



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.: HZ25070031h

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

Review by:

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Aug. 13, 2025

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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 35W 3500K Setting	SWISH2X4 35W 4000K Setting	SWISH2X4 35W 5000K Setting
Luminous Efficacy (Lumens /Watt)	141.1	148.9	143.2
Total Luminous Flux (Lumens)	4783.1	4902.8	4831.7
Power (Watts)	33.91	32.92	33.74
Power Factor	0.9945	0.9947	0.9948
CCT (K)	3370	3991	4779
CRI	82.0	83.4	82.5
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

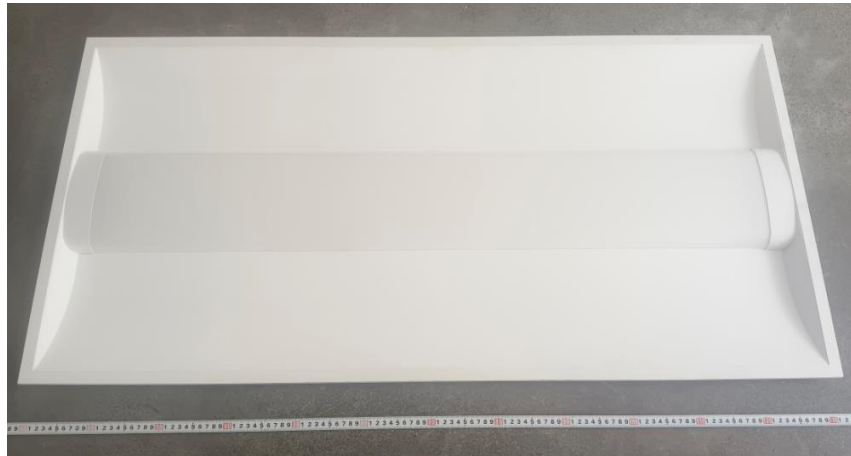


Figure 1- Overview of the sample

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 (35W 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)	0.284	0.128
Power Factor	0.9945	0.9434
Test Power (W)	33.91	33.44
THD A%	6.75	13.80
Luminous Efficacy (lm/W)	141.1	141.4
Total Luminous Flux (lm)	4783.1	4728.2
Color Rendering Index (CRI)	82.0	
R9	5.5	
Correlated Color Temperature (CCT)(K)	3370	
Chromaticity Chroma x	0.4143	
Chromaticity Chroma y	0.3985	
Chromaticity Chroma u	0.2384	
Chromaticity Chroma v	0.3439	
Duv	0.0015	
Chromaticity Chroma u'	0.2384	
Chromaticity Chroma v'	0.5158	

Special Color Rendering Indices	
R1	79.9
R2	89
R3	96.2
R4	80.4
R5	79.8
R6	85.5
R7	84.6
R8	60.9
R9	5.5
R10	74.5
R11	79.3
R12	62.9
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)	0.284
Power Factor	0.9947
Power (W)	33.92
Luminous Efficacy (lm/W)	141.3
Total Luminous Flux (lm)	4792.3
Beam Angle (°)	117.5 (0°-180°) / 120.8 (90°-270°)
Center Beam Candle Power (cd)	1539
Maximum Beam Candle Power (cd)	1541 (At: C=220.0, Gamma=2.0)
Spacing Criteria	1.31 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	75.30%
Zonal Lumens in the 60 °-90 °Zone	24.61%
Zonal Lumens in the 90 °-120 °Zone	0.04%
Zonal Lumens in the 120 °-180 °Zone	0.05%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

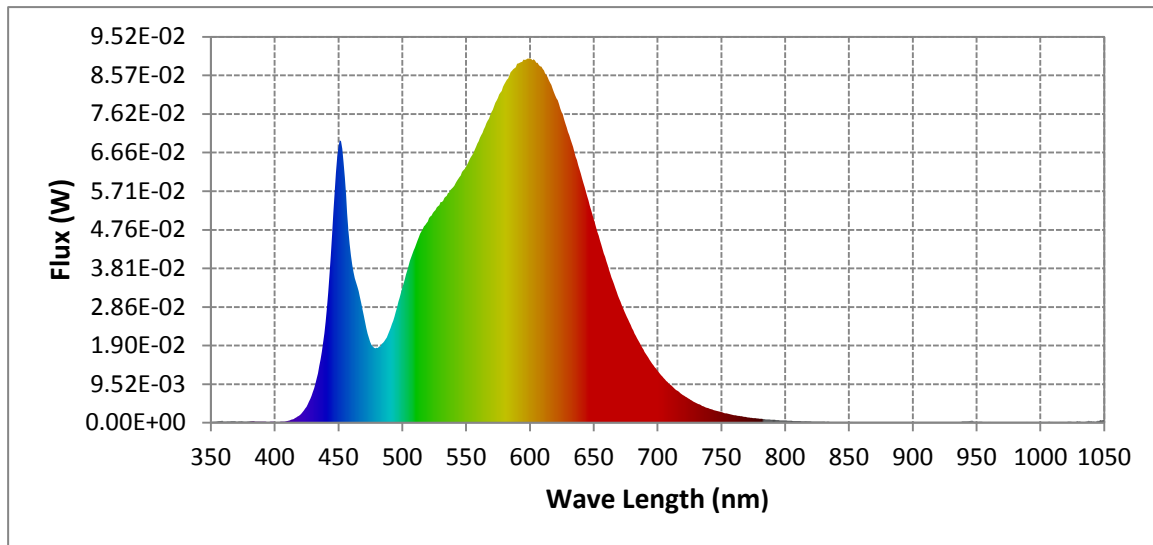
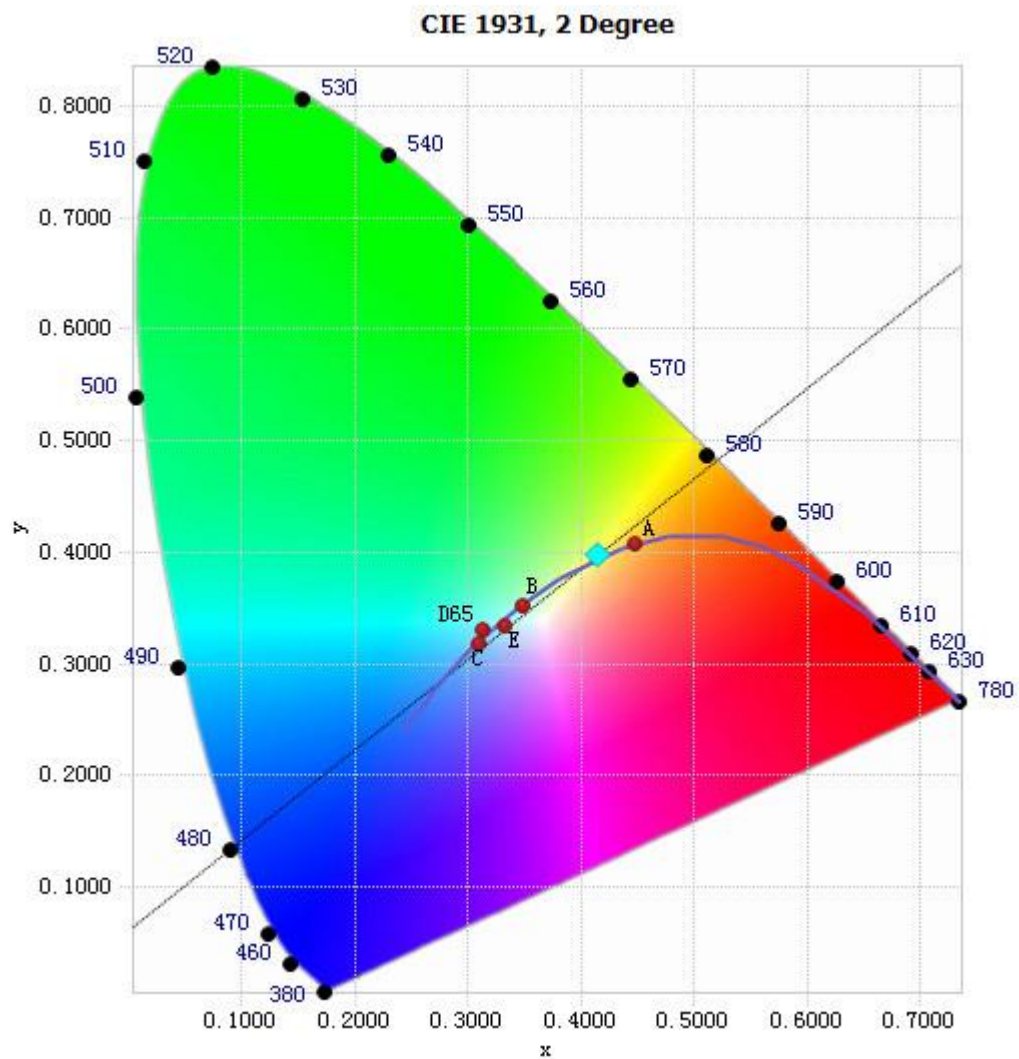


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.31E-04	485	1.97E-02	590	8.86E-02	695	1.50E-02
385	2.36E-04	490	2.26E-02	595	8.96E-02	700	1.29E-02
390	2.78E-04	495	2.73E-02	600	8.99E-02	705	1.10E-02
395	2.07E-04	500	3.32E-02	605	8.88E-02	710	9.40E-03
400	2.06E-04	505	3.87E-02	610	8.73E-02	715	8.02E-03
405	2.58E-04	510	4.32E-02	615	8.45E-02	720	6.82E-03
410	4.34E-04	515	4.72E-02	620	8.07E-02	725	5.85E-03
415	9.13E-04	520	4.96E-02	625	7.67E-02	730	4.94E-03
420	1.93E-03	525	5.21E-02	630	7.17E-02	735	4.18E-03
425	3.93E-03	530	5.44E-02	635	6.67E-02	740	3.57E-03
430	7.59E-03	535	5.59E-02	640	6.15E-02	745	3.06E-03
435	1.40E-02	540	5.81E-02	645	5.58E-02	750	2.61E-03
440	2.50E-02	545	6.06E-02	650	5.03E-02	755	2.23E-03
445	4.63E-02	550	6.30E-02	655	4.50E-02	760	1.89E-03
450	6.81E-02	555	6.60E-02	660	3.98E-02	765	1.63E-03
455	6.04E-02	560	6.94E-02	665	3.50E-02	770	1.38E-03
460	4.13E-02	565	7.30E-02	670	3.06E-02	775	1.18E-03
465	3.36E-02	570	7.66E-02	675	2.68E-02	780	1.01E-03
470	2.65E-02	575	8.01E-02	680	2.33E-02		
475	1.99E-02	580	8.35E-02	685	2.03E-02		
480	1.85E-02	585	8.65E-02	690	1.75E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4143, 0.3985)

