



LM-79-19 TEST REPORT

for

Industrial Lighting Products, LLC

3224 McCraney Loop, Sanford, FL, 32771

LED Retrofit-kits in Lithonia 2GT8 lensed 2x4

Model: ULB3-30L-U-35-L3

ULB3-30L-U-35-L3-MWS

30LB/3F/835/U/A3

30LB/3F/835/U/A3/MWS

Laboratory: Leading Testing Laboratories

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Report No.: HZ25030014k

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

Review by:

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Approved by:



April Zou

Engineer: Wei Fei
May 28, 2025

Manager: April Zou
May 28, 2025

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: **ULB3-30L-U-35-L3**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
128.4	5007.6	39.01	0.9962
CCT (K)	CRI	Stabilization Time (Light & Power)	
3507	82.8	50	

Table 1: Executive Data Summary

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

Test specifications:

Date of Receipt	: Mar. 18, 2025
Date of Test	: Mar. 20, 2025
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

TABLE OF CONTENT

LM-79-19 TEST REPORT.....	1
TEST SUMMARY	2
SAMPLE PHOTO	4
TEST RESULTS	5
Sphere-Spectroradiometer Method.....	5
Goniophotometer Method	6
Spectral Power Distribution - Sphere Spectroradiometer Method	7
Chromaticity Diagram - Sphere Spectroradiometer Method.....	8
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	9
Color Rendition Report – Sphere Spectroradiometer Method	10
Zonal Lumen Tabulation- Goniophotometer Method	11
Illuminance Plots- Goniophotometer Method	12
Luminous Intensity Distribution Plots- Goniophotometer Method.....	13
Luminous Intensity Data- Goniophotometer Method	14
EQUIPMENT LIST	16
TEST METHODS	16
Seasoning of SSL Product.....	16
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	16
Goniophotometer Method	17
Photometric and Electrical Measurements	17
Color Characteristics Measurements.....	17

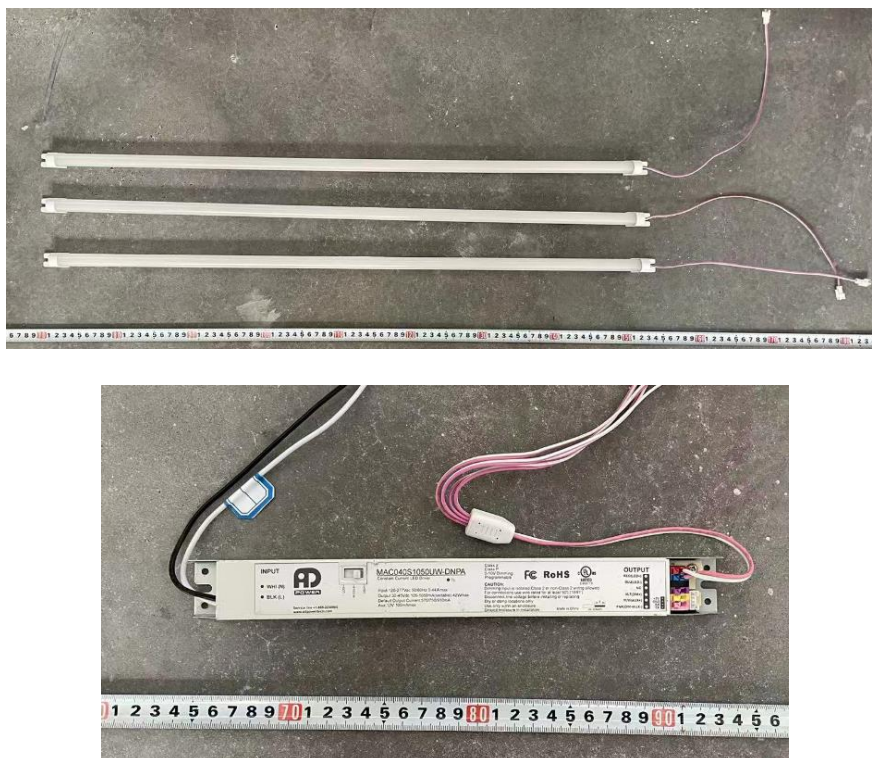


Figure 1- Overview of the sample



Sample in Lithonia 2GT8 lensed 2x4

Equipment Under Test(EUT)

Name	: LED Retrofit-kits	
Model	: ULB3-30L-U-35-L3	ULB3-30L-U-35-L3-MWS
	: 30LB/3F/835/U/A3	30LB/3F/835/U/A3/MWS
Electrical Ratings	: 120-277V, 50/60Hz	
Product Description	: Field-Adjustable 40W/36W/32W, 3500K LED Tube supplied by a LED driver: MAC040S1050UW-DNPA	
Manufacturer	: Industrial Lighting Products, LLC	
Address	: 3224 McCraney Loop, Sanford, FL, 32771	

TEST RESULTS

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.326	0.146
Power Factor	0.9962	0.9621
Test Power (W)	39.01	38.78
THD A%	7.21	14.95
Luminous Efficacy (lm/W)	128.4	129.6
Total Luminous Flux (lm)	5007.6	5024.1
Color Rendering Index (CRI)	82.8	
R9	9.8	
Correlated Color Temperature (CCT)(K)	3507	
Chromaticity Chroma x	0.4033	
Chromaticity Chroma y	0.3866	
Chromaticity Chroma u	0.2361	
Chromaticity Chroma v	0.3395	
Duv	-0.0014	
Chromaticity Chroma u'	0.2361	
Chromaticity Chroma v'	0.5092	

Special Color Rendering Indices	
R1	81.4
R2	89.2
R3	95
R4	81.8
R5	81.4
R6	85.4
R7	84.8
R8	63.1
R9	9.8
R10	74.6
R11	81.1
R12	64.3
R13	83.2
R14	97.3

Table 2: Test data per Sphere-Spectroradiometer Method

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

Goniophotometer Method

Test ambient temperature was 24.8 °C.

