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): CRVFAD-14R/MVS/EM

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2024-07-01

Prepared By:

Test & Report By:

Engineer: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120V-277Vac, 60 Hz
Nominal Power	25.0W
Rated Initial Lamp Lumen	1400lm（mode2700K）
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	2024-06-26	**Test Ambient:**	25.1 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CRVFAD-14R/MVS/EM	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150010	120.0	60	0.181	21.50	0.989

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2748
Duv	0.0019
Chromaticity (x, y)	x=0.4593 y=0.4157
Chromaticity (u', v')	u'=0.2599 v'=0.5292
Color Rendering Index (CRI)	93.0
R9	58
Rg	98
Rf	93
Rcs,h1%	-6

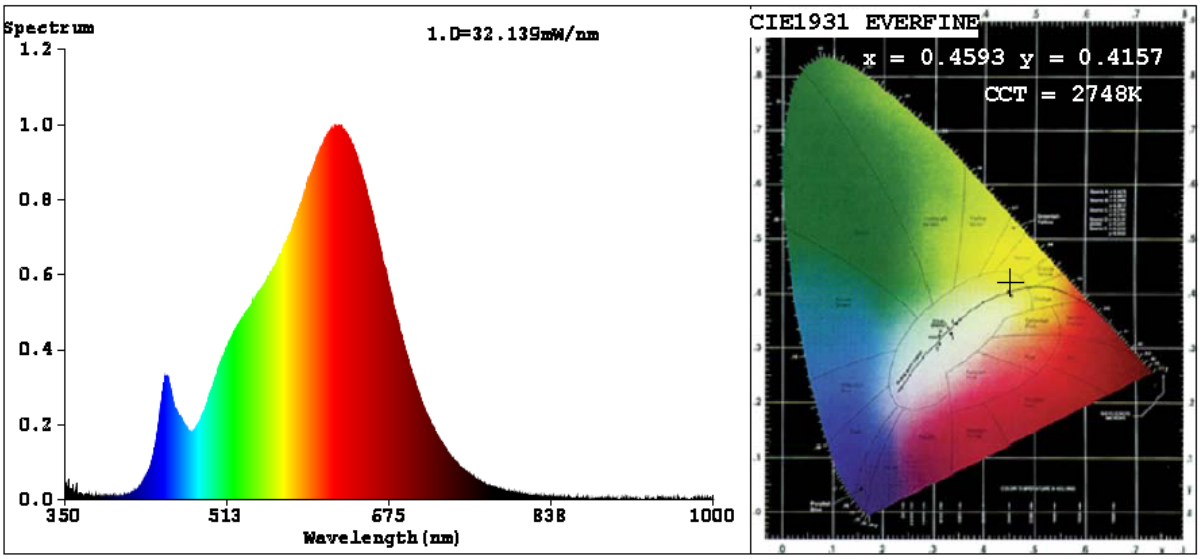
Special Color Rendering Indices			
R1	93	R9	58
R2	96	R10	90
R3	99	R11	95
R4	94	R12	84
R5	92	R13	94
R6	96	R14	98
R7	93	R15	88
R8	82	--	--

Photometric Measurement – Goniophotometer Method:

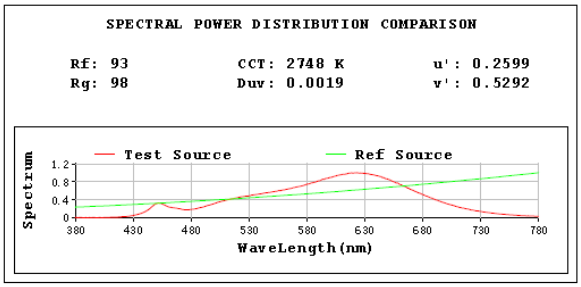
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1435.1
Luminous Efficacy (lm/W)	66.75
Beam Angle (°)	129.0
Center Beam Candle Power (cd)	351.0

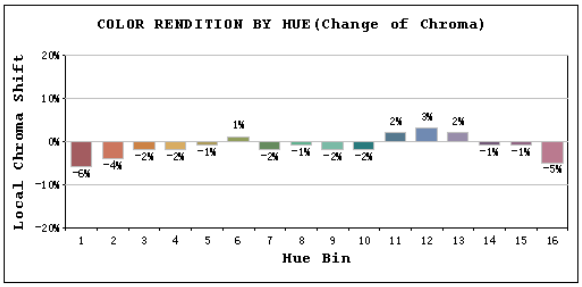
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1440.0
Luminous Efficacy (lm/W)	64.63

