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L. W. Dixon	COMPONENTS - RESISTORS	R60XF19
		DATE 3-25-60

TITLE Qualification Approval Tests on Resistance Products Co.'s Type "H" Carbon Composition Resistors (0.2 and 40 Megohm)

ABSTRACT Engineering Work Requests ESE-48 & 49 established a program for performance of Qualification Approval Tests on RPC's 0.2 and 40 meghom Carbon Composition Resistors. This report is an accounting of these tests wherein (50) samples of each component were subjected to QA tests per drawings 802C250 and 802C251. Tests are explained and results tabulated.

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CONCLUSIONS

1. The two subject components are classified Non-SA. Fifty (50) samples of each component subjected to QA Tests, equivalent to Supplier Acceptance Criteria, adequately met all Test Requirements.
2. The Type "H" High Megohm carbon composition resistors manufactured by Resistance Products Co., Harrisburg, Pennsylvania, and described by GEXF drawings 802C250, Rev. 4, and 802C251, Rev. 4, are recommended for use in the telemetering circuit of the MC-890 Type Power Supply. These resistors have been incorporated into the Modified Power Supply per EN 224.

By cutting out this rectangle and folding on the center line, the above information can be fitted into a standard card file.

For list of contents—drawings, photos, etc. and for distribution see next page.

INFORMATION PREPARED FOR Engineering

TESTS MADE BY GJ Bonk/LW Dixon Gary J Bonk / LWD.

COUNTERSIGNED R. L. Bailey Robert L. Bailey 3/18/60 3/18/60 SECTION Electronic Systems Engineering

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F-1068

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DRAWING NOS. 802C250 P1 Rev. 4 (1 sheet)

802C251 P1 Rev. 4 (1 sheet)

124A1182 Rev. 1 (7 sheets)

PHOTO NOS.

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1.0 PURPOSE OF TEST: To evaluate Resistance Products Co.'s Type "H" High Megohm carbon composition Resistors by subjection of fifty (50) samples each of RPC's part X2058A & X2058B (40 & 0.2 megohms respectively) to Qualification Approval Tests, equivalent to Supplier Acceptance Tests, as specified on GEXF drawings 802C250, Rev. 4, and 802C251, Rev. 4. These new resistors are proposed for use in the telemetering circuit of the MC-890 Type Power Supply, offering greater temperature stability and reliability over the presently used MIL-R-10509B Type fixed film resistor per drawing 118A1238-P55 and fixed film resistor per drawing 895B732-P2.

2.0 MANUFACTURER: Resistance Products Company
914 South 13th Street
Harrisburg, Pennsylvania

3.0 MANUFACTURER TYPES: (a) Type H (X2058A) 40 megohms
(b) Type H (X2058B) 0.2 megohms

4.0 SPECIFICATIONS: MIL: MIL-R-14293A
GEXF: 802C250 - P1 Rev. 4
802C251 - P1 Rev. 4
124A1182 Rev. 1

5.0 QUANTITY OF SAMPLES: 50 each type.

6.0 DATE TESTS STARTED: November 3, 1959.

DATE TESTS COMPLETED: December 1, 1959.

7.0 TESTS CONDUCTED BY: (a) Visual & Mechanical:
G. Newtown, Foreman
Q.C. Receiving Inspection
(b) Electrical:
G. J. Bonk & R. S. Lee
ESE Laboratory

8.0 DISPOSITION OF SAMPLES: Retain in ESE Laboratory.

9.0 SUMMARY OF TESTS: The 50 piece sample group of each type component subjected to all required tests per applicable drawings favorably met all acceptance criteria. As noted by the test summary only one minor failure occurred.

ACKNOWLEDGEMENT: The prompt and efficient service given by Quality Control, Incoming Inspection and Test in Performance of Visual and Mechanical Inspection on the subject 2 groups of QA samples is appreciated.

10.0 TEST SUMMARY

Para. No.	Test	*Test Paragraph Number	Number Tested	Allowable Failures	Acutal Failures	Acceptable
	802C250 - P1 (40 meg.)					
10.0	Visual & Mech. Inspection	1	50	3	**1	Yes
11.0	Resistance @26°C	2	50	0	0	Yes
12.0	Terminal Strength	3	7	0	0	Yes
13.0	Temperature Cycling	4	5	1	0	Yes
14.0	Operational Life	5	10	0	0	Yes
15.0	Temperature Coefficient of Resistance	6	25	1	0	Yes
	802C251 - P1 (0.2 Meg.)					
10.0	Visual & Mech. Inspection	1	50	3	0	Yes
11.0	Resistance @26°C	2	50	0	0	Yes
12.0	Terminal Strength	3	7	0	0	Yes
13.0	Temperature Cycling	4	5	1	0	Yes
14.0	Operational Life	5	10	0	0	Yes
15.0	Temperature Coefficient of Resistance	6	25	1	0	Yes

* Referenced Test Para Nos. apply to Dwgs. 802C250 & 802C251 respectively

** Minor failure: Sample No. 10 of 802C250 - P1 (40 Meg.) exceeded maximum Insulation Length by .004 inch.

11.0 VISUAL & MECHANICAL INSPECTION

11.1 Requirements: Per Test No. 1 of drawings 802C250 & 802C251 respectively.

11.2 Equipment: Six inch scale, Vernier Calipers, Micrometer calipers.

11.3 Method: All Visual attributes and delineated physical dimensions were checked and measured against applicable specifications.

11.4 Results:
802C250 - P1 One sample of 50 failed to meet the maximum outside insulation length of 1.800 inch. Sample measured 1.804 inch. Three failures allowable.

802C251 - P1 No failures in 50 samples.

12.0 RESISTANCE

12.1 Requirements: Per Test No. 2 of drawings 802C250 & 802C251 respectively.

12.2 Equipment: John Fluke Differential Voltmeter, John Fluke Power Supply, Precision Wire-Wound Resistor.

12.3 Method: A resistance ratio method of measuring for this parameter, with a precision wire-wound resistor as a standard was used. Each sample was measured with a D.C. potential of 100 volts, terminal to terminal, at 26°C, with normal ambient conditions.

12.4 Results:
802C250 - P1 All samples met the 40 ±5% megohms requirement. $\bar{X}$ = 40.23, maximum reading 41.532; minimum reading 39.059.

802C251 - P1 All samples met the 200K ±5% ohms requirement. $\bar{X}$ = 203.0K maximum reading 206.54K; minimum reading 197.813K.

13.0 TERMINAL STRENGTH

13.1 Requirements: Per Test No. 3 of drawings 802C250 & 802C251 respectively (7 samples each).

13.2 Equipment: Long nose pliers, four inch vise.

13.3 Method: Each terminal of each sample was bent through 90° at a point 1/4 inch from body of resistor, with the radius of curvature at the bend approximately 1/32 inch. Each terminal was then clamped within 3/64 inch of the bend on the side between the bend and the remaining portion of lead and the body of the resistor rotated about the original axis of the bent terminal through 360° in alternating directions.

13.4 Results:
802C250 - P1
& 802C251 - P1: Each terminal of each sample withstood 10 rotations. Minimum requirement 3 rotations.

14.0 TEMPERATURE CYCLING:

14.1 Requirements: Per Test No. 4 of drawings 802C250 & 802C251, respectively(5 samples each).

14.2 Equipment: Statham Temperature Chamber, John Fluke Differential Voltmeter and Power Supply, Precision Wire-Wound Resistor.

14.3 Method: Five samples of each type were subjected to Temperature Cycling conditions as specified under para. 4.6.5, MIL-R-14293A and Method 102A, Condition D, MIL-STD-202A (5 cycles).

14.4 Results:
802C250 &
802C251: Following subjection to Temperature Cycling, Visual & Mechanical and Resistance checks were made. All samples met original requirements of Tests Nos. 1 & 2. (Paras. 11 & 12 above).

15.0 OPERATIONAL LIFE - 75°C

15.1 Requirements: Test No. 5 of drawings 802C250 & 802C251 respectively (10 samples each).

15.2 Equipment: Statham Temperature Chamber, John Fluke Differential Voltmeter and Power Supply, Precision Wire-Wound Resistor.

15.3 Method: Ten samples of each type were subjected to a 10 hour continuous test period at 75°C ±2°C with 9.0 KVDC applied terminal to terminal. Following the 10 hour test period, Visual & Mechanical and Resistance checks were made.

15.4 Results: All samples met original requirements for Visual & Mechanical Inspection. Maximum resistance change referred to original measurement @ 26°C was -1.15% and -0.63% for 802C250 - P1 and 802C251 - P1 respectively. Maximum allowable change ±8%. All samples met this requirement.

