

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.: HZ25070031g

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

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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 26W 3500K Setting	SWISH2X4 26W 4000K Setting	SWISH2X4 26W 5000K Setting
Luminous Efficacy (Lumens /Watt)	144.5	150.8	145.9
Total Luminous Flux (Lumens)	3681.2	3758.4	3720.1
Power (Watts)	25.47	24.93	25.50
Power Factor	0.9908	0.9907	0.9906
CCT (K)	3361	3987	4777
CRI	82.1	83.4	82.4
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins
Note	3500K	4000K	5000K

Table 1: Executive Data Summary

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

Test specifications:

Date of Receipt	: Jul. 28, 2025
Date of Test	: Aug. 06, 2025
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2019 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

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SAMPLE PHOTO

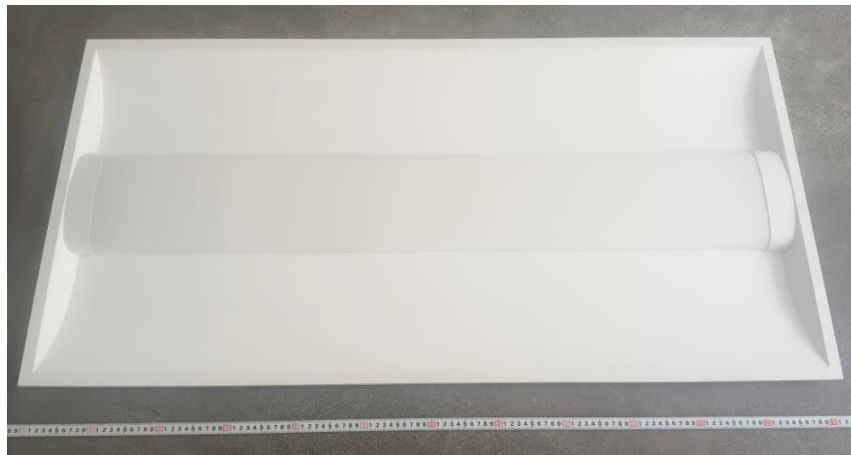


Figure 1- Overview of the sample

Equipment Under Test(EUT)

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

TEST RESULTS (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)	0.214	0.102
Power Factor	0.9908	0.9061
Test Power (W)	25.47	25.60
THD A%	7.88	14.03
Luminous Efficacy (lm/W)	144.5	143.0
Total Luminous Flux (lm)	3681.2	3661.9
Color Rendering Index (CRI)	82.1	
R9	5	
Correlated Color Temperature (CCT)(K)	3361	
Chromaticity Chroma x	0.4148	
Chromaticity Chroma y	0.3985	
Chromaticity Chroma u	0.2387	
Chromaticity Chroma v	0.3439	
Duv	0.0014	
Chromaticity Chroma u'	0.2387	
Chromaticity Chroma v'	0.5159	

Special Color Rendering Indices	
R1	80
R2	89
R3	96.2
R4	80.5
R5	80
R6	85.6
R7	84.5
R8	60.7
R9	5
R10	74.6
R11	79.5
R12	63.2
R13	82.1
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)	0.215
Power Factor	0.9908
Power (W)	25.50
Luminous Efficacy (lm/W)	144.8
Total Luminous Flux (lm)	3693.6
Beam Angle (°)	117.4 (0°-180°) / 120.8 (90°-270°)
Center Beam Candle Power (cd)	1187
Maximum Beam Candle Power (cd)	1187 (At: C=260.0, Gamma=0.5)
Spacing Criteria	1.28 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	75.26%
Zonal Lumens in the 60 °-90 °Zone	24.66%
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

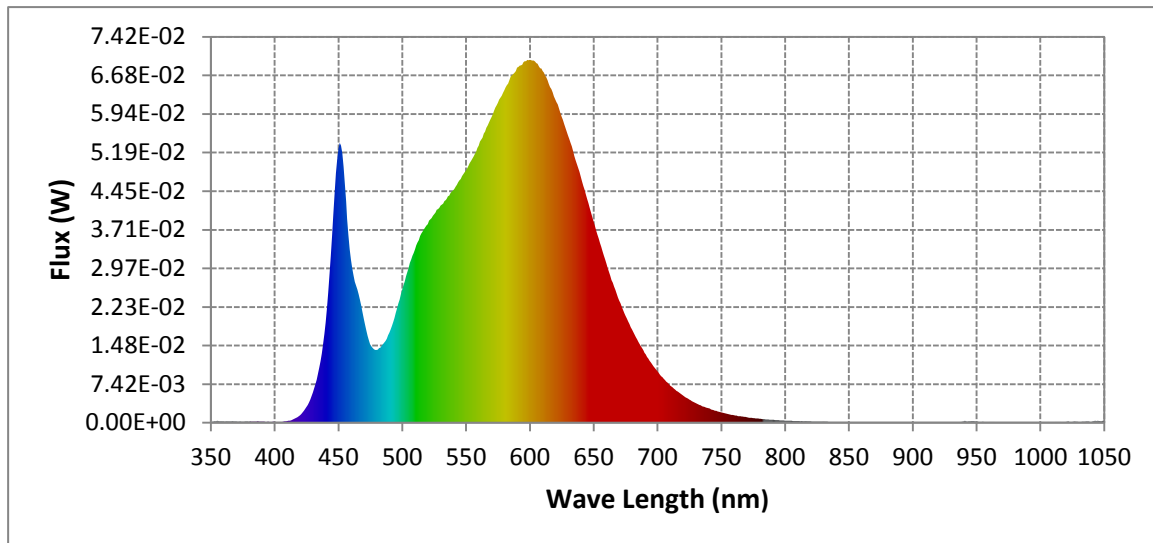
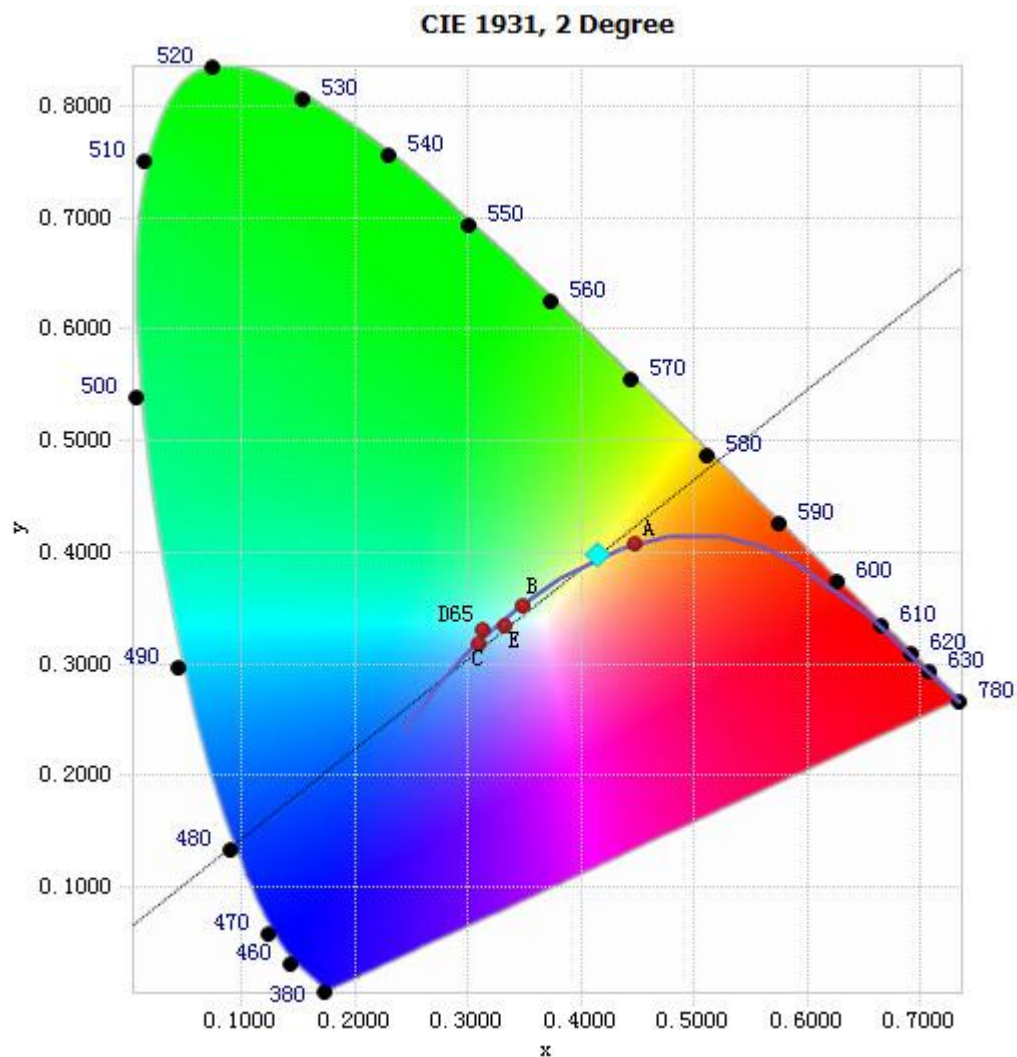


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.26E-04	485	1.51E-02	590	6.83E-02	695	1.16E-02
385	2.37E-04	490	1.73E-02	595	6.93E-02	700	9.92E-03
390	1.90E-04	495	2.11E-02	600	6.98E-02	705	8.48E-03
395	1.94E-04	500	2.55E-02	605	6.91E-02	710	7.18E-03
400	1.75E-04	505	2.98E-02	610	6.76E-02	715	6.15E-03
405	1.38E-04	510	3.33E-02	615	6.51E-02	720	5.29E-03
410	3.61E-04	515	3.64E-02	620	6.22E-02	725	4.45E-03
415	7.24E-04	520	3.82E-02	625	5.89E-02	730	3.80E-03
420	1.47E-03	525	4.01E-02	630	5.52E-02	735	3.19E-03
425	3.04E-03	530	4.17E-02	635	5.12E-02	740	2.82E-03
430	5.81E-03	535	4.30E-02	640	4.73E-02	745	2.34E-03
435	1.06E-02	540	4.46E-02	645	4.30E-02	750	2.00E-03
440	1.93E-02	545	4.66E-02	650	3.87E-02	755	1.71E-03
445	3.59E-02	550	4.84E-02	655	3.46E-02	760	1.45E-03
450	5.27E-02	555	5.07E-02	660	3.06E-02	765	1.24E-03
455	4.59E-02	560	5.33E-02	665	2.69E-02	770	1.06E-03
460	3.13E-02	565	5.60E-02	670	2.35E-02	775	9.17E-04
465	2.56E-02	570	5.87E-02	675	2.05E-02	780	7.70E-04
470	2.00E-02	575	6.15E-02	680	1.79E-02		
475	1.51E-02	580	6.39E-02	685	1.56E-02		
480	1.40E-02	585	6.65E-02	690	1.35E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4148, 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

