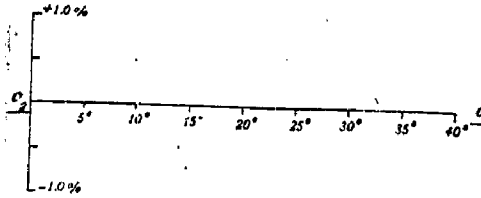


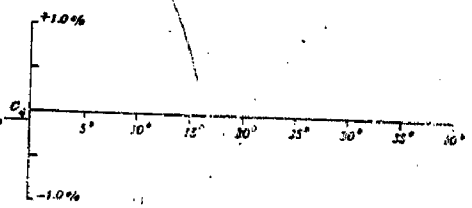
Doppelobjektiv.











F:75-6398-RE

1358

Ψ 1939 № 33, 1 : 1.4, f = 5 cm v. 27.6.39.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (mit ψ 11/10)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'		Doppelobjektiv Δf'	
		−12.3	−8.8	−17.3	−16.9	−14.6	−24.3

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		82.5	117.0	143.0	−5.9 (−3.7) −5.9

Astigmatismus (mit ψ 15) .64 – 66 – 64

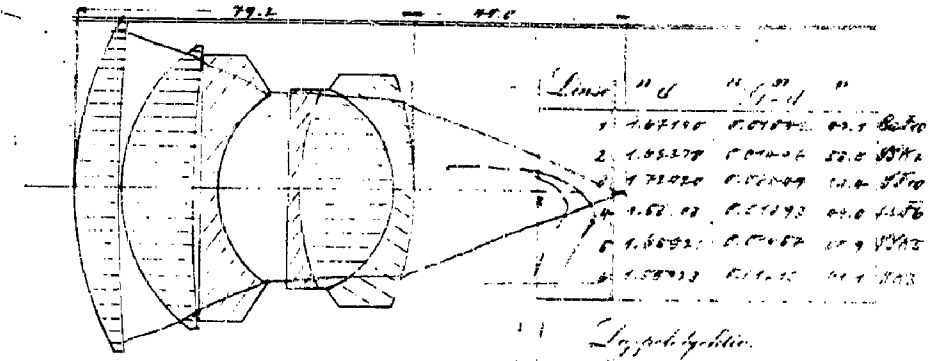
Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel		
		−1.4	−2.2	−2.2	+0.3	+5.1	−6.2

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung		
		25.0	38.4	49.3	1006.2	1012.0	1019.0

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	L_1	d_2	L_2	d_3	L_3	d_4	d_5	d_6
78.5	342.0	25.0	192.0	∞	25.6	∞	58.9	12.9	93.5	10.2	0.4	17.1	1.7	4.0	46.6	2.7	21.6	5.0

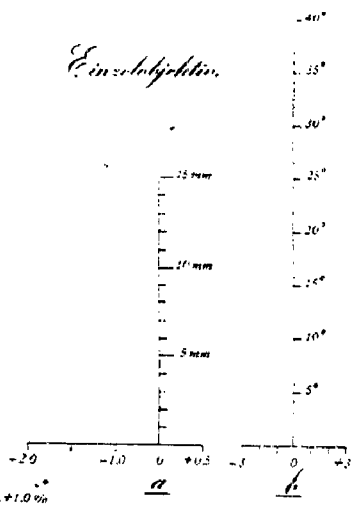
$D_{r\cdot 2}$	$D_{3\cdots 4}$	D_5	$\bar{r}_6$	$D_{7\cdots 9}$	$D_{9\cdots 10}$
75.0	65.0	60.0	42.0	46.0	57.0

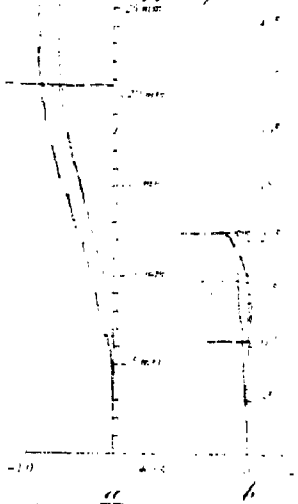


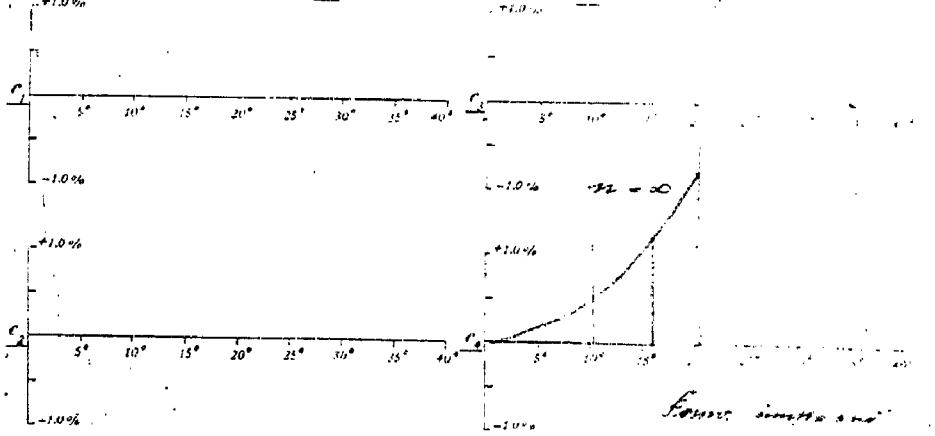
Linse	n_d	$n_{F'}-n_{C'}$	ν
1	1.67190	0.01844	63.1 Bak10
2	1.65379	0.01804	58.8 BSK2
3	1.72020	0.02809	41.4 SF10
4	1.62 02	0.01193	60.6 LLF6
5	1.65921	0.01857	50.9 VSK3
6	1.58913	0.01410	61.1 BK7

Doppelobjektiv.

Einzelobjektiv.







Triplet

No. 1930

F-75-6378-RE

1379

Typ 1939 No. 33. 1:4.4 f = 5 cm Blende = 2.4 cm 3.9

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs'/s')

Einzelobjektiv.		Doppelobjektiv.	
Δs'	Δf'	Δs'	Δf'
1.3	-0.4	-0.0	-0.3	+0.9	+0.6	-0.5	-0.2

Einzelobjektiv.		Doppelobjektiv.	
Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		12.6	+0.6	8.0	+0.0	3.0	+0.0	1.0	+0.0

Astigmatismus (s'k'/s'-s'_m)/s'_m = 0.9

Einzelobjektiv.			Doppelobjektiv.		
Aequatorialbüschel	Meridionalbüschel		Aequatorialbüschel	Meridionalbüschel	
+1.0	-2.2	-2.2	+0.3	+0.1	-0.1

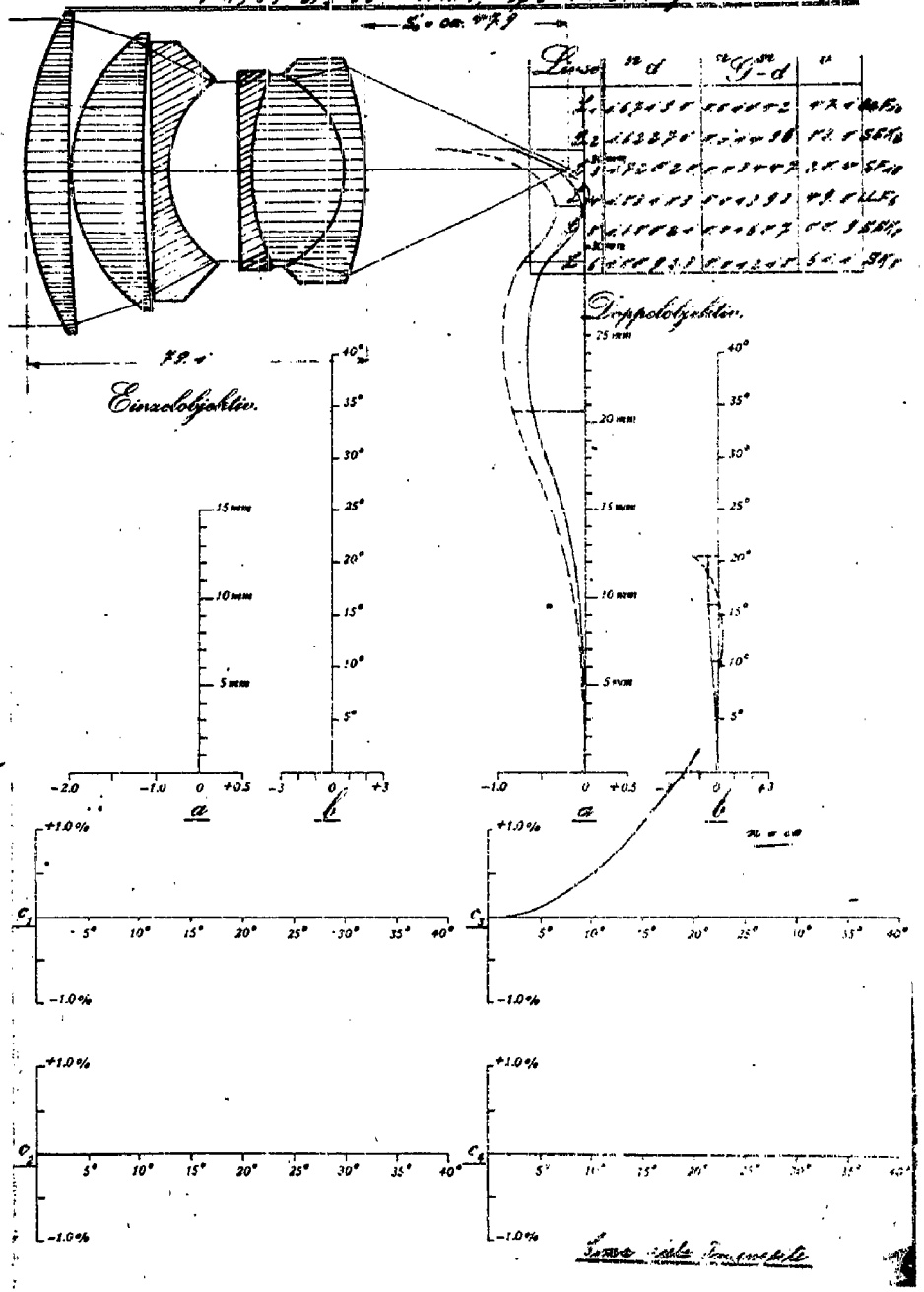
Einzelobjektiv.		Doppelobjektiv.	
Frontwinkel.	Vorzeichnung.	Frontwinkel.	Vorzeichnung.
2.5°	3.4°	+9.2	innen 2.9 · innen 9° · innen 9.0 m

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	l_0	d_2	l_2	d_3	l_3	l_4	d_4	d_5	d_6
3.5	+5.4	+3.3	+2.3	∞	-2.6	∞	+1.3	2.2	3.2	+0.2	4.4	+2.0	1.3	4.0	1.0	+0.5	1.2	0.6	5.0

+0.2
-2.4
+2.0
-1.2
+0.0
-5.0
-1.5
2.2
2.6
5.0

7.9



F-75-6396-AE

1360

Voläten / Voigtl. m. Kodaner Cäsiblinse, 1:6.3, f=10 mm, Bld. 1987
D.R.P. 182477 v. 20.3.06 f. Weitwinkel

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Abb. 43)

Δs'	Δf'

Δs'			Δf'		
−0.7	−0.3	+2.5	−0.9	−0.4	+0.2

Einfallshöhen. | Chromasie.

Einfallshöhen. | Chromasie.

10.3	25.0	37.5

Astigmatismus (Abb. 86) 184–185

Segmentalwinkel	Meridionalwinkel				

Segmentalwinkel			Meridionalwinkel		
−0.4	−0.1	+0.5	−0.2	+2.0	+5.3

Frontwinkel. | Vorzeichnung.

Frontwinkel. | Vorzeichnung.

22.3	31.0	37.3

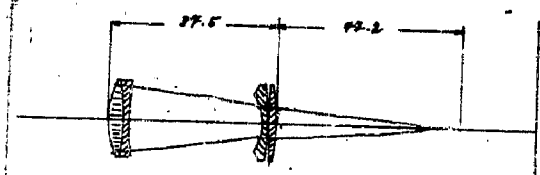
1071.2 1073.1 999.9

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	d_2	l_1	d_3	l_2	d_4		D_{n_d}	$\bar{n}_g$	$\bar{n}_F$	$D_{n_F - n_C}$		
253	41.6	87.0	12.5	75.0	188.0	42.0	3.7	1.2	38.2	1.0	0.1	1.9		17.5	16.5	$\frac{17.5}{38.2}$	$\frac{17.5}{41.2}$		

N. 1431

Voläten / Voigtl. m. Kodaner Cäsiblinse, 1:6.3, f=10 mm, Bld. 1987
D.R.P. 182477 v. 20.3.06 f. Weitwinkel

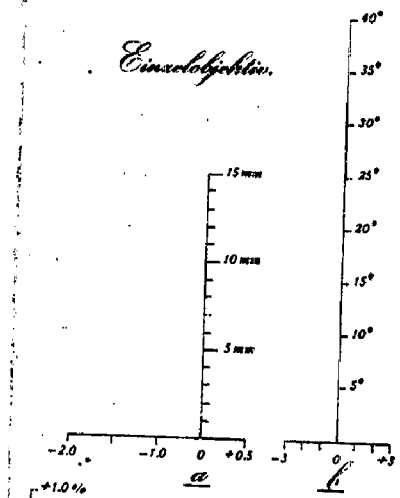


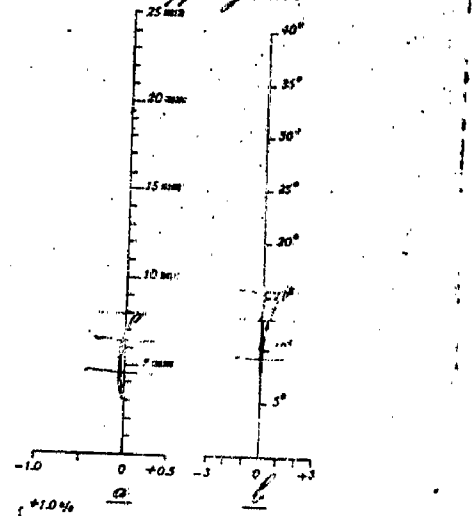
Linsen-Nr. 1352 (75 mm)
+ 14 : 1

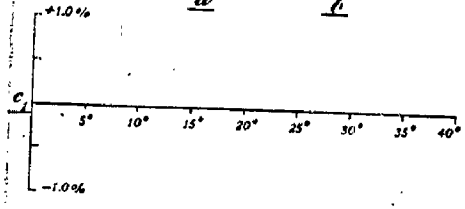
Linse	n_{D^e}	$n_{F^e} - n_{C^e}$	ν
1	1.58073		59.7
2	1.72825		28.3
3	1.57423		57.0
4	1.62054		36.3

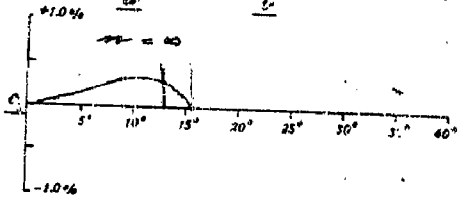
Doppelobjektiv.

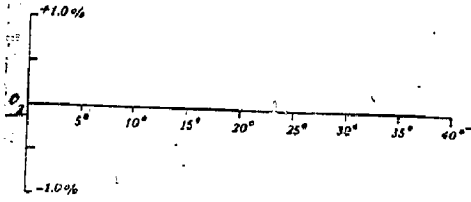
Einzelobjektiv.

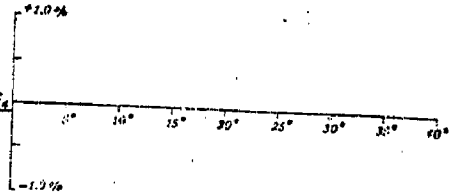












L. 1432

Voltikon (Voloob. m. Kodak. Ektiline.), 1:6.3, f = 10 cm, Okt. 1937
F.P. 382.977 v. 15.2.40 2. Beispiel

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AWW) 47

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
		-1.8	-2.1	-1.0	-2.8	-3.5	-2.0

Einfallshöhen.	Chromasie.	Einfallshöhen.	Chromasie.
		17.3 | 25.9 | 31.8	

Astigmatismus (AWW) 106-129

Sagittalbüschel	Meridionalbüschel	Sagittalbüschel			Meridionalbüschel		
		+0.0	-0.1	+0.1	-0.2	+0.0	-0.6

Frontalwinkel.	Verzeichnung.	Frontalwinkel.			Verzeichnung.		
		22.1	30.7	37.8	1005.8	1009.8	1011.5

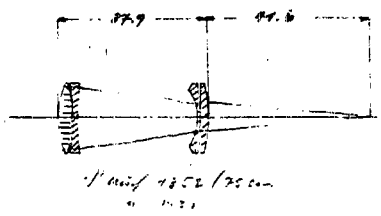
Radien, Dicken und Abstände für f = 100 mm.

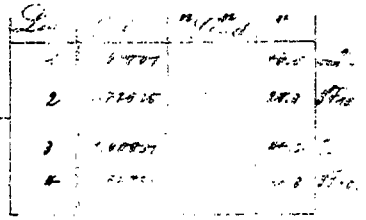
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	d_3	l_3	d_4		D_{0-1_0}	F_S	D_{0-r_8}
24.1	45.0	48.2	74.0	12.0	79.0	∞	33.1	2.2	0.1	1.2	20.4	1.0	0.1	1.9		17.6	77.5 / 76.6	79.6

F-75-696-RE

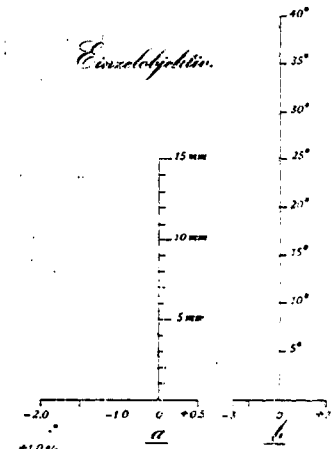
1961

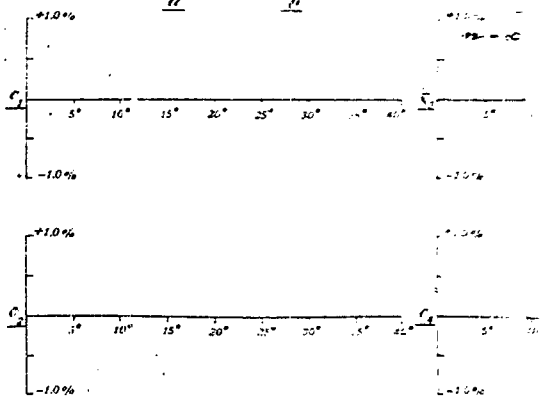
Voltikon (Voloob. m. Kodak. Ektiline.), 1:6.3, f = 10 cm, Okt. 1937
F.P. 382.977 v. 15.2.40 2. Beispiel.





Einzelobjektiv.





F-TS-6378-RE

1392

Nr. 1433

Tessar 1:3.5, f = 3.5 cm v. 13.12.44

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (ARK 22) / 21

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'			Doppelobjektiv Δf'		
		−16.7	−7.2	+3.3	−16.7	−7.2	+3.3

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen			Doppelobjektiv Chromasie	
		32.5	46.0	66.3	−12.2 (−3.1?) −16.7	−24.7 (−4) −36.7

Astigmatismus (ARK 26) / 34–35

Einzelobjektiv Sagittalbüschel			Einzelobjektiv Meridionalbüschel		

Doppelobjektiv Sagittalbüschel			Doppelobjektiv Meridionalbüschel		
−5.7		+2.2	−2.7		−1.2

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung

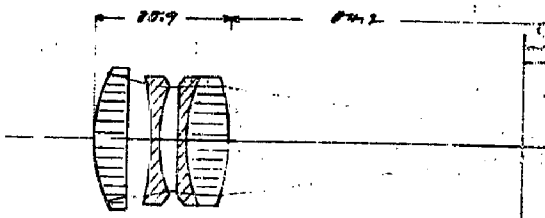
Doppelobjektiv Frontwinkel		Doppelobjektiv Vorzeichnung	
67.4	72.7	1811.0	1817.6

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	l_1	d_2	l_2	d_3	d_4	D_{1-2}	D_2	D_3	D_4	D_5
34.1	758.0	70.5	28.3	273.6	28.1	65	7.4	5.3	2.7	4.3	1.8	16.8		32.0	29.0	26.0	19.0

16.7
6.4
+1.9
24.9

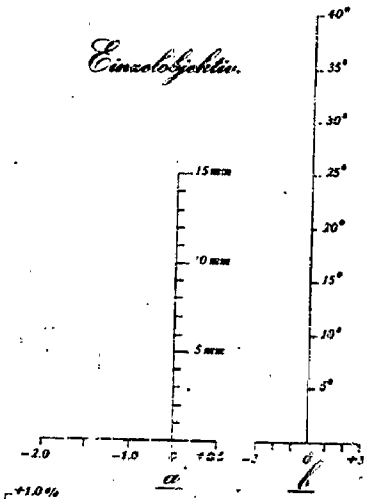
Tessar 1:3.5, f = 3.5 cm v. 13.12.44



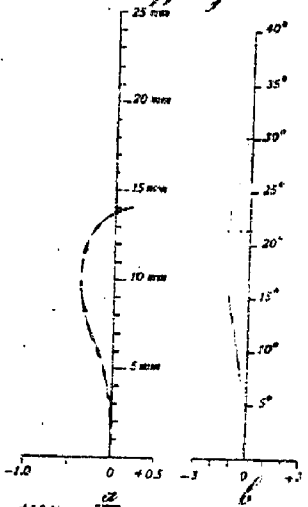
Linse	n_d	ν_{G-d}	ν_d	
1	1.62287		60.5	SK16
2	1.61339		36.9	F3
3	1.72291		50.7	LaSF5
4	1.47000		67.4	BaF10

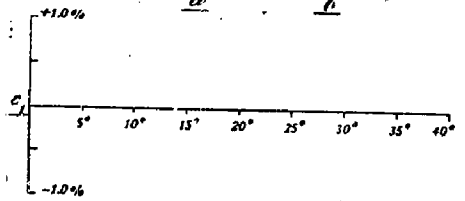
Brennweite 79.94 ± 0.1 mm
ca. 0.5 mm länger (wenn Ding v. Tr. = ∞)

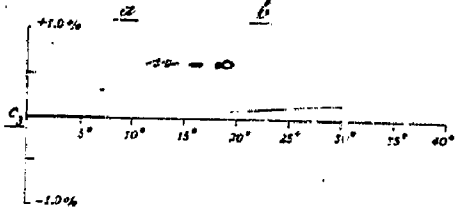
Einzelobjektiv

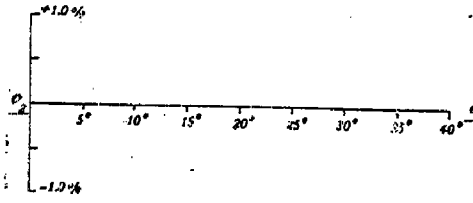


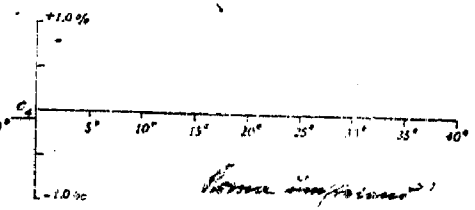
Doppelobjektiv











F-75-6388-RE

1963

FR-Biotar 1:1.5, f = 15 cm v. 27.6.44 mit Luftspalt

Einzelobjektiv — Doppelobjektiv

Sphärische Korrektion (AK 44/113/124–126)

mit Luftspalt

Δs'			Δf'		
−5.3	+1.0	−0.5	+0.6	+1.1	−0.5

ohne Luftspalt

Δs'			Δf'		
−0.5	+0.4	−1.3	−0.4	+0.5	−1.3

Einfallshöhen — Chromasie

76.1	100.0	122.6	(−17.0) −21.2

Δs = 1074 → +11.2

Einfallshöhen — Chromasie

76.1	100.0	122.6	(+8.2) −7.9

Δs = 1074 → −11.1 (+274) −7.2

Astigmatismus (AK 44/112–121)

Sagittalbüschel		Meridionalbüschel	
	+2.6	+1.0	/	+2.1	+6.3

Sagittalbüschel		Meridionalbüschel	
	−1.0	−1.7		−0.3	−1.6

Frontwinkel — Vorzeichnung

	24.6	34.1	961.3 974.6

Frontwinkel — Vorzeichnung

	24.6	27.1	996.9 998.0

Radien, Dicken und Abstände für f = 100 mm

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	d_{L1}	L_1	d_{L2}	L_2	d_{L3}	L_3	d_{L4}	L_4
746.0	674.0	96.6	1111.6	1111.6	84.1	38.2	47.8	45.8	96.6	112.8	114.0	7.8	6.1	19.4	8.1	1.7	18.8	4.4	6.7

Luftspalt

d_{L5}	L_5	d_{L6}		r_{13}	r_{14}	d_{L7}	L_7		D_{1-2}	D_{2-3}	D_{3-4}	D_{4-5}	D_{5-6}	D_{6-7}	D_{7-8}	D_{8-9}			
80.0	6.2	28.7		99.6	139.0	87.2	1.6		69.8	62.6	68.8	45.8	142.0		64.0				

9.8
79.5
20.4
4.5
49.9
74.6

FR-Biotar 1:1.5, f = 15 cm v. 27.6.44 mit Luftspalt

94.6

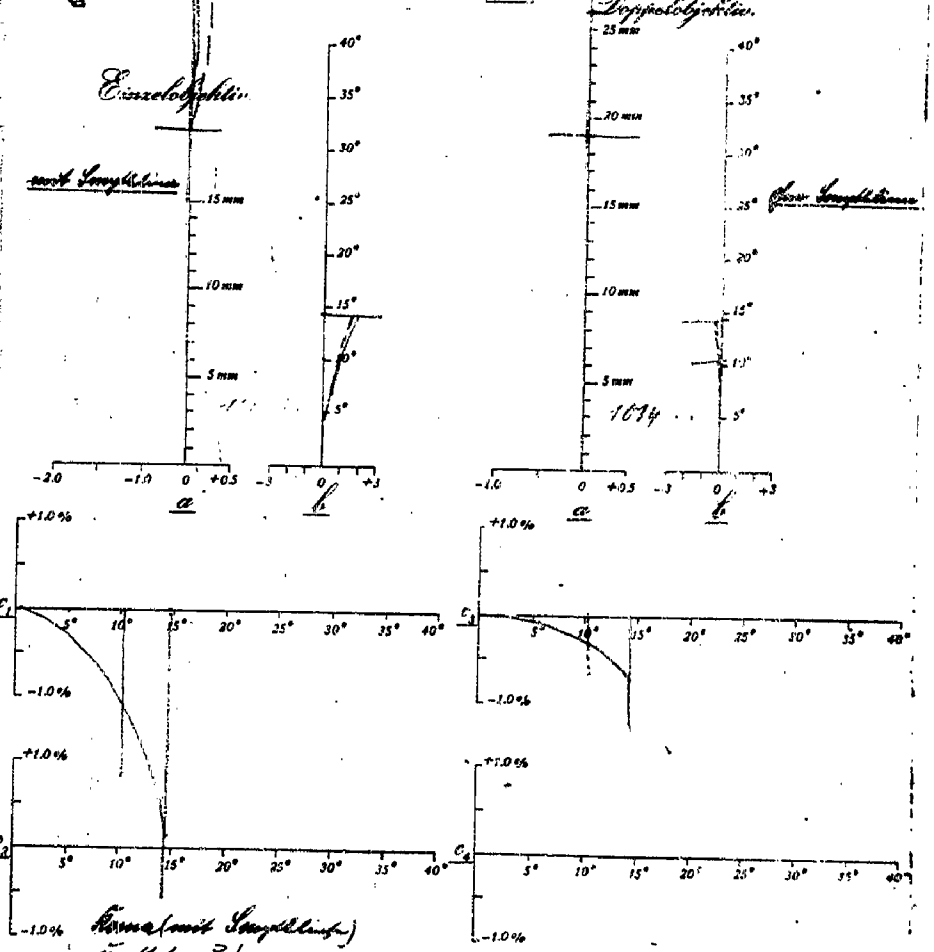
Luftspalt

Objektiv 67.2

Linse	n_d	$n_F - n_C$	ν	
1	1.6138		57.7	SK 4
2	1.6211		57.0	SK 4
3	1.6138		37.0	LF 5
4	1.6097		42.7	SF 1
5	1.6116		44.5	BaSF 1
6	1.6016		44.5	BaSF 1
7	1.6210		36.7	SF 6

Einzelobjektiv — mit Luftspalt

Doppelobjektiv — ohne Luftspalt



Kurven (mit Luftspalt) einschließlich

F.75.639.125

1964

V.1942 Nr. 1 1:1 f=13 cm für n=6 v. 21.11.64

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (bis 78)/78

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
		−4.6	−4.7	+1.5	−2.7	−4.0	−5.18

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen			Doppelobjektiv. Chromasie. $\frac{G'_0}{G'_0 - d}$
		114.0	162.0	200.0	−5.85 −171

Astigmatismus (bis 85)/93 - 102

Einzelobjektiv. Sagittaler Bildwinkel			Einzelobjektiv. Meridionaler Bildwinkel			Doppelobjektiv. Sagittaler Bildwinkel			Doppelobjektiv. Meridionaler Bildwinkel		
						−0.1	+0.1	+1.0	−1.4	−1.8	+2.2

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel			Doppelobjektiv. Verzeichnung		
		22.5	28.5	29.7	991.9	985.0	993.2

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	d_1	l_1	d_2	d_3	l'_1	l'_2
194.8	1402.2	66.0	∞	42.5	67.3	98.5	105.0	196.0	176.0	67.0	1160.2	68.8	∞	16.5	8.1	29.5	6.7	72.3	97.6

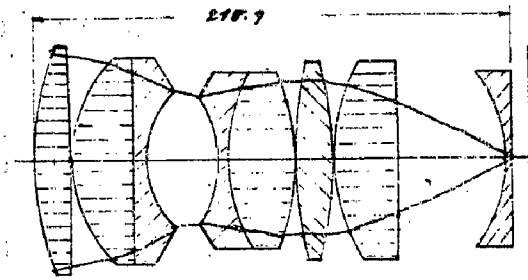
d_4	d_5	l_4	d_6	l_2	d_7	l_3	d_8	1	2	3	4	5	6	7	8	9	10	11	12
6.2	38.2	0.1	17.0	0.1	29.5	49.3	2.7	100.0	96.0	98.5	88.6	84.8	57.6	60.8	69.8	70.3	69.5	66.4	62.5

fr. d

1: 15.6 96.3 84.9 95.4 97.2 49.5 52.6 / 419.9

13 14
2.2 c

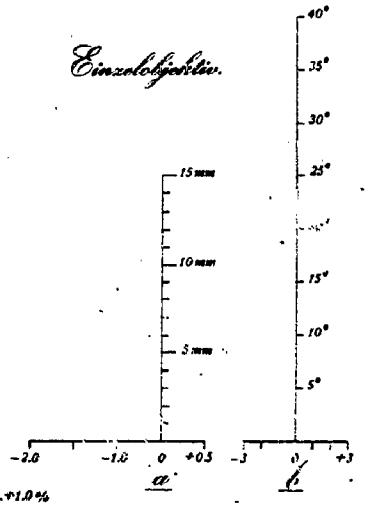
V.1942 Nr. 1, 1:1, f=13 cm für n=6 v. 21.11.64



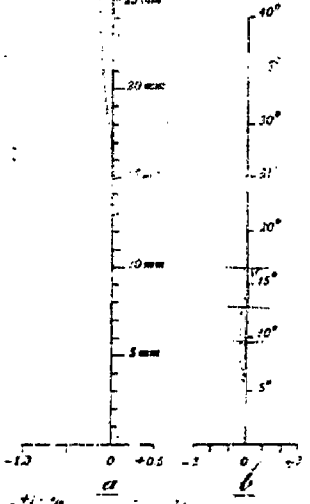
Linsen	n_d	$\frac{n_G - n_d}{n_d}$	ν	
1	1.6665		55.6	
2	1.6242		60.2	
3	1.5780		61.0	
4	1.6780		56.0	
5	1.6584		58.0	
6	1.6242		60.2	
7	1.6872		55.0	
8	1.6584		58.7	

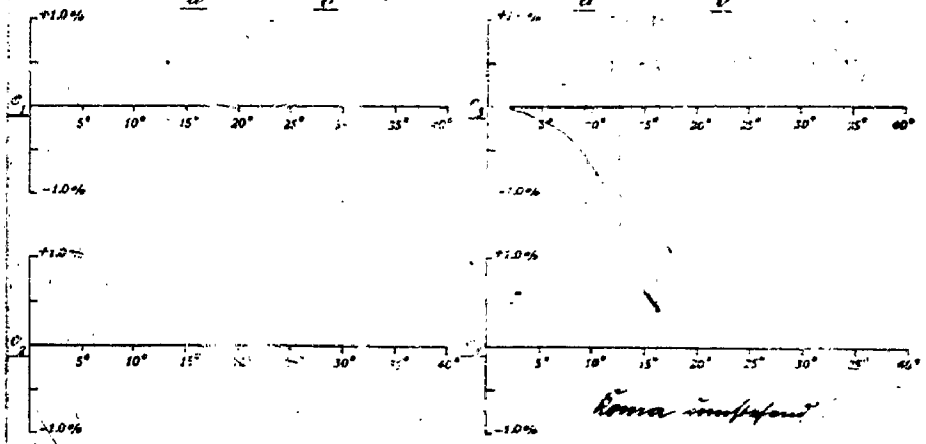
Zeichnung für f = 67 mm.

Einzelobjektiv.



Doppelobjektiv.





F-75-6398-RE
1365

Vi941 No 24, 1:2, f = 10 cm, für n = 2.67 v. 21.11.41

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (ZAW 16) f=8

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		−1.0 −2.2 +0.9	−0.2 −1.7 +6.6

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie.
		68.6 62.6 101.0	g–d −0.10 ‰ v. Mittenstrahl

Astigmatismus (ZAW 16) f=8

Einzelobjektiv. Sagittenastigmatismus	Einzelobjektiv. Meridionalastigmatismus	Doppelobjektiv. Sagittenastigmatismus	Doppelobjektiv. Meridionalastigmatismus
		−1.2 −0.7 +0.2	+0.7 −0.8 −2.5

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
		31.5 41.8 46.5	101.6 101.5 100.8

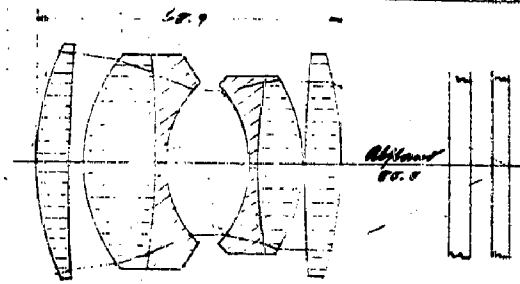
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	d_1	b_1	d_2	d_3	b_2	b_3
60.5	952.6	87.2	107.6	249	46.6	107.2	26.0	190.6	84.6	∞	∞	∞	∞	7.7	3.0	16.8	2.8	72.4	6.8

d_4	d_5	b_4	d_6	b_5	d_7	b_6	d_8	1	2	3	4	5	6	7	8	9	10
2.2	10.4	8.4	8.0	88.8	5.0	5.0	4.6	50.0	49.2	46.6	46.6	32.7	31.7	26.2	29.6	37.0	37.7

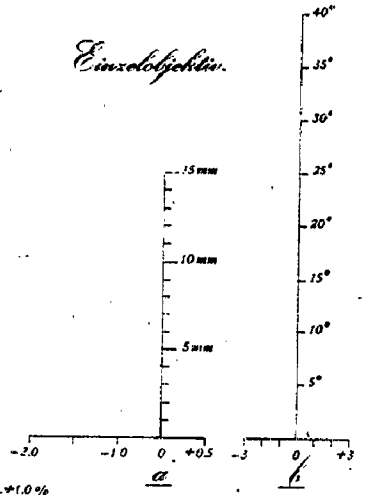
24.7
49.2
17.6
8.4
99.9

Vi941 No 24, 1:2, f = 10 cm, für n = 2.67 v. 21.11.41

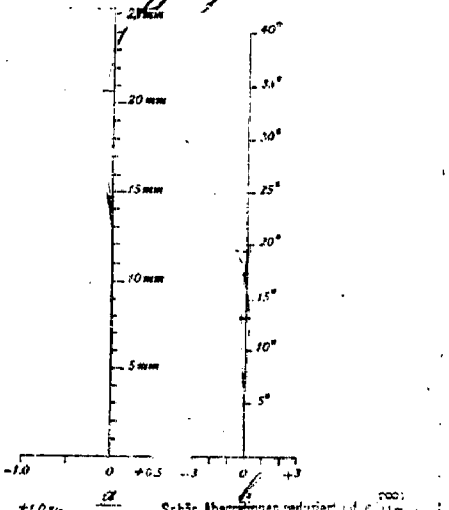


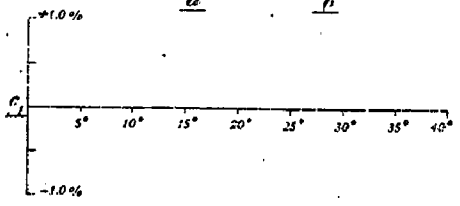
Linse	n_d	ν_d	s
1	1.607 02		60.7
2	1.65752		58.7
3	1.60100		36.5
4	1.58925		40.6
5	1.61249		58.1
6	1.60702		56.7

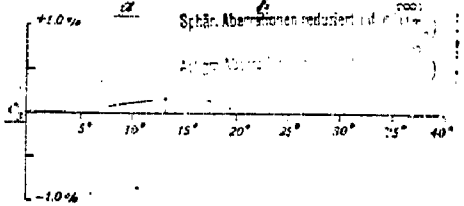
Einzelobjektiv.

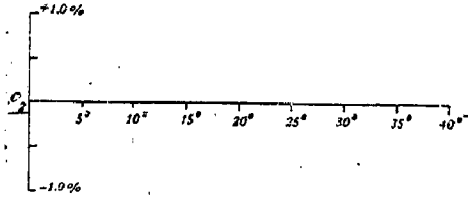


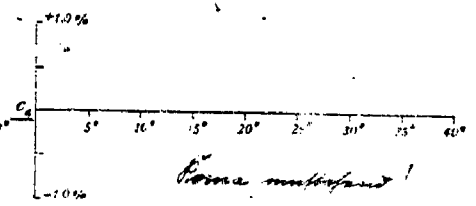
Doppelobjektiv.











Sphär. Aberrationen reduziert

Fünf mitgeliefert!

ZV-9869-Z

1369

FR-Lomar 1:1.5 f=15 cm v. 30.5.41 (mit Tangblende)

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (AX 5/87 88)

mit Tangblende

Δs'			Δf		
-9.3	-7.7	-9.8	79.5	11.5	-7.9
-7.5	+1.6	-4.0	-12.1	-1.6	0.0

ohne Tangblende

Δs'			Δf		
-9.5	-8.0	-10.5	9.2	-4.5	-8.2

Einfallshöhen. Chromasie.

72.6	102.8	126.8

Einfallshöhen. Chromasie.

74.6	105.6	129.3

AX 1/102 Astigmatismus (AX 1/101)

Sagittalwinkel		Meridionalwinkel		
+2.7		+2.6	+1.8	+5.8

Sagittalwinkel		Meridionalwinkel		
-1.7		-3.3	-7.8	-2.7

Frontwinkel. Verzeichnung.

24.6	27.2	992.7	955.3

Frontwinkel. Verzeichnung.

