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RELIABLE, LOW COST, STABLE RESISTORS

GENERAL PURPOSE

REPORT #10

CONTRACT NO.: DA-36-039-AMC-02202(E)

DA TASK NO.: 1P6 22001-A 057 01

ORDER NO.: 5465-PM-63-91

Tenth Quarterly Progress Report 1 August 1965 to 31 October 1965

Prepared for the U.S. Army Electronics Command

Fort Monmouth, New Jersey

by

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RELIABLE, LOW COST, STABLE RESISTORS

GENERAL PURPOSE

REPORT #10

Contract No.:	DA-36-039-AMC-02202 (E)
Applicable Specifications:	SCL-2101P 18 February 1963 "Technical Reports" Technical Guidelines, 7 February, 1964 Reliable, Low Cost, Stable Resistor MIL-R-11/8, 17 May 1963
Order No.:	5465-PM-63-91
Tenth Quarterly Progress Report	1 August 1965 to 31 October 1965
Objective:	Reliability Evaluation and Improvement of Stable, Low Cost, General Purpose Resistors.
Report Prepared At:	IRC 401 North Broad Street Philadelphia, Pennsylvania

Written By:

Sylvester J. Mattie
Product Engineer

Approved By:

James E. VerHoef
Senior Liaison Engineer

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PURPOSE

For many years, the "workhorse" among electronic components has been the general purpose carbon composition resistor. The quality, reliability, and stability of this component has been improving for many, many years; this has been reflected in the increasing tightness of the requirements for its performance, as spelled out in subsequent revisions of its applicable specification, MIL-R-11. The resistor is inexpensive, is readily available, and its application reasonably well understood by circuit designers.

With the ever increasing complexity of military electronic equipments, and with the increasing demands for products that perform under higher environmental stresses, an increasing need is developing for a component with performance characteristics superior to the familiar composition resistor. In recognition of this fact, International Resistance Company has carried on development work on two new resistive systems. One of these was based on conductive ceramic in bulk form; the other makes use of a class of resistive materials known as glazes or cermets, utilized in the form of a film or coating on a substrate.

These two units were evaluated as general purpose resistors meeting the stated needs. The evaluation indicated that a resistor combining the glaze resistive film with the assembly methods of the bulk unit had an excellent chance of meeting these requirements. Such a resistor has been developed. It is intended that it be evaluated against the specified needs and that further development work be done as required to assure the availability of such a unit.

ABSTRACT

MIL-R-11 70 °C load life tests have been completed to 1000 hours on the 100Ω group. The completed results, on all pertinent resistance values, demonstrates conformance to the MIL-R-11 requirements. The contract requirements of 5% maximum resistance change on the Mil moisture resistance and Resistance-Temperature characteristic of less than 500ppm/°C have also been met.

The moisture load matrix has been completed through 2000 hours on the 100Ω and 100KΩ groups. These results definitely indicate smaller resistance changes with increasing load, especially in the 100KΩ group.

The temperature load matrix tests have completed 2000 hours on the 100Ω group and 3000 hours on the 100KΩ group. The 10Ω, 1KΩ, 10KΩ, and 39KΩ groups have completed 6000 hours of testing. The present calculated failure rate, which includes the two early (50 hours of test) failures on the 100KΩ group, is 0.10%/1000 hours at a confidence level of 60%. on units tested at 85 °C ambient with 1/4 watt load. The calculated failure rate without the two early failures is no more than 0.03%/1000 hours at a confidence level of 60%. The average resistance change for the 100Ω and 100KΩ groups after 2000 hours at 85 °C ambient with 1/4 watt load is less than 0.1%; and less than 0.4% on the 10Ω, 1KΩ, 10KΩ, and 39KΩ groups.

BACKGROUND

The Rv resistor consisted of a completely inorganic volume resistive element with metallized termination and a molded jacket. It was fabricated in resistance values from 2.7Ω to 30,000Ω in the form factor of the RC-07 style of MIL-R-11E. The resistor demonstrated excessive resistance changes when subjected to high humidity and D.C. load and was not capable of meeting the required .05%/°C resistance-temperature characteristic. Equipment capable of low cost production of this unit was designed.

The L07 resistor utilizes a metal glaze fired on a ceramic substrate. Silver terminations are fired on to the ends, a ground helix in the metal glaze is used to determine resistance value and cap leads are pressed on the ends of the body. A filled modified silicone coating material is used to provide electrical insulation and mechanical protection. The use of cap leads and (to a lesser extent) precious metal glaze, coupled with repeated price reductions in the composition resistor market, have made it impossible for this resistor to be considered as being in the same price range as the MIL-R-11e composition resistors. In addition, the general construction, and particularly the use of cap leads, makes any substantial size reduction in this unit (as specified in the Technical Guidelines) for lower power use extremely unlikely.

Because of the specific problems encountered in the Rv and L07 units a third approach termed the Rg has been implemented. This consists of a metal glaze fired on a ceramic substrate and toleranced by helixing as in the L07 process. The termination and molded jacket are those used on the Rv. The low cost processes and automated equipment of the Rv are used throughout the Rg process with the exception of the glaze application firing and helixing steps which utilize automated L07 type equipment.

This approach is expected to result in a resistor with the excellent performance of the L07 combined with the price and size reduction potential of the Rv.

FACTUAL DATA

I. Temperature Load Matrix

The current failure rate curve is shown in Figure I. As can be seen, no failures have occurred since the last report indicating a failure rate of not more than 0.1%/1000 hours at a confidence level of 60%. As stated before tests were run to determine the possibility of the two failures reported in Report #9 were mechanical failures. The failure rate without these two failures is shown on the curve with a broken line. This curve indicates a failure rate of no more than 0.03%/1000 hours at a confidence level of 60%.

Up to 6000 test hours have now elapsed for the resistance values (10Ω, 1KΩ, 10KΩ, & 39KΩ) 2000 hours for 100Ω and 3000 hours for 100KΩ in the temperature load matrix. An up-to-date summary of test results are shown in Tables I and II.

It was originally planned that 21 of the 30 cells in the load life matrix would run for only 2000 hours and that the balance would be run for the full 10,000 hours. The resistance changes and the incidence of failure after 2,000 hours under stresses as high as 150°C, 3/4 watt, were so small as to prevent derivation of a mathematical model of Rg performance. For this reason all cells were continued to the 5000 hour point. This has been reached for the 10Ω, 1K, 10K and 39K groups and these have been removed. Failures in these groups will be analyzed in an effort to determine failure mode.

Work has started on the development of a degradation model for resistance values, 1KΩ & 10KΩ. A computer program was written to retrieve test data from a history tape and perform a linear regression of %ΔR vs. time for each block of the test matrix. The program has been run successfully and up to the writing of this report, the slopes, (rate of resistance change with respect to time) were being evaluated graphically for possible fit to the Arrhenius or Eyring rate of reaction models. If the graphical analysis yields reasonably good results, the data will be evaluated more accurately with a least square multiple regression program. The only thing that can be reported at this time for resistance values, 1KΩ, & 10KΩ is that % resistances for practically every stress condition has a highly significant linear relationship with time. More detailed results should be available for the next quarterly report.

Frequency plots of % Δ R readings at indicated 1000 hour intervals for 85°C 1/4 watt stress conditions are shown in Figures 2 through 9. The 100Ω & 100KΩ values, Figures 10 through 14 show very tight normal distributions and low average resistance changes. Resistance values, 10Ω, 10KΩ & 39KΩ have a few outliers, low average resistance changes and no failures, (greater than 5.0%). The 100KΩ value also has a number of outliers with two of them being failures. At 1000 hours, one resistor read -12.65% and at 2000 hours another resistor read -5.35%. At 3000 hours the -12.65% resistor recovered to -0.47%. These two failures were discussed under the failure rate progress section of the last Quarterly Report.

For an explanation of an interpretation of the values under calculations/ summary shown on each plot, refer to the previous Quarterly Report.

A total of 2, 580 resistors are included in the portion of the temperature load matrix which does not represent an overload to a rating of 1/4 watt at 85°C. Of these resistors, six have exhibited resistance changes greater than 5% and can therefore be considered performance failures. Of the six failures, four were early failures which occurred during the first 100 hours of load. The remaining two occurred under no load conditions. Experience on other resistors under high reliability specifications (such as MIL-R-55182) indicates that a burn in under load conditions is necessary to eliminate early failures. Thus resistors subject to the early failure mode may ultimately fail under no load conditions, but are not particularly likely to fail early in the test. In this context, the fact that the incidence of failure in the no load cells (2/900) is the same as the incidence of early failure (4/1860) in the load cells, suggests that the same weakness is involved in both.

The history gathered on the Rg 1/4 watt with reference to the STOL (short time overload) screen vs. the test data indicated that "sporty" test rejects could be eliminated by screening the units with an overload prior to testing. The standard MIL-R-11E STOL test was instituted as a production operation with good results. From time to time, as in the contract data, lot samples on test would yield "sporty" failures which could be traced to improper screening. These incidents were few, however. An initial evaluation was set up to again prove that the failures shown on the contract could be traced to possible insufficient screening. If this can be demonstrated, it would be possible to eliminate these early failures as process failures not a normal failure rate problem.

A lot of standard low metal content 100K Rg rods was processed through molding as per standard procedures except for STOL. These units were split into two groups. One group received the no STOL and one STOL one at a time with readings before and after STOL. Units which changed more than 2.5% were eliminated from the screened groups. It should be noted that there were (13) thirteen such rejects.

All units were placed on 85°C 1/4 watt load life for 48 hours. The results of the load life Δ R's were plotted and are shown of Figure #15 attached. As can be seen from these plots, the No STOL group has more "sports" than does the STOL group. In order to determine the significance of these two plots the data was given further analysis as below.

Figures #16 and #17 show the cumulative frequencies of the two distributions as plotted on Weibull Probability paper. Constants were added to the individual Δ R's in order to make all results positive. The reason for these plots is to find the cut-off point for the outliers or "sports". Had these been single distributions, the lines would be straight. The break-off points from the plots indicated (12) twelve "sports" for the No STOL group, against (3) for the STOL group. The probability of obtaining 12/230 vs. 3/300 in two samples that were known to have been randomly selected from the same population was calculated using the following formula:

$$P = \frac{A!\ B!\ R!\ (N-R)!}{a!\ b!\ (A-a)!\ (B-b)!\ N!}$$

Where A = Sample size of 1st sample = 230
B = " " " 2nd sample = 300
a = No. of outliers in 1st dample = 12
b = " " " " 2nd sample = 3
N = A + B = 530
! = Factorial
R = a + b = Total of outliers

The results of these calculations shows a low probability (on the order of .03) below the .05 significance level that the two samples are not significantly different. Therefore, it can be said that the two distributions are significantly different. It can therefore be assumed that proper screening will reduce early failures and for this reason failure rate calculations will continue to be made with and without early failures.

A screen test evaluation will be conducted using 510Ω and 150K resistors and the following screening conditions:

1. Control (no screening)
2. 2 1/2 times rated voltage for 5 seconds
3. 3 1/2 times rated voltage for 5 seconds
4. 2 1/2 times rated voltage for 60 seconds
5. 1/2 watt at 70°C for 8 hours

The resistors which remain within ±2% of their original resistance value will be submitted to 1/4 watt load for 96 hours at 85°C. Resistance readings will be made after 1, 2, 3, 4, 8, 24, 48 and 96 hours.

II. Step-Stress Test Matrix

The step-stress program as outlined in the last report has been completed. However, the data has not as yet been completely analyzed. There is, however, data completed on the temperature rise measurements. This is discussed below.

III. Temperature Rise Measurements

As is well known, a current flowing through a resistor will generate a temperature rise in the resistor and create a hot-spot. This temperature rise is a function of such things as the diameter and length of the resistor body, length and diameter of leads, dissipated power, ambient temperature, heat transfer and heat conduction coefficients. For the Rg resistor a mathematical expression of temperature rise as a function of power dissipation and load was developed from measurements taken on (2) resistors each from resistance values (10Ω, 100Ω, 1KΩ, 10KΩ, 39KΩ and 100KΩ) under loads (1/8, 1/4, 3/8, 1/2, 5/8, 3/4, and 1 watt) and ambient temperatures (70°C, 100°C, 125°C, and 150°C). These temperature rise (ΔT), measurements are listed in Figures #18 through #21.

Using graphical means, an expression of the following form was obtained.

$$\Delta T = L(85 - 0.18\ T) \qquad (1)$$

Where

ΔT = Temperature Rise in °C
L = Load in Watts
T = Ambient Temperature in °C

A plot of temperature rise curves for the various ambients are shown in Figure #22.

Dissipation constants, (D), in terms of milliwatts per degree C a measure of the power required to raise the resistor temperature 1°C can be calculated from the following derived equation (3).

$$D = \frac{L}{\Delta T} \qquad (2)$$

On substituting EQ (1) in (2) and multiplying by 1000 to obtain mw/°C, it follows,

$$D = \frac{1}{85 - 0.18T} \times 1000 \qquad (3)$$

Dissipation constants for each ambient are listed below:

Ambient	Dissipation Constant (mw/°C)
70 °C	13.81
100 °C	14.92
125 °C	16.00
150 °C	17.24

The difference in dissipation constants for the different ambients is attributed to a dependence of the heat transfer coefficients between the resistor, and its environment, upon the ambient temperature.

IV. Physics of Resistance Change

The mechanism of resistance change for the Rg resistor under thermal stress was explained in apreviou= report as due to a combination annealing and oxidation process. The initial negative drifts observed for different temperature load stresses was attributed an annealing process. The shift from negative

to positive resistance changes was attributed to an oxidation mechanism, presumeably of the metal particles in the glaze.

To substantiate the annealing and oxidation mechanisms, the following experiment was performed:

(a). (60) 10KΩ resistors were randomly selected from a homogeneous lot and divided into two randomly selected groups.

(b). One group was placed with no load in an air atmosphere oven set at 175°C. The other group was placed with no load in an oven set at 175°C wherein argon was slowly forced through.

(c). Resistance measurements were taken at selected intervals and recorded.

(d). After the end of 2000 hours, the resistors in argon were transferred to the oven with the air atmosphere.

The results from the experiment are now complete and indirectly support the proposed mechanism for resistance change. Shown in Figures #23 and #24 are distribution plots of $\%\Delta R$'s for the two groups. The group in air shows a negative drift followed by a positive drift to an average ΔR of +1.37% after 2000 hours. The group in argon shows a gradual negative drift to -1.58% after 2000 hours. These results are interpreted as follows:

> The units in argon underwent an annealing process only since they were not exposed to oxygen from the air, whereas the resistors in air underwent both an annealing and oxidation process.

After being placed in air, the resistors initially in argon started to drift positive to an average of +0.93% after 1800 hours as plotted in Figure #24. This again indicates an oxidation process taking place. The oxidation process as compared to annealing appears to be influenced more by production variations of glaze thickness, firing conditions, substrate differences and etc. This is evidenced by the larger $\%\Delta R$ dispersions shown by the resistors while in air.

The same experiment is being replicated using 1KΩ resistors. The data collected so far indicates a similar pattern taking place.

V. MIL-R-11 Tests

The MIL-R-11 data summary Figures #25 and # 26 is now completed on the six pertinent resistance values. The additional data to be reported is the completion of 1000 hours of 70 °C Load Life tests on the 100Ω group which shows a maximum change of -0.28%. Completion of the MIL-R-11E testing has demonstrated the capability of the Rg-1/4 resistor over the resistance range values from 10Ω to 100KΩ. The Rg-1/4 has also successfully demonstrated its capability to be well within the requirements of 0.05%/°C temperature characteristic and ±5% maximum resistance change on moisture resistance and load life test, as outlined in the Technical Guidelines.

VI. Moisture Load Matrix Tests

The moisture load matrix test is run at 98% - 100% relative humidity at 55°C at no load and with loads of 1/20 watt, 1/8 watt, and 1/4 watt, continuously applied. The test is intended to identify any conditions of moisture load stress which induce excessive resistance changes.

The moisture - load matrix has completed 2000 hours on the 100Ω and 100KΩ groups. A summary of the data is included in Figures #27 through #32.

The following is a discussion of the results for the 100Ω and 100KΩ groups. A resistance change of over 10% has been defined as a failure for this matrix.

1. No Load

100Ω group: No failures, maximum change ±2.63%

100K group: 7 failures, maximum change -16.49%

2. 1/20 Watt Load

100Ω group: No failures, maximum change +0.29%

100KΩ group: No failures, maximum change +6.82%

3. 1/8 Watt Load

100Ω group: No failures, maximum change 0.14%

100KΩ group: No failures, maximum change 0.91%

4. 1/4 Watt Load

100Ω group: No failures, maximum change +0.77%
100KΩ group: No failures, maximum change +0.82%

The moisture - no load block of this matrix has been identified for these resistance values as for those previously tested, to be the most severe condition. The failures resulting from these tests will be analyzed in an attempt to identify the mechanism of failure. However, a test condition of 98 - 100% R.H. at 75°C as used in the accelerated moisture tests may be more useful for an accelerated test of moisture resistance capability.

VII. Experimental Activities

The resistors from the original runs, made to achieve improved temperature coefficient, were submitted for full MIL-R-11 tests. The results of these tests are summarized in Figure #33. The 250Ω resistors were from the high metal content glaze; 1.5K from medium metal content glaze and 100KΩ from low metal content glaze. A complete conformance to MIL-R-11 is demonstrated by this data. In addition, the temperature coefficient are all within 200 ppm and the moisture resistance and load life resistance changes are well within the 5% maximum contract requirements.

The temperature coefficient results on the repeatability runs are plotted on Figure #34.

CONCLUSIONS

The Rg - 1/4 watt has demonstrated a complete conformance to the requirements of MIL-R-11E. In addition, this resistor has met the specific requirements of; resistance-temperature characteristic (less than 0.05%/°C), moisture resistance and load life (less than 5%), as outlined in the Technical Guidelines.

The calculated failure rate, on resistors tested at 85°C 1/4 watt load, 0.1%/ 1000 hours could be reduced to 0.03%/ 1000 hours by elimination of early failures. Early failures (within the first 100 hours after application of voltage) are the only type which have been observed in the 16 load cells (out of 25) in the matrix, which do not constitute severe overloads. In these cells (limited by the conditions 25°C at 3/4 watt, 70°C at 1/2 watt, 85°C at 1/2 watt, 125°C at 1/4 watt and 150°C at 1/8 watt) seven early failures have been observed during accumulation of 13, 000, 000 unit hours. Tighter controls on the production screen testing (STOL) indicate these early failures may be eliminated.

The excellent results in the 1/4 watt at 125°C load block of the temperature load matrix, demonstrate the capability of the Rg-1/4 resistor to operate at ambients in excess of 85°C.

PROGRAM FOR NEXT QUARTER

1. Continue failure rate curve for groups tested at 85°C ambient with 1/4 watt load.

2. Analysis of data from the step-stress test program, which consisted of applying loads in 1/8 watt steps from 1/8 watt to 1 watt at 70°C, 100°C, 125°C, and 150°C will be initiated.

3. Continue performing preliminary regression of $\%\Delta R$ vs. time for the 85°C 1/4 watt block of temperature load matrix.

4. Continue mechanism of failure experiment on 1KΩ resistors, comparing performance in argon vs. air atmosphere.

5. Continue screen test evaluations.

PERSONNEL

Department		Hours
Rg Assembly		182.5
R&D / Engineering		1425.0
J. Brzeczek	155.5	
M. Dixon	244.5	
J. Forman	173.5	
W. Hawk	266.5	
P. Lowenstein	82.5	
C. Mabie	22.5	
S. Mattie	132.0	
J. Saboe	67.5	
N. Thelin	37.5	
J. Troendle	228.0	
R. Vander Harr	15.0	
Environmental Test Laboratory		651.3
	TOTAL	2258.8

The above represents time spent on the contract during the period 1 August 1965 through 31 October 1965.

APPENDIX

Table I (30 pages)	Temperature Load Matrix Summary (Original Submission)
Table II (35 pages)	Temperature Load Matrix Summary (Resubmitted 100Ω and 100KΩ)
Figure 1	Failure Rate Curve
Figures 2 through 14	Frequency Distribution - 1/4 Watt 85°C Load Life
Figure 15	Load Life ΔR - STOL Screen Test
Figures 16 and 17	Cumulative Frequencies Distribution - Screen Test vs. Load Life
Figures 18 through 21	Temperature Rise vs. Load in Various Ambients
Figure 22	Temperature Rise Curves
Figures 23 and 24	Frequency Distributions - Annealing vs. Oxidation Experiment
Figures 25 and 26	MIL-R-11-E Data Summary
Figures 27 through 32	Moisture Load Matrix Summary
Figure 33	MIL-R-11 Performance Summary Improved T C Runs'
Figure 34	Temperature Coefficient Repeatability Runs

TABLE I TEMPERATURE LOAD - MATRIX

TEST 25°C - No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	950	1000	2000	3000	4000	5000
10Ω	Avg.	-0.033	-0.047	-0.026	0.037	-0.010	-0.007	0.179	-0.340	-0.328	-0.013
	Max	0.200	0.100	0.100	0.300	0.300	0.200	1.314	0.100	0.100	1.021
	Min	-0.496	-0.397	-0.397	-0.099	-0.421	-0.526	-0.526	-0.900	-0.900	-0.695
	Sigma	0.139	0.117	0.114	0.098	0.150	0.139	0.365	0.265	0.259	0.335
	K-1	-1.280	-1.240	-1.540	0.696	-0.268	-1.520	1.320	-0.470	-0.374	0.625
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	1	1
1KΩ	Avg.	0.018	0.002	0.032	0.061	0.063	0.176	0.101	0.058	0.128	0.108
	Max	0.069	0.089	0.178	0.178	0.178	0.781	0.188	0.138	0.206	0.215
	Min	0.000	-0.098	-0.029	-0.019	-0.029	0.009	0.000	-0.029	-0.009	0.000
	Sigma	0.028	0.037	0.045	0.051	0.048	0.180	0.046	0.044	0.050	0.048
	K-1	1.730	-0.260	1.260	0.321	0.110	2.120	-0.064	0.185	-0.344	0.067
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	0.021	0.004	0.049	0.088	0.131	0.135	0.195	0.203	0.271	0.311
	Max	0.095	0.097	0.161	0.213	0.282	0.311	0.361	0.395	0.499	0.612
	Min	-0.097	-0.097	-0.097	-0.097	0.000	0.00	0.000	0.000	0.000	0.058
	Sigma	0.046	0.051	0.062	0.067	0.069	0.068	0.092	0.101	0.126	0.141
	K-1	-0.225	-0.220	0.573	-0.276	0.456	0.490	0.227	0.114	-0.007	0.156
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.013	0.013	0.045	0.080	0.104	0.109	0.156	0.197	0.229	0.317
	Max	0.077	0.077	0.176	0.233	0.285	0.285	0.337	0.448	0.532	0.757
	Min	-0.436	-0.025	-0.050	0.000	-0.076	0.000	0.038	0.025	0.083	-0.077
	Sigma	0.083	0.0193	0.044	0.054	0.070	0.068	0.070	0.109	0.118	0.186
	K-1	-0.043	1.140	0.733	0.920	0.289	0.682	0.675	0.847	0.966	0.522
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 25°C - 1/8 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.017	-0.010	0.007	0.036	0.030	0.033	0.091	0.047	0.104	0.207
	Max	0.000	0.200	0.101	0.101	0.101	0.101	0.202	0.202	0.303	0.401
	Min	-0.101	-0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
	Sigma	0.037	0.053	0.025	0.048	0.046	0.047	0.048	0.062	0.071	0.077
	K-1	-1.780	1.200	3.470	0.553	0.872	0.707	-0.309	0.971	1.080	0.749
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	-0.055	-0.038	-0.028	-0.026	0.031	0.032	0.097	0.059	0.144	Units
	Max	0.000	0.009	0.009	0.099	0.089	0.168	0.247	0.227	0.356	cancelled
	Min	-0.159	-0.079	-0.059	-0.019	-0.019	-0.029	0.029	-0.019	0.039	due
	Sigma	0.028	0.016	0.018	0.024	0.022	0.034	0.038	0.046	0.065	to
	K-1	-1.540	0.089	0.187	0.791	0.789	+1.820	2.100	1.380	1.100	overload
	N	30	30	30	30	30	30	30	30	30	
	Fails	0	0	0	0	0	0	0	0	0	
10KΩ	Avg.	0.003	0.024	0.059	0.099	-0.023	0.150	0.105	0.301	0.349	0.452
	Max	0.067	0.097	0.163	0.221	0.265	0.582	0.487	0.617	0.693	1.154
	Min	-0.047	-0.009	0.000	0.009	-0.214	0.000	-0.116	0.146	0.175	0.245
	Sigma	0.026	0.028	0.041	0.054	0.133	0.112	0.138	0.112	0.132	0.202
	K-1	0.112	1.260	0.633	0.434	0.512	2.140	0.428	0.925	0.821	1.680
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.006	-0.007	0.030	0.056	0.052	0.092	0.122	0.224	0.272	0.342
	Max	0.143	0.229	0.295	0.333	0.346	0.337	0.522	0.573	0.623	0.623
	Min	-0.395	-0.714	-0.688	-0.638	-0.612	-0.232	-0.435	-0.111	-0.048	-0.169
	Sigma	0.094	0.149	0.149	0.145	0.146	0.100	0.176	0.133	0.144	0.177
	K-1	-2.410	-3.370	-3.440	-3.330	-2.760	0.094	-0.422	0.082	0.339	-0.689
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE-LOAD MATRIX

TEST 25°C - 1/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.010	-0.010	0.003	0.080	0.073	0.046	0.103	0.097	0.133	0.241
	Max	0.099	0.099	0.101	0.202	0.499	0.202	0.404	0.404	0.506	0.708
	Min	-0.100	-0.101	-0.100	0.000	-0.100	0.000	0.000	0.000	0.000	0.100
	Sigma	0.039	0.039	0.041	0.056	0.099	0.056	0.083	0.088	0.105	0.118
	K-1	-0.850	-0.858	0.251	-0.089	2.340	0.708	1.150	1.280	1.260	1.830
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1kΩ	Avg.	-0.032	0.006	0.015	0.086	0.106	0.106	0.181	0.180	0.220	0.263
	Max	0.059	0.128	0.108	0.237	0.297	0.316	0.415	0.415	0.465	0.504
	Min	-0.079	-0.059	-0.049	0.000	0.039	0.019	0.089	0.069	0.089	0.128
	Sigma	0.025	0.036	0.028	0.049	0.053	0.061	0.072	0.082	0.090	0.093
	K-1	1.250	1.190	0.871	0.985	1.660	1.390	1.430	1.130	1.020	0.961
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	0.020	0.045	0.096	0.161	0.060	0.265	0.396	0.416	0.464	0.597
	Max	0.172	0.172	0.589	0.686	0.879	1.159	0.995	0.869	0.908	1.459
	Min	-0.107	0.000	0.000	0.019	-0.206	0.049	0.099	0.139	0.159	0.285
	Sigma	0.049	0.049	0.110	0.129	0.197	0.195	0.187	0.163	0.178	0.247
	K-1	0.933	1.840	3.040	2.330	2.340	3.140	1.120	0.781	0.626	1.670
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	0.003	-0.007	0.047	0.093	0.117	0.306	0.233	0.345	0.372	0.432
	Max	0.176	0.184	0.573	0.557	0.595	3.657	0.758	0.812	0.891	0.941
	Min	-0.191	-0.451	-0.071	-0.232	-0.186	0.012	0.033	0.109	0.073	-0.012
	Sigma	0.070	0.122	0.143	0.132	0.138	0.646	0.159	0.211	0.222	0.211
	K-1	-0.059	-1.540	1.020	1.160	1.180	4.630	1.610	1.120	1.140	0.594
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 25° C - 1/4 W — Fail. Limit ± 5.0%

RANGE		HOURS 6000									
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.	0.238									
	Max	0.511									
	Min	0.089									
1 MΩ	Sigma	0.103									
	K-1	1.020									
	N	30									
	Fails	0									
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE I TEMPERATURE - LOAD MATRIX