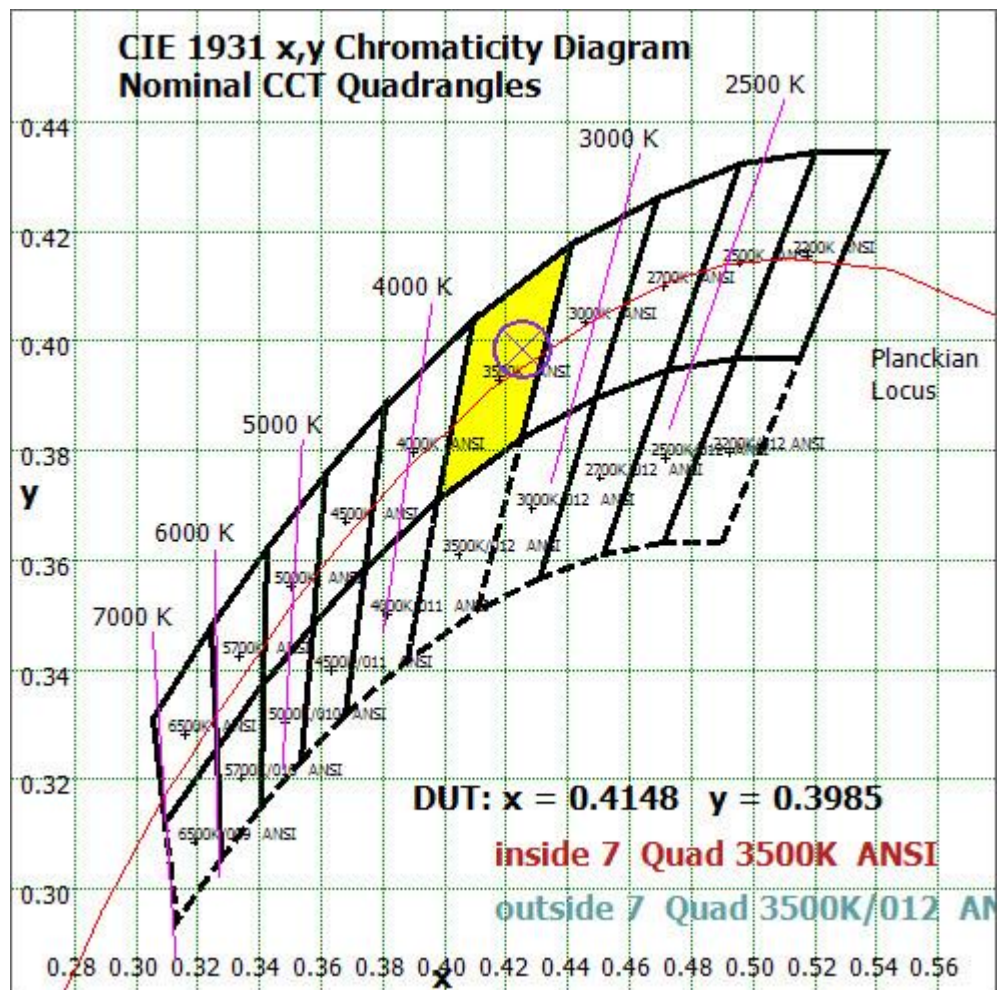


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

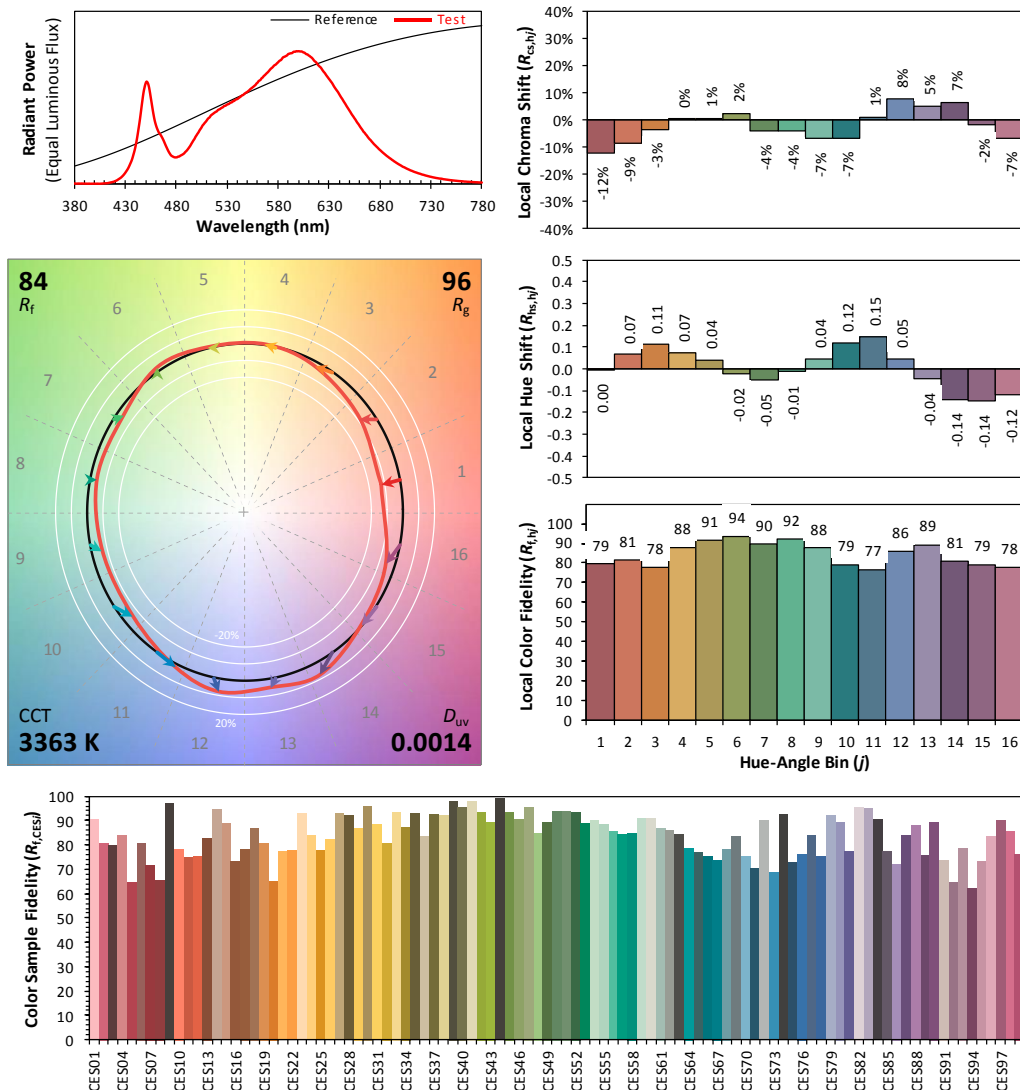
ANSI/IES TM-30-18 Color Rendition Report

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 0.4148
 y 0.3985
 u' 0.2387
 v' 0.5159

CIE 13.3-1995
(CRI)
 R_a 82
 R_g 5

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	112.34	3.04%
10- 20	323.148	8.75%
20- 30	494.308	13.38%
30- 40	605.192	16.38%
40- 50	642.585	17.40%
50- 60	602.138	16.30%
60- 70	488.647	13.23%
70- 80	318.351	8.62%
80- 90	103.681	2.81%
90-100	0.417	0.01%
100-110	0.448	0.01%
110-120	0.449	0.01%
120-130	0.45	0.01%
130-140	0.462	0.01%
140-150	0.406	0.01%
150-160	0.319	0.01%
160-170	0.213	0.01%
170-180	0.081	0.00%
Total	3693.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2779.711	75.26%
60- 90	910.679	24.66%
0-90	3690.39	99.91%
90- 180	3.245	0.09%
0- 180	3693.6	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	13.9	15.6	14.3	15.9	16.2	14.0	15.7	14.4	16.0	16.3
	3H	15.8	17.4	16.2	17.7	18.1	16.2	17.7	16.6	18.1	18.4
	4H	16.6	18.0	17.0	18.4	18.7	17.2	18.6	17.6	19.0	19.3
	6H	17.1	18.4	17.5	18.8	19.2	18.0	19.4	18.4	19.7	20.1
	8H	17.2	18.5	17.6	18.9	19.3	18.4	19.7	18.8	20.0	20.4
	12H	17.3	18.5	17.7	18.9	19.3	18.6	19.8	19.0	20.2	20.6
4H	2H	14.7	16.1	15.1	16.5	16.8	14.7	16.1	15.1	16.5	16.9
	3H	16.9	18.1	17.3	18.5	18.9	17.1	18.4	17.6	18.8	19.2
	4H	17.7	18.8	18.1	19.2	19.7	18.3	19.4	18.7	19.8	20.2
	6H	18.4	19.3	18.8	19.8	20.2	19.3	20.3	19.7	20.7	21.2
	8H	18.6	19.5	19.0	19.9	20.4	19.7	20.6	20.2	21.1	21.5
	12H	18.7	19.5	19.2	20.0	20.5	20.0	20.8	20.5	21.3	21.8
8H	4H	18.2	19.1	18.7	19.6	20.0	18.6	19.6	19.1	20.0	20.5
	6H	19.1	19.8	19.5	20.3	20.8	19.9	20.6	20.4	21.1	21.6
	8H	19.4	20.0	19.9	20.5	21.0	20.4	21.1	20.9	21.6	22.1
	12H	19.6	20.2	20.1	20.7	21.2	20.8	21.4	21.3	21.9	22.4
12H	4H	18.3	19.1	18.8	19.6	20.1	18.7	19.5	19.2	20.0	20.5
	6H	19.2	19.9	19.8	20.4	20.9	20.0	20.7	20.5	21.1	21.7
	8H	19.6	20.2	20.1	20.7	21.3	20.6	21.2	21.1	21.7	22.2

