



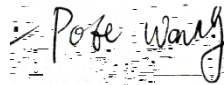
# TEST REPORT

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-A-3528H343W-S1-13HL-HR5**

<b>Report Type:</b> 10000 Hours Test Report		<b>Product Type:</b> LED Package	
<b>Reviewed By:</b>	Pote Wang 		
<b>Report Number:</b>	SZ2220402-12245E-10-10000		
<b>Test Date:</b>	2022-04-09 to 2023-07-03		
<b>Report Date:</b>	2023-07-07		
<b>Approved by:</b>	Blake Zhang / EE Engineer 		
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008		
<b>Test Facility:</b>	Test facility was located at No.12, Pulong East 1 <sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China.		

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.



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## 1 - General Information

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### 1.1 Description of LED Light Sources<sup>#</sup>

#### Sample Size:

50 PCS test samples were in good condition and received on 2022-04-02. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-A-3528H343W-S1-13HL-HR5
Part Type:	LED Package
Drive Level:	DC 20mA
Nominal CCT:	2700K
Power:	0.064W
Average Current Density per LED die:	246.032mA/mm <sup>2</sup>
Average Power Density per LED die:	0.787W/mm <sup>2</sup>
CRI:	90
Die Spacing:	/

#### 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<sup>®</sup> 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 ENER(t)-51(E).01 Tm [(E)-4(N)21(E)-4(R)6(G(t)-51(E).01 Tm [(E)-4(N)21(E)-4(R)6(409.)19( )-5-3(o)4(r)20(m)-17()-5(h)4(r)5



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### 1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2022-11-18	2023-11-17
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2022-11-18	2023-11-17
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2022-11-18	2023-11-17
Standard Light Source	EVERFINE	D062	1011093	2021-09-15	2023-09-14
Multilayer aging machine	BACL	B2-270	20015	2022-10-19	2023-10-18
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060002	2022-10-20	2023-10-19

### 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 F R O G H V W ' 8 7 V ' 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  $2^{\circ}\text{C}$  below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to  $5^{\circ}\text{C}$  below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with \$ 6 7 0 ( ' 7 D E O H ' 3 6 S H F L D O / L P L W V ' )

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  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , RH <65%.

### 1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate  $u'_{\text{f}}/2$ . Measurement was used and sample was driven by DC power supply. The forward current was regulated to within  $\pm 0.5\%$  of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

The uncertainty of the light output measurements is  $U=1.59\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=21\text{K}$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of the temperature is  $U=0.8671^{\circ}\text{C}$  ( $K=2$ ), at the 95% confidence level.

### 1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Shenzhen) attested the related chamber was



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### 1.8 Sample Set

#### Data Set 1: 55°C, 20mA

Part Number: HL-A-3528H343W-S1-13HL-HR5  
Number of Units: 25  
Case Temperature: >53°C  
Ambient Temperature: >50°C  
Life Test Drive Current: 20mA  
Measurement Current: 20mA

#### Data Set 2: 85°C, 20mA

Part Number: HL-A-3528H343W-S1-13HL-HR5  
Number of Units: 25  
Case Temperature: >83°C  
Ambient Temperature: >80°C  
Life Test Drive Current: 20mA  
Measurement Current: 20mA

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### 3.2 Data Set 1, 55°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	2.817	2.830	2.826	2.828							





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### 3.3 Data Set 1, 55°C, 20mA (Chromaticity Shift)

No.	X	Y	CCT(K)	Chromaticity Shift    X   Y									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2578	0.5280	2797	0.0002	0.0004	0.0008	0.0009	0.0011	0.0013	0.0014	0.0016	0.0017	0.0020
2	0.2584	0.5321	2767	0.0001	0.0002	0.0005	0.0006	0.0008	0.0009	0.0012	0.0014	0.0015	0.0015
3	0.2586	0.5303	2768	0.0001	0.0002	0.0001	0.0001	0.0002	0.0005	0.0009	0.0009	0.0012	0.0018
4	0.2581	0.5283	2790	0.0002	0.0004	0.0008	0.0010	0.0011	0.0013	0.0015	0.0016	0.0017	0.0019
5	0.2594	0.5312	2750	0.0002	0.0004	0.0007	0.0008	0.0010	0.0012	0.0013	0.0016	0.0017	0.0020
6	0.2578	0.5295	2790	0.0001	0.0003	0.0006	0.0006	0.0007	0.0010	0.0013	0.0014	0.0015	0.0015
7	0.2617	0.5302	2706	0.0001	0.0001	0.0004	0.0005	0.0006	0.0011	0.0012	0.0013	0.0015	0.0017
8	0.2609	0.5301	2723	0.0002	0.0005	0.0006	0.0007	0.0008	0.0013	0.0015	0.0019	0.0018	0.0021
9	0.2598	0.5312	2741	0.0002	0.0003	0.0005	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018
10	0.2578	0.5298	2789	0.0001	0.0001	0.0006	0.0006	0.0008	0.0011	0.0014	0.0016	0.0019	0.0021
11	0.2577	0.5292	2794	0.0002	0.0005	0.0007	0.0007	0.0009	0.0013	0.0015	0.0017	0.0017	0.0020
12	0.2584	0.5309	2771	0.0001	0.0001	0.0004	0.0004	0.0005	0.0007	0.0008	0.0009	0.0014	0.0018
13	0.2585	0.5317	2766	0.0002	0.0003	0.0005	0.0008	0.0009	0.0009	0.0011	0.0013	0.0016	0.0017
14	0.2561	0.5301	2825	0.0001	0.0001	0.0003	0.0004	0.0007	0.0009	0.0011	0.0012	0.0013	0.0014



