

Title: Product Qualification

Sample History: All parts were built and tested in DOMINANT Opto Technologies Sdn. Bhd.

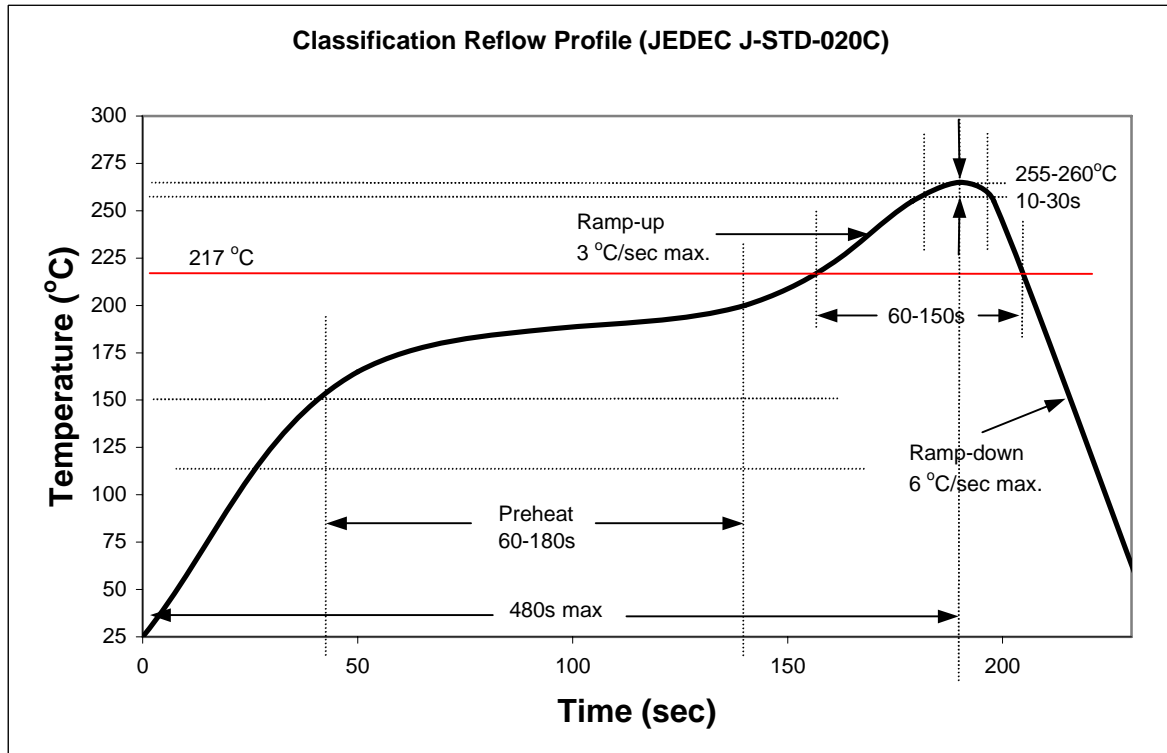
Qualification Plan: All units are to be pre-conditioned before proceeding to the respective test

	Conditions
<ul style="list-style-type: none"> Pre-conditioning as per JEDEC Level II requirement (JESD22-A113-B) IR re-flow soldering on FR4 board 	<ul style="list-style-type: none"> Bake @ 125°C, 24 hrs Storage @ 85°C/60% RH, 168 hrs 3xIR re-flow soldering at 260°C/10 sec. min. (JEDEC)

Failure Criteria:

<ul style="list-style-type: none"> Electrical Failures 	<ul style="list-style-type: none"> Vf shift >= 20% Ir > 2x standard limits
<ul style="list-style-type: none"> Light Output Degradation 	<ul style="list-style-type: none"> % Iv shift <= ±50%
<ul style="list-style-type: none"> Visual Failures 	<ul style="list-style-type: none"> Broken or damaged package or lead Solderability < 95% wetting Dimension out of tolerance

Recommended Pb Free IR-Reflow Soldering Profile



Reliability Test Matrix:

IR/Convection Re-Flow Process at Peak Temperature 260°C for 10 seconds

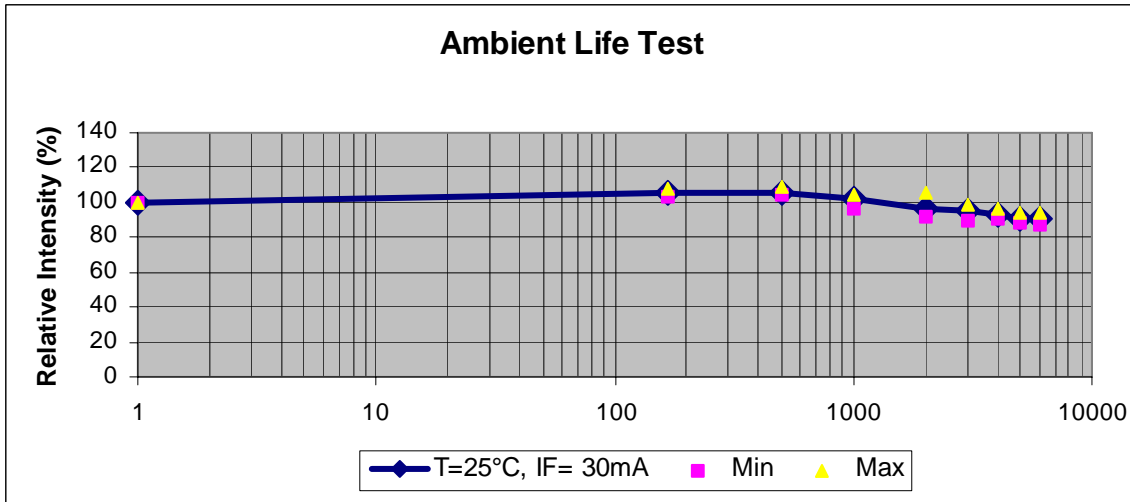
Device: DDW-WJG

Result: No. of failure(s)

No	Test Type	Stress Condition	S/S	Test Point	Vf	Iv
1	Ambient Life Test (ALT)	a) Pre-conditioning b) IR re-flow soldering <ul style="list-style-type: none"> • Ta = 25°C • If = 30mA 	90	0 hrs 168 hrs 504 hrs 1000hrs 2000hrs 3000hrs 4000hrs 5000hrs 6000hrs	0/90 0/90 0/90 0/90 0/90 0/90 0/90 0/90	0/90 0/90 0/90 0/90 0/90 0/90 0/90
2	High Temperature Operating Life Test (HTOL)	a) Pre-conditioning b) IR re-flow soldering <ul style="list-style-type: none"> • Ta = 70°C • If = 30mA 	90	0 hrs 168 hrs 504 hrs 1000 hrs 2000hrs 3000hrs 4000hrs	0/90 0/90 0/90 0/90 0/90 0/90 0/90	0/90 0/90 0/90 0/90 0/90 0/90

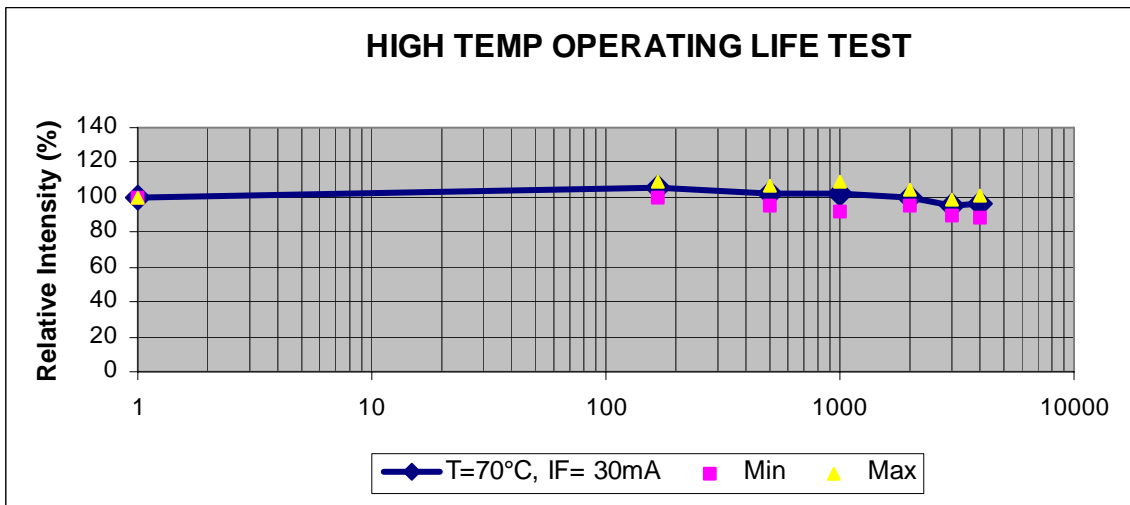
Conclusions: All qualification samples passed

Iv Degradation Data



Note:

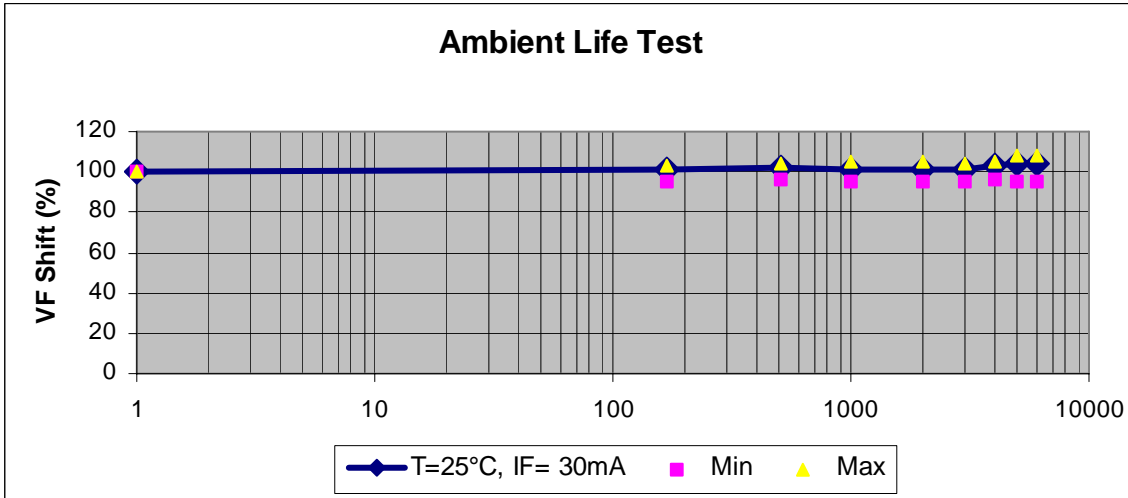
168hrs max = 7.667%	504hrs max = 9.236%	1000hrs max = 4.949%
168hrs min = 3.753%	504hrs min = 4.563%	1000hrs min = -3.802%
2000hrs max = 6.142%	3000hrs max = -1.347%	4000hrs max = -3.943%
2000hrs min = -8.344%	3000hrs min = -10.190%	4000hrs min = -9.620%
5000hrs max = -5.952%	6000hrs max = -5.935%	
5000hrs min = -11.807%	6000hrs min = -12.540%	



