

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]1X4[blank,/PIR,/LCBS,/MVS,/LCBS/MVS][blank,/E]

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ25070031e

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

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Aug. 07, 2025

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Aug. 07, 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	SWISH1X4 26W 3500K Setting	SWISH1X4 26W 4000K Setting	SWISH1X4 26W 5000K Setting
Luminous Efficacy (Lumens /Watt)	142.5	150.7	147.0
Total Luminous Flux (Lumens)	3588.9	3716.3	3718.6
Power (Watts)	25.18	24.66	25.30
Power Factor	0.9902	0.9901	0.9903
CCT (K)	3353	3928	4769
CRI	83.1	83.6	81.9
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. 05, 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	: SWISH1X4
Electrical Ratings	: 120-277V, 50/60Hz
Product Description	: Field-Adjustable 18W/26W/35W Color- Tunable 3500K/4000K/5000K
Manufacturer	: RAB Lighting Inc
Address	: 408 W 14th St, New York, NY 10014 United States

TEST RESULTS (26W 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)	0.212	0.100
Power Factor	0.9902	0.9219
Test Power (W)	25.18	25.42
THD A%	8.89	12.23
Luminous Efficacy (lm/W)	142.5	141.2
Total Luminous Flux (lm)	3588.9	3589.2
Color Rendering Index (CRI)	83.1	
R9	11.6	
Correlated Color Temperature (CCT)(K)	3353	
Chromaticity Chroma x	0.4142	
Chromaticity Chroma y	0.3960	
Chromaticity Chroma u	0.2393	
Chromaticity Chroma v	0.3432	
Duv	0.0005	
Chromaticity Chroma u'	0.2393	
Chromaticity Chroma v'	0.5148	

Special Color Rendering Indices	
R1	81.6
R2	89.6
R3	95.7
R4	81.8
R5	81.2
R6	86.1
R7	85.4
R8	63.3
R9	11.6
R10	75.4
R11	80.9
R12	62.8
R13	83.5
R14	97.6

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)	0.212
Power Factor	0.9903
Power (W)	25.21
Luminous Efficacy (lm/W)	142.9
Total Luminous Flux (lm)	3603.5
Beam Angle (°)	117.2 (0°-180°) / 116.6 (90°-270°)
Center Beam Candle Power (cd)	1202
Maximum Beam Candle Power (cd)	1203 (At: C=350.0, Gamma=1.5)
Spacing Criteria	1.29 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	77.43%
Zonal Lumens in the 60 °-90 °Zone	22.48%
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

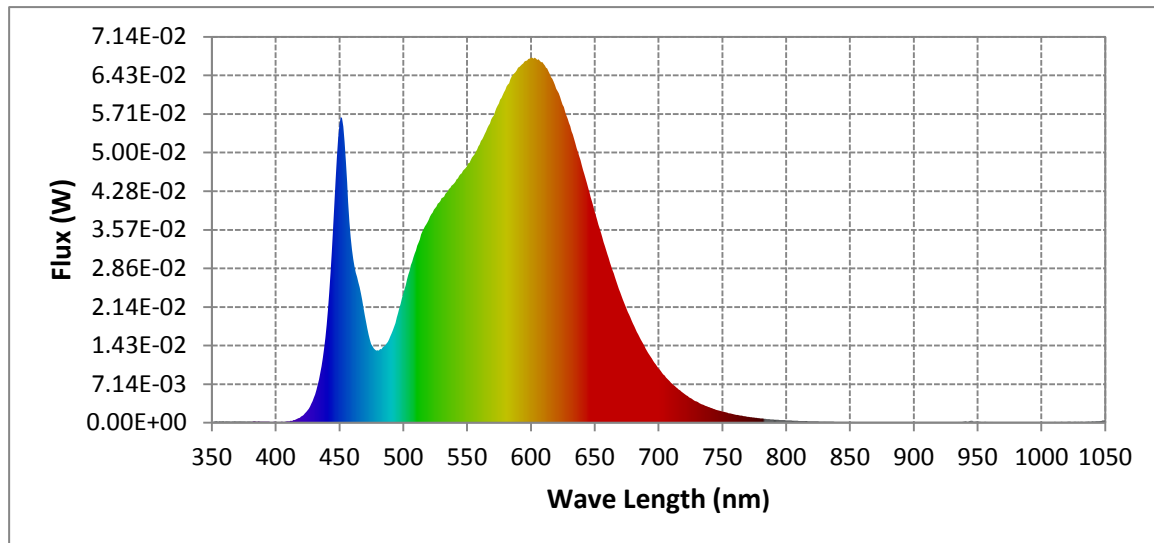
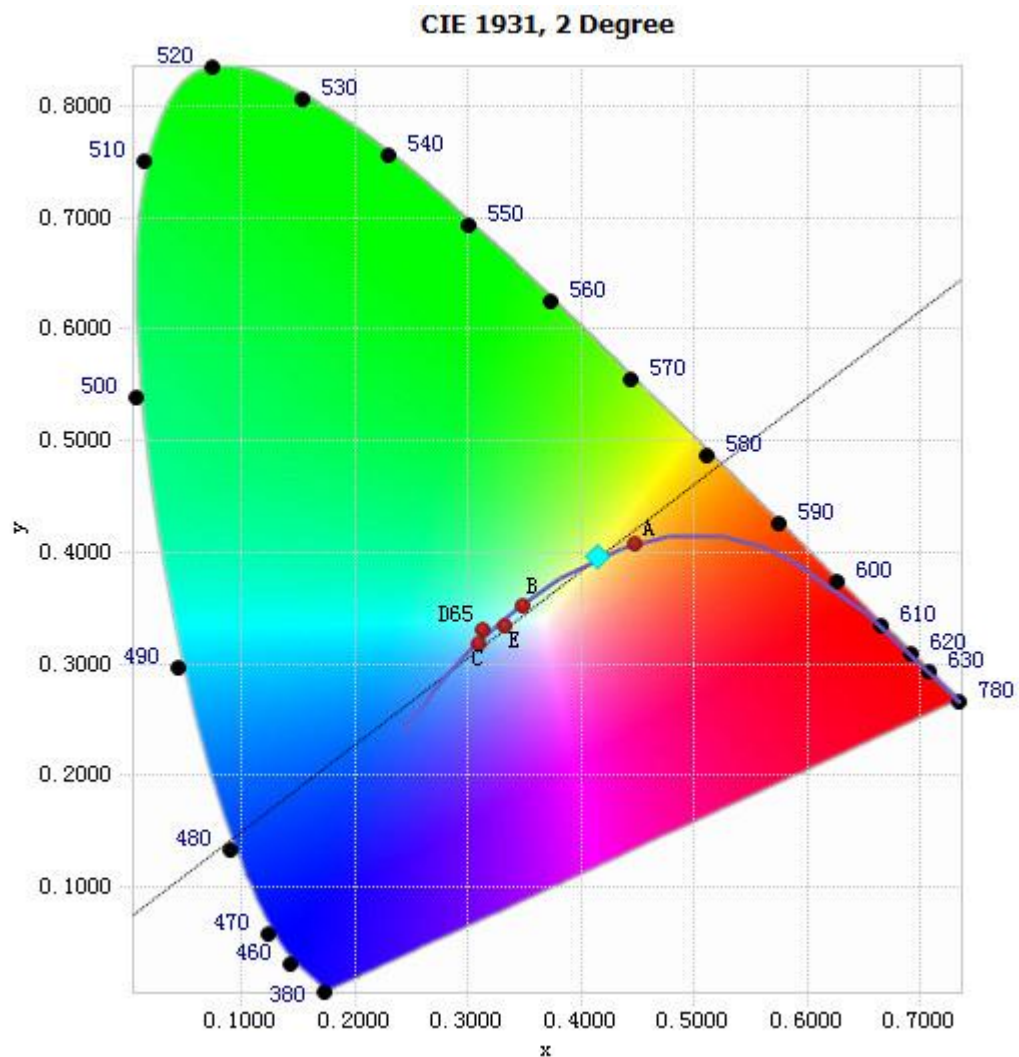


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.37E-04	485	1.41E-02	590	6.57E-02	695	1.19E-02
385	2.35E-04	490	1.60E-02	595	6.68E-02	700	1.01E-02
390	2.10E-04	495	1.94E-02	600	6.75E-02	705	8.72E-03
395	1.90E-04	500	2.38E-02	605	6.71E-02	710	7.40E-03
400	1.50E-04	505	2.81E-02	610	6.63E-02	715	6.33E-03
405	1.87E-04	510	3.19E-02	615	6.45E-02	720	5.40E-03
410	2.70E-04	515	3.54E-02	620	6.18E-02	725	4.60E-03
415	5.22E-04	520	3.76E-02	625	5.88E-02	730	3.92E-03
420	1.13E-03	525	3.97E-02	630	5.55E-02	735	3.33E-03
425	2.30E-03	530	4.15E-02	635	5.17E-02	740	2.86E-03
430	4.64E-03	535	4.28E-02	640	4.76E-02	745	2.43E-03
435	9.18E-03	540	4.43E-02	645	4.34E-02	750	2.08E-03
440	1.81E-02	545	4.60E-02	650	3.91E-02	755	1.76E-03
445	3.59E-02	550	4.74E-02	655	3.51E-02	760	1.54E-03
450	5.52E-02	555	4.93E-02	660	3.12E-02	765	1.31E-03
455	4.84E-02	560	5.15E-02	665	2.76E-02	770	1.11E-03
460	3.21E-02	565	5.39E-02	670	2.41E-02	775	9.53E-04
465	2.59E-02	570	5.65E-02	675	2.10E-02	780	8.21E-04
470	2.00E-02	575	5.90E-02	680	1.83E-02		
475	1.45E-02	580	6.16E-02	685	1.59E-02		
480	1.34E-02	585	6.40E-02	690	1.37E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4142, 0.3960)