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## 3.4 Data Set 2, 85°C, 20mA (Lumen Maintenance)

No.	- O P	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	7.550	100.30	100.05	99.89	99.75	99.52	99.23	99.07	98.86	98.60	98.26
27	7.588	100.17	99.93	99.66	99.51	99.33	99.06	98.79	98.60	98.43	98.14
28	7.543	100.05	99.71	99.50	99.34	99.22	98.98	98.77	98.55	98.24	98.12
29	7.442	100.03	99.85	99.61	99.37	98.97	98.66	98.51	98.25	98.01	97.89
30	7.426	100.08	99.81	99.58	99.33	99.02	98.71	98.48	98.29	98.03	97.90
31	7.407	100.31	100.05	99.81	99.49	99.19	98.99	98.76	98.60	98.20	98.04
32	7.640	100.26	99.93	99.58	99.33	99.07	98.76	98.57	98.36	98.21	98.09
33	7.500	100.28	100.00	99.77	99.47	99.25	99.03	98.88	98.63	98.45	98.16
34	7.414	99.84	99.70	99.50	99.26	98.99	98.71	98.44	98.25	97.91	97.56
35	7.581	100.28	100.01	99.75	99.53	99.26	98.94	98.72	98.38	98.07	97.90
36	7.557	100.26	100.03	99.81	99.54	99.36	99.10	98.94	98.58	98.19	97.90
37	7.570	100.25	99.97	99.80	99.43	99.27	99.15	98.86	98.60	98.23	97.98
38	7.445	99.97	99.80	99.61	99.41	99.22	98.94	98.62	98.32	98.05	97.89
39	7.593	100.26	99.96	99.76	99.35	99.09	98.87	98.75	98.59	98.35	98.13
40	7.594	100.16	99.92	99.64	99.50	99.17	98.89	98.66	98.29	98.08	97.88
41	7.588	100.14	99.86	99.66	99.33	99.14	98.88	98.68	98.34	98.17	97.97
42	7.364	100.03	99.92	99.69	99.46	99.27	99.10	98.82	98.59	98.32	98.02
43	7.518	100.19	99.93	99.69	99.49	99.27	98.92	98.68	98.31	98.18	97.90
44	7.588	100.18	99.92	99.68	99.38	99.17	98.93	98.70	98.48	98.23	97.96
45	7.47.48 Tt										