16.0 TEMPERATURE COEFFICIENT OF RESISTANCE

16.1 Requirements: Test No. 6 of drawings 802C250 - P1 and 802C251 - P1 respectively (25 samples each).

16.2 Equipment: Statham Temperature Chamber, John Fluke Differential Voltmeter and Power Supply, Precision Wire-Wound Resistor.

16.3 Method: 25 samples of each type were maintained and stabilized at -55°C for approximately 30 minutes. At the end of this period, resistance measurements were made using the ratio method described in para. 12.0. Temperature Coefficient of resistance referred to the original room temperature measurements were calculated using the formula:

$$T.C = \frac{R - r}{R(t_r - t)} \times 100$$

T.C = Temperature coefficient of resistance in percent per degree C.
R = Resistance at room temperature.
r = Resistance at -55°C.
t_r = Reference Room Temperature.
t = Test temperature (-55°C).

16.4 Results:

(a) 802C250 - P1: (40 Meg) The 25 samples favorably met the specified requirement of -0.105%/°C maximum, and -.050%/°C minimum; $\bar{X}$ = -.077%/°C, 3 sigma = .003.

(b) 802C251 - P1: (0.2 Meg) The 25 samples favorably met the specified requirement (same as 802C250 - P1) $\bar{X}$ = -.075%/°C, 3 sigma = .0075.

7.0 CONCLUSIONS The subject Type "H" carbon composition resistors manufactured by Resistance Products Company, Harrisburg, Pennsylvania, favorably met all Qualification Approval tests and requirements as described on GEXF drawings 802C250 - P1, Rev. 4 and 802C251 - P1, Rev. 4. As evidenced by the included variable test data and comments on applicable results of individual tests, the two resistors exhibited excellent control on the two critical parameters for MC-890 Type Power Supply use, Resistance @ Room Temperature and Temperature Coefficient of Resistance.

Resistance Products Company, was visited by a GEXF survey team on June 4, 1959, and was found to possess necessary capabilities both in manufacturing and Quality Control to produce a quality product meeting the critical requirements of the subject drawings.

The two subject components described by drawings 802C250 - P1, Rev. 4 (40 Megohms) and 802C251 - P1, Rev. 4 (0.2 Megohms) are recommended for use in the MC-890 Type Power Supply Telemetering Circuit.

These resistors have been incorporated into the Modified Power Supply currently under construction per EN 224. Due to their physical size the new resistors cannot be incorporated into the present Power Supply without incorporation of the SA - 745 type rectifiers.

The two subject components are classified non-SA.

MUL - 642-R1

Component Test Report

Part Description 40 Megohm Resistor Drawing 8020250 - P1

Vendor Resistance Products Company Lot Size 50 Date Tested 11-4-59

Equipment Used Six inch scale, Vernier Calipers, Micrometer Calipers.

Tested By QC Incoming Inspection

Test #1 -- Visual & Mechanical Inspection

Unit No.	Length of insulation Max. 1.800 Inches	Length of Body Max. 1.609 Inches	Lead #1 Length Min. 1.50 Inches	Lead #2 Length Min. 1.500 Inches	Insulation Overlap Lead #1 Min. .040 Inch	Insulation Overlap Lead #2 Min. .040 Inch	Outside Diameter Max. .281 Inch	Lead Diameter #20 Awg. Min. .031 Max. .033 Inch	
1	1.795	1.587	2.00	2.00	.093	.093	.276	.032	.032
2	1.790	1.590	2.00	2.03	.062	.093	.276	.032	.032
3	1.793	1.603	2.00	2.00	.062	.093	.273	.032	.032
4	1.799	1.580	2.00	2.00	.093	.100	.277	.032	.032
5	1.780	1.585	2.00	2.00	.080	.080	.278	.032	.032
6	1.789	1.597	2.00	2.03	.070	.093	.275	.033	.031
7	1.787	1.581	2.00	2.00	.093	.093	.276	.032	.033
8	1.800	1.587	2.00	2.00	.080	.080	.275	.032	.032
9	1.800	1.583	2.00	2.03	.093	.093	.274	.032	.033
10	1.804*	1.590	2.00	2.00	.093	.100	.278	.032	.033
11	1.793	1.593	2.00	2.03	.070	.093	.275	.032	.032
12	1.795	1.593	2.02	2.00	.070	.100	.278	.032	.032
13	1.797	1.586	2.00	2.00	.080	.100	.276	.032	.032
14	1.778	1.580	2.00	2.00	.093	.093	.276	.032	.032
15	1.785	1.585	2.00	2.00	.093	.093	.276	.032	.032
16	1.783	1.596	2.00	2.00	.080	.093	.274	.032	.032
17	1.795	1.576	2.00	2.00	.080	.125	.274	.032	.032
18	1.770	1.592	2.00	2.00	.062	.093	.279	.032	.032
19	1.795	1.592	2.00	2.00	.093	.093	.278	.032	.031
20	1.796	1.595	2.02	2.00	.093	.093	.276	.032	.032
21	1.781	1.596	2.00	2.00	.062	.093	.274	.033	.032
22	1.788	1.590	2.00	2.00	.062	.093	.279	.032	.032
23	1.789	1.581	2.00	2.00	.070	.100	.278	.032	.032
24	1.774	1.586	2.00	2.00	.093	.093	.275	.032	.032
25	1.783	1.594	2.00	2.00	.093	.100	.278	.032	.031
26	1.775	1.584	2.00	2.00	.070	.093	.275	.032	.032
27	1.796	1.582	2.00	2.00	.093	.093	.284	.032	.032
28	1.780	1.596	2.00	2.00	.080	.093	.288	.032	.032
29	1.786	1.593	2.00	2.00	.093	.080	.275	.032	.032
30	1.775	1.590	2.00	2.00	.093	.062	.278	.032	.032

Component Test Report

Part Description 40 Megohm Resistor Drawing 802C250

Vendor Resistance Products Company Lot Size 50 Date Tested 11-4-59

Equipment Used Six inch scale, Vernier Calipers, Micrometer Calipers.

Tested By QC Incoming Inspection

Test #1 -- Visual & Mechanical Inspection

Unit No.	Length of Insulation Max. 1.800 Inches	Length of Body Max. 1.609 Inches	Lead #1 Length Min. 1.50 Inches	Lead #2 Length Min. 1.500 Inches	Insulation Overlap Min. .040 Inch	Insulation Overlap Lead #2 Min. .040 Inch	Outside Diameter Max. .281 Inch	Lead Diameter #20 Awg. Min. .031 Max. .033 Inch	
31	1.779	1.585	2.00	2.00	.080	.093	.275	.032	.032
32	1.799	1.590	2.03	2.00	.093	.093	.276	.032	.032
33	1.795	1.585	2.00	2.00	.062	.093	.275	.032	.032
34	1.793	1.582	2.03	2.00	.070	.100	.274	.032	.032
35	1.791	1.581	2.02	2.00	.093	.093	.274	.032	.032
36	1.780	1.591	2.02	2.02	.062	.093	.276	.032	.032
37	1.798	1.587	2.00	2.00	.070	.100	.274	.032	.032
38	1.798	1.591	2.03	2.00	.080	.093	.275	.032	.032
39	1.795	1.588	2.00	2.00	.093	.100	.275	.032	.032
40	1.795	1.585	2.02	2.00	.080	.100	.275	.032	.032
41	1.783	1.587	2.00	2.00	.080	.093	.275	.032	.032
42	1.783	1.597	2.00	2.00	.070	.093	.281	.032	.032
43	1.779	1.592	2.00	2.00	.062	.093	.276	.032	.032
44	1.798	1.592	2.00	2.00	.093	.093	.276	.032	.032
45	1.773	1.583	2.00	2.00	.070	.093	.275	.032	.032
46	1.769	1.594	2.00	2.00	.080	.093	.274	.032	.032
47	1.760	1.591	2.00	2.00	.062	.093	.275	.032	.032
48	1.789	1.592	2.00	2.00	.070	.093	.278	.032	.032
49	1.791	1.582	2.00	2.00	.093	.100	.275	.032	.032
50	1.775	1.592	2.00	2.00	.062	.093	.274	.032	.032

* Minor Failure: Sample No. 10 exceeded Maximum insulation dimension Visual for Marking - all samples O.K.

MUL - 642-R1

Component Test Report

Part Description 40 Megohm Resistor Drawing 8020250

Vendor Resistance Products Company Lot Size 50 Date Tested 11-1-59 & 12-1-59

Equipment Used Fluke Differential Voltmeter, Fluke Power Supply Precision Resistor.