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

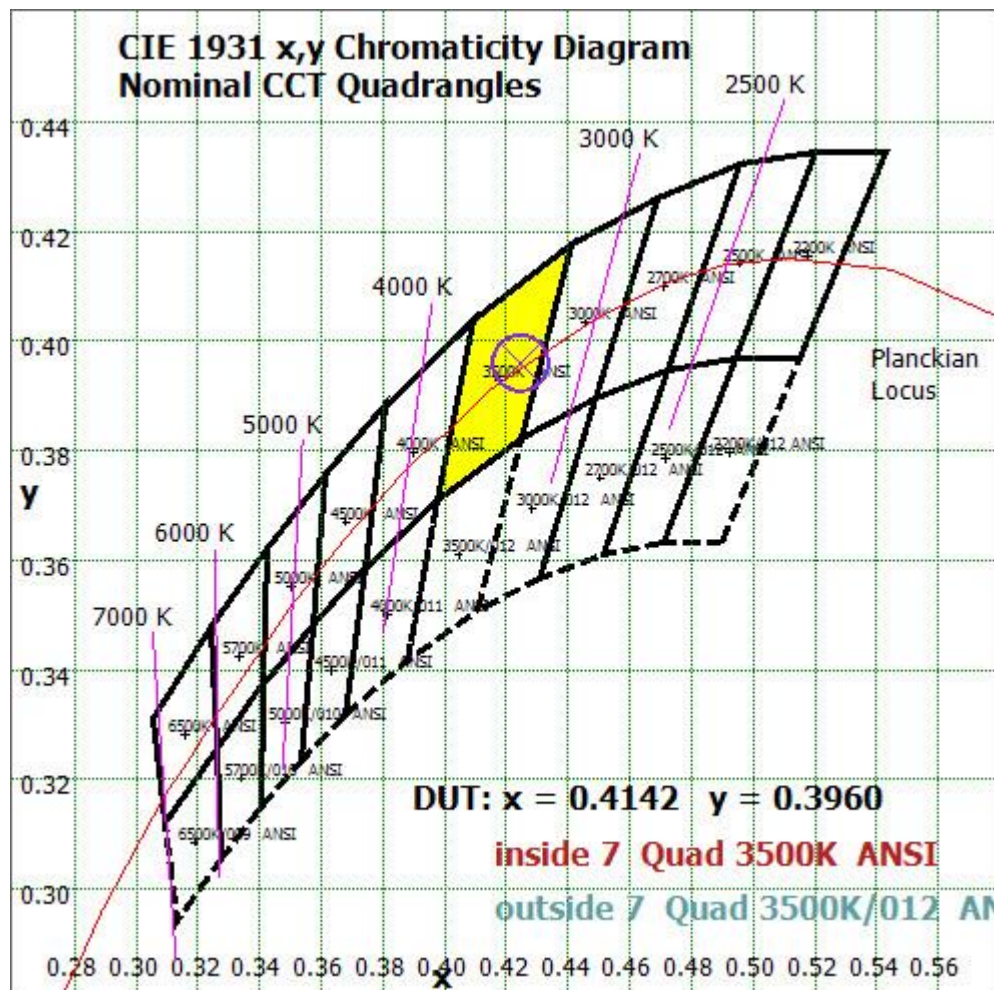


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

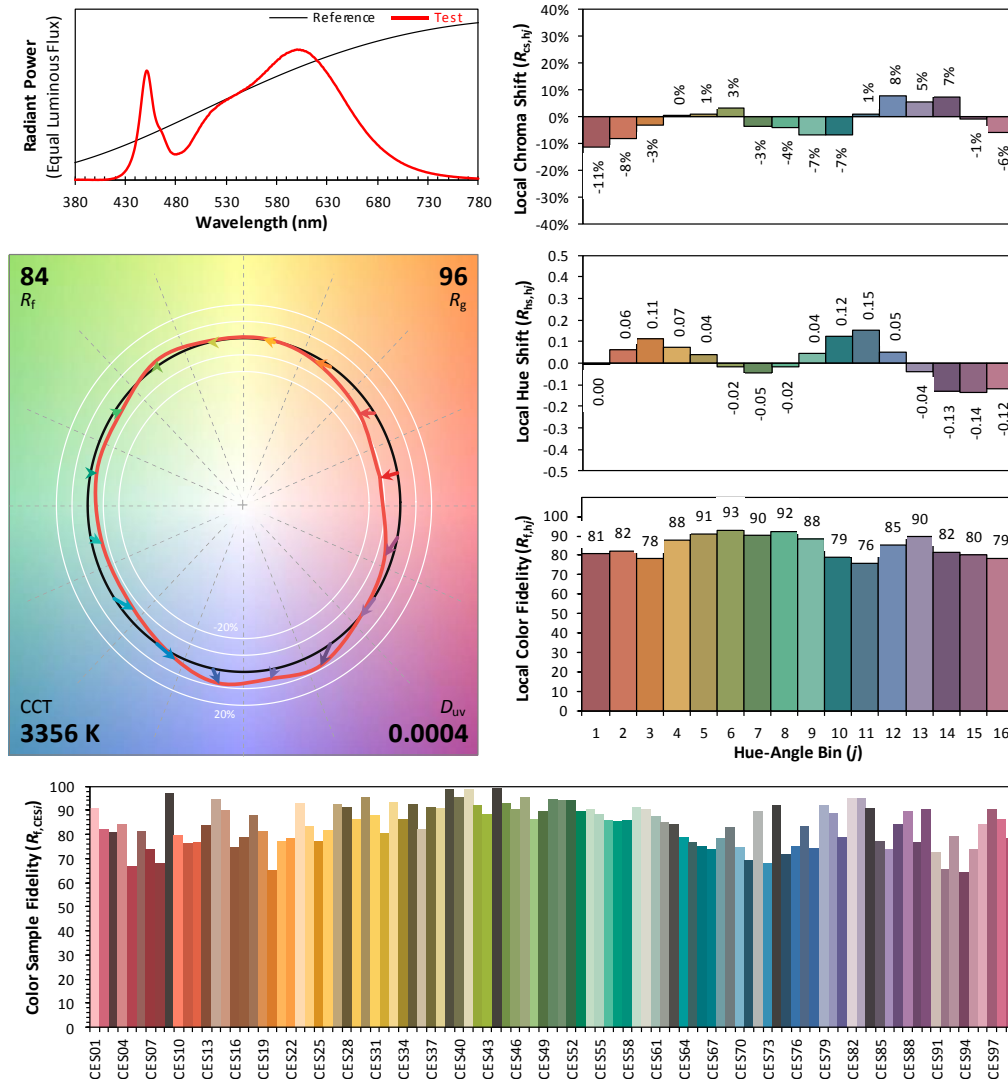
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: RAB Lighting Inc

Date: 2025/08/05

Model: SWISH1X4



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

x 0.4142
 y 0.3960
 u' 0.2393
 v' 0.5148

CIE 13.3-1995
(CRI)

R_a 83

R_g 12

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	113.871	3.16%
10- 20	327.214	9.08%
20- 30	499.503	13.86%
30- 40	609.528	16.92%
40- 50	643.59	17.86%
50- 60	596.443	16.55%
60- 70	468.557	13.00%
70- 80	274.32	7.61%
80- 90	67.355	1.87%
90-100	0.328	0.01%
100-110	0.404	0.01%
110-120	0.417	0.01%
120-130	0.427	0.01%
130-140	0.451	0.01%
140-150	0.415	0.01%
150-160	0.332	0.01%
160-170	0.222	0.01%
170-180	0.081	0.00%
Total	3603.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2790.149	77.43%
60- 90	810.232	22.48%
0-90	3600.381	99.91%
90- 180	3.077	0.09%
0- 180	3603.5	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	16.3	18.0	16.7	18.3	18.6	16.3	18.0	16.7	18.3	18.6
	3H	18.2	19.7	18.6	20.0	20.4	18.3	19.8	18.6	20.1	20.5
	4H	18.8	20.3	19.2	20.6	21.0	18.9	20.4	19.3	20.7	21.1
	6H	19.3	20.6	19.7	21.0	21.3	19.4	20.8	19.9	21.1	21.5
	8H	19.4	20.6	19.8	21.0	21.4	19.6	20.9	20.0	21.2	21.6
	12H	19.4	20.6	19.9	21.0	21.4	19.7	20.9	20.1	21.3	21.7
4H	2H	17.0	18.4	17.4	18.8	19.2	17.0	18.5	17.4	18.8	19.2
	3H	19.1	20.3	19.5	20.7	21.1	19.2	20.4	19.6	20.8	21.2
	4H	19.9	21.0	20.3	21.4	21.8	20.0	21.1	20.4	21.5	21.9
	6H	20.5	21.4	20.9	21.8	22.3	20.6	21.6	21.1	22.0	22.5
	8H	20.6	21.5	21.1	21.9	22.4	20.8	21.7	21.3	22.1	22.6
	12H	20.7	21.5	21.2	22.0	22.4	20.9	21.7	21.4	22.2	22.7
8H	4H	20.2	21.1	20.7	21.6	22.0	20.4	21.2	20.8	21.7	22.2
	6H	20.9	21.7	21.4	22.2	22.6	21.1	21.8	21.6	22.3	22.8
	8H	21.1	21.8	21.6	22.3	22.8	21.4	22.0	21.9	22.5	23.0
	12H	21.3	21.8	21.8	22.3	22.9	21.5	22.1	22.0	22.6	23.2
12H	4H	20.3	21.1	20.8	21.5	22.0	20.4	21.2	20.9	21.7	22.1
	6H	21.0	21.7	21.5	22.1	22.7	21.2	21.8	21.7	22.3	22.8
	8H	21.3	21.8	21.8	22.3	22.9	21.5	22.1	22.0	22.6	23.1