TEST 25°C - 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.030	-0.030	-0.000	0.043	0.070	-0.003	0.130	0.120	0.164	0.244
	Max	0.000	0.000	0.100	0.301	1.017	0.402	0.603	0.703	0.804	0.904
	Min	-0.103	-0.101	-0.101	-0.101	-0.101	-1.003	0.099	0.00	0.000	0.100
	Sigma	0.046	0.046	0.045	0.072	0.196	0.204	0.101	0.122	0.136	0.141
	K-1	-0.873	-0.872	-0.014	1.320	3.820	-3.590	3.310	3.450	3.340	3.290
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	-0.043	-0.005	0.035	0.143	0.132	0.163	0.220	0.197	0.256	0.305
	Max	0.019	0.099	0.148	0.247	0.287	0.376	0.485	0.564	0.653	0.732
	Min	-0.079	-0.039	-0.009	0.089	0.069	0.099	0.149	0.099	0.149	0.199
	Sigma	0.022	0.028	0.038	0.039	0.050	0.061	0.073	0.097	0.101	0.106
	K-1	0.862	1.610	1.130	1.080	1.400	1.870	1.920	2.120	2.240	2.370
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	0.571	0.720	2.450	2.850	3.270	8.760	7.970	0.797	0.847	1.000
	Max	9.762	12.51	61.10	70.89	86.84	243.8	219.9	100.00	7.313	7.768
	Min	-0.194	-0.116	-0.069	0.000	-0.199	0.097	-0.197	0.157	0.197	0.291
	Sigma	2.080	2.510	10.900	12.600	15.500	43.600	39.300	1.370	1.370	1.320
	K-1	3.540	3.870	5.090	5.130	5.140	5.190	5.180	3.890	3.890	4.040
	N	30	30	30	30	30	30	30	30	30	30
	Fails	2	2	2	2	2	2	2	2	2	2
39KΩ	Avg.	-0.026	0.013	0.096	0.190	0.206	0.242	0.479	0.603	0.729	0.869
	Max	0.412	0.464	0.962	0.985	1.444	1.573	1.653	1.740	1.917	2.188
	Min	-0.298	-0.200	-0.224	-0.127	-0.076	-0.017	-0.025	0.127	0.204	0.281
	Sigma	0.148	0.145	0.207	0.208	0.266	0.412	0.350	0.337	0.402	0.446
	K-1	0.683	0.836	2.38	1.880	3.330	-0.262	1.680	1.460	1.320	1.330
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 25°C - 1/2 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.050	-0.057	-0.027	0.049	0.059	0.053	0.120	0.143	0.273	0.407
	Max	0.099	0.099	0.299	0.598	0.698	0.898	1.397	1.996	2.495	2.994
	Min	-0.101	-0.102	-0.101	-0.101	-0.101	-0.101	0.000	0.000	0.000	0.100
	Sigma	0.056	0.056	0.077	0.133	0.140	0.172	0.255	0.364	0.510	0.568
	K-1	0.556	0.830	2.210	2.790	3.240	3.990	4.140	4.380	3.450	3.600
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.002	0.040	0.080	0.167	0.161	0.170	0.248	0.267	0.321	0.360
	Max	0.187	0.217	0.286	0.435	0.445	0.435	0.543	0.573	0.632	0.682
	Min	-0.059	-0.029	-0.029	-0.069	-0.039	-0.039	0.089	0.059	0.119	0.139
	Sigma	0.047	0.053	0.067	0.074	0.084	0.08	0.092	0.105	0.106	0.114
	K-1	1.930	1.200	0.939	1.670	1.150	1.280	1.230	0.826	0.989	0.924
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	0.021	0.010	0.063	0.165	0.171	0.306	0.433	0.630	0.658	0.808
	Max	0.077	0.116	0.193	1.214	1.214	1.802	2.111	3.056	3.210	3.335
	Min	0.000	-0.144	0.000	0.000	-0.029	0.079	0.168	0.267	0.287	0.363
	Sigma	0.023	0.053	0.045	0.215	0.228	0.308	0.349	0.489	0.516	0.530
	K-1	1.060	0.119	0.921	3.780	3.100	3.740	3.630	3.990	3.980	3.870
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.098	-0.062	0.093	0.083	0.143	0.236	0.379	0.570	0.739	0.866
	Max	0.120	0.067	0.318	0.594	0.769	0.844	1.020	1.250	1.527	1.833
	Min	-0.694	-0.730	-0.086	-0.679	-0.555	-0.480	-0.176	-0.045	0.408	0.264
	Sigma	0.162	0.139	0.150	0.184	0.196	0.202	0.224	0.259	0.299	0.353
	K-1	-2.350	-3.590	-2.56	-1.590	-0.369	-0.513	0.727	0.632	1.270	1.070
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 25°C - 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.130	-0.113	-0.080	-0.053	-0.066	-0.060	0.066	0.069	0.122	0.279
	Max	0.000	0.000	0.000	0.100	0.198	0.198	0.992	1.388	1.686	1.984
	Min	-0.201	-0.201	-0.201	-0.200	-0.200	-0.203	-0.101	-0.203	-0.900	-0.161
	Sigma	0.053	0.042	0.048	0.071	0.069	0.088	0.199	0.281	0.379	0.371
	K-1	-0.164	-0.741	0.500	0.654	1.750	0.867	3.340	3.440	1.710	3.230
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.019	0.077	0.145	0.249	0.245	0.271	0.296	0.243	0.337	0.331
	Max	0.239	0.382	0.549	0.795	0.864	0.922	0.962	0.972	1.388	1.654
	Min	-0.208	-0.168	-0.208	-0.238	-0.297	-0.277	-0.327	-0.386	-0.327	-0.208
	Sigma	-.098	0.122	0.161	0.198	0.212	0.217	0.227	0.254	0.334	0.324
	K-1	0.068	0.236	0.335	0.197	0.398	0.437	0.354	0.787	1.400	2.230
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.154	-0.150	-0.142	-0.106	-0.215	-0.082	-0.203	0.232	0.473	0.871
	Max	0.671	0.421	0.508	0.671	0.350	0.539	1.630	1.210	1.506	3.[illegible]
	Min	-0.570	-0.580	-0.589	-0.508	-0.635	-0.635	-1.025	-0.693	-0.341	-0.[illegible]
	Sigma	0.200	0.180	0.220	0.258	0.251	0.296	0.530	0.588	0.674	0.767
	K-1	1.870	0.573	0.516	0.883	0.422	0.486	1.540	1.630	2.080	1.[illegible]
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	0.009	0.075	0.234	0.326	0.358	0.468	0.601	0.953	1.320	1.[illegible]
	Max	0.432	0.516	0.722	0.774	1.020	1.520	2.520	3.173	3.570	4.[illegible]
	Min	-0.446	-0.456	-0.272	-0.133	-0.133	-0.090	-0.090	-0.007	0.244	0.[illegible]
	Sigma	0.175	0.163	0.184	0.198	0.257	0.324	0.502	0.655	0.768	0.[illegible]
	K-1	-0.416	-0.454	0.310	0.463	0.546	1.180	1.920	1.600	1.560	1.[illegible]
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0

TABLE I. TEMPERATURE-LOAD MATRIX

TEST 70°C - No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	0.470	0.490	0.483	0.527	0.516	0.497	0.779	0.120	0.489	0.422
	Max	1.011	1.011	1.011	1.011	1.011	1.215	1.832	0.598	1.206	1.395
	Min	-0.099	-0.198	0.099	-0.099	0.099	0.000	0.100	-0.099	0.099	0.100
	Sigma	0.309	0.347	0.290	0.320	0.283	0.323	0.526	0.140	0.279	0.251
	K-1	-0.047	-0.262	0.011	-0.186	2.630	0.304	0.264	1.440	0.948	1.950
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.038	0.027	0.065	0.095	0.116	0.260	0.173	0.138	0.180	0.166
	Max	0.089	0.109	0.136	0.158	0.238	0.625	0.287	0.215	0.254	0.257
	Min	0.000	-0.019	0.009	0.049	0.039	0.069	0.099	0.079	0.109	0.079
	Sigma	0.025	0.033	0.031	0.031	0.040	0.186	0.046	0.036	0.039	0.048
	K-1	0.550	0.882	0.445	0.554	1.030	0.858	0.603	0.341	0.236	0.318
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.050	-0.071	0.147	0.236	0.281	0.356	0.509	0.538	0.654	0.716
	Max	0.529	0.686	0.980	1.960	1.960	2.029	2.176	2.274	2.333	2.392
	Min	-0.068	-0.048	0.009	-0.145	-0.048	0.056	0.107	0.138	0.168	0.202
	Sigma	0.097	0.120	0.164	0.336	0.332	0.329	0.342	0.360	0.360	0.364
	K-1	3.890	4.340	4.230	4.400	4.220	4.320	3.720	3.590	3.170	3.010
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	0.017	0.037	0.056	0.132	0.163	0.212	0.310	0.366	0.449	0.510
	Max	0.456	0.456	0.181	0.614	0.760	0.839	0.990	1.092	1.245	1.322
	Min	-0.355	-0.131	-0.030	0.048	-0.025	0.087	0.158	0.193	0.168	0.262
	Sigma	0.108	0.085	.0416	0.114	0.148	0.150	0.167	0.181	0.204	0.209
	K-1	0.825	3.660	0.608	3.190	2.980	3.120	2.180	2.730	2.290	2.270
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE- LOAD MATRIX

TEST 70°C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	7500	1000	2000	3000	4000	5000
10Ω	Avg.	0.037	-0.023	0.023	0.059	0.029	-0.006	0.180	0.239	0.306	0.272
	Max	0.513	0.000	0.398	0.298	0.398	0.398	0.604	0.697	0.991	0.991
	Min	-0.099	-0.099	-0.299	-0.099	-0.198	-0.198	-0.198	-0.299	-0.299	-0.299
	Sigma	0.123	0.042	0.114	0.132	0.093	0.114	0.185	0.215	0.287	0.288
	K-1	2.580	-1.260	0.594	2.530	1.300	0.909	0.568	0.238	0.588	0.806
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.016	0.019	0.062	0.054	0.128	0.097	0.182	0.272	0.289	0.219
	Max	0.058	0.078	0.126	0.136	0.301	0.223	0.304	0.418	0.486	0.372
	Min	-0.009	-0.019	0.009	0.000	-0.295	0.019	0.097	0.195	0.195	0.098
	Sigma	0.023	0.026	0.031	0.039	0.122	0.051	0.054	0.057	0.072	0.076
	K-1	0.885	0.550	0.183	0.345	-0.843	0.550	0.458	0.910	1.050	0.443
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.092	0.007	0.120	0.183	0.215	0.267	0.389	0.454	0.665	0.697
	Max	0.087	0.124	0.344	0.430	1.674	0.669	0.956	1.089	1.449	1.480
	Min	-0.135	-0.191	-0.133	-0047	0.000	0.000	0.153	0.172	-0.334	0.277
	Sigma	0.056	0.056	0.069	0.077	0.107	0.107	0.147	0.168	0.261	0.289
	K-1	0.411	-1.540	-0.577	0.199	4.220	1.270	1.940	1.690	2.070	1.280
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.064	-0.041	0.015	0.076	0.086	0.136	0.253	0.332	0.379	0.486
	Max	0.050	0.078	0.279	0.348	0.407	0.636	0.890	1.048	1.814	1.170
	Min	-0.280	-0.229	-0.216	-0.142	-0.051	-0.101	-0.050	-0.063	-0.050	0.081
	Sigma	0.079	0.069	0.079	0.094	0.105	0.126	0.176	0.200	0.340	0.218
	K-1	-1.050	-0.668	0.512	0.640	1.560	1.830	1.980	1.730	2.690	1.360
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	1 unstable	1 unstable

TABLE I · TEMPERATURE LOAD MATRIX

TEST 70°C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS 6000
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails	
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails	
	Avg.	0.685
	Max	1.481
	Min	0.334
10 KΩ	Sigma	0.228
	K-1	1.460
	N	30
	Fails	2
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails	

TABLE I TEMPERATURE - LOAD MATRIX

TEST 70°C - 1/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.016	0.003	0.000	-0.003	-0.003	-0.043	0.010	0.123	0.153	0.133
	Max	0.299	0.299	0.398	0.199	0.299	0.299	0.398	0.900	0.909	1.300
	Min	-0.495	-0.396	-0.495	-0.495	-0.495	-0.495	-0.495	-0.396	-0.098	-0.495
	Sigma	0.120	0.104	0.122	0.110	0.110	0.119	0.131	0.202	0.219	0.286
	K-1	-1.900	-0.744	-1.030	-2.690	-2.240	-1.050	-0.930	1.400	2.140	2.040
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.079	0.065	0.149	0.149	0.171	0.194	0.296	0.379	0.380	0.316
	Max	1.234	0.345	1.234	1.382	1.343	1.531	1.728	2.143	2.054	2.024
	Min	0.000	-0.048	0.000	-0.009	0.000	0.000	0.069	0.159	0.158	0.156
	Sigma	0.217	0.072	.210	0.238	0.229	0.260	0.279	0.338	0.323	0.329
	K-1	4.940	2.340	4.540	4.600	4.390	4.460	4.470	4.710	4.620	4.630
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.015	0.085	0.561	0.520	0.411	0.570	0.723	1.020	1.260	1.480
	Max	3.435	6.129	13.92	12.14	10.17	12.410	14.31	20.460	21.230	24.030
	Min	-0.474	-0.569	-0.341	-0.332	-0.284	-0.284	-0.246	-0.170	-0.507	0.000
	Sigma	0.649	1.120	2.480	2.160	1.810	2.200	2.520	3.610	3.810	4.200
	K-1	4.980	5.080	5.180	5.170	5.150	5.170	5.170	5.180	4.780	5.120
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	1	1	1	1	1	1	1	1	1
39KΩ	Avg.	-0.137	-0.117	-0.072	-0.072	0.175	0.196	0.315	0.471	0.648	0.701
	Max	0.228	0.228	0.339	0.738	0.989	1.090	1.517	1.894	3.778	2.321
	Min	-1.079	-1.004	-0.451	-0.502	-0.276	-0.276	-0.077	0.075	0.025	0.176
	Sigma	0.220	0.202	1.154	0.204	0.241	0.243	0.288	0.322	0.739	0.402
	K-1	-2.550	-2.620	-0.774	0.516	1.480	1.610	2.240	2.490	2.870	1.960
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0

ABLE I TEMPERATURE LOAD MATRIX

TEST 70 °C 3/8 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.039	-0.013	-0.029	-0.049	-0.052	-0.053	-0.046	0.037	0.037	0.017
	Max	0.399	0.399	0.399	0.300	0.398	0.200	0.400	0.501	0.601	0.601
	Min	-0.495	-0.297	-0.495	-0.495	-0.495	-0.398	-0.495	-0.396	-0.396	-0.199
	Sigma	0.169	0.102	0.136	0.177	0.155	0.130	0.204	0.171	0.195	0.174
	K-1	0.095	1.410	0.506	-0.619	-0.366	-1.070	-0.306	0.088	0.858	1.720
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1MΩ	Avg.	0.051	0.065	0.129	0.128	0.155	0.179	0.243	0.308	0.303	0.212
	Max	0.107	0.156	0.255	0.255	0.274	0.295	0.383	0.451	0.461	0.382
	Min	-0.048	-0.029	-0.009	-0.049	-0.049	-0.049	+0.049	0.068	0.078	0.000
	Sigma	-.040	0.045	0.061	0.069	0.077	0.076	0.078	0.082	0.079	0.084
	K-1	-0.744	-0.460	-0.312	-0.528	-0.643	-0.646	-0.181	-0.570	-0.540	-0.348
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10 MΩ	Avg.	-0.142	-0.125	0.127	0.143	0.085	0.165	0.235	0.363	0.179	0.608
	Max	0.096	0.184	0.336	0.403	0.384	0.509	0.768	0.903	1.155	1.344
	Min	-0.519	-0.519	-0.097	-0.113	-0.105	-0.077	-0.099	-0.009	-0.511	0.181
	Sigma	0.122	0.142	0.102	0.119	0.135	0.130	0.169	0.213	0.412	0.275
	K-1	-0.538	3.730	-0.099	-0.124	0.620	0.328	0.843	0.669	0.575	0.858
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39 MΩ	Avg.	-0.019	-0.081	.0855	0.092	0.171	0.179	0.266	0.331	0.367	0.552
	Max	0.050	0.100	0.301	0.328	0.377	0.385	0.527	0.704	0.905	1.157
	Min	-0.757	-0.299	-0.287	-0.365	-0.261	-0.299	-0.199	0.040	-0.242	0.175
	Sigma	0.136	0.130	0.107	0.137	0.133	0.156	0.170	0.161	0.201	0.215
	K-1	-3.520	-3.240	-1.410	-1.570	-1.480	-1.670	-0.624	0.009	0.181	0.374
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 70°C - 1/2 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.089	-0.103	-0.063	-0.109	-0.130	-0.123	0.133	0.013	0.103	0.139
	Max	0.100	0.199	0.200	0.199	0.099	0.399	0.591	0.588	0.883	1.177
	Min	-0.500	-0.600	-0.500	-0.600	-0.600	-0.700	-0.700	-0.201	-0.199	-0.199
	Sigma	0.139	0.162	0.137	0.171	0.171	0.210	1.090	0.152	0.241	0.312
	K-1	-1.560	-1.400	-0.606	-1.020	1.000	-0.484	4.840	1.680	1.470	1.980
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.062	0.038	0.155	0.137	0.064	0.152	0.185	0.249	0.253	0.189
	Max	0.282	0.291	0.476	0.621	0.771	0.679	0.671	0.768	0.922	0.912
	Min	-0.097	-1.001	-0.107	-0.205	-0.530	-0.273	-0.312	-0.205	-0.117	-0.285
	Sigma	0.067	0.204	0.117	0.149	0.292	0.168	0.179	0.210	0.238	0.275
	K-1	0.804	-4.300	0.558	1.080	-0.148	0.890	0.482	0.530	0.929	0.915
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.135	-0.117	0.092	0.122	0.017	0.118	0.156	0.345	0.391	1.040
	Max	0.462	0.462	0.658	0.658	0.462	0.560	0.667	0.953	1.265	3.626
	Min	-0.330	-0.373	-0.126	-0.087	-0.233	-0.136	-0.229	-0.126	-0.429	0.067
	Sigma	0.147	0.160	0.143	0.140	0.154	0.158	0.206	0.234	0.417	0.674
	K-1	2.090	1.400	1.990	1.740	0.121	0.743	0.697	0.265	0.182	2.060
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	00	0	0	0	0
39KΩ	Avg.	-0.131	-0.082	0.079	0.063	0.103	0.098	0.099	0.288	0.422	0.631
	Max	0.360	0.488	0.751	0.694	0.771	0.758	0.617	1.157	1.596	1.672
	Min	-2.467	-2.467	-2.317	-2.317	-2.292	-2.242	-2.018	-1.731	-1.644	-1.345
	Sigma	0.480	0.487	0.498	0.499	0.509	0.506	0.472	0.477	0.525	0.566
	K-1	-3.790	-3.840	-3.590	-3.510	-3.360	-3.180	-2.880	2.270	-1.570	-0.877
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 70°C - 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.086	-0.090	-0.106	-0.089	-0.092	-0.065	0.560	1.490	2.190	2.510
	Max	0.000	0.000	0.201	0.300	0.300	0.616	2.564	7.150	8.850	10.214
	Min	-0.600	-0.500	-0.600	-0.600	-0.600	-0.495	-0.099	0.100	0.100	0.100
	Sigma	0.095	0.110	0.170	0.189	0.204	0.232	0.575	1.310	1.600	1.880
	K-1	-1.400	-1.970	-1.310	-0.853	-0.962	0.498	1.530	2.730	2.100	2.260
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	1	1	3
1KΩ	Avg.	-0.135	-0.204	-0.192	-0.256	-0.409	-0.276	-0.035	0.252	0.129	0.044
	Max	0.176	0.097	0.389	0.535	0.618	0.477	0.757	5.449	100.00	1.224
	Min	-0.447	-0.489	-0.587	-0.743	-1.629	-0.880	-0.619	-0.511	-0.2422	-0.505
	Sigma	0.147	0.147	0.207	0.248	0.507	0.279	0.364	1.020	0.372	0.372
	K-1	-0.159	-0.256	0.510	0.766	-0.305	0.381	0.596	4.320	1.070	1.070
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	1	1	1
10KΩ	Avg.	-0.152	-0.182	-0.104	-0.128	-0.073	0.143	1.740	2.760	2.890	3.480
	Max	0.272	0.070	0.202	0.077	0.552	1.119	3.549	7.027	7.886	9.319
	Min	-0.425	-0.425	-0.260	-0.320	-0.519	-0.480	0.108	0.432	0.255	0.550
	Sigma	0.120	0.108	0.114	0.132	0.268	0.419	0.840	1.420	1.780	1.850
	K-1	1.070	0.086	0.483	0.115	0.562	0.463	0.240	0.938	1.050	1.180
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	3	3	4
39KΩ	Avg.	-0.097	-0.209	-0.216	-0.227	-0.192	-0.011	0.122	2.810	4.400	2.420
	Max	0.220	0.322	0.250	1.243	1.704	2.662	10.00	28.887	64.115	10.442
	Min	-0.658	-0.681	-0.593	-0.709	-0.784	-0.633	-0.184	0.372	-0.381	0.524
	Sigma	0.202	0.226	0.211	0.352	0.459	0.710	2.000	5.130	11.280	2.020
	K-1	-0.517	-0.207	0.046	2.340	2.450	2.320	5.580	4.510	4.960	2.490
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	1	4	4	4

TABLE I TEMPERATURE LOAD MATRIX

TEST 85°C No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	0.001	0.041	-0.369	0.000	-0.003	-0.036	0.286	-0.302	-0.157	-0.322
	Max	0.720	0.720	0.099	0.199	0.400	0.720	1.112	0.199	3.235	2.097
	Min	-0.298	-0.199	-1.001	-0.199	-0.596	-1.001	0.000	-1.201	-3.296	-1.901
	Sigma	0.169	0.167	0.376	0.085	0.193	0.290	0.347	0.368	1.240	0.742
	K-1	2.270	2.080	-0.441	-0.312	-0.898	-1.030	1.320	-0.806	0.368	0.630
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.056	0.048	0.039	0.094	0.129	0.141	0.207	0.222	-0.145	0.739
	Max	0.745	0.348	0.308	0.358	0.447	0.447	0.705	0.705	0.892	0.609
	Min	-0.009	0.000	-0.039	0.000	0.029	0.039	0.099	0.09	-1.391	-1.140
	Sigma	0.148	0.067	0.060	0.076	0.089	0.092	0.115	0.116	0.559	0.270
	K-1	3.710	2.880	2.850	1.640	2.220	2.190	2.920	2.800	-0.429	0.734
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	0.049	0.078	0.099	0.192	0.225	0.296	0.463	0.526	0.015	-0.025
	Max	0.181	0.193	0.262	0.384	0.482	0.547	0.724	0.989	2.063	2.174
	Min	-0.027	-0.055	-0.039	0.000	-0.360	0.087	0.109	0.128	-3.694	-1.672
	Sigma	0.045	0.073	0.074	0.094	0.161	0.118	0.165	0.218	1.580	0.602
	K-1	0.652	-0.039	-0.014	-0.072	-1.410	0.100	-0.122	0.122	-0.859	0.696
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	0.019	0.029	0.029	0.111	0.156	0.198	0.314	0.435	-0.025	0.316
	Max	0.144	0.254	0.122	0.457	0.533	0.490	0.703	1.367	3.022	1.801
	Min	0.000	-0.051	-0.088	-0.050	0.000	0.000	0.118	-0.075	-2.571	-0.303
	Sigma	0.028	0.052	0.039	0.091	0.102	0.120	0.131	0.266	1.410	0.460
	K-1	2.960	2.360	-0.608	1.610	1.810	0.918	1.250	1.510	-0.015	1.320
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 35°C - No Load Fail. Limit ± 5.0%

RANGE		HOURS 6000
10Ω	Avg.	-0.380
	Max	1.798
	Min	-2.002
	Sigma	0.741
	K-1	0.726
	N	30
	Fails	0
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails	
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails	
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails	

TABLE I TEMPERATURE LOAD MATRIX

TEST 85°C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.010	0.033	0.006	0.007	0.049	0.073	0.099	0.119	0.192	0.832
	Max	0.100	0.597	0.597	0.597	0.597	1.095	1.095	1.095	1.195	1.691
	Min	-0.396	-0.495	-0.495	-0.400	-0.400	-0.396	-0.396	-0.400	-0.396	0.000
	Sigma	0.097	0.172	0.151	0.156	0.191	0.237	0.253	0.283	0.305	0.500
	K-1	-2.130	0.866	0.752	0.665	0.530	2.750	2.090	1.280	0.959	0.196
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.016	0.028	0.045	0.038	0.079	0.114	0.149	0.211	0.273	0.291
	Max	0.098	0.108	0.137	0.196	0.196	0.205	0.283	0.342	0.410	0.451
	Min	-0.058	-0.009	0.000	-0.029	0.000	0.029	0.058	0.097	0.176	0.175
	Sigma	0.031	0.035	0.040	0.054	0.056	0.058	0.053	0.065	0.065	0.079
	K-1	0.740	0.996	0.812	1.220	0.705	0.345	0.405	0.079	0.139	0.250
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.059	-0.012	-0.009	0.065	0.274	0.125	0.256	0.287	0.505	0.542
	Max	0.285	0.308	0.479	0.581	4.622	0.696	0.846	0.981	1.266	1.860
	Min	-0.519	-0.278	-0.298	-0.400	-0.400	-0.400	-0.332	-0.332	-0.185	-0.126
	Sigma	0.167	0.149	0.171	0.157	0.825	0.180	0.197	0.220	0.303	0.347
	K-1	-0.863	-0.764	-0.029	0.379	4.840	0.356	0.062	0.319	0.760	1.560
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.019	-0.021	0.010	0.073	0.121	0.140	0.276	0.346	0.544	0.584
	Max	0.208	0.208	0.112	0.308	0.385	0.573	0.752	0.989	2.420	2.386
	Min	-0.388	-0.491	-0.181	-0.119	-0.025	-0.050	0.003	0.101	-0.151	-0.532
	Sigma	0.093	0.110	0.074	0.080	0.080	0.123	0.171	0.196	0.437	0.459
	K-1	-1.930	-2.400	0.624	0.372	1.160	1.630	1.450	1.740	2.900	1.880
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 85°C - 1/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.031	-0.024	-0.018	-0.035	0.011	0.029	0.019	0.038	0.098	0.135
	Max	0.398	0.298	1.078	0.402	0.229	1.176	0.592	0.783	0.996	1.496
	Min	-0.500	-0.500	-0.500	-0.500	-0.500	-0.500	-0.398	-0.500	-0.500	-0.500
	Sigma	0.123	0.098	0.162	0.159	0.139	0.171	0.167	0.188	0.215	0.258
	K-1	-1.200	-0.022	2.470	-0.752	-1.290	2.540	0.765	0.737	1.580	1.960
	N	100	100	100	100	100	100	100	100	100	100
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.009	0.023	0.038	0.052	0.072	0.102	0.138	0.201	0.264	0.294
	Max	0.206	0.364	0.453	0.453	0.453	0.453	0.453	0.539	0.635	0.649
	Min	-0.097	-0.097	-0.097	-0.107	-0.107	-0.078	-0.087	-0.049	0.000	0.019
	Sigma	0.045	0.068	0.086	0.096	0.098	0.105	0.116	0.123	0.126	0.127
	K-1	1.050	1.730	1.600	1.07	0.908	0.744	0.486	0.499	0.628	0.682
	N	100	100	100	100	100	100	100	100	100	100
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.081	-0.089	-0.091	-0.047	0.018	0.021	0.114	0.089	0.355	0.384
	Max	0.098	0.115	0.383	0.386	0.660	1.219	0.671	0.884	1.470	1.160
	Min	-1.232	-1.251	-1.347	-1.155	-1.155	-1.155	-1.229	-3.494	-2.977	-1.268
	Sigma	0.144	0.149	0.175	0.171	0.178	0.211	0.243	0.434	0.475	0.349
	K-1	-5.160	-4.810	-3.720	-2.900	-2.420	0.131	-2.520	-3.000	-3.350	-1.570
	N	100	100	100	100	100	100	100	100	100	100
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.029	-0.029	-0.019	0.021	0.065	0.064	0.154	0.158	0.303	0.336
	Max	1.108	0.982	0.680	0.680	0.781	0.781	0.899	1.029	3.038	1.526
	Min	-0.801	-0.775	-0.978	-1.235	-1.313	-1.441	-1.632	-1.725	-1.725	-1.789
	Sigma	0.164	0.174	0.167	0.194	0.249	0.226	0.250	0.315	0.439	0.369
	K-1	2.160	0.864	-1.300	-2.300	-2.890	-2.360	-3.210	-1.640	1.950	-0.584
	N	100	100	100	100	100	100	100	100	100	100
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 85°C @ 1/4 W Fail. Limit ± 5.0%

RANGE		HOURS 6000
10 Ω	Avg.	0.155
	Max	1.892
	Min	-0.199
	Sigma	0.299
	K-1	2.620
	N	100
	Fails.	0
1 KΩ	Avg.	0.288
	Max	0.678
	Min	0.000
	Sigma	0.132
	K-1	0.666
	N	100
	Fails.	0
10 KΩ	Avg.	0.367
	Max	1.216
	Min	-3.595
	Sigma	0.508
	K-1	-4.710
	N	100
	Fails.	0
39 KΩ	Avg.	0.338
	Max	1.597
	Min	-1.817
	Sigma	0.340
	K-1	-1.690
	N	100
	Fails.	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 85°C - 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.076	-0.109	-0.069	-0.106	-0.049	-0.043	-0.023	0.041	0.057	0.813
	Max	0.104	0.104	0.104	0.208	0.208	0.312	0.417	1.042	1.179	2.085
	Min	-0.495	-0.500	-0.500	-0.500	-0.500	-0.398	-0.490	-0.392	-0.900	0.000
	Sigma	0.113	0.175	0.131	0.169	0.142	0.147	0.174	0.265	0.358	0.532
	K-1	-1.630	-1.050	-1.600	-0.865	-1.360	-0.524	0.062	1.860	1.040	0.516
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.117	0.033	0.037	0.002	0.018	0.044	0.057	0.109	0.168	0.177
	Max	0.146	0.244	0.254	0.254	0.283	0.372	0.342	0.372	0.434	0.482
	Min	-0.058	-0.107	-0.127	-0.244	-0.244	-0.263	-0.312	-0.255	-0.186	-0.098
	Sigma	0.048	0.078	0.097	0.124	0.127	0.144	0.161	0.157	0.140	0.137
	K-1	0.952	0.559	0.294	-0.006	-0.029	-0.031	-0.299	-0.306	-0.058	0.459
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.111	-0.099	-0.099	-0.038	0.035	-0.006	0.115	0.178	0.436	0.792
	Max	0.084	0.150	0.178	0.404	0.592	0.498	0.809	0.818	1.303	4.106
	Min	-0.319	-0.362	-0.381	-0.287	-0.277	-0.327	-0.356	-0.426	-0.237	-0.218
	Sigma	0.101	0.095	0.121	0.138	0.164	0.155	0.221	0.269	0.363	0.765
	K-1	-0.411	-0.154	-0.213	1.220	1.220	1.090	1.010	0.327	0.642	2.530
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	2	0	0	0	0	0	0
39KΩ	Avg.	-0.024	-0.007	0.031	0.062	0.175	0.180	0.127	0.146	0.428	0.617
	Max	0.253	0.304	0.380	0.456	0.552	0.492	0.532	0.557	1.838	2.679
	Min	-0.351	-0.351	-0.426	-0.276	-0.030	-0.271	-0.288	-0.225	0.075	0.144
	Sigma	0.114	0.128	0.145	0.154	0.133	0.169	0.191	0.196	0.303	0.477
	K-1	-0.547	-0.501	-0.750	0.279	0.852	0.342	0.209	0.295	3.230	2.850
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

Table I TEMPERATURE - LOAD MATRIX

TEST 85°C - 1/2 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.046	-0.053	-0.003	0.029	-0.017	0.043	0.136	0.279	0.452	0.613
	Max	0.301	0.301	0.300	0.400	1.091	1.091	2.182	2.579	3.075	3.075
	Min	-0.490	-0.490	-0.490	-0.297	-0.490	-0.300	-0.401	-0.100	0.000	0.000
	Sigma	0.139	0.159	0.157	0.167	0.244	0.266	0.450	0.513	0.566	0.588
	K-1	-0.581	-0.304	-0.505	0.971	2.870	2.160	3.130	3.060	3.320	2.530
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	-0.053	-0.079	-0.098	-0.135	-0.123	-0.118	-0.038	0.063	0.099	0.113
	Max	0.067	0.078	0.087	0.126	0.318	0.482	1.099	1.379	1.359	1.369
	Min	-0.329	-0.339	-0.339	-0.397	-0.343	-0.315	-0.292	-0.205	-0.098	-0.146
	Sigma	0.067	0.080	0.098	0.136	0.175	0.192	0.251	0.267	0.253	0.255
	K-1	-1.910	-0.394	0.136	0.400	0.801	1.250	3.050	3.870	4.040	3.900
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	0.127	0.032	0.025	0.111	0.260	0.062	0.339	0.717	1.300	2.080
	Max	6.770	4.535	4.623	6.704	9.277	4.550	7.549	14.379	21.076	37.150
	Min	-1.740	-1.740	-1.740	-1.644	-1.547	-1.547	-1.354	-1.13	-0.629	-0.219
	Sigma	1.430	1.070	1.080	1.390	1.810	1.090	1.540	2.670	3.790	6.570
	K-1	3.490	2.750	2.710	3.590	4.120	2.620	3.510	4.470	4.710	5.040
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	1	1	1	1	1	1	1	1	1	1
39KΩ	Avg.	-0.009	-0.009	-0.031	-0.160	0.054	-0.005	0.273	0.554	1.050	1.400
	Max	0.460	0.512	0.640	0.691	0.768	0.845	1.413	1.645	2.289	2.787
	Min	-0.625	-0.609	-0.609	-0.571	-0.545	-0.675	-0.197	-0.101	0.127	0.254
	Sigma	0.187	0.195	0.226	0.225	0.258	0.284	0.399	0.467	0.606	0.715
	K-1	-0.691	-0.362	0.001	0.625	0.759	0.733	0.873	0.329	0.426	0.561
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 85°C - 1/2 W Fail. Limit ± 5.0%

