



# DC FAN CUSTOMIZED LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by Rxx or Fxx series suffixes. This test report applies to GFC 40x40x56.0mm series as the right table					
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**Representative Test P/N :GFC0412DS-SM06AES**

**Equipment: 1.Oven: E24-T0178** On/Off Cycles: Every 500 hours

◎ **L<sub>10</sub> Expectancy: 100,000 hours minimum @ fan rated voltage and the temperature of 50°C**

According to the equation for **Weibull distribution**, **MTTF ÷ 1.89×L<sub>10</sub> = 189,000 hours**

And we rely on a zero failure Weibull test strategy and accelerated testing technique, to determine the total test time (t) for verifying the above life estimation by the equations,

$$t = 1.119 \times MTTF \times [(B_{r,c}) \div n]^{0.33} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

where, (B<sub>r,c</sub>) is Poisson distribution factor with the failure number of r equal to 0 and the decimal confidence level of c equal to 0.90(90%).

Stress/Elevated Temperature T <sub>s</sub> (°C) (Actual Test Temperature)	Unstress Temperature T <sub>u</sub> (°C)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r,c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 50 °C (hours)	Verified L <sub>10</sub> 50 °C (hours)
70	50	2.25	56	2.303	32,792	17,937.0	103,383	54,700

**Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2015/6/2 4:50 PM	2022/3/9 10:43 PM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	<b>17937.0</b>

Herewith , we could assume as right on the basis of above test result. Besides, if the actual test time exceed the required, it comes out that those fans' L<sub>10</sub> expectancy and MTTF are greater than the warrant. ( **MTTF** : means Mean Time To Failures, it should be used in a non-repairable system setting. Now we show the MTTF in our life report, that's because we will not repair the failed fans during life experiment. **MTBF**: means Mean Time Between failures, it should be used in a repairable system setting. )

Temperature for MTTF Estimation (°C)	Acceleration Factor A <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	6.20	284,889	150,735
30	5.06	232,611	123,074
40	3.38	155,074	82,050
50	2.25	103,383	54,700
60	1.50	68,922	36,467
70	1.00	45,948	24,311

Fan permission criteria for the measurement after test :

1. Speed can not drop of ≥ 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Method according to IPC-9591.

<b>Test Result</b>	<input checked="" type="checkbox"/> <b>Accept</b> <input type="checkbox"/> <b>Reject</b>
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG15FNL058	26542.17	2020/6/29	Loly.Wang	Tim Yi

BGN (dBA) :15.9

Temp (°C) : 25



# DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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<b>Required Test Time (hrs)</b>	<b>Date for Test Beginning</b>	<b>Date for Test Termination</b>	<b>Sample Size (pcs):</b>	<b>Failure (pcs):</b>	<b>Current Total Test Time (hrs)</b>
32,792	2015/6/2 4:50 PM	2022/3/9 10:43 PM	56	0	<b>17937.0</b>

Representative Test P/N :GFC0412DS-SM06AES	<b>Current Test Status</b>	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0178 On/Off Cycles: Every 500 hours