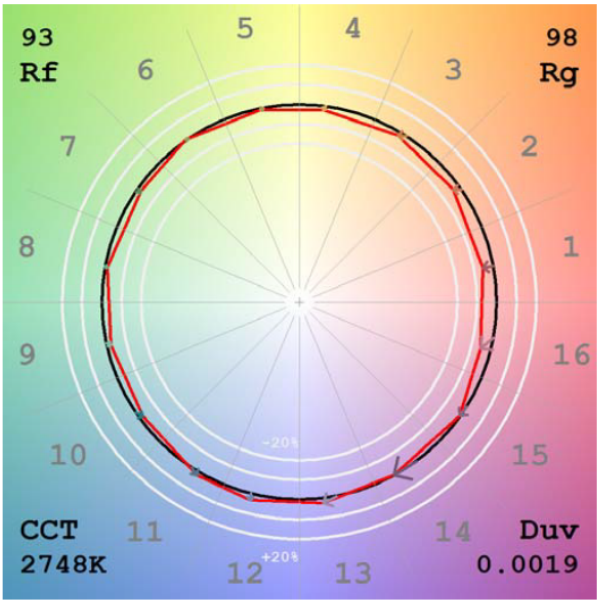
Spectral Power Distribution & Chromaticity Diagram

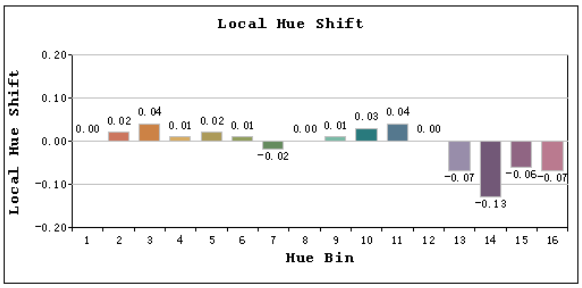


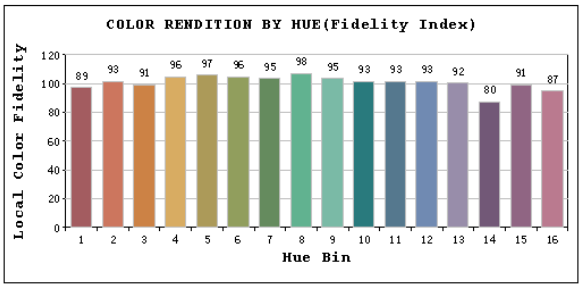
TM30

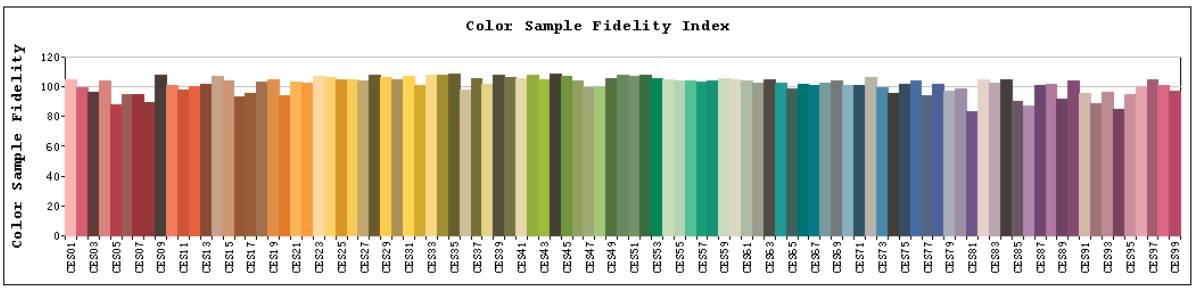

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 98
CCT: 2748 K
Duv: 0.0019
u': 0.2599
v': 0.5292
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
98
Rg
CCT
2748K
Duv
0.0019