RANGE		HOURS 6000
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails.	
	Avg.	
	Max	
	Min	
	Sigma	
	K-1	
	N	
	Fails.	
10 KΩ	Avg.	2,310
	Max	38.05
	Min	-0.058
	Sigma	6,690
	K-1	5,050
	N	30
	Fails.	1
39 KΩ	Avg.	1,630
	Max	4,386
	Min	0,320
	Sigma	0,912
	K-1	1,170
	N	30
		0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 85°C 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.108	-0.168	-0.165	-0.151	-0.016	0.077	1.270	8.290	2.920	3.890
	Max	0.298	0.199	0.199	0.607	1.215	2.502	15.02	190.39	18.200	20.000
	Min	-0.594	-0.600	-0.600	-0.700	-0.600	-0.600	-0.099	0.000	0.300	0.800
	Sigma	0.190	0.216	0.218	0.266	0.369	0.537	2.900	33.900	3.650	4.070
	K-1	-0.920	-0.966	-0.974	0.001	1.510	3.220	3.740	5.130	2.740	2.420
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	4	6	7
1KΩ	Avg.	-0.209	-0.409	-0.426	-0.317	-0.202	-0.121	-0.029	0.081	0.247	0.352
	Max	0.048	0.380	0.702	0.937	1.034	1.181	1.464	1.767	2.206	2.880
	Min	-0.744	-1.107	-1.234	-1.038	-0.582	-0.473	-0.380	-0.331	-0.176	-0.097
	Sigma	0.131	0.255	0.346	0.370	0.317	0.327	0.406	0.459	0.519	0.598
	K-1	-1.800	0.452	0.736	0.995	2.060	2.230	1.990	1.970	2.180	2.710
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.349	-0.394	-0.553	0.107	0.387	0.973	2.330	3.160	5.090	3.410
	Max	-0.011	0.032	0.211	11.93	6.511	11.014	11.894	13.466	58.050	13.652
	Min	-1.141	-1.211	-1.299	-0.878	-0.512	-0.416	0.173	0.000	0.349	0.278
	Sigma	0.229	0.242	0.326	2.230	1.330	2.110	2.440	3.190	1.010	2.870
	K-1	-1.660	-1.350	-0.035	4.930	3.740	3.640	2.210	1.880	4.660	1.690
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	1	1	1	3	6	6	7
39K	Avg.	-0.205	-0.308	-0.465	-0.327	0.146	1.280	2.563	3.150	4.920	3.790
	Max	2.092	1.990	1.812	1.891	2.783	20.050	>100.00	12.399	44.376	13.319
	Min	-0.899	-0.951	-1.333	-0.891	-0.840	-0.401	0.794	0.814	0.977	1.030
	Sigma	0.494	0.499	0.513	0.622	0.949	3.670	5.592	2.560	7.930	2.850
	K-1	3.120	3.070	2.790	2.250	1.650	4.440	5.190	2.050	4.240	1.770
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	1	5	5	7	9

TABLE I TEMPERATURE - LOAD MATRIX

TEST 125°C - NO LOAD Fail. Limit ± 5.0%

RANGE		HOURS - 50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	No	No	0.406	0.373	0.396	-0.325	0.658	0.046	0.516	-0.662
	Max			0.909	0.909	1.215	0.103	1.507	1.395	2.093	2.193
	Min			-0.099	-0.199	-0.199	-0.700	-0.102	-0.203	0.000	-19.620
	Sigma	Reads	Reads	0.315	0.314	0.360	0.183	0.479	0.280	0.440	3.550
	K-1			0.126	-0.017	0.140	0.486	0.016	3.630	1.890	-5.040
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	1
1KΩ	Avg.			0.055	0.062	0.041	0.046	0.080	0.070	0.133	0.116
	Max	No	No	0.208	0.308	0.298	0.237	0.397	0.387	0.317	0.447
	Min			-0.069	-0.118	-0.149	-0.149	-0.179	-0.249	-0.209	0.259
	Sigma	Reads	Reads	0.082	0.122	0.128	0.130	0.151	0.139	0.136	0.119
	K-1			0.307	0.335	0.291	0.213	0.054	-0.181	-0.397	-0.615
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
10KΩ	Avg.			-0.018	-0.007	0.024	0.104	0.107	0.153	0.306	0.474
	Max	No	No	0.488	0.603	0.708	1.005	1.255	1.417	1.628	1.916
	Min			-0.163	-0.200	-0.220	-0.115	-0.231	-0.316	-0.299	-0.299
	Sigma	Reads	Reads	0.122	0.168	0.184	0.239	0.318	0.362	0.386	0.440
	K-1			2.280	2.120	2.420	2.660	2.370	1.890	1.530	1.330
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.004	-0.040	-0.026	-0.043	-0.032	-0.026	-0.079	-0.067	0.008	0.106
	Max	0.319	0.253	0.163	0.163	0.214	0.240	0.266	0.312	0.400	0.664
	Min	-0.107	-0.233	-0.230	-0.307	-0.282	-0.708	-0.939	-1.015	-0.406	-0.461
	Sigma	0.069	0.082	0.069	0.076	0.089	0.152	0.190	0.233	0.182	0.206
	K-1	3.380	1.150	-0.220	-0.620	0.041	-2.900	-2.890	-2.130	0.068	0.003
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 125°C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.		-0.105	-0.177	-0.200	-0.197	-0.328	-0.279	-0.309	-0.299	-0.130
	Max		0.000	0.000	0.295	0.493	0.000	0.295	0.099	0.198	0.498
	Min		-0.490	-0.679	0.970	-1.067	-1.380	-1.359	-1.359	-1.553	-1.456
	Sigma		0.150	0.195	0.241	0.266	0.325	0.317	0.289	0.332	0.358
	K-1		-1.670	-1.230	-1.100	-0.837	-1.490	-1.210	-1.570	-1.900	-1.590
	N		30	30	30	30	30	30	30	30	30
	Fails		0	0	0	0	0	0	0	0	0
1KΩ	Avg.			-0.177	-0.199	-0.199	-0.227	-0.188	-0.147	-0.094	0.114
	Max			0.000	0.000	0.038	0.095	0.204	0.389	0.408	0.603
	Min			-0.287	-0.354	-0.387	-0.469	-0.574	-0.641	-0.574	-0.268
	Sigma			0.072	0.086	0.119	0.138	0.192	0.206	0.193	0.187
	K-1			0.781	0.499	0.765	0.752	0.398	0.184	0.162	0.441
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
10 KΩ	Avg.			-0.265	0.032	-0.129	-0.077	+0.097	0.228	0.509	0.536
	Max			0.918	1.221	0.918	1.110	1.311	1.412	1.776	2.058
	Min			-0.873	-0.383	-0.582	-0.485	-0.488	-0.379	0.000	-0.038
	Sigma			0.349	0.275	0.264	0.294	0.356	0.358	0.406	0.509
	K-1			1.150	2.580	1.860	2.000	1.110	1.250	1.320	1.560
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
39 KΩ	Avg.	0.039	-0.036	-0.042	-0.065	-0.127	-0.108	-0.091	-0.045	0.119	0.144
	Max	2.865	2.104	2.046	1.914	1.861	1.800	1.313	1.015	1.015	1.089
	Min	-0.313	-1.094	-1.509	-2.120	-2.247	-2.494	-2.980	-3.214	-3.265	-3.461
	Sigma	0.531	0.488	0.555	0.536	0.549	0.572	0.612	0.643	0.689	0.730
	K-1	4.990	3.150	1.680	-0.210	-0.345	-1.180	-3.080	-3.780	-3.799	-3.850
	N	30	30	30	30	30	30	30	30	30	30
	Fail-	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 125°C - 1/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.		-0.183	-0.219	-0.200	-0.223	-0.065	-0.233	-0.111	0.110	0.177
	Max		0.000	0.398	0.199	0.299	6.929	0.299	0.294	0.962	1.112
	Min		-0.791	-0.791	-0.594	-0.890	-0.693	-0.890	-0.791	-0.594	-0.891
	Sigma		0.227	0.252	0.201	0.252	1.320	0.282	0.243	0.333	0.493
	K-1		-1.380	-0.275	-0.528	-0.561	4.920	-0.139	-0.810	0.873	0.115
	N		30	30	30	30	30	30	30	30	30
	Fails		0	0	0	0	1	1	0	0	0
1KΩ	Avg.			-0.319	-0.410	-0.394	-0.356	-0.208	-0.124	-0.121	0.073
	Max			0.057	0.057	-0.038	0.057	0.260	0.280	0.351	0.444
	Min			-0.568	-0.682	-0.726	-0.761	-0.576	-0.384	-0.358	-0.233
	Sigma			0.154	0.201	0.197	0.213	0.186	0.148	0.142	0.156
	K-1			0.621	0.682	0.382	0.213	0.148	0.299	0.510	0.326
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
10KΩ	Avg.			-0.260	-0.306	-0.231	-0.200	0.111	0.490	0.864	1.270
	Max			-0.007	0.733	0.228	0.234	0.923	1.275	1.775	1.625
	Min			-0.580	-0.824	-0.639	-0.620	-0.485	-0.304	-0.038	0.057
	Sigma			0.130	0.171	0.205	0.237	0.320	0.391	0.469	0.449
	K-1			-1.440	0.043	0.342	0.164	0.561	0.014	-0.044	0.014
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.050	-0.097	-0.087	-0.080	0.136	0.043	0.063	0.253	0.554	0.672
	Max	1.281	1.732	1.462	1.538	3.302	2.194	1.481	1.429	1.531	1.480
	Min	-0.550	-0.934	-0.939	-1.027	-1012	-0.522	-0.241	-0.121	0.124	0.238
	Sigma	0.268	0.377	0.334	0.357	0.804	0.625	0.293	0.278	0.312	0.286
	K-1	3.830	3.390	2.740	2.410	2.370	2.360	3.240	2.300	1.360	0.763
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 125°C- 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.		-0.228	-0.234	0.252	0.554	0.733	0.738	0.983	1.200	1.800
	Max		0.000	0.099	15.920	17.705	17.606	17.61	16.815	18.793	19.78
	Min		-0.693	-0.699	-0.699	-0.996	-1.095	-0.497	-0.298	-0.199	0.000
	Sigma		0.151	0.165	2.910	3.480	3.610	3.190	3.000	3.330	3.500
	K-1		-1.150	-0.109	5.170	4.210	3.670	4.910	4.850	4.860	4.500
	N		30	30	30	30	30	30	30	30	30
	Fails		0	0	1	2	3	3	3	3	3
1KΩ	Avg.			-0.458	-0.447	-0.353	-0.263	-0.096	-0.067	-0.049	0.205
	Max			-0.009	-0.029	0.000	0.097	0.241	0.173	0.311	0.701
	Min			-0.721	-0.801	-0.791	-0.675	-0.417	-0.417	-0.417	-0.165
	Sigma			0.164	0.180	0.201	0.182	0.158	0.172	0.196	0.190
	K-1			0.936	0.200	0.029	-0.001	0.318	0.250	0.607	0.245
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.219	-0.351	-0.569	-0.245	-0.151	-0.088	0.958	1.631	1.930	2.180
	Max	0.009	-0.096	0.009	0.289	0.386	0.482	1.908	2.603	3.012	3.293
	Min	-0.582	-0.842	-1.262	-0.793	-0.744	-0.754	0.193	0.310	0.435	0.580
	Sigma	0.106	0.169	0.336	0.233	0.269	0.281	0.421	0.556	0.602	0.681
	K-1	-0.838	-1.410	0.167	-0.078	-0.186	0.023	-0.052	-0.294	-0.649	-0.525
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.174	-0.267	-0.734	-0.312	-0.291	-0.205	0.277	0.595	0.685	0.773
	Max	0.002	-0.020	0.538	-0.076	0.075	0.328	0.836	1.358	1.537	1.460
	Min	-0.688	-0.779	-4.016	-0.640	-0.739	-0.640	-0.432	0.179	-0.128	0.007
	Sigma	0.129	0.139	0.930	0.152	0.174	0.198	0.251	0.302	0.323	0.327
	K-1	-1.960	-1.470	-1.960	-1.440	-0.116	0.362	-0.022	0.815	0.203	0.168
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE - LOAD MATRIX

TEST 125°C - 1/2 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.128	-0.174	-0.309	-0.263	-0.138	-0.039	-0.171	1.180	1.490	1.660
	Max	0.196	0.196	0.099	0.294	0.981	0.981	1.090	2.994	3.925	4.416
	Min	-0.583	-0.699	-0.999	-1.098	-0.686	-0.874	-1.482	0.388	0.583	0.691
	Sigma	0.190	0.200	0.262	0.314	0.337	0.428	0.751	0.623	0.768	0.843
	K-1	-1.310	-0.787	-0.921	-0.873	0.767	0.448	0.125	1.140	1.220	1.410
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.			-0.634	-0.487	-0.250	-0.149	-0.022	0.064	0.092	0.372
	Max	No	No	0.154	0.038	0.202	0.385	0.481	0.578	0.521	0.889
	Min			-1.016	-1.114	-0.892	-0.650	-0.347	-0.231	-0.163	0.067
	Sigma	Result	Result	0.224	0.209	0.263	0.199	0.204	0.210	0.212	0.219
	K-1			0.539	-0.486	-0.488	0.214	0.920	0.988	1.080	0.836
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.316	-0.665	-0.511	-0.273	0.655	0.710	2.330	2.530	2.860	2.960
	Max	2.137	0.000	2.672	2.996	10.000	3.273	5.794	6.511	6.758	7.063
	Min	-1.012	-1.927	-1.324	-0.917	-0.526	-0.490	0.660	0.686	0.786	0.833
	Sigma	0.485	0.344	0.659	0.701	2.320	0.696	1.140	1.200	1.260	1.280
	K-1	4.180	-1.650	3.680	3.390	4.320	1.040	0.814	0.983	0.753	0.848
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	1	1	2	2	2	2
39KΩ	Avg.	-0.254	-0.396	-0.312	-0.078	0.250	0.623	1.060	1.300	1.490	1.280
	Max	2.194	1.765	2.371	2.850	3.254	3.685	6.105	6.735	7.013	6.634
	Min	-1.040	-1.141	-1.141	-1.116	-1.015	-0.762	-0.610	0.280	-0.253	-0.402
	Sigma	0.480	0.435	0.543	0.642	0.726	0.837	1.200	1.330	1.680	1.340
	K-1	4.250	3.880	3.910	3.080	2.000	1.940	2.640	2.590	2.120	2.440
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	1	1	2	2

TABLE I TEMPERATURE - LOAD MATRIX

TEST 125°C - 3/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.612	-0.526	-0.388	3.230	4.010	4.710	5.810	6.530	7.030	7.940
	Max	2.660	3.645	4.433	7.262	11.209	11.504	12.757	14.720	15.827	19.842
	Min	-1.883	-1.783	-1.733	0.891	1.188	1.386	1.881	2.079	2.178	2.475
	Sigma	0.719	0.869	1.010	1.800	2.320	2.460	2.590	2.910	3.200	3.940
	K-1	2.840	3.490	3.370	0.567	1.150	0.857	0.565	0.762	0.773	1.290
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	7	11	12	18	20	21	24
1KΩ	Avg.			-0.340	-0.096	0.033	0.097	0.278	0.497	0.689	1.140
	Max	No	No	0.133	0.477	0.701	0.877	1.286	1.871	2.358	2.805
	Min			-0.990	-0.414	-0.318	-0.384	-0.125	0.009	0.134	0.427
	Sigma	Failed	Readings	0.282	0.211	0.240	0.262	0.322	0.438	0.514	0.533
	K-1			-0.432	0.623	0.714	0.752	1.240	1.660	1.800	1.670
	N			30	30	30	30	30	30	30	30
	Fails			0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.973	-0.912	-0.224	1.730	3.020	3.270	3.790	8.760	4.380	4.420
	Max	0.197	0.296	3.612	8.460	9.316	9.981	10.580	143.9	11.255	11.379
	Min	-2.134	-1.930	-1.603	-0.521	0.354	0.255	0.551	0.846	0.974	0.885
	Sigma	0.379	0.416	1.060	1.260	2.000	2.030	2.150	2.510	2.220	2.210
	K-1	-0.257	0.373	1.880	2.140	1.640	1.790	1.640	5.140	1.600	1.510
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	3	4	4	5	7	9	10
39KΩ	Avg.	-0.816	-0.745	-0.040	0.807	1.330	1.300	1.560	1.770	1.970	1.890
	Max	0.318	1.222	2.143	3.579	4.757	8.773	9.721	9.845	10.344	10.200
	Min	-2.516	-2.615	-2.541	-1.554	0.096	-0.814	-0.320	-0.197	-0.148	0.299
	Sigma	0.414	0.595	0.840	1.000	1.160	1.780	1.940	1.940	1.980	1.970
	K-1	-1.630	0.279	0.184	0.764	1.370	2.590	2.650	2.560	2.640	2.620
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	1	1	1	3	3

TABLE I - TEMPERATURE LOAD MATRIX

TEST 150°C - No load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.059	-0.023	-0.063	-0.116	0.104	0.186	-0.403	0.077	-0.263	0.650
	Max	1.123	1.011	1.011	1.011	1.112	1.001	0.697	1.401	0.900	2.042
	Min	-1.001	-1.001	-1.001	-1.001	-1.201	-1.001	-1.601	-1.601	-1.901	-1.001
	Sigma	0.349	0.373	0.383	0.382	0.508	0.449	0.505	0.627	0.664	0.648
	K-1	0.002	-0.268	-0.348	-0.365	-0.807	-0.525	-0.284	-0.487	-0.250	-0.020
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	0.008	-0.026	-0.018	-0.029	-0.029	-0.237	-0.252	-0.207	-0.227	-0.267
	Max	0.389	0.389	0.409	0.898	0.389	0.556	0.650	2.706	1.282	1.153
	Min	-0.099	-0.229	-0.298	-0.479	-0.492	-0.541	-0.664	-0.754	-0.738	-0.738
	Sigma	0.088	0.121	0.148	0.305	0.229	0.271	0.324	0.655	0.419	0.412
	K-1	2.590	1.160	0.838	1.130	1.210	1.420	1.330	3.060	1.850	1.750
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.060	-0.167	-0.212	-0.367	-0.366	-0.288	0.135	0.518	1.030	1.390
	Max	0.130	0.030	2.195	1.894	1.794	1.844	5.740	7.291	7.785	8.082
	Min	-0.251	-0.375	-2.245	-2.392	-2.460	-3.650	-3.612	-3.437	-3.117	-3.001
	Sigma	0.061	0.948	0.587	0.575	0.583	0.858	1.370	1.600	1.660	1.730
	K-1	0.071	0.176	0.309	0.581	0.168	-1.140	1.700	2.070	1.800	1.470
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	1	1	1	1
39KΩ	Avg.	-0.048	-0.113	-0.178	-0.280	-0.292	-0.284	-0.204	0.005	0.319	0.654
	Max	0.091	0.066	0.116	0.057	0.116	0.215	0.446	0.699	1.135	1.647
	Min	-0.487	-0.227	-0.549	-0.609	-0.623	-0.521	-0.726	-0.468	-0.122	-0.020
	Sigma	0.103	0.076	0.131	0.145	0.165	0.198	0.285	0.301	0.295	0.360
	K-1	-2.730	0.628	-0.471	0.414	0.808	0.940	0.683	0.636	0.872	0.894
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 150°C - 1/8 W Fail. Lin lt ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.141	-0.312	-0.193	-0.223	-0.246	-0.240	0.302	0.296	0.500	0.227
	Max	0.198	0.000	0.891	0.198	0.592	0.592	1.176	1.778	1.976	2.173
	Min	-0.495	-0.693	-0.990	-0.693	-0.891	-0.792	-0.495	-0.594	-0.490	0.000
	Sigma	0.177	0.176	0.367	0.213	0.325	0.253	0.415	0.460	0.432	0.470
	K-1	-0.190	-0.271	0.479	-0.110	0.307	0.775	1.070	0.715	1.000	0.861
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	-0.002	-0.240	0.030	-0.059	-0.215	-0.044	0.251	0.054	0.276	0.334
	Max	0.094	-0.143	0.114	0.077	0.173	0.173	0.606	1.270	1.694	1.828
	Min	-0.191	-0.527	-0.287	-0.335	-0.521	-0.287	-0.028	-0.257	-0.095	-0.172
	Sigma	0.050	0.073	0.081	0.090	0.1789	0.108	0.153	0.275	0.313	0.339
	K-1	-1.640	-1.920	2.120	-0.904	0.248	-0.318	-0.085	2.710	2.960	2.720
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.075	-0.190	-0.180	-0.076	-0.157	-0.130	0.417	0.871	1.220	1.420
	Max	0.186	0.097	0.146	0.579	0.373	0.934	2.759	2.168	2.953	3.869
	Min	-0.362	-0.490	-0.578	-0.490	-0.794	-0.647	-0.252	0.000	0.339	0.457
	Sigma	0.141	0.138	0.152	0.199	0.223	0.282	0.597	0.478	0.561	0.687
	K-1	-0.048	0.104	-0.179	1.040	-0.077	1.710	2.430	0.718	0.969	1.389
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0
39KΩ	Avg.	-0.196	-0.242	-0.353	-0.223	-0.297	-0.307	0.123	0.613	0.882	1.110
	Max	0.013	0.000	0.000	0.151	1.233	0.200	0.926	1.995	4.563	4.763
	Min	-0.479	-0.656	-0.748	-0.573	-0.755	-0.748	-0.681	-0.100	0.151	0.277
	Sigma	0.117	0.148	0.146	0.157	0.350	0.229	0.322	0.411	0.761	0.883
	K-1	-0.136	-0.525	-0.444	-0.114	2.590	0.088	-0.327	1.010	3.690	2.640
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 150°C - 1/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.111	-0.139	0.004	-0.057	-0.113	-0.100	0.850	0.898	1.280	1.660
	Max	0.495	1.941	2.135	2.135	2.038	2.233	3.333	3.431	4.334	5.320
	Min	-0.588	-0.793	-0.694	-0.793	-0.883	-0.793	-0.392	-0.295	-0.197	0.000
	Sigma	0.269	0.714	0.713	0.711	0.711	0.748	0.986	1.020	1.080	1.320
	K-1	0.045	2.020	1.900	2.010	1.860	1.890	1.180	1.230	1.270	1.410
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	2
1KΩ	Avg.	-0.079	-0.324	-0.088	-0.098	-0.033	0.017	0.451	0.308	0.563	0.665
	Max	0.283	0.194	0.485	0.485	0.485	0.505	1.227	1.133	1.639	1.820
	Min	-0.482	-0.480	-0.478	-0.573	-0.468	-0.382	0.086	-0.182	0.019	0.076
	Sigma	0.130	0.165	0.204	0.209	0.208	0.215	0.277	0.334	0.393	0.445
	K-1	-0.094	0.047	0.393	0.299	0.575	0.549	0.958	0.841	0.953	0.768
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.226	-0.389	-0.356	-0.062	-0.007	0.321	1.210	1.560	1.810	1.940
	Max	0.000	0.099	0.049	0.646	1.155	1.699	3.434	4.109	5.005	5.078
	Min	-0.398	-0.592	-0.647	-0.454	-0.484	-0.346	0.000	0.187	0.295	0.610
	Sigma	0.118	0.142	0.169	0.303	0.408	0.553	0.938	1.010	1.100	1.140
	K-1	0.351	0.284	0.561	0.917	1.290	1.010	0.844	0.906	1.050	0.991
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	1	1
	Avg.	-0.263	-0.346	-0.410	-0.273	-0.252	-0.060	0.598	0.928	1.070	1.130
	Max	-0.102	-0.168	-0.097	0.195	0.318	0.482	1.911	2.709	3.164	3.620
	Min	-1.342	-1.567	-1.642	-1.342	-1.117	-0.482	-0.060	0.452	0.528	0.576
	Sigma	0.216	0.250	0.264	0.249	0.293	0.312	0.442	0.492	0.571	0.626
	K-1	-4.110	-3.830	-3.280	-2.460	-0.673	-0.035	1.340	2.210	2.140	2.470
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD MATRIX

TEST 150°C 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.131	-0.332	-0.272	-0.292	-0.170	0.119	0.984	0.905	1.080	1.230
	Max	0.397	0.098	0.297	0.397	1.191	1.191	1.697	1.796	2.184	2.184
	Min	-0.679	-0.970	-0.990	-0.970	-1.067	-1.067	0.298	0.298	0.298	0.298
	Sigma	0.207	0.266	0.287	0.309	0.402	0.404	0.354	0.400	0.447	0.475
	K-1	-0.509	-0.754	-0.844	-0.382	0.694	0.164	0.551	0.899	0.541	0.227
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
1KΩ	Avg.	-0.126	-0.332	-0.048	0.015	0.036	0.172	0.762	0.652	0.954	1.130
	Max	0.247	0.000	0.288	0.332	0.573	0.955	1.977	1.814	2.015	2.101
	Min	-0.656	-0.946	-0.528	-0.380	-0.526	-2.437	0.142	-0.047	0.191	0.393
	Sigma	0.159	0.201	0.200	0.190	0.270	0.551	0.355	0.395	0.411	0.474
	K-1	-0.742	-1.030	-0.522	-0.035	3.120	-3.370	0.991	-0.473	-0.291	0.179
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	0	0	0
10KΩ	Avg.	-0.357	-0.496	-0.484	0.336	0.833	1.450	2.160	2.420	2.660	2.760
	Max	4.386	5.273	4.288	6.140	5.653	7.320	10.137	10.361	11.112	10.956
	Min	-0.965	-1.341	-1.274	-0.686	-0.182	-0.182	0.009	0.153	0.394	0.423
	Sigma	0.921	1.120	0.987	1.170	1.050	1.350	1.780	1.780	1.900	1.860
	K-1	4.520	4.430	3.760	3.960	3.100	2.680	2.920	2.870	2.890	2.770
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	1	1	1	1	1	1	2	2	2
39KΩ	Avg.	-0.338	-0.440	-0.480	0.103	0.382	0.823	1.480	1.550	1.810	1.740
	Max	1.454	1.594	1.772	2.573	3.204	4.113	7.139	6.584	6.911	6.303
	Min	-2.467	-2.742	-2.987	-2.597	-2.597	-2.597	-2.077	-1.857	-1.896	-1.880
	Sigma	0.674	0.709	0.755	0.904	1.000	1.250	1.560	1.490	1.580	1.550
	K-1	-0.485	0.307	0.127	0.442	0.475	1.160	1.490	1.310	1.030	0.950
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	1	1	1	1

TABLE I TEMPERATURE LOAD MATRIX

TEST 150°C - 1/2 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.342	-0.604	-0.374	0.052	0.271	1.440	2.520	2.560	2.960	3.310
	Max	0.000	-0.199	0.691	2.764	3.553	20.300	21.300	21.900	21.900	20.000
	Min	-0.700	-1.367	-1.171	-0.594	-4.100	-0.099	0.782	0.493	0.690	0.782
	Sigma	0.192	0.273	0.372	0.622	1.080	3.570	3.660	3.810	3.810	3.910
	K-1	-0.247	-0.406	0.552	2.810	-1.170	4.860	4.500	4.350	4.100	3.860
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	1	2	3	3	3
1KΩ	Avg.	-0.221	-0.378	-0.035	0.116	0.283	0.405	1.080	1.230	1.720	2.640
	Max	0.000	0.000	0.445	0.675	1.503	1.598	2.442	3.282	6.804	13.55
	Min	-0.769	-0.961	-0.436	-0.210	-0.185	-0.047	0.362	0.106	0.308	0.385
	Sigma	0.142	0.181	0.183	0.216	0.316	0.380	0.583	0.757	1.220	2.320
	K-1	-1.680	-0.754	0.714	0.962	1.880	1.520	0.596	0.782	2.360	3.350
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	1	1
10KΩ	Avg.	-0.820	-0.890	-0.452	0.828	1.570	1.840	1.960	2.450	2.740	2.940
	Max	1.622	0.097	1.904	5.095	6.449	7.126	5.784	6.910	7.108	7.246
	Min	-3.326	-1.427	-1.332	-0.191	0.200	0.239	-0.273	0.590	0.649	1.003
	Sigma	1.340	0.349	0.665	1.090	1.340	1.450	1.380	1.470	1.570	1.560
	K-1	0.056	0.691	1.630	2.270	2.080	2.000	1.310	1.500	1.220	1.200
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	1	2	2	3	6	10	10
39KΩ	Avg.	-0.777	-0.733	-0.430	0.393	0.515	0.610	0.673	0.909	1.000	1.100
	Max	-0.420	0.591	0.703	2.090	2.485	2.636	2.615	2.905	3.148	3.262
	Min	-1.142	-1.360	-1.172	-0.406	-0.309	-0.283	-0.309	-0.040	-0.071	0.023
	Sigma	0.162	0.381	0.494	0.575	0.622	0.665	0.687	0.729	0.750	0.765
	K-1	-0.192	1.380	0.643	1.040	1.260	1.060	0.865	0.760	0.848	0.834
	N	30	30	30	30	30	30	30	30	30	30
	Fails	0	0	0	0	0	0	0	0	0	0