Chart 5: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

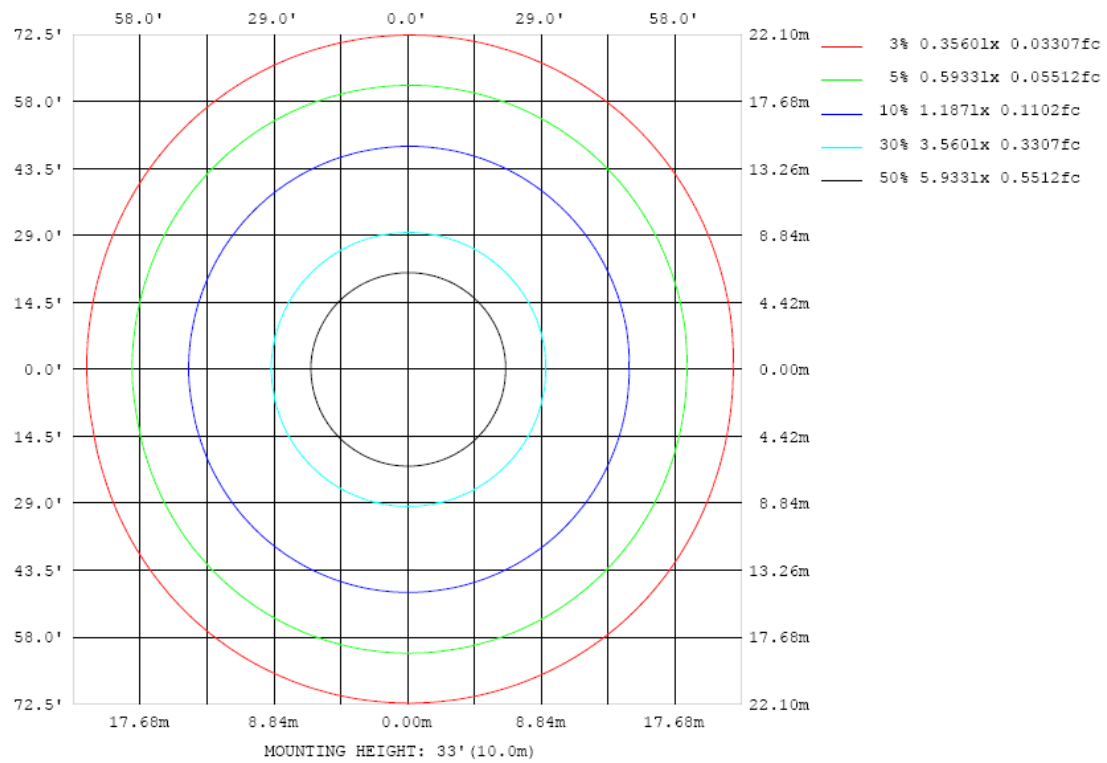


Chart 6: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

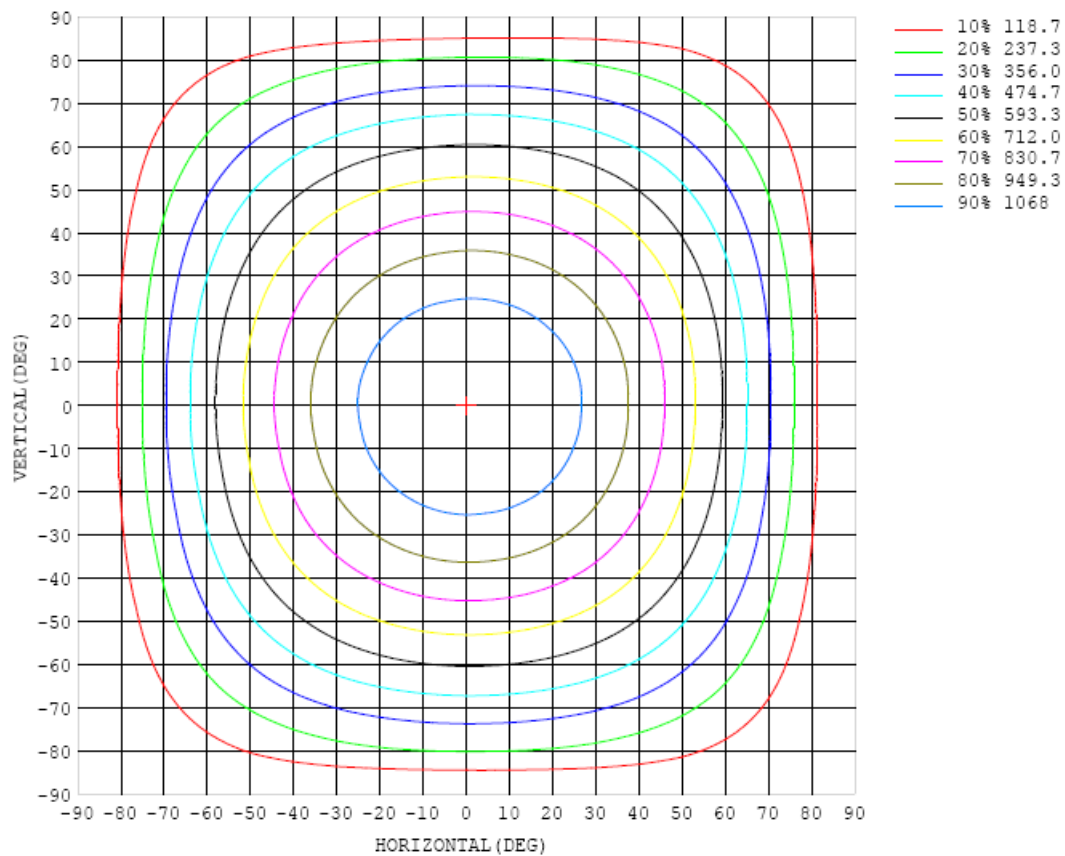


Chart 7: Isocandela Plot

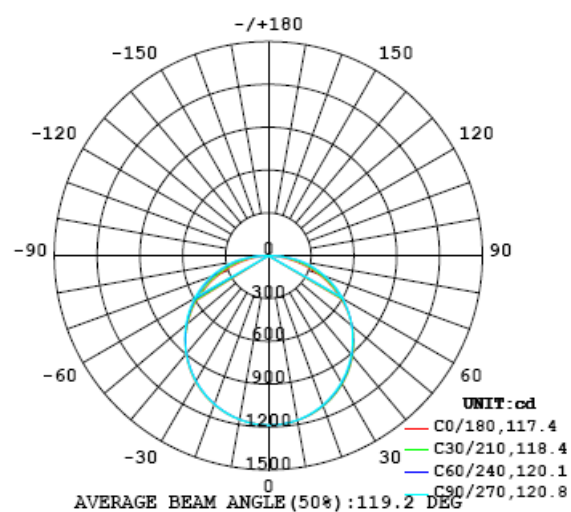


Chart 8: Polar Candela Distribution

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	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187
5	1184	1183	1183	1183	1184	1183	1182	1182	1181	1183	1182	1182	1181	1181	1181	1180	1180	1180	1179
10	1171	1171	1171	1171	1171	1170	1169	1168	1168	1168	1168	1167	1167	1166	1166	1166	1166	1165	1165
15	1150	1151	1150	1150	1150	1149	1147	1146	1145	1145	1145	1143	1143	1142	1142	1142	1142	1141	1142
20	1121	1121	1120	1120	1119	1118	1116	1114	1112	1113	1112	1110	1111	1110	1110	1109	1109	1109	1110
25	1082	1083	1082	1082	1080	1078	1075	1074	1071	1071	1070	1069	1069	1069	1069	1069	1068	1068	1069
30	1035	1036	1035	1034	1033	1030	1028	1025	1023	1022	1022	1020	1020	1020	1019	1019	1019	1018	1020
35	981	981	980	979	977	975	972	969	967	966	965	964	963	962	962	962	961	960	963
40	917	918	916	915	913	911	909	906	904	903	902	900	899	898	897	896	895	894	897
45	844	845	845	844	843	841	839	837	835	834	833	831	830	828	825	824	822	820	823
50	764	765	766	765	765	765	764	763	762	761	759	757	754	751	747	745	741	738	742
55	676	677	678	681	682	684	685	685	683	683	681	678	674	670	664	659	653	649	653
60	579	581	584	589	594	598	600	601	601	601	599	595	590	584	575	567	559	553	557
65	477	479	485	492	501	508	512	515	515	515	513	509	503	494	483	471	459	451	454
70	368	372	381	393	406	415	421	424	425	425	423	418	412	402	388	373	357	344	347
75	257	262	275	292	308	320	327	331	334	334	331	326	319	308	292	274	253	237	239
80	147	154	172	193	210	224	235	240	242	242	240	236	228	214	196	177	154	134	134
85	54.2	61.7	78.3	95.9	107	112	112	108	105	103	102	103	103	99.7	92.8	81.2	63.8	47.4	44.7
90	1.87	2.61	4.87	1.29	0.23	3.57	1.10	0.67	0.52	0.45	0.28	0.23	0.64	0.83	0.90	2.48	0.75	0.14	0.39
95	0.21	0.19	0.19	0.19	0.20	0.21	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.21	0.20	0.19	0.20	0.48
100	0.26	0.24	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.22	0.22	0.57
105	0.30	0.28	0.26	0.24	0.24	0.25	0.26	0.26	0.25	0.26	0.27	0.27	0.27	0.27	0.26	0.25	0.27	0.29	0.61
110	0.35	0.32	0.31	0.28	0.27	0.27	0.28	0.28	0.27	0.28	0.29	0.30	0.31	0.30	0.30	0.31	0.32	0.34	0.61
115	0.40	0.36	0.34	0.33	0.32	0.32	0.32	0.32	0.31	0.32	0.33	0.35	0.36	0.35	0.35	0.36	0.38	0.38	0.60
120	0.45	0.41	0.37	0.38	0.36	0.37	0.37	0.36	0.37	0.37	0.38	0.40	0.41	0.40	0.41	0.43	0.41	0.43	0.62
125	0.50	0.46	0.43	0.42	0.40	0.37	0.41	0.40	0.41	0.41	0.42	0.44	0.44	0.42	0.45	0.49	0.47	0.48	0.67
130	0.54	0.48	0.48	0.43	0.46	0.47	0.41	0.41	0.45	0.46	0.46	0.44	0.43	0.49	0.51	0.47	0.51	0.52	0.71
135	0.58	0.51	0.52	0.50	0.43	0.49	0.50	0.47	0.45	0.44	0.45	0.48	0.50	0.51	0.47	0.55	0.54	0.53	0.77
140	0.59	0.56	0.53	0.52	0.48	0.43	0.46	0.48	0.48	0.50	0.48	0.46	0.48	0.45	0.52	0.54	0.54	0.57	0.79
145	0.61	0.62	0.52	0.54	0.53	0.50	0.46	0.42	0.42	0.44	0.41	0.40	0.44	0.52	0.54	0.55	0.54	0.62	0.80
150	0.65	0.65	0.61	0.60	0.57	0.56	0.52	0.51	0.50	0.50	0.50	0.49	0.52	0.56	0.58	0.58	0.54	0.67	0.83
155	0.71	0.70	0.69	0.61	0.62	0.58	0.55	0.55	0.55	0.52	0.53	0.53	0.55	0.60	0.62	0.60	0.66	0.72	0.84
160	0.77	0.75	0.76	0.72	0.64	0.59	0.58	0.58	0.58	0.54	0.52	0.55	0.60	0.65	0.64	0.69	0.74	0.78	0.87
165	0.82	0.82	0.83	0.83	0.80	0.74	0.66	0.59	0.59	0.56	0.57	0.60	0.67	0.74	0.79	0.82	0.83	0.84	0.86
170	0.85	0.85	0.86	0.86	0.85	0.81	0.72	0.65	0.66	0.65	0.63	0.68	0.77	0.81	0.82	0.83	0.84	0.88	0.90
175	0.85	0.90	0.94	0.95	0.96	0.97	0.92	0.86	0.89	0.81	0.74	0.76	0.82	0.82	0.84	0.87	0.89	0.90	0.90
180	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84

Table 6: Luminous Intensity Data

Table--2		UNIT: cd																	
γ	C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	
0		1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	
5		1180	1181	1180	1180	1181	1180	1180	1180	1181	1181	1181	1182	1182	1183	1183	1183	1182	
10		1166	1165	1165	1165	1165	1165	1164	1164	1166	1166	1167	1168	1168	1170	1171	1171	1171	
15		1143	1142	1141	1140	1140	1139	1139	1139	1141	1142	1143	1144	1145	1148	1149	1151	1151	
20		1111	1109	1108	1107	1106	1105	1105	1105	1107	1109	1110	1112	1114	1117	1119	1121	1121	
25		1069	1067	1066	1065	1064	1063	1064	1063	1065	1067	1068	1072	1074	1077	1080	1083	1084	
30		1020	1018	1017	1016	1014	1013	1013	1014	1015	1017	1020	1023	1027	1030	1034	1037	1038	
35		963	961	959	958	957	956	957	957	959	961	964	968	971	974	979	982	983	
40		897	895	894	894	893	893	893	894	896	899	901	905	908	912	915	918	920	
45		823	822	822	823	823	823	825	826	829	831	834	836	839	842	845	847	849	
50		742	742	743	745	747	749	751	753	756	758	761	763	764	766	768	769	770	
55		653	655	658	663	667	670	673	676	680	681	683	684	684	684	683	683	682	
60		558	562	568	575	582	588	592	595	599	601	602	602	600	597	594	591	587	
65		456	464	473	484	494	501	507	511	515	517	517	515	512	506	499	492	486	
70		351	362	376	391	403	413	420	425	428	430	430	427	421	412	401	389	380	
75		245	260	279	296	311	322	330	335	339	340	339	336	329	317	302	285	271	
80		143	162	183	201	218	231	241	246	250	251	249	244	235	221	204	183	164	
85		53.6	70.2	87.4	98.3	105	110	113	115	119	124	130	133	132	125	108	88.6	68.9	
90		0.40	0.41	0.43	0.45	0.47	0.49	0.49	0.50	0.50	0.52	0.52	0.52	0.52	0.51	0.49	0.46	0.45	
95		0.48	0.47	0.49	0.51	0.53	0.55	0.56	0.55	0.55	0.54	0.53	0.52	0.51	0.49	0.46	0.45	0.45	
100		0.55	0.52	0.53	0.54	0.57	0.59	0.60	0.60	0.59	0.58	0.58	0.56	0.55	0.53	0.52	0.50	0.53	
105		0.58	0.57	0.55	0.57	0.59	0.62	0.64	0.63	0.62	0.61	0.61	0.60	0.58	0.57	0.55	0.56	0.57	
110		0.57	0.58	0.55	0.55	0.57	0.61	0.63	0.62	0.61	0.61	0.60	0.60	0.58	0.56	0.55	0.57	0.57	
115		0.56	0.56	0.55	0.53	0.53	0.56	0.58	0.57	0.56	0.56	0.57	0.57	0.56	0.53	0.55	0.54	0.56	
120		0.58	0.57	0.57	0.54	0.51	0.53	0.54	0.54	0.53	0.53	0.53	0.53	0.53	0.54	0.55	0.54	0.58	
125		0.64	0.61	0.62	0.58	0.55	0.53	0.52	0.52	0.52	0.51	0.53	0.53	0.56	0.57	0.57	0.57	0.62	
130		0.68	0.66	0.66	0.64	0.62	0.59	0.58	0.60	0.59	0.58	0.59	0.60	0.63	0.62	0.61	0.61	0.64	
135		0.73	0.72	0.74	0.72	0.71	0.70	0.68	0.71	0.70	0.69	0.71	0.73	0.72	0.70	0.69	0.68	0.71	
140		0.79	0.77	0.78	0.77	0.77	0.78	0.76	0.81	0.81	0.79	0.79	0.80	0.75	0.71	0.70	0.68	0.71	
145		0.81	0.78	0.81	0.82	0.81	0.78	0.79	0.85	0.86	0.84	0.79	0.75	0.74	0.72	0.70	0.67	0.74	
150		0.83	0.80	0.82	0.85	0.83	0.79	0.80	0.83	0.83	0.75	0.73	0.73	0.74	0.71	0.71	0.75	0.79	
155		0.84	0.85	0.81	0.83	0.81	0.76	0.75	0.73	0.71	0.71	0.71	0.70	0.71	0.71	0.73	0.80	0.82	
160		0.87	0.87	0.85	0.81	0.82	0.75	0.69	0.70	0.69	0.70	0.69	0.68	0.70	0.72	0.80	0.84	0.85	
165		0.86	0.87	0.88	0.88	0.85	0.78	0.72	0.69	0.69	0.67	0.64	0.65	0.68	0.75	0.81	0.83	0.84	
170		0.91	0.93	0.94	0.95	0.96	0.93	0.84	0.78	0.76	0.75	0.74	0.74	0.76	0.80	0.83	0.85	0.86	
175		0.93	0.96	0.97	0.96	0.97	0.96	0.90	0.84	0.83	0.83	0.87	0.84	0.78	0.79	0.84	0.87	0.86	
180		0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	

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)	0.210	0.100
Power Factor	0.9907	0.9032
Test Power (W)	24.93	25.07
THD A%	7.89	14.07
Luminous Efficacy (lm/W)	150.8	149.0
Total Luminous Flux (lm)	3758.4	3736.0
Color Rendering Index (CRI)	83.4	
R9	11	
Correlated Color Temperature (CCT)(K)	3987	
Chromaticity Chroma x	0.3816	
Chromaticity Chroma y	0.3797	
Chromaticity Chroma u	0.2247	
Chromaticity Chroma v	0.3354	
Duv	0.0010	
Chromaticity Chroma u'	0.2247	
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	86.4
R8	65.3
R9	11
R10	75.1
R11	81
R12	60
R13	83.7
R14	97.5

Table 8: 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)	0.210
Power Factor	0.9906
Power (W)	24.95
Luminous Efficacy (lm/W)	151.1
Total Luminous Flux (lm)	3770.3
Beam Angle (°)	117.5 (0°-180°) / 120.9 (90°-270°)
Center Beam Candle Power (cd)	1211
Maximum Beam Candle Power (cd)	1211 (At: C=210.0, Gamma=1.0)
Spacing Criteria	1.31 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	75.28%
Zonal Lumens in the 60 °-90 °Zone	24.63%
Zonal Lumens in the 90 °-120 °Zone	0.04%
Zonal Lumens in the 120 °-180 °Zone	0.05%