The photometric distance is 30 m.

Luminous data was taken at 0.5 vertical intervals and 10 horizontal intervals.

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.327
Power Factor	0.9960
Power (W)	39.04
Luminous Efficacy (lm/W)	128.6
Total Luminous Flux (lm)	5018.8
Beam Angle (°)	95.3 (0°-180°) / 94.7 (90°-270°)
Center Beam Candle Power (cd)	2263
Maximum Beam Candle Power (cd)	2267 (At: C=30.0, Gamma=0.5)
Spacing Criteria	1.20 (0°-180°) / 1.26 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	88.31%
Zonal Lumens in the 60 °-90 °Zone	11.45%
Zonal Lumens in the 90 °-120 °Zone	0.09%
Zonal Lumens in the 120 °-180 °Zone	0.15%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

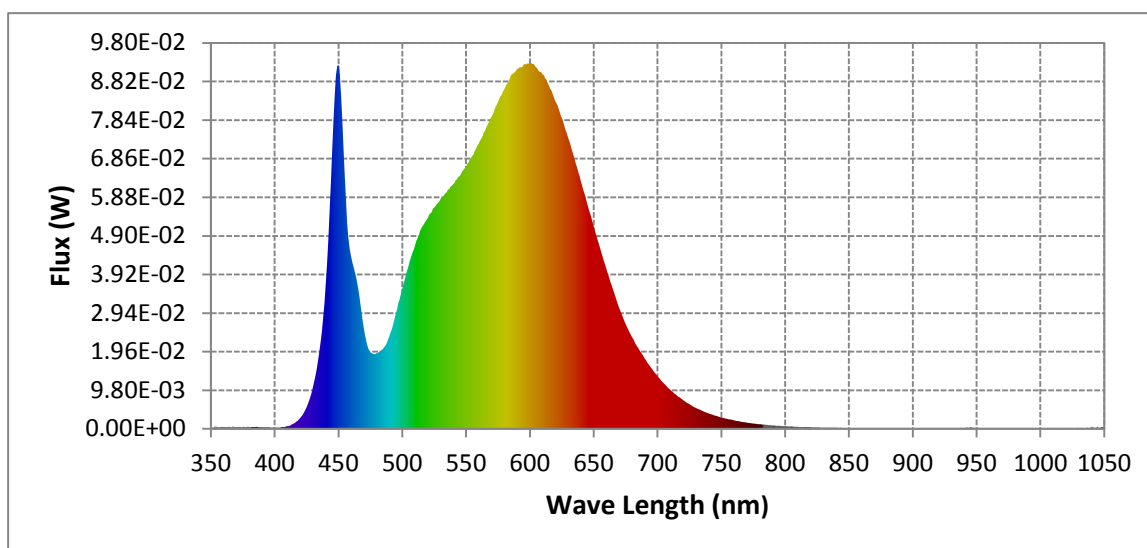
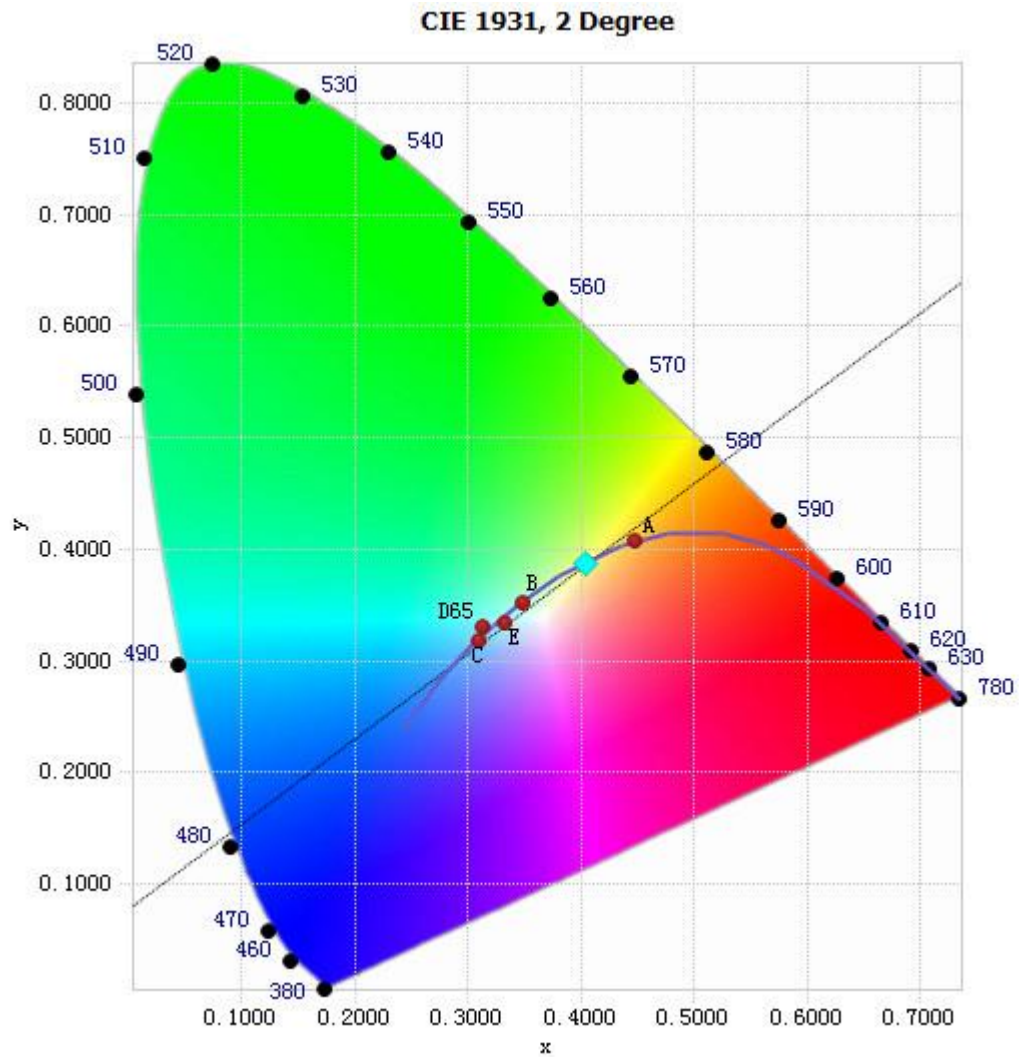


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	5.28E-04	485	2.03E-02	590	9.14E-02	695	1.56E-02
385	4.62E-04	490	2.35E-02	595	9.24E-02	700	1.35E-02
390	3.91E-04	495	2.92E-02	600	9.29E-02	705	1.16E-02
395	3.72E-04	500	3.55E-02	605	9.17E-02	710	9.94E-03
400	2.49E-04	505	4.14E-02	610	8.99E-02	715	8.56E-03
405	3.49E-04	510	4.64E-02	615	8.72E-02	720	7.37E-03
410	6.59E-04	515	5.09E-02	620	8.33E-02	725	6.27E-03
415	1.31E-03	520	5.35E-02	625	7.90E-02	730	5.33E-03
420	2.69E-03	525	5.62E-02	630	7.40E-02	735	4.61E-03
425	5.42E-03	530	5.84E-02	635	6.87E-02	740	3.94E-03
430	1.05E-02	535	6.00E-02	640	6.30E-02	745	3.36E-03
435	1.94E-02	540	6.21E-02	645	5.72E-02	750	2.89E-03
440	3.63E-02	545	6.41E-02	650	5.15E-02	755	2.48E-03
445	6.99E-02	550	6.64E-02	655	4.60E-02	760	2.13E-03
450	9.24E-02	555	6.92E-02	660	4.06E-02	765	1.84E-03
455	6.36E-02	560	7.24E-02	665	3.55E-02	770	1.59E-03
460	4.39E-02	565	7.57E-02	670	3.07E-02	775	1.36E-03
465	3.69E-02	570	7.92E-02	675	2.66E-02	780	1.18E-03
470	2.56E-02	575	8.29E-02	680	2.33E-02		
475	1.95E-02	580	8.62E-02	685	2.04E-02		
480	1.92E-02	585	8.96E-02	690	1.79E-02		

Table 4: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4033, 0.3866)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