Chart 5: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

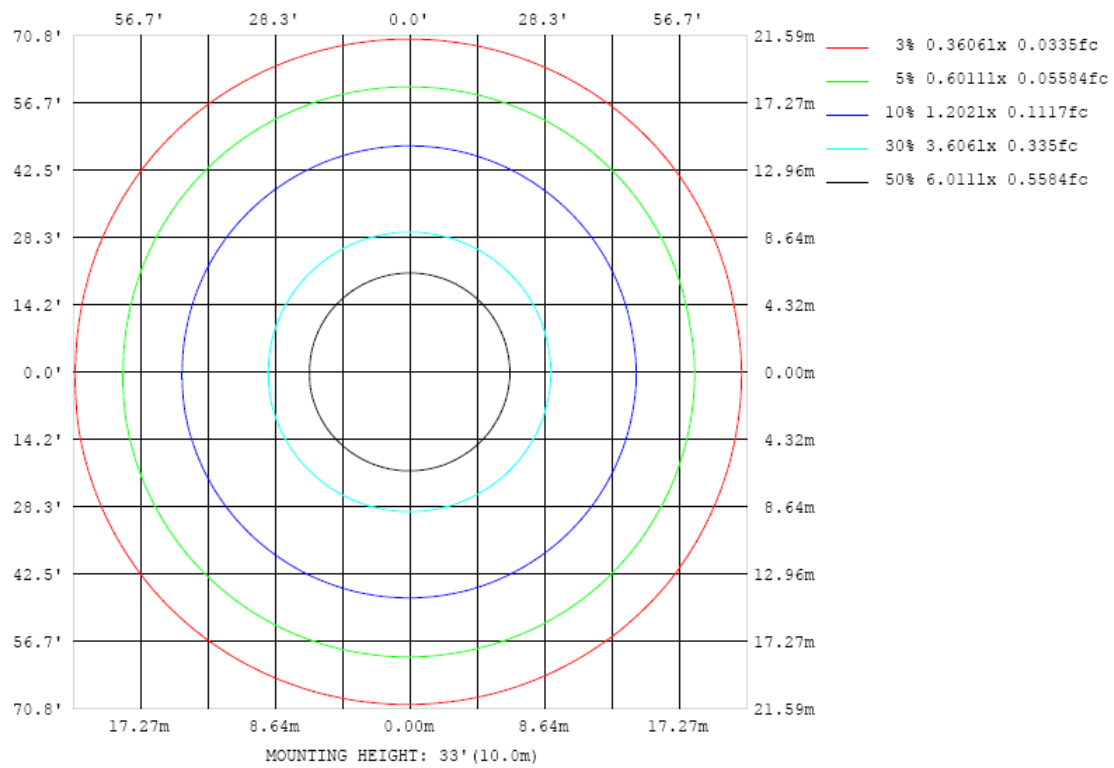


Chart 6: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

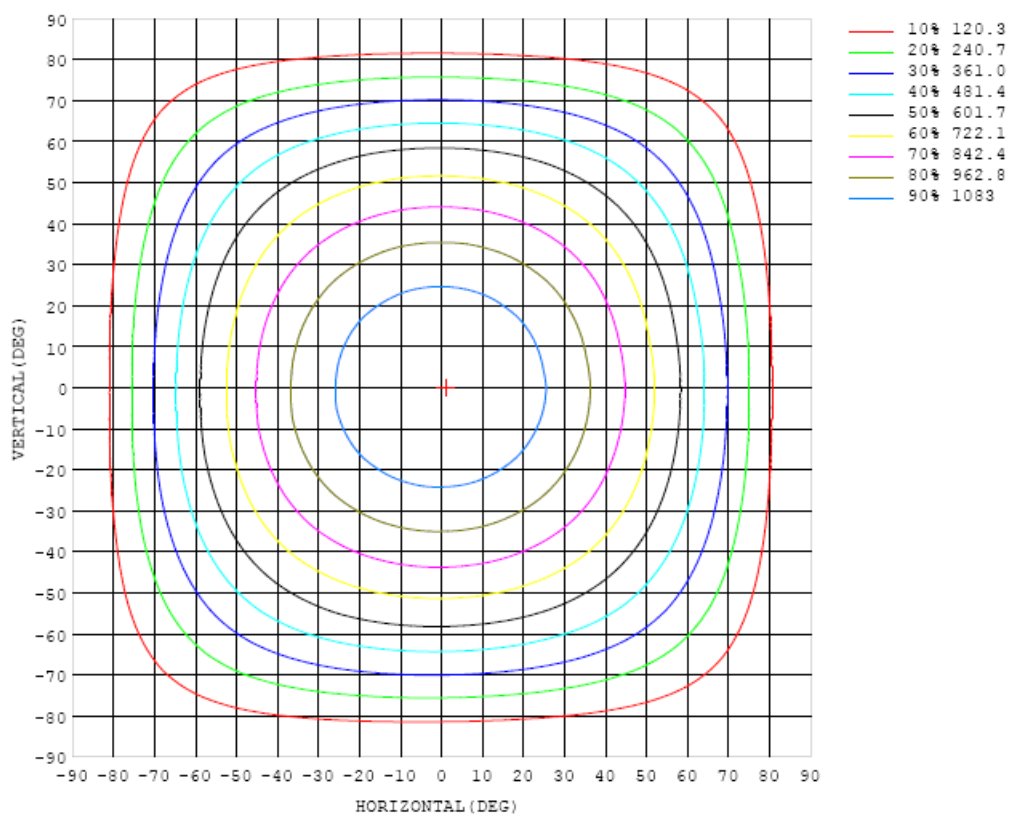


Chart 7: Isocandela Plot

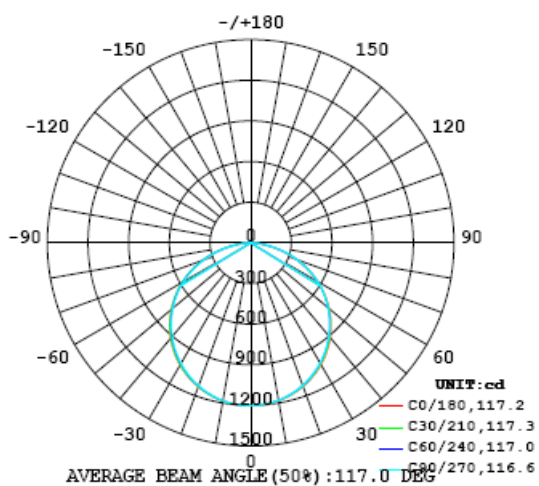


Chart 8: Polar Candela Distribution

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	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202
5	1197	1198	1197	1197	1197	1197	1196	1197	1197	1197	1198	1197	1197	1198	1199	1198	1198	1199	1199
10	1184	1183	1182	1183	1182	1181	1180	1181	1181	1181	1181	1182	1182	1183	1185	1186	1185	1186	1185
15	1160	1160	1159	1157	1158	1156	1155	1155	1154	1155	1156	1156	1158	1159	1161	1163	1163	1164	1163
20	1128	1127	1126	1124	1124	1122	1120	1120	1120	1120	1121	1122	1124	1125	1129	1131	1132	1133	1131
25	1087	1086	1084	1082	1081	1078	1076	1077	1075	1076	1077	1079	1081	1083	1087	1090	1092	1093	1091
30	1038	1036	1034	1031	1030	1026	1025	1024	1023	1023	1025	1027	1030	1033	1038	1041	1043	1045	1043
35	979	978	975	973	970	967	965	964	963	963	965	967	971	974	980	984	986	989	986
40	913	911	909	907	904	901	898	897	896	897	898	901	905	909	914	919	921	924	921
45	838	837	834	832	830	826	824	824	823	824	826	829	832	836	842	846	849	851	847
50	756	754	753	751	749	747	744	744	744	745	747	750	753	757	763	766	769	770	766
55	666	665	664	663	662	660	659	660	660	661	663	665	669	672	676	680	682	682	677
60	568	568	568	569	570	569	568	567	566	567	570	574	579	582	585	587	588	587	581
65	463	465	467	469	472	470	468	467	466	467	470	475	480	485	488	488	487	485	477
70	353	357	361	366	367	365	362	361	360	361	365	370	376	381	386	386	382	378	368
75	241	247	254	258	258	256	254	252	252	253	257	261	267	273	278	279	274	268	255
80	133	141	148	151	151	149	148	147	147	149	152	156	161	166	170	172	168	160	144
85	39.2	45.4	48.7	50.1	51.4	52.7	53.4	54.3	55.2	56.6	58.7	61.2	64.1	66.2	67.3	67.5	66.0	60.6	48.6
90	0.34	0.34	0.35	0.36	0.36	0.37	0.37	0.38	0.38	0.37	0.37	0.36	0.36	0.36	0.33	0.20	0.49	0.43	0.15
95	0.42	0.42	0.42	0.43	0.44	0.45	0.45	0.46	0.46	0.45	0.45	0.44	0.44	0.43	0.42	0.41	0.40	0.40	0.15
100	0.48	0.48	0.48	0.49	0.50	0.51	0.52	0.53	0.52	0.52	0.52	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.17
105	0.51	0.51	0.51	0.52	0.54	0.56	0.58	0.59	0.58	0.57	0.57	0.58	0.57	0.56	0.54	0.52	0.50	0.50	0.20
110	0.51	0.50	0.51	0.52	0.53	0.56	0.59	0.60	0.59	0.58	0.58	0.59	0.59	0.57	0.54	0.52	0.50	0.50	0.24
115	0.50	0.49	0.50	0.51	0.52	0.53	0.56	0.57	0.57	0.56	0.56	0.58	0.57	0.56	0.53	0.51	0.49	0.49	0.29
120	0.52	0.51	0.52	0.52	0.51	0.51	0.53	0.54	0.54	0.53	0.54	0.55	0.55	0.54	0.52	0.51	0.50	0.51	0.34
125	0.57	0.57	0.56	0.56	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.55	0.55	0.55	0.54	0.53	0.53	0.55	0.40
130	0.61	0.62	0.62	0.63	0.60	0.59	0.61	0.58	0.60	0.59	0.59	0.62	0.62	0.60	0.58	0.59	0.58	0.59	0.44
135	0.68	0.69	0.69	0.71	0.70	0.69	0.69	0.67	0.71	0.72	0.70	0.70	0.71	0.69	0.70	0.68	0.67	0.66	0.48
140	0.70	0.73	0.77	0.78	0.78	0.78	0.78	0.75	0.79	0.81	0.79	0.79	0.80	0.77	0.74	0.72	0.70	0.67	0.49
145	0.77	0.79	0.82	0.83	0.84	0.84	0.84	0.82	0.86	0.89	0.87	0.85	0.84	0.82	0.77	0.72	0.73	0.73	0.53
150	0.82	0.82	0.85	0.85	0.87	0.87	0.84	0.85	0.88	0.88	0.85	0.88	0.84	0.81	0.76	0.79	0.80	0.79	0.58
155	0.82	0.82	0.86	0.88	0.87	0.85	0.82	0.82	0.82	0.88	0.85	0.82	0.79	0.78	0.81	0.83	0.82	0.81	0.64
160	0.84	0.83	0.84	0.87	0.88	0.88	0.82	0.78	0.82	0.77	0.78	0.78	0.79	0.82	0.83	0.85	0.84	0.83	0.70
165	0.83	0.83	0.83	0.86	0.88	0.89	0.86	0.82	0.79	0.80	0.79	0.78	0.80	0.81	0.82	0.83	0.83	0.81	0.77
170	0.86	0.87	0.89	0.91	0.92	0.94	0.95	0.89	0.82	0.81	0.84	0.84	0.82	0.81	0.83	0.85	0.85	0.83	0.81
175	0.89	0.91	0.92	0.93	0.94	0.93	0.94	0.90	0.84	0.85	0.84	0.87	0.84	0.81	0.84	0.86	0.84	0.82	0.84
180	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86

Table 6: Luminous Intensity Data

Table--2		UNIT: cd																		
γ (DEG)	C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0		1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202	1202		
5		1198	1198	1199	1199	1198	1198	1198	1198	1197	1198	1198	1198	1197	1198	1199	1198	1197		
10		1185	1185	1185	1185	1183	1183	1184	1183	1183	1183	1183	1183	1182	1183	1184	1183	1182		
15		1163	1163	1162	1162	1159	1159	1159	1158	1157	1157	1157	1158	1158	1159	1160	1159	1158		
20		1131	1131	1130	1129	1127	1125	1125	1124	1123	1123	1124	1124	1124	1126	1127	1126	1126		
25		1091	1090	1089	1088	1085	1083	1082	1080	1079	1080	1080	1081	1081	1084	1085	1085	1085		
30		1042	1042	1040	1038	1035	1032	1031	1028	1028	1028	1028	1030	1030	1033	1034	1034	1034		
35		986	984	982	980	976	973	972	969	968	968	969	970	971	974	975	975	975		
40		920	919	917	914	910	906	905	902	901	901	902	903	904	907	908	909	909		
45		847	846	844	841	837	833	832	829	828	827	828	830	831	833	834	834	833		
50		766	765	763	761	757	754	752	750	748	749	749	750	750	752	753	752	750		
55		678	677	676	675	672	669	668	666	665	665	664	664	664	665	664	662	660		
60		581	583	583	583	581	579	576	572	571	571	572	574	572	572	570	566	563		
65		479	482	484	485	483	479	475	472	470	470	471	473	474	474	469	464	459		
70		371	376	381	381	378	374	370	366	364	364	365	367	368	369	365	358	350		
75		260	268	273	273	269	265	261	258	256	256	256	258	259	260	257	249	239		
80		152	161	164	164	161	158	154	152	151	150	150	151	152	152	149	143	132		
85		55.6	60.3	63.1	64.2	63.8	63.3	61.8	60.6	59.7	59.1	58.6	58.1	55.5	53.9	50.8	46.7	40.5		
90		1.56	0.08	2.16	1.42	0.74	2.00	0.17	0.10	0.11	0.12	0.14	0.19	0.20	0.35	0.80	0.08	0.12		
95		0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15		
100		0.17	0.18	0.18	0.19	0.19	0.20	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.18		
105		0.20	0.20	0.21	0.22	0.23	0.24	0.24	0.23	0.23	0.24	0.25	0.25	0.24	0.23	0.23	0.22	0.22		
110		0.24	0.24	0.25	0.25	0.27	0.28	0.27	0.26	0.26	0.28	0.29	0.28	0.28	0.27	0.27	0.26	0.26		
115		0.29	0.28	0.28	0.29	0.30	0.31	0.31	0.30	0.30	0.32	0.34	0.33	0.32	0.32	0.32	0.31	0.31		
120		0.35	0.34	0.33	0.33	0.35	0.37	0.34	0.34	0.34	0.36	0.39	0.38	0.37	0.37	0.38	0.37	0.36		
125		0.40	0.39	0.37	0.37	0.40	0.41	0.39	0.39	0.39	0.40	0.43	0.42	0.41	0.42	0.43	0.42	0.42		
130		0.45	0.44	0.44	0.42	0.44	0.47	0.45	0.43	0.45	0.45	0.47	0.47	0.45	0.46	0.47	0.46	0.46		
135		0.50	0.49	0.48	0.46	0.47	0.49	0.48	0.46	0.48	0.48	0.48	0.49	0.48	0.50	0.51	0.49	0.50		
140		0.49	0.49	0.49	0.47	0.49	0.50	0.48	0.48	0.49	0.48	0.47	0.49	0.49	0.49	0.50	0.49	0.52		
145		0.53	0.54	0.52	0.51	0.51	0.52	0.51	0.50	0.51	0.49	0.49	0.50	0.51	0.51	0.52	0.52	0.54		
150		0.58	0.60	0.59	0.55	0.56	0.54	0.54	0.55	0.54	0.54	0.53	0.54	0.55	0.56	0.55	0.56	0.59		
155		0.63	0.64	0.66	0.62	0.59	0.58	0.58	0.59	0.56	0.57	0.58	0.58	0.60	0.61	0.62	0.62	0.64		
160		0.69	0.70	0.71	0.70	0.65	0.62	0.61	0.62	0.58	0.59	0.63	0.64	0.67	0.69	0.69	0.68	0.70		
165		0.77	0.78	0.80	0.80	0.77	0.74	0.73	0.72	0.68	0.68	0.72	0.78	0.80	0.79	0.78	0.77	0.77		
170		0.81	0.82	0.83	0.84	0.81	0.75	0.72	0.76	0.72	0.70	0.74	0.79	0.80	0.79	0.78	0.79	0.81		
175		0.91	0.93	0.93	0.94	0.95	0.91	0.86	0.87	0.81	0.79	0.80	0.81	0.79	0.82	0.84	0.86	0.89		
180		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86		

Table 7: Luminous Intensity Data

TEST RESULTS (26W 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)	0.208	0.098
Power Factor	0.9901	0.9193
Test Power (W)	24.66	24.92
THD A%	8.66	12.24
Luminous Efficacy (lm/W)	150.7	149.1
Total Luminous Flux (lm)	3716.3	3716.0
Color Rendering Index (CRI)	83.6	
R9	15.2	
Correlated Color Temperature (CCT)(K)	3928	
Chromaticity Chroma x	0.3836	
Chromaticity Chroma y	0.3789	
Chromaticity Chroma u	0.2263	
Chromaticity Chroma v	0.3353	
Duv	0.0002	
Chromaticity Chroma u'	0.2263	
Chromaticity Chroma v'	0.5030	

Special Color Rendering Indices	
R1	82.4
R2	88.9
R3	93.4
R4	83.3
R5	82.1
R6	84.3
R7	87.1
R8	67.3
R9	15.2
R10	73.2
R11	82.3
R12	59.8
R13	84
R14	96.3

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)	0.208
Power Factor	0.9903
Power (W)	24.68
Luminous Efficacy (lm/W)	151.1
Total Luminous Flux (lm)	3729.0
Beam Angle (°)	117.2 (0°-180°) / 116.7 (90°-270°)
Center Beam Candle Power (cd)	1245
Maximum Beam Candle Power (cd)	1245 (At: C=270.0, Gamma=1.0)
Spacing Criteria	1.28 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0°-60° Zone	77.43%
Zonal Lumens in the 60°-90° Zone	22.49%
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

