LM-79-08 Test Report

For

RAB LIGHTING INC

(Brand Name: N/A)

170 Ludlow Ave,PO BOX 970,Northvale, NJ 07647-2305 USA

Model name(s): ORB6

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2024-06-15

Prepared By:

Test & Report By:

Engineer: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120Vac, 60 Hz
Nominal Power	13.0W
Rated Initial Lamp Lumen	1100lm（mode5000K）
Declared CCT	2700K/3000K/3500K/4000K/5000K

1.2 Test Specifications:

Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:
Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25°C ±1°C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1°vertical intervals and 22.5°horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:
Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25ºC ±1ºC. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm

3) Electrical Measurements:
Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25ºC ±1ºC. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1.1 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-12	Test Ambient:	25.1 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	ORB6	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406110029	120.0	60	0.107	12.60	0.975

Chromaticity Measurement - Sphere-Spectroradiometer Method:

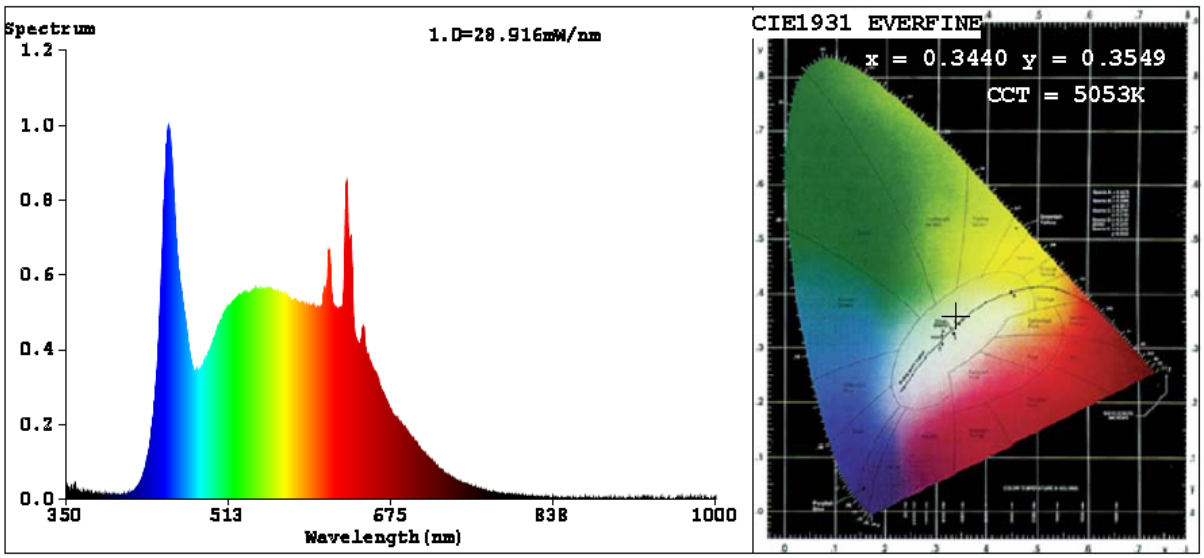
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5053
Duv	0.0021
Chromaticity (x, y)	x=0.3440 y=0.3549
Chromaticity (u', v')	u'=0.2094 v'=0.4861
Color Rendering Index (CRI)	95.5
R9	82
Rg	100
Rf	93
Rcs,h1%	-3

Special Color Rendering Indices			
R1	96	R9	82
R2	97	R10	92
R3	96	R11	96
R4	96	R12	73
R5	95	R13	97
R6	94	R14	97
R7	96	R15	95
R8	93	--	--

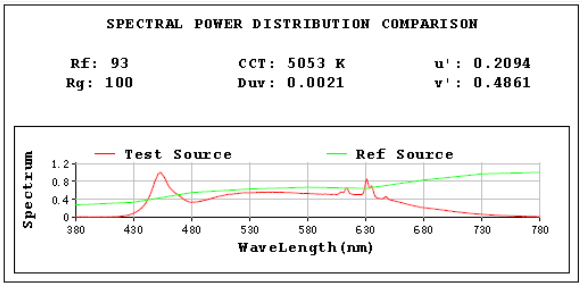
Photometric Measurement – Goniophotometer Method:

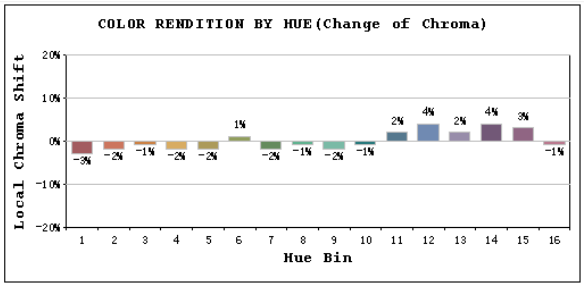
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1106.2
Luminous Efficacy (lm/W)	87.79
Beam Angle (°)	114.8
Center Beam Candle Power (cd)	354.2

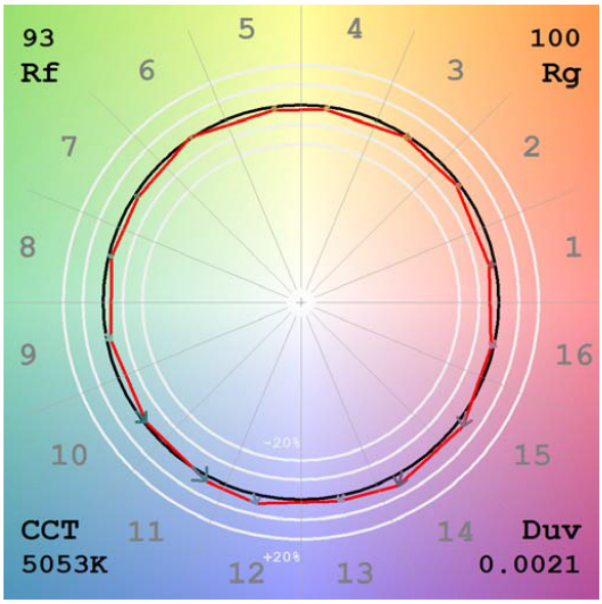
Spectral Power Distribution & Chromaticity Diagram

