



State of the Art, Inc.

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MIL-PRF-55342 Failure Rate Level Qualification and Maintenance

Failure Rate Qualification. Failure rates are established at 60 percent confidence (FRSP-60) on the basis of life tests per paragraph 1.1 of MIL-PRF-55342Ham1. Table I from MIL-STD-690D (p. 11) shows 91.6 million unit hours is required to qualify to S failure rate and 9.16 million unit hours for R failure rate using a c=0 plan.

TABLE I. FRSP-60.

FR level symbol	Qualified FR level 1/	Cumulative unit hours in millions (c = number of failures permitted)											
		c=0	c=1	c=2	c=3	c=4	c=5	c=6	c=7	c=8	c=9	c=10	
	<u>2/</u> %/1,000 hr												
L	<u>2/</u>			("M" row divided by "L")									
M	1.0	.0916	.202	.311	.418	.524	.629	.735	.839	.943	1.048	1.152	
P	0.1	.916	2.02	3.11	4.18	5.24	6.29	7.35	8.39	9.43	10.48	11.52	
R	0.01	9.16	20.2	31.1	41.8	52.4	62.9	73.5	83.9	94.3	104.8	115.2	
S	0.001	91.6	202	311	418	524	629	735	839	943	1048	1152	

1/ For FR level expressed in terms other than %/1,000 hour, see 4.1c and 4.1d.

2/ Where a FR level greater than 1.0 percent is required, level "L" shall be specified and the cumulative unit hours computed as shown.

Failure Rate Maintenance. Failure rates are maintained at 10 percent confidence (maintenance period A of FRSP-10) on the basis of life tests using per paragraph 4.4.4.1.c of MIL-PRF-55342Ham1. Table IV from MIL-STD-690D (p. 16) shows the need to accumulate 53.2 million unit hours allowing a single failure for S failure rate and 5.32 million unit hours for R failure rate using a c=1 plan.

TABLE IV. FRSP-10.

FR level symbol	Qualified FR level 1/	Qualification maintenance period (in months)			Cumulative unit hours in millions (c = number of failures permitted)										
		A	B	C	c=0	c=1	c=2	c=3	c=4	c=5	c=6	c=7	c=8	c=9	c=10
L	<u>2/</u>	3	6	<u>3/</u>			("M" row divided by "L")								
M	1.0	3	6	<u>3/</u>		.0532	.110	.175	.243	.315	.389	.467	.544	.623	.701
P	0.1	6	9	6		.532	1.10	1.75	2.43	3.15	3.89	4.67	5.44	6.23	7.01
R	0.01	9	12	24		5.32	11.0	17.5	24.3	31.5	38.9	46.7	54.4	62.3	70.1
S	0.001	12	15		10.5 4/	53.2	110	175	243	315	389	467	544	623	701

1/ Expressed in %/1,000 hours. For FR level expressed in terms other than %/1,000 hour, see 4.1c and 4.1d.

2/ Where a FR level greater than 1.0 percent is required, level "L" shall be specified and the cumulative unit hours computed as shown.

3/ Each lot.

4/ Applicable to FR level "S" only.

State of the Art, Inc. typically accumulates >60 million unit hours per year on our thick film products maintained at FRL S and >6 million unit hours every nine months on our thin film products maintained at FRL R. Samples are presented for inspection each month. Inspection lots are selected to represent the breadth of our qualification and production over each reporting period. Sample sizes for each lot range from five to fifty devices depending upon resistance value (more accurately current required) and space in the life test oven. Samples placed on test remain on test for 10,000 hours and are removed for resistance measurements at specified measurement intervals (250, 500, 1000, 2000, 4000, 6000, 8000, and 10000 hours). We report our maintenance performance to the qualifying activity every six months.