24.6	27.2	1007.6	1016.8

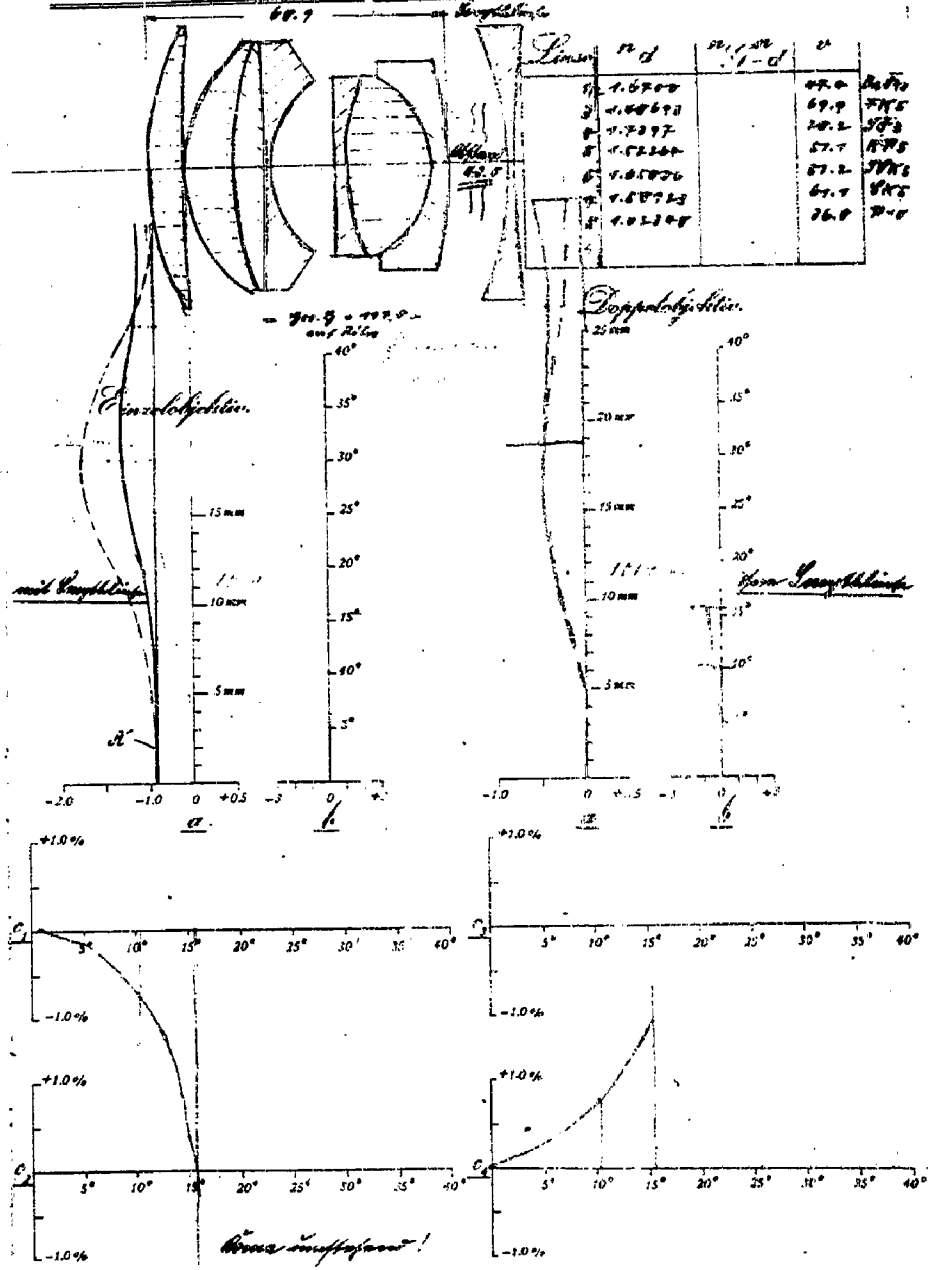
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	d_1	t_1	d_2	d_3	d_4	t_2	t_3	d_5
66.2	+30.0	49.6	20.4	94.8	23.5	∞	67.2	21.3	99.4	77.0	135.0	0.8	0.2	11.7	7.1	1.7	12.5	1.9	2.7

d_6	d_7	d_8	d_9	f=	1	2	3	4	5	6	7	8	9	10	11	12
19.4	4.3	43.8	1.5		67.5	66.5	64.0	62.0	48.8	46.4	36.0	26.5	24.5	21.0	57.6	57.5

77.3
21.3
4.6
23.7
68.9

FR-Lomar 1:1.5 f=15 cm v. 30.5.41 (mit Tangblende)



F-TS-6398-RE

1967

V 1942 Hf 2, 1:1, f = 7.5 cm v. 7.1.42

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Hf 29) 146

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'		Doppelobjektiv. Δf'	
		-3.7	-1.8	+6.0	+2.9	+6.8	-2.7

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie.
		119.0	168.8	196.6	ν_d – 1074 = −8.9 (−8.6) −76.7

Astigmatismus (Hf 48) 7/15-20

Einzelobjektiv. Sagittalwölbschnitt	Einzelobjektiv. Meridionalwölbschnitt	Doppelobjektiv. Sagittalwölbschnitt		Doppelobjektiv. Meridionalwölbschnitt	
		+4.8	+8.9	+12.7	+2.9	+3.7	+11.6
		−8.2	−8.4	−10.2	−8.4	−8.4	−8.3

Einzelobjektiv. Frontwinkel.	Einzelobjektiv. Verzeichnung.	Doppelobjektiv. Frontwinkel.	Doppelobjektiv. Verzeichnung.
		27.8	37.4	42.6	97.6	98.8	99.9

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	d_1	b_1	d_2	d_3
90.3	407.1	52.6	148.8	31.6	42.6	72.1	67.4	88.4	619.0	79.3	262.6	387.0	177.8	68.6	167.0	14.7	0.1	15.8	8.7

b_0	b_2	d_0	d_5	b_2	d_6	b_3	d_7	b_4	d_8	d_9	d_4
18.1	16.2	5.3	12.8	0.1	19.0	0.1	17.8	11.6	2.5	13.7	1.0

40.7
13.8
21.5
23.9
28.9
14.1
150.3
14.9
165.2

V 1942 Hf 2, 1:1, f = 7.5 cm v. 7.1.42

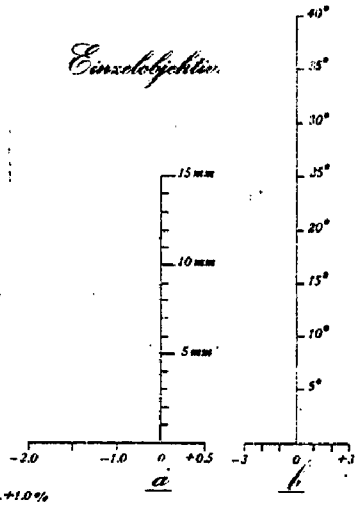
No. 165.2

Linse	n_d	$\nu_d - 1$	
1	1.66999		99.1
2	1.61148		58.4
3	1.67199		47.5
4	1.69199		30.0
5	1.62293		56.7
6	1.65611		99.2
7	1.74324		99.1
8	2.99 9		28.5
9	1.78466		26.1

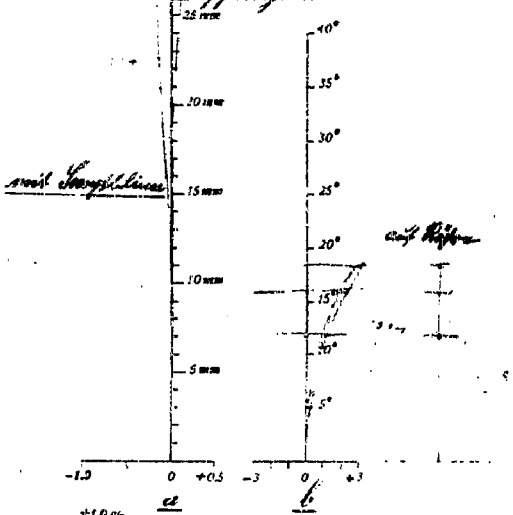
Prüfung für f = 50 mm.

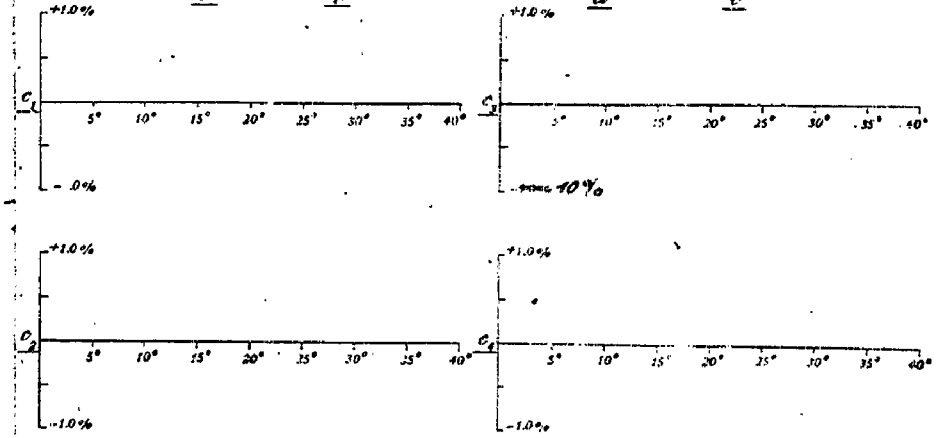
Einzelobjektiv. | Doppelobjektiv.

Einzelobjektiv.



Doppelobjektiv.





F-Ts-6398-RE

1360

No. 1430

Kino-Meyar, Görlitz / Ernst Plötzner 1:1.5 f=10 cm Lfd. Nr. 14878 v. J. 3.40

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (ΔS') / Δf

Einzelobjektiv. ΔS'	Einzelobjektiv. Δf	Doppelobjektiv. ΔS'			Doppelobjektiv. Δf		
		−5.0	−5.6	+5.8	−11.6	−15.2	−4.0

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie.
		77.8	107.6	134.8	−1.61 −0.26 (+0.82 L) (+0.47) +.77 +0.70

Astigmatismus (ΔS') / Δf

Einzelobjektiv. Segmentalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Segmentalbüschel		Doppelobjektiv. Meridionalbüschel	
			−7.2	−4.0		−2.0	−12.3

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel		Doppelobjektiv. Vorzeichnung	
			26.2	34.8	1099.5	1128.5

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_1	l_1	d_2	l_2	d_3	l_3	d_4	d_5
78.0	784.3	42.1	57.2	732.9	80.9	95.4	89.7	94.2	12.7	0.7	15.0	0.7	6.2	17.8	4.7	45.8

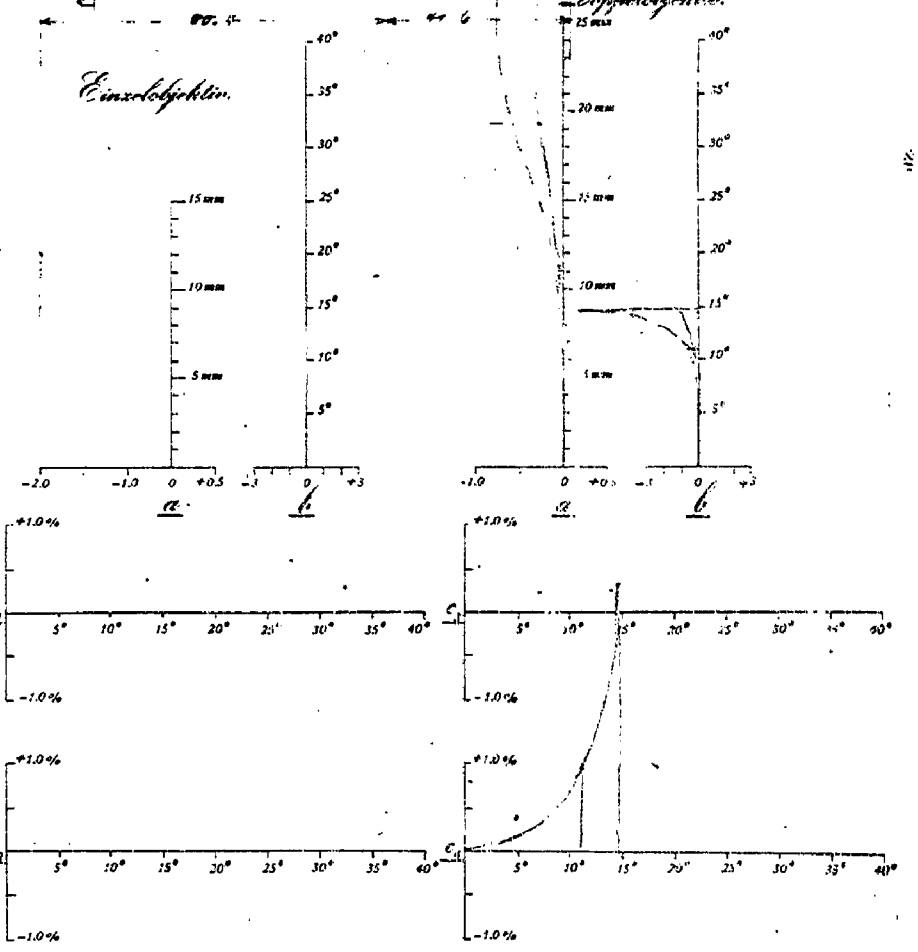
Nr.	1	2	3	4	5	6	7	8	9
	66.6	65.2	26.2	46.2	43.6	15.4	29.2	32.0	20.6

15.2
21.7
24.0
19.9
80.4
=

Kino-Meyar, Görlitz / Ernst Plötzner 1:1.5 f=10 cm Lfd. Nr. 14878 v. J. 3.40

Linse	n_D d	ν_D d	$\vartheta_{g,F}$ d
1	1.62004	0.01749	36.3
2	1.62004	0.01749	36.3
3	1.75182	0.02844	27.8
4	1.88300	0.02032	40.8
5	1.88300	0.02032	40.8

Einzelobjektiv. | Doppelobjektiv.



Nr. 14407

Tessar 1 : 1.4, f = 5 cm ø 30.12.41 Rodenstock Kg 1457

Einzelobjektiv.

Sphärische Korrektion (Δs'/s'; Δf/f)

Δs'		Δf	

Einfallshöhen. Chromasie.

Doppelobjektiv.

Sphärische Korrektion (Δs'/s'; Δf/f)

Δs'			Δf		
d = -0.7	-6.1	-16.5	-19.5	-16.0	-32.3
s' = -2.3	+7.7	+1.6	-6.5	+0.5	-7.7

Einfallshöhen. Chromasie.

98.5	114.0	139.0

-305
(+158)
-147

Astigmatismus (Δx'/s'; y'-y)

Sagittalwinkelbüschel		Meridionalwinkelbüschel			
-2.2	-2.6	-4.7	-0.8	-0.5	0

Frontwinkel. Verzeichnung.

26.8	47.8	54.0

1015.6, 1024.6, 1029.2

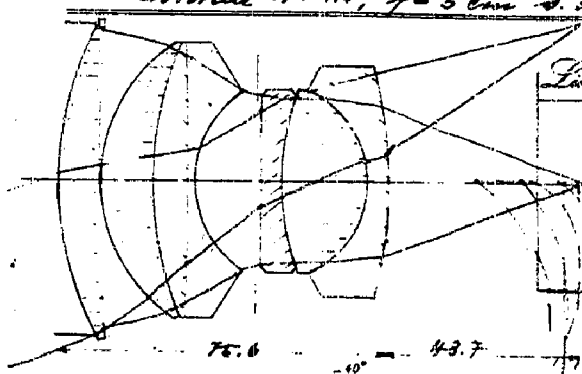
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	l_1	d_2	d_3	d_4	l_2	l_3	d_5	d_6	d_7
74.5	409.0	37.0	79.0	536.0	24.2	∞	57.6	35.5	102.0	9.5	0.3	11.9	7.8	1.8	12.2	1.7	4.8	19.6	5.6

D 71.5 — P 41.8 48.5 — P' 40.8 42.0 47.2

9.5
(9.5)
76.1
44.8
47.2

Tessar 1 : 1.4, f = 5 cm ø 30.12.41 Rodenstock Kg 1457

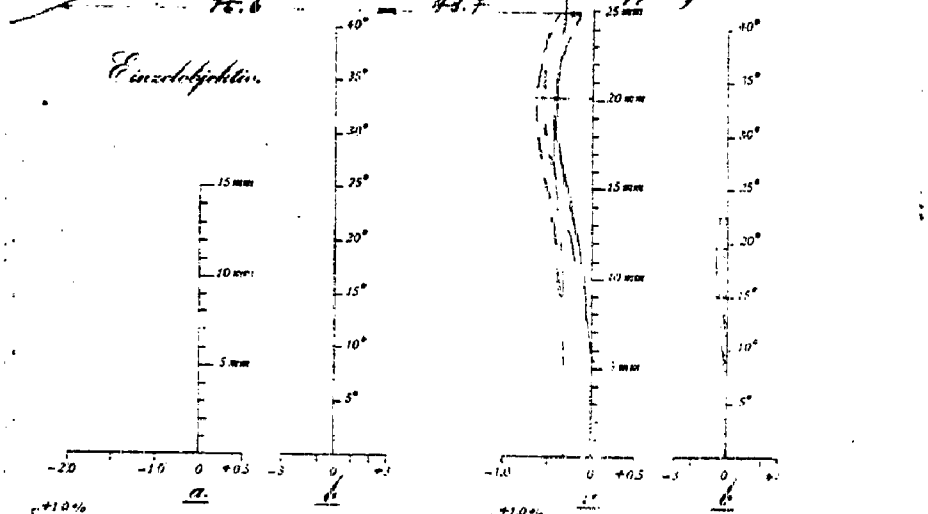


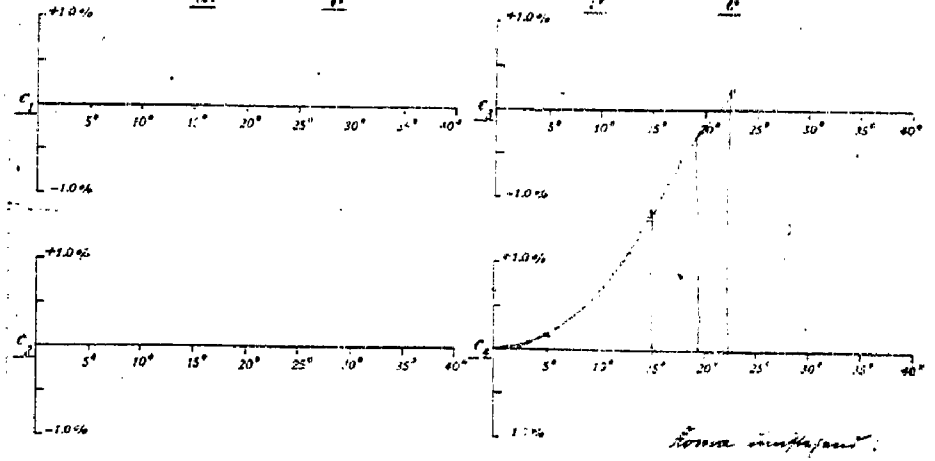
Tessar	n_d	ν_d	ν_{f-d}	
1	1.6935			42.0
2	1.6924			23.0
3	1.0875			70.8
4	1.7225			40.5
5	1.6772			50.1
6	1.6666			44.6
7	1.6072			58.6

2
55.5
44.5
58.2
5.42

75.6 — 43.7

Einzelobjektiv. Doppelobjektiv.





Tessar einfachster Typ

F-75-6376-RE
1569

F.TS-6398-RE

1370

V 1942 N:3 1:1 f = 7,5 cm Rechn. v. 24. 1. 42.

Einzelobjektive. | Doppelobjektive.

Sphärische Korrektion (AX 41 / 109)

Einzelobjektive Δs	Einzelobjektive Δf	Doppelobjektive Δs	Doppelobjektive Δf
		−2.9 −1.6 +2.4	+0.2 +8.1 −6.5

Einzelobjektive Einfallshöhen	Einzelobjektive Chromasie	Doppelobjektive Einfallshöhen	Doppelobjektive Chromasie
		113,3 160,2 196,3	

Astigmatismus (AX 40 / 109)

Einzelobjektive Sagittalbüschel	Einzelobjektive Meridionalbüschel	Doppelobjektive Sagittalbüschel	Doppelobjektive Meridionalbüschel
		+3.4 +3.0 +11.5 −1.8 −3.0 −6.5	+2.6 +3.3 +17.6 −0.9 −0.4 +7.4

auf 3 Höhen

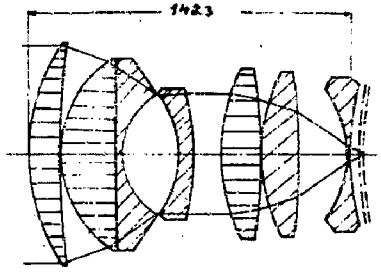
Einzelobjektive Frontwinkel	Einzelobjektive Verzeichnung	Doppelobjektive Frontwinkel	Doppelobjektive Verzeichnung
		24.0 37.4 43.6	985.60 992.95 966.45

Radien. Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	d_1	ℓ_1	d_2	d_3	d_4	d_5	d_6
88,47	461,3	51,15	1395	30,9	45,4	112,4	83,5	239,4	33,8	274,6	47,8	12,5,8	14,4	0,1	4,5,4	3,0	9,6	15,9	7,2

ℓ_2	d_{10}	ℓ_3	d_8	ℓ_4	d_9
14,9	18,6	0,1	17,4	22,3	4,7

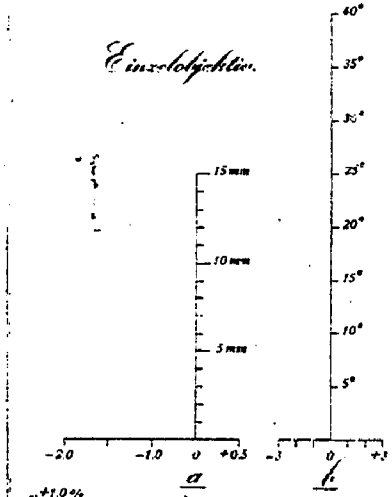
V 1942 N:3 1:1 f = 7,5cm Rechn. v. 24. 1. 42.



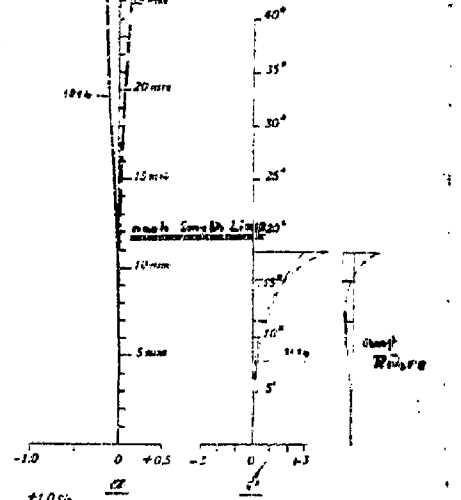
M 1:2

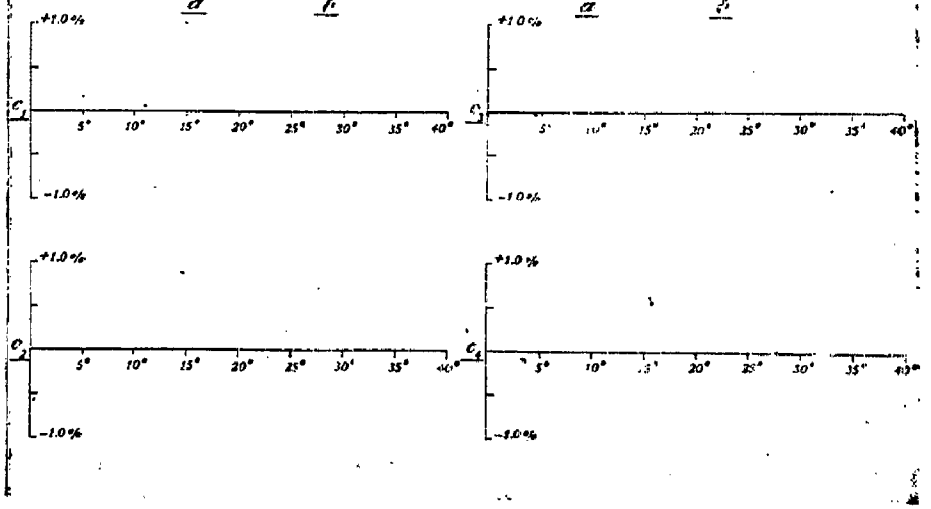
Linse	n_d	$\nu_d - \nu_C$	ℓ'
1	1,66999		47,1
2	1,61480		58,4
3	1,57420		44,8
R 8			
4	1,66840		23,3
5	1,70249		40,9
6	1,73866		33,7

Einzelobjektive.



Doppelobjektive.





F-75-6398-RE

1371

h 1942

V 1942 № 4. 1:1.5. f = 40 cm. Rchs. 27. 2. 42.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion für s = ∞ / f = 33

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'

Einzelobjektiv Einfallsöffnen.	Einzelobjektiv Chromasie.	Doppelobjektiv Einfallsöffnen.	Doppelobjektiv Chromasie.

Astigmatismus für s = ∞ / f = 33

Einzelobjektiv Sagittaler Büschel	Einzelobjektiv Meridionaler Büschel	Doppelobjektiv Sagittaler Büschel	Doppelobjektiv Meridionaler Büschel

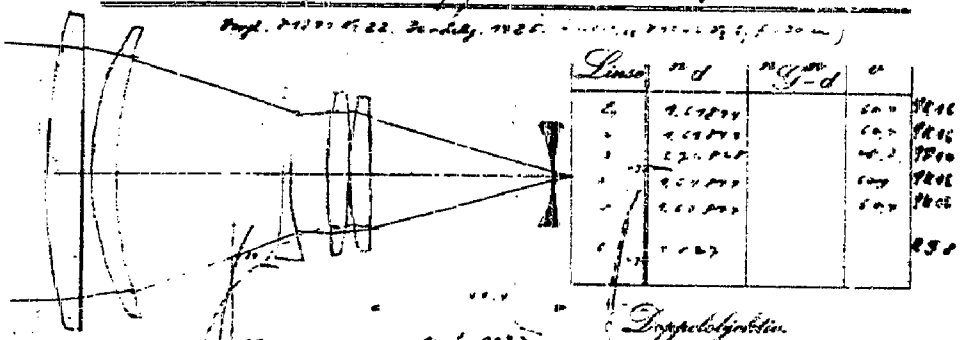
Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

Nr.	r	d	n	ν	P	r	s	tan ω	z_0	l_1	z_1	l_2	d_3	l_3	d_4	l_4	z_4'

l_0	$s_{F'}$	r_{EP}	d_4	l_0

Zeichnung

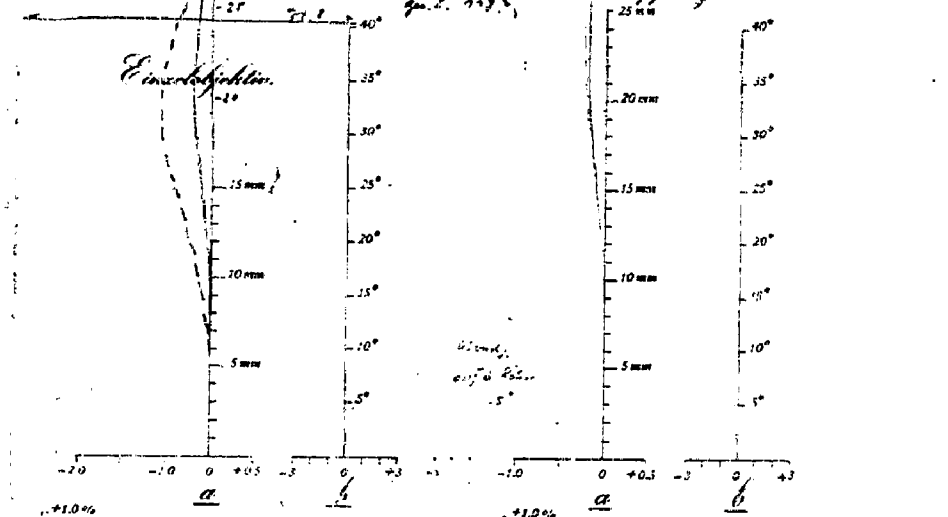


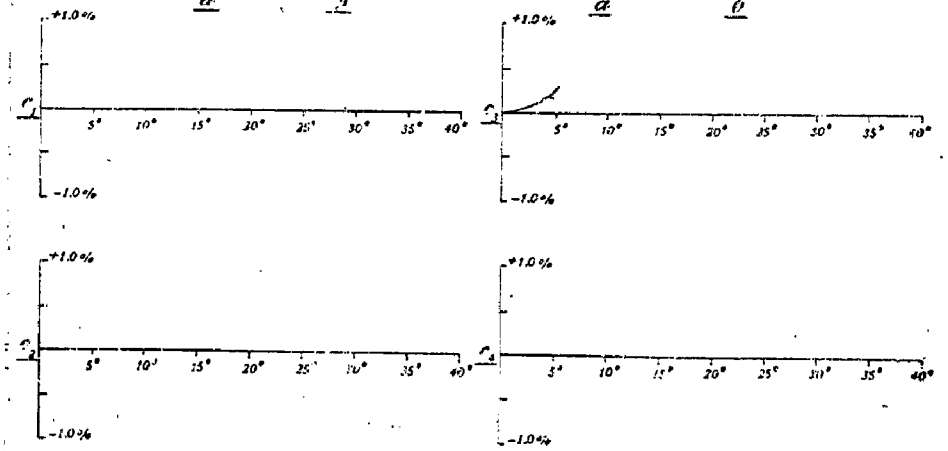
V 1942 № 4, 1:1.5. f = 40 cm. Rchs. 27. 2. 42.

Dopp. 2. 42. Zeichn. 1942. [illegible] f = 30 cm.

Linse	n d	n_F − d	ν

Einzelobjektiv. | Doppelobjektiv.





D. R. G. M. Nr. 1489609 v. 1. 8. 10. Reinval I

G. Rodenstock, München 1:1.9 f = 10 cm

F-75-6396-RE

13772

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δz, f)

Einzelobjektiv. Δs'		Einzelobjektiv. Δf'		Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
				-6.4	-3.0	+20.6	-9.4	-6.0	+25.6

Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		60.2	85.3	105.2	+0.08°	+5'
					(+0.47)	(+97)
					+0.35	+154

Astigmatismus (/).

Sagittale Büschel	Meridionale Büschel	Sagittale Büschel	Meridionale Büschel
		-1.8	-3.0	-4.8	-0.3	-7.5	-23.6

Frontneigung	Verzeichnung	Frontneigung	Verzeichnung
		25.0	54.3	64.6	103.96	100.99	95.2.76

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	l1	l2	l3	l4	l5
∞	39.2	97.7	112.5	34.4	88.8	52.3	11.0	0.2	10.6	6.0	3.2	2.8	10.8	12.0	

9.2

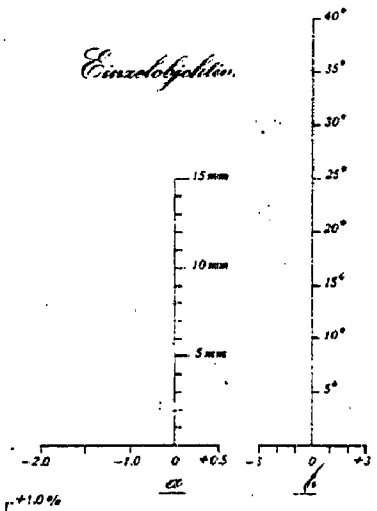
D. R. G. M. Nr. 1489.609 v. 1. 8. 10. Reinval I

1443

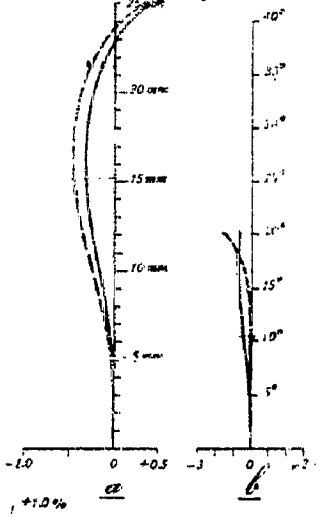
G. Rodenstock, München 1:1.9 f = 10 cm

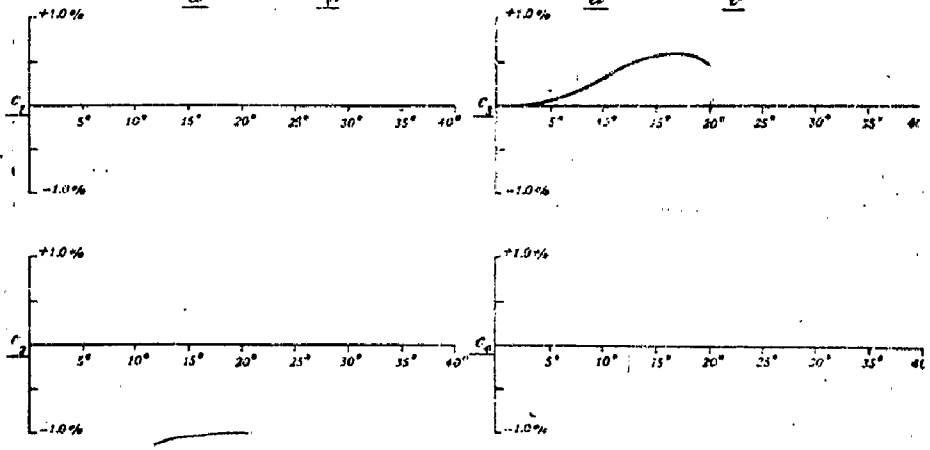
Linse	n_d	n_d - d	ν_d
1	1.6201	0.01298	60.3
2	1.6201	0.01298	60.3
3	1.6970	0.03409	30.9
4	1.6201	0.01298	60.3

Einzelobjektiv.



Doppelobjektiv.





f=75-6328-RZ
137.3

V1942 N:8 1:1 f=7,5 cm Rechn. v. 27.3.42.

Einzelobjektive. | Doppelobjektive.

Sphärische Korrektion /RZ 6 /44

Δl'	Δl	Δs'	Δl
		-8.0	-6.4
		+8.0	-7.2
		-2.6	-4.5

Einzelobjektive. Einfallshöhen	Chromasie.	Doppelobjektive. Einfallshöhen	Chromasie.
		144.5	157.3
		192.1	

Astigmatismus /RZ 42 /49

Einzelobjektive. Sagittalwinkel	Meridionalwinkel	Doppelobjektive. Sagittalwinkel	Meridionalwinkel
		+4.0	+8.1
		+13.8	+8.7
		+7.3	+13.2
		-0.3	-1.3
		-4.7	-2.7
		-8.4	+87.2

auf Bahnkr.

Einzelobjektive. Frontwinkel	Bezeichnung.	Doppelobjektive. Frontwinkel	Bezeichnung.
		26.4	35.3
		41.3	

Radien, Dicken und Abstände für f = 100 mm.

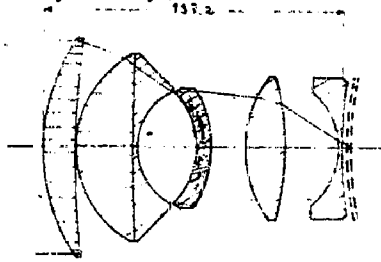
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	l_a
84.8	345	101.1	813.	27.9	36.4	58.3	64.2	128.	33.4	192.	4.46	0.4	2.62	2.16	23.6	7.8	18.4	12.2	2.4	24.8

d_6 4.47

V1942 N:8 1:1 f = 7,5cm Rechn. v. 27.3.42.

Prof. Dr. Ludwig 1942 f.

137.2

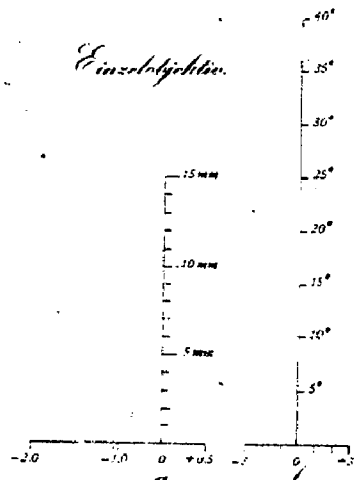


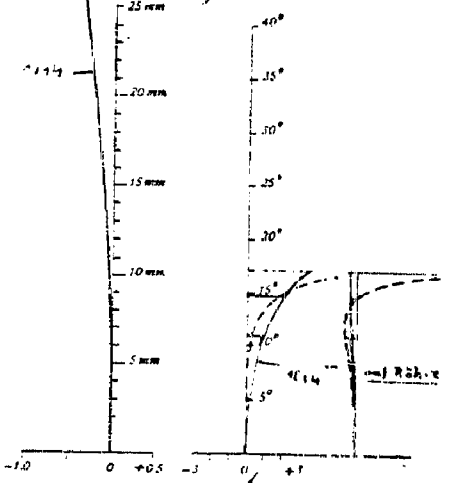
für s_F = ∞ mm

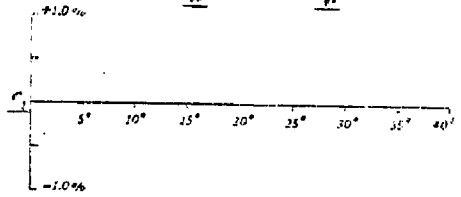
Linse	r	d	$n_d - d$	ν_d	
1		4.66	1.49	47.3	Balsam
2		1.61	1.80	25.4	Kron
3		4.57	1.80	44.5	Flint
4		Rg 8			
5		1.78	1.64	35.7	Kron
6		1.78	1.64	35.7	Flint

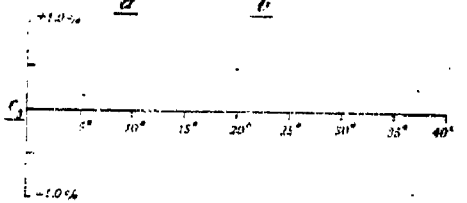
Doppelobjektive.

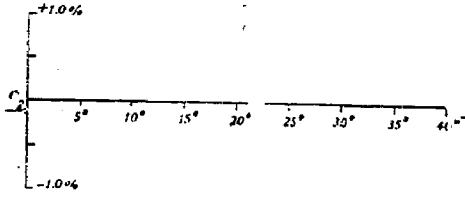
Einzelobjektive.

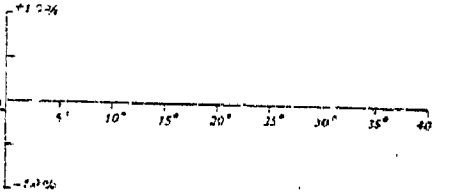












V 1942 Nr. 9 1:1.5, f = 5cm.

Rapid 94 42

F.15-6398-RE

1944

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (423/35 Fr)

Δs'	Δf'

Δs'			Δf'			
-5.0	+4.6	+7.9	-5.0	+8.0	-8.0	cl
± 0.0	+14.2	+19.6	-2.5	+16.0	-2.7	15°

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

75.0	126.1	129.9

-772
(-30)
-202

Astigmatismus (423/35 Fr)

Astigmatische Differenz | Meridionalfehler

Astigmatische Differenz | Meridionalfehler

-3.5°	-2.3	-7.7	± 0.0	+0.1	-7.0 cl
	-8.8			+3.2	5°

Bildweite | Verzeichnung

Bildweite | Verzeichnung

36.2	+7.4	55.0

1129.87 1109.68 1105.51 cl
1105.62 5°

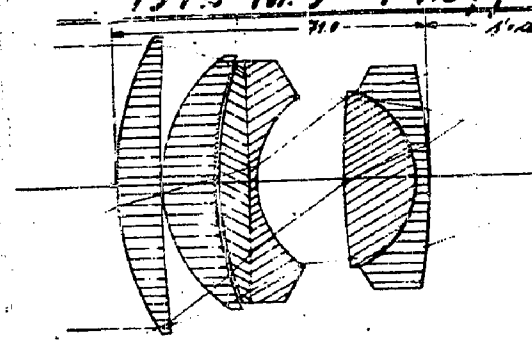
Rechnungsdaten und Abstände für f = 100 mm.

r 1	r 2	r 3	r 4	r 5	r 6	r 7	r 8	r 9	r 10	d 1	L 1	d 2	L 2	d 3	d 4	L 3	d 5	d 6	Σ d
46.8	91.0	38.2	80.6	89.9	212.2	23.2	55.8	25.3	72.0	10.1	8.5	77.7	7.0	6.6	7.7	26.4	76.5	2.9	77.0

1 L 14495

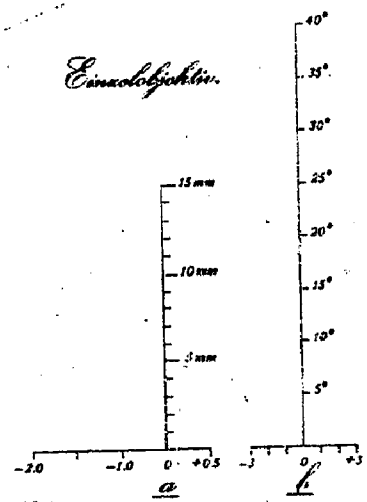
V 1942 Nr. 9 1:1.5, f = 5cm.

Rapid 94 42

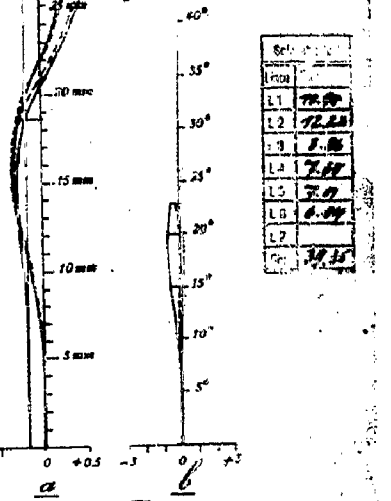


Linse	r	G	n
L1	1.582270	0.975056	57.1
L2	1.571060	0.978064	57.2
L3	1.740745	0.804863	49.9
L4	1.738070	0.803495	28.3
L5	1.797162	0.822220	40.2
L6	1.692280	1.077731	47.0

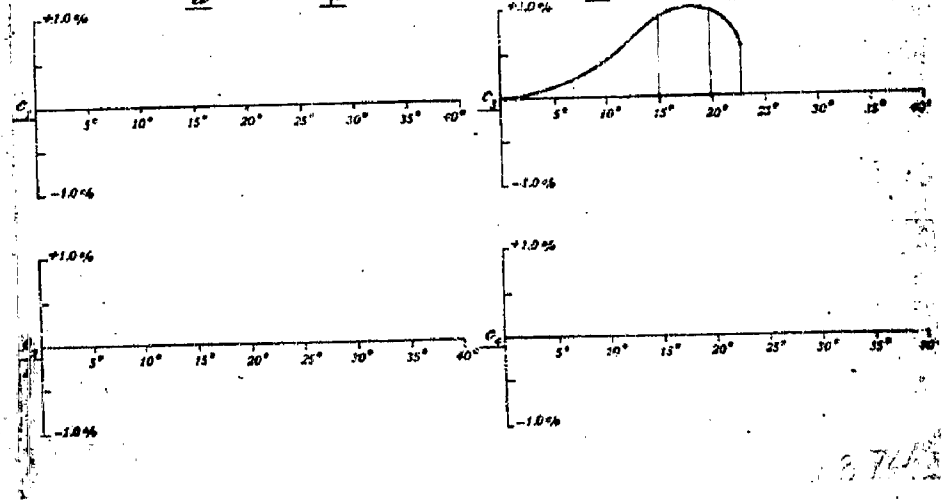
Einzelobjektiv.



Doppelobjektiv.



