



# TEST REPORT

According to ANSI/IES LM-80-15  
For

## Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

**#Model: HL LH004F95W-48B8C12(Ra2)-CS**

<b>Report Type:</b> 10000 Hours Test Report		<b>Product Type:</b> LED Module	
<b>Reviewed By:</b>	Pote Wang <i>Pote Wang</i>		
<b>Report Number:</b>	RSZ190603512-10-10000		
<b>Test Date:</b>	2019-06-04 to 2020-08-18		
<b>Report Date:</b>	2020-09-16		
<b>Approved by:</b>	Bill Xiong / EE Engineer		
<b>Test Facility:</b>	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.		
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588		
<b>Accreditation:</b>	The IAS Accreditation Number TL-460.		



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## 1 - General Information

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### 1.1 Description of LED Light Sources

#### Sample Size:

24 PCS test samples were in good condition and received on 2019-06-03. The samples were numbered from 1 to 12 and 13 to 24.

#Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
#Part Number:	HL LH004F95W-48B8C12(Ra2)-CS
#Part Type:	LED Module
#Drive Level:	DC 1400mA
#Nominal CCT:	2500K
#Power:	50.4W
#Average Current Density per LED die:	692mA/mm <sup>2</sup>
#Average Power Density per LED die:	2.145W/mm <sup>2</sup>
#CRI:	80
#Die Spacing:	0.48mm

#### The Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.



Multiple models	LH029F95W-9B2C18(Ra2)-CS	80	2500K~6500K	B1C18+B1C18	0.039	692.0	350	0.48	350
Multiple models	LH002D101W-5B8C3(Ra2)-CS	80	2500K~6500K	B4C3+B4C3	0.0296	596.2	150	0.62	600
Multiple models	LH003D101W-15B2C30(Ra2)-CS	80	2500K~6500K	B1C30+B1C30	0.0374	596.2	150	0.49	150
Multiple models	HL-LH004F95W-30B6C16(Ra2)-CS	80	2500K~6500K	B3C16+B3C16	0.0643	692.0	350	0.49	1050

## 1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

## 1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
1.0m integrating sphere	SENSING	SCD-20008	N/A	2019-10-22	2020-10-21
spectroradiometer	SENSING	SCD-20008	N/A	2019-10-22	2020-10-21
DC Power Supply	Hanshenpuyuan	HSPY-100-05	2013010210003	2020-07-23	2021-07-22
Standard Light Source	EVERFINE	D204	N/A	2020-07-19	2021-07-18
DC Power Supply	BACL	B25001	90020	2020-01-07	2021-01-07
Multilayer aging machine	BACL	B2-270	20005	2020-03-11	2021-03-10
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090007	2020-03-16	2021-03-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090004	2020-03-10	2021-03-09

## 1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within  $\pm 3\%$  of the specified value of the manufacturer during maintenance test, and was within  $\pm 0.5\%$  during photometric and electrical measurement test.

## 1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the LED location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing,  $TMP_{LED}$  of the coldest LEDs were maintained at a temperature that was greater than or equal to  $2^{\circ}C$  below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to  $5^{\circ}C$  below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within  $\pm 3\%$  of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to  $25^{\circ}C \pm 2^{\circ}C$ , RH <65%.

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**3 - Test Data**

**3.1 Data Set 1, 85°C, 1400mA (Lumen Maintenance)**

No.	0hr(Initial)	Lumen Maintenance (%)									
		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	4814.37	99.64	99.13	98.77	98.18	97.43	96.84	96.43	95.89	95.20	95.00
2	5001.42	100.49	99.76	99.16	98.94	98.34	97.79	97.16	96.68	96.22	95.63
3	4996.16	100.24	99.92	99.31	98.67	98.12	97.54	96.91	96.13	95.84	95.44
4	5037.21	99.60	99.12	98.55	98.21	97.50	97.12	96.73	96.31	95.88	95.49
5	4937.52	100.20	99.75	99.25	98.74	98.08	97.87	97.11	96.73	96.15	95.54
6	4943.38	100.24	99.87	99.54	99.07	98.44	97.51	97.24	96.86	96.27	95.87
7	4749.87	100.25	99.49	98.98	98.68	98.00	97.41	96.75	96.30	95.81	95.18
8	4855.42	99.75	99.54	98.95	98.59	97.45	96.97	96.45	95.85	95.34	94.78
9	4884.74	100.25	99.50	98.80	98.34	97.34	96.66	96.43	96.04	95.75	95.36
10	4960.97	99.96	99.51	99.30	98.89	98.02	97.64	96.89	96.23	95.85	95.23
11	5002.02	100.24	99.92	99.31	98.81	98.52	97.54	96.92	96.54	96.00	95.56
12	4966.84	100.12	99.39	99.07	98.74	97.87	97.41	96.78	96.36	95.87	95.46
Avg.	4929.16	100.08									