Table 9: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

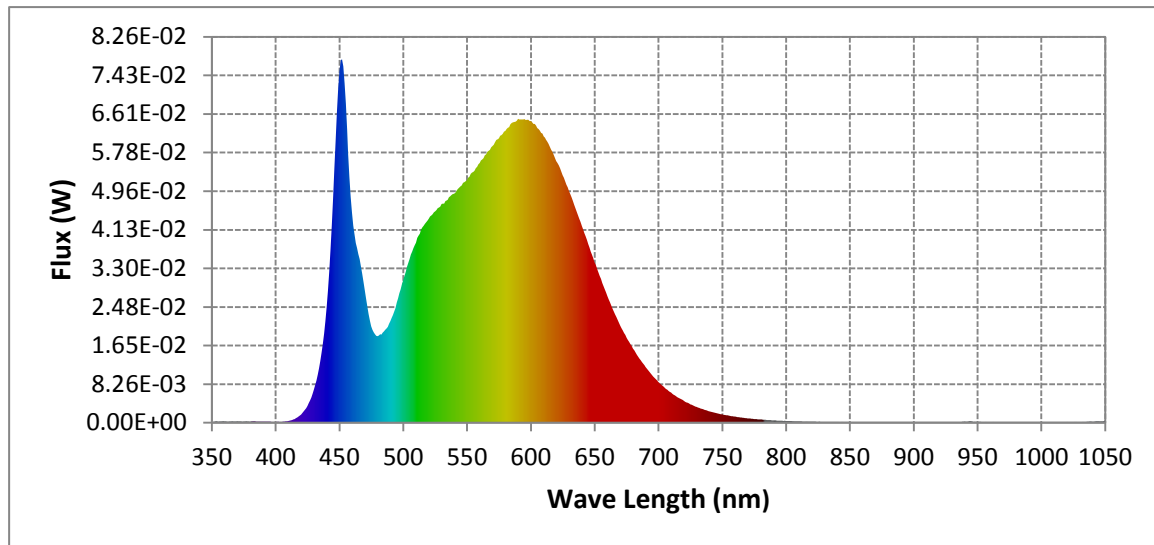
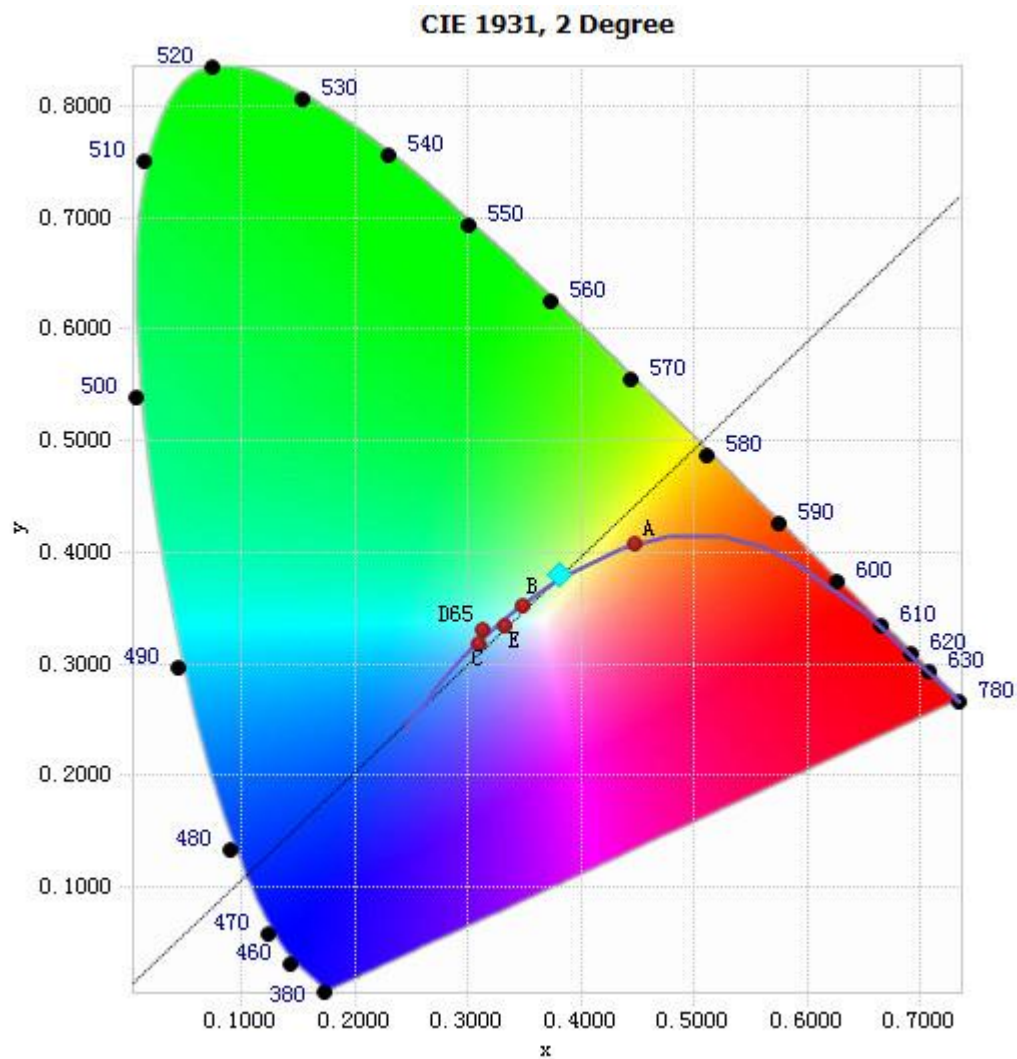


Chart 9: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.71E-04	485	1.95E-02	590	6.50E-02	695	1.02E-02
385	2.63E-04	490	2.18E-02	595	6.49E-02	700	8.75E-03
390	2.48E-04	495	2.57E-02	600	6.45E-02	705	7.50E-03
395	2.68E-04	500	3.05E-02	605	6.31E-02	710	6.44E-03
400	1.88E-04	505	3.50E-02	610	6.13E-02	715	5.47E-03
405	1.70E-04	510	3.85E-02	615	5.90E-02	720	4.69E-03
410	3.70E-04	515	4.18E-02	620	5.60E-02	725	3.97E-03
415	8.10E-04	520	4.37E-02	625	5.29E-02	730	3.37E-03
420	1.77E-03	525	4.53E-02	630	4.96E-02	735	2.89E-03
425	3.62E-03	530	4.68E-02	635	4.59E-02	740	2.44E-03
430	7.09E-03	535	4.77E-02	640	4.22E-02	745	2.08E-03
435	1.32E-02	540	4.90E-02	645	3.83E-02	750	1.79E-03
440	2.48E-02	545	5.06E-02	650	3.43E-02	755	1.52E-03
445	4.79E-02	550	5.19E-02	655	3.08E-02	760	1.31E-03
450	7.52E-02	555	5.37E-02	660	2.71E-02	765	1.10E-03
455	6.83E-02	560	5.56E-02	665	2.38E-02	770	9.52E-04
460	4.50E-02	565	5.74E-02	670	2.08E-02	775	8.12E-04
465	3.61E-02	570	5.92E-02	675	1.82E-02	780	7.00E-04
470	2.84E-02	575	6.09E-02	680	1.58E-02		
475	2.07E-02	580	6.24E-02	685	1.38E-02		
480	1.85E-02	585	6.42E-02	690	1.20E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3816, 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

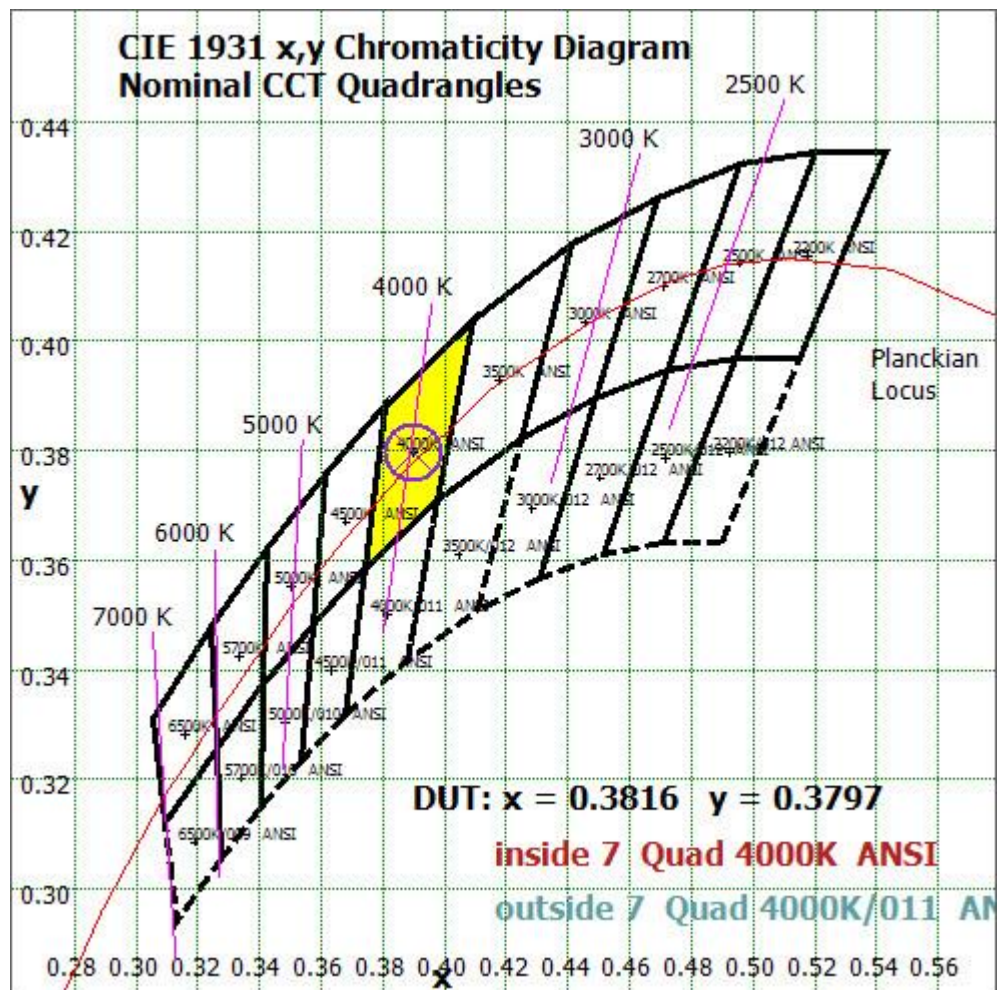


Chart 11: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

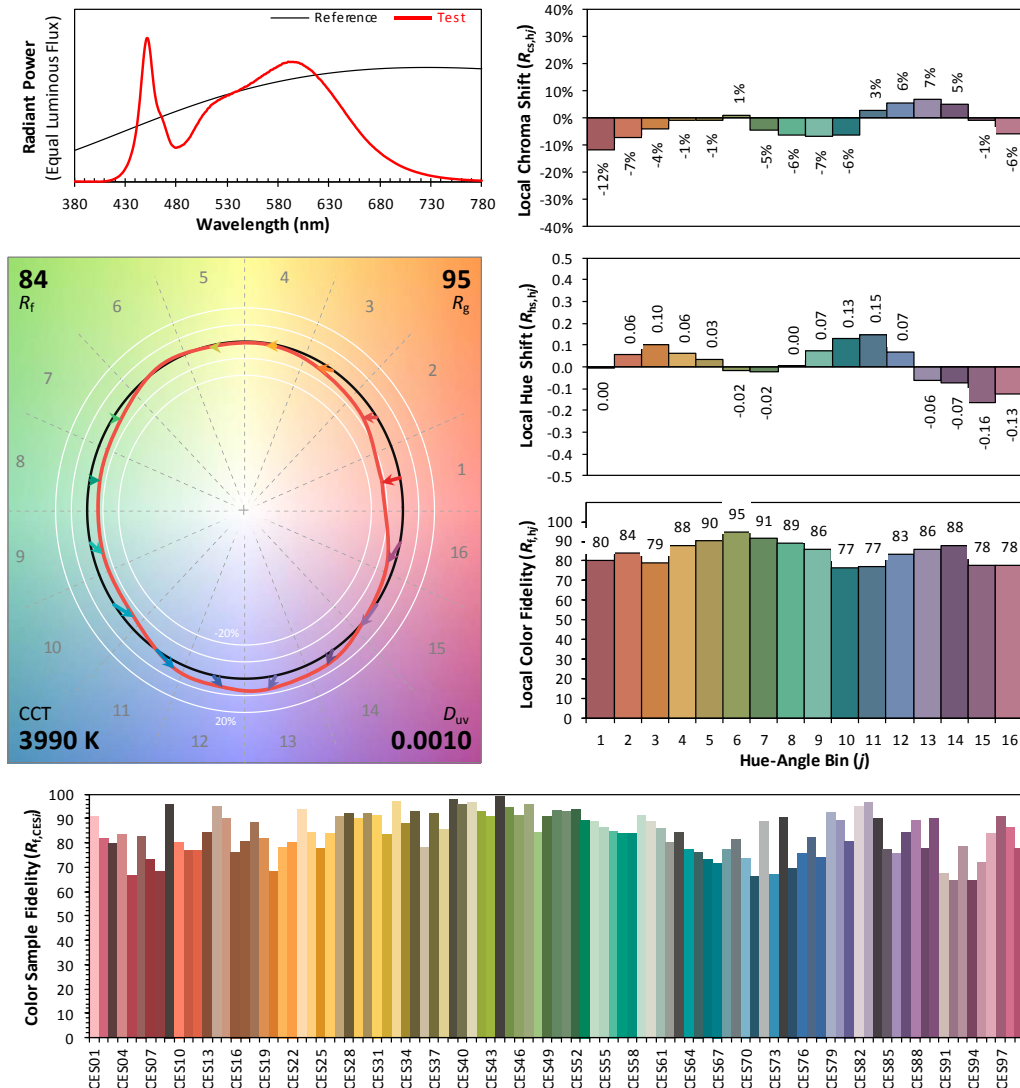
ANSI/IES TM-30-18 Color Rendition Report

