Quality Assured

NVLAP LAB CODE 200960-0

LM-79-08 Test Report

for

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

LED HID

Model: 80HID/850/277V/EX39

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ16060024a

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by: April Zou

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Jun. 17, 2016

Approved by: Jim Zhang

LEADING TESTING LABORATORIES

Manager: Jim Zhang

Jun. 17, 2016

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Summary

Sample Tested: **80HID/850/277V/EX39**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
122.0	9640.7	78.83	0.9985

CCT (K)	CRI	Stabilization Time (Light & Power)
4815	81.8	60

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

Test specifications:	
Date of Receipt	: Jun. 16, 2016
Date of Test	: Jun. 16, 2016
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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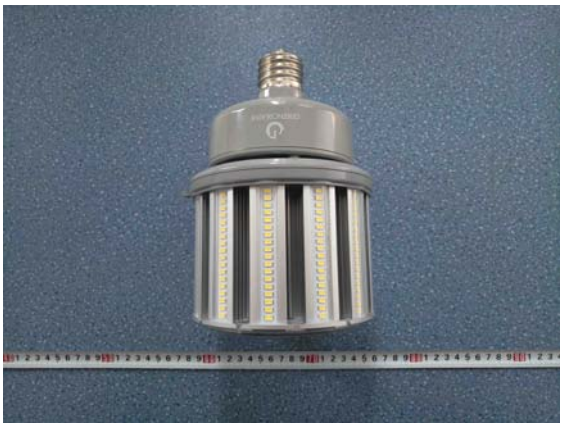
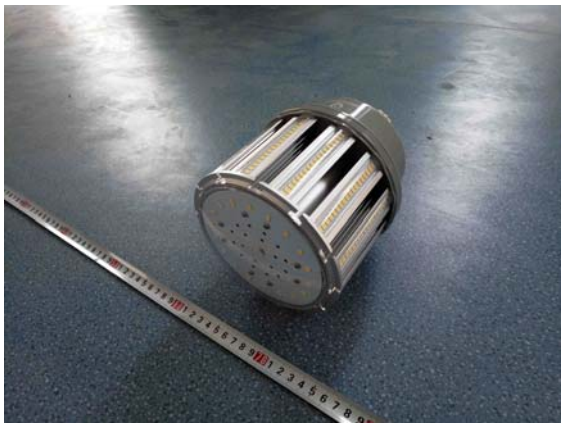
Sample Photos

Overview of the sample

Equipment Under Test (EUT)	
Name	: LED HID
Model	: 80HID/850/277V/EX39
Electrical Ratings	: 120-277V, 60Hz, 80W
Product Description	: EX39 base, 5000K, CRI80
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 25.1℃.

Base orientation was Light down. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 95 minutes.

The photometric distance of Goniophotometer is 2.47 m.

Luminous data was taken at 0.5° vertical intervals and 10.0°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.658	0.303
Power Factor	0.9985	0.9342
Test Power (W)	78.83	78.49
THD A%	4.98	9.86
Luminous Efficacy (lm/W)	122.0	
Total Luminous Flux (lm)	9640.7	
Color Rendering Index (CRI)	81.8	
R9	6.1	
Correlated Color Temperature (CCT) (K)	4815	
Chromaticity (Chroma x, Chroma y)	(0.3518, 0.3666)	
Chromaticity (Chroma u, Chroma v)	(0.2102, 0.3285)	
Chromaticity (Chroma u', Chroma v')	(0.2102, 0.4928)	
Duv	0.0048	
Average Beam Angle (°)	318.4	
Center Beam Candle Power (cd)	287	
Spacing Criteria	3.01 (0°-180°)/ 2.99 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	22.44%	
Zonal Lumens in the 60°-90°Zone	32.01%	
Zonal Lumens in the 90°-120°Zone	30.28%	
Zonal Lumens in the 120°-180°Zone	15.28%	

Special Color Rendering Indices	
R1	79.5
R2	85.6
R3	91.1
R4	82.4
R5	79.9
R6	80.4
R7	87.9
R8	67.8
R9	6.1
R10	66.7
R11	81.6
R12	58.2
R13	80.6
R14	95.2

Table 2: Test data per Goniophotometer Method

Note: According to CIE 1976 (u',v') diagram, u' = u = 4x/(-2x+12y+3), v' = 3v/2 = 9y/(-2x+12y+3).