Sch	
Rad	
L1	12.59
L2	12.28
L3	5.86
L4	7.69
L5	7.01
L6	6.89
L7	
Σ	39.35



F-15-6398-RE

1575

Nr. 1446

Pantar 1942 Nr. 7, 1 : 1.4, f = 5 cm v. 24. 8. 42

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Δs' / Δf')

	Einzelobjektiv Δs'			Einzelobjektiv Δf'		
d	-2.7	+4.9	+6.4	-6.4	+6.6	+6.4
g'	-1.9	+14.9	+11.5	-1.5	+12.4	+6.1

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		69.5 / 110.6 / 119.0	-3.07 (-1.7) -1.6

Astigmatismus (Δx' / Δs') +2.0 -1.9 +1.6 -1.9

	Einzelobjektiv Sagittalbüschel			Einzelobjektiv Meridionalbüschel		
d	-4.5	-3.0	-4.5	-0.8	-1.8	-2.8
g'	-1.7		-0.5	+5.8		-1.3

Einzelobjektiv Fünfzehnwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Fünfzehnwinkel	Doppelobjektiv Verzeichnung
		36.2 / 48.2 / 55.2	1000.00, 1009.57, 1009.55

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	d_1	l_1	d_2	l_2	d_3	d_4	l_3	d_5	l_4
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Pantar 1942 Nr. 7, 1 : 1.4, f = 5 cm v. 24. 8. 42

Linse	n_d	ν_d	φ
1	1.62417	57.1	54°15
2	1.62036	60.3	46.5
3	1.64791	49.9	34°5
4	1.72916	54.7	37°4
5	1.67715	47.9	27°8
6	1.74926	44.8	25°7
7	1.60342	38.0	22°7

Einzelobjektiv. | Doppelobjektiv.

Diese Unterlagen!

F-75-6390-RE

1376

Tessar 1:12.5, f= 67.5 cm u. 28. u. 42.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (448 49/206-14)

Δs' | Δs'

Δs | Δs'

A' -1.8 -2.0 0.4 -2.1 -2.5 -1.8

g' +8.2 +2.9 +7.6 +8.5 +3.5 +8.1

Einfallshöhen. | Chromasie.

Einfallshöhen. | Chromasie.

9.2 10.0 10.0

g'-A'

+3

(+18)

+21

Astigmatismus (448 32/206

Sagittenvielfachheit. | Meridionalvielfachheit.

Sagittenvielfachheit. | Meridionalvielfachheit.

A' +0.2

g' -0.2

Frontwinkel. | Vorzeichnung.

Frontwinkel. | Vorzeichnung.

- 43.4 A' 1000.00

g' 1000.00

Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	d2	d3	d4	d5	d6
104.9	∞	61.6	41.9	93.8	144.6	24.0	1.2	7.7	0.8	3.9	1.0	4.2

Luftraum = 5.65

Tessar 1:12.5, f= 67.5 cm u. 28. u. 42.

(67.5)

- 9.6 - ca. 96.8

Linse	r	d	n_e	ν_e	
1	1	1.617440			55.2
2	2	1.583126			40.2
3	3	1.523960			51.8
4	4	1.615132			59.2

Einzelobjektiv.

Doppelobjektiv.

15 mm 10 mm 5 mm

-2.0 -1.0 0 +0.5

a

b

+1.0 %

-1.0 %

5° 10° 15° 20° 25° 30° 35° 40°

C1

C2

Vergl. 1467

V 1942 № 77. 1:7. f = 5cm Rel. v. 15.5.28.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (220 / 43

Δs' | Δf | Δs' | Δf

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Astigmatismus für 24 cm / 22 cm

Segmentwinkel | Meridionalwinkel | Segmentwinkel | Meridionalwinkel

Frontwinkel | Verzeichnung. | Frontwinkel | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

r₀	r₁	s	r₂	r₃	s'	r₄	r₅	s''	r₆	r₇	d₁	d₂	d₃	d₄	d₅	d₆	d₇	d₈

Vergl. 1467

V 1942 № 77. 1:7 f = 5cm

Zeichn. v. 15.5.28

Einzelobjektiv.

Doppelobjektiv.

Koma u. Zonenfehler.

ZV-8868-AE

F-75-6398-RE

1348

Biogon 1:2,7 f = 35 cm. Rechn. Nr. 1447 Dat. 29.7.41

Format 25 × 25 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (824/114)

Δs			Δs'		
d	-3.8	-5.7	+13.8	-7.7	-8.0	+3.5	d
g'	-2.5	+2.6	+16.6	-4.4	-0.4	+20.2	g'

Δs		Δs'	
Einfallshöhen	Chromasie	Einfallshöhen	Chromasie
		42.8	60.5	74.1	-42.3 (+2.2) -19.6	-9.1 (+0.1) -9.0

Astigmatismus (926/52-26)

Tangentialwinkel	Meridionalwinkel	Tangentialwinkel	Meridionalwinkel
		-2.4	-2.3	-0.8	-0.6	±0.0	-0.1

Feldwinkel	Bezeichnung	Frontwinkel	Bezeichnung
		42.7	56.2	64.2	1004.18 1005.18 1004.72

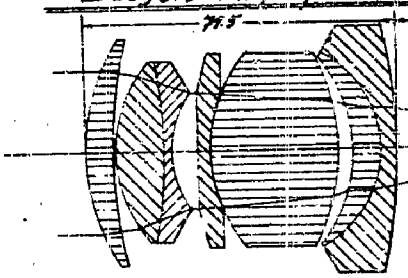
Radien, Dicken und Abstände für f = 100 mm.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	l1	d2	l2	d3	l3	d4	l4	d5	l5	d6
46.3	104.9	31.1	104.3	22.6	428.2	13.5	46.8	32.8	24.2	119.7	6.3	0.38	11.2	1.7	6.0	2.6	28.4	3.5	6.2	d7	4.3

Größe φ	l1	d2/3	F1	F2	l4	F3	l5	F4	l7
	59.2	40.7	26.4	26.2	43.3	25.7	42.8	42.3	55.8

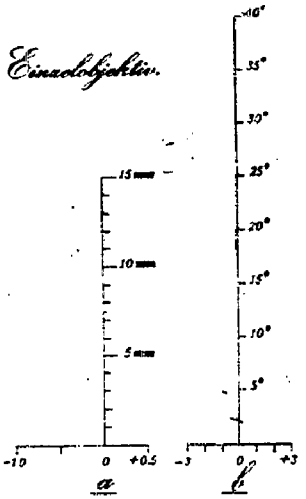
K 1449

Biogon 1:2,7 f = 35 cm. Rechn. Nr. 1447 Datum 29.7.41

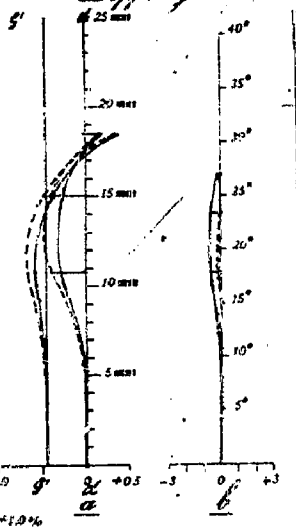


Linse	nd	nG-d	ν
1	1.617845	0.075494	49.7
2	1.652447	0.029190	30.7
3	1.740840	1.035708	28.1
4	1.488857	0.002221	65.5
5	1.612025	0.072193	60.4
6	1.612025	0.072193	60.4
7	1.488857	0.002203	65.2

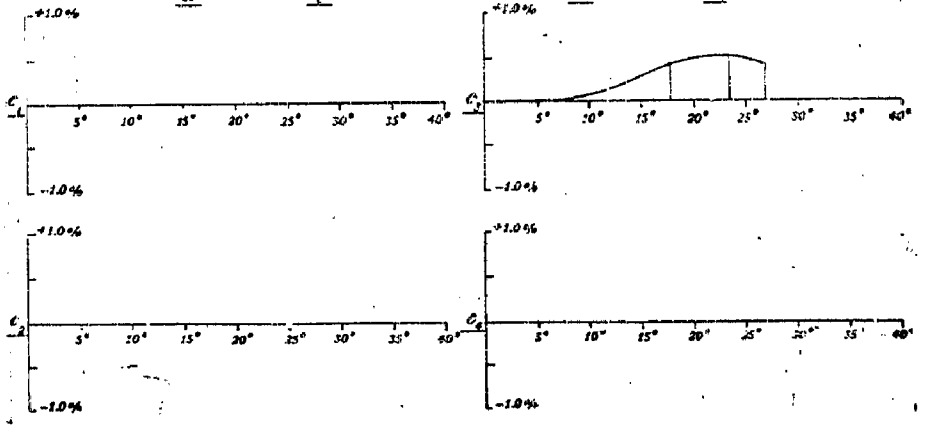
Einzelobjektiv.



Doppelobjektiv.



Spektr.	
C1	70.85
C2	6.36
C3	7.69
C4	3.82
C5	8.68
C6	6.58
C7	3.82
C8	58.80



AK 1453

Zeiss-Tessar 1:2, f=10 cm, m. 9.1.38 (2.1.44) D 788699

Einzellinsen. | Doppellinsen.

Sphärische Korrektion (AW 49/35

Einzellinsen. Δs'	Einzellinsen. Δf'	Doppellinsen. Δs'			Doppellinsen. Δf'		
		-5.4	-9.6	+2.6	-10.0	-11.2	+7.0
		-5.0	-6.4	+19.4	-6.6	-2.4	+24.0

Einzellinsen. Einfallshöhen	Einzellinsen. Chromasie	Doppellinsen. Einfallshöhen	Doppellinsen. Chromasie
		67.6 | 91.0 | 100.6	-3.56 (+78) -18.7

Astigmatismus (AK 3) 519-530 m. 482-495

Einzellinsen. Segmentwinkel	Einzellinsen. Meridianwinkel	Doppellinsen. Segmentwinkel			Doppellinsen. Meridianwinkel		
		-1.8	-2.0	-1.2	-0.5	-1.8	-2.4

Einzellinsen. Frontwinkel	Einzellinsen. Vorzeichnung	Doppellinsen. Frontwinkel	Doppellinsen. Vorzeichnung
		36.1 | 47.9 | 55.2	1005.9, 1009.8, 1010.2

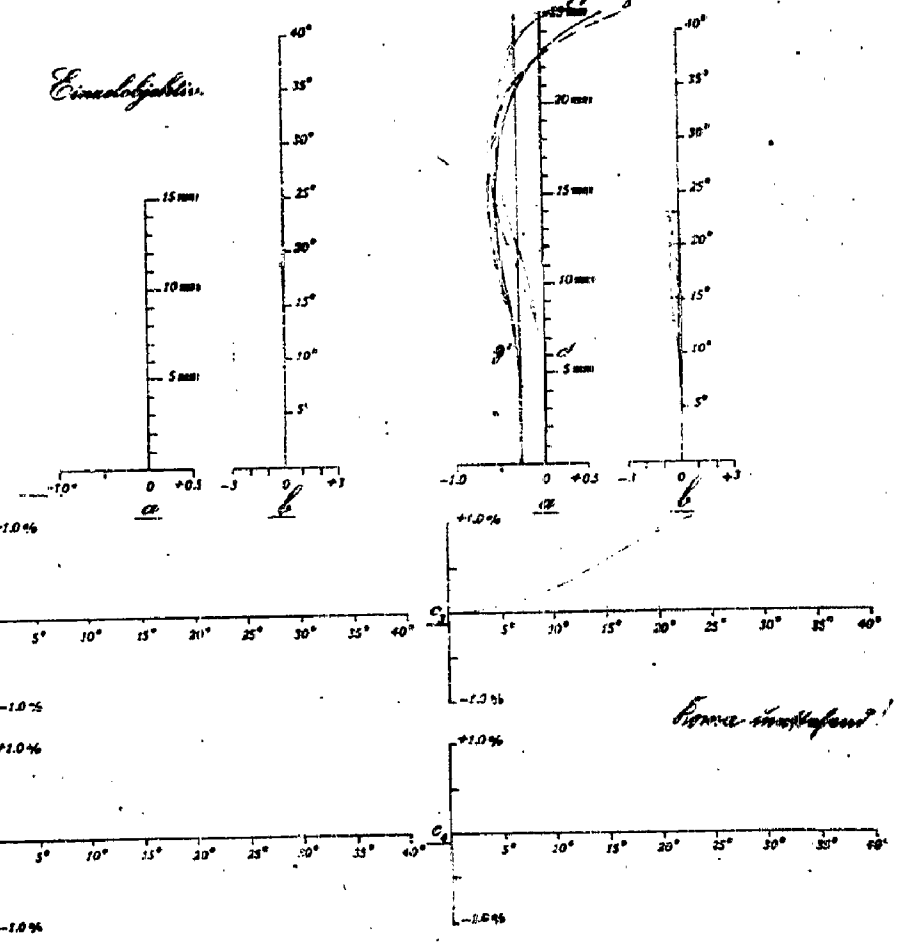
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9
63.6	127.1	30.0	61.2	167.8	24.1	125.9	93.4	44.7	91.3	6.7	2.4	7.2	7.6	1.9	7.5	1.9	19.8	1.9	24.5

Zeiss-Tessar 1:2, f=15 cm, m. 9.1.38 (2.1.44) D 788699

Linse	n_e d	ν_e g-d	φ
1	1.6400	60.1	58°6
2	1.7016	41.2	24°9
3	1.6200	60.4	24°2
4	1.6893	31.2	5°8
5	1.6420	60.1	37°6
6	1.6770	32.8	17°5
7	1.6625	58.2	8.5°7

Einzellinsen. | Doppellinsen.



Distance-Variations!

1579

Z-15-6398-22

F-TS-1398-PE

1390

V 1942 № 73. 1 : 7.5, f = 30 cm. Rdg. v. 12.6.42

Einzelobjektiv

Doppelobjektiv

nach Abschnitt 6a: Sphärische Korrektion für 12 Wellenl. auf Reihe.

Δs'			Δf'		

Einfallsblenden | Chromasie

Δs'			Δf'		

Einfallsblenden | Chromasie

Astigmatismus für 12 Wellenl.

Sagittale Winkel		Meridionale Winkel	

Feldwinkel | Verzeichnung

Sagittale Winkel		Meridionale Winkel	

Feldwinkel | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm.

№ 1451

V 1942 № 73. 1 : 7.5, f = 30 cm. Rdg. v. 12. 6. 42

Linse	n_d	ν_d	v

Doppelobjektiv.

Einzelobjektiv.

nach Abschnitt 6a.

auf Reihe 1

a

b

a

b

c_1

c_2

c_3

c_4

+1.0%

-1.0%

5° 10° 15° 20° 25° 30° 35° 40°

für 21 mm

v. Rohr nach Abbe

V 1942 Nº 12 1:1,5 f=40cm Rechn. v. 15.6.42

Nr. 1452

ZY-6596-Rz

1951

Einzelobjektiv. — nach Abschluss Glas

Doppelobjektiv. — auf Röhre

Sphärische Korrektion (A 222/63)

Δs'			Δl'		
+1.0	+1.2	-5.1	-5.0	-8.1	-13.6
+0.3	-1.1	-4.8	-4.2	-7.4	-10.9
+0.5	+2.0	+2.5	-1.8	-1.6	+1.8
+2.4	+2.4	+5.5	-1.0	+0.8	-5.3
+1.1	+1.1	+2.8	-0.5	+3.5	+10.2

Einfallshöhen — Chromasie

Δs'			Δl'		
-0.8	-1.1	-4.3	-5.1	-7.9	-15.3
-0.4	-0.7	-0.8	-3.3	-3.9	-6.0
+0.8	+2.8	+5.4	+4.1	+3.9	+6.1
+4.4	+5.6	+7.0	+7.0	+21.6	+42.9
+4.2	+5.0	+6.6	+10.4	+31.0	+66.9

Einfallshöhen — Chromasie

70.2	99.3	121.6

Stigmatismus (A 245/51)

Segmentalwinkel	Randstrahlwinkel
-0.5	-0.3
-0.5	-0.3

Segmentalwinkel	Randstrahlwinkel
-0.2	0.0
-0.3	+0.2

Frontwinkel — Verzeichnung

Frontwinkel	Verzeichnung
12.4	

Frontwinkel — Verzeichnung

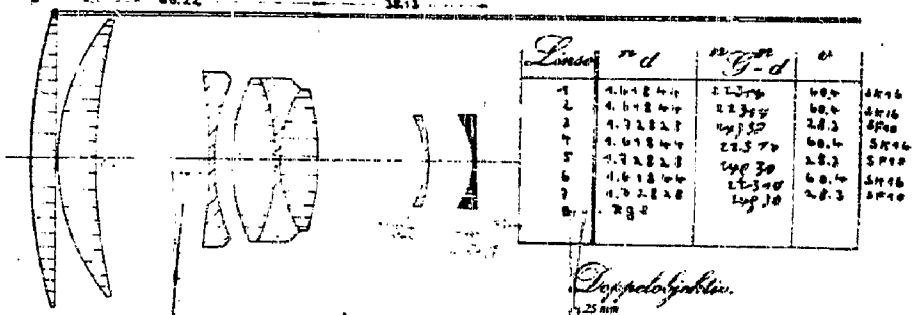
Frontwinkel	Verzeichnung
12.4	

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	d_1	d_2	d_3	d_4	d_5	d_6
+13.99	99	∞	+82.02	+12.5	13.4.0	+44.43	+41.33	+46.38	30.13	60.51	40.81	32.21	99.41	324.8	5.95	0.19	8.86	14.29	11.37	7.42

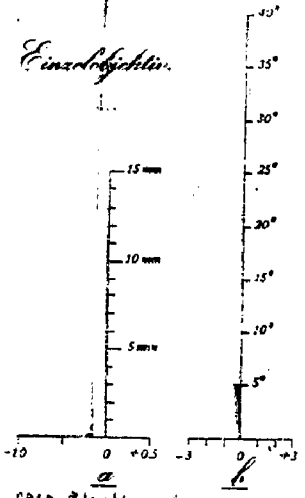
β_1	β_2	d_7	d_8	β_3	d_9	d_{10}	d_{11}
+42	9.83	4.46	8.50	26.45	7.16	18.02	0.78

V 1942 Nº 12 1:1,5 f=40cm Rechn. v. 15.6.42

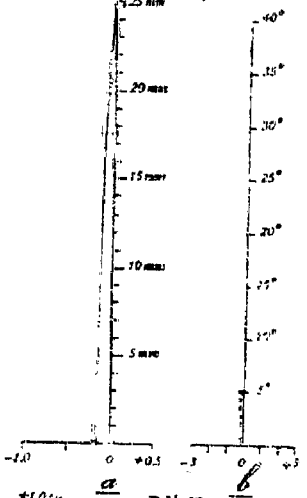


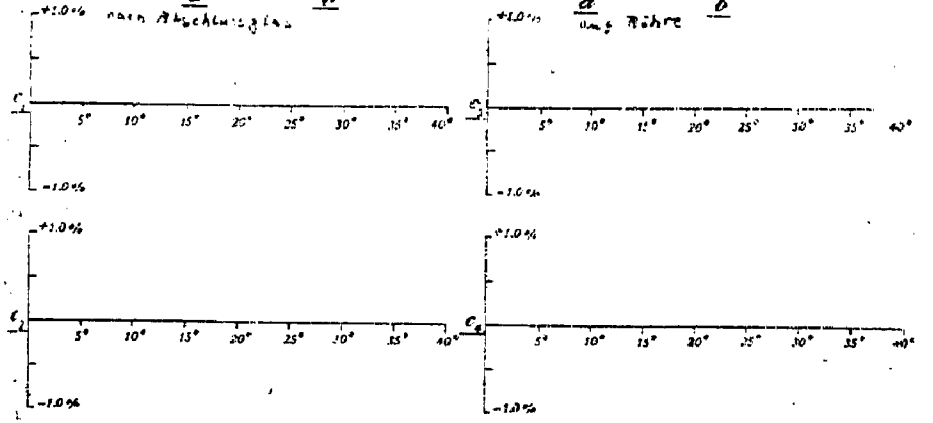
Linse	r_m d	n_e ν_e - d	ϑ°
1	4.6+2.4+4	2.2-49	60.4
2	4.6+2.4+4	2.2 3+5	60.4
3	4.7 2.8 2.8	typ 37	2.8.3
4	4.6+2.4+4	2.2.5 7+	60.4
5	4.7 2.8 2.8	typ 30	2.8.3
6	4.6+2.4+4	2.2-3+0	60.4
7	4.7 2.8 2.8	typ 30	2.8.3
Bl.	Rg 0		

Einzelobjektiv.



Doppelobjektiv.





f:75-6396-45
138 E

Nr. 1453

Rodenstock, München: D 697038; 1:2, f= 1cm v. 4. 10. 1940

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (f'50/27).

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'			Doppelobjektiv Δf'		
		-12.0	-7.0	+14.0	-12.0	-7.0	+14.0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen			Doppelobjektiv Chromasie
		50.0	42.0	100.4	-7.2 (+8.4) -10.3

Astigmatismus (f'27.6 / 40-45°).

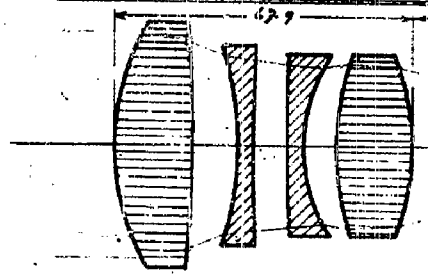
Einzelobjektiv Sagittalbüschel		Einzelobjektiv Meridionalbüschel		Doppelobjektiv Sagittalbüschel			Doppelobjektiv Meridionalbüschel		
				-2.8	-7.4	-6.4	20.0	-2.6	-12.6

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel			Doppelobjektiv Vorzeichnung		
		27.6	37.4	43.9	999.48	996.80	992.76

Radien, Dicken und Abstände für f = 100 mm.

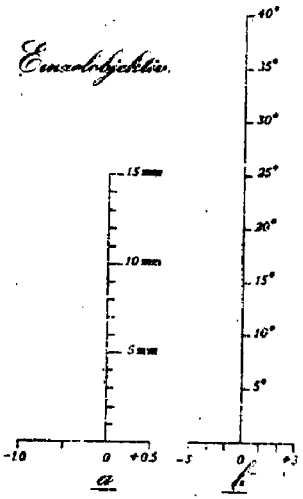
r_1	2	3	4	5	6	7	8	d_1	l_0	d_2	l_1	d_3	l_2	d_4				s_0'
52.6	284.9	70.6	40.2	165.3	36.0	62.5	52.6	13.0	10.0	3.0	3.9	3.0	3.4	17.0				66.5

Rodenstock München: D 697038; 1:2, f= 1cm v. 4. 10. 1940

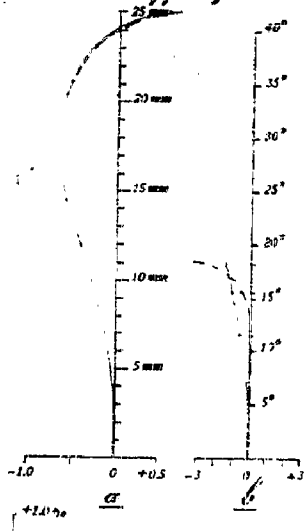


Linsen	n_d	$\frac{50}{27}$ e - d	v	
L_1-L_2	1.6093	0.07288	59.5	SK 7
L_2-L_3	1.6200	0.02345	36.3	F 2

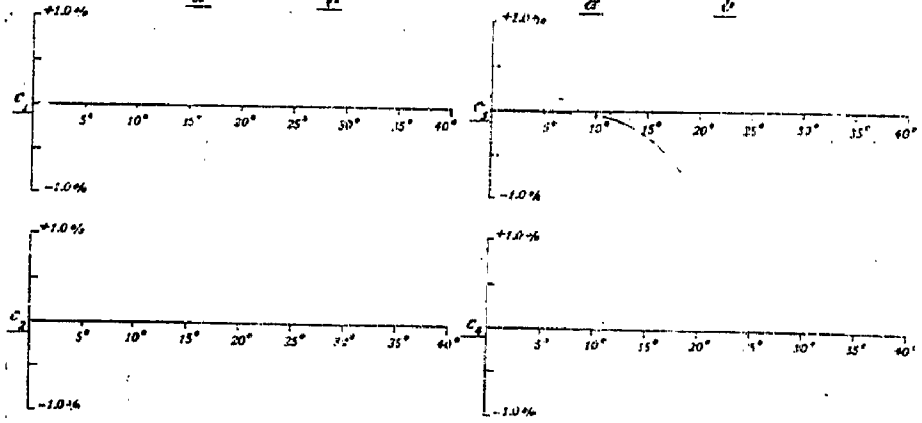
Einzelobjektiv.



Doppelobjektiv.



L_1	10.5
L_2	10.07
L_3	10.50
L_4	10.56
ΣL	36.2



E.T.-6398-R2

1383

Weitwinkel 1:5.7, f. 5 cm Rechn. v. 15.5.42

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (A 2m) / mm

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
		-8.4	+3.2	+28.7	-3.6	-0.4	+7.5

Einfallshöhen. | Chromasie.

Einzelobjektiv. Einfallshöhen.			Doppelobjektiv. Chromasie.
			-1.2 F (+0.3) -F
28.2	28.3	35.0	

Astigmatismus (A 2m) / mm

Einzelobjektiv. Sagittalwinkel			Doppelobjektiv. Meridionalwinkel		
+2.5					-2.5
+4.7	+3.5	-2.5	+0.3	+2.6	+2.2

Frontwinkel. | Verzeichnung.

Einzelobjektiv. Frontwinkel.			Doppelobjektiv. Verzeichnung.		
47.0	32.9	19.5	7.5	0	

Radien, Dicken und Abstände für f = 100 mm/m.

r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	d1	l1	d2	l2	d'3	l3	d4	l4	l
533	458	774.1	93.2	142.8	897.	42.2	42.7	43.0	84.5	939.5	4.95	0.4	9.9	52.3	10.3	0.8	96.3	3.8	5.2

r12	r13
88.3	938.1

d'2	l2	d2
75.5	67.5	6.2

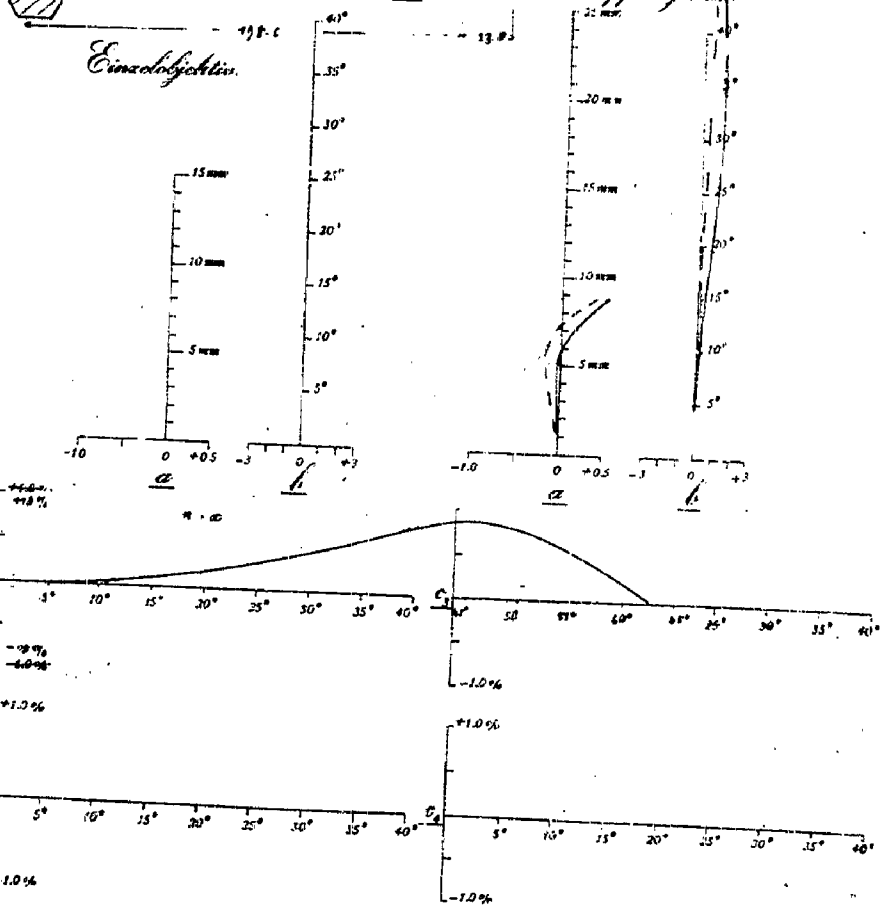
Nr. 1454

Weitwinkel 1:5.7, f. 5 cm Rechn. v. 15.5.42

Linse	r	d	n	ν	d/f
1		3.70	1.62		0.12
2		2.90	1.67		0.04
3		1.22	1.63		0.04
4		2.67	1.67		0.03
5		1.70	1.67		0.03
6		1.22	1.62		0.04
7		1.06	1.67		0.03

M 1:2

Einzelobjektiv. | Doppelobjektiv.



A 1455

V 1942 Nr. 14 1:3.5 f = 50 cm Rechn. v. 18. 9. 1942

F-75-6398-RE

1824

Einzelobjektiv. Doppelobjektiv.

Sphärische Korrektion (92% Zug).

	Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'	
d'	−0.76	−0.60	−3.59	+0.72	+0.79	−1.09	+1.2
C'	−0.04	−0.62	−2.83	+0.90	+0.97	−0.17	+0.2
d	+0.94	+0.63	+0.84	+0.38	+0.39	−0.12	

Einfallshöhen. Chromasie.

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		32.7	46.6	56.6	

Astigmatismus (92% Zug).

	Einzelobjektiv Sagittenastigmatismus Winkel	Einzelobjektiv Meridianastigmatismus Winkel	Doppelobjektiv Sagittenastigmatismus Winkel	Doppelobjektiv Meridianastigmatismus Winkel	
d'	−0.74	−0.84	−0.67	−0.76	−0.53	−2.96	+0.—
C'	−0.45	−0.63	+0.19	+0.10	−0.19	−1.79	−0.02
d	−0.53	−0.95	+0.47	+0.30	+0.43	−1.26	

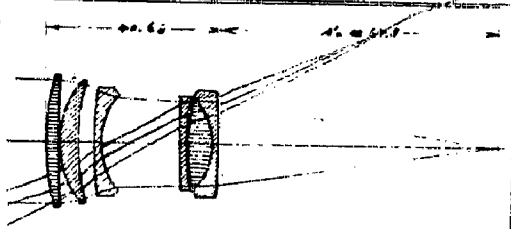
Frontwinkel. Vorzeichnung.

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung	
		20.2	40.1	50.6	s'_S +1001.71 +1001.97 +1002.09 s'_C +1001.71 +1001.92 +1001.91 s'_d +1001.71 +1001.76 +1001.96

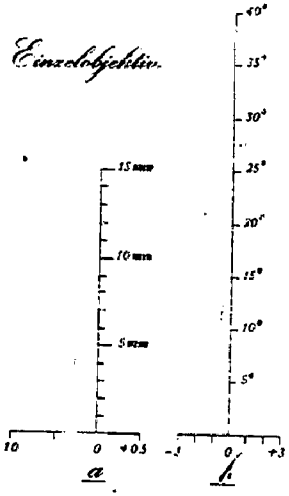
Radien, Dicken und Abstände für f' = 100 mm.

	r1	d1	r2	d2	r3	d3	r4	d4	r5	d5	r6	
	56.6	19.6	41.5	53.1	79.0	16.3	362.9	45.3	85.3	19.6	92.85	s' 64.8
	d1	l1	d1	l2	d2	l	d4	l1	d5	d6		
	2.93	0.77	4.64	3.05	2.03	48.85	7.61	0.05	5.90	1.6		

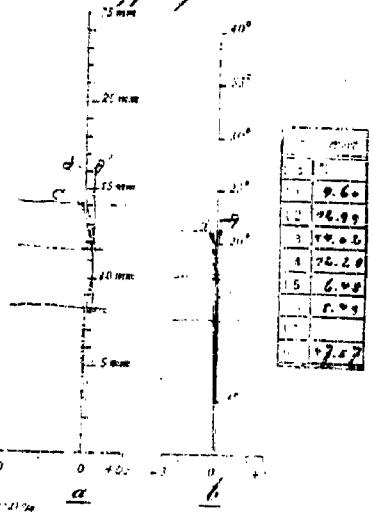
Einzelobjektiv.



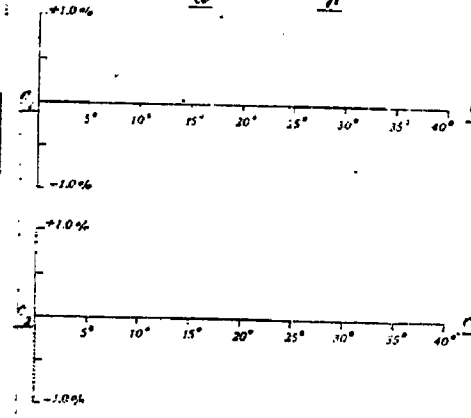
Linse	n d	ν d	r
L_1	1.56980		61.0	PSK2
L_2	1.69997		49.5	BaSF7
L_3	1.73960		28.5	SF3
L_4	1.67360		32.1	SF15
L_5	1.66980		47.1	BaF10
L_6	1.62030		49.4	BaF5

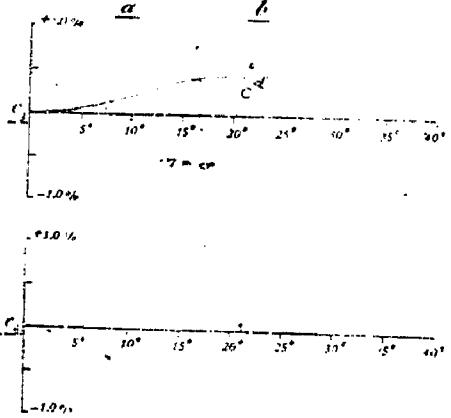


Doppelobjektiv.



1	9.60
2	96.99
3	99.05
4	96.28
5	6.98
	5.99
	97.27





Z-13-6698-52-2

1505

V 1942 Nr 16 1:18 f. 38 cm v. 23.9.42

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (RZ 32/37

Δs'	Δf

Δs'		Δf'	
-0.1	0	+0.6	-0.5	0	+0.5	+1.2

Einfallshöhen. | Chromasie.

5.3	7.9	9.2	11.1

f'o - f'o
+5
(+2)
+7

Stigmatismus / /

Sagittalwölbungsk. | Meridionalwölbungsk.

Sagittalwölbungsk.			Meridionalwölbungsk.		
-0.1	+0.2	+0.6	-0.3	0	+0.3

Frontwinkel. | Verzeichnung.

18.1	31.9	36.4	1000,03 mm statt 999,98

Radien, Dicken und Abstände für f' = 100 mm.

r1	r2	r3	r4	r5	r6	r7	d1	l	d2	d3	d4	d5	d6
12.9	∞	42.2	14.4	29.9	12.5	24.8	4.9	0.39	0.6	1.2	0.9	1.0	7.2

N° 1456

V 1942 Nr 16 1:18 f. 38 cm v. 23.9.42

ca 95.5

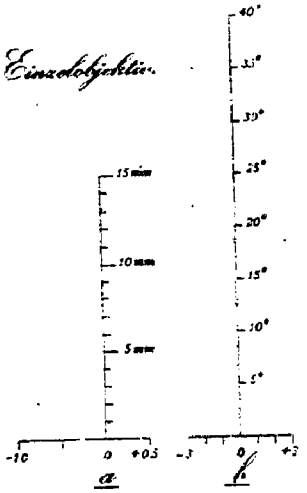
Brennebene

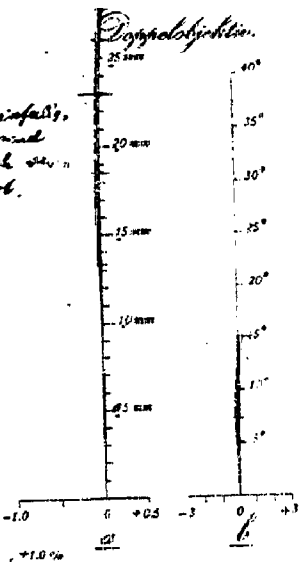
Linse	n_d	n_F-d	ν
1	1.589934	0.012218	61.0
2	1.63022	0.013411	57.4
3	1.62805	0.012855	62.3
4	1.610977	0.011363	56.9

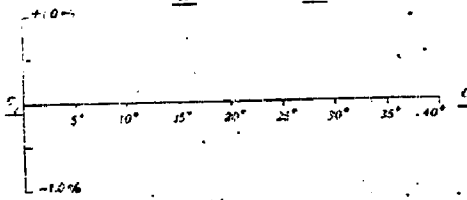
Doppelobjektiv.

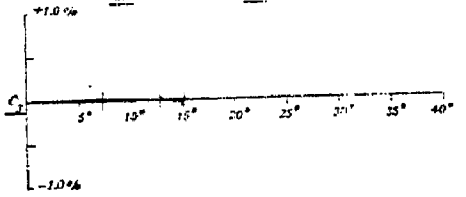
Einzelobjektiv.

Die Brennweiten und Hauptebenen sind gemessen.

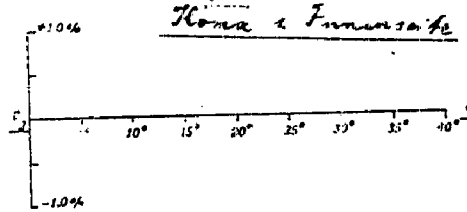


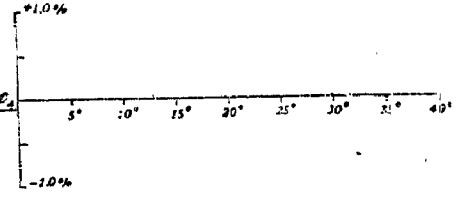






Koma z Frauenhofera





Pleon 1:8 f. 7.25 cm v. 16.2.40

Pleon 1:8 f. 7.25 cm v. 16.2.40.

Einzelobjektiv. Doppelobjektiv.

Sphärische Korrektion / /

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-3.82 -1.37 -0.48 -0.[illegible] -0.74 -0.[illegible]	

Einfallshöhen. Chromasie. Einfallshöhen. Chromasie.

Einfallshöhen	Chromasie
14.4	30.4

Astigmatismus / /

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel

Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
-0.24 -0.39 +0.18 +2.76 +3.60 +4.80	
-1.65 -1.80 0.00 +4.32 +5.88 +7.76	

Frontwinkel. Verzeichnung. Frontwinkel. Verzeichnung.

Einzelobjektiv Frontwinkel			Doppelobjektiv Frontwinkel		
48.2	73.0	90.0			
7-9.6	7+3.3	72.6			

Radien, Dicken und Abstände für f = 100 mm.

∞	7+3.2	7 m.6	77+.7	2+2.2	42.0	78.3	74.8	7+.8	78.8	78.8	42.0	2+2.2	∞	∞	70.6	7.4	3+.7	76.2	7+.0	6.+6

7.5	9.76	9.09	7.5-	0.79	73.6	2.4	6.9

Linsenachsenschnitt
mit 2 Innenradien.

Einzelobjektiv. Doppelobjektiv.

a b a b

Pleon 1:8 f. 7.25 cm

K. 1452

1381

F.S.-6596-2

F-TS-6398-RE

1827

Nr. 7458

7 g. Tessar Zeiss Nr. 752826 1:4.5 f = 10 cm = 24.4 Zoll Serie I

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (64 7½ / 12 cm)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		−5.3	−1.0	+0.2	−0.1	+2.6	−3.1

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Einzelobjektiv Einfallshöhen	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
22.7	17.0	17.3

Astigmatismus (64 7½ / 12 cm)

Einzelobjektiv Sagittaldifferenz	Einzelobjektiv Meridionaldifferenz	Doppelobjektiv Sagittaldifferenz	Doppelobjektiv Meridionaldifferenz
		−1.6	−4.6	−2.5	−6.7

Pfeilwinkel. | Vorzeichnung. | Pfeilwinkel. | Vorzeichnung.

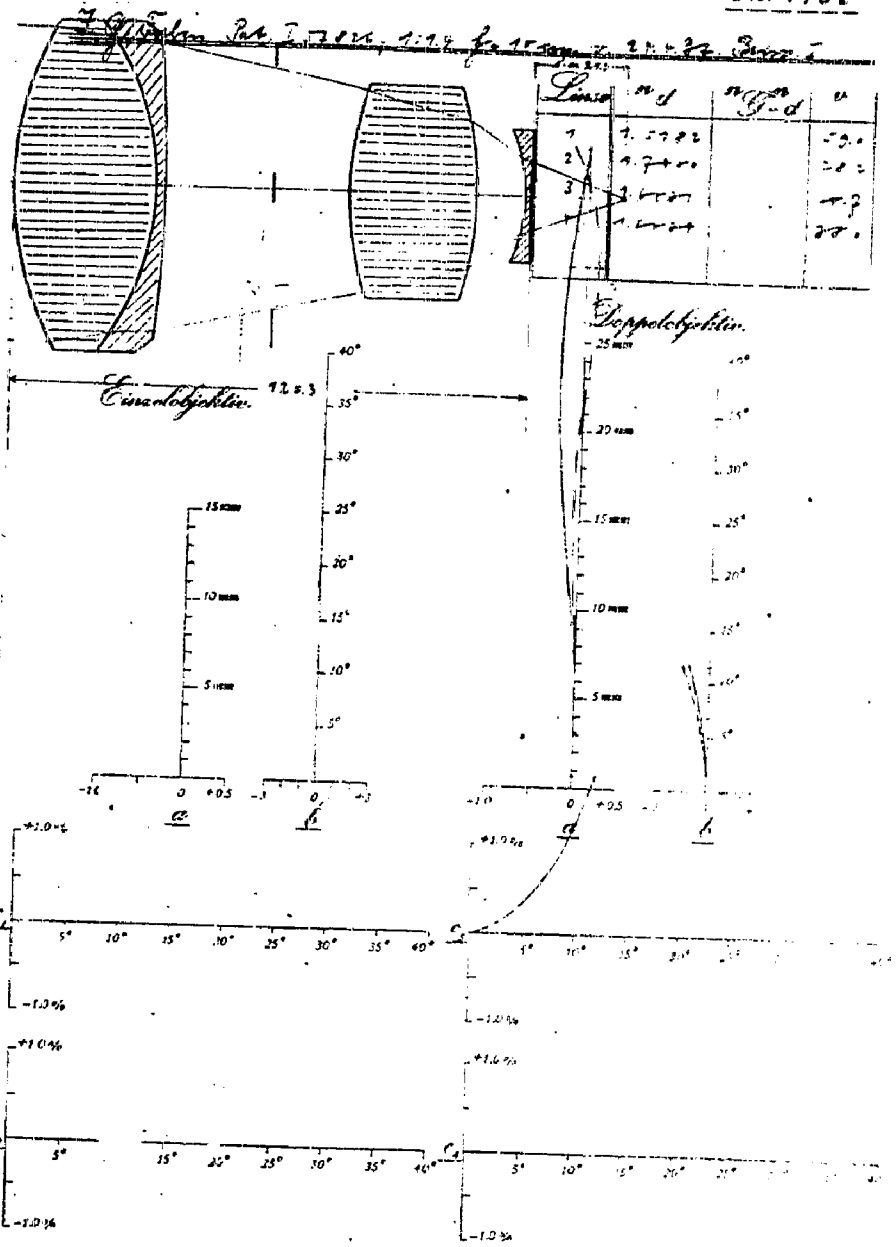
Einzelobjektiv Pfeilwinkel	Doppelobjektiv Pfeilwinkel
	16.6	28.7

Radien, Dicken und Abstände für f = 100 mm.