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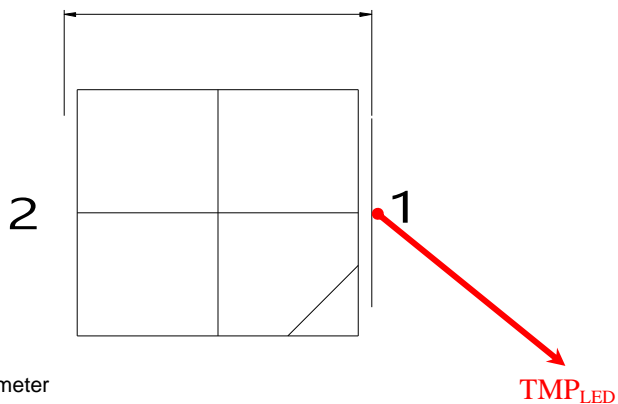
## 3.5 Data Set 2, 85°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	2.815	2.830	2.825	2.838	2.803	2.809	2.835	2.843	2.805	2.814	2.814
27	2.820	2.835	2.833	2.835	2.820	2.816	2.822	2.828	2.848	2.812	2.803
28	2.808	2.823	2.819	2.814	2.802	2.835	2.813	2.801	2.839	2.842	2.831
29	2.818	2.830	2.828	2.799	2.833	2.803	2.813	2.811	2.802	2.811	2.805
30	2.809	2.823	2.825	2.826	2.806	2.827	2.807	2.815	2.815	2.807	2.841
31	2.811	2.825	2.825	2.839	2.808	2.845	2.825	2.804	2.846	2.822	2.819
32	2.807	2.820	2.821	2.843	2.806	2.803	2.827	2.815	2.827	2.816	2.805
33	2.809	2.822	2.822	2.824	2.813	2.815	2.835	2.813	2.819	2.818	2.816
34	2.816	2.827	2.828	2.826	2.818	2.804	2.827	2.816	2.815	2.817	2.809
35	2.818	2.833	2.833	2.832	2.816	2.812	2.831	2.826	2.806	2.801	2.816
36	2.813	2.827	2.827	2.823	2.809	2.838	2.801	2.816	2.814	2.813	2.818
37	2.813	2.824	2.825	2.811	2.811	2.805	2.803	2.818	2.805	2.813	2.803
38	2.816	2.827	2.828	2.829	2.839	2.805	2.841	2.811	2.843	2.829	2.803
39	2.813	2.825	2.825	2.801	2.802	2.820	2.837	2.813	2.818	2.818	2.802
40	2.811	2.826	2.826	2.829	2.812	2.824	2.804	2.811	2.818	2.805	2.809
41	2.814	2.829	2.827	2.825	2.830	2.814	2.816	2.832	2.803	2.814	2.803
42	2.815	2.829	2.825	2.825	2.806	2.803	2.800	2.839	2.806	2.807	2.819
43	2.821	2.835	2.832	2.828	2.821	2.833	2.810	2.834	2.845	2.800	2.841
44	2.802	2.814	2.811	2.797	2.811	2.829	2.827	2.816	2.803	2.818	2.804
45	2.811	2.828	2.822	2.825	2.815	2.816	2.805	2.814	2.802	2.816	2.801
46	2.798	2.815	2.811	2.828	2.800	2.818	2.801	2.841	2.819	2.832	2.802
47	2.815	2.828	2.825	2.828	2.843	2.814	2.817	2.844	2.807	2.800	2.825
48	2.798	2.810	2.808	2.811	2.826	2.832	2.804	2.842	2.837	2.823	2.839
49	2.811	2.825	2.822	2.813	2.812	2.803	2.829	2.816	2.845	2.841	2.804
50	2.809	2.827	2.821	2.798	2.822	2.816	2.818	2.817	2.844	2.813	2.809
Avg.	2.812	2.825	2.824	2.822	2.815	2.818	2.818	2.821	2.821	2.816	2.814
Med.	2.813	2.827	2.825	2.825	2.812	2.816	2.817	2.816	2.818	2.814	2.809
st dev	0.006	0.006	0.006	0.013	0.012	0.012	0.013	0.013	0.017	0.011	0.013
Min.	2.798	2.810	2.808	2.797	2.800	2.803	2.800	2.801	2.802	2.800	2.801
Max.	2.821	2.835	2.833	2.843	2.843	2.845	2.841	2.844	2.848	2.842	2.841



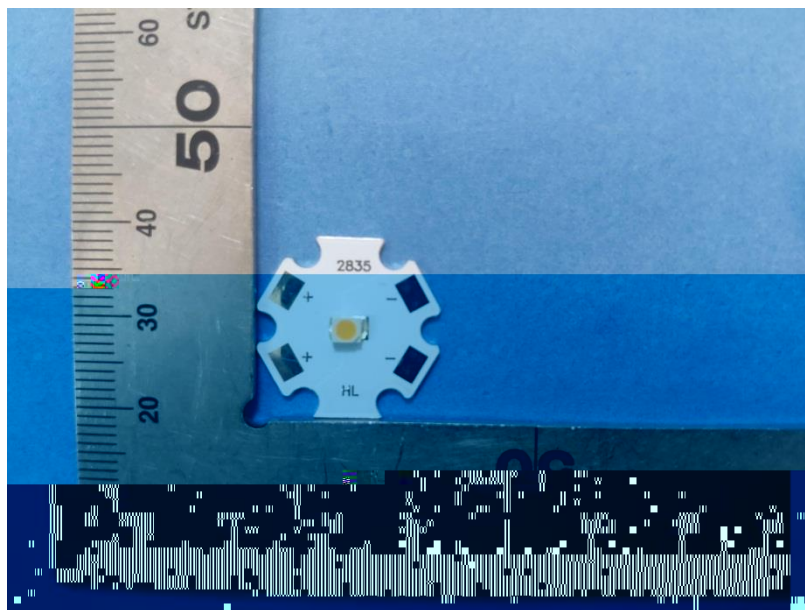
## 4 - DUT Photo

### 4.1 Mechanical Dimensions



All dimensions are in millimeter

### 4.2 DUT Photo





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### Directions

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