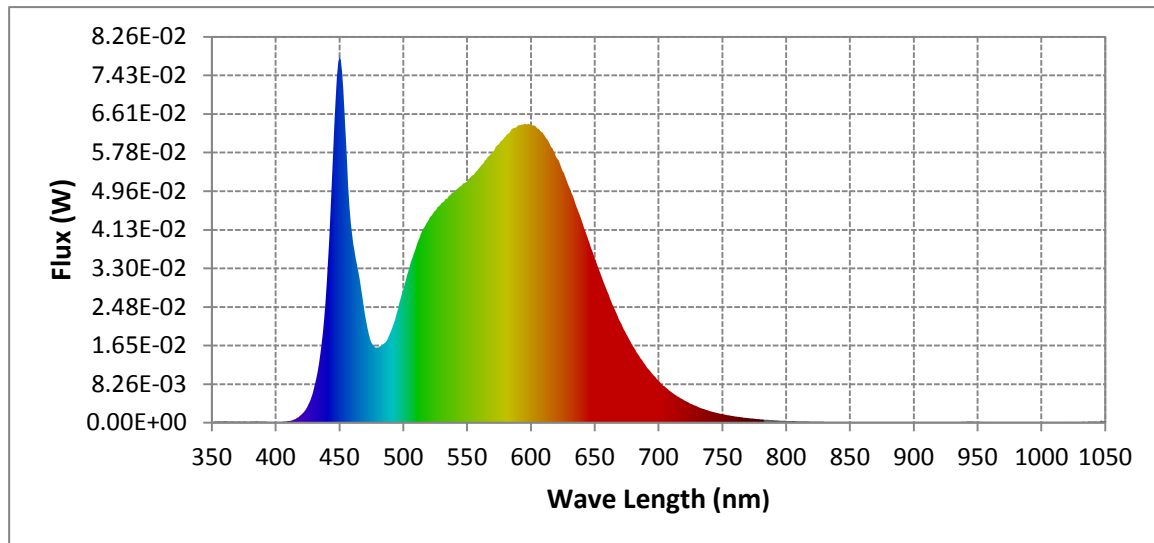
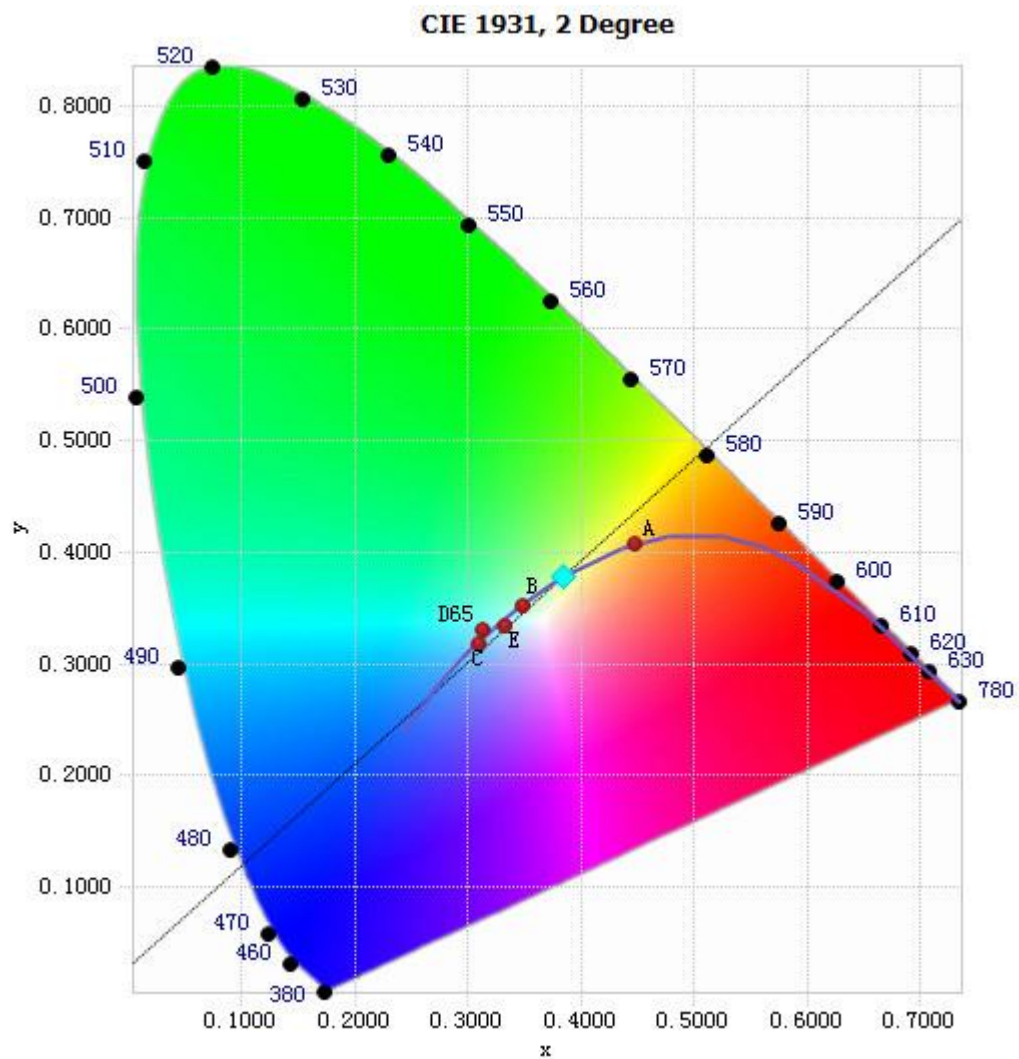


Chart 9: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.58E-04	485	1.70E-02	590	6.37E-02	695	1.06E-02
385	3.05E-04	490	1.92E-02	595	6.40E-02	700	9.06E-03
390	2.62E-04	495	2.35E-02	600	6.38E-02	705	7.76E-03
395	1.90E-04	500	2.85E-02	605	6.30E-02	710	6.61E-03
400	1.66E-04	505	3.33E-02	610	6.17E-02	715	5.65E-03
405	1.92E-04	510	3.75E-02	615	5.96E-02	720	4.81E-03
410	3.56E-04	515	4.10E-02	620	5.68E-02	725	4.10E-03
415	7.50E-04	520	4.34E-02	625	5.38E-02	730	3.50E-03
420	1.69E-03	525	4.54E-02	630	5.05E-02	735	2.97E-03
425	3.46E-03	530	4.70E-02	635	4.69E-02	740	2.53E-03
430	7.27E-03	535	4.81E-02	640	4.32E-02	745	2.17E-03
435	1.46E-02	540	4.93E-02	645	3.92E-02	750	1.87E-03
440	2.96E-02	545	5.06E-02	650	3.53E-02	755	1.60E-03
445	5.74E-02	550	5.16E-02	655	3.16E-02	760	1.35E-03
450	7.83E-02	555	5.30E-02	660	2.80E-02	765	1.17E-03
455	6.08E-02	560	5.46E-02	665	2.47E-02	770	1.01E-03
460	4.06E-02	565	5.63E-02	670	2.16E-02	775	8.55E-04
465	3.23E-02	570	5.79E-02	675	1.89E-02	780	7.37E-04
470	2.34E-02	575	5.95E-02	680	1.64E-02		
475	1.72E-02	580	6.12E-02	685	1.42E-02		
480	1.61E-02	585	6.28E-02	690	1.23E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3836, 0.3789)

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

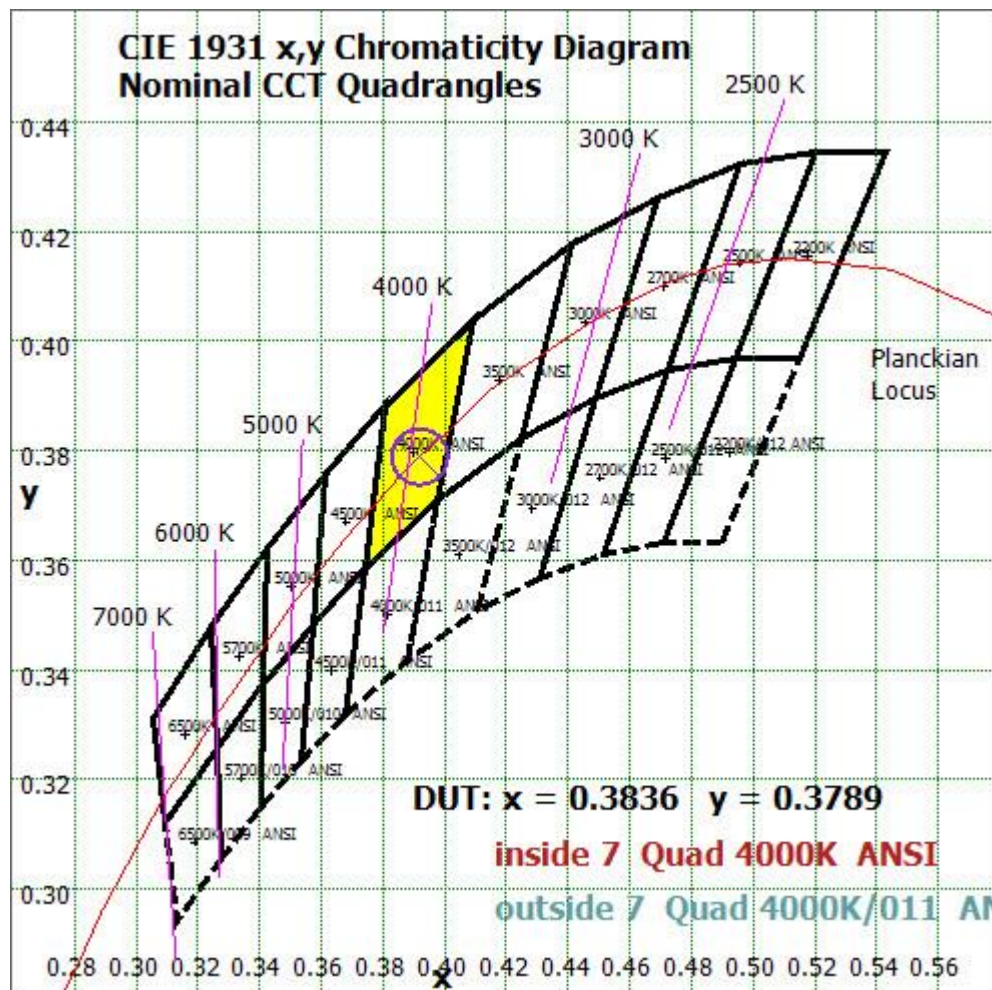


Chart 11: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

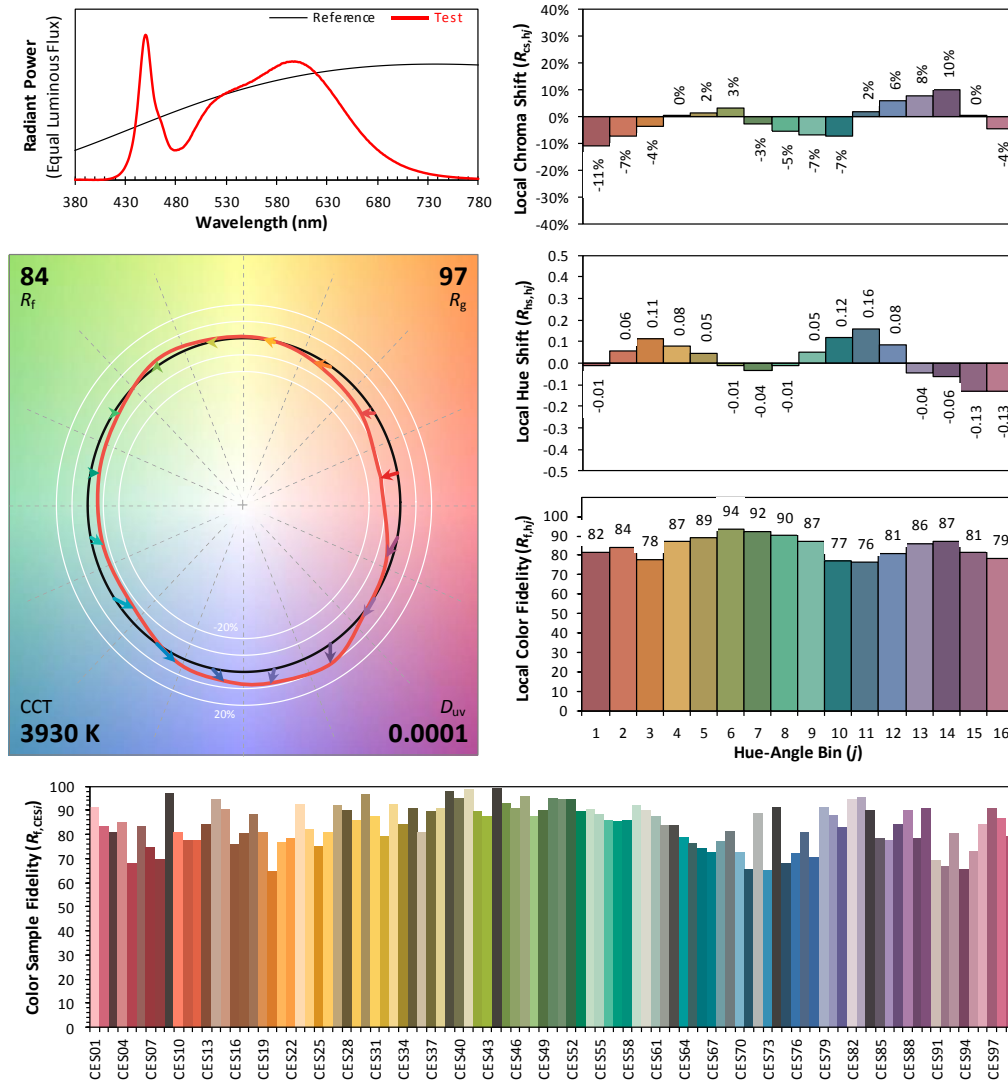
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: RAB Lighting Inc

Date: 2025/08/05

Model: SWISH1X4



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

x 0.3836
 y 0.3789
 u' 0.2263
 v' 0.5030

CIE 13.3-1995
(CRI)

R_a 84
 R_g 15

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	117.808	3.16%
10- 20	338.538	9.08%
20- 30	516.827	13.86%
30- 40	630.723	16.91%
40- 50	666.047	17.86%
50- 60	617.32	16.55%
60- 70	484.98	13.01%
70- 80	283.92	7.61%
80- 90	69.63	1.87%
90-100	0.339	0.01%
100-110	0.419	0.01%
110-120	0.433	0.01%
120-130	0.443	0.01%
130-140	0.466	0.01%
140-150	0.43	0.01%
150-160	0.344	0.01%
160-170	0.231	0.01%
170-180	0.083	0.00%
Total	3729.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2887.263	77.43%
60- 90	838.53	22.49%
0-90	3725.793	99.91%
90- 180	3.188	0.09%
0- 180	3729.0	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	16.5	18.1	16.8	18.4	18.8	16.5	18.1	16.8	18.4	18.7
	3H	18.3	19.8	18.7	20.2	20.5	18.4	19.9	18.7	20.2	20.6
	4H	19.0	20.4	19.4	20.7	21.1	19.1	20.5	19.5	20.8	21.2
	6H	19.4	20.7	19.8	21.1	21.5	19.6	20.9	20.0	21.2	21.6
	8H	19.5	20.8	19.9	21.2	21.6	19.7	21.0	20.1	21.4	21.8
	12H	19.6	20.8	20.0	21.2	21.6	19.8	21.0	20.2	21.4	21.8
4H	2H	17.1	18.6	17.5	18.9	19.3	17.2	18.6	17.6	18.9	19.3
	3H	19.3	20.4	19.7	20.8	21.2	19.3	20.5	19.7	20.9	21.3
	4H	20.0	21.1	20.5	21.5	22.0	20.1	21.2	20.6	21.6	22.0
	6H	20.6	21.5	21.1	22.0	22.4	20.7	21.7	21.2	22.1	22.6
	8H	20.7	21.6	21.2	22.1	22.5	20.9	21.8	21.4	22.3	22.7
	12H	20.8	21.6	21.3	22.1	22.6	21.1	21.9	21.5	22.3	22.8
8H	4H	20.4	21.3	20.8	21.7	22.2	20.5	21.4	20.9	21.8	22.3
	6H	21.1	21.8	21.6	22.3	22.8	21.2	22.0	21.7	22.4	22.9
	8H	21.3	21.9	21.8	22.4	22.9	21.5	22.1	22.0	22.6	23.1
	12H	21.4	22.0	21.9	22.5	23.0	21.7	22.2	22.2	22.7	23.3
12H	4H	20.4	21.2	20.9	21.7	22.2	20.5	21.3	21.0	21.8	22.3
	6H	21.1	21.8	21.7	22.3	22.8	21.3	22.0	21.8	22.4	23.0
	8H	21.4	22.0	21.9	22.5	23.0	21.6	22.2	22.1	22.7	23.2