R_1	2	3	4	5	6	7	d_1	d_2	—	d_3	d_4	d_5	d_6	für 2 mm ϕ η'_2	η'_3	η'_4	η'_5
75.0	60.6	293.7	79.4	72.5	31.6	64.9	33.1	2.0	25.0	17.8	22.0	44.0	2.0	71.0	66.0	57.9	28.7

Linse | n_d | $n_F - n_d$ | ν_d

Linse	n_d	$n_F - n_d$	ν_d
1	1.57882		59.0
2	1.74400		28.2
3	1.57501		41.2
4	1.64769		33.8



F.25-6369

9231

J. G. Farbw. Ref. I 52626 1:1.4 f = 10 cm x 2 2 + 3 7 Zeiss T

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (K 7 1 / 1 3 2)

Einzelobjektiv.			Doppelobjektiv.		
Δs'	Δf		Δs'	Δf	
			-2.8	-9.8	-6.8
Einfallsloch.	Chromasie.		Einfallsloch.	Chromasie.	
			82.5	116.6	192.9

Astigmatismus (K 7 1 / 1 3 2) 86-91

Einzelobjektiv.			Doppelobjektiv.		
Segmentwinkel i.f.	Meridionalbüschel		Segmentwinkel	Meridionalbüschel	
			-0.9	3 0.0	+0.6
Pupillenwinkel	Verzeichnung		Pupillenwinkel	Verzeichnung	
			46.6	24.0	

Radien, Dicken und Abstände für f = 100 mm.

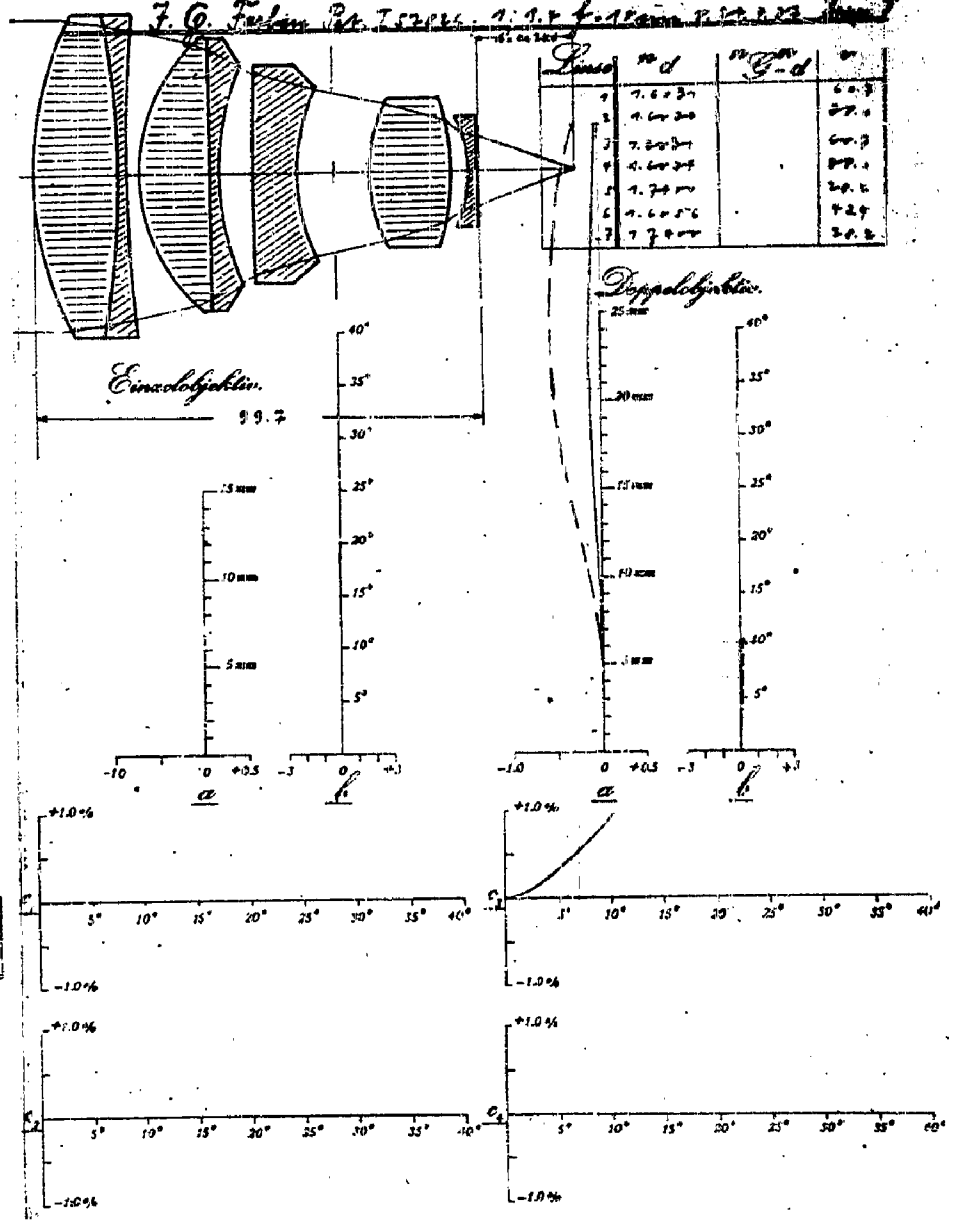
R_1	2	3	4	5	6	7	8	9	10	11	12	d_0	d_1	l_0	d_3	d_4	l_1	d_5
50.1	2	3	4	5	∞	6	5	7	8	9	10	11	12	13	14	15	16	17

Zeiss Dicken usw

R_1	2	3	4	5	6	7	8	9	10	11	12	d_0	d_1	l_0	d_3	d_4	l_1	d_5
71.0	68.2	65.8	59.7	56.0	49.0	46.0	37.7	30.2	22.2	17.2	7.5	2.5	2.0	48.5	3.6	2.0		

K 1459

J. G. Farbw. Ref. I 52626 1:1.4 f = 10 cm x 2 2 + 3 7 Zeiss T



J.-R. Objektiv 1:1 f = 5cm Rechn. v. 23.10.42.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AZ 2 / 95)

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf
		-2.4 -4.1 +3.4	+0.2 +1.5 -3.8

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		169.9	165.5	99.4

Astigmatismus (AZ 30 / 936)

Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel
		-4.0 -3.3 -5.4	-0.8 -4.0 -4.0

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		15.4	26.4	33.5	

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}
29.44	444.4	54.63	490.8	34.11	44.34	448.4	38.44	244.3	99.34	3.89.6	26.80

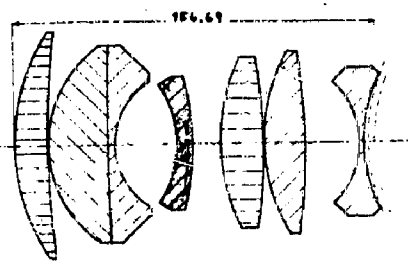
d_1	ϑ_1	d_2	ϑ_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	d_{10}
43.45	14.64	0.03	45.83	3.87	48.13	19.33	3.38	13.20	48.88	0.43	47.84

d_{11}	d_{12}	d_{13}	d_{14}	d_{15}
33.31	3.41			

J.-R. Objektiv 1:1 f = 5cm Rechn. v. 23.10.42.

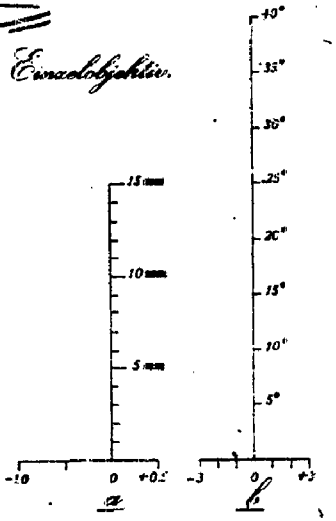
N 1460

Linse	Nr. d	Nr. F–d	D
1	1.62942		42.3
2	1.64478		58.4
3	1.83520		44.4
4	Rgl		
5	1.62041		43.3
6	1.69911		41.2
	1.61660		34.8

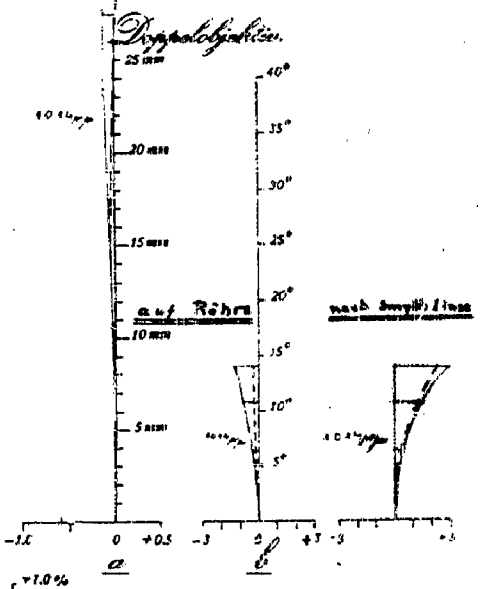


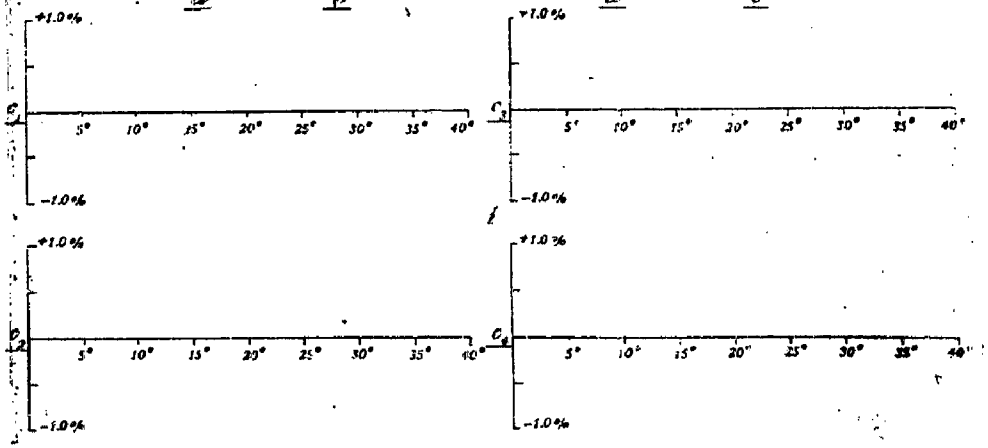
M 1:2

Einzelobjektiv.



Doppelobjektiv.





Zeiss Ikon Zeitwinkel Objektiv 1:2.8 f=10cm v. 11.1.48 J 1479 717

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (A 48/12/sec. 113)

Einzelobjektiv.		Doppelobjektiv.			
$\Delta s'$	Δf	$\Delta s'$		Δf	
		-7.2	-7.8	+10.7	-9.7	-10.5	+7.6
Einfallshöhen	Koma	Einfallshöhen		Koma	
		41.0	57.2	71.5			

Astigmatismus (A 48/12/sec. 107)

Sagittalwinkel	Meridionalwinkel	Sagittalwinkel		Meridionalwinkel	
		-3.0	-1.8	+2.2	0.8	1.1	+0.4
Feldwinkel	Bezeichnung	Feldwinkel		Bezeichnung	
		62.2	67.6	78.0	1078.6	1070.1	1078.2

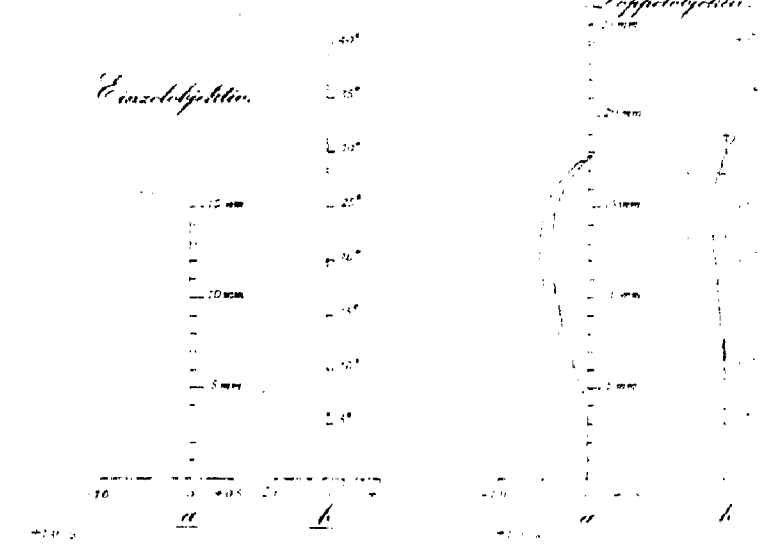
Radien, Dicken und Abstände für f = 100 mm.

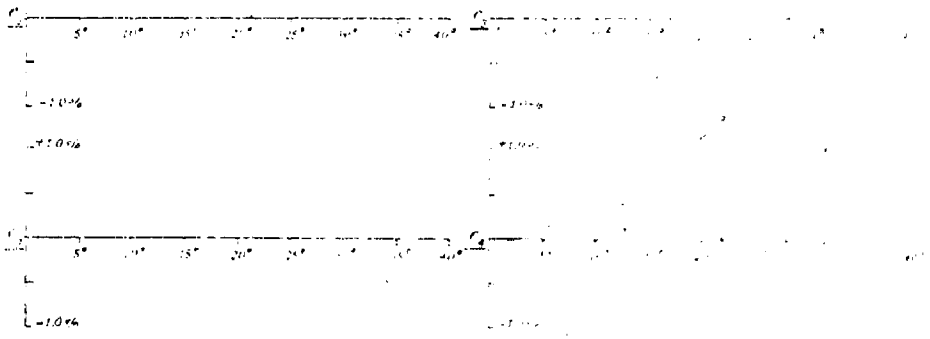
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	l	d_2	d_3	d_4	d_5	d_6	d_7
41.6	71.0	25.1	∞	18.9	1243.3	16.4	10.6	32.7	138.2	6.7	0.2	7.0	7.6	0.1	7.6	2.5	17.4	7.6	23.9

Zeiss Ikon Zeitwinkel Objektiv 1:2.8 f 10cm v. 11.1.48 J 1479 717

1	1.7516	41.6	Ba SF1
2	1.7282	25.1	Ba SF8
3	1.7486	18.9	SF12
4	1.6043	10.6	2
5	1.6031	32.7	SK2
6	1.6060	16.4	Ba SF11
7	1.5234	10.6	Ba F11

Einzelobjektiv. | Doppelobjektiv.





F-TS-6378.AE

1950

F.-Nr. 6329-26

1391

Meyer, Görlitz (Paul Schäfer), 1:1.5, f=10cm, # 2.3.40 DO 144-78

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (HZ 7/49

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'		Doppelobjektiv Δf'	
		−7.4	−5.0	+4.6	−13.6	−16.0	+3.0

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen			Doppelobjektiv Chromasie
		46.8	109.0	138.6	-77 (+102) +27

Astigmatismus (HZ 17/119-123

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittalwinkel		Doppelobjektiv Meridionalwinkel	
		−0.7	−1.2	−1.6	+1.1	−2.0	−10.5

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel			Doppelobjektiv Verzeichnung
		26.2	34.7	40.4	999.67, 997.24, 994.17

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_1	l_1	d_2	l_2	d_3	l_3	d_4	d_5
67.8	750.5	64.2	55.1	707.4	29.8	99.1	34.0	70.6	12.2	0.7	1.4	7.8	4.7	26.9	16.2	3.9

L. 1462

Meyer, Görlitz (Paul Schäfer), 1:1.5, f=10cm, # 2.3.40 DO 144-78

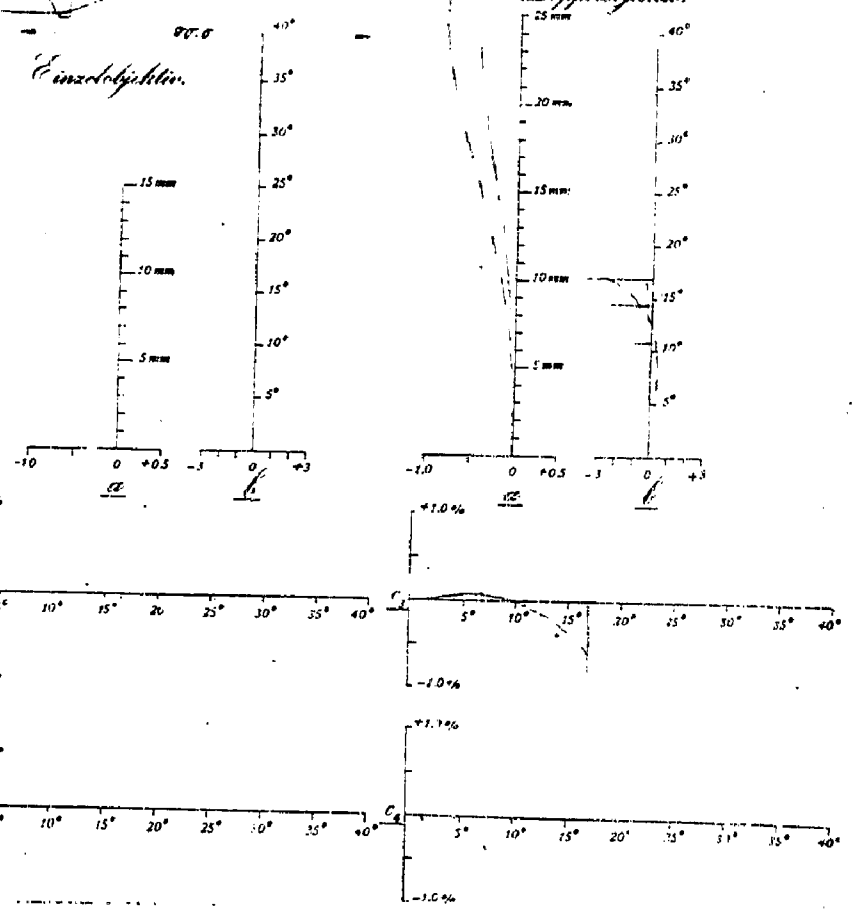
46.8

Linse	n_d	$\frac{n-1}{\rho}\cdot d$	ν_d	
1	1.6031	0.071753	60.7	SK16
2	1.6200	0.071398	60.3	SK16
3	1.7400	0.02679	28.2	SF8
4	1.6504	0.09657	50.9	SSK5
5	1.5874	0.07855	44.5	LF5

90.0

Einzelobjektiv.

Doppelobjektiv.



Siehe Tabellenblatt 225

Nr. 1463

1:1.8, f=10cm, DRP. Nr. 186.673 v. 10.7.06 / Zeitschr. f. Instrumk. 31. Jahrg. Bd. 11, 9. Heft S. 265-275

F-TS-6358-RE

1392

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion

Einzelobjektiv					
Δs'			Δf'		
-1.1	-1.1	+7.5	-11.5	-5.1	+2.2

Einfallshöhen		Chromasie
57.4	59.2	99.9

Doppelobjektiv					
Δs'			Δf'		
-4.6	-6.0	+4.4	-7.2	-7.8	-2.2

Einfallshöhen		Chromasie
63.8	96.2	115.5

Astigmatismus

Sagittalwinkel			Meridionalwinkel		
+0.7	+1.3	+2.4	+1.7	+1.8	+2.6

Sagittalwinkel			Meridionalwinkel		
-2.4	-4.6	-6.7	-3.0	-5.9	-7.6

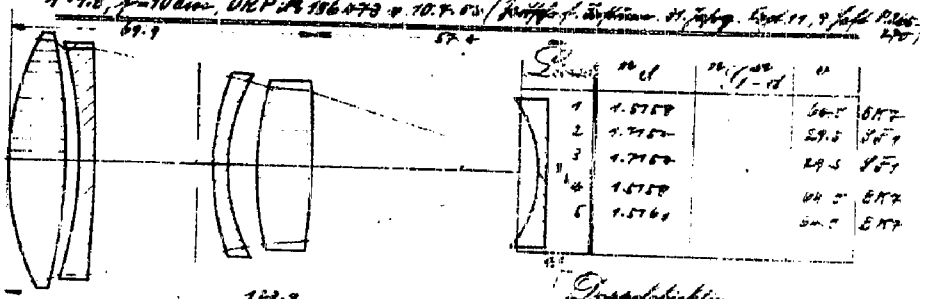
Feldwinkel		Verzeichnung
15.9	21.6	24.2

Feldwinkel		Verzeichnung
15.4	21.6	26.2

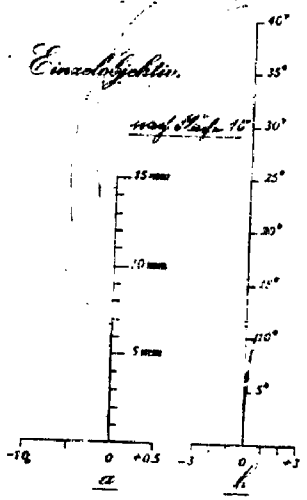
Radien, Dicken und Abstände für f = 100 mm.

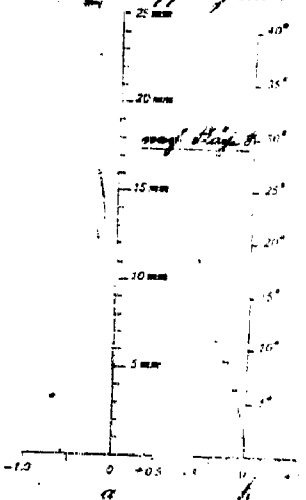
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	b_1	d_2	b_2	d_3	b_3	d_4	b_4	d_5
63.7	132.0	92.9	271.4	58.8	42.4	75.7	176.5	27.2	4109.2	12.9	2.9	3.7	23.2	3.7	6.6	12.9	52.1	1.9

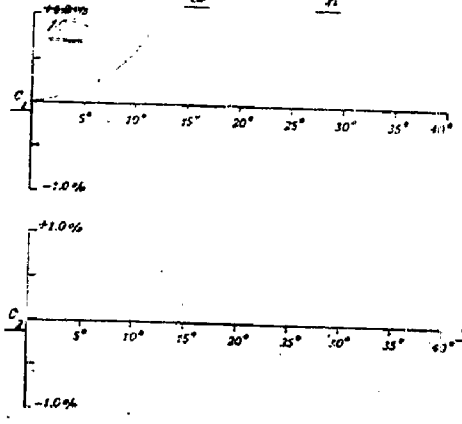
1:1.8, f=10cm, DRP. Nr. 186.673 v. 10.7.06 / Zeitschr. f. Instrumk. 31. Jahrg. Bd. 11, 9. Heft S. 265-275

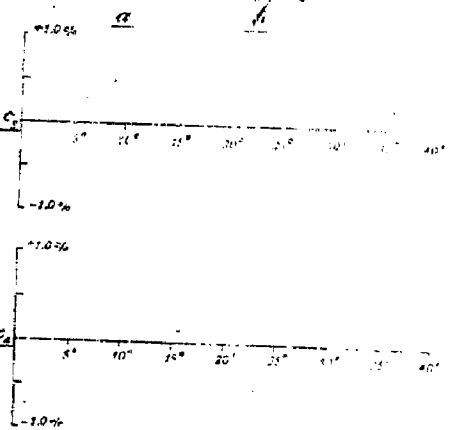


Fläche	r_n	d_n	n_e	ν_e
1	1.5758	6.5	1.5172	64.2
2	1.7160	29.5	1.6727	32.1
3	1.7160	2.5	1.6727	32.1
4	1.5758	9.5	1.5172	64.2
5	1.5761			









F-73-6378-AE

1373

Zeiss-Ikon Sonnar 1:1.4 f=5.5cm v. 30.12.41 Rechn. 1444

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (AK 34/117)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		−6.2	−3.2
		−10.7	−9.5
		−6.6	−13.7

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie

Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
80.4	−159
114.5	(+169)
139.0	−90

Astigmatismus (AK 49/75 a 107)

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel

Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
−1.2	−1.0
−0.4	−0.7

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung

Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
26.8	31.5

1872.8, 1915.5

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	l_1	d_2	l_2	d_3	l_3	d_4	l_4	d_5	d_6	d_7
77.5	16.0	25.5	64.2	355.	24.8	∞	52.1	22.2	74.6	10.1	0.2	9.8	11.3	2.4	14.9	3.5	17.1	5.1		

Zeiss-Ikon Sonnar 1:1.4, f=5.5cm, v. 30.12.41, Rechn. 1444

No. 1444/41

Linse	n_d	$n_F - n_C$	ν_d	
1	1.6788	0.01838	43.2	Schott
2	1.6129	0.01377	60.4	BK1?
3	1.0621	0.00933	66.8	FK3
4	1.7324	0.01857	29.5	F5?
5	1.6238	0.01586	46.5	LLF3
6	1.6717	0.01833	49.2	Schott
7	1.6781	0.01342	67.3	BK12

Einzelobjektiv.

Doppelobjektiv.

Bitte wenden!

FTS-6398-RE

4621

№ 1465

V/1442 № 5 1:2.8 f=13.5 cm 4.7.3.42 für Dr. Hofm. Hannover

V/1442 № 5 1:2.8 f=13.5 cm 4.7.3.42 für Dr. Hofm. Hannover

ca. 59.3 — ca. 60.1

Linse	n d	n (Gl.-d)	v
1	1.624478	0.019290	56.4
2	1.608701	0.352494	44.9
3	1.581144	0.019305	40.8
4	1.581144	0.019267	40.8
5	1.612778	0.187295	44.5
6	1.617778	0.091298	55.9

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (A II 23) 116

Δs'	Δf'

Δs'			Δf'		
-2.5	-1.8	-3.5	-1.9	-0.5	-2.6

Einfallshöhen. | Chromasie.

44.0	58.0	71.0

-12
(+67)
+32

Einzelobjektiv.

Doppelobjektiv.

Astigmatismus (A X 3) 102-107

Aequatorialbüschel			Meridionalbüschel		

Aequatorialbüschel			Meridionalbüschel		
-2.6	-0.1	+5.3	-1.5	-0.3	+0.5

Frontwinkel. | Vorzeichnung.

Frontwinkel. | Vorzeichnung.

46.0	58.0	66.5

1006.5 1009.0 1009.6

Radien, Dicken und Abstände für f = 110 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	d_1	l_1	d_2	d_3	l_2	d_4	d_5	l_3	d_6
60.9	224.0	44.4	200.5	26.9	28.0	107.0	35.0	245.0	70.0	4.7	3.0	54.7	2.2	13.7	2.2	15.7	0.7	6.9

05/38

A. 75-6200-25

1365

F. R. Objektiv 1:1 f. = 7.5 cm

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (Δz bei ± 2.5)

nach Lage-Linse Δs'			Δf'		
-3.7	-1.6	+2.1	+2.6	+7.1	-3.4

auf Ruhm Δs'			Δf'		
-2.4	-1.3	+1.0	+1.9	+5.8	-5.3

Einfallshöhen		Chromasie
11 2.2	11 8.7	11 4.1

Einfallshöhen		Chromasie
11 3.4	11 9.8	11 5.7

Δf = 11.9 (= 2.7 g)

Astigmatismus (Δz bei ± 1°)

Segmentwinkel	Meridianwinkel				
+1.7	+5.4	+11.0	+1.2	+5.1	+11.1

Segmentwinkel	Meridianwinkel				
-1.9	-2.5	-3.4	-1.9	-1.2	-1.6

Frontwinkel	Verzeichnung
15.4	2 6.2

Frontwinkel	Verzeichnung
15.4	2 6.2	3 4.2

Radien, Dicken und Abstände für f = 100 mm.

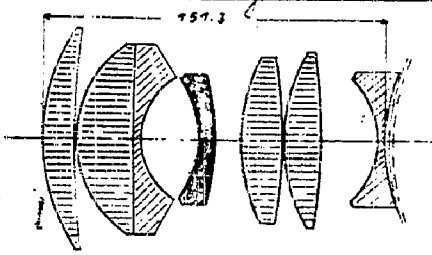
R_0	2	3	4	5	6	7	8	9	10	11	12	13	14	15	d_1	l_1	d_2	d_3	l_2
89.9	+06.	52.0	+1+2	31.2	95.9	+7 3 2	88.9	2 3 2	70.6	2 7.0	3 0.2	7 3 4	+6 2.1	99.2	-7 4.5	0.1	2 5.0	3.0	10.0

Freie Bahnen, aus

l_1/l_2	3/4	5	6	3	8/9	10/12	11/13
97.0	8 8.0	58.0	51.5	5 5.5	7 2.2	7 6.0	5 3.0

l_2 d_1 l_0 d_2 l_3 d_3 l_4 d_4 l_5 (Zeichn.)

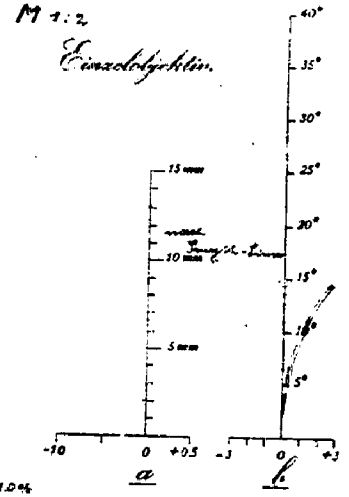
16.1 7.2 12.1 1 8.7 8 1 17.6 2 3.5 2.9 2.0 2.0



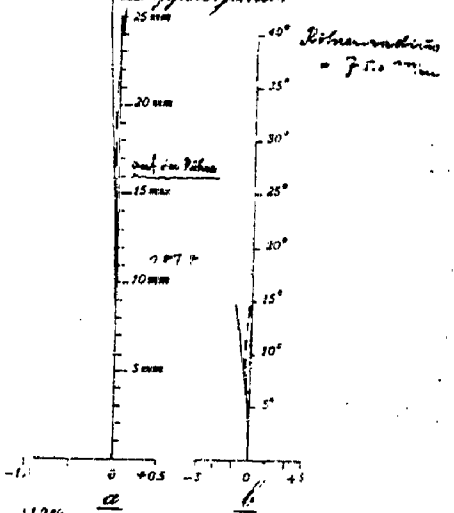
Linse	n_d	$n_{G'-d}$	ν
1	1.67 [illegible]	0.0 1830	+7.3
2	1.67 1 9 2	0. [illegible] 3 2 9	5 8.2
3	1.57 5 2	5. [illegible] 8 7 7	+1.1
4	[illegible]		
5	1.67 [illegible] 2	0. [illegible] 2 [illegible]	+7.3
6	1.6 4 4 1 1	0. [illegible] 2 3 7 9	+1.2
7	1.67 2 6 5	0. 0 2 9 4 1	3 2.2

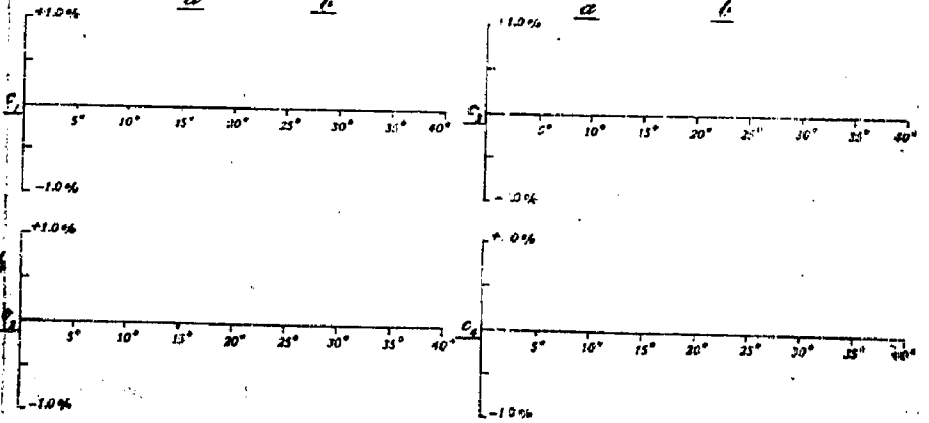
M 1:2

Einzelobjektiv



Doppelobjektiv





F-TS-5398-RE

Z. 2 Objektiv 1:7 f = 5 cm r 5.11.42

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion für 537.37

nach Empfindlichkeit

Δs'	Δf

auf Bilder

Δs'			Δf		
-6.9	-3.2	+15.8	-8.9	-2.8	+6.9

Einfallsfehler | Chromasie

Einfallsfehler | Chromasie

+12.1	158	+9.42

Astigmatismus für 222/16

Segmentalwinkel			Meridionalwinkel		
+6.2	+10.9	+16.7	+6.4	+12.8	+20.5

Frontwinkel | Vorzeichnung

26.4	27.4	35.5

Segmentalwinkel			Meridionalwinkel		
-2.8	-3.6	-4.9	+7.8	+9.3	+10.8

Frontwinkel | Vorzeichnung

26.4	37.4	35.5

Radien, Dicken und Abstände für f = 100 mm.

	1	2	3	4	5	6	7	8	9	10	11	12	d_1	l_1	d_2	d_3	l_2	l_3	d_4
	88.8	103.8	493	89.9	25.1	36.9	57.7	55.5	1733	293	76.9	83.9	80.1	15.0	1.1	26.8	2.6	11.6	15.9	7.2

Datum mm

$2_{1/2}$ 3/8 Fuss 6 7 9/11 10 12 Fuss

100 = 85.2 57.7 50.0 59.2 65.3 54.2 65.3

l_2 d_3 l_3 d_4 Linse Fuss

15.7 11.0 24.2 3.0 1.0 3.0

M 1:2

Einzelobjektiv.

nach Empfindlichkeit

Doppelobjektiv.

auf Bilder

1014

Nr 7467

Linse	n_d	$n_G - d$	ν_d
1	1.6172	0.01220	47.3
2	1.6176	0.01338	36.6
3	1.6176	0.01611	47.1
r	2.30	—	—
5	1.7044	1.0412	27.7
6	1.6176	0.01217	36.6

J-R. Objektiv 1:1.5 f=15cm Rechn.v. 12.11.42.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (RX 43 / 12)

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		−4.1 −4.3 +0.1	−6.8 −6.6 +3.3
		0.0 +0.8 +1.5	−0.3 +5.3 +10.5

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		34.0	10.3 12.3

Astigmatismus (A 239 / 10)

Einzelobjektiv Segmentalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Segmentalbüschel	Doppelobjektiv Meridionalbüschel
		+0.2	−0.3

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		12.0	

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	d_1	d_2	d_3	d_4	d_5	d_6
98.9	367.5	54.8	94.2	403.9	98.3	403.3	44.9	24.0	43.0	43.7	∞	86.5	28.11	8.6	3.1	6.0	19.0	43.6	4.5

d_{11}	d_{12}	d_{13}	d_{14}	d_{15}	d_{16}	d_{17}	d_{18}
3.5	7.4	4.4	9.4	35.0	4.0	0.5	4.0

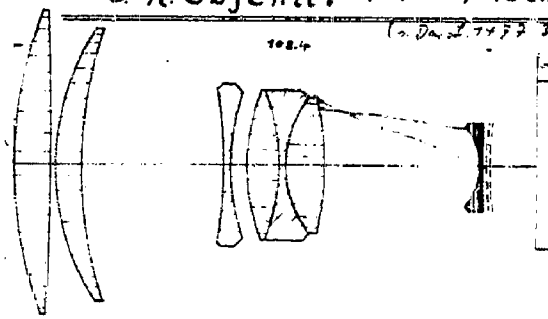
1397

f-15-6378-RE

J 9942/22

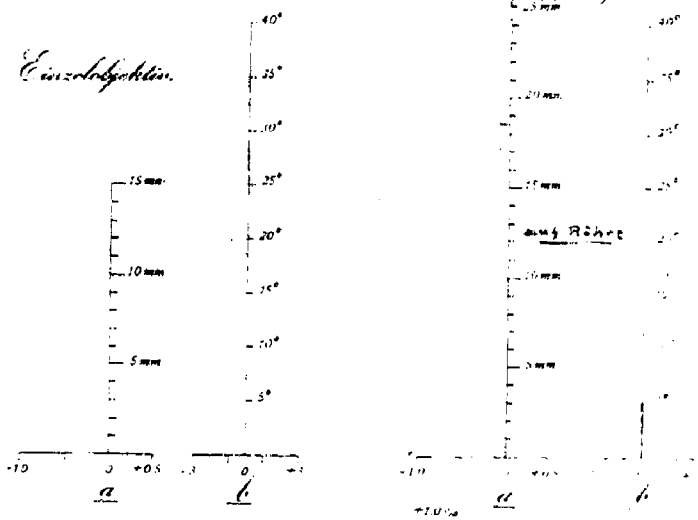
J.-R. Objektiv 1:1.5 f=15cm Rechn.v. 12.11.42.

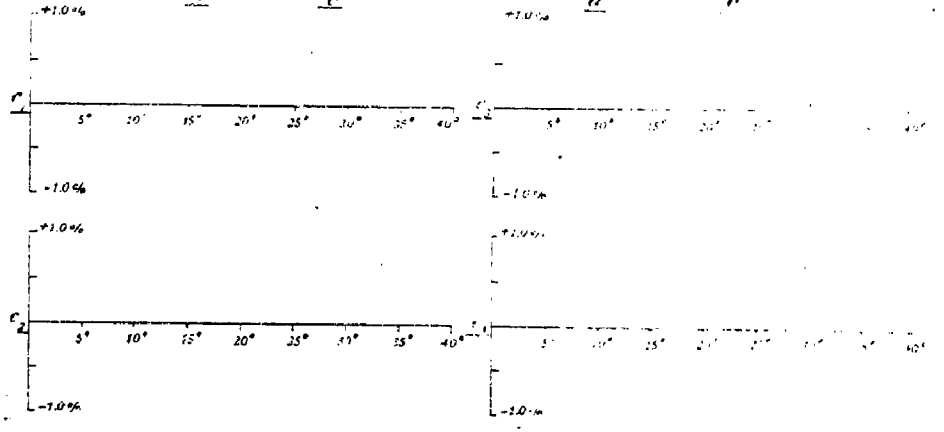
Lfd. No. 1468



Linse	n_d	n_{C-d}	ν
1	1.614851		60.8
2	1.614851		60.8
3	1.713548		48.3
4	1.613391		55.4
5	1.713548		48.3
6	1.613391		55.4
7	Rgl		

Einzelobjektiv. | Doppelobjektiv.





3V-8639-51-1

1387

V 1942 Nr 27. 3 R Objektiv 1:1.5. f = 15 cm. Rdf. v. 20 VI 42

Einzelobjektive. | Doppelobjektive.

Sphärische Korrektion (f 235 / 63)

Einfallshohen. Chromasie.

Astigmatismus (f 235 / 63)

Segmentalwinkel. Meridionalwinkel.

Frontwinkel. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

1)

V 1942 Nr 27. 3 R Objektiv 1:1.5. f = 15 cm. Rdf. v. 20 VI 42

M 4469

Linse | n_d | $\nu_{G'-d}$ | e

Einzelobjektive.

Doppelobjektive.

Kreis 2 : Zeichnung 1 !

F-75-6369-RE

1369

2)

No 1469 a

V 1942 No 21. 7 R. Objektiv 1:1.5. f = 15 cm. R. v. 20. II. 42.

V 1942 No 21. 7 R. Objektiv 1:1.5. f = 15 cm. Red. v. 20. II. 42.

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (Δ25°) f. ...

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

Astigmatismus (Δ20°) f. ...

Sagittalvertikalbüschel. Meridionalbüschel.

Sagittalvertikalbüschel. Meridionalbüschel.

Frontwinkel. Verzeichnung.

Frontwinkel. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

Nr.	R	D	L	n	ν	R	D	L	n	ν	R	D	L	n	ν	R	D	L	n	ν

Linse | Nr. d | Nr. G-d | Nr.

1 | 2 | 3 | 4 | 5

Einzelobjektiv.

Doppelobjektiv.

Red. auf f = 25 mm

Red. auf f = 100 mm

Prog. 1053 ...

Red. auf f = 100 mm

F-T5-6598-22

V 1972 Nr 27. J. R. Oberkochen 1:1.5 f = 15 cm. Rad. v. 20.11.72

Ohne Symm. Linse
Einzelobjektiv

Mit Symm. Linse auf Rückseite
Doppelobjektiv

Sphärische Korrektion (/) A Z 35/62. / A Z 35/114.

Einzelobjektiv — gemacht für f

Δs'			Δf'		
-3.5	-4.6	-9.3	+1.7	+5.3	+22.2

Doppelobjektiv

Δs'			Δf'		
-2.8	-3.8	-3.0	-5.5	-2.8	+9.2

Einfallshöhen — Chromasie

82.4 | 113.2 | 138.2 — -0.52 (+0.03) -0.89

Einfallshöhen — Chromasie

76.1 | 107.3 | 132.0 — -0.57 (+1.79) -2.36

Astigmatismus (22-39) / 73-

Sagittaler Bildabstand		Meridionaler Bildabstand	
-0.9	-3.0	-2.0	-6.5

Sagittaler Bildabstand		Meridionaler Bildabstand	
+0.2	-1.7	-1.2	-7.0

Farbwinkel — Vorzeichnung

6.6 | 12.0 — 1000.26 1000.67

Farbwinkel — Vorzeichnung. Nach Symm.-Linse

6.6 | 12.0 — 1000.29 1025.89

Radien, Dicken und Abstände für f = 100 mm.