Local Hue Shift
Local Hue Shift
Hue Bin


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

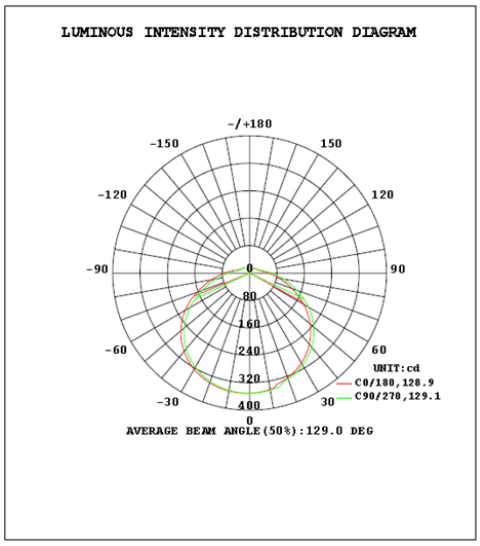

Color Sample Fidelity Index
Color Sample Fidelity

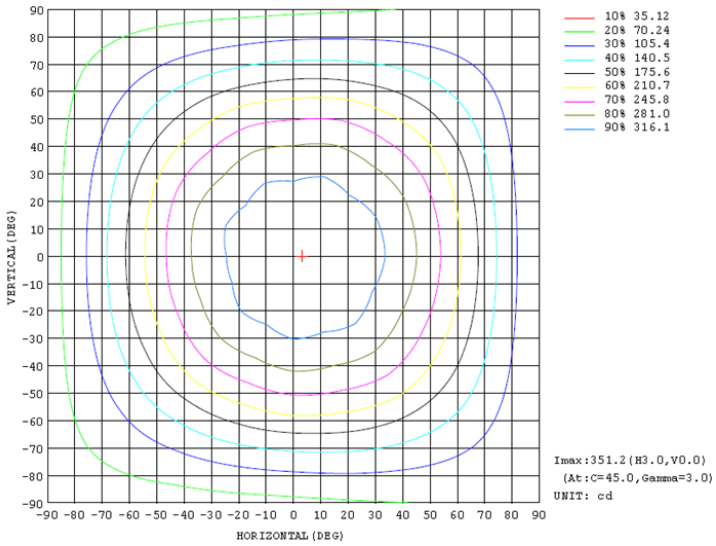
Zonal Lumen Tabulation

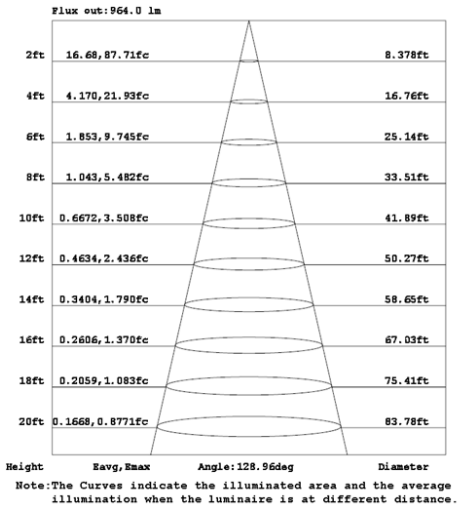
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	279.3	19.5%
0-40	467.3	32.6%
0-60	873.4	60.9%
60-90	390.2	27.2%
70-100	273.9	19.1%
90-120	117.0	8.2%
0-90	1263.6	88.1%
90-180	171.5	11.9%
0-180	1435.1	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	33.3	2.3%	90-100	55.3	3.9%
10-20	96.4	6.7%	100-110	35.4	2.5%
20-30	149.6	10.4%	110-120	26.3	1.8%
30-40	188.0	13.1%	120-130	21.2	1.5%
40-50	205.8	14.3%	130-140	15.9	1.1%
50-60	200.3	14.0%	140-150	10.2	0.7%
60-70	171.7	12.0%	150-160	5.1	0.4%
70-80	129.9	9.1%	160-170	1.7	0.1%
80-90	88.7	6.2%	170-180	0.4	0.0%