E_T = 101.0000 Volts D.C. R_s = 400.22 Kohms

Tested By R. S. Lee

Test	2		6			4		
Unit No.	Standard Resistor Voltage (E_{rs})@26°C Volts	Resistance At 26°C (Calculated) Max. 42.000 Min. 38.000 Megohms	Standard Resistor Voltage (E_{rs})@-55°C Volts	Resistance At -55°C (Calculated) Megohms	Temperature Coefficient of Resistance Max. -.105 Min. -.050 %/°C	After Standard Resistor Voltage (E_{rs})@26°C Volts	Temperature Resistance At 26°C (Calculated) Megohms	Cycling Change in Resistance Max. ±8 Percent
1	0.9711	41.225	0.9135	43.849	-.07858			
2	0.9994	40.046	0.9415	42.533	-.07667			
3	1.0035	39.881	0.9467	42.298	-.07483			
4	0.9782	40.923	0.9236	43.365	-.07367			
5	1.0201	39.226	0.9623	41.605	-.07488			
6	0.9838	40.688	0.9266	43.224	-.07695			
7	0.9725	41.165	0.9163	43.714	-.07644			
8	0.9727	41.156	0.9148	43.786	-.07889			
9	1.0223	39.140	0.9632	41.566	-.07652			
10	1.0070	39.741	0.9471	42.280	-.07888			
11	1.0124	39.527	0.9530	42.015	-.07770			
12	0.9742	41.093	0.9163	43.714	-.07874			
13	1.0079	39.705	0.9481	42.234	-.07863			
14	0.9722	41.178	0.9133	43.859	-.08038			
15	1.0132	39.495	0.9521	42.056	-.08005			
16	0.9914	40.373	0.9324	42.952	-.07886			
17	1.0033	39.889	0.9448	42.383	-.07718			
18	0.9870	40.554	0.9290	42.111	-.07784			
19	0.9768	40.982	0.9203	43.522	-.07652			
20	1.0017	39.953	0.9447	42.388	-.07525			
21	0.9909	40.393	0.9336	42.897	-.07653			
22	1.0123	39.531	0.9543	41.957	-.07576	VISUAL & MECHANICAL OK		
23	1.0050	39.821	0.9465	42.306	-.07704			
24	1.0021	39.937	0.9445	42.397	-.07605			
25	0.9909	40.393	0.9370	42.739	-.07170			
26	1.0207	39.202				1.0314	38.791	-1.05
27	0.9803	40.834				0.9916	40.364	-1.15
28	0.9719	41.191				0.9765	40.995	-0.476
29	1.0244	39.059				1.0374	38.564	-1.27
30	0.9640	41.532				0.9713	41.216	-0.761

Component Test Report

MUL - 642-R1

Part Description 40 Megohm Resistor Drawing 8020250

Vendor Resistance Products Company Lot Size 50 Date Tested 11-1-59 thru 12-4-59

Equipment Used Fluke Differential Voltmeter, Fluke Power Supply, Precision Resistor, Long Nose Pliers, Four inch Vise.

E_T = 101.0000 Volts D.C. R_S = 400.22 Kohms

Tested By R. S. Lee

Test	1	2	5			3		
			After Operational Life			Terminal Strength		
Unit No.	Standard Resistor Voltage (E_{rs})@26°C Volts	Resistance At 26°C (Calculated) Max. 42.000 Min. 38.000 Megohms	Standard Resistor Voltage (E_{rs})@26°C Volts	Resistance (Calculated) Megohms	Change In Resistance Max. ±8 Percent	Lead #1 At 27°C Min. 3 Arcs	Lead #2 At 26°C Min. 3 Arcs	
31	1.0088	39.669	1.0140	39.464	-0.52	10	10	
32	0.9759	41.020	1.0126	39.519	-3.66	10	10	
33	0.9656	41.462	1.0069	39.745	-4.14	10	10	
34	1.0190	39.622	1.0367	38.591	-3.33	10	10	
35	0.9826	40.738	1.0144	39.448	-3.17	10	10	
36	0.9993	40.050	1.0272	38.951	-2.74	10	10	
37	0.9999	40.026	1.0220	39.152	-2.18	10	10	
38	1.0046	39.837	1.0207	39.202	-1.59			
39	0.9956	40.201	1.0340	38.692	-3.75			
40	0.9709	41.234	1.0019	39.945	-3.13			
41	1.0023	39.929						
42	1.0077	39.713						
43	0.9716	41.204						
44	1.0030	39.901	VISUAL & MECHANICAL					
45	1.0095	39.642		OK				
46	1.0241	39.071						
47	1.0071	39.712						
48	1.0131	39.499						
49	0.9937	40.278						
50	0.9827	40.734						

Component Test Report

Part Description 0.2 Megohm Resistor Drawing 8020251 - P1

Vendor Resistance Products Company Lot Size 50 Date Tested 11-4-59

Equipment Used Six inch scale; Vernier Calipers; Micrometer Calipers.

Tested By QC Receiving Inspection

Test No. 1 -- Visual & Mechanical Inspection

Unit No.	Length of Insulation Max. 1.050 Inches	Length of Body Max. 0.859 Inches	Lead #1 Length Min. 1.500 Inches	Lead #2 Length Min. 1.500 Inches	Insulation Overlap Lead #1 Min. .040 Inch	Insulation Overlap Lead #2 Min. .040 Inch	Outside Diameter Max. .281 Inch	Lead Diameter #20 Awg. Min. .031 Max. .033 Inch	
1	1.015	.840	2.032	2.000	.062	.092	.275	.032	.032
2	1.015	.836	2.000	2.012	.062	.093	.275	.032	.032
3	1.015	.845	2.032	2.000	.093	.093	.275	.033	.033
4	1.000	.843	2.000	2.000	.070	.085	.275	.032	.031
5	1.008	.835	2.000	2.000	.062	.093	.279	.032	.032
6	1.018	.840	2.000	2.000	.070	.093	.273	.032	.032
7	1.015	.842	2.000	2.032	.070	.093	.275	.032	.030
8	0.998	.840	2.000	2.000	.080	.080	.273	.032	.032
9	1.021	.840	2.000	2.032	.093	.093	.272	.033	.032
10	1.000	.841	2.000	2.000	.062	.093	.278	.033	.032
11	1.000	.840	2.032	2.000	.093	.080	.276	.033	.032
12	0.997	.835	2.000	2.000	.062	.093	.273	.033	.032
13	1.015	.841	2.032	2.000	.093	.062	.276	.032	.032
14	1.000	.837	2.000	2.032	.062	.093	.275	.032	.032
15	1.008	.840	2.000	2.000	.062	.093	.279	.032	.033
16	1.000	.831	2.000	2.000	.100	.062	.275	.032	.032
17	1.003	.841	2.000	2.032	.093	.070	.278	.032	.033
18	1.022	.835	2.000	2.015	.062	.090	.278	.033	.032
19	1.030	.838	2.000	2.000	.070	.093	.277	.032	.032
20	1.000	.836	2.000	2.000	.062	.093	.275	.033	.032
21	1.019	.834	2.000	2.032	.062	.093	.274	.033	.032
22	1.005	.836	2.000	2.000	.093	.062	.277	.033	.032
23	1.010	.834	2.000	2.000	.062	.099	.274	.032	.032
24	1.020	.844	2.000	2.000	.070	.070	.275	.032	.032
25	1.005	.835	2.000	2.000	.070	.093	.278	.032	.032
26	0.997	.840	2.032	2.000	0.62	.093	.277	.033	.032
27	1.020	.846	2.000	2.000	.062	.093	.273	.033	.032
28	1.030	.843	2.000	2.000	.062	.100	.273	.032	.032
29	1.033	.830	2.000	2.000	.093	.100	.277	.033	.032
30	1.008	.835	2.000	2.000	.062	.093	.274	.032	.033

MUL - 642-R1

Component Test Report

Part Description 0.2 Megohm Resistor Drawing 802C251 - P1

Vendor Resistance Products Company Lot Size 50 Date Tested 11-4-59

Equipment Used Six inch scale; Vermier Calipers; Micrometer Calipers.