Nach Symm.-Linse

Δ s'			Δ f'		
-2.1 / -3.2	-1.3 / -1.3	-1.8 / -3.8	-5.2 / -5.2	-1.7 / -1.7	+10.4 / +11.0

+0.2 | +0.5 | +1.9 | -4.6

75.2 / 75.2 | 109.3 / 112.3 | 134.3 / 134.1 Einfallshöhen

1400

N 1762

V 1972 Nr 27. J. R. Oberkochen 1:1.5 f = 15 cm. Rad. v. 20.11.72

Linse | n_d | n_F-d | ν

Veränderte Symm. Linse (schwache Wirkung)

Doppelobjektiv

Einzelobjektiv

Ohne Symm.-Linse

Mit Symm.-Linse

a / b / c

a auf Bild f

Vorz. 1025.9

F-TS-6378-RE

1490

V 1942 Nr 21. J. R. Objektiv 1:1.5 f=15 cm. Kook v. 20.11.42

Ohne Symm. Linse
Einzelobjektiv

Mit Symm. Linse auf Rückseite
Doppelobjektiv

Sphärische Korrektion ( ) RZ 35/42.
nach pl 6

Δs'			Δf		
-3.3	-2.6	-1.3	+1.7	+5.3	+8.2

Δs'			Δf		
-2.8	-2.4	-3.0	-5.5	-2.2	+1.2

Einfallshöhen | Chromasie
88.4 | 113.7 | 139.2 | -0.52 (+0.03) -0.19

Einfallshöhen | Chromasie
76.1 | 101.3 | 132.0 | -0.57 (+1.79) -2.36

Astigmatismus f(22.5°) 1.75

Sagittalwinkelfehler		Meridionalwinkelfehler	
	-0.9	-3.0	-2.0	-6.5

Sagittalwinkelfehler		Meridionalwinkelfehler	
	-0.83	-1.9	-1.2	-7.0

Frontwinkel | Vorzeichnung
6.6 | 12.0 — 1000.26 1000.67

Frontwinkel | Vorzeichnung (Nach Symm. Linse)
6.6 | 12.0 — 1025.83

Radien, Dicken und Abstände für f = 100 mm.

Nach Symm. Linse

Δ r'			Δ f'		
-1.2	-1.2	-1.8	-5.2	-1.7	+1.0
-2.2	-2.3	-3.8	-5.2	-1.7	+0.0

-0.2 | -0.9 | -4.6

75.2 | 98.3 | 124.3
75.7 | 99.3 | 124.3 + Einfallshöhen

Nr 1368

V 1942 Nr 21. J. R. Objektiv 1:1.5 f=15 cm. Kook v. 20.11.42

Veränderte Symm. Linse (schwach wirkend.)

Linse | n_d | ν_d | r

Einzelobjektiv

Doppelobjektiv

a | f

a | f

a Auf Rückseite

Vorz. 1025.9

F-75-6346-RE

1941

V 1942 Nr 21. 7.2. Objektiv 1:7.5. f = 15 cm. Rolf. v. 20. XI. 42.

Einzelobjektiv.

Doppelobjektiv

mit Symmetrie auf Raster.

nach Symmetrie / ideal Sphärische Korrektion (13×13) / 127

Einzelobjektiv.						Doppelobjektiv.					
Δs'			Δf'			Δs'			Δf'		
-0.5	-0.0	-0.3	-0.0	+0.5	+0.2	-3.0	-2.6	-2.5	-1.3	+0.7	+1.2

Einfallshöhen.			Chromasie.	Einfallshöhen.			Chromasie.
22.5	22.0	21.2	1'-2' = -0.7 (-0.5) -0.7	23.3	23.0	22.5	1'-2' = -0.7 (-0.5) -0.7

Astigmatismus (1:2.2) / 102

Segmentalhöhe	Meridionalhöhe		Segmentalhöhe	Meridionalhöhe	
	+1.3	-0.5		-1.1	-1.0

Frontwinkel	Vorzeichnung.		Frontwinkel	Vorzeichnung.	
	12.0	1000.77		12.0	nach Symmetrie Linse 1000.25

Radien, Dicken und Abstände für f = 100 mm.

| | | | | | |

F-75-6398-RE

14402

Nr. 1470

Vi942 d:20, 1:1, f= 6.5 cm, bis n=12, E. v. 26.11.42

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (d:Z23).20

Δs'	Δf'

Δs'			Δf'		
-7.0	-7.0	+6.3	-3.1	-5.0	-0.9

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie. F-d₀ = 2.28 = 4

114.0	162.0	200.0

Astigmatismus (d:Z37).17 ...

Segittalwinkelbüschel. Meridionalbüschel.

Segittalwinkelbüschel.			Meridionalbüschel.	
-0.3		0.4	20.0	+0.7

Frontalwinkel. Vorzeichnung.

Frontalwinkel. Vorzeichnung.

30.5		42.5	991.95	992.98

Radien, Dicken und Abstände für f = 100 mm.

r₁	r₂	r₃	r₄	r₅	r₆	r₇	r₈	r₉	r₁₀	r₁₁	r₁₂	r₁₃	r₁₄	d₁	l₁	d'₂	d₂	l₂	l'₂
131.5	1052.6	61.4	276.0	39.2	49.1	44.8	90.5	169.0	163.5	86.2	462.0	85.1	∞	18.4	0.1	24.7	5.2	11.3	18.2

d₃	d₄	l₃	d₅	l₄	d₆	l₅	d₇
4.8	25.5	0.1	15.7	8.3	27.8	86.9	2.4

Vi942 d:20, 1:1, f= 6.5 cm, bis n=12, E. v. 26.11.42

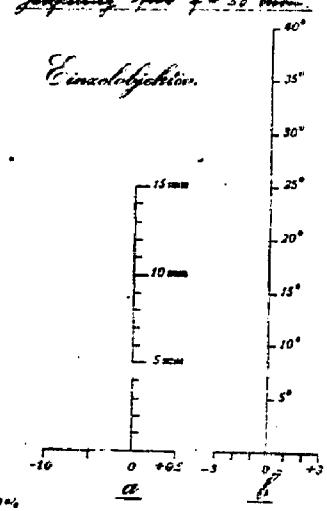
w=194.5

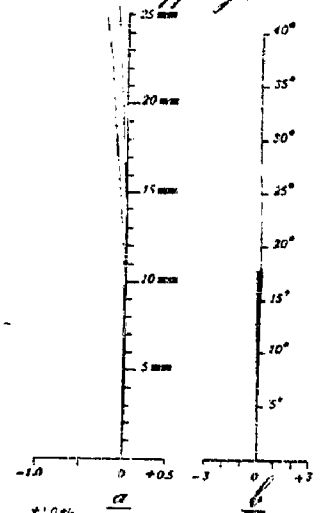
Linse	nd	νd	
1	1.6667	48.6	BaKrn
2	1.6206	60.3	SK14
3	1.5748	41.4	LF5
4	1.6987	30.1	SF15
5	1.6589	57.2	SK15
6	1.6206	60.3	SK16
7	1.6392	58.6	SK18
8	1.7920	25.8	SF11

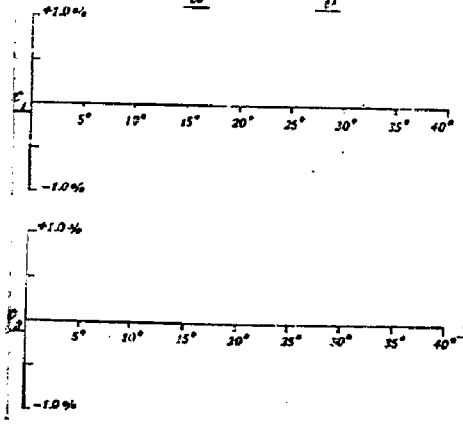
Prüfung für f = 50 mm.

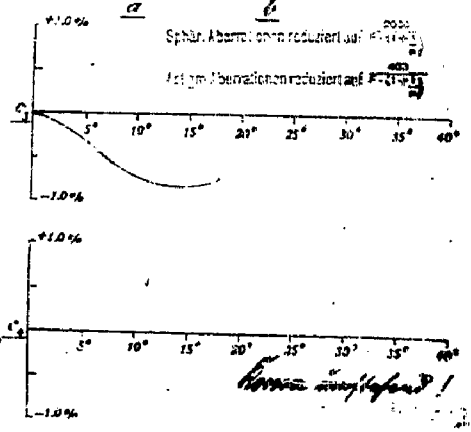
Einzelobjektiv.

Doppelobjektiv.









Sphär. Abberr. ohne reduziert auf

Fehler der Abberationen reduziert auf

Linsen auswechselbar!

Biogon 1:2.8 f=3.5 cm v. 19.9.72 Patent Nr. 1437 8

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (RU 19/72)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		−7.0 −7.2 −7.0	−9.5 −10.6 −3.9

Einzelobjektiv. Einfallsloch	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallsloch	Doppelobjektiv. Chromasie
		36.9	52.0 77.4

Astigmatismus (RU 20/72)

Einzelobjektiv. Sagittalwinkel	Einzelobjektiv. Meridionalwinkel	Doppelobjektiv. Sagittalwinkel	Doppelobjektiv. Meridionalwinkel
		−1.8 −1.0 −0.7	+1.1 +0.7 +1.2 +1.1 +1.0

Einzelobjektiv. Frontalwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontalwinkel	Doppelobjektiv. Verzeichnung
		42.7	55.9 64.0 74.4

Radien, Dicken und Abstände für f = 100 mm.

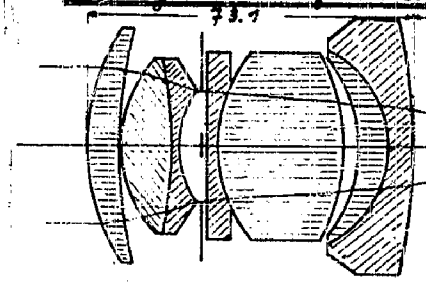
R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	d_1	l_1	d_2	d_3	b_1	b_2	d_4	d_5	l_2
39.6	777.6	29.4	777.6	22.7	42.7	33.6	46.0	33.1	1.49	78.1	7.6	0.3	77.2	1.7	4.8	1.4	2.4	28.7	3.2

Freie Blende mm

											d_6	d_7
36.1	24.1	32.9	24.5	25.4	25.0	24.5	24.7	18.7	22.5	14.7	6.9	4.9

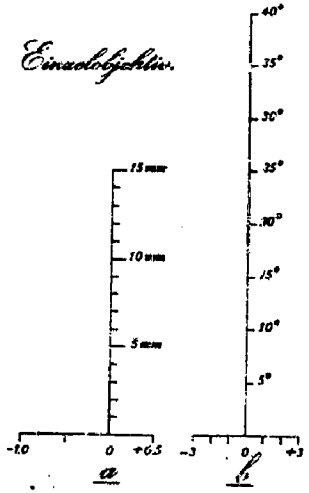
Nr. 1471

Biogon 1:2.8 f=3.5 cm v. 19.9.72 Patent Nr. 1437 8

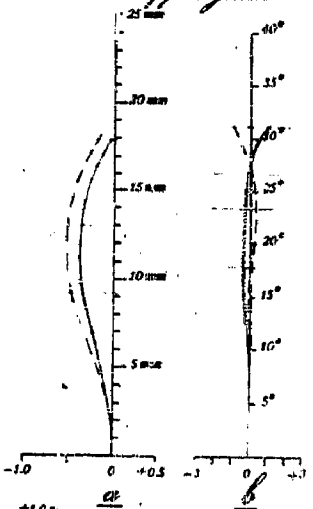


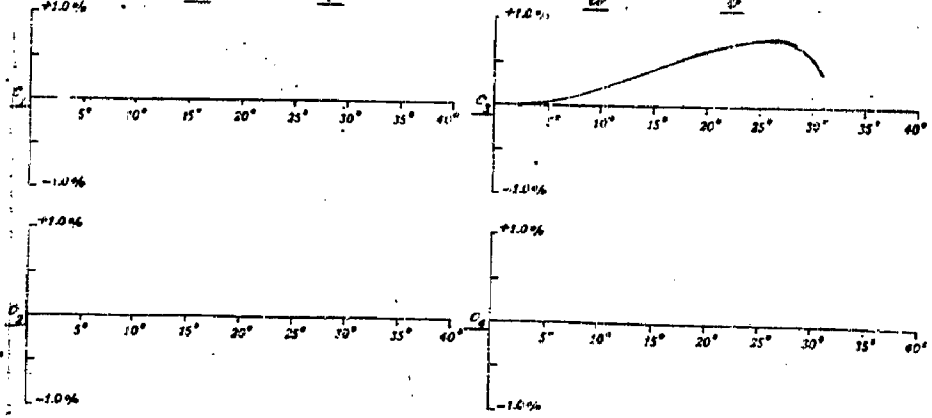
Linse	n_d	ν_d	$P_{g,d}$	r
1	1.617 73			82.6
2	1.616 73			34.1
3	1.732 67			2 81.3
4	1.716 62			6 5.6
5	1.612 59			6 0.5
6	1.612 59			6 0.5
7	1.716 62			6 5.6

Einzelobjektiv.



Doppelobjektiv.





F.Ts-6398-RE

1404

Sonnar 1:2.0 f = 7.5 cm v. 7.2.71 Zeiss Nr. 1378 Z

Nr. 7472

Sonnar 1:2.0 f = 7.5 cm v. 7.2.71 Zeiss Nr. 1378 Z

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (R 7/25/.139

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-2.8 -3.2 -3.0 -4. -4.8 -4.5	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		40.9 57.9 70.9	- 7.54 (+ 0.99)

Astigmatismus (Ar 22/23 f = 7.5 cm)

Einzelobjektiv Sagittaler Bildwinkel	Einzelobjektiv Meridionaler Bildwinkel	Doppelobjektiv Sagittaler Bildwinkel	Doppelobjektiv Meridionaler Bildwinkel
		-0.3 -0.3 -1.5 -1.5 -0.5 -0.7	-1.4

Einzelobjektiv Frontwinkel	Einzelobjektiv Verzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Verzeichnung
		7.9 11.3 15.9	18.8

Radien, Dicken und Abstände für f = 100 mm.

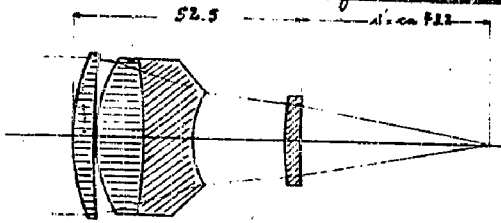
Zeiss Balsam a

R_1	2	3	4	5	6	7		d_1	l	d_2	d_3	l_3	l_4	d_4	$\beta_{1,2}$	γ	ε	s'	l'/f
0.69	1.79232		12.91	13.78	60.4	22.03		5.0	0.3	11.3	11.5	19.5	1.3	3.6	38.2	33.3	29.4	20.3	16.3

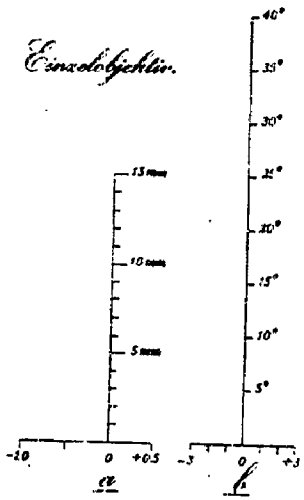
37.0 37.0

Linse | n_d | $n_F - n_d$ | ν

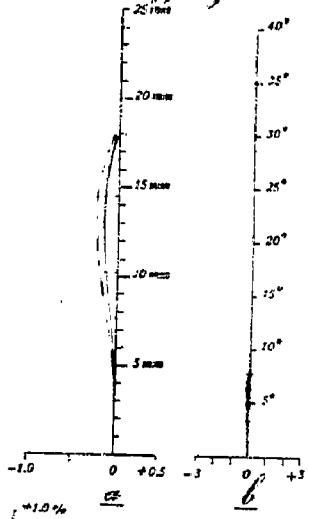
Linse	n_d	$n_F - n_d$	ν
1	1.6488	0.01730	56.9
2	1.5890	0.01754	42.6
3	1.6890	0.02993	31.2
4	1.6890	0.02993	31.2

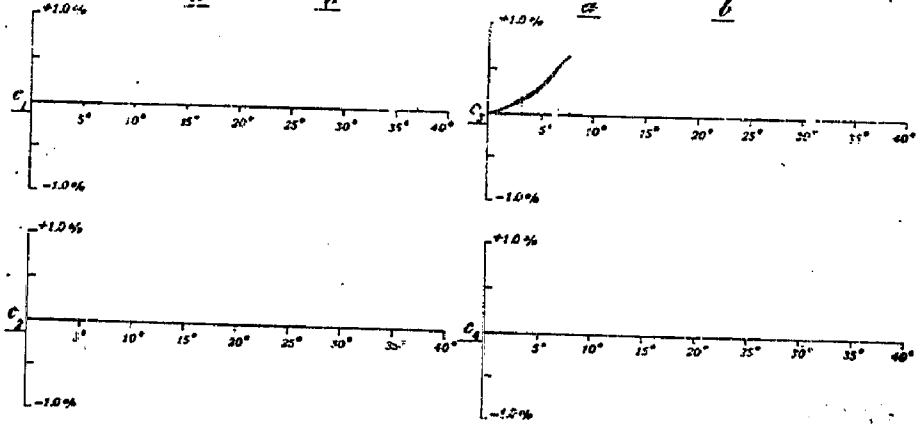


Einzelobjektiv.



Doppelobjektiv.





Astro-Gesellschaft Zeiche & Co. 1:1.05 f = 10 cm x 9.1.02

A. 9226/24

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AWs 0/.105

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-15.7	-21.9	+10.2	-26.7	-37.0	+19.3

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		109.0	155.7	196.2	

Astigmatismus (AZs 0/.92-95

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel	Doppelobjektiv. Meridionalbüschel
			- 2.8	- 3.1	+ 2.2	+ 3.8

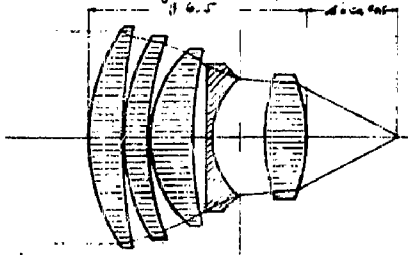
Einzelobjektiv. Fernbereich	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Fernbereich	Doppelobjektiv. Verzeichnung	
			37.2	35.8	1.0%/-1.0%/19

Radien, Dicken und Abstände für f = 100 mm.

R_1	s_1	d_1	R_2	s_2	d_2	R_3	s_3	d_3	R_4	s_4	d_4	l_0	d_{L_1}	L_1	d_{L_2}	L_2	$2y$	f_0	l_2	d_{L_3}
58.2	12.4	58.3	124.-	5.32	17.3	∞	35.1	32.8	76.4	15.1	0.5	70.7	0.4	13.6	5.3	2.7	72.0	10.9	79.1	

Fortsetzung

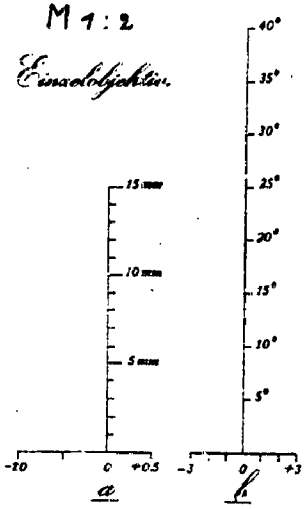
R_5	s_5	d_5	R_6	s_6	d_6	R_7	s_7	d_7	R_8	s_8	d_8
95	9.2	8.1	82.8	7.3	68.0	64.6	5.0	17.3	98.3		



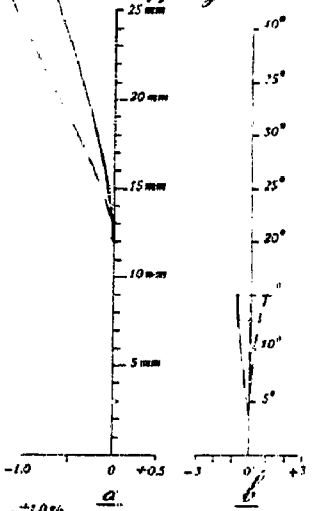
Linse	n_d	ν_d	$n_F - n_d$	ν
1	1.5693			64.0
2	1.6123			58.6
3	1.6538			56.0
4	1.7286			28.2
5	1.6688			44.9

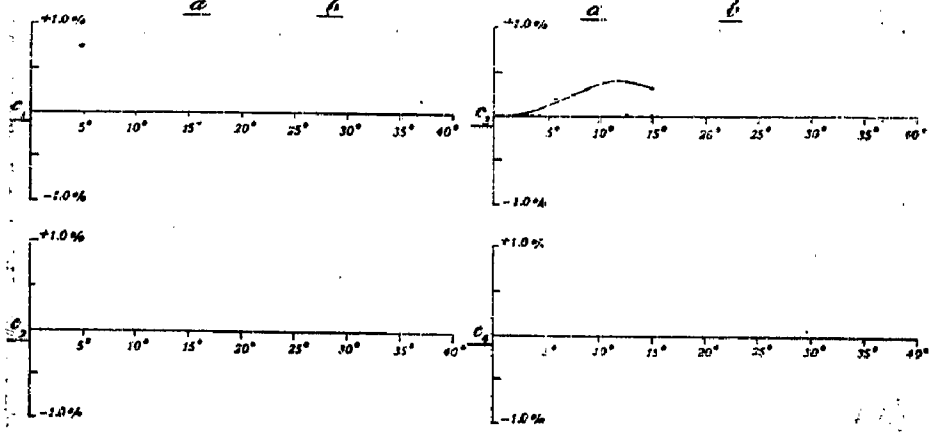
M 1:2

Einzelobjektiv.



Doppelobjektiv.





F.S-6396-42

Apo-Tessar 1:9, f= 45 mm (innerhalb) für n = 1 ∞ 28.1140

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (Öffnung 12.9–10.1

	Δs'			Δf'		
d	−5.2	−4.5	−3.4	−2.6	−2.0	+0.5
g'	−1.8	+3.3	+12.4	−0.4	+0.3	+3.7

Einfallshöhen. Chromasie.

18.9	18.2	24.0

−48
(+12)
−36.

Astigmatismus (Öffnung 9.1–7.9

Sagittaler Bildschl.			Meridionaler Bildschl.		
−1.6	−1.8	+1.8	−1.5	−0.9	+1.3

Bildfeldwölbung. Verzeichnung.

32.4	44.6	67.2	1000:32	1000:65	1000:75

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	L_1	d_2	L_2	b_2	d_3	L_3	d_4
116.5	40	63.5	16.0	82.5	42.4	18.8	254.6	2.5	1.6	0.5	2.5	0.6	1.9	5.72	2.8

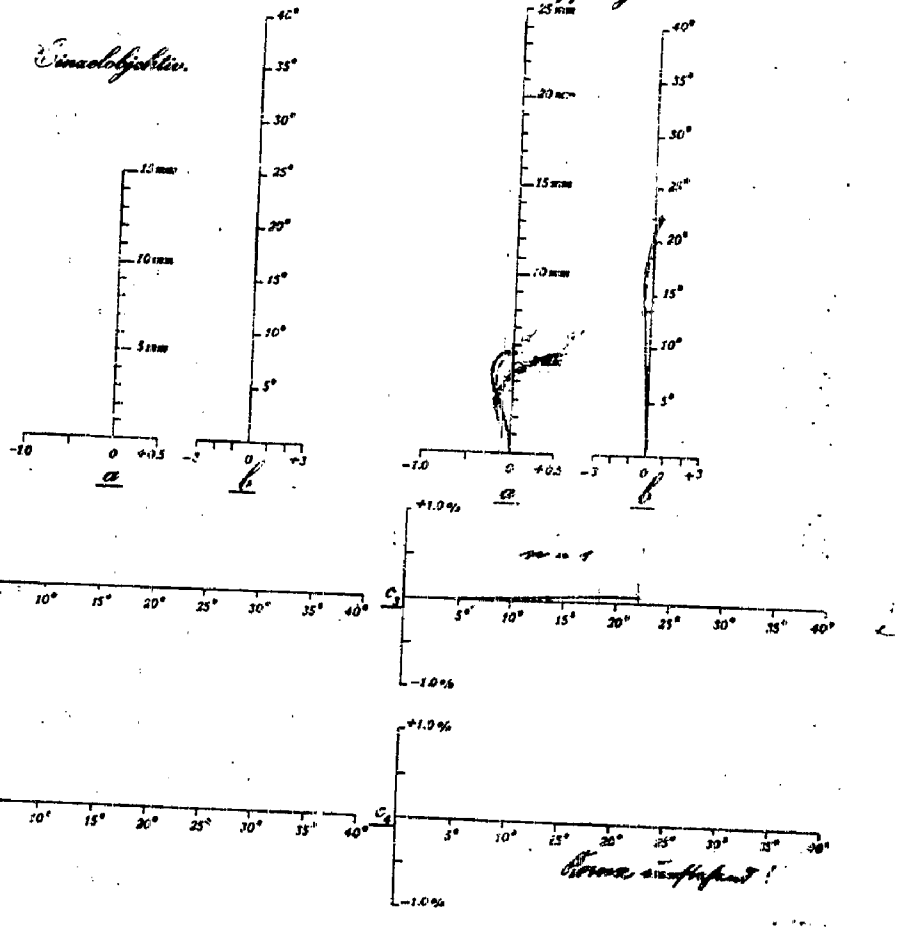
Apo-Tessar 1:9, f= 45 mm (innerhalb) für n = 1.0 ∞ 11.45

N. 14774

Linse	^{nd}d	$^{nd}G-d$	$\varnothing$	
1	1.613340	0.041077	58.8	VK+
2	1.581440	0.041628	40.8	SK+F3
3	1.612850	0.041871	61.7	K3+F2
4	1.647700	0.041440	58.1	SSK+

Einzelobjektiv.

Doppelobjektiv.



F-15-6398-25

1407

Nr. 1475

Vi 39 Nr. 40, 1:2, f = 5 cm, v. 8.11.39 (Reformiert Stufe 7)

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Nr. 35/73)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
		d -4.1	-4.6	-2.1	-1.6	-2.3	-15.6
		g' 1.7	+4.3	+12.9	+1.5	+6.4	+1.6

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen			Doppelobjektiv. Chromasie
		57.3	47.0	99.8	− 205 (− 66) − 271

Astigmatismus (Nr. 40) 14–24

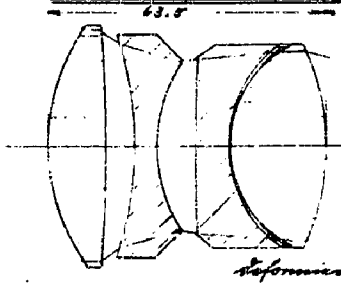
Einzelobjektiv. Segmentazimutfehler	Einzelobjektiv. Meridionalazimutfehler	Doppelobjektiv. Segmentazimutfehler		Doppelobjektiv. Meridionalazimutfehler	
		-1.5	-2.6	-2.1	+0.6	-1.2	-6.9

Einzelobjektiv. Feldwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Feldwinkel			Doppelobjektiv. Vorzeichnung
		29.3	42.2	57.5	998.00 998.58 999.89

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	l_2'	d_3	d_4	d_5
45.0	333.0	-9.5	34.2	449.0	27.0	45.0	62.1	12.6	6.5	5.0	5.9	2.9	7.7	0.02	22.2

Vi 39 Nr. 40, 1:2, f = 5 cm, v. 8.11.39 (Reformiert Stufe 7)

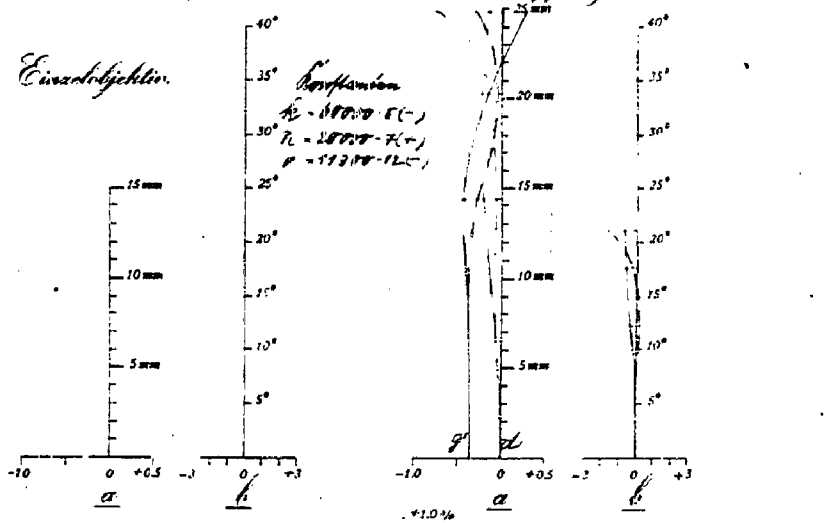


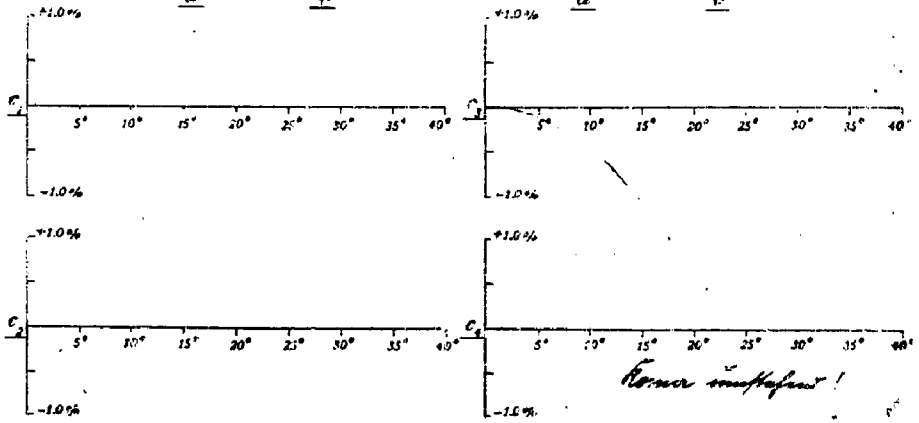
Linse	n_d	$\frac{n_F - n_C}{n_d}$	v	
1	1.62382	0.01458	58.7	SK18
2	1.66340	0.02077	38.1	F8
3	1.61734	0.02077	38.1	F6
4	1.57478	0.01620	43.8	ZnKF6
5	1.62230	0.01944	47.0	SK18

Reformiert St. 7

Einzelobjektiv. | Doppelobjektiv.

Konstanten
K = 0.00000 5 (−)
P_L = 0.0000 7 (+)
P = 1.73180 12 (−)





Korrektion!

F-25-6378-RE

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (RZ20/62

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'		Doppelobjektiv. Δf'	
		−0.6	−0.6	+0.9	−0.8	−0.8	−0.8

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		46.2	45.3	50.0	— 9 7 (= 2)

Astigmatismus (RZ20/22-999)

Einzelobjektiv. Asymmetriewinkel	Einzelobjektiv. Meridionalwinkel	Doppelobjektiv. Asymmetriewinkel		Doppelobjektiv. Meridionalwinkel		
		−7.2	−3.2	−2.9	+0.2	−0.7	−2.0

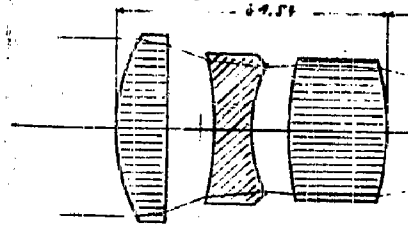
Einzelobjektiv. Pupillenwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Pupillenwinkel	Doppelobjektiv. Vorzeichnung
		27.6	36.2	43.0	998.2 / 999.2 / 999.9

Radien, Dicken und Abstände für f = 100 mm.

Fassung Dallmeyer

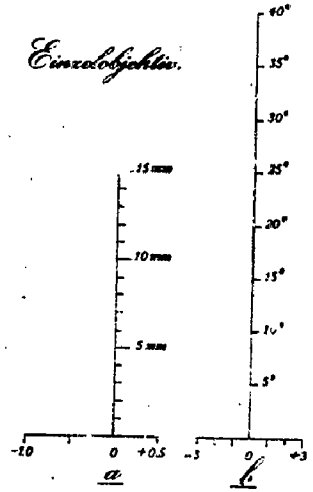
R_1	2	3	4	5	6	d_1	d_2	d_3	d_4	d_5	d_6	R_7	8	9	10	11	12
42.2	1892	37.6	34.1	72.4	573	12.57	7.69	3.08	8.96	8.96	2.13	50.0	39.6	77.7	28.2	29.6	28.9

Bogen: g_{15} 1:2.5 f = 15 mm

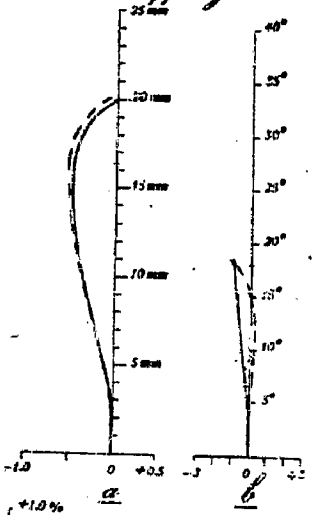


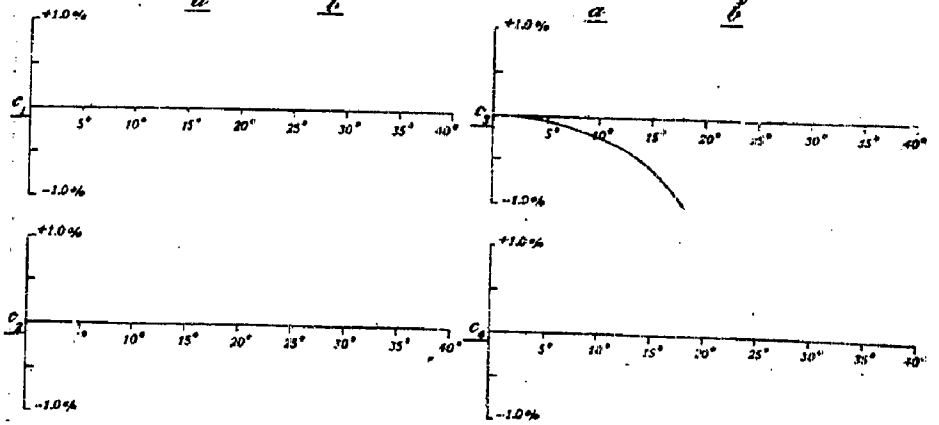
Linse	n_d	$n_g - n_d$	ν
1	1.620	0.0126	60.3
2	1.611	0.0249	39.2
3	1.6890	0.0167	55.5

Einzelobjektiv.



Doppelobjektiv.





V 1943 No 1. 7. R. Objektiv 1:1.5 f = 15 cm. R. v. 37. XI. 42

V 1943 No 1. 7. R. Objektiv 1:1.5 f = 15 cm. Rk. v. 37. XI. 42

Nr. 1477 a

F:15-6328 AE

1409

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (1923/37).

ohne Empf. d. Rückl.

Δs'	1923/37	Δf'
- 7.7	- 7.5 - 6.2 - 4.5 - 2.5	8.9

mit Empf. d. Rückl. auf Rörr.

Δs'	Δf'
- 4.5 - 2.5 - 0.5 - 1.2	2.5 cm 2.7
- 1.5 - 1.5 - 3.2	2.0 cm 2.7
- 7.2 - 0.2 - 2.5 - 6.2	7.7 cm 2.0

Einfallshöhen	Chromasie
33.1 | 32.2 | 32.4	- 0.55 (+ 0.03) - 0.53

Einfallshöhen	Chromasie
33.2 | 32.3 | 32.2	- 0.63 (+ 0.03) - 3.20
34.4 | 33.0 | 32.6	
34.3 | 33.6 | 33 cm	

Δs' − 30	Δs' − 40	Δs' − 50
- 0.63 (+ 0.03) - 3.20	- 0.28 (- 2.74) - 2.42	

Astigmatismus (1923/37).

Sagittalschnitt	Meridionalschnitt
	2.7

Sagittalschnitt	Meridionalschnitt
0.25	2.30 mm

Frontlinse Rel.	Vorzeichnung.
1 | 12.0	1409. Pa.

Frontlinse Rel.	Vorzeichnung.
12.0	1422. 43

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	d_1	r_3	r_4	d_2	r_5	r_6	d_3	r_7	r_8	d_4	r_9	r_{10}	d_5	r_{11}	r_{12}	d_6	r_{13}	r_{14}
46.26	109.9	6.33	∞	52.45	7.30	72.3	72.6	3.30	33.3	32.8	15.00	77.0	8.3	1.2	3.3	14.15	0.35	0.2	9.6

Empfkt. 2 Rörr. d_m d_{11}

$f_1 = 66.7$ $f_2 = 57.6$ $f_3 = 41.7$ $f_4 = 42.3$

Linse | r_1 | d | r_2 | n_d | ν_d

Linse	r_1	d	r_2	n_d	ν_d
1	+ 52.26	6.4	- 109.9	1.613	44.7 BK7
2	+ 32.8	2.0	+ 52.45	1.648	33.8 SF10
3	+ 33.3	6.4	+ 72.3	1.613	44.7 BK7
4	+ 32.3	15.0	- 72.6		Luft
5	+ 52.3	6.4	- 46.26	1.613	44.7 BK7

Einzelobjektiv.

Doppelobjektiv.

a f

a f

V 1943 Nr 1. T. R. Objektiv 1:1,5 f = 15 cm. Rdg. v. 32. XII. 42.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (1235) / 115

Ohne Symm. K. | mit Symm. K. auf Risse

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf
-1,1	-1,5	-0,55	-0,5
-1,5	-1,5	-0,55	-1,5
-1,2	-1,5	-0,5	-1,5
-1,5	-1,5	-0,5	-1,5
-1,5	-1,5	-0,5	-1,5
-2,1	-2,3	-0,5	-0,3

Einfallshöhen. | Chromasie.

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
21,3	-0,55	21,7	0,5
19,6	(-0,03)	19,3	
13,9	-0,01	13,2	

Astigmatismus (1243) / 133

Einzelobjektiv Sagittalwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Sagittalwinkel	Doppelobjektiv Meridionalwinkel
	-3,7		-1,6
	-2,0		-1,6

Restwinkel. | Vorzeichnung.

Einzelobjektiv Restwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Restwinkel	Doppelobjektiv Vorzeichnung
			mit Sagittal Riss
12,0	1000,5	12,0	1030,2

Radien, Dicken und Abstände für f = 100 mm.

r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	r_{17}	r_{18}	r_{19}
32,3	102,0	69,0	∞	57,85	4,33	12,57	14,24	17,76	0,3	1,5	17,24	12,44	3,26	17,64	2,3	66,0	0,3	2,3	7,5

Sagittal | Radial | Tangential | Radial

Verzeichnung: -0,3 +0,0 -1,3 -2,5 -4,0 ± ∞ · l_0 = 60,0 l_1 = 60,3 l_2 = 59,7

1/2 | 1/1

+0,2 -3,2

12,0 1030,2

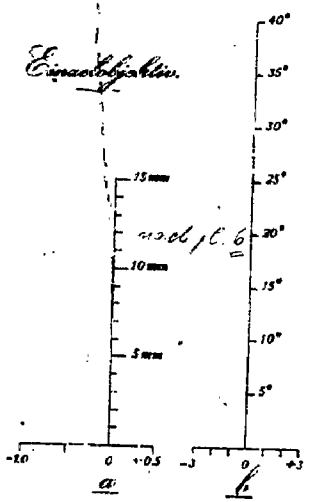
V 1943 Nr 1. T. R. Objektiv 1:1,5. f = 15 cm. Rdg. v. 32. XII. 42

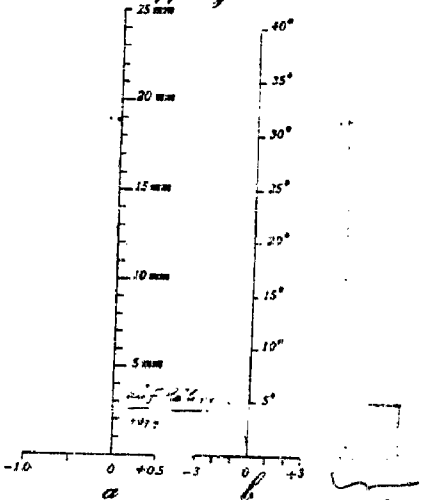
Nr. 1922 c

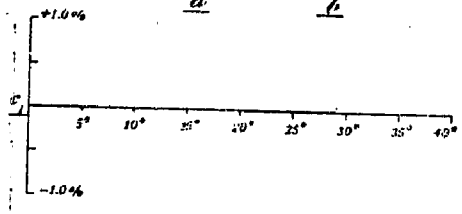
1,6 Verkürzung

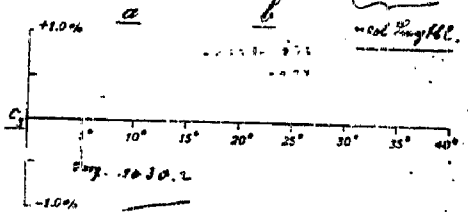
Linse	n_d	ν_d $G-d$	v
1			

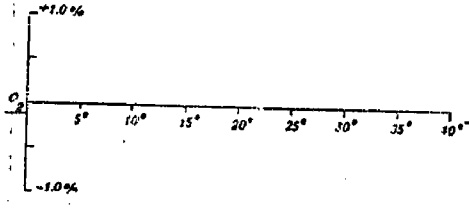
Einzelobjektiv. | Doppelobjektiv.

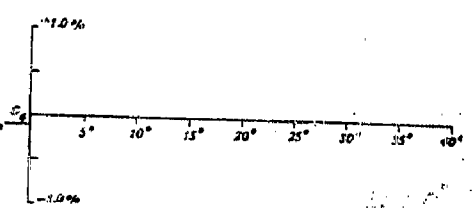












Zy-9869-57

1141

V 1943 Nr 1. 7 R. Objektiv 1:7.5 f = 15 cm. Rehg. v. 37.XI.42.

Einzelobjektiv.

Doppelobjektiv.

mit 2 Empfl. Linse auf Rückse!