Photometric Data







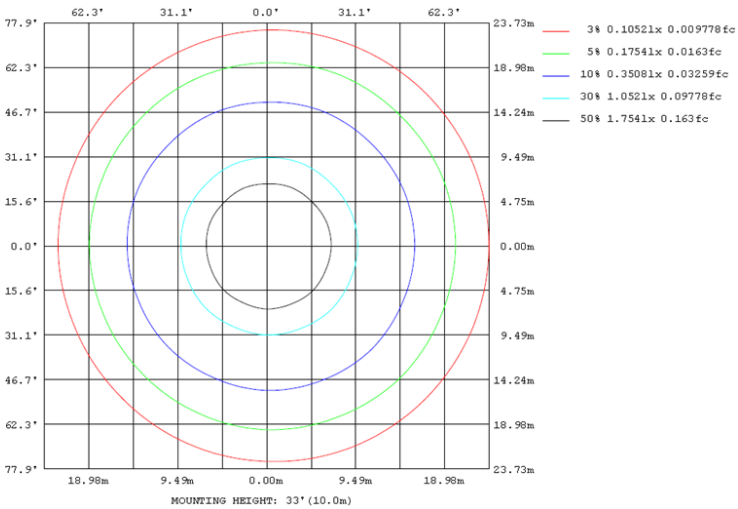


Table--1 UNIT: cd

γ (DEG) \ C(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	351	351	351	351	351	351	351	351	351	351	351	351	351	351	351	351
5	351	351	351	350	350	349	349	349	348	348	349	349	350	350	350	351
10	349	349	349	348	347	347	345	345	345	345	345	346	347	348	349	349
15	346	346	346	345	343	340	340	333	333	338	334	340	343	343	345	346
20	341	342	340	333	337	329	332	325	325	330	326	333	329	337	333	340
25	333	328	333	325	328	320	322	315	315	321	316	324	321	328	326	333
30	324	319	323	315	317	308	310	303	303	308	305	312	310	318	316	323
35	312	307	311	303	304	295	295	288	288	293	291	298	297	306	304	312
40	298	293	296	288	288	279	278	271	271	276	274	282	282	290	290	297
45	281	277	279	271	270	260	259	252	252	257	256	264	264	273	273	281
50	262	258	259	251	249	239	237	230	231	235	235	243	244	253	254	262
55	241	236	237	229	226	216	214	207	207	212	212	220	222	231	233	240
60	217	213	213	205	202	192	188	182	182	187	188	195	198	207	209	217
65	192	188	188	180	172	166	159	156	157	158	162	166	173	180	185	191
70	162	162	159	154	146	140	134	131	132	133	137	141	147	153	159	162
75	137	137	133	129	122	116	110	108	109	109	113	117	123	128	134	137
80	113	113	110	106	99.7	94.8	89.3	87.6	88.0	88.5	91.9	95.2	101	105	110	113
85	92.4	91.6	89.0	85.4	80.0	75.7	70.9	69.8	70.1	70.6	73.7	76.5	81.1	85.1	89.7	92.3
90	74.0	73.0	70.7	67.5	62.9	59.2	55.2	54.5	55.0	55.6	58.1	60.4	64.2	67.7	71.6	74.0
95	58.1	57.1	55.1	52.6	48.8	46.1	43.0	42.5	43.0	43.7	45.7	47.4	50.3	53.1	56.3	58.3
100	45.6	44.9	43.4	41.4	38.7	36.6	34.5	34.2	34.7	35.4	36.8	37.9	39.9	41.9	44.2	45.7
105	36.9	36.6	35.6	34.2	32.3	30.7	29.1	29.2	29.6	30.3	31.3	31.9	33.1	34.2	35.7	36.7
110	31.6	31.4	31.1	30.2	28.6	27.3	25.7	26.0	26.5	27.1	28.0	28.3	29.0	29.6	30.5	31.2
115	28.3	28.3	28.5	27.7	26.4	25.2	23.9	23.9	24.2	24.9	25.6	25.7	26.1	26.6	27.2	27.8
120	26.1	26.7	27.2	26.5	25.4	24.3	23.0	22.9	23.1	23.6	24.3	24.5	24.5	24.3	24.6	25.3
125	25.1	25.6	26.0	25.3	24.2	23.1	21.9	21.8	21.9	22.5	23.2	23.4	23.4	23.2	23.2	23.9
130	23.8	24.4	24.7	24.0	22.7	21.6	20.4	20.3	20.5	21.1	21.9	22.1	22.1	21.9	22.0	22.7
135	22.2	22.8	23.0	22.2	20.9	19.7	18.6	18.4	18.7	19.4	20.2	20.5	20.6	20.3	20.5	21.2
140	20.3	20.9	20.9	20.1	18.8	17.5	16.5	16.3	16.6	17.3	18.1	18.5	18.6	18.4	18.6	19.3
145	17.9	18.6	18.5	17.7	16.3	15.1	14.1	13.8	14.2	14.9	15.8	16.2	16.4	16.2	16.4	17.1
150	15.3	15.9	15.7	14.9	13.6	12.4	11.5	11.2	11.6	12.2	13.1	13.6	13.8	13.7	14.0	14.6
155	12.4	13.0	12.7	11.9	10.7	9.58	8.72	8.50	8.89	9.39	10.2	10.7	11.0	11.1	11.4	11.9
160	9.50	9.84	9.52	8.84	7.77	6.81	6.06	5.93	6.23	6.55	7.22	7.74	8.19	8.38	8.79	9.20
165	6.60	6.64	6.27	5.89	5.45	5.05	4.76	4.66	4.76	4.83	4.98	5.18	5.53	5.92	6.30	6.56
170	4.93	4.88	4.79	4.66	4.54	4.36	4.20	4.13	4.21	4.20	4.21	4.28	4.47	4.70	4.88	4.95
175	4.31	4.25	4.22	4.15	4.10	4.01	3.96	3.84	3.79	3.86	3.87	3.94	4.00	4.12	4.23	4.28
180	3.96	3.92	3.90	3.86	3.81	3.80	3.83	3.92	3.96	3.93	3.90	3.88	3.81	3.80	3.84	3.90