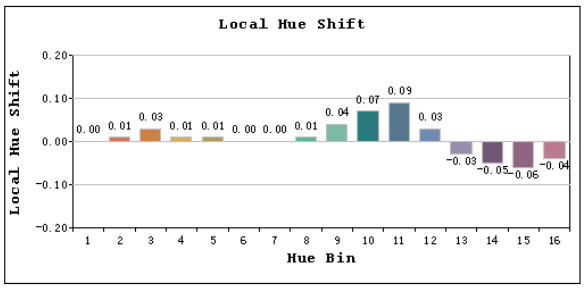


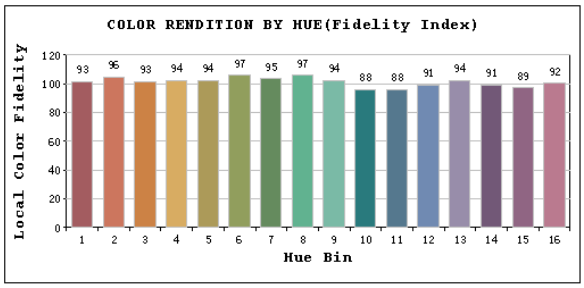
TM30

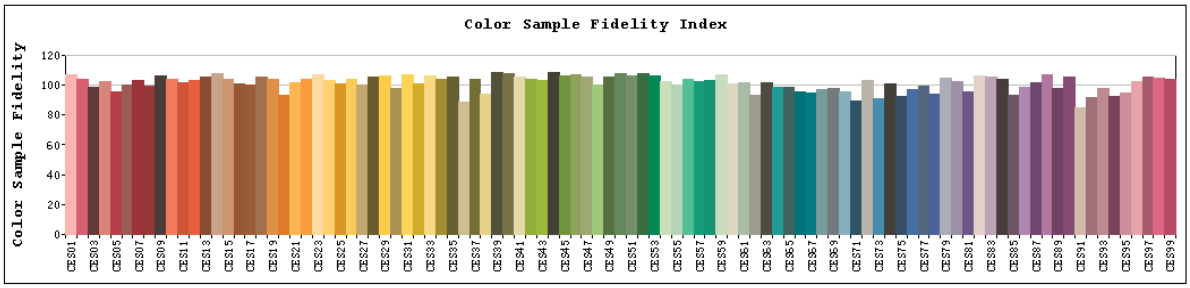

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 100
CCT: 5053 K
Duv: 0.0021
u': 0.2094
v': 0.4861
Test Source
Ref Source
Spectrum
WaveLength(nm)


COLOR RENDITION BY HUE(Change of Chroma)
Local Chroma Shift
Hue Bin


93
Rf
100
Rg
CCT
5053K
Duv
0.0021


Local Hue Shift
Local Hue Shift
Hue Bin


COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin

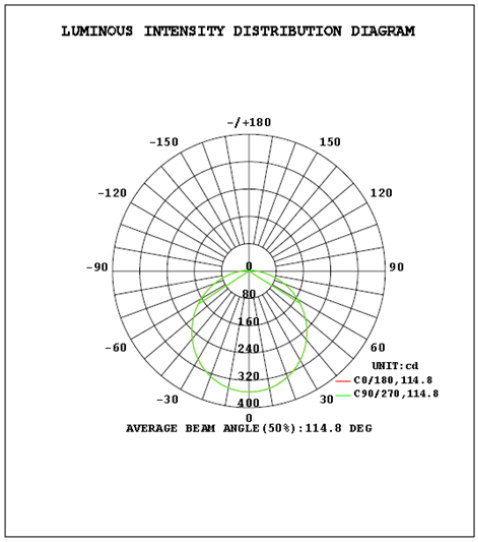

Color Sample Fidelity Index
Color Sample Fidelity

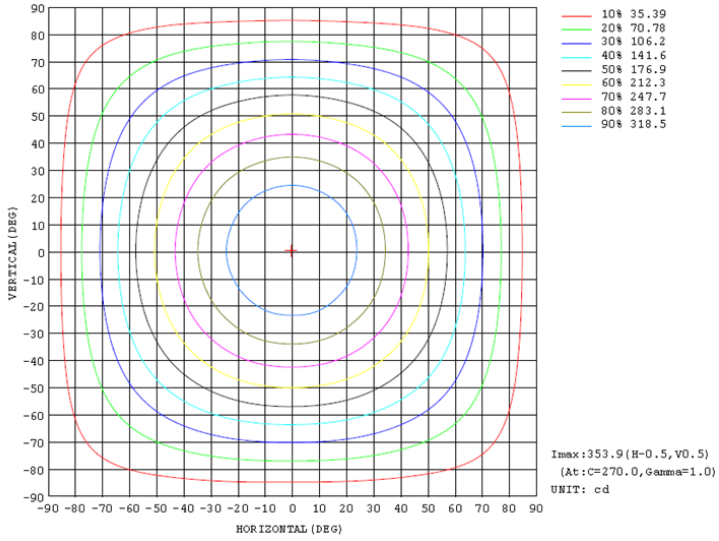
Zonal Lumen Tabulation

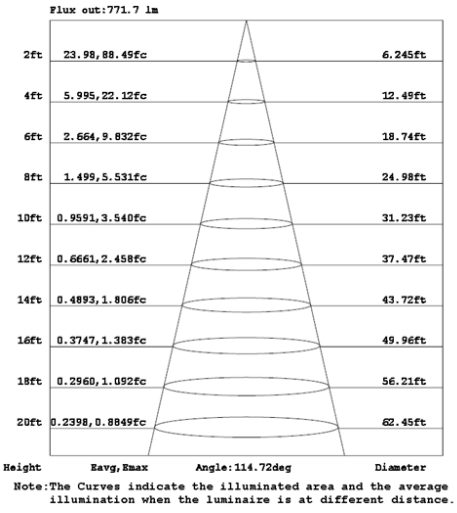
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	274.7	24.8%
0-40	450.5	40.7%
0-60	803.3	72.6%
60-90	262.1	23.7%
70-100	144.4	13.1%
90-120	24.6	2.2%
0-90	1065.4	96.3%
90-180	40.8	3.7%
0-180	1106.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	33.5	3.0%	90-100	17.0	1.5%
10-20	95.9	8.7%	100-110	4.0	0.4%
20-30	145.4	13.1%	110-120	3.6	0.3%
30-40	175.8	15.9%	120-130	4.3	0.4%
40-50	183.7	16.6%	130-140	4.4	0.4%
50-60	169.2	15.3%	140-150	3.8	0.3%
60-70	134.7	12.2%	150-160	2.2	0.2%
70-80	87.3	7.9%	160-170	1.1	0.1%
80-90	40.1	3.6%	170-180	0.4	0.0%