Chart 13: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

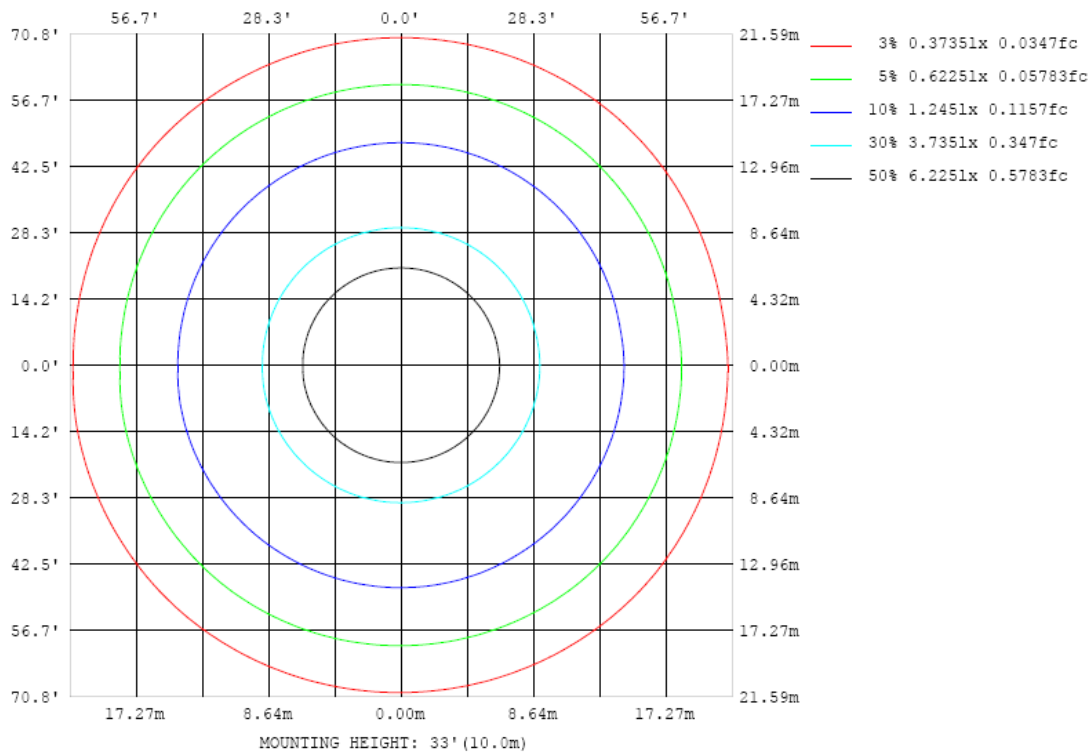


Chart 14: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

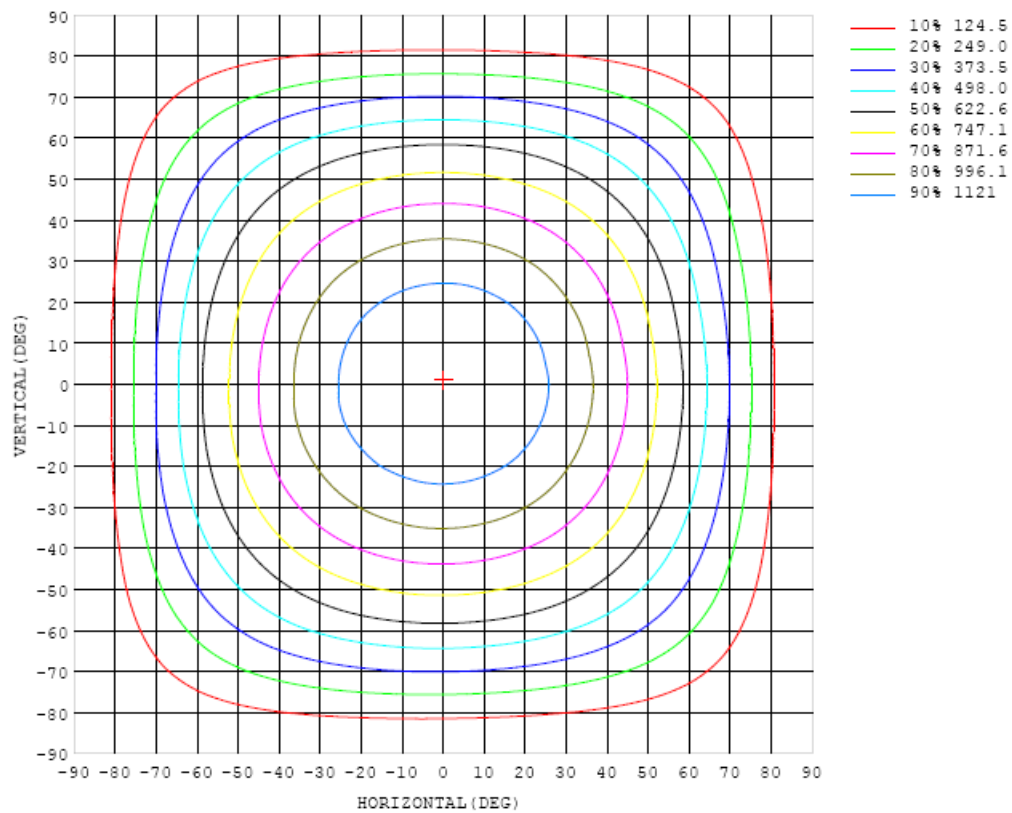


Chart 15: Isocandela Plot

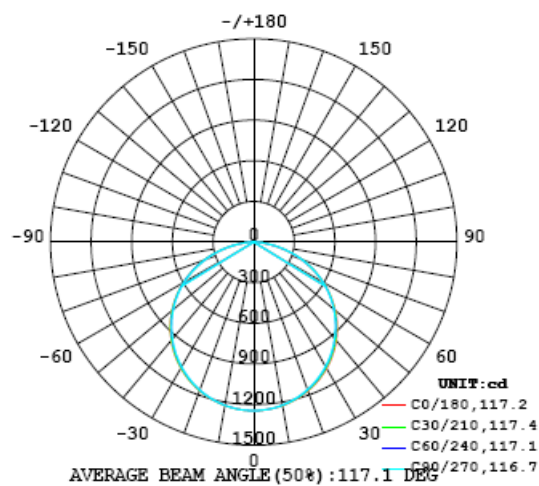


Chart 16: Polar Candela Distribution

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	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245
5	1239	1239	1239	1239	1239	1239	1239	1238	1238	1239	1239	1238	1239	1239	1239	1240	1239	1239	1238
10	1225	1225	1225	1224	1224	1224	1222	1222	1222	1222	1222	1221	1223	1223	1224	1225	1226	1224	1224
15	1201	1202	1201	1200	1199	1198	1196	1195	1195	1196	1196	1195	1197	1198	1199	1201	1203	1202	1201
20	1170	1169	1168	1165	1165	1163	1161	1160	1159	1159	1161	1160	1162	1164	1165	1167	1169	1170	1167
25	1127	1127	1125	1123	1121	1119	1116	1114	1114	1113	1115	1115	1118	1121	1122	1125	1128	1128	1125
30	1077	1075	1073	1071	1068	1066	1063	1061	1060	1060	1061	1062	1065	1068	1071	1074	1077	1078	1075
35	1017	1015	1013	1010	1007	1005	1001	998	998	998	1000	1000	1004	1007	1011	1015	1019	1019	1015
40	948	947	945	942	939	936	932	930	929	929	930	932	935	940	942	947	951	952	948
45	871	870	867	865	863	859	856	854	853	853	855	856	859	864	868	872	876	877	872
50	786	785	783	781	778	776	774	772	771	772	773	774	778	782	786	790	793	794	788
55	693	692	691	690	688	687	686	685	685	685	687	688	691	694	698	701	703	704	695
60	592	592	592	592	593	593	590	588	587	588	590	593	598	601	603	605	606	606	596
65	483	485	487	489	492	489	487	484	484	484	487	491	495	501	504	503	503	501	490
70	369	372	377	382	382	380	377	375	374	375	378	383	388	394	398	398	394	390	377
75	252	258	265	269	269	267	264	262	262	263	266	271	277	283	287	288	284	277	261
80	140	147	155	158	158	156	154	153	153	155	158	161	167	172	176	177	174	165	147
85	41.5	48.0	51.5	52.9	54.3	55.6	56.3	56.9	57.8	59.3	61.4	63.9	66.7	68.9	70.0	70.4	68.9	63.1	49.1
90	0.35	0.35	0.36	0.37	0.37	0.38	0.38	0.39	0.39	0.39	0.38	0.37	0.37	0.37	0.33	0.21	0.59	0.51	0.19
95	0.43	0.43	0.44	0.45	0.45	0.46	0.47	0.47	0.47	0.47	0.46	0.46	0.45	0.44	0.43	0.42	0.41	0.41	0.15
100	0.49	0.50	0.50	0.50	0.52	0.53	0.54	0.55	0.54	0.53	0.53	0.53	0.53	0.52	0.51	0.50	0.48	0.47	0.18
105	0.53	0.53	0.53	0.54	0.55	0.58	0.60	0.61	0.60	0.59	0.59	0.60	0.59	0.58	0.56	0.54	0.52	0.52	0.21
110	0.53	0.52	0.53	0.54	0.55	0.58	0.61	0.62	0.61	0.60	0.61	0.62	0.61	0.59	0.56	0.54	0.52	0.52	0.25
115	0.52	0.51	0.52	0.53	0.53	0.55	0.58	0.60	0.59	0.58	0.58	0.60	0.59	0.58	0.55	0.53	0.51	0.51	0.30
120	0.54	0.53	0.53	0.53	0.53	0.53	0.56	0.57	0.56	0.55	0.56	0.57	0.57	0.56	0.54	0.52	0.52	0.53	0.36
125	0.58	0.59	0.58	0.58	0.56	0.55	0.56	0.55	0.55	0.55	0.55	0.57	0.57	0.57	0.55	0.55	0.55	0.56	0.41
130	0.63	0.64	0.64	0.65	0.62	0.61	0.62	0.60	0.62	0.62	0.61	0.64	0.64	0.62	0.60	0.61	0.60	0.61	0.46
135	0.70	0.71	0.72	0.74	0.72	0.71	0.71	0.69	0.74	0.74	0.72	0.72	0.73	0.72	0.72	0.70	0.69	0.68	0.50
140	0.72	0.76	0.79	0.81	0.81	0.81	0.81	0.77	0.82	0.83	0.81	0.81	0.83	0.80	0.76	0.74	0.72	0.69	0.51
145	0.79	0.81	0.84	0.86	0.86	0.87	0.87	0.85	0.89	0.92	0.90	0.88	0.87	0.85	0.80	0.75	0.76	0.75	0.55
150	0.84	0.85	0.88	0.88	0.90	0.90	0.87	0.88	0.91	0.91	0.88	0.91	0.87	0.84	0.79	0.81	0.83	0.81	0.60
155	0.85	0.85	0.89	0.91	0.90	0.88	0.85	0.85	0.85	0.91	0.88	0.85	0.82	0.81	0.84	0.86	0.85	0.83	0.66
160	0.87	0.86	0.87	0.90	0.91	0.91	0.84	0.80	0.85	0.80	0.81	0.80	0.82	0.85	0.86	0.88	0.87	0.85	0.73
165	0.86	0.86	0.86	0.89	0.91	0.93	0.90	0.85	0.81	0.83	0.82	0.81	0.83	0.84	0.85	0.86	0.85	0.84	0.80
170	0.89	0.90	0.92	0.94	0.96	0.98	0.98	0.92	0.85	0.84	0.87	0.87	0.85	0.84	0.86	0.88	0.88	0.86	0.84
175	0.93	0.94	0.95	0.97	0.97	0.97	0.97	0.94	0.87	0.88	0.87	0.90	0.87	0.84	0.86	0.89	0.87	0.84	0.86
180	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89