Sphärische Korrektion (2 × 3) . 12 f.

nach Empfl. X –

Δs'			Δf'		
– 0.4	– 0.2	– 0.1	– 0.1	+ 0.2	+ 0.4

Δs'			Δf'		
– 0.5	– 0.1	– 0.3	– 0.5	+ 3.5	+ 7.5

– 1.2 – 7.3

Einfallshöhen. Chromasie.

21.5	10.7	10.7

Einfallshöhen. Chromasie.

21.0	10.8	10.7

– 1.1 – 10.7 µm

– 0.66

(– 2.55).

– 3.21

Astigmatismus (2 × 32) . 10.7

Sagittalwinkelfehler		Meridionalwinkelfehler	
+ 0.5	+ 0.5	– 7.2	– 7.7

Sagittalwinkelfehler		Meridionalwinkelfehler	
+ 0.5	– 1.2	– 7.7	– 8.3

Frontwinkel. Verzeichnung.

6.0	12.0	10.6 µm/10.6 µm

Frontwinkel. Verzeichnung.

6.0	12.0	10.6 µm/10.6 µm

– 0.2 Empfl. Linse

Radien, Dicken und Abstände für f = 100 mm.

r_1	d_1	r_2	d_2	r_3	d_3	r_4	d_4	r_5	d_5	r_6	d_6	r_7	d_7	r_8	d_8	r_9	d_9	r_{10}	d_{10}	r_{11}
24.41	5.52	61.99	0.0	77.33	16.69	9.24	12.66	33.7	2.09	9.16	10.2	1.88	0.5	7.5	64.4	0.30	2.30	7.42		

Empfl. 2 Rückse Empfl. Rückse

η_1 = 6.2 η_2 = 4.2 η_3 = 1.5 η_4 = 0.2

V 1943 Nr 1. 7 R Objektiv 1:7.5 f = 15 cm Rehg. v. 37.XI.42

Linse	n_d	$n_{(f-d)}$	v_d	
1	1.52325		64.2	64.2
2	1.72277		29.2	58.4
3	1.57735		42.2	84.4
4	1.61337			29.0
5	1.51633	Rückse		2.

Einzelobjektiv.

Doppelobjektiv.

25 mm

20 mm

15 mm

10 mm

5 mm

a f

a f

+1.0 %

–1.0 %

5° 10° 15° 20° 25° 30° 35° 40°

η_2 = 10.6 µm

L 14478

F:5.6/198.82

14/12

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (923/924).

	Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'	
d	−7.0	−4.4	−6.3	−5.3	+0.3	−6.7	4.0
G'	−4.4	+2.0	+4.7	−3.2	+5.3	+7.8	

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Einzelobjektiv Einfallshöhen			Einzelobjektiv Chromasie		Doppelobjektiv Chromasie	
97.7	87.7	100.0	−0.40 (−0.06) −0.42		−2.59 (+0.63) −1.96	

Astigmatismus (923/924 und 923/925).

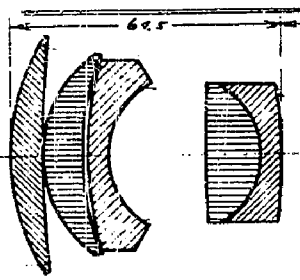
Einzelobjektiv Sagittalbüschel	Einzelobjektiv Meridionalbüschel	Doppelobjektiv Sagittalbüschel	Doppelobjektiv Meridionalbüschel			
−0.8	−0.5	+0.7	+0.4	−0.2	−7.5	

Frontwinkel. | Verzeichnung. | Frontwinkel. | Verzeichnung.

Einzelobjektiv Frontwinkel			Einzelobjektiv Verzeichnung			Doppelobjektiv Verzeichnung
36.0	46.3	53.3	100+0.75	100+0.98	100−3.40	

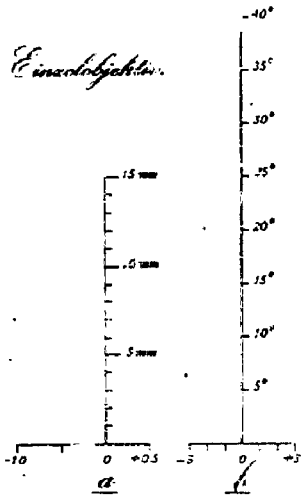
Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9		d_1	l_1	d_2	l_2	d_3	l_3	d_4	d_5	s_k'
50.0	170.4	47.8	61.7	83.6	70.6	337.6	76.6	49.3		7.7	0.5	6.9	4.0	4.9	27.9	78.6	4.4	50.0

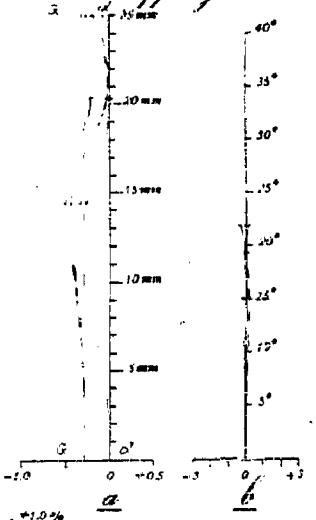


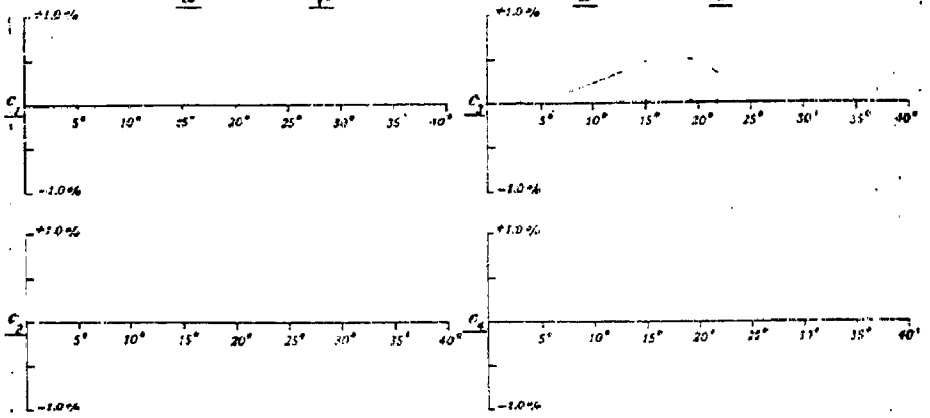
Linse	n_d	$\frac{n_d - 1}{\nu_d - d}$	ν_d
1	1.56930	0.0 11331	63.1
2	1.72050	0.0 6282	47.1
3	1.74077	0.0 2764	27.7
4	1.67003	0.0 10033	47.2
5	1.60729	0.0 15281	49.4

Einzelobjektiv.



Doppelobjektiv.





Nr. 1479

Zeiss 1:6,3 f = 8 cm v. 17.7.1939 F 879 903

Linse	n d	r	d	v
1	1.51680	1 conv		64.0
2	1.60470	258.0		38.9
3	1.51680	1 conv		64.0
4	1.72.15.0	51.51		29.6
5	1.72.50.0	51.51		22.8
6	1.67660	1 conv		64.0

Linsenabstände schmal

siehe Innenseite

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (BA) / .25

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'

Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
-7,0	-4.0	+9.9	-5,6	-1.8	+6.1

Einfallshöhen. | Chromasie.

Einfallshöhen. | Chromasie. +0.024

18.3	25.9	21.7

Astigmatismus (BA) / .33

Einzelobjektiv. Sagittalwinkelfehler	Meridionalwinkelfehler

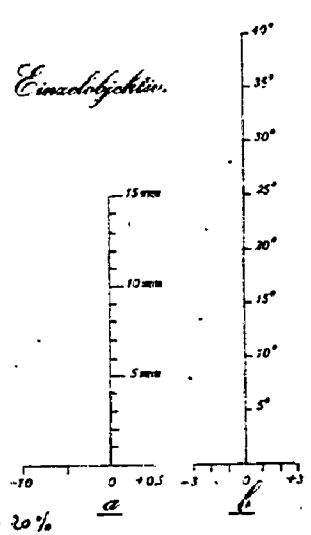
Doppelobjektiv. Sagittalwinkelfehler			Meridionalwinkelfehler		
+0,2	-1,8	-16,3	+4,0	+5.2	-30.6
-1.5			+5		

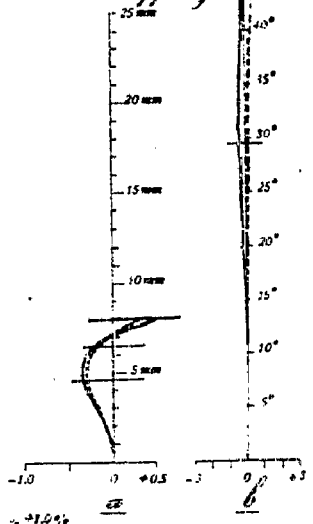
Frontwinkel. | Verzeichnung.

Frontwinkel. | Verzeichnung.

69.8	121.4	153.8	200

934 766 578 166



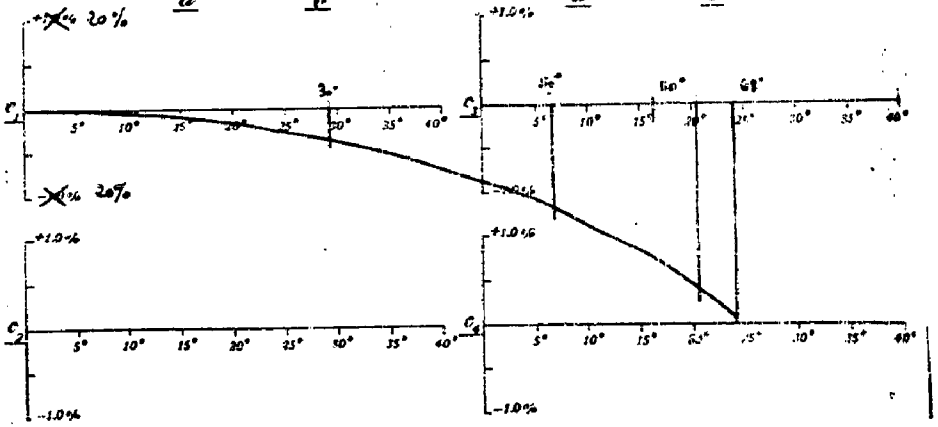


Radien, Dicken und Abstände für f = 10 cm

Brechzahlen

R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	L_1	L_2	L_3	L_4	L_5	L_6
∞	76.95	148,18	13.316	34.005	18.49	40.340	10.345	18.85	34.005	13.276	264	184	34	23	23	34

D_1	D_2	d_1	D_4	d_2	D_6	d_3	D_8	d_4	D_{10}
4,3	18.6	68.8	1.3	0,03	1.1	13.48	1.1	0.03	4.3



F-Nr. 879 903

1479

Leitz Hektor 1:2,5 f = 100 mm 1:1,3 m. Zwei offen

Nr. 7480

P.-Z.-6378-KE

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion f 34,3/6

Einzelobjektiv. Δs'		Δf		Doppelobjektiv. Δs'			Δf		
				-5,1	-5,5	+3,5	-1,7	-2,2	+6,2

Einzelobjektiv. Einfallshöhen		Chromasie.	Doppelobjektiv. Einfallshöhen		Chromasie.
			22,1	16,6	10,2

-0,144

Astigmatismus f 1.

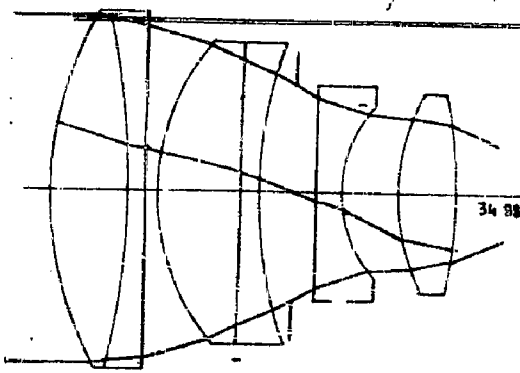
Einzelobjektiv. Asymmetrischer Bildwinkel	Meridionaler Bildwinkel	Doppelobjektiv. Asymmetrischer Bildwinkel		Meridionaler Bildwinkel	
			-3,1	-3,6	-1,5	-2,7

Einzelobjektiv. Frontwinkel	Verzeichnung	Doppelobjektiv. Frontwinkel		Verzeichnung	
		24,5	23,3	24,9	4mal 0,2 1mal 0,0

Radien, Dicken und Abstände für f = 100 mm.

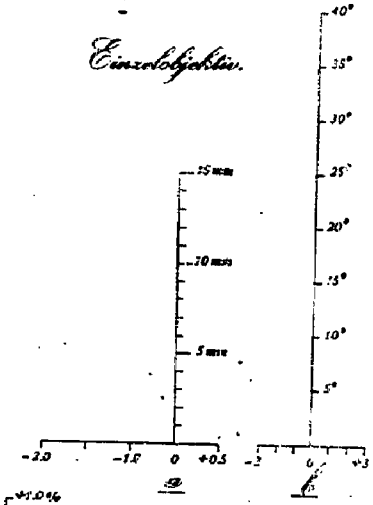
Nr.	R_v	R_2	R_{11}	R_7	R_6	R_5	R_3	R_4	R_{10}	Grundmaßen L_1	L_3	L_5	L_{10}	L_{12}	L_{14}
34,3	214,6	88,5	60,1	36,2	22,8	∞	33,4	98,0	1:85	76,3	36,1	58,3	68,1	41,3	33,4

D_1	D_2	L_1	D_{11}	D_7	L_6	D_6	L_5	D_5
4,8	2,0	7,6	4,0	3,3	1,3	2,0	0,5	0,5

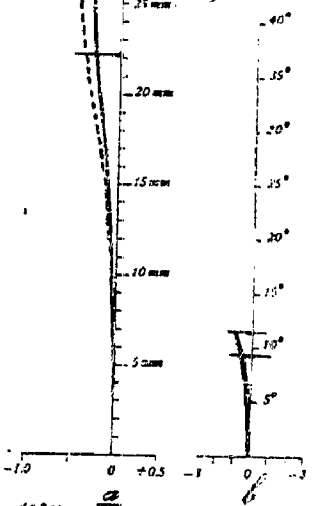


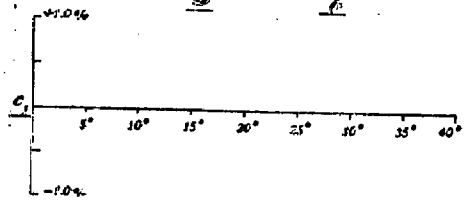
Linse	Nr. d	Nr. G-d	n
1	1.5338	1224	56,4
2	1.7283	3457	28,3
3	1.6120	1856	58,1
4	1.7283	3457	28,3
5	1.6073	1586	49,2
6	1.6034	7861	56,7

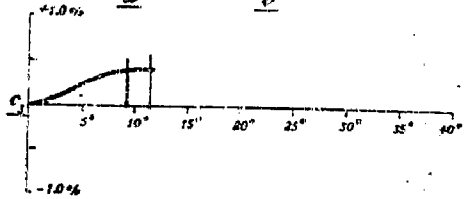
Einzelobjektiv.

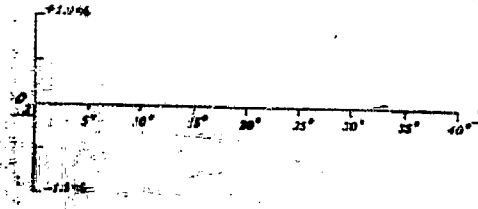


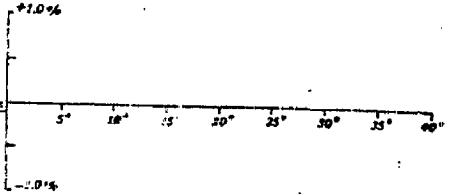
Doppelobjektiv.











Nr 1481

Tessar 1:4.5 f = 15 cm Nr. 26.2.43 (Zeiss-Tessar)

Tessar 1:4.5 f = 15 cm Nr. 26.2.43 (Zeiss Frau)

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (R 7+4 / 39)

Einzelobjektiv.			Doppelobjektiv.		
Δs'		Δf'	Δs'		Δf'
			− 3.7	− 2.6 + 3.3	− 1.8 − 1.2 + 1.1
Einfallshöhen.		Chromasie.	Einfallshöhen.		Chromasie.
			76.4	188.0 132.3	A' = 1.7774 − 0.40 (+ 0.02) − 0.38 für [illegible]

Astigmatismus (4830 / 62-63)

s' auf Rücken (mein Zeiger - Linie)

Einzelobjektiv.				Doppelobjektiv.			
Sagittalwinkel		Meridionalwinkel		Sagittalwinkel		Meridionalwinkel	
0.37	− 1.33		− 0.76	− 0.70	− 0.4	− 1.4 − 4.1	− 5.2 − 0.6 − 0.3
Frontwinkel.	Vorzeichnung.			Frontwinkel.	Vorzeichnung.		
7.2	13.4		mehr Fraunhofer-Linie	7.2	13.4	23.8	mehr 0.37 / mehr 5.2 / mehr 15.0

Radien, Dicken und Abstände für f = 100 mm.

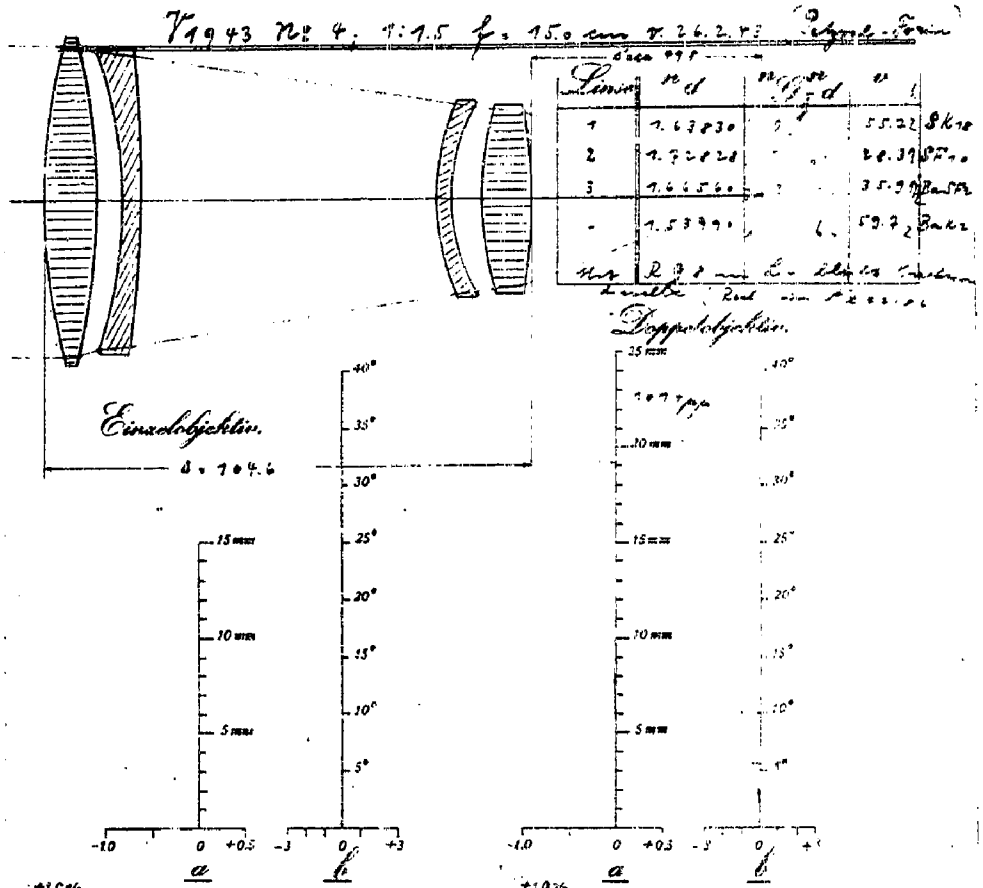
R_1	2	3	4	5	6	7	8	d_1	l_1	d_2	l_2	d_3	l_3	d_4	l_4	d_5
130.4	111.4	96.5	295.	50.0	39.6	68.3	196.6	11.6	5.5	4.4	33.4	30.0	3.0	6.3	10.7	

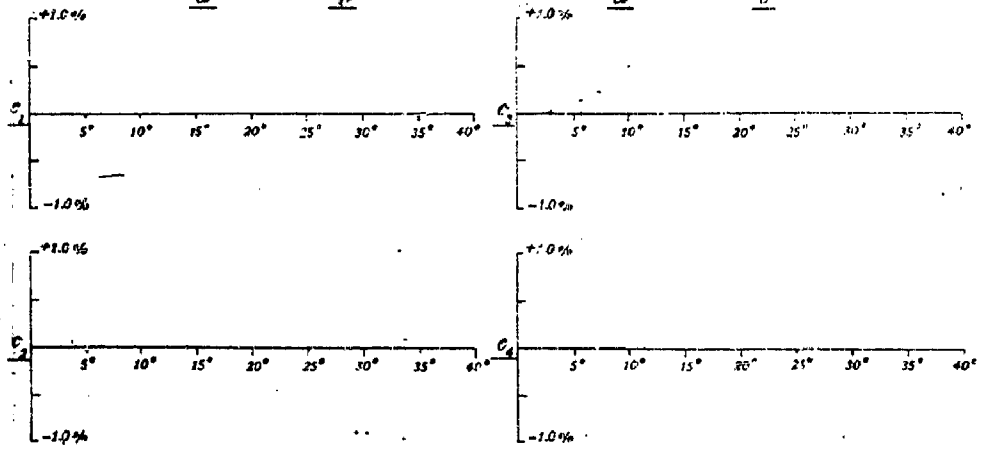
Freie Belichtungen

F_1	2	3	4	5	6	7	8
66.4	65.5	62.7	62.4	59.1	38.8	38.7	36.0

Linse	n_d	$n_{F'}-n_d$	ν	
1	1.63830	2	55.22	Schott
2	1.72828	"	28.31	"
3	1.66560	"	35.9	Barium
4	1.53990	"	59.72	Barium

Nr. R 3 mm E. Abstand Linse 1 und 2 = 2.2 mm





Nr. 1487a

Tessar-Form 1:1.5 f = 15.0 mm n. 2.5.2.43

Linse	n d	ν d	v
1	1.63430		55.7 SK 18
2	1.67270		29.1 ST 10
3	1.61720		35.3 Ba SF 1
4	1.53996		59.7 Ba K 1

Einzellinse

Doppellinse

Einzellinse

Doppellinse

Astigmatismus (Af30/f = 0.10)

Sagittaler Bruch | Meridionaler Bruch

Sagittaler Bruch | Meridionaler Bruch

Fernweite | Verzeichnung

Fernweite | Verzeichnung

Radien, Dicken und Abstände für f = 100 mm

Luft-Dicken

62.7	63.0	53.7	59.9	30.2	36.2	38.6	38.5	

U. R. Objektiv B 1:7.5 f = 15,0 cm v. 20.4.43

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AB++)

Einzelobjektiv Δs'			Einzelobjektiv Δf'			Doppelobjektiv Δs'			Doppelobjektiv Δf'		
-3.6	-3.8	+7.2	-7.9	-6.2	+13.9	-3.6	-3.4	+2.4	-2.0	-2.3	-3.4

Einzelobjektiv Einfallshöhen			Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen			Doppelobjektiv Chromasie
79.8	77.0	72.4		73.6	70.0	12[illegible]	

Astigmatismus (AB30)

s' min Bunge-Linie auf Zirkon

Einzelobjektiv Astigmatische Differenz		Einzelobjektiv Meridionale Differenz		Doppelobjektiv Astigmatische Differenz		Doppelobjektiv Meridionale Differenz		
-0.49	-1.73		-0.25	-0.67	-0.5	-1.1	-1.6	-0.4	-0.8	-1.6

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung nach Bunge-Linie	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
7.2	11.8	7.2	11.8	22.7	+22.69 / +22.27 / +45.88

Radien, Dicken und Abstände für f = 100 mm.

R_1	2	3	4	5	6	7	8	d_1	l_1	d_2	l_2	l_3	d_3	l_4	d_4	Δ
+28.5	+77.6	-52.2	230.	-43.5	32.7	62.1	+79.4	11.5	3.7	4.1	38.6	23.6	9.1	8.8	8.1	+17.9

Freie Bohrungen

1	2	3	4	5	6	7	8
63.7	62.2	61.9	61.0	42.0	39.6	38.4	27.8

f

U. R. Objektiv B 1:7.5 f = 15,0 cm v. 20.4.43

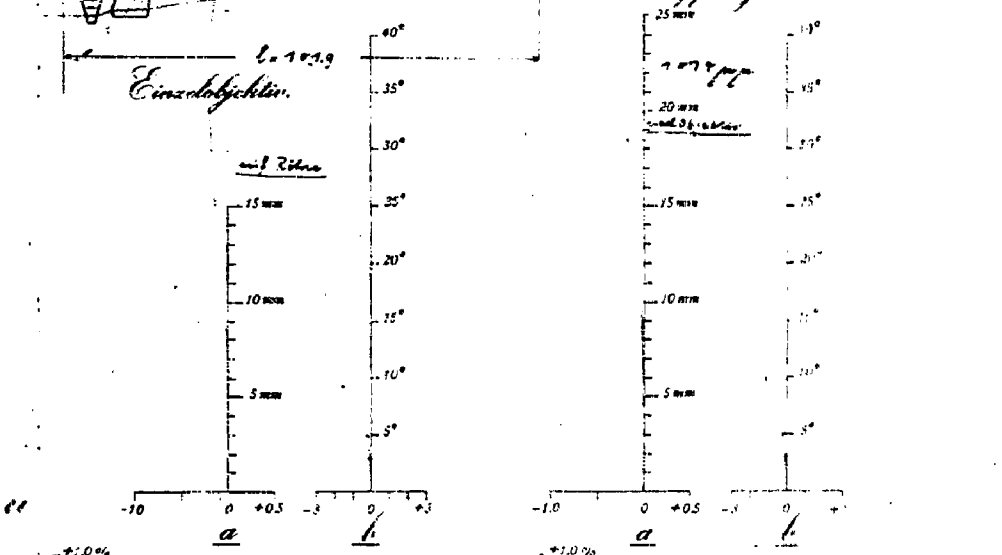
Linse	n d	ν d − 1	ν
1	1.5[illegible]		64.0
2	1.72[illegible]		28.4
3	1.6[illegible]		35.9
4	1.[illegible]		64.0

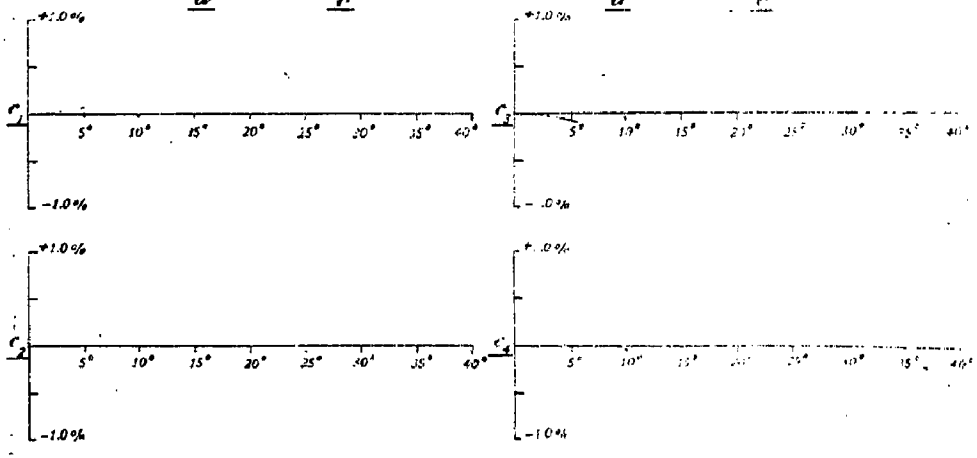
BK 7 / SF 10 / SF 2 / BK 7

l = 101.9

Einzelobjektiv. | Doppelobjektiv.

mit Zirkon





Ltd. 7482

F-75-6378-RE

1418

Nr. 1482a

U. R. Objektiv B 1:9.5 f=17 cm mit 2 Zeiss Lo

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AZ++/.99)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'	Doppelobjektiv. Δf
		−3.6 −3.3 +2.3	−1.9 −3.0 −3.1

Einzelobjektiv. Einfallsloch.	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallsloch.	Doppelobjektiv. Chromasie.
		79.5	705.4 729.0

Astigmatismus (AZ++/.997)

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel	Doppelobjektiv. Meridionalbüschel
		−0.5 −1.1 −1.6	−0.9 −0.6 −2.7

Einzelobjektiv. Frontwinkel.	Einzelobjektiv. Verzeichnung.	Doppelobjektiv. Frontwinkel.	Doppelobjektiv. Verzeichnung.
		7.2 11.8 23.3	999.65 999.7 995.57

Radien, Dicken und Abstände für f = 100 mm.

R_1	2	3	4	5	6	7	8	d_1	l_1	d_2	b_1	b_2	d_3	l_2	e_2	Δd
270.0	196.	91.5	223.	98.1	94.2	63.9	179.7	11.3	3.8	9.1	39.1	23.3	9.1	8.9	8.9	20.34

Freie Öffnungen

r_1	2	3	4	5	6	7	8
69.5	64.0	62.6	61.8	54.6	47.0	38.1	37.3

Linse	n d	ν d	e
1	1.5	64	6.0
2	1.72	29	2.8
3	1.66	33	3.5
4	1.53	70	

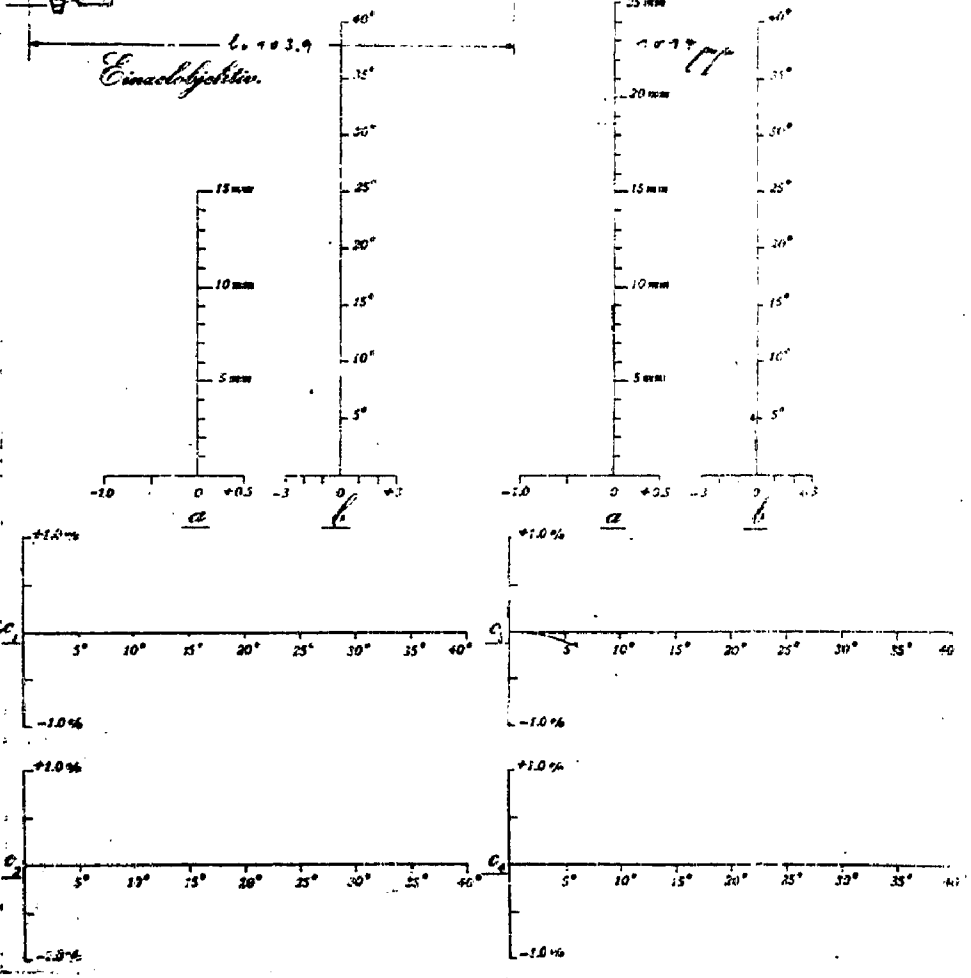
Abe 53.3

Rz 3
SF 1
Ba SF 2
Rz 2

l = 103.9

Einzelobjektiv.

Doppelobjektiv.



Nr. 1402 b

ZY-6578-Z1-1

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (BA 3/39). objektiv

3 A 3/44

Einzelobjektiv. Δs'			Einzelobjektiv. Δf'		
- 2.7	- 1.2	+ 2.4	- 4.6	- 1.2	+ 3.0

Doppelobjektiv. Δs'			Doppelobjektiv. Δf'		
- 2.7	- 2.2	+ 1.2	- 1.7	- 3.2	- 1.8

Einfallsloben. | Chromasie.

Einzelobjektiv. Einfallsloben			Doppelobjektiv. Einfallsloben			Doppelobjektiv. Chromasie.
71.0	70.0	72.6	71.5	70.5	72.1	- 0.2.5 (- 0.1.6)

Astigmatismus (/).

Abgenommener Bereich | Maximum Bereich

Einzelobjektiv. Abgenommener Bereich		Einzelobjektiv. Maximum Bereich	
	- 0.6		- 0.9

Doppelobjektiv. Abgenommener Bereich		Doppelobjektiv. Maximum Bereich	
	- 1.3		- 1.5

Frontwinkel. | Verzeichnung.

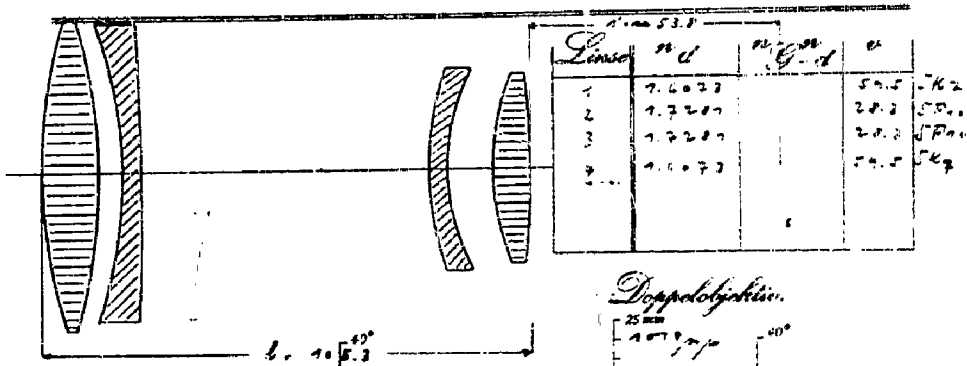
Einzelobjektiv. Frontwinkel.			Einzelobjektiv. Verzeichnung.
	71.9		

Doppelobjektiv. Frontwinkel.			Doppelobjektiv. Verzeichnung.
	71.9		999-99

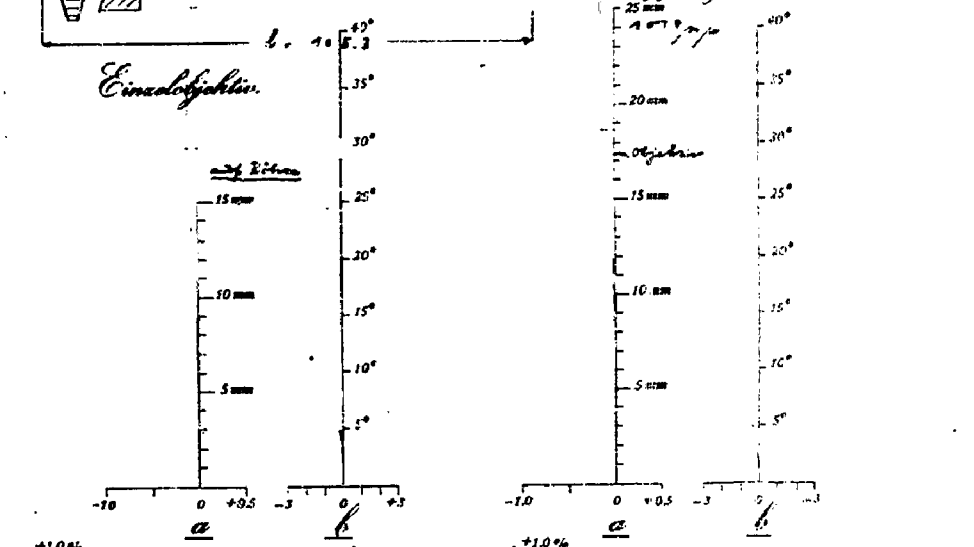
Radien, Dicken und Abstände für f = 100 mm.

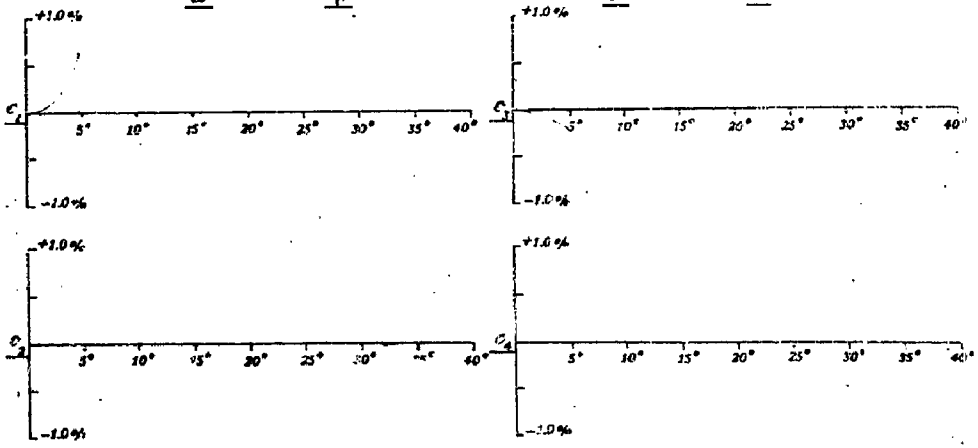
R_1	r_1	s_1	R_2	r_2	s_2	R_3	r_3	s_3	R_4	r_4	s_4	R_5	r_5	s_5	R_6	r_6	s_6
119.2	119.4	29.7	68.7	69.5	5.2	52.7	132.4	2.2	72.2	5.2	9.1	38.9	28.2	2.7	9.3	8.2	5.2

67 ° 68 ° 52 °



Einzelobjektiv. | Doppelobjektiv.





Kapella 1:2.5 f = 10 cm vom 18.11.35 E = 30605

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Nr. 310)/109

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie.	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie.
		76.0	65.1

Astigmatismus (Nr. 310)/109 - 109 + 113

Einzelobjektiv. Sagittalwinkel	Einzelobjektiv. Meridionalwinkel	Doppelobjektiv. Sagittalwinkel	Doppelobjektiv. Meridionalwinkel

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Vorzeichnung
		49.3	987.32

Raulen, Dicken und Abstände für f = 100 mm.

r_0	r_1	r_2	r_3	r_4	r_5	d_0	d_1	d_2	d_3	d_4	d_5
46.5	66.4	+2.6	16.1	+9.0	15.3	3.4	3.5	4.2	8.3	6.3	+2.2

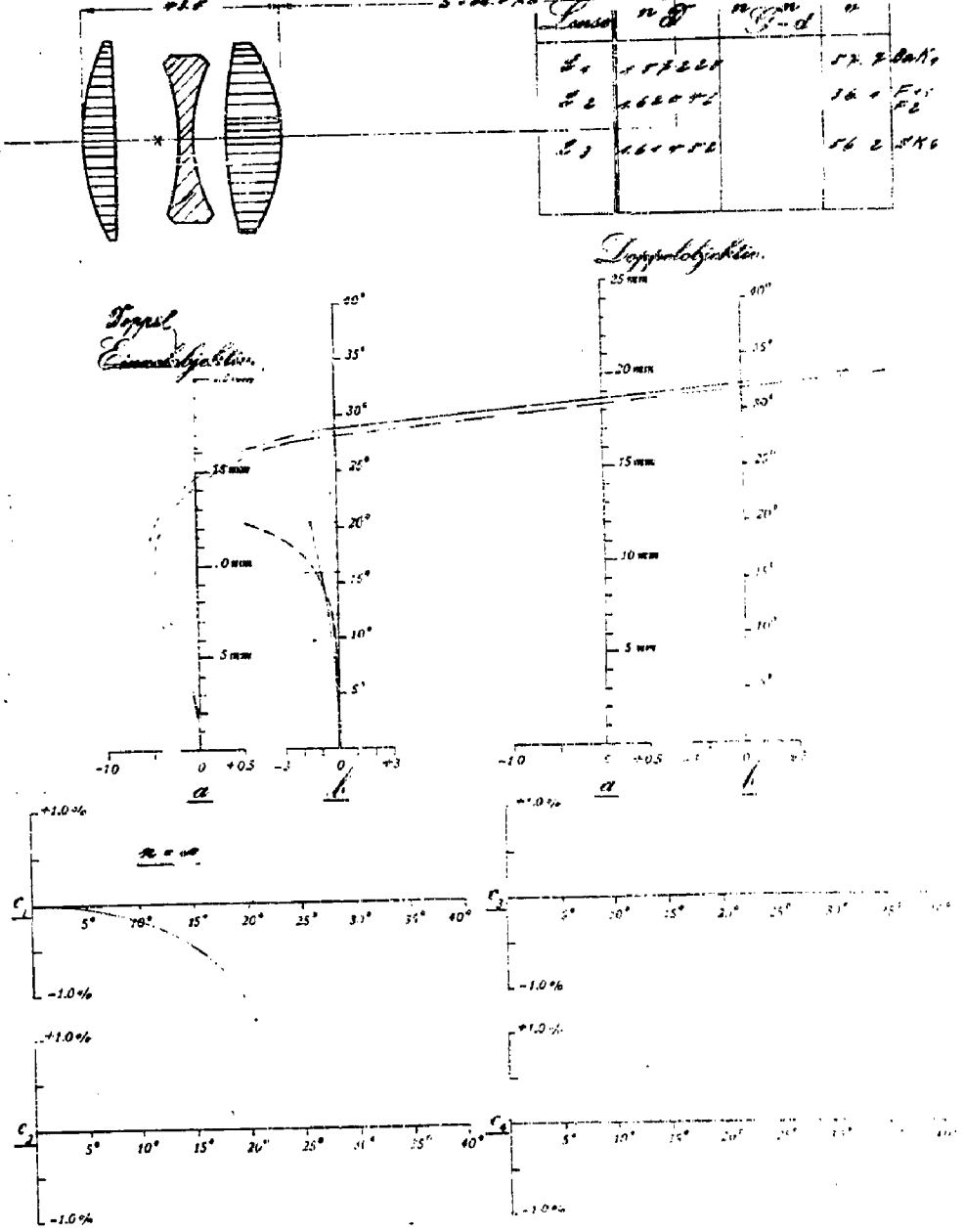
F-75-6328-AE

1420

Kapella 1:2.5 f = 10 cm vom 18.11.35 E = 30605

Linse	n_D	$n_{F'}-n_{C'}$	ν
L_1	1.51222		52.2 Bal.
L_2	1.62042		36.4 F.2
L_3	1.61772		56.2 SK 6

Doppelobjektiv.