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**3.2 Data Set 1, 85°C, 1400mA (Forward Voltage)**

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	37.38	37.16	37.03	37.38	37.52	36.54	37.16	37.03	37.07	37.09	37.06
2	37.25	37.55	37.42	37.84	37.99	36.66	37.55	37.42	37.28	37.11	37.18
3	37.27	37.11	36.98	37.27	37.39	36.48	37.11	36.98	37.21	37.25	37.22
4	36.80	36.53	36.43	36.80	36.93	36.54	36.53	36.43	36.46	36.44	36.41
5	36.83	36.70	36.56	36.83	36.94	36.56	36.70	36.56	36.77	36.79	36.76
6	37.28	37.11	37.01	37.28	37.42	36.69	37.11	37.01	37.04	36.95	36.92
7	37.44	37.29	37.15	37.44	37.57	36.85	37.29	37.15	37.15	37.06	37.03
8	37.33	37.15	37.02	37.33	37.47	36.37	37.15	37.02	37.21	37.12	37.15
9	36.64	36.48	36.36	36.64	36.76	37.03	36.48	36.36	36.55	36.57	36.54
10	36.57	36.42	36.29	36.57	36.70	36.32	36.42	36.29	36.37	36.31	36.38
11	36.59	36.42	36.31	36.59	36.71	36.84	36.42	36.31	36.51	36.44	36.41
12	37.03	36.84	36.69	37.03	37.15	36.87	36.84	36.69	36.85	36.85	36.92
Avg.	37.03	36.90	36.77	37.08	37.21	36.65	36.90	36.77	36.87	36.83	36.83
Med.	37.14	36.98	36.84	37.15	37.27	36.61	36.98	36.84	36.95	36.90	36.92
st dev	0.33	0.38	0.38	0.40	0.41	0.22	0.38	0.38	0.33	0.32	0.32
Min.	36.57	36.42	36.29	36.57	36.70	36.32	36.42	36.29	36.37	36.31	36.38
Max.	37.44	37.55	37.42	37.84	37.99	37.03	37.55	37.42	37.28	37.25	37.22





**3.3 Data Set 1, 85°C, 1400mA (Chromaticity Shift)**

No.			CCT(K)										
	Ohr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2729	0.5349	2476	0.0003	0.0004	0.0009	0.0011	0.0014	0.0017	0.0018	0.0023	0.0021	0.0023
2	0.2713	0.5360	2505	0.0004	0.0006	0.0015	0.0015	0.0016	0.0018	0.0021	0.0029	0.0031	0.0033
3	0.2686	0.5350	2554	0.0002	0.0004	0.0007	0.0011	0.0013	0.0016	0.0018	0.0018	0.0018	0.0019
4	0.2707	0.5362	2514	0.0006	0.0008	0.0014	0.0014	0.0018	0.0021	0.0023	0.0027	0.0029	0.0030
5	0.2688	0.5344	2552	0.0002	0.0005	0.0007	0.0011	0.0013	0.0016	0.0019	0.0016	0.0017	0.0018
6	0.2686	0.5350	2554	0.0002	0.0004	0.0007	0.0008	0.0013	0.0016	0.0018	0.0021	0.0023	0.0024
7	0.2728	0.5348	2480	0.0004	0.0009	0.0013	0.0011	0.0015	0.0018	0.0022	0.0026	0.0028	0.0030
8	0.2687	0.5349	2552	0.0003	0.0006	0.0008	0.0011	0.0014	0.0017	0.0021	0.0018	0.0021	0.0023
9	0.2704	0.5357	2520	0.0004	0.0005	0.0008	0.0010	0.0015	0.0018	0.0019	0.0020	0.0019	0.0020
10	0.2704	0.5359	2520	0.0003	0.0006	0.0009	0.0011	0.0014	0.0017	0.0021	0.0021	0.0027	0.0028
11	0.2704	0.5359	2518	0.0001	0.0004	0.0007	0.0011	0.0013	0.0016	0.0018	0.0018	0.0019	0.0021
12	0.2707	0.5360	2512	0.0003	0.0005	0.0007	0.0011	0.0014	0.0017	0.0019	0.0019	0.0019	0.0021
Avg.	0.2704	0.5354	2521	0.0003	0.0006	0.0009	0.0012	0.0014	0.0017	0.0020	0.0021	0.0023	0.0024
Med.	0.2704	0.5354	2519	0.0003	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0020	0.0021	0.0023
st dev	0.0015	0.0006	27	0.0001	0.0002	0.0003	0.0002	0.0001	0.0001	0.0002	0.0004	0.0005	0.0005
Min.	0.2686	0.5344	2476	0.0001	0.0004	0.0007	0.0008	0.0013	0.0016	0.0018	0.0016	0.0017	0.0018
Max.	0.2729	0.5362	2554	0.0006	0.0009	0.0015	0.0015	0.0018	0.0021	0.0023	0.0029	0.0031	0.0033