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

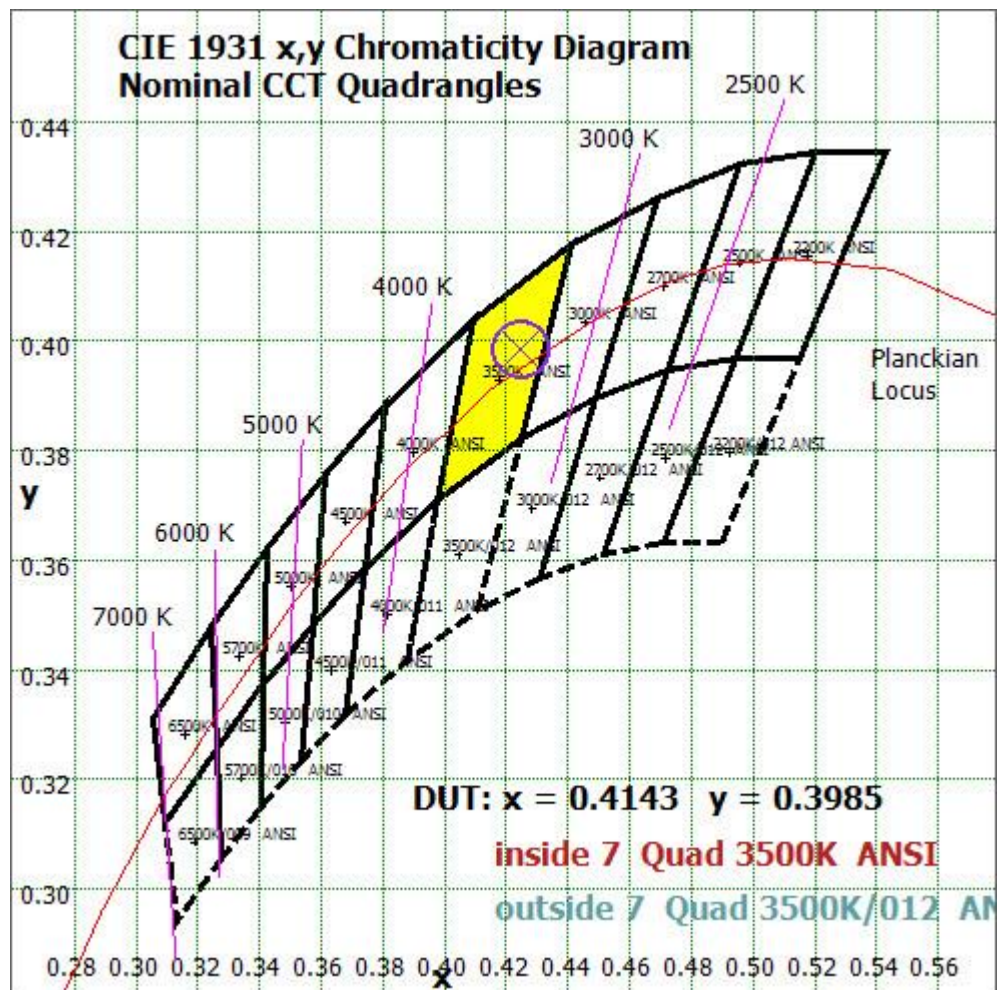


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

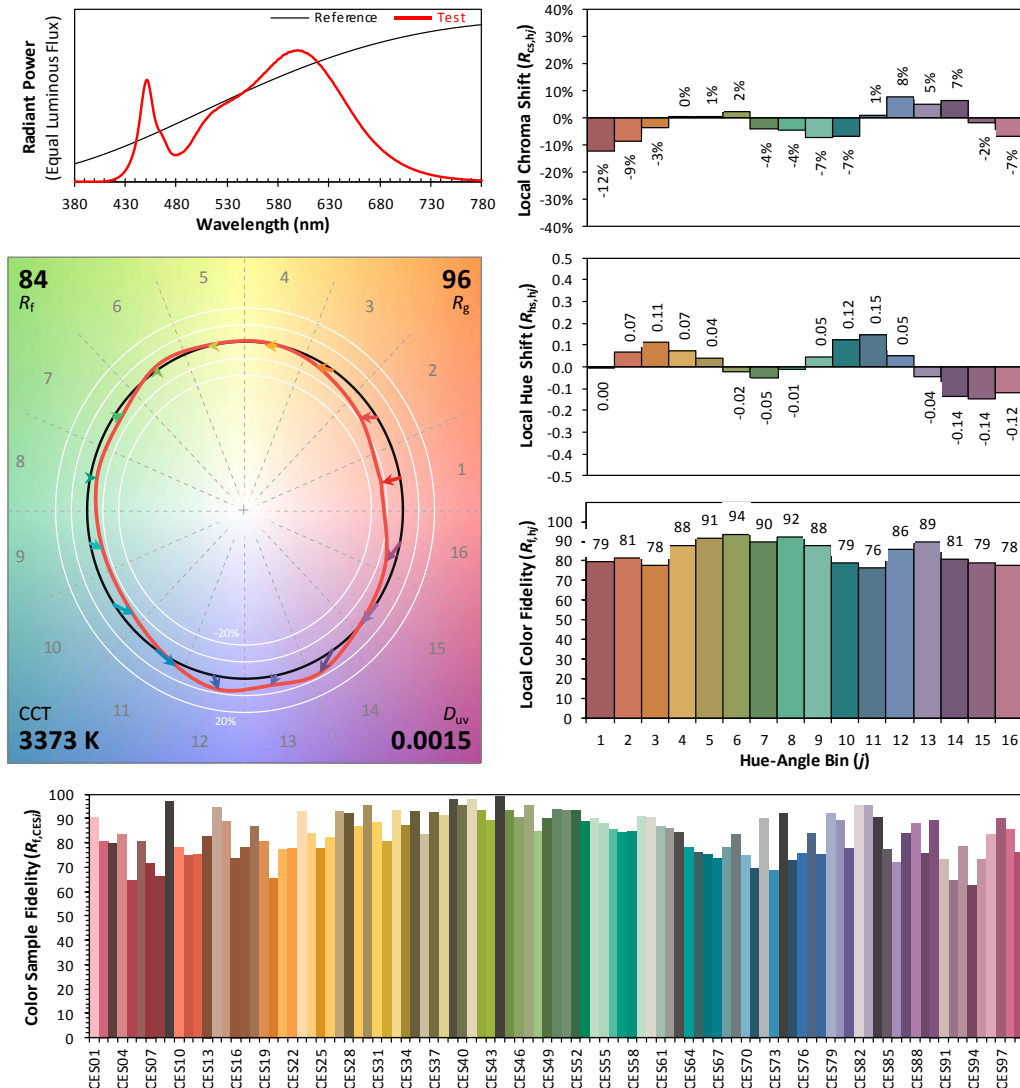
ANSI/IES TM-30-18 Color Rendition Report

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 0.4143
 y 0.3985
 u' 0.2384
 v' 0.5158

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	145.787	3.04%
10- 20	419.345	8.75%
20- 30	641.568	13.39%
30- 40	785.567	16.39%
40- 50	834.29	17.41%
50- 60	781.949	16.32%
60- 70	634.291	13.24%
70- 80	412.253	8.60%
80- 90	133.013	2.78%
90-100	0.529	0.01%
100-110	0.576	0.01%
110-120	0.583	0.01%
120-130	0.594	0.01%
130-140	0.612	0.01%
140-150	0.54	0.01%
150-160	0.424	0.01%
160-170	0.284	0.01%
170-180	0.109	0.00%
Total	4792.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3608.506	75.30%
60- 90	1179.557	24.61%
0-90	4788.063	99.91%
90- 180	4.251	0.09%
0- 180	4792.3	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	14.6	16.3	14.9	16.6	16.9	14.9	16.6	15.3	16.9	17.2
	3H	16.5	18.0	16.8	18.3	18.7	17.1	18.7	17.5	19.0	19.4
	4H	17.2	18.6	17.6	19.0	19.3	18.1	19.5	18.5	19.9	20.3
	6H	17.6	19.0	18.1	19.4	19.7	19.0	20.3	19.4	20.7	21.1
	8H	17.8	19.1	18.2	19.5	19.9	19.3	20.6	19.8	21.0	21.4
	12H	17.8	19.1	18.3	19.5	19.9	19.5	20.8	20.0	21.2	21.6
4H	2H	15.3	16.8	15.7	17.1	17.5	15.6	17.1	16.0	17.4	17.8
	3H	17.5	18.7	17.9	19.1	19.5	18.1	19.3	18.5	19.7	20.1
	4H	18.3	19.4	18.8	19.8	20.3	19.2	20.3	19.6	20.7	21.2
	6H	19.0	19.9	19.4	20.4	20.8	20.3	21.2	20.7	21.7	22.1
	8H	19.1	20.1	19.6	20.5	21.0	20.7	21.6	21.1	22.0	22.5
	12H	19.2	20.1	19.7	20.5	21.0	21.0	21.8	21.5	22.3	22.7
8H	4H	18.8	19.7	19.3	20.2	20.7	19.6	20.5	20.0	20.9	21.4
	6H	19.6	20.4	20.1	20.9	21.4	20.8	21.6	21.3	22.1	22.5
	8H	19.9	20.6	20.4	21.1	21.6	21.4	22.1	21.9	22.6	23.0
	12H	20.1	20.7	20.6	21.2	21.8	21.8	22.4	22.3	22.9	23.4
12H	4H	18.9	19.8	19.4	20.2	20.7	19.6	20.5	20.1	20.9	21.4
	6H	19.8	20.5	20.3	21.0	21.5	20.9	21.6	21.4	22.1	22.6
	8H	20.2	20.8	20.7	21.3	21.8	21.5	22.1	22.0	22.6	23.2

