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AP-902

Quarterly Development Report

for

DEVELOPMENT OF -

FILM DIELECTRIC CAPACITORS ---- HIGH TEMPERATURE

-0-

This report covers the period September 19th, 1952 to December 15th, 1952

TOBE DEUTSCHMANN CORPORATION

921 Providence Highway
Norwood, Massachusetts

NAVY DEPARTMENT BUREAU OF SHIPS --- ELECTRONICS DIVISION

Contract No. NObsr - 57200

Index No. NE-111016, St. 1.

Date of Contract: Feb. 20, 1952

Date of Report: Dec. 22, 1952

C M P Classification: Class "A" Product

Certification DO-A-7; certified under CMP Regulation #3

SECURITY INFORMATION

RESTRICTED

R-E-S-T-R-I-C-T-E-D

ABSTRACT

We feel that our experience with Mylar A is sufficient to allow us to evaluate briefly the major advantages and disadvantages of this material as a dielectric.

Mylar A as a dielectric, with faults eliminated, surpasses paper impregnated Capacitors. At 85° C., 1 Mfd. Capacitors constructed with two half mil layers of this film between foils will operate at 2,000 V.D.C. for at least 72 hours with a loss of units not exceeding 30 %.

Moreover, these are untreated units, and of the failures that do occur, most fail early and are caused by the high fault count. No conventional paper impregnated unit of similar construction will match this feat.

From the few tests run at elevated temperatures, we predict a similar performance at 125° C., i.e. Mylar will withstand higher voltage stress than paper units.

Probably, the greatest overall advantage is the fact that these results are obtained with unprocessed units. From the winding machine into a container without the handling and re-handling of impregnated units -- and without these accumulative costs.

Metallized Mylar follows a similar pattern, but its superiority outshines plain Mylar. Actually, this is probably an allusion created by the fact that metallized Mylar has only one competitor, whereas plain Mylar A challenges the field.

S-E-C-U-R-I-T-Y

I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R E S T R I C T E D

Compared to metallized paper, metallized Mylar will match it, size for size, in the low voltage groups, and will come in smaller containers in the higher voltage units. It will be a better electrical capacitor and will operate over a much wider temperature range.

The most obvious objection to Mylar, to date, is found in the relatively high fault count. The initial dielectric failures are still too high to allow production of low-cost units. It is possible that with some further treatment of the dielectric, such as impregnation with oil or a substitute, the number of failures may be reduced. At the moment, however, this is supposition since the project to date embraces only untreated Mylar A units.

Probably the next objection to the material is its reluctance to perform on a winding machine like conventional dielectrics. Having greater tensile strength, it very seldom ruptures, but rather stretches and causes wrinkling at the start of the winding. Moreover, being transparent, the operator has great difficulty maintaining even margins, since the material naturally tends to sway.

Lastly, the static charges developed make margin alignment a problem. While these are difficulties now, they are not insurmountable, and with a little study and effort should be remedied.

R-E-S-T-R-I-C-T-E-D

Part I.

PURPOSE

A. Develop Film Dielectric Capacitors, high temperature, utilizing DuPont "Mylar" Film (V-200) or equivalent, as a capacitor dielectric, in order to achieve higher temperature operation and greater reliability of fixed paper capacitors, in accordance with Bureau of Ships Contract Specification SHIPS F-400, dated 15 September, 1951, as follows:

B. Phase I.

1. Evaluate a V-200 film or equivalent in accordance with paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-499.
2. Furnish fifty (50) each of various capacitors as described in paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-499.
3. Submit reports as specified therein.

C. Phase II.

1. Evaluate a V-200 film or equivalent with metallized electrodes in accordance with paragraph 3.2.2. of referenced Bureau of Ships Contract Specification SHIPS F-499.
2. Furnish fifty (50) each of various capacitors as described in paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-499.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

C. Phase II. (continued)

3. Furnish one (1) set of Type D. Class IV Manufacturing Drawings in accordance with Bureau of Ships Specification 16D19(RE) , dated 15 January 1946, and Amendment No. 2 dated 1 May 1948.
4. Submit Reports as specified herein.

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GENERAL FACTUAL DATA

We had on hand fifty pieces of the 1 Mfd. 2" x .0005" Mylar A with 1/8" margins remaining from earlier tests. These were tested along with twenty-five units similarly constructed, but from the second shipment of Mylar A. (See Part III, p.p. 4, 5, 6). The voltages were not the same on the three groups, and of course that factor must be taken into consideration, but we found that we lost only one unit wound with the material from the second shipment as against four and six -- wound with that of the first shipment. This merely substantiates our previous statements that the film itself is not yet consistent.

After the units made for these tests were assembled and soldered, they were run through a degreaser and exposed to the vapors of trichloroethylene to remove soldering film and other smudge.

~~R-E-S-T-R-I-C-T-E-D~~GENERAL FACTUAL DATA (continued)

During this process, several units dropped off the baskets down into the boiling liquid (87° C.). The units were open and some of this contaminated mixture managed to seep into the cans and onto the sections. We placed twenty-five of these units on Life Test along with twenty-three units of the regular process, i. e. only exposed to the vapor. Within eight (8) hours, every unit within the immersed group had failed (See Part III, P. 14).

Examination revealed that almost every unit had failed somewhere along the outer quarter of the winding at the margin. This particular group was not tested with any intent to supply data for the general classification, but rather to determine the effect of the immersion.

We found when we changed from the 1 Mfd. $2 \times .0005''$ unit to the 1 Mfd. $2 \times .00025''$ unit that we had difficulty getting the section wound to our specifications into the can. By depleting a few of the outer turns and decreasing the margins, the winding fit snugly into the container, but not without a sacrifice of some capacitance.

The 1 Mfd. $2 \times .0005''$ unit averages about .9 Mfd. while the 1 Mfd. $2 \times .00025''$ unit averages about .75 Mfd.

~~S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N~~~~R-E-S-T-R-I-C-T-E-D~~

R-E-S-T-R-I-C-T-E-D

GENERAL FACTUAL DATA (continued)

We found that the .00025" film taken at random, as we did for these units, gauged up to and even surpassed .0003" . The next sections scheduled are to be wound with pre-gauged rolls, with an attempt to maintain a balance as close to .00025" as possible.

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DETAIL FACTUAL DATAPHASE I.

Work resumed with 1 Mfd. units constructed with two .0005" Mylar A films between foils and tested at 85° C.

A. Seventy-five units divided into three groups of twenty-five each.

1. Tested at 2100 V. D. C. , two units failed voltage test prior to Life Test. Both were Mylar faults. The remaining twenty-three units were placed on test and ten completed 114 hours. There were three mechanical failures and ten Mylar faults. (See Part III, P. L.)
2. Tested at 2200 V. D. C. , four units failed voltage test prior to Life Test. Two were mechanical failures and two were Mylar faults. The remaining twenty-one units were placed on test; seven completed 101 hours. There were two mechanical failures and fourteen Mylar faults. (See Part III, P. 2.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D**DETAIL FACTUAL DATA (continued)**

3. Tested at 2300 V.D.C., four units failed voltage test prior to Life Test. Two were mechanical failures and two were Mylar faults. The remaining twenty-one units were placed on test and four completed 73 hours. There were three mechanical failures, eleven Mylar faults, and three units opened during test. (See Part III, P. 3)

B. Seventy-five units divided into three groups of twenty-five each.

1. Tested at 1900 V.D.C., one unit failed voltage test prior to Life Test. This was a Mylar fault. The remaining twenty-four units were placed on test and fifteen completed 73 hours. There were two mechanical failures and seven Mylar faults. (See Part III, P. 4)
2. Tested at 2000 V.D.C., four units failed voltage test prior to Life Test. There was one mechanical failure and three Mylar faults. The remaining twenty-one units were placed on test, and twelve completed 99 hours. There were three mechanical failures and five Mylar faults. One opened during the test. (See Part III, P. 5.)
3. Tested at 2100 V.D.C., six units failed voltage test prior to Life Test. Two were mechanical failures and four were Mylar faults. The remaining nineteen units were placed on test, and twelve completed 101 hours. One mechanical failure and six Mylar faults were noted here. (See Part III, P. 6).