Note:

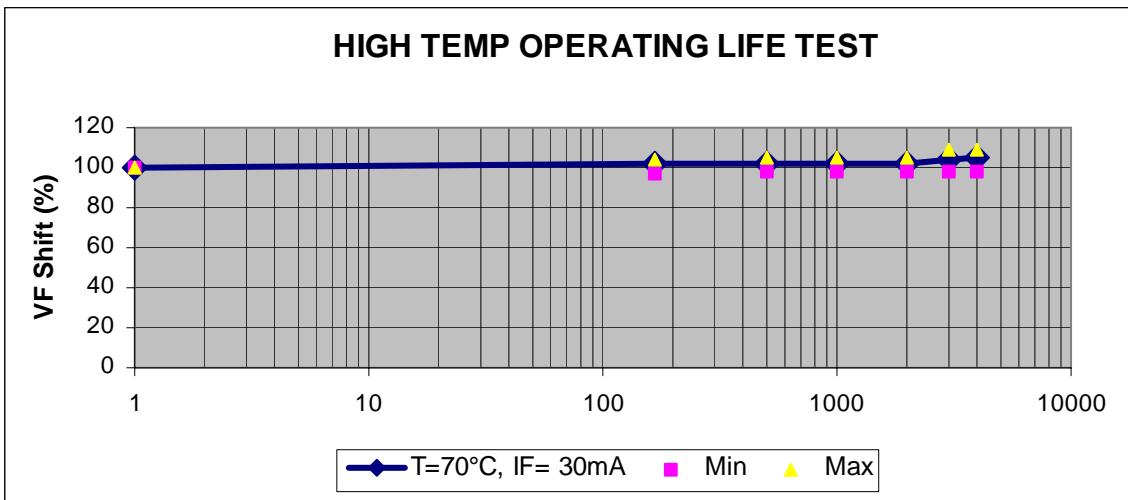
168hrs max = 9.407%	504hrs max = 6.622%	1000hrs max = 8.506%
168hrs min = -0.528%	504hrs min = -4.386%	1000hrs min = -7.718%
2000hrs max = 3.931%	3000hrs max = -1.816%	4000hrs max = 0.431%
2000hrs min = -5.326%	3000hrs min = -10.633%	4000hrs min = -11.623%

Vf Shift Data



Note:

168hrs max = 3.377%	504hrs max = 4.373%	1000hrs max = 4.930%
168hrs min = -4.618%	504hrs min = -3.727%	1000hrs min = -4.619%
2000hrs max = 4.931%	3000hrs max = 4.216%	4000hrs max = 4.848%
2000hrs min = -4.951%	3000hrs min = -4.789%	4000hrs min = -4.242%
5000hrs max = 7.937%	6000hrs max = 7.937%	
5000hrs min = -4.503%	6000hrs min = -4.648%	



Note:

168hrs max = 3.905%	504hrs max = 4.994%	1000hrs max = 4.924%
168hrs min = -2.803%	504hrs min = -2.446%	1000hrs min = -2.028%
2000hrs max = 4.755%	3000hrs max = 8.645%	4000hrs max = 9.080%
2000hrs min = -1.819%	3000hrs min = -2.058%	4000hrs min = -2.088%

Reliability Test Data:

Ambient Life Test

T=25°C, IF=30mA

Unit no.	0 hr Vf	0 hr Iv	168 hr Vf	Delta Vf %	168 hrs Iv	Delta Iv %	504 hrs Vf	Delta Vf %	504 hrs Iv	Delta Iv %	1000 hrs Vf	Delta Vf %	1000 hrs Iv	Delta Iv %
1	3.339	2111.59	3.449	3.294	2215.27	4.910	3.485	4.373	2238.81	6.025	3.353	0.419	2141.45	1.414
2	3.209	2108	3.233	0.748	2234.16	5.985	3.242	1.028	2254.5	6.950	3.271	1.932	2162.54	2.587
3	3.316	2107.67	3.406	2.714	2211.22	4.913	3.434	3.559	2228.71	5.743	3.385	2.081	2138.88	1.481
4	3.167	2100.01	3.209	1.326	2222.06	5.812	3.218	1.610	2233.72	6.367	3.25	2.621	2153.53	2.549
5	3.331	2101.04	3.431	3.002	2179.89	3.753	3.461	3.903	2198.33	4.631	3.313	-0.540	2119.94	0.900
6	3.179	2088.62	3.223	1.384	2192.7	4.983	3.239	1.887	2219.87	6.284	3.265	2.705	2115.16	1.271
7	3.143	2099.36	3.162	0.605	2200.72	4.828	3.168	0.795	2218.84	5.691	3.182	1.241	2118.08	0.892
8	3.327	2093.09	3.427	3.006	2180.7	4.186	3.455	3.847	2198.21	5.022	3.307	-0.601	2108.36	0.730
9	3.248	2177.1	3.276	0.862	2284.7	4.942	3.285	1.139	2313.09	6.246	3.35	3.140	2094.32	-3.802
10	3.25	2158.82	3.276	0.800	2286.49	5.914	3.285	1.077	2311.44	7.070	3.321	2.185	2202.12	2.006
11	3.312	2112.12	3.4	2.657	2205.83	4.437	3.429	3.533	2226.01	5.392	3.475	4.921	2129.75	0.835
12	3.226	2168.27	3.254	0.868	2303.09	6.218	3.259	1.023	2318.3	6.919	3.296	2.170	2234.62	3.060
13	3.311	2125.51	3.402	2.748	2216.89	4.299	3.425	3.443	2227.85	4.815	3.381	2.114	2148.55	1.084
14	3.209	2149.16	3.229	0.623	2258.98	5.110	3.23	0.654	2271.87	5.710	3.265	1.745	2189.79	1.891
15	3.256	2195.43	3.328	2.211	2291.27	4.365	3.345	2.733	2307.36	5.098	3.39	4.115	2210.12	0.669
16	3.161	2116.47	3.181	0.633	2220.04	4.894	3.19	0.917	2246.44	6.141	3.206	1.424	2142.48	1.229
17	3.233	2107.39	3.268	1.083	2236.88	6.145	3.283	1.547	2268.26	7.634	3.317	2.598	2169.9	2.966
18	3.172	2133.54	3.215	1.356	2240.45	5.011	3.228	1.765	2250.8	5.496	3.261	2.806	2171.12	1.761
19	3.238	2163.1	3.237	-0.031	2271.56	5.014	3.235	-0.093	2289.16	5.828	3.259	0.649	2204.37	1.908
20	3.231	2206.38	3.265	1.052	2327.54	5.491	3.278	1.455	2336.05	5.877	3.312	2.507	2234.93	1.294
21	3.311	2059.52	3.401	2.718	2152.85	4.532	3.429	3.564	2178.72	5.788	3.378	2.024	2086.71	1.320
22	3.241	2172.51	3.289	1.481	2286.67	5.255	3.304	1.944	2321.17	6.843	3.342	3.116	2220.72	2.219
23	3.226	2168.68	3.27	1.364	2265.09	4.446	3.286	1.860	2289.68	5.579	3.325	3.069	2179.04	0.478
24	3.173	2089.09	3.185	0.378	2187.96	4.733	3.186	0.410	2220.47	6.289	3.212	1.229	2115.7	1.274
25	3.238	2166.71	3.274	1.112	2256.53	4.145	3.285	1.452	2283.96	5.411	3.32	2.532	2169.41	0.125
26	3.595	2068.51	3.429	-4.618	2173.2	5.061	3.461	-3.727	2189.18	5.834	3.51	-2.364	2093.96	1.230
27	3.221	2229.2	3.224	0.093	2319.08	4.032	3.225	0.124	2336.51	4.814	3.254	1.025	2231.75	0.114
28	3.249	2134.68	3.271	0.677	2232.66	4.590	3.278	0.893	2253.69	5.575	3.315	2.031	2160.84	1.225
29	3.209	2152.11	3.246	1.153	2243.75	4.258	3.257	1.496	2261.45	5.081	3.294	2.649	2151.23	-0.041
30	3.163	2150.18	3.205	1.328	2235.79	3.982	3.217	1.707	2256.34	4.937	3.241	2.466	2155.46	0.246
31	3.23	2169.68	3.258	0.867	2293.41	5.703	3.276	1.424	2324.12	7.118	3.308	2.415	2229.08	2.738
32	3.179	2028.14	3.19	0.346	2178.18	7.398	3.204	0.786	2215.45	9.236	3.221	1.321	2128.52	4.949
33	3.248	2179.78	3.272	0.739	2282.22	4.700	3.282	1.047	2305.47	5.766	3.316	2.094	2205.63	1.186
34	3.331	2084.45	3.433	3.062	2168.86	4.050	3.467	4.083	2190.62	5.093	3.316	-0.450	2107	1.082
35	3.343	2117.99	3.44	2.902	2204.38	4.079	3.474	3.919	2227.86	5.187	3.352	0.269	2129.73	0.554
36	3.339	2106.08	3.442	3.085	2203.31	4.617	3.483	4.313	2232.68	6.011	3.328	-0.329	2122.4	0.775
37	3.25	2206.86	3.269	0.585	2324.48	5.330	3.287	1.138	2356.06	6.761	3.318	2.092	2252.94	2.088
38	3.164	2045.7	3.201	1.169	2133.06	4.270	3.217	1.675	2159.88	5.581	3.244	2.528	2078.64	1.610
39	3.324	2098.23	3.418	2.828	2209.61	5.308	3.444	3.610	2232.48	6.398	3.395	2.136	2158.87	2.890
40	3.229	2206.6	3.266	1.146	2321.44	5.204	3.281	1.610	2356.57	6.796	3.316	2.694	2258.98	2.374
41	3.213	2144.3	3.22	0.218	2308.7	7.667	3.225	0.373	2341.94	9.217	3.248	1.089	2233.42	4.156
42	3.309	2042.05	3.402	2.811	2154.84	5.523	3.438	3.898	2179.37	6.725	3.387	2.357	2087.73	2.237
43	3.265	2067.4	3.354	2.726	2173.12	5.114	3.382	3.583	2194.74	6.159	3.42	4.747	2104.89	1.813
44	3.172	2063.84	3.187	0.473	2211.73	7.166	3.189	0.536	2242.64	8.663	3.209	1.166	2154.84	4.409
45	3.239	2202.51	3.263	0.741	2326.9	5.648	3.269	0.926	2346.34	6.530	3.299	1.852	2248.27	2.078