Chart 5: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

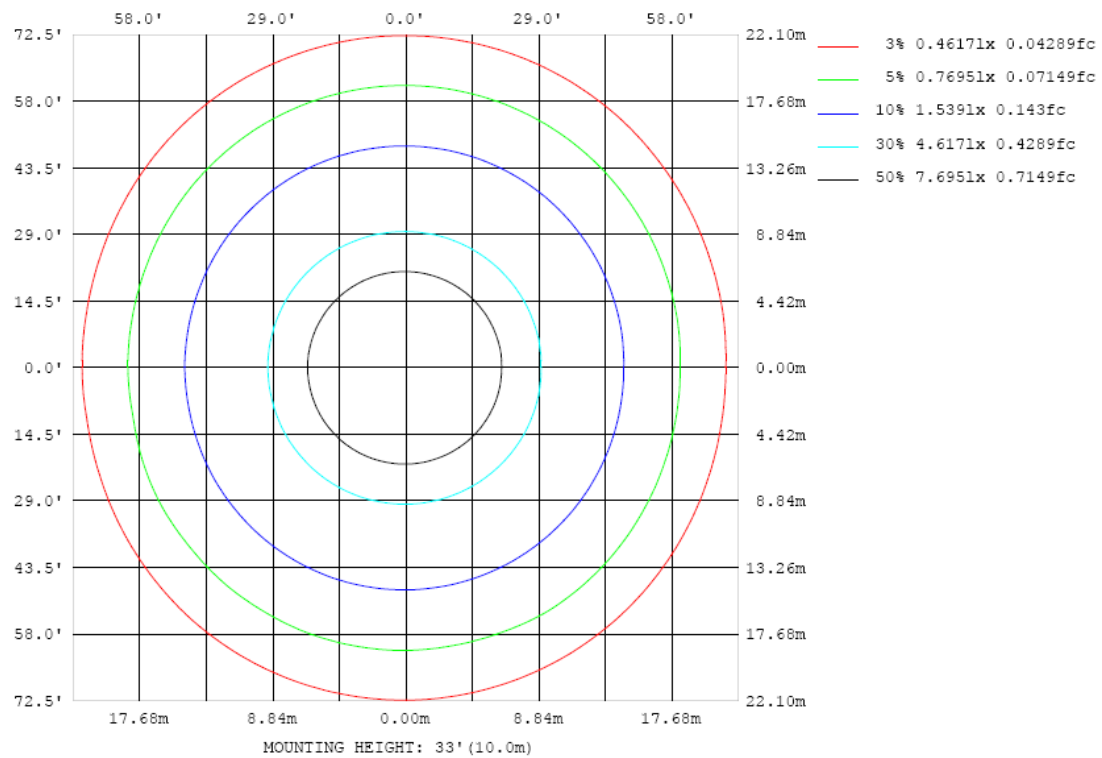


Chart 6: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

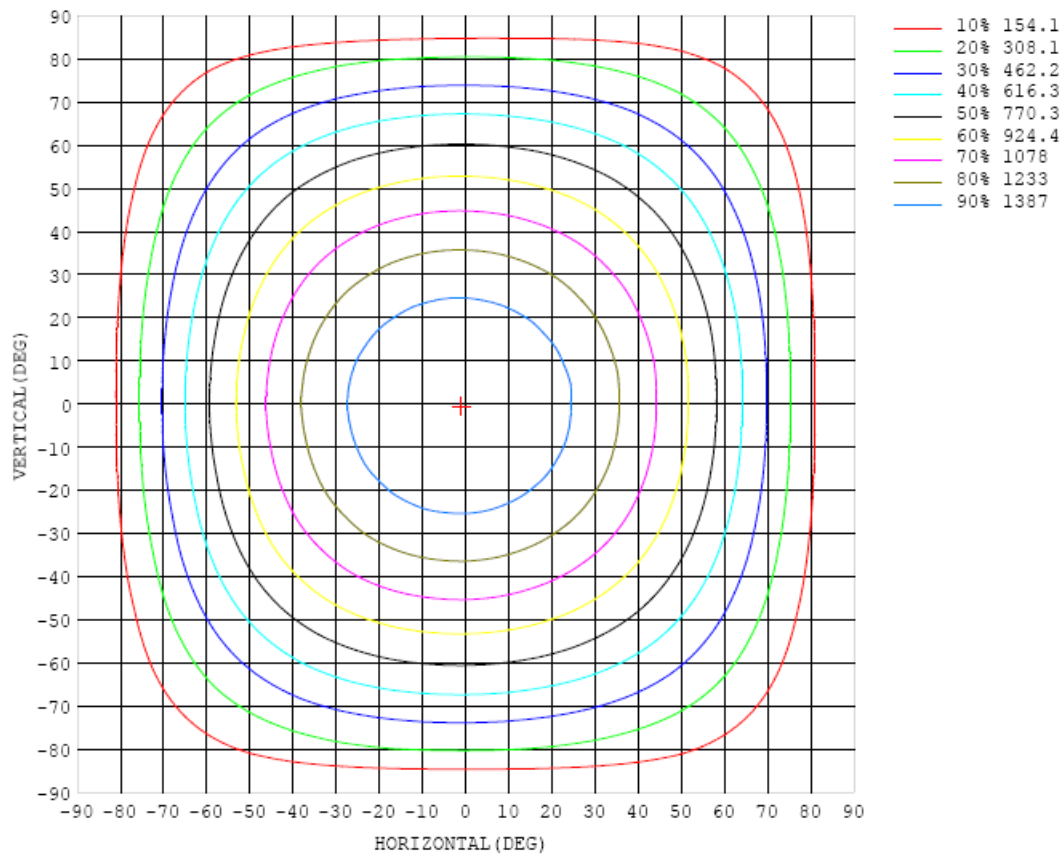


Chart 7: Isocandela Plot

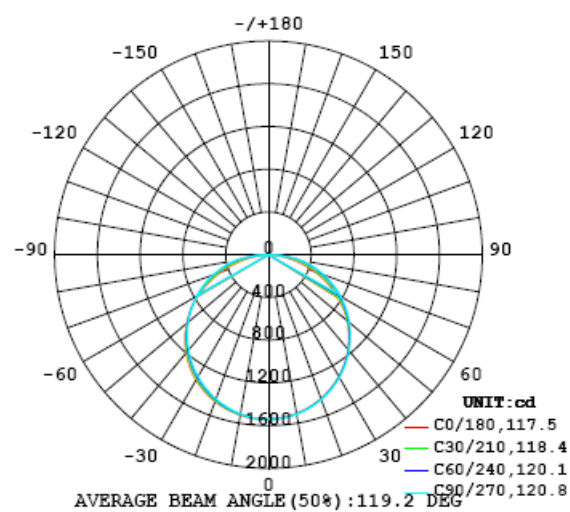


Chart 8: Polar Candela Distribution

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	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539
5	1529	1530	1530	1532	1532	1532	1532	1533	1534	1534	1533	1534	1536	1537	1536	1536	1537	1536	1538
10	1508	1510	1510	1511	1513	1511	1513	1514	1515	1516	1518	1518	1520	1521	1521	1522	1522	1522	1524
15	1477	1478	1478	1479	1481	1480	1482	1482	1484	1486	1486	1490	1492	1494	1494	1497	1497	1497	1500
20	1434	1435	1437	1436	1439	1437	1439	1440	1442	1444	1445	1448	1450	1456	1455	1459	1459	1460	1463
25	1380	1382	1383	1382	1385	1385	1385	1386	1389	1391	1393	1397	1400	1404	1405	1409	1410	1412	1416
30	1317	1318	1319	1318	1320	1319	1322	1322	1325	1327	1330	1335	1339	1343	1345	1349	1349	1351	1354
35	1242	1243	1244	1244	1245	1246	1247	1249	1252	1254	1258	1262	1266	1271	1272	1276	1278	1279	1283
40	1157	1159	1160	1160	1163	1163	1165	1167	1171	1173	1176	1181	1184	1189	1189	1194	1194	1195	1200
45	1062	1064	1067	1068	1071	1072	1075	1077	1082	1085	1087	1091	1094	1098	1098	1100	1100	1101	1105
50	959	961	964	967	971	974	977	982	986	990	992	996	998	999	998	998	995	995	999
55	845	847	852	857	864	869	875	881	886	889	891	894	894	893	889	886	881	877	882
60	722	725	730	745	750	758	767	774	779	783	785	786	784	781	774	766	756	749	754
65	592	595	605	617	631	643	654	661	667	671	672	671	668	662	650	637	623	613	618
70	455	460	474	491	510	525	537	546	552	555	555	554	549	539	524	506	485	470	474
75	315	322	340	364	386	404	418	427	433	436	436	434	427	415	396	373	346	325	327
80	179	187	210	238	262	283	299	310	316	319	318	315	305	289	267	241	211	184	183
85	64.2	72.8	95.3	118	134	142	145	144	142	140	141	143	144	139	129	112	87.7	65.6	61.2
90	2.15	2.86	5.62	1.08	0.66	4.81	2.07	1.54	1.26	1.11	1.06	0.25	1.39	1.58	1.60	1.29	3.30	0.90	0.48
95	0.26	0.24	0.23	0.24	0.25	0.26	0.27	0.27	0.27	0.27	0.28	0.27	0.27	0.26	0.25	0.24	0.23	0.24	0.60
100	0.35	0.31	0.26	0.26	0.27	0.28	0.29	0.29	0.30	0.30	0.30	0.30	0.30	0.28	0.27	0.27	0.26	0.31	0.73
105	0.41	0.37	0.33	0.30	0.30	0.32	0.33	0.33	0.33	0.33	0.34	0.34	0.34	0.32	0.31	0.30	0.32	0.37	0.79
110	0.47	0.43	0.40	0.36	0.34	0.36	0.37	0.37	0.36	0.35	0.37	0.37	0.38	0.36	0.35	0.37	0.40	0.43	0.79
115	0.55	0.49	0.45	0.44	0.41	0.41	0.40	0.41	0.40	0.40	0.41	0.43	0.43	0.42	0.43	0.45	0.48	0.49	0.78
120	0.62	0.57	0.49	0.51	0.48	0.48	0.48	0.46	0.47	0.47	0.48	0.50	0.51	0.50	0.51	0.54	0.53	0.55	0.81
125	0.68	0.63	0.57	0.56	0.54	0.49	0.55	0.54	0.53	0.53	0.54	0.56	0.56	0.54	0.56	0.62	0.60	0.62	0.87
130	0.73	0.65	0.64	0.57	0.61	0.62	0.56	0.56	0.59	0.61	0.60	0.57	0.55	0.62	0.64	0.60	0.66	0.68	0.92
135	0.79	0.72	0.69	0.67	0.58	0.66	0.68	0.64	0.60	0.59	0.59	0.62	0.64	0.65	0.60	0.71	0.70	0.68	0.99
140	0.80	0.78	0.70	0.69	0.65	0.59	0.64	0.66	0.66	0.67	0.64	0.61	0.63	0.57	0.66	0.70	0.69	0.74	1.01
145	0.83	0.84	0.67	0.72	0.70	0.67	0.64	0.59	0.58	0.60	0.56	0.52	0.56	0.66	0.69	0.71	0.70	0.81	1.04
150	0.88	0.89	0.82	0.79	0.76	0.75	0.72	0.70	0.70	0.68	0.68	0.65	0.66	0.71	0.74	0.74	0.69	0.88	1.08
155	0.95	0.94	0.94	0.80	0.82	0.78	0.76	0.76	0.76	0.72	0.72	0.71	0.71	0.76	0.80	0.76	0.85	0.94	1.10
160	1.03	1.01	1.02	0.96	0.85	0.79	0.78	0.80	0.79	0.74	0.73	0.77	0.84	0.82	0.89	0.97	1.02	1.15	
165	1.09	1.10	1.11	1.11	1.08	0.98	0.88	0.80	0.80	0.78	0.80	0.79	0.85	0.94	1.02	1.08	1.10	1.10	1.14
170	1.15	1.15	1.16	1.15	1.14	1.10	0.99	0.90	0.92	0.88	0.88	0.92	1.00	1.08	1.09	1.10	1.11	1.14	1.18
175	1.15	1.22	1.25	1.27	1.29	1.30	1.23	1.18	1.22	1.10	1.04	1.04	1.09	1.11	1.11	1.14	1.17	1.19	1.19
180	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

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	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539	1539		
5	1537	1537	1537	1536	1536	1535	1535	1533	1533	1530	1531	1531	1530	1530	1528	1532	1531		
10	1525	1524	1522	1521	1517	1516	1514	1513	1511	1510	1508	1509	1509	1508	1510	1509	1510		
15	1499	1497	1495	1492	1488	1486	1482	1481	1479	1478	1476	1476	1476	1474	1477	1477	1479		
20	1462	1460	1456	1452	1447	1444	1440	1437	1435	1433	1432	1432	1432	1431	1434	1434	1437		
25	1413	1410	1405	1402	1394	1391	1387	1384	1381	1378	1377	1376	1378	1378	1380	1380	1384		
30	1353	1349	1345	1340	1332	1329	1323	1319	1315	1313	1312	1312	1313	1313	1316	1317	1320		
35	1281	1277	1271	1266	1259	1255	1249	1246	1243	1240	1239	1238	1240	1239	1243	1244	1247		
40	1198	1193	1189	1184	1178	1173	1168	1165	1161	1158	1157	1156	1158	1156	1159	1160	1162		
45	1103	1099	1095	1093	1087	1083	1080	1077	1073	1070	1069	1067	1068	1065	1068	1067	1069		
50	997	995	993	991	988	986	984	982	979	977	974	972	971	967	967	965	966		
55	881	880	882	884	882	884	882	881	879	876	874	870	868	861	859	854	853		
60	754	757	762	768	771	775	776	776	774	772	769	763	759	749	743	735	732		
65	619	626	636	647	655	661	664	666	665	662	659	653	646	634	622	611	604		
70	478	490	506	523	535	544	549	552	552	550	546	539	529	515	499	481	470		
75	333	351	374	395	412	423	430	434	435	433	430	422	411	394	373	350	333		
80	193	217	244	268	287	303	313	317	319	318	315	306	291	272	249	221	198		
85	72.2	93.7	115	128	134	138	139	140	143	146	153	157	156	147	130	107	82.5		
90	0.49	0.51	0.54	0.56	0.59	0.61	0.62	0.63	0.63	0.63	0.63	0.15	0.44	0.25	0.16	4.32	0.74		
95	0.60	0.59	0.61	0.64	0.67	0.70	0.71	0.71	0.71	0.70	0.69	0.67	0.65	0.62	0.60	0.57	0.58		
100	0.70	0.66	0.67	0.69	0.72	0.76	0.78	0.77	0.76	0.76	0.75	0.74	0.72	0.69	0.67	0.65	0.69		
105	0.75	0.74	0.70	0.71	0.75	0.80	0.82	0.81	0.80	0.80	0.80	0.79	0.77	0.74	0.72	0.73	0.76		
110	0.74	0.74	0.70	0.70	0.72	0.77	0.81	0.80	0.79	0.79	0.80	0.79	0.77	0.74	0.72	0.76	0.76		
115	0.73	0.72	0.71	0.67	0.68	0.72	0.75	0.74	0.73	0.74	0.76	0.75	0.74	0.71	0.74	0.74	0.76		
120	0.76	0.73	0.74	0.70	0.65	0.68	0.71	0.70	0.69	0.70	0.72	0.72	0.72	0.72	0.75	0.74	0.78		
125	0.84	0.80	0.81	0.76	0.71	0.70	0.69	0.69	0.69	0.69	0.72	0.73	0.76	0.76	0.78	0.78	0.84		
130	0.87	0.86	0.84	0.84	0.82	0.76	0.77	0.81	0.81	0.79	0.81	0.79	0.86	0.84	0.80	0.84	0.86		
135	0.92	0.94	0.96	0.93	0.93	0.93	0.91	0.94	0.94	0.92	0.96	0.98	0.97	0.95	0.94	0.93	0.96		
140	1.00	0.99	1.01	1.00	0.98	1.02	1.01	1.09	1.11	1.07	1.07	1.08	1.00	0.97	0.97	0.96	1.01		
145	1.05	0.98	1.06	1.06	1.05	1.01	1.03	1.13	1.17	1.14	1.06	1.01	1.02	0.99	0.98	0.89	1.02		
150	1.08	1.05	1.07	1.10	1.07	1.03	1.05	1.10	1.11	1.02	1.01	1.02	1.02	0.97	0.96	1.02	1.08		
155	1.10	1.11	1.03	1.09	1.05	0.99	0.99	0.97	0.97	0.98	0.98	0.98	0.97	0.97	0.96	1.08	1.10		
160	1.14	1.14	1.11	1.04	1.06	0.99	0.91	0.96	0.95	0.97	0.95	0.94	0.95	0.95	1.08	1.12	1.14		
165	1.14	1.15	1.15	1.15	1.11	1.01	0.94	0.92	0.93	0.91	0.87	0.88	0.93	1.02	1.09	1.11	1.13		
170	1.19	1.22	1.23	1.24	1.25	1.22	1.12	1.05	1.03	1.03	1.01	1.01	1.04	1.09	1.13	1.15	1.17		
175	1.22	1.26	1.28	1.27	1.28	1.27	1.21	1.14	1.13	1.14	1.19	1.14	1.07	1.07	1.12	1.16	1.14		
180	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15		

Table 7: Luminous Intensity Data

TEST RESULTS (35W 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)	0.276	0.249
Power Factor	0.9947	0.9402
Test Power (W)	32.92	32.54
THD A%	7.26	13.61
Luminous Efficacy (lm/W)	148.9	149.1
Total Luminous Flux (lm)	4902.8	4852.2
Color Rendering Index (CRI)	83.4	
R9	11.2	
Correlated Color Temperature (CCT)(K)	3991	
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	81.7
R2	89.6
R3	95.1
R4	81.9
R5	81.5
R6	85.2
R7	86.5
R8	65.4
R9	11.2
R10	75.1
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)	0.276
Power Factor	0.9949
Power (W)	32.94
Luminous Efficacy (lm/W)	149.2
Total Luminous Flux (lm)	4915.7
Beam Angle (°)	117.5 (0°-180°) / 120.9 (90°-270°)
Center Beam Candle Power (cd)	1579
Maximum Beam Candle Power (cd)	1580 (At: C=150.0, Gamma=1.5)
Spacing Criteria	1.31 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0°-60° Zone	75.29%
Zonal Lumens in the 60°-90° Zone	24.62%
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