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 0.3816
 y 0.3797
 u' 0.2247
 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	114.654	3.04%
10- 20	329.833	8.75%
20- 30	504.62	13.38%
30- 40	617.951	16.39%
40- 50	656.295	17.41%
50- 60	615.105	16.31%
60- 70	499.187	13.24%
70- 80	324.724	8.61%
80- 90	104.563	2.77%
90-100	0.437	0.01%
100-110	0.46	0.01%
110-120	0.463	0.01%
120-130	0.47	0.01%
130-140	0.484	0.01%
140-150	0.427	0.01%
150-160	0.335	0.01%
160-170	0.224	0.01%
170-180	0.086	0.00%
Total	3770.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2838.458	75.28%
60- 90	928.474	24.63%
0-90	3766.932	99.91%
90- 180	3.386	0.09%
0- 180	3770.3	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	13.8	15.4	14.1	15.8	16.1	14.1	15.8	14.5	16.1	16.4
	3H	15.6	17.2	16.0	17.5	17.9	16.3	17.9	16.7	18.2	18.6
	4H	16.3	17.8	16.7	18.1	18.5	17.3	18.8	17.7	19.1	19.5
	6H	16.8	18.2	17.2	18.5	18.9	18.2	19.5	18.6	19.9	20.3
	8H	17.0	18.2	17.4	18.6	19.0	18.5	19.8	19.0	20.2	20.6
	12H	17.0	18.3	17.5	18.7	19.1	18.8	20.0	19.2	20.4	20.8
4H	2H	14.5	16.0	14.9	16.3	16.7	14.8	16.3	15.2	16.6	17.0
	3H	16.7	17.9	17.1	18.3	18.7	17.3	18.5	17.7	18.9	19.3
	4H	17.5	18.6	17.9	19.0	19.5	18.4	19.5	18.8	19.9	20.4
	6H	18.1	19.1	18.6	19.5	20.0	19.5	20.4	19.9	20.9	21.3
	8H	18.3	19.2	18.8	19.7	20.1	19.9	20.8	20.3	21.2	21.7
	12H	18.4	19.3	18.9	19.7	20.2	20.2	21.0	20.7	21.5	21.9
8H	4H	18.0	18.9	18.5	19.4	19.8	18.8	19.7	19.3	20.2	20.6
	6H	18.8	19.6	19.3	20.1	20.5	20.0	20.8	20.5	21.3	21.8
	8H	19.1	19.8	19.6	20.3	20.8	20.6	21.3	21.1	21.8	22.3
	12H	19.3	19.9	19.8	20.4	21.0	21.0	21.6	21.5	22.1	22.6
12H	4H	18.1	18.9	18.6	19.4	19.9	18.8	19.7	19.3	20.1	20.6
	6H	19.0	19.7	19.5	20.2	20.7	20.1	20.8	20.7	21.3	21.8
	8H	19.4	20.0	19.9	20.5	21.0	20.7	21.4	21.3	21.8	22.4

Chart 13: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

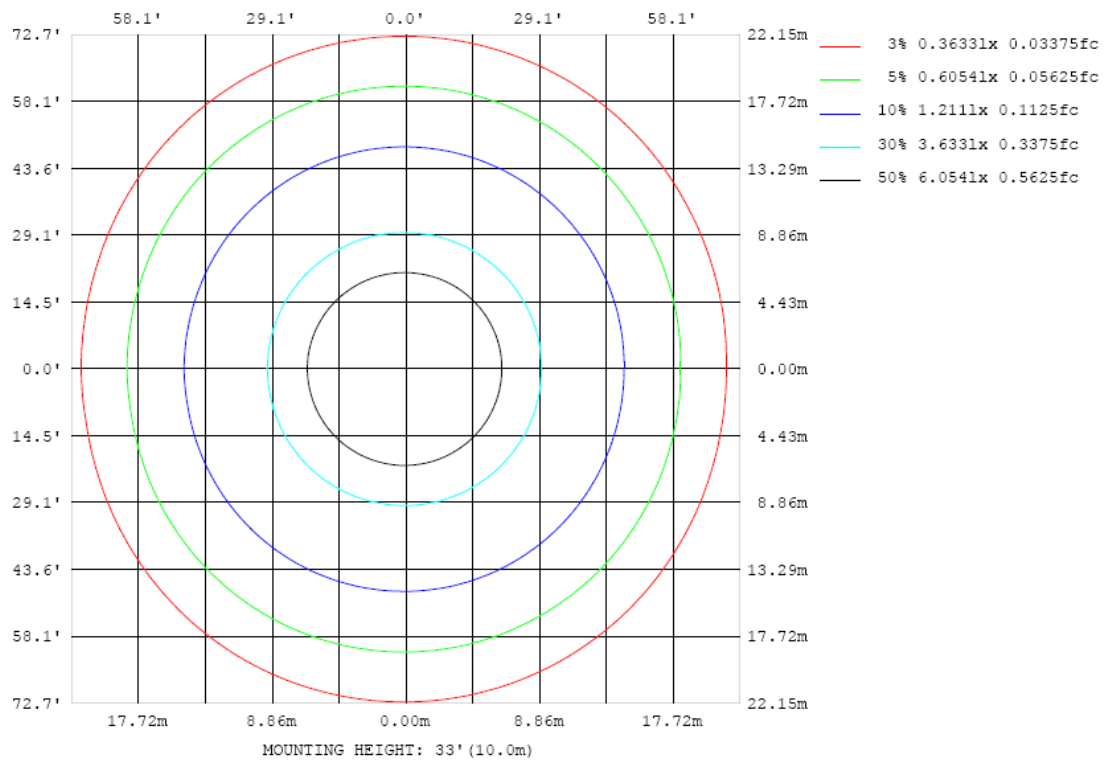


Chart 14: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

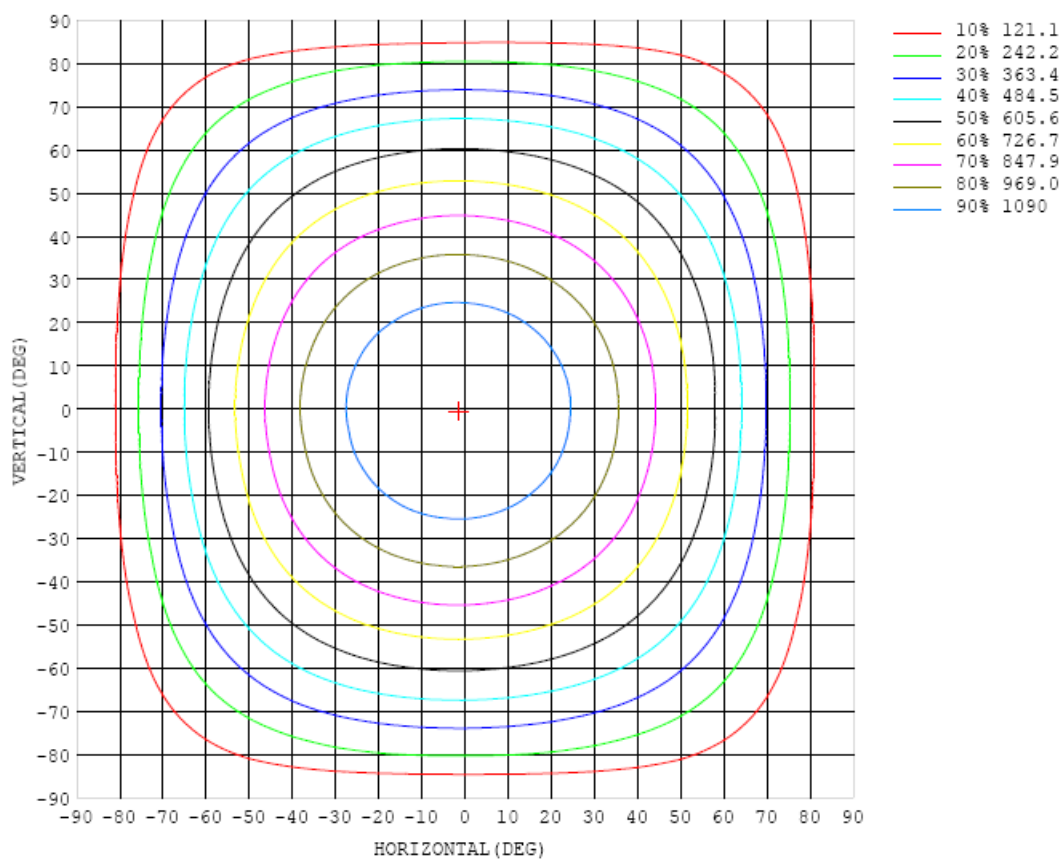


Chart 15: Isocandela Plot

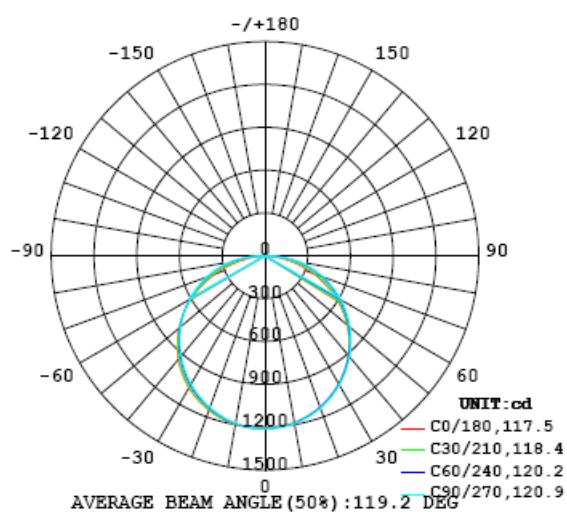


Chart 16: Polar Candela Distribution

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	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211
5	1203	1202	1204	1204	1204	1205	1205	1206	1206	1207	1207	1208	1209	1209	1209	1208	1209	1209	1209
10	1186	1187	1187	1188	1188	1188	1189	1190	1192	1193	1193	1194	1195	1197	1197	1198	1199	1199	1199
15	1161	1161	1162	1163	1163	1164	1165	1166	1168	1169	1170	1172	1174	1175	1176	1177	1179	1179	1180
20	1127	1127	1128	1129	1129	1130	1131	1133	1134	1136	1138	1140	1143	1145	1147	1148	1150	1149	1151
25	1085	1085	1086	1087	1087	1087	1089	1090	1092	1094	1096	1099	1103	1105	1108	1110	1112	1111	1114
30	1034	1035	1035	1036	1036	1037	1039	1040	1043	1045	1047	1050	1054	1057	1060	1062	1064	1064	1067
35	976	976	977	978	978	979	980	983	985	987	990	993	997	1001	1003	1006	1008	1007	1011
40	909	910	910	911	912	914	916	918	921	923	926	929	934	936	939	941	942	942	945
45	835	836	837	839	840	842	844	848	850	854	856	859	862	865	866	868	868	867	870
50	753	754	756	759	762	766	769	772	776	779	782	784	786	787	787	787	786	783	787
55	664	665	668	672	677	683	688	692	696	699	702	703	704	703	701	698	695	692	695
60	567	569	574	581	589	596	603	609	613	616	618	619	618	615	610	604	598	592	595
65	465	467	475	485	496	506	514	521	526	528	530	530	527	522	514	503	493	484	487
70	358	362	372	386	401	413	423	430	434	437	438	437	434	426	415	400	384	372	373
75	248	253	267	286	304	318	329	336	341	344	344	342	337	327	313	295	274	257	257
80	141	148	166	187	206	223	236	244	249	251	251	248	241	228	211	191	167	146	144
85	51.9	58.6	75.5	93.1	106	112	113	112	110	109	109	111	112	109	102	88.9	69.7	52.9	47.6
90	1.81	2.43	4.72	4.95	4.40	3.62	1.35	0.97	0.77	0.74	0.69	0.78	0.96	1.18	1.32	1.15	1.14	1.59	0.40
95	0.21	0.20	0.19	0.20	0.21	0.22	0.22	0.22	0.23	0.23	0.23	0.23	0.22	0.22	0.21	0.20	0.20	0.19	0.20
100	0.28	0.25	0.21	0.21	0.22	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.24	0.23	0.22	0.22	0.21	0.25
105	0.33	0.29	0.27	0.24	0.25	0.26	0.27	0.27	0.27	0.26	0.27	0.27	0.27	0.26	0.25	0.24	0.26	0.29	0.63
110	0.37	0.34	0.32	0.29	0.28	0.29	0.29	0.29	0.29	0.28	0.29	0.30	0.30	0.29	0.28	0.29	0.32	0.34	0.63
115	0.44	0.39	0.36	0.35	0.32	0.33	0.32	0.33	0.32	0.32	0.33	0.34	0.34	0.34	0.34	0.36	0.38	0.39	0.62
120	0.49	0.45	0.39	0.40	0.38	0.38	0.38	0.37	0.37	0.37	0.38	0.40	0.40	0.39	0.41	0.43	0.42	0.44	0.64
125	0.54	0.50	0.45	0.45	0.43	0.39	0.43	0.43	0.42	0.42	0.43	0.44	0.44	0.43	0.45	0.49	0.47	0.49	0.69
130	0.58	0.51	0.50	0.45	0.49	0.49	0.44	0.44	0.47	0.48	0.48	0.45	0.43	0.49	0.51	0.48	0.52	0.54	0.73
135	0.62	0.56	0.55	0.53	0.46	0.52	0.53	0.51	0.48	0.47	0.47	0.49	0.51	0.51	0.48	0.56	0.55	0.54	0.79
140	0.63	0.61	0.55	0.54	0.51	0.47	0.50	0.52	0.52	0.53	0.51	0.48	0.50	0.45	0.52	0.55	0.55	0.58	0.80
145	0.66	0.66	0.54	0.57	0.56	0.53	0.51	0.46	0.46	0.47	0.45	0.41	0.44	0.52	0.55	0.56	0.55	0.64	0.82
150	0.70	0.70	0.64	0.62	0.60	0.59	0.57	0.55	0.55	0.54	0.53	0.51	0.53	0.57	0.59	0.59	0.55	0.70	0.86
155	0.75	0.74	0.74	0.63	0.64	0.62	0.60	0.60	0.60	0.57	0.57	0.56	0.56	0.61	0.63	0.60	0.68	0.74	0.87
160	0.81	0.79	0.80	0.76	0.67	0.62	0.62	0.63	0.63	0.59	0.57	0.57	0.61	0.66	0.65	0.71	0.77	0.81	0.91
165	0.86	0.87	0.87	0.87	0.85	0.78	0.70	0.63	0.63	0.61	0.63	0.63	0.67	0.75	0.81	0.85	0.87	0.87	0.90
170	0.91	0.91	0.91	0.91	0.90	0.87	0.78	0.72	0.73	0.70	0.70	0.73	0.80	0.85	0.86	0.87	0.88	0.91	0.93
175	0.91	0.95	0.98	1.00	1.01	1.02	0.98	0.93	0.96	0.87	0.82	0.82	0.87	0.87	0.88	0.90	0.93	0.94	0.94
180	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91