Photometric Data







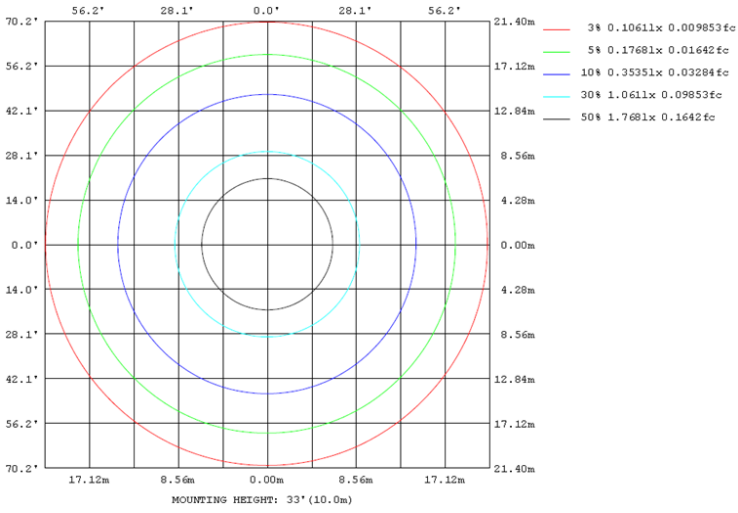


Table--1 UNIT: cd

C(DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	354	354	354	354	354	354	354	354	354	354	354	354	354	354	354	354			
5	352	351	351	352	352	352	352	351	352	352	352	353	353	352	352	352			
10	347	347	346	347	347	347	347	347	348	348	348	348	349	348	347	347			
15	339	338	339	339	339	339	338	339	340	340	340	341	341	340	340	340			
20	329	328	327	328	328	328	328	329	330	330	330	330	331	330	329	329			
25	314	314	313	314	314	314	314	315	316	316	317	317	318	317	316	316			
30	299	298	297	298	298	298	298	299	301	300	301	301	302	301	300	300			
35	280	279	279	279	279	280	280	281	283	282	283	282	283	282	282	281			
40	259	259	258	259	258	259	260	261	262	262	262	262	263	262	261	261			
45	237	237	236	236	237	237	237	239	240	239	240	240	240	239	239	239			
50	213	212	212	212	213	213	213	214	216	216	217	216	216	215	215	214			
55	187	187	187	187	187	188	189	189	191	191	192	191	191	190	190	189			
60	161	161	160	161	161	162	162	163	165	165	165	165	165	164	164	163			
65	134	134	133	134	134	135	135	137	138	138	139	138	138	137	137	136			
70	107	107	106	108	107	108	108	110	111	111	111	110	111	109	109	109			
75	80.6	81.0	80.1	81.1	80.9	82.1	81.9	83.0	84.7	84.1	84.6	83.6	83.7	82.5	82.7	82.0			
80	55.7	56.2	55.5	56.5	56.1	57.2	57.2	58.2	59.4	58.8	59.3	58.2	58.6	57.3	57.6	57.0			
85	34.0	34.4	34.0	34.6	34.5	35.3	35.2	36.0	36.8	36.3	36.7	36.0	36.2	35.4	35.6	35.0			
90	21.6	21.6	21.5	21.7	21.7	22.0	22.0	22.2	22.3	22.0	22.1	21.9	22.0	21.9	22.0	22.0			
95	15.6	15.7	15.6	15.9	15.9	16.2	16.0	16.1	16.0	15.8	16.0	16.0	16.3	16.1	16.2	16.1			
100	7.73	7.89	7.90	8.47	8.43	8.67	8.52	8.39	8.27	8.13	8.45	8.49	8.63	8.45	8.68	8.34			
105	2.09	2.30	2.35	2.71	2.72	2.74	2.68	2.56	2.35	2.42	2.45	2.50	2.49	2.41	2.58	2.45			
110	2.84	2.94	2.90	2.97	2.99	2.84	2.90	2.98	2.74	2.86	2.64	2.69	2.73	2.34	2.75	2.82			
115	3.98	3.97	3.82	3.85	3.85	3.72	3.64	3.78	3.72	3.74	3.41	3.49	3.71	3.28	3.66	3.68			
120	4.68	4.60	4.35	4.39	4.41	4.35	4.19	4.33	4.39	4.38	3.80	3.14	4.42	4.03	4.31	4.29			
125	5.31	5.20	4.89	4.94	4.98	4.97	4.83	4.92	5.00	5.05	4.20	3.41	4.80	4.83	4.86	5.02			
130	5.93	5.78	5.41	5.48	5.56	5.53	5.38	5.45	5.60	5.71	4.66	4.03	4.94	5.26	5.50	5.64			
135	6.45	6.22	5.71	5.86	5.99	5.98	5.84	5.95	6.11	6.21	4.98	4.53	4.44	5.54	5.94	6.06			
140	6.83	6.61	5.99	6.15	6.36	6.30	6.11	6.26	6.52	6.64	5.08	4.85	4.24	5.73	6.20	6.26			
145	6.94	6.65	6.27	6.29	6.38	6.25	6.25	6.26	6.60	6.85	5.27	4.76	4.47	5.70	6.22	6.10			
150	6.53	6.40	6.08	5.79	5.91	5.78	5.74	5.98	6.18	6.48	5.34	4.50	4.46	5.29	5.99	4.93			
155	5.52	5.40	4.91	4.73	4.91	4.89	4.80	4.89	5.20	5.34	4.96	3.71	4.04	4.90	5.23	5.36			
160	3.64	3.69	3.65	3.69	3.66	3.69	3.66	3.68	3.58	3.56	3.59	3.58	3.63	3.58	3.62	3.59			
165	3.83	3.88	3.84	3.88	3.85	3.87	3.85	3.87	3.78	3.76	3.79	3.77	3.81	3.78	3.82	3.79			
170	4.01	4.04	3.99	4.03	4.03	4.03	4.02	4.02	3.96	3.93	3.96	3.95	3.99	3.96	3.99	3.97			
175	4.11	4.11	4.09	4.13	4.13	4.13	4.11	4.12	4.08	4.07	4.08	4.08	4.11	4.09	4.11	4.09			
180	4.15	4.14	4.14	4.15	4.17	4.17	4.17	4.17	4.15	4.14	4.16	4.16	4.17	4.16	4.16	4.16			

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-12	**Test Ambient:**	25.1 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	ORB6	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406110029	120.0	60	0.106	12.40	0.974

Chromaticity Measurement - Sphere-Spectroradiometer Method:

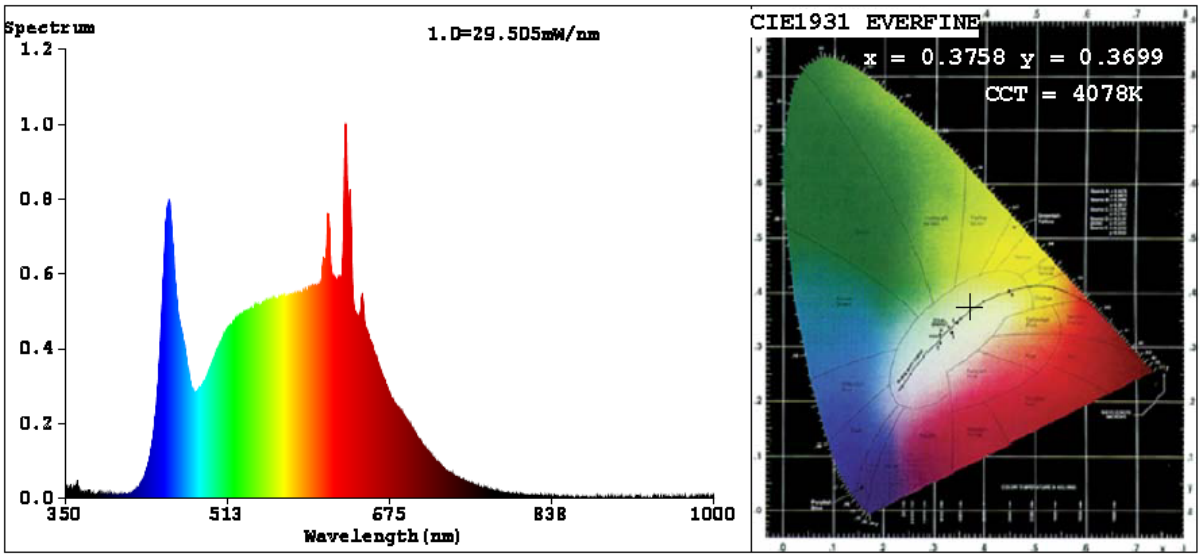
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4078
Duv	-0.0019
Chromaticity (x, y)	x=0.3758 y=0.3699
Chromaticity (u', v')	u'=0.2248 v'=0.4978
Color Rendering Index (CRI)	96.9
R9	88
Rg	100
Rf	93
Rcs,h1%	-3