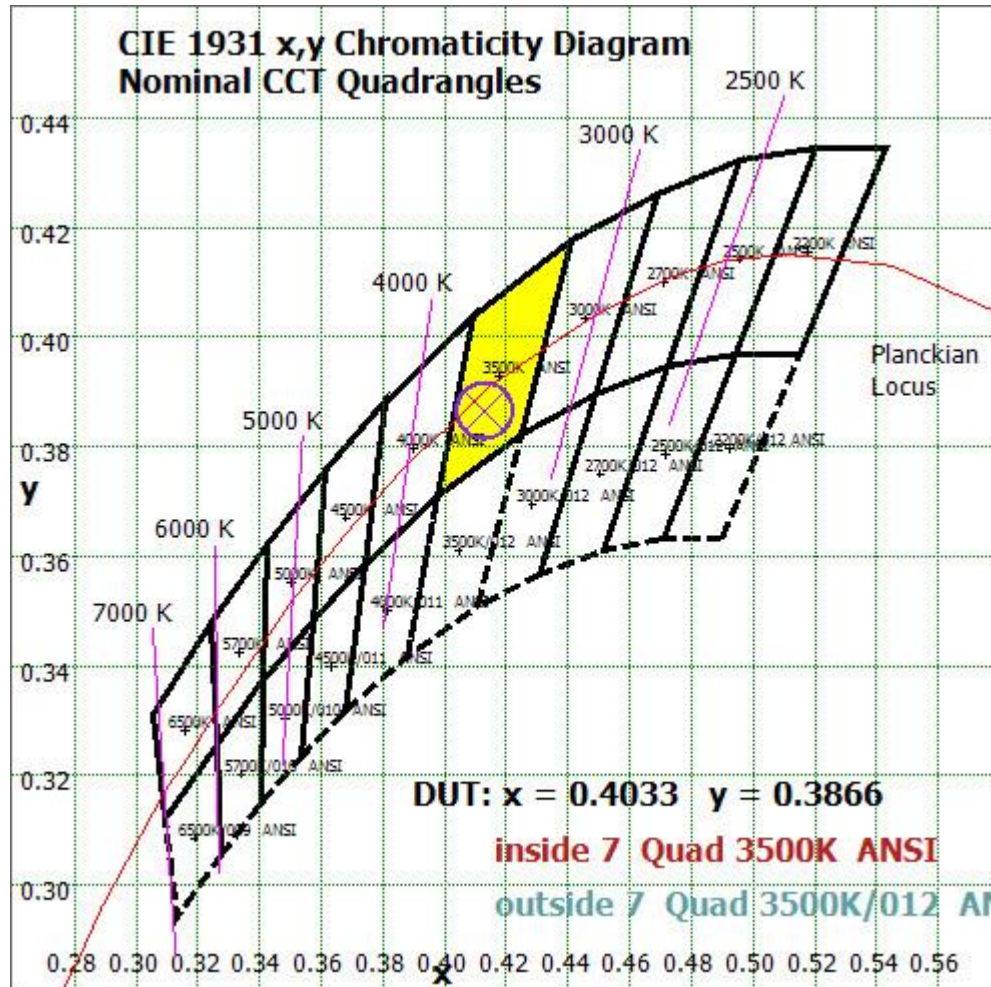


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram



Color Rendition Report – Sphere Spectroradiometer Method

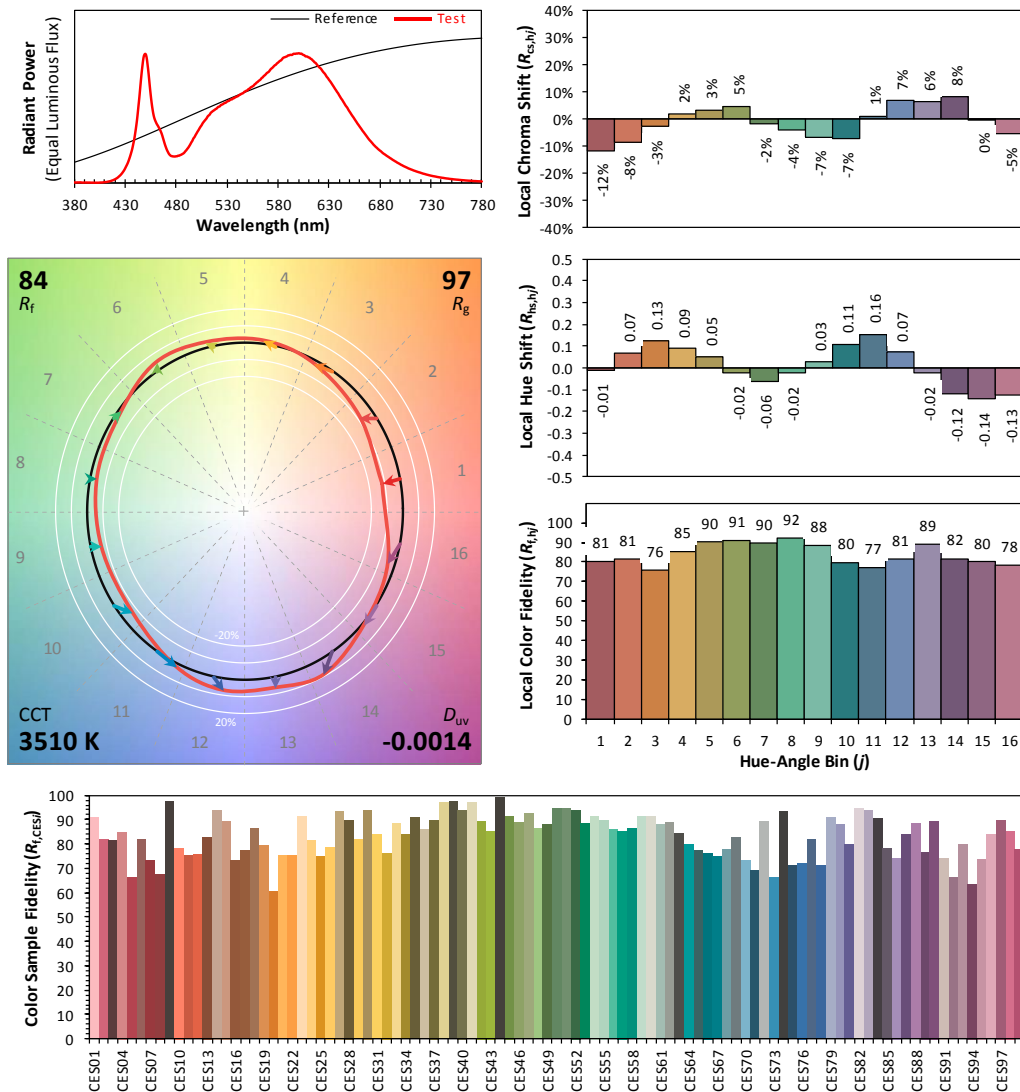
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: Industrial Lighting Products, LLC

Date: 2025/03/20

Model: ULB3-30L-U-35-L3



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4033
 y 0.3866
 u' 0.2361
 v' 0.5092

CIE 13.3-1995
(CRI)

R_a 83
 R_g 10

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 4: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 2 due to rounding.