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	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211	1211		
5	1210	1209	1208	1208	1206	1206	1206	1205	1205	1204	1203	1204	1203	1203	1203	1203	1203		
10	1200	1198	1197	1196	1194	1192	1191	1190	1189	1187	1187	1187	1186	1186	1186	1186	1186		
15	1179	1177	1176	1174	1172	1169	1167	1165	1163	1162	1161	1160	1160	1160	1160	1161	1161		
20	1150	1148	1146	1142	1139	1137	1134	1131	1129	1127	1126	1126	1125	1125	1126	1127	1128		
25	1112	1109	1107	1103	1098	1094	1092	1089	1086	1084	1082	1082	1082	1083	1083	1085	1085		
30	1065	1062	1058	1054	1050	1045	1042	1038	1035	1033	1031	1032	1032	1032	1033	1034	1035		
35	1009	1005	1002	997	992	988	984	981	978	975	974	973	973	975	975	977	977		
40	943	940	937	932	928	924	920	916	914	911	909	909	909	909	909	911	911		
45	869	866	864	861	857	853	850	847	844	841	840	839	838	837	837	837	837		
50	786	784	783	781	779	777	775	772	770	767	765	763	761	760	758	757	756		
55	694	694	695	696	696	696	695	693	692	689	687	684	680	677	673	670	668		
60	595	597	601	605	608	610	611	611	609	607	604	600	595	589	582	577	573		
65	488	493	502	510	517	521	523	524	523	521	518	513	506	498	488	479	472		
70	377	386	399	412	423	429	433	435	434	432	429	424	415	404	390	377	367		
75	263	277	295	312	325	334	340	342	343	341	338	332	322	309	292	274	260		
80	152	171	193	211	227	240	247	250	252	251	248	240	229	214	195	174	156		
85	56.2	73.3	90.4	101	106	109	111	111	114	118	122	125	124	117	102	83.2	64.1		
90	0.40	0.41	0.44	0.46	0.48	0.49	0.51	0.51	0.51	0.51	0.52	0.52	0.52	0.52	0.52	0.52	0.51		
95	0.48	0.48	0.49	0.51	0.54	0.56	0.57	0.57	0.57	0.57	0.56	0.54	0.52	0.50	0.48	0.46	0.47		
100	0.56	0.53	0.53	0.55	0.57	0.60	0.62	0.61	0.61	0.61	0.60	0.59	0.57	0.55	0.54	0.52	0.55		
105	0.59	0.59	0.56	0.57	0.60	0.63	0.65	0.64	0.64	0.64	0.64	0.63	0.61	0.59	0.57	0.58	0.60		
110	0.58	0.59	0.56	0.55	0.58	0.61	0.64	0.63	0.63	0.63	0.63	0.63	0.61	0.59	0.57	0.60	0.60		
115	0.58	0.57	0.56	0.53	0.54	0.57	0.60	0.59	0.58	0.59	0.60	0.60	0.59	0.57	0.59	0.59	0.60		
120	0.60	0.58	0.58	0.55	0.52	0.54	0.56	0.56	0.55	0.56	0.57	0.57	0.57	0.58	0.59	0.58	0.61		
125	0.66	0.63	0.64	0.60	0.56	0.56	0.55	0.55	0.55	0.55	0.57	0.58	0.60	0.60	0.62	0.62	0.66		
130	0.68	0.68	0.66	0.66	0.65	0.60	0.61	0.64	0.64	0.63	0.64	0.63	0.68	0.67	0.63	0.66	0.68		
135	0.73	0.74	0.76	0.73	0.73	0.73	0.72	0.74	0.74	0.72	0.76	0.78	0.77	0.75	0.74	0.73	0.76		
140	0.79	0.78	0.80	0.79	0.77	0.81	0.80	0.86	0.88	0.85	0.84	0.85	0.79	0.77	0.77	0.76	0.80		
145	0.82	0.78	0.84	0.84	0.83	0.80	0.82	0.90	0.93	0.90	0.84	0.80	0.80	0.78	0.77	0.71	0.80		
150	0.85	0.82	0.84	0.87	0.85	0.82	0.83	0.87	0.87	0.81	0.80	0.80	0.81	0.77	0.76	0.80	0.85		
155	0.87	0.87	0.81	0.86	0.83	0.78	0.78	0.77	0.77	0.78	0.78	0.77	0.77	0.77	0.76	0.85	0.87		
160	0.90	0.90	0.87	0.82	0.84	0.78	0.72	0.76	0.75	0.76	0.75	0.74	0.75	0.75	0.85	0.89	0.90		
165	0.90	0.90	0.91	0.91	0.87	0.80	0.74	0.73	0.73	0.72	0.69	0.69	0.73	0.80	0.86	0.88	0.89		
170	0.94	0.96	0.97	0.98	0.99	0.96	0.88	0.83	0.81	0.81	0.80	0.80	0.82	0.86	0.89	0.91	0.92		
175	0.97	1.00	1.01	1.01	1.01	1.00	0.95	0.89	0.89	0.90	0.94	0.90	0.85	0.84	0.88	0.92	0.90		
180	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91		

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)	0.215	0.102
Power Factor	0.9906	0.9081
Test Power (W)	25.50	25.61
THD A%	7.92	13.84
Luminous Efficacy (lm/W)	145.9	144.6
Total Luminous Flux (lm)	3720.1	3703.3
Color Rendering Index (CRI)	82.4	
R9	7.5	
Correlated Color Temperature (CCT)(K)	4777	
Chromaticity Chroma x	0.3525	
Chromaticity Chroma y	0.3638	
Chromaticity Chroma u	0.2117	
Chromaticity Chroma v	0.3277	
Duv	0.0032	
Chromaticity Chroma u'	0.2117	
Chromaticity Chroma v'	0.4916	

Special Color Rendering Indices	
R1	80.2
R2	87.5
R3	92.9
R4	81.5
R5	80.2
R6	82.2
R7	87.8
R8	67
R9	7.5
R10	70.3
R11	80.2
R12	55.4
R13	82
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)	0.215
Power Factor	0.9909
Power (W)	25.52
Luminous Efficacy (lm/W)	146.3
Total Luminous Flux (lm)	3732.8
Beam Angle (°)	117.5 (0°-180°) / 120.9 (90°-270°)
Center Beam Candle Power (cd)	1198
Maximum Beam Candle Power (cd)	1199 (At: C=110.0, Gamma=1.5)
Spacing Criteria	1.31 (0°-180°) / 1.27 (90°-270°)
Zonal Lumens in the 0°-60° Zone	75.28%
Zonal Lumens in the 60°-90° Zone	24.63%
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

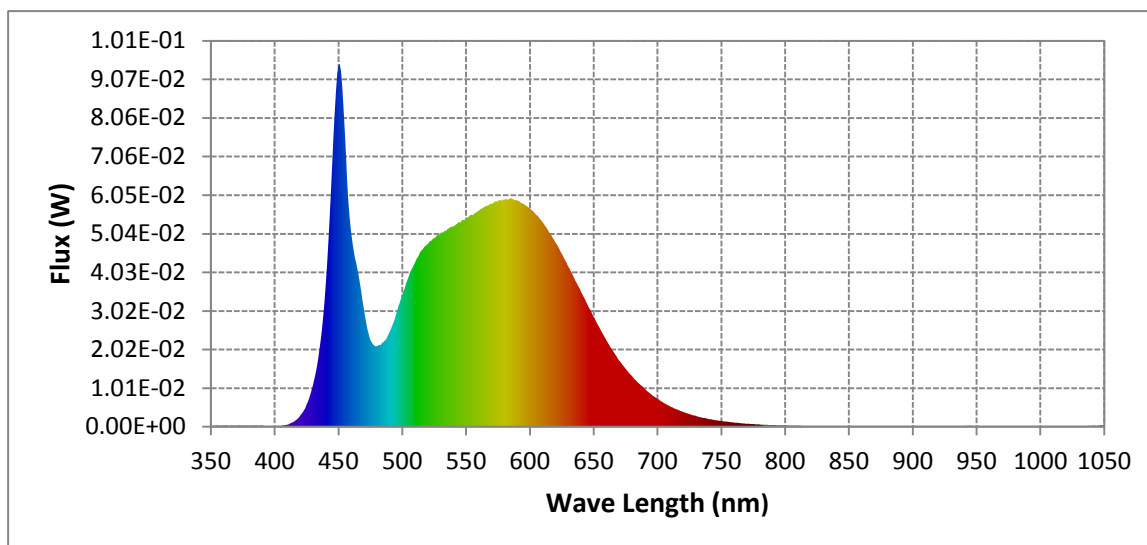


Chart 17: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.24E-04	485	2.20E-02	590	5.92E-02	695	8.54E-03
385	2.54E-04	490	2.46E-02	595	5.82E-02	700	7.30E-03
390	2.92E-04	495	2.91E-02	600	5.71E-02	705	6.25E-03
395	2.09E-04	500	3.44E-02	605	5.52E-02	710	5.35E-03
400	1.89E-04	505	3.91E-02	610	5.34E-02	715	4.57E-03
405	2.11E-04	510	4.28E-02	615	5.10E-02	720	3.90E-03
410	5.52E-04	515	4.60E-02	620	4.82E-02	725	3.31E-03
415	1.33E-03	520	4.78E-02	625	4.53E-02	730	2.86E-03
420	2.85E-03	525	4.93E-02	630	4.19E-02	735	2.39E-03
425	5.69E-03	530	5.06E-02	635	3.87E-02	740	2.08E-03
430	1.08E-02	535	5.13E-02	640	3.54E-02	745	1.75E-03
435	1.99E-02	540	5.24E-02	645	3.20E-02	750	1.52E-03
440	3.68E-02	545	5.34E-02	650	2.87E-02	755	1.28E-03
445	6.78E-02	550	5.42E-02	655	2.56E-02	760	1.10E-03
450	9.43E-02	555	5.53E-02	660	2.26E-02	765	9.52E-04
455	7.67E-02	560	5.64E-02	665	1.98E-02	770	8.01E-04
460	5.13E-02	565	5.74E-02	670	1.73E-02	775	7.07E-04
465	4.13E-02	570	5.82E-02	675	1.51E-02	780	6.01E-04
470	3.09E-02	575	5.89E-02	680	1.32E-02		
475	2.28E-02	580	5.93E-02	685	1.14E-02		
480	2.10E-02	585	5.97E-02	690	9.93E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method