F-75-6368-RP

Nr. 1454

Einzelobjektiv. | Doppelobjektiv.

Datum v.

Sphärische Korrektion (Nr. A2 1/2)

Einzelobjektiv Δs'	Einzelobjektiv Δf	Doppelobjektiv Δs'	Doppelobjektiv Δf
		-3.8 / -2.4	-2.6 / -5.4

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

8.84 | 12.50

Astigmatismus (Nr. A2 1/2)

Sagittalwinkel	Meridionalwinkel	Sagittalwinkel	Meridionalwinkel
		-7.6	-0.6

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

72.0 | 993.00

Radien, Dicken und Abstände für f = 100 mm

R_1	2	3	4	5	6	d_1	d_2	d_3	d_4	d_5
99.0	84.5	47.4	78.0	+3.2	177.0	12.0	3.2	47.2	11.4	2.75

Kurzes Görlitz 1:1.6 f = 132.0 mm

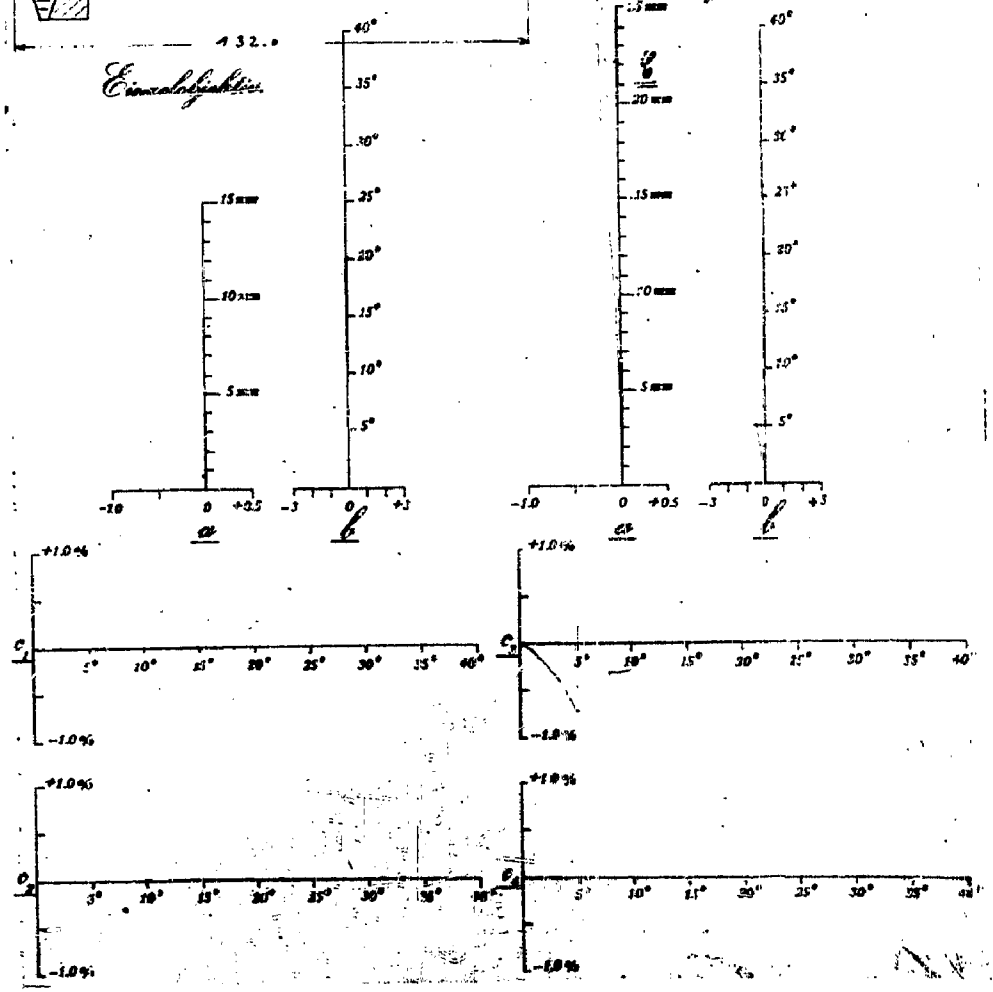
Linse	n_d	ν_d	
1	1.517	64.5	K 3
2	1.617	36.6	SSK 2
3	1.517	64.5	K 3
4	1.617	36.6	SSK 2

104.3

132.0

Einzelobjektiv

Doppelobjektiv



F-TS-6319-R2

Tessar 1:3.5 f = 3.5 cm. V. 3 ... 32

Einzellobjektiv. | Doppelobjektiv.

Sphärische Korrektion (f, L_1, L_2) / 33

Einzellobjektiv Δs'	Einzellobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'

Einzellobjektiv Einfallshöhen	Einzellobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
			- 6.0 - 1.9 (1.6) (+ 3.6) - 5.4 - 1.3

Astigmatismus (f, L_1, L_2) / 33 / 3 - 6 / 26 - 27 / 3 f 5.6 / 34

Einzellobjektiv Sagittenfehler	Einzellobjektiv Meridianfehler	Doppelobjektiv Sagittenfehler	Doppelobjektiv Meridianfehler
		2.0 - 3.5 +2 +6 - 1.2 - 2.0 2.9 3.5	

Einzellobjektiv Frontwinkel	Einzellobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		35.4 36.4 41.3 65.0	1 mm 35 mm +6 mm 41 39.07

14.22

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	d_1	l_1	d_2	l_2	L_1	d_3	d_4	D_1	D_2	D_3	D_4	D_5	D_6
14.3	∞	7.4	3.4	∞	24.2	5	5.6	5.3	3.4	4.1	2.2	1.7	1.7	34.2	23.4	22.3	2	4	2.2

5.6
5.3
3.4
4.1
2.2
1.7
1.7
34.0

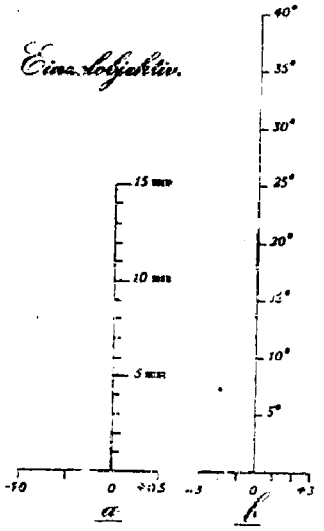
Tessar 1:3.5 f = 3.5 cm. V. 3 ... 32

h. 1405

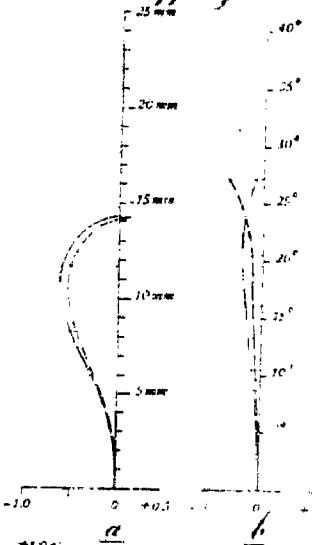
320 — 5' = ca. 825

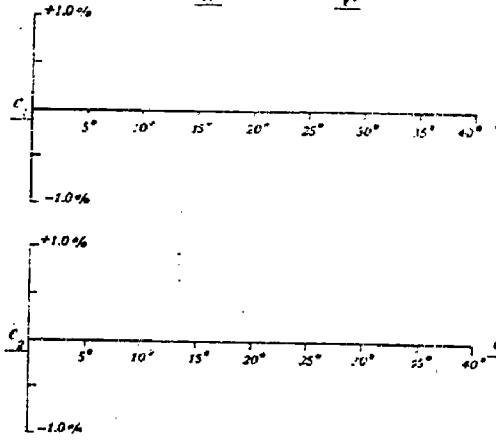
Linse	n_d	ν_d	$r_1 - r_2$	d
L_1	1.603113	60.7	7.4 ... 3.4	5.6
L_2	1.573566	57.7	3.4 ... ∞	1.7
L_3	1.516633	64.1	∞ ... 24.2	5.3
L_4	1.612293	36.9	5 ... 6.3	3.4

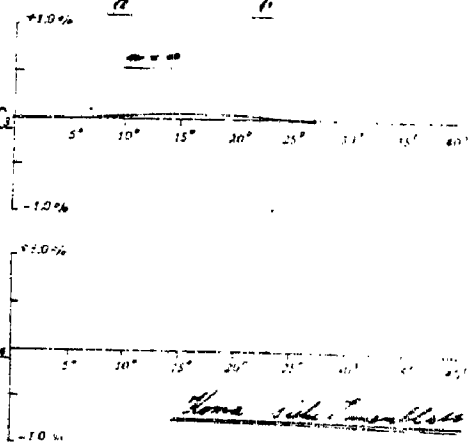
Einzellobjektiv.



Doppelobjektiv.







Kern Aarau Tessar

06/38

U.-R. Objektiv A 1:1 f=25cm Rechn. v. 26.5.43.

Einzelobjektiv. | Doppelobjektiv.

nach Objektiv

Sphärische Korrektion (AR 41)

Einzelobjektiv Δs'			Einzelobjektiv Δf'		
−4.3	−3.6	−3.3	−4.1	−10.4	−16.6

Doppelobjektiv Δs'			Doppelobjektiv Δf'		
−0.6	−0.3	−0.9	+0.2	+2.3	+4.1

Einfallshöhen | Chromasie | Einfallshöhen | Chromasie

Einfallshöhen			Chromasie
			−0.04
146.1	146.2	281.4	(−0.32)
			−0.24

Einfallshöhen			Chromasie
			−0.04
+13.3	155.4	296.0	(−0.30)
+0.3	156.0	296.0	−0.24

Astigmatismus ( )

Sagittaler Bildort | Meridionaler Bildort | Sagittaler Bildort | Meridionaler Bildort

Sagittaler Bildort		Meridionaler Bildort	
−4.4	−2.5	−2.2	−4.1

Sagittaler Bildort		Meridionaler Bildort	
+2.4	+2.3	+2.4	+2.3
−0.2	−0.4	−0.3	+0.3

Frontwinkel | Verzeichnung | Frontwinkel | Verzeichnung

Frontwinkel		Verzeichnung	
	44.3	45.3	194.44 783.99

Frontwinkel		Verzeichnung	
	44.5	45.3	

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	r_{17}	r_{18}	r_{19}	r_{20}
106.3	44.43	57.3	146.5	146.5	33.6	44.8	189.5	189.5	56.5	33.6	221.9	104.9	150.3	44.3	58.9	31.3	34.5		

d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	d_{10}	d_{11}	d_{12}	d_{13}	d_{14}	d_{15}	d_{16}	d_{17}	d_{18}	d_{19}
12.9	8.04	25.8	0.04	4.5	12.6	4.4	0.04	12.8	0.04	10.3	9.4	14.3	53.4	3.0	0.2	1.4		

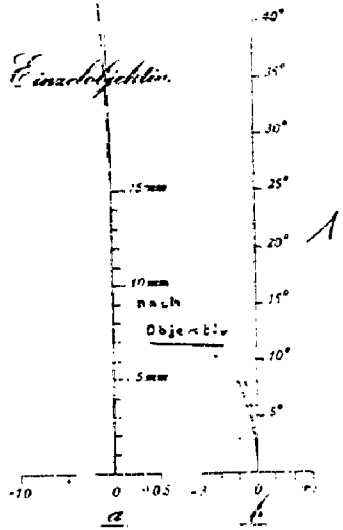
U.-R. Objektiv A 1:1 f=25cm Rechn. v. 26.5.43.

Nr. 1486

Rohsamschnitt siehe Innenseite

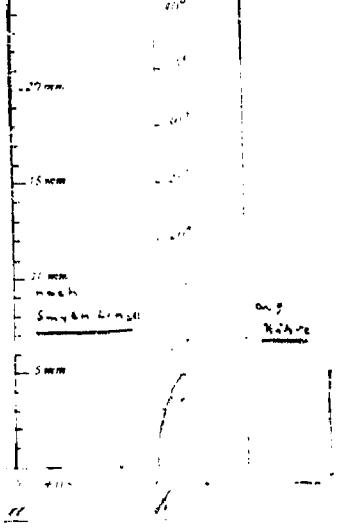
Linse	r	d	n	ν
1				
2				
3				
4				
5				
6				
7				
8				

Einzelobjektiv. | Doppelobjektiv.

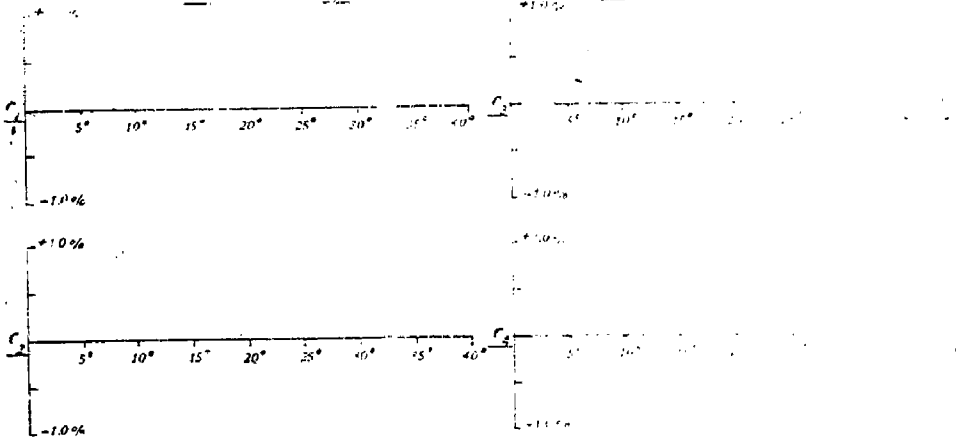


nach Objektiv

1011 µm



nach Symm. Linse



F-Xs-6398-RE

Tessar 1:3.5 f=4 cm mit Glasweg

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (88 % lk).

Δs'	Δf	Δs'	Δf
		+0.25	−0.35

Einfallsblenden	Chromasie.	Einfallsblenden	Chromasie.
		57.2	−0.052

Astigmatismus (88 % lk).

Sagittalwinkel	Meridionalwinkel	Sagittalwinkel	Meridionalwinkel
		−1.90	+1.35

Frontalwinkel	Verzeichnung.	Frontalwinkel	Verzeichnung.
		47	988.96 / 987.22

Radien, Dicken und Abstände für f = 100 mm.

Durchmesser.

2.	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}		L_1	L_2	L_3	L_4	L_5	L_6
3.	226.68	68.39	34.52	1414.10	31.93	57.85	∞	15.252	∞			24.62	14.99	23.15	23.15	52.46	13.28
	D_1	d_1	D_2	d_2	D_3	D_4	d_3	D_5	D_6								
	6.38	0.45	1.49	6.18	1.87	0.31	3.45	14.80	3.87								

R_4 R_5

Tessar 1:3.5 f=4 cm mit Glasweg

Linse	n_d	ν_d	$P_{g,d}$	v_d
1	1.6088	61.03		56.6
2	1.5938	28.5		44.4
3	1.5880	40.94		51.5
4	1.6132	43.85		56.9
5	1.6130	38.83		60.3
6	1.6200	36.43		56.1

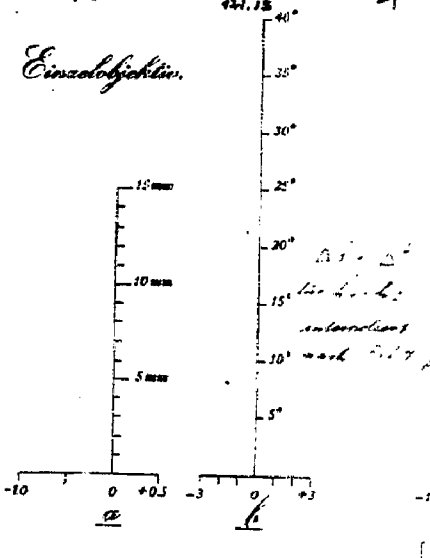
+98.25

+1.38

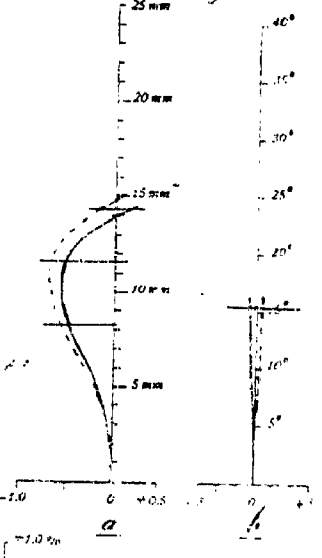
+97.15

Einzelobjektiv.

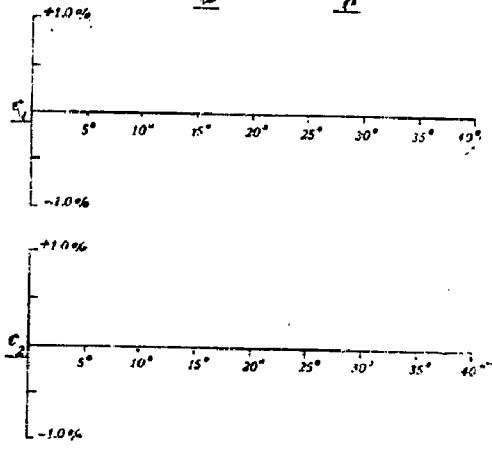
Doppelobjektiv.

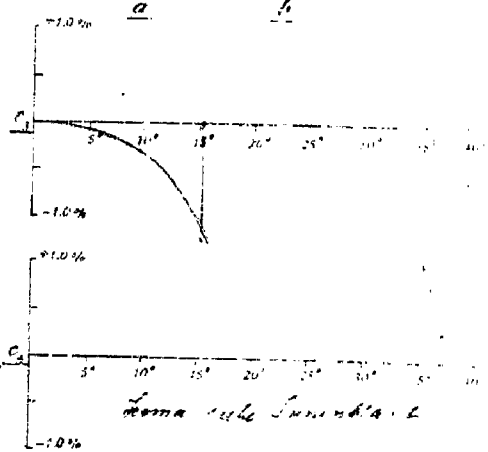


a f



a f

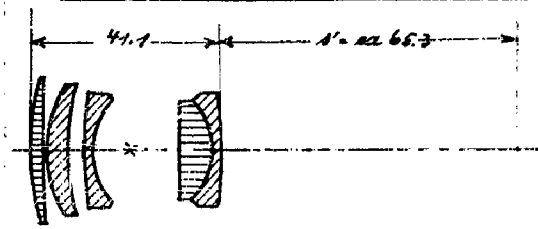




Leica

Nr. 1488

V 1942 Nr. 15 1:3.5 f: 50 mm v. 17.10.1942



Linse	n_d	$n_{C'} - n_{F'}$	ν
L'1	1.57020		53.1
L'2	1.69173		54.2
L'3	1.74354		28.0
L'4	1.62293		47.9
L'5	1.60716		48.5

f = 13.6378-22

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion / AZ / 34,3

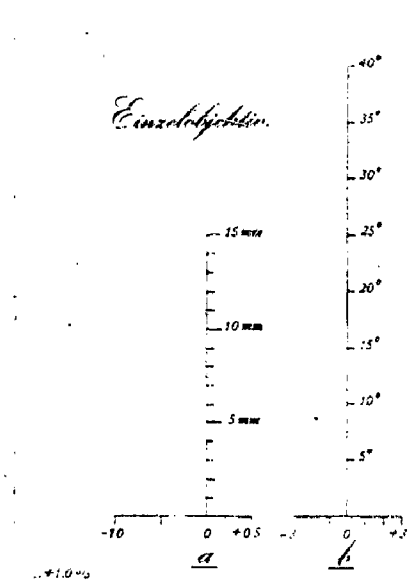
	Δs'	Δf'	Δs'		Δf'	
A'	+0.3	+0.6	-3.9	+1.2	+2.0	-4.6
d	+2.4	+5.5	+4.9	+3.5	-7.2	+4.8

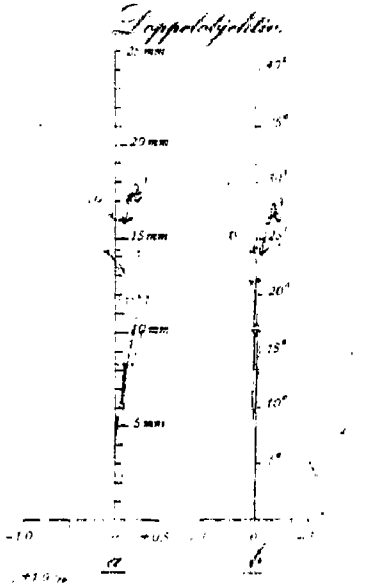
Einzelobjektiv.		Doppelobjektiv.		
Einfallshöhen.	Chromasie.	Einfallshöhen.		Chromasie.
		33.0	46.7	57.3

Astigmatismus / /.

Sagittalwinkel	Meridionalwinkel		Sagittalwinkel	Meridionalwinkel	
		A'	-0.8	20.0	-6.2 -7
		d	-0.7	+0.6	+0.4 -0.8

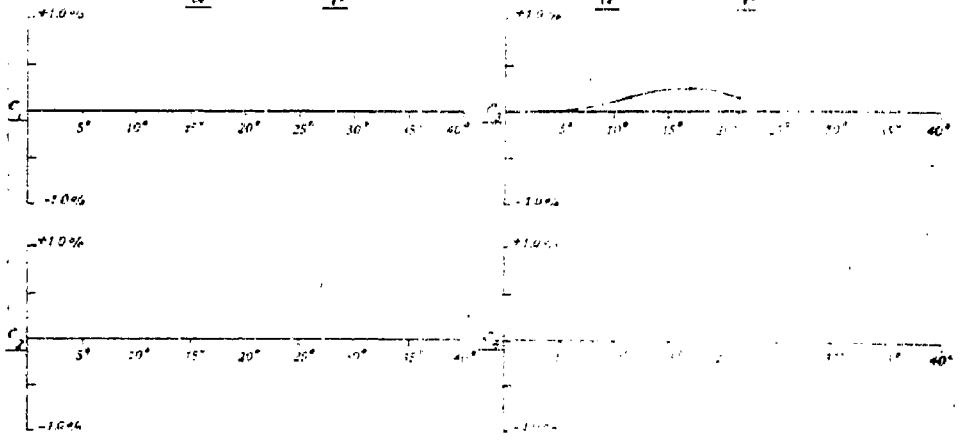
Frontwinkel.	Vorzeichnung.	Frontwinkel.		Vorzeichnung.
		48.3	58.9	A' -1002.38 1001.39
				d -1002.97 1001.53





Realisn. Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	d_1	l_1	$d_{1,2}$	l_2	d_3	$d_{3,1}$	l_3	$d_{3,2}$	$d_{3,3}$	d
56.26	333.2	41.95	+3.3	29.7	+6.0	378.4	+71.48	+12.0	3.0	0.2	+6	1.1	2.0	2.9	+0.2	2.3	+7.90	65.3



U.-R. Objektiv B 1:1 f=25 cm Rechn. v. 14.8.43.

Einzelobjektiv.

Doppelobjektiv.

Sphärische Korrektion (BA 41)

Δs'		Δf	

Einfallshöhen. Chromasie.

Einfallshöhen. Chromasie.

Astigmatismus (BA 42)

nach Kompensationslinse

Tangentialbüschel		Meridionalbüschel	

Frontwinkel. Verzeichnung.

Frontwinkel. Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	r_{17}	d_1	d_2	d_3

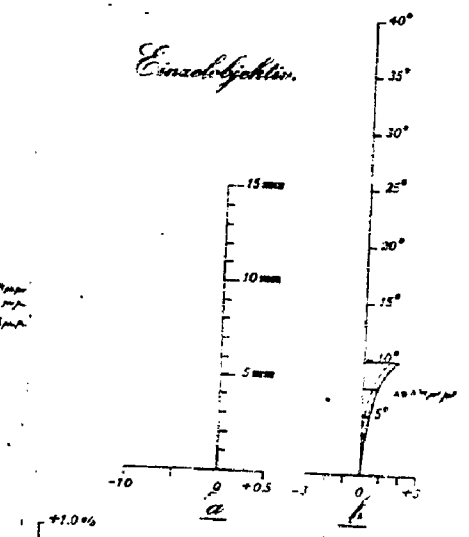
d_4	d_5	d_6	d_7	d_8	d_9	d_{10}	d_{11}	d_{12}	d_{13}	d_{14}	d_{15}	d_{16}

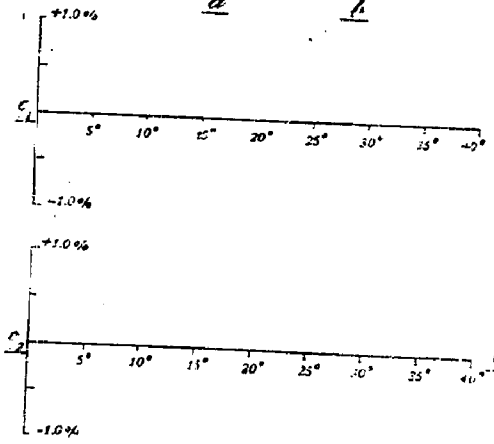
U.-R. Objektiv B 1:1 f=25 cm Rechn. v. 14.8.43.

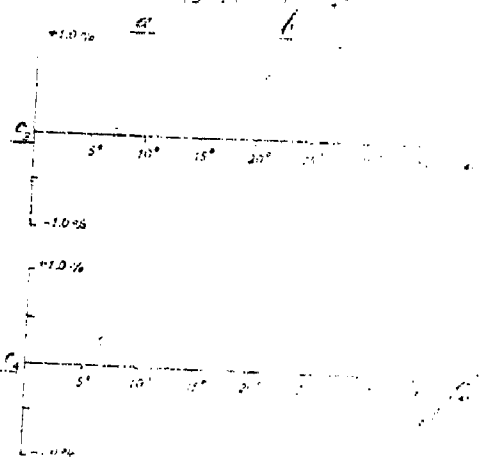
M 1:2

Einzelobjektiv.

Doppelobjektiv.







U.-R. Objektiv A 1:1 f=9cm Rechn. v. 10.9.43.

F-Nr. 6398

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion (A245)

Einzelobjektiv			Doppelobjektiv		
Δs'	Δf		Δs'	Δf	
			-0.4	-4.1	-0.9
			+0.4	-3.5	-4.3
Einfallshöhen	Chromasie		Einfallshöhen	Chromasie	
			440.3	456.0	468.4

Astigmatismus (BA22)

nach Hempelmann-Linse

Einzelobjektiv					
Segmentalbüschel	Meridionalbüschel				
	-5.8	-10.4		-10.4	-15.7
Frontalwinkel	Vorzeichnung				

Doppelobjektiv					
Segmentalbüschel	Meridionalbüschel				
-4.4	-4.5	-2.4	-0.9	-0.2	-4.4
Frontalwinkel	Vorzeichnung				
22.4	30.5	30.2			

Radien, Dicken und Abstände für f = 100 mm.

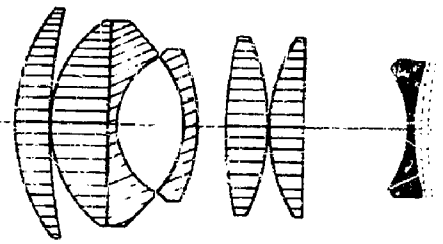
r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	d_{01}	d_{12}	d_{23}	d_{34}
38.3	133.9	53.4	4[illegible]	[illegible]	52.3	42.9	31.4	462.6	82.7	∞ 8	3[illegible]76	-48.3	98.4	135.5	434.3	4-5	0.1	2.43	0.1

d_{45}	d_{56}	d_{67}	d_{78}	d_{89}	$d_{9\,10}$	$d_{10\,11}$	$d_{11\,12}$	$d_{12\,13}$	$d_{13\,14}$	$d_{14\,15}$	$d_{15\,16}$
4.0	24.5	3.2	42.2	48.7	0.1	-0.8	+5.3	5.2	4.8	7.8	

U.-R. Objektiv A 1:1 f=9cm Rechn. v. 10.9.43.

L. 1490

Linse	r	d	n	Glas
4	[illegible]		60.0	SK 16
3	[illegible]		60.9	SK 16
2	[illegible]		59.5	SF 10
1	[illegible]		58.1	SF 10
5	[illegible]		60.1	SK 16
6	[illegible]		60.5	SK 16
7	RG 8			RG 8
8	A-5000		50.6	



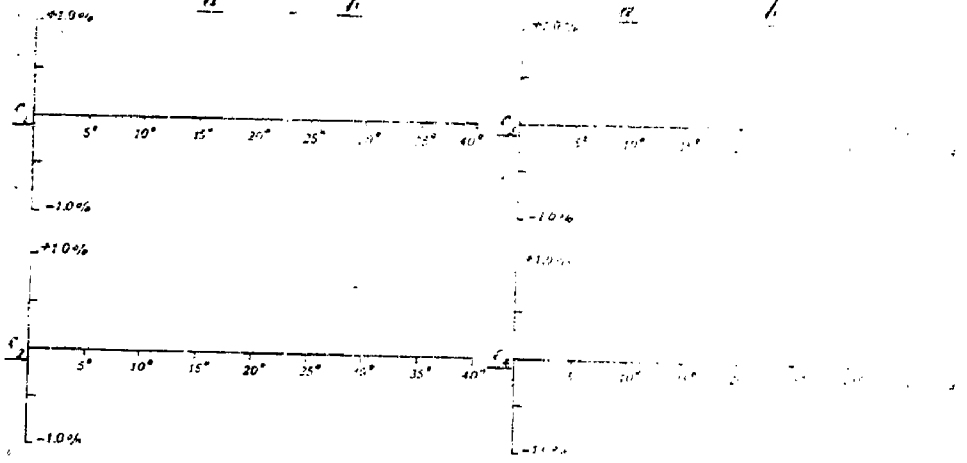
M 1:2

Einzelobjektiv

Doppelobjektiv

auf Rohr

auf Rohr



U. R. Objektiv 1:7 f = 5 cm

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (R232/51)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf	Doppelobjektiv. Δs'			Doppelobjektiv. Δf		
		- 2.0	2.0	+3.5	+3.9	- 0.1	- 40.8

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen			Doppelobjektiv. Chromasie
4		444.0	457.0	492.5	- 0.6 (- 0.75)

Astigmatismus (B916/4)

Einzelobjektiv. Sagittalwinkel	Einzelobjektiv. Meridianwinkel	Doppelobjektiv. Sagittalwinkel		Doppelobjektiv. Meridianwinkel	
			- 3.8	- 6.7		- 2.0	- 7.2

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
		25.99	33.2

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	d_1	l_1	d_2	d_3	b_1	b_2	d_4
89.90	409.2	52.4	409.2	11.6	44.2	119.1	85.1	249.2	79.5	246.1	46.2	187.2	45.66	0.05	25.91	3.97	40.44	16.22	7.30

l_2	d_5	l_3	d_6	l_4	d_7
42.49	18.85	0.12	17.65	25.56	106

Linse	n_d	$n_d - n_{d'}$	φ
1	1.66937		37.7
2	1.64724		54.6
3	1.57350		44.6
4	R 38		
5	1.66842		37.3
6	1.72034		44.1
7	1.61337		26.2

M. 1:2

Einzelobjektiv.

Doppelobjektiv.

1014/49 auf Rohre

a f

a f

+1.0%

-1.0%

c_1 c_2 c_3 c_4

5° 10° 15° 20° 25° 30° 35° 40°

A 1491

P-73-6198-R23

1428

Leitz U. R. Objektiv 1:1. f = 9 cm. Rdj. v. 12. X. 93.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (A² n³) / r²ν

Δs'	Δf

auf 2'Lm

Δs'	Δf
-0.2	+0.2
+1.3	-1.6
-1.3	-2.3

Einfallshöhen. | Chromasie.

Einfallshöhen. | Chromasie.

Astigmatismus (A² n²/r²) (A² n²/r²)

auf 2'Lm

Sagittalastigmatismus | Meridionalastigmatismus

Sagittalastigmatismus | Meridionalastigmatismus

-5.3	-2.2	-0.2	+0.2

Frontalwinkel. | Vorzeichnung.

Frontalwinkel. | Vorzeichnung.

2°50'	3° 3'

Radien, Dicken und Abstände für f = 100 mm.

(nach Komp. Form)

r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	r_9	r_{10}	r_{11}	r_{12}	r_{13}	r_{14}	r_{15}	r_{16}	r_{17}	r_{18}	$\bar{r}_0$	$\bar{r}_1$
+19.06	+19.74	+10.3	199.9	96.08	+3.62	+3.62	-2.30	17.37	18.64	-20.6	-20.66	-96.74	+199.2	-5.73	194.6	192.6	193.5	+2.18	0.46	

$\bar{r}_2$	$\bar{r}_3$	$\bar{r}_4$	$\bar{r}_5$	$\bar{r}_6$	$\bar{r}_7$	$\bar{r}_8$	$\bar{r}_9$	$\bar{r}_{10}$	$\bar{r}_{11}$	$\bar{r}_{12}$	$\bar{r}_{13}$	$\bar{r}_{14}$	$\bar{r}_{15}$	$\bar{r}_{16}$	$\bar{r}_{17}$	$\bar{r}_{18}$
+0.76	0.96	+0.52	0.46	1.68	0.92	0.92	+0.83	19.03	2.6.0	19.30	12.82	1.88	1.43	2.0		

$\bar{d}_0$ $\bar{d}_1$ $\bar{d}_2$ $\bar{d}_3$ $\bar{d}_4$ $\bar{d}_5$ $\bar{d}_6$ $\bar{d}_7$ $\bar{d}_8$

$\bar{z}_1$ $\bar{z}_2$ $\bar{z}_3$ $\bar{z}_4$ $\bar{z}_5$ $\bar{z}_6$ $\bar{z}_7$ $\bar{z}_8$ $\bar{z}_9$

$\beta_1 = +19.5$ $\beta_2 = 19.9$

$\beta_3 = 0.0$ $\beta_4 = 19.9$

$\bar{z}_{Lm}$ $\beta_{Lm} = 0.0$ $\beta_{Lm} = 0.0$

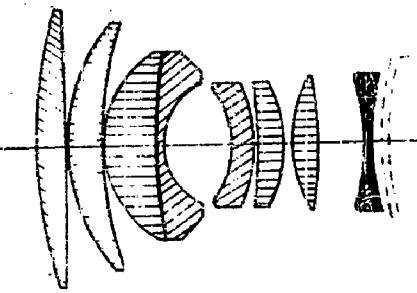
$\beta_{Lm} = 0.0$ $\beta_{Lm} = 0.0$

P-75-6378-RE

1429

Nr 1492

Leitz U. R. Objektiv 1:1. f = 9 cm. Rdj. v. 12. X. 93.



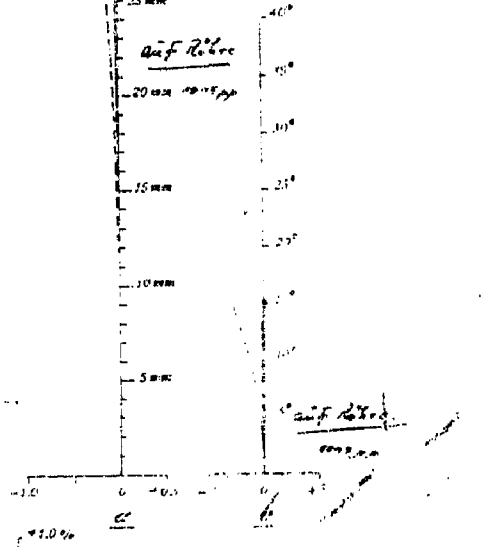
Linse	n_d	ν_d	$\frac{n_d - 1}{\nu_d}$	ϱ
1	1.6150	59.2	0.0151	+0.5 r
2	1.6200	36.3	0.0276	-0.5 r
3	1.6200	60.3	0.0166	-0.5 r
4	1.7283	28.5	0.0341	-1.0 r
5	1.7283	28.5	0.0341	-1.0 r
6	1.6200	36.3	0.0276	-0.5 r
7	1.6200	60.3	0.0166	-0.5 r
8	1.6150	59.2	0.0151	+0.5 r

Einzelobjektiv.

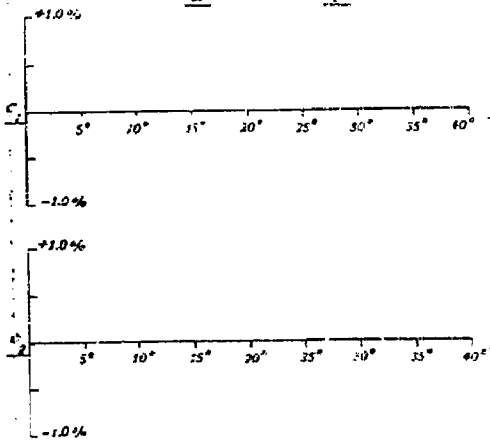


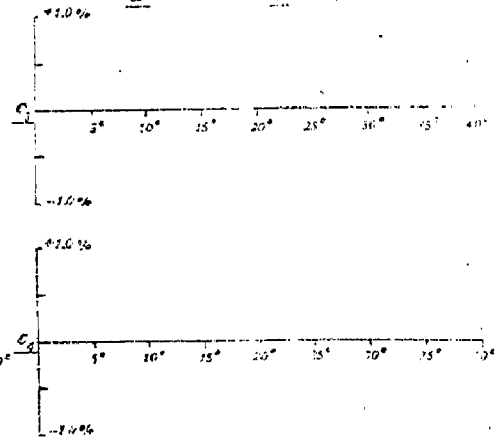
a b

Doppelobjektiv.



c d





F.Z.-6396 "Zeiss"

Nr. 1493

Ø 1944 No 2. U.R. Objektiv 1:7, f = 5 cm. Rel. v. 7. XI. 44.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (AZ 12). 43

Einzelobjektiv Δs'	Einzelobjektiv Δf'	Doppelobjektiv Δs'	Doppelobjektiv Δf'
		-0,5 -1,2 -1,9 -0,4 -0,6 -1,0	

Einzelobjektiv Einfallshöhen	Einzelobjektiv Chromasie	Doppelobjektiv Einfallshöhen	Doppelobjektiv Chromasie
		10,3 17,0 23,0	- 0,17 - 0,01 - 0,3 f

Astigmatismus (39-7 mm)

Einzelobjektiv Segmentwaldwinkel	Einzelobjektiv Meridionalwinkel	Doppelobjektiv Segmentwaldwinkel	Doppelobjektiv Meridionalwinkel
		-3,0 -6,3	-4,9 -8,2

Einzelobjektiv Frontwinkel	Einzelobjektiv Vorzeichnung	Doppelobjektiv Frontwinkel	Doppelobjektiv Vorzeichnung
		26,7 36,2	1929,2 1933,2

Meridional Segmental

Radien, Dicken und Abstände für f = 100 mm.

r1	d1	r2	d2	r3	d3	r4	d4	r5	d5	r6	d6	r7	d7	r8	d8	r9	d9	r10	d10	r11	d11
75,77	2,37	53,5	0,15	49,4	1,00	26,93	2,72	167,38	0,15	33,12	2,72	49,0	0,15	33,1	3,31	39,1					

r12	d12	r13	d13	r14	d14	r15	d15	r16	d16	r17	d17	r18	d18	r19	d19	r20	d20	r21	d21	r22	d22
7,74	0,3	49,8	0,15	49,8	0,15	33,81	2,0	0,0													

Einzelobjektiv	Doppelobjektiv
f_1 39,8	f_1 39,7
f_2 39,8	f_2 39,7
f_3 49,3	f_3 49,3
f_4 49,3	f_4 49,3
f_5 49,3	f_5 49,3
f_6 49,3	f_6 49,3
f_7 49,3	f_7 49,3

f_{ges} 49,3

26 mm = 95°

Ø 1944 No 2. U.R. Objektiv 1:7, f = 5 cm. Rel. v. 7. XI. 44.

Linse	r_1 d	r_2 d	r_3 d
L_1	75,77 2,37		53,5 0,15
L_2	49,4 1,00		26,93 2,72
L_3	167,38 0,15		33,12 2,72
L_4	49,0 0,15		33,1 3,31
L_5	39,1		
L_6	7,74 0,3		49,8 0,15
L_7	49,8 0,15		33,81 2,0

Einzelobjektiv.

Doppelobjektiv.

a b a b

C_1 C_2 C_3 C_4

+10% -10%

5° 10° 15° 20° 25° 30° 35° 40°

04/988

Kipro-Anastigmat D.R.P. 724605 1:1.9 f = 10cm Rdhg. v. 17.4.42.

Kipro-Anastigmat D.R.P. 724605 1:1.9 f = 10cm Rdhg. v. 17.4.42.