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-26	**Test Ambient:**	25.1 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CRVFAD-14R/MVS/EM	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150010	120.0	60	0.179	21.30	0.989

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3189
Duv	-0.0010
Chromaticity (x, y)	x=0.4228 y=0.3964
Chromaticity (u', v')	u'=0.2447 v'=0.5162
Color Rendering Index (CRI)	94.9
R9	69
Rg	100
Rf	93
Rcs,h1%	-4

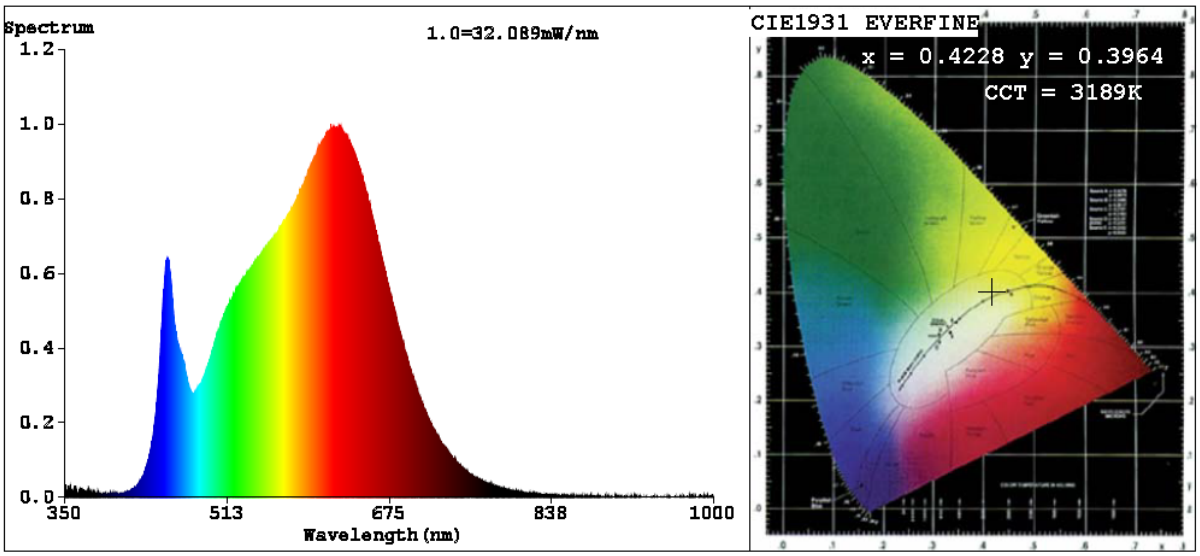
Special Color Rendering Indices			
R1	96	R9	69
R2	98	R10	94
R3	98	R11	96
R4	95	R12	81
R5	95	R13	97
R6	96	R14	99
R7	94	R15	93
R8	86	--	--