Special Color Rendering Indices			
R1	98	R9	88
R2	99	R10	97
R3	98	R11	98
R4	97	R12	74
R5	97	R13	100
R6	95	R14	98
R7	96	R15	97
R8	94	--	--

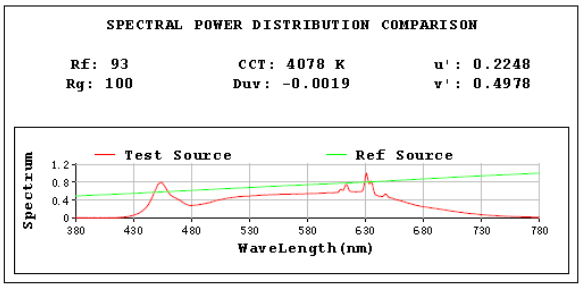
Photometric Measurement – Goniophotometer Method:

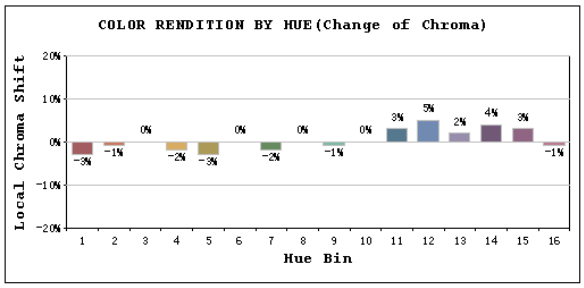
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1112.8
Luminous Efficacy (lm/W)	89.74

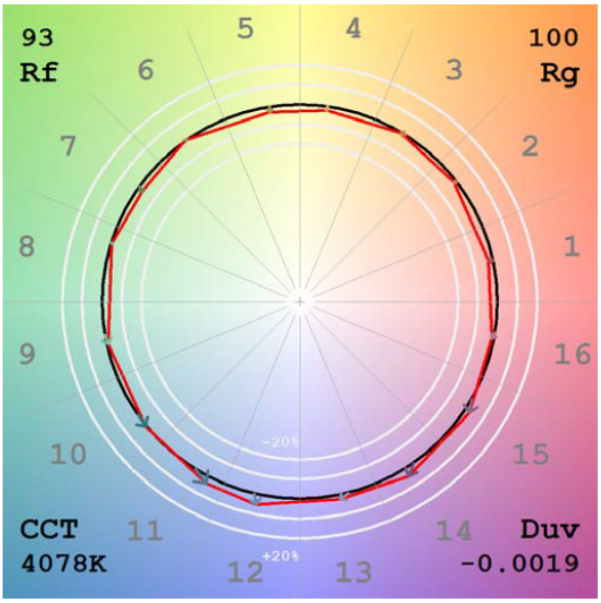
Spectral Power Distribution & Chromaticity Diagram

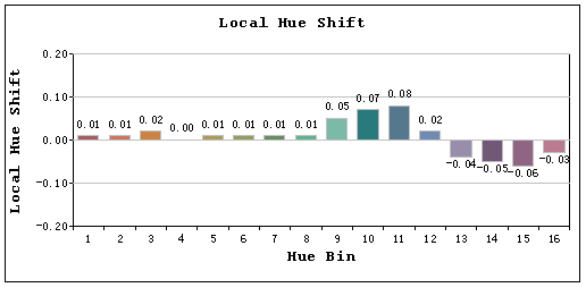


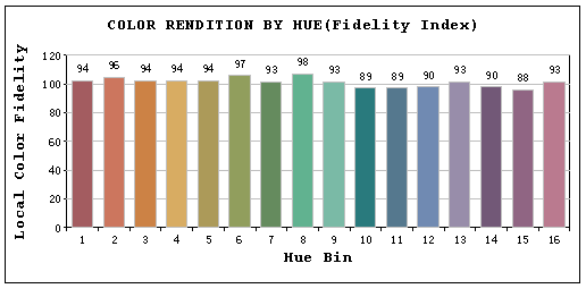
TM30

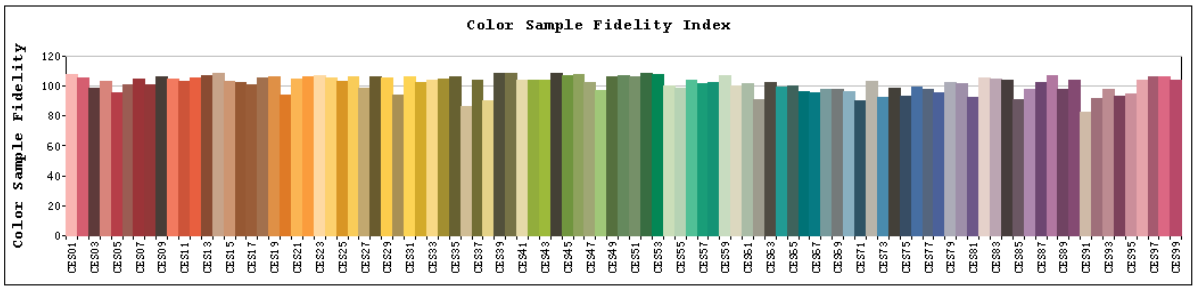

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
CCT: 4078 K
u': 0.2248
Rg: 100
Duv: -0.0019
v': 0.4978
Test Source
Ref Source
Spectrum
WaveLength(nm)


COLOR RENDITION BY HUE(Change of Chroma)
Local Chroma Shift
Hue Bin


93
Rf
100
Rg
CCT
4078K
Duv
-0.0019


Local Hue Shift
Local Hue Shift
Hue Bin


COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-12	Test Ambient:	25.1 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	ORB6	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406110029	120.0	60	0.105	12.30	0.974

Chromaticity Measurement - Sphere-Spectroradiometer Method:

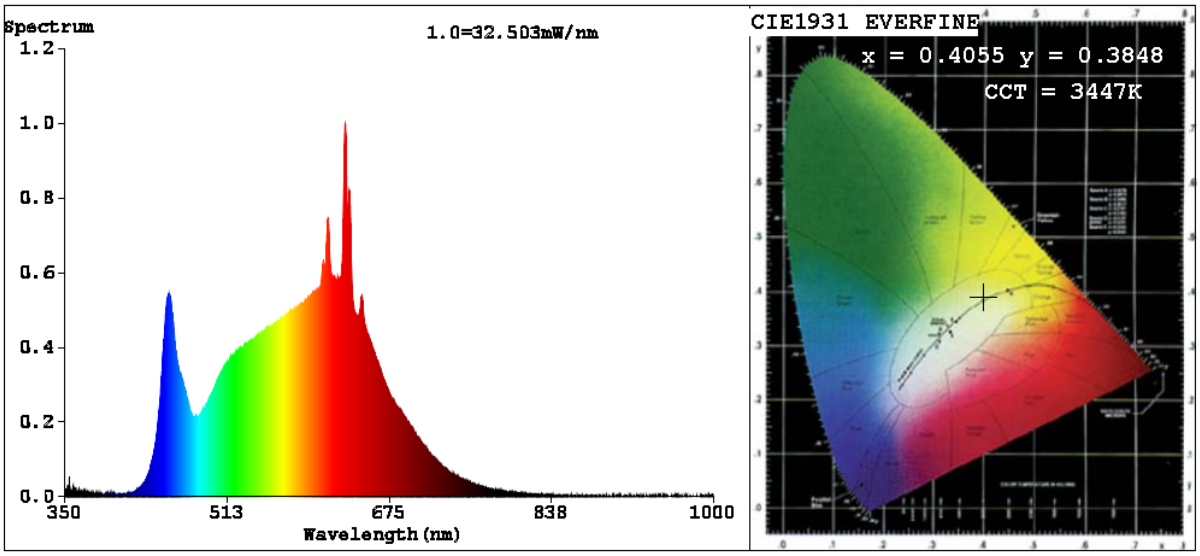
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3447
Duv	-0.0027
Chromaticity (x, y)	x=0.4055 y=0.3848
Chromaticity (u', v')	u'=0.2383 v'=0.5088
Color Rendering Index (CRI)	96.6
R9	82
Rg	101
Rf	93
Rcs,h1%	-3

Special Color Rendering Indices			
R1	99	R9	82
R2	99	R10	98
R3	98	R11	98
R4	98	R12	79
R5	98	R13	100
R6	96	R14	98
R7	95	R15	97
R8	92	--	--

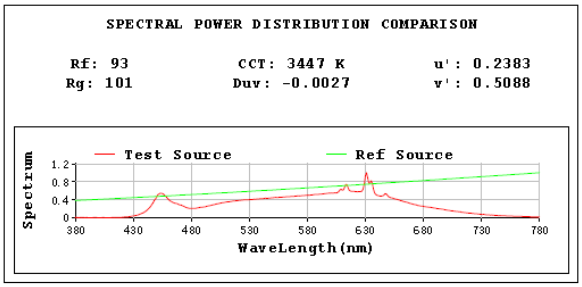
Photometric Measurement – Goniophotometer Method:

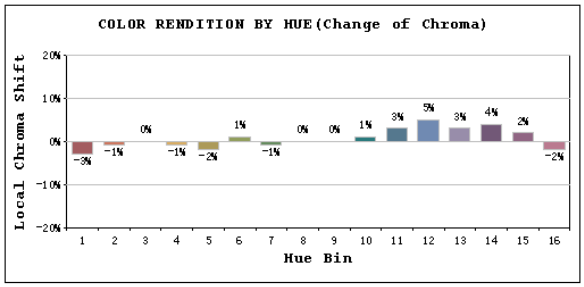
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1086.5
Luminous Efficacy (lm/W)	88.33

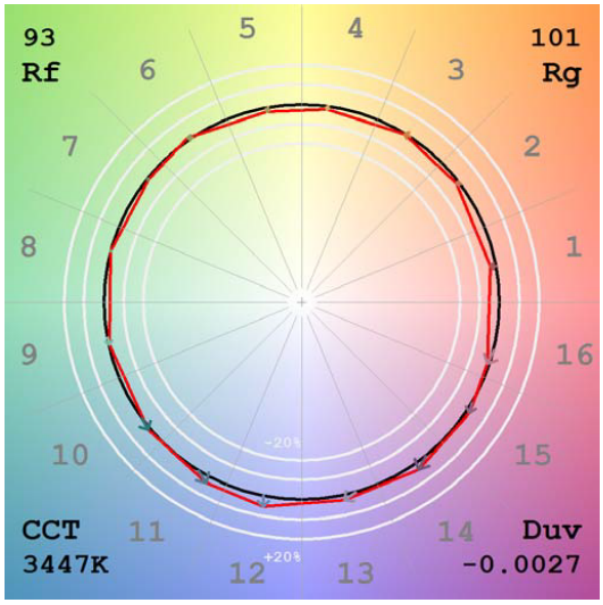
Spectral Power Distribution & Chromaticity Diagram

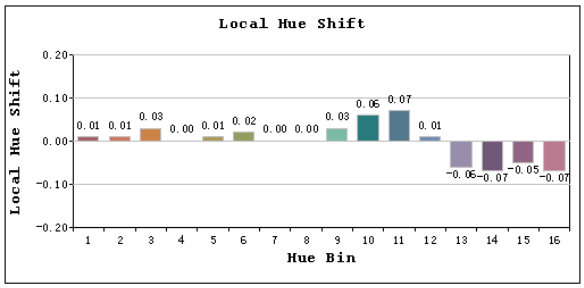


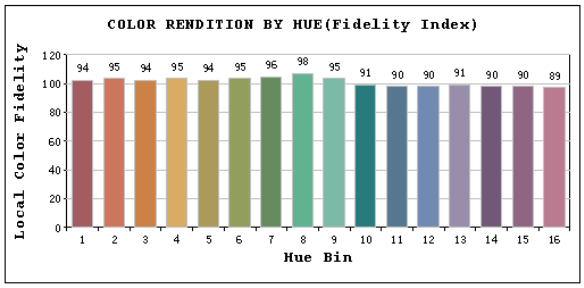
TM30

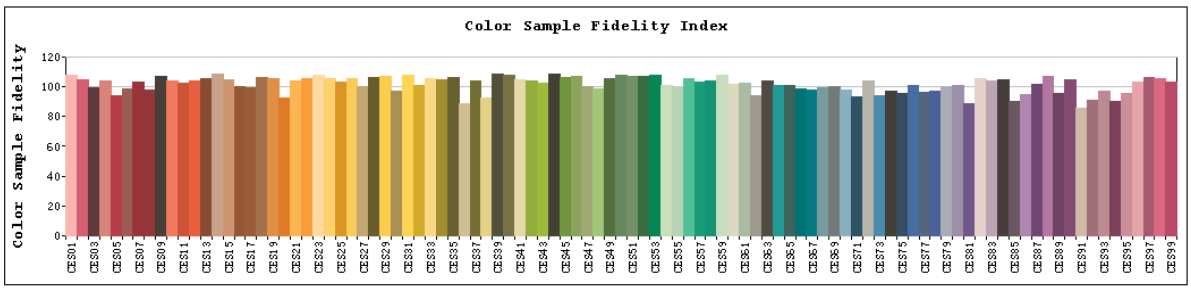

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
CCT: 3447 K
u': 0.2383
Rg: 101
Duv: -0.0027
v': 0.5088
Test Source
Ref Source
Spectrum
WaveLength(nm)


COLOR RENDITION BY HUE(Change of Chroma)
Local Chroma Shift
Hue Bin


93
Rf
101
Rg
CCT
3447K
Duv
-0.0027


Local Hue Shift
Local Hue Shift
Hue Bin


COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-12	Test Ambient:	25.1 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	ORB6	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406110029	120.0	60	0.106	12.40	0.974