TABLE I TEMPERATURE LOAD-MATRIX

TEST 150°C 3/4 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
10Ω	Avg.	-0.736	-0.319	1.470	3.080	4.500	4.580	6.100	6.710	8.080	42.100
	Max	-0.098	2.871	8.217	17.722	23.663	25.643	32.772	34.851	35.940	915.87
	Min	-1.862	-1.864	0.196	0.882	0.989	1.334	2.274	2.769	3.145	3.813
	Sigma	0.410	0.750	1.480	3.180	4.250	4.440	5.490	5.770	5.820	169.00
	K-1	-1.010	2.190	3.200	3.350	3.080	3.570	3.790	3.810	3.560	5.180
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	1	2	7	10	13	15	22	27
Ω	Avg.	-0.730	-0.916	-0.488	0.201	0.078	0.267	0.248	2.230	5.250	23.600
	Max	-0.268	-0.431	0.354	1.297	1.652	2.521	3.584	6.676	59.304	143.48
	Min	-1.490	-2.264	-1.877	-0.213	-0.601	-0.861	-1.093	0.783	-1.258	0.900
	Sigma	0.315	0.405	0.412	0.355	0.443	0.583	0.938	1.310	11.400	34.400
	K-1	-1.270	-0.996	-1.170	1.570	1.490	1.780	1.080	1.740	3.610	2.270
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	0	0	0	0	2	6	21
1MΩ	Avg.	-2.560	0.081	0.192	2.190	1.560	1.820	1.620	2.600	1.880	2.200
	Max	-0.877	3.449	3.004	5.205	4.651	5.062	5.062	5.740	4.833	5.233
	Min	-3.942	-1.565	-1.826	-0.514	-0.984	-0.681	-0.885	0.248	-0.944	-1.054
	Sigma	0.766	1.130	1.260	1.280	1.300	1.380	1.480	1.360	1.490	1.510
	K-1	0.332	1.260	0.559	0.553	0.644	0.562	0.550	0.655	0.108	0.089
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	0	0	0	2	2	2	2	2	2	2
39KΩ	Avg.	-2.130	0.150	0.115	0.801	0.842	0.927	1.980	1.050	16.100	8.0080
	Max	5.722	23.500	15.609	24.471	24.371	25.126	67.600	10.564	456.58	811.05
	Min	-5.251	-3.639	-2.855	-2.370	-2.370	-2.345	-2.503	-1.295	-1.911	-1.758
	Sigma	1.680	4.730	3.530	4.910	4.890	4.990	12.400	2.360	81.800	1.680
	K-1	3.110	4.100	3.120	3.830	3.810	3.870	4.930	2.420	5.190	5.190
	N	30	30	30	30	30	30	30	30	30	30
	Fails.	2	3	3	3	3	3	3	3	3	5

TABLE II TEMPERATURE LOAD - MATRIX

TEST 25° C - No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	0.021	0.005	0.019	0.044	0.041	0.135	0.058			
	Max	0.071	+ 0.040	0.071	0.222	0.302	0.423	0.403			
	Min	0.00	- 0.030	0.00	0.00	0.00	0.029	0.00			
	Sigma	0.021	0.013	0.019	0.043	0.057	0.075	0.076			
	K-1	1.030	0.486	1.210	2.340	3.190	1.830	3.270			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 KΩ	Avg.	0.004	0.019	0.027	0.051	0.037	0.087	0.126	0.129		
	Max	0.019	0.072	0.165	0.208	0.208	0.208	0.331	0.465		
	Min	0.187	0.116	0.009	0.218	0.009	0.029	0.00	0.049		
	Sigma	0.036	0.029	0.029	0.066	0.040	0.042	0.075	0.072		
	K-1	- 4.990	3.130	3.360	- 1.530	2.710	1.240	1.070	3.280		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD - MATRIX

TEST 25°C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS 50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	0.021	0.011	0.041	0.051		0.077	0.098	0.067		
	Max	0.060	0.060	0.160	0.160		0.163	0.215	0.215		
	Min	$\bar{0}$.010	$\bar{0}$.020	0.00	0.00		0.010	0.030	0.000		
	Sigma	0.017	0.019	0.030	0.035		0.041	0.048	0.060		
	K-1	0.050	0.661	1.202	1.114		0.654	0.880	1.030		
	N	30	30	30	30		30	30	30		
	Fails	0	0	0	0		0	0	0		
100 K	Avg.	$\bar{0}$.063	$\bar{0}$.033	0.031	0.008	0.008	0.025	0.118	0.161		
	Max	0.010	0.087	1.736	0.405	0.213	0.261	0.543	0.523		
	Min	$\bar{0}$.168	$\bar{0}$.188	$\bar{0}$.168	$\bar{0}$.203	$\bar{0}$.168	$\bar{0}$.178	-0.119	-0.069		
	Sigma	0.039	0.053	0.321	0.103	0.077	0.083	0.117	0.115		
	K-1	$\bar{0}$.272	$\bar{0}$.295	4.930	1.680	0.774	0.681	1.440	1.030		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										

TABLE II TEMPERATURE LOAD - MATRIX

TEST 25°C - 1/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	0.011	-0.019	0.028	0.025	0.092	0.049	0.069	0.047		
	Max	0.040	0.030	0.070	0.080	0.152	0.110	0.210	0.130		
	Min	-0.020	-0.099	0.00	-0.020	0.030	0.00	0.00	-0.010		
	Sigma	0.014	0.025	0.019	0.024	0.031	0.031	0.045	0.042		
	K-1	-0.183	-1.040	0.234	0.486	-0.045	0.301	0.954	0.473		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
100 K	Avg.	-0.068	N	0.163	0.050	0.070	0.093	0.224	0.315		
	Max	0.062	O	0.645	0.191	0.311	0.352	0.632	0.746		
	Min	-0.186	R	-0.119	-0.099	-0.079	-0.059	0.029	0.069		
	Sigma	0.055	a	0.167	0.076	0.084	0.085	0.129	0.143		
	K-1	0.137	d	0.564	0.648	0.827	0.873	1.150	1.010		
	N	30		30	30	30	30	30	30		
	Fails	0		0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD - MATRIX

TEST 25°C - 3/8 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.010	-0.030	-0.028	-0.025	-0.044	0.049	0.083	0.069		
	Max	0.050	0.020	0.098	0.099	0.110	0.121	0.152	0.162		
	Min	-0.098	-0.196	-0.098	-0.098	-0.098	0.00	0.00	0.00		
	Sigma	0.029	0.038	0.035	0.038	0.045	0.038	0.039	0.047		
	K-1	-1.430	-2.700	-0.703	-0.516	-0.697	0.437	0.119	0.338		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
100 K	Avg.	-0.107	-0.057	-0.041	0.025	0.037	0.070	0.229	0.355		
	Max	0.029	0.126	0.311	0.428	0.467	0.487	0.740	0.896		
	Min	-0.305	-0.177	-0.154	-0.128	-0.089	-0.078	-0.009	0.039		
	Sigma	0.073	0.066	0.091	0.103	0.114	0.121	0.153	0.179		
	K-1	-0.538	0.498	1.600	1.690	1.490	1.420	1.540	1.030		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max.										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD - MATRIX

TEST 25° C 1/2 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.00	-0.015	0.007	0.016	0.071	0.039	0.062	0.056		
	Max	0.060	0.040	0.100	0.099	0.181	0.130	0.199	0.211		
	Min	-0.020	-0.099	-0.099	-0.030	0.00	-0.010	0.00	-0.030		
	Sigma	0.016	0.026	0.047	0.037	0.049	0.040	0.056	0.055		
	K-1	1.970	-0.929	-0.217	1.340	0.789	0.606	1.040	1.080		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
100 K	Avg.	-0.138	-0.072	0.006	0.031	0.043	0.079	0.234	0.354		
	Max	0.209	0.299	1.012	0.539	0.629	0.669	0.988	1.068		
	Min	-0.288	-0.258	-0.228	-0.179	-0.169	-0.189	-0.029	0.069		
	Sigma	0.098	0.105	0.233	0.122	0.140	0.151	0.191	0.221		
	K-1	1.370	1.270	2.900	2.160	2.280	1.710	1.910	1.440		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD - MATRIX

TEST 25°C 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.011	-0.032	-0.004	-0.026	-0.002	-0.007	0.031	-0.009		
	Max	0.200	0.170	0.221	0.210	0.251	0.231	0.370	0.221		
	Min	-0.101	-0.131	-0.101	-0.160	-0.150	-0.170	-0.170	-0.170		
	Sigma	0.055	0.056	0.066	0.077	0.093	0.090	0.107	0.100		
	K-1	1.790	1.500	1.640	1.030	0.936	0.826	0.994	0.685		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
100 K	Avg.	-0.097	0.093	0.124	0.155	0.188	0.193	0.358	0.659		
	Max	0.207	0.463	0.876	1.378	1.663	1.958	2.549	2.874		
	Min	-0.334	-0.167	-0.157	-0.328	-0.147	-0.187	-0.128	-0.078		
	Sigma	0.128	0.166	0.200	0.284	0.312	0.365	0.475	0.597		
	K-1	0.692	0.741	1.830	2.520	3.460	3.700	3.280	1.930		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE - LOAD MATRIX

TEST 70 °C - No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	0.017	-0.104	-0.118	-0.083	-0.027	-0.075	-0.049			
	Max	0.170	-0.030	0.00	0.00	0.100	0.070	0.170			
	Min	-0.040	-0.190	-0.759	-0.190	-0.100	-0.180	-0.150			
	Sigma	0.044	0.043	0.129	0.052	0.055	0.058	0.071			
	K-1	1.760	-0.272	-4.000	-0.186	0.494	0.275	0.930			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.006	-0.010	0.006	0.024	0.023	0.048	0.121			
	Max	0.048	0.041	0.116	0.194	0.174	0.272	0.311			
	Min	-0.154	-0.059	-0.059	-0.154	-0.088	-0.154	0.019			
	Sigma	0.035	0.027	0.033	0.054	0.047	0.068	0.062			
	K-1	-2.450	0.137	1.190	-0.086	0.846	0.240	1.160			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE - LOAD MATRIX

TEST 70 °C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.005	-0.028	-0.012	-0.067	-0.053	-0.038	-0.029			
	Max	0.059	0.009	0.097	0.009	0.038	0.097	0.097			
	Min	-0.098	-0.176	-0.166	-0.196	-0.196	-0.196	-0.196			
	Sigma	0.024	0.036	0.037	0.040	0.043	0.049	0.051			
	K-1	-1.570	-2.350	-1.540	-0.687	-0.913	-0.546	-0.670			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.060	-0.047	-0.042	0.008	0.039	0012	0.161			
	Max	0.00	0.010	0.127	0.206	0.294	0.294	0.529			
	Min	-0.414	-0.363	-0.414	-0.252	-0.212	-0.313	-0.090			
	Sigma	0.078	0.071	0.090	0.076	0.084	0.101	0.118			
	K-1	-3.080	-2.940	-1.990	-0.613	+0.192	-0.229	0.988			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 70°C 1/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	0.135	0.322	0.330	0.252	0.268	0.323	0.313			
	Max	0.329	0.679	0.689	0.669	0.669	0.699	0.705			
	Min	-0.299	-0.259	-0.239	-0.259	-0.239	-0.199	-0.179			
	Sigma	0.124	0.265	0.260	0.272	0.272	0.266	0.269			
	K-1	-1.400	-0.415	-0.338	-0.059	-0.064	-0.256	-0.177			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.124	-1.120	-0.762	-0.520	-0.576	-0.440	-0.079	-0.064		
	Max	0.059	0.061	0.162	0.285	0.377	0.458	0.856	1.121		
	Min	-0.497	30.70	20.40	14.65	17.37	-12.63	-6.596	-8.626		
	Sigma	0.121	5.490	3.640	2.620	3.120	2.260	1.220	1.600		
	K-1	-1.380	-5.190	-5.180	-5.170	-5.170	-5.150	-4.940	-4.990		
	N	30	30	30	30	30	30	30	30		
	Fails	0	1	1	1	1	1	1	1		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE - LOAD MATRIX

TEST 70°C - 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	0.050	0.315	0.325	0.277	0.272	0.288	0.277			
	Max	0.308	0.697	0.697	0.697	0.697	0.697	0.717			
	Min	-0.792	-0.306	-0.306	-0.306	-0.366	-0.306	-0.373			
	Sigma	0.253	0.291	0.290	0.291	0.293	0.291	0.299			
	K-1	-1.360	-0.715	-0.692	-0.639	-0.644	-0.625	-0.607			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.138	-0.074	-0.084	-0.015	0.040	0.004	0.149	0.255		
	Max	0.102	0.133	0.307	0.440	0.522	0.471	0.819	0.963		
	Min	-0.594	-0.564	-0.512	-0.266	-0.300	-0.210	-0.110	-0.060		
	Sigma	0.142	0.133	0.145	0.137	0.153	0.160	0.202	0.206		
	K-1	-1.440	-1.520	-0.459	0.653	0.659	0.751	1.170	1.240		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE - LOAD MATRIX

TEST 70° C 1/2 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.021	-0.030	-0.009	-0.056	-0.075	-0.061	-0.076			
	Max	0.119	0.729	0.799	0.719	0.699	0.699	0.699			
	Min	-0.395	-0.494	-0.395	-0.494	-0.444	-0.454	-0.395			
	Sigma	0.081	0.171	0.172	0.174	0.167	0.169	0.169			
	K-1	-3.030	2.210	3.050	2.400	2.920	2.540	2.840			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.127	-0.035	-0.009	0.065	0.092	0.075	0.280	0.557		
	Max	0.020	0.301	0.593	0.693	0.693	0.593	0.994	3.257		
	Min	-0.321	-0.276	-0.224	-0.175	-0.119	-0.149	-0.049	0.009		
	Sigma	0.089	0.107	0.143	0.154	0.178	0.167	0.250	0.577		
	K-1	-0.471	0.688	2.380	2.220	1.660	1.330	1.230	3.360		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II - TEMPERATURE - LOAD MATRIX

TEST 70°C 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.085	-0.167	-0.163		-0.220	-0.184	0.181			
	Max	0.00	0.068	0.068		0.009	0.097	1.129			
	Min	-0.260	-0.470	-0.460		-0.500	-0.500	-0.401			
	Sigma	0.055	0.095	0.091		0.104	0.146	0.404			
	K-1	-0.681	-0.625	-0.776		-0.420	0.598	0.881			
	N	30	30	30		30	30	30			
	Fails	0	0	0		0	0	0			
100K	Avg.	-0.535	-0.355	-0.319	-0.181	0.020	5.040	6.450	5.700		
	Max	0.234	0.439	0.418	0.724	1.431	138.8	121.34	62.29		
	Min	-15.110	-14.77	-12.43	-10.80	-7.762	-0.242	0.362	1.097		
	Sigma	2.700	2.680	2.250	1.980	1.490	24.800	21.700	11.100		
	K-1	-5.180	-5.170	-5.160	-5.100	-4.680	5.190	5.050	4.650		
	N	30	30	30	30	30	30	30	30		
	Fails	1	1	1	1	1	2	4	8		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 85°C No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.004	0.013	0.096	0.040	-0.050	-0.015	-0.037			
	Max	0.040	0.069	0.230	0.100	0.000	0.010	0.100			
	Min	-0.020	-0.020	0.000	0.000	-0.129	-0.089	-0.121			
	Sigma	0.011	0.020	0.062	0.033	0.029	0.020	0.050			
	K-1	2.130	1.410	0.342	0.378	-0.587	-1.820	0.395			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.011	-0.019	-0.002	0.022	0.036	0.065				
	Max	0.009	0.010	0.049	0.099	0.138	0.326				
	Min	-0.069	-0.118	-0.118	-0.102	-0.099	-0.099				
	Sigma	0.016	0.029	0.034	0.046	0.047	0.079				
	K-1	-1.840	-1.430	-1.380	-0.915	-0.385	0.791				
	N	30	30	30	30	30	30				
	Fails	0	0	0	0	0	0				
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 85°C 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	±0.040	-0.040	-0.099	-0.082	-0.080	-0.088	-0.090			
	Max	0.019	0.019	0.000	0.098	0.098	0.098	0.098			
	Min	-0.792	-0.892	-2.236	-2.296	-2.376	-2.436	-2.627			
	Sigma	0.141	0.159	0.398	0.412	0.427	0.437	0.472			
	K-1	-4.960	-5.020	-5.130	-5.150	-5.150	-5.150	-5.150			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	±0.057	-0.085	±0.072	-0.062	-0.030	-0.023	0.106	0.119		
	Max	0.030	0.00	0.020	0.201	0.291	0.301	0.748	0.654		
	Min	-0.168	-0.183	-0.228	-0.241	-0.171	-0.181	-0.110	-0.109		
	Sigma	0.047	0.048	0.072	0.088	0.092	0.092	0.175	0.160		
	K-1	-0.465	-0.142	0.021	0.599	1.390	1.470	2.030	1.570		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II · TEMPERATURE LOAD MATRIX

TEST 85°C - 1/4 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.015	-0.009	-0.035	-0.011	-0.012	-0.014	-0.027			
	Max	0.099	0.110	0.110	0.150	0.228	0.298	0.298			
	Min	-0.091	-0.101	-0.203	-0.193	-0.203	-0.203	0.286			
	Sigma	0.035	0.041	0.055	0.052	0.059	0.064	0.072			
	K-1	0.020	0.254	0.155	-0.101	0.304	0.858	0.162			
	N	100	100	100	100	100	100	100			
	Fails.	0	0	0	0	0	0	0			
100 K	Avg.	-0.303	-0.284	-0.316	-0.252	-0.224	-0.186	-0.079	0.098		
	Max	0.090	0.097	0.195	0.372	0.514	0.625	1.090	1.595		
	Min	-13.85	-13.69	-13.95	-14.03	-13.34	-12.65	-10.26	-5.508		
	Sigma	1.540	1.480	1.530	1.520	1.460	1.340	1.170	0.641		
	K-2	-7.690	-8.030	-7.810	-8.010	-7.910	-8.350	-7.410	-6.310		
	N	100	100	100	100	100	100	100	100		
	Fails.	2	2	2	2	2	2	2	2		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails.										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails.										

TABLE II TEMPERATURE LOAD MATRIX

TEST 85°C - 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	[illegible]	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.026	-0.037	-0.069	[illegible]	-0.050	-0.051	-0.065			
	Max	0.069	0.009	0.040	[illegible]	0.019	0.069	0.069			
	Min	-0.207	-0.267	-0.306	[illegible]	-0.306	-0.306	-0.306			
	Sigma	0.049	0.057	0.062	0.066	0.066	0.069	0.073			
	K-1	-1.610	-2.250	-1.640	[illegible]	[illegible]	-1.520	-1.140			
	N	30	30	30	[illegible]	[illegible]	30	30			
	Fails	0	0	0	[illegible]	[illegible]	0	0			
100K	Avg.	-0.138	-0.088	-0.101	-0.024	-0.019	0.003	0.130	0.311		
	Max	-0.030	0.00	0.00	0.098	0.138	0.197	0.494	1.093		
	Min	-0.354	-0.222	-0.243	-0.182	-0.192	[illegible]	-0.179	-0.099		
	Sigma	0.075	0.072	0.074	0.080	0.085	0.104	0.160	0.307		
	K-1	-1.060	-0.370	0.093	-0.149	-0.105	-0.053	0.477	1.070		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 85°C - 1/2 Watt — Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg	-0.031	-0.039	-0.137	-0.056	-0.062	-0.072	-0.076			
	Max	0.118	0.128	0.109	0.168	0.168	0.177	0.276			
	Min	-0.088	-0.099	-0.906	-0.192	-0.259	-0.278	-0.384			
	Sigma	0.039	0.047	0.214	0.067	0.081	0.089	0.109			
	K-1	1.600	1.340	-2.840	1.210	0.489	0.799	0.525			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.151	-0.092	-0.100	-0.021	-0.003	0.019	0.231	0.531		
	Max	0.00	0.100	0.100	0.301	0.342	0.412	1.104	1.926		
	Min	-0.314	-0.297	-0.310	-0.290	-0.300	-0.310	-0.210	0.00		
	Sigma	0.083	0.092	0.099	0.122	0.130	0.139	0.259	0.399		
	K-1	-0.204	-0.353	0.014	0.310	0.337	0.586	1.420	1.650		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 85° C - 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS 50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	0.049	0.047	0.016	0.085	0.214	0.454	1.950			
	Max	5.727	5.826	5.727	5.648	5.628	5.628	13.432			
	Min	-0.370	-0.410	-0.410	-0.319	-0.411	-0.266	-0.170			
	Sigma	1.050	1.070	1.060	1.040	1.030	1.220	2.840			
	K-1	5.160	5.140	5.110	4.960	4.200	3.050	2.570			
	N	30	30	30	30	30	30	30			
	Fails	1	1	1	1	1	1	4			
100 K	Avg.	-0.056	0.062	-0.038	0.110	0.425	1.150	5.200	8.440		
	Max	0.271	0.705	0.503	2.585	3.860	4.491	12.566	+79.04		
	Min	-0.486	-0.377	-0.510	-0.709	-0.992	-0.100	1.374	1.990		
	Sigma	0.198	0.250	0.248	0.564	0.860	1.100	3.710	13.800		
	K-1	-0.092	0.658	0.259	2.780	2.230	1.240	2.070	4.570		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	11	16		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II. TEMPERATURE LOAD MATRIX

TEST 125° C - No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.036	0.096	0.096	-0.059	-0.059	-0.117				
	Max	0.00	0.252	0.252	-0.010	-0.010	-0.020				
	Min	-0.078	0.000	0.000	-0.102	-0.102	-0.203				
	Sigma	0.018	0.063	0.063	0.026	0.026	0.044				
	K-1	-0.372	0.558	0.558	0.059	0.059	0.267				
	N	30	30	30	30	30	30				
	Fails	0	0	0	0	0	0				
100K	Avg.	-0.027	-0.038	-0.043	-0.044	-0.066	-0.049	-0.004	0.059		
	Max	0.029	0.009	0.00	0.030	0.050	0.101	0.216	0.433		
	Min	-0.069	-0.109	-0.109	-0.138	-0.209	-0.209	-0.229	-0.209		
	Sigma	0.024	0.028	0.032	0.042	0.052	0.061	0.085	0.123		
	K-1	-0.041	-0.573	-0.196	-0.101	-0.443	-0.287	0.189	0.775		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 125°C - 1/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.037	-0.034	-0.155	-0.079	0.024	0.030	-0.066			
	Max	0.058	0.058	0.009	0.00	0.156	0.724	0.098			
	Min	-0.155	-0.099	-0.293	-0.289	-0.099	-0.219	-0.339			
	Sigma	0.042	0.040	0.062	0.068	0.063	0.148	0.095			
	K-1	-0.392	-0.095	-0.037	-1.320	-0.325	3.160	-0.960			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.085	-0.111	-0.137	-0.134	-0.114	-0.201	0.059	-0.106		
	Max	0.030	0.050	0.010	0.040	0.040	0.059	0.358	0.290		
	Min	-0.199	-0.268	-0.351	-0.378	-0.388	-0.481	-0.298	-0.184		
	Sigma	0.057	0.063	0.073	0.084	0.090	0.120	0.160	0.181		
	K-1	-0.62	-0.359	-1.090	-1.060	-1.040	-0.516	-0.204	0.296		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 125°C - 1/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Ave.	-0.047	-0.038	-0.160	-0.082	0.023	-0.007	-0.043			
	Max	0.019	0.009	0.601	0.00	0.098	0.098	0.076			
	Min	-0.099	-0.097	-0.294	-0.195	-0.097	-0.098	-0.295			
	Sigma	0.036	0.036	0.149	0.041	0.043	0.051	0.081			
	K-1	0.121	-0.220	4.400	-0.174	-0.434	-0.364	-1.040			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.140	-0.130	-0.184	-0.178	-0.176	-0.220	0.156	0.474		
	Max	-0.029	0.191	0.140	0.301	0.533	0.593	1.596	4.691		
	Min	-0.867	-0.816	-0.908	-1.071	-1.122	-1.224	-1.020	-0.714		
	Sigma	0.146	0.161	0.163	0.220	0.244	0.253	0.455	0.893		
	K-1	-4.070	-2.150	-2.590	-1.540	-1.040	-0.960	1.310	3.480		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 125°C - 3/8 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.053	-0.052	-0.217	-0.127	-0.014	-0.039	0.033			
	Max	0.079	0.079	-0.029	0.00	0.098	0.098	0.774			
	Min	-0.118	-0.117	-0.316	-0.276	-0.227	-0.286	-0.373			
	Sigma	0.044	0.045	0.067	0.067	0.084	0.091	0.200			
	K-1	0.804	0.733	0.591	-0.424	-0.758	-0.897	1.340			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.151	-0.146	-0.207	-0.732	-0.556	-0.531	1.820	3.250		
	Max	0.00	0.482	0.380	0.770	1.931	3.145	7.682	11.720		
	Min	-0.499	-0.519	-0.601	-16.90	-15.46	-15.42	-7.135	0.468		
	Sigma	0.104	0.156	0.158	3.000	2.800	2.830	2.500	2.600		
	K-1	-1.200	1.660	1.200	-5.150	-4.980	-4.750	-0.765	1.430		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	1	1	1	5	8		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										

TABLE II. TEMPERATURE LOAD MATRIX

TEST 125°C - 1/2 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	0.137	0.109	-0.044	0.038	0.192	0.389	2.210			
	Max	8.708	8.635	8.433	8.552	8.616	8.625	20.15			
	Min	-0.868	-0.868	-0.728	-0.965	-0.502	-0.550	0.098			
	Sigma	1.590	1.590	1.580	1.590	1.570	1.620	3.740			
	K-1	5.120	5.110	5.130	5.070	5.100	4.370	3.850			
	N	30	30	30	30	30	30	30			
	Fails	1	1	1	1	1	1	2			
100K	Avg	-0.640	-0.665	-0.731	-0.529	-0.020	1.180	3.880	4.270		
	Max	0.020	0.00	0.117	0.499	1.477	6.406	9.044	9.216		
	Min	-10.000	-10.000	-10.000	-7.980	-6.462	-2.777	0.359	0.579		
	Sigma	2.590	2.580	2.330	1.420	1.290	1.640	2.060	2.090		
	K-1	-5.180	-5.180	-5.120	-4.770	-4.00	0.881	0.679	0.580		
	N	30	30	30	30	30	30	30	30		
	Fails	1	1	1	1	1	2	10	11		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 125°C - 3/4 Watt Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.288	-0.298	-0.218	1.120	2.190	3.890	5.460			
	Max	0.068	0.078	0.859	4.528	8.958	11.210	16.029			
	Min	-0.874	-0.874	-0.931	-0.098	0.583	1.078	1.869			
	Sigma	0.174	0.178	0.456	1.080	1.870	2.230	3.030			
	K-1	-1.220	-1.050	0.984	1.110	1.520	1.600	1.940			
	N	30	30	30	30	30	30	30			
	Fail.	0	0	0	0	4	5	11			
100K	Avg.	-0.248	-0.306	0.451	2.800	4.450	5.360	6.950	7.310		
	Max	0.378	0.478	4.964	8.154	9.652	12.762	13.171	13.560		
	Min	-0.957	-1.243	-0.787	0.696	1.910	2.232	3.006	3.217		
	Sigma	0.288	0.322	1.110	1.560	1.800	2.410	2.710	2.850		
	K-1	-0.872	-0.861	2.380	1.260	0.892	1.130	0.698	0.671		
	N	30	30	30	30	30	30	30	30		
	Fails.	0	0	0	2	8	14	20	24		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails.										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails.										