**Test Data Between Initial Test and Final Test**

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation
	<b>2.8 Max.</b>	<b>2.8 Max.</b>		<b>20700-25300</b>	<b>20700-25300</b>		<b>72.5 Max</b>	<b>72.5 Max</b>	
1	1.89	1.83	-3.2	23627	23596	-0.1	66.8	67.8	1.0
				17770	17807	0.2			
2	1.81	1.83	1.1	23247	23441	0.8	67.3	68.6	1.3
				17799	17398	-2.3			
3	1.76	1.83	3.8	23507	23320	-0.8	67.0	68.0	1.0
				17690	17747	0.3			
4	1.77	1.83	3.2	22943	23297	1.5	66.9	67.7	0.8
				17775	17720	-0.3			
5	1.79	1.83	1.8	23416	23347	-0.3	66.8	68.4	1.6
				17546	17117	-2.4			
6	1.80	1.83	1.6	22851	23534	3.0	67.2	68.1	0.9
				17671	17064	-3.4			
7	1.92	1.83	-4.9	23595	23494	-0.4	66.6	68.7	2.1
				17343	17095	-1.4			
8	1.80	1.83	1.3	23380	23319	-0.3	67.5	68.4	0.9
				17604	17233	-2.1			
9	1.66	1.83	10.0	23378	23442	0.3	67.2	68.3	1.1
				18544	17226	-7.1			
10	1.77	1.83	3.2	23397	23325	-0.3	67.4	68.3	0.9
				17278	17249	-0.2			
11	1.77	1.83	3.1	23366	23397	0.1	66.6	68.8	2.2
				17774	17685	-0.5			
12	1.87	1.83	-2.5	23424	23309	-0.5	67.0	67.9	0.9
				17213	17039	-1.0			
13	1.83	1.83	-0.2	22128	23424	5.9	66.7	69.6	2.9
				17581	17123	-2.6			
14	1.78	1.83	2.7	23090	23528	1.9	67.2	67.8	0.6
				17773	16994	-4.4			
15	1.82	1.83	0.4	22827	23417	2.6	67.4	68.4	1.0
				17156	17089	-0.4			
16	1.68	1.83	8.9	22198	23291	4.9	66.7	68.2	1.5
				16993	17076	0.5			
17	1.75	1.83	4.2	23363	23115	-1.1	67.1	67.6	0.5
				17232	17131	-0.6			
18	1.93	1.83	-5.5	22188	23369	5.3	66.8	68.5	1.7
				17789	16684	-6.2			

<b>QE File No.</b>	<b>Time-out for function test or others (hours)</b>	<b>Issued Date</b>	<b>Reported By</b>	<b>Approved By</b>
DG15FNL058	26542.17	2020/6/29	Loly.Wang	Tim.Yi



## DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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<b>Required Test Time (hrs)</b>	<b>Date for Test Beginning</b>	<b>Date for Test Termination</b>	<b>Sample Size (pcs):</b>	<b>Failure (pcs):</b>	<b>Current Total Test Time (hrs)</b>
32,792	2015/6/2 4:50 PM	2022/3/9 10:43 PM	56	0	<b>17937.0</b>
Representative Test P/N :GFC0412DS-SM06AES			<b>Current Test Status</b>		<input checked="" type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input type="checkbox"/> Termination

Equipment: 1.Oven: E24-T0178     On/Off Cycles: Every 500 hours

### Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation
	2.8 Max.	2.8 Max.		20700-25300 15660-19140	20700-25300 15660-19140		72.5 Max	72.5 Max	
19	1.75	1.83	4.3	23407	23279	-0.5	67.3	68.2	0.9
				17863	16966	-5.0			
20	1.88	1.83	-2.6	21972	23594	7.4	67.5	67.8	0.3
				17832	17205	-3.5			
21	1.72	1.83	6.1	22625	23441	3.6	66.6	68.5	1.9
				17217	17069	-0.9			
22	1.84	1.83	-0.9	21981	23429	6.6	66.8	67.9	1.1
				17855	17081	-4.3			
23	1.78	1.83	2.5	22802	22203	-2.6	67.1	69.0	1.9
				17773	17205	-3.2			
24	1.84	1.83	-0.8	22486	23507	4.5	67.3	68.1	0.8
				17511	16929	-3.3			
25	1.73	1.83	5.9	23419	23306	-0.5	66.9	68.7	1.8
				17194	17286	0.5			
26	1.84	1.83	-0.8	22141	23563	6.4	67.5	68.4	0.9
				17687	17198	-2.8			
27	1.76	1.83	3.5	23348	23248	-0.4	67.2	68.5	1.3
				17367	17452	0.5			
28	1.75	1.83	4.2	22885	23401	2.3	66.8	67.9	1.1
				17367	17404	0.2			
29	1.83	1.83	0.0	22114	23052	4.2	66.6	69.0	2.4
				17364	17543	1.0			
30	1.73	1.99	15.2	23090	23406	1.4	67.0	68.0	1.0
				17352	17420	0.4			
31	1.83	1.93	5.4	23407	23495	0.4	66.7	68.6	1.9
				17354	17725	2.1			
32	1.82	2.07	13.6	23255	23383	0.6	67.3	68.5	1.2
				17004	17349	2.0			
33	1.82	2.03	11.9	23339	23446	0.5	66.7	68.6	1.9
				17738	17470	-1.5			
34	1.98	1.96	-0.9	23153	23528	1.6	67.1	68.6	1.5
				17712	17596	-0.7			
35	1.88	1.95	3.9	23307	23545	1.0	67.4	68.8	1.4
				17574	17409	-0.9			
36	1.89	1.97	3.9	23462	23514	0.2	66.6	68.0	1.4
				17484	17450	-0.2			
37	1.89	1.97	4.2	23294	23547	1.1	67.0	67.9	0.9
				17560	17256	-1.7			