Chromaticity Measurement - Sphere-Spectroradiometer Method:

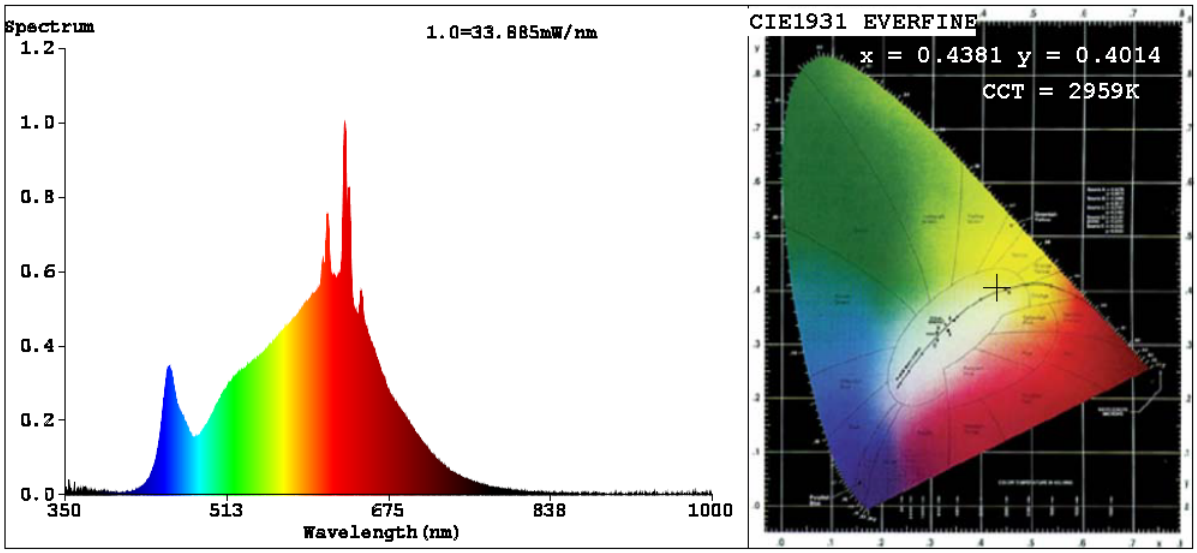
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2959
Duv	-0.0012
Chromaticity (x, y)	x=0.4381 y=0.4014
Chromaticity (u', v')	u'=0.2525 v'=0.5205
Color Rendering Index (CRI)	95.4
R9	70
Rg	100
Rf	93
Rcs,h1%	-4

Special Color Rendering Indices			
R1	97	R9	70
R2	99	R10	96
R3	99	R11	97
R4	96	R12	83
R5	96	R13	98
R6	97	R14	99
R7	93	R15	93
R8	86	--	--

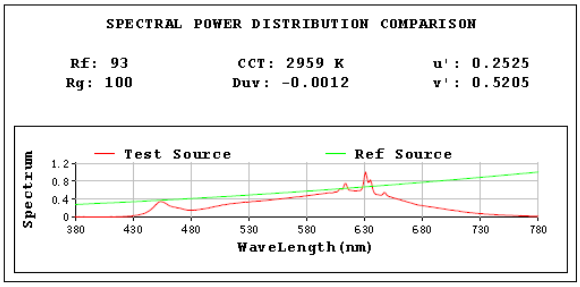
Photometric Measurement – Goniophotometer Method:

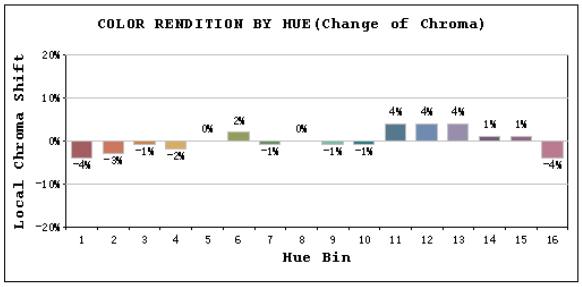
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1031.8
Luminous Efficacy (lm/W)	83.21

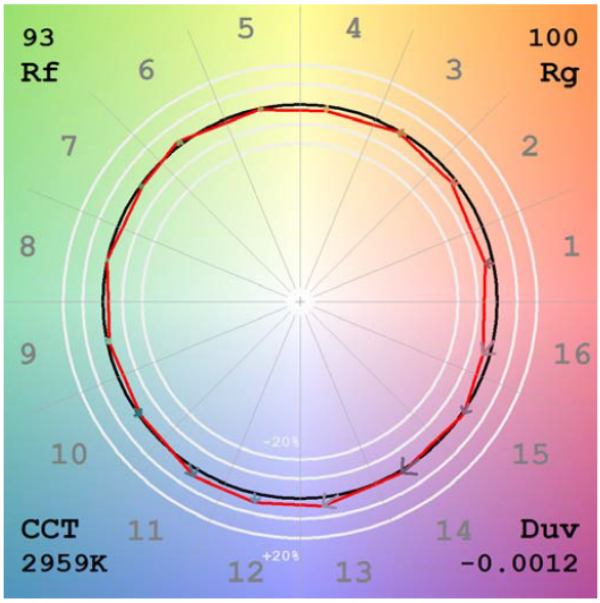
Spectral Power Distribution & Chromaticity Diagram

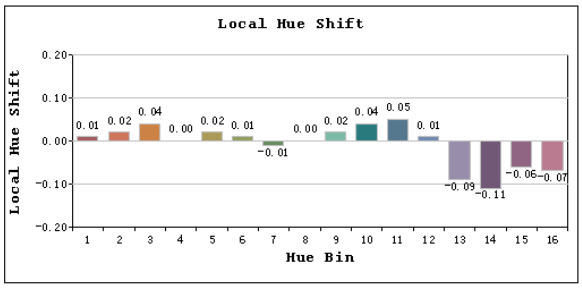


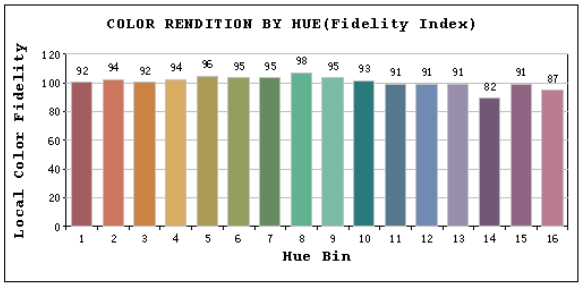
TM30

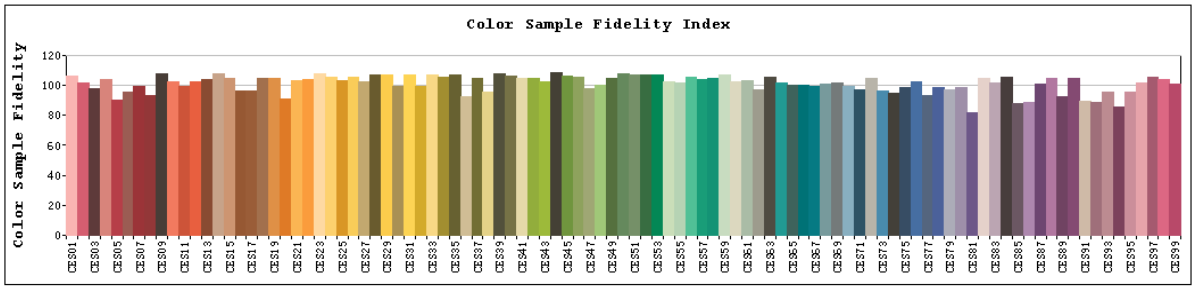

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 100
CCT: 2959 K
Duv: -0.0012
u': 0.2525
v': 0.5205
Test Source
Ref Source
Spectrum
WaveLength(nm)


