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-C3535F15R3EA-ZW

Report Type: 6000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	RSZ190428535-10-6000
	2020-01-09 to 2020-10-20
Report Date:	2020-10-26
Approved by:	Blake Zhang / EE Engineer
Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

60 PCS test samples were in good condition and received on 2019-04-28. The samples were numbered from 1 to 30 and 31 to 60.

#Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
#Part Number:	HL-C3535F15R3EA-ZW
#Part Type:	LED Package
#Drive Level:	DC 700mA
#Wavelength:	660nm
#Power:	1.75W
#Average Current Density per LED die:	529.3mA/mm^2
#Average Power Density per LED die:	1.323 W/mm^2
#CRI:	NA
#Die Spacing:	NA

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.
These manufacturing lots are picked to represent a wide parametric distribution.

#Family products covered by this report:

According to ENERGY STAR® Requirements for the Use of LM-80 Data, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of ENERGY STAR® Requirements for the Use of LM-80 Data (September 28, 2017)

This report covers the following models:

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2019-10-22	2020-10-21
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2020-07-23	2021-07-22
High Accuracy Array Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2019-10-22	2020-10-21
Standard Light Source	EVERFINE	D062	1011093	2019-11-19	2020-11-18
Multilayer aging machine	BACL	B2-270	20013	2020-03-11	2021-03-10
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpuyuan	HSPY-200-01	N/A	2020-07-01	2021-06-30

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 ±3% of the specified value of the manufacturer during maintenance test, and was within ±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 FROGHVW '87V¶$_{LED}$ FDVH 703 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°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with $670 (7DEOH ³6SHFLDO /LPLWV´

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within ±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°C ± 2°C, RH <65%.

1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure spectral power distribution and photon flux. 2 Œmeasurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	.		Reported TM-21 Q_{70} Lifetime	Reported TM-21 Q_{90} Lifetime
1	30	0	1000hrs	6000hrs	3.131E-06	1.001	>36000 hours	34000 hours
2	30	0	1000hrs	6000hrs	3.693E-06	0.999	>36000 hours	28000 hours

Average Photon Flux Maintenance, Photosynthetic 400-700nm (PFM_P) (Percentage of Initial)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs

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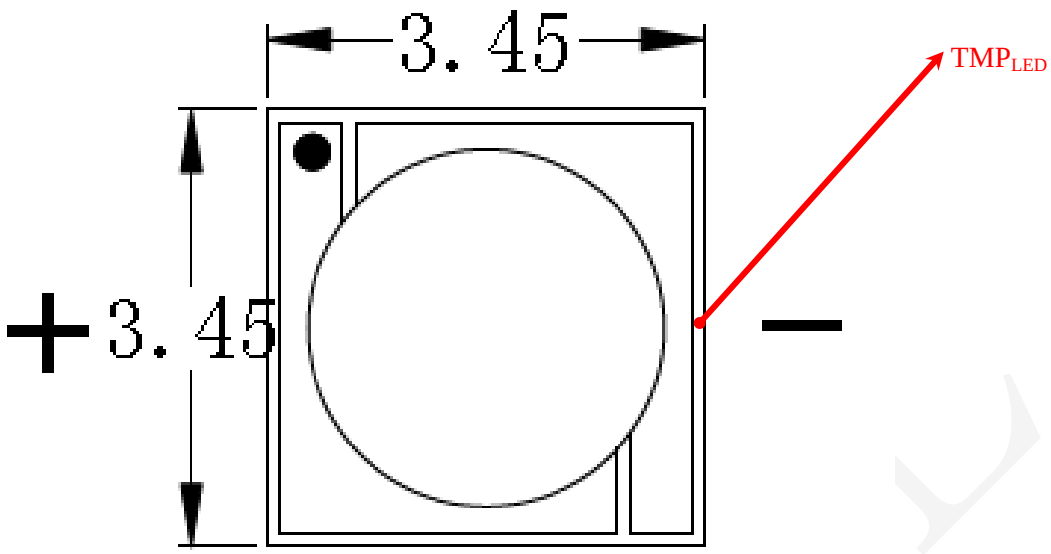
3.2 Data Set 1, 85°C, 700mA (Forward Voltage)