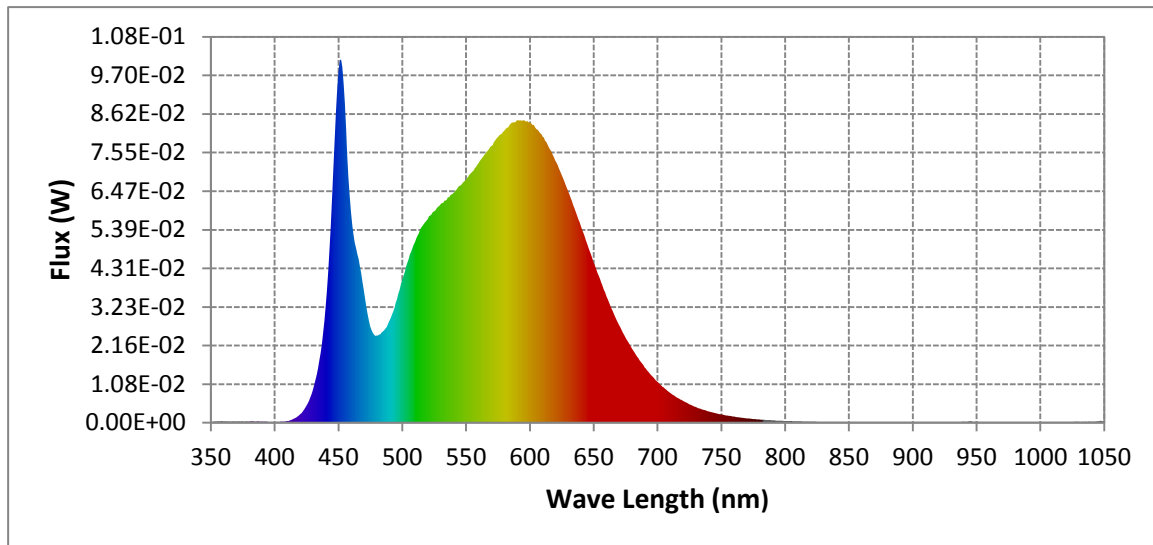
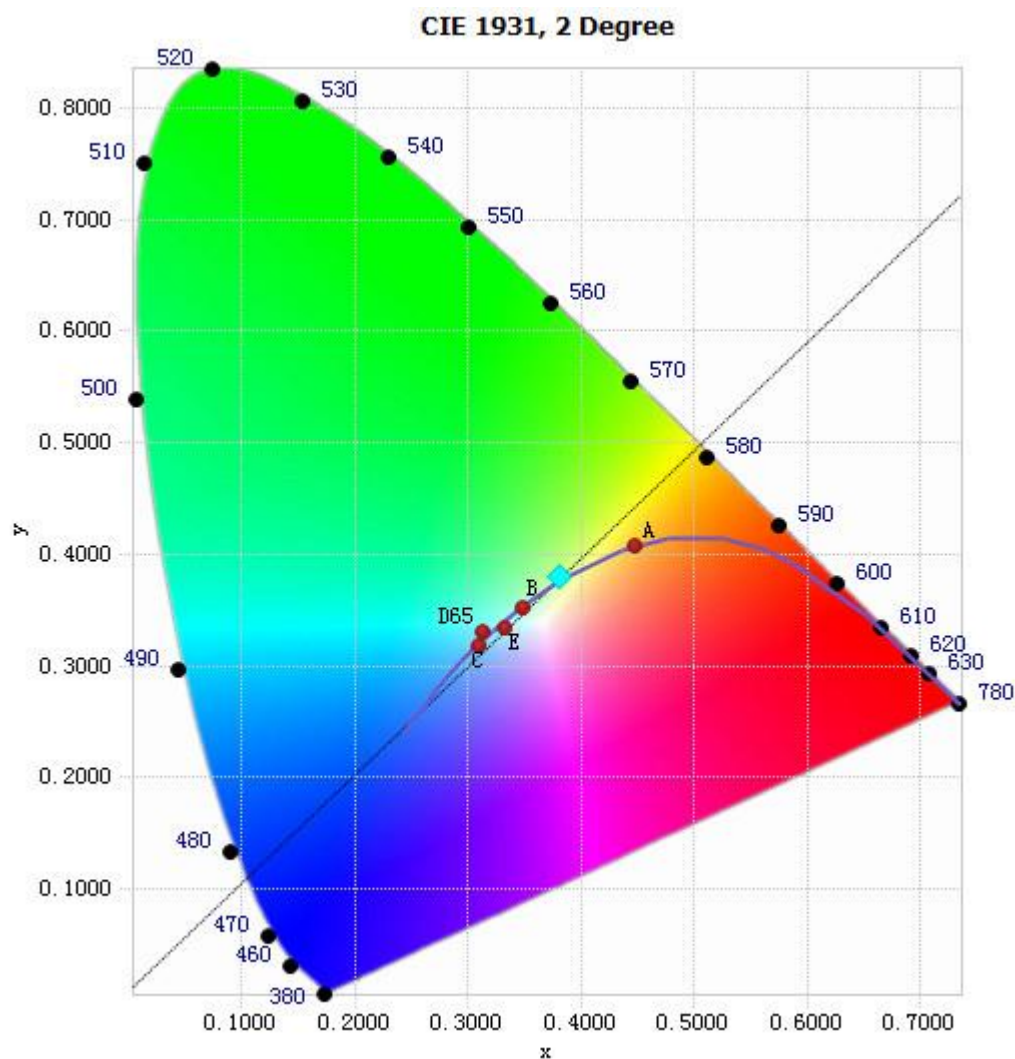


Chart 9: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.69E-04	485	2.56E-02	590	8.46E-02	695	1.34E-02
385	3.41E-04	490	2.85E-02	595	8.45E-02	700	1.14E-02
390	2.80E-04	495	3.35E-02	600	8.39E-02	705	9.85E-03
395	2.41E-04	500	3.98E-02	605	8.20E-02	710	8.34E-03
400	2.52E-04	505	4.57E-02	610	7.99E-02	715	7.12E-03
405	2.68E-04	510	5.05E-02	615	7.69E-02	720	6.13E-03
410	4.93E-04	515	5.46E-02	620	7.32E-02	725	5.17E-03
415	1.10E-03	520	5.69E-02	625	6.92E-02	730	4.40E-03
420	2.36E-03	525	5.91E-02	630	6.48E-02	735	3.72E-03
425	4.81E-03	530	6.10E-02	635	5.99E-02	740	3.18E-03
430	9.19E-03	535	6.23E-02	640	5.50E-02	745	2.69E-03
435	1.73E-02	540	6.40E-02	645	4.99E-02	750	2.34E-03
440	3.25E-02	545	6.61E-02	650	4.48E-02	755	1.98E-03
445	6.28E-02	550	6.77E-02	655	4.01E-02	760	1.71E-03
450	9.81E-02	555	7.01E-02	660	3.54E-02	765	1.46E-03
455	8.93E-02	560	7.25E-02	665	3.11E-02	770	1.25E-03
460	5.89E-02	565	7.50E-02	670	2.72E-02	775	1.03E-03
465	4.71E-02	570	7.73E-02	675	2.37E-02	780	9.10E-04
470	3.71E-02	575	7.97E-02	680	2.07E-02		
475	2.70E-02	580	8.15E-02	685	1.80E-02		
480	2.44E-02	585	8.35E-02	690	1.55E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3814, 0.3797)

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

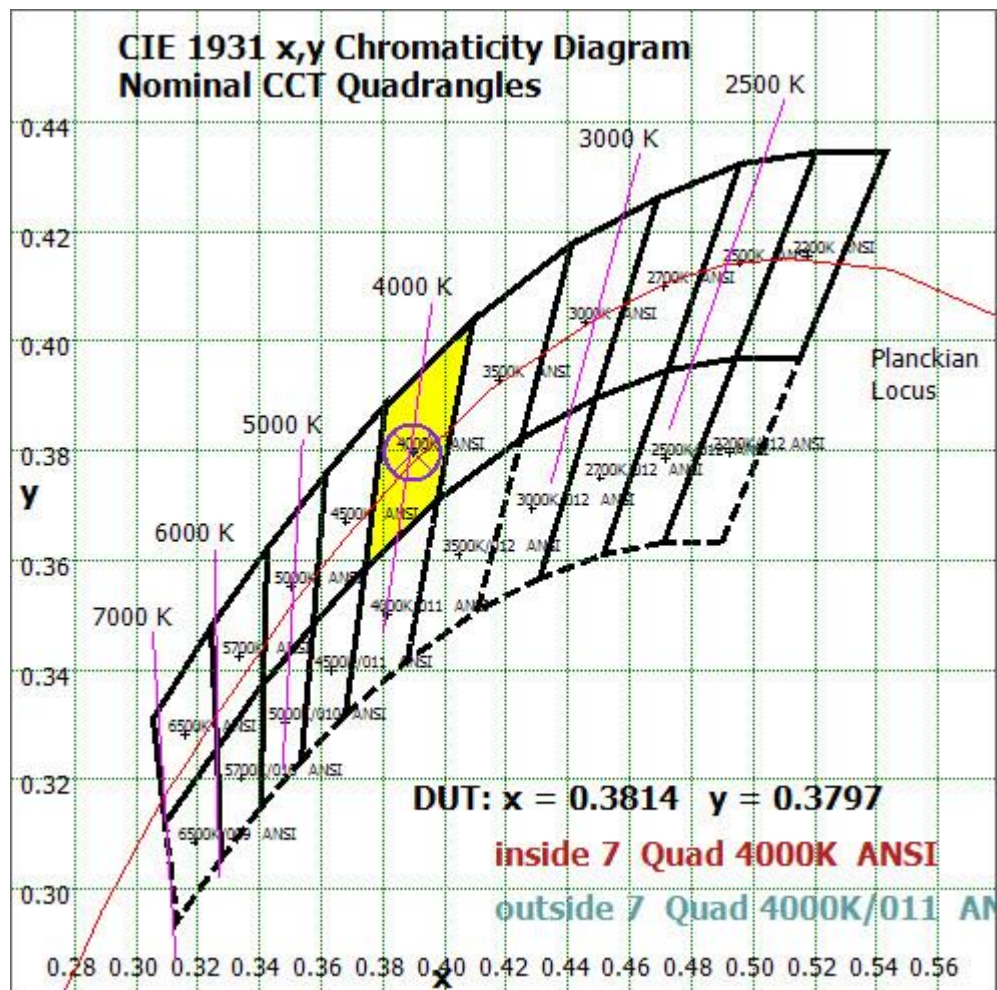


Chart 11: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

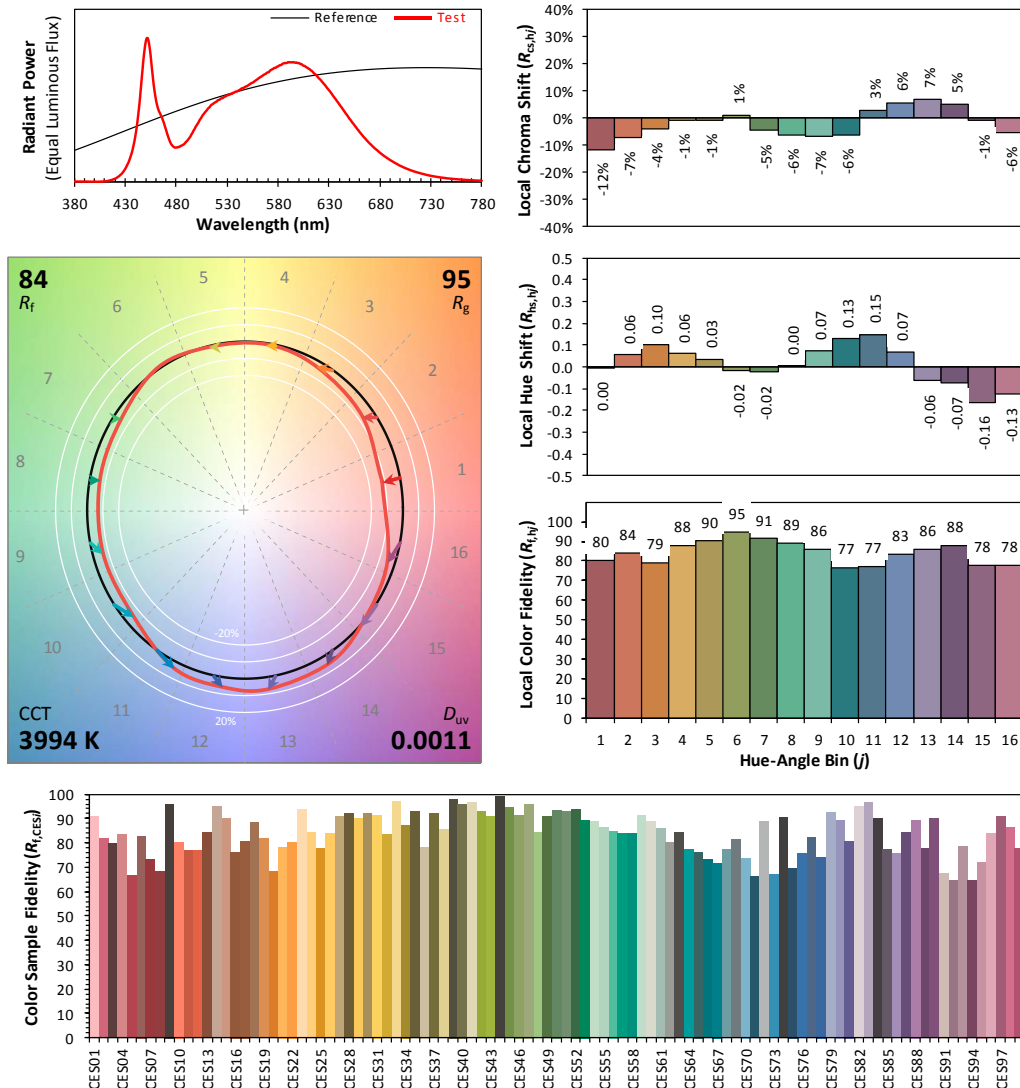
ANSI/IES TM-30-18 Color Rendition Report