Tested By QC Receiving Inspection

Test #1 -- Visual & Mechanical Inspection

Unit No.	Length of insulation Max. 1.050 Inches	Length of Body Max. 0.859 Inches	Lead #1 Length Min. 1.500 Inches	Lead #2 Length Min. 1.500 Inches	Insulation Overlap Lead #1 Min. .040 Inch	Insulation Overlap Lead #2 Min. .040 Inch	Outside Diameter Max. .281 Inch	Lead Diameter #20 Awg. Min. .031 Max. .033 Inch	
31	1.013	.840	2.000	2.000	.080	.093	.275	.032	.032
32	1.004	.836	2.000	2.000	.062	.093	.274	.032	.033
33	1.020	.840	2.000	2.000	.062	.093	.274	.032	.033
34	1.005	.837	2.000	2.000	.062	.080	.278	.033	.033
35	1.021	.840	2.000	2.000	.070	.093	.276	.032	.032
36	1.010	.846	2.000	2.000	.062	.093	.276	.033	.032
37	1.010	.836	2.000	2.000	.062	.062	.274	.033	.031
38	1.022	.840	2.000	2.000	.062	.093	.275	.033	.032
39	1.011	.839	2.000	2.000	.062	.093	.278	.032	.032
40	1.010	.834	2.000	2.000	.080	.080	.274	.032	.032
41	1.043	.835	2.000	2.000	.093	.100	.275	.032	.032
42	1.009	.846	2.000	2.000	.080	.080	.273	.032	.032
43	1.004	.840	2.000	2.000	.063	.080	.275	.033	.032
44	1.025	.836	2.000	2.000	.062	.070	.274	.033	.032
45	1.005	.843	2.000	2.000	.062	.093	.275	.032	.032
46	1.047	.835	2.000	2.000	.093	.093	.276	.032	.032
47	1.000	.836	2.062	2.032	.092	.092	.276	.032	.032
48	0.994	.837	2.000	2.000	.062	.062	.277	.033	.032
49	0.997	.831	2.000	2.000	.070	.093	.277	.032	.032
50	1.000	.837	2.000	2.000	.062	.070	.275	.033	.032

MUL - 642-R1

Component Test Report

Part Description 200Kohm Resistor Drawing 8020251

Vendor Resistance Products Company Lot Size 50 Date Tested 11-11-59 and 12-1-59

Equipment Used Fluke Differential Voltmeter, Fluke Power Supply, Precision Resistor

E_T = 101.0000 Volts D. C. R_S = 2014.1 Ohms Tested By R. S. Lee

Test	2		6			4		
						After Temperature Cycling		
Unit No.	Standard Resistor Voltage (E_{rs})@ 26°C Volts	Resistance At 26°C (Calculated) Max. 210.00 Min. 190.00 Kohms	Standard Resistor Voltage (E_{rs})@-55°C Volts	Resistance At -55°C (Calculated) Kohms	Temperature Coefficient of Resistance Max. -.100 Min. -.050 %Per°C	Standard Resistor Voltage E_{rs}@26°C Volts	Resistance At 26°C (Calculated) Kohms	Change In Resistance Max. ±8 Percent
1	0.9860	204.2982	0.9294	216.8628	-.07593			
2	0.9789	205.7947	0.9219	218.6434	-.07707			
3	0.9909	203.2781	0.9354	215.4588	-.07397			
4	1.0163	198.1474	0.9602	209.8418	-.07286			
5	0.9825	205.0334	9.9311	216.4630	-.06881			
6	0.9814	205.2654	0.9292	216.9099	-.07004			
7	0.9754	206.5405	0.9219	218.6434	-.07235			
8	0.9831	204.9069	0.9267	217.5004	-.07588			
9	0.9895	203.5687	0.9373	215.0179	-.06943			
10	0.9883	203.8183	0.9338	215.8314	-.07276			
11	1.0140	198.6013	0.9600	209.8859	-.07015			
12	0.9917	203.1125	0.9349	215.5750	-.07575			
13	0.9989	201.6340	0.9417	214.0038	-.07574			
14	1.0058	200.2370	0.9456	213.1129	-.07938			
15	0.9979	201.8380	0.9354	215.4588	-.08331			
16	0.9866	204.1729	0.9289	216.9806	-.07744			
17	0.9820	205.1387	0.9255	217.7850	-.07611			
18	1.0023	200.9431	0.9462	212.9766	-.07394			
19	0.9974	201.9403	0.9403	214.3254	-.07572			
20	1.0094	199.5155	0.9519	211.6892	-.07533			
21	1.0016	201.0851	0.9451	213.2267	-.07454	VISUAL & MECHANICAL OK		
22	0.9997	201.4710	0.9391	214.6020	-.08047			
23	0.9787	205.8372	0.9235	218.2610	-.07452			
24	0.9964	202.1449	0.9367	215.1568	-.07947			
25	0.9931	202.8232	0.9323	215.7147	-.07847			
26	0.9787	205.8372				0.9839	204.7387	-.533
27	0.9973	201.9607				1.0036	200.6803	-.634
28	0.9816	205.2231				0.9867	204.1520	-.522
29	0.9973	201.9607				1.0030	200.8015	-.574
30	0.9816	205.2231				0.9837	204.7808	-.215

Component Test Report

MUL - 642-R1

Part Description 200 Kohm Resistor Drawing 802C251

Vendor Resistance Products Company Lot Size 50 Date Tested 11-11-59 Thru 12-4-59

Equipment Used Fluke Differential Voltmeter, Fluke Power Supply Precision Resistor, Long Nose Pliers, Four inch Vise.

E_T = 101.0000 Volts D.C. R_S = 2014.1 Ohms

Tested By R. S. Lee

Test	2		5			3	
			After Operational Life			Terminal Strength	
Unit No.	Standard Resistor Voltage Ers@26°C Volts	Resistance At 26°C Calculated Max. 210.00 Min. 190.00 Kohms	Standard Resistor Voltage Ers@26°C Volts	Resistance Calculated Megohms	Change In Resistance Max. ±8 Percent	Lead #1 At 27°C Min. 3 Arcs	Lead #2 At 27°C Min. 3 Arcs
31	0.9968	202.0630	1.0084	199.7141	-1.16	10^+	10^+
32	0.9796	205.6463	0.9925	202.9468	-1.31	10^+	10^+
33	0.9830	204.9280	0.9951	202.4110	-1.23	10^+	10^+
34	0.9875	203.9850	1.0001	201.3878	-1.27	10^+	10^+
35	0.9781	205.9647	0.9886	203.7544	-1.07	10^+	10^+
36	0.9858	204.3403	0.9975	201.9196	-1.19	10^+	10^+
37	1.0180	197.8130	1.0325	195.0052	-1.42	10^+	10^+
38	1.0051	200.3778	1.0221	197.0112	-1.68		
39	0.9936	202.7204	1.0099	199.4140	-1.63		
40	0.9765	206.3055	0.9872	204.0465	-1.09		
41	0.9827	204.9913					
42	1.0101	199.3760					
43	0.9990	201.6136					
44	0.9942	202.5967					
45	1.0135	198.7004	VISUAL & MECHANICAL OK				
46	1.0058	200.2370					
47	1.0013	201.1460					
48	0.9847	204.5707					
49	0.9959	202.2475					
50	0.9762	206.3695					

802 C 250

GENERAL ELECTRIC

802 C 250

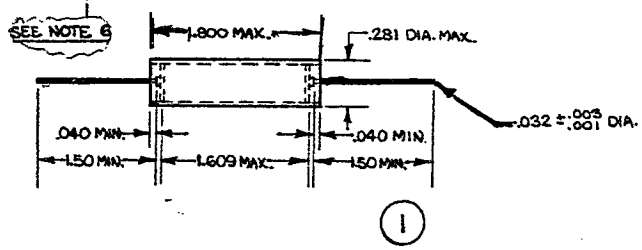
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:—				
APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

TITLE RESISTOR

FIRST MADE FOR RESISTANCE PRODUCTS CO. TYPE X2058A

OTHER APPLICABLE DOCUMENTS: 124A1182

FOR EXPERIMENTAL USE ONLY



1. CHARACTERISTICS

RESISTANCE -	40 MEGOHMS
RESISTANCE TOLERANCE -	± 5%
MAXIMUM CONTINUOUS WORKING VOLTAGE-	6000 VOLTS DC
OPERATING TEMPERATURE RANGE -	-55 TO 75°C

2. CONSTRUCTION

CORE-	CERAMIC
RESISTIVE ELEMENT-	CARBON COMPOSITION
LEADS -	TINNED COPPER
PROTECTIVE COATING -	EPOXY VARNISH

3. MARKING

THE RESISTOR SHALL BE MARKED WITH THE SUPPLIER'S NAME OR CODE, RESISTANCE AND TOLERANCE, AND THE NUMBER 802C250 P1.

TEST SPECIFICATIONS

THE FOLLOWING SPECIFICATIONS COVERS DESIGN TESTS AND PRODUCTION TESTS ON THE COMPONENT. MILITARY SPECIFICATION, RESISTORS, FIXED, HIGH MEGOHM, MIL-R-14293A, SHALL BE CONSIDERED PART OF THIS SPECIFICATION TO THE EXTENT INDICATED. IN THE EVENT OF CONFLICT, THIS SPECIFICATION SHALL TAKE PRECEDENCE.