Nicht mehr lieferbar 1940

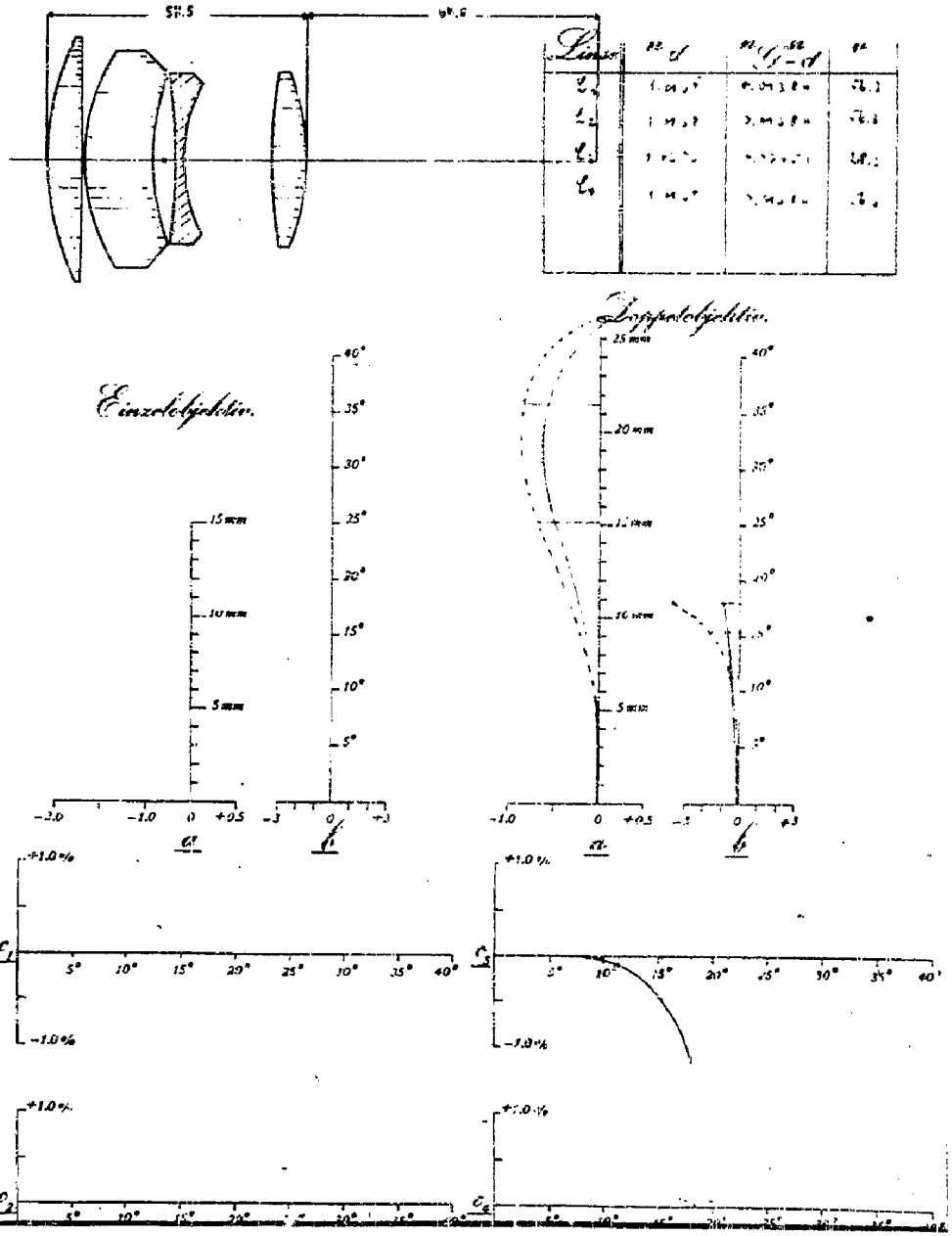
L. 1494

ZV-75-1398-RE

1431

Einzelobjektiv.		Doppelobjektiv.		
Sphärische Korrektion (AZ = ∞)				
Δs'	Δl'	Δs'		Δl'
Einfallshöhen.	Chromasie.	Einfallshöhen.		Chromasie.
Astigmatismus (AZ = ∞)				
Aequatorialbüschel	Meridionalbüschel	Aequatorialbüschel		Meridionalbüschel
Frontwinkel.	Verzeichnung.	Frontwinkel.		Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.



Nr. 7495

J S Farben G 15 25 136 , 1 1.5 f = 100 mm v. 30.10 42

F-15-6398-AZ

1932

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (Hefte Nr. 14/42)

Δs'	Δf'
23 6	34 2
	-6 4
	-21.8
	-19 4
	+32 4

Einfallshöhen. | Chromasie.

Einfallshöhen.	Chromasie.
133 52	+169
108 80	-198
76.96	-29

Astigmatismus (Hefte Nr. 14/42)

Sagittalwinkel	Meridionalwinkel	Sagittalwinkel	Meridionalwinkel
		+0 16	-1.72
		-4.32	+2.76
		-1 52	5.44

Frontwinkel. | Verzeichnung.

Frontwinkel.	Verzeichnung.
25 56	1:001 39 / 100 = 1:1004.71
34 45	
44 23	

Radien, Dicken und Abstände für f = 100 mm.

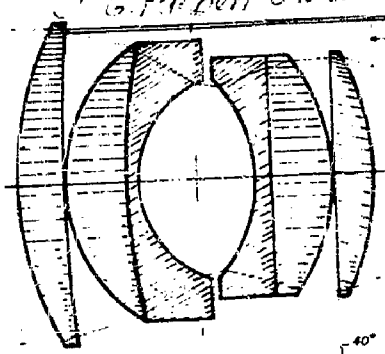
R	2	3	4	5	6	7	8	9	10	d_1	l_1	d_2	d_3	l_2	d_4	d_5	l_3	d_6
-2	145 6	34 5	2	22 0	30 65	∞	44 3	∞	45 3	10.0	0-58	13.-	7.35	25.22	3 45	13.84	0.29	7-60

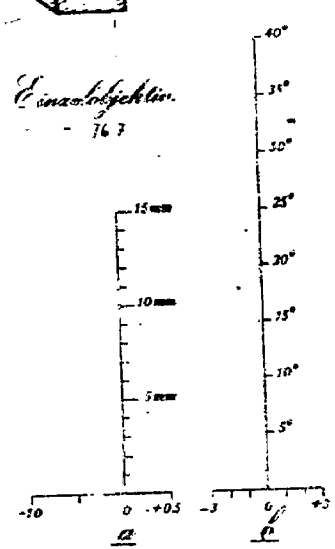
J G Farben G 15 25 136 , 1 1.5 , f. 100 mm v. 30.10.42

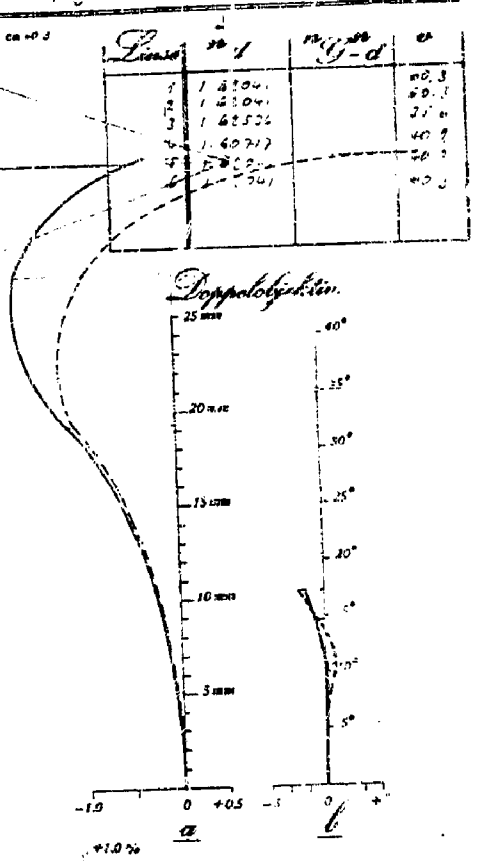
Einzelobjektiv.

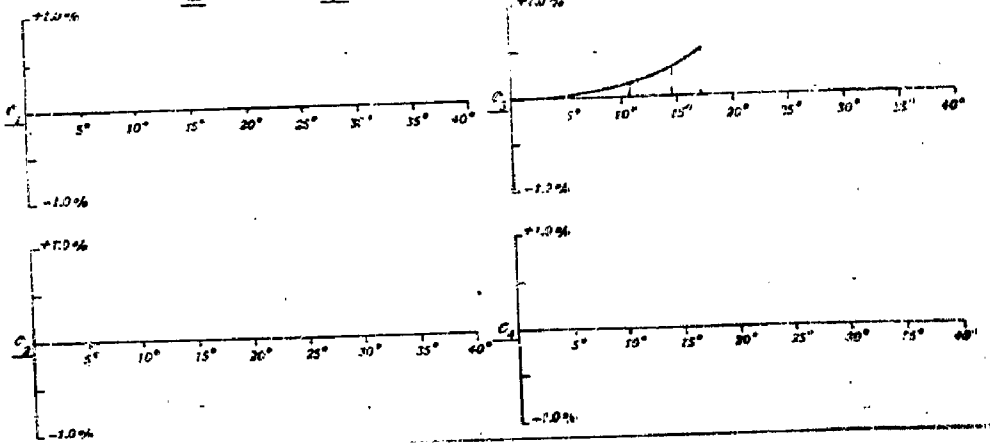
- 76 7

Doppelobjektiv.









Nr. 1496

Optikotechna, Společnost SRO Přerov S 21.86.85, 1:3,5, f=100 mm, ze dne 31.12.41.

Optikotechna, Společnost S.R.O Přerov S 21.86.85, 1:3,5, f=100 mm, ze dne 31.12.41

Fr. 23.12.42

1433

Einzel-Objektiv.

Doppelobjektiv.

Sphärische Korrektion (C 14/39).

Einzel-Objektiv Δs'	Einzel-Objektiv Δf'

Doppelobjektiv Δs'			Doppelobjektiv Δf'		
-3.0	-5.4	-6.2	-1.6	-2.4	-3.4

Einzel-Objektiv Einfallsloch.	Einzel-Objektiv Chromasie.

Doppelobjektiv Einfallsloch.	Doppelobjektiv Chromasie. C	D	G'
33.0	46.6	57.1	s' 8.64	8.57	8.38
			f' 100.05	100.06	100.28

Astigmatismus (C 14/42).

Einzel-Objektiv Sagittalbüschel	Einzel-Objektiv Meridionalbüschel

Doppelobjektiv Sagittalbüschel		Doppelobjektiv Meridionalbüschel		
-2.08	-2.26	-7.12	+0.14	0.12	-24.4

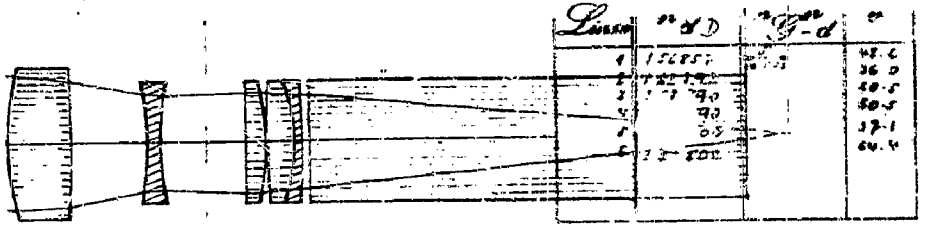
Einzel-Objektiv Frontwinkel.	Einzel-Objektiv Verzeichnung.

Doppelobjektiv Frontwinkel.			Doppelobjektiv Verzeichnung.		
24.6	33.7	45.2	99.45	99.18	99.62

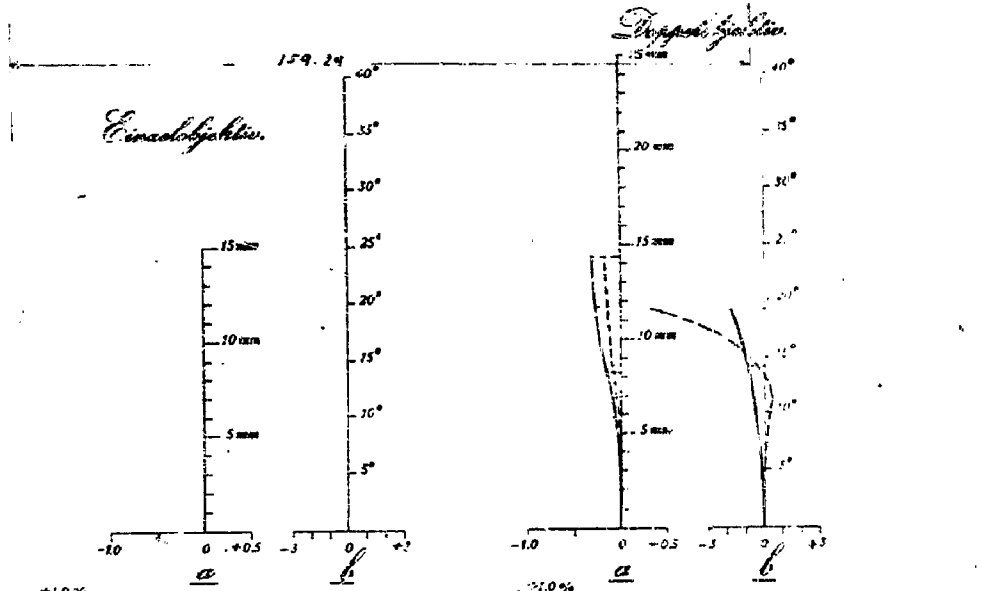
Radien, Dicken und Abstände für f = 100 mm.

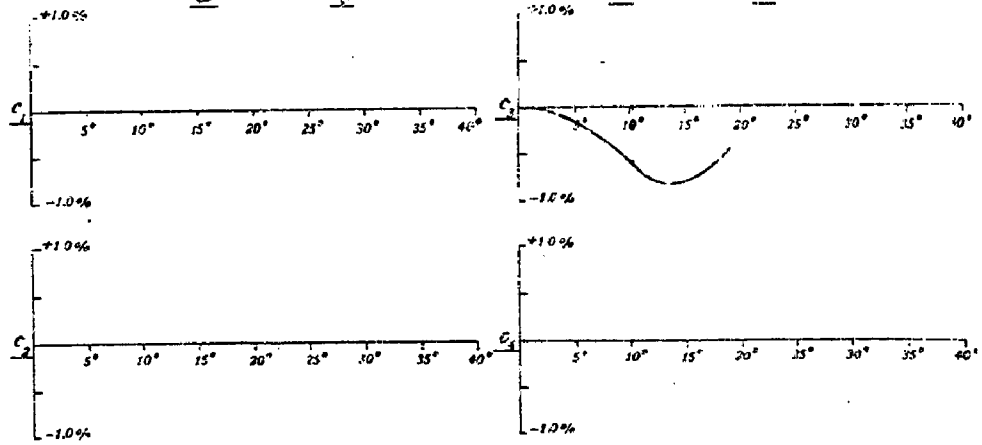
r_1	2	3	4	5	6	7	8	9	10	11	d_1	l_1	d_2	b_1	b_2	d_3	l_2	d_4	d_5
42.37	289.8	60.72	60.72	∞	54.53	180.48	34.52	180.98	—	—	13.4	17.1	2.	10.	8.5	4.5	0.1	5.9	1.74

l_3	d_6
1.5	94.31



Linse	nd	νd	r
1	1.56857	56.3	42.4
2	1.62	40	36.0
3	1.7	30	49.5
4		40	60.5
5		0.5	37.1
6	1.5	60	64.4





Askania Teleobjektiv Ung 130 44 ⌀ Dg. 1942, 1:3, f=100.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (C/14 812/.)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-1.6 / -0.8 / +4.6	-4.2 / -1.0 / +13.0

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		38.5 / 54.4 / 66.8	nd +6.7 (-11) ; nG' +56

Astigmatismus (C/14 811 5/.)

Einzelobjektiv. Sagittalwinkel	Einzelobjektiv. Meridionalwinkel	Doppelobjektiv. Sagittalwinkel	Doppelobjektiv. Meridionalwinkel
		+1.76 / +6.24 / +18.52	+1.72 / +8.44 / +46.72

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Vorzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Vorzeichnung
		12.4 / 17.3 / 24.0	1022.44 / 1046.57 / 1102.30

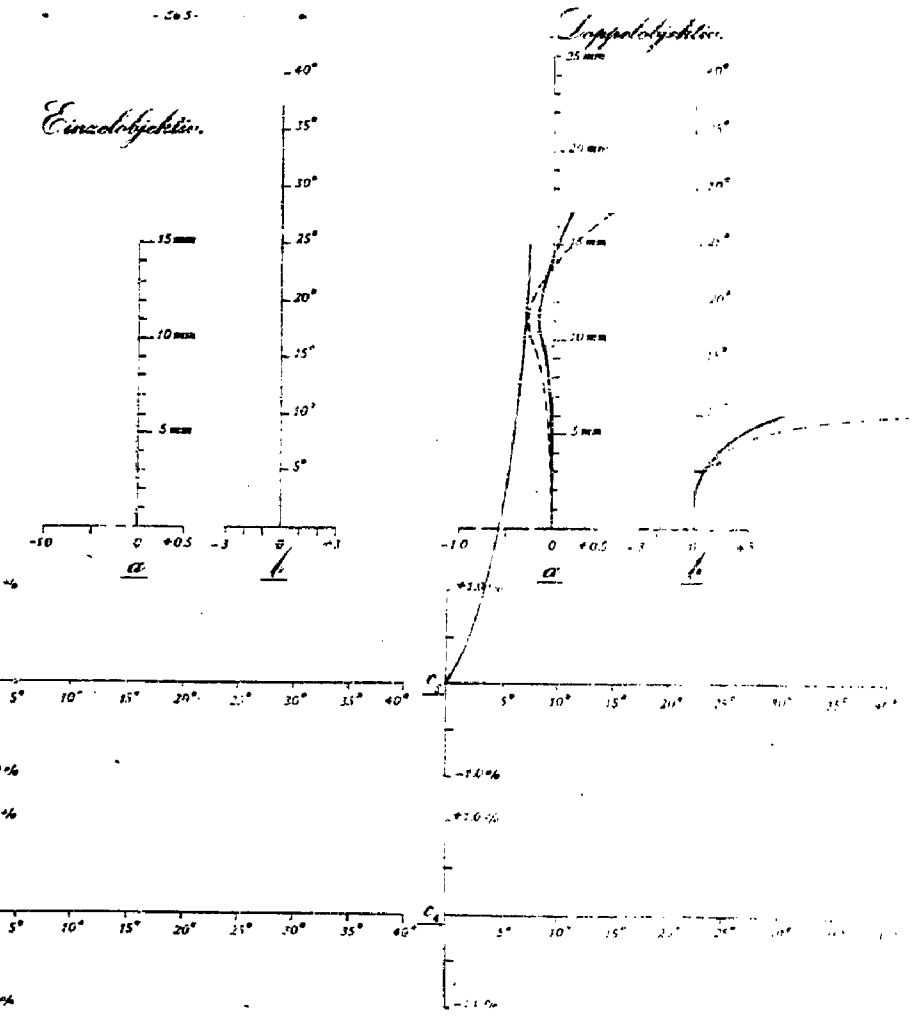
Radien, Dicken und Abstände für f = 100 mm.

R_1	2	3	4	5	6	7	8	9	d_1	d_2	l_1	d_3	b_1	b_2	d_4	d_5	d_6
44.2	60.1	12.5	29.1	83.8	14.8	13.6	15.6	17.0	1/7	2.7	1.7	4.7	24	10	2.0	1.0	2.7

Askania Teleobjektiv Ung 13 44 ⌀ Dg 1942 1:3, f=100

Linse Nr. | Nr. d. Fl. | Nr. d. Kitt | Nr.
1. | 1.5163 | | 34.6
2. | 1.6223 | | 32.2
3. | 1.6204 | | 60.3
4. | | | 32.2
5. | | | 60.3
6. | 1.5174 | | 27.2

Einzelobjektiv. | Doppelobjektiv.



1.43

Nr. 1495

Kodak F 867 580 Teleobjektiv 1:3.8 f=100 v. 28.10.60

f-Ts-6378-66

Einzelobjektiv

Doppelobjektiv

Sphärische Korrektion f/14 60 cm

Δs'	Δf'

Δs'			Δf'		
-4.4	-6.8	-3.0	-5.4	-8.6	-3.6

Einfallshöhen	Chromasie

Einfallshöhen			Chromasie		
31.52	44.12	54.04			

Astigmatismus f/14 60 cm

Sagittalwölbung	Meridianwölbung

Sagittalwölbung			Meridianwölbung		
+2.7	+3.76	+22.00	+2.80	+5.68	+16.04

Frontwinkel	Verzeichnung

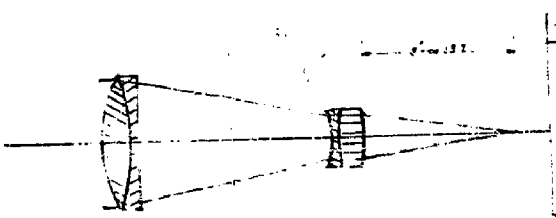
Frontwinkel			Verzeichnung		
23.08	31.40	38.20	1004.40	1011.72	1002.02

Radien, Dicken und Abstände für f = 100 mm

R	2	3	4	5	6	d1	d2	b1	b2	d3	d4
29.17	42.52	494.6	12.41	+19.32	58	4	1.5	2.0	21.6	1.	

05/60

Kodak F 867 580 Teleobjektiv 1:3.8 f=100 v. 28.10.60



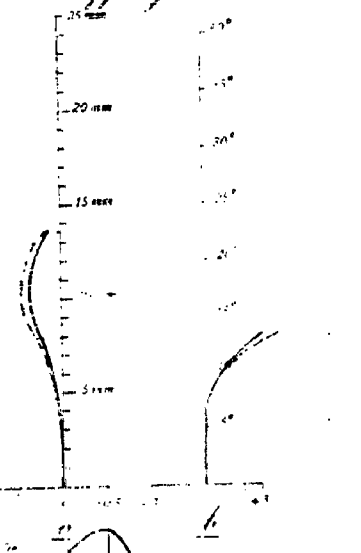
Linse	r	d	n	ν
1		5.6		64.1
2		1.4		37.9
3		2.6		64.1
4		0.39		55.5

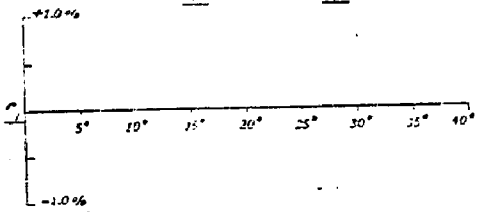


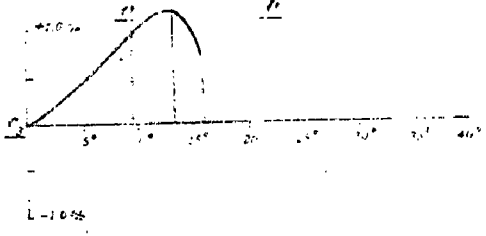
Einzelobjektiv

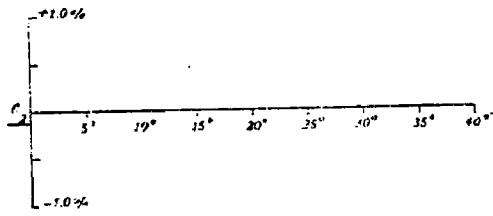


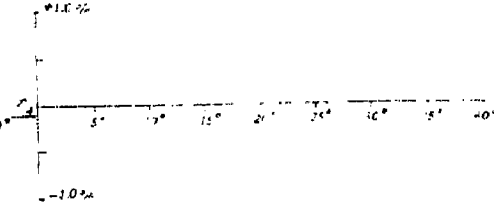
Doppelobjektiv











Kodak F 867 580 Teleobjektiv 1:3.8, f = 100 v. 28.10.40.

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (C/Ne Blau/Hg)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-5.2 / -7.2 / -4.0	-6.0 / -7.8 / -3.6

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		31.72 / 4...2 / 54.04	mD -226 / mg (-141) / mf -87

Astigmatismus (C/Ne Blau/Hg)

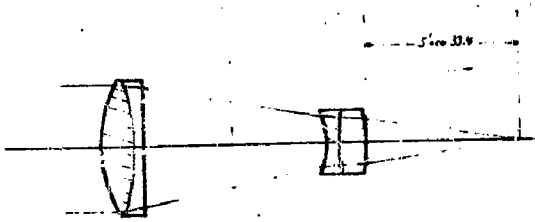
Einzelobjektiv. Astigmatischer Winkel	Einzelobjektiv. Meridionaler Winkel	Doppelobjektiv. Astigmatischer Winkel	Doppelobjektiv. Meridionaler Winkel
		+2.80 / +5.72 / +8.75	+0.94 / +3.11 / +6.92

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
		17.12 / 23.83 / 28.85	1006.58 / 1012.12 / 1016.43

Radien, Dicken und Abstände für f = 100 mm.

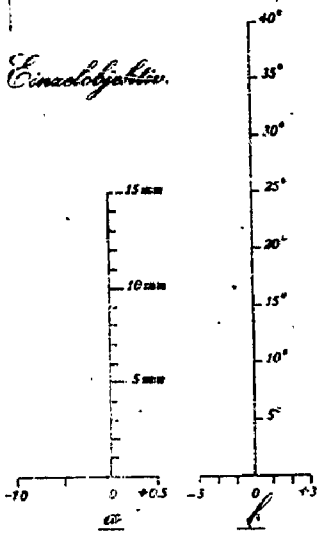
r_n	2	3	4	5	6	d_1	d_2	b_1	b_2	d_3	d_4
75.16	47.45	∞	16.45	52.3	37.58	7.3	2.11	19	20.5	1.9	5.5

Kodak F 867 580 Teleobjektiv 1:3.8, f = 100 v. 28.10.40

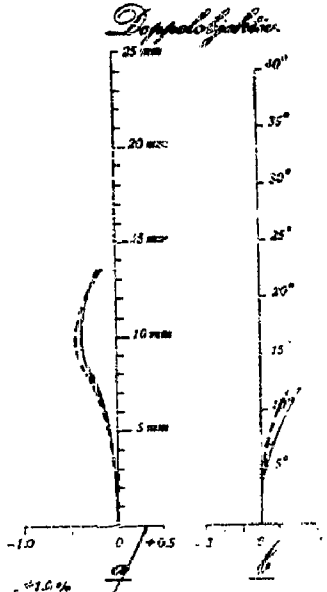


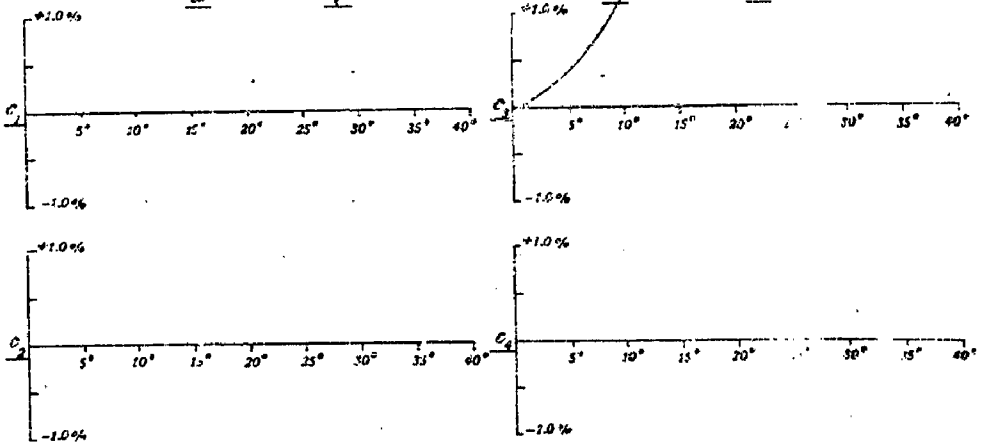
Linse	n_D	$\frac{n_g - 1}{n_f - n_g}$	r
1	1.498		67.2
2	1.664		35.7
3	1.516		69.1
4.	1.639		55.5

Einzelobjektiv.



Doppelobjektiv.





L 1500

S Rodenstock Münchner Planconsmuster No 489 609 42h 240 1:2.5 f=10cm

S Rodenstock Münchner Planconsmuster No [illegible]

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion (C14 Blatt 26)

Einzelobjektiv. Δs'	Einzelobjektiv. Δf'	Doppelobjektiv. Δs'	Doppelobjektiv. Δf'
		-6.6 -10.0 -3.8	-10.0 -2.0 -0.6

Einzelobjektiv. Einfallshöhen	Einzelobjektiv. Chromasie	Doppelobjektiv. Einfallshöhen	Doppelobjektiv. Chromasie
		46.20 65.22 80.00	+310 (-11) +299

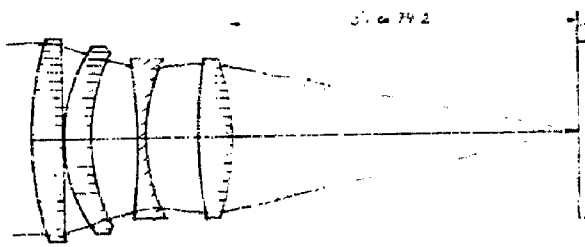
Astigmatismus (C14 Blatt 21-23)

Einzelobjektiv. Sagittalbüschel	Einzelobjektiv. Meridionalbüschel	Doppelobjektiv. Sagittalbüschel	Doppelobjektiv. Meridionalbüschel
		-3.08 -3.72 -3.16	+0.08 -1.12 -6.44

Einzelobjektiv. Frontwinkel	Einzelobjektiv. Verzeichnung	Doppelobjektiv. Frontwinkel	Doppelobjektiv. Verzeichnung
		33.2 44.8 52.5	1000 19/997 40/992 %

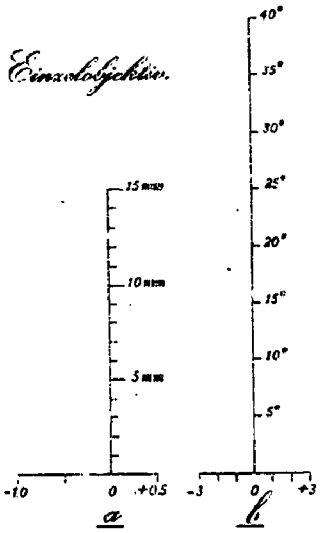
Radien, Dicken und Abstände für f = 100 mm.

	1	2	3	4	5	6	7	8	d_1	l_1	a_2	b_2	b_2	d_3	l_3	l_4
489	∞	32.96	40.40	119.36	32.08	98.16	32.36		7.0	0.2	5.96	4.9	3.1	2.0	10.8	7.9

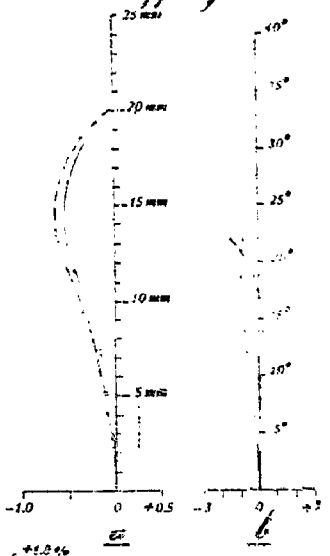


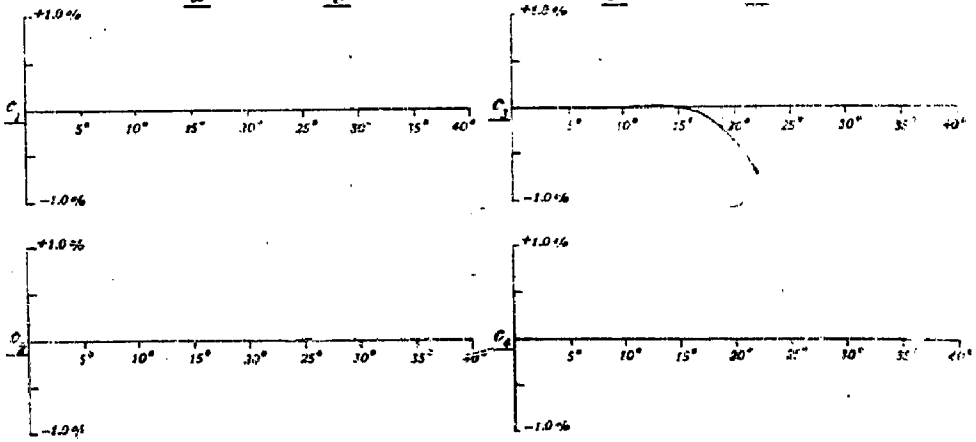
Linse	n_d	ν_d	$P_{gF}-d$	Pt
1	1.620 41			60.3
2	1.611 60			60.3
3	1.691 10			56
4	1.611 71			60.4

Einzelobjektiv.



Doppelobjektiv.





№ 1503

Telemetar 1:5, f = 1m

Einzelobjektiv. | Doppelobjektiv.

Sphärische Korrektion

Δs'	Δf'		Δs'	Δf'
		d		
		e		

Einfallshöhen. | Chromasie. | Einfallshöhen. | Chromasie.

Astigmatismus

Sagittaler Bildwinkel | Meridionaler Bildwinkel | Sagittaler Bildwinkel | Meridionaler Bildwinkel

Frontalwinkel. | Verzeichnung. | Frontalwinkel. | Verzeichnung.

Radien, Dicken und Abstände für f = 100 mm.

r_1	r_2	r_3	r_4	r_5	r_6	r_7	r_8	d_1	l_1	d_2	l_2	d_3	l_3	d_4

Telemetar 1:5, f = 1:2

Einzelobjektiv. | Doppelobjektiv.

Kopie

F-73-6378-RE

1439

371

Rechner [illegible] f. 150 mm Opt. Werk. Zeiss Jena v. 22.7.32

Einzelobjektiv | Doppelobjektiv

Sphärische Korrektion ($\Delta s'$, $\Delta f'$) = Δs_m, f'

	$\Delta s'$			$\Delta f'$		
s'	-9.2	-10.7	-12.7	-9.5	-11.8	-14.4
s'	-6.8	-2.5	+2.2	-6.2	-3.0	+0.2

Einfallshöhen | Chromasie

Einfallshöhen | Chromasie

15.4	11.2	11.8

-1.9
(0.0)
-1.9

Astigmatismus ($\Delta s'_{sa}$, $\Delta s'_{m}$)

	Äquatorialbüschel			Meridionalbüschel		
s'	-3.3	-1.2	+1.--	+0.2	+0.9	-0.9
s'	-2.0	-1.1	+1.0	-0.3	+0.0	-2.0

Äquatorialbüschel | Meridionalbüschel

Frontlinsenhöhe | Tangentenneigung

Frontlinsenhöhe | Tangentenneigung

11.8	12.4	13.0

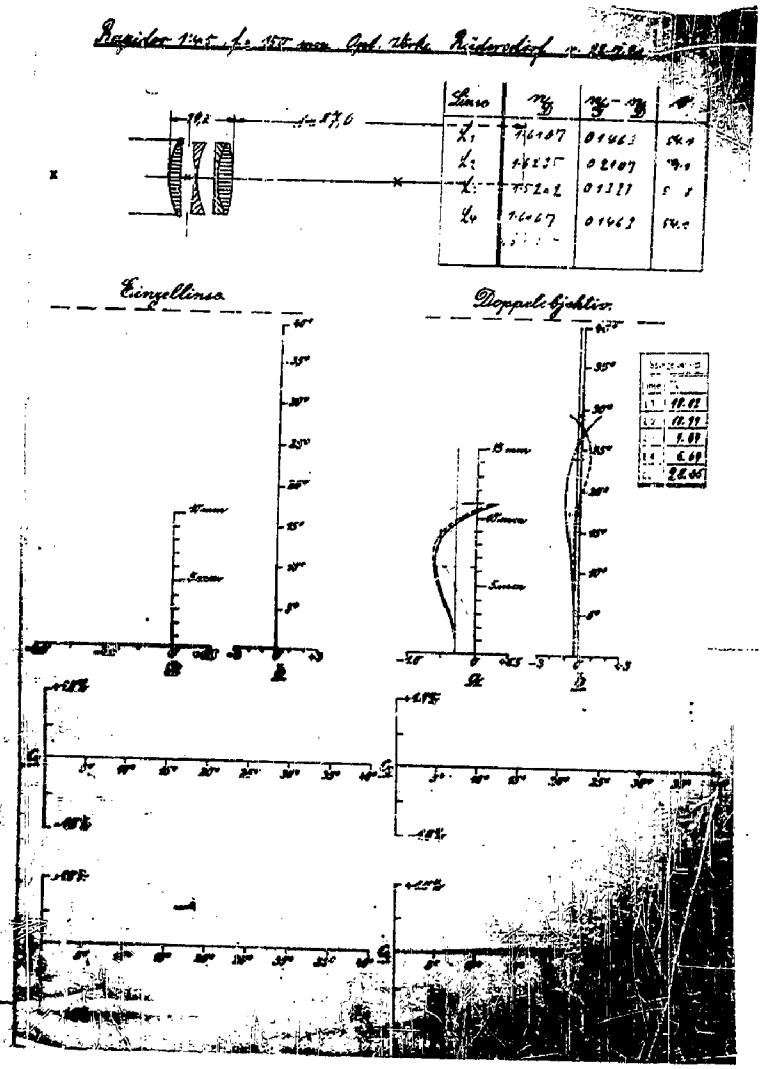
Radien, Dicken und Abstände für f = 100 mm

r1	r2	r3	r4	r5	r6	r7	D1	d1	d2	d3	l	d4	d5	d6	d7	d8
43.6	-57.	94.	43.5	-23.0	22.4	n=1		3.6	0.7	1.0	5.1	1.0	0.3	0.1	4.0	

Rechner [illegible] f. 150 mm Opt. Werk. Rodenstock v. 12.5.32

Linse	n_g	$n_g - n_g$	
L_1	1.61187	0.1463	54.4
L_2	1.62257	0.2107	36.1
L_3	1.5212	0.1377	51.1
L_4	1.61187	0.1463	54.4

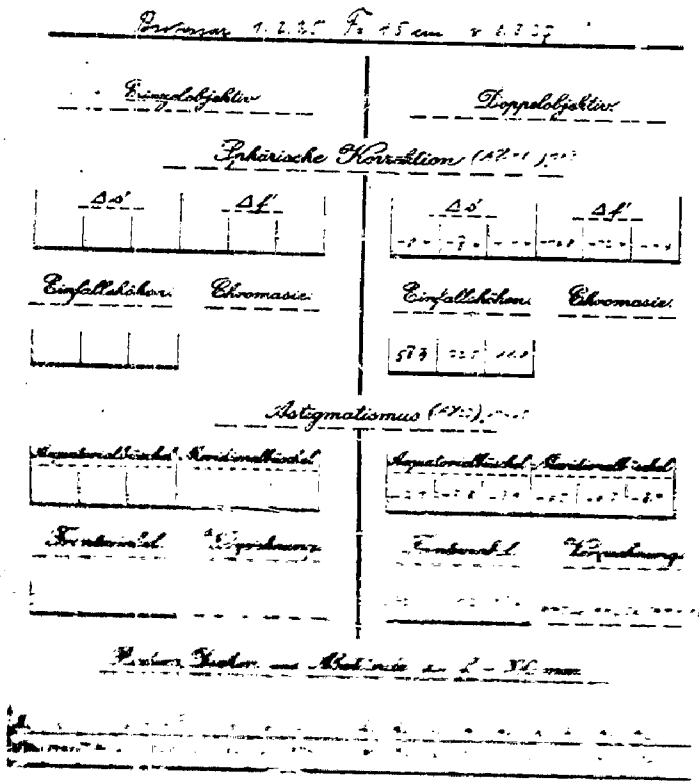
Einzellinse | Doppelobjektiv

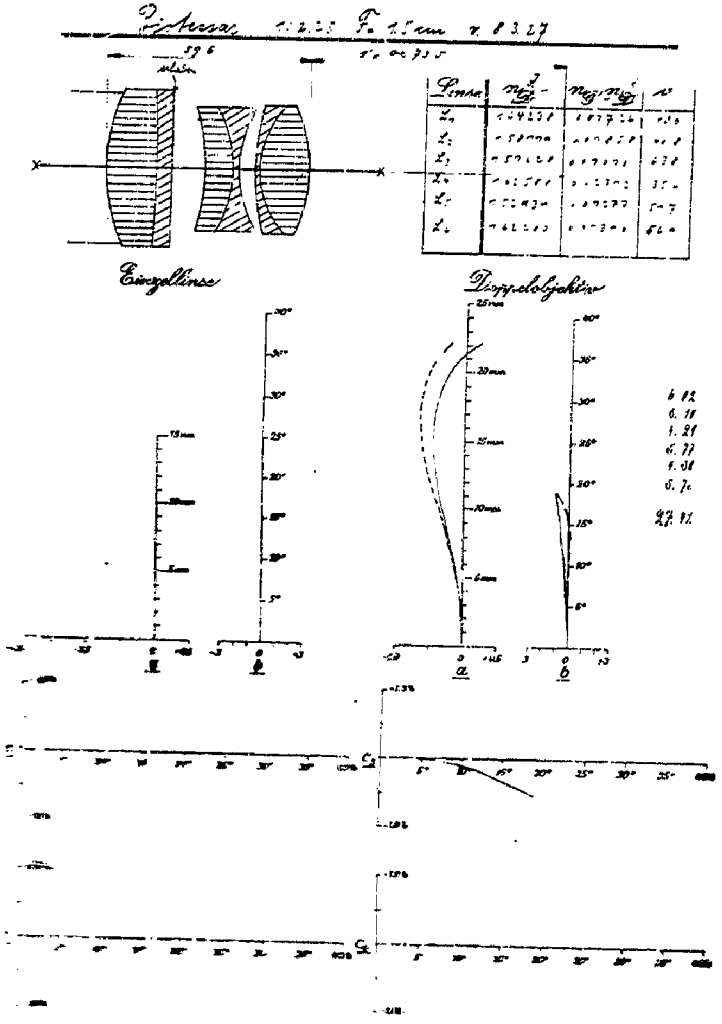


F-75-6398-RE

0440

№ 757





1411

F-ES-6398-RE

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ABSTRACT:

A compilation is made of lens formula cards obtained from the Zeiss Works. In general, the list of objectives is arranged by types, such as Tessar, Cook, Hekton, etc. An explanation of terms used on the cards precedes the lists, and each type of objective is described by pertinent information. The information covers aperture ratio, focal length, spherical correction, astigmatism, a meridian section of the system of lenses, the rectangular system of coordinates for a, b, and c curves, and other data. In the text of the Index, remarks are made about particular lenses. A sample card in translation has been included as a guide in interpreting the data presented.

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