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_9 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	149.435	3.04%
10- 20	429.977	8.75%
20- 30	657.878	13.38%
30- 40	805.659	16.39%
40- 50	855.762	17.41%
50- 60	802.21	16.32%
60- 70	650.813	13.24%
70- 80	423.227	8.61%
80- 90	136.387	2.77%
90-100	0.517	0.01%
100-110	0.582	0.01%
110-120	0.592	0.01%
120-130	0.605	0.01%
130-140	0.625	0.01%
140-150	0.552	0.01%
150-160	0.434	0.01%
160-170	0.29	0.01%
170-180	0.111	0.00%
Total	4915.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3700.921	75.29%
60- 90	1210.427	24.62%
0-90	4911.348	99.91%
90- 180	4.308	0.09%
0- 180	4915.7	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	14.6	16.3	15.0	16.6	16.9	15.0	16.7	15.4	17.0	17.4
	3H	16.5	18.1	16.9	18.4	18.7	17.2	18.8	17.6	19.1	19.5
	4H	17.2	18.7	17.6	19.0	19.4	18.2	19.7	18.6	20.0	20.4
	6H	17.7	19.0	18.1	19.4	19.8	19.1	20.4	19.5	20.8	21.2
	8H	17.8	19.1	18.3	19.5	19.9	19.4	20.7	19.9	21.1	21.5
	12H	17.9	19.1	18.3	19.5	19.9	19.7	20.9	20.1	21.3	21.7
4H	2H	15.4	16.8	15.8	17.2	17.6	15.7	17.2	16.1	17.5	17.9
	3H	17.5	18.8	17.9	19.2	19.6	18.2	19.4	18.6	19.8	20.2
	4H	18.4	19.5	18.8	19.9	20.3	19.3	20.4	19.7	20.8	21.3
	6H	19.0	20.0	19.5	20.4	20.9	20.4	21.4	20.8	21.8	22.2
	8H	19.2	20.1	19.6	20.5	21.0	20.8	21.7	21.3	22.2	22.6
	12H	19.3	20.1	19.8	20.6	21.1	21.1	21.9	21.6	22.4	22.9
8H	4H	18.9	19.8	19.3	20.2	20.7	19.7	20.6	20.2	21.1	21.5
	6H	19.7	20.5	20.2	20.9	21.4	20.9	21.7	21.4	22.2	22.7
	8H	20.0	20.7	20.5	21.2	21.6	21.5	22.2	22.0	22.7	23.2
	12H	20.2	20.8	20.7	21.3	21.8	21.9	22.5	22.4	23.0	23.5
12H	4H	19.0	19.8	19.5	20.3	20.8	19.7	20.6	20.2	21.0	21.5
	6H	19.9	20.6	20.4	21.0	21.6	21.1	21.7	21.6	22.2	22.7
	8H	20.2	20.8	20.7	21.3	21.9	21.7	22.3	22.2	22.7	23.3

Chart 13: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

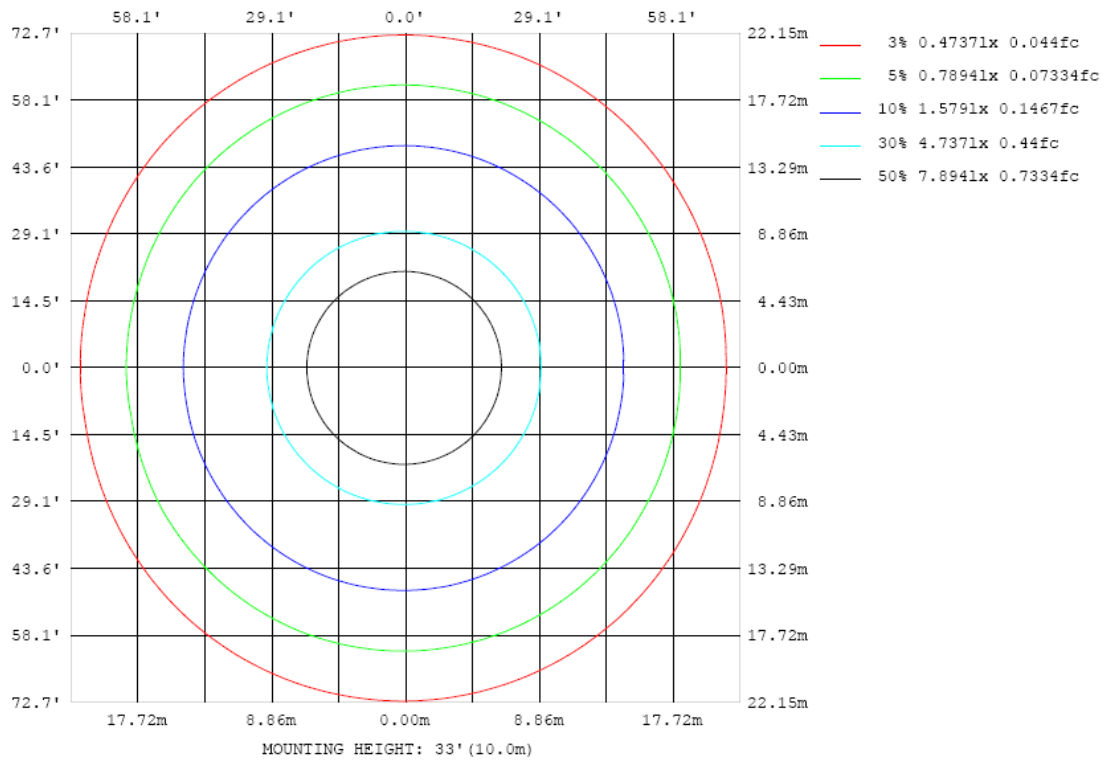


Chart 14: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

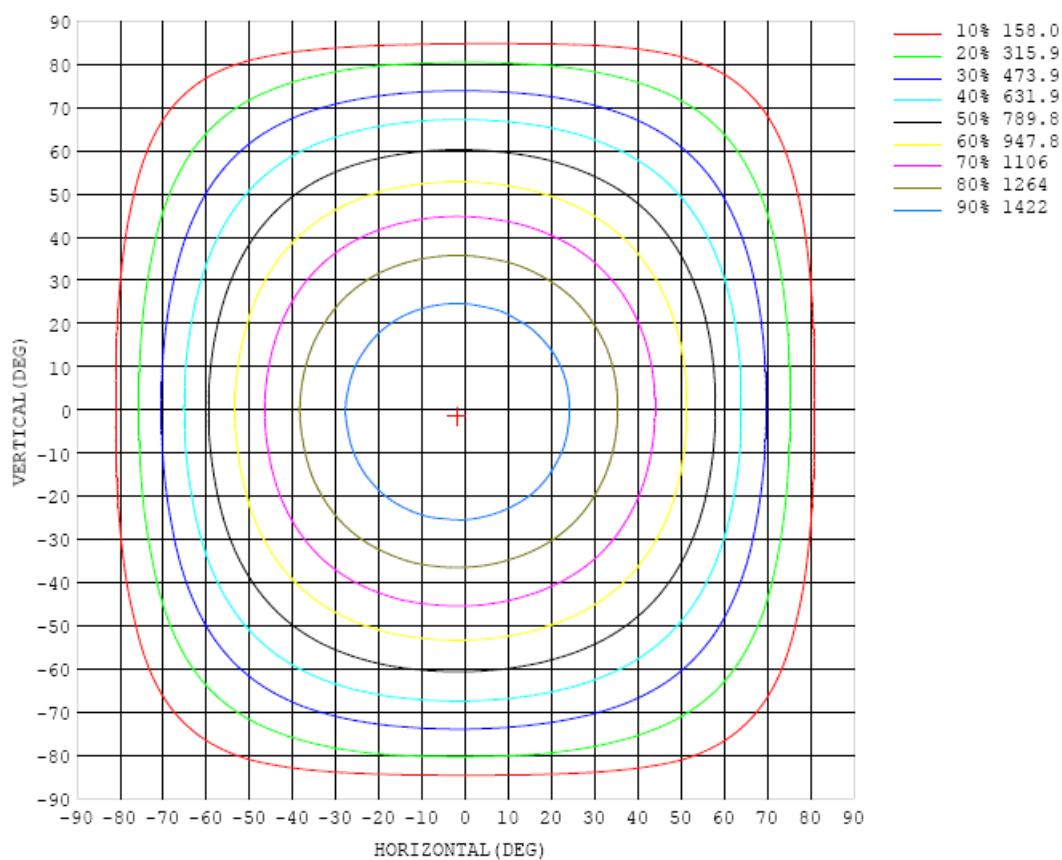


Chart 15: Isocandela Plot

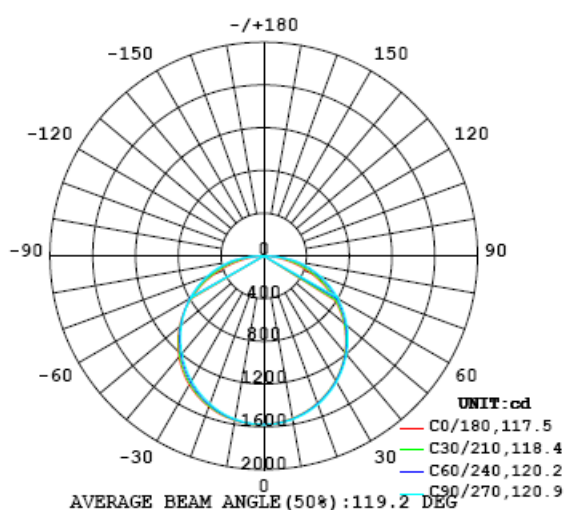


Chart 16: Polar Candela Distribution

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	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579
5	1565	1567	1566	1567	1569	1569	1569	1571	1572	1573	1573	1575	1575	1576	1577	1576	1576	1578	1574
10	1543	1544	1545	1546	1548	1549	1550	1551	1552	1554	1555	1558	1559	1561	1562	1562	1564	1564	1563
15	1510	1512	1513	1514	1515	1515	1518	1519	1522	1524	1526	1530	1531	1534	1536	1538	1540	1538	1540
20	1467	1467	1468	1470	1471	1472	1473	1475	1479	1481	1484	1488	1492	1495	1497	1500	1502	1501	1503
25	1412	1411	1413	1412	1416	1418	1418	1420	1423	1427	1430	1436	1439	1443	1447	1450	1453	1452	1454
30	1345	1346	1347	1347	1350	1351	1352	1355	1358	1363	1366	1373	1376	1381	1384	1389	1391	1391	1393
35	1268	1270	1271	1270	1273	1275	1277	1279	1284	1288	1292	1299	1302	1307	1312	1315	1318	1318	1320
40	1182	1183	1184	1184	1189	1191	1192	1196	1200	1204	1209	1215	1219	1224	1228	1231	1233	1232	1235
45	1085	1087	1089	1089	1093	1097	1100	1104	1109	1114	1117	1124	1127	1131	1132	1135	1137	1135	1138
50	978	979	984	986	991	997	1001	1006	1011	1016	1020	1025	1027	1029	1031	1029	1029	1027	1029
55	862	864	869	874	883	890	896	902	908	913	916	921	921	921	918	915	911	907	909
60	735	740	747	755	767	777	786	793	800	804	807	810	808	805	799	791	784	777	779
65	603	607	616	630	645	659	669	678	685	690	692	693	689	683	673	659	646	635	637
70	464	469	483	501	521	538	551	560	567	571	572	572	567	558	543	524	504	487	489
75	322	328	347	371	395	414	428	438	445	449	450	448	441	429	410	386	359	337	336
80	183	191	215	243	268	290	307	318	325	327	328	325	316	299	276	249	219	191	188
85	66.4	74.8	98.0	121	138	146	148	147	144	143	143	146	147	143	133	116	91.1	67.6	62.3
90	2.32	3.17	1.34	1.51	0.93	0.64	3.67	1.27	0.99	0.87	0.90	1.05	1.30	1.57	1.83	1.47	3.53	0.98	0.48
95	0.25	0.23	0.22	0.23	0.24	0.25	0.26	0.26	0.26	0.27	0.27	0.26	0.26	0.25	0.24	0.23	0.22	0.23	0.61
100	0.35	0.30	0.25	0.26	0.27	0.28	0.29	0.29	0.29	0.29	0.30	0.30	0.29	0.28	0.27	0.26	0.26	0.30	0.74
105	0.41	0.37	0.33	0.30	0.30	0.32	0.33	0.33	0.33	0.33	0.33	0.34	0.34	0.32	0.31	0.30	0.32	0.37	0.81
110	0.48	0.44	0.41	0.36	0.35	0.36	0.37	0.37	0.36	0.35	0.37	0.38	0.38	0.36	0.35	0.37	0.41	0.43	0.80
115	0.56	0.50	0.46	0.44	0.41	0.41	0.41	0.42	0.40	0.40	0.42	0.44	0.43	0.43	0.44	0.46	0.48	0.50	0.80
120	0.63	0.57	0.50	0.51	0.49	0.49	0.49	0.47	0.47	0.47	0.48	0.51	0.51	0.50	0.52	0.55	0.54	0.56	0.83
125	0.70	0.64	0.58	0.57	0.55	0.50	0.55	0.54	0.54	0.54	0.54	0.56	0.56	0.55	0.57	0.63	0.61	0.64	0.89
130	0.75	0.66	0.65	0.58	0.63	0.63	0.57	0.57	0.60	0.62	0.61	0.58	0.56	0.63	0.65	0.61	0.67	0.70	0.94
135	0.80	0.73	0.70	0.68	0.59	0.67	0.69	0.66	0.62	0.61	0.61	0.63	0.65	0.66	0.62	0.73	0.71	0.70	1.02
140	0.81	0.79	0.71	0.70	0.66	0.60	0.65	0.67	0.67	0.68	0.66	0.62	0.64	0.58	0.67	0.71	0.71	0.75	1.03
145	0.85	0.86	0.69	0.73	0.72	0.69	0.65	0.60	0.59	0.61	0.57	0.53	0.57	0.67	0.70	0.73	0.71	0.83	1.06
150	0.91	0.91	0.83	0.81	0.77	0.77	0.73	0.72	0.71	0.70	0.69	0.66	0.68	0.73	0.76	0.76	0.71	0.90	1.11
155	0.97	0.96	0.96	0.82	0.83	0.80	0.77	0.78	0.78	0.74	0.73	0.72	0.72	0.78	0.81	0.78	0.87	0.96	1.13
160	1.05	1.03	1.04	0.98	0.87	0.81	0.80	0.82	0.81	0.76	0.74	0.74	0.79	0.86	0.84	0.91	1.00	1.05	1.17
165	1.12	1.12	1.13	1.13	1.10	1.01	0.90	0.82	0.82	0.80	0.81	0.81	0.87	0.97	1.05	1.10	1.12	1.13	1.16
170	1.17	1.17	1.18	1.18	1.17	1.12	1.02	0.93	0.94	0.90	0.90	0.94	1.03	1.11	1.12	1.13	1.14	1.17	1.21
175	1.17	1.24	1.27	1.29	1.31	1.33	1.27	1.21	1.25	1.13	1.06	1.07	1.12	1.13	1.14	1.17	1.20	1.22	1.22
180	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18