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA (continued)**C. Seventy-five units divided into three groups of twenty-five each.**

1. Tested at 1800 V.D.C., there were no voltage failures prior to Life Test. All twenty-five units were placed on Life Test, and thirteen completed 146 hours. There was one mechanical failure and ten Mylar faults. One opened during the test. (See Part III, P. 7.)
2. Tested at 1900 V.D.C., there were no voltage failures prior to Life Test. All twenty-five units were placed on Life Test, and seventeen completed 250 hours. There was one mechanical failure and six Mylar faults. One opened during the test. (See Part III, P. 8.)
3. Tested at 2000 V.D.C., two units failed prior to Life Test. One was a mechanical failure, and the other an intermittent open, caused by a broken top tab. The remaining twenty-three units were placed on test, and twelve completed 227 hours. There were two mechanical failures and six Mylar faults. Three opened during the test. (See Part III, P. 9)

D. Seventy-five units divided into three groups of twenty-five each.

1. Tested at 1900 V.D.C.; one unit failed voltage test prior to Life Test. This was a mechanical failure. The remaining twenty-four were placed on test, and fourteen completed 131 hours. There were four mechanical failures, and five Mylar faults. One unit opened during the test. (See Part III, P. 10)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

~~R-E-S-T-R-I-C-T-E-D~~

2. Tested at 2000 V.D.C., one unit failed voltage test prior to Life Test. a mechanical failure. The remaining twenty four were placed on test, and fourteen completed 146 hours. There were three mechanical failures, and seven Mylar faults. (See Part III, P. 11.)
 3. Tested at 2100 V.D.C., three units failed voltage test prior to Life Test. One was a mechanical failure and two were Mylar faults. The remaining twenty-two were placed on Life Test, and fourteen completed 74 hours. There were two mechanical failures, and six Mylar faults. (See Part III, P. 12.)
- E. Forty-eight units were divided into two groups of twenty-three and twenty-five each.
1. Tested at 2000 V.D.C., three units failed voltage test prior to Life Test. Two were mechanical failures and one a Mylar fault. The remaining twenty units were placed on Life Test, and nineteen completed 72 hours. There was one mechanical failure. (See Part III, P. 13).
 2. Tested at 2000 V.D.C., two units failed voltage test prior to Life Test. Both were Mylar faults. The remaining twenty-three were placed on Life Test, and all failed within 8 hours. All were Mylar faults, resulting from immersion in Trichloroethylene. (See Part III, P. 14).

R-E-S-T-R-I-C-T-E-D

F. The project changed at this point to 1 Mfd. units constructed with two .00025" Mylar A films between foils, and tested at 85° C. Seventy-five units divided into three groups of twenty-five each made up this test.

1. Tested at 700 V.D.C., two units failed prior to Life Test.
Both were mechanical failures. The remaining twenty-three units were placed on test, and twenty-one completed 74 hours. Two were Mylar faults. (See Part III, P. 15)
2. Tested at 800 V.D.C., one unit failed prior to Life Test.
It was a mechanical failure. The remaining twenty-four were placed on Life Test, and twenty-three completed 90 hours. There was one Mylar fault. (See Part III, P. 16).
3. Tested at 900 V.D.C., one unit failed prior to Life Test.
This was a mechanical failure. The remaining twenty-four were placed on test, and twenty-two completed 76 hours. There were two Mylar faults. (See Part III, P. 17).

G. Seventy-five units divided into three groups of twenty-five each.

1. Tested at 1000 V.D.C., two units failed prior to Life Test.
Both were mechanical failures. The remaining twenty-three were placed on Life Test, and twenty-two completed 74 hours. There was one Mylar failure. (See Part III, P. 18).
2. Tested at 1100 V.D.C., four units failed prior to Life Test.
All four were mechanical failures. The remaining twenty-one units were placed on Life Test, and twenty completed 76 hours. There was one mechanical failure. (See Part III, P. 19)

~~R-E-S-T-R-I-C-T-E-D~~

3. Tested at 1200 V. D. C. , three units failed prior to Life Test. One was a Mylar fault and two were mechanical failures. The remaining twenty-two were placed on Life Test, and nineteen completed 77 hours. The results show one mechanical failure, one Mylar fault, and one unit opened during Life Test. (See Part III, P. 20.)

H. Seventy-five units divided into three groups of twenty-five each.

1. Tested at 1300 V. D. C. , three units failed prior to Life Test. All were mechanical failures. The remaining twenty-two were placed on Life Test, and sixteen completed 82 hours. The results show five Mylar faults. One unit opened during the test. (See Part III, P. 21).
2. Tested at 1400 V. D. C. , seven units failed prior to Life Test. One was mechanical and six were Mylar faults. The remaining eighteen units were placed on Life Test, and thirteen completed 86 hours. There was one mechanical failure, and four Mylar faults. (See Part III, P. 22.)
3. Tested at 1500 V. D. C. , there were no failures prior to Life Test. All twenty-five were placed on Life Test, and fourteen completed 79 hours. The results show one mechanical failure, and ten Mylar faults. (See Part III, P. 23.)

R-E-S-T-R-I-C-T-E-D

- I. Seventy-five units divided into three groups of twenty-five each
1. Tested at 1600 V. D. C. , five units failed prior to Life Test. One was a mechanical failure, and four were Mylar faults. The remaining twenty units were placed on Life Test, and fifteen completed 83 hours. Four were Mylar faults. One opened during the test. (See Part III, P. 24.)
 2. Tested at 1700 V. D. C. , three failures were observed prior to Life Test. One was a mechanical failure, and two were Mylar faults. The remaining twenty-two were placed on Life Test, and five completed 74 hours. One was a mechanical failure and sixteen were Mylar faults. (See Part III, P. 25.)
 3. Tested at 1800 V. D. C. , five units failed prior to Life Test. All were Mylar faults. The remaining twenty units were placed on Life Test, and four completed 73 hours. Results showed two were mechanical failures, and fourteen were Mylar faults. (See Part III, P. 26.)

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DETAIL	FACTUAL DATA	PHASE II.
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- J. Twenty-four .25 Mfd. units constructed of single layer .0005" Metallized Mylar 1" wide with 1/16" margins, divided into two groups of twelve units each.
1. Tested at 1200 V. D. C. , at 85° C. , eight units completed 279 hours without a complete breakdown. Four units opened during the test. (See Part III, P. 30.)

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA (continued)

2. Tested at 1500 V. D. C., at 85° C., one failed completely after 15 minutes. Three completed 253 hours. Six units opened during the test. Two failed mechanically, and each unit suffered the loss of one end terminal during the test. (See Part III, P. P. 32, 33.).

K. Sixty .25 Mfd. units constructed of single layer .0005" Metallized Mylar 1" wide with 1/16" margins divided into three groups of twenty units each.

1. Tested at 800 V. D. C., at 85° C., all units completed 351 hours without a complete breakdown. The average for the entire period was 4.2 temporary, self-healing breakdowns per Microfarad. (See Part III, P P. 34, 35.).
2. Tested at 1000 V. D. C., at 85° C., all units completed 318 hours without a complete breakdown. The average for the entire period was 23 temporary, self-healing breakdowns per microfarad. (See Part III P. P. 36, 37, 38)
3. Tested at 1200 V. D. C., at 85° C., all units completed 250 hours without a complete breakdown. The average for the entire period was 53 temporary, self-healing breakdowns, per microfarad. (See Part III, p. p. 39, 40, 41.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

C O N C L U S I O N S :

- A. First, the 1 Mfd. unit constructed with two layers of .0005" Mylar A. between foils.