Unit no.	0 hr Vf	0 hr Iv	168 hr Vf	Delta Vf %	168 hrs Iv	Delta Iv %	504 hrs Vf	Delta Vf %	504 hrs Iv	Delta Iv %	1000 hrs Vf	Delta Vf %	1000 hrs Iv	Delta Iv %
46	3.346	2085.4	3.459	3.377	2222.7	6.584	3.492	4.363	2227.62	6.820	3.343	-0.090	2134.4	2.350
47	3.161	2117.4	3.204	1.360	2243.23	5.943	3.22	1.866	2265.77	7.007	3.245	2.657	2168.55	2.416
48	3.383	2101.03	3.488	3.104	2237.66	6.503	3.518	3.991	2245.88	6.894	3.379	-0.118	2176.51	3.593
49	3.209	2171.74	3.216	0.218	2324.21	7.021	3.21	0.031	2333.27	7.438	3.237	0.873	2254.36	3.804
50	3.225	2084.18	3.305	2.481	2180.97	4.644	3.323	3.039	2197.62	5.443	3.358	4.124	2120.94	1.764
51	3.217	2175.44	3.218	0.031	2310.81	6.223	3.217	0.000	2330.29	7.118	3.241	0.746	2231.11	2.559
52	3.148	2080.39	3.155	0.222	2185.6	5.057	3.16	0.381	2203.46	5.916	3.175	0.858	2121.21	1.962
53	3.165	2070.74	3.204	1.232	2165.34	4.568	3.212	1.485	2172.29	4.904	3.243	2.464	2099.52	1.390
54	3.237	2156.5	3.271	1.050	2259.82	4.791	3.277	1.236	2272.78	5.392	3.316	2.441	2189.32	1.522
55	3.17	2099.24	3.208	1.199	2185.81	4.124	3.216	1.451	2198.63	4.735	3.246	2.397	2125.5	1.251
56	3.234	2071.27	3.313	2.443	2171.47	4.838	3.338	3.216	2192.81	5.868	3.371	4.236	2087.42	0.780
57	3.167	2091.93	3.172	0.158	2207.15	5.508	3.175	0.253	2233.08	6.747	3.196	0.916	2133.74	1.999
58	3.25	2117.02	3.276	0.800	2247.13	6.146	3.279	0.892	2263.65	6.926	3.318	2.092	2181.62	3.051
59	3.324	2077.42	3.42	2.888	2188.85	5.364	3.438	3.430	2201.92	5.993	3.391	2.016	2119.34	2.018
60	3.319	2115.92	3.415	2.892	2210.05	4.449	3.433	3.435	2223.11	5.066	3.388	2.079	2133.11	0.812
61	3.206	2127.92	3.212	0.187	2276.67	6.990	3.215	0.281	2302.12	8.186	3.24	1.061	2196.39	3.218
62	3.339	2110.1	3.432	2.785	2215.17	4.979	3.46	3.624	2224.66	5.429	3.319	-0.599	2137.98	1.321
63	3.195	2040.74	3.226	0.970	2142.85	5.004	3.234	1.221	2152.65	5.484	3.271	2.379	2080.54	1.950
64	3.306	2060.21	3.392	2.601	2151.68	4.440	3.416	3.327	2178.03	5.719	3.469	4.930	2096.55	1.764
65	3.249	2117.76	3.274	0.769	2233.17	5.450	3.281	0.985	2256.2	6.537	3.314	2.001	2169.83	2.459
66	3.184	2106.68	3.202	0.565	2224.07	5.572	3.208	0.754	2251.25	6.862	3.224	1.256	2138.08	1.490
67	3.293	2077.56	3.37	2.338	2167.33	4.321	3.399	3.219	2189.38	5.382	3.442	4.525	2077.52	-0.002
68	3.338	2124.45	3.443	3.146	2212.38	4.139	3.471	3.984	2221.38	4.563	3.325	-0.389	2138.16	0.645
69	3.184	2041.63	3.203	0.597	2148.29	5.224	3.2	0.503	2163.39	5.964	3.226	1.319	2088.18	2.280
70	3.217	2207.84	3.237	0.622	2301.75	4.253	3.24	0.715	2313.96	4.807	3.272	1.710	2216.82	0.407
71	3.322	2134.23	3.414	2.769	2264.8	6.118	3.442	3.612	2283.2	6.980	3.392	2.107	2190.84	2.652
72	3.166	2056.1	3.205	1.232	2152.72	4.699	3.214	1.516	2158.38	4.974	3.248	2.590	2075.37	0.937
73	3.233	2150.42	3.275	1.299	2271.46	5.629	3.279	1.423	2275.27	5.806	3.324	2.815	2200.44	2.326
74	3.16	2046.02	3.174	0.443	2151.79	5.170	3.173	0.411	2160.48	5.594	3.193	1.044	2081.77	1.747
75	3.155	2113.01	3.185	0.951	2206.58	4.428	3.188	1.046	2217.58	4.949	3.205	1.585	2127.71	0.696
76	3.167	2050.13	3.176	0.284	2167.42	5.721	3.181	0.442	2185.52	6.604	3.198	0.979	2092.88	2.085
77	3.442	2134.88	3.352	-2.615	2263.05	6.004	3.353	-2.586	2278.12	6.710	3.283	-4.619	2189.52	2.559
78	3.334	2101.18	3.429	2.849	2233.1	6.278	3.447	3.389	2230.85	6.171	3.208	-3.779	2155.5	2.585
79	3.317	2118.04	3.41	2.804	2224.41	5.022	3.426	3.286	2233.34	5.444	3.287	-0.904	2156.89	1.834
80	3.176	2111.69	3.224	1.511	2230.5	5.626	3.231	1.732	2244.19	6.275	3.267	2.865	2160.91	2.331
81	3.258	2085.33	3.278	0.614	2239.02	7.370	3.284	0.798	2259.65	8.359	3.315	1.750	2146.17	2.918
82	3.326	2049.66	3.42	2.826	2172.68	6.002	3.444	3.548	2182.63	6.487	3.296	-0.902	2091.01	2.017
83	3.164	2092.25	3.202	1.201	2205.43	5.409	3.204	1.264	2204.1	5.346	3.244	2.528	2125.24	1.577
84	3.153	2071.32	3.188	1.110	2203.32	6.373	3.191	1.205	2207.84	6.591	3.224	2.252	2126.17	2.648
85	3.322	2018.33	3.415	2.800	2120.95	5.084	3.437	3.462	2127.59	5.413	3.291	-0.933	2039.95	1.071
86	3.296	2154.2	3.307	0.334	2288.07	6.214	3.314	0.546	2320.7	7.729	3.347	1.547	2219.84	3.047
87	3.157	2110.21	3.175	0.570	2219.7	5.189	3.176	0.602	2226.24	5.499	3.197	1.267	2136.99	1.269
88	3.164	2106.77	3.178	0.442	2230.68	5.882	3.175	0.348	2235.7	6.120	3.202	1.201	2157.96	2.430
89	3.19	2212.38	3.218	0.878	2333.98	5.496	3.218	0.878	2334.41	5.516	3.255	2.038	2249.85	1.694
90	3.24	2094.7	3.24	0.000	2243.48	7.103	3.233	-0.216	2264.34	8.099	3.262	0.679	2177.47	3.951
Ave				1.341		5.277		1.747		6.136		1.622		1.767
Min				-4.618		3.753		-3.727		4.563		-4.619		-3.802
Max				3.377		7.667		4.373		9.236		4.930		4.949