<b>QE File No.</b>	<b>Time-out for function test or others (hours)</b>	<b>Issued Date</b>	<b>Reported By</b>	<b>Approved By</b>
DG15FNL058	26542.17	2020/6/29	Loly.Wang	Tim.Yi



# DC FAN FUNCTION TEST RECORD

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Representative Test P/N :GFC0412DS-SM06AES			<b>Current Test Status</b>	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested) <input type="checkbox"/> Termination
Equipment: 1.Oven: E24-T0178				On/Off Cycles: Every 500 hours	

### Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation
	2.8 Max.	2.8 Max.		20700-25300 15660-19140	20700-25300 15660-19140		72.5 Max	72.5 Max	
38	1.81	1.94	7.2	23463	23518	0.2	66.7	68.3	1.6
				17421	17590	1.0			
39	1.84	1.97	6.8	23182	23383	0.9	66.9	68.0	1.1
				17105	17334	1.3			
40	1.85	1.99	7.6	23223	23568	1.5	67.1	68.2	1.1
				17233	17382	0.9			
41	1.88	1.99	5.7	23346	23351	0.0	66.8	69.7	2.9
				17157	17376	1.3			
42	1.83	2.03	10.8	23251	23505	1.1	67.3	68.0	0.7
				17404	17267	-0.8			
43	1.81	1.96	8.1	23239	23483	1.0	66.9	69.1	2.2
				17638	17683	0.3			
44	1.99	2.03	2.1	23343	23416	0.3	67.5	68.5	1.0
				17602	17641	0.2			
45	1.87	2.00	7.0	23614	23505	-0.5	67.0	68.2	1.2
				17411	17368	-0.2			
46	1.87	2.05	9.7	23407	23508	0.4	67.2	69.1	1.9
				17115	17425	1.8			
47	1.88	1.94	3.3	23940	23506	-1.8	66.9	69.0	2.1
				17410	17369	-0.2			
48	1.83	1.94	6.3	23281	23351	0.3	67.4	68.5	1.1
				17315	17677	2.1			
49	1.85	2.01	8.4	23841	23468	-1.6	66.7	68.0	1.3
				17321	17403	0.5			
50	1.87	1.95	4.5	23352	23552	0.9	67.0	68.6	1.6
				17470	17420	-0.3			
51	1.89	2.01	6.3	23583	23423	-0.7	67.2	67.9	0.7
				17299	17364	0.4			
52	1.88	2.04	8.9	23297	23498	0.9	67.4	69.0	1.6
				17138	17644	3.0			
53	1.87	1.98	5.5	23292	23419	0.5	67.1	68.1	1.0
				17594	17287	-1.7			
54	1.86	1.96	5.0	23360	23492	0.6	67.4	69.2	1.8
				17587	17449	-0.8			
55	1.87	1.95	4.3	23467	23475	0.0	67.2	67.9	0.7
				17087	17290	1.2			
56	1.88	1.97	4.5	23458	23578	0.5	67.0	67.6	0.6
				17399	17646	1.4			
X-Bar	1.827	1.901	-	20314.018	20374.118	-	67.042	68.384	-
$\sigma$	0.066	0.084	-	2849.993	3038.600	-	0.276	0.482	-

<b>QE File No.</b>	<b>Time-out for function test or others (hrs)</b>	<b>Issued Date</b>	<b>Reported By</b>	<b>Approved By</b>
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