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	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245		
5	1239	1239	1239	1240	1240	1239	1238	1240	1240	1240	1239	1239	1240	1240	1239	1240	1240		
10	1225	1225	1225	1225	1224	1224	1224	1224	1223	1224	1224	1224	1225	1225	1225	1225	1225		
15	1201	1201	1201	1201	1200	1199	1198	1197	1197	1199	1198	1199	1200	1200	1200	1201	1200		
20	1168	1168	1167	1166	1165	1163	1162	1163	1162	1162	1163	1164	1165	1166	1167	1168	1168		
25	1126	1125	1125	1123	1121	1119	1118	1117	1117	1118	1118	1119	1122	1122	1123	1125	1124		
30	1075	1074	1073	1072	1069	1066	1064	1063	1063	1064	1064	1066	1069	1070	1072	1073	1072		
35	1015	1015	1013	1011	1008	1005	1003	1002	1002	1002	1002	1005	1007	1009	1011	1013	1011		
40	948	947	945	943	939	936	934	933	932	932	934	936	939	940	943	944	943		
45	872	871	869	867	864	860	858	857	856	857	858	860	862	864	865	866	865		
50	788	788	787	785	782	778	777	776	775	775	775	778	779	781	781	781	779		
55	697	697	697	695	693	691	689	689	688	688	688	689	690	690	689	688	686		
60	598	599	600	600	599	597	594	592	591	592	592	595	594	592	591	588	584		
65	492	495	498	500	498	494	490	488	487	487	488	490	492	491	487	482	476		
70	381	386	391	392	389	385	381	378	377	377	378	380	382	382	379	371	363		
75	267	275	280	280	277	273	269	266	264	264	265	267	269	269	266	259	248		
80	155	165	168	168	165	162	159	157	155	155	155	156	157	157	154	147	136		
85	56.5	61.7	64.2	64.4	64.6	63.7	62.6	61.8	59.6	60.5	60.0	59.4	57.7	55.0	52.0	47.6	41.1		
90	1.48	0.23	1.97	1.15	2.66	0.24	0.10	0.10	0.12	0.13	0.14	0.17	0.19	0.33	0.78	0.08	0.13		
95	0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.16		
100	0.18	0.18	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.21	0.21	0.21	0.20	0.20	0.19	0.19		
105	0.21	0.21	0.22	0.23	0.24	0.25	0.25	0.24	0.24	0.25	0.26	0.25	0.25	0.24	0.24	0.22	0.22		
110	0.25	0.25	0.26	0.26	0.28	0.29	0.28	0.27	0.27	0.29	0.30	0.29	0.29	0.28	0.28	0.27	0.26		
115	0.30	0.29	0.30	0.30	0.32	0.33	0.32	0.31	0.31	0.33	0.35	0.34	0.33	0.33	0.33	0.32	0.32		
120	0.36	0.35	0.34	0.35	0.37	0.38	0.36	0.36	0.35	0.37	0.40	0.39	0.38	0.39	0.39	0.38	0.38		
125	0.42	0.40	0.39	0.39	0.41	0.43	0.41	0.40	0.40	0.41	0.44	0.43	0.43	0.44	0.44	0.43	0.43		
130	0.47	0.46	0.46	0.44	0.46	0.49	0.47	0.45	0.47	0.47	0.49	0.48	0.47	0.48	0.49	0.47	0.48		
135	0.52	0.51	0.50	0.48	0.49	0.51	0.50	0.48	0.50	0.49	0.50	0.50	0.49	0.51	0.52	0.51	0.52		
140	0.51	0.51	0.51	0.49	0.51	0.52	0.50	0.50	0.51	0.49	0.48	0.50	0.50	0.51	0.51	0.51	0.53		
145	0.55	0.56	0.54	0.53	0.53	0.55	0.53	0.52	0.52	0.51	0.50	0.52	0.52	0.53	0.54	0.54	0.56		
150	0.60	0.62	0.62	0.58	0.58	0.57	0.57	0.57	0.56	0.56	0.55	0.55	0.57	0.58	0.57	0.58	0.61		
155	0.65	0.67	0.68	0.65	0.61	0.60	0.60	0.61	0.58	0.59	0.60	0.60	0.62	0.63	0.64	0.64	0.66		
160	0.72	0.73	0.74	0.72	0.68	0.65	0.64	0.64	0.60	0.62	0.65	0.67	0.70	0.71	0.71	0.70	0.73		
165	0.80	0.81	0.83	0.83	0.80	0.77	0.75	0.75	0.71	0.71	0.74	0.81	0.83	0.82	0.80	0.79	0.80		
170	0.84	0.85	0.86	0.87	0.84	0.78	0.75	0.79	0.75	0.72	0.77	0.82	0.83	0.81	0.81	0.81	0.84		
175	0.94	0.96	0.97	0.98	0.98	0.94	0.89	0.90	0.84	0.81	0.83	0.84	0.82	0.84	0.87	0.89	0.92		
180	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89		

Table 13: Luminous Intensity Data

TEST RESULTS (26W 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)	0.213	0.100
Power Factor	0.9903	0.9236
Test Power (W)	25.30	25.52
THD A%	8.92	13.85
Luminous Efficacy (lm/W)	147.0	145.5
Total Luminous Flux (lm)	3718.6	3712.4
Color Rendering Index (CRI)	81.9	
R9	9	
Correlated Color Temperature (CCT)(K)	4769	
Chromaticity Chroma x	0.3526	
Chromaticity Chroma y	0.3626	
Chromaticity Chroma u	0.2122	
Chromaticity Chroma v	0.3273	
Duv	0.0025	
Chromaticity Chroma u'	0.2122	
Chromaticity Chroma v'	0.4910	

Special Color Rendering Indices	
R1	80.2
R2	85.8
R3	89.9
R4	82.5
R5	80.3
R6	80.1
R7	87.7
R8	68.4
R9	9
R10	66.1
R11	81.4
R12	54.9
R13	81.4
R14	94.4

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)	0.213
Power Factor	0.9902
Power (W)	25.33
Luminous Efficacy (lm/W)	147.4
Total Luminous Flux (lm)	3733.3
Beam Angle (°)	117.2 (0°-180°) / 116.7 (90°-270°)
Center Beam Candle Power (cd)	1245
Maximum Beam Candle Power (cd)	1246 (At: C=180.0, Gamma=0.5)
Spacing Criteria	1.29 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	77.42%
Zonal Lumens in the 60 °-90 °Zone	22.50%
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

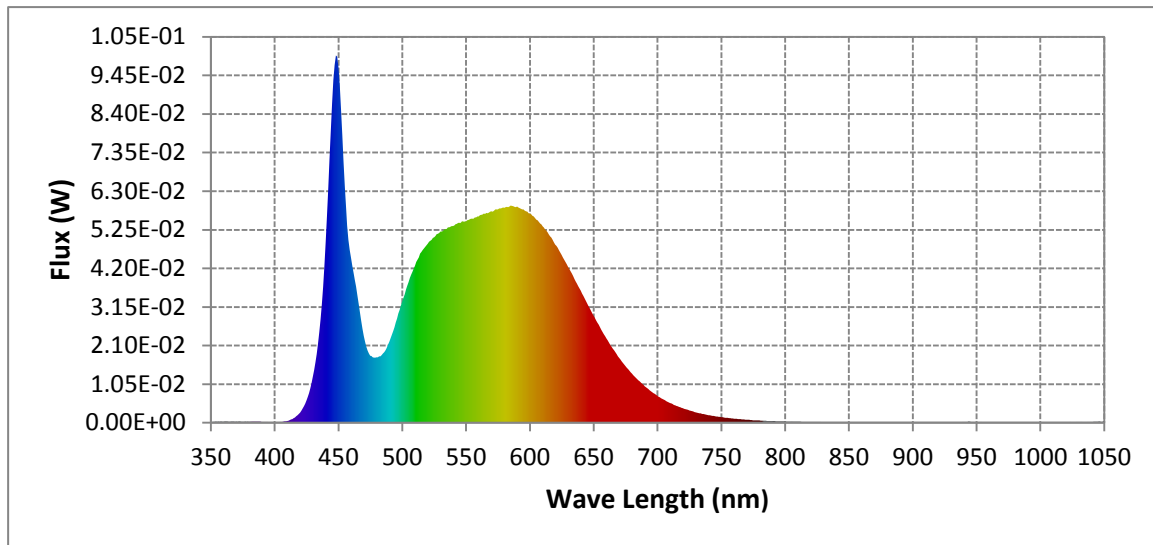
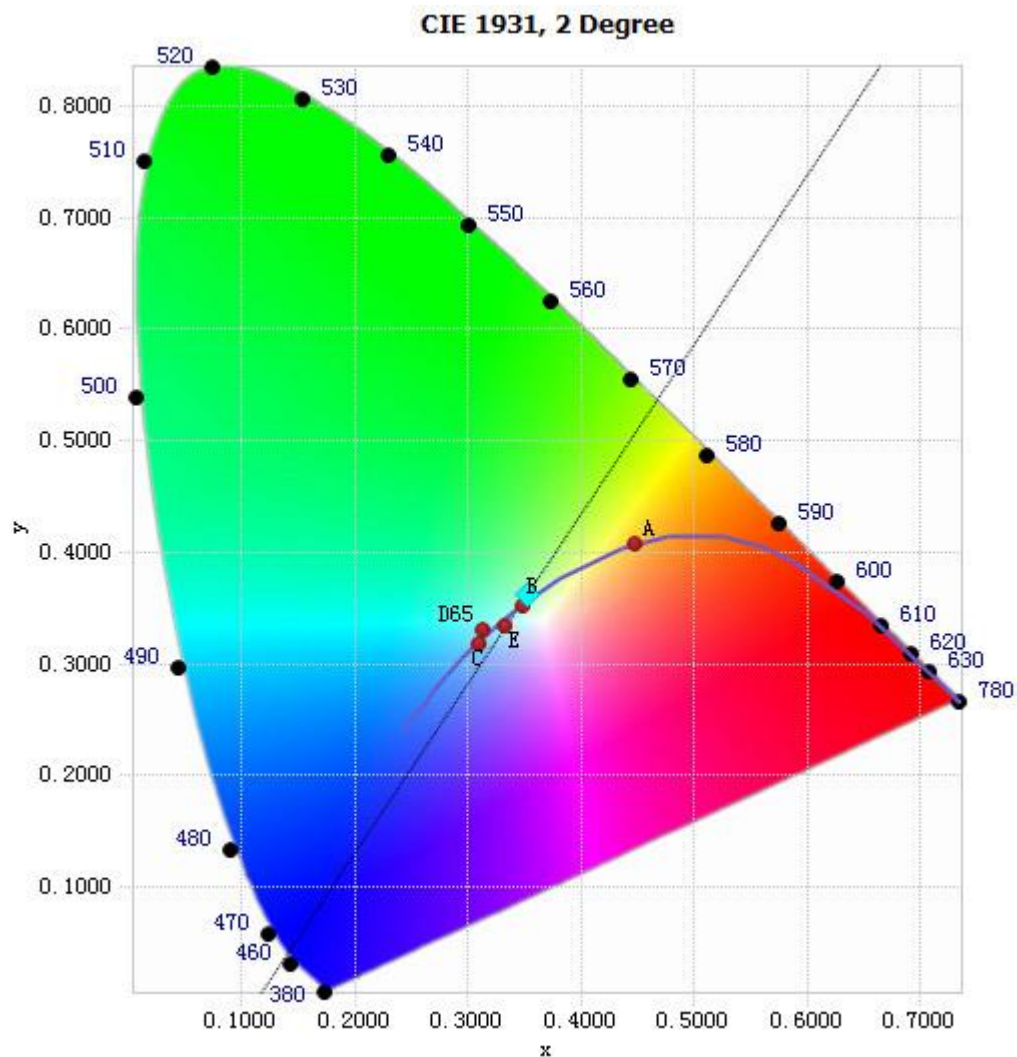


Chart 17: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.85E-04	485	1.88E-02	590	5.88E-02	695	8.59E-03
385	2.61E-04	490	2.20E-02	595	5.80E-02	700	7.35E-03
390	2.42E-04	495	2.73E-02	600	5.69E-02	705	6.31E-03
395	2.04E-04	500	3.29E-02	605	5.53E-02	710	5.36E-03
400	1.57E-04	505	3.83E-02	610	5.34E-02	715	4.61E-03
405	1.95E-04	510	4.27E-02	615	5.13E-02	720	3.95E-03
410	5.18E-04	515	4.64E-02	620	4.85E-02	725	3.37E-03
415	1.24E-03	520	4.87E-02	625	4.56E-02	730	2.86E-03
420	2.78E-03	525	5.05E-02	630	4.25E-02	735	2.43E-03
425	6.03E-03	530	5.20E-02	635	3.91E-02	740	2.06E-03
430	1.25E-02	535	5.27E-02	640	3.59E-02	745	1.78E-03
435	2.46E-02	540	5.35E-02	645	3.24E-02	750	1.52E-03
440	4.90E-02	545	5.44E-02	650	2.91E-02	755	1.31E-03
445	8.67E-02	550	5.47E-02	655	2.60E-02	760	1.12E-03
450	9.67E-02	555	5.55E-02	660	2.30E-02	765	9.78E-04
455	6.40E-02	560	5.61E-02	665	2.02E-02	770	8.45E-04
460	4.49E-02	565	5.68E-02	670	1.76E-02	775	6.90E-04
465	3.47E-02	570	5.75E-02	675	1.54E-02	780	6.09E-04
470	2.36E-02	575	5.80E-02	680	1.34E-02		
475	1.82E-02	580	5.85E-02	685	1.16E-02		
480	1.78E-02	585	5.91E-02	690	9.99E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3526, 0.3626)