Photometric Measurement – Goniophotometer Method:

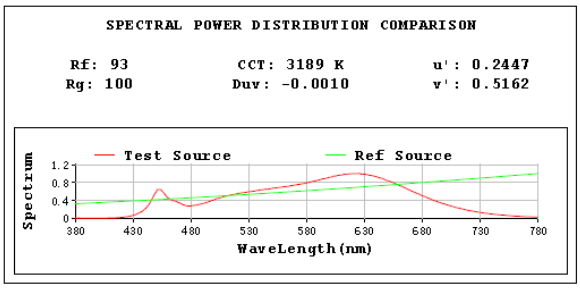
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1593.2
Luminous Efficacy (lm/W)	74.80

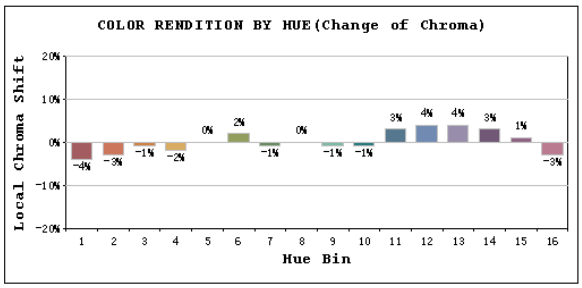
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1599.0
Luminous Efficacy (lm/W)	72.46

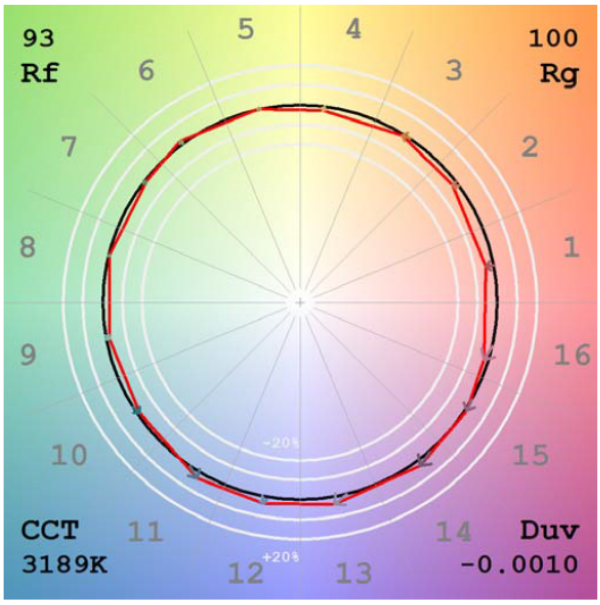
Spectral Power Distribution & Chromaticity Diagram