Unit no.	0 hr Vf	0 hr Iv	2000 hrs Vf	Delta Vf %	2000 hrs Iv	Delta Iv %	3000 hrs Vf	Delta Vf %	3000 hrs Iv	Delta Iv %	4000 hrs Vf	Delta Vf %	4000 hrs Iv
1	3.339	2111.59	3.264	-2.24618	2019.99	-4.338	3.278	-1.82689	1896.41	-10.190	3.412	2.186	1962.41
2	3.209	2108	3.181	-0.87255	1961.95	-6.928	3.291	2.555313	1924.92	-8.685	3.301	2.867	1974.43
3	3.316	2107.67	3.384	2.050663	2001.1	-5.056	3.233	-2.50302	1910.5	-9.355	3.351	1.055	1967.77
4	3.167	2100.01	3.154	-0.41048	2033.27	-3.178	3.277	3.473319	2004.1	-4.567	3.289	3.852	1986.79
5	3.331	2101.04	3.183	-4.44311	2035.24	-3.132	3.26	-2.13149	1986.17	-5.467	3.388	1.711	1942.78
6	3.179	2088.62	3.189	0.314564	2016.52	-3.452	3.291	3.52312	1982.74	-5.069	3.308	4.058	1921.33
7	3.143	2099.36	3.275	4.199809	1997.91	-4.832	3.194	1.622654	1974.64	-5.941	3.202	1.877	1917.06
8	3.327	2093.09	3.299	-0.8416	2119.18	1.246	3.255	-2.16411	1995.45	-4.665	3.377	1.503	1946.17
9	3.248	2177.1	3.259	0.33867	2188.12	0.506	3.348	3.078818	2052.68	-5.715	3.354	3.264	2004.89
10	3.25	2158.82	3.189	-1.87692	2037.08	-5.639	3.347	2.984615	2064.38	-4.375	3.356	3.262	2019.22
11	3.312	2112.12	3.183	-3.89493	1959.65	-7.219	3.216	-2.89855	1993.22	-5.629	3.345	0.996	1945.23
12	3.226	2168.27	3.373	4.556727	2094.69	-3.393	3.313	2.696838	2093.33	-3.456	3.328	3.162	2046.59
13	3.311	2125.51	3.242	-2.08396	1994.7	-6.154	3.221	-2.71821	2003.34	-5.748	3.346	1.057	1955.41
14	3.209	2149.16	3.275	2.056715	1997.91	-7.038	3.272	1.963228	2049.69	-4.628	3.28	2.213	2000.36
15	3.256	2195.43	3.2	-1.7199	2047.29	-6.748	3.232	-0.7371	2070.63	-5.685	3.35	2.887	2025.09
16	3.161	2116.47	3.257	3.037014	2120.56	0.193	3.216	1.739956	2014.07	-4.838	3.225	2.025	1944.95
17	3.233	2107.39	3.251	0.556758	2044.83	-2.969	3.343	3.402413	2044.55	-2.982	3.356	3.805	1985.32
18	3.172	2133.54	3.204	1.008827	2013.07	-5.646	3.279	3.373266	2031.37	-4.789	3.291	3.752	1979.76
19	3.238	2163.1	3.373	4.16924	2020.23	-6.605	3.267	0.895615	2052.39	-5.118	3.274	1.112	1998.58
20	3.231	2206.38	3.293	1.918911	2097.36	-4.941	3.341	3.404519	2065.95	-6.365	3.363	4.085	2033.92
21	3.311	2059.52	3.181	-3.92631	1965.64	-4.558	3.223	-2.65781	1961.61	-4.754	3.346	1.057	1906.66
22	3.241	2172.51	3.378	4.22709	2001.25	-7.883	3.371	4.011108	2079.5	-4.281	3.349	3.332	2018.82
23	3.226	2168.68	3.244	0.557967	2135.4	-1.535	3.362	4.215747	2025.31	-6.611	3.376	4.650	1960.06
24	3.173	2089.09	3.268	2.994012	2164.83	3.626	3.217	1.3867	1983.39	-5.060	3.222	1.544	1937.81
25	3.238	2166.71	3.373	4.16924	2020.23	-6.760	3.346	3.335392	2039.99	-5.848	3.361	3.799	2002.74
26	3.595	2068.51	3.417	-4.95132	1939.91	-6.217	3.549	-1.27955	1978.14	-4.369	3.575	-0.556	1920.59
27	3.221	2229.2	3.295	2.297423	2059.21	-7.626	3.264	1.334989	2080.16	-6.686	3.27	1.521	2016.09
28	3.249	2134.68	3.373	3.816559	2070.03	-3.029	3.331	2.523853	2031.86	-4.817	3.344	2.924	1974.54
29	3.209	2152.11	3.238	0.903708	2081.04	-3.302	3.318	3.396697	2008.95	-6.652	3.339	4.051	1961.47
30	3.163	2150.18	3.277	3.604173	2013.23	-6.369	3.263	3.161555	2031.2	-5.533	3.276	3.573	1987.62
31	3.23	2169.68	3.375	4.489164	2097.91	-3.308	3.329	3.065015	2080.77	-4.098	3.341	3.437	2017.78
32	3.179	2028.14	3.239	1.887386	1997.49	-1.511	3.226	1.478452	2000.83	-1.347	3.234	1.730	1948.18
33	3.248	2179.78	3.375	3.910099	1997.91	-8.344	3.334	2.647783	2049.78	-5.964	3.348	3.079	1995.35
34	3.331	2084.45	3.177	-4.62324	2020.52	-3.067	3.259	-2.16151	1966.01	-5.682	3.385	1.621	1926.75
35	3.343	2117.99	3.267	-2.27341	2125.38	0.349	3.266	-2.30332	1993.38	-5.883	3.393	1.496	1953.69
36	3.339	2106.08	3.27	-2.06649	1986.49	-5.678	3.266	-2.18628	2000.51	-5.013	3.394	1.647	1935.09
37	3.25	2206.86	3.206	-1.35385	2054.24	-6.916	3.338	2.707692	2094.28	-5.101	3.361	3.415	2034.74
38	3.164	2045.7	3.187	0.726928	2012.77	-1.610	3.258	2.970923	1944.64	-4.940	3.275	3.508	1887.37
39	3.324	2098.23	3.375	1.534296	1997.91	-4.781	3.232	-2.76775	2027.97	-3.349	3.357	0.993	1980.21
40	3.229	2206.6	3.377	4.583462	2078.62	-5.800	3.347	3.654382	2102.72	-4.708	3.361	4.088	2046.8
41	3.213	2144.3	3.202	-0.34236	2106.01	-1.786	3.255	1.30719	2106.78	-1.750	3.273	1.867	2047.02
42	3.309	2042.05	3.308	-0.03022	1966.42	-3.704	3.228	-2.44787	1966.36	-3.707	3.352	1.299	1906.84
43	3.265	2067.4	3.183	-2.51149	1981.33	-4.163	3.244	-0.64319	1970.04	-4.709	3.365	3.063	1916.68
44	3.172	2063.84	3.263	2.868852	2133.48	3.374	3.211	1.229508	2034.28	-1.432	3.219	1.482	1977.84
45	3.239	2202.51	3.3	1.883297	2094.39	-4.909	3.321	2.531646	2101.58	-4.582	3.332	2.871	2050.08

Unit no.	0 hr Vf	0 hr Iv	2000 hrs Vf	Delta Vf %	2000 hrs Iv	Delta Iv %	3000 hrs Vf	Delta Vf %	3000 hrs Iv	Delta Iv %	4000 hrs Vf	Delta Vf %	4000 hrs Iv	Delta Iv %
46	3.346	2085.4	3.259	-2.60012	2102.9	0.839	3.282	-1.91273	2010	-3.616	3.508	4.842	1932.82	-7.317
47	3.161	2117.4	3.275	3.606454	1972.63	-6.837	3.266	3.321734	2045.67	-3.388	3.28	3.765	1989.38	-6.046
48	3.383	2101.03	3.318	-1.92137	2102.71	0.080	3.221	-4.78865	2046.94	-2.574	3.547	4.848	1993.34	-5.126
49	3.209	2171.74	3.346	4.269243	2073.26	-4.535	3.246	1.153007	2103.99	-3.120	3.249	1.246	2040.24	-6.055
50	3.225	2084.18	3.27	1.395349	2082.73	-0.070	3.293	2.108527	1996.85	-4.190	3.304	2.450	1950.33	-6.422
51	3.217	2175.44	3.172	-1.39882	2080.55	-4.362	3.244	0.839291	2089.21	-3.964	3.251	1.057	2016.84	-7.290
52	3.148	2080.39	3.202	1.715375	1989.6	-4.364	3.182	1.080051	1982.97	-4.683	3.19	1.334	1929.3	-7.263
53	3.165	2070.74	3.221	1.769352	2098.36	1.334	3.261	3.033175	1949.73	-5.844	3.276	3.507	1890.24	-8.717
54	3.237	2156.5	3.18	-1.76089	1998.92	-7.307	3.347	3.398208	2027.42	-5.986	3.362	3.862	1983.01	-8.045
55	3.17	2099.24	3.205	1.104101	2006.29	-4.428	3.267	3.059937	1994.66	-4.982	3.279	3.438	1964.65	-6.411
56	3.234	2071.27	3.325	2.813853	2054.82	-0.794	3.201	-1.02041	1960.4	-5.353	3.317	2.566	1906.48	-7.956
57	3.167	2091.93	3.179	0.378907	1981.26	-5.290	3.199	1.01042	2003.14	-4.244	3.206	1.231	1954.24	-6.582
58	3.25	2117.02	3.187	-1.93846	2015.57	-4.792	3.336	2.646154	2039.03	-3.684	3.355	3.231	1989.67	-6.016
59	3.324	2077.42	3.375	1.534296	1997.91	-3.827	3.231	-2.79783	1978.63	-4.755	3.456	3.971	1931.13	-7.042
60	3.319	2115.92	3.173	-4.39892	2031.92	-3.970	3.231	-2.6514	2001.32	-5.416	3.452	4.007	1960.97	-7.323
61	3.206	2127.92	3.278	2.245789	2128.29	0.017	3.257	1.590767	2077.61	-2.364	3.261	1.716	2004.03	-5.822
62	3.339	2110.1	3.186	-4.58221	2023.6	-4.099	3.27	-2.06649	2010.58	-4.716	3.491	4.552	1953.11	-7.440
63	3.195	2040.74	3.249	1.690141	2152.63	5.483	3.293	3.067293	1951.36	-4.380	3.307	3.505	1894.28	-7.177
64	3.306	2060.21	3.196	-3.32728	1961.56	-4.788	3.215	-2.75257	1963.85	-4.677	3.428	3.690	1908.93	-7.343
65	3.249	2117.76	3.375	3.878116	1997.91	-5.659	3.34	2.800862	2030.92	-4.101	3.347	3.016	1974.53	-6.763
66	3.184	2106.68	3.341	4.930905	2073.87	-1.557	3.233	1.538945	1999.57	-5.084	3.237	1.665	1931.84	-8.299
67	3.293	2077.56	3.375	2.490131	1997.91	-3.834	3.283	-0.30367	1941.46	-6.551	3.397	3.158	1884.37	-9.299
68	3.338	2124.45	3.274	-1.91732	2054.98	-3.270	3.266	-2.15698	1993.33	-6.172	3.484	4.374	1935.66	-8.887
69	3.184	2041.63	3.191	0.219849	2053.48	0.580	3.236	1.633166	1946.8	-4.645	3.238	1.696	1893.59	-7.251
70	3.217	2207.84	3.233	0.497358	2106.12	-4.607	3.297	2.486789	2059.18	-6.733	3.307	2.798	2005.49	-9.165
71	3.322	2134.23	3.389	2.016857	2062.47	-3.362	3.235	-2.6189	2065.4	-3.225	3.454	3.974	1981.37	-7.162
72	3.166	2056.1	3.229	1.989893	2082.64	1.291	3.27	3.284902	1962.31	-4.562	3.28	3.601	1892.59	-7.952
73	3.233	2150.42	3.249	0.494896	2182.1	1.473	3.346	3.495206	2053.26	-4.518	3.361	3.959	1990.83	-7.421
74	3.16	2046.02	3.201	1.297468	1997.74	-2.360	3.203	1.360759	1943.75	-4.998	3.206	1.456	1886.35	-7.804
75	3.155	2113.01	3.275	3.803487	1997.91	-5.447	3.216	1.933439	1974.07	-6.575	3.222	2.124	1922.81	-9.001
76	3.167	2050.13	3.287	3.789075	2176.05	6.142	3.206	1.231449	1966.43	-4.083	3.21	1.358	1884.62	-8.073
77	3.442	2134.88	3.352	-2.61476	2043.65	-4.273	3.293	-4.32888	2048.98	-4.024	3.296	-4.242	1968.26	-7.805
78	3.334	2101.18	3.183	-4.52909	2083.04	-0.863	3.242	-2.75945	2010.58	-4.312	3.463	3.869	1945.54	-7.407
79	3.317	2118.04	3.258	-1.77872	2147.47	1.389	3.228	-2.68315	2007.73	-5.208	3.447	3.919	1954.64	-7.715
80	3.176	2111.69	3.272	3.02267	2079.74	-1.513	3.292	3.652393	2009.08	-4.859	3.306	4.093	1961.16	-7.128
81	3.258	2085.33	3.375	3.59116	1997.91	-4.192	3.337	2.4248	2025.75	-2.857	3.345	2.670	1929.98	-7.450
82	3.326	2049.66	3.377	1.533373	1978.62	-3.466	3.235	-2.73602	1981.58	-3.322	3.456	3.909	1914.22	-6.608
83	3.164	2092.25	3.202	1.201011	2006.01	-4.122	3.257	2.939317	1996.48	-4.577	3.269	3.319	1934.02	-7.563
84	3.153	2071.32	3.202	1.554075	1962.02	-5.277	3.241	2.790993	1995.87	-3.643	3.252	3.140	1942.51	-6.219
85	3.322	2018.33	3.339	0.51174	2036.32	0.891	3.232	-2.70921	1924.78	-4.635	3.449	3.823	1864.64	-7.615
86	3.296	2154.2	3.369	2.214806	2053.53	-4.673	3.364	2.063107	2072.32	-3.801	3.377	2.458	2000.23	-7.147
87	3.157	2110.21	3.275	3.737726	1997.91	-5.322	3.204	1.488755	2007.01	-4.891	3.226	2.186	1945.02	-7.828
88	3.164	2106.77	3.201	1.169406	2052.65	-2.569	3.206	1.327434	2027.36	-3.769	3.214	1.580	1965.49	-6.706
89	3.19	2212.38	3.19	0	2063.62	-6.724	3.274	2.633229	2108.52	-4.694	3.287	3.041	2043.38	-7.639
90	3.24	2094.7	3.267	0.833333	2115.92	1.013	3.27	0.925926	2037.46	-2.733	3.274	1.049	1984.59	-5.257
Ave				0.697		-3.254		0.848		-4.785		2.656		-7.252
Min				-4.951		-8.344		-4.789		-10.190		-4.242		-9.620
Max				4.931		6.142		4.216		-1.347		4.848		-3.943