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

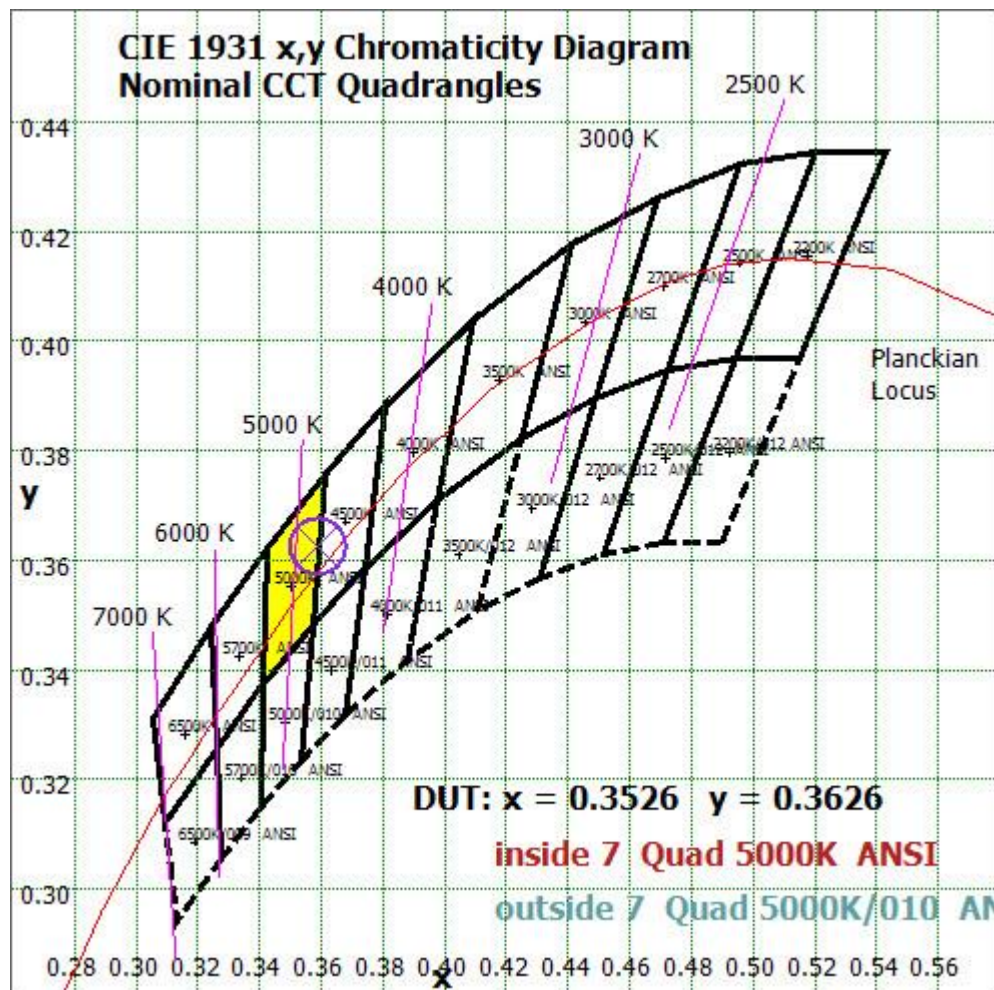


Chart 19: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

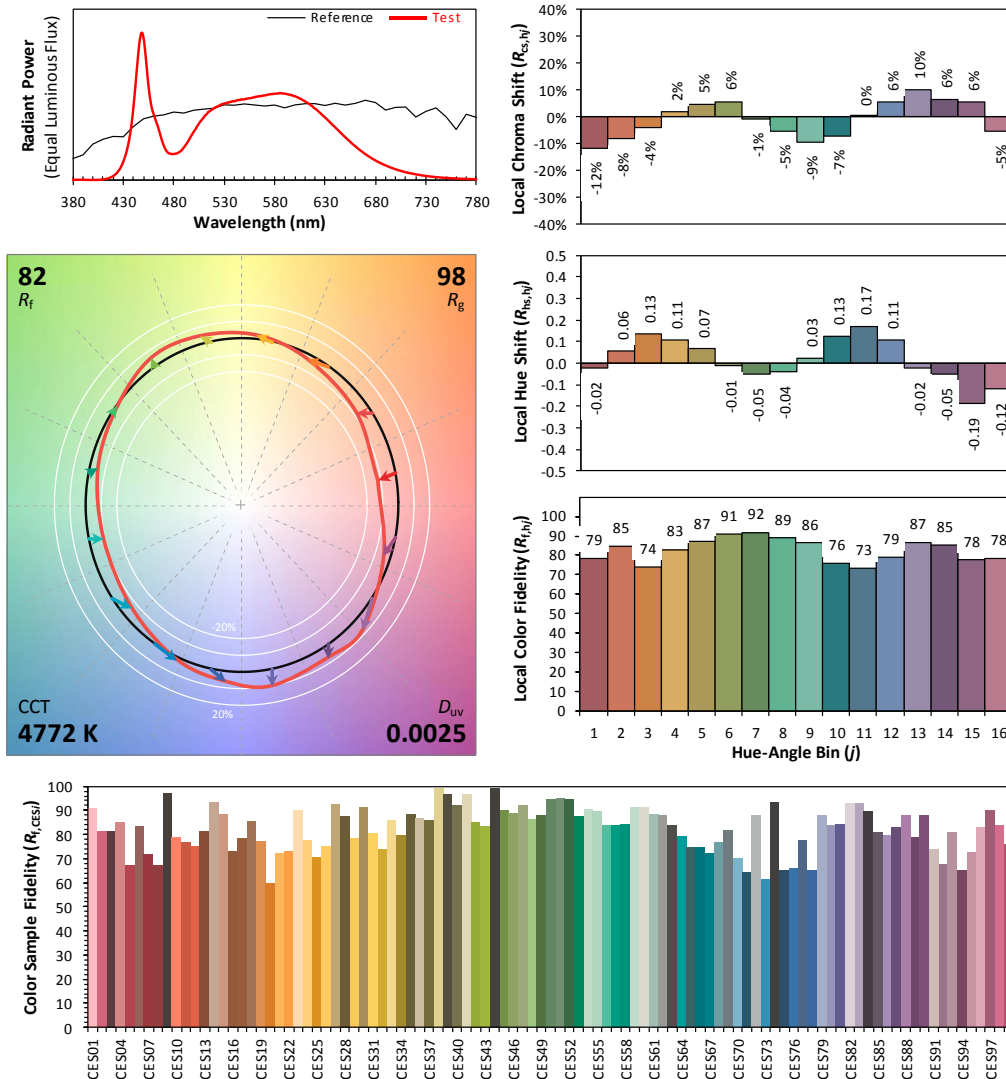
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: RAB Lighting Inc

Date: 2025/08/05

Model: SWISH1X4



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

x 0.3526
 y 0.3626
 u' 0.2122
 v' 0.4910

CIE 13.3-1995
(CRI)

R_a 82
 R_g 9

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	117.888	3.16%
10- 20	338.799	9.08%
20- 30	517.259	13.86%
30- 40	631.337	16.91%
40- 50	666.803	17.86%
50- 60	618.126	16.56%
60- 70	485.685	13.01%
70- 80	284.356	7.62%
80- 90	69.8	1.87%
90-100	0.343	0.01%
100-110	0.42	0.01%
110-120	0.433	0.01%
120-130	0.443	0.01%
130-140	0.466	0.01%
140-150	0.429	0.01%
150-160	0.344	0.01%
160-170	0.23	0.01%
170-180	0.083	0.00%
Total	3733.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2890.212	77.42%
60- 90	839.841	22.50%
0-90	3730.053	99.91%
90- 180	3.191	0.09%
0- 180	3733.2	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	16.4	18.1	16.8	18.4	18.7	16.5	18.1	16.8	18.4	18.7
	3H	18.3	19.8	18.7	20.1	20.5	18.4	19.9	18.7	20.2	20.6
	4H	19.0	20.4	19.3	20.7	21.1	19.1	20.5	19.5	20.8	21.2
	6H	19.4	20.7	19.8	21.1	21.5	19.6	20.9	20.0	21.2	21.6
	8H	19.5	20.8	19.9	21.2	21.5	19.7	21.0	20.1	21.4	21.8
	12H	19.5	20.8	20.0	21.1	21.6	19.8	21.0	20.2	21.4	21.8
4H	2H	17.1	18.6	17.5	18.9	19.3	17.2	18.6	17.5	18.9	19.3
	3H	19.2	20.4	19.6	20.8	21.2	19.3	20.5	19.7	20.9	21.3
	4H	20.0	21.1	20.5	21.5	21.9	20.1	21.2	20.6	21.6	22.0
	6H	20.6	21.5	21.0	22.0	22.4	20.7	21.7	21.2	22.1	22.6
	8H	20.7	21.6	21.2	22.1	22.5	20.9	21.8	21.4	22.3	22.7
	12H	20.8	21.6	21.3	22.1	22.5	21.1	21.9	21.5	22.3	22.8
8H	4H	20.3	21.2	20.8	21.7	22.1	20.5	21.4	20.9	21.8	22.3
	6H	21.0	21.8	21.5	22.3	22.7	21.2	22.0	21.7	22.4	22.9
	8H	21.3	21.9	21.8	22.4	22.9	21.5	22.1	22.0	22.6	23.1
	12H	21.4	22.0	21.9	22.5	23.0	21.7	22.2	22.2	22.7	23.3
12H	4H	20.4	21.2	20.9	21.7	22.1	20.5	21.3	21.0	21.8	22.3
	6H	21.1	21.8	21.6	22.2	22.8	21.3	22.0	21.8	22.4	23.0
	8H	21.4	22.0	21.9	22.4	23.0	21.6	22.2	22.1	22.7	23.2