Spectral Power Distribution

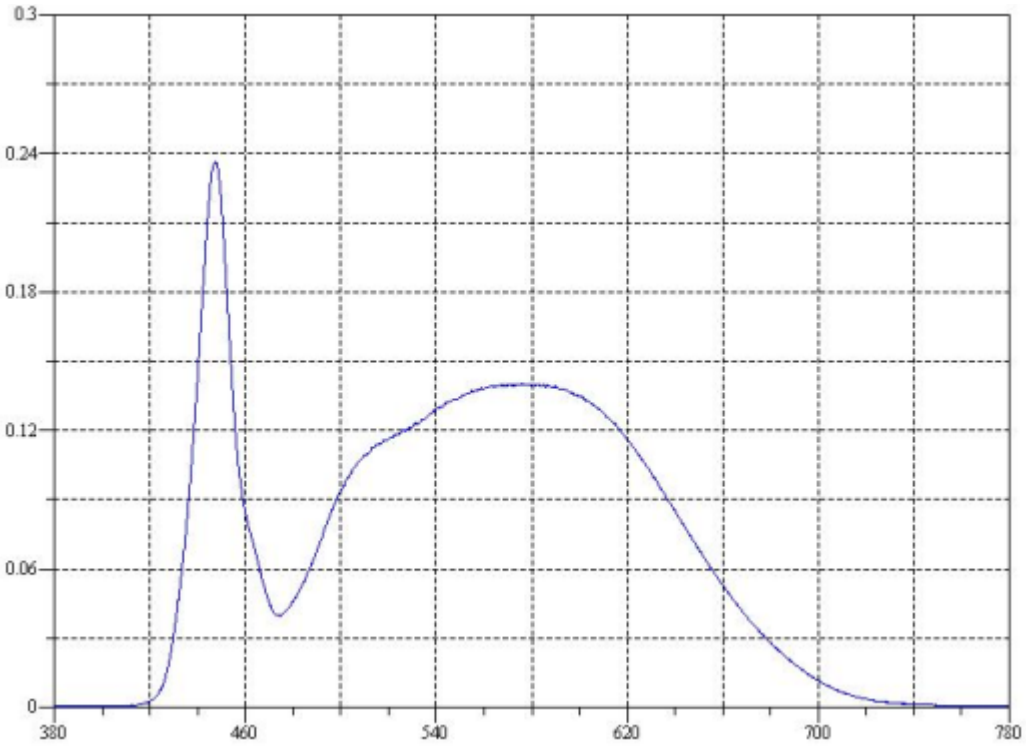


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	28.388	0.29%
10- 20	101.865	1.06%
20- 30	227.37	2.36%
30- 40	406.285	4.21%
40- 50	602.663	6.25%
50- 60	796.556	8.26%
60- 70	954.592	9.90%
70- 80	1048.079	10.87%
80- 90	1082.968	11.23%
90-100	1076.341	11.16%
100-110	999.011	10.36%
110-120	843.731	8.75%
120-130	648.556	6.73%
130-140	445.629	4.62%
140-150	251.843	2.61%
150-160	104.326	1.08%
160-170	21.81	0.23%
170-180	0.702	0.01%
Total	9640.7	100%

γ(°)	Lumens	% Total
0- 60	2163.127	22.44%
60- 90	3085.639	32.01%
0-90	5248.766	54.44%
90- 180	4391.949	45.56%
0- 180	9640.7	100%