TEST NO.	TEST	MIL-R-14293A REF.	CONDITIONS	NOTES	MIN	MAX	UNIT
1.	VISUAL & MECHANICAL INSPECTION	4.6.1	PER DELINEATION				
2.	RESISTANCE	4.6.2	100 Vdc		38.0	42.0	MEG
3.	TERMINAL STRENGTH	4.6.12	MIL-R-14293A		3		ARCS
4.	TEMPERATURE CYCLING	4.6.5	MIL-R-14293A	1	5		CYCLES
5.	OPERATIONAL LIFE 75°C ± 2°C	4.6.6	CONTINUOUS 9000 Vdc	1	10		HRS
	LIFE TEST END POINT TEST NO. 1	-	--	5	-		-
	TEST NO. 2	-	--	-	-	8	%
6.	TEMPERATURE COEFFICIENT OF RESISTANCE	4.6.10	ROOM TEMP. & -55°C ± 2°C		-.050	-.105	%/°C

QUALITY SPECIFICATION

THIS QUALITY SPECIFICATION COVERS ACCEPTANCE CRITERIA. SPECIFICATION FOR SAMPLING AND INSPECTION PROCEDURE FOR COMPONENTS, DRAWING NO. 124A1182, SHALL BE CONSIDERED PART OF THIS QS UNLESS SPECIFICALLY EXEMPTED.

TEST NO.	TEST	ACCEPTANCE CRITERIA: FOR SUPPLIER 100%	AQL	LTPD	NOTES	FOR PROCURING AGENCY 100%	AQL	LTPD	NOTES
1.	VISUAL & MECHANICAL INSPECTION		1.0	9.0			4.0	18.0	
2.	RESISTANCE	X					.65	6.5	
3.	TERMINAL STRENGTH		.40		2,3		.65		2,3
4.	TEMPERATURE CYCLING		2.5	14.0	2,3		4.0	18.0	2,3
5.	OPERATIONAL LIFE		.25		3,4		.40		3,4
6.	TEMP. COEFFICIENT OF RESISTANCE		.65	6.5			1.0	9.0	

NOTES:

1. FOLLOWING THIS TEST, THE RESISTOR SHALL BE CAPABLE OF MEETING THE POST LIFE TEST END POINT REQUIREMENTS.
2. THIS TEST IS A DESIGN TEST AND SHALL BE MADE ON THE FIRST LOT AND AT ANY TIME THEREAFTER AT THE DISCRETION OF THE PROCURING AGENCY.
3. THESE TESTS ARE CONSIDERED DESTRUCTIVE AND SAMPLING SHALL BE PER TABLE V, MIL-STD-105A, INSPECTION LEVEL II.
4. THE ACCEPTANCE NUMBER IS ZERO ON TESTS SO NOTED REGARDLESS OF SAMPLE SIZE.
5. EVIDENCE OF INTERNAL OR EXTERNAL ARCING SHALL BE CAUSE FOR REJECTION.
6. TO BE PROVIDED ASSEMBLED WITH .015 ± .005 THK. POLYVINYL SLEEVE MEETING DIMENSIONS AS SPECIFIED.

4. TEST FACILITIES AND ENVIRONMENTAL CONDITIONS

4.1 ALL MEASUREMENTS OF SPECIFIED VALUES SHALL BE MADE WITHIN AN ACCURACY OF ± 3%. TEST TEMPERATURE SHALL BE 27° ± 3°C / - 2° UNLESS OTHERWISE SPECIFIED.

4.2 ALL TESTING REQUIRED HEREIN SHALL BE PERFORMED BY THE SUPPLIER. THE SUPPLIER SHALL NOT SUBCONTRACT ANY TESTING REQUIRED BY THIS DRAWING WITHOUT PRIOR APPROVAL OF THE PROCURING AGENCY.

5. PRODUCTION LOTS

5.1 A LOT SHALL CONTAIN NOT LESS THAN 110 UNITS WHEN SUBMITTED TO THE PROCURING AGENCY FOR ACCEPTANCE. THE MAXIMUM LOT SIZE SHALL BE LIMITED TO VARIATIONS IN MATERIAL, TOOLING OR DESIGN WHICH DO NOT RESULT IN SIGNIFICANT CHANGE IN PREVIOUSLY ESTABLISHED PROCESS AVERAGES FOR THE SPECIFIED TEST REQUIREMENTS AND SHALL NOT EXCEED A 30 - DAY PRODUCTION.

5.2 THE SUPPLIER SHALL FORWARD THREE COPIES OF A CERTIFIED RECORD PER 118A1342 OF LOT TESTS PERFORMED ON EACH SHIPMENT LOT TO THE PROCURING AGENCY. THESE RECORDS SHALL INCLUDE VARIABLE DATA ON 50 UNITS MAXIMUM AND LIFE TEST END POINT DATA.

5.3. THE SUPPLIER SHALL KEEP RECORDS OF ALL TESTS PERFORMED ON EACH LOT OF PRODUCT FOR A MINIMUM OF ONE YEAR FROM DATE OF SHIPMENT AND SHALL MAKE SUCH RECORDS AVAILABLE TO THE PROCURING AGENCY UPON REQUEST.

6. DOCUMENT PRECEDENCE

6.1 IN THE EVENT OF CONFLICT, PRECEDENCE SHALL BE IN THE FOLLOWING ORDER: PURCHASE CONTRACT, THIS DRAWING AND THEN REFERENCED SPECIFICATIONS.

DRAWING NO. 802 C 250

REV. NO.

REVISIONS			PRINTS TO
4	2-2-60 D. Scarborough	P-4410 C-3	
CHG. RES. TOL. & TEST #2			
NR	4-13-60 R.E. Powell	NCN	
DWG. RE-DRAWN			
			B

MADE BY R.E. Powell ISSUED M Adams 4-15-60 APPROVALS R.E. Powell 4/15/60 4/16/60

PINELLAS PENINSULA PLANT ST. PETERSBURG, FLORIDA

802 C 250

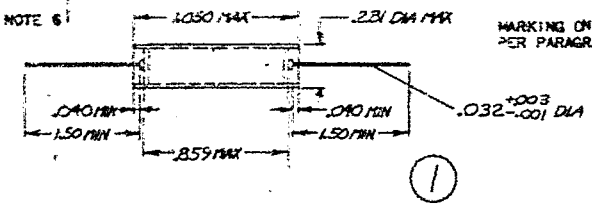
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING—				
APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

TITLE: RESISTOR

FIRST MADE FOR: RESISTANCE PRODUCTS CO. TYPE X2058B

OTHER APPLICABLE DOCUMENTS: 124A1182

SEE NOTE 6



MARKING ON RESISTOR BODY PER PARAGRAPH 3.

OTHER APPLICABLE DOCUMENTS - 118A1342

1. CHARACTERISTICS:

RESISTANCE	.2 MEGOHMS
RESISTANCE TOLERANCE	±5%
MAXIMUM CONTINUOUS WORKING VOLTAGE	500 VOLTS DC
OPERATING TEMPERATURE RANGE	-55 TO 75°C

2. CONSTRUCTION:

CORE	CERAMIC
RESISTIVE ELEMENT	CARBON COMPOSITION
LEADS	TINNED COPPER
PROTECTIVE COATING	EPOXY VARNISH

3. MARKING

THE RESISTOR SHALL BE MARKED WITH THE SUPPLIER'S NAME OR CODE, RESISTANCE AND TOLERANCE, AND THE NUMBER 802C251 P1

TEST SPECIFICATIONS

THE FOLLOWING SPECIFICATIONS COVERS DESIGN TESTS AND PRODUCTION TESTS ON THE COMPONENT. MILITARY SPECIFICATION, RESISTORS, FIXED, HIGH MEGOHM, MIL-R-14293A, SHALL BE CONSIDERED PART OF THIS SPECIFICATION TO THE EXTENT INDICATED. IN THE EVENT OF CONFLICT, THIS SPECIFICATION SHALL TAKE PRECEDENCE.