Combining the results of tests NObsr #22 through NObsr #40, we find a definite pattern (See Part III, P. 27.) Tests above NObsr #22 were not at 85° C., and cannot be used here, but will be averaged later when we get to their classifications. Test NObsr #41 is not included in the computations used because, as we pointed out on Page , this was more a test within a test.

<u>Temperature</u>	<u>Voltage D. C.</u>	<u>Percent Mylar Failures</u>	<u>Number of Units Tested</u>
85° C.	1000	1.	23
"	1200	1.	24
"	1400	2.	23
"	1600	4.8	21
"	1800	22.	46
"	1900	24.5	73
"	2000	20.8	108
"	2100	33.6	65
"	2200	62.0	21
"	2300	52.5*	21

Examination of the above table shows that at 2000 volts, we find fewer Mylar A Life Test failures than at 1900 volts. However,

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

CONCLUSIONS (continued)

by referring to the chart (Part III, P. 27), we note that Test Group NObsr #40 completed its Life Test without any Mylar failures.

This, of course, does not follow the pattern of the other test groups. If we omit this test from the final computation, the result becomes 26% for the 2000-volt groups.

Therefore, a group of 1 Mfd. capacitors constructed with two .0005" layers of Mylar A between foils can be expected to operate at 85° C. for a minimum of 72 hours, with a loss of not greater than 30% of the starting group.

B. Second, the 1 Mfd. unit constructed with two layers of .00025" Mylar A between foils.

The tests are not complete with this classification, but the chart (Part III, P. 28) shows some interesting trends. Tests NObsr #20 and #21 both yielded 50% Mylar failures at voltages of 1000 and 1200.. These two groups also were constructed with 1/8" margins. Yet, tests NObsr #49 and #51 run at 1400 and 1600 V.D.C. respectively show only 22% and 20% Mylar failures. These groups were constructed with 3/16" margin. Examination of the individual tests' data shows that very few in each group failed at the margins whether they be 1/8" or 3/16". The difference in this case seems to be caused

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

CONCLUSIONS (continued)

by differences in capacitance. The tests NObsr #20 and #21 average just under .9 Mfd. while that of test groups NObsr #49 and #51 about .75 Mfd.

To date, there has been only one group tested at each voltage. We will now repeat tests using units close to .9 Mfd. in value until we have sufficient data to make our conclusion.

C. Third, metallized Mylar Capacitors.

The test data with this material is by far too meagre to draw any conclusions. The indications are that it is superior to metallized paper both in electrical and temperature characteristics.

The last three tests we performed with this material, namely NObsr M#5, M#6, M#7 - were similar to the previous tests M#3, and M#4. However, with the last tests, we counted the actual number of temporary breakdowns, and were able to get an average expressed in terms of breakdowns per Microfarad. Here again, we have an indication of the pattern we expect to find. (Sec Part III, P. P. 29 - 41).

1. For 250 hrs. Life Test at 85° C. at 800 V. D. C.
4.2 temporary breakdowns per Microfarad.
2. For 250 hours Life Test at 85° C. at 1000 V. D. C.
23 temporary breakdowns per Microfarad.
3. For 250 hours Life Test at 85° C. at 1200 V. D. C.,
53 temporary breakdowns per Microfarad.

R-E-S-T-R-I-C-T-E-D

P A R T I I -- PROGRAM FOR NEXT INTERVAL

It is our plan to continue tests with the 1 Mfd. unit constructed with two layers of .00025" Mylar A. The results gathered thus far indicate that we should concentrate our tests on voltages between 1000 and 1500.

At any rate, we will repeat these tests until the data yields conclusive results.

The next type unit we will investigate will be 1 Mfd. constructed with two layers of .00025" and one of .0005" Mylar A. We will follow the same procedure with this type capacitor.

We have not received any .0001" Mylar, and unless we do, we probably will repeat these constructions with the .25 Mfd. capacitors before turning our attentions to the single film units.

We haven't received any Metallized Mylar this last quarter, so our plans with this material must wait. We have decided to have the material metallized to the following specifications.

.00025"	1" with 3/32" margins
.0005"	1" with 1/8" margins
.001"	2" with 3/16" margins

PLEASE SEE

PART III

WHICH FOLLOWS.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

LIFE TEST RECORD

25 UNITS 1. Mfd. 2x.5 MIL:V

LOT NO. Webster 29

SPECIFICATION

FOR MORE

CONTRACT NO. *No 65r* 57200

HOURS ON TEST

TRIPLE TERROR

5

VOLTAGE 2200 - DC

Part 3 of 3

Clock # 5 - 1018

Date Listed

Clock
Tray

Total-Hours 101

26. Sept. 52

ELECTRICAL TESTS BEFORE LIFT TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 22000V	P	F	P	P								P	F	P	P			P	F	P			P	F	
Shunt R. 12 Mega-ohm	K	R	100K									100K	100K	100K				100K	100K	100K			100K		
Cap. in mfd - 1000 S.	940	940	915	957	926	880	882	861	942	830	862	918	811	811	890	812	934	851	866	922	911	915	896		
Power Factor in %	234	234	237	238	143	139	137	137	137	139	138	138	138	136	135	142	137	139	138	138	137	141	139	137	136
		Unable to find										Mylor Foil side turns	Mylor Foil side turns	Mylor Foil side turns				Mylor Foil winding	Mylor Foil winding						
LIFE TEST FAILURES IN HRS.										30.5	10.5	9			25	14		3	335			1	99.5	29	

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R in Mega	100K		100K	100K					100K				60K				100K				100K				
Rep. in mfd.	1000	912	902	943					933				.802				.922				.911				
Power Factor in %		.39	.39	.4					.39				.137				.39				.39				

Date collected by H.J.-

V. W. W. B.

Page 2

ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHEMAN CORPORATION

WORWOOD, MASS

LIFE TEST RECORD

25 UNITS 1.0 MED. 2X.5 MIL - U LOT NO. Nabir - 30

FOR VERN

CONTRACT NO. Nabir 57200

HOURS ON TEST 72 +

TEMPERATURE 85 °C

VOLTAGE 2300 DC

Date started 26 Sept. 52

Clock # 6 - 7.17

Clock # 6 790

26 Sept. 52

Date finished 7-08 am - 52

Total Hours 73

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2300 DC	P	P	P	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R. in Mega-ohms	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K
a 90 volts																									
Cap. in mfd - 1000	809	925	918	918	844	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843
Power Factor	0.37	0.44	0.43	0.43	0.39	0.46	0.42	0.43	0.41	0.42	0.39	0.4	0.53	0.43	0.43	0.36	0.37	0.4	0.46	0.45	0.46	0.42	0.48	0.48	0.48
LIFE TEST FAILURES IN HRS.	4/13	66			47	60			4		13.5				52			26		1		3/			

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mega-ohms	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K	19K 60K
Cap. in mfd - 1000	809	925	918	918	844	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843	843
Power Factor	0.37	0.44	0.43	0.43	0.39	0.46	0.42	0.43	0.41	0.42	0.39	0.4	0.53	0.43	0.43	0.36	0.37	0.4	0.46	0.45	0.46	0.42	0.48	0.48	0.48
Notes																									

LIFE TEST RECORD

5 UNITS 1.45d. - 2x.5v

Lot No. Nob. 31

SPECIFICATION

FOR VROM V. Winroth

CONTRACT NO. Nobsk - 57200

HOURS ON TEST

72+

TEMPERATURE 8.5-9.0

VOLTAGE

Date started

Clock 10 590
Tray

Date Finished

Clock **Tray**

Total Hours 73

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Salt age - 1900 cc	P																P	F	P						P
Wet R _n MgO - 50% / 100K																	> 100K	> 100K	> 100K						> 100K
Sp. in H ₂ O - 1000 St.	840	890	797	843	1003	932	831	899	896	845	837	928	891	781	881	889	884	851	935	851	850	803	898	928	933
Bower Factor in 2	.35	.37	.33	.36	.37	.48	.34	.43	.36	.4	.36	.38	.32	.37	.37	.37	.37	.39	.39	.36	.36	.34	.35	.39	.37
LIFE TEST FAILURES IN HRS.								45			23.5		71	40.5		.5			21						

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

Data collected by H.J. Y.W. W.B.

