



# IESNA LM-80-08

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

## MEASUREMENT AND TEST REPORT For

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

**Model: HL-A-2835HW-S1-08-HR3**

<b>Report Type:</b> 9000 Hours Test Report	<b>Product Type:</b> LED Package
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<b>Report Number:</b> RSZ140217504-10-9000-M3	
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<b>Revised Note:</b> The previous report RSZ140217504-10-9000-M2 is replaced by this report on 2019-01-12	
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**Note:** The test data was only valid for the test sample(s). 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. (Dongguan).  
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# 1 - GENERAL INFORMATION

## 1.1 Description of LED Light Sources

Devices tested

Part Number:	HL-A-2835HW-S1-08-HR3
Part Type:	LED Package
Nominal CCT:	2700K
Power:	0.2W
Current Density per LED die:	372mA/mm <sup>2</sup>
Power Density per LED die:	1.24W/mm <sup>2</sup>
CRI:	80
Die Spacing:	N/A

### 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:

Differences Items	Testing Products	Multiple Models	Details
Model Name	HL-A-2835HW-S1-08-HR3	HL-A-2835HW-S1-08-HR3(R9)	Only different Model name for different market
		HL-A-PU2835HW-S1-08-HR3	
		HL-A-PU2835HW-S1-08-HR3(R9)	
		HL-A-2835HW-S1-08-PCT-HR3	
		HL-A-2835HW-S1-08-PCT-HR3(R9)	
		HL-A-PU2835HW-S1-08-PCT-HR3	
		HL-A-PU2835HW-S1-08-PCT-HR3(R9)	
		HL-AS-2835HW-S1-08-PCT-HR3	
		HL-AS-2835HW-S1-08-PCT-HR3(R9)	
		HL-AS-PU2835HW-S1-08-PCT-HR3	
		HL-AS-PU2835HW-S1-08-PCT-HR3(R9)	
		HL-A-2835HW-S1-08L-HR3	
HL-A-2835HW-S1-08HL-HR3			

Differences Items	Testing Products	Multiple Models	Details
		HL-A-2835HW-S1-08L-HR3(R9)	
		HL-A-2835HW-S1-08HL-HR3(R9)	
		HL-A-PU2835HW-S1-08L-HR3	
		HL-A-PU2835HW-S1-08HL-HR3	
		HL-A-PU2835HW-S1-08L-HR3(R9)	
		HL-A-PU2835HW-S1-08HL-HR3(R9)	
		HL-A-2835HW-S1-08L-PCT-HR3	
		HL-A-2835HW-S1-08L-PCT-HR3(R9)	
		HL-A-PU2835HW-S1-08L-PCT-HR3	
		HL-A-PU2835HW-S1-08L-PCT-HR3(R9)	
		HL-AS-2835HW-S1-08L-PCT-HR3	
		HL-AS-2835HW-S1-08L-PCT-HR3(R9)	
		HL-AS-PU2835HW-S1-08L-PCT-HR3	
		HL-AS-PU2835HW-S1-08L-PCT-HR3(R9)	
		SL-*B2835FAB-11CA*	<p>Only different Model name for different market</p> <p>The first * is a letter I, N, W which stand for CCT:                      I means Below 3700K;                      N means 3700-4700K;                      W means More than 4700K</p> <p>The second * is a different product solution (Color coordinate and applications and special solution etc ).</p> <p>The third * is different version numbers, Use 123. ... Or ABC ... expression.</p>
		SL-*B2835FAA-11CA*	
		SL-*B2835FTA-11CA*	
		SL-*B2835FAB-11CA*H	
		SL-*B2835FAA-11CA*H	
		SL-*B2835FTA-11CA*H	
		SL-*B2835FAB-11CA*/*	
		SL-*B2835FAA-11CA*/*	
		SL-*B2835FTA-11CA*/*	
		SL-*B2835FAB-11CA*-*	
		SL-*B2835FAA-11CA*-*	
		SL-*B2835FTA-11CA*-*	

Differences Items	Testing Products	Multiple Models	Details
		SL-*B2835FAB-11CA*H/*	
		SL-*B2835FAA-11CA*H/*	
		SL-*B2835FTA-11CA*H/*	
		SL-**B2835FTA-11CA***C-APH***	Only different Model name for different market. First **-designates nominal CCT (22=2200K,27=2700K,30=3000K, 35=3500K,40=4000K,50=5000K, 57=5700K,65=6500K)
		SL-**B2835FAA-11CA***C-APH***	Middle *** -designates nominal Different solution (Color coordinate and applications and special solution etc )
		SL-**B2835FAB-11CA***C-APH***	Last *** -designates version numbers, Use 001 002 003 ... expression.