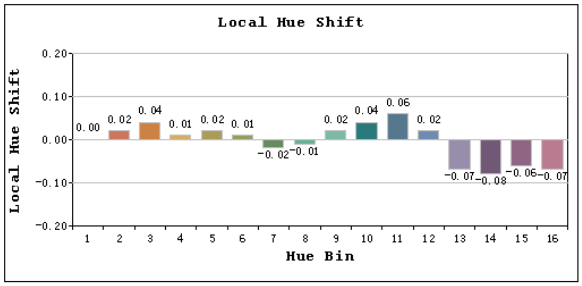


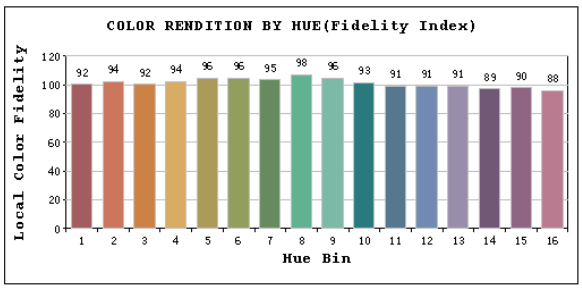
TM30

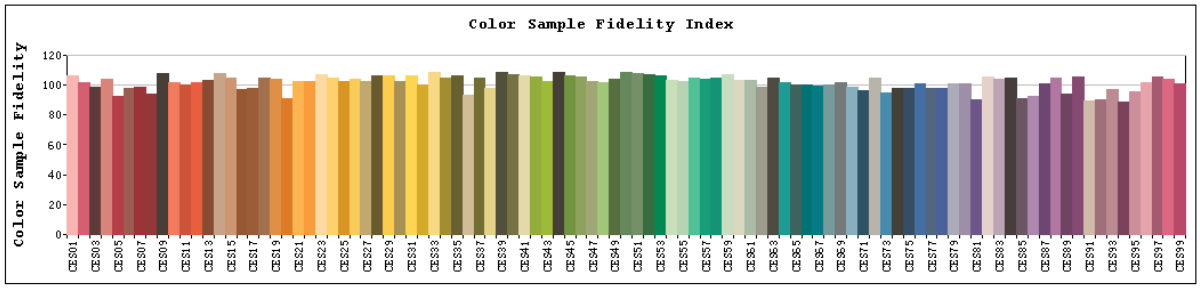

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 100
CCT: 3189 K
Duv: -0.0010
u': 0.2447
v': 0.5162
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
100
Rg
CCT
3189K
Duv
-0.0010


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	2024-06-26	Test Ambient:	25.1 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	CRVFAD-14R/MVS/EM	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150010	120.0	60	0.175	20.80	0.988

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3651
Duv	-0.0014
Chromaticity (x, y)	x=0.3959 y=0.3828
Chromaticity (u', v')	u'=0.2328 v'=0.5065
Color Rendering Index (CRI)	95.2
R9	74
Rg	100
Rf	93
Rcs,h1%	-4

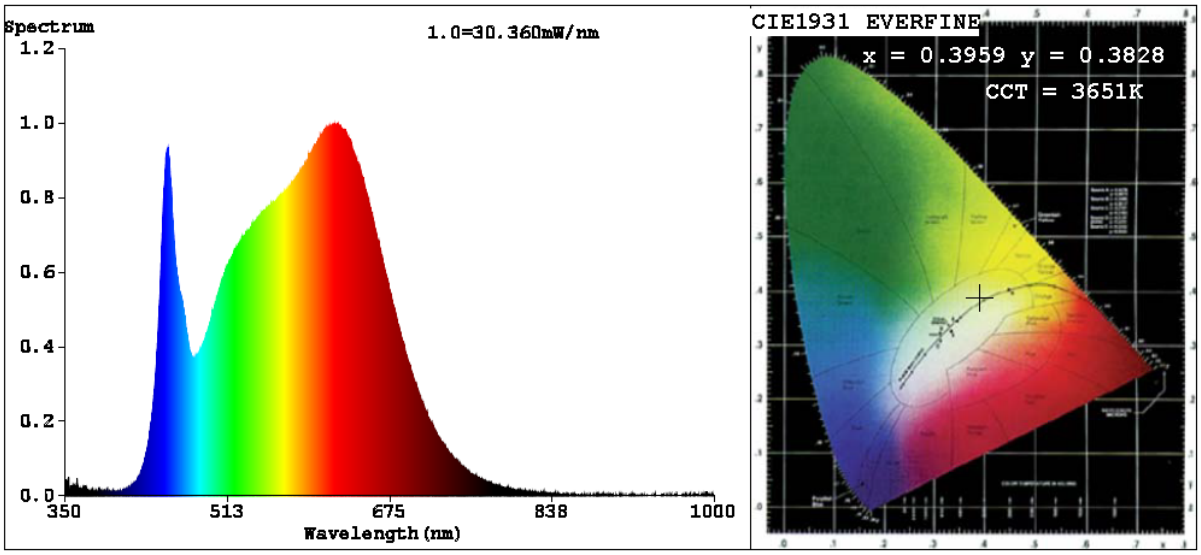
Special Color Rendering Indices			
R1	96	R9	74
R2	98	R10	94
R3	98	R11	96
R4	95	R12	78
R5	95	R13	97
R6	95	R14	98
R7	95	R15	94
R8	89	--	--

Photometric Measurement – Goniophotometer Method:

