

LM-79-19 TEST REPORT

for

RAB Lighting Inc

408 W 14th St, New York, NY 10014 United States

LED Panel Light

Model: SWISH[blank,AIR]2X4[blank,/PIR,/LCBS,/MVS,/LCBS/MVS][blank,/E]

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ25070031i

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

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Aug. 13, 2025



Approved by:

April Zou

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Aug. 13, 2025

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

TEST SUMMARY

Tested Model	SWISH2X4 44W 3500K Setting	SWISH2X4 44W 4000K Setting	SWISH2X4 44W 5000K Setting
Luminous Efficacy (Lumens /Watt)	137.8	147.0	138.7
Total Luminous Flux (Lumens)	5858.9	6047.5	5882.6
Power (Watts)	42.52	41.15	42.42
Power Factor	0.9963	0.9987	0.9960
CCT (K)	3373	3993	4781
CRI	82.0	83.4	82.4
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins
Note	3500K	4000K	5000K

Table 1: Executive Data Summary

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

Test specifications:

Date of Receipt	: Jul. 28, 2025
Date of Test	: Aug. 06, 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 for the Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

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SAMPLE PHOTO

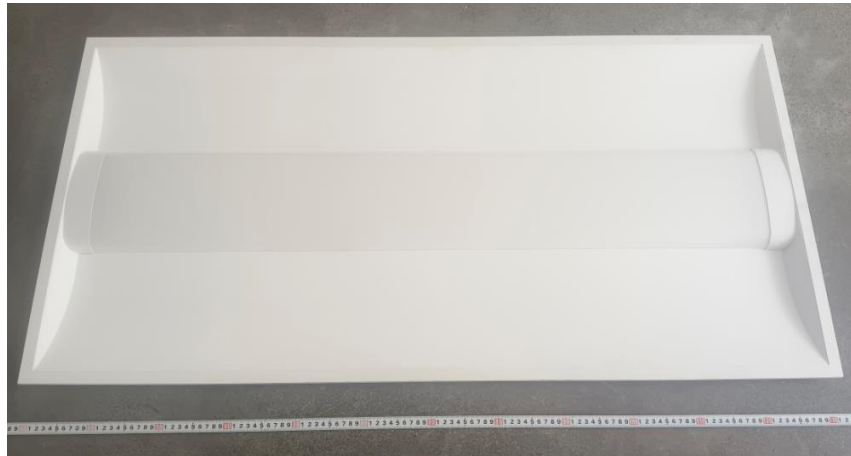


Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Panel Light
Model	: SWISH2X4
Electrical Ratings	: 120-277V, 50/60Hz
Product Description	: Field-Adjustable 26W/35W/44W Color- Tunable 3500K/4000K/5000K
Manufacturer	: RAB Lighting Inc
Address	: 408 W 14th St, New York, NY 10014 United States

TEST RESULTS (44W 3500K Setting)

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)	0.355	0.155
Power Factor	0.9963	0.9649
Test Power (W)	42.52	41.36
THD A%	7.38	13.62
Luminous Efficacy (lm/W)	137.8	139.8
Total Luminous Flux (lm)	5858.9	5784.1
Color Rendering Index (CRI)	82.0	
R9	5.6	
Correlated Color Temperature (CCT)(K)	3373	
Chromaticity Chroma x	0.4141	
Chromaticity Chroma y	0.3984	
Chromaticity Chroma u	0.2383	
Chromaticity Chroma v	0.3438	
Duv	0.0015	
Chromaticity Chroma u'	0.2383	
Chromaticity Chroma v'	0.5157	

Special Color Rendering Indices	
R1	79.9
R2	89
R3	96.2
R4	80.3
R5	79.8
R6	85.4
R7	84.6
R8	60.9
R9	5.6
R10	74.4
R11	79.1
R12	62.8
R13	82
R14	98.1

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 25.1 °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)	0.355
Power Factor	0.9961
Power (W)	42.53
Luminous Efficacy (lm/W)	138.1
Total Luminous Flux (lm)	5871.7
Beam Angle (°)	118.4 (0°-180°) / 121.7 (90°-270°)
Center Beam Candle Power (cd)	1865
Maximum Beam Candle Power (cd)	1867 (At: C=320.0, Gamma=2.0)
Spacing Criteria	1.27 (0°-180°) / 1.29 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	74.85%
Zonal Lumens in the 60 °-90 °Zone	25.07%
Zonal Lumens in the 90 °-120 °Zone	0.03%
Zonal Lumens in the 120 °-180 °Zone	0.05%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

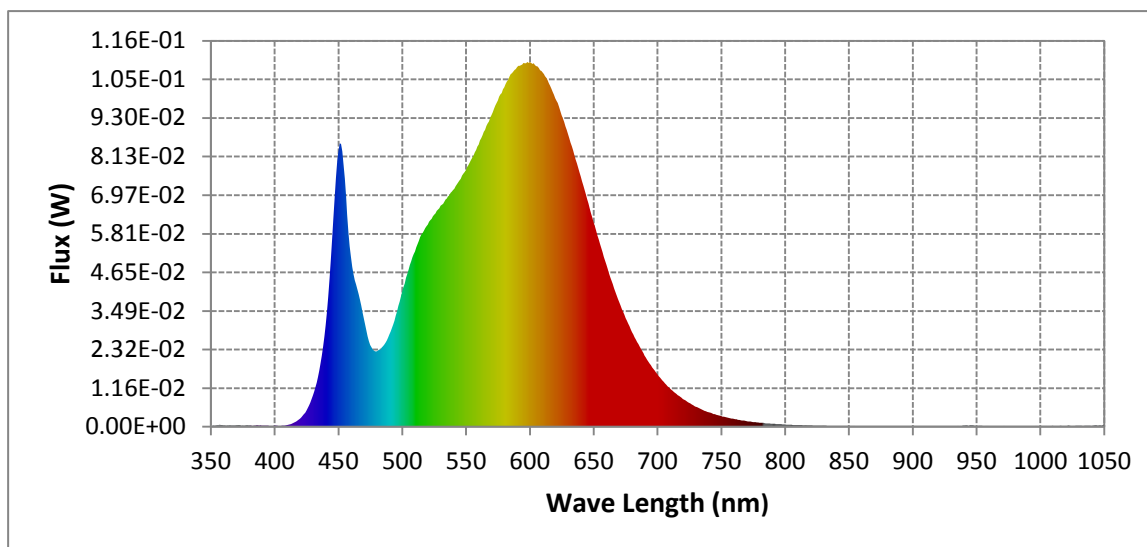
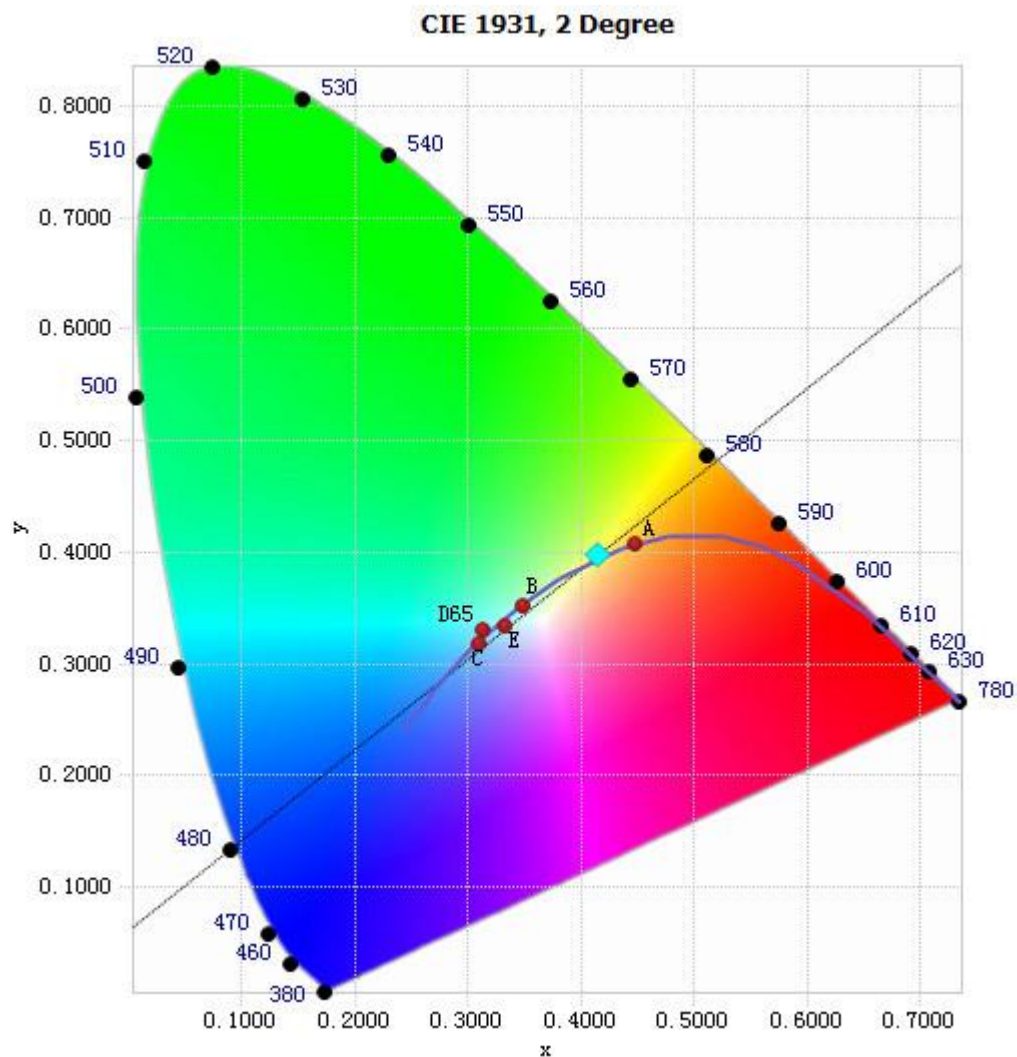


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	4.39E-04	485	2.42E-02	590	1.08E-01	695	1.85E-02
385	3.51E-04	490	2.78E-02	595	1.09E-01	700	1.58E-02
390	3.34E-04	495	3.35E-02	600	1.10E-01	705	1.35E-02
395	3.10E-04	500	4.07E-02	605	1.09E-01	710	1.16E-02
400	3.03E-04	505	4.72E-02	610	1.07E-01	715	9.83E-03
405	2.76E-04	510	5.27E-02	615	1.03E-01	720	8.35E-03
410	5.17E-04	515	5.79E-02	620	9.89E-02	725	7.18E-03
415	1.20E-03	520	6.09E-02	625	9.38E-02	730	6.06E-03
420	2.47E-03	525	6.39E-02	630	8.81E-02	735	5.17E-03
425	4.86E-03	530	6.66E-02	635	8.18E-02	740	4.41E-03
430	9.36E-03	535	6.86E-02	640	7.53E-02	745	3.78E-03
435	1.69E-02	540	7.13E-02	645	6.84E-02	750	3.18E-03
440	3.06E-02	545	7.42E-02	650	6.15E-02	755	2.72E-03
445	5.62E-02	550	7.72E-02	655	5.50E-02	760	2.33E-03
450	8.31E-02	555	8.10E-02	660	4.88E-02	765	1.98E-03
455	7.46E-02	560	8.49E-02	665	4.29E-02	770	1.69E-03
460	5.11E-02	565	8.93E-02	670	3.75E-02	775	1.44E-03
465	4.14E-02	570	9.38E-02	675	3.27E-02	780	1.25E-03
470	3.27E-02	575	9.82E-02	680	2.85E-02		
475	2.46E-02	580	1.02E-01	685	2.49E-02		
480	2.27E-02	585	1.06E-01	690	2.14E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4141, 0.3984)

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

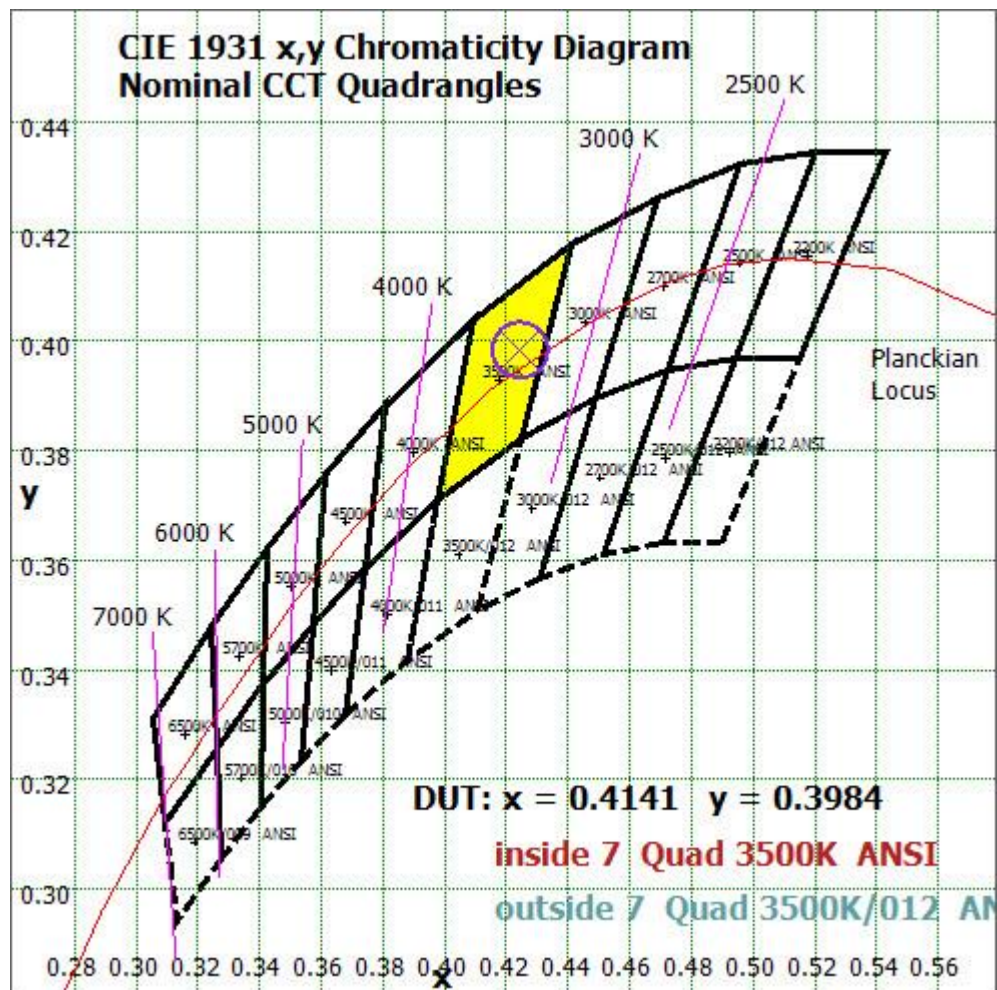


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

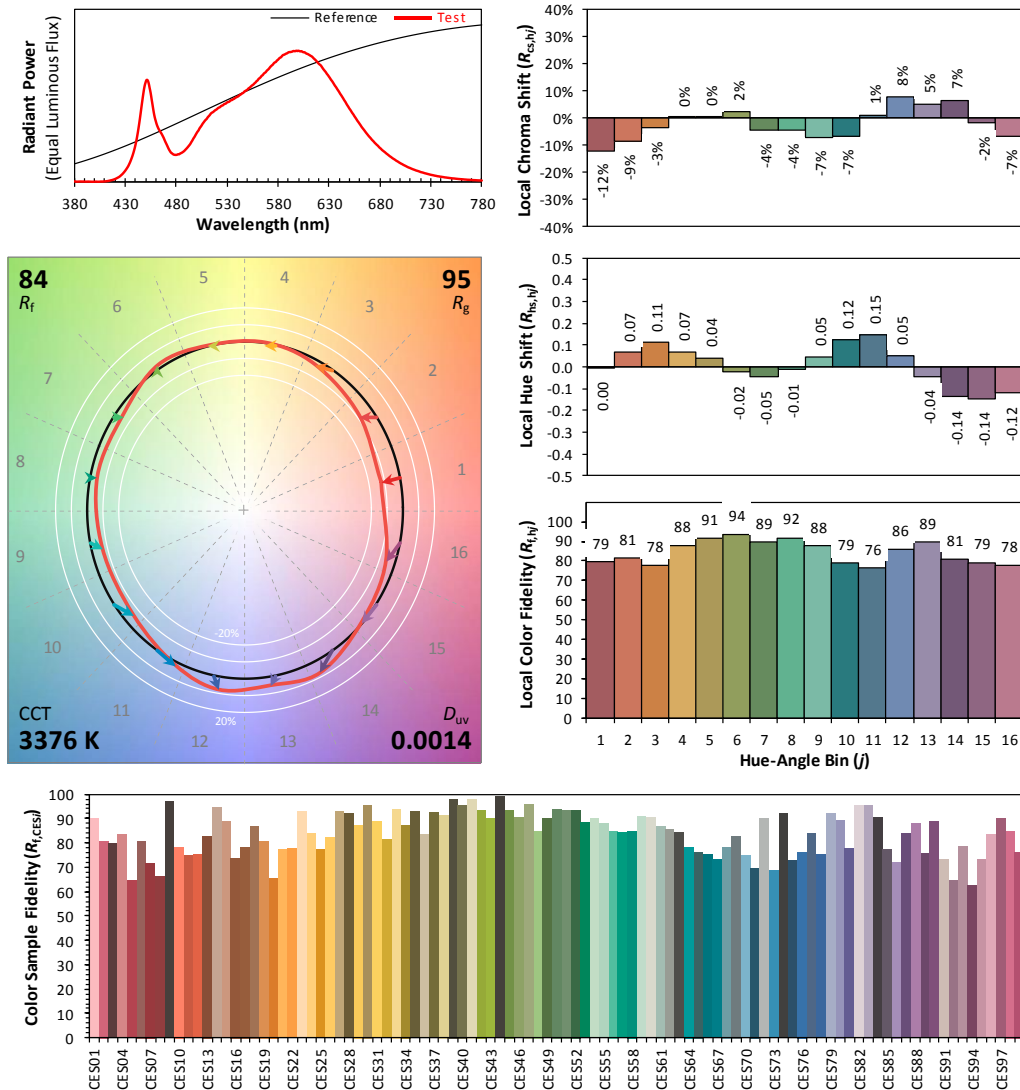
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: RAB Lighting Inc

Date: 2025/08/06

Model: SWISH2X4



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

x 0.4141
 y 0.3984
 u' 0.2383
 v' 0.5157

CIE 13.3-1995
(CRI)
 R_a 82
 R_9 6

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	176.618	3.01%
10- 20	508.371	8.66%
20- 30	778.696	13.26%
30- 40	955.642	16.28%
40- 50	1017.753	17.33%
50- 60	957.672	16.31%
60- 70	781.86	13.32%
70- 80	514.159	8.76%
80- 90	175.813	2.99%
90-100	0.631	0.01%
100-110	0.683	0.01%
110-120	0.7	0.01%
120-130	0.714	0.01%
130-140	0.738	0.01%
140-150	0.649	0.01%
150-160	0.51	0.01%
160-170	0.341	0.01%
170-180	0.13	0.00%
Total	5871.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4394.752	74.85%
60- 90	1471.832	25.07%
0-90	5866.584	99.91%
90- 180	5.096	0.09%
0- 180	5871.7	100%

Table 5: Zonal Lumen

UGR Table (Corrected) - Goniophotometer Method

Reflectances											
Ceiling Cavity		70	70	50	50	30	70	70	50	50	30
Walls		50	30	50	30	30	50	30	50	30	30
Floor Cavity		20	20	20	20	20	20	20	20	20	20
Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	15.7	17.4	16.0	17.7	18.0	15.6	17.3	16.0	17.6	17.9
	3H	17.6	19.1	18.0	19.5	19.8	17.8	19.4	18.2	19.7	20.1
	4H	18.3	19.8	18.7	20.1	20.5	18.8	20.3	19.2	20.6	21.0
	6H	18.8	20.2	19.3	20.6	20.9	19.7	21.1	20.1	21.4	21.8
	8H	19.0	20.3	19.4	20.7	21.1	20.1	21.4	20.5	21.8	22.2
	12H	19.1	20.3	19.5	20.7	21.1	20.4	21.6	20.8	22.0	22.4
4H	2H	16.4	17.9	16.8	18.2	18.6	16.3	17.8	16.7	18.1	18.5
	3H	18.6	19.8	19.0	20.2	20.6	18.8	20.0	19.2	20.4	20.8
	4H	19.5	20.6	19.9	21.0	21.4	20.0	21.1	20.4	21.5	21.9
	6H	20.1	21.1	20.6	21.6	22.0	21.0	22.0	21.5	22.4	22.9
	8H	20.3	21.3	20.8	21.7	22.2	21.5	22.4	21.9	22.8	23.3
	12H	20.5	21.3	21.0	21.8	22.2	21.8	22.6	22.3	23.1	23.6
8H	4H	20.0	20.9	20.4	21.3	21.8	20.3	21.3	20.8	21.7	22.2
	6H	20.8	21.6	21.3	22.1	22.6	21.6	22.4	22.1	22.9	23.4
	8H	21.1	21.8	21.6	22.3	22.8	22.2	22.9	22.7	23.4	23.9
	12H	21.3	21.9	21.8	22.4	23.0	22.6	23.3	23.1	23.7	24.3
12H	4H	20.1	20.9	20.6	21.4	21.9	20.4	21.2	20.9	21.7	22.2
	6H	21.0	21.7	21.5	22.2	22.7	21.7	22.4	22.2	22.9	23.4
	8H	21.4	22.0	21.9	22.5	23.0	22.4	23.0	22.9	23.5	24.0

Chart 5: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

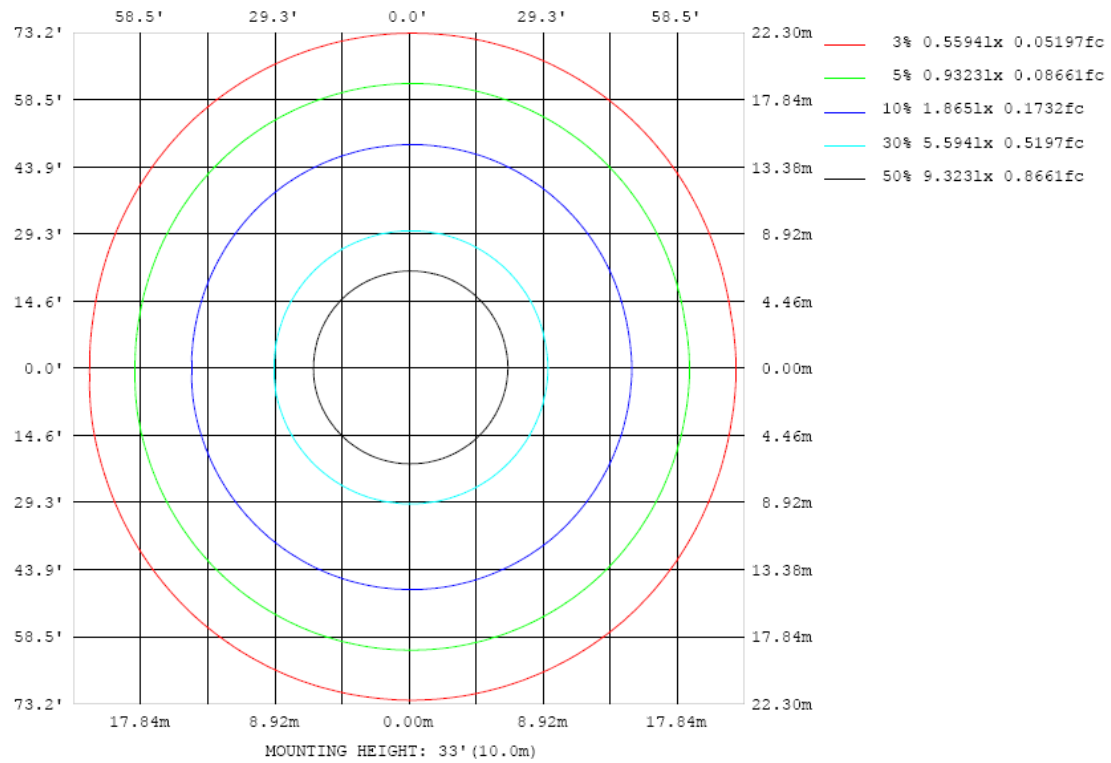


Chart 6: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

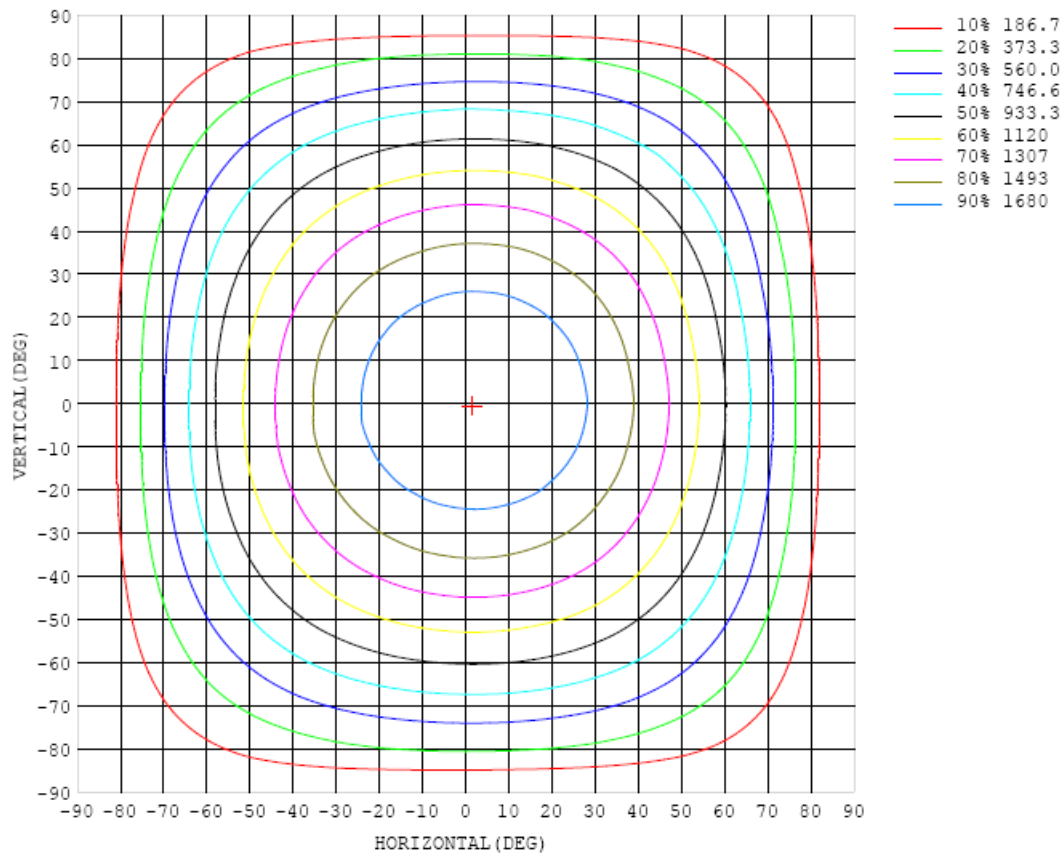


Chart 7: Isocandela Plot

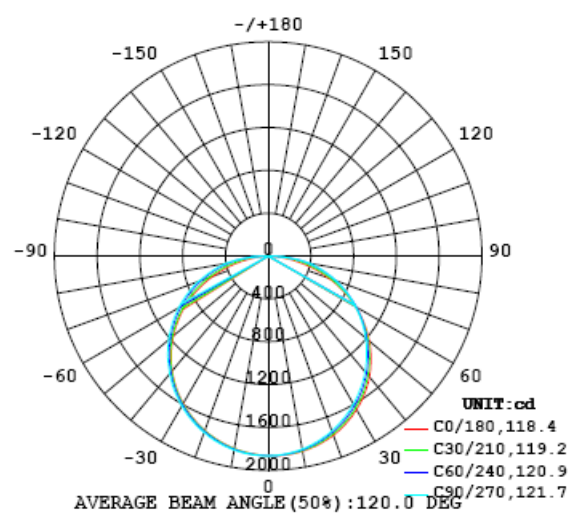


Chart 8: Polar Candela Distribution

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	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865
5	1863	1863	1862	1861	1860	1861	1858	1857	1857	1854	1854	1854	1852	1852	1851	1852	1852	1853	1850
10	1850	1847	1846	1844	1843	1841	1837	1833	1832	1829	1826	1827	1825	1827	1826	1825	1825	1826	1826
15	1822	1819	1817	1812	1809	1806	1801	1797	1794	1790	1786	1787	1785	1785	1786	1786	1787	1788	1786
20	1781	1776	1773	1767	1763	1758	1751	1746	1743	1738	1734	1731	1730	1732	1731	1733	1733	1736	1733
25	1724	1719	1716	1709	1702	1696	1688	1681	1676	1670	1669	1666	1663	1664	1665	1667	1668	1670	1670
30	1654	1648	1643	1635	1630	1623	1614	1605	1601	1595	1591	1588	1586	1588	1588	1589	1592	1594	1590
35	1571	1565	1561	1553	1543	1534	1528	1518	1513	1507	1502	1500	1498	1499	1499	1501	1503	1506	1501
40	1472	1465	1460	1452	1446	1439	1430	1421	1415	1409	1405	1403	1399	1400	1399	1400	1402	1405	1401
45	1361	1354	1349	1341	1335	1330	1321	1314	1309	1304	1299	1295	1292	1292	1290	1290	1291	1292	1285
50	1235	1228	1224	1220	1215	1212	1205	1200	1195	1191	1185	1181	1175	1174	1171	1169	1168	1168	1160
55	1094	1090	1088	1086	1085	1086	1082	1078	1075	1070	1064	1061	1055	1049	1043	1039	1034	1033	1022
60	943	939	941	943	947	951	951	949	947	943	938	933	927	918	909	900	892	887	876
65	778	776	782	791	802	810	813	814	815	812	807	802	793	783	769	755	742	732	716
70	605	606	617	634	651	665	672	675	677	675	671	665	655	643	625	605	585	571	552
75	426	431	450	474	498	516	526	531	534	534	530	524	514	500	479	454	427	406	382
80	250	260	286	317	344	365	381	389	393	393	390	385	373	356	332	304	271	244	217
85	94.3	106	133	159	175	183	185	183	182	182	185	191	195	192	182	160	132	103	76.8
90	0.59	0.42	0.00	0.00	0.00	0.65	0.69	0.71	0.72	0.73	0.72	0.72	0.20	0.00	8.23	6.42	4.10	1.77	3.82
95	0.68	0.68	0.68	0.70	0.74	0.77	0.81	0.83	0.84	0.83	0.83	0.81	0.79	0.77	0.73	0.70	0.67	0.68	0.28
100	0.85	0.82	0.78	0.79	0.81	0.85	0.89	0.92	0.92	0.91	0.91	0.91	0.89	0.86	0.83	0.81	0.79	0.83	0.39
105	0.95	0.90	0.89	0.84	0.85	0.90	0.95	0.99	0.97	0.96	0.97	0.97	0.96	0.93	0.90	0.88	0.89	0.92	0.48
110	0.95	0.90	0.90	0.84	0.83	0.87	0.93	0.97	0.96	0.95	0.96	0.97	0.96	0.94	0.91	0.89	0.93	0.93	0.57
115	0.93	0.88	0.87	0.85	0.80	0.81	0.86	0.90	0.89	0.88	0.90	0.92	0.92	0.91	0.88	0.91	0.91	0.92	0.65
120	0.97	0.91	0.88	0.88	0.83	0.78	0.81	0.85	0.84	0.83	0.86	0.87	0.88	0.88	0.89	0.91	0.90	0.95	0.74
125	1.05	1.00	0.96	0.96	0.90	0.86	0.84	0.83	0.84	0.83	0.85	0.88	0.89	0.94	0.93	0.95	0.96	1.02	0.82
130	1.11	1.04	1.03	1.02	1.00	0.99	0.92	0.93	0.98	0.98	0.95	0.99	0.97	1.05	1.04	0.99	1.03	1.05	0.88
135	1.19	1.11	1.12	1.16	1.12	1.12	1.12	1.10	1.15	1.16	1.11	1.18	1.20	1.19	1.17	1.15	1.13	1.15	0.94
140	1.19	1.20	1.18	1.21	1.21	1.18	1.23	1.21	1.32	1.35	1.29	1.29	1.31	1.23	1.19	1.19	1.17	1.23	0.95
145	1.23	1.25	1.17	1.26	1.27	1.27	1.22	1.24	1.37	1.43	1.38	1.29	1.23	1.24	1.20	1.19	1.09	1.23	0.99
150	1.29	1.29	1.25	1.27	1.31	1.29	1.25	1.27	1.33	1.35	1.24	1.22	1.23	1.24	1.18	1.16	1.23	1.30	1.05
155	1.32	1.32	1.33	1.22	1.30	1.27	1.20	1.20	1.19	1.18	1.18	1.19	1.18	1.18	1.18	1.16	1.31	1.34	1.13
160	1.38	1.37	1.38	1.34	1.25	1.28	1.20	1.10	1.17	1.16	1.17	1.14	1.14	1.15	1.15	1.31	1.37	1.39	1.23
165	1.36	1.37	1.38	1.38	1.39	1.34	1.23	1.13	1.11	1.12	1.10	1.05	1.05	1.12	1.24	1.33	1.35	1.36	1.31
170	1.40	1.42	1.46	1.48	1.49	1.50	1.48	1.36	1.26	1.24	1.24	1.23	1.21	1.25	1.31	1.36	1.39	1.40	1.37
175	1.43	1.45	1.50	1.53	1.53	1.54	1.53	1.46	1.36	1.36	1.38	1.44	1.36	1.27	1.28	1.36	1.39	1.38	1.40
180	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38

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	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865	1865		
5	1852	1853	1854	1855	1856	1858	1859	1858	1859	1861	1861	1861	1863	1863	1863	1863	1862		
10	1825	1827	1828	1830	1833	1833	1835	1837	1837	1841	1843	1844	1848	1847	1848	1849	1849		
15	1785	1789	1790	1792	1795	1795	1796	1802	1804	1806	1810	1812	1816	1817	1819	1819	1820		
20	1735	1737	1738	1740	1744	1746	1749	1750	1755	1760	1763	1766	1769	1773	1775	1776	1776		
25	1670	1672	1674	1676	1679	1680	1685	1689	1693	1698	1702	1706	1712	1715	1718	1719	1719		
30	1593	1595	1598	1599	1603	1605	1608	1615	1616	1622	1630	1634	1641	1644	1647	1648	1648		
35	1501	1506	1508	1511	1515	1517	1521	1526	1531	1538	1543	1548	1555	1557	1563	1564	1564		
40	1401	1404	1407	1412	1415	1418	1423	1428	1435	1441	1447	1453	1459	1462	1466	1466	1466		
45	1288	1291	1296	1301	1306	1311	1316	1324	1331	1335	1342	1346	1350	1352	1356	1354	1353		
50	1162	1168	1173	1180	1189	1194	1202	1209	1216	1221	1226	1231	1232	1232	1233	1230	1226		
55	1026	1033	1041	1052	1063	1073	1081	1089	1096	1099	1106	1105	1106	1102	1098	1093	1086		
60	878	889	901	915	930	942	952	961	968	972	976	974	971	963	955	944	934		
65	721	737	753	773	791	806	817	828	835	838	840	836	829	817	802	786	771		
70	557	575	599	624	647	664	676	686	694	695	695	691	681	663	642	617	598		
75	391	414	445	475	500	518	532	543	549	552	550	543	530	509	481	448	422		
80	227	257	292	324	352	374	390	400	406	408	405	394	377	351	321	284	250		
85	88.1	117	147	171	185	194	197	198	200	203	208	209	203	188	162	130	98.1		
90	3.23	1.22	1.83	2.08	1.77	1.41	1.34	1.68	1.96	2.41	3.15	3.94	4.43	4.66	4.98	2.06	3.21		
95	0.25	0.24	0.24	0.26	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.27	0.26	0.25	0.24	0.23	0.24		
100	0.35	0.29	0.29	0.30	0.31	0.33	0.33	0.33	0.32	0.33	0.33	0.33	0.31	0.30	0.29	0.29	0.33		
105	0.44	0.39	0.34	0.35	0.36	0.38	0.39	0.38	0.37	0.38	0.39	0.39	0.37	0.35	0.35	0.37	0.42		
110	0.52	0.48	0.43	0.41	0.42	0.43	0.44	0.42	0.41	0.43	0.44	0.44	0.42	0.41	0.43	0.47	0.49		
115	0.59	0.55	0.52	0.49	0.49	0.49	0.50	0.47	0.47	0.49	0.51	0.51	0.50	0.51	0.53	0.56	0.57		
120	0.68	0.59	0.61	0.57	0.57	0.58	0.56	0.56	0.55	0.57	0.60	0.60	0.59	0.60	0.61	0.65	0.65		
125	0.76	0.68	0.68	0.65	0.61	0.66	0.64	0.63	0.62	0.64	0.66	0.66	0.66	0.63	0.73	0.69	0.73		
130	0.79	0.76	0.68	0.73	0.74	0.67	0.69	0.70	0.71	0.71	0.71	0.65	0.72	0.77	0.72	0.79	0.81		
135	0.89	0.83	0.80	0.70	0.79	0.81	0.78	0.69	0.69	0.68	0.73	0.77	0.78	0.73	0.85	0.84	0.82		
140	0.94	0.84	0.82	0.77	0.71	0.79	0.79	0.78	0.81	0.78	0.74	0.76	0.68	0.76	0.84	0.83	0.84		
145	1.00	0.82	0.87	0.84	0.81	0.75	0.70	0.69	0.74	0.69	0.62	0.66	0.78	0.82	0.85	0.86	0.95		
150	1.07	0.98	0.96	0.91	0.90	0.86	0.83	0.83	0.81	0.81	0.77	0.79	0.84	0.88	0.89	0.83	1.03		
155	1.13	1.13	0.97	0.99	0.93	0.91	0.90	0.90	0.87	0.86	0.85	0.84	0.92	0.96	0.91	1.00	1.11		
160	1.21	1.22	1.15	1.02	0.95	0.94	0.94	0.93	0.88	0.88	0.87	0.91	1.00	0.98	1.05	1.16	1.21		
165	1.33	1.33	1.33	1.29	1.17	1.04	0.96	0.95	0.93	0.95	0.94	1.00	1.10	1.21	1.28	1.31	1.31		
170	1.38	1.39	1.39	1.38	1.32	1.18	1.07	1.09	1.05	1.05	1.08	1.19	1.28	1.30	1.32	1.33	1.36		
175	1.47	1.51	1.53	1.55	1.55	1.47	1.40	1.45	1.32	1.25	1.23	1.29	1.33	1.33	1.36	1.39	1.42		
180	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38		

Table 7: Luminous Intensity Data

TEST RESULTS (44W 4000K Setting)

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)	0.343	0.150
Power Factor	0.9987	0.9631
Test Power (W)	41.15	40.08
THD A%	7.60	13.12
Luminous Efficacy (lm/W)	147.0	148.8
Total Luminous Flux (lm)	6047.5	5965.4
Color Rendering Index (CRI)	83.4	
R9	11.3	
Correlated Color Temperature (CCT)(K)	3993	
Chromaticity Chroma x	0.3814	
Chromaticity Chroma y	0.3797	
Chromaticity Chroma u	0.2246	
Chromaticity Chroma v	0.3353	
Duv	0.0011	
Chromaticity Chroma u'	0.2246	
Chromaticity Chroma v'	0.5030	

Special Color Rendering Indices	
R1	81.6
R2	89.5
R3	95.1
R4	81.9
R5	81.5
R6	85.2
R7	86.5
R8	65.5
R9	11.3
R10	75
R11	80.9
R12	59.9
R13	83.7
R14	97.5

Table 8: 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 25.1 °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)	0.344
Power Factor	0.9959
Power (W)	41.17
Luminous Efficacy (lm/W)	147.2
Total Luminous Flux (lm)	6061.4
Beam Angle (°)	118.3 (0°-180°) / 121.8 (90°-270°)
Center Beam Candle Power (cd)	1925
Maximum Beam Candle Power (cd)	1927 (At: C=340.0, Gamma=0.5)
Spacing Criteria	1.26 (0°-180°) / 1.30 (90°-270°)
Zonal Lumens in the 0°-60° Zone	74.82%
Zonal Lumens in the 60°-90° Zone	25.09%
Zonal Lumens in the 90°-120° Zone	0.03%
Zonal Lumens in the 120°-180° Zone	0.05%

Table 9: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

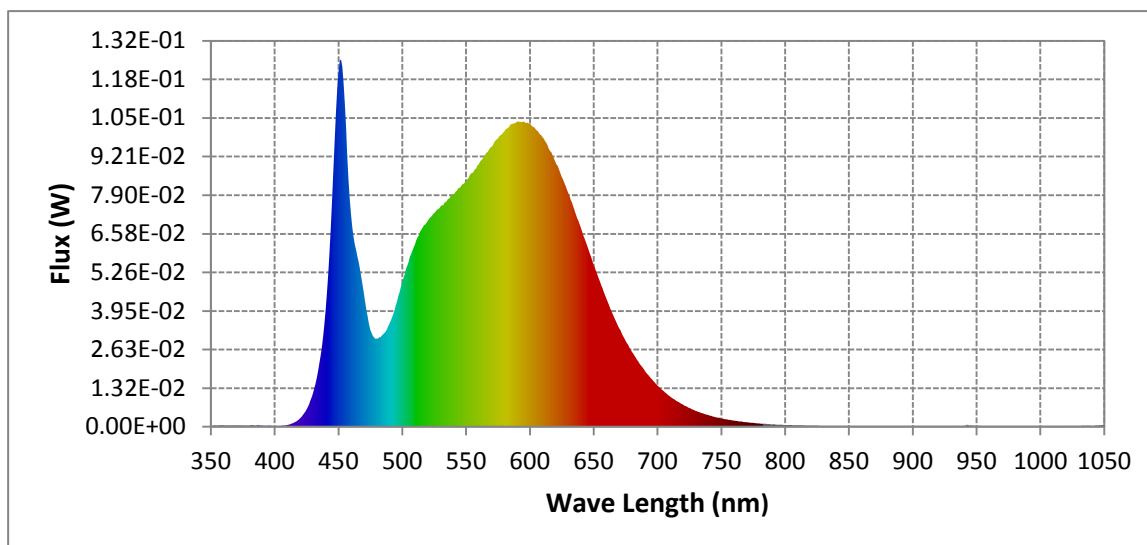


Chart 9: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.82E-04	485	3.15E-02	590	1.04E-01	695	1.65E-02
385	3.69E-04	490	3.50E-02	595	1.04E-01	700	1.41E-02
390	4.23E-04	495	4.14E-02	600	1.03E-01	705	1.22E-02
395	3.74E-04	500	4.92E-02	605	1.01E-01	710	1.04E-02
400	2.96E-04	505	5.62E-02	610	9.85E-02	715	8.82E-03
405	3.06E-04	510	6.21E-02	615	9.48E-02	720	7.61E-03
410	6.03E-04	515	6.71E-02	620	9.04E-02	725	6.40E-03
415	1.36E-03	520	7.02E-02	625	8.53E-02	730	5.45E-03
420	2.92E-03	525	7.28E-02	630	8.00E-02	735	4.62E-03
425	5.80E-03	530	7.52E-02	635	7.39E-02	740	3.96E-03
430	1.13E-02	535	7.69E-02	640	6.79E-02	745	3.37E-03
435	2.14E-02	540	7.92E-02	645	6.17E-02	750	2.82E-03
440	3.99E-02	545	8.15E-02	650	5.52E-02	755	2.45E-03
445	7.72E-02	550	8.35E-02	655	4.94E-02	760	2.10E-03
450	1.21E-01	555	8.65E-02	660	4.37E-02	765	1.78E-03
455	1.10E-01	560	8.94E-02	665	3.84E-02	770	1.55E-03
460	7.27E-02	565	9.26E-02	670	3.36E-02	775	1.32E-03
465	5.81E-02	570	9.55E-02	675	2.93E-02	780	1.12E-03
470	4.58E-02	575	9.83E-02	680	2.55E-02		
475	3.33E-02	580	1.01E-01	685	2.22E-02		
480	3.01E-02	585	1.03E-01	690	1.93E-02		

Table10: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method

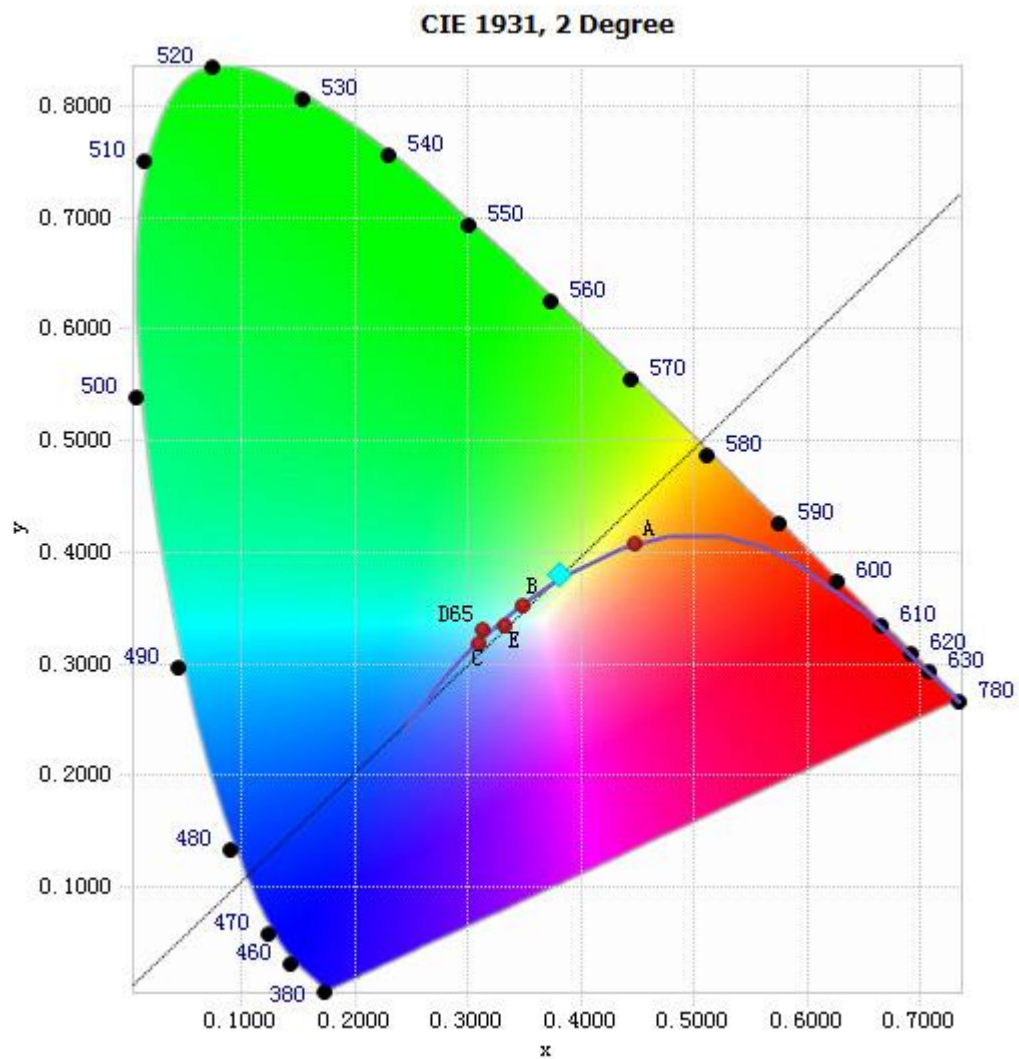


Chart 10: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

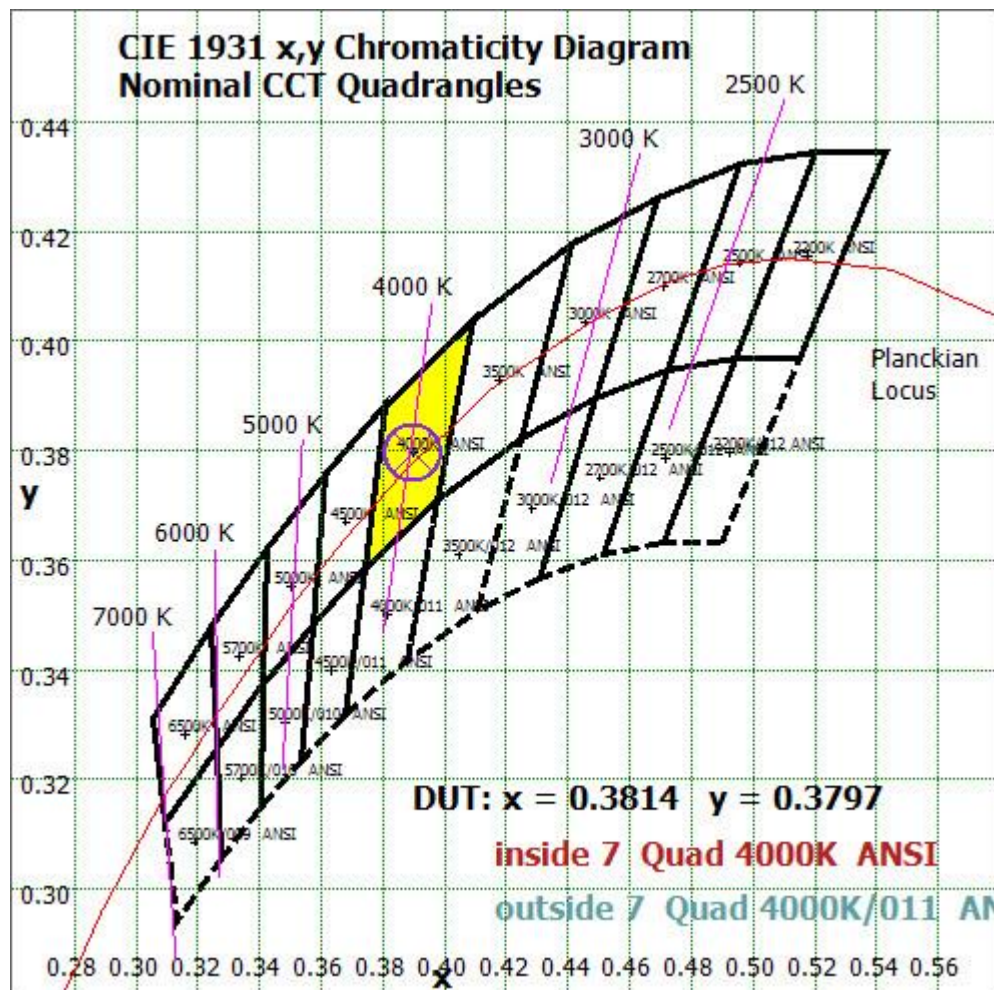


Chart 11: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

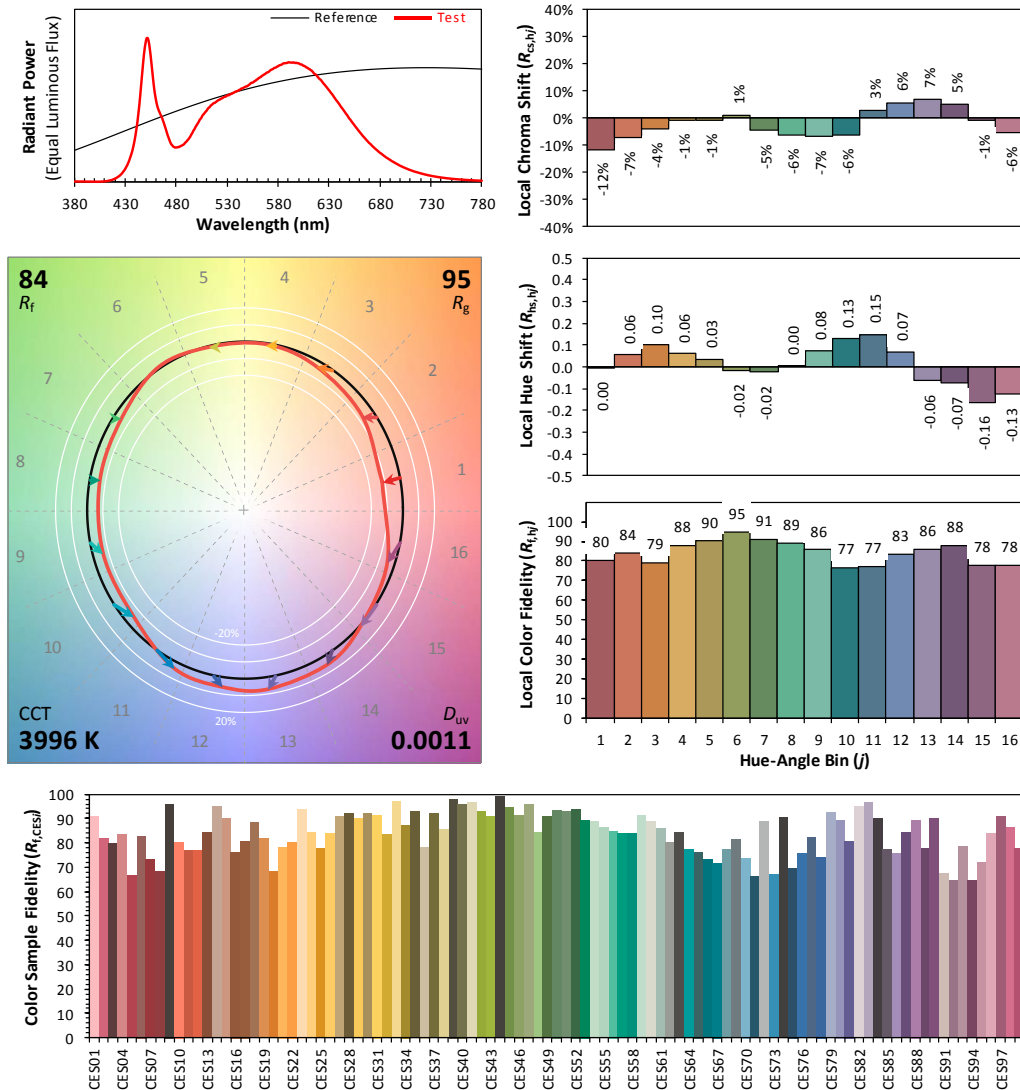
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: RAB Lighting Inc

Date: 2025/08/06

Model: SWISH2X4



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

x 0.3814
 y 0.3797
 u' 0.2246
 v' 0.5030

CIE 13.3-1995
(CRI)
 R_a 83
 R_g 11

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

Chart 12: 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 8 due to rounding.

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	182.191	3.01%
10- 20	524.447	8.65%
20- 30	803.4	13.25%
30- 40	986.057	16.27%
40- 50	1050.504	17.33%
50- 60	988.738	16.31%
60- 70	807.647	13.32%
70- 80	531.374	8.77%
80- 90	181.706	3.00%
90-100	0.674	0.01%
100-110	0.707	0.01%
110-120	0.722	0.01%
120-130	0.738	0.01%
130-140	0.765	0.01%
140-150	0.67	0.01%
150-160	0.526	0.01%
160-170	0.352	0.01%
170-180	0.134	0.00%
Total	6061.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4535.337	74.82%
60- 90	1520.727	25.09%
0-90	6056.064	99.91%
90- 180	5.288	0.09%
0- 180	6061.4	100%

Table 11: Zonal Lumen

UGR Table (Corrected) - Goniophotometer Method

Reflectances											
Ceiling Cavity		70	70	50	50	30	70	70	50	50	30
Walls		50	30	50	30	30	50	30	50	30	30
Floor Cavity		20	20	20	20	20	20	20	20	20	20
Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	15.8	17.5	16.2	17.8	18.1	15.6	17.3	16.0	17.6	18.0
	3H	17.8	19.3	18.1	19.6	20.0	17.9	19.4	18.2	19.7	20.1
	4H	18.5	19.9	18.9	20.3	20.7	18.8	20.3	19.2	20.6	21.0
	6H	19.0	20.4	19.4	20.7	21.1	19.7	21.1	20.1	21.4	21.8
	8H	19.1	20.4	19.6	20.8	21.2	20.1	21.4	20.5	21.8	22.1
	12H	19.2	20.5	19.7	20.9	21.3	20.3	21.5	20.7	21.9	22.4
4H	2H	16.6	18.0	17.0	18.4	18.7	16.3	17.8	16.7	18.2	18.5
	3H	18.8	20.0	19.2	20.4	20.8	18.8	20.1	19.2	20.5	20.9
	4H	19.6	20.8	20.1	21.2	21.6	20.0	21.1	20.4	21.5	21.9
	6H	20.3	21.3	20.7	21.7	22.2	21.0	22.0	21.5	22.4	22.9
	8H	20.5	21.4	20.9	21.9	22.3	21.4	22.4	21.9	22.8	23.3
	12H	20.6	21.5	21.1	21.9	22.4	21.7	22.6	22.2	23.0	23.5
8H	4H	20.1	21.1	20.6	21.5	22.0	20.3	21.3	20.8	21.7	22.2
	6H	21.0	21.8	21.5	22.2	22.7	21.6	22.4	22.1	22.9	23.3
	8H	21.3	22.0	21.8	22.5	23.0	22.1	22.8	22.6	23.3	23.8
	12H	21.5	22.1	22.0	22.6	23.2	22.5	23.2	23.0	23.7	24.2
12H	4H	20.2	21.1	20.7	21.5	22.0	20.4	21.2	20.9	21.7	22.2
	6H	21.2	21.9	21.7	22.3	22.9	21.7	22.4	22.2	22.9	23.4
	8H	21.5	22.2	22.0	22.6	23.2	22.3	22.9	22.8	23.4	24.0

Chart 13: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

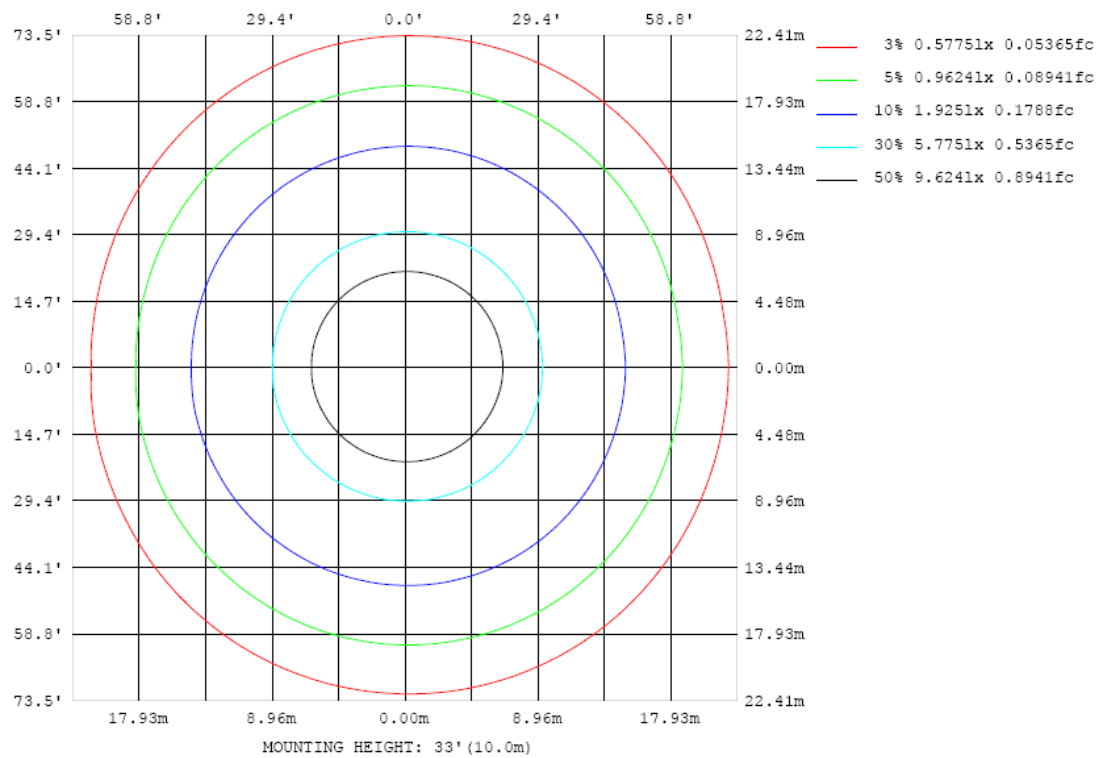


Chart 14: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

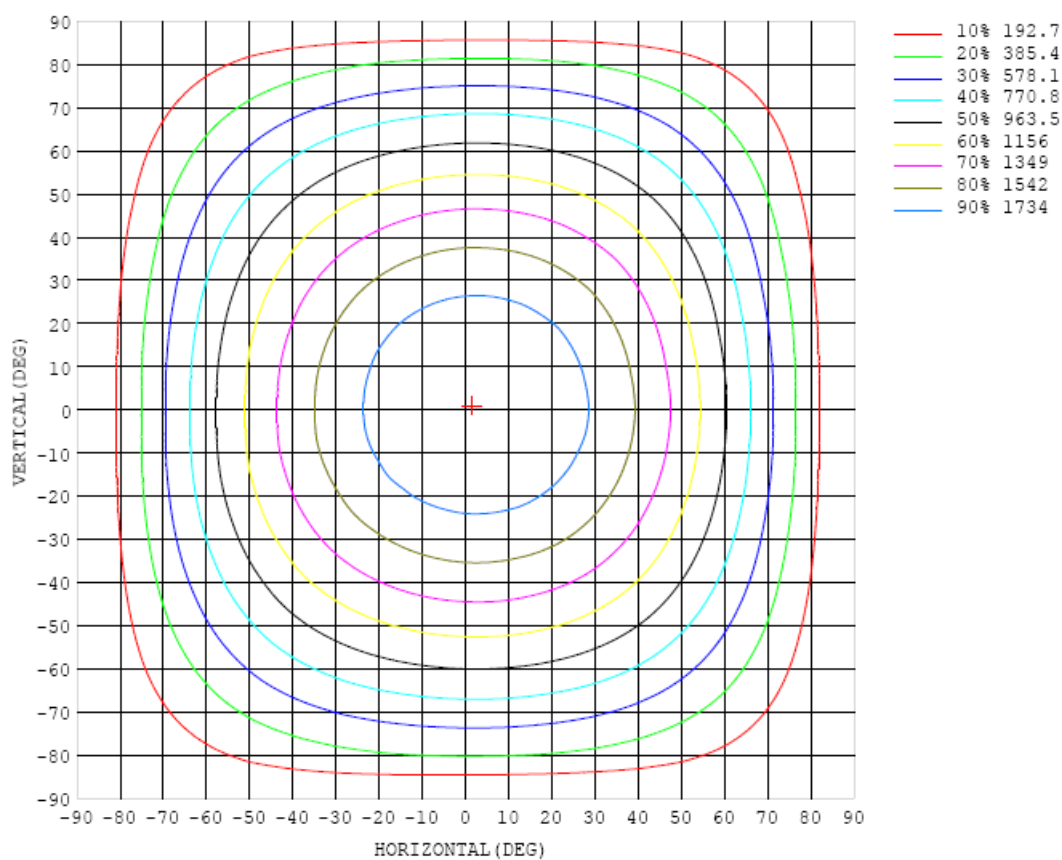


Chart 15: Isocandela Plot

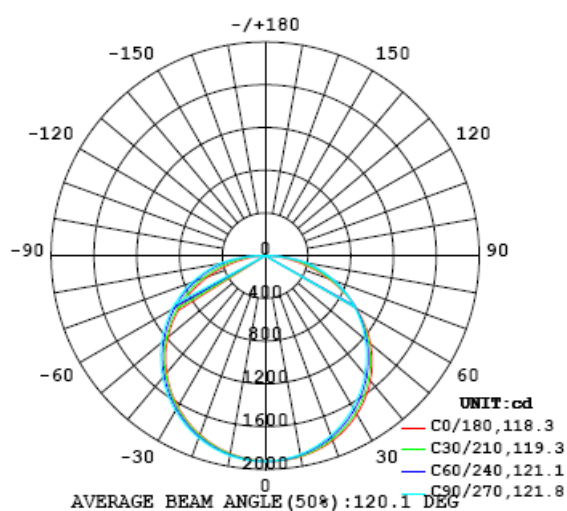


Chart 16: Polar Candela Distribution

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	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925
5	1924	1921	1921	1920	1919	1916	1917	1916	1915	1912	1911	1910	1909	1908	1910	1908	1908	1909	1907
10	1911	1910	1905	1902	1899	1899	1895	1893	1890	1887	1883	1880	1879	1878	1882	1878	1878	1881	1877
15	1882	1880	1875	1872	1868	1863	1858	1852	1849	1844	1841	1837	1837	1835	1837	1834	1835	1837	1837
20	1838	1838	1831	1826	1818	1812	1806	1800	1794	1789	1783	1780	1778	1777	1780	1780	1782	1785	1780
25	1785	1780	1773	1765	1757	1749	1741	1732	1726	1720	1714	1711	1710	1709	1711	1710	1711	1715	1712
30	1713	1708	1699	1691	1682	1673	1664	1653	1647	1640	1633	1629	1628	1627	1629	1628	1631	1635	1632
35	1628	1622	1613	1602	1594	1583	1575	1564	1556	1549	1542	1537	1534	1534	1537	1535	1539	1543	1539
40	1527	1521	1513	1502	1493	1482	1472	1463	1456	1447	1440	1436	1432	1431	1434	1433	1434	1440	1434
45	1414	1407	1397	1388	1380	1371	1361	1352	1345	1337	1330	1325	1321	1318	1320	1318	1319	1323	1316
50	1284	1276	1269	1262	1254	1248	1240	1233	1227	1219	1212	1206	1201	1197	1197	1192	1193	1195	1186
55	1139	1132	1127	1123	1120	1117	1112	1107	1101	1095	1088	1082	1076	1069	1064	1057	1056	1055	1045
60	981	976	974	975	977	977	977	974	970	965	958	951	943	934	926	916	909	906	894
65	811	808	810	818	827	832	835	834	832	829	822	814	806	794	782	766	754	747	732
70	630	629	639	655	670	681	687	690	690	687	681	674	664	650	634	612	594	582	562
75	444	447	464	488	511	527	537	540	542	541	535	529	519	504	484	458	432	413	390
80	261	269	295	325	351	371	386	393	396	395	392	386	374	356	334	305	274	247	221
85	98.8	109	135	159	175	180	177	173	170	171	175	182	186	184	178	159	132	103	78.2
90	0.61	0.51	0.28	0.13	0.08	0.68	0.72	0.74	0.75	0.75	0.74	0.73	0.00	0.00	3.39	2.74	1.96	1.11	3.90
95	0.70	0.70	0.70	0.73	0.76	0.81	0.85	0.87	0.88	0.87	0.87	0.85	0.83	0.80	0.77	0.73	0.70	0.71	0.29
100	0.88	0.85	0.81	0.82	0.84	0.88	0.93	0.96	0.96	0.94	0.95	0.94	0.92	0.89	0.86	0.84	0.82	0.86	0.41
105	0.98	0.92	0.91	0.87	0.88	0.93	0.99	1.03	1.01	1.00	1.01	1.01	0.99	0.96	0.94	0.91	0.93	0.95	0.50
110	0.98	0.93	0.93	0.87	0.86	0.89	0.96	1.00	0.99	0.98	0.99	1.00	1.00	0.97	0.95	0.92	0.96	0.96	0.58
115	0.96	0.91	0.90	0.88	0.83	0.84	0.89	0.93	0.92	0.91	0.93	0.96	0.95	0.95	0.92	0.94	0.94	0.95	0.67
120	1.00	0.95	0.91	0.92	0.86	0.80	0.84	0.88	0.88	0.86	0.89	0.91	0.92	0.91	0.93	0.95	0.94	0.98	0.76
125	1.08	1.04	1.00	1.00	0.94	0.88	0.88	0.86	0.87	0.87	0.88	0.91	0.93	0.97	0.98	0.99	1.00	1.05	0.84
130	1.14	1.08	1.06	1.05	1.04	1.03	0.96	0.96	1.03	1.03	1.00	1.02	1.01	1.09	1.08	1.02	1.06	1.09	0.90
135	1.23	1.15	1.16	1.20	1.15	1.16	1.17	1.15	1.21	1.21	1.17	1.23	1.25	1.24	1.21	1.19	1.17	1.18	0.96
140	1.22	1.24	1.22	1.25	1.25	1.21	1.28	1.25	1.37	1.40	1.35	1.34	1.36	1.26	1.23	1.23	1.21	1.27	0.97
145	1.27	1.29	1.21	1.30	1.31	1.31	1.26	1.27	1.42	1.48	1.43	1.32	1.27	1.28	1.24	1.23	1.12	1.28	1.00
150	1.32	1.34	1.30	1.31	1.35	1.34	1.29	1.31	1.38	1.39	1.28	1.27	1.27	1.28	1.22	1.20	1.28	1.34	1.07
155	1.36	1.36	1.38	1.26	1.35	1.31	1.24	1.24	1.22	1.23	1.22	1.23	1.22	1.22	1.22	1.20	1.36	1.37	1.15
160	1.42	1.42	1.42	1.39	1.30	1.32	1.25	1.13	1.21	1.20	1.22	1.18	1.18	1.19	1.20	1.36	1.41	1.43	1.25
165	1.41	1.41	1.42	1.43	1.44	1.40	1.29	1.18	1.15	1.17	1.14	1.09	1.10	1.18	1.29	1.37	1.39	1.40	1.35
170	1.45	1.46	1.50	1.53	1.54	1.56	1.54	1.42	1.32	1.30	1.30	1.28	1.25	1.30	1.36	1.40	1.44	1.44	1.41
175	1.48	1.49	1.54	1.58	1.59	1.59	1.60	1.53	1.43	1.42	1.44	1.50	1.40	1.31	1.35	1.43	1.43	1.42	1.47
180	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44