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	214.115	4.27%
10- 20	612.438	12.20%
20- 30	922.82	18.39%
30- 40	1087.107	21.66%
40- 50	988.425	19.69%
50- 60	607.374	12.10%
60- 70	326.344	6.50%
70- 80	182.85	3.64%
80- 90	65.584	1.31%
90-100	0.954	0.02%
100-110	1.826	0.04%
110-120	1.661	0.03%
120-130	1.723	0.03%
130-140	1.837	0.04%
140-150	1.624	0.03%
150-160	1.145	0.02%
160-170	0.751	0.01%
170-180	0.235	0.00%
Total	5018.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4432.279	88.31%
60- 90	574.778	11.45%
0-90	5007.057	99.77%
90- 180	11.756	0.23%
0- 180	5018.8	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

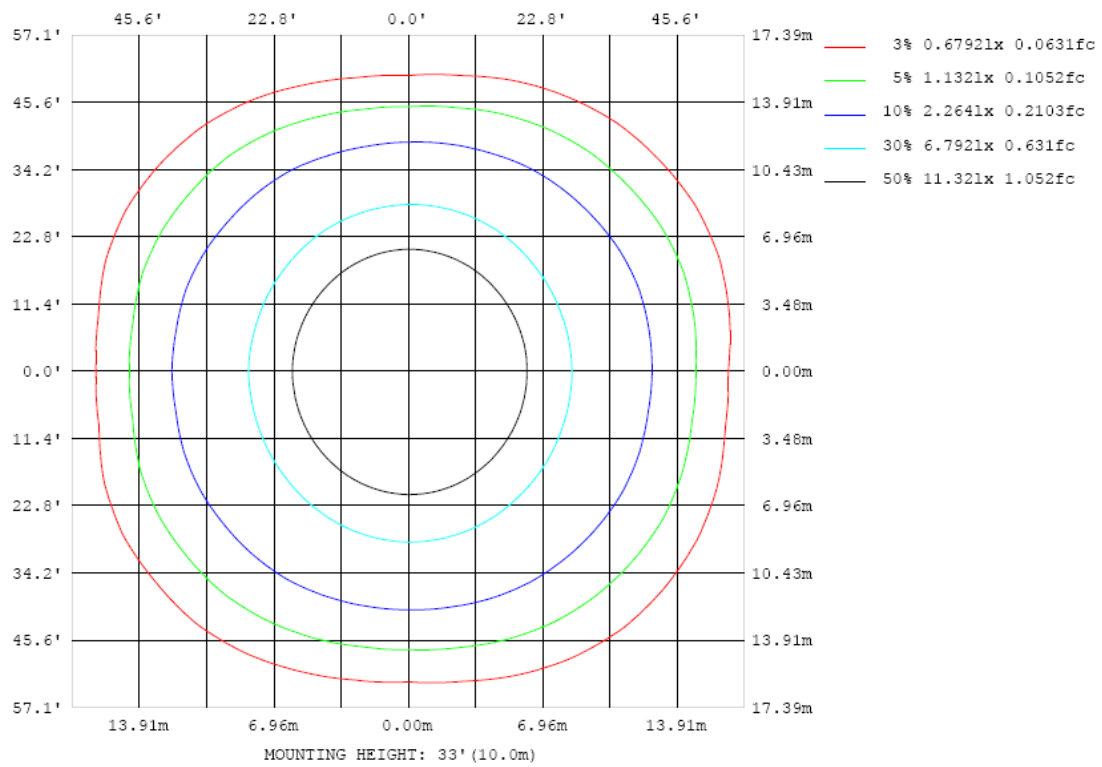


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

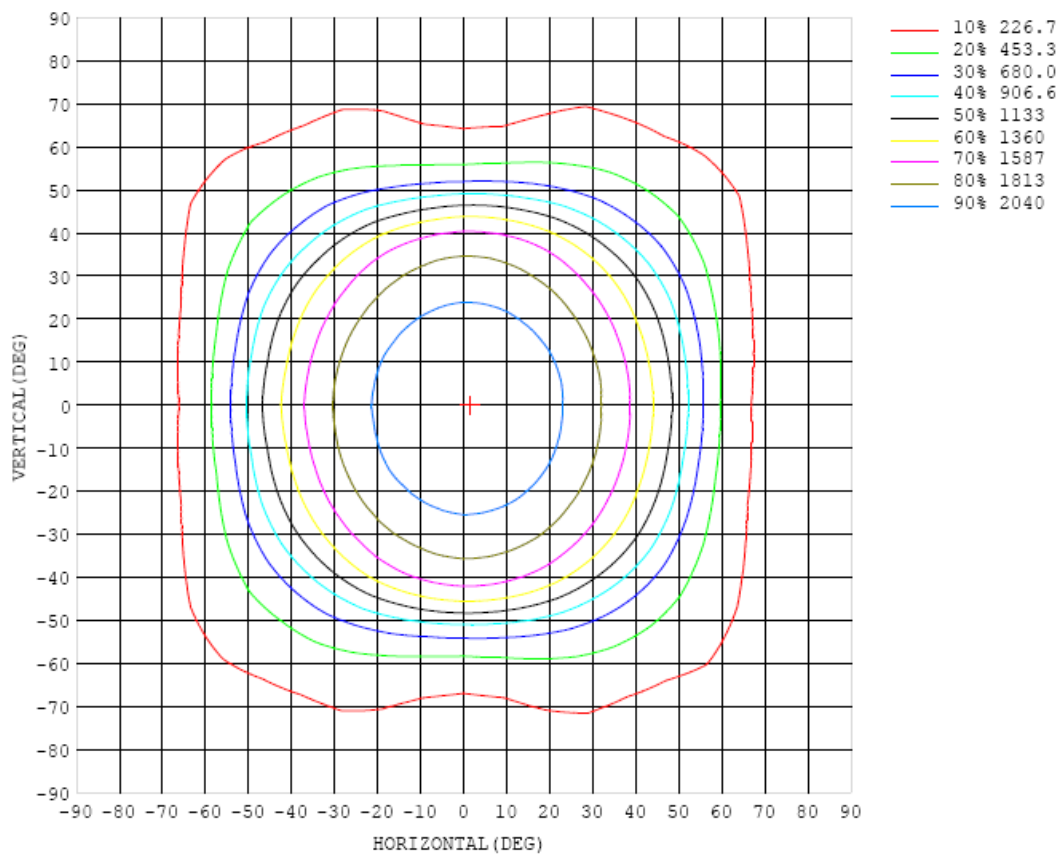


Chart 6: Isocandela Plot

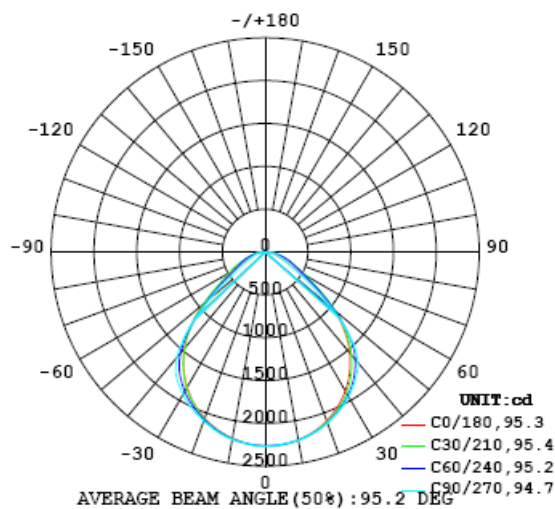


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

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	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263
5	2257	2254	2261	2262	2256	2262	2255	2257	2258	2253	2262	2255	2247	2257	2244	2250	2245	2250	2248
10	2226	2227	2232	2230	2232	2229	2225	2232	2230	2228	2227	2228	2217	2216	2211	2212	2210	2205	2211
15	2176	2172	2176	2182	2181	2190	2187	2189	2191	2186	2194	2183	2174	2173	2160	2155	2149	2151	2149
20	2099	2099	2106	2110	2113	2120	2121	2131	2129	2125	2123	2119	2103	2097	2083	2079	2065	2064	2068
25	1997	1997	2007	2018	2026	2034	2036	2047	2047	2045	2046	2031	2015	2008	1991	1980	1962	1957	1958