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3.6 Data Set 2, 105°C, 1400mA (Chromaticity Shift)

No.	CCT(K)												
	Ohr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
13	0.2708	0.5360	2512	0.0003	0.0005	0.0009	0.0016	0.0016	0.0018	0.0021	0.0017	0.0016	0.0018
14	0.2690	0.5354	2546	0.0003	0.0004	0.0007	0.0016	0.0016	0.0018	0.0020	0.0017	0.0019	0.0021
15	0.2705	0.5360	2516	0.0002	0.0006	0.0007	0.0017	0.0020	0.0018	0.0021	0.0021	0.0023	0.0024
16	0.2694	0.5345	2540	0.0003	0.0006	0.0014	0.0017	0.0017	0.0018	0.0021	0.0022	0.0024	0.0025
17	0.2691	0.5356	2542	0.0001	0.0005	0.0011	0.0017	0.0019	0.0017	0.0021	0.0025	0.0027	0.0028
18	0.2691	0.5345	2546	0.0004	0.0008	0.0011	0.0016	0.0018	0.0019	0.0023	0.0023	0.0027	0.0028
19	0.2713	0.5362	2502	0.0004	0.0007	0.0011	0.0017	0.0017	0.0020	0.0023	0.0024	0.0026	0.0028
20	0.2704	0.5360	2518	0.0003	0.0006	0.0012	0.0016	0.0017	0.0018	0.0021	0.0025	0.0024	0.0025
21	0.2732	0.5350	2472	0.0005	0.0007	0.0015	0.0017	0.0021	0.0021	0.0023	0.0029	0.0031	0.0032
22	0.2704	0.5354	2520	0.0005	0.0010	0.0018	0.0018	0.0018	0.0021	0.0025	0.0037	0.0037	0.0039
23	0.2690	0.5350	2546	0.0004	0.0006	0.0009	0.0016	0.0018	0.0019	0.0021	0.0020	0.0021	0.0023
24	0.2691	0.5348	2546	0.0003	0.0006	0.0013	0.0016	0.0018	0.0018	0.0021	0.0022	0.0023	0.0024
Avg.	0.2701	0.5354	2526	0.0003	0.0006	0.0012	0.0017	0.0018	0.0019	0.0022	0.0024	0.0025	0.0026
Med.	0.2699	0.5354	2530	0.0003	0.0006	0.0011	0.0017	0.0018	0.0018	0.0021	0.0023	0.0024	0.0025
st dev	0.0013	0.0006	23	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0002	0.0006	0.0005	0.0005
Min.	0.2690	0.5345	2472	0.0001	0.0004	0.0007	0.0016	0.0016	0.0017	0.0020	0.0017	0.0016	0.0018
Max.	0.2732	0.5362	2546	0.0005	0.0010	0.0018	0.0018	0.0021	0.0021	0.0025	0.0037	0.0037	0.0039

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### Directions

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