Unit no.	0 hr Vf	0 hr Iv	5000 hrs Vf	Delta Vf %	5000 hrs Iv	Delta Iv %	6000 hrs Vf	Delta Vf %	6000 hrs Iv	Delta Iv %
1	3.339	2111.59	3.604	7.937	1910.76	-9.511	3.604	7.937	1899.86	-10.027
2	3.209	2108	3.291	2.555	1910.33	-9.377	3.284	2.337	1882.64	-10.691
3	3.316	2107.67	3.546	6.936	1905.09	-9.612	3.541	6.785	1879.34	-10.833
4	3.167	2100.01	3.283	3.663	1930.27	-8.083	3.273	3.347	1902.99	-9.382
5	3.331	2101.04	3.583	7.565	1878.61	-10.587	3.578	7.415	1854.68	-11.726
6	3.179	2088.62	3.303	3.901	1893.74	-9.331	3.295	3.649	1882.95	-9.847
7	3.143	2099.36	3.195	1.654	1867.69	-11.035	3.189	1.464	1836.09	-12.540
8	3.327	2093.09	3.573	7.394	1903.57	-9.055	3.565	7.154	1874.72	-10.433
9	3.248	2177.1	3.351	3.171	1960.07	-9.969	3.343	2.925	1936.94	-11.031
10	3.25	2158.82	3.35	3.077	1971.02	-8.699	3.340	2.769	1942.10	-10.039
11	3.312	2112.12	3.538	6.824	1906.99	-9.712	3.535	6.733	1891.82	-10.430
12	3.226	2168.27	3.319	2.883	2003.00	-7.622	3.314	2.728	1979.52	-8.705
13	3.311	2125.51	3.541	6.947	1908.78	-10.197	3.541	6.947	1897.64	-10.721
14	3.209	2149.16	3.269	1.870	1953.01	-9.127	3.259	1.558	1943.53	-9.568
15	3.256	2195.43	3.44	5.651	1967.79	-10.369	3.434	5.467	1953.00	-11.042
16	3.161	2116.47	3.215	1.708	1871.43	-11.578	3.212	1.613	1872.98	-11.505
17	3.233	2107.39	3.339	3.279	1928.81	-8.474	3.338	3.248	1930.24	-8.406
18	3.172	2133.54	3.283	3.499	1932.39	-9.428	3.279	3.373	1925.68	-9.742
19	3.238	2163.1	3.265	0.834	1958.06	-9.479	3.257	0.587	1943.55	-10.150
20	3.231	2206.38	3.354	3.807	1976.59	-10.415	3.346	3.559	1964.65	-10.956
21	3.311	2059.52	3.541	6.947	1867.56	-9.321	3.538	6.856	1855.19	-9.921
22	3.241	2172.51	3.384	4.412	1972.97	-9.185	3.377	4.196	1958.09	-9.870
23	3.226	2168.68	3.372	4.526	1928.75	-11.063	3.369	4.433	1916.89	-11.610
24	3.173	2089.09	3.212	1.229	1884.67	-9.785	3.206	1.040	1874.81	-10.257
25	3.238	2166.71	3.353	3.552	1929.66	-10.941	3.345	3.305	1924.97	-11.157
26	3.595	2068.51	3.569	-0.723	1892.44	-8.512	3.568	-0.751	1886.91	-8.779
27	3.221	2229.2	3.26	1.211	1970.47	-11.606	3.254	1.025	1963.08	-11.938
28	3.249	2134.68	3.337	2.709	1940.67	-9.088	3.331	2.524	1926.79	-9.739
29	3.209	2152.11	3.33	3.771	1909.98	-11.251	3.328	3.708	1893.85	-12.000
30	3.163	2150.18	3.271	3.414	1943.33	-9.620	3.265	3.225	1922.31	-10.598
31	3.23	2169.68	3.333	3.189	1981.75	-8.662	3.322	2.848	1978.70	-8.802
32	3.179	2028.14	3.225	1.447	1907.42	-5.952	3.216	1.164	1907.76	-5.935
33	3.248	2179.78	3.343	2.925	1957.88	-10.180	3.335	2.679	1957.20	-10.211
34	3.331	2084.45	3.58	7.475	1883.23	-9.653	3.576	7.355	1884.47	-9.594
35	3.343	2117.99	3.59	7.389	1909.01	-9.867	3.588	7.329	1906.16	-10.001
36	3.339	2106.08	3.583	7.308	1868.71	-11.271	3.588	7.457	1878.56	-10.803
37	3.25	2206.86	3.339	2.738	1984.21	-10.089	3.340	2.769	1986.22	-9.998
38	3.164	2045.7	3.265	3.192	1839.55	-10.077	3.262	3.097	1841.34	-9.990
39	3.324	2098.23	3.555	6.949	1937.77	-7.647	3.548	6.739	1925.90	-8.213
40	3.229	2206.6	3.355	3.902	2004.25	-9.170	3.344	3.561	1994.85	-9.596
41	3.213	2144.3	3.251	1.183	2009.96	-6.265	3.242	0.903	2005.72	-6.463
42	3.309	2042.05	3.546	7.162	1859.55	-8.937	3.544	7.102	1864.02	-8.718
43	3.265	2067.4	3.462	6.034	1884.63	-8.841	3.461	6.003	1876.52	-9.233
44	3.172	2063.84	3.212	1.261	1938.83	-6.057	3.204	1.009	1935.00	-6.243
45	3.239	2202.51	3.325	2.655	1971.88	-10.471	3.319	2.470	1977.38	-10.222

Unit no.	0 hr Vf	0 hr Iv	5000 hrs Vf	Delta Vf %	5000 hrs Iv	Delta Iv %	6000 hrs Vf	Delta Vf %	6000 hrs Iv	Delta Iv %
46	3.346	2085.4	3.607	7.800	1901.69	-8.809	3.604	7.711	1888.96	-9.420
47	3.161	2117.4	3.274	3.575	1956.72	-7.589	3.269	3.417	1928.39	-8.927
48	3.383	2101.03	3.643	7.685	1954.74	-6.963	3.641	7.626	1922.17	-8.513
49	3.209	2171.74	3.24	0.966	2001.77	-7.826	3.230	0.654	1968.50	-9.358
50	3.225	2084.18	3.405	5.581	1911.17	-8.301	3.397	5.333	1889.97	-9.318
51	3.217	2175.44	3.236	0.591	1987.76	-8.627	3.225	0.249	1985.47	-8.732
52	3.148	2080.39	3.182	1.080	1897.40	-8.796	3.176	0.889	1892.18	-9.047
53	3.165	2070.74	3.272	3.381	1835.14	-11.378	3.272	3.381	1824.08	-11.912
54	3.237	2156.5	3.357	3.707	1932.04	-10.409	3.351	3.522	1919.03	-11.012
55	3.17	2099.24	3.274	3.281	1898.83	-9.547	3.269	3.123	1889.50	-9.991
56	3.234	2071.27	3.41	5.442	1881.08	-9.182	3.412	5.504	1879.49	-9.259
57	3.167	2091.93	3.192	0.789	1916.69	-8.377	3.195	0.884	1901.97	-9.081
58	3.25	2117.02	3.342	2.831	1950.27	-7.877	3.340	2.769	1909.41	-9.807
59	3.324	2077.42	3.553	6.889	1890.44	-9.001	3.547	6.709	1900.51	-8.516
60	3.319	2115.92	3.552	7.020	1924.76	-9.034	3.546	6.839	1911.29	-9.671
61	3.206	2127.92	3.245	1.216	1960.83	-7.852	3.248	1.310	1975.54	-7.161
62	3.339	2110.1	3.579	7.188	1909.82	-9.491	3.586	7.397	1912.28	-9.375
63	3.195	2040.74	3.299	3.255	1854.40	-9.131	3.298	3.224	1836.66	-10.000
64	3.306	2060.21	3.526	6.655	1873.11	-9.082	3.524	6.594	1880.26	-8.735
65	3.249	2117.76	3.339	2.770	1925.51	-9.078	3.334	2.616	1931.84	-8.779
66	3.184	2106.68	3.23	1.445	1896.15	-9.993	3.226	1.319	1905.60	-9.545
67	3.293	2077.56	3.497	6.195	1847.53	-11.072	3.494	6.104	1836.66	-11.595
68	3.338	2124.45	3.584	7.370	1900.47	-10.543	3.587	7.460	1884.49	-11.295
69	3.184	2041.63	3.232	1.508	1848.30	-9.469	3.228	1.382	1846.52	-9.557
70	3.217	2207.84	3.299	2.549	1947.16	-11.807	3.293	2.362	1949.82	-11.687
71	3.322	2134.23	3.552	6.924	1967.25	-7.824	3.547	6.773	1964.50	-7.953
72	3.166	2056.1	3.279	3.569	1870.93	-9.006	3.275	3.443	1849.58	-10.044
73	3.233	2150.42	3.355	3.774	1947.64	-9.430	3.345	3.464	1937.66	-9.894
74	3.16	2046.02	3.202	1.329	1847.18	-9.718	3.195	1.108	1835.29	-10.300
75	3.155	2113.01	3.218	1.997	1881.39	-10.962	3.213	1.838	1872.42	-11.386
76	3.167	2050.13	3.208	1.295	1859.53	-9.297	3.203	1.137	1862.24	-9.165
77	3.442	2134.88	3.287	-4.503	1942.40	-9.016	3.282	-4.648	1937.99	-9.223
78	3.334	2101.18	3.564	6.899	1912.49	-8.980	3.563	6.869	1904.73	-9.350
79	3.317	2118.04	3.547	6.934	1926.70	-9.034	3.541	6.753	1930.62	-8.849
80	3.176	2111.69	3.301	3.936	1915.71	-9.281	3.292	3.652	1909.50	-9.575
81	3.258	2085.33	3.335	2.363	1912.34	-8.296	3.330	2.210	1903.11	-8.738
82	3.326	2049.66	3.545	6.584	1887.65	-7.904	3.548	6.675	1880.92	-8.233
83	3.164	2092.25	3.264	3.161	1903.73	-9.010	3.262	3.097	1888.40	-9.743
84	3.153	2071.32	3.245	2.918	1910.58	-7.760	3.241	2.791	1903.27	-8.113
85	3.322	2018.33	3.543	6.653	1828.78	-9.391	3.543	6.653	1826.68	-9.495
86	3.296	2154.2	3.37	2.245	1962.97	-8.877	3.366	2.124	1929.26	-10.442
87	3.157	2110.21	3.207	1.584	1918.61	-9.080	3.204	1.489	1859.83	-11.865
88	3.164	2106.77	3.21	1.454	1942.27	-7.808	3.205	1.296	1897.03	-9.956
89	3.19	2212.38	3.285	2.978	2009.06	-9.190	3.277	2.727	1967.87	-11.052
90	3.24	2094.7	3.263	0.710	1942.70	-7.256	3.250	0.309	1932.72	-7.733
Ave				3.829		-9.239		3.686		-9.767
Min				-4.503		-11.807		-4.648		-12.540
Max				7.937		-5.952		7.937		-5.935