TABLE II TEMPERATURE LOAD - MATRIX

TEST 150°C - No Load Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.032	-0.035	0.078	-0.086	-0.144	-0.150	-0.137			
	Max	0.00	0.030	0.231	-0.010	-0.030	-0.030	0.150			
	Min	-0.093	-0.103	-0.030	-0.207	-0.311	-0.304	-0.308			
	Sigma	0.020	0.025	0.069	0.047	0.066	0.076	0.102			
	K-1	-0.938	-0.419	0.470	-0.356	-0.440	-0.250	0.490			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.017	-0.030	-0.043	-0.065	-0.084	-0.071	0.113	0.321		
	Max	0.051	0.041	0.059	0.097	0.114	0.162	0.558	1.095		
	Min	-0.127	-0.118	-0.147	-0.350	-0.267	-0.216	-0.049	-0.009		
	Sigma	0.028	0.034	0.048	0.086	0.074	0.077	0.146	0.276		
	K-1	-1.530	-0.140	-0.054	-0.822	0.057	0.322	1.480	0.949		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II - TEMPERATURE LOAD MATRIX

TEST 150°C - 1/8 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.007	-0.0064	-0.123	0.023	-0.071	-0.075	-0.061			
	Max	0.912	0.902	0.902	2.026	2.046	2.236	2.357			
	Min	-0.176	-0.196	-0.392	-0.392	-0.480	-0.490	-0.490			
	Sigma	0.179	0.176	0.219	0.523	0.405	0.442	0.473			
	K-1	4.460	4.380	3.380	3.320	4.720	4.720	4.390			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.089	-0.126	-0.018	-0.099	-0.135	-0.146	-0.003	0.412		
	Max	0.050	0.040	0.192	0.192	0.162	0.172	1.101	2.522		
	Min	-2.547	-0.577	-0.435	-0.557	-0.648	-0.637	-0.557	-0.200		
	Sigma	0.103	0.106	0.102	0.113	0.124	0.127	0.343	0.630		
	K-1	-2.800	-2.440	-1.970	-1.610	-1.770	-1.360	1.450	1.810		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II - TEMPERATURE LOAD MATRIX

TEST 150°C - 1/8 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.007	-0.0004	-0.123	-0.023	-0.071	-0.075	-0.061			
	Max	0.912	0.902	0.902	2.28	2.046	2.236	2.357			
	Min	-0.176	-0.196	-0.392	-0.392	-0.480	-0.490	-0.470			
	Sigma	0.179	0.176	0.219	0.223	0.405	0.442	0.473			
	K-1	4.460	4.380	3.380	3.320	4.720	4.720	4.390			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.089	-0.136	-0.018	-0.099	-0.135	-0.146	-0.003	0.412		
	Max	0.050	0.040	0.192	0.192	0.162	0.172	1.101	2.522		
	Min	-0.547	-0.577	-0.435	-0.557	-0.648	-0.637	-0.557	-0.200		
	Sigma	0.103	0.106	0.102	0.113	0.124	0.127	0.343	0.630		
	K-1	-2.800	-2.440	-1.970	-1.610	-1.770	-1.360	1.450	1.810		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	0	0		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE - LOAD MATRIX

TEST 150 °C - 1/4 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100 Ω	Avg.	-0.101	-0.106	-0.563	-0.221	-0.222	-0.211	0.147			
	Max	0.095	0.095	0.194	-0.009	0.00	0.194	0.909			
	Min	-0.961	-0.961	-0.901	-1.134	-1.134	-1.057	-0.663			
	Sigma	0.168	0.170	0.370	0.191	0.196	0.201	0.335			
	K-1	-4.380	-4.110	0.647	3.570	-3.180	-2.100	0.271			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100 K	Avg.	-0.126	-0.207	-0.056	-0.158	-0.151	-0.038	1.920	3.030		
	Max	-0.029	-0.050	0.203	0.346	0.529	0.723	8.874	13.764		
	Min	-0.430	-0.530	-0.330	-0.508	-0.599	-0.609	0.303	0.505		
	Sigma	0.085	0.116	0.121	0.167	0.226	0.311	1.810	2.590		
	K-1	-1.460	-0.741	-0.229	0.413	0.604	0.730	2.360	2.600		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	0	2	3		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 150°C - 3/8 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.163	-0.193	-0.345	-0.276	0.057	0.558	2.130			
	Max	0.00	0.00	0.290	0.097	1.493	2.429	5.141			
	Min	-0.311	-0.360	-0.590	-0.614	-0.408	-0.380	0.448			
	Sigma	0.076	0.087	0.167	0.157	0.459	0.747	1.290			
	K-1	-0.276	-0.145	1.440	0.229	1.700	1.210	1.060			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	0	0			
100K	Avg.	-0.159	-0.227	-0.227	-0.175	0.547	1.790	4.010	4.690		
	Max	0.287	0.133	0.518	1.130	2.991	5.868	8.474	9.246		
	Min	-0.459	-0.589	-0.649	-0.805	-0.544	0.00	1.438	1.734		
	Sigma	0.147	0.153	0.218	0.363	0.807	1.410	1.880	2.070		
	K-1	0.694	-0.039	0.775	1.460	1.140	1.190	0.842	0.632		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	0	0	2	8	13		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

TABLE II TEMPERATURE LOAD MATRIX

TEST 150°C - 1/2 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.235	-0.238	-0.293	0.547	1.810	2.820	4.620			
	Max	-0.097	-0.077	0.488	1.851	3.865	5.604	8.909			
	Min	-0.485	-0.520	-1.296	-0.253	0.097	0.780	2.000			
	Sigma	0.089	0.108	0.393	0.616	0.914	1.030	1.450			
	K-1	-1.100	-1.100	-0.006	0.781	0.272	0.476	1.020			
	N	30	30	30	30	30	30	30			
	Fails	0	0	0	0	0	2	11			
	Avg.	-0.219	-0.359	-0.022	0.981	3.890	6.450	6.600	7.320		
	Max	0.00	-0.039	1.154	5.987	13.430	45.210	19.620	21.351		
	Min	-0.693	-0.904	-0.416	-0.070	0.766	1.116	2.070	2.899		
	Sigma	0.158	0.196	0.385	1.280	2.880	8.030	4.210	4.430		
	K-1	-1.020	-0.859	1.620	2.270	1.510	3.800	1.770	1.770		
	N	30	30	30	30	30	30	30	30		
	Fails	0	0	0	1	7	14	15	19		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

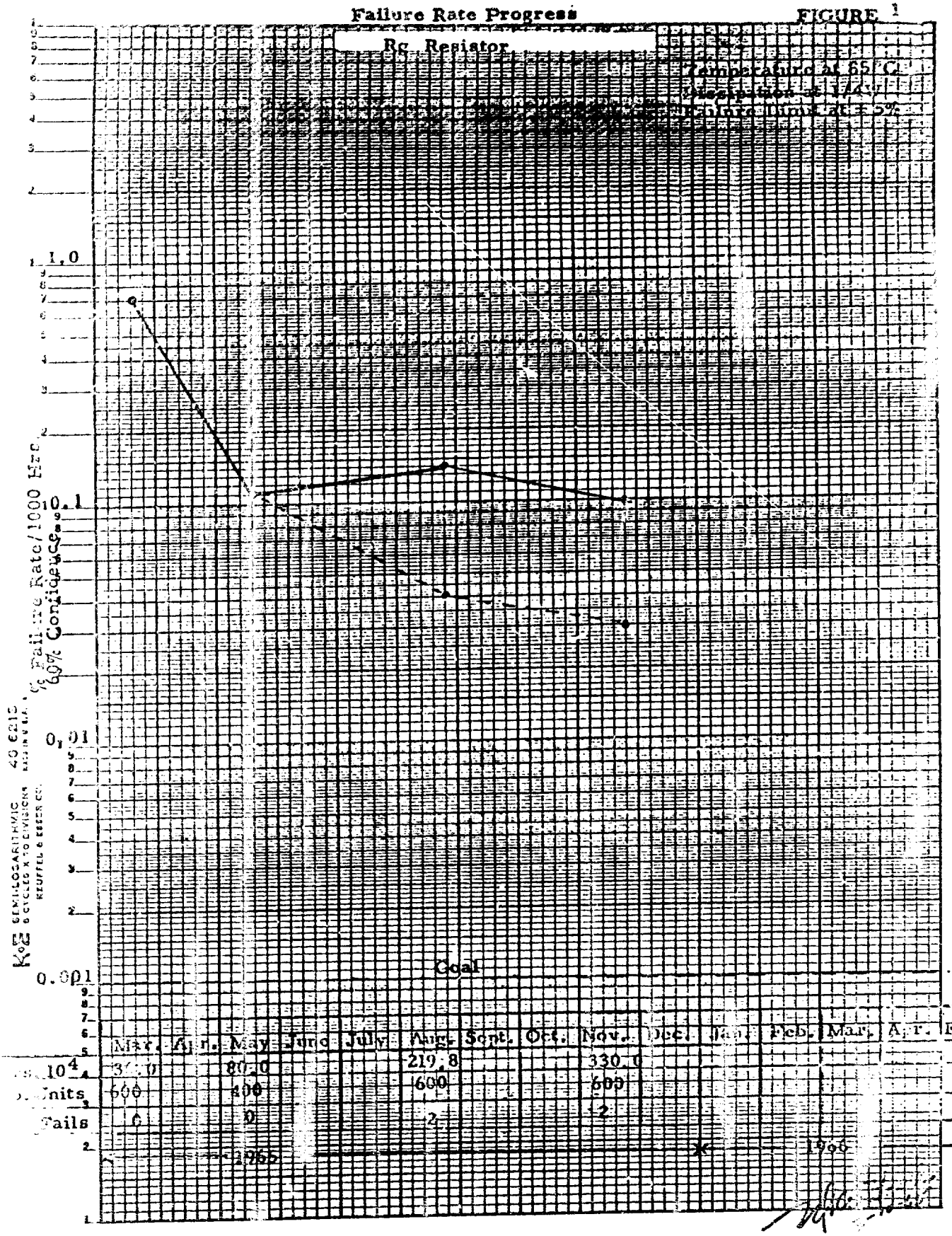
TABLE II TEMPERATURE LOAD MATRIX

TEST 150°C - 3/4 W Fail. Limit ± 5.0%

RANGE		HOURS									
		50	100	250	500	750	1000	2000	3000	4000	5000
100Ω	Avg.	-0.044	0.772	2.960	4.340	5.230	7.010	8.080			
	Max	0.868	3.418	7.241	8.347	10.274	52.95	54.48			
	Min	-0.651	-0.493	0.284	2.094	2.782	3.435	4.025			
	Sigma	0.348	0.972	1.740	1.560	1.890	8.680	8.930			
	K-1	0.850	1.180	0.685	0.685	1.060	4.910	4.650			
	N	30	30	30	30	30	30	30			
	Fails	0	0	5	8	13	14	23			
100K	Avg.	-0.528	-0.323	3.990	5.930	7.380	7.970	9.360	10.100		
	Max	0.743	0.973	9.320	12.276	14.721	15.359	16.798	17.866		
	Min	-12.21	-11.88	0.980	1.099	1.485	1.683	2.574	2.564		
	Sigma	2.180	2.180	1.670	2.290	2.980	3.170	3.560	3.830		
	K-1	-5.050	-4.930	0.807	0.483	0.556	0.478	0.421	0.395		
	N	30	30	30	30	30	30	30	30		
	Fails	1	1	8	23	26	27	29	29		
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										
	Avg.										
	Max										
	Min										
	Sigma										
	K-1										
	N										
	Fails										

Failure Rate Progress

FIGURE 1



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RETRIEVAL DISTRIBUTION FIG. 2

CELL WIDTH 0.100 % 85E - 1/4 WATT - 10^ 5000 Hrs.

```
                    0         10        20        30        40        50
CELL   NO.          .         .         .         .         .         .
-----------------------------------------------------------------------

-OVER (00000) I

-0006 (00001) IX
-0005 (00000) I
-0004 (00001) IX
-0003 (00001) IX
-0002 (00002) IXX
-0001 (00004) IXXXX
 0000 (00028) IXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0001 (00020) IXXXXXXXXXXXXXXXXXXXX
 0002 (00018) IXXXXXXXXXXXXXXXXXX
 0003 (00012) IXXXXXXXXXXXX
 0004 (00000) I
 0005 (00003) IXXX
 0006 (00002) IXX
 0007 (00003) IXXX
 0008 (00002) IXX
 0009 (00000) I
 0010 (00001) IX
 0011 (00000) I
 0012 (00000) I
 0013 (00000) I
 0014 (00000) I
 0015 (00001) IX
 0016 (00000) I
 0017 (00000) I
 0018 (00000) I
 0019 (00000) I
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 0041 (00000) I
 0042 (00000) I
 0043 (00000) I
 0044 (00000) I
 0045 (00000) I
 0046 (00000) I
 0047 (00000) I
 0048 (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.19362.00
VARIANCE	0.30210.00
STD. DEV.	0.54964.00
SKEWNESS	0.68253.01
KURTOSIS	0.58917.02

RETRIEVAL DISTRIBUTION FIG 3

CELL WIDTH 0.100 % 85°C - 1/4 WATT - 10^ - 6000 Hours

```
                 0         10        20        30        40        50
CELL   NO.       +         +         +         +         +         +
-----------------------------------------------------------------------

-OVER (00000) I

-0002 (00007) IXXXXXXX
-0001 (00004) IXXXX
 0000 (00035) IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0001 (00016) IXXXXXXXXXXXXXXXX
 0002 (00017) IXXXXXXXXXXXXXXXXX
 0003 (00004) IXXXX
 0004 (00000) I
 0005 (00005) IXXXXX
 0006 (00004) IXXXX
 0007 (00001) IX
 0008 (00005) IXXXXX
 0009 (00000) I
 0010 (00000) I
 0011 (00001) IX
 0012 (00000) I
 0013 (00000) I
 0014 (00000) I
 0015 (00000) I
 0016 (00000) I
 0017 (00000) I
 0018 (00000) I
 0019 (00001) IX

 OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000-03
MEAN	0.15577-00
VARIANCE	0.89640--01
STD. DEV.	0.29940-00
SKEWNESS	0.24213-01
KURTOSIS	0.13230-02

RETRIEVAL DISTRIBUTION F.G. 4

CELL WIDTH 0.100 % 85°C - 1/4 WATT - 1K^2 - 5000 HRS

```
                 0         10        20        30        40        50
CELL   NO.       ↓         ↓         ↓         ↓         ↓         ↓
-----------------------------------------------------------------------

-OVER (00000) I

 0000 (00000) I
 0001 (00004) IXXXX
 0002 (00016) IXXXXXXXXXXXXXXXX
 0003 (00039) IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0004 (00025) IXXXXXXXXXXXXXXXXXXXXXXXXX
 0005 (00009) IXXXXXXXXX
 0006 (00005) IXXXXX
 0007 (00002) IXX

 OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.29483.00
VARIANCE	0.16192.-01
STD. DEV.	0.12709.00
SKEWNESS	0.68204.00
KURTOSIS	0.35518.01

RETRIEVAL DISTRIBUTION FIG 8

CELL WIDTH 0.100 % 85°C - 1/4 WATT - 1K^ - 6000 Hrs

```
                 0         10        20        30        40        50
CELL   NO.       ↓         ↓         ↓         ↓         ↓         ↓
-----------------------------------------------------------------------

-OVER (00000) I

 0000 (00001) IX
 0001 (00004) IXXXX
 0002 (00019) IXXXXXXXXXXXXXXXXXXX
 0003 (00042) IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0004 (00020) IXXXXXXXXXXXXXXXXXXXX
 0005 (00006) IXXXXXX
 0006 (00005) IXXXXX
 0007 (00003) IXXX

 OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.28817.00
VARIANCE	0.17671.-01
STD. DEV.	0.13293.00
SKEWNESS	0.66661.00
KURTOSIS	0.36023.01

RETRIEVAL DISTRIBUTION

FIG. 6

CELL WIDTH 0.100 % 85°C - 1/4 WATT - 10KΩ - 5000 HRS

```
                 0         10        20        30        40        50
CELL   NO.       *         *         *         *         *         *
-----------------------------------------------------------------------

-OVER (00050) I

-0013 (00001) IX
-0012 (00000) I
-0011 (00001) IX
-0010 (00000) I
-0009 (00000) I
-0008 (00000) I
-0007 (00000) I
-0006 (00000) I
-0005 (00000) I
-0004 (00001) IX
-0003 (00000) I
-0002 (00002) IXX
-0001 (00002) IXX
 0000 (00001) IX
 0001 (00005) IXXXXX
 0002 (00009) IXXXXXXXXX
 0003 (00017) IXXXXXXXXXXXXXXXXX
 0004 (00012) IXXXXXXXXXXXX
 0005 (00014) IXXXXXXXXXXXXXX
 0006 (00012) IXXXXXXXXXXXX
 0007 (00008) IXXXXXXXX
 0008 (00007) IXXXXXXX
 0009 (00003) IXXX
 0010 (00003) IXXX
 0011 (00001) IX
 0012 (00001) IX

 OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.38471.00
VARIANCE	0.12201.00
STD. DEV.	0.34930.00
SKEWNESS	-0.15787.01
KURTOSIS	0.91320.01

RETRIEVAL DISTRIBUTION FIG. 7

CELL WIDTH 0.100 % 85°C 1/4 WATT 10KΩ 6000 HRS.

```
                    0         10        20        30        40        50
CELL   NO.          ↑         ↑         ↑         ↑         ↑         ↑
-----------------------------------------------------------------------------

-OVER (00000) I

-0036 (00001) IX
-0035 (00000) I
-0034 (00000) I
-0033 (00000) I
-0032 (00000) I
-0031 (00000) I
-0030 (00000) I
-0029 (00000) I
-0028 (00000) I
-0027 (00000) I
-0026 (00000) I
-0025 (00000) I
-0024 (00000) I
-0023 (00000) I
-0022 (00000) I
-0021 (00000) I
-0020 (00000) I
-0019 (00000) I
-0018 (00000) I
-0017 (00000) I
-0016 (00000) I
-0015 (00000) I
-0014 (00000) I
-0013 (00000) I
-0012 (00000) I
-0011 (00000) I
-0010 (00001) IX
-0009 (00000) I
-0008 (00000) I
-0007 (00000) I
-0006 (00000) I
-0005 (00000) I
-0004 (00001) IX
-0003 (00000) I
-0002 (00001) IX
-0001 (00003) IXXX
 0000 (00000) I
 0001 (00004) IXXXX
 0002 (00012) IXXXXXXXXXXXX
 0003 (00016) IXXXXXXXXXXXXXXXX
 0004 (00013) IXXXXXXXXXXXXX
 0005 (00013) IXXXXXXXXXXXXX
 0006 (00017) IXXXXXXXXXXXXXXXXX
 0007 (00005) IXXXXX
 0008 (00005) IXXXXX
 0009 (00002) IXX
 0010 (00000) I
 0011 (00003) IXXX
 0012 (00001) IX
 0013 (00001) IX
 0014 (00001) IX

OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.36742.00
VARIANCE	0.25822.00
STD. DEV.	0.50816.00
SKEWNESS	-0.47156.01
KURTOSIS	0.37914.02

RETRIEVAL DISTRIBUTION FIG. 8

CELL WIDTH 0.100 S 85°C - 1/4 WATT - 39 KM - 5000 HRS

```
                    0         10        20        30        40        50
CELL   NO.          *         *         *         *         *         *
-----------------------------------------------------------------------

-OVER (00000) I

-0018 (00001) IX
-0017 (00000) I
-0016 (00000) I
-0015 (00000) I
-0014 (00000) I
-0013 (00000) I
-0012 (00000) I
-0011 (00000) I
-0010 (00000) I
-0009 (00000) I
-0008 (00000) I
-0007 (00000) I
-0006 (00000) I
-0005 (00000) I
-0004 (00000) I
-0003 (00001) IX
-0002 (00000) I
-0001 (00000) I
 0000 (00001) IX
 0001 (00010) IXXXXXXXXXX
 0002 (00016) IXXXXXXXXXXXXXXXX
 0003 (00026) IXXXXXXXXXXXXXXXXXXXXXXXXXX
 0004 (00010) IXXXXXXXXXX
 0005 (00013) IXXXXXXXXXXXXX
 0006 (00009) IXXXXXXXXX
 0007 (00004) IXXXX
 0008 (00001) IX
 0009 (00003) IXXX
 0010 (00001) IX
 0011 (00002) IXX
 0012 (00000) I
 0013 (00000) I
 0014 (00000) I
 0015 (00000) I
 0016 (00001) IX
 0017 (00000) I
 0018 (00000) I
 0019 (00000) I
 0020 (00001) IX

OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.33655.00
VARIANCE	0.13640.00
STD. DEV.	0.36933.00
SKEWNESS	-0.58424.00
KURTOSIS	0.16167.02

RETRIEVAL DISTRIBUTION FIG. 9

CELL WIDTH 0.100 % 852 - 1/4 WAIT - 59 kΩ - 6000 Hrs.

```
                    0         10        20        30        40        50
CELL   NO.          ↑         ↑         ↑         ↑         ↑         ↑
-----------------------------------------------------------------------

-OVER (00000) I

-0019 (00001) IX
-0018 (00000) I
-0017 (00000) I
-0016 (00000) I
-0015 (00000) I
-0014 (00000) I
-0013 (00000) I
-0012 (00000) I
-0011 (00000) I
-0010 (00000) I
-0009 (00000) I
-0008 (00000) I
-0007 (00000) I
-0006 (00000) I
-0005 (00000) I
-0004 (00000) I
-0003 (00000) I
-0002 (00001) IX
-0001 (00000) I
 0000 (00000) I
 0001 (00012) IXXXXXXXXXXXX
 0002 (00010) IXXXXXXXXXX
 0003 (00029) IXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0004 (00012) IXXXXXXXXXXXX
 0005 (00014) IXXXXXXXXXXXXXX
 0006 (00005) IXXXXX
 0007 (00006) IXXXXXX
 0008 (00002) IXX
 0009 (00005) IXXXXX
 0010 (00000) I
 0011 (00002) IXX
 0012 (00000) I
 0013 (00000) I
 0014 (00000) I
 0015 (00000) I
 0016 (00001) IX

 OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.33880.00
VARIANCE	0.11617.00
STD. DEV.	0.34084.00
SKEWNESS	-0.16974.01
KURTOSIS	0.18730.02

RETRIEVAL DISTRIBUTION FIG. 10

CELL WIDTH 0.100 % 85°C - 1/4 WATT - 100° - 1000 HRS

```
                 0         10        20        30        40        50
CELL   NO.       ↓         ↓         ↓         ↓         ↓         ↓
-----------------------------------------------------------------------

-OVER (00000) I

-0003 (00001) IX
-0002 (00003) IXXX
-0001 (00048) IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0000 (00021) IXXXXXXXXXXXXXXXXXXXXX
 0001 (00025) IXXXXXXXXXXXXXXXXXXXXXXXXX
 0002 (00001) IX
 0003 (00001) IX

 OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000-03
MEAN	-0.14439-01
VARIANCE	0.41348-02
STD. DEV.	0.64302-01
SKEWNESS	0.85852-00
KURTOSIS	0.81357-01

RETRIEVAL DISTRIBUTION

Fig. 11

CELL WIDTH 0.100 E 85°C - 1/4 WATT - 100Ω - 2000 Hours

```
CELL   NO.    0         10        20        30        40        50        60
              ----------------------------------------------------------------
-OVER (00000) I

-0003 (00002) IXX
-0002 (00004) IXXXX
-0001 (00056) IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0000 (00018) IXXXXXXXXXXXXXXXXXX
 0001 (00018) IXXXXXXXXXXXXXXXXXX
 0002 (00001) IX
 0003 (00001) IX

OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000E03
MEAN	-0.27268E-01
VARIANCE	0.52249E-02
STD. DEV.	0.72283E-01
SKEWNESS	0.16205E00
KURTOSIS	0.83460E01

RETRIEVAL DISTRIBUTION F.C. 12

CELL WIDTH 0.100 % 8 sec - 1/4 WATT - 100 kΩ - 1000 Hrs.

```
                 0         10        20        30        40        50
CELL   NO.       +         +         +         +         +         +
-----------------------------------------------------------------------

-OVER (00001) IX

-0047 (00001) IX
-0046 (00000) I
-0045 (00000) I
-0044 (00000) I
-0043 (00000) I
-0042 (00000) I
-0041 (00000) I
-0040 (00000) I
-0039 (00000) I
-0038 (00000) I
-0037 (00000) I
-0036 (00000) I
-0035 (00000) I
-0034 (00000) I
-0033 (00000) I
-0032 (00000) I
-0031 (00000) I
-0030 (00000) I
-0029 (00000) I                    CALCULATIONS/SUMMARY
-0028 (00000) I
-0027 (00000) I
-0026 (00000) I                    NUMBER       0.10000-03
-0025 (00000) I
-0024 (00000) I                    MEAN        -0.18602-00
-0023 (00000) I
-0022 (00000) I                    VARIANCE     0.18044-01
-0021 (00000) I
-0020 (00000) I                    STD. DEV.    0.13433-01
-0019 (00000) I
-0018 (00000) I                    SKEWNESS    -0.03594-01
-0017 (00000) I
-0016 (00000) I                    KURTOSIS     0.75459-02
-0015 (00000) I
-0014 (00000) I
-0013 (00000) I
-0012 (00000) I
-0011 (00000) I
-0010 (00000) I
-0009 (00000) I
-0008 (00000) I
-0007 (00000) I
-0006 (00000) I
-0005 (00001) IX
-0004 (00001) IX
-0003 (00003) IXXX
-0002 (00009) IXXXXXXXXX
-0001 (00040) IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0000 (00014) IXXXXXXXXXXXXXX
 0001 (00018) IXXXXXXXXXXXXXXXXXX
 0002 (00008) IXXXXXXXX
 0003 (00002) IXX
 0004 (00000) I
 0005 (00000) I
 0006 (00001) IX
 0007 (00001) IX
```

RETRIEVAL DISTRIBUTION

Fig. 13

CELL WIDTH 0.100 E 839 - 1/4 Watt - 100K - 2000 Hrs

CELL NO.	0	10	20	30	40	50
-OVER (00001)	IX					
-0054 (00001)	IX					
-0053 (00000)	I					
-0052 (00000)	I					
-0051 (00000)	I					
-0050 (00000)	I					
-0049 (00000)	I					
-0048 (00000)	I					
-0047 (00000)	I					
-0046 (00000)	I					
-0045 (00000)	I					
-0044 (00000)	I					
-0043 (00000)	I					
-0042 (00000)	I					
-0041 (00000)	I					
-0040 (00000)	I					
-0039 (00000)	I					
-0038 (00000)	I					
-0037 (00000)	I					
-0036 (00000)	I					
-0035 (00000)	I					
-0034 (00000)	I					
-0033 (00000)	I					
-0032 (00000)	I					
-0031 (00000)	I					
-0030 (00000)	I					
-0029 (00000)	I					
-0028 (00000)	I					
-0027 (00000)	I					
-0026 (00000)	I					
-0025 (00000)	I	-0005 (00000)	I			
-0024 (00000)	I	-0004 (00002)	IXX			
-0023 (00000)	I	-0003 (00000)	I			
-0022 (00000)	I	-0002 (00009)	IXXXXXXXXX			
-0021 (00000)	I	-0001 (00017)	IXXXXXXXXXXXXXXXXX			
-0020 (00000)	I	0000 (00010)	IXXXXXXXXXX			
-0019 (00000)	I	0001 (00029)	IXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
-0018 (00000)	I	0002 (00016)	IXXXXXXXXXXXXXXXX			
-0017 (00000)	I	0003 (00009)	IXXXXXXXXX			
-0016 (00000)	I	0004 (00002)	IXX			
-0015 (00000)	I	0005 (00002)	IXX			
-0014 (00000)	I	0006 (00000)	I			
-0013 (00000)	I	0007 (00000)	I			
-0012 (00000)	I	0008 (00000)	I			
-0011 (00000)	I	0009 (00001)	IX			
-0010 (00000)	I	0010 (00000)	I			
-0009 (00000)	I	0011 (00001)	IX			
-0008 (00000)	I					
-0007 (00000)	I	OVER (00000)	I			
-0006 (00000)	I					

CALCULATIONS/SUMMARY

NUMBER	0.10000+03
MEAN	-0.79361+-01
VARIANCE	0.13769+01
STD. DEV.	0.11734+01
SKEWNESS	-0.74195+01
KURTOSIS	0.60790+02

RETRIEVAL DISTRIBUTION F.G. 14

CELL WIDTH 0.100 % 85 E. 1/4 WATT - 100K^ - 3000 Hours

```
CELL   NO.        0         10        20        30        40        50
                  ♦         ♦         ♦         ♦         ♦         ♦
-----------------------------------------------------------------------

-OVER (00000) I

-0056 (00001) IX
-0055 (00000) I
-0054 (00000) I
-0053 (00000) I
-0052 (00000) I
-0051 (00000) I
-0050 (00000) I
-0049 (00000) I
-0048 (00000) I
-0047 (00000) I
-0046 (00000) I

-0021 (00000) I
-0020 (00000) I
-0019 (00000) I
-0018 (00000) I
-0017 (00000) I
-0016 (00000) I
-0015 (00000) I
-0014 (00000) I
-0013 (00000) I
-0012 (00000) I
-0011 (00000) I
-0010 (00000) I
-0009 (00000) I
-0008 (00000) I
-0007 (00000) I
-0006 (00000) I
-0005 (00001) IX
-0004 (00001) IX
-0003 (00000) I
-0002 (00004) IXXXX
-0001 (00013) IXXXXXXXXXXXXX
 0000 (00008) IXXXXXXXX
 0001 (00023) IXXXXXXXXXXXXXXXXXXXXXXX
 0002 (00025) IXXXXXXXXXXXXXXXXXXXXXXXXX
 0003 (00010) IXXXXXXXXXX
 0004 (00007) IXXXXXXX
 0005 (00000) I
 0006 (00002) IXX
 0007 (00001) IX
 0008 (00000) I
 0009 (00000) I
 0010 (00000) I
 0011 (00001) IX
 0012 (00000) I
 0013 (00001) IX
 0014 (00000) I
 0015 (00000) I
 0016 (00001) IX
 0017 (00001) IX

OVER (00000) I
```

CALCULATIONS/SUMMARY

NUMBER	0.10000.03
MEAN	0.97821.-01
VARIANCE	0.41141.00
STD. DEV.	0.64141.00
SKEWNESS	-0.63103.01
KURTOSIS	0.59167.02

NO. 340R-10 KEUFFEL & ESSER CO. GRAPH PAPER
10 X 10 PER INCH
EUGENE DIETZGEN CO.
MADE IN U. S. A.

RG 14 — 48 Hour Load Life - 85°C ¼ W — 10-26-85

Fig. 15

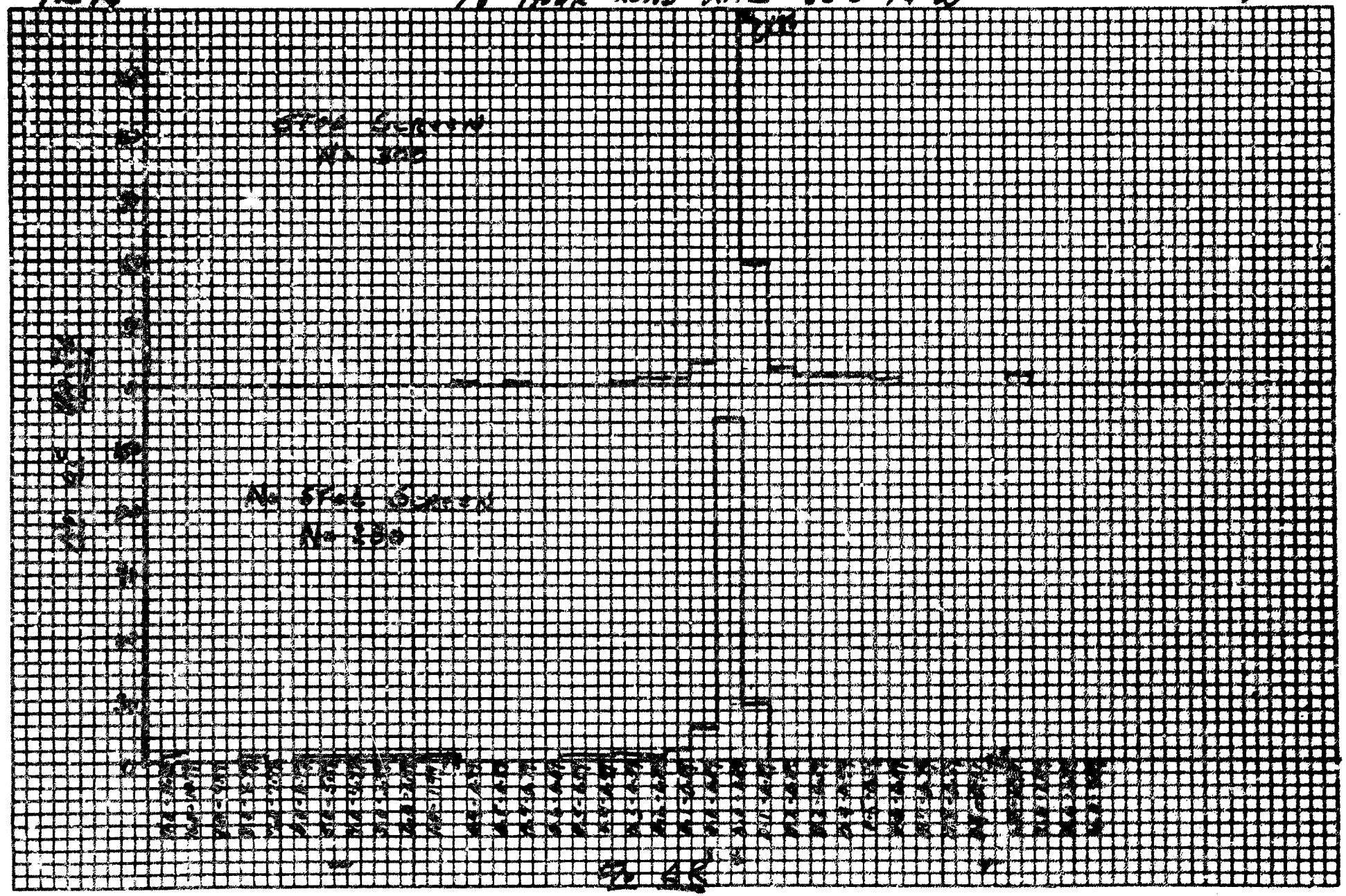


Fig. 16

Fig. 17.