Table 3: Zonal Lumen Data

Illuminance Plots

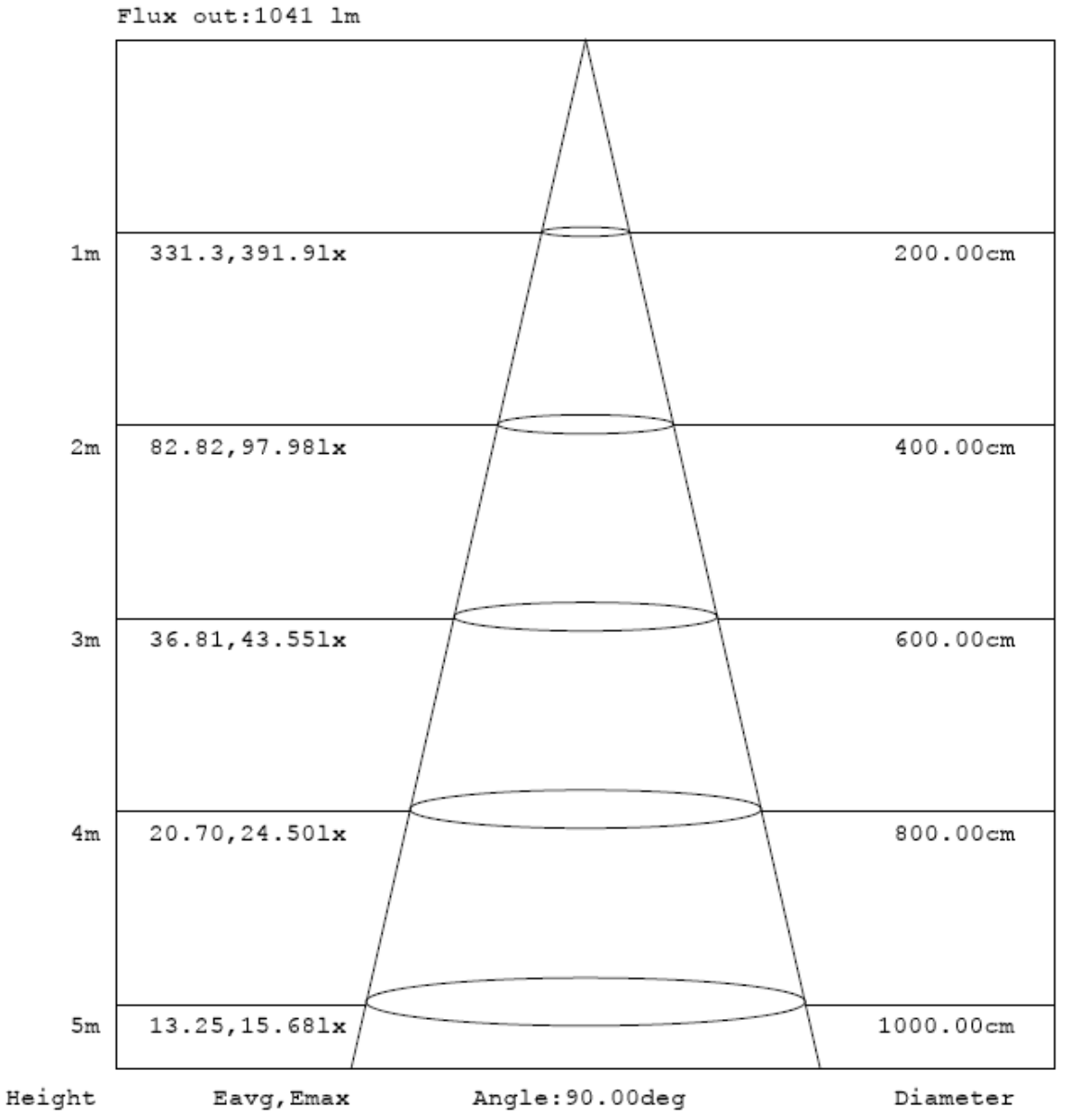


Chart 2: Beam Angle

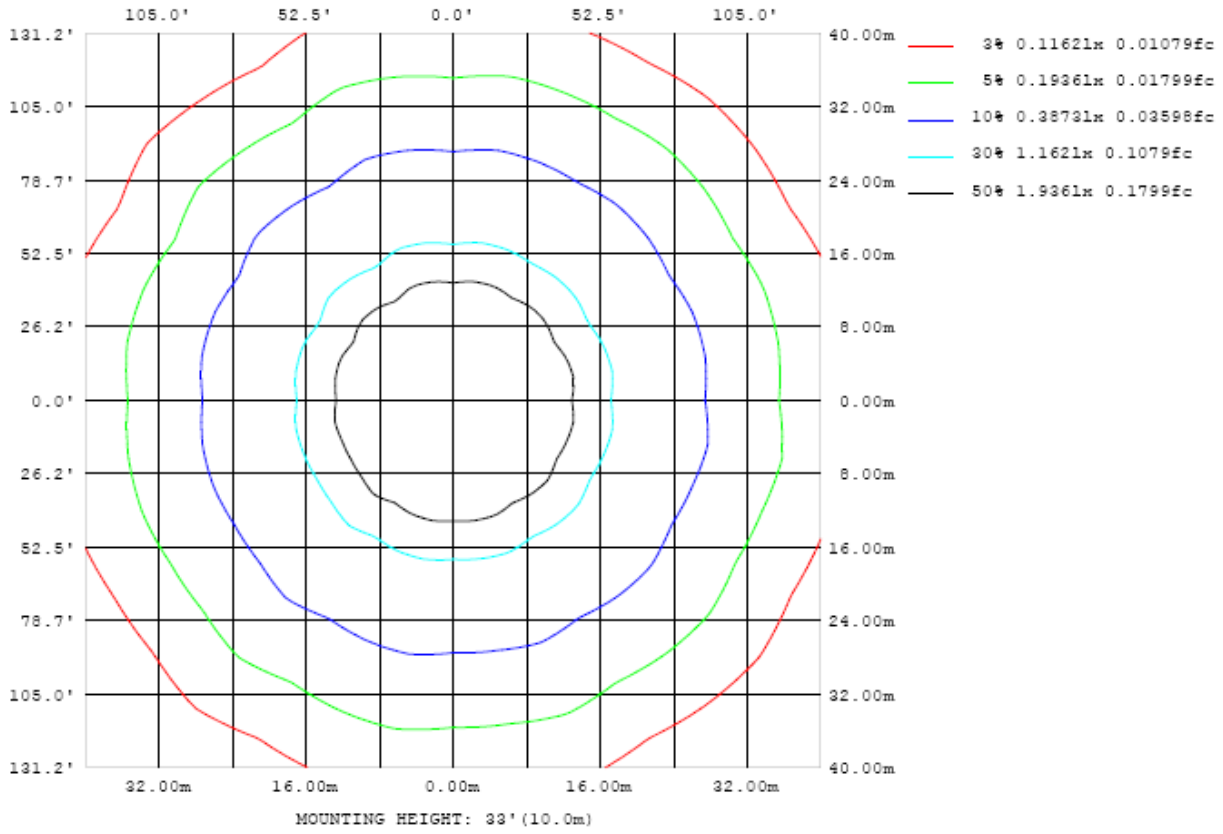


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

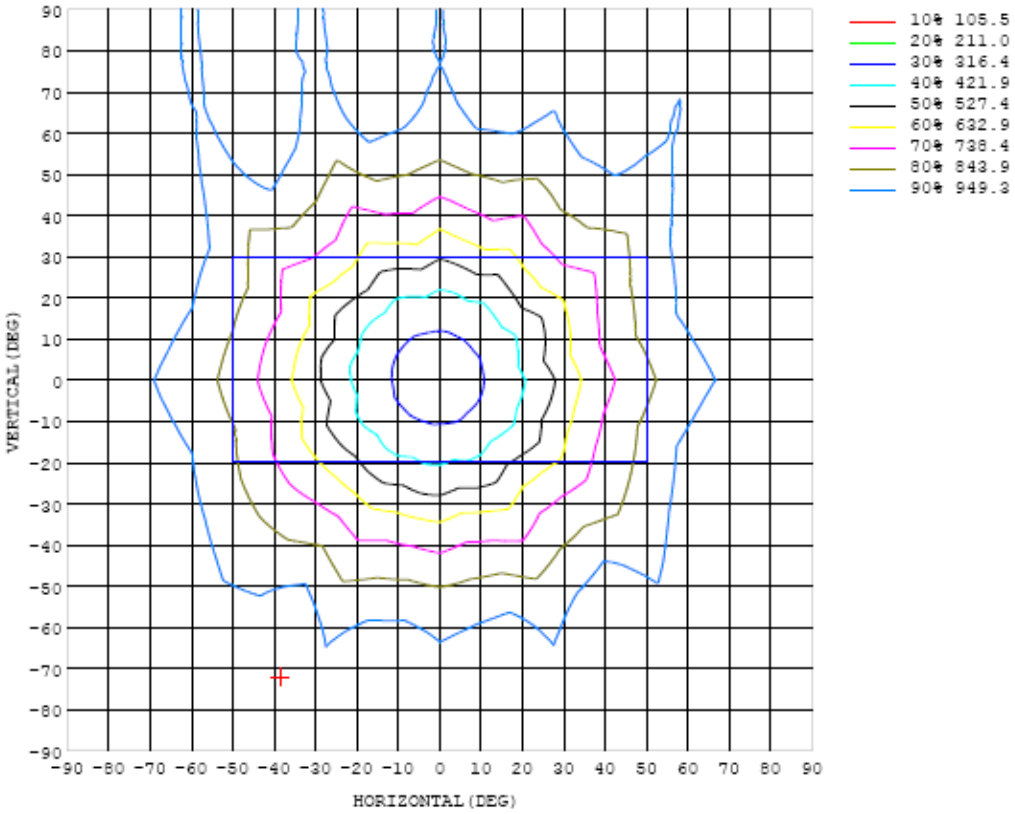


Chart 4: Isocandela Plot

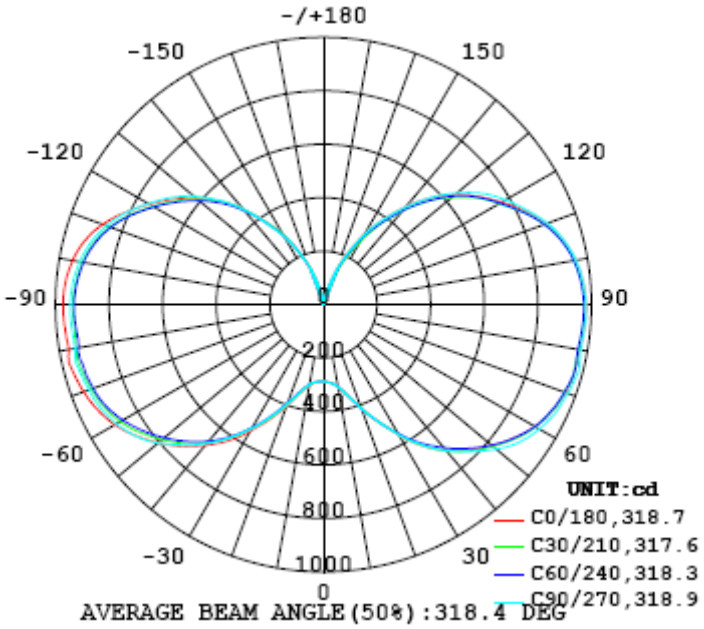


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

C (DEG) / γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287
5	293	293	294	294	294	294	294	294	294	294	294	294	294	294	293	293	293	292	292
10	312	312	312	313	315	314	312	312	312	312	311	311	311	310	310	307	306	307	306
15	354	355	357	353	361	365	353	351	359	353	352	357	351	350	354	346	344	351	344
20	413	419	426	411	424	436	414	413	429	413	413	427	410	409	421	402	399	417	402
25	484	494	506	482	502	515	483	488	502	483	486	500	481	485	495	473	467	496	473