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	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579	1579		
5	1575	1575	1575	1574	1575	1573	1571	1571	1571	1569	1570	1568	1569	1568	1568	1567	1566		
10	1563	1562	1560	1557	1557	1555	1553	1552	1550	1548	1548	1546	1547	1546	1547	1547	1545		
15	1537	1537	1533	1532	1529	1525	1522	1519	1517	1513	1514	1511	1510	1511	1511	1512	1511		
20	1501	1499	1494	1491	1487	1482	1478	1475	1472	1467	1469	1465	1466	1465	1465	1468	1468		
25	1451	1449	1444	1438	1434	1429	1424	1419	1416	1412	1411	1409	1410	1409	1410	1412	1412		
30	1390	1387	1381	1374	1370	1364	1358	1354	1349	1346	1346	1342	1343	1343	1344	1346	1347		
35	1317	1313	1308	1302	1296	1290	1283	1279	1274	1270	1269	1266	1266	1268	1268	1270	1270		
40	1231	1227	1222	1218	1212	1206	1200	1195	1190	1186	1185	1182	1182	1182	1183	1183	1185		
45	1135	1131	1127	1123	1120	1113	1108	1104	1100	1096	1094	1091	1090	1088	1088	1089	1088		
50	1026	1025	1022	1019	1018	1015	1010	1007	1003	999	997	993	991	987	985	983	983		
55	906	908	907	908	910	909	907	904	902	897	894	888	885	879	874	870	867		
60	777	780	785	791	795	797	797	796	794	790	786	780	773	765	757	750	744		
65	638	645	655	666	675	680	683	683	682	678	674	666	658	646	633	622	613		
70	492	505	521	538	552	560	565	566	565	563	558	550	539	524	507	490	476		
75	343	362	385	408	425	436	442	445	446	444	439	431	418	401	379	355	337		
80	198	223	252	276	297	313	322	326	328	326	322	312	297	277	253	225	201		
85	73.5	95.9	118	132	139	142	143	144	147	150	157	161	159	149	132	108	83.3		
90	0.48	0.50	0.53	0.56	0.58	0.61	0.62	0.62	0.63	0.63	0.64	0.60	0.09	0.86	0.22	4.86	0.71		
95	0.60	0.59	0.61	0.64	0.67	0.70	0.72	0.72	0.72	0.71	0.70	0.68	0.66	0.63	0.60	0.58	0.59		
100	0.71	0.67	0.67	0.69	0.73	0.77	0.79	0.78	0.77	0.76	0.76	0.75	0.73	0.70	0.68	0.66	0.70		
105	0.76	0.75	0.71	0.72	0.77	0.81	0.84	0.82	0.81	0.82	0.82	0.80	0.78	0.76	0.73	0.75	0.77		
110	0.75	0.76	0.71	0.71	0.74	0.79	0.82	0.81	0.80	0.81	0.81	0.81	0.79	0.76	0.73	0.77	0.78		
115	0.74	0.73	0.72	0.68	0.69	0.73	0.77	0.76	0.75	0.76	0.77	0.77	0.76	0.73	0.75	0.75	0.77		
120	0.77	0.74	0.75	0.71	0.66	0.70	0.72	0.71	0.71	0.72	0.73	0.73	0.74	0.74	0.76	0.75	0.79		
125	0.85	0.82	0.82	0.78	0.72	0.72	0.71	0.71	0.71	0.71	0.73	0.74	0.78	0.78	0.80	0.80	0.85		
130	0.88	0.87	0.85	0.85	0.83	0.78	0.79	0.83	0.83	0.81	0.83	0.81	0.88	0.87	0.82	0.86	0.88		
135	0.94	0.96	0.98	0.95	0.95	0.94	0.93	0.96	0.96	0.94	0.98	1.00	0.99	0.97	0.95	0.95	0.98		
140	1.02	1.01	1.03	1.02	1.00	1.05	1.03	1.11	1.13	1.10	1.09	1.10	1.03	1.00	1.00	0.98	1.04		
145	1.07	1.00	1.08	1.08	1.07	1.03	1.05	1.16	1.20	1.17	1.09	1.04	1.04	1.01	1.00	0.92	1.04		
150	1.10	1.07	1.09	1.12	1.09	1.06	1.08	1.13	1.13	1.05	1.03	1.04	1.04	1.00	0.98	1.04	1.10		
155	1.13	1.13	1.05	1.12	1.08	1.01	1.01	0.99	1.00	1.01	1.01	1.00	1.00	1.00	0.98	1.10	1.13		
160	1.16	1.17	1.13	1.07	1.08	1.01	0.93	0.98	0.98	0.99	0.97	0.97	0.98	0.97	1.10	1.15	1.17		
165	1.17	1.17	1.18	1.18	1.13	1.03	0.96	0.94	0.95	0.93	0.89	0.90	0.95	1.04	1.11	1.14	1.15		
170	1.22	1.25	1.26	1.27	1.28	1.25	1.14	1.07	1.05	1.05	1.04	1.03	1.07	1.11	1.15	1.18	1.19		
175	1.25	1.29	1.31	1.30	1.31	1.30	1.23	1.16	1.16	1.17	1.21	1.17	1.10	1.09	1.15	1.18	1.17		
180	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18		

Table 13: Luminous Intensity Data

TEST RESULTS (35W 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)	0.283	0.127
Power Factor	0.9948	0.9440
Test Power (W)	33.74	33.30
THD A%	7.18	13.68
Luminous Efficacy (lm/W)	143.2	143.6
Total Luminous Flux (lm)	4831.7	4783.1
Color Rendering Index (CRI)	82.5	
R9	7.6	
Correlated Color Temperature (CCT)(K)	4779	
Chromaticity Chroma x	0.3524	
Chromaticity Chroma y	0.3637	
Chromaticity Chroma u	0.2117	
Chromaticity Chroma v	0.3277	
Duv	0.0031	
Chromaticity Chroma u'	0.2117	
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	7.6
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)	0.283
Power Factor	0.9950
Power (W)	33.77
Luminous Efficacy (lm/W)	143.5
Total Luminous Flux (lm)	4846.8
Beam Angle (°)	118.3 (0°-180°) / 121.8 (90°-270°)
Center Beam Candle Power (cd)	1538
Maximum Beam Candle Power (cd)	1541 (At: C=310.0, Gamma=2.0)
Spacing Criteria	1.27 (0°-180°) / 1.29 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	74.83%
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

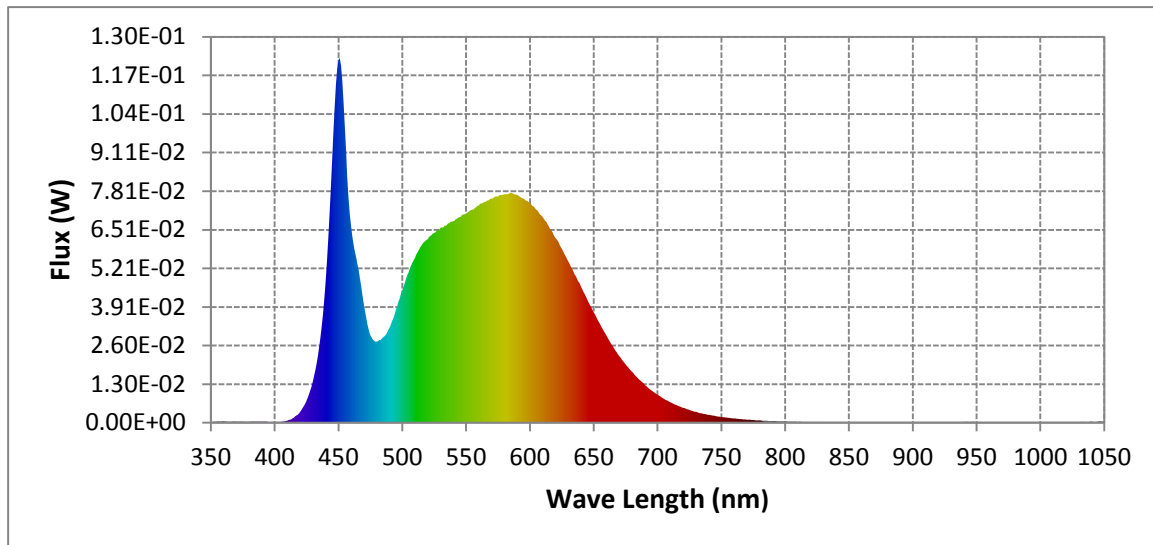
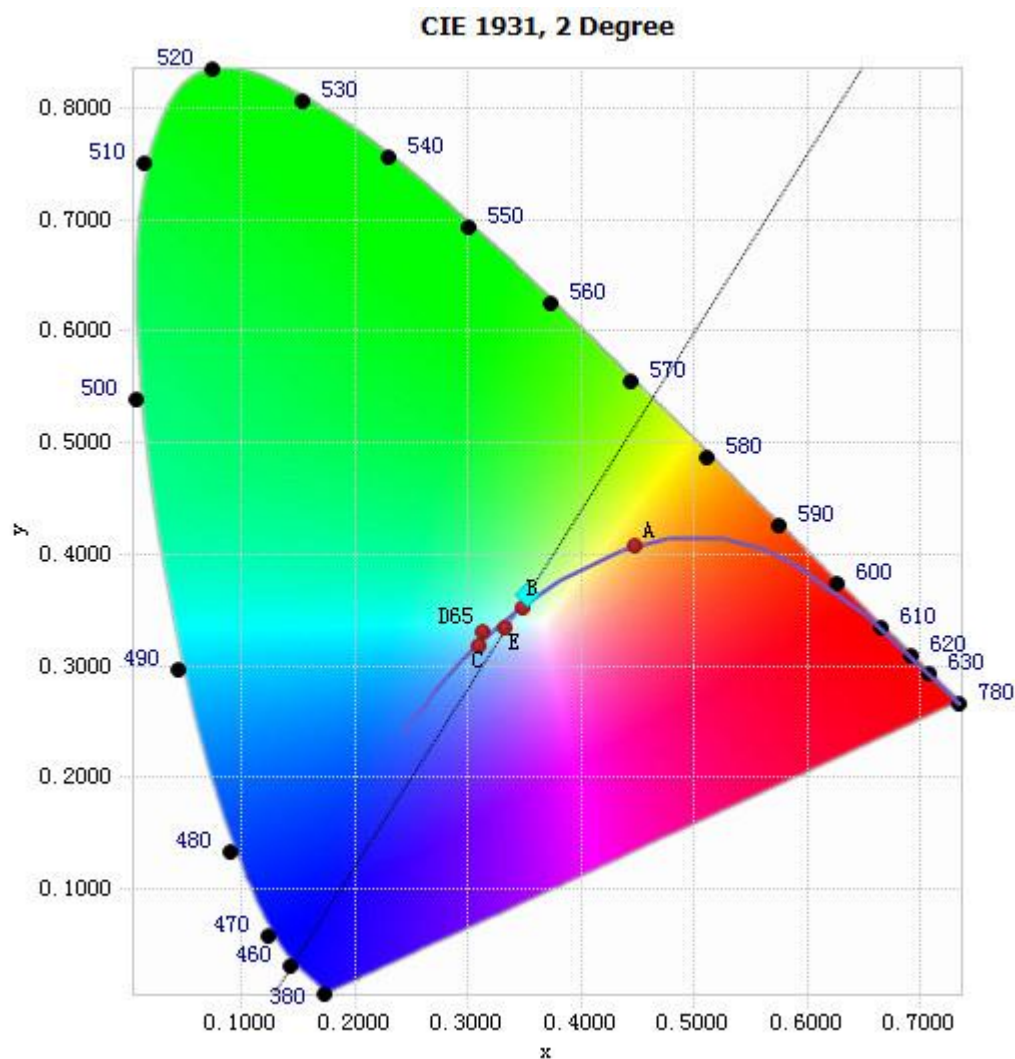


Chart 17: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	4.18E-04	485	2.87E-02	590	7.69E-02	695	1.11E-02
385	3.51E-04	490	3.20E-02	595	7.56E-02	700	9.51E-03
390	3.35E-04	495	3.79E-02	600	7.41E-02	705	8.12E-03
395	3.04E-04	500	4.46E-02	605	7.18E-02	710	6.94E-03
400	2.28E-04	505	5.07E-02	610	6.93E-02	715	5.94E-03
405	2.67E-04	510	5.56E-02	615	6.63E-02	720	5.07E-03
410	7.25E-04	515	5.98E-02	620	6.25E-02	725	4.34E-03
415	1.67E-03	520	6.20E-02	625	5.87E-02	730	3.69E-03
420	3.62E-03	525	6.40E-02	630	5.46E-02	735	3.16E-03
425	7.43E-03	530	6.58E-02	635	5.02E-02	740	2.69E-03
430	1.40E-02	535	6.66E-02	640	4.60E-02	745	2.30E-03
435	2.59E-02	540	6.80E-02	645	4.16E-02	750	1.97E-03
440	4.78E-02	545	6.93E-02	650	3.73E-02	755	1.69E-03
445	8.80E-02	550	7.03E-02	655	3.33E-02	760	1.45E-03
450	1.22E-01	555	7.19E-02	660	2.94E-02	765	1.24E-03
455	9.96E-02	560	7.33E-02	665	2.58E-02	770	1.06E-03
460	6.67E-02	565	7.44E-02	670	2.25E-02	775	9.12E-04
465	5.36E-02	570	7.56E-02	675	1.97E-02	780	7.93E-04
470	4.02E-02	575	7.63E-02	680	1.72E-02		
475	2.96E-02	580	7.70E-02	685	1.48E-02		
480	2.73E-02	585	7.76E-02	690	1.29E-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