30	1872	1876	1889	1897	1906	1920	1933	1945	1954	1950	1946	1930	1908	1887	1861	1847	1833	1825	1826
35	1719	1723	1733	1746	1764	1790	1803	1822	1832	1829	1824	1801	1764	1743	1710	1688	1666	1658	1662
40	1538	1538	1546	1565	1587	1610	1639	1670	1685	1684	1672	1639	1599	1555	1512	1487	1463	1456	1466
45	1316	1311	1323	1342	1357	1375	1392	1406	1408	1403	1391	1367	1340	1307	1273	1254	1232	1215	1232
50	1043	1034	1057	1070	1062	1056	1050	1029	1002	983	988	996	1007	999	982	980	960	928	938
55	719	721	760	775	761	753	730	691	650	624	636	673	697	716	709	708	688	636	629
60	436	454	510	541	548	546	515	471	418	390	411	449	485	513	509	510	476	412	396
65	268	290	357	396	396	391	383	344	285	262	280	325	364	366	362	378	345	277	251
70	173	195	261	293	275	278	290	254	203	185	205	245	277	268	259	281	257	193	170
75	128	143	197	213	189	190	209	188	155	144	154	191	204	184	187	200	197	152	140
80	101	116	152	144	121	123	140	137	119	113	118	136	138	121	115	131	143	123	102
85	62.0	74.6	86.1	83.4	67.5	67.9	75.0	75.6	67.3	63.4	69.4	72.5	69.2	61.6	55.8	67.4	74.7	64.5	57.0
90	4.22	3.56	5.47	5.09	4.28	3.54	2.58	5.75	3.84	3.08	2.84	3.07	2.88	2.60	2.28	1.87	4.18	2.31	1.58
95	0.51	0.74	0.87	0.82	0.64	0.56	0.46	0.37	0.31	0.27	0.27	0.28	0.34	0.38	0.52	0.73	0.80	0.94	0.72
100	0.65	0.59	0.71	1.55	1.51	1.57	1.65	1.41	1.26	1.16	0.71	0.67	0.75	0.92	1.16	1.33	1.29	0.96	1.86
105	1.04	1.02	0.90	1.57	2.16	2.31	2.20	1.96	1.83	1.75	1.71	1.74	1.86	1.84	1.83	1.67	1.10	1.09	2.20