30	563	576	587	560	583	595	557	569	589	563	565	577	556	563	570	556	539	578	546
35	646	665	661	642	671	678	632	658	672	641	652	655	637	656	650	635	620	652	622
40	711	736	732	714	740	744	699	730	742	712	727	729	704	734	724	701	694	721	687
45	767	799	789	773	804	802	761	797	802	778	794	793	762	806	778	760	756	782	749
50	820	858	841	825	870	857	818	862	859	841	857	848	815	872	831	816	816	839	804
55	870	911	895	874	935	913	869	919	912	895	914	904	866	931	883	869	876	893	855
60	911	961	941	913	980	961	912	967	951	930	960	952	909	981	927	912	927	938	899
65	942	1001	968	940	1007	989	938	1001	975	956	997	983	939	1018	956	944	964	972	930
70	962	1029	983	958	1026	1003	956	1024	986	971	1024	1000	958	1041	971	963	993	992	952
75	970	1038	985	968	1037	1012	969	1039	994	984	1038	1012	967	1051	981	979	1012	1006	968
80	973	1043	985	969	1037	1008	964	1032	985	975	1030	1004	962	1048	975	974	1014	1000	965
85	978	1046	986	972	1042	1010	970	1036	985	978	1033	1004	964	1048	973	976	1016	1001	969
90	980	1047	986	974	1043	1010	971	1039	986	979	1034	1005	966	1050	975	978	1020	1003	972
95	973	1041	979	967	1035	1002	964	1032	981	972	1028	1000	960	1046	970	973	1014	998	967
100	956	1025	963	950	1017	987	949	1017	968	956	1014	986	945	1031	956	958	997	985	951
105	928	992	936	922	986	961	920	988	945	930	985	961	917	1003	932	931	966	961	923
110	888	943	896	878	941	921	877	943	911	890	938	921	874	962	894	887	917	919	877
115	831	881	841	822	887	865	821	884	859	838	877	866	820	910	839	829	856	861	817
120	767	808	776	757	817	800	761	818	801	785	812	802	759	846	779	767	789	799	752
125	704	733	712	698	740	739	701	748	741	725	745	737	696	777	721	705	722	737	688
130	642	653	640	625	650	661	633	672	675	650	672	670	627	702	659	638	651	673	621