High Temperature Operating Life Test

T=70°C, IF=30mA

Unit no.	0 hr Vf	0 hr Iv	168 hr Vf	Delta Vf %	168 hrs Iv	Delta Iv %	504 hrs Vf	Delta Vf %	504 hrs Iv	Delta Iv %	1000 hrs Vf	Delta Vf %	1000 hrs Iv	Delta Iv %
1	3.234	2148.89	3.248	0.433	2254.63	4.921	3.261	0.835	2054.65	-4.386	3.275	1.268	2095.86	-2.468
2	3.205	2198.05	3.235	0.936	2298.64	4.576	3.25	1.404	2114.86	-3.785	3.27	2.028	2194.49	-0.162
3	3.169	2125.45	3.215	1.452	2226.99	4.777	3.235	2.083	2185.17	2.810	3.256	2.745	2188	2.943
4	3.174	2081.45	3.231	1.796	2201.23	5.755	3.25	2.394	2140.24	2.824	3.272	3.088	2059.17	-1.070
5	3.301	2116.95	3.396	2.878	2255.56	6.548	3.437	4.120	2208.28	4.314	3.373	2.181	2173.92	2.691
6	3.237	2175.14	3.267	0.927	2287.02	5.144	3.283	1.421	2160.68	-0.665	3.305	2.101	2128.09	-2.163
7	3.217	2187.16	3.233	0.497	2274.71	4.003	3.244	0.839	2256.03	3.149	3.26	1.337	2178.41	-0.400
8	3.175	2082.58	3.201	0.819	2174.3	4.404	3.212	1.165	2144.5	2.973	3.227	1.638	2165.67	3.990
9	3.326	2057.04	3.434	3.247	2144.81	4.267	3.474	4.450	1968.95	-4.282	3.413	2.616	2010.86	-2.245
10	3.273	2073.31	3.375	3.116	2197.52	5.991	3.405	4.033	2108.16	1.681	3.337	1.955	2150.64	3.730
11	3.157	2107.41	3.176	0.602	2226.6	5.656	3.181	0.760	2104.16	-0.154	3.195	1.204	2105.12	-0.109
12	3.255	2157.88	3.283	0.860	2271.43	5.262	3.299	1.352	2123.5	-1.593	3.322	2.058	2249.59	4.250
13	3.31	2113	3.405	2.870	2218.06	4.972	3.439	3.897	2124.89	0.563	3.473	4.924	1996.06	-5.534
14	3.323	2134	3.431	3.250	2231.64	4.575	3.471	4.454	2176.71	2.001	3.403	2.407	2167.68	1.578
15	3.353	2059.23	3.479	3.758	2171.51	5.453	3.424	2.118	2125.94	3.240	3.464	3.310	2148.6	4.340
16	3.206	2092.28	3.24	1.061	2195.33	4.925	3.268	1.934	2097	0.226	3.296	2.807	2051.29	-1.959
17	3.269	2140.36	3.293	0.734	2234.17	4.383	3.319	1.530	2125.85	-0.678	3.348	2.417	2214.26	3.453
18	3.362	2058.29	3.48	3.510	2148.98	4.406	3.529	4.967	2115.69	2.789	3.477	3.421	2147.67	4.342
19	3.352	2112.1	3.462	3.282	2211.94	4.727	3.51	4.714	2160.98	2.314	3.455	3.073	2139.21	1.284
20	3.219	2116.16	3.251	0.994	2233.75	5.557	3.267	1.491	2180.08	3.021	3.285	2.050	2208.09	4.344
21	3.183	2043.55	3.201	0.566	2157.77	5.589	3.211	0.880	2116.96	3.592	3.226	1.351	2093.65	2.452
22	3.194	2113.28	3.253	1.847	2233.32	5.680	3.279	2.661	2150.2	1.747	3.307	3.538	2153.57	1.907
23	3.182	2107.85	3.215	1.037	2213.14	4.995	3.23	1.508	2169.42	2.921	3.25	2.137	2124.84	0.806
24	3.348	2073.02	3.463	3.435	2182.54	5.283	3.508	4.779	2128.35	2.669	3.45	3.047	2161.32	4.259
25	3.314	2088.34	3.417	3.108	2181.26	4.449	3.458	4.345	2099.78	0.548	3.398	2.535	2115.73	1.312
26	3.224	2139.26	3.254	0.931	2241.3	4.770	3.28	1.737	2189.28	2.338	3.298	2.295	2085.99	-2.490
27	3.182	2135.79	3.234	1.634	2214.18	3.670	3.26	2.451	2173.08	1.746	3.282	3.143	2187.33	2.413
28	3.156	2120.65	3.171	0.475	2226.66	4.999	3.18	0.760	2170.13	2.333	3.185	0.919	2192.13	3.371
29	3.188	2190.67	3.232	1.380	2327.49	6.246	3.251	1.976	2256.57	3.008	3.269	2.541	2282.45	4.190
30	3.192	2055.35	3.219	0.846	2185.91	6.352	3.225	1.034	2129.22	3.594	3.238	1.441	2137.11	3.978
31	3.255	2123.29	3.288	1.014	2276.99	7.239	3.316	1.874	2116.27	-0.331	3.342	2.673	2058.46	-3.053
32	3.349	2084.35	3.465	3.464	2201.8	5.635	3.421	2.150	2107.29	1.101	3.47	3.613	2124.52	1.927
33	3.346	2110.09	3.463	3.497	2217.31	5.081	3.51	4.901	2167.74	2.732	3.447	3.019	2166.96	2.695
34	3.254	2055.41	3.347	2.858	2190.45	6.570	3.375	3.719	2132.81	3.766	3.402	4.548	2007.74	-2.319
35	3.199	2134.3	3.168	-0.969	2257.44	5.770	3.176	-0.719	2183.03	2.283	3.188	-0.344	2138.95	0.218
36	3.295	2086.34	3.383	2.671	2208.15	5.838	3.429	4.067	2159.98	3.530	3.367	2.185	2172.93	4.150
37	3.19	2060.13	3.215	0.784	2204.88	7.026	3.225	1.097	2125.86	3.191	3.236	1.442	2015.42	-2.170
38	3.343	2075.15	3.473	3.889	2225.56	7.248	3.425	2.453	2165.04	4.332	3.473	3.889	2147.55	3.489
39	3.324	2067.15	3.429	3.159	2189.93	5.940	3.476	4.573	2140.93	3.569	3.42	2.888	2101.15	1.645
40	3.173	2080.46	3.197	0.756	2229.36	7.157	3.203	0.945	2184.35	4.994	3.212	1.229	2156.1	3.636
41	3.239	2138.46	3.275	1.111	2288.53	7.018	3.294	1.698	2236.98	4.607	3.325	2.655	2275.38	6.403
42	3.343	2105.61	3.462	3.560	2215.53	5.220	3.508	4.936	2172.15	3.160	3.462	3.560	2175.16	3.303
43	3.266	2086.37	3.358	2.817	2196.63	5.285	3.395	3.950	2139.92	2.567	3.335	2.113	2157.24	3.397
44	3.315	2028.49	3.438	3.710	2126.62	4.838	3.385	2.112	2074.17	2.252	3.435	3.620	2092.62	3.161
45	3.234	2151.48	3.263	0.897	2286.98	6.298	3.273	1.206	2233.75	3.824	3.296	1.917	2249.75	4.568