Table 12: 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	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925	1925		
5	1908	1909	1911	1913	1913	1916	1915	1919	1920	1922	1920	1923	1923	1926	1923	1923	1922		
10	1882	1884	1884	1887	1890	1892	1895	1899	1902	1902	1906	1907	1908	1912	1908	1911	1908		
15	1839	1841	1845	1846	1851	1854	1857	1862	1867	1869	1871	1876	1877	1882	1881	1883	1882		
20	1785	1785	1790	1794	1797	1802	1806	1813	1816	1820	1825	1830	1834	1839	1838	1840	1838		
25	1716	1718	1722	1726	1733	1736	1741	1749	1753	1758	1763	1769	1775	1781	1782	1782	1782		
30	1636	1639	1644	1648	1653	1660	1663	1670	1677	1683	1689	1696	1700	1709	1709	1712	1710		
35	1543	1547	1552	1557	1564	1569	1574	1582	1588	1595	1603	1609	1616	1623	1623	1625	1624		
40	1437	1442	1448	1455	1461	1469	1475	1483	1490	1497	1504	1512	1516	1523	1523	1526	1523		
45	1322	1327	1334	1341	1349	1357	1366	1374	1382	1389	1396	1401	1405	1412	1411	1409	1405		
50	1193	1199	1208	1218	1228	1239	1247	1258	1266	1272	1278	1283	1284	1287	1285	1281	1277		
55	1051	1060	1073	1086	1099	1111	1123	1134	1141	1149	1153	1156	1154	1154	1146	1140	1132		
60	902	913	929	945	963	977	991	1002	1011	1016	1020	1020	1015	1011	999	986	974		
65	740	757	778	800	821	839	853	864	873	878	880	877	870	859	840	822	805		
70	572	592	619	646	672	693	708	716	728	732	728	741	714	702	675	648	626		
75	401	427	462	494	522	543	559	571	579	582	580	574	559	538	506	472	442		
80	234	266	305	340	370	394	412	423	431	433	429	420	400	374	340	300	262		
85	91.7	123	156	184	202	213	218	220	223	227	230	231	223	205	174	138	103		
90	3.51	1.37	2.09	1.86	1.90	1.66	1.47	1.67	2.06	2.78	4.31	4.99	5.75	5.37	4.04	1.91	3.37		
95	0.26	0.25	0.25	0.27	0.28	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.27	0.26	0.25	0.24	0.24		
100	0.36	0.30	0.30	0.31	0.32	0.34	0.34	0.34	0.33	0.34	0.34	0.33	0.32	0.30	0.30	0.29	0.34		
105	0.45	0.40	0.36	0.36	0.38	0.39	0.40	0.39	0.38	0.39	0.40	0.39	0.38	0.36	0.35	0.38	0.43		
110	0.54	0.49	0.44	0.42	0.43	0.45	0.45	0.43	0.43	0.44	0.45	0.45	0.43	0.42	0.44	0.48	0.50		
115	0.61	0.56	0.54	0.50	0.50	0.50	0.51	0.49	0.48	0.50	0.52	0.52	0.51	0.52	0.54	0.58	0.58		
120	0.70	0.61	0.63	0.59	0.59	0.60	0.57	0.57	0.56	0.58	0.61	0.61	0.60	0.62	0.62	0.66	0.67		
125	0.79	0.70	0.70	0.66	0.65	0.67	0.66	0.65	0.64	0.66	0.68	0.68	0.67	0.65	0.75	0.71	0.75		
130	0.81	0.78	0.70	0.75	0.76	0.69	0.73	0.72	0.72	0.73	0.73	0.67	0.72	0.79	0.74	0.81	0.82		
135	0.91	0.86	0.83	0.72	0.82	0.84	0.80	0.70	0.72	0.70	0.73	0.80	0.81	0.76	0.87	0.87	0.84		
140	0.97	0.87	0.85	0.80	0.73	0.83	0.82	0.81	0.83	0.81	0.76	0.79	0.70	0.78	0.86	0.86	0.85		
145	1.03	0.84	0.89	0.86	0.83	0.77	0.72	0.72	0.78	0.72	0.64	0.68	0.80	0.84	0.88	0.88	0.96		
150	1.10	1.01	0.99	0.93	0.93	0.89	0.85	0.85	0.83	0.83	0.79	0.81	0.87	0.91	0.92	0.85	1.05		
155	1.17	1.16	0.99	1.02	0.96	0.94	0.93	0.93	0.90	0.89	0.88	0.86	0.94	0.99	0.94	1.02	1.13		
160	1.25	1.25	1.18	1.05	0.98	0.97	0.97	0.96	0.91	0.91	0.90	0.93	1.03	1.01	1.06	1.19	1.23		
165	1.37	1.37	1.37	1.31	1.18	1.06	0.99	0.98	0.97	0.98	0.97	1.02	1.11	1.23	1.31	1.35	1.35		
170	1.43	1.44	1.44	1.42	1.36	1.21	1.10	1.11	1.08	1.09	1.11	1.21	1.31	1.35	1.36	1.38	1.40		
175	1.53	1.56	1.58	1.61	1.59	1.49	1.44	1.49	1.36	1.30	1.26	1.31	1.38	1.37	1.39	1.43	1.46		
180	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44		

Table 13: Luminous Intensity Data

TEST RESULTS (44W 5000K Setting)

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)	0.355	0.154
Power Factor	0.9960	0.9647
Test Power (W)	42.42	41.27
THD A%	7.42	13.60
Luminous Efficacy (lm/W)	138.7	140.8
Total Luminous Flux (lm)	5882.6	5812.4
Color Rendering Index (CRI)	82.4	
R9	7.7	
Correlated Color Temperature (CCT)(K)	4781	
Chromaticity Chroma x	0.3524	
Chromaticity Chroma y	0.3637	
Chromaticity Chroma u	0.2116	
Chromaticity Chroma v	0.3277	
Duv	0.0032	
Chromaticity Chroma u'	0.2116	
Chromaticity Chroma v'	0.4915	

Special Color Rendering Indices	
R1	80.2
R2	87.5
R3	92.9
R4	81.5
R5	80.3
R6	82.2
R7	87.8
R8	67.1
R9	7.7
R10	70.3
R11	80.2
R12	55.5
R13	82.1
R14	96.2

Table 14: Test data per Sphere-Spectroradiometer Method

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

Goniophotometer Method

Test ambient temperature was 25.1 °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)	0.355
Power Factor	0.9961
Power (W)	42.44
Luminous Efficacy (lm/W)	139.0
Total Luminous Flux (lm)	5899.3
Beam Angle (°)	118.3 (0°-180°) / 121.8 (90°-270°)
Center Beam Candle Power (cd)	1871
Maximum Beam Candle Power (cd)	1875 (At: C=310.0, Gamma=1.5)
Spacing Criteria	1.27 (0°-180°) / 1.29 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	74.82%
Zonal Lumens in the 60 °-90 °Zone	25.09%
Zonal Lumens in the 90 °-120 °Zone	0.03%
Zonal Lumens in the 120 °-180 °Zone	0.05%

Table 15: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

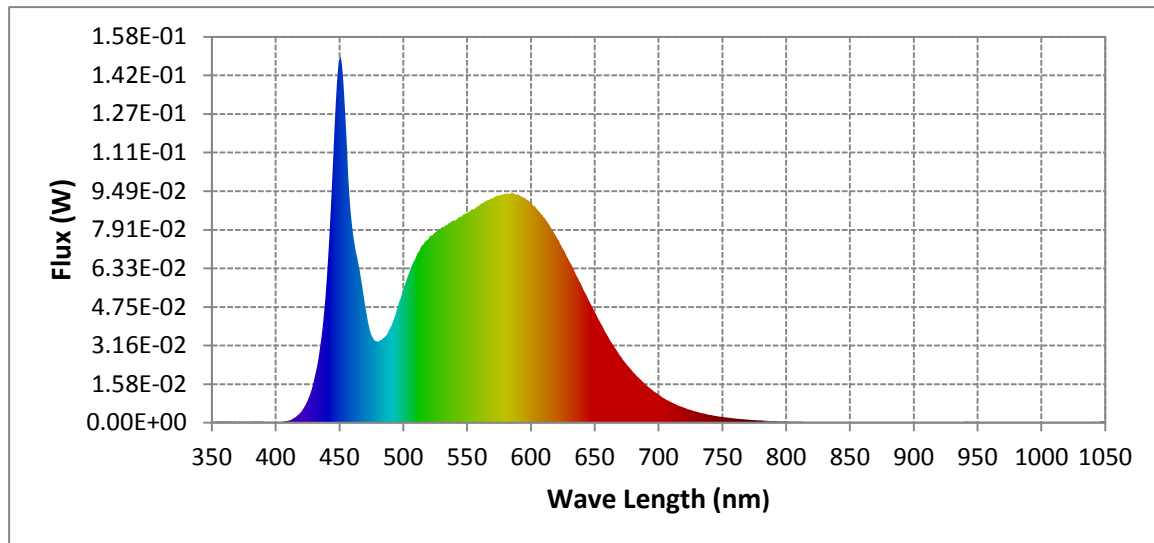
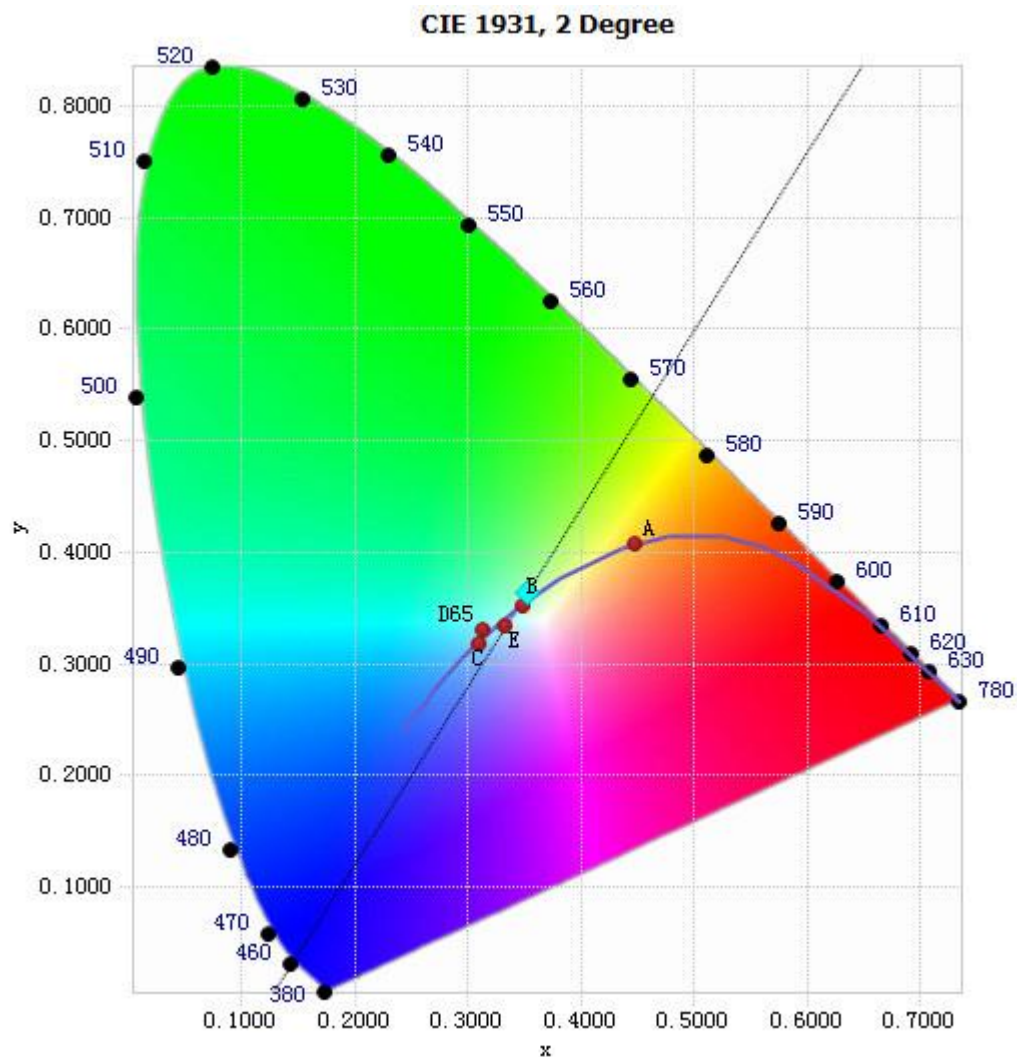


Chart 17: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	4.62E-04	485	3.49E-02	590	9.37E-02	695	1.36E-02
385	4.54E-04	490	3.89E-02	595	9.22E-02	700	1.16E-02
390	4.20E-04	495	4.62E-02	600	9.01E-02	705	9.91E-03
395	4.33E-04	500	5.45E-02	605	8.73E-02	710	8.42E-03
400	3.02E-04	505	6.19E-02	610	8.41E-02	715	7.21E-03
405	3.46E-04	510	6.79E-02	615	8.07E-02	720	6.19E-03
410	8.56E-04	515	7.27E-02	620	7.62E-02	725	5.26E-03
415	2.13E-03	520	7.55E-02	625	7.14E-02	730	4.52E-03
420	4.44E-03	525	7.80E-02	630	6.64E-02	735	3.81E-03
425	9.03E-03	530	8.01E-02	635	6.12E-02	740	3.26E-03
430	1.71E-02	535	8.12E-02	640	5.60E-02	745	2.78E-03
435	3.14E-02	540	8.28E-02	645	5.06E-02	750	2.37E-03
440	5.82E-02	545	8.45E-02	650	4.55E-02	755	2.05E-03
445	1.07E-01	550	8.59E-02	655	4.05E-02	760	1.75E-03
450	1.49E-01	555	8.74E-02	660	3.57E-02	765	1.51E-03
455	1.22E-01	560	8.91E-02	665	3.14E-02	770	1.28E-03
460	8.10E-02	565	9.06E-02	670	2.73E-02	775	1.10E-03
465	6.52E-02	570	9.19E-02	675	2.40E-02	780	9.44E-04
470	4.89E-02	575	9.30E-02	680	2.08E-02		
475	3.61E-02	580	9.38E-02	685	1.82E-02		
480	3.32E-02	585	9.44E-02	690	1.57E-02		