Fig. 15

°C TEMPERATURE RISE AT 70°C AMBIENT

GOVERNMENT CONTRACT 88-71-20

	LOAD - WATTS						
	1/8	1/4	3/8	1/2	5/8	3/4	1
10Ω	10.5 9.5	20.8 17.5	26.2 28.5	35.0 36.0	45.4 48.6	47.0 55.5	70.0 75.5
100Ω	11.5 11.0	20.9 21.2	23.4 26.6	37.0 42.0	49.8 51.8	51.0 57.5	62.0 75.7
1KΩ	9.5 9.0	18.5 17.5	26.8 24.8	36.0 33.0	48.0 53.4	49.5 46.0	49.9 63.5
10KΩ	9.5 11.5	20.0 22.5	27.8 31.0	37.0 39.0	52.0 53.4	60.5 60.5	79.3 81.3
39KΩ	10.5 10.5	20.8 21.5	29.5 32.5	35.0 37.0	46.0 49.0	53.0 54.5	73.5 76.5
100KΩ	9.5 7.5	18.2 15.2	28.2 27.5	39.0 36.0	51.8 49.8	56.5 52.0	73.5 68.5
AVG.	10.0	19.5	27.7	36.8	49.9	53.6	70.8
MAX.	11.5	22.5	32.5	42.0	53.4	60.5	81.3
MIN.	7.5	15.2	23.4	33.0	45.6	46.0	49.9

10/5/65

Fig 19

°C TEMPERATURE RISE AT 100°C AMBIENT

GOVERNMENT CONTRACT 88-71-20

	LOAD - WATTS						
	1/8	1/4	3/8	1/2	5/8	3/4	1
10Ω	8.5 11.5	19. 23.0	21.7 24.5	28.0 34.0	39.6 46.6	48.0 57.0	60.2 67.4
100Ω	13.0 8.5	22.8 24.0	27.3 27.5	31.0 31.0	41.6 41.8	48.2 49.0	59.2 60.8
1KΩ	8.5 12.5	19.5 24.8	25.0 28.9	31.0 34.0	42.8 47.0	50.0 53.0	66.6 70.5
10KΩ	8.5 7.5	15.2 15.8	28.3 26.3	29.0 26.0	40.6 41.4	52.4 52.4	67.2 67.4
39KΩ	11.5 12.5	22.0 25.2	31.0 34.7	36.0 41.0	48.8 52.8	59.0 64.0	76.8 84.8
100KΩ	8.5 8.5	18.6 17.8	29.0 27.0	34.0 32.0	44.8 42.8	53.4 51.4	69.1 65.4
AVG.	9.9	20.7	27.5	32.4	44.2	53.1	67.9
MAX.	13.0	25.2	34.7	41.0	52.8	64.0	84.8
MIN.	7.5	15.2	21.7	28.0	39.6	48.0	59.2

10/8/65

Fig. 20

°C TEMPERATURE RISE AT 125°C AMBIENT

Government Contract 88-71-20

Resistance	LOAD - WATTS						
	1/8	1/4	3/8	1/2	5/8	3/4	1
10Ω	5.0 5.0	12.6 11.6	22.8 21.8	9.0 27.0	48.0 45.4	48.0 46.0	74.0 68.2
100Ω	9.5 9.5	22.5 21.5	25.5 25.5	11.0 32.0	40.6 40.0	47.6 47.0	55.2 51.9
1KΩ	0.0 1.5	11.5 11.5	16.8 21.0	22.0 27.0	34.4 40.4	38.0 43.4	62.4 50.9
10KΩ	3.0 3.5	13.8 12.2	20.8 17.5	28.0 26.0	42.4 38.4	51.0 46.4	72.9 60.4
39KΩ	8.5 9.5	21.0 20.5	29.8 29.2	35.0 36.0	47.4 47.4	54.0 56.0	74.2 74.8
100KΩ	3.5 3.5	14.6 13.8	22.8 22.5	31.0 30.0	41.8 40.0	49.0 45.0	65.8 61.5
AVG.	5.2	15.6	23.0	26.2	42.2	47.4	64.3
MAX.	9.5	22.5	29.8	36.0	48.0	56.0	74.9
MIN.	0.0	11.5	16.8	9.0	34.4	38.0	50.9

10/8/65

Fig. 21

°C TEMPERATURE RISE AT 150°C AMBIENT

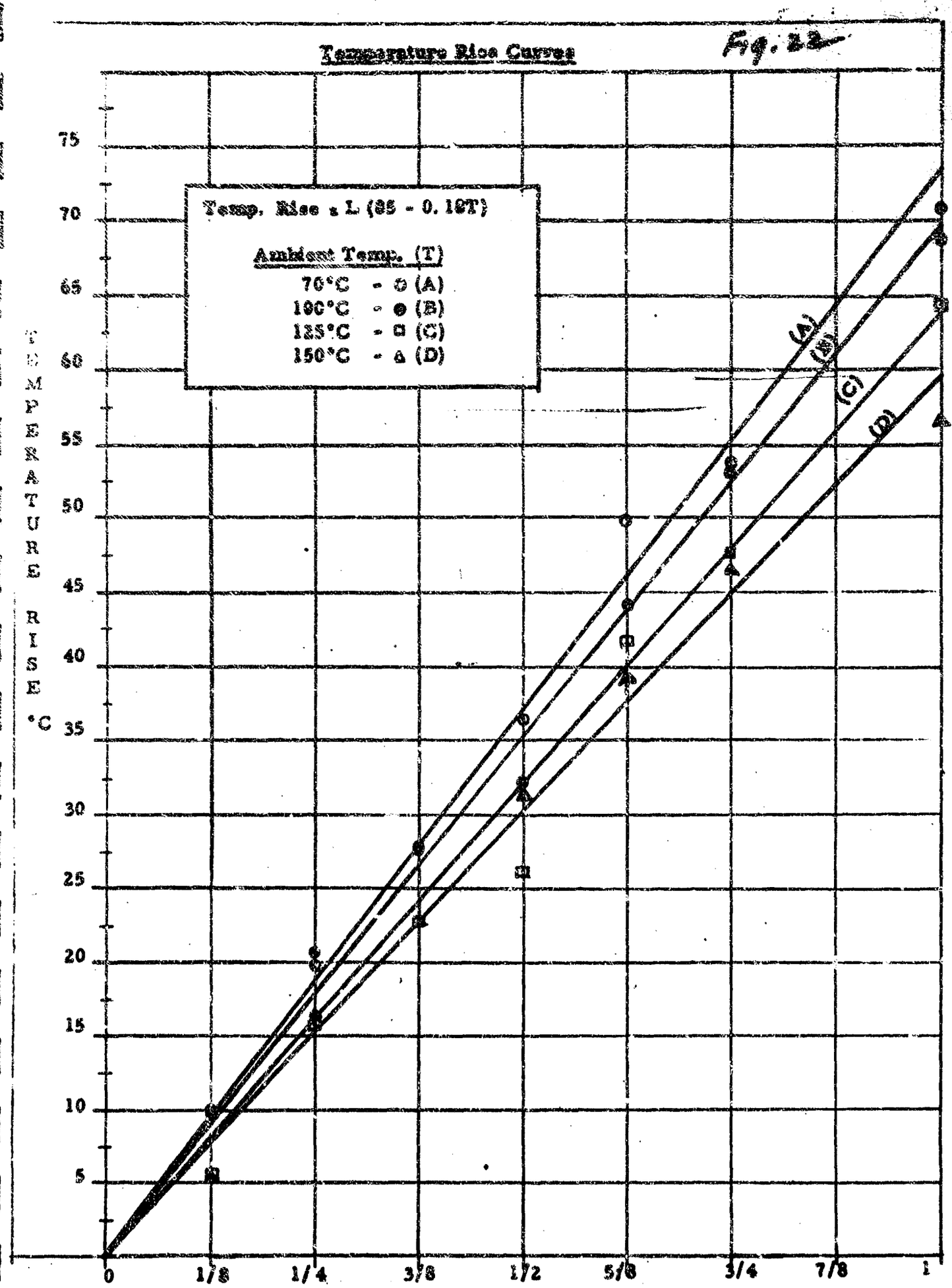
GOVERNMENT CONTRACT 88-71-20

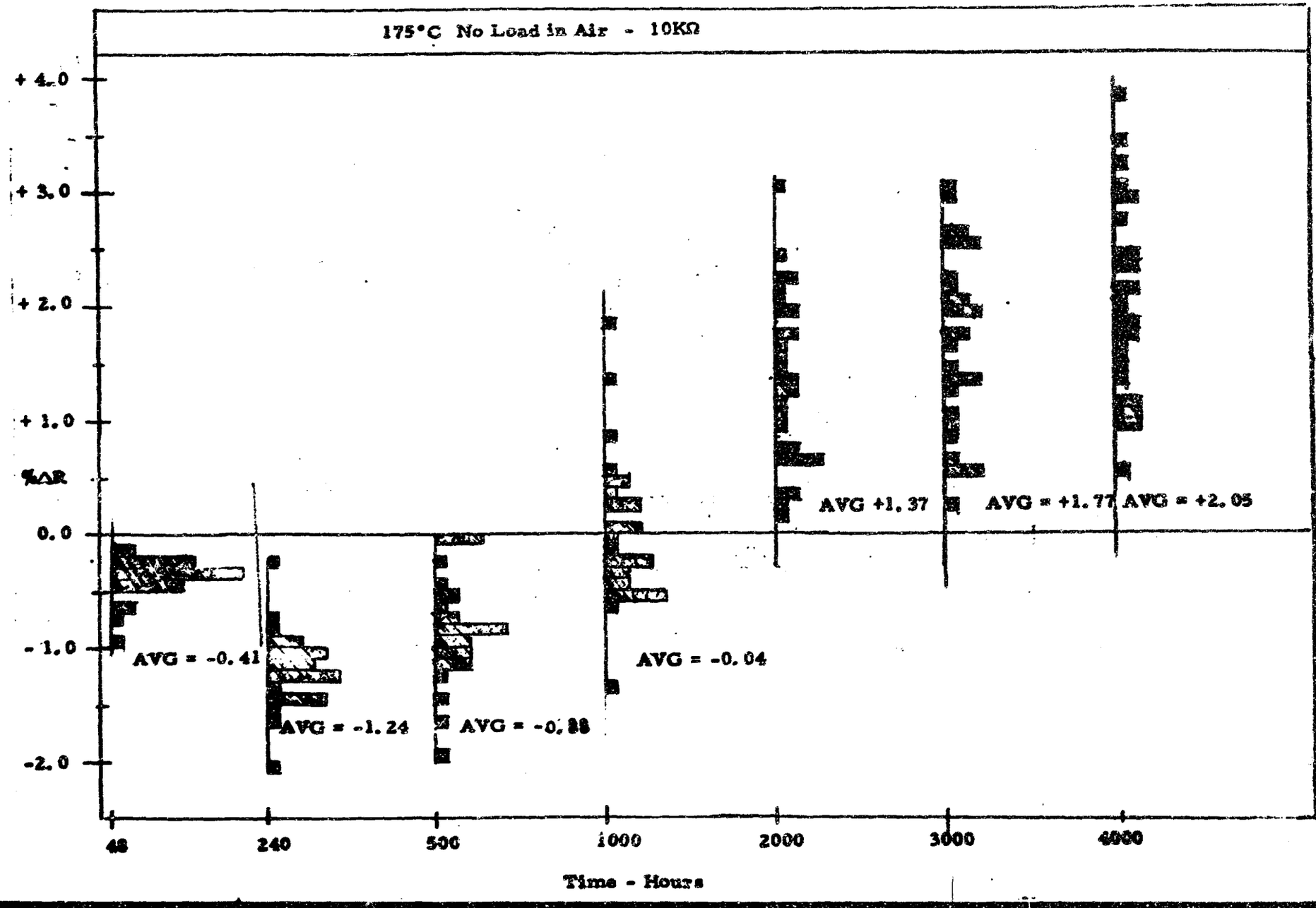
	LOAD - WATTS						
Size	1/8	1/4	3/8	1/2	5/8	3/4	1
10Ω	2.0 3.0	10.0 10.0	20.8 22.6	30.0 29.0	37.4 31.8	42.0 40.0	42.0 42.0
100Ω	7.0 9.5	20.2 22.0	21.8 23.2	27.0 31.0	38.6 40.4	47.4 51.0	63.0 59.0
1KΩ	3.0 4.0	16.2 17.0	22.4 22.4	32.0 32.0	40.7 43.4	45.0 44.5	62.8 61.4
10KΩ	3.0 5.0	14.0 17.0	20.0 24.2	31.0 33.0	34.8 38.4	41.4 47.5	51.6 58.2
39KΩ	9.0 9.0	21.8 22.0	27.4 30.0	35.0 43.0	38.0 45.6	48.0 55.6	54.0 67.5
100KΩ	1.5 4.0	13.0 14.2	19.8 22.2	30.0 33.0	37.8 40.7	51.0 47.0	58.5 59.0
AVG.	5.2	16.4	23.1	32.2	38.9	46.7	56.5
MAX.	9.5	22.0	30.0	43.0	45.6	55.6	67.5
MIN.	1.5	10.0	19.8	27.0	31.8	40.0	42.0

10/8/65

Fig. 22

Temperature Rise Curves




175°C No Load in Air - 10KΩ
+ 4.0
+ 3.0
+ 2.0
+ 1.0
%ΔR
0.0
- 1.0
-2.0
AVG = -0.41
AVG = -1.24
AVG = -0.88
AVG = -0.04
AVG +1.37
AVG = +1.77
AVG = +2.05
48
240
500
1000
2000
3000
4000
Time - Hours

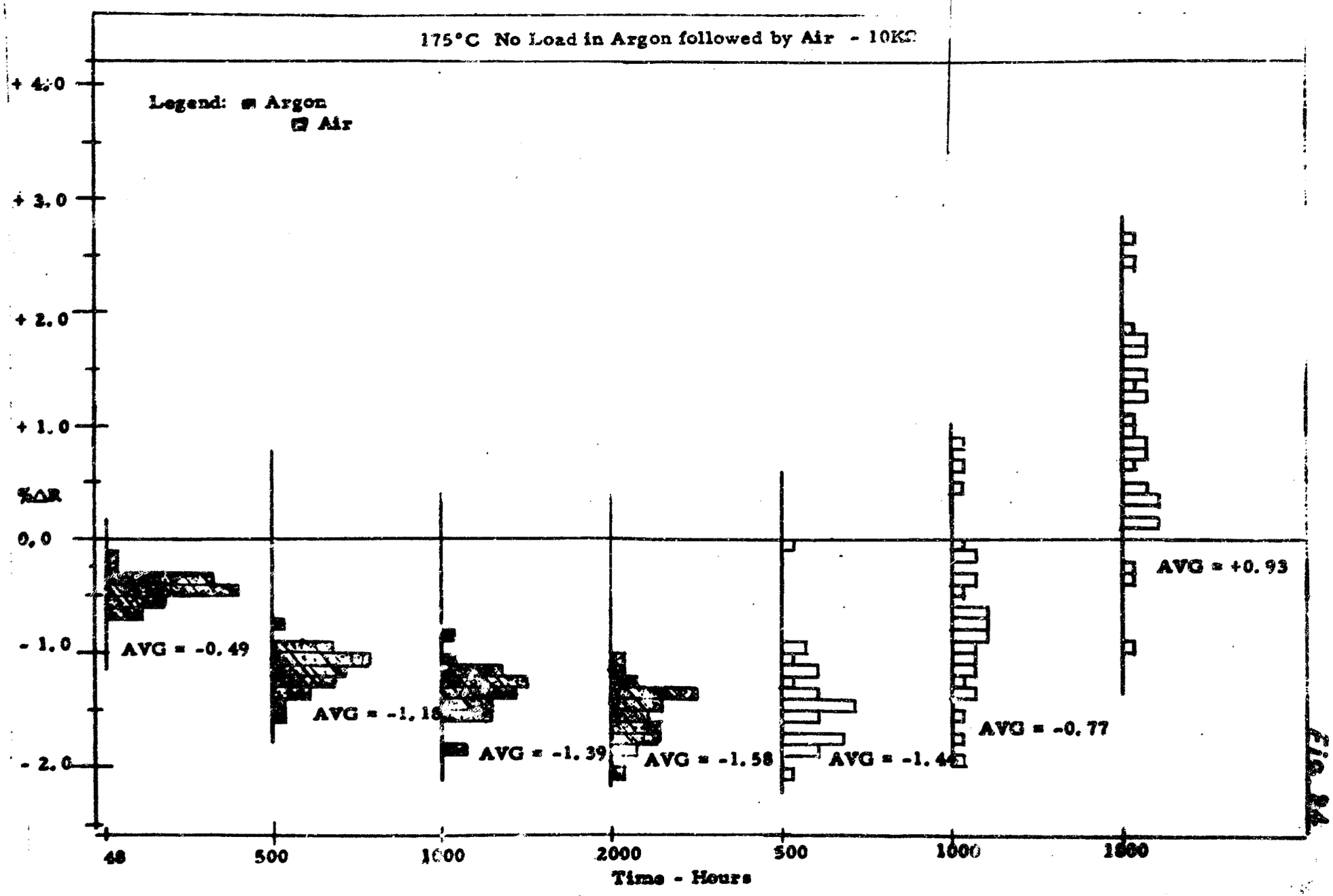

175°C No Load in Argon followed by Air - 10KΩ
Legend: Argon
Air
+ 4.0
+ 3.0
+ 2.0
+ 1.0
%ΔR
0.0
- 1.0
- 2.0
AVG = -0.49
AVG = -1.18
AVG = -1.39
AVG = -1.58
AVG = -1.46
AVG = -0.77
AVG = +0.93
48
500
1000
2000
500
1000
1500
Time - Hours

Fig. 24

PREPARED BY: M. DIXON

CHECKED BY: W. HAWK

APPROVED BY: S. MATTIE

TITLE: SUMMARY OF MIL-R-11E PERFORMANCE QUALIFICATION

CONTRACT PROJECT - 88-7-20 MOLD RUNNER -6

LOADABLE PERCENT CHANGE

RESISTANCE & DATA NO		RESISTANCE - TEMPERATURE CHARACTERISTIC (-25, +25, +85, +105)				VOLTAGE COEFFICIENT % PER VOLT	DIELECTRIC STRENGTH	INSULATION STRENGTH (MEGA)	DATA NO	LOW TEMP OPERATION	TEMPERATURE CYCLE	MOISTURE RESISTANCE			
		75	35	+65	+105							LOAD	SIMULATED FREEDOM (MEGA)	NO LOAD	
10Ω 30252	AVERAGE	-0.14	-0.83	+0.77	+1.37	NA	—	ALL	30 25 3	-0.10	-0.11	-0.50	ALL	-3.58	ALL
	SPAN	-0.20	-0.90	+1.73	+1.92		—	10⁵		-1.51	-0.20	+1.01	10⁴	+1.91	10⁴
		-0.90	-1.22	-0.50	+1.00		—	MEGA		-0.10	-0.9	-1.09	MEGA	-2.10	MEGA
	FAIL	0	0	0	0		0	0		0	0	0/5	0/5	0/5	0/5
10Ω 30258	AVERAGE	-0.71	-1.10	+1.08	+1.63	NA	—	ALL	30 25 9	-0.09	-0.06	-0.56	ALL	-0.66	ALL
	SPAN	-0.61	-0.61	+1.68	+2.12		—	10⁵		+0.20	+0.50	+1.21	10⁴	+1.10	10⁴
		-0.81	-1.41	+0.60	+1.30		—	MEGA		-0.30	0.0	0.0	MEGA	0.0	MEGA
	FAIL	0	0	0	0		0	0		0	0	0/5	0/5	0/5	0/5
10Ω 30264	AVERAGE	-0.44	-1.01	+0.93	+1.64	NA	—	ALL	30 26 5	+0.05	+0.09	+0.42	ALL	+0.36	ALL
	SPAN	-0.60	-0.40	+1.32	+2.21		—	10⁵		+1.10	+1.62	+2.00	10⁴	+1.80	10⁴
		-0.80	-1.81	+0.50	+1.02		—	MEGA		0.0	-0.10	-2.59	MEGA	0.0	MEGA
	FAIL	0	0	0	0		0	0		0	0	0/5	0/5	0/5	0/5
100Ω 30270	AVERAGE	-2.73	-4.20	+2.13	+4.52	NA	—	ALL	30 27 1	+0.02	+0.09	+0.68	ALL	+0.72	ALL
	SPAN	-2.90	-5.75	+3.92	+7.02		—	10⁵		+0.08	+0.19	+1.39	10⁴	+1.26	10⁴
		-3.30	-6.84	+2.84	+6.09		—	MEGA		-0.07	-0.09	-0.28	MEGA	-0.20	MEGA
	FAIL	10	10	10	10		0	0		0	0	0/5	0/5	0/5	0/5
100Ω 30276	AVERAGE	-2.60	-4.15	+2.32	+4.46	NA	—	ALL	30 27 7	+0.04	+0.03	+0.55	ALL	+0.40	ALL
	SPAN	-1.78	-5.76	+3.64	+7.31		—	10⁵		+0.06	0.0	+1.46	10⁴	+1.57	10⁴
		-3.10	-6.25	+2.19	+5.78		—	MEGA		-0.01	-0.10	+0.37	MEGA	+0.27	MEGA
	FAIL	10	10	10	10		0	0		0	0	0/5	0/5	0/5	0/5
100Ω 30282	AVERAGE	-3.21	-5.91	+2.82	+4.85	NA	—	ALL	30 28 3	+0.01	+0.03	+0.42	ALL	+0.29	ALL
	SPAN	-2.87	-5.47	+2.54	+4.07		—	10⁵		+0.09	+0.10	+0.54	10⁴	+0.53	10⁴
		-3.65	-6.17	+2.14	+4.30		—	MEGA		0.0	-0.07	+0.27	MEGA	+0.17	MEGA
	FAIL	10	10	10	10		0	0		0	0	0/5	0/5	0/5	0/5
1K 30288	AVERAGE	-0.92	-2.67	+1.00	-2.18	+.00166	—	ALL	30 28 9	+0.05	+0.06	+0.34	ALL	+0.31	ALL
	SPAN	-0.96	-1.70	+1.92	+2.84	+.0034	—	10⁵		+1.24	+0.05	+0.52	10⁴	+0.52	10⁴
		-1.62	-2.88	+0.66	+1.85	+.0014	—	MEGA		-0.05	-0.07	+0.18	MEGA	-0.06	MEGA
	FAIL	0	0	0	0	•	0	0		0	0	0/5	0/5	0/5	0/5
1K 30294	AVERAGE	-0.77	+1.31	+0.87	+1.87	+.0057	—	ALL	30 29 2	+0.03	+0.04	+0.42	ALL	+0.26	ALL
	SPAN	-0.18	+0.41	+1.76	+2.87	+.0027	—	10⁵		+0.07	+1.20	+1.14	10⁴	+0.29	10⁴
		-1.88	-3.23	+0.15	+0.17	.000	—	MEGA		-0.09	-0.05	+0.13	MEGA	-0.07	MEGA
	FAIL	0	0	0	0	0	0	0		0	0	0/5	0/5	0/5	0/5
1K 30300	AVERAGE	-0.89	-1.61	+0.02	+0.34	+.00198	—	ALL	30 30 1	+0.04	+0.05	+0.46	ALL	+0.53	ALL
	SPAN	-0.58	-1.08	+1.36	+2.62	+.00284	—	10⁵		+0.10	+0.3	+0.46	10⁴	+0.45	10⁴
		-1.31	-2.36	+0.71	+1.57	+.0014	—	MEGA		0.0	0.0	+0.36	MEGA	+0.17	MEGA
	FAIL	0	0	0	0	0	0	0		0	0	0/5	0/5	0/5	0/5
10K 30306	AVERAGE	-0.14	-0.47	+0.04	+0.15	-.00148	—	ALL	30 30 7	-0.01	-0.05	-0.21	ALL	-0.57	ALL
	SPAN	+0.28	+0.21	+0.09	+0.19	-.0002	—	10⁵		+0.03	+0.10	+0.35	10⁴	+0.48	10⁴
		0.0	-0.02	-0.11	-0.12	-.0035	—	MEGA		-0.04	-0.10	-0.11	MEGA	-0.29	MEGA
	FAIL	0	0	0	0	0	0	0		0	0	0/5	0/5	0/5	0/5
10K 30312	AVERAGE	-0.25	-0.54	+0.11	+0.11	-.00188	—	ALL	30 31 3	+0.10	+0.05	+0.36	ALL	+0.52	ALL
	SPAN	+0.30	+1.05	+0.12	+0.28	-.0009	—	10⁵		+0.10	+0.10	+0.58	10⁴	+0.53	10⁴
		-0.10	-0.48	-0.27	-0.28	-.0035	—	MEGA		-0.02	0.0	-0.22	MEGA	-0.07	MEGA
	FAIL	0	0	0	0	0	0	0		0	0	0/5	0/5	0/5	0/5
10K 30318	AVERAGE	-0.26	-0.46	-0.06	-0.09	-.00225	—	ALL	30 31 9	-0.04	-0.08	-0.41	ALL	-0.47	ALL
	SPAN	+0.40	+0.85	+0.18	+0.07	-.0011	—	10⁵		+0.09	+0.1	+0.28	10⁴	+0.14	10⁴
		-0.01	-0.1	-0.22	-0.35	-.0050	—	MEGA		-0.02	0.0	-0.31	MEGA	-0.21	MEGA
	FAIL	0	0	0	0	0	0	0		0	0	0/5	0/5	0/5	0/5

NOTE: ARITHMETIC AVERAGES OF ABSOLUTE CHANGES ARE SHOWN WITH ± OR ∓ INDICA

CE CHARACTERISTICS

TYPE R6

B - FIGURE 25

DATE - FEB. 10, 1965

AND POWDER -666

± 5% MOISTURE RESISTANCE LOAD	INSULATION RESISTANCE (MEGS.)	NO LOAD	INSULATION RESISTANCE (MEGS.)	SHORT TIME OVER LOAD	DATA Nº	± 5% 70° LOAD LIFE HOURS					DATA Nº	TERMINAL STRENGTH	EFFECT OF SOLDERING	DATA Nº	SHOCK TEST	HI-FREQUENCY VIBRATION	DATA Nº	SOLDER-ABILITY
						1K	2.5K	5K	7.5K	10K								
±0.50	ALL>	±0.58	ALL>	±0.06	30	0.0	0.0	0.0	4.0	±0.12	30	±0.05	±0.06	30	±0.10	±0.06	30	—
±1.21	10⁴	±1.4	10⁴	±0.51	025	0.0	0.0	0.0	0.0	±0.50	025	±0.0	±0.20	25	±0.3	±0.50	25	—
-0.09	MEG>	±0.0	MEG>	±0.0	34	0.0	0.0	0.0	0.0	±0.0	55	±0.28	0.0	56	±0.40	0.0	57	—
0/5	95	0/5	95	0		0	0	0	0	0		0	0		0	0		0
±0.56	ALL>	±0.66	ALL>	±0.11	302	±0.04	±0.02	±0.14	±0.08	±0.07	302	±0.01	±0.08	302	±0.02	±0.06	302	—
±1.21	10⁴	±1.10	10⁴	±1.00	026	±1.0	±0.10	±0.80	±0.20	±0.0	026	0.0	±0.10	262	±0.10	±0.30	263	—
0.0	MEG>	0.0	MEG>	0.0	0	-0.0	-0.0	-0.70	±1.40	±1.40	1	-0.0	-0.40	2	0.0	0.0	3	—
0/5	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.42	ALL>	±0.36	ALL>	±0.16	302	0.0	0.0	±0.03	±0.05	±0.04	302	±0.02	±0.04	302	±0.03	±0.05	302	—
±1.00	10⁴	±0.80	10⁴	±1.50	026	0.0	0.0	0.0	±0.10	±0.0	026	±0.0	±0.30	268	±0.0	±0.20	269	—
-0.59	MEG>	0.0	MEG>	0.0	6	0.0	0.0	-0.10	-0.10	±0.0	7	-0.10	0.0	8	0.0	-0.10	9	—
0/5	95	95	95	0		0	0	0	0	0		0	0.19		0	0		0
±0.68	ALL>	±0.72	ALL>	±0.05	302	±0.10	±0.55	±0.73	±1.03	±1.37	3	±0.05	±0.11	302	±0.02	±0.14	302	—
±1.30	10⁴	±1.24	10⁴	+0.0	027	+0.40	±1.64	±2.14	±2.39	±1.25	026	±0.0	±0.20	274	±0.0	±0.20	275	—
-0.28	MEG>	±0.20	MEG>	-0.10	12	-0.06	0.0	-0.08	0.0	±0.14	13	-0.10	±0.03	14	-0.07	±0.10	15	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.55	ALL>	±0.40	ALL>	±0.05	302	±0.09	±0.53	±0.62	±0.97	±1.26	302	-0.04	±0.09	302	±1.09	±0.16	302	—
±1.46	10⁴	±0.57	10⁴	±0.0	027	±0.29	±1.29	±1.74	±2.14	±1.87	027	-0.01	±0.12	282	±0.0	±0.21	302	—
±0.37	MEG>	±0.27	MEG>	-0.09	28	0.02	±0.18	±0.17	±0.32	±0.46	29	-0.10	±0.03	28	-0.15	±0.10	28	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.42	ALL>	±0.29	ALL>	±0.04	302	±0.08	±0.50	±0.66	±1.02	±1.39	302	±0.06	±0.10	302	±0.03	±0.10	30	—
±0.54	10⁴	±0.35	10⁴	±0.10	028	±0.27	±1.22	±1.69	±2.10	±2.84	028	±0.0	±0.20	28	±0.04	±0.15	2.8	—
±0.27	MEG>	±0.17	MEG>	-0.05	84	-0.02	±0.16	±0.16	±0.27	±0.35	85	-0.10	0.0	86	-0.10	0.0	87	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.36	ALL>	±0.31	ALL>	±0.03	302	±0.06	±0.11	±0.11	±0.14	±0.15	302	±0.09	±0.02	302	±0.03	±0.06	302	—
±0.52	10⁴	±0.52	10⁴	0.0	029	±0.10	±0.20	±0.20	±0.22	±0.24	029	±0.35	±0.06	292	±0.09	±0.08	292	—
±0.19	MEG>	-0.06	MEG>	-0.18	90	0.0	±0.02	0.0	±0.02	±0.03	91	-0.11	-0.07	92	±0.01	0.0	93	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.43	ALL>	±0.26	ALL>	±0.05	302	±0.02	±0.10	±0.10	±0.12	±0.15	302	±0.02	±0.01	302	±0.02	±0.12	302	—
±0.14	10⁴	±0.39	10⁴	±0.10	029	±0.07	±0.27	±0.27	±0.29	±0.38	029	±0.03	±0.06	292	±0.07	±0.09	292	—
±0.13	MEG>	±0.09	MEG>	-0.12	96	0.0	±0.04	±0.03	±0.00	±0.0	97	-0.05	-0.01	98	0.0	±0.07	99	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.46	ALL>	±0.53	ALL>	±0.03	303	±0.07	±0.14	±0.14	±0.17	±0.20	803	±0.05	±0.01	303	±0.05	±0.12	303	—
±0.45	10⁴	±0.18	10⁴	±0.10	032	±0.30	±0.39	±0.45	±0.49	±0.49	033	±0.07	±0.03	304	±0.06	±0.20	305	—
±0.36	MEG>	±0.27	MEG>	-0.11		0.01	±0.06	±0.04	±0.08	±0.08		±0.30	0.0		±0.21	±0.05		—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.21	ALL>	±0.57	ALL>	±0.14	303	±0.03	±0.14	±0.14	±0.15	±0.17	303	±0.12	±0.10	303	±0.04	±0.08	303	—
±0.35	10⁴	±0.41	10⁴	±0.16	033	±0.08	±0.18	±0.20	±0.21	±0.24	033	±0.04	±0.26	303	±0.05	±0.07	303	—
±0.11	MEG>	±0.29	MEG>	-0.11	08	-0.01	±0.02	±0.09	±0.04	±0.05	09	0.08	-0.01	10	0.0	-0.01	11	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.36	ALL>	±0.32	ALL>	±0.10	303	±0.19	±0.15	±0.17	±0.20	±0.21	303	±0.17	±0.15	303	±0.01	±0.06	303	—
±0.56	10⁴	±0.50	10⁴	±0.10	031	±0.10	±0.25	±0.23	±0.28	±0.33	032	±0.46	±0.10	303	±0.03	±0.10	308	—
±0.12	MEG>	±0.09	MEG>	-0.58	14	-0.14	±0.33	-0.29	±0.23	-0.14	15	±0.01	-0.32	16	-0.08	±0.01	17	—
95	95	95	95	0		0	0	0	0	0		0	0		0	0		0
±0.44	ALL>	±0.47	ALL>	±0.15	303	±0.21	±0.14	±0.15	±0.18	±0.22	803	±0.10	±0.24	303	±0.01	±0.04	303	—
±0.28	10⁴	±0.84	10⁴	±0.07	031	±0.10	±0.20	±0.25	±0.33	±0.36	032	±0.26	±0.19	303	±0.05	±0.08	303	—
±0.35	MEG>	±0.21	MEG>	-0.33	20	0.36	±0.08	±0.05	±0.06	±0.10	21	0.0	-0.30	22	0.0	0.0	23	—
95	95	95	95	0	00	0	0	0	0	0	1	0	1 Failure	2	0	5	3	0

WITH ± OR ∓ INDICATING THE MAXIMUM CLASS OF ENVIRONMENTAL CHANGES.