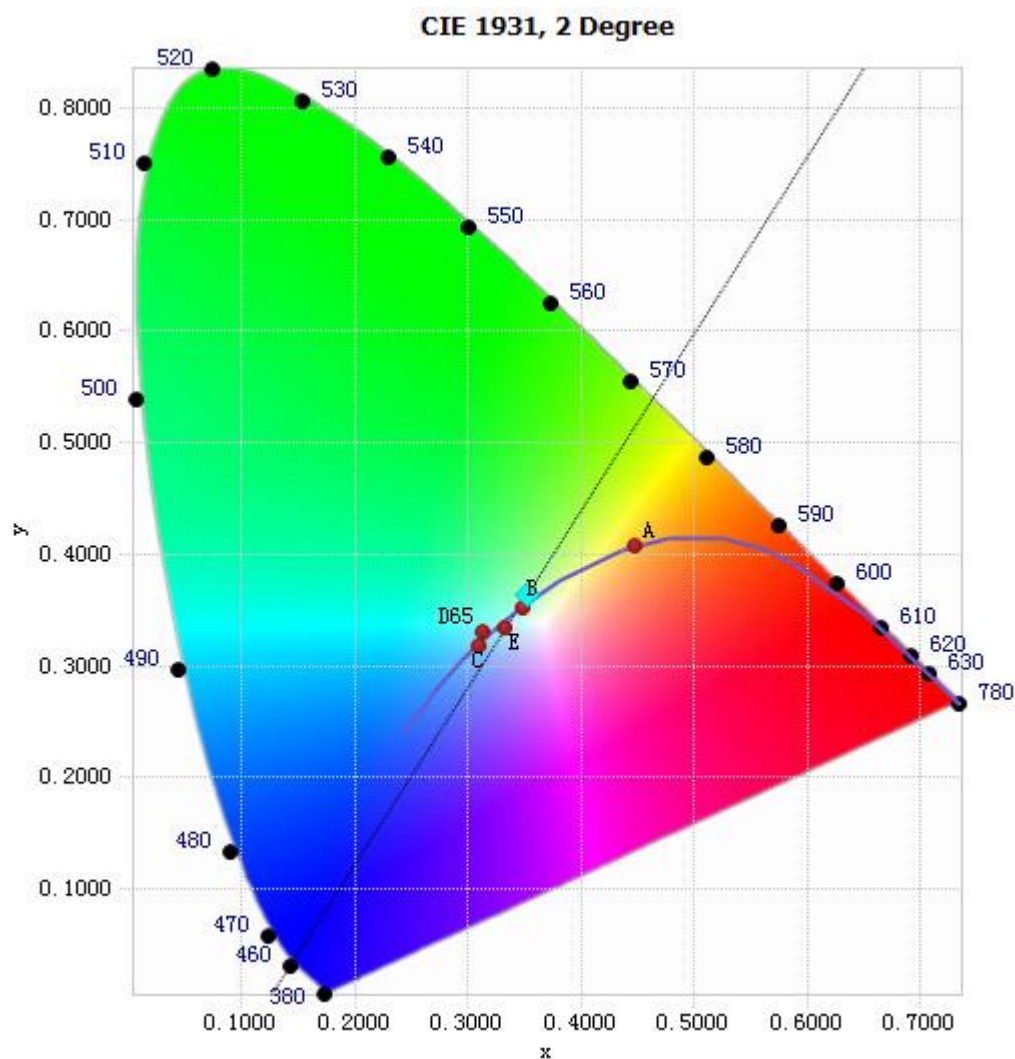


Chart 18: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

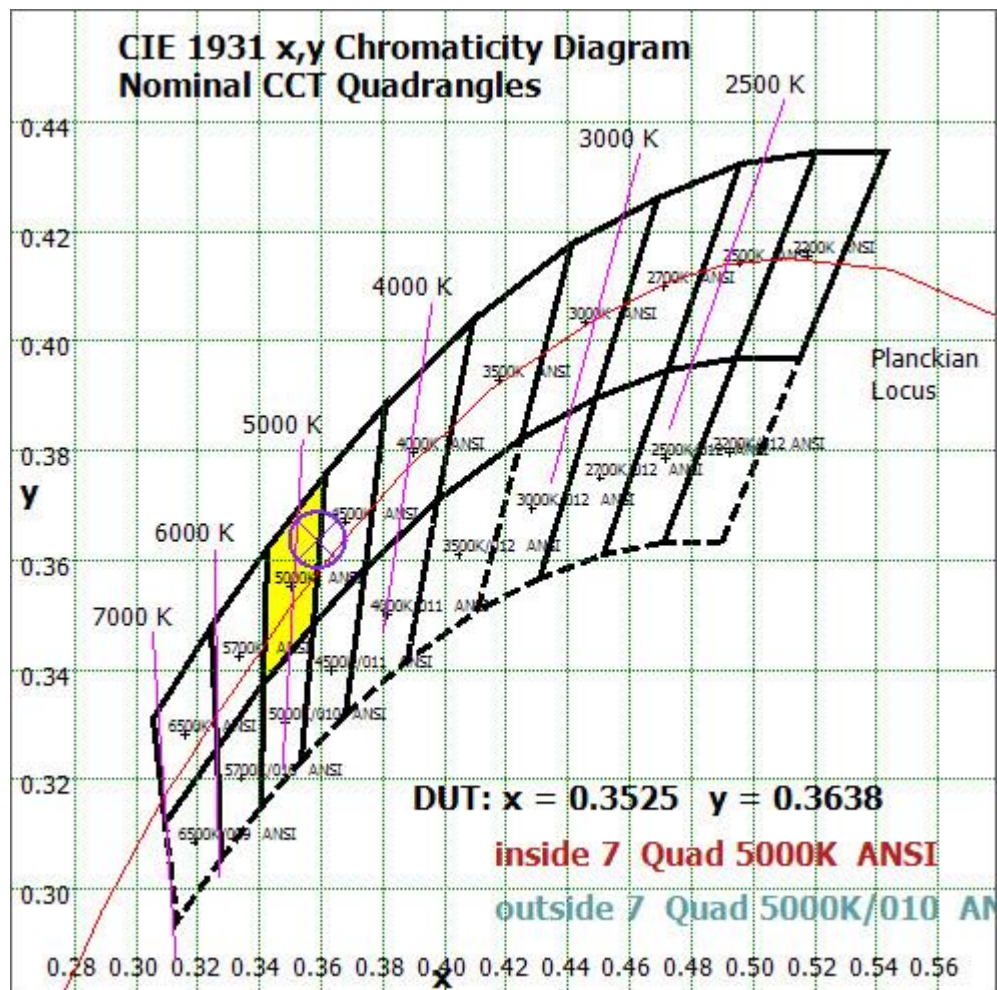


Chart 19: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

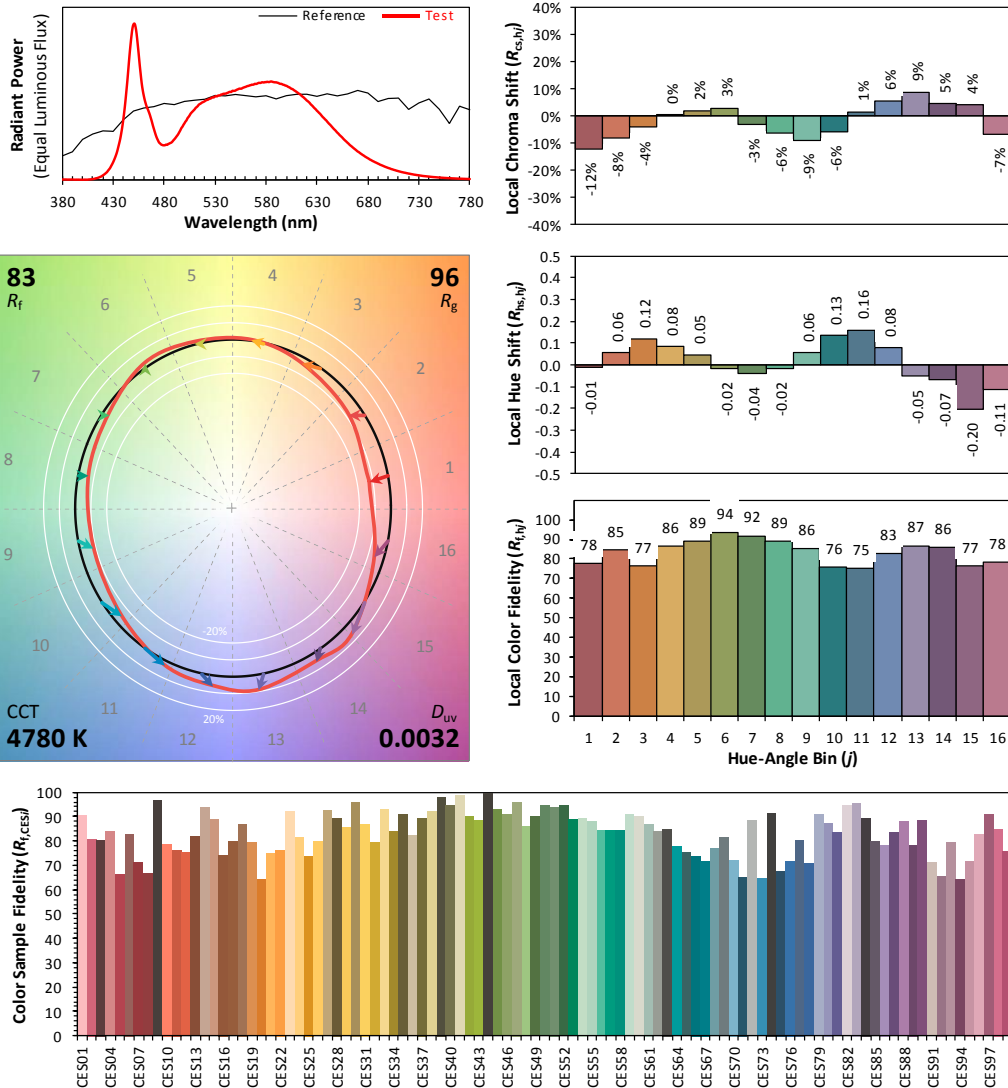
ANSI/IES TM-30-18 Color Rendition Report

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 0.3525
 y 0.3638
 u' 0.2117
 v' 0.4916

CIE 13.3-1995
 (CRI)
 R_a 82
 R_g 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	113.488	3.04%
10- 20	326.479	8.75%
20- 30	499.535	13.38%
30- 40	611.754	16.39%
40- 50	649.768	17.41%
50- 60	609.028	16.32%
60- 70	494.288	13.24%
70- 80	321.587	8.62%
80- 90	103.593	2.78%
90-100	0.403	0.01%
100-110	0.445	0.01%
110-120	0.452	0.01%
120-130	0.46	0.01%
130-140	0.475	0.01%
140-150	0.42	0.01%
150-160	0.33	0.01%
160-170	0.221	0.01%
170-180	0.084	0.00%
Total	3732.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2810.052	75.28%
60- 90	919.468	24.63%
0-90	3729.52	99.91%
90- 180	3.29	0.09%
0- 180	3732.8	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	13.8	15.5	14.2	15.8	16.1	14.1	15.8	14.5	16.1	16.5
	3H	15.7	17.2	16.0	17.5	17.9	16.4	17.9	16.7	18.2	18.6
	4H	16.4	17.8	16.8	18.2	18.5	17.3	18.8	17.7	19.1	19.5
	6H	16.9	18.2	17.3	18.6	19.0	18.2	19.5	18.6	19.9	20.3
	8H	17.0	18.3	17.4	18.7	19.1	18.5	19.8	19.0	20.2	20.6
	12H	17.1	18.3	17.5	18.7	19.1	18.8	20.0	19.2	20.4	20.8
4H	2H	14.5	16.0	14.9	16.3	16.7	14.8	16.3	15.2	16.6	17.0
	3H	16.7	17.9	17.1	18.3	18.7	17.3	18.5	17.7	18.9	19.3
	4H	17.5	18.6	18.0	19.1	19.5	18.4	19.5	18.8	19.9	20.4
	6H	18.2	19.1	18.6	19.6	20.0	19.5	20.5	19.9	20.9	21.3
	8H	18.3	19.3	18.8	19.7	20.2	19.9	20.8	20.4	21.3	21.7
	12H	18.5	19.3	18.9	19.8	20.2	20.2	21.0	20.7	21.5	21.9
8H	4H	18.0	19.0	18.5	19.4	19.9	18.8	19.7	19.3	20.2	20.6
	6H	18.8	19.6	19.3	20.1	20.6	20.0	20.8	20.5	21.3	21.8
	8H	19.1	19.8	19.6	20.3	20.8	20.6	21.3	21.1	21.8	22.3
	12H	19.3	19.9	19.8	20.4	21.0	21.0	21.6	21.5	22.1	22.6
12H	4H	18.1	19.0	18.6	19.4	19.9	18.8	19.7	19.3	20.1	20.6
	6H	19.0	19.7	19.6	20.2	20.7	20.2	20.8	20.7	21.3	21.8
	8H	19.4	20.0	19.9	20.5	21.0	20.8	21.4	21.3	21.8	22.4

Chart 21: UGR Table (Corrected)