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2.571	2.568	2.573	2.597	2.575	2.573	2.571
2	2.445	2.441	2.470	2.460	2.447	2.443	2.449
3	2.397	2.399	2.400	2.400	2.399	2.399	2.403
4	2.486	2.484	2.485	2.504	2.489	2.490	2.496
5	2.551	2.547	2.544	2.571	2.548	2.549	2.554
6	2.453	2.453	2.450	2.466	2.455	2.455	2.462
7	2.575	2.571	2.592	2.594	2.576	2.574	2.592
8	2.598	2.606	2.591	2.598	2.593	2.593	2.600
9	2.483	2.472	2.482	2.499	2.479	2.479	2.489
10	2.485	2.476	2.475	2.491	2.478	2.480	2.493
11	2.549	2.428	2.538	2.545	2.545	2.542	2.554
12	2.462	2.585	2.464	2.468	2.468	2.460	2.482
13	2.624	2.617	2.622	2.632	2.633	2.620	2.640
14	2.593	2.591	2.592	2.596	2.661	2.590	2.597
15	2.491	2.501	2.492	2.496	2.500	2.492	2.512
16	2.548	2.533	2.536	2.538	2.540	2.543	2.539
17	2.597	2.596	2.597	2.615	2.605	2.601	2.604
18	2.559	2.539	2.543	2.554	2.549	2.545	2.547
19	2.493	2.493	2.489	2.502	2.500	2.491	2.500
20	2.584	2.582	2.585	2.595	2.593	2.585	2.595
21	2.434	2.431	2.439	2.451	2.452	2.431	2.445
22	2.598	2.581	2.583	2.603	2.590	2.587	2.586
23	2.481	2.477	2.485	2.497	2.499	2.486	2.491
24	2.599	2.595	2.599	2.619	2.608	2.599	2.605
25	2.590	2.580	2.586	2.597	2.607	2.589	2.589
26	2.620	2.613	2.615	2.627	2.661	2.622	2.622
27	2.532	2.543	2.534	2.532	2.583	2.605	2.536
28	2.625	2.621	2.625	2.628	2.626	2.634	2.646
29	2.428	2.424	2.428	2.427	2.598	2.437	2.450
30	2.538	2.533	2.538	2.548	2.595	2.547	2.546
Avg.	2.533	2.529	2.532	2.542	2.548	2.535	2.540
Med.	2.549	2.541	2.538	2.547	2.562	2.546	2.547
st dev	0.066	0.067	0.064	0.066	0.069	0.067	0.064
Min.	2.397	2.399	2.400	2.400	2.399	2.399	2.403
Max.	2.625	2.621	2.625	2.632	2.661	2.634	2.646

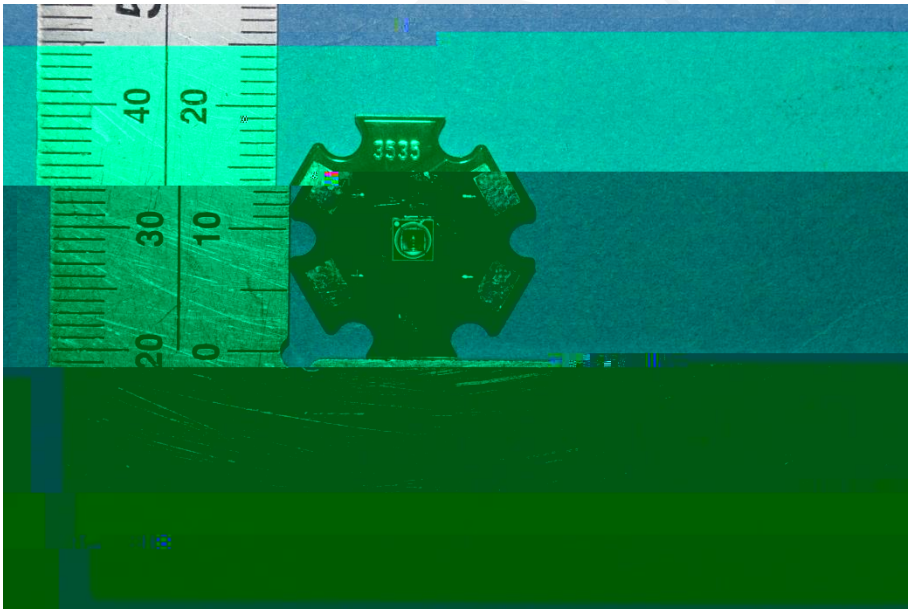
4 - DUT Photo

4.1 #Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



Directions

1. The information marked superscript # ° is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
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