TEST NO.	TEST	MIL-R-14293A REF.	CONDITIONS	NOTES	MIN	MAX	UNIT
1.	VISUAL & MECHANICAL INSPECTION	4.6.1	PER DELINEATION				
2.	RESISTANCE	4.6.2	100 Vdc		.19	.21	MEG
3.	TERMINAL STRENGTH	4.6.12	MIL-R-14293A		3		ARCS
4.	TEMPERATURE CYCLING	4.6.5	MIL-R-14293A	1	5		CYCLES
5.	OPERATIONAL LIFE 75°C ± 2°C	4.6.6	CONTINUOUS 250 Vdc	1	10	-	HRS
	LIFE TEST END POINT TEST #1	-	—	5	-	-	-
	TEST #2	-	—	-	-	8	%
6.	TEMPERATURE COEFFICIENT OF RESISTANCE	4.6.10	ROOM TEMP & -55°C ± 2°C		-.050	-.105	%/°C

QUALITY SPECIFICATION

THIS QUALITY SPECIFICATION COVERS ACCEPTANCE CRITERIA. SPECIFICATION FOR SAMPLING AND INSPECTION PROCEDURE FOR COMPONENTS, DWG NO. 124A1182, SHALL BE CONSIDERED PART OF THIS QS UNLESS SPECIFICALLY EXEMPTED.

TEST NO.		ACCEPTANCE CRITERIA: FOR SUPPLIER 100%	AQL	LTPD	NOTES	FOR PROCURING AGENCY 100%	AQL	LTPD	NOTES
1.	VISUAL & MECHANICAL INSP.		1.0	9.0			4.0	18.0	
2.	RESISTANCE	X					.65	6.5	
3.	TERMINAL STRENGTH		.40		2,3		.65		2,3
4.	TEMPERATURE CYCLING		2.5	14.0	2,3		4.0	18.0	2,3
5.	OPERATIONAL LIFE		.25		3,4		.40		3,4
6.	TEMP COEFFICIENT OF RESISTANCE		.65	6.5			1.0	9.0	

NOTES:

1. FOLLOWING THIS TEST, THE RESISTOR SHALL BE CAPABLE OF MEETING THE POST LIFE TEST END POINT REQUIREMENTS.
2. THIS TEST IS A DESIGN TEST AND SHALL BE MADE ON THE FIRST LOT AND AT ANY TIME THEREAFTER AT THE DISCRETION OF THE PROCURING AGENCY.
3. THESE TESTS ARE CONSIDERED DESTRUCTIVE AND SAMPLING SHALL BE PER TABLE V, MIL-STD-105A, INSPECTION LEVEL II.
4. THE ACCEPTANCE NUMBER IS ZERO ON TESTS SO NOTED REGARDLESS OF SAMPLE SIZE.
5. EVIDENCE OF INTERNAL OR EXTERNAL ARCING SHALL BE CAUSE FOR REJECTION.
6. TO BE PROVIDED ASSEMBLED WITH .015 ± .005 THICK POLYVINYL SLEEVE MEETING DIMENSIONS AS SPECIFIED.

4. TEST FACILITIES AND ENVIRONEMENTAL CONDITIONS

4.1 ALL MEASUREMENTS OF SPECIFIED VALUES SHALL BE MADE WITHIN AN ACCURACY OF ± 3%. TEST TEMPERATURE SHALL BE 27° ± 3/2°C UNLESS OTHERWISE SPECIFIED.

4.2 ALL TESTING REQUIRED HEREIN SHALL BE PERFORMED BY THE SUPPLIER. THE SUPPLIER SHALL NOT SUB-CONTRACT ANY TESTING REQUIRED BY THIS DRAWING WITHOUT PRIOR APPROVAL OF THE PROCURING AGENCY.

5. PRODUCTION LOTS

5.1 A LOT SHALL CONTAIN NOT LESS THAN 110 UNITS WHEN SUBMITTED TO THE PROCURING AGENCY FOR ACCEPTANCE. THE MAXIMUM LOT SIZE SHALL BE LIMITED TO VARIATIONS IN MATERIAL, TOOLING OR DESIGN WHICH DO NOT RESULT IN SIGNIFICANT CHANGE IN PREVIOUSLY ESTABLISHED PROCESS AVERAGES FOR THE SPECIFIED TEST REQUIREMENTS AND SHALL NOT EXCEED A 30-DAY PRODUCTION.

5.2 THE SUPPLIER SHALL FORWARD THREE COPIES OF A CERTIFIED RECORD PER 118A1342 OF LOT TESTS PERFORMED ON EACH SHIPMENT LOT TO THE PROCURING AGENCY. THESE RECORDS SHALL INCLUDE VARIABLE DATA ON 50 UNITS MAXIMUM, AND LIFE TEST END POINT DATA.

5.3 THE SUPPLIER SHALL KEEP RECORDS OF ALL TESTS PERFORMED ON EACH LOT OF PRODUCT FOR A MINIMUM OF ONE YEAR FROM DATE OF SHIPMENT AND SHALL MAKE SUCH RECORDS AVAILABLE TO THE PROCURING AGENCY UPON REQUEST.

6. DOCUMENT PRECEDENCE

6.1 IN THE EVENT OF CONFLICT, PRECEDENCE SHALL BE IN THE FOLLOWING ORDER: PURCHASE CONTRACT, THIS DRAWING, AND THEN REFERENCED SPECIFICATIONS.

802C251 REV NO.

FOR EXPERIMENTAL USE ONLY

REVISIONS		PRINTS TO
1		
2		
3		
4		

NICHOLAS PENINSULA PLANT, ST. PETERSBURG, FLORIDA

802C251

GENERAL ELECTRIC

124A1182

CONT ON SHEET 2 SH NO. 1

REV NO. 01

124A1182

CONT ON SHEET 2 SH NO. 1

TITLE
SPECIFICATION FOR SAMPLING AND INSPECTION PROCEDURES

FIRST MADE FOR

REVISIONS

1. SCOPE

1.1 THIS SPECIFICATION SUPPLEMENTS THE QUALITY SPECIFICATION BY DEFINING TERMS, AND OUTLINING THE SAMPLING PROCEDURE TO BE FOLLOWED.

1.2 PRECEDENCE.--THE REQUIREMENTS OF THE APPLICABLE QUALITY SPECIFICATION TAKE PRECEDENCE OVER THIS SPECIFICATION WHEN THEIR REQUIREMENTS ARE IN CONFLICT.

2. APPLICABLE DOCUMENTS

2.1 THERE ARE NO OTHER APPLICABLE DOCUMENTS.

3. REQUIREMENTS

3.1 DEFINITIONS AND IMPLICATIONS OF TERMS

3.1.1 LOT.--A LOT IS A COLLECTION OF UNITS SUBJECTED AS AN ENTITY TO THE PROVISIONS OF THE QUALITY SPECIFICATION.

3.1.2 AQL.--THE ACCEPTABLE QUALITY LEVEL (AQL) IS THE PERCENTAGE OF DEFECTIVE ITEMS IN AN INSPECTION LOT SUCH THAT THE SAMPLING PLAN WILL RESULT IN THE ACCEPTANCE OF NOT MORE THAN 95 PER CENT OF SUBMITTED INSPECTION LOTS CONTAINING THAT PERCENTAGE OF DEFECTIVE ITEMS.

3.1.3 LTPD.--THE LOT TOLERANCE PER CENT DEFECTIVE (LTPD) IS THE PERCENTAGE OF DEFECTIVE ITEMS IN AN INSPECTION LOT SUCH THAT THE SAMPLING PLAN WILL RESULT IN THE REJECTION OF 90 PER CENT OF SUBMITTED INSPECTION LOTS CONTAINING THAT PERCENTAGE OF DEFECTIVE ITEMS.

3.1.4 ACCEPTANCE NUMBER (C).--(ATTRIBUTES SAMPLING). THE MAXIMUM NUMBER OF DEFECTIVES IN A SAMPLE OR SERIES OF SAMPLES FOR A TEST REQUIREMENT THAT WILL PERMIT ACCEPTANCE OF THE LOT.

3.1.5 DEFECTIVE.--A DEFECTIVE IS A UNIT HAVING ONE OR MORE DEVIATIONS FROM THE REQUIREMENTS

3.1.6 SAMPLE (N).--A SAMPLE CONSISTS OF ONE OR MORE UNITS SELECTED AT RANDOM FROM A LOT.

3.1.7 QUALITY SPECIFICATION.--THE QUALITY SPECIFICATION (QS) INDICATES THE QUALITY REQUIREMENTS APPLICABLE TO THE SPECIFIC PRODUCT. EACH OF THESE REQUIREMENTS (FOR AN INSPECTION OR A TEST) HAS ITS ASSOCIATED N-C OR AQL-LTPD AS REQUIRED FOR QUALIFICATION APPROVAL AND LOT ACCEPTANCE.