2

CHECKED BY: M. RYAN

APPROVED BY: W. HAWK

PREPARED BY: S. HATTIE

ALLOWABLE PERCENT CHANGE

TITLE: SUMMARY OF HI-R-11E PERFORMANCE CHARACTERISTICS

CONTRACT PROJECT 85-720

MOLD POWDER

1 5%

RESISTANCE & DATA NO		RESISTANCE - TEMPERATURE CHARACTERISTIC ±5% ±1% ±2% ±3%				VOLTAGE COEFFICIENT % PER VOLT	DIELECTRIC STRENGTH	INSULATION RESISTANCE (MEGS)	DATA NO	LOW TEMP OPERATION	TEMPERATURE CYCLE	MOISTURE RESISTANCE			
		-75	-55	+65	+105							LOAD	INSULATION RESISTANCE (MEGS)	NO LOAD	INSULATION RESISTANCE (MEGS)
39K 30324	AVERAGE	-0.48	-0.30	+0.48	+0.25	-.00357	—	ALL	30 3 35	-0.02	-0.01	-0.18	ALL	-0.37	ALL
	SPAN	-0.20	-0.29	+0.28	+0.49	-.0009	—	10^5		+0.03	+0.19	+0.39	10^5	+0.79	10^5
		-0.28	-0.29	+0.28	+0.49	-.0004	—	MEGS		-0.04	-0.34	-0.07	MEGS	-0.2	MEGS
	FAIL	0	0	0	0	0	0	0		0	0	0%	0%	0%	0%
39K 30330	AVERAGE	-0.40	-0.23	+0.19	+0.25	-.00207	—	ALL	3 3 3	-0.01	-0.01	+0.24	ALL	+0.05	ALL
	SPAN	-0.35	+0.20	+0.06	+0.17	-.0015	—	10^5		-0.25	+0.22	+0.05	10^5	+0.25	10^5
		-0.46	-0.51	-0.45	-0.51	-.0045	—	MEGS		-0.18	-0.01	+0.21	MEGS	+0.08	MEGS
	FAIL	0	0	0	0	0	0	0		0	0	0%	0%	0%	0%
39K 30326	AVERAGE	-0.09	-0.25	+0.10	+0.20	-.00348	—	ALL	3 3 3	-0.01	-0.01	+0.17	ALL	+0.06	ALL
	SPAN	-0.12	-0.08	+0.11	+0.15	-.0015	—	10^5		-0.3	+0.27	+0.37	10^5	+0.37	10^5
		-0.28	-0.63	+0.21	-0.44	-.0061	—	MEGS		0.0	-0.01	+0.02	MEGS	+0.01	MEGS
	FAIL	0	0	0	0	0	0	0		0	0	0%	0%	0%	0%
62K 30342	AVERAGE	-1.36	-1.91	-1.21	-2.22	-.0380	—	ALL	3 3 3	-0.03	-0.01	+0.61	ALL	+0.67	ALL
	SPAN	-2.68	-3.41	-2.84	-0.67	-.0074	—	10^5		-0.05	+0.24	+0.24	10^5	+1.28	10^5
		-0.57	-1.12	-2.35	-3.20	-.1407	—	MEGS		-2.07	-1.54	-2.35	MEGS	-1.90	MEGS
	FAIL	1	2	1	1	3	0	0		2	0	0%	0%	0%	0%
62K 30342	AVERAGE	-1.97	-1.04	-1.34	-2.29	-.03955	—	ALL	3 3 3	-0.04	-0.01	+0.61	ALL	+0.67	ALL
	SPAN	-2.18	-2.49	-0.37	-2.65	-.0077	—	10^5		-0.06	+0.05	+0.24	10^5	+2.40	10^5
		-0.32	-1.53	-2.35	-3.32	-.1114	—	MEGS		-2.02	-2.74	-2.37	MEGS	-1.20	MEGS
	FAIL	4	4	1	1	3	0	0		2	1	0%	0%	0%	0%
62K 30354	AVERAGE	-2.38	-1.81	-1.67	-2.24	-.05239	—	ALL	3 3 3	-0.05	-0.12	-0.58	ALL	-0.27	ALL
	SPAN	-12.04	-12.67	-0.28	-2.82	-.0079	—	10^5		-0.02	+0.11	+0.25	10^5	+0.65	10^5
		-0.70	-1.11	-1.24	-3.89	-.1519	—	MEGS		-1.87	-0.41	-1.66	MEGS	-0.04	MEGS
	FAIL	5	—	1	4	3	0	0		1	0	0%	0%	0%	0%
100K 03631	AVERAGE	+0.82	+1.58	-0.54	-0.98	-.00771	—	ALL	0 3 3 2	-0.01	+0.05	+0.30	ALL	+0.34	ALL
	SPAN	+1.32	+2.46	-0.28	-0.45	-.0049	—	10^5		0.0	+0.09	+0.57	10^5	+0.57	10^5
		-0.55	+0.99	-0.85	-1.25	-.0109	—	MEGS		-0.06	0.0	+0.16	MEGS	+0.16	MEGS
	FAIL	0	0	0	0	0	0	0		0	0	0%	0%	0%	0%
100Ω 04573	AVERAGE	-1.27	-2.43	+1.12	+2.10		—		0 4 5 7 4	+0.05	+0.02	+0.04	ALL	+0.06	ALL
	SPAN	-1.26	-2.38	+1.19	+2.24	NA	—			+0.06	+0.02	+0.20	10^5	+0.26	10^5
		-1.34	-2.57	+1.00	+1.90		—			0.0	-0.05	-0.02	MEGS	-0.01	MEGS
	FAIL	0	0	0	0		0			0	0	0%	0%	0%	0%
100Ω 04579	AVERAGE	-1.35	-2.45	+1.76	+2.18		—		0 4 5 8 0	+0.04	+0.02	+0.03	ALL	+0.05	ALL
	SPAN	-1.28	-2.33	+1.35	+2.26	NA	—			+0.10	+0.03	+0.09	10^5	+0.12	10^5
		-1.51	-2.57	+1.10	+2.08		—			0.0	-0.05	0.0	MEGS	-0.01	MEGS
	FAIL	0	0	0	0		0			0	0	0%	0%	0%	0%
100Ω 04515	AVERAGE	-1.24	-2.35	+1.13	+2.15		—		0 4 5 1 6	+0.05	+0.03	+0.03	ALL	+0.05	ALL
	SPAN	-0.74	-1.84	+1.22	+2.22	NA	—			+0.10	0.0	+0.09	10^5	+0.20	10^5
		-1.42	-2.55	+1.10	+2.06		—			0.0	-0.10	-0.03	MEGS	0.0	MEGS
	FAIL	0	0	0	0		0			0	0	0%	0%	0%	0%
	AVERAGE														
	SPAN														
	FAIL														
	AVERAGE														
	SPAN														
	FAIL														

NOTE: ARITHMETIC AVERAGES OF ABSOLUTE CHANGES ARE SHOWN WITH ± OR ÷ INDICATING

CHARACTERISTICS

TYPE 56

B - FIGURE 16

DATE - FEB. 10, 1965

MOLD POWDER — PREV 66-6

MOISTURE RESISTANCE				SHORT TIME OVER LOAD	DATA NO	70° LOAD LIFE HOURS					DATA NO	TERMINAL STRENGTH	EFFECT OF SOLDERING	DATA NO	SHOCK TEST	VIBRATION	DATA NO	SOLDER-ABILITY
LOAD	INSULATION RESISTANCE (MEGS.)	90 LOAD	INSULATION RESISTANCE (MEGS.)			48	240	500	750	1000								
ALL 7	ALL 7	ALL 7	ALL 7	0/15	3 0 3	±.10	±.07	±.18	±.20	±.32	2 0 9	±.09	±.07	5 0 8	±.02	±.07	3 0 3	—
±.39	10⁶	±.73	10⁶	-.01		±.15	±.11	±.052	±.82	±.58		±.05	±.42		±.08	±.47		—
-.07	MEGS	±.0	MEGS	±.35	1 2 6	±.25	-.17	±.07	-.10	±.05	4 2 7	±.02	-.13	4 2 8	.00	±.05	2 1 2	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0
±.33	ALL 7	±.35	ALL 7	±.04	3 0 3	±.12	±.14	±.23	±.23	±.25	3 0 8	±.10	±.08	3 0 3	±.01	±.01	3 0 3	—
±.05	10⁶	±.15	10⁶	±.03		±.69	±.182	±.19	±.23	±.14		±.35	±.04		±.04	±.04		—
±.07	MEGS	±.06	MEGS	-.39	3 2 5	-.16	.05	-.03	.03	±.03	3 2 8	.00	-.18	3 3 4	-.09	.00	3 3 5	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0
±.17	ALL 7	±.14	ALL 7	±.15	3 0 3	±.08	±.05	±.01	±.08	±.09	3 0 3	±.18	±.08	3 0 3	±.02	±.05	3 0 3	—
±.27	10⁶	±2.37	10⁶	±.07		±.00	±.08	±.03	±.05	±.14		±.44	±.10		±.07	±.10		—
±.02	MEGS	±.01	MEGS	-.38	3 3 8	-.06	.03	±.08	.05	-.02	3 3 9	-.00	-.20	4 4 0	.00	±.02	4 4 1	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0
±.41	ALL 7	±.47	ALL 7	±.37	3 0 3	±.14	±.10	±.10	±.18	±.17	3 0 3	±.14	±.03	3 0 3	±.16	±.07	3 0 3	—
±.04	10⁶	±.55	10⁶	±.09		±.03	±.15	±.05	±.11	±.13		±.11	±.02		±.13	±.14		—
±.35	MEGS	±.40	MEGS	±.61	4 4 5	±.20	±.09	±.20	±.28	±.27	4 4 5	-.04	-.13	4 4 10	±.12	±.35	3 4 2	—
05	05	05	05	1/4		0	0	0	0	0		0	0		0	0		0
±.43	ALL 7	±.47	ALL 7	±.92	3 0 3	±.19	±.17	±.11	±.12	±.19	3 0 3	±.16	±.08	3 0 3	±.38	±.12	3 0 3	—
±.03	10⁵	±.20	10⁵	-.19		±.25	±.06	±.04	±.20	±.08		±.12	±.08		±.06	±.80		—
±.37	MEGS	±.20	MEGS	±.91	5 5 5	-.17	±.09	±.15	-.10	-.07	5 5 7	-.60	-.25	5 5 7	-.26	-.05	5 5 9	—
05	05	05	05	10E5	0	0	0	0	2	2	1	0	0	2	0	0	3	0
±.48	ALL 7	±.29	ALL 7	±.46	3 0 3	±.45	±.30	±.36	±.31	±.29	3 0 3	±.46	±.24	3 0 3	±.06	±.06	3 0 3	—
±.07	10⁶	±.05	10⁶	-.15		±.02	±.05	±.19	±.21	±.34		±.67	±.55		±.16	±.16		—
-1.66	MEGS	-.04	MEGS	±2.38	5 5 6	-.55	±.17	-.20	±.21	±.08	5 5 7	-.35	-.03	5 5 8	±.02	-.03	5 5 8	—
05	05	05	05	10E5		0	0	0	1	1	2	2			0	0		0
±.30	ALL 7	±.34	ALL 7	±.03	0 3 6	±.08	±.01	±.04	±.07	±.05	0 3 6	±.04	±.13	0 3 6	±.13	±.03	0 3 6	—
±.57	10⁶	±.57	10⁶	±.11		0.0	±.12	±.17	±.32	±.22		.13	±.39		±.06	±.10		—
±.16	MEGS	±.16	MEGS	-.10	3 3 5	-.14	-.20	-.10	0.0	0.0	3 4 5	-.02	-.01	3 5 5	-.01	.02	3 6 6	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0
±.004	ALL 7	±.006	ALL 7	±.03	0 4 5	±.008	±.02	±.09	±.16	±.08	0 4 5	±.04	±.10	0 4 7	±.00	±.11	0 4 7	—
±.20	10⁵	±.26	10⁵	±.08		±.02	±.10	0.0	±.10	±.02		±.07	±.23		.00	±.10		—
.02	MEGS	0.01	MEGS	0.0	7 5 5	-.02	-.04	±.19	-.10	.26	5 7 7	±.01	±.13	4 7 8	-.01	±.10	5 7 9	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0
±.03	ALL 7	±.005	ALL 7	±.005	0 4 5	±.000	±.03	±.09	±.09	±.07	0 4 5	±.04	±.11	0 4 5	±.01	±.02	0 4 5	—
±.09	10⁴	±.12	10⁵	±.07		±.01	±.01	±.03	±.03	±.01		±.03	±.29		±.01	±.04		—
.00	MEGS	.00	MEGS	±.02	6 1 8	-.06	-.09	±.14	±.15	±.13	5 2 8	.00	±.03	4 5 8	±.04	±.16	4 5 8	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0
±.003	ALL 7	±.005	ALL 7	±.005	0 4 5	±.001	±.03	±.10	±.10	±.06	0 4 5	±.004	±.002	0 4 5	±.01	±.007	0 4 5	—
±.09	10⁵	±.20	10⁴	±.12		±.001	±.00	±.03	±.10	±.10		±.17	±.00		±.09	±.14		—
-.003	MEGS	.00	MEGS	±.001	8 7 8	-.007	-.11	-.17	±.14	-.11	8 4 8	-.001	.00	4 5 8	-.021	±.03	4 5 9	—
05	05	05	05	0		0	0	0	0	0		0	0		0	0		0

± OR ∓ INDICATING THE MAJORITY CLASS OF BIDIRECTIONAL CHANGES.

S-306

PREPARED BY
CHECKED BY
APPROVED BY

TITLE MOISTURE LOAD MATRIX - NO LOAD, 1/20 WATT -

CONTRACT PROJECT 68-420 NO. R

RESISTANCE & DATA NO.

68-100% RH @ 55°

RESISTANCE & DATA NO.		68	100	250	500	750	1000	2000					
30942	INI	+0.15	-0.98	-0.11	+0.08	-0.12	-0.17	+0.22					
10Ω	SPAN	+0.20	-0.20	+0.3	+0.2	+0.10	+0.10	+0.20					
		-0.10	-0.90	-0.05	-0.04	-0.04	-0.04	0.0					
NO LOAD	FAIL	0	0	0	0	0	0	0					
30943	INI	+0.23	-0.36	+0.18	+0.15	-0.18	-0.28	-0.31					
10Ω	SPAN	+0.10	+0.10	+0.10	+0.20	+0.10	+0.30	+0.20					
		-0.70	-0.90	-0.70	-0.70	-0.60	-0.50	-0.10					
NO LOAD	FAIL	0	0	0	0	0	0	0					
30944	INI	+0.51	-0.06	+0.26	+0.09	-0.21	+0.25	+0.3					
10Ω	SPAN	0.0	-0.10	+0.10	+0.10	+0.10	+0.10	+0.01					
		-2.30	-2.40	-2.00	-2.00	-2.10	-2.00	-2.00					
NO LOAD	FAIL	0	0	0	0	0	0	0					
30945	INI	+0.12	+0.27	+0.24	+0.28	+0.38	+0.64						100 Ω
100Ω	SPAN	+0.46	+0.39	+0.69	+0.37	+0.17	+0.14						04683
		-0.12	+0.06	+0.08	+0.06	+0.23	+0.26						
NO LOAD	FAIL	0	0	0	0	0	0						NO LOAD
30946	INI	+0.18	+0.35	+0.69	+0.25	+1.87	+1.64						100 Ω
100Ω	SPAN	+0.06	+0.09	+0.67	+0.17	+0.17	+0.19						
		+0.14	+0.06	+0.10	+0.09	-0.39	-1.01						04689
NO LOAD	FAIL	0	0	0	0	0	0						NO LOAD
30947	INI	+0.25	+0.37	+0.24	+0.22	+1.11	+1.38						100 Ω
100Ω	SPAN	+0.22	+0.10	+0.19	+0.32	+0.38	+0.60						
		-0.15	-0.07	+0.05	+0.03	-0.20	-0.29						04690
NO LOAD	FAIL	0	0	0	0	0	0						NO LOAD
30948	INI	+0.20	+0.38	+0.29	+0.35	+0.32	+0.03	+0.14					
10Ω	SPAN	+0.10	+0.10	+0.10	+0.10	+0.10	+0.20	+0.10					
		-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.50					
1/20W	FAIL	0	0	0	0	0	0	0					
30949	INI	+0.17	+0.28	+0.18	+0.34	+0.16	+0.53	+1.40					
10Ω	SPAN	+0.3	0.0	+0.20	+0.40	+0.20	+0.40	+0.50					
		-1.4	-1.8	-1.01	-1.4	-1.01	-1.01	-1.01					
1/20W	FAIL	0	0	0	0	0	0	0					
30950	INI	+0.28	+0.62	+0.55	+0.11	+1.58	+0.56	+0.57					
10Ω	SPAN	+0.40	0.0	+0.40	+0.10	0.0	0.0	+0.10					
		-1.57	-1.11	-1.08	-1.11	-1.08	-0.59	-0.57					
1/20W	FAIL	0	0	0	0	0	0	0					
30951	INI	+0.20	+0.39	+0.76	+0.13	+0.05	+0.24						100 Ω
100Ω	SPAN	+0.40	+0.10	+0.00	+0.34	+0.66	+0.61						04691
		+0.50	+0.10	+0.13	+0.34	+0.18	+0.23						
1/20W	FAIL	0	0	0	0	0	0						1/20W
30952	INI	+0.23	+0.36	+0.60	+0.11	+0.60	+0.24						100 Ω
100Ω	SPAN	+0.35	+0.52	+0.55	+0.26	+0.50	+0.58						04692
		+0.10	+0.13	+0.18	+0.34	+0.20	+0.34						
1/20W	FAIL	0	0	0	0	0	0						1/20W
30953	INI	+0.29	+0.00	+0.66	+1.0	+0.79	+1.52						100 Ω
100Ω	SPAN	+0.11	+0.08	+1.96	+0.10	+0.56	+0.30						04693
		0.0	+0.10	+0.20	+0.33	+0.10	+0.30						
1/20W	FAIL	0	0	0	0	0	0						1/20W

*. #8 LEAD BROKE AT END OF TEST V. GRAMS CONCAVE

6 LOAD, ½ WATT - 10Ω, 100Ω,

HOLD POWDER - [illegible]

TYPE	DWG. NO.	FIGURE 27
R0	DATE	

98/100% RH @ 550 PERIODS

[illegible]	48	100	250	[illegible]	500	1000	2000
100Ω	±0.07	±1.03	±1.05	±[illegible]	±0.20	±0.37	±[illegible]
04688	+0.17	+2.34	+2.35	+0.32	+0.67	+1.0[illegible]	[illegible]
	-0.30	-2.25	-2.25	-0.27	-0.20	[illegible]	0.0
No Load	0	0	0	0	0	0	0
100Ω	±0.06	±1.05	±1.05	[illegible]	+0.37	[illegible]	[illegible]
	+0.30	+3.09	[illegible]	+0.52	+0.69	[illegible]	[illegible]
04689	-0.05	-2.57	-2.5[illegible]	+0.01	[illegible]	[illegible]	[illegible]
No Load	0	0	0	0	0	0	0
100Ω	±0.09	±1.09	±1.09	+0.17	[illegible]	[illegible]	[illegible]
	+0.31	+2.20	+2.30	[illegible]	[illegible]	[illegible]	[illegible]
04690	-0.06	-1.82	-1.82	+0.01	[illegible]	[illegible]	[illegible]
No Load	0	0	0	0	0	0	0
100Ω	±0.07	±0.56	±0.50	[illegible]	[illegible]	[illegible]	[illegible]
04691	+0.15	+1.48	+1.57	[illegible]	[illegible]	[illegible]	[illegible]
	-0.30	-1.29	-1.28	[illegible]	-0.03	[illegible]	0.0
1/20W	0	0	0	0	0	0	0
100Ω	±0.03	±0.85	±0.85	±0.05	±0.05	±0.07	[illegible]
04692	+0.15	+2.20	+2.20	+0.19	[illegible]	[illegible]	[illegible]
	-0.07	-1.98	-1.98	-0.09	[illegible]	-0.05	0.0
1/20W	0	0	0	0	0	0	0
100Ω	±0.08	±0.90	±0.91	±0.05	[illegible]	[illegible]	[illegible]
04693	+0.04	+2.12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	-0.01	-2.05	[illegible]	[illegible]	-0.05	[illegible]	0.0
1/20W	0	0	0	0	0	0	0

GROUPS CANCELLED TO BE REPEATED

3-206

PREPARED BY
CHECKED BY
APPROVED BY

TITLE MOISTURE LOAD MATRIX NO LOAD 1/20 WATT-

CONTRACT PROJECT - 88-T-20

98-100% RH @ 55°C

RESISTANCE & DATA NO.		4K	10K	20K	30K	50K	100K	200K
30954	AV	+0.42	+0.25	+0.16	+0.15	+0.23	+0.19	+0.20
1K	SIGMA	+0.20	+0.63	+0.41	+0.37	+0.16	+0.17	+0.52
		0.0	+0.08	+0.16	+0.20	+0.24	+0.32	+0.22
No Load	FAIL	0	0	0	0	0	0	0
30955	AV	+0.11	+0.22	+0.14	+0.40	+0.24	+0.2	+0.02
1K	SIGMA	+0.21	+0.38	+0.06	+0.27	+0.42	+0.56	+0.05
		+0.02	+0.03	+0.27	+0.28	+0.47	+0.67	+0.35
No Load	FAIL	0	0	0	1	1	1	2 [illegible]
30956	AV	+0.07	+0.16	+0.12	+0.17	+0.06	+0.12	+0.65
1K	SIGMA	+0.14	+0.26	+0.09	+0.05	+0.28	+0.20	+0.14
		+0.07	+0.06	0.0	0.0	+0.10	+0.10	+0.4
No Load	FAIL	0	0	0	1	1	1	1 [illegible]
30957	AV	+0.29	+0.31	+0.34	+0.75	+0.85	+0.42	+2.4
1 WT	SIGMA	+0.07	+0.04	+0.20	+0.42	+0.50	+2.22	+2.24
		+2.35	+0.7	+0.7	+0.7	+0.27	+0.25	+0.46
No Load	FAIL	0	0	0	0	0	0	0
30958	AV	+0.37	+0.26	+0.63	+0.51	+0.83	+0.34	+2.8
10K	SIGMA	+0.22	+0.27	+0.27	+0.96	+2.06	+2.52	+0.47
		+0.20	+0.12	+0.03	+0.03	+0.03	+0.30	+0.80
No Load	FAIL	0	0	0	0	0	0	0
30959	AV	+0.36	+0.45	+0.53	+0.59	[illegible]	+0.49	+2.20
10K	SIGMA	+0.22	+0.12	+0.41	[illegible]	[illegible]	+2.64	+0.41
		+0.13	+0.18	+0.24	+0.17	+0.27	+0.25	+0.26
No Load	FAIL	0	0	0	0	0	0	0
30960	AV	+0.26	+0.11	+0.21	+0.50	+1.00	+0.98	+1.22
1K	SIGMA	+0.15	+0.15	+0.19	+0.08	+0.37	+0.52	+0.12
		0.0	0.0	+0.39	-0.29	-0.28	-0.22	+0.25
Fault	FAIL	0	0	0	0	0	0	0
30961	AV	+0.46	+0.20	+0.10	+0.15	+0.18	+0.62	+0.42
1K	SIGMA	+0.18	+0.19	+0.19	+0.29	+0.32	+0.69	+0.28
		-0.15	0.0	+0.01	0.0	+0.06	+0.02	+0.11
Fault	FAIL	0	0	0	0	0	0	0
30962	AV	+0.07	+0.10	+0.13	+0.14	+0.29	+0.40	+2.55
1K	SIGMA	+0.17	+0.20	+0.17	+0.28	+0.13	+0.33	+2.06
		0.0	+0.02	+0.06	+0.07	+0.09	+0.11	+0.11
1/20W	FAIL	0	0	0	0	0	0	0
30963	AV	+0.19	+0.25	+0.44	+0.53	+0.70	+1.37	+0.14
10K	SIGMA	+0.28	+0.38	+1.13	+1.86	+2.65	+2.36	+2.0
		+0.07	+0.14	+0.21	+0.24	+0.28	+0.55	+0.80
Fault	FAIL	0	0	0	0	0	0	0
30964	AV	+0.42	+0.19	+0.37	+0.36	+0.57	+0.84	+1.21
10K	SIGMA	+0.26	+0.31	+0.41	+0.16	+0.50	+0.58	+2.03
		+0.07	+0.10	+0.19	+0.12	+0.15	+0.24	+0.45
Fault	FAIL	0	0	0	0	0	0	0
30965	AV	+0.20	+0.23	+0.32	+0.31	+0.45	+0.67	+1.03
10K	SIGMA	+0.16	+0.23	+0.35	+0.21	+0.23	+0.55	+2.06
		+0.10	+0.01	+0.16	+0.09	+0.01	+0.28	+0.42
1/20W	FAIL	0	0	0	0	0	0	0

* = UNIT # 5 - BODY CRACKED

OAD $\frac{1}{10}$ WATT - 1K, 10K
AND POWDER - AREN

R

DATE

2

BODY CRACKED WHILE BEING REMOVED FROM RACK

PREPARED BY
PROJECT BY
APPROVED BY

TITLE Moisture Load Matrix No Load Flow -

RESISTANCE & DATA NO.		96-100 To RH @ 35%										
		46	100	200	500	1000	1000	2000				
30966 3% No Load	AV	+0.11	+0.15	+0.30	+0.58	+2.41	+0.87	+1.70				
	SPAN	+0.10	+0.63	+0.64	+0.97	+0.84	+0.10	+1.42				
		+0.09	+0.12	+0.12	+0.11	-0.56	+0.38	-0.27				
	FAIL	0	0	/	/	/	/	0				
30967 3% No Load	AV	+0.21	+0.48	+0.37	+0.69	+1.60	+0.84	+1.06				
	SPAN	+0.35	+0.46	+0.65	+0.66	+1.02	+0.80	+1.78				
		+0.09	+0.10	+0.12	+0.08	-0.36	+0.35	+0.28				
	FAIL	0	0	0	0	0	0	0				
30968 3% No Load	AV	+0.17	+0.21	+0.34	+0.54	+1.39	+0.64	+0.98				
	SPAN	+0.25	+0.49	+0.62	+0.77	+0.77	+0.96	+1.28				
		+0.07	+0.10	-0.20	+0.03	-0.48	+0.14	+0.65				
	FAIL	0	0	0	0	0	0	0				
30969 62% No Load	AV	+0.24	+0.34	+0.52	+0.68	+0.65	+1.16					100K 03737 □ No Load
	SPAN	+0.49	+0.51	+1.00	+0.96	+1.10	+2.53					
		+0.11	+0.13	+0.16	+0.14	0.0	+0.31	X				
	FAIL	0	0	0	0	0	0					
30970 62% No Load	AV	+0.27	+0.34	+0.46	+0.58	+0.69	+1.05					
	SPAN	+0.45	+0.60	+0.42	+1.42	+1.33	+1.72					
		+0.4	+0.17	+0.32	+0.37	-0.29	+0.58	X				
	FAIL	0	0	0	0	0	0					
30971 62% No Load	AV	+0.21	+0.24	+0.31	+0.40	+1.05	+1.82					
	SPAN	+0.32	+0.40	+0.64	+0.81	+1.03	+1.72	X				
		+0.12	+0.06	+0.08	+0.05	-2.96	0.06					
	FAIL	0	0	0	0	0	0					
30972 3% No Load	AV	+0.13	+0.18	+0.28	+0.31	+0.34	+0.84	+1.36				
	SPAN	+0.44	+0.55	+0.61	+0.89	+0.78	+1.66	+2.52				
		-0.69	-0.52	-0.98	+0.09	+0.10	+0.28	+0.52				
	FAIL	0	0	0	0	0	0	0				
30973 3% No Load	AV	+0.22	+0.61	+0.60	+0.00	+0.97	+1.28	+0.02				
	SPAN	+0.65	+3.92	+2.97	+4.02	+3.92	+4.29	+4.27				
		+0.51	-2.24	-0.34	+0.10	-0.34	+0.01	+0.23				
	FAIL	0	0	0	0	0	1-5.13	1-32.1				
30974 3% No Load	AV	+0.16	+0.19	+0.34	+0.46	+1.44	+1.92	+1.83				
	SPAN	+0.27	+0.02	+0.12	+0.13	+0.16	+2.83	+2.39				
		+0.08	+0.03	+0.02	+0.008	-0.02	+0.08	+0.27				
	FAIL	0	0	0	0	0	0	0				
30975 62% No Load	AV	+0.07	+0.07	+0.08	+0.05	+0.60	+2.03					100K 03738 □ No Load
	SPAN	+0.18	+0.62	+0.25	+0.42	+0.57	+3.62	X				
		0.0	-0.01	0.0	-0.03	-2.27	+0.67					
	FAIL	0	0	0	0	0	0					
30976 62% No Load	AV	+0.09	+0.11	+0.10	+0.08	+0.19	+1.46					
	SPAN	+0.21	+0.26	+0.20	+0.20	+0.20	+2.72	X				
		0.0	0.0	-0.10	-0.05	-0.54	-1.65					
	FAIL	0	0	0	0	0	0					
30977 62% No Load	AV	+0.09	+0.09	+0.09	+0.09	+0.25	+1.62					
	SPAN	+0.19	+0.17	+0.16	+0.21	+0.25	+3.62	X				
		0.0	-0.02	+0.01	-0.03	-1.37	+0.40					
	FAIL	0	0	0	0	0	0					