Chart 21: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

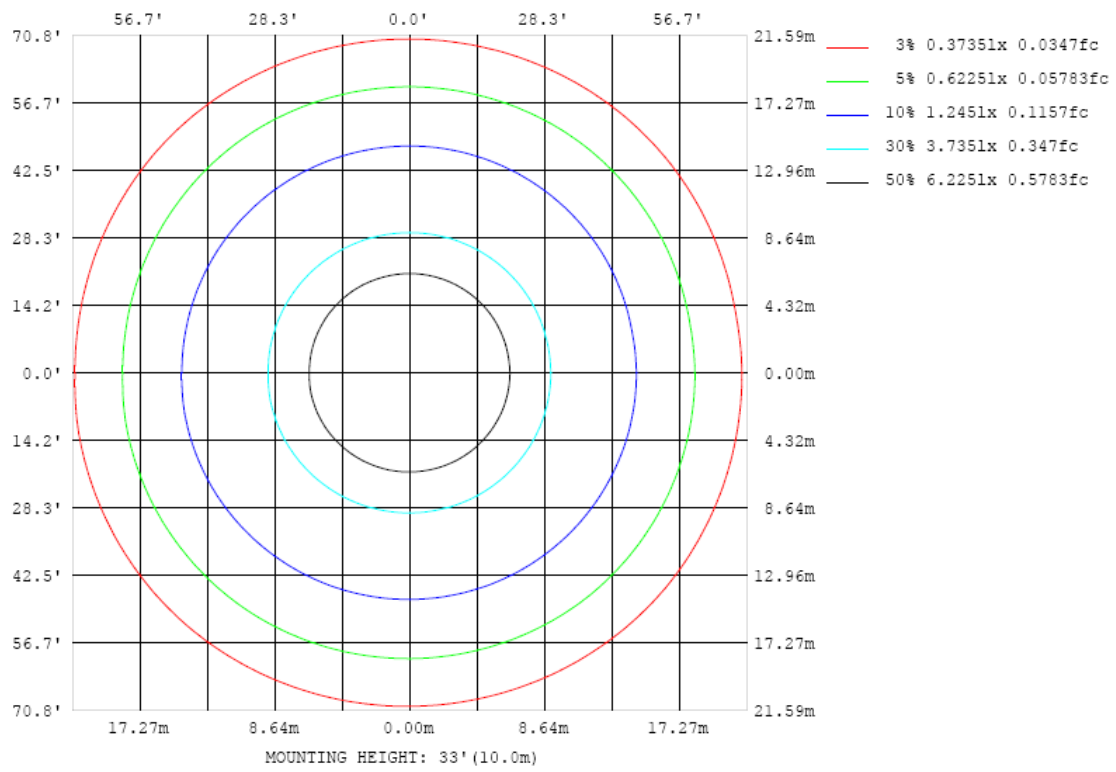


Chart 22: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

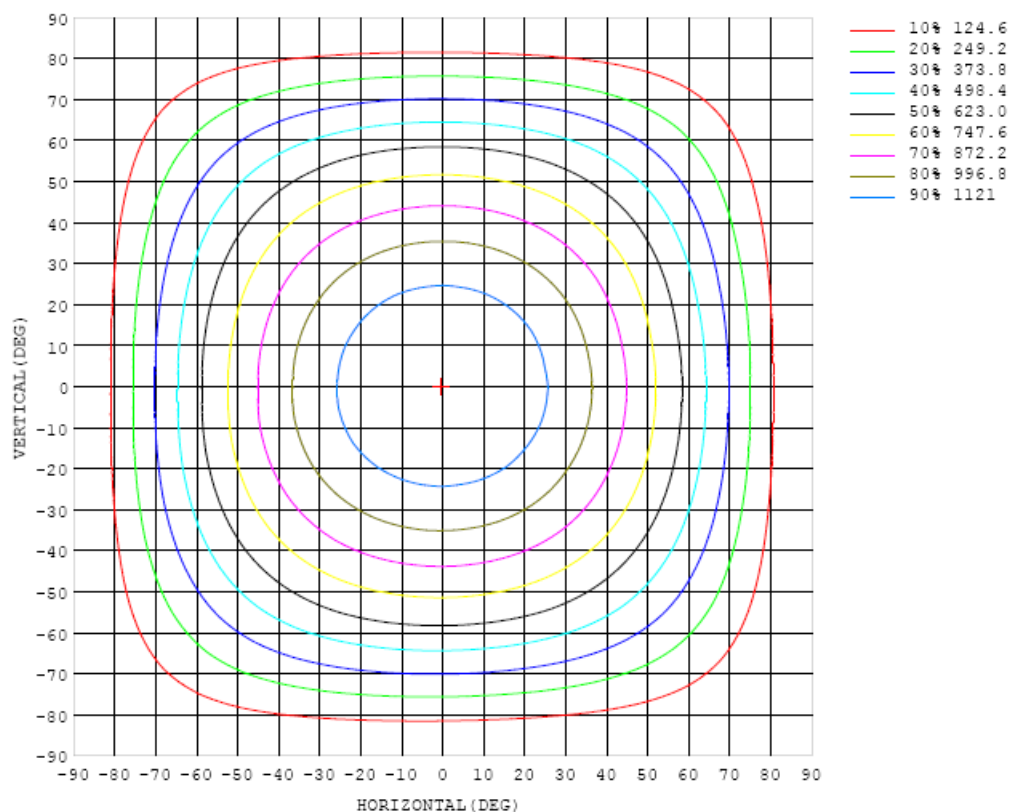


Chart 23: Isocandela Plot

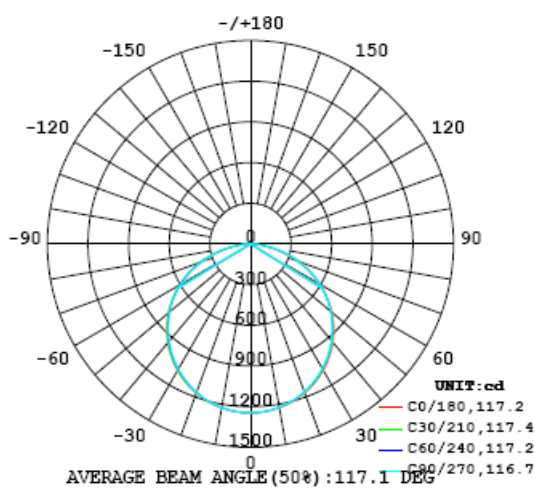


Chart 24: Polar Candela Distribution

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	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245
5	1240	1240	1240	1240	1239	1239	1239	1239	1238	1239	1239	1239	1240	1240	1240	1241	1241	1240	1241
10	1226	1226	1226	1225	1224	1223	1223	1222	1222	1223	1223	1223	1224	1225	1226	1227	1227	1227	1227
15	1202	1202	1201	1200	1199	1198	1198	1197	1195	1196	1196	1197	1199	1200	1202	1203	1204	1204	1203
20	1169	1169	1168	1165	1164	1162	1162	1160	1159	1160	1161	1162	1163	1166	1168	1170	1171	1172	1170
25	1127	1126	1125	1122	1119	1117	1117	1115	1114	1114	1115	1117	1119	1122	1125	1128	1130	1131	1128
30	1075	1075	1073	1070	1067	1065	1063	1061	1059	1061	1061	1064	1066	1070	1074	1077	1079	1081	1078
35	1016	1014	1012	1009	1006	1004	1002	999	998	998	1000	1002	1005	1010	1013	1018	1021	1022	1019
40	947	945	943	940	938	935	932	930	929	929	930	934	937	941	946	951	953	955	951
45	869	868	867	863	861	858	856	853	853	854	855	858	862	866	870	875	878	880	875
50	785	783	782	779	778	775	773	772	771	772	774	776	780	784	789	793	795	797	791
55	690	690	690	688	687	686	685	685	684	686	688	690	692	696	700	703	705	706	699
60	590	590	591	591	591	592	590	588	587	588	591	595	600	602	605	607	608	607	600
65	481	483	486	488	490	489	486	484	483	485	488	492	497	502	505	505	504	502	493
70	367	371	376	381	381	380	377	375	374	375	378	383	390	395	399	399	395	391	380
75	251	256	264	268	268	267	264	262	262	263	266	271	277	283	288	289	284	277	263
80	138	146	154	157	157	156	154	153	154	155	158	162	167	172	176	177	174	165	149
85	40.7	47.2	51.0	52.7	54.2	55.7	56.6	57.2	58.2	59.7	61.7	64.3	67.3	69.3	70.2	70.2	68.6	62.7	50.3
90	0.36	0.36	0.36	0.37	0.38	0.38	0.39	0.39	0.39	0.39	0.38	0.38	0.37	0.36	0.36	0.24	0.59	0.48	0.19
95	0.43	0.44	0.44	0.45	0.46	0.46	0.47	0.48	0.47	0.47	0.47	0.46	0.46	0.45	0.44	0.43	0.42	0.41	0.16
100	0.50	0.50	0.50	0.51	0.52	0.53	0.54	0.55	0.54	0.54	0.54	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.18
105	0.53	0.53	0.53	0.54	0.56	0.58	0.60	0.61	0.60	0.59	0.60	0.60	0.59	0.58	0.56	0.54	0.52	0.52	0.21
110	0.53	0.52	0.53	0.54	0.55	0.58	0.61	0.62	0.61	0.60	0.61	0.62	0.61	0.59	0.57	0.54	0.52	0.52	0.25
115	0.52	0.51	0.52	0.53	0.54	0.55	0.58	0.60	0.59	0.58	0.58	0.60	0.59	0.58	0.55	0.53	0.51	0.51	0.30
120	0.54	0.53	0.53	0.53	0.53	0.53	0.56	0.57	0.56	0.55	0.56	0.57	0.57	0.56	0.54	0.53	0.52	0.53	0.36
125	0.59	0.59	0.58	0.58	0.56	0.55	0.56	0.55	0.55	0.55	0.55	0.57	0.57	0.57	0.55	0.55	0.55	0.57	0.41
130	0.63	0.64	0.64	0.65	0.62	0.61	0.63	0.60	0.62	0.61	0.61	0.64	0.64	0.62	0.60	0.61	0.60	0.61	0.46
135	0.70	0.71	0.72	0.74	0.72	0.71	0.72	0.69	0.74	0.74	0.72	0.72	0.73	0.71	0.72	0.70	0.69	0.69	0.50
140	0.73	0.76	0.79	0.81	0.81	0.81	0.81	0.77	0.82	0.83	0.81	0.81	0.83	0.79	0.76	0.74	0.72	0.69	0.51
145	0.80	0.81	0.84	0.86	0.86	0.87	0.87	0.85	0.89	0.92	0.90	0.88	0.87	0.85	0.80	0.75	0.76	0.75	0.55
150	0.85	0.85	0.88	0.88	0.90	0.90	0.87	0.88	0.91	0.91	0.88	0.91	0.87	0.84	0.79	0.81	0.83	0.81	0.60
155	0.85	0.85	0.89	0.91	0.90	0.88	0.85	0.85	0.85	0.91	0.88	0.85	0.82	0.81	0.84	0.86	0.85	0.84	0.67
160	0.87	0.86	0.87	0.90	0.90	0.91	0.84	0.80	0.85	0.80	0.81	0.80	0.82	0.84	0.86	0.88	0.87	0.86	0.73
165	0.86	0.86	0.86	0.88	0.91	0.92	0.89	0.84	0.81	0.82	0.81	0.81	0.83	0.83	0.84	0.86	0.85	0.84	0.80
170	0.89	0.90	0.92	0.94	0.95	0.98	0.98	0.92	0.85	0.84	0.86	0.87	0.85	0.84	0.86	0.88	0.88	0.86	0.84
175	0.93	0.94	0.95	0.97	0.97	0.97	0.97	0.93	0.87	0.88	0.87	0.89	0.87	0.84	0.86	0.89	0.87	0.84	0.86
180	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88

Table 18: Luminous Intensity Data

Table--2		UNIT: cd																	
γ (DEG)	C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	
0		1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	1245	
5		1241	1240	1240	1241	1241	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240	1241	1240	
10		1227	1226	1226	1226	1226	1225	1224	1223	1224	1224	1224	1225	1225	1225	1226	1226	1225	
15		1203	1203	1202	1201	1201	1200	1199	1198	1198	1198	1199	1199	1200	1200	1201	1201	1201	
20		1170	1170	1168	1167	1166	1165	1164	1163	1163	1163	1163	1164	1164	1166	1168	1168	1167	
25		1128	1128	1126	1125	1123	1122	1119	1118	1118	1117	1118	1119	1120	1122	1125	1124	1124	
30		1078	1077	1075	1073	1071	1068	1066	1064	1064	1064	1065	1067	1068	1070	1072	1073	1073	
35		1019	1018	1015	1013	1010	1008	1005	1003	1002	1002	1004	1005	1008	1009	1011	1012	1012	
40		951	950	948	945	942	939	936	934	933	933	935	936	939	941	943	943	943	
45		876	874	872	870	866	863	861	858	857	857	859	860	862	864	866	866	865	
50		791	791	789	787	784	781	779	777	776	776	776	777	779	780	781	781	779	
55		700	701	699	698	695	693	691	689	689	689	689	689	690	690	690	688	686	
60		601	603	603	602	601	600	596	593	592	592	593	595	594	593	592	588	585	
65		496	499	500	502	500	496	492	489	487	487	489	491	492	491	487	482	477	
70		384	389	393	394	391	387	382	379	377	377	379	381	382	383	379	372	363	
75		269	277	282	282	278	274	270	266	265	264	265	267	269	270	267	259	248	
80		157	166	170	169	166	163	159	157	155	155	155	156	157	157	155	148	137	
85		57.5	62.9	64.9	64.9	65.2	64.1	62.3	61.0	60.6	60.2	59.7	59.1	57.6	54.6	52.3	48.1	41.9	
90		1.49	1.95	2.13	1.33	0.66	1.73	0.06	0.08	0.09	0.10	0.11	0.14	0.12	0.24	0.43	0.08	0.13	
95		0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	
100		0.18	0.18	0.19	0.20	0.20	0.21	0.20	0.20	0.20	0.21	0.21	0.21	0.21	0.21	0.20	0.19	0.19	
105		0.21	0.21	0.22	0.23	0.24	0.25	0.25	0.24	0.24	0.25	0.26	0.25	0.25	0.24	0.24	0.22	0.22	
110		0.25	0.25	0.26	0.26	0.28	0.29	0.28	0.27	0.27	0.29	0.30	0.29	0.29	0.28	0.28	0.26	0.27	
115		0.30	0.29	0.30	0.30	0.32	0.33	0.32	0.31	0.31	0.33	0.35	0.34	0.33	0.33	0.33	0.32	0.32	
120		0.36	0.35	0.34	0.35	0.37	0.38	0.36	0.36	0.36	0.37	0.40	0.39	0.38	0.39	0.39	0.38	0.38	
125		0.42	0.40	0.39	0.39	0.41	0.43	0.41	0.40	0.41	0.41	0.44	0.43	0.43	0.43	0.44	0.43	0.43	
130		0.47	0.46	0.45	0.44	0.46	0.49	0.47	0.45	0.47	0.47	0.49	0.48	0.47	0.48	0.49	0.47	0.48	
135		0.51	0.51	0.50	0.48	0.49	0.51	0.50	0.48	0.50	0.49	0.50	0.50	0.49	0.51	0.52	0.51	0.52	
140		0.51	0.51	0.51	0.49	0.51	0.52	0.50	0.50	0.51	0.49	0.48	0.50	0.50	0.51	0.51	0.51	0.54	
145		0.55	0.55	0.54	0.53	0.53	0.54	0.53	0.52	0.52	0.51	0.50	0.52	0.53	0.53	0.54	0.54	0.56	
150		0.60	0.62	0.62	0.57	0.58	0.56	0.56	0.57	0.56	0.56	0.55	0.55	0.57	0.58	0.57	0.58	0.61	
155		0.65	0.67	0.68	0.65	0.61	0.60	0.60	0.61	0.58	0.59	0.60	0.60	0.62	0.63	0.65	0.64	0.66	
160		0.72	0.73	0.73	0.72	0.68	0.65	0.64	0.64	0.60	0.61	0.65	0.67	0.70	0.71	0.71	0.70	0.73	
165		0.80	0.81	0.83	0.83	0.80	0.78	0.75	0.75	0.71	0.70	0.74	0.81	0.83	0.82	0.80	0.79	0.80	
170		0.84	0.85	0.85	0.87	0.84	0.78	0.75	0.79	0.75	0.72	0.77	0.82	0.83	0.81	0.81	0.81	0.85	
175		0.94	0.96	0.96	0.98	0.98	0.94	0.89	0.90	0.84	0.81	0.83	0.83	0.82	0.85	0.87	0.89	0.92	
180		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	

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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