Table 16: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3524, 0.3637)

Chart 18: 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

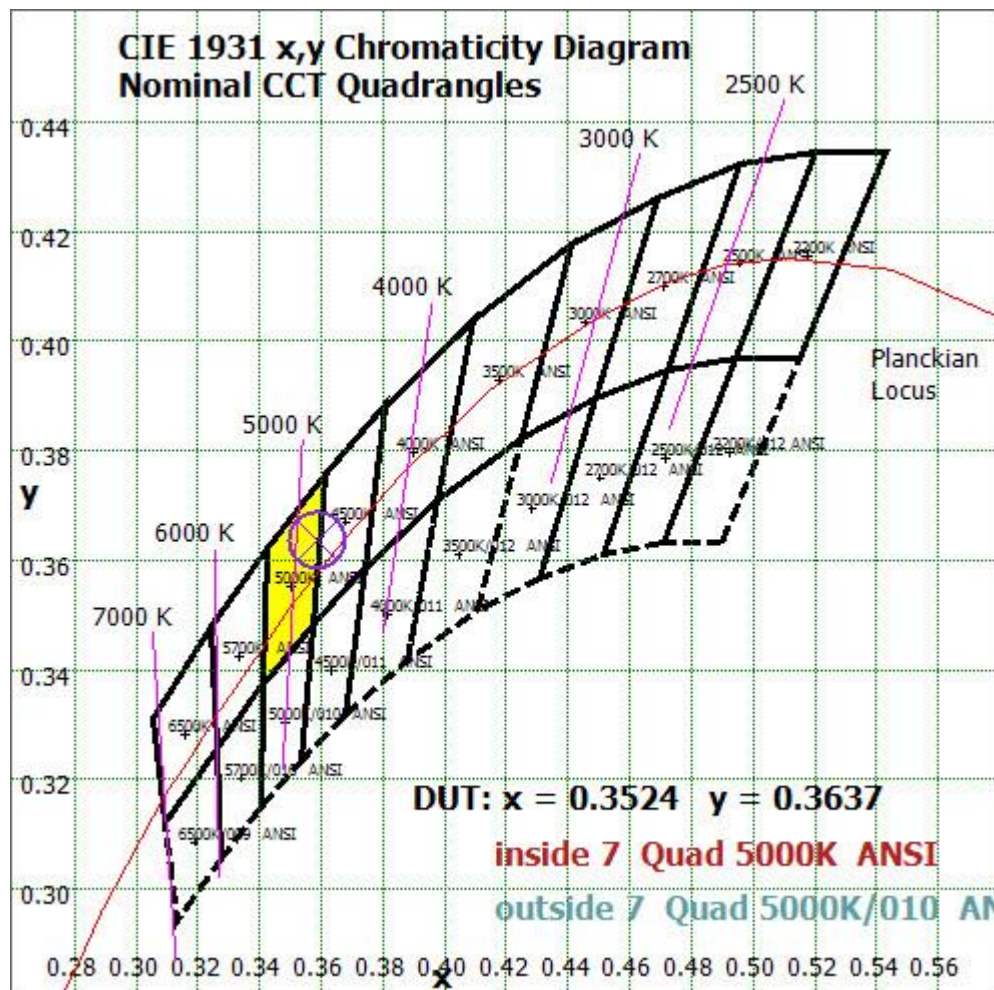


Chart 19: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

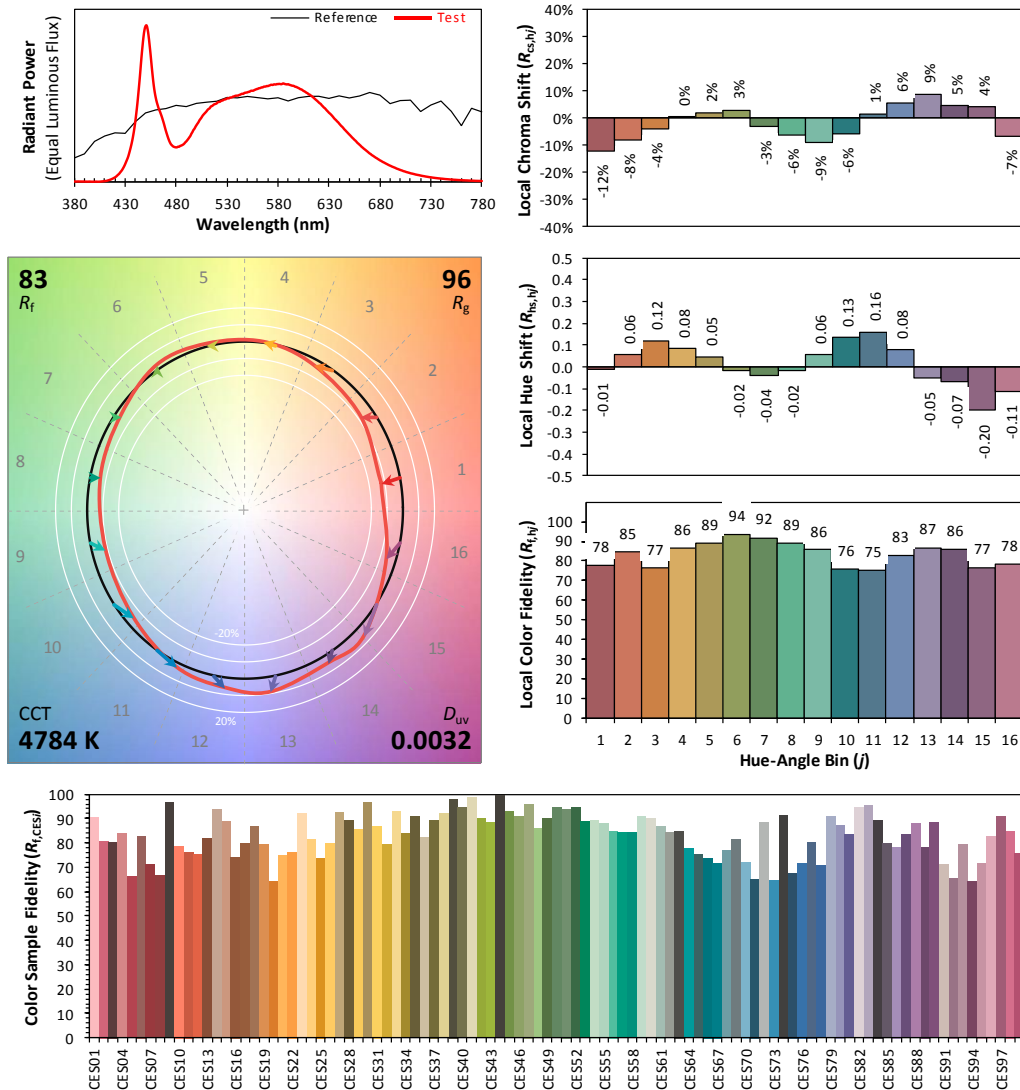
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: RAB Lighting Inc

Date: 2025/08/06

Model: SWISH2X4



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

x 0.3523
 y 0.3637
 u' 0.2116
 v' 0.4915

CIE 13.3-1995
(CRI)
 R_a 82
 R_9 8

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

Chart 20: 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 14 due to rounding.

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	177.288	3.01%
10- 20	510.351	8.65%
20- 30	781.867	13.25%
30- 40	959.726	16.27%
40- 50	1022.397	17.33%
50- 60	962.328	16.31%
60- 70	786.027	13.32%
70- 80	517.141	8.77%
80- 90	176.998	3.00%
90-100	0.634	0.01%
100-110	0.689	0.01%
110-120	0.705	0.01%
120-130	0.717	0.01%
130-140	0.741	0.01%
140-150	0.652	0.01%
150-160	0.512	0.01%
160-170	0.342	0.01%
170-180	0.13	0.00%
Total	5899.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4413.957	74.82%
60- 90	1480.166	25.09%
0-90	5894.123	99.91%
90- 180	5.122	0.09%
0- 180	5899.2	100%

Table 17: Zonal Lumen

UGR Table (Corrected) - Goniophotometer Method

Reflectances											
Ceiling Cavity		70	70	50	50	30	70	70	50	50	30
Walls		50	30	50	30	30	50	30	50	30	30
Floor Cavity		20	20	20	20	20	20	20	20	20	20
Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	15.7	17.4	16.0	17.7	18.0	15.6	17.3	15.9	17.6	17.9
	3H	17.6	19.2	18.0	19.5	19.8	17.8	19.4	18.2	19.7	20.0
	4H	18.3	19.8	18.7	20.1	20.5	18.8	20.3	19.2	20.6	21.0
	6H	18.9	20.2	19.3	20.6	21.0	19.7	21.1	20.1	21.4	21.8
	8H	19.0	20.3	19.4	20.7	21.1	20.1	21.4	20.5	21.7	22.1
	12H	19.1	20.3	19.5	20.7	21.2	20.3	21.6	20.8	22.0	22.4
4H	2H	16.4	17.9	16.8	18.2	18.6	16.3	17.8	16.7	18.1	18.5
	3H	18.6	19.9	19.0	20.3	20.7	18.8	20.0	19.2	20.4	20.8
	4H	19.5	20.6	19.9	21.0	21.5	19.9	21.0	20.4	21.4	21.9
	6H	20.2	21.1	20.6	21.6	22.0	21.0	22.0	21.4	22.4	22.9
	8H	20.3	21.3	20.8	21.7	22.2	21.4	22.4	21.9	22.8	23.3
	12H	20.5	21.3	21.0	21.8	22.3	21.8	22.6	22.3	23.1	23.6
8H	4H	20.0	20.9	20.4	21.4	21.8	20.3	21.2	20.8	21.7	22.1
	6H	20.8	21.6	21.3	22.1	22.6	21.6	22.4	22.1	22.9	23.3
	8H	21.1	21.8	21.6	22.3	22.8	22.2	22.9	22.7	23.4	23.8
	12H	21.3	22.0	21.8	22.5	23.0	22.6	23.2	23.1	23.7	24.3
12H	4H	20.1	20.9	20.6	21.4	21.9	20.4	21.2	20.9	21.7	22.2
	6H	21.0	21.7	21.5	22.2	22.7	21.7	22.4	22.2	22.9	23.4
	8H	21.4	22.0	21.9	22.5	23.1	22.3	23.0	22.8	23.5	24.0