LIFE TEST RECORD

15 UNITS 1.44d. - 2 X .5 U. wound with Mylar from 1st shipment LOT NO. Nobler 32
SPECIFICATION FOR VEHOM V. Winreth CONTRACT NO. Nobler - 57200

HOURS ON TEST 72+ TEMPERATURE 85°C VOLTAGE 2000 DC
Date started Clock # 11 289 Date finished Clock # 11 349 Total Hours 99
11 OCT 1952

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2000 DC	P	F	P	P	P	P	P	P	P	P	P	P	P	P	F	P	P	P	P	P	P	P	P	P	P
Shunt R. in Mega. Ohms	1.011	1.011	1.011	1.004	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005
Cap. in Mfd. - 1000	1.011	1.011	1.011	1.004	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005
Power Factor in %	34	34	33	33	35	33	33	32	33	34	32	32	32	32	32	32	35	33	32	33	35	35	39	39	34
																			</						

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mega ohms	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K
Cap. in mfd. - 1000 %	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K
Power Factor in %	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K	1.004/100K

Date collected by H.T. V.N. W.B.

LIFE TEST RECORD

15 UNITS 1.44d - 2 X .5 V - wound with Mylar from 1st shipment LOT NO. Nobsr # 33

SPECIFICATION

FOR WHOM V. Winroth CONTRACT NO. Nobsr - 57200

HOURS ON TEST 72

TEMPERATURE 85 °C

VOLTAGE 2000 DC

Date started

Clock # 12

Date finished

Clock # 12

Total Hours

1 Oct. 52

6 - Oct. 52

373

101

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2000 DC	F	P	P	P	F	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	F
Shunt R in Mega-ohms	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K	100K/100K
Cap. in 44d - 1000 & 1000	1.008	1.037	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044
Power Factor in %	42	44	44	44	44	44	44	45	41	45	45	43	44	43	44	41	42	43	42	42	44	43	44	44	44
LIFE TEST FAILURES IN HRS.	23																								
Notes	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R in Mega-ohms	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in 44d - 1000 & 1000	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016	1.016
Power Factor in %	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Notes	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin	Mylar failure, 1/4" section, 1/4" from margin

LIFE TEST RECORD

25 UNITS 1. Mfd. 2X.5 U Mylar Capacitors LOT NO. Nobsr 34
 SPECIFICATION FOR WHOM CONTRACT NO. Nobsr - 57200

HOURS ON TEST 72+ TEMPERATURE 85°C VOLTAGE 1800 DC
 Date started Clock # 10-613 Date finished Clock # 10-809 Total Hours 146
 9 Oct. 52 20. Oct. 52

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage-1800dc	P	K																							P
Cap. in mfd. 1000	2.930	932	864	908	897	927	839	858	911	1.014	923	948	850	939	864	907	960	891	933	919	909	810	915	937	85
Power Factor in	2.34	.33	.33	.33	.34	.33	.33	.33	.34	.33	.32	.39	.33	.33	.34	.34	.35	.33	.34	.35	.32	.31	.33	.36	.31
Shunt R. in Mega	100K	100K	100K	100K	90K	100K	100K	100K	90K	90K	90K	80K	80K	90K	90K	90K	90K	80K	80K	90K	90K	90K	90K	100K	100K
LIFE TEST FAILURES IN HRS.				6					48	17		7		17	2			5		23	14				6

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Cap. in mfd. 1000	2.919	921	856	919	886	921	846	852																	
Power Factor in	2.45	.42	.39	.39	.35	.47	.5	.44																	
Shunt R. in Mega	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Notes																									

LIFE TEST RECORD

25 UNITS 1 add - 2X 5 V Mylar Capacitors 107 NO. Nobis 35

SPECIFICATION 11 - 388 Date finished 20.0.52 Clock # 11 655 CONTRACT NO. Nobis - 57200 VOLTAGE 1900 DC

HOURS ON TEST 72 TEMPERATURE 85 ° C Total Hours 200

Date started 9 Oct 52

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mylar 100K																									
Cap. in add - 1000 1/2 850 845 831 896 850 866 816 927 920 910 948 934 925 928 933 766 201 257 779 932 720 842 889 925 926																									
Varier Resistor 10 34 34 24 35 34 32 35 35 35 36 35 37 37 34 35 34 33 35 35 37 36 35 35 37 36																									
Voltage - 1900 DC PK																									
LIFE TEST FAILURES IN HRS. 3					156	3					14														9

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mylar 100K																									
Cap. in add - 1000 1/2 838 892 895 896																									
Varier Resistor 10 34 34 24 35 34 32 35 35 35 36 35 37 37 34 35 34 33 35 35 37 36 35 35 37 36																									
Voltage - 1900 DC PK																									
LIFE TEST FAILURES IN HRS. 3																									

LIFE TEST RECORD

25 UNITS 1.2Mfd - 2X .5V Mylar Capacitors LOT NO. No. 12 36

SPECIFICATION

FOR VEH

CONTRACT NO. No. 12 - 57200

HOURS ON TEST

TEMPERATURE 85°C

VOLTAGE 2000 DC

Date started

Clock # 12 - 373 Date finished

Clock # 12 600

9 Oct - 52

20 - 0 Q No. 52

Total Hours 227

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mega	100K	100K	100K	80K	60K	90K	50K	100K	100K	90K	50K	100K	100K	100K	100K	100K	70K	50K	60K	100K	100K	100K	100K	100K	100K
Cap. in mfd.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Power Factor	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Voltage - 2000 DC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
LIFE TEST FAILURES IN HRS.																									

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mega	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in mfd.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Power Factor	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

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Data collected by H.T. V.W.

ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHMANN CORPORATION

WORWOOD, MASS

3

LOT NO. Nosr. 37

SPECIFICATION

FOR WHOM V. Winroth

CONTRACT NO. No 651 - 57200

TEST NO	SECTOR	HOURS ON TEST
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

72

Clock 10 809

Clock 10
Tray

Date finished

2

Clock

940

Total Hours 131

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1500dc	P								> P			P												> P	
Short P in Mega-ohms									> 100K			> 100K												> 100K	
Cap. in 450. - 1000	8826	936	918	943	904	933	792	888	936	874	450	866	908	904	1.12	885	188	856	1700	890	918	822	810	848	883
Power Factor in %	.34	.35	.36	.37	.32	.35	.36	.36	.37	.35	Mechanical at 7000 rpm	.35	.34	.33	.39	.33	.35	.35	.36	.37	.37	.36	.36	.35	.34
LIFE TEST FAILURES IN HRS.				8							Winding at 7000 rpm	123						1.5	9	20.5					

ELECTRICAL TESTS AFTER LIFT TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Magn. 16A	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K			100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cop in xld - 1000	2.850	9.48	9.23	9.10	9.46	7.97	8.35	8.43	8.83				.933		1.18	8.97					.829	.844	.858		
Paver Foster in 1/2"	.37	.37	.38	.4	.38	.36	.35	.36	.39				.38		.48	.34					.34	.36	.35		

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ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHMANN CORPORATION

5. H. V. W.

NORWOOD, MASS.