COLOR RENDITION BY HUE(Change of Chroma)
Local Chroma Shift
Hue Bin


93
Rf
100
Rg
CCT
2959K
Duv
-0.0012


Local Hue Shift
Local Hue Shift
Hue Bin


COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-12	**Test Ambient:**	25.1 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	ORB6	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406110029	120.0	60	0.107	12.50	0.975

Chromaticity Measurement - Sphere-Spectroradiometer Method:

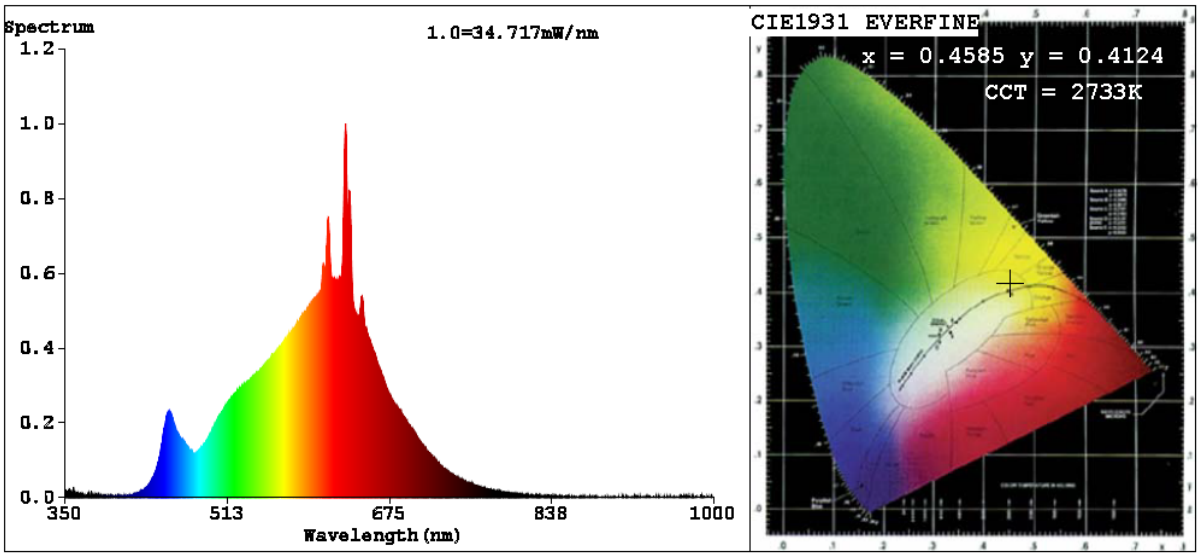
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2733
Duv	0.0008
Chromaticity (x, y)	x=0.4585 y=0.4124
Chromaticity (u', v')	u'=0.2608 v'=0.5278
Color Rendering Index (CRI)	94.1
R9	62
Rg	99
Rf	92
Rcs,h1%	-5

Special Color Rendering Indices			
R1	95	R9	62
R2	97	R10	93
R3	99	R11	96
R4	95	R12	84
R5	94	R13	96
R6	97	R14	98
R7	92	R15	90
R8	83	--	--

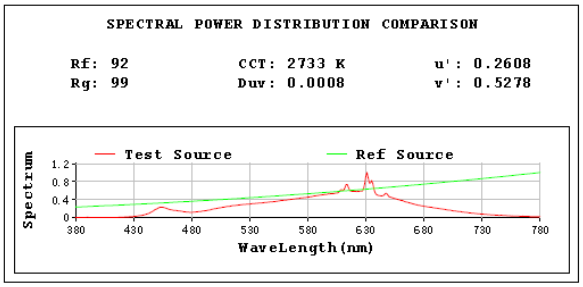
Photometric Measurement – Goniophotometer Method:

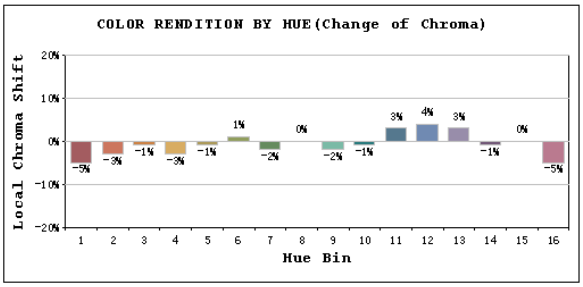
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	996.3
Luminous Efficacy (lm/W)	79.70

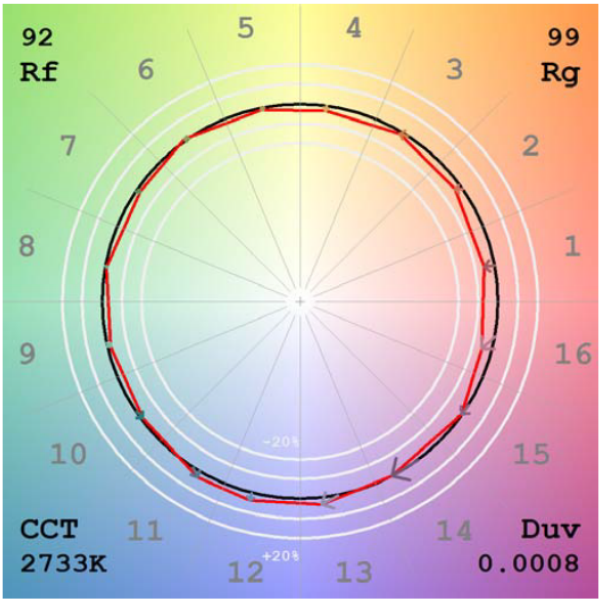
Spectral Power Distribution & Chromaticity Diagram