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3.1.8 QUALIFICATION TESTS.--EACH TEST SPECIFIED ON THE TEST REQUIREMENTS (TR) DRAWING IS A QUALIFICATION TEST. THESE TESTS WILL BE APPLIED AS INDICATED IN THE "QUALIFICATION" COLUMN OF THE QS TO THE QUALIFICATION SAMPLES (SEE SECTION 3.4.1) OR TOOL-MADE SAMPLES. (SEE PARAGRAPH 3.4.2).

3.1.9 LOT ACCEPTANCE TESTS.--THE MINIMUM ACCEPTANCE CRITERIA OF EACH LOT ARE TABULATED UNDER LOT ACCEPTANCE ON THE QS. IF THE BUYER DEEMS IT NECESSARY TO ASSURE THAT A LOT HAS THE QUALITY REQUIRED OF THE PRODUCT, HE SHALL PERFORM, OR HAVE A SUBCONTRACTOR PERFORM, ANY OTHER TEST IN THE TR. FAILURE TO MEET THESE ADDITIONAL CRITERIA IS CAUSE FOR REJECTION. THE PROCURING AGENCY SHALL BE NOTIFIED OF SUCH FAILURE.

3.2 SAMPLING METHOD

3.2.1 LOT IDENTIFICATION.--UNITS OF A LOT SHALL BE IDENTIFIED TO DISTINGUISH THEM FROM UNITS OF OTHER LOTS.

3.2.2 SELECTION OF SAMPLES.--WHEN SAMPLING IS SPECIFIED IN THE QS, THE UNITS COMPRISING THE SAMPLES SHALL BE SELECTED AT RANDOM. SELECTION OF UNITS FOR NON-DESTRUCTIVE TESTING SHALL BE MADE SO THAT ALL UNITS OF A LOT HAVE AN EQUAL CHANCE OF SELECTION. RANDOM NUMBER TABLES, SUCH AS ARE INCLUDED IN HANDBOOK H-105 (SEE PARA. 6.1), ARE RECOMMENDED, WHEN APPLICABLE, FOR USE TO ENSURE THE SELECTION OF RANDOM SAMPLES. SAMPLES FOR DESTRUCTIVE TESTS SHALL BE SELECTED AT RANDOM FROM THE LOT AFTER ALL DEFECTIVES FOUND IN NON-DESTRUCTIVE TESTING HAVE BEEN REMOVED, REPAIRED, OR REPLACED WITH A PRODUCT MEETING ALL NON-DESTRUCTIVE TEST REQUIREMENTS.

3.2.3 SELECTION OF SAMPLING PLAN.--THE SUPPLIER SHALL SELECT A SAMPLING PLAN SO THAT THE MAXIMUM AQL AND THE MAXIMUM LTPD SPECIFIED IN THE QS ARE NOT EXCEEDED. TABLE I IS DERIVED FROM THE SAMPLING PLANS OF MIL-STD-105A AND HAS BEEN RESTRICTED TO THOSE OC CURVES WHERE THE PROBABILITY OF A LOT ACCEPTANCE FOR THE STATED AQL DOES NOT EXCEED 0.95. THE VALUES IN TABLE I DO NOT NECESSARILY CORRESPOND TO VALUES BASED ON A MORE PRECISE COMPUTATION. ANY COMBINATION OF SAMPLE SIZE AND ACCEPTANCE NUMBER FROM TABLE I OR ANY OTHER SUITABLE SAMPLING PLANS MAY BE USED PROVIDED THE CORRESPONDING AQL AND LTPD ARE LESS THAN THE MAXIMUM AQL AND MAXIMUM LTPD SPECIFIED IN THE QS.

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3.3 DEFECTIVE MATERIAL

3.3.1 KNOWN DEFECTIVES.--KNOWN DEFECTIVES SHALL NOT BE SHIPPED TO THE BUYER AS PART OF THE LOT.

3.3.2 DESTRUCTIVELY TESTED SAMPLES.--SAMPLES SUBJECTED TO DESTRUCTIVE TESTS SHALL NOT BE INCLUDED IN THE SHIPPED LOT. IF THE BUYER REQUESTS SUCH SAMPLES, THE INDIVIDUAL UNITS AND THEIR CONTAINER SHALL BE MARKED "D-TESTED."

3.3.3 LOTS REJECTED ON NON-DESTRUCTIVE TESTS.--LOTS FAILING TO MEET ACCEPTANCE CRITERIA FOR NON-DESTRUCTIVE SAMPLING TESTS MAY BE RESUBMITTED FOR ACCEPTANCE PROVIDED THE LOT HAS FIRST BEEN 100 PER CENT INSPECTED FOR THE FAILING CHARACTERISTICS AND THE DEFECTIVES HAVE BEEN REMOVED, REPAIRED, OR REPLACED WITH A PRODUCT CONFORMING TO THE TEST REQUIREMENTS. THE LOT SHALL THEN BE SAMPLED BY ATTRIBUTES FOR THE FAILING CHARACTERISTIC TO THE AQL-LTPD REQUIRED FOR THAT CHARACTERISTIC.

3.3.4 LOTS REJECTED ON DESTRUCTIVE TESTING. LOTS FAILING TO MEET ACCEPTANCE CRITERIA FOR DESTRUCTIVE TESTS SHALL BE REJECTED. AFTER REVIEW OF THE CIRCUMSTANCES LEADING TO THE REJECTION, THE PROCURING AGENCY MAY APPROVE A PROPOSAL REGARDING REWORK AND/OR REINSPECTION OF THE LOT. UNITS WHICH HAVE BEEN SUBJECTED TO DESTRUCTIVE TESTS SHALL NOT BE REWORKED.

3.4 QUALIFICATION.--ANY REQUIREMENT SPECIFIED ON ANY DRAWING OR SPECIFICATION CALLED FOR IS A QUALIFICATION REQUIREMENT. QUALIFICATION OF PRODUCT IS BASED UPON APPROVAL BY THE PROCURING AGENCY OF REPRESENTATIVE SAMPLES OF THE PRODUCT. THESE MAY BE EITHER QUALIFICATION SAMPLES OR TOOL-MADE SAMPLES AS SPECIFIED IN THE PRODUCT SPECIFICATION (PS)

3.4.1 QUALIFICATION SAMPLES (WHEN SPECIFIED).--THE REQUIRED NUMBER OF QUALIFICATION SAMPLES OF THE PRODUCT AS SPECIFIED IN THE APPLICABLE PS SHALL BE SUBMITTED TO THE PROCURING AGENCY. THESE QUALIFICATION SAMPLES SHALL BE SUPPLIED FROM EACH SET OF TOOLS AT EACH MANUFACTURING LOCATION WHERE THE FINAL PRODUCT IS FABRICATED. UNLESS OTHERWISE SPECIFIED BY THE PROCURING AGENCY NO FURTHER SHIPMENT OF THE PRODUCT SHALL BE MADE UNTIL WRITTEN QUALIFICATION SAMPLE APPROVAL HAS BEEN RECEIVED. QUALIFICATION SAMPLE APPROVAL DOES NOT RELIEVE THE SUPPLIER OF HIS OBLIGATION TO CONFORM WITH THE SPECIFICATIONS AND IN NO WAY GUARANTEES ACCEPTANCE OF NON-CONFORMING PRODUCT AFTER SUCH APPROVAL. SUBSEQUENT TO THE FIRST ORDER AND WRITTEN QUALIFICATION SAMPLE APPROVAL, QUALIFICATION SAMPLES USUALLY WILL NOT BE REQUIRED ON PURCHASE ORDERS.

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THE PROCURING AGENCY RESERVES THE RIGHT:

A. TO CONDUCT ANY TEST SPECIFIED ON THE TR DEEMED NECESSARY TO PROVIDE EVIDENCE OF CONTINUED CONFORMANCE OF THE PRODUCT TO THE QS.

B. TO CANCEL QUALIFICATION SAMPLE APPROVAL AS A RESULT OF DEFECTS WHICH BECOME APPARENT DURING SUCH TESTS.

C. TO REQUIRE ADDITIONAL QUALIFICATION SAMPLES AS A RESULT OF THE SUPPLIER(S) CHANGE IN DESIGN, MATERIAL OR TOOLING.

WHEN QUALIFICATION SAMPLES ARE INITIALLY SUBMITTED, THE SUPPLIER SHALL CERTIFY IN WRITING THAT HE WILL IMMEDIATELY NOTIFY THE PROCURING AGENCY OF ANY CHANGES IN DESIGN, MATERIAL, OR TOOLING OF THE PRODUCT WHICH HAS RECEIVED QUALIFICATION APPROVAL. THIS NOTIFICATION SHALL ALSO INCLUDE A COMPLETE STATEMENT DESCRIBING THE CHANGES AND THE REASONS THEREFOR.