Chart 21: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

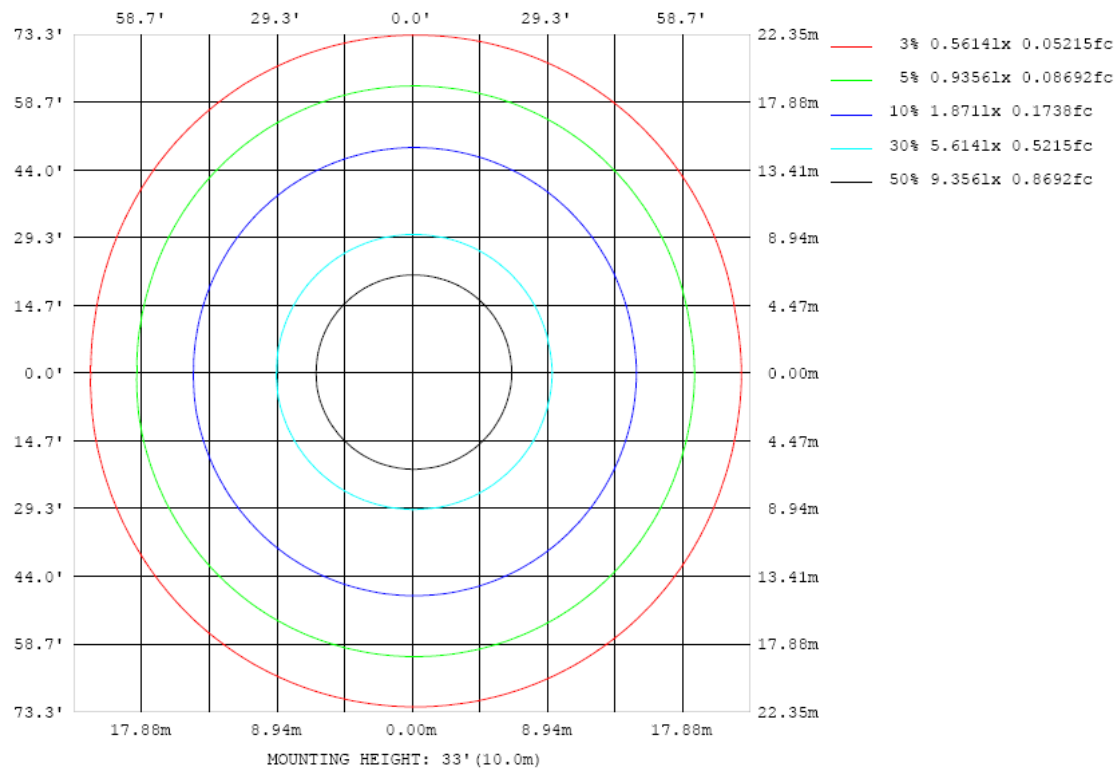


Chart 22: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

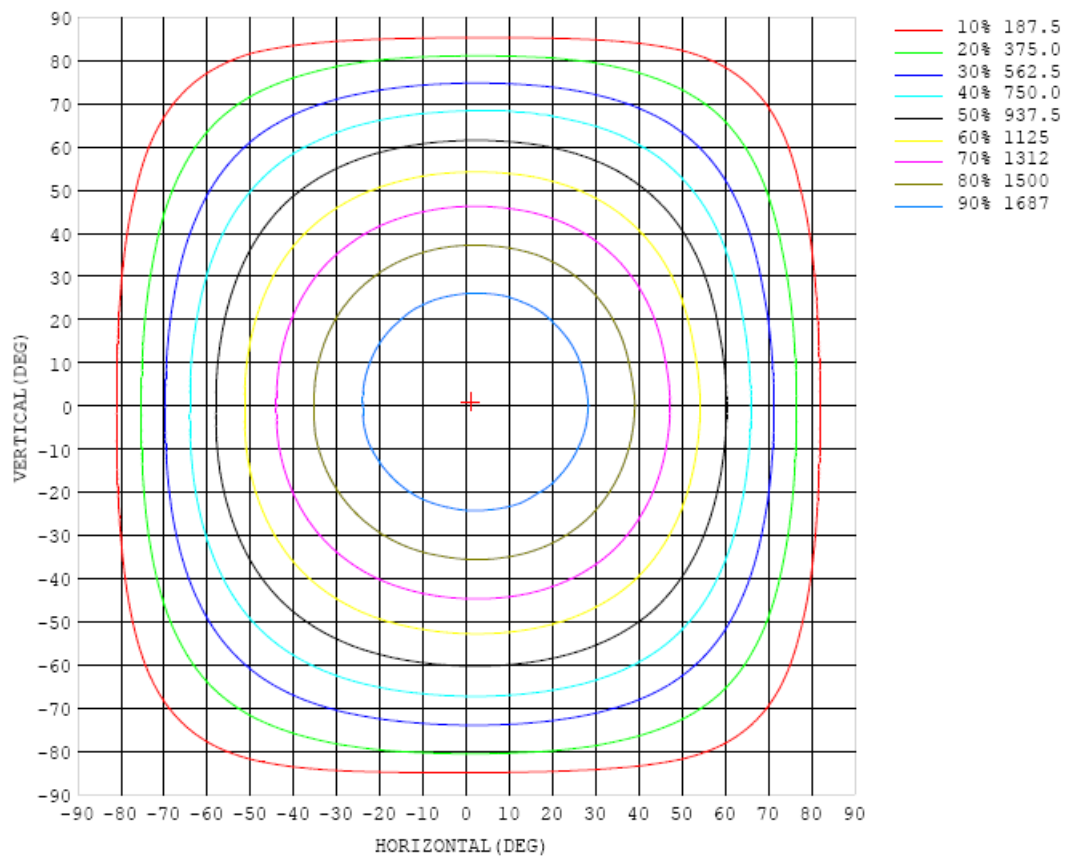


Chart 23: Isocandela Plot

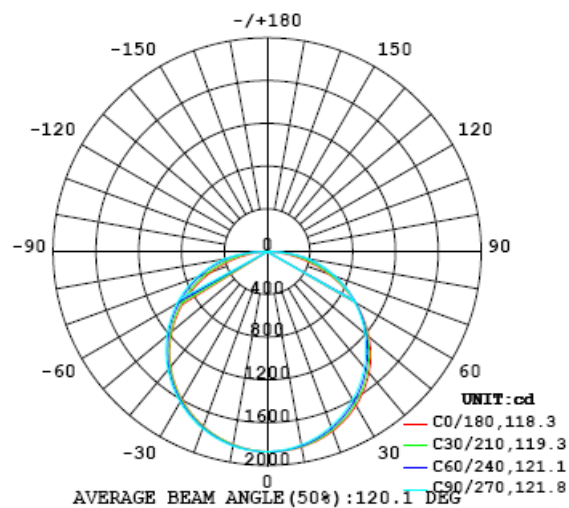


Chart 24: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871
5	1871	1871	1869	1868	1867	1867	1867	1865	1864	1860	1859	1860	1861	1858	1857	1858	1858	1858	1858
10	1857	1857	1854	1850	1848	1846	1845	1841	1839	1834	1832	1832	1835	1831	1832	1833	1833	1831	1833
15	1829	1827	1823	1819	1817	1812	1807	1803	1798	1796	1793	1792	1791	1788	1790	1791	1792	1792	1793
20	1787	1785	1781	1774	1769	1764	1757	1753	1746	1741	1738	1738	1736	1735	1735	1738	1741	1741	1739
25	1732	1729	1722	1714	1710	1703	1696	1688	1681	1677	1671	1670	1669	1668	1669	1671	1674	1676	1674
30	1663	1658	1651	1642	1636	1627	1621	1612	1604	1598	1593	1592	1592	1591	1591	1593	1596	1597	1595
35	1578	1574	1566	1557	1550	1541	1533	1525	1518	1509	1504	1503	1502	1500	1501	1504	1507	1508	1505
40	1480	1475	1467	1459	1451	1441	1434	1426	1418	1412	1405	1404	1402	1401	1401	1404	1406	1407	1403
45	1368	1364	1356	1348	1341	1334	1326	1319	1311	1305	1299	1296	1295	1292	1291	1292	1294	1294	1289
50	1242	1237	1231	1225	1221	1215	1210	1203	1197	1192	1185	1182	1178	1175	1171	1170	1170	1170	1162
55	1102	1097	1093	1091	1089	1088	1085	1081	1076	1071	1065	1060	1055	1050	1044	1039	1035	1034	1025
60	948	945	945	947	951	953	954	952	949	944	938	934	927	919	909	900	893	889	876
65	783	782	787	795	805	812	816	817	816	812	806	801	792	782	769	754	742	733	719
70	609	610	621	637	654	666	674	677	677	675	670	664	655	641	624	604	585	571	553
75	429	434	452	477	500	517	527	532	535	533	529	523	513	498	477	452	426	406	383
80	252	262	288	319	345	366	381	390	393	393	390	385	373	354	331	303	271	243	217
85	95.1	107	134	160	177	186	188	186	185	185	189	193	197	193	180	160	132	103	77.0
90	0.60	0.40	0.00	0.00	0.00	0.67	0.60	0.43	0.31	0.28	0.30	0.40	1.12	0.37	11.3	7.81	4.72	2.02	3.84
95	0.68	0.69	0.68	0.71	0.74	0.78	0.82	0.85	0.85	0.85	0.84	0.82	0.80	0.77	0.74	0.71	0.68	0.68	0.28
100	0.86	0.82	0.79	0.79	0.82	0.86	0.91	0.93	0.93	0.92	0.92	0.91	0.89	0.87	0.83	0.81	0.79	0.83	0.40
105	0.95	0.90	0.89	0.85	0.86	0.91	0.96	1.00	0.98	0.97	0.98	0.98	0.97	0.94	0.91	0.88	0.90	0.93	0.49
110	0.95	0.90	0.91	0.84	0.84	0.88	0.94	0.98	0.97	0.96	0.97	0.98	0.97	0.95	0.92	0.89	0.94	0.94	0.57
115	0.94	0.89	0.88	0.86	0.81	0.82	0.87	0.91	0.90	0.89	0.91	0.93	0.93	0.92	0.89	0.91	0.92	0.93	0.66
120	0.97	0.92	0.88	0.89	0.84	0.78	0.82	0.86	0.85	0.84	0.86	0.88	0.89	0.89	0.89	0.91	0.91	0.95	0.75
125	1.05	1.01	0.97	0.97	0.90	0.87	0.85	0.84	0.84	0.84	0.85	0.89	0.90	0.94	0.93	0.96	0.96	1.02	0.82
130	1.11	1.05	1.03	1.02	1.01	0.99	0.92	0.94	0.99	0.98	0.96	0.99	0.97	1.05	1.04	0.99	1.03	1.06	0.88
135	1.19	1.12	1.13	1.16	1.13	1.12	1.12	1.10	1.15	1.16	1.11	1.18	1.21	1.20	1.17	1.15	1.14	1.15	0.94
140	1.19	1.20	1.18	1.22	1.21	1.19	1.24	1.21	1.33	1.35	1.30	1.29	1.32	1.24	1.19	1.19	1.17	1.23	0.96
145	1.24	1.25	1.18	1.26	1.27	1.27	1.22	1.25	1.38	1.43	1.38	1.30	1.23	1.24	1.21	1.19	1.09	1.23	0.99
150	1.29	1.30	1.26	1.28	1.31	1.30	1.25	1.27	1.34	1.36	1.24	1.23	1.24	1.24	1.18	1.17	1.23	1.31	1.06
155	1.32	1.32	1.33	1.23	1.31	1.27	1.20	1.21	1.19	1.18	1.18	1.20	1.19	1.19	1.18	1.16	1.31	1.34	1.14
160	1.38	1.38	1.38	1.34	1.25	1.28	1.20	1.10	1.17	1.17	1.18	1.14	1.15	1.16	1.15	1.31	1.37	1.39	1.24
165	1.37	1.37	1.38	1.39	1.39	1.34	1.23	1.13	1.12	1.13	1.10	1.05	1.05	1.12	1.23	1.32	1.35	1.36	1.32
170	1.40	1.42	1.46	1.48	1.50	1.51	1.48	1.35	1.26	1.24	1.24	1.22	1.21	1.25	1.31	1.36	1.39	1.40	1.38
175	1.43	1.46	1.51	1.54	1.54	1.55	1.54	1.46	1.36	1.36	1.38	1.44	1.36	1.27	1.28	1.36	1.40	1.38	1.40
180	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38

Table 18: 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	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871	1871		
5	1858	1858	1860	1862	1864	1865	1865	1866	1865	1867	1869	1872	1872	1871	1872	1872	1871		
10	1833	1834	1836	1838	1840	1843	1843	1846	1845	1848	1851	1855	1856	1855	1856	1857	1856		
15	1795	1794	1796	1798	1801	1803	1808	1808	1811	1815	1817	1823	1825	1827	1828	1830	1827		
20	1742	1742	1745	1747	1749	1755	1757	1760	1764	1766	1772	1777	1780	1782	1784	1788	1785		
25	1676	1677	1681	1684	1685	1691	1692	1696	1701	1705	1712	1718	1721	1724	1727	1730	1728		
30	1600	1601	1604	1608	1609	1615	1618	1622	1626	1631	1639	1646	1650	1652	1656	1659	1658		
35	1509	1512	1514	1518	1521	1526	1530	1535	1540	1546	1553	1561	1565	1569	1572	1574	1573		
40	1406	1409	1414	1418	1421	1429	1433	1439	1443	1449	1458	1464	1469	1472	1475	1477	1474		
45	1293	1296	1301	1308	1312	1320	1326	1334	1337	1343	1351	1357	1362	1363	1365	1364	1362		
50	1167	1173	1179	1188	1194	1204	1211	1218	1223	1230	1236	1240	1243	1242	1241	1239	1235		
55	1030	1038	1046	1058	1069	1081	1089	1098	1104	1109	1114	1117	1115	1111	1108	1102	1094		
60	882	893	906	922	936	949	961	970	976	980	984	986	980	973	963	952	941		
65	725	740	758	779	797	813	826	836	843	846	848	847	838	825	811	794	778		
70	561	579	603	630	652	671	684	692	700	709	711	700	691	671	648	624	603		
75	393	417	449	480	505	525	540	549	555	557	556	550	536	514	485	454	426		
80	229	259	295	328	356	380	396	406	411	412	410	400	381	356	324	287	253		
85	88.8	118	148	173	187	195	197	198	200	203	208	210	205	190	164	131	99.0		
90	3.27	1.25	1.75	2.06	1.54	1.31	1.13	1.38	1.63	2.41	3.21	3.92	4.61	4.29	2.73	2.23	3.18		
95	0.26	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.29	0.29	0.28	0.28	0.26	0.25	0.24	0.24	0.24		
100	0.36	0.29	0.29	0.30	0.32	0.33	0.33	0.33	0.32	0.33	0.33	0.33	0.31	0.30	0.29	0.29	0.34		
105	0.44	0.39	0.35	0.35	0.37	0.38	0.39	0.38	0.37	0.38	0.39	0.39	0.37	0.35	0.35	0.37	0.43		
110	0.52	0.48	0.43	0.41	0.42	0.44	0.44	0.42	0.41	0.43	0.44	0.44	0.42	0.41	0.43	0.47	0.50		
115	0.60	0.55	0.53	0.49	0.49	0.49	0.50	0.48	0.47	0.49	0.51	0.51	0.50	0.51	0.53	0.56	0.57		
120	0.69	0.59	0.61	0.57	0.58	0.58	0.56	0.56	0.55	0.57	0.60	0.60	0.59	0.60	0.61	0.65	0.65		
125	0.77	0.68	0.68	0.65	0.60	0.66	0.64	0.63	0.62	0.64	0.66	0.66	0.66	0.64	0.74	0.69	0.74		
130	0.79	0.77	0.69	0.74	0.74	0.67	0.69	0.70	0.71	0.72	0.71	0.65	0.73	0.77	0.73	0.79	0.81		
135	0.89	0.84	0.80	0.70	0.80	0.82	0.78	0.69	0.70	0.69	0.73	0.77	0.79	0.73	0.85	0.84	0.83		
140	0.94	0.85	0.83	0.78	0.71	0.78	0.79	0.78	0.81	0.78	0.74	0.76	0.68	0.77	0.84	0.83	0.85		
145	1.01	0.83	0.87	0.84	0.81	0.76	0.70	0.69	0.73	0.69	0.63	0.67	0.79	0.82	0.85	0.86	0.95		
150	1.07	0.99	0.96	0.91	0.90	0.86	0.83	0.83	0.82	0.81	0.77	0.79	0.85	0.89	0.90	0.84	1.04		
155	1.13	1.13	0.98	0.99	0.93	0.91	0.91	0.90	0.87	0.86	0.86	0.85	0.92	0.96	0.92	1.01	1.12		
160	1.21	1.22	1.16	1.03	0.96	0.94	0.95	0.93	0.88	0.88	0.88	0.92	1.01	0.98	1.05	1.17	1.22		
165	1.33	1.34	1.34	1.29	1.17	1.05	0.96	0.96	0.94	0.96	0.95	1.01	1.11	1.22	1.29	1.32	1.32		
170	1.38	1.39	1.39	1.38	1.32	1.19	1.08	1.10	1.05	1.06	1.09	1.20	1.29	1.31	1.32	1.34	1.37		
175	1.47	1.51	1.53	1.55	1.55	1.48	1.41	1.46	1.32	1.25	1.23	1.30	1.33	1.33	1.36	1.40	1.43		
180	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38		

Table 19: 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 20: 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 lamps) 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 lamps) 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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