Unit no.	0 hr Vf	0 hr Iv	168 hr Vf	Delta Vf %	168 hrs Iv	Delta Iv %	504 hrs Vf	Delta Vf %	504 hrs Iv	Delta Iv %	1000 hrs Vf	Delta Vf %	1000 hrs Iv	Delta Iv %
46	3.187	2070.86	3.21	0.722	2189.97	5.752	3.218	0.973	2036.07	-1.680	3.232	1.412	1911.03	-7.718
47	3.218	2170.84	3.237	0.590	2291.45	5.556	3.25	0.994	2129.82	-1.890	3.266	1.492	2104.05	-3.077
48	3.348	2083.66	3.476	3.823	2205.22	5.834	3.326	-0.657	2081.57	-0.100	3.476	3.823	2062.72	-1.005
49	3.21	2112.54	3.256	1.433	2277.88	7.827	3.276	2.056	2238.38	5.957	3.341	4.081	2227.43	5.438
50	3.151	2117.4	3.18	0.920	2237.99	5.695	3.187	1.142	2063.41	-2.550	3.199	1.523	2173.9	2.668
51	3.175	2038.94	3.189	0.441	2153.22	5.605	3.201	0.819	2101.66	3.076	3.216	1.291	2122.89	4.117
52	3.222	2137.89	3.256	1.055	2291.64	7.192	3.274	1.614	2152.47	0.682	3.304	2.545	2263.41	5.871
53	3.329	2089.25	3.459	3.905	2217.79	6.152	3.495	4.986	2157.69	3.276	3.452	3.695	2174.51	4.081
54	3.164	2085.04	3.202	1.201	2239.21	7.394	3.212	1.517	2176.54	4.388	3.228	2.023	2199.34	5.482
55	3.169	2030.51	3.223	1.704	2174.13	7.073	3.24	2.240	2096.28	3.239	3.263	2.966	2024.55	-0.294
56	3.231	2190.74	3.279	1.486	2300.23	4.998	3.311	2.476	2161.89	-1.317	3.344	3.497	2282.41	4.184
57	3.265	2112.55	3.3	1.072	2224.6	5.304	3.324	1.807	2178.04	3.100	3.346	2.481	2195.34	3.919
58	3.172	2118.76	3.224	1.639	2220.79	4.816	3.246	2.333	2178.88	2.838	3.265	2.932	2216.49	4.613
59	3.217	2108.2	3.271	1.679	2255.77	7.000	3.298	2.518	2184.33	3.611	3.323	3.295	2104.57	-0.172
60	3.195	2119.87	3.232	1.158	2238.3	5.587	3.251	1.753	2179.12	2.795	3.268	2.285	2193.72	3.484
61	3.229	2206.56	3.27	1.270	2305.46	4.482	3.304	2.323	2163.41	-1.956	3.335	3.283	2280.9	3.369
62	3.351	2131.56	3.466	3.432	2223.88	4.331	3.516	4.924	2172.09	1.901	3.464	3.372	2180.74	2.307
63	3.347	2108.16	3.46	3.376	2214.99	5.067	3.503	4.661	2157.9	2.359	3.439	2.749	2147.66	1.874
64	3.344	2085.25	3.459	3.439	2201.49	5.574	3.505	4.815	2141.67	2.706	3.451	3.200	2142.84	2.762
65	3.163	2084.84	3.182	0.601	2206.39	5.830	3.191	0.885	2145.5	2.910	3.202	1.233	2167.39	3.960
66	3.235	2055.66	3.319	2.597	2143.21	4.259	3.352	3.617	2110.65	2.675	3.378	4.420	2130.75	3.653
67	3.175	2051.53	3.198	0.724	2182.09	6.364	3.207	1.008	2056.6	0.247	3.221	1.449	2015.15	-1.773
68	3.226	2185.13	3.259	1.023	2310.61	5.742	3.279	1.643	2249.31	2.937	3.305	2.449	2240.53	2.535
69	3.357	2149.13	3.474	3.485	2241.5	4.298	3.523	4.945	2058.99	-4.194	3.464	3.187	2027.3	-5.669
70	3.177	2099.49	3.272	2.990	2296.18	9.368	3.296	3.746	2238.52	6.622	3.322	4.564	2278.08	8.506
71	3.234	2066.28	3.183	-1.577	2196.16	6.286	3.192	-1.299	2143.16	3.721	3.207	-0.835	2150.79	4.090
72	3.175	2052.9	3.225	1.575	2246.02	9.407	3.263	2.772	2183.76	6.374	3.309	4.220	2200.87	7.208
73	3.227	2185.46	3.192	-1.085	2173.93	-0.528	3.21	-0.527	2126.26	-2.709	3.229	0.062	2138.82	-2.134
74	3.353	2143.52	3.259	-2.803	2334.5	8.910	3.271	-2.446	2209.93	3.098	3.285	-2.028	2276.69	6.213
75	3.176	2166.3	3.219	1.354	2295.96	5.985	3.234	1.826	2236.07	3.221	3.251	2.361	2047.07	-5.504
76	3.165	2108.06	3.2	1.106	2226.13	5.601	3.217	1.643	2169.36	2.908	3.233	2.148	2076.54	-1.495
77	3.282	2069.29	3.387	3.199	2196.16	6.131	3.432	4.570	2070.85	0.075	3.37	2.681	2040.14	-1.409
78	3.177	2055.96	3.238	1.920	2157.65	4.946	3.262	2.675	2115.67	2.904	3.281	3.274	2122.67	3.245
79	3.177	2099.49	3.234	1.794	2215.02	5.503	3.255	2.455	2164.91	3.116	3.272	2.990	2163.39	3.044
80	3.311	2103.58	3.424	3.413	2212.67	5.186	3.465	4.651	2170.34	3.174	3.4	2.688	2184.83	3.862
81	3.316	2117.17	3.405	2.684	2213.98	4.573	3.452	4.101	2168.75	2.436	3.422	3.197	2137.23	0.947
82	3.195	2185.42	3.232	1.158	2302.6	5.362	3.257	1.941	2159.95	-1.165	3.274	2.473	2138.6	-2.142
83	3.301	2097.14	3.392	2.757	2216.12	5.673	3.437	4.120	2176.93	3.805	3.39	2.696	2152.56	2.643
84	3.175	2081.08	3.229	1.701	2216.39	6.502	3.253	2.457	2165.42	4.053	3.267	2.898	2181.39	4.820
85	3.207	2137.64	3.255	1.497	2302.1	7.694	3.276	2.152	2237.66	4.679	3.293	2.682	2144.91	0.340
86	3.344	2083.74	3.461	3.499	2206.65	5.899	3.511	4.994	2149.01	3.132	3.446	3.050	2113.94	1.449
87	3.31	2095.6	3.411	3.051	2197.03	4.840	3.45	4.230	2111.79	0.773	3.396	2.598	2104.13	0.407
88	3.302	2086.27	3.396	2.847	2193.85	5.157	3.422	3.634	2011.15	-3.601	3.374	2.180	2074.62	-0.558
89	3.229	2225.16	3.259	0.929	2340.39	5.179	3.267	1.177	2168.08	-2.565	3.299	2.168	2210.91	-0.640
90	3.177	2107.54	3.207	0.944	2266.13	7.525	3.207	0.944	2111.75	0.200	3.225	1.511	2112.88	0.253
Ave				1.791		5.638		2.403		1.841		2.476		1.687
Min				-2.803		-0.528		-2.446		-4.386		-2.028		-7.718
Max				3.905		9.407		4.994		6.622		4.924		8.506

Unit no.	0 hr Vf	0 hr Iv	2000 hrs Vf	Delta Vf %	2000 hrs Iv	Delta Iv %	3000 hrs Vf	Delta Vf %	3000 hrs Iv	Delta Iv %	4000 hrs Vf	Delta Vf %	4000 hrs Iv	Delta Iv %
1	3.234	2148.89	3.29	1.7316	2124.14	-1.152	3.288	1.670	2012.43	-6.350	3.284	1.546	2061.48	-4.068
2	3.205	2198.05	3.29	2.65211	2179.76	-0.832	3.296	2.839	2065.88	-6.013	3.291	2.683	2097.46	-4.576
3	3.169	2125.45	3.283	3.59735	2129.81	0.205	3.289	3.787	2008.19	-5.517	3.293	3.913	2035.69	-4.223
4	3.174	2081.45	3.303	4.06427	2117.46	1.730	3.308	4.222	1996.2	-4.096	3.316	4.474	2019.23	-2.989
5	3.301	2116.95	3.318	0.515	2153.9	1.745	3.527	6.846	2035.38	-3.853	3.531	6.968	2058.06	-2.782
6	3.237	2175.14	3.315	2.40964	2174.04	-0.051	3.31	2.255	2043.49	-6.052	3.314	2.379	2100.78	-3.419
7	3.217	2187.16	3.275	1.80292	2192.95	0.265	3.266	1.523	2066.9	-5.498	3.262	1.399	2105.18	-3.748
8	3.175	2082.58	3.238	1.98425	2097.45	0.714	3.246	2.236	1973.96	-5.216	3.249	2.331	1998.15	-4.054
9	3.326	2057.04	3.364	1.14251	2052.32	-0.229	3.571	7.366	1930.91	-6.132	3.582	7.697	1970.61	-4.202
10	3.273	2073.31	3.366	2.84143	2098.43	1.212	3.47	6.019	1977.75	-4.609	3.475	6.172	1992.7	-3.888
11	3.157	2107.41	3.203	1.45708	2144.73	1.771	3.201	1.394	2001.87	-5.008	3.208	1.615	2048.35	-2.802
12	3.255	2157.88	3.335	2.45776	2167.88	0.463	3.327	2.212	2013.95	-6.670	3.332	2.366	2080.39	-3.591
13	3.31	2113	3.31	0	2086.01	-1.277	3.521	6.375	1953.3	-7.558	3.531	6.677	1986.16	-6.003
14	3.323	2134	3.35	0.81252	2132.74	-0.059	3.562	7.192	2017.79	-5.446	3.577	7.644	2049.86	-3.943
15	3.353	2059.23	3.308	-1.3421	2070.21	0.533	3.62	7.963	1961.74	-4.734	3.634	8.381	1984.57	-3.626
16	3.206	2092.28	3.313	3.33749	2090.3	-0.095	3.317	3.462	1960.03	-6.321	3.325	3.712	2005.75	-4.136
17	3.269	2140.36	3.362	2.84491	2140.5	0.007	3.363	2.875	1995.4	-6.773	3.369	3.059	2040	-4.689
18	3.362	2058.29	3.324	-1.1303	2076.34	0.877	3.639	8.239	1936.71	-5.907	3.655	8.715	1955.61	-4.989
19	3.352	2112.1	3.301	-1.5215	2107.34	-0.225	3.611	7.727	1989.04	-5.826	3.626	8.174	2000.03	-5.306
20	3.219	2116.16	3.297	2.42311	2130.09	0.658	3.295	2.361	2003.64	-5.317	3.294	2.330	2050.09	-3.122
21	3.183	2043.55	3.234	1.60226	2058.31	0.722	3.232	1.539	1933.56	-5.382	3.237	1.697	1985.49	-2.841
22	3.194	2113.28	3.331	4.28929	2116.3	0.143	3.338	4.508	1990.99	-5.787	3.35	4.884	2020.07	-4.411
23	3.182	2107.85	3.267	2.67128	2117.23	0.445	3.271	2.797	2000.26	-5.104	3.276	2.954	2025.25	-3.919
24	3.348	2073.02	3.35	0.05974	2078.44	0.261	3.612	7.885	1957.86	-5.555	3.62	8.124	1968.17	-5.058
25	3.314	2088.34	3.34	0.78455	2030.36	-2.776	3.557	7.333	1932.87	-7.445	3.565	7.574	1955.44	-6.364
26	3.224	2139.26	3.311	2.69851	2126.65	-0.589	3.312	2.730	1997.97	-6.605	3.317	2.885	2056.37	-3.875
27	3.182	2135.79	3.3	3.70836	2096.97	-1.818	3.309	3.991	1995.34	-6.576	3.322	4.400	2045.7	-4.218
28	3.156	2120.65	3.196	1.26743	2119.13	-0.072	3.196	1.267	2011.11	-5.165	3.193	1.172	2043.72	-3.628
29	3.188	2190.67	3.286	3.07403	2195.01	0.198	3.293	3.294	2082.38	-4.943	3.29	3.199	2107.22	-3.809
30	3.192	2055.35	3.242	1.56642	2048.47	-0.335	3.254	1.942	1962.48	-4.518	3.243	1.598	1988.13	-3.270
31	3.255	2123.29	3.355	3.0722	2205.1	3.853	3.353	3.011	2051.4	-3.386	3.357	3.134	2082.61	-1.916
32	3.349	2084.35	3.316	-0.9854	2120.73	1.745	3.632	8.450	1978.3	-5.088	3.64	8.689	1987.49	-4.647
33	3.346	2110.09	3.395	1.46444	2100.92	-0.435	3.611	7.920	1983.55	-5.997	3.611	7.920	1998.37	-5.295
34	3.254	2055.41	3.324	2.1512	2105.47	2.436	3.432	5.470	1984.71	-3.440	3.435	5.562	2011.99	-2.112
35	3.199	2134.3	3.199	0	2149.35	0.705	3.201	0.063	2039.5	-4.442	3.2	0.031	2062.85	-3.348
36	3.295	2086.34	3.308	0.39454	2101.39	0.721	3.517	6.737	1966.95	-5.722	3.531	7.162	2011.72	-3.577
37	3.19	2060.13	3.243	1.66144	2115.07	2.667	3.237	1.473	1989.85	-3.411	3.241	1.599	2031.59	-1.385
38	3.343	2075.15	3.317	-0.7777	2111.61	1.757	3.632	8.645	1965.13	-5.302	3.627	8.495	1833.96	-11.623
39	3.324	2067.15	3.36	1.08303	2088.7	1.042	3.579	7.671	1966.69	-4.860	3.586	7.882	1969.87	-4.706
40	3.173	2080.46	3.217	1.3867	2094.37	0.669	3.224	1.607	1998.64	-3.933	3.22	1.481	2029.82	-2.434
41	3.239	2138.46	3.335	2.96388	2183.3	2.097	3.337	3.026	2078.51	-2.803	3.342	3.180	2132.91	-0.260
42	3.343	2105.61	3.397	1.61532	2096.08	-0.453	3.617	8.196	2002.28	-4.907	3.632	8.645	2038.36	-3.194
43	3.266	2086.37	3.371	3.21494	2066.14	-0.970	3.487	6.767	1970.5	-5.554	3.496	7.042	2008.01	-3.756
44	3.315	2028.49	3.381	1.99095	2013.09	-0.759	3.595	8.446	1915.91	-5.550	3.608	8.839	1954.27	-3.659
45	3.234	2151.48	3.304	2.1645	2206.24	2.545	3.303	2.134	2088.74	-2.916	3.302	2.103	2039.16	-5.221