X = 5 Groups

LOAD 200 - 5TH, 62F

TYPE Ro | DATE

48-100% RH @ 55% REPEATS

DATE	48	100	200	500	750	1000	2000
100K	—	±0.21	±0.30	±2.45	±7.06	±5.24	-10.57
03739	—	+0.58	+0.94	+0.95	+1.51	3.07	-4.62
□	—	-0.06	-0.26	-8.90	-18.34	-13.78	-16.49
NO LOAD		0	0	0	5X	2	7
100K	—	±0.07	+1.09	+1.37	+1.58	1.74	+2.71
03738	—	+0.17	+4.72	+5.21	+5.63	6.01	+6.82
□	—	-0.03	+0.08	+0.26	+0.36	0.42	+0.70
4201W		0	0	0	0	0	0

2

*: GROUPS CANCELLED TO BE REPEATED

S-398

PREPARED BY
CHECKED BY
APPROVED BY

TITLE MOISTURE - LOAD MATRIX - 1/8 W, 1/4 W - 40 Ω

CONTRACT PROJECT EE-X-12

98-100% RH @ 55°C

RESISTANCE & DATA NO.		1/8	1/4	2nd	3rd	1st	100 hr	2nd					
30978	AV	±0.26	±0.32	±0.44	±0.28	±0.36	±0.38	±0.64					
10Ω	SPAN	+0.20	+0.40	+0.80	+0.20	+0.60	+0.60	+0.90					
		-1.20	-1.00	-1.00	-1.00	-1.00	-0.69	-1.40					
1/8 W	FAIL	0	0	0	0	0	0	0					
30979	AV	±0.18	±0.24	±0.46	±0.16	±0.18	±0.11	±0.37					
10Ω	SPAN	+0.30	+0.50	+0.50	+0.10	+0.60	+0.10	+0.90					
		-0.20	-0.30	-1.20	-0.30	-0.30	-0.20	-0.10					
1/8 W	FAIL	0	0	0	0	0	0	0					
30980	AV	±0.06	±0.12	±0.16	±0.21	±0.24	±0.24	±0.52					
10Ω	SPAN	+0.10	0.0	+0.30	+0.10	0.0	+0.10	+0.41					
		-0.20	-0.89	-0.89	-0.89	-0.89	-0.99	+0.10					
1/8 W	FAIL	0	0	0	0	0	0	0					
30981	AV	±0.16	±0.23	±0.44	±0.24	±0.60	±1.53						100Ω
100Ω	SPAN	+0.36	+0.76	+0.89	+0.59	+0.72	+2.20	✗					04694
		0.0	+0.10	+0.12	+0.20	-0.06	+0.20						
1/8 W	FAIL	0	0	0	0	0	0						1/8 W
30982	AV	±0.15	±0.27	±0.56	±0.97	±0.81	±1.65						100Ω
100Ω	SPAN	+0.59	+1.16	+2.75	+1.32	+2.13	+5.28	✗					
		0.0	+0.29	+0.10	+0.12	+0.14	+0.24						04695
1/8 W	FAIL	0	0	0	0	0							1/8 W
30983	AV	±0.23	±0.32	±0.52	±0.68	±0.58	±1.47						100Ω
100Ω	SPAN	+0.53	+1.12	+1.31	+1.32	+1.19	+2.40	✗					
		0.0	0.0	+0.10	+0.27	-0.82	+0.58						04696
1/8 W	FAIL	0	0	0	0	0	0						1/8 W
30984	AV	±0.32	±0.36	±0.28	±0.27	±0.15	±0.31	±0.81					
10Ω	SPAN	+0.80	+0.60	+0.60	+0.60	+0.80	+0.99	+0.90					
		-0.69	-0.89	-0.69	-0.71	-0.69	-0.79	-0.30					
1/4 W	FAIL	0	0	0	0	0	0	0					
30985	AV	±0.02	±0.13	±0.12	±0.14	±0.12	±0.12	±0.43					
10Ω	SPAN	±0.10	±0.10	+0.10	+0.20	+0.16	+0.29	+0.02					
		-0.10	-0.82	-0.82	-0.82	-0.82	-0.82	0.0					
1/4 W	FAIL	0	0	0	0	0	0	0					
30986	AV	±0.28	±0.33	±0.29	±0.30	±0.24	±0.20	±0.51					
10Ω	SPAN	+0.0	+0.50	+0.40	+0.30	+0.10	+0.70	+0.90					
		-1.00	-1.00	-1.00	-1.00	-1.09	-0.69	-0.49					
1/4 W	FAIL	0	0	0	0	0	0	0					
30987	AV	±0.17	±0.28	±0.54	±0.32	±0.76	±2.68						100Ω
100Ω	SPAN	+0.33	+0.50	+0.81	+0.54	+0.35	+0.93	✗					04697
		-0.04	-0.02	+0.13	+0.25	+0.33	+0.15						
1/4 W	FAIL	0	0	0	0	0	0						1/4 W
30988	AV	±0.18	±0.30	±0.58	±1.05	±0.89	±2.02						100Ω
100Ω	SPAN	+0.32	+0.81	+1.35	+2.42	+2.22	+3.76	✗					04698
		-0.01	+0.01	+0.10	+0.20	+0.03	+0.30						
1/4 W	FAIL	0	0	0	0	0	0						1/4 W
30989	AV	±0.33	±0.43	±0.77	±1.22	±1.12	±2.09						100Ω
100Ω	SPAN	+0.87	+1.82	+2.66	+3.74	+3.60	+4.28	✗					04699
		+0.07	+0.06	+0.17	+0.27	+0.35	+0.57						
1/4 W	FAIL	0	0	0	0	0	0						1/4 W

✗ = GROUPS CANCELLED

4W - 10m, 10Ω

HOLD BINDER - DWG. 66-6

TYPE F

DWG. No. B | FIG. NO. 80

DATE

10-10K RHEOSTAT RESISTANCES

DATE	4W	10	20	30	50	100	200
100 Ω	±0.04	±0.16	±0.17	±0.05	±0.08	±0.09	±0.10
04694	+0.02	+1.45	+1.45	+0.07	+0.07	+0.07	+0.10
	-0.02	-1.41	-1.40	-0.06	-0.07	-0.81	-0.66
1/8 W	0	0	0	0	0	0	0
100 Ω	±0.30	±0.70	±0.69	±0.05	±0.08	±0.08	±0.14
	+0.10	+2.15	+2.12	+0.09	+0.11	+0.12	+0.14
04695	-0.06	-2.08	-2.05	-0.09	-0.08	-0.07	0.0
1/8 W	0	0	0	0	0	0	0
100 Ω	±0.06	±0.32	±0.32	±0.05	±0.06	±0.06	±0.05
	+0.10	+0.61	+0.61	+0.10	+0.10	+0.10	+0.11
04696	-0.10	-0.44	-0.44	-0.10	-0.12	-0.07	-0.09
1/8 W	0	0	0	0	0	0	0
100 Ω	±0.04	±0.83	±1.83	±0.07	±0.06	±0.06	±0.14
04697	+0.09	+2.30	+2.36	+0.10	+0.14	+0.14	+0.27
	-0.07	-2.14	-2.12	-0.13	-0.10	-0.07	-0.06
1/4 W	0	0	0	0	0	0	0
100 Ω	±0.03	±1.11	±1.10	±0.05	±0.05	±0.08	±0.07
04698	+0.08	+3.47	+3.47	+0.14	+0.14	+0.15	+0.28
	-0.08	-3.29	-3.27	-0.09	-0.10	-0.08	-0.07
1/4 W	0	0	0	0	0	0	0
100 Ω	±0.03	±0.25	±0.75	±0.05	±0.04	±0.04	±0.08
04699	+0.0	+1.25	+1.24	+0.03	+0.03	+0.09	+0.20
	-0.18	-1.21	-1.19	-0.10	-0.10	-0.08	-0.09
1/4 W	0	0	0	0	0	0	0

2

ADJUSTMENTS TO BE RECHECKED

B-366

PREPARED BY
CHECKED BY
APPROVED BY

TITLE Moisture Load Matrix 1/8W, 1/4W 1K, [illegible]

CONTRACT PROJECT 88-7420

98-100% RH @ 55°C

RESISTANCE & DATA NO.		1/8	1/4	1/2	5/8	3/4	1.0	2.0
30990	AV	+0.06	+0.06	+0.11	+0.18	+0.27	+0.37	+0.65
	Δ MAX	+0.11	+0.18	+0.20	+0.28	+0.60	+0.69	+0.76
1K	Δ MIN	0.0	0.0	+0.06	+0.14	+0.11	+0.24	+0.30
1/8W	FAIL	0	0	0	0	0	0	0
30991	AV	+0.11	+0.12	+0.19	+0.27	+0.33	+0.37	+0.67
	Δ MAX	+0.18	+0.23	+0.29	+0.42	+0.50	+0.56	+0.63
1K	Δ MIN	+0.07	+0.05	+0.12	+0.20	+0.23	+0.27	+0.37
1/8W	FAIL	0	0	0	0	0	0	0
30992	AV	+0.12	+0.16	+0.16	+0.20	+0.25	+0.32	+0.76
	Δ MAX	+0.32	+0.27	+0.32	+0.35	+0.37	+0.34	+0.55
1K	Δ MIN	+0.02	+0.03	+0.10	+0.17	+0.20	+0.19	+0.30
1/8W	FAIL	0	0	0	0	0	0	0
30993	AV	+0.34	+0.37	+0.40	+0.53	+0.82	+1.06	+1.39
	Δ MAX	+2.89	+2.82	+2.09	+2.96	+3.88	+4.04	+4.64
10K	Δ MIN	0.0	0.0	+0.06	+0.10	+0.32	+0.23	+0.52
1/8W	FAIL	0	0	0	0	0	0	0
30994	AV	+0.17	+0.19	+0.28	+0.35	+0.57	+0.81	+1.16 LL
	Δ MAX	+0.49	+0.34	+0.44	+0.55	+1.21	+1.49	+1.84
10K	Δ MIN	+0.04	+0.06	+0.11	+0.10	+0.12	+0.16	+0.20
1/8W	FAIL	0	0	0	0	0	0	1 1/4W
30995	AV	+0.10	+0.13	+0.18	+0.28	+0.54	+0.64	+1.22
	Δ MAX	+0.14	+0.32	+0.44	+0.58	+2.21	+2.01	+2.56
10K	Δ MIN	0.0	0.0	0.0	+0.14	+0.21	+0.08	+0.26
1/8W	FAIL	0	0	0	0	0	0	0
30996	AV	+0.07	-0.06	+0.11	+0.18	+0.29	+0.22	+0.62
	Δ MAX	+0.28	+0.22	+0.28	+0.39	+0.75	+0.68	+0.87
1K	Δ MIN	0.0	-0.01	+0.02	+0.05	+0.14	+0.11	+0.22
1/4W	FAIL	0	0	0	0	0	0	0
30997	AV	+0.12	+0.11	+0.20	+0.20	+0.34	+0.47	+0.58
	Δ MAX	+0.18	+0.23	+0.31	+0.31	+1.00	+1.06	+1.30
1K	Δ MIN	+0.03	+0.02	+0.06	+0.10	+0.19	+0.17	+0.22
1/4W	FAIL	0	0	0	0	0	0	0
30998	AV	+0.06	-0.05	+0.09	+0.17	+0.25	+0.28	+0.60
	Δ MAX	+0.11	+0.11	+0.18	+0.23	+0.49	+0.44	+0.57
1K	Δ MIN	0.0	-0.02	+0.02	+0.04	+0.11	+0.10	+0.17
1/4W	FAIL	0	0	0	0	0	0	0
30999	AV	+0.06	+0.05	+0.12	+0.17	+0.61	+0.90	+1.11
	Δ MAX	+0.12	+0.16	+0.20	+0.28	+0.46	+0.56	+0.86
10K	Δ MIN	-0.10	-0.10	-0.10	0.0	+0.34	+0.30	+0.55
1/4W	FAIL	0	0	0	0	0	0	0
31000	AV	+0.03	+0.04	+0.12	+0.17	+0.42	+0.64	+0.84
	Δ MAX	+0.10	+0.13	+0.22	+0.32	+0.67	+0.89	+1.25
10K	Δ MIN	-0.02	+0.08	+0.07	+0.10	+0.19	+0.24	+0.36
1/4W	FAIL	0	0	0	0	0	0	0
31001	AV	+0.06	+0.11	+0.14	+0.16	+0.49	+0.75	+0.97
	Δ MAX	+0.12	+0.19	+0.27	+0.34	+0.88	+0.91	+1.12
10K	Δ MIN	+0.01	+0.03	+0.05	-0.11	-0.01	+0.21	+0.39
1/4W	FAIL	0	0	0	0	0	0	0

1, 1/4W 1K, 10K

Mod. 66-6

TYPE	DWG. NO.	FIGURE 31
RC	DATE	

S-308

PREPARED BY

APPROVED BY

APPROVED BY

TITLE MOISTURE LOAD MATRIX 98% RH @ 55°C

CONTRACT PROJECT 88-1120

98/100% RH @ 55°C

RESISTANCE @ DATA NO.

		50	100	200	500	1000	1500	2000				
31002	AV	±0.12	±0.06	±0.04	±0.30	±0.45	±0.58	±0.60				
3PT	SPAN	±0.20	±0.31	±0.36	±0.68	±0.82	±1.11	±1.28				
		-0.01	-0.02	-0.04	-0.01	±0.06	±0.005	±0.26				
KW	FAIL	0	0	0	0	0	0	0				
31003	AV	±0.08	±0.10	±0.17	±0.29	±0.32	±0.25	±0.29				
3PT	SPAN	±0.11	±0.32	±0.30	±0.60	±0.69	±0.68	±0.87				
		±0.05	0.0	±0.10	±0.15	±0.19	±0.18	±0.54				
KW	FAIL	0	0	0	0	0	0	0				
31004	AV	±0.12	±0.11	±0.15	±0.29	±0.35	±0.38	±0.43				
3PT	SPAN	±0.20	±0.36	±0.38	±0.64	±0.78	±0.33	±0.72				
		-0.10	0.0	0.0	±0.03	±0.10	±0.18	±0.26				
KW	FAIL	0	0	0	0	0	0	0				
31005	AV	±0.04	±0.04	±0.02	±0.07	±0.06	±0.58				100K	
6PT	SPAN	±0.08	±0.10	±0.12	±0.19	±0.73	±0.10				0.3737	
		0.0	0.0	-0.02	-0.05	-2.35	±0.04				Ω	
1/2W	FAIL	0	0	0	0	0	0				1/2W	
31006	AV	±0.03	±0.04	±0.05	±0.08	±0.14	±0.41					
6PT	SPAN	±0.09	±0.10	±0.13	±0.16	±0.33	±0.27					
		-0.05	-0.05	0.06	-0.10	-0.18	±0.00					
KW	FAIL	0	0	0	0	0	0					
31007	AV	±0.07	±0.08	±0.06	±0.08	±0.22	±0.28					
6PT	SPAN	±0.13	±0.18	±0.11	±0.15	±0.39	±0.11					
		-0.01	0.0	-0.005	0.03	±0.10	±0.50					
KW	FAIL	0	0	0	0	0	0					
31008	AV	±0.08	±0.09	±0.12	±0.18	±0.25	±0.27	±0.29				
3PT	SPAN	±0.12	±0.33	±0.53	±0.60	±0.26	±0.57	±0.91				
		0.0	0.0	0.0	±0.15	±0.10	±0.32	±0.51				
KW	FAIL	0	0	0	0	0	0	0				
31009	AV	±0.07	±0.05	±0.04	±0.04	±0.06	±0.08	±0.10				
3PT	SPAN	±0.13	±0.18	±0.11	±0.15	±0.39	±0.11					
		-0.01	0.0	-0.005	0.03	±0.10	±0.50					
1/2W	FAIL	0	0	0	0	0	0					
31010	AV	±0.09	±0.08	±0.05	±0.05	±0.09	±0.15	±0.16				
3PT	SPAN	±0.08	±0.10	±0.08	±0.07	±0.26	±0.44	±0.64				
		-0.07	-0.02	-0.02	-0.03	±0.20	±0.28	±0.36				
KW	FAIL	0	0	0	0	0	0	0				
31011	AV	±0.04	±0.05	±0.04	±0.02	±0.24	±0.61				100K	
6PT	SPAN	±0.07	±0.07	±0.10	±0.08	±0.32	±0.34				0.3736	
		-0.10	-0.04	-0.06	-0.10	±0.18	±0.27				Ω	
KW	FAIL	0	0	0	0	0	0				1/4W	
31012	AV	±0.05	±0.03	±0.06	±0.01	±0.27	±1.42					
6PT	SPAN	±0.25	±0.23	±0.32	±0.32	±0.36	±2.25					
		-0.03	-0.02	-0.05	-0.05	-0.96	±0.59					
KW	FAIL	0	0	0	0	0	0					
31013	AV	±0.03	±0.04	±0.05	±0.01	±0.26	±1.13					
6PT	SPAN	±0.06	±0.08	±0.08	±0.09	±0.27	±2.47					
		-0.03	-0.03	-0.11	-0.12	±0.06	±0.31					
KW	FAIL	0	0	0	0	0	0					

Ω = GROUND CONC.

1/8W, 1/4W – 39K, 62K – 100K

Fixed. 66-6

TYPE	DWG. NO.	FIGURE
RG	DATE	

□ = 144 HRS. 98-100% RH @ 55C REPEATS

DATA #	48	100	200	500	750	1000	2000
100K	—	±0.07	+0.10	±1.29	+0.24	±0.29	+0.50
03737	—	+0.17	+0.23	+3.18	+0.47	0.56	+0.91
□	—	-0.03	0.0	-2.71	+0.07	-0.121	+0.16
1/8W	—	0	0	0	0	0	0
100K	—	±0.09	±0.08	±0.08	±0.10	±0.13	+0.35
03736	—	+0.06	+0.11	+0.20	+0.30	0.40	+0.82
□	—	-0.24	-0.20	-0.11	-0.05	-0.021	+0.14
1/4W	—	0	0	0	0	0	0

2

* = GROUPS CANCELLED TO BE REPEATED

D BY: S. MATTIE
BY: S. M.
D BY: S. MATTIE

TITLE: SUMMARY OF MIL-R-11E PERFORMANCE CHARACTERISTICS

CONTRACT PROJECT 88-71-20

BLE PERCENT CHANGE		±2.0 %				0.035%/V		10^4 MΩ		3.0	4.5	1 AO AVE; 3 STAN NO'N I.O				
RESISTANCE & DATA NO		RESISTANCE - TEMPERATURE CHARACTERISTIC				VOLTAGE COEFFICIENT % PER VOLT	DIELECTRIC STRENGTH	INSULATION STRENGTH (MEGS)	DATA NO	LOW TEMP OPERATION	TEMPERATURE CYCLE	MOISTURE RESISTANCE LOAD	MOISTURE RESISTANCE INSULATION RESISTANCE (MEGS)	MOISTURE RESISTANCE NO LOAD	MOISTURE RESISTANCE INSULATION RESISTANCE (MEGS)	SHORT TIME OVER LOAD
		-55		+105												
250a	AVERAGE	±0.19		+0.34			—	ALL>	0	±0.03	±0.04	+0.05	ALL>	±0.21	ALL>	±0.03
67-1-A	SPAN	+0.43		+1.16		N.A.	—	10^4	6	0.0	±.008	+0.12	10^4	+0.65	10^4	+0.04
		-0.59		+0.66			—	MEG	7	-0.08	-0.08	+0.01	MEG	-0.04	MEG	-0.04
06787	FAIL	0		0			0	0	91	0	0	9/5	9/5	9/5	9/5	0
1.5K	AVERAGE	+0.21		±0.27		0.0	—	ALL>	0	+0.05	±0.04	-0.07	ALL>	-0.20	ALL>	±.007
67-2-A	SPAN	+0.33		+0.93		0.0	—	10^4	6	+0.12	±.007	-0.02	10^4	-0.02	10^4	+0.03
		+0.03		-0.04		0.0	—	MEG	7	0.0	-0.12	-0.14	MEG	-0.59	MEG	-0.01
06788	FAIL	0		0		0	0	0	92	0	0	9/5	9/5	9/5	9/5	0
100K	AVERAGE	±0.14		±0.33		-0.00173	—	ALL	0	±0.04	±0.05	±0.20	ALL>	+0.32	ALL>	±0.17
67-3A2	SPAN	+0.15		+0.63		-0.00070	—	10^4	7	+0.22	+0.16	+0.34	10^4	+0.98	10^4	+0.10
		-0.14		-0.14		-0.00340	—	MEG	8	-0.18	-0.06	-0.14	MEG	+0.09	MEG	-0.82
07881	FAIL	0		0		0	0	0	89	0	0	9/5	9/5	9/5	9/5	0
	AVERAGE															
	SPAN															
	FAIL															
	AVERAGE															
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	FAIL															

1

CHARACTERISTICS G-67-289 A

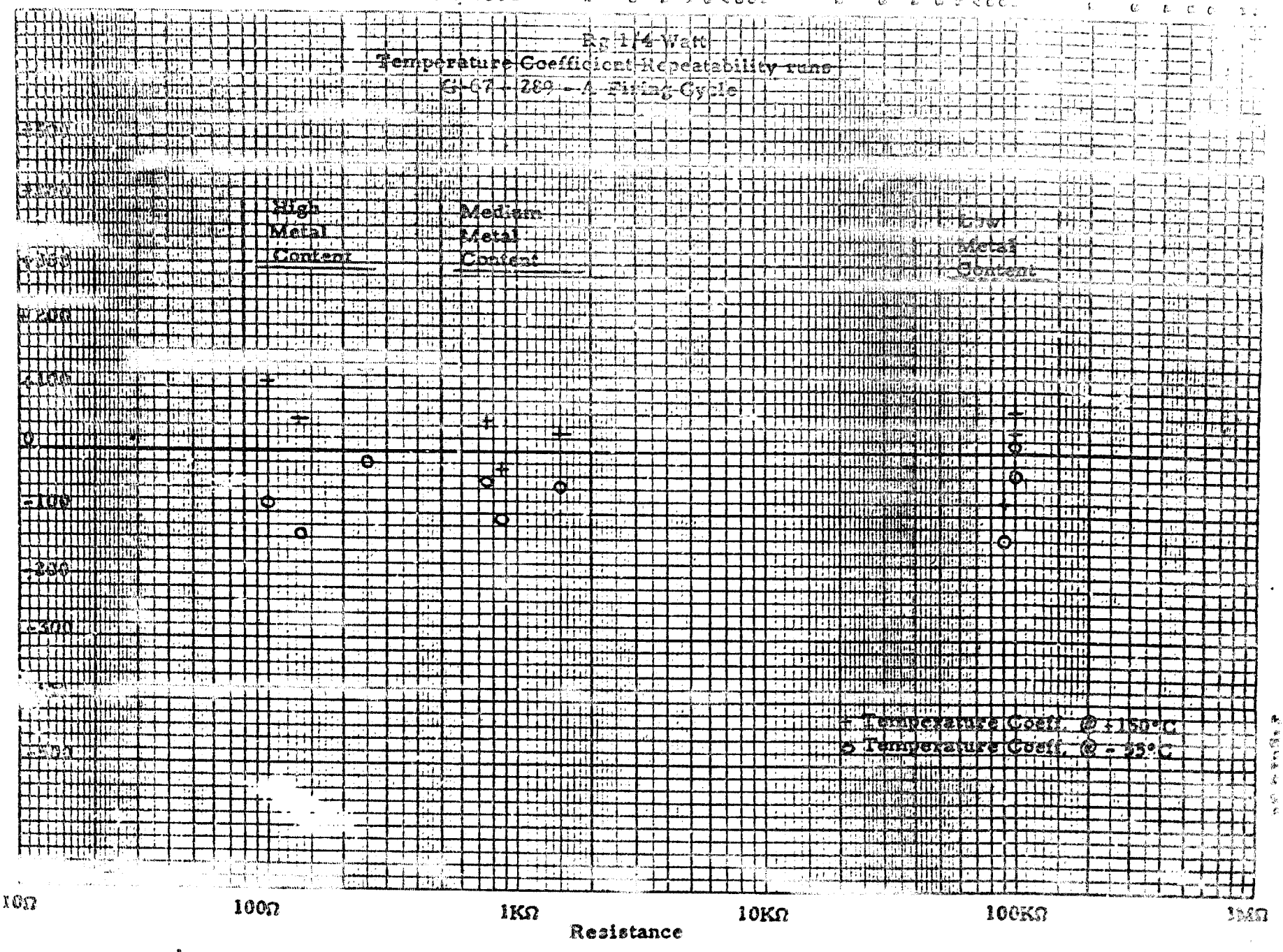
TYPE Rg 1/4

B- Figure 33

DATE - 11-15-65

4.0	14.0 AVG; 15.0 IAVG 10² H I-2						6.0 AVG; 10.0 IAVG						1.0	3.0		3.0	8.0		
TEMPERATURE CYCLE	MOISTURE RESISTANCE LOAD	INSULATION RESISTANCE (MEGS.)	NO LOAD	INSULATION RESISTANCE (MEGS.)	SHORT TIME OVER LOAD	DATA Nº	70° LOAD LIFE HOURS 48	240	504	720	1008	DATA Nº	TERMINAL STRENGTH	EFFECT OF SOLDERING	DATA Nº	SHOCK TEST	NI-FREQUENCY VIBRATION	DATA Nº	SOLDER-ABILITY
0.04	+0.05	ALL>	±0.21	ALL>	∓0.02	0	±0.03	+0.11	+0.20	+0.26	+0.28	0	+0.11	+0.04	0	+0.02	-0.03		
.008	+0.12	10⁴	+0.65	10⁴	+0.04	6	+0.08	+0.25	+0.48	+0.60	+0.63	6	+0.19	+0.20	6	+0.04	-.008		
-0.08	+0.01	MEG12	-0.04	MEG12	-0.04	7	-0.04	+0.04	+0.12	+0.17	+0.20	7	+0.04	0.0	8	0.0	0.06		
0	0/5	0/5	0/5	0/5	0	9 5	0	0	0	0	0	9 9	0	0	0 3	0	0		
0.04	-0.07	ALL>	-0.20	ALL>	±.009	0	∓0.32	∓0.32	±0.33	±0.34	±0.34	0	+0.19	±0.13	0	+0.02	+0.02		
.007	-0.02	10⁴	-0.02	10⁴	+0.03	6	+0.04	+0.07	+0.19	+0.21	+0.23	6	+1.16	+0.13	6	+0.04	+0.06		
.12	-0.14	MEG12	-0.59	MEG12	-0.01	7	-1.97	-1.93	-1.85	-1.86	-1.83	8	+0.03	-0.89	8	0.0	0.0		
0	0/5	0/5	0/5	0/5	0	9 6	0	0	0	0	0	0 0	1	0	0 4	0	0		
0.05	±0.20	ALL>	+0.32	ALL>	∓0.17	0	∓0.07	±0.05	±0.08	±0.11	±0.14	0	+0.06	+0.12					
0.16	+0.34	10⁴	+0.48	10⁴	+0.10	7	+0.10	+0.30	+0.39	+0.41	+0.49	7	+0.12	+0.18					
0.06	-0.14	MEG12	+0.09	MEG12	-0.82	8	-0.19	-0.10	-0.10	-0.10	-0.07	8	0.0	+0.08					
0	0/5	0/5	0/5	0/5	0	2	0	0	0	0	0	9 0	0/9	0/9					

2



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General Purpose

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Reliable Resistor Development Report	U. S. Army Electronics Command Fort Monmouth, New Jersey AMSEL-KL-EC

13. ABSTRACT

MIL-R-11 70°C load life tests have been completed to 1000 hours on the 100Ω group. The completed results, on all pertinent resistance values, demonstrates conformance to the MIL-R-11 requirements. The contract requirements of 5% maximum resistance change on the Mil moisture resistance and Resistance-Temperature characteristic of less than 500ppm/°C have also been met.

The moisture load matrix has been completed through 2000 hours on the 100Ω and 100KΩ groups. These results definitely indicate smaller resistance changes with increasing load, especially in the 100KΩ group.

The temperature load matrix tests have completed 2000 hours on the 100Ω group and 3000 hours on the 100KΩ group. The 10Ω, 1KΩ, 10KΩ, and 39KΩ groups have completed 6000 hours of testing. The present calculated failure rate, which includes the two early (50 hours of test) failures on the 100KΩ group, is 0.10%/1000 hours at a confidence level of 60% on units tested at 85°C ambient with 1/4 watt load. The calculated failure rate without the two early failures is no more than 0.03%/1000 hours at a confidence level of 60%. The average resistance change for the 100Ω and 100KΩ groups after 2000 hours at 85°C ambient with 1/4 watt load is less than 0.1%; and less than 0.4% on the 10Ω, 1KΩ, 10KΩ, and 39KΩ groups.

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
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Reliable, Low Cost						
Stable						
Test Matrix						
Cermet						
Failure Rate						
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