## 1.2 Standards Used:

IESNA LM-80-08: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.

CIE 127:2007: Measurement of LEDs (This standard was not accredited by IAS)

ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

## 1.3 Test Facility

The testing facility used by Bay Area Compliance Laboratories Corp. (Dongguan). is located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.

## 1.4 Description of Auxiliary Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integral Sphere	EVERFINE	Diameter 0.3m	1011119	2015-03-04	2016-03-04
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	2015-03-12	2016-03-12
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	2014-12-26	2015-12-26

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D062	1011093	2015-05-06	2016-05-06

Precision digital  
stabilized DC

FENVAL



## 2 - SUMMARY OF TEST RESULT

<b>Data Set:</b>	<b>Data Set 1, 55°C, 60mA</b>
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h, 7000h,8000h,9000h
Average. Lumen Maintenance at 6000 hours:	97.47%
Average Chromaticity Shift at 6000 hours ( $\Delta$ *;	0.0017
Average. Lumen Maintenance at 9000 hours:	95.72%
Average Chromaticity Shift at 9000 hours ( $\Delta$ *;	0.0029
Reported TM-21 L <sub>70</sub> Lifetime:	>54,000 hours

<b>Data Set:</b>	<b>Data Set 2, 85°C, 60mA</b>
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h, 7000h,8000h,9000h
Average. Lumen Maintenance at 6000 hours:	96.90%
Average Chromaticity Shift at 6000 hours) *;	0.0022
Average. Lumen Maintenance at 9000 hours:	95.06%
Average Chromaticity Shift at 9000 hours ( $\Delta$ *;	0.0035
Reported TM-21 L <sub>70</sub> Lifetime:	>54,000 hours

<b>Data Set:</b>	<b>Data Set 3, 105°C, 60mA</b>
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h, 7000h,8000h,9000h
Average. Lumen Maintenance at 6000 hours:	96.39%
B f bhf!Di b d !Ti g!b!7i11!i ) *;	0.0027
Average. Lumen Maintenance at 9000 hours:	94.32%
Average Chromaticity Shift at 9000 hours ( $\Delta$ *;	0.0039
Reported TM-21 L <sub>70</sub> Lifetime:	53,000 hours



### 3 - Test Data

#### 3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)

No.	V <sub>F</sub> (V)	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000h	8000h	9000h
1	2.808	23.10	100.30	99.52	99.18	98.53	98.10	97.62	97.19	96.93	96.36
2	2.806	23.48	100.21	99.62							