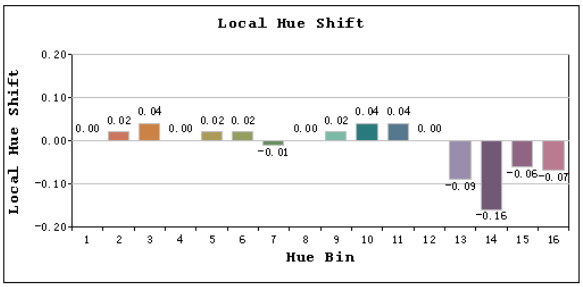


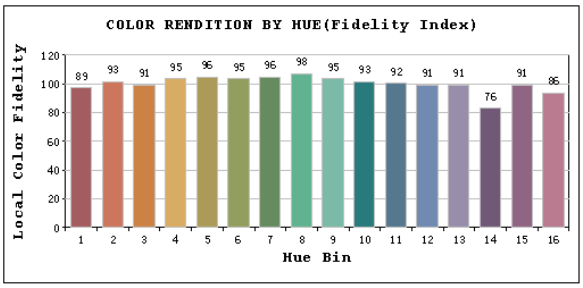
TM30

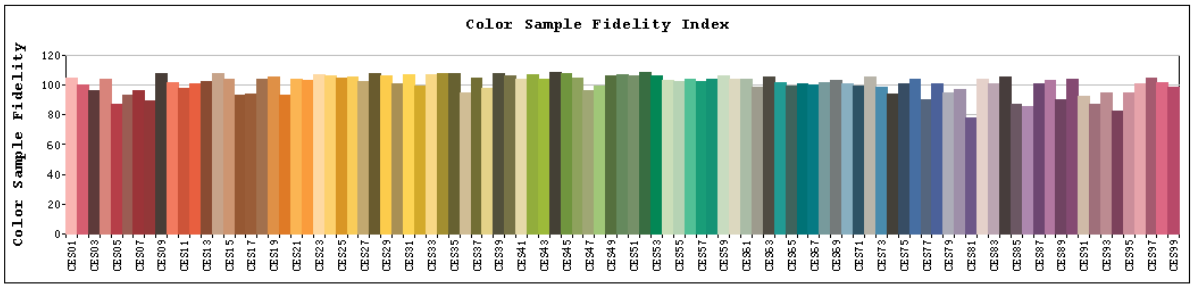

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 92
CCT: 2733 K
u': 0.2608
Rg: 99
Duv: 0.0008
v': 0.5278
Test Source
Ref Source
Spectrum
WaveLength(nm)


COLOR RENDITION BY HUE(Change of Chroma)
Local Chroma Shift
Hue Bin


92
Rf
99
Rg
CCT
2733K
Duv
0.0008

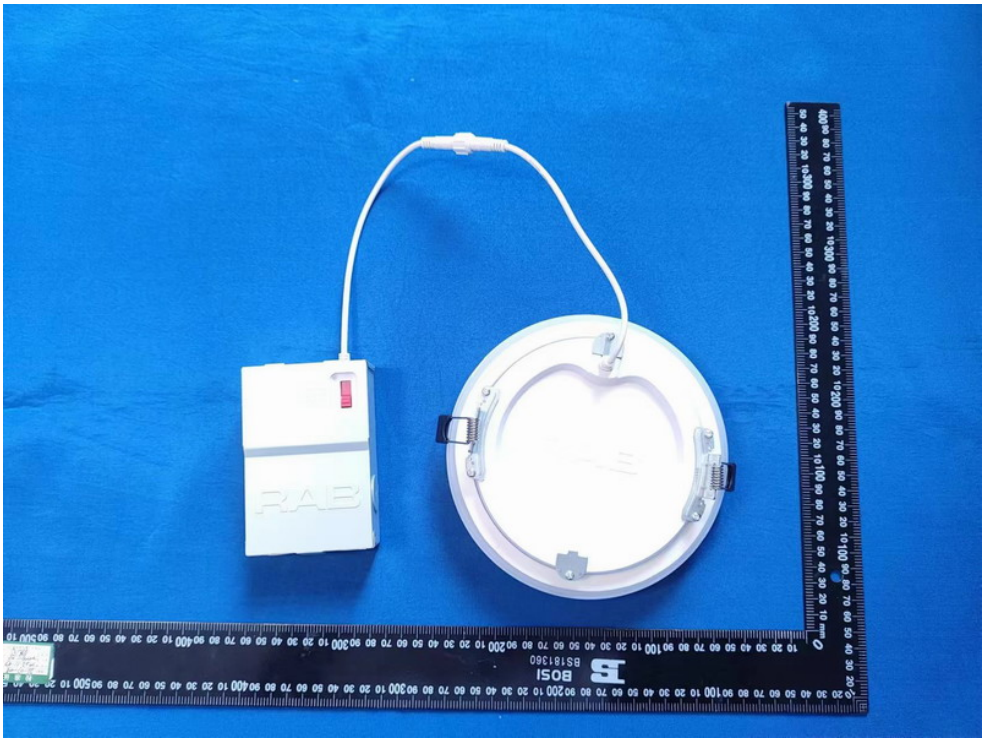

Local Hue Shift
Local Hue Shift
Hue Bin

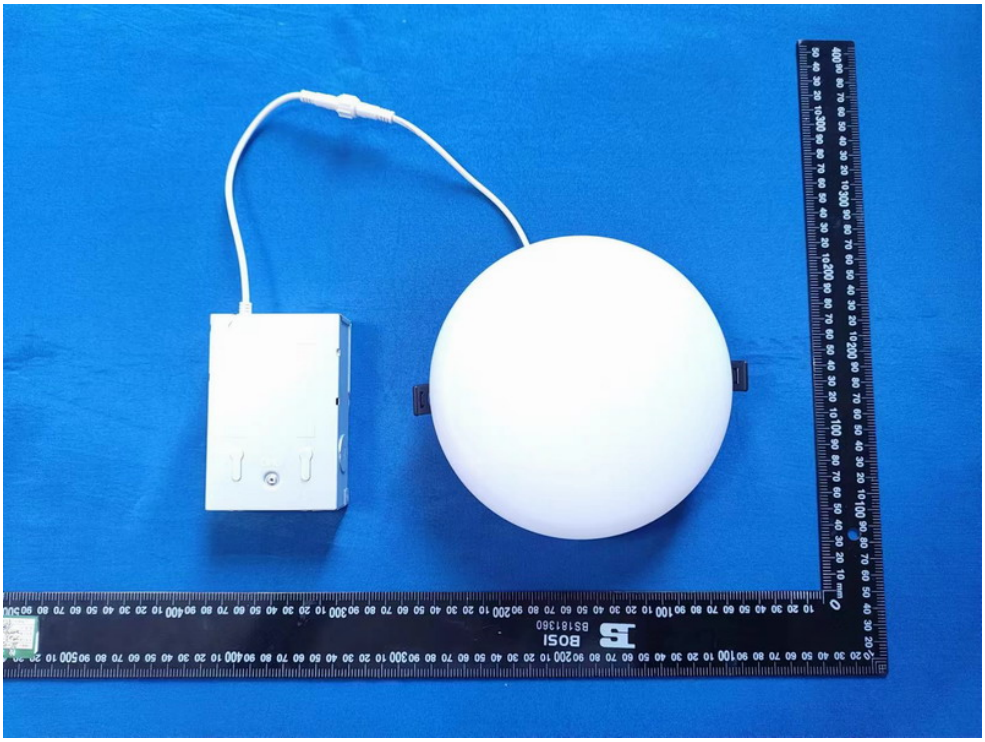

COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
ORB6	2700K setting	120	996.3	12.50	79.70
	3000K setting	120	1031.8	12.40	83.21
	3500K setting	120	1086.5	12.30	88.33
	4000K setting	120	1112.8	12.40	89.74
	5000K setting	120	1106.2	12.60	87.79

3. Product Photo





******** END OF REPORT ********