Illuminance Plots- Goniophotometer Method

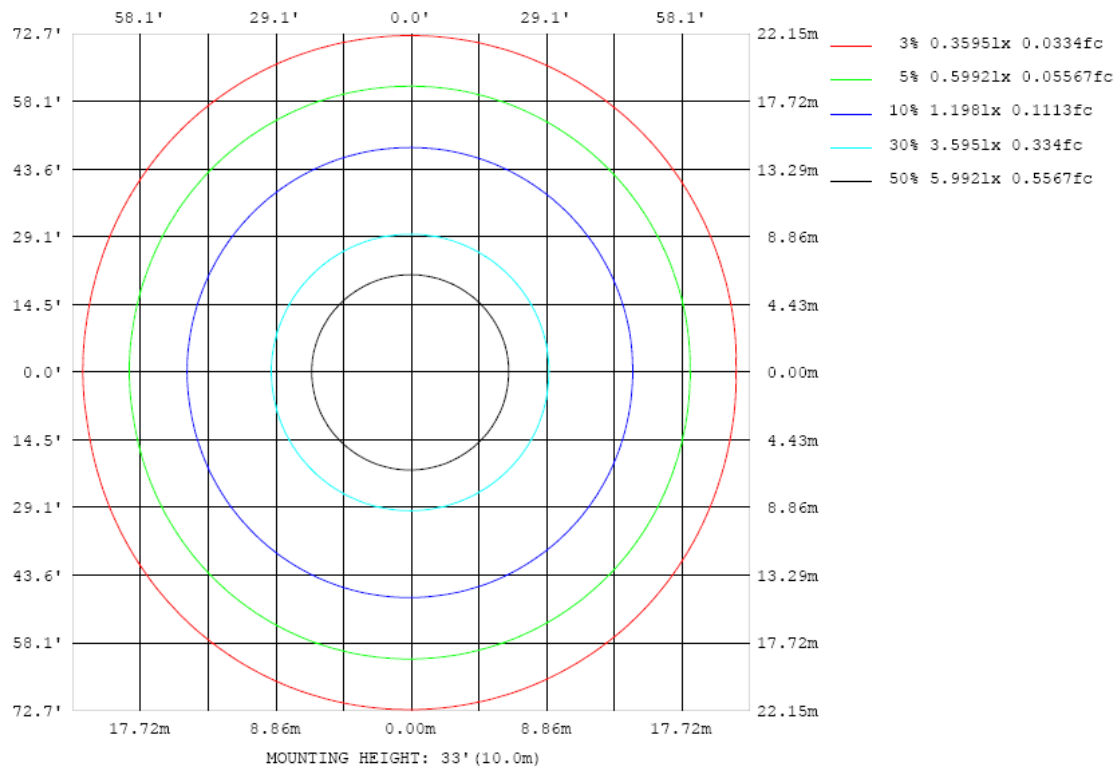


Chart 22: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

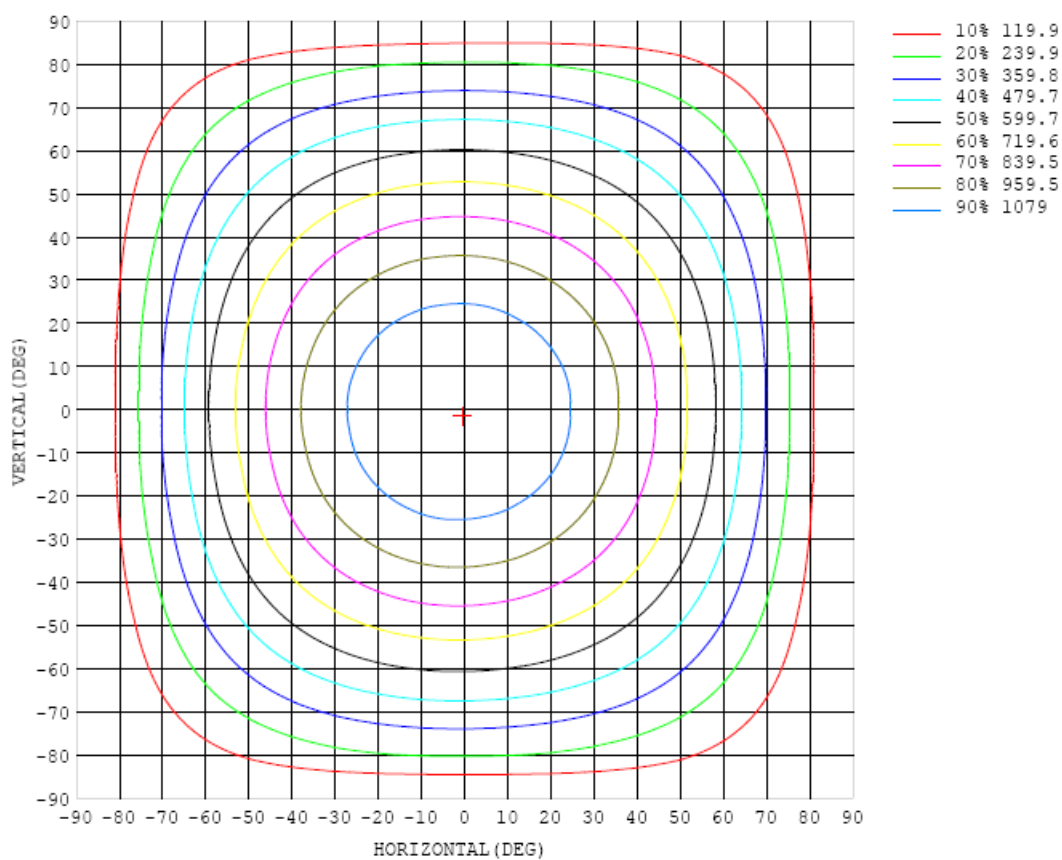


Chart 23: Isocandela Plot

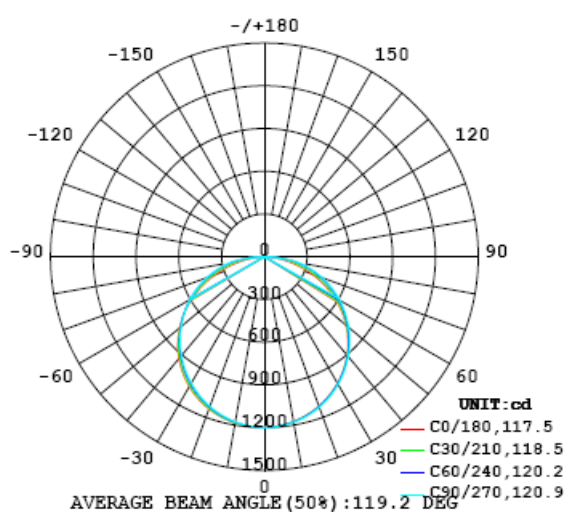


Chart 24: Polar Candela Distribution

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	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198
5	1191	1191	1192	1192	1193	1192	1193	1194	1193	1195	1195	1195	1196	1196	1196	1196	1196	1197	1196
10	1175	1175	1176	1177	1177	1178	1178	1179	1180	1181	1183	1183	1183	1184	1185	1185	1186	1185	1185
15	1150	1151	1151	1152	1153	1153	1153	1155	1155	1158	1159	1160	1161	1162	1164	1165	1166	1165	1166
20	1117	1118	1119	1119	1120	1120	1120	1122	1122	1124	1127	1129	1130	1132	1134	1135	1137	1137	1138
25	1076	1077	1077	1078	1078	1078	1079	1081	1082	1083	1086	1089	1090	1093	1095	1097	1098	1098	1100
30	1026	1027	1028	1028	1029	1029	1029	1031	1033	1035	1038	1040	1042	1045	1048	1050	1052	1051	1053
35	968	970	970	971	971	971	972	974	976	978	981	984	986	989	992	994	996	995	997
40	903	904	904	905	907	907	908	911	912	915	918	920	923	925	927	930	931	930	933
45	829	830	831	833	835	837	838	841	843	846	848	851	852	854	856	857	857	856	858
50	748	749	752	755	757	760	763	766	769	772	774	776	777	777	777	777	776	773	776
55	659	661	664	669	674	679	683	688	691	693	695	697	696	695	692	689	686	682	685
60	564	566	571	578	586	593	599	604	608	611	613	613	611	607	602	596	589	583	586
65	462	465	472	483	494	504	511	518	521	524	525	525	522	516	507	497	486	477	479
70	356	360	370	385	399	411	420	427	431	434	434	433	429	421	409	394	379	367	368
75	247	252	266	285	303	317	327	334	339	341	341	339	333	323	309	291	270	253	253
80	140	147	165	187	206	221	234	243	247	248	248	246	238	225	208	188	165	144	142
85	51.4	58.3	75.0	92.4	104	110	111	109	106	105	106	108	109	106	99.4	87.4	68.5	52.1	47.0
90	1.70	2.38	4.56	4.68	0.14	1.72	0.97	0.64	0.52	0.39	0.42	0.52	0.70	0.88	1.16	1.03	0.96	1.43	0.37
95	0.20	0.18	0.17	0.18	0.19	0.20	0.20	0.20	0.21	0.21	0.21	0.21	0.20	0.19	0.19	0.18	0.17	0.18	0.47
100	0.27	0.23	0.20	0.20	0.21	0.22	0.22	0.23	0.23	0.22	0.23	0.23	0.23	0.22	0.21	0.20	0.20	0.24	0.57
105	0.31	0.28	0.25	0.23	0.23	0.24	0.25	0.26	0.25	0.25	0.26	0.26	0.26	0.25	0.24	0.23	0.25	0.29	0.62
110	0.36	0.33	0.31	0.28	0.26	0.27	0.28	0.28	0.27	0.27	0.28	0.29	0.29	0.28	0.27	0.28	0.31	0.33	0.61
115	0.43	0.38	0.35	0.34	0.31	0.31	0.31	0.32	0.31	0.31	0.32	0.33	0.33	0.33	0.33	0.35	0.37	0.38	0.61
120	0.48	0.44	0.38	0.39	0.37	0.37	0.37	0.36	0.36	0.36	0.37	0.39	0.39	0.38	0.40	0.42	0.41	0.43	0.63
125	0.53	0.49	0.44	0.44	0.42	0.38	0.42	0.41	0.41	0.41	0.42	0.43	0.43	0.41	0.44	0.48	0.47	0.49	0.68
130	0.57	0.50	0.49	0.44	0.48	0.48	0.43	0.43	0.46	0.47	0.47	0.43	0.43	0.48	0.50	0.47	0.51	0.53	0.72
135	0.61	0.56	0.54	0.52	0.45	0.51	0.52	0.50	0.47	0.46	0.47	0.48	0.50	0.50	0.47	0.55	0.54	0.54	0.77
140	0.62	0.60	0.54	0.53	0.51	0.46	0.49	0.51	0.51	0.52	0.50	0.47	0.49	0.44	0.51	0.54	0.54	0.58	0.78
145	0.65	0.65	0.53	0.56	0.55	0.52	0.50	0.46	0.45	0.46	0.44	0.41	0.44	0.51	0.54	0.55	0.54	0.63	0.81
150	0.69	0.69	0.63	0.61	0.59	0.58	0.56	0.54	0.54	0.53	0.53	0.50	0.52	0.56	0.58	0.58	0.54	0.69	0.84
155	0.74	0.73	0.73	0.62	0.63	0.61	0.59	0.59	0.59	0.56	0.56	0.55	0.55	0.60	0.62	0.59	0.67	0.74	0.86
160	0.81	0.78	0.79	0.75	0.66	0.61	0.61	0.62	0.62	0.58	0.56	0.57	0.60	0.65	0.64	0.70	0.76	0.80	0.89
165	0.85	0.85	0.86	0.86	0.84	0.77	0.69	0.63	0.63	0.60	0.62	0.62	0.67	0.74	0.80	0.84	0.86	0.86	0.89
170	0.90	0.89	0.90	0.90	0.89	0.86	0.77	0.71	0.72	0.69	0.69	0.72	0.79	0.84	0.85	0.86	0.86	0.89	0.92
175	0.89	0.94	0.97	0.98	1.00	1.01	0.97	0.92	0.95	0.86	0.81	0.81	0.85	0.86	0.87	0.89	0.92	0.93	0.93
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 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	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198	1198		
5	1196	1196	1196	1195	1195	1194	1193	1193	1192	1192	1192	1191	1191	1191	1192	1191	1190		
10	1185	1185	1184	1183	1181	1179	1179	1177	1177	1176	1175	1174	1174	1174	1175	1175	1175		
15	1166	1164	1163	1161	1158	1156	1154	1152	1151	1151	1150	1149	1149	1149	1150	1151	1151		
20	1137	1135	1132	1129	1127	1123	1122	1119	1117	1116	1115	1114	1115	1115	1117	1118	1118		
25	1099	1096	1093	1090	1086	1082	1080	1076	1075	1073	1072	1072	1072	1073	1075	1076	1077		
30	1052	1049	1046	1041	1037	1033	1030	1026	1025	1023	1022	1021	1022	1023	1025	1027	1028		
35	996	993	989	985	980	976	973	969	967	966	965	964	965	966	968	969	970		
40	930	928	925	921	916	912	910	906	904	902	901	900	900	901	903	904	905		
45	857	855	852	849	846	842	841	837	835	834	832	831	830	831	831	832	832		
50	775	773	772	771	769	767	766	763	761	761	758	756	755	754	753	752	752		
55	684	684	685	686	687	687	687	686	684	682	680	677	674	671	668	666	664		
60	586	588	593	597	600	602	604	603	602	601	598	594	590	584	579	574	569		
65	481	487	495	503	510	514	517	518	518	516	513	508	502	494	484	476	470		
70	371	380	394	406	416	423	428	429	430	428	425	419	412	401	388	375	365		
75	258	273	291	308	321	330	335	338	339	338	335	329	320	306	290	272	259		
80	150	169	190	209	224	237	244	248	249	249	246	238	227	212	193	173	155		
85	55.6	72.5	90.1	101	107	110	112	113	115	119	123	126	124	117	101	82.8	64.0		
90	0.37	0.39	0.41	0.43	0.45	0.47	0.48	0.48	0.49	0.50	0.51	0.50	0.50	1.62	0.42	0.83	0.57		
95	0.46	0.46	0.47	0.49	0.52	0.54	0.55	0.55	0.55	0.54	0.53	0.52	0.50	0.48	0.46	0.44	0.45		
100	0.54	0.51	0.52	0.53	0.56	0.59	0.60	0.60	0.59	0.59	0.58	0.57	0.56	0.54	0.52	0.51	0.53		
105	0.58	0.57	0.54	0.56	0.58	0.62	0.64	0.63	0.62	0.62	0.62	0.61	0.59	0.57	0.56	0.57	0.59		
110	0.57	0.58	0.55	0.54	0.56	0.60	0.63	0.62	0.61	0.62	0.62	0.61	0.60	0.58	0.56	0.59	0.59		
115	0.57	0.56	0.55	0.52	0.53	0.56	0.59	0.58	0.57	0.58	0.59	0.58	0.58	0.56	0.57	0.57	0.59		
120	0.59	0.57	0.57	0.54	0.51	0.53	0.55	0.54	0.54	0.55	0.56	0.56	0.56	0.56	0.58	0.57	0.60		
125	0.65	0.62	0.63	0.59	0.55	0.54	0.54	0.54	0.54	0.54	0.56	0.57	0.59	0.59	0.61	0.61	0.65		
130	0.67	0.66	0.65	0.65	0.64	0.59	0.60	0.63	0.63	0.61	0.63	0.61	0.66	0.66	0.62	0.65	0.67		
135	0.72	0.73	0.75	0.72	0.72	0.72	0.71	0.73	0.73	0.71	0.74	0.76	0.75	0.74	0.73	0.72	0.75		
140	0.78	0.77	0.79	0.78	0.76	0.80	0.78	0.85	0.86	0.84	0.83	0.84	0.78	0.76	0.76	0.74	0.79		
145	0.81	0.76	0.82	0.82	0.82	0.79	0.81	0.88	0.91	0.89	0.84	0.79	0.79	0.77	0.76	0.70	0.79		
150	0.84	0.81	0.83	0.86	0.83	0.80	0.82	0.86	0.86	0.80	0.78	0.79	0.79	0.76	0.74	0.79	0.84		
155	0.86	0.86	0.80	0.85	0.82	0.77	0.77	0.76	0.76	0.77	0.77	0.76	0.76	0.76	0.74	0.83	0.86		
160	0.89	0.89	0.86	0.81	0.82	0.77	0.71	0.74	0.74	0.75	0.74	0.73	0.74	0.74	0.83	0.88	0.89		
165	0.89	0.89	0.90	0.89	0.86	0.78	0.73	0.72	0.72	0.71	0.68	0.68	0.72	0.79	0.85	0.87	0.87		
170	0.93	0.95	0.96	0.97	0.97	0.94	0.86	0.81	0.79	0.79	0.78	0.78	0.81	0.84	0.87	0.90	0.91		
175	0.96	0.98	0.99	0.99	1.00	0.98	0.93	0.88	0.88	0.88	0.92	0.89	0.83	0.82	0.87	0.90	0.89		
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 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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