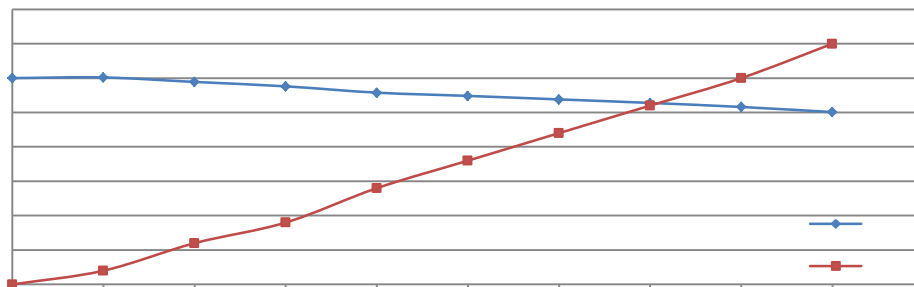
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### 3.4 Data Set 2, 85°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000h	8000h
26	0.2654	0.5262	2646	0.0001	0.0004	0.0007	0.0013	0.0019	0.0023	0.0026	0.0031	0.0034
27	0.2655	0.5264	2642	0.0001	0.0003	0.0006	0.0014	0.0021	0.0025	0.0028	0.0034	0.0038
28	0.2647	0.5258	2661	0.0004	0.0007	0.0008	0.0014	0.0014	0.0018	0.0023	0.0026	0.0030
29	0.2630	0.5244	2702	0.0002	0.0006	0.0010	0.0015	0.0018	0.0021	0.0025	0.0027	0.0032
30	0.2632	0.5242	2699	0.0003	0.0005	0.0011	0.0014	0.0018	0.0021	0.0026	0.0031	0.0036
31	0.2622	0.5231	2724	0.0003	0.0005	0.0008	0.0013	0.0019	0.0022	0.0027	0.0031	0.0036
32	0.2652	0.5270	2646	0.0004	0.0006	0.0009	0.0014	0.0017	0.0022	0.0026	0.0031	0.0034
33	0.2660	0.5256	2635	0.0002	0.0007	0.0009	0.0014	0.0019	0.0023	0.0026	0.0030	0.0036
34	0.2666	0.5259	2623	0.0001	0.0004	0.0009	0.0016	0.0018	0.0023	0.0027	0.0031	0.0037
35	0.2653	0.5251	2651	0.0001	0.0007	0.0012	0.0021	0.0013	0.0016	0.0021	0.0025	0.0029
36	0.2631	0.5255	2694	0.0001	0.0006	0.0010	0.0017	0.0018	0.0021	0.0025	0.0029	0.0033
37	0.2660	0.5257	2634	0.0001	0.0007	0.0009	0.0017	0.0018	0.0023	0.0027	0.0029	0.0032
38	0.2639	0.5263	2676	0.0002	0.0005	0.0008	0.0017	0.0017	0.0021	0.0025	0.0031	0.0036
39	0.2651	0.5262	2652	0.0001	0.0005	0.0008	0.0016	0.0016	0.0019	0.0024	0.0029	0.0034
40	0.2649	0.5256	2657	0.0001	0.0007	0.0009	0.0016	0.0014	0.0019	0.0021	0.0027	0.0032
41	0.2653	0.5259	2647	0.0003	0.0006	0.0010	0.0014	0.0017	0.0022	0.0025	0.0029	0.0033
42	0.2631	0.5257	2695	0.0003	0.0004	0.0009	0.0014	0.0018	0.0023	0.0026	0.0029	0.0034
43	0.2644	0.5255	2668	0.0001	0.0007	0.0009	0.0011	0.0018	0.0023	0.0028	0.0031	0.0036
44	0.2641	0.5258	2674	0.0001	0.0006	0.0010	0.0014	0.0017	0.0021	0.0025	0.0030	0.0035
45	0.2633	0.5245	2696	0.0001	0.0006	0.0009	0.0014	0.0017	0.0021	0.0026	0.0029	0.0033
46	0.2655	0.5264	2643	0.0002	0.0006	0.0008	0.0014	0.0017	0.0023	0.0029	0.0033	0.0037
47	0.2646	0.5258	2663	0.0001	0.0008	0.0009	0.0013	0.0019	0.0024	0.0029	0.0033	0.0036
48	0.2643	0.5257	2669	0.0001	0.0006	0.0009	0.0013	0.0018	0.0024	0.0028	0.0032	0.0038
49	0.2655	0.5275	2637	0.0002	0.0006	0.0008	0.0012	0.0018	0.0023	0.0027	0.0030	0.0033
50	0.2620	0.5234	2728	0.0002	0.0005	0.0007	0.0013	0.0019	0.0024	0.0030	0.0033	0.0037
Ave.	0.2645	0.5256	2666	0.0002	0.0006	0.0009	0.0014	0.0018	0.0022	0.0026	0.0030	0.0035
Med.	0.2647	0.5257	2661	0.0001	0.0006	0.0009	0.0014	0.0018	0.0022	0.0026	0.0030	0.0034
st dev	0.0012	0.0010	28.6983	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2620	0.5231	2623	0.0001	0.0003	0.0006	0.0011	0.0013	0.0016	0.0021	0.0025	0.0029
Max.	0.2666	0.5275	2728	0.0004	0.0008	0.0012	0.0021	0.0021	0.0025	0.0030	0.0034	0.0038



**3.5 Data Set 3, 105°C, 60mA (Lumen Maintenance)**

No.	V <sub>F</sub> (V)	Φ(lm)	Lumen Maintenance (%)								
			0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000h	8000h
51	2.809	23.71	99.92	99.37	98.52	97.64	96.96	96.54	96.04	95.44	94.56
52	2.804	23.42	100.00	99.40	98.68	97.52	97.10	96.58	95.86	95.22	94.41
53	2.808	22.98	99.91	99.52	98.74	97.74	97.08	96.52			

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**3.6 Data Set 3, 105°C, 60mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000h	8000h	9000h
51	0.2640	0.5255	2676	0.0001	0.0007	0.0009	0.0017	0.0020	0.0024	0.0027	0.0031	0.0036

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