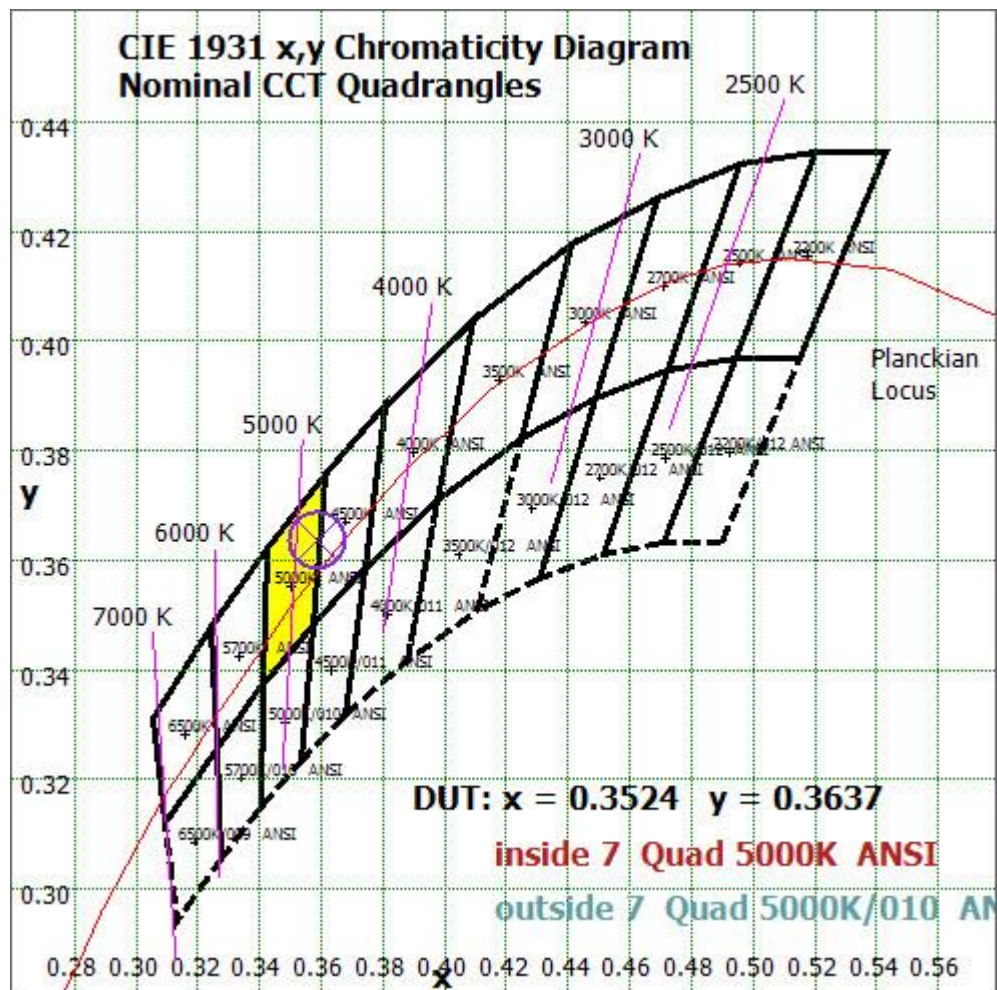


Chart 19: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

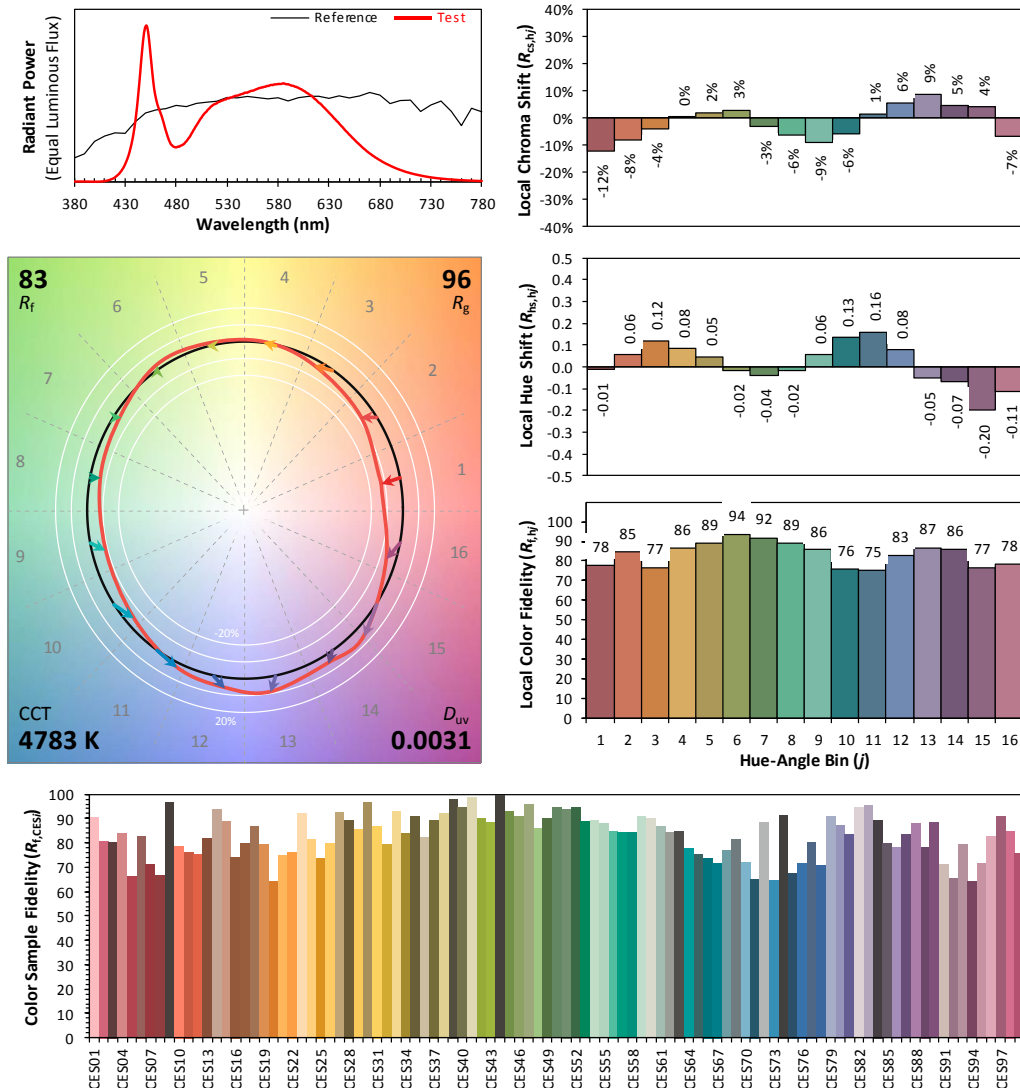
ANSI/IES TM-30-18 Color Rendition Report

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 0.3524
 y 0.3637
 u' 0.2117
 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	145.691	3.01%
10- 20	419.387	8.65%
20- 30	642.524	13.26%
30- 40	788.467	16.27%
40- 50	839.962	17.33%
50- 60	790.714	16.31%
60- 70	645.594	13.32%
70- 80	425.023	8.77%
80- 90	145.217	3.00%
90-100	0.528	0.01%
100-110	0.565	0.01%
110-120	0.577	0.01%
120-130	0.588	0.01%
130-140	0.607	0.01%
140-150	0.534	0.01%
150-160	0.419	0.01%
160-170	0.28	0.01%
170-180	0.107	0.00%
Total	4846.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3626.745	74.83%
60- 90	1215.834	25.09%
0-90	4842.579	99.91%
90- 180	4.205	0.09%
0- 180	4846.8	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	15.0	16.7	15.3	17.0	17.3	14.9	16.6	15.2	16.9	17.2
	3H	16.9	18.4	17.3	18.8	19.1	17.1	18.7	17.5	19.0	19.3
	4H	17.6	19.1	18.0	19.4	19.8	18.1	19.5	18.5	19.9	20.3
	6H	18.1	19.5	18.6	19.9	20.2	19.0	20.3	19.4	20.7	21.1
	8H	18.3	19.6	18.7	20.0	20.4	19.4	20.7	19.8	21.0	21.4
	12H	18.4	19.6	18.8	20.0	20.4	19.6	20.9	20.0	21.2	21.7
4H	2H	15.7	17.2	16.1	17.5	17.9	15.6	17.0	16.0	17.4	17.8
	3H	17.9	19.1	18.3	19.5	19.9	18.1	19.3	18.5	19.7	20.1
	4H	18.8	19.9	19.2	20.3	20.7	19.2	20.3	19.6	20.7	21.2
	6H	19.4	20.4	19.9	20.9	21.3	20.3	21.3	20.7	21.7	22.2
	8H	19.6	20.6	20.1	21.0	21.5	20.7	21.7	21.2	22.1	22.6
	12H	19.8	20.6	20.3	21.1	21.5	21.1	21.9	21.5	22.4	22.8
8H	4H	19.3	20.2	19.7	20.6	21.1	19.6	20.5	20.1	21.0	21.4
	6H	20.1	20.9	20.6	21.4	21.9	20.9	21.7	21.4	22.1	22.6
	8H	20.4	21.1	20.9	21.6	22.1	21.4	22.1	21.9	22.6	23.1
	12H	20.6	21.3	21.1	21.7	22.3	21.9	22.5	22.4	23.0	23.6
12H	4H	19.4	20.2	19.9	20.7	21.2	19.7	20.5	20.2	21.0	21.4
	6H	20.3	21.0	20.8	21.5	22.0	21.0	21.7	21.5	22.1	22.7
	8H	20.7	21.3	21.2	21.8	22.3	21.6	22.2	22.1	22.7	23.3