Unit no.	0 hr Vf	0 hr Iv	2000 hrs Vf	Delta Vf %	2000 hrs Iv	Delta Iv %	3000 hrs Vf	Delta Vf %	3000 hrs Iv	Delta Iv %	4000 hrs Vf	Delta Vf %	4000 hrs Iv	Delta Iv %
46	3.187	2070.86	3.238	1.60025	2048.23	-1.093	3.238	1.600	1960.83	-5.313	3.243	1.757	2006.29	-3.118
47	3.218	2170.84	3.371	4.75451	2158.27	-0.579	3.274	1.740	2060.26	-5.094	3.271	1.647	2110.71	-2.770
48	3.348	2083.66	3.315	-0.9857	2051.99	-1.520	3.636	8.602	1962.26	-5.826	3.652	9.080	1994	-4.303
49	3.21	2112.54	3.302	2.86604	2039.37	-3.464	3.306	2.991	2039.37	-3.464	3.305	2.960	2075.82	-1.738
50	3.151	2117.4	3.206	1.74548	2055.61	-2.918	3.215	2.031	1984.17	-6.292	3.216	2.063	2019.94	-4.603
51	3.175	2038.94	3.223	1.51181	2041.61	0.131	3.229	1.701	1953.5	-4.190	3.231	1.764	2000.22	-1.899
52	3.222	2137.89	3.302	2.48293	2168.73	1.443	3.311	2.762	2064.68	-3.424	3.313	2.824	2089.72	-2.253
53	3.329	2089.25	3.383	1.62211	2087.9	-0.065	3.612	8.501	1975.36	-5.451	3.627	8.952	1978.6	-5.296
54	3.164	2085.04	3.24	2.40202	2145.5	2.900	3.247	2.623	2040.38	-2.142	3.249	2.686	2062.24	-1.094
55	3.169	2030.51	3.284	3.62891	2063.26	1.613	3.293	3.913	1961.26	-3.410	3.296	4.008	1990.89	-1.951
56	3.231	2190.74	3.361	4.02352	2193.98	0.148	3.367	4.209	2065.66	-5.709	3.375	4.457	2112.39	-3.576
57	3.265	2112.55	3.361	2.94028	2091.01	-1.020	3.363	3.002	1980.24	-6.263	3.37	3.216	2024.05	-4.189
58	3.172	2118.76	3.286	3.59395	2143.75	1.179	3.297	3.941	2039.07	-3.761	3.304	4.161	2051.31	-3.183
59	3.217	2108.2	3.342	3.88561	2149.73	1.970	3.346	4.010	2024.2	-3.984	3.349	4.103	2042.88	-3.098
60	3.195	2119.87	3.281	2.69171	2115.59	-0.202	3.284	2.786	1997.56	-5.770	3.283	2.754	2044.35	-3.562
61	3.229	2206.56	3.358	3.99504	2200.6	-0.270	3.356	3.933	2062.82	-6.514	3.367	4.274	2122.01	-3.832
62	3.351	2131.56	3.498	4.38675	2104.12	-1.287	3.617	7.938	1966.74	-7.732	3.636	8.505	1989.07	-6.685
63	3.347	2108.16	3.374	0.80669	2077.94	-1.433	3.592	7.320	1966.69	-6.711	3.598	7.499	1992.93	-5.466
64	3.344	2085.25	3.389	1.34569	2064.23	-1.008	3.603	7.745	1949.94	-6.489	3.612	8.014	1981.69	-4.966
65	3.163	2084.84	3.212	1.54916	2072.81	-0.577	3.218	1.739	1971.45	-5.439	3.217	1.707	1998.19	-4.156
66	3.235	2055.66	3.309	2.28748	2038.42	-0.839	3.407	5.317	1939.32	-5.659	3.416	5.595	1992.4	-3.077
67	3.175	2051.53	3.221	1.44882	2065.21	0.667	3.225	1.575	1981.93	-3.393	3.228	1.669	2029.54	-1.072
68	3.226	2185.13	3.312	2.66584	2200.54	0.705	3.314	2.728	2075.99	-4.995	3.318	2.852	2106.21	-3.612
69	3.357	2149.13	3.305	-1.549	2109.55	-1.842	3.624	7.954	1993.18	-7.256	3.645	8.579	2031.14	-5.490
70	3.177	2099.49	3.304	3.99748	2182.02	3.931	3.358	5.697	2061.36	-1.816	3.362	5.823	2108.53	0.431
71	3.234	2066.28	3.211	-0.7112	2100.77	1.669	3.215	-0.588	1983.57	-4.003	3.218	-0.495	2032.33	-1.643
72	3.175	2052.9	3.303	4.0315	2115.9	3.069	3.353	5.606	1990.79	-3.025	3.323	4.661	2028.54	-1.187
73	3.227	2185.46	3.251	0.74372	2069.06	-5.326	3.258	0.961	1953.07	-10.633	3.265	1.178	1974.73	-9.642
74	3.353	2143.52	3.292	-1.8193	2214.86	3.328	3.284	-2.058	2084.96	-2.732	3.283	-2.088	2130.66	-0.600
75	3.176	2166.3	3.275	3.11713	2157.67	-0.398	3.278	3.212	2030.98	-6.247	3.277	3.180	2052.12	-5.271
76	3.165	2108.06	3.238	2.30648	2095.86	-0.579	3.245	2.528	2001.5	-5.055	3.254	2.812	2032.35	-3.591
77	3.282	2069.29	3.395	3.44302	2044.35	-1.205	3.522	7.313	1944.94	-6.009	3.54	7.861	1954.39	-5.553
78	3.177	2055.96	3.3	3.87158	2021.56	-1.673	3.312	4.249	1935.92	-5.839	3.323	4.596	1970.55	-4.154
79	3.177	2099.49	3.295	3.7142	2074.01	-1.214	3.305	4.029	1977.55	-5.808	3.317	4.407	2001.22	-4.681
80	3.311	2103.58	3.343	0.96648	2086.39	-0.817	3.555	7.369	1980.11	-5.870	3.571	7.853	2010.13	-4.442
81	3.316	2117.17	3.328	0.36188	2110.13	-0.333	3.539	6.725	1968.29	-7.032	3.562	7.419	2002.44	-5.419
82	3.195	2185.42	3.303	3.38028	2181.95	-0.159	3.308	3.537	2043.59	-6.490	3.315	3.756	2073.51	-5.121
83	3.301	2097.14	3.3613	1.82672	2125.47	1.351	3.528	6.877	2002.38	-4.519	3.543	7.331	2004.42	-4.421
84	3.175	2081.08	3.3	3.93701	2105.1	1.154	3.31	4.252	1988.88	-4.430	3.317	4.472	2023.16	-2.783
85	3.207	2137.64	3.318	3.46118	2188.41	2.375	3.301	2.931	2069.71	-3.178	3.316	3.399	2070.53	-3.139
86	3.344	2083.74	3.384	1.19617	2047.01	-1.763	3.613	8.044	1982.63	-4.852	3.639	8.822	2015.74	-3.263
87	3.31	2095.6	3.312	0.06042	2059.5	-1.723	3.545	7.100	1965.37	-6.214	3.571	7.885	2024.05	-3.414
88	3.302	2086.27	3.397	2.87704	2067.21	-0.914	3.525	6.753	1969.06	-5.618	3.547	7.420	2007.31	-3.785
89	3.229	2225.16	3.3	2.19882	2196.58	-1.284	3.311	2.539	2078.37	-6.597	3.312	2.570	2106.41	-5.337
90	3.177	2107.54	3.22	1.35348	2128.53	0.996	3.232	1.731	2037.94	-3.302	3.232	1.731	2061.47	-2.186
Ave				1.947		0.147		4.388		-5.232		4.580		-3.810
Min				-1.819		-5.326		-2.058		-10.633		-2.088		-11.623
Max				4.755		3.931		8.645		-1.816		9.080		0.431