3.4.2 TOOL-MADE SAMPLES (WHEN SPECIFIED).--THE REQUIRED NUMBER OF TOOL-MADE SAMPLES AS SPECIFIED IN THE APPLICABLE PS SHALL BE SUBMITTED TO THE PROCURING AGENCY UNLESS OTHERWISE AUTHORIZED BY THE BUYER, NO FURTHER SHIPMENT OF THE PRODUCT SHALL BE MADE UNTIL WRITTEN APPROVAL OF SUCH SAMPLES HAS BEEN RECEIVED FROM THE PROCURING AGENCY. APPROVAL OF SUCH SAMPLES SHALL NOT WAIVE THE SUPPLIER(S) OBLIGATION TO MAKE DELIVERIES IN CONFORMITY WITH THE DRAWINGS AND SPECIFICATIONS. IF THE SUPPLIER EMPLOYS MORE THAN ONE MANUFACTURING LOCATION OR SET OF TOOLS, THE NUMBER OF TOOL-MADE SAMPLES SPECIFIED IN THE PS ARE REQUIRED FROM EACH. TOOL-MADE SAMPLES ARE NOT REQUIRED ON PURCHASE ORDERS SUBSEQUENT TO THE FIRST ORDER IF THE SUPPLIER EMPLOYS THE SAME MANUFACTURING LOCATION(S) AND TOOLS UNLESS SPECIFIED BY THE BUYER.

3.4.3 TESTS AND RECORDS ON TOOL-MADE SAMPLES OR QUALIFICATION SAMPLES BY THE SUPPLIER.--TOOL-MADE SAMPLES OR QUALIFICATION SAMPLES SHALL COMPRISE A LOT OR SHALL BE RANDOMLY SELECTED FROM A LOT CONFORMING TO THE REQUIREMENTS OF THE APPLICABLE QS. DESTRUCTIVELY TESTED UNITS SHALL NOT BE SUBMITTED AS TOOL-MADE SAMPLES OR QUALIFICATION SAMPLES. TEST RECORDS ON THE LOT, INCLUDING RECORDS OF TESTS ON DESTRUCTIVELY TESTED UNITS, SHALL BE SUBMITTED WITH THE TOOL-MADE SAMPLES OR QUALIFICATION SAMPLES OR WITHIN THREE DAYS OF SHIPMENT OF SAMPLES. ANY ADDITIONAL PERTINENT TEST DATA ON THE LOT SHOULD ALSO BE INCLUDED.

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3.5 QUALITY SURVEYS.--ANY SUPPLIER WHO ACCEPTS AN ORDER TO WHICH THIS SPECIFICATION APPLIES THEREBY AGREES TO PERMIT PERIODIC QUALITY SURVEYS BY AUTHORIZED REPRESENTATIVES OF THE BUYER. THE PURPOSE OF THESE SURVEYS WILL BE TO OBTAIN ASSURANCE OF THE SUPPLIER(S) CONFORMANCE TO THE PROCEDURE AND INTENT OF APPLICABLE SPECIFICATIONS.

3.6 INSPECTION AND TESTING RESPONSIBILITY.

3.6.1. THE SUPPLIER SHALL PERFORM THE INSPECTION AND TESTING SPECIFIED ON THE QS UNDER "LOT ACCEPTANCE" FOR THE "SUPPLIER." UNLESS OTHERWISE AUTHORIZED BY THE PROCURING AGENCY INSPECTION AND TESTING SHALL NOT BE SUBCONTRACTED.

3.6.2 THE BUYER SHALL PERFORM THE INSPECTION AND TESTING SPECIFIED ON THE QS UNDER LOT ACCEPTANCE FOR BUYER.

3.6.3 THE PROCURING AGDNCY WILL PERFORM THE INSPECTION AND TESTING SPECIFIED ON THE QS UNDER "QUALIFICATION".

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 AS SPECIFIED ON THE QS FOR THE PRODUCT.

5. PREPARATION FOR DELIVERY

5.1 NOT APPLICABLE.

6. _____

6.1 THE FOLLOWING PUBLICATIONS WHILE NOT MANDATORY MAY BE USED IN THE APPLICATION OF THIS SPECIFICATION:

ATTRIBUTES SAMPLING PLANS:

MILITARY STANDARD, MIL-STD-105A, DATED 11 SEPTEMBER 1950 "SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES."

FREEMAN, FRIEDMAN, MOSTELLER, WALLIS SAMPLING INSPECTION, McGRAW-HILL BOOK CO., INC., NEW YORK 1946.

DODGE AND ROMIG, SAMPLING INSPECTION TABLES, JOHN WILEY AND SONS, INC., NEW YORK

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SPECIFICATION FOR SAMPLING AND INSPECTION PROCEDURES

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VARIABLES SAMPLING PLANS:

MILITARY SPECIFICATION, ORD-M608-10, DATED JUNE 1954, "SAMPLING INSPECTION BY VARIABLES."

BOWKER AND GOODE, SAMPLING INSPECTION BY VARIABLES, McGRAW-HILL BOOK CO., NEW YORK, 1952.

OTHER PUBLICATIONS:

SUPPLY AND LOGISTICS HANDBOOK H-105, DATED 27 APRIL 1954, "ADMINISTRATION OF SAMPLING PROCEDURES FOR ACCEPTANCE INSPECTION."

ORDNANCE INSPECTION HANDBOOK DATED MARCH 1952, ORD. M-606-9 "STATISTICAL QUALITY CONTROL AND ACCEPTANCE SAMPLING."

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PINELLAS PENINSULA PLANT
ST. PETERSBURG, FLORIDA

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TABLE I

SINGLE SAMPLING BY ATTRIBUTES (MIL-STD-105A)

N	AQL% 0.10		AQL% 0.25		AQL% 0.40		AQL% 0.65		AQL% 1.0		AQL% 1.5		AQL% 2.5		AQL% 4.0		AQL% 6.5		AQL% 10.0		AQL% 15.0	
	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD	C	LTPD
2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	70.0	↓	↓
3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	55.0	↑	↑	↓	↓
5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	38.0	↑	↑	↓	↓	1	78.0
7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	28.0	↑	↑	↑	↑	1	45.0	2	75.0
10	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	22.0	↑	↑	↑	↑	1	35.0	2	45.0	3	68.0
15	↓	↓	↓	↓	↓	↓	↓	↓	0	13.0	↑	↑	↑	↑	1	25.0	2	32.0	3	40.0	4	54.0
25	↓	↓	↓	↓	↓	↓	0	9.0	↑	↑	↓	↓	1	14.3	2	20.0	3	25.0	5	34.0	7	48.0
35	↓	↓	↓	↓	0	6.0	↑	↑	↓	↓	1	10.5	2	12.8	3	18.0	5	25.0	7	32.0	10	45.0
50	↓	↓	0	4.5	↑	↑	↓	↓	1	7.8	2	10.3	3	12.7	4	16.0	6	22.0	9	28.0	13	37.5
75	↓	↓	↑	↑	↓	↓	1	5.2	2	7.0	3	8.8	4	10.3	6	13.0	9	19.0	13	25.0	19	35.0
110	0	2.1	↓	↓	1	3.5	2	4.8	3	6.0	4	7.5	6	9.3	8	12.0	12	16.3	18	22.5	26	31.0
150	↑	↑	1	2.6	2	3.5	3	4.4	4	5.5	5	6.2	8	8.9	11	11.0	17	15.8	24	21.0	34	29.0
225	↓	↓	2	2.5	3	3.0	4	3.6	5	4.0	8	5.9	11	7.5	17	10.2	24	14.0	34	19.0	48	26.0
300	1	1.25	3	2.3	4	2.7	5	3.1	7	3.8	10	5.0	14	6.8	20	9.2	32	13.6	44	18.0	63	25.0
450	2	1.20	4	1.8	5	2.0	7	2.6	10	3.5	14	4.6	20	6.1	29	8.3	43	11.8	62	16.4	89	22.5
750	3	0.90	8	1.4	8	1.7	11	2.3	15	2.7	20	3.6	31	5.3	45	7.4	68	10.7	98	14.9	↑	↑
1500	4	0.65	9	1.2	13	1.3	18	1.7	25	2.2	35	2.9	56	4.8	81	6.3	124	9.4	184	13.6	↑	↑

↓ = USE FIRST SAMPLE AND LTPD BELOW ARROW.

↑ = USE FIRST SAMPLE AND LTPD ABOVE ARROW.

N = SIZE OF THE SAMPLE.

C = ACCEPTANCE NUMBER.

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