Chart 21: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

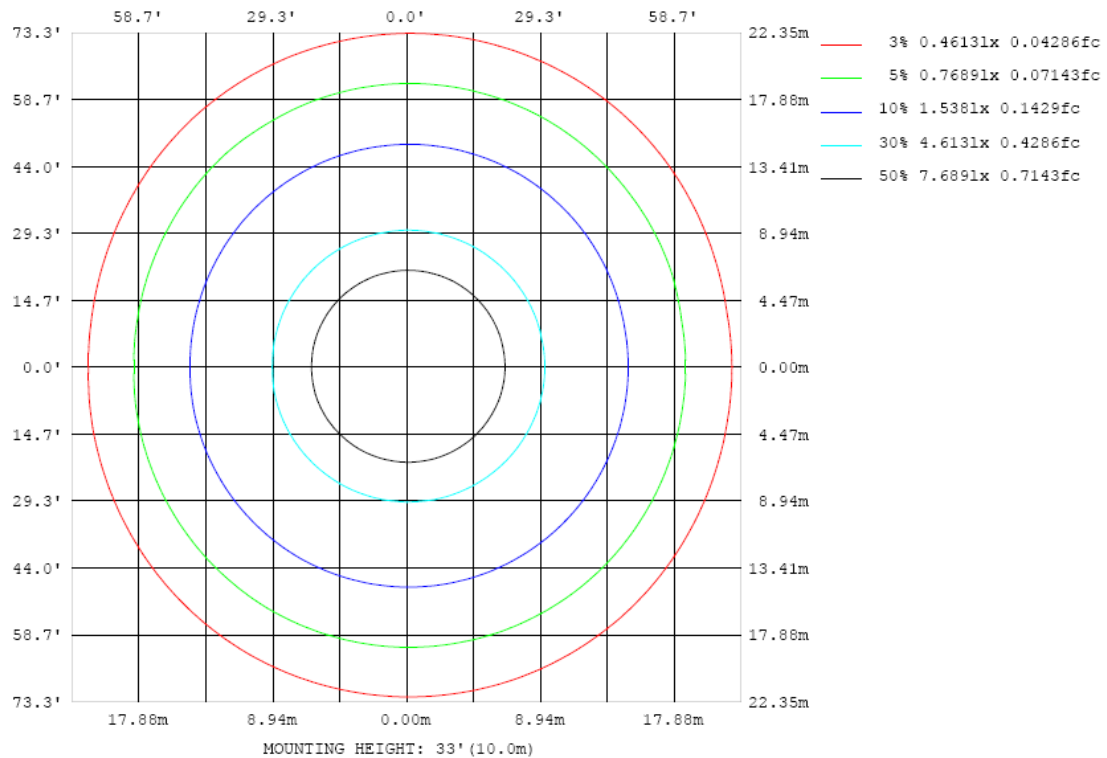


Chart 22: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

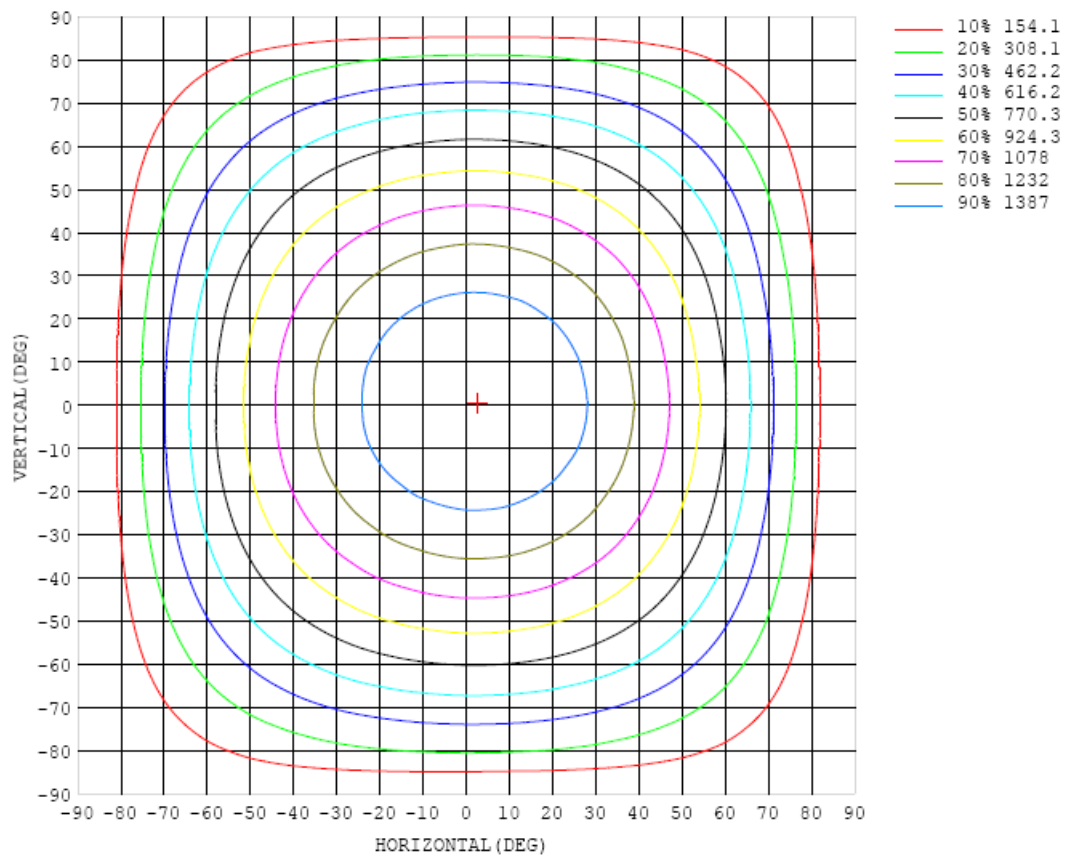


Chart 23: Isocandela Plot

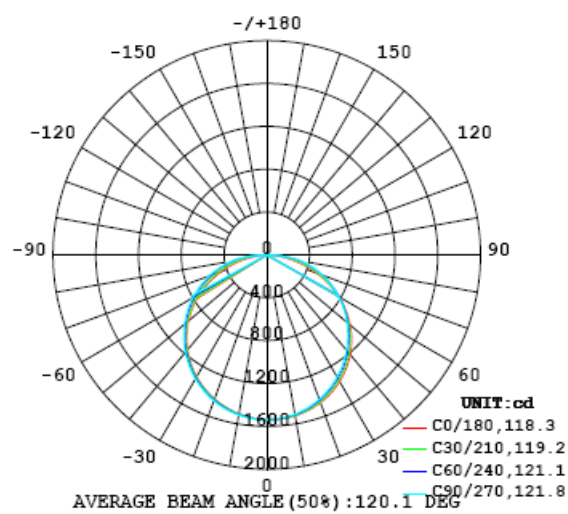


Chart 24: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538
5	1537	1537	1537	1536	1534	1535	1535	1534	1530	1530	1526	1529	1528	1527	1529	1529	1527	1526	1527
10	1525	1525	1524	1520	1517	1517	1514	1514	1510	1509	1507	1505	1506	1503	1506	1506	1507	1505	1505
15	1501	1501	1500	1495	1491	1488	1484	1482	1478	1477	1473	1472	1473	1469	1472	1473	1474	1473	1473
20	1467	1465	1463	1457	1453	1449	1444	1440	1435	1432	1429	1426	1427	1425	1428	1428	1431	1431	1431
25	1421	1419	1416	1408	1403	1397	1392	1387	1382	1378	1375	1372	1373	1371	1373	1375	1377	1377	1377
30	1363	1361	1356	1349	1343	1336	1329	1324	1318	1314	1310	1308	1308	1306	1308	1310	1313	1314	1312
35	1294	1291	1286	1277	1271	1264	1257	1251	1245	1241	1237	1233	1234	1232	1235	1237	1240	1240	1239
40	1213	1210	1204	1196	1190	1184	1176	1171	1164	1160	1156	1153	1153	1151	1153	1154	1157	1157	1155
45	1120	1117	1112	1105	1100	1093	1088	1082	1077	1072	1068	1064	1063	1061	1061	1062	1064	1063	1061
50	1017	1014	1010	1004	1000	996	992	988	983	979	974	970	969	964	963	962	962	961	957
55	902	899	897	894	893	892	888	887	883	880	875	870	867	861	858	854	852	849	845
60	776	773	775	776	779	781	781	781	779	775	771	766	761	754	747	739	734	730	724
65	640	639	644	651	659	665	668	670	669	667	662	657	652	642	631	620	610	602	593
70	497	498	508	522	535	545	552	556	556	554	550	545	538	526	513	497	481	469	456
75	350	354	370	390	409	423	432	437	438	438	435	430	422	409	392	372	350	333	317
80	205	213	235	260	282	299	312	319	322	323	320	315	306	290	272	248	222	199	180
85	76.6	86.6	109	131	145	152	153	152	149	150	153	157	159	157	148	131	107	83.5	65.2
90	0.47	0.28	0.00	0.00	0.52	0.55	0.50	0.60	0.61	0.62	0.26	0.33	0.51	0.31	0.00	6.50	3.82	0.76	2.25
95	0.56	0.57	0.56	0.58	0.61	0.65	0.67	0.70	0.70	0.70	0.69	0.68	0.66	0.64	0.61	0.58	0.56	0.56	0.23
100	0.71	0.68	0.65	0.65	0.67	0.71	0.74	0.77	0.76	0.76	0.76	0.75	0.74	0.71	0.69	0.67	0.65	0.69	0.33
105	0.78	0.74	0.73	0.69	0.71	0.75	0.79	0.82	0.80	0.80	0.80	0.80	0.79	0.77	0.74	0.73	0.74	0.76	0.40
110	0.78	0.74	0.74	0.69	0.69	0.72	0.77	0.81	0.79	0.79	0.80	0.80	0.80	0.78	0.75	0.73	0.77	0.77	0.47
115	0.77	0.73	0.72	0.70	0.66	0.67	0.71	0.75	0.74	0.73	0.75	0.76	0.76	0.75	0.73	0.75	0.75	0.76	0.54
120	0.80	0.75	0.72	0.73	0.68	0.64	0.67	0.70	0.70	0.69	0.71	0.72	0.73	0.73	0.73	0.75	0.74	0.78	0.61
125	0.86	0.83	0.79	0.79	0.74	0.71	0.69	0.69	0.69	0.69	0.70	0.72	0.74	0.77	0.77	0.79	0.79	0.84	0.67
130	0.91	0.86	0.85	0.84	0.83	0.81	0.76	0.77	0.81	0.81	0.78	0.82	0.80	0.86	0.86	0.82	0.84	0.86	0.72
135	0.98	0.92	0.93	0.95	0.92	0.92	0.92	0.90	0.94	0.95	0.91	0.97	0.99	0.98	0.96	0.94	0.93	0.94	0.77
140	0.98	0.99	0.97	1.00	0.99	0.97	1.01	1.00	1.09	1.11	1.07	1.06	1.08	1.01	0.98	0.98	0.96	1.01	0.79
145	1.02	1.03	0.96	1.03	1.04	1.04	1.00	1.02	1.13	1.17	1.14	1.06	1.01	1.02	0.99	0.97	0.89	1.01	0.81
150	1.06	1.06	1.03	1.05	1.08	1.06	1.02	1.04	1.09	1.11	1.02	1.00	1.01	1.02	0.97	0.95	1.01	1.07	0.87
155	1.08	1.08	1.09	1.00	1.07	1.04	0.98	0.99	0.98	0.97	0.97	0.98	0.97	0.97	0.97	0.95	1.07	1.10	0.93
160	1.13	1.13	1.13	1.10	1.03	1.05	0.98	0.90	0.96	0.96	0.96	0.94	0.94	0.95	0.95	1.07	1.12	1.14	1.01
165	1.12	1.12	1.13	1.14	1.14	1.10	1.01	0.93	0.91	0.92	0.90	0.86	0.86	0.92	1.01	1.08	1.10	1.11	1.08
170	1.15	1.17	1.20	1.22	1.23	1.24	1.21	1.11	1.03	1.02	1.02	1.00	0.99	1.02	1.07	1.11	1.14	1.15	1.13
175	1.17	1.20	1.24	1.26	1.26	1.27	1.26	1.20	1.12	1.12	1.13	1.18	1.12	1.04	1.05	1.11	1.14	1.13	1.14
180	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13

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		1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538	1538		
5		1529	1528	1529	1530	1530	1531	1533	1532	1535	1534	1534	1536	1536	1537	1538	1538	1537		
10		1507	1508	1508	1510	1512	1513	1514	1516	1518	1519	1521	1523	1522	1524	1525	1526	1525		
15		1475	1477	1477	1479	1480	1482	1485	1487	1491	1492	1491	1497	1498	1499	1501	1502	1500		
20		1433	1434	1435	1436	1438	1440	1444	1447	1450	1452	1454	1459	1460	1465	1466	1467	1465		
25		1379	1382	1382	1385	1387	1389	1393	1395	1400	1402	1405	1411	1412	1416	1419	1420	1419		
30		1315	1319	1318	1322	1325	1326	1330	1333	1338	1341	1345	1351	1353	1359	1361	1362	1361		
35		1242	1245	1246	1248	1251	1254	1258	1261	1267	1270	1275	1282	1284	1288	1290	1293	1291		
40		1158	1161	1163	1167	1170	1173	1178	1182	1187	1191	1196	1203	1204	1209	1211	1212	1209		
45		1065	1069	1071	1076	1081	1085	1091	1096	1102	1106	1109	1114	1116	1120	1120	1120	1117		
50		961	966	971	977	985	990	997	1002	1009	1012	1015	1019	1019	1021	1020	1017	1014		
55		849	855	862	872	881	889	897	903	909	912	914	918	916	914	910	905	899		
60		728	737	745	759	771	782	790	798	804	807	809	809	804	799	791	782	773		
65		598	609	624	641	656	669	679	687	692	695	695	694	686	678	664	650	637		
70		463	478	498	519	538	552	564	571	577	579	578	575	566	552	533	513	495		
75		325	345	371	396	417	433	445	452	458	459	457	453	440	423	400	373	350		
80		190	215	244	271	294	313	326	334	339	340	337	329	314	293	267	236	208		
85		74.1	98.5	123	143	155	162	164	164	166	168	172	174	169	157	136	109	81.9		
90		3.03	1.43	1.99	2.04	1.66	1.41	1.35	1.64	1.78	2.14	2.87	3.56	4.42	4.36	3.48	2.05	3.01		
95		0.21	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.24	0.24	0.23	0.23	0.22	0.21	0.20	0.19	0.20		
100		0.29	0.24	0.24	0.25	0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.24	0.24	0.28		
105		0.36	0.32	0.28	0.29	0.30	0.31	0.32	0.31	0.31	0.32	0.32	0.32	0.30	0.29	0.28	0.30	0.35		
110		0.43	0.39	0.35	0.34	0.35	0.36	0.36	0.34	0.34	0.35	0.36	0.36	0.35	0.34	0.35	0.39	0.41		
115		0.49	0.45	0.43	0.40	0.40	0.40	0.41	0.39	0.38	0.40	0.42	0.42	0.41	0.42	0.43	0.46	0.47		
120		0.56	0.48	0.50	0.47	0.47	0.47	0.46	0.46	0.45	0.47	0.49	0.49	0.48	0.49	0.50	0.53	0.54		
125		0.63	0.56	0.55	0.53	0.50	0.54	0.52	0.52	0.51	0.52	0.54	0.54	0.54	0.52	0.60	0.56	0.61		
130		0.65	0.62	0.56	0.60	0.61	0.55	0.57	0.57	0.58	0.59	0.58	0.54	0.59	0.63	0.59	0.65	0.67		
135		0.73	0.68	0.66	0.58	0.65	0.67	0.64	0.56	0.57	0.56	0.60	0.63	0.65	0.60	0.70	0.69	0.68		
140		0.77	0.69	0.67	0.64	0.58	0.64	0.65	0.64	0.67	0.64	0.60	0.62	0.56	0.63	0.69	0.68	0.69		
145		0.82	0.68	0.71	0.69	0.66	0.62	0.57	0.57	0.60	0.57	0.51	0.55	0.64	0.67	0.70	0.70	0.78		
150		0.87	0.81	0.78	0.74	0.74	0.70	0.68	0.68	0.67	0.67	0.63	0.64	0.69	0.73	0.73	0.69	0.85		
155		0.93	0.92	0.80	0.81	0.76	0.74	0.74	0.74	0.71	0.70	0.70	0.69	0.75	0.79	0.75	0.82	0.92		
160		0.99	1.00	0.94	0.84	0.78	0.76	0.77	0.76	0.72	0.72	0.72	0.75	0.83	0.80	0.86	0.95	1.00		
165		1.09	1.09	1.09	1.06	0.96	0.86	0.79	0.78	0.77	0.78	0.77	0.83	0.91	1.00	1.05	1.08	1.08		
170		1.13	1.14	1.14	1.13	1.08	0.97	0.88	0.89	0.86	0.87	0.89	0.98	1.06	1.07	1.08	1.09	1.12		
175		1.20	1.23	1.25	1.27	1.27	1.21	1.15	1.19	1.09	1.02	1.01	1.06	1.09	1.09	1.11	1.15	1.17		
180		1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13		

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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