110	1.27	1.36	1.16	1.28	1.57	2.37	2.46	2.40	2.41	2.39	2.36	2.32	2.32	2.08	1.96	1.24	1.37	1.29	1.87
115	1.57	1.69	1.52	1.53	1.54	1.85	1.86	2.28	2.48	2.48	2.39	2.13	1.94	1.96	1.48	1.30	1.69	1.50	1.58
120	1.91	2.06	1.80	1.95	1.76	1.71	1.92	1.95	1.93	1.96	1.99	2.01	1.90	1.49	1.68	1.64	2.21	2.08	1.75
125	2.06	2.35	1.93	2.49	2.27	2.03	1.86	1.73	1.74	1.79	1.71	1.61	1.66	1.90	2.00	2.06	1.59	2.42	1.96
130	1.12	1.31	2.46	2.25	2.67	2.44	2.50	2.03	1.90	1.87	1.83	1.87	2.15	2.17	2.36	2.37	1.57	2.01	1.90
135	1.50	2.88	3.17	1.26	3.06	3.00	2.81	2.60	2.42	2.33	2.35	2.39	2.44	2.53	2.55	1.28	2.02	2.37	2.09
140	1.64	3.06	3.19	3.22	1.43	3.22	3.22	2.99	2.88	2.82	2.80	2.75	2.83	2.73	1.56	2.04	2.79	2.52	1.51
145	1.56	3.08	3.42	3.41	2.74	1.46	2.63	3.11	3.15	3.07	3.06	2.93	2.75	1.55	1.69	2.78	2.95	2.79	1.56
150	1.67	3.11	3.19	3.39	3.38	2.50	1.48	1.49	1.69	2.09	1.80	1.55	1.40	1.49	2.60	2.91	2.88	2.87	1.76
155	1.80	2.92	3.31	3.53	2.66	2.12	3.28	3.09	2.02	1.84	1.84	2.44	2.80	2.82	2.15	2.01	2.61	2.68	1.85
160	1.66	2.09	2.25	2.25	2.39	3.46	3.43	3.29	3.10	3.02	3.04	2.97	3.14	3.03	3.00	2.57	1.94	1.88	1.67
165	1.69	1.89	2.73	3.22	3.43	3.34	3.40	3.32	3.25	3.18	3.16	3.21	3.06	3.15	2.28	1.97	1.98	1.97	1.76
170	1.86	1.91	2.60	3.31	3.42	3.24	3.16	3.24	3.25	3.14	3.17	3.24	2.20	1.98	2.01	2.00	2.06	2.08	1.85
175	2.05	2.10	2.13	2.30	2.68	3.04	2.99	3.10	3.12	3.08	2.29	1.99	2.08	2.85	2.82	2.55	2.17	2.10	1.99
180	2.02	2.05	2.07	2.07	2.08	2.09	2.03	2.07	1.91	1.92	1.95	2.05	1.99	2.02	1.99	1.99	2.01	1.99	2.01