LIFE TEST RECORD

UNITS 141d - 2X.5 V - Mylar Capacitors LOT NO. Nebser 99
 SPECIFICATION FOR WHEN V. Winrotz CONTRACT NO. Nebser - 57200

HOURS ON TEST 72+ TEMPERATURE 85°C VOLTAGE 2100 VDC
 Date started Clock # 12 600 Date finished Clock # 12 674
 20-08-52 24-08-62 Tray # x Total Hours 74

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2100V	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R. in Mega 735/100K																									
Cap. in Mfd. 1000 2.915	946	933	1028	704																					
Power Factor in %	35	33	38	42	37																				
LIFE TEST FAILURES IN HRS.	52			20			2								1	5									

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mega	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K	190K
Cap. in Mfd. 1000 2.930																									
Power Factor in %	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	
Mechanical Failures	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	Mechanical Failure at winding	

LIFE TEST RECORD

LOT NO. No 657 40

Mylor Capacitors

15 UNITS 1. utd. 2x.5 U

FOR VIEW

CONTRACT NO. *Nob. 57200*

HOURS ON TEST	T
72	72

TEMPERATURE 55°C

VOLTAGE 2000 VDC

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Clock #	/o	-	941	Date Finished
1	10	-	941	10/10/94
2	10	-	941	10/10/94
3	10	-	941	10/10/94
4	10	-	941	10/10/94
5	10	-	941	10/10/94
6	10	-	941	10/10/94
7	10	-	941	10/10/94
8	10	-	941	10/10/94
9	10	-	941	10/10/94
10	10	-	941	10/10/94
11	10	-	941	10/10/94
12	10	-	941	10/10/94
13	10	-	941	10/10/94
14	10	-	941	10/10/94
15	10	-	941	10/10/94
16	10	-	941	10/10/94
17	10	-	941	10/10/94
18	10	-	941	10/10/94
19	10	-	941	10/10/94
20	10	-	941	10/10/94
21	10	-	941	10/10/94
22	10	-	941	10/10/94
23	10	-	941	10/10/94
24	10	-	941	10/10/94
25	10	-	941	10/10/94
26	10	-	941	10/10/94
27	10	-	941	10/10/94
28	10	-	941	10/10/94
29	10	-	941	10/10/94
30	10	-	941	10/10/94
31	10	-	941	10/10/94
32	10	-	941	10/10/94
33	10	-	941	10/10/94
34	10	-	941	10/10/94
35	10	-	941	10/10/94
36	10	-	941	10/10/94
37	10	-	941	10/10/94
38	10	-	941	10/10/94
39	10	-	941	10/10/94
40	10	-	941	10/10/94
41	10	-	941	10/10/94
42	10	-	941	10/10/94
43	10	-	941	10/10/94
44	10	-	941	10/10/94
45	10	-	941	10/10/94
46	10	-	941	10/10/94
47	10	-	941	10/10/94
48	10	-	941	10/10/94
49	10	-	941	10/10/94
50	10	-	941	10/10/94
51	10	-	941	10/10/94
52	10	-	941	10/10/94
53	10	-	941	10/10/94
54	10	-	941	10/10/94
55	10	-	941	10/10/94
56	10	-	941	10/10/94
57	10	-	941	10/10/94
58	10	-	941	10/10/94
59	10	-	941	10/10/94
60	10	-	941	10/10/94
61	10	-	941	10/10/94
62	10	-	941	10/10/94
63	10	-	941	10/10/94
64	10	-	941	10/10/94
65	10	-	941	10/10/94
66	10	-	941	10/10/94
67	10	-	941	10/10/94
68	10	-	941	10/10/94
69	10	-	941	10/10/94
70	10	-	941	10/10/94
71	10	-	941	10/10/94
72	10	-	941	10/10/94
73	10	-	941	10/10/94
74	10	-	941	10/10/94
75	10	-	941	10/10/94
76	10	-	941	10/10/94
77	10	-	941	10/10/94
78	10	-	941	10/10

Clock # 10 - 10.13

Total Hours 72

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shut P. in Mega- μ look													100K	100K	100K		100K	100K		100K	100K				
Cop. in mfd. - 1000 μ look	.905	.908	.895	.842	.943	.747	.813	.850	.859	.921	.855	.859	.913	Start of Mergin	.919		.866	.880		.844	.906	.917			
Paper Feather in K.	.39	.4	.4	.39	.4	.38	.37	.4	.41	.41	.4	.4	.41	Mechanical winding. Bad wiring file of Mergin	.38		.39	.39		.41	.4	.4			

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Data collected by H.T. V.W.

TOBE DEUTSCHMANN CORPORATION

ENGINEERING DEPT. C.L. 1002

NORWOOD, MASS

LOT NO. No. 51

QUANTITY	DESCRIPTION	UNIT	FOR VENDOR SPECIFICATION
25 UNITS	1.44d 2x.5" V Mylar Capacitors		

FOR VIEW

TEST NO SCHEDULE

79.

TEMPERATURE

١٠٠

VOLTAGE 2000 VOL

[illegible]

Clock

2-681

Total Hours 2

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFT TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	Mylar failure - outer 1/4 of section - 3" from margin	Mylar failure - outer 1/4 of section - at the margin	Mylar failure - outer 1/4 of section - 1/2 from margin	Mylar failure - outer 1/4 of section - at the margin	Mylar failure - outer 1/4 of section - 1/2 from margin	Mylar failure - outer 1/4 of section - 1/2 from margin	Mylar failure - inner 1/4 of section - 1/2 from margin	Mylar failure - outer 1/4 of section - 1/2 from margin	Mylar failure - inner 1/4 of section - middle of film	Mylar failure - inner 1/4 of winding - middle of film	Mylar failure - outer 1/4 of winding - middle of film	Mylar failure - outer 1/4 of section - at the margin	Mylar failure - outer 1/4 of section - 1/2 from margin	Mylar failure - outer 1/4 of section - at the margin	Mylar failure - outer 1/4 of section - 1/2 from margin	Mylar failure - inner 1/4 of section - middle of film	Mylar failure - outside turn - middle of film			Mylar failure outer 1/3 of section - at margin	Mylar failure - outer 1/2 of section - 1/2 from margin	Nylon failure - midway section - middle of film	Mylar failure outer 1/4 of section - middle of film	Mylar failure outer 1/4 of section - at the margin	Mylar failure outer 1/4 of section - at the margin	Mylar failure - outer turn - middle of film

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Data collected by

www.

W.B.

ENGINEERING DEPT. C.L. 1002

TOBI DEUTSCHMANN CORPORATION

KORWOOD, MASS

LIFE TEST RECORD

UNITS

44-25-11

Mylar Capenture

LOT NO.

303-12

SPECIFICATION

FOR WHOM V. H. H. H. H.

CONTRACT NO.

572-20

HOURS ON TEST

72

TEMPERATURE

25°C

VOLTAGE

100-0-100

Date started

Clock 4

Tray 4

Date finished

Clock 4

Tray 4

Date started

Clock 4

Tray 4

Date finished

Clock 4

Tray 4

Total Hours 74

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1																									
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LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHEMAN CORPORATION

Data collected by H.J. V. W.

BORWOOD, MASS

LIFE TEST RECORD

UNIT 1

25-11 1941 Coco, Tor.

Lot No. 133

SPECIFICATION

FOR WHOM *Wierzbicki*

CONTRACT NO.

HOURS ON TEST

TEMPERATURE

21.2

[illegible]

Clock

Total Hours:

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

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ENCLOSURE DEPT. C.L. 1002

TOBE DEUTSCHEMAN CORPORATION

Data collected by H.J. V.W.