135	565	570	562	547	564	583	549	592	598	568	597	592	553	619	584	563	576	597	550
140	479	476	470	461	472	496	460	495	510	477	504	501	470	520	503	478	487	510	466
145	389	379	380	367	375	403	371	398	423	389	408	414	383	419	415	394	393	427	378
150	303	287	291	271	282	312	290	305	329	300	313	329	299	324	328	307	306	344	300
155	212	198	205	183	193	222	199	209	232	209	219	236	210	229	240	213	220	254	214
160	131	121	121	106	115	134	120	126	149	130	134	151	132	143	152	129	138	159	137
165	64.1	58.6	52.8	45.9	50.5	56.4	55.5	59.4	68.6	63.9	65.2	70.6	65.8	71.4	74.0	65.7	70.7	81.1	71.5
170	17.9	15.3	12.3	10.5	12.1	12.8	12.7	14.3	16.3	18.2	17.7	19.4	18.7	19.8	20.7	20.4	21.9	23.9	21.8
175	1.44	1.25	1.03	0.85	0.73	0.75	0.83	0.99	1.14	1.24	1.40	1.48	1.70	1.83	1.92	2.16	2.27	2.49	2.74
180	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.40	0.40	0.40	0.40	0.40	0.39	0.40	0.39	0.39	0.39