Table 6: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263	2263		
5	2247	2252	2255	2251	2252	2246	2254	2256	2252	2260	2260	2252	2258	2251	2257	2254	2256		
10	2208	2211	2211	2211	2217	2218	2222	2222	2222	2228	2227	2226	2229	2226	2229	2226	2230		
15	2149	2151	2156	2154	2159	2157	2165	2171	2170	2179	2176	2176	2176	2173	2174	2173	2175		
20	2064	2071	2073	2077	2084	2085	2093	2096	2099	2108	2108	2100	2107	2098	2105	2100	2100		
25	1958	1961	1967	1971	1979	1989	2007	2015	2017	2023	2018	2015	2006	2004	2003	1999	2004		
30	1820	1830	1836	1845	1867	1880	1898	1910	1917	1925	1922	1904	1903	1880	1878	1874	1876		
35	1656	1656	1668	1689	1710	1741	1772	1793	1801	1802	1789	1773	1752	1736	1727	1718	1724		
40	1453	1453	1468	1481	1510	1538	1565	1585	1600	1614	1606	1588	1574	1547	1537	1529	1536		
45	1211	1222	1224	1217	1222	1233	1229	1234	1257	1274	1286	1305	1301	1304	1311	1305	1308		
50	924	942	929	906	896	879	842	819	825	856	886	936	972	998	1032	1048	1042		
55	634	666	664	645	634	594	544	501	487	519	574	628	675	700	742	758	745		
60	417	468	489	473	451	415	373	331	313	338	395	438	480	502	523	517	482		
65	280	346	369	328	319	317	278	234	213	227	283	337	350	361	382	372	316		
70	193	256	263	232	231	245	221	175	155	165	209	254	255	250	274	275	209		
75	152	196	182	163	154	175	166	134	124	128	156	184	173	170	192	205	151		
80	119	137	120	95.0	95.1	109	110	99.2	90.5	94.6	109	121	110	101	130	150	120		
85	62.1	68.1	56.8	43.7	41.0	45.6	48.4	45.8	42.5	46.2	54.9	58.0	57.6	57.1	74.9	79.5	76.1		
90	3.68	3.94	0.54	0.83	0.58	0.38	0.26	0.19	0.19	0.20	0.23	0.27	0.32	0.55	0.91	1.15	1.08		
95	1.04	1.24	0.81	1.32	0.76	0.52	0.40	0.35	0.39	0.43	0.47	0.53	0.60	0.62	0.62	0.75	0.98		
100	1.88	2.09	1.61	2.13	2.06	1.91	1.56	1.43	1.68	1.75	1.93	2.12	2.12	1.58	1.48	1.13	0.62		
105	1.98	2.04	1.16	1.44	2.18	2.54	2.45	2.43	2.45	2.47	2.34	2.24	2.22	1.99	1.19	0.78	1.00		
110	1.33	1.81	1.13	1.55	1.41	1.64	1.61	1.72	1.88	1.88	1.87	2.02	1.67	1.34	1.32	1.00	1.27		
115	1.64	1.89	1.30	1.55	1.37	1.27	1.13	1.24	1.40	1.35	1.18	1.33	1.52	1.66	1.64	1.00	1.48		
120	2.06	1.60	1.28	1.83	1.80	1.47	1.39	1.38	1.37	1.45	1.58	1.66	1.86	1.91	1.91	1.20	1.82		
125	2.26	1.69	1.50	1.84	1.95	1.89	1.77	1.72	1.80	1.85	1.98	2.00	2.25	2.32	2.33	1.07	2.04		
130	2.16	1.99	1.44	2.31	2.03	2.05	2.03	2.08	2.10	2.13	2.22	2.67	2.55	2.64	2.61	2.13	1.35		
135	2.67	1.92	1.34	2.30	2.34	2.30	2.39	2.42	2.57	2.63	3.08	2.97	3.10	2.97	1.37	2.62	2.71		
140	2.29	2.52	2.42	1.56	2.49	2.68	2.79	2.80	2.97	3.14	3.39	3.39	3.21	1.58	2.56	2.68	2.81		
145	2.51	2.70	2.78	2.26	1.74	2.40	2.75	2.99	3.10	3.44	3.33	2.99	1.69	2.03	2.71	2.83	2.71		
150	2.67	2.60	2.73	2.55	2.05	1.75	1.83	2.01	2.06	1.96	1.75	1.66	1.99	2.69	2.85	2.89	2.85		
155	2.18	2.54	2.36	2.13	2.71	2.65	2.71	2.34	2.11	2.22	2.70	2.91	2.31	2.36	2.93	3.00	2.78		
160	1.74	2.04	2.34	2.43	2.78	3.09	2.82	2.99	2.89	2.97	3.01	3.07	3.06	2.77	2.43	2.16	2.20		
165	1.74	1.95	2.01	2.12	2.42	2.76	2.93	2.95	2.85	2.92	3.06	3.11	3.06	3.10	2.93	2.80	2.27		
170	1.85	1.93	2.06	2.06	2.01	2.02	2.26	2.86	2.82	2.81	2.83	2.78	2.78	2.76	2.88	2.79	2.59		
175	2.00	2.10	2.23	2.73	2.75	2.72	2.14	2.04	2.11	2.77	2.77	2.75	2.67	2.72	2.82	2.31	2.11		
180	2.01	2.05	2.07	2.07	2.07	2.08	2.06	2.04	1.93	1.90	1.89	2.01	2.02	2.03	2.02	2.01	2.02		

Table 7: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Feb. 05, 2025	-
Digital Power Meter	PF2010A	HZTE028-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	DPS1060	HZTE001-06	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	WY12010	HZTE004-03	Aug. 08, 2024	Aug. 07, 2025
Temperature recorder	JM624U	HZTE018-08	Aug. 08, 2024	Aug. 07, 2025
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 08, 2024	Aug. 07, 2025
Standard source	D908	HZTE012-01	Aug. 14, 2018	-
Integrate Sphere system	3M	HZTE015-04	Dec. 10, 2024	-
Digital Power Meter	WT210	HZTE008-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	PCR 500L	HZTE001-07	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	IT6154	HZTE004-04	Aug. 08, 2024	Aug. 07, 2025
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 08, 2024	Aug. 07, 2025
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2024	Aug. 07, 2025

Table 8: 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.

Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and 3 Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is 4π . Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. 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 LED Tubes) 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 20 min, taken 10 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expanded uncertainty is 2.1% with a coverage factor $k=2$.

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 LED Tubes) 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 20 min, taken 10 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 expanded uncertainty is 2.3% 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.

*** End of Report ***

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