DORWOOD, MASS

LIFE TEST RECORD

UNITS 1 unit at 250 V 1 unit at 250 V LOT NO. 11
 SPECIFICATION 1 unit at 250 V CONTRACT NO. 11
 HOURS ON TEST 72 FOR WHOM 1 unit at 250 V VOLTAGE 250
 Date started 11/11/41 TEMPERATURE 25°C Clock # 1 Total Hours 72
 Date finished 11/11/41 Tray # 1

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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LIFE TEST RECORD

25 UNITS 124d 2A.25 V Mylar Capacitors LOT NO. 45
 SPECIFICATION FOR WHOM V. W. H. CONTRACT NO. 57200
 HOURS ON TEST 72 TEMPERATURE 25 VOLTAGE 100
 Date started Clock finished Clock Tray Total Hours 74
 21 11/11/52 21 11/11/52

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHMANN CORPORATION

Data collected by H. J. V. W.

BORWOOD, MASS

LIFE TEST RECORD

UNITS

14-1 - 21-25 U

Mylar Capacitor

LOT NO.

11

SPECIFICATION

FOR WHOM

V.W.

CONTRACT NO.

11-11-52

HOURS ON TEST

72

TEMPERATURE

25°C

VOLTAGE

110-115

Date started

11-25

Date finished

24 Nov 52

Clock #

5-1211

Tray #

76

Total Hours

76

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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Date collected by H.J. V.W.

ENGINEERING DEPT. C.L. 1002

TONE DEUTSCHMANN CORPORATION

BORWOOD, MASS

2.5 UNITS

$$\underline{2 \times 25} \quad 0$$

Mylar Capacitors

1

LOT NO. Nobsr 47

SPECIFICATION

NO SMOKE ON TEST

Part 1

Clock # 1 - 816

Date finished

**Clock
Tray.**

6-943

Total Hours	77
-------------	----

21 Nov. - 53

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFT TEST

[illegible]

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Data collected by

H.J.	V. W.
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ENGINEERING DEPT. C.L. 1002

TOBI DEUTSCHEMANN CORPORATION

NORWOOD, MASS.

2.5 UNITS

25 UNITS / 45d.

2x.25 u

Mylar Capacitors

1

LOT NO. Nob5r " 49

SPECIFICATION

FOR FROM V. Winroth

CONTRACT NO.

No. 57200

HOURS ON TEST

727

TEMPERATURE 85°C

VOLTAGE 1400 VDC

Date started

Date finished

Clock

1

26. Nov 1955

8 Dec. 1952

Tray +

78	Total Hours
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ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 14000V	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R in Mg - 25% 100K at 105V	100K	90K	80K	70K	60K	50K	40K	30K	20K	100K	100K	100K	100K	90K	80K	70K	60K	50K	40K	30K	20K	100K	100K	100K	100K
Cap. in mfd - 10000	.722	.775	.760	.803	.837	.871	.905	.939	.973	.801	.787	.732	.677	.677	.735	.735	.727	.779	.754	.675	.739	.739	.739	.739	.739
Power Factor in %	.4	.4	.4	.38	.39	.38	.37	.36	.35	.34	.33	.32	.31	.30	.29	.28	.27	.26	.25	.24	.23	.22	.21	.20	.19
	Mylar Failure - Inner 1/4 of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding	Mylar Failure - Middle of Winding
LIFE TEST FAILURES IN HRS.						6			25							16						2			

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. in Mega. 99%		100K	100K			100K	100K			100K	100K		100K		100K		100K	100K	100K				100K	100K
at 105 V									1/4 F ilm															
Cap. 12.45fd - 1000 %		820	807			765	816		1/4 F ilm	835	760		746		766		760	813	777					763
Power Factor in 70		.34	.37			.38	.34		Mylar Failure, Middle Section	.32	.33		.32		.35		.34	.34	.35					.34

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Data collected by H.J. V. W.

ENGINEERING DEPT. C.I. 1002

TOBE DEUTSCHMANN CORPORATION

NORWOOD, MASS.

LIFE TEST RECORD

15 UNITS 1. Mtd. 2 X 25 M LOT NO. Nobsr 50

SPECIFICATION

FOR FROM V W 19074 CONTRACT NO. Nobsr 57200

HOURS ON TEST 72

TEMPERATURE 85 °C VOLTAGE 1500 VDC

Date started Clock # 9-671 Date finished Clock # 9-750

26 Nov 1952 Tray # 4 Dec. 1952 Total Hours 79

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1500V	P																								P
Short Pin Mfg. Check																									100K
AT 70 V																									
Cap. in Mtd. 1000	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755
Power Factor 10%	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
LIFE TEST FAILURES IN HRS.				1		13	1	8							55	2			5	2	1				1

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Short Pin Mfg. Check	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mtd. 1000	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755
Power Factor 10%	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
LIFE TEST FAILURES IN HRS.				1		13	1	8							55	2			5	2	1				1

Date collected by H. J. V. W.

LIFE TEST RECORD

UNITS 1 vol 2 x 2-0

LOT NO. 115-1

SPECIFICATION

FOR WHOM 1941-2-10

CONTRACT NO. 115-1

HOURS ON TEST

TEMPERATURE 15

VOLTAGE 16

Date started

Date finished

Clock Tray

Total Hours

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHMAN CORPORATION

Data collected by H.T. V.W.

BORWOOD, MASS

UNITS	1	4-2	-	25	U	Mylar Separators	CONTRACT NO.	10005722	LOT NO.	100052
SPECIFICATION	FOR WEOM						VOLTA			
HOURS ON TEST	22	TEMPERATURE		2	VOLTAGE		17			
Date started	5-12-52	Date finished		5-15-52	Clock		5-15-52	Total Hours		
					Tray					

UNITS	1	4-2	-	25	U	Mylar Separators	CONTRACT NO.	10005722	LOT NO.	100052
SPECIFICATION	FOR WEOM						VOLTA			
HOURS ON TEST	22	TEMPERATURE		2	VOLTAGE		17			
Date started	5-12-52	Date finished		5-15-52	Clock		5-15-52	Total Hours		
					Tray					

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

LIFE TEST RECORD

LOT NO. N651 53

Mylar Capacitors

FOR WHOM V. Winroth

CONTRACT NO. N651 57220

VOLTAGE 1800 V.D.S.

TEMPERATURE 85° C

Total Hours 73

Clock #

Date finished

Tray #

11 Dec. 1952

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK
Sh. N. in Mfg. spec.	800	726	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729
Cap. in Mfd. spec.	31	64	28	30	54	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Power Factor																									
LIFE TEST FAILURES IN HRS.																									

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Sh. N. in Mfg. spec.	800	726	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729	729
Cap. in Mfd. spec.	31	64	28	30	54	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Power Factor																									
LIFE TEST FAILURES IN HRS.																									

1 Mfd. 2 x .5 Mil V

Bober #	Voltage	Temp.	Number of Units	Failed before Life	Started on Life	Mechanical Failures	Mylar Failures	Mylar Failures	Lot Material	Margin	Number Open after Life
7	600 D.C.	85° C.	25	—	25	—	—	4.	Lot #1	1/8"	0
8	800 D.C.	85° C.	25	—	25	—	—	8.	Lot #1	1/8"	0
9	1000 D.C.	85° C.	25	—	25	1	—	4.	Lot #1	1/8"	0
10	600 D.C.	100° C.	25	—	25	—	—	12.	Lot #1	1/8"	0
11	800 D.C.	100° C.	25	—	25	—	—	20.	Lot #1	1/8"	0
12	1000 D.C.	100° C.	25	—	25	—	—	24.	Lot #1	1/8"	0
13	600 D.C.	125° C.	6	2	4	—	—	0	Lot #2	1/8"	0
14	800 D.C.	125° C.	6	3	3	1	—	0	Lot #2	1/8"	0
15	1000 D.C.	125° C.	6	1	5	1	—	40	Lot #2	1/8"	0
16	600 D.C.	125° C.	25	1	24	—	—	4.16	Lot #2	1/4"	6
17	800 D.C.	125° C.	25	0	25	—	—	32.	Lot #2	1/4"	4
18	1000 D.C.	125° C.	25	0	25	—	—	80.	Lot #2	1/4"	4
22	85° C.	85° C.	25	2	23	—	—	7.7	Lot #2	1/4"	1
23	1200 D.C.	85° C.	25	1	24	—	—	7.15	Lot #2	1/4"	1
24	1400 D.C.	85° C.	25	2	23	—	—	8.7	Lot #2	1/4"	0
25	1600 D.C.	85° C.	25	4	21	1	—	4.8	Lot #2	1/4"	4
26	1800 D.C.	85° C.	25	4	21	—	—	19.0	Lot #2	1/4"	2
27	2000 D.C.	85° C.	25	5	20	—	—	30.	Lot #2	1/4"	0
28	2100 D.C.	85° C.	25	2	23	2	—	43.5	Lot #2	1/4"	0
29	2200 D.C.	85° C.	25	4	21	1	—	62.0	Lot #2	1/4"	0
30	2300 D.C.	85° C.	25	4	21	3	—	52.5	Lot #2	1/4"	3
31	1900 D.C.	85° C.	25	1	24	2	—	29.2	Lot #2	1/4"	0
32	2000 D.C.	85° C.	25	4	21	3	—	19.	Lot #1	1/8"	1
33	2100 D.C.	85° C.	25	6	19	1	—	31.6	Lot #1	1/8"	0
34	1800 D.C.	85° C.	25	0	25	1	—	40.	Lot #2	1/4"	1
35	1900 D.C.	85° C.	25	0	25	1	—	24.	Lot #2	1/4"	1
36	2000 D.C.	85° C.	25	2	23	2	—	26.	Lot #2	1/4"	1
37	1900 D.C.	85° C.	25	1	24	4	—	20.85	Lot #2	1/4"	1
38	2000 D.C.	85° C.	25	1	24	3	—	29.	Lot #2	1/4"	0
39	2100 D.C.	85° C.	25	2	23	2	—	26.	Lot #2	1/4"	0
40	2000 D.C.	85° C.	23	3	20	1	—	0	Lot #2	1/4"	0
41	2000 D.C.	85° C.	25	2	23	0	—	100.	Lot #2	1/4"	0

1 Mfd. 2 x .25 Mil. V

Order #	Voltage	Temp.	Number of Units	Failed before Life	Started on Life	Mechanical Failures	Mylar Failures	% Mylar Failures	Lot Material	Margin	Number Open After Life
19	800 V.C.	85° C.	12	4	8	0	1	12.5%	Lot #2	1/8"	0
20	1000 V.C.	85° C.	12	4	8	1	4	50%	Lot #2	1/8"	0
21	1200 V.C.	85° C.	12	10	2	0	1	50%	Lot #2	1/8"	0
22	700 V.C.	85° C.	25	2	23	0	2	8.7%	Lot #2	3/16"	0
23	800 V.C.	85° C.	25	1	24	0	1	4.2%	Lot #2	3/16"	0
24	900 V.C.	85° C.	25	1	24	0	2	8.3%	Lot #2	3/16"	0
25	1000 V.C.	85° C.	25	2	23	0	1	4.3%	Lot #2	3/16"	0
26	1100 V.C.	85° C.	25	4	21	1	0	0%	Lot #2	3/16"	0
27	1200 V.C.	85° C.	25	3	22	1	1	4.5%	Lot #2	3/16"	1
28	1300 V.C.	85° C.	25	3	22	0	5	22.5%	Lot #2	3/16"	1
29	1400 V.C.	85° C.	25	7	18	1	4	22.3%	Lot #2	3/16"	0
30	1500 V.C.	85° C.	25	0	25	1	10	40%	Lot #2	3/16"	0
31	1600 V.C.	85° C.	25	5	20	0	4	20%	Lot #2	3/16"	1
32	1700 V.C.	85° C.	25	3	22	1	16	73%	Lot #2	3/16"	0
33	1800 V.C.	85° C.	25	5	20	2	14	70%	Lot #2	3/16"	0

LIFE TEST RECORD

UNITS 25 mfd - 2.5 mil capacitor 1" with 1/16" terminals LOT NO. NOBsr M-3
 SPECIFICATION FOR WHOM Eng Dept CONTRACT NO. NOBsr-55
 HOURS ON TEST 72 TEMPERATURE 85°C VOLTAGE 125V
 Date started 1156 Date finished 1156 Clock # 1 Tray # 1
 Total Hours 271

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1st. 25 mfd capacitor																									
2nd. 25 mfd capacitor																									
3rd. 25 mfd capacitor																									
4th. 25 mfd capacitor																									
5th. 25 mfd capacitor																									
6th. 25 mfd capacitor																									
7th. 25 mfd capacitor																									
8th. 25 mfd capacitor																									
9th. 25 mfd capacitor																									
10th. 25 mfd capacitor																									
11th. 25 mfd capacitor																									
12th. 25 mfd capacitor																									
13th. 25 mfd capacitor																									
14th. 25 mfd capacitor																									
15th. 25 mfd capacitor																									
16th. 25 mfd capacitor																									
17th. 25 mfd capacitor																									
18th. 25 mfd capacitor																									
19th. 25 mfd capacitor																									
20th. 25 mfd capacitor																									
21th. 25 mfd capacitor																									
22th. 25 mfd capacitor																									
23th. 25 mfd capacitor																									
24th. 25 mfd capacitor																									
25th. 25 mfd capacitor																									

LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
SWUNT R.M. N																									
90K 16K 17K 60K 16K 100K 80K 90K 80K 70K 75K 80K																									
CAPACITANCE																									
MID. 12.102M																									
POWER FACTOR																									
1.24 1.06 - 1.81 1.48 - 1.14 2.69 7.64																									



For _____ Spec. _____ Move Ticket _____ Date _____ 194_____

Assigned _____ JAN No. _____ Date Completed _____ 194 _____

SYMBOLS: T—TESTED P—PASSED F—FAILED S—SHORT T—TERMINAL C—CONTAINER R—RESISTANCE V—VOLTS

SAMPLE NO.	1	2	3	4	5	6	7	8	9	10	11	12
Breakdowns during life Test strong enough to trip relay. (Relay current 4-5 ma) Many breakdowns at start of test before all units were cured.												
Breakdowns	Clock		Elapsed Time									
	11 58											
1	11 63		5.0		hrs							
1	11 63.5		5.5		"							
1	11 65.3		7.3		"							
1	11 69.5		11.5		"							
1	11 69.9		11.9		"							
1	11 70.9		12.9		"							
1	11 77.6		19.6		"							
1	11 85.5		27.5		"							
1	11 94.9		36.9		"							
1	12 75.1		117.1		"							
1	13 43.9		185.9		"							
0	14 57		279.0		Removed from Test							

Notes:

This is not a count of the actual breakdowns but of the interruptions. At each interruption there are usually several breakdowns before the units heal themselves.

LOT NO. NOB, M = 4.

UNITS	MOULD CODE	CONTRACT NO.	DATE
25	0.5	110	11/10

SPECIFICATION	FOR BUREAU	TEMPERATURE	VOLTAGE	1500
		200		

HOURS ON TEST	72	Date finished	Clock #	2	1654	Total Hours	205

Date started	Clock	Tray	Time
	7-08	52	

[illegible][illegible]

LIFE TEST
SAMPLES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
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92	
93	
94	
95	
96	
97	
98	
99	
100	

[illegible]

24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1

WOODWARD, MARG

TORE DEUTSCHMANN CORPORATION

Page 31
C.L. 1002

108E

DATA SHEET

Type of Units • 25 4fd. - 0.5 mil nylon 1 1/16 755212

File No. Nobsr 4

For Spec. Page I

Move Ticket

Date

194

Assigned

JAN No.