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287		
5	292	291	291	291	291	291	291	290	291	291	291	291	291	292	292	292	293		
10	305	305	305	304	304	303	304	304	304	305	307	308	309	311	310	311	313		
15	342	343	340	342	341	337	342	346	340	344	352	348	352	358	350	357	361		
20	396	407	397	400	405	390	399	415	394	401	417	402	416	427	405	421	436		
25	468	492	466	474	483	458	474	491	462	475	495	472	493	510	475	493	521		
30	542	571	534	551	565	530	549	575	535	555	576	543	570	587	549	570	601		
35	632	647	608	641	646	603	635	659	609	641	664	624	661	666	632	656	676		
40	705	721	674	716	720	667	711	726	678	712	732	690	733	740	694	728	747		
45	765	784	734	784	778	724	775	785	743	775	790	752	797	797	745	785	807		
50	829	839	785	848	833	775	842	840	806	837	846	810	853	848	795	842	863		
55	889	892	834	911	885	823	903	891	856	894	898	867	900	897	843	895	917		
60	939	939	875	966	930	864	955	937	892	939	940	912	942	940	886	938	960		
65	973	970	903	998	960	897	991	970	917	966	965	938	974	966	916	970	990		
70	997	986	922	1016	972	915	1011	984	931	983	974	954	994	981	938	994	1002		
75	1016	996	936	1031	976	925	1023	995	944	996	980	967	1005	989	945	1004	1002		
80	1016	996	936	1032	976	928	1022	989	942	995	975	967	1006	988	952	1013	1002		
85	1018	992	933	1032	972	928	1024	989	944	997	974	970	1008	992	956	1017	1003		
90	1022	995	935	1036	973	930	1026	990	945	997	973	971	1009	993	957	1019	1003		
95	1018	991	928	1030	968	924	1020	983	939	989	966	963	1002	986	949	1010	996		
100	1004	979	913	1017	957	909	1005	970	924	972	953	947	987	970	932	990	980		
105	979	957	888	992	936	884	980	948	899	946	931	921	962	946	904	959	956		
110	934	920	849	950	902	845	940	913	862	906	900	883	920	907	862	911	921		
115	875	867	795	896	854	793	889	863	814	854	853	832	862	852	806	850	867		
120	812	807	735	837	795	732	825	799	756	789	792	773	795	785	741	781	801		
125	749	745	676	769	732	669	748	732	698	717	726	710	727	716	676	712	735		
130	680	681	614	694	667	606	669	664	632	639	657	634	657	649	610	638	665		
135	603	606	547	614	592	537	589	589	553	560	579	553	580	576	539	565	586		
140	514	518	466	525	509	459	501	509	467	475	495	468	491	488	463	475	497		
145	423	428	380	425	425	374	402	426	374	380	410	379	389	398	378	376	411		
150	327	341	304	329	330	297	311	331	294	292	311	296	298	310	288	285	328		
155	227	249	219	230	240	215	222	241	212	206	223	211	205	224	200	193	233		
160	143	160	146	147	157	141	140	156	141	127	142	135	126	142	128	116	141		
165	73.1	80.5	78.0	79.1	80.4	73.6	70.5	77.9	74.0	63.6	66.8	69.9	62.7	64.5	66.3	57.6	65.0		
170	23.2	23.1	24.4	25.1	25.2	23.6	23.6	24.2	23.9	22.3	20.8	20.7	19.8	19.4	20.0	18.4	18.7		
175	2.81	3.01	3.07	3.02	3.10	3.07	2.89	2.86	3.01	2.83	2.76	2.67	2.49	2.43	2.25	2.07	1.94		
180	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

Table 6: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning.
Therefore, no seasoning was performed.

Goniophotometer Method

Photometric and Electrical Measurements

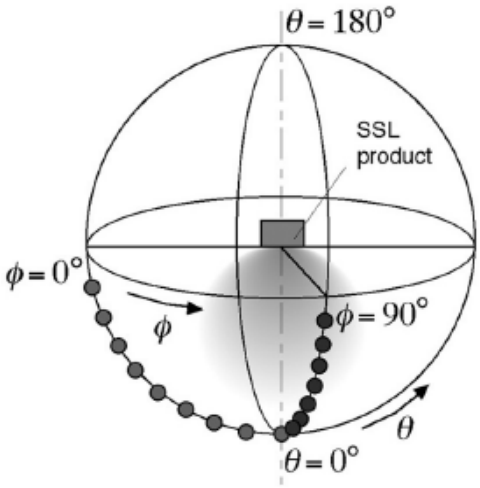
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.
The stabilization time typically ranges from 30 min (small integrated 2x2' Troffer Retrofit Kit) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.
Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.
Some graphics were created with Photometric Plus software.
The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.
The uncertainty of goniophotometer system reported in this document is expended uncertainty is 1.94% with a coverage factor k=2.

Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes (C=0°/180° and C=90°/270°) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for delta color differences of the u', v' chromaticity coordinates. The spatial non-uniformity of chromaticity, Δu'v', is determined as the maximum deviation (distance on the CIE (u', v') diagram) among all measured points from the spatially averaged chromaticity coordinate.
The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



*** End of Report ***

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