Date Completed

194

SYMBOLS:

T-TESTED

P-PASSED

F-FAILED

S-SHORT

T-TERMINAL

C-CONTAINER

R-RESISTANCE

V-VOLTS

SAMPLE NO.

1

2

3

4

5

6

7

8

9

10

11

12

Breakdowns during life test strong enough to trip relay (Relay current 4-5 amp)
 Many breakdowns at start of test before all units were cured.

Breakdowns

Clock

Elapsed Time

14 01

1

14 01.25

.25

hrs. (unit removed to test)

1

14 03.5

2.5

"

2

14 04

3.0

"

1

14 05.5

4.5

"

2

14 06

5.0

"

1

14 06.5

5.5

"

1

14 07

6.0

"

1

14 12

11.0

"

1

14 20

14.0

"

1

14 23

22.0

"

1

14 24

23.0

"

1

14 40.5

34.5

"

1

14 49

42.0

"

1

14 56

45.0

"

1

14 55.5

44.5

"

1

15 31

130.0

"

1

15 32

131.0

"

1

15 38

137.0

"

TOBE

DATA SHEET

Type of Units - 25 ysd. - 0.5 mil nylon 1 1/4" margin Modified

File No. N0651 "4"

For

Spec.

Page 15

Move Ticket

Date

194...

Assigned

JAN No.

Date Completed

194...

SYMBOLS: T-TESTED P-PASSED F-FAILED S-SHORT I-TERMINAL C-CONTAINER R-RESISTANCE V-VOLTS

SAMPLE NO.

1

2

3

4

5

6

7

8

9

10

11

12

continued

Breakdowns

Clock

Elapsed Time

1

15.40

139 hrs

1

15.63

159 "

1

15.45.5

194.5 "

1

15.47

196 "

1

16.33

232 "

1

16.52

251 "

0

Removed from Test

251 "

Note:

This is not a count of the actual breakdowns but of the interruptions. At each interruption there are usually several breakdowns before the units heal themselves.

N

UNITS	DESCRIPTION	FOR WHOM	CONTRACT NO.	LOT NO.
25	Micronized Nylon Capacitors - .25Wd. - 0.5 MIL Nylon - 1/2 inch diameter	V. M. Smith	44-570	17-5

SPECIFICATION

HOURS ON TEST		TEMPERATURE		VOLTAGE	
Date started	1-17-37	Date finished	1-17-37	Clock	1-17-37
				Tray	
					Total Hours

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt P. mfgs. 2 1/2 100K	100K	150	100K	150	100K	100K	250	100K	100K	20K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K					
20 725 V 400W																									
Cop in mid - 1000	25	24	25	25	25	25	25	25	24	24	24	24	24	24	24	24	24	24	24	24					
Power factor - %	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99					

Number of Temporary Breakdowns vs. Time with 20 .25 Mfd. Metallized Mylar Units

Test No. 5 - Wbsr. 5/200	Clock Reading	Elapsed Time
	#1 1437	Start of Test
1	1509	72 Hours
1	1582	145 "
22	1585	148 "
1	1587	150 "
2	1690	253 "
1	1691	254 "
1	1712	275 "
1	1784	347 "
	1788	351 "

Test concluded

$$\frac{30}{5} \times \frac{250}{351} = 4.2 \text{ Temp. oven breakdowns/Mfd.}$$

for 250 hour life test
at 85° C. at 800 V.D.C.

Temporary Breakdowns during Life Test strong enough to trip relays.

(Relay current = 4 - 5 milliamperes)

LIFE TEST RECORD

20 UNITS McTallised Mylar Capacitors - 2544d. - 0.5 MLC Mylar - 1" W. Th. Margin LOT NO. 140000 M⁶
 SPECIFICATION FOR WHOM V. W. WOOD TH CONTRACT NO. 57200

HOURS ON TEST 250 TEMPERATURE 85°C VOLTAGE 12.5 VDC
 Date started 2-16-54 Date finished 15 Dec 1959 Clock # 2 - 1972 Total Hours 212
 15 NOV 1152

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1000V PK																									
Short to ground																									
Cap in MFD - 2544d																									
Power Factor																									

LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Short to ground - 1000V PK																									
Cap in MFD - 2544d																									
Power Factor - 90.52.7																									

Number of Temporary Breakdowns vs time with 20 .25 Mfd. Metallized Mylar Units

Test No. 6 - NObsr 57200

Temperature 85° C.

Voltage 1000 V.D.C.

<u>Number of Breakdowns</u>	<u>Clock Reading</u>	<u>Elapsed Time</u>
	#2 1654	Start of Test
20	1656	2 Hours
1	1657	3 "
1	1667	6 "
1	1664	10 "
8	1673	19 "
5	1677	23 "
6	1679	23 "
1	1680	28 "
16	1684	30 "
1	1685	31 "
1	1688	34 "
2	1688.5	34.5 "
1	1652	38 "
1	1700	46 "
1	1715	61 "
2	1720	66 "
9	1723	69 "
4	1724	70 "
1	1728	74 "
1	1780	76 "
1	1735	81 "
1	1744	90 "
4	1762	98 "
1	1793	139 "
1	1813	159 "
5	1816	162 "
4	1817	163 "
1	1820	166 "
2	1830	176 "
1	1834	180 "
1	1848	194 "
1	1853	199 "
1	1854	200 "
2	1858	204 "
3	1858.5	204.5 "

Test No. 6 - NUBer 57200 (Continued)

<u>Number of Breakdowns</u>	<u>Clock Reading</u>	<u>Elapsed Time</u>
2	1860.3	206.5 Hours
8	1861	207 "
1	1862	208 "
2	1862.3	208.5 "
6	1863	209 "
1	1863.5	209.5 "
4	1892	238 "
1	1897	243 "
—	1972	918 "

Test Concluded

$$\frac{147}{5} \times \frac{262}{318} = 23 \text{ temporary breakdowns/Mfd.}$$

for 250 hour Life Test at 85° C. and 1000 V.D.C.

Temporary breakdowns during Life Test strong enough to trip relays.

(Relay current 4 - 5 milliamperes)

Number of temporary breakdowns vs. Time 20 .25 Mfd. Metallized Mylar Units

Test No. 7 - N0bsr 57200

Temperature 85° C.

Voltage 1200 V.D.C.

Number of breakdowns

Clock reading

Elapsed Time

#3 625

Start of Test

53

627

2 Hours

21

627.5

2.5 "

4

628

3 "

3

628.5

3.5 "

2

629.5

4.5 "

7

630

5 "

1

630.5

5.5 "

6

632

7 "

2

639

8 "

6

635

10 "

2

636

11 "

1

639.5

14.5 "

3

642

17 "

11

642.5

17.5 "

1

643

18 "

2

644.5

19.5 "

1

646.5

21.5 "

44

648.5

23.5 "

7

653

28 "

3

655

30 "

1

659

34 "

3

660

35 "

1

663

36 "

5

668.5

36.5 "

22

671

46 "

1

671.5

46.5 "

3

673

48

Test No. 7 - NObsr 57200

(Continued)

Number of Breakdowns	Clock Reading	Elapsed Time
1	677	52 Hours
1	678	53 "
1	679	54 "
4	707	82 "
22	717	92 "
3	717.5	92.5 "
1	718	93 "
3	719	94 "
1	727	102 "
1	730	105 "
1	734	109 "
1	737.5	112.5 "
1	740	115 "
1	746	121 "
1	758	133 "
1	761	136 "
1	787	162 "
1	810	185 "
3	844	219 "
--	875	250 "

Total 265

Test Concluded

$\frac{265}{5} = 53$ temporary breakdowns/mfd.

for 250 hour Life Test at 85° C. and 1200 v.D.C.

Temporary breakdowns during Life Test strong enough to trip relays.

(Relay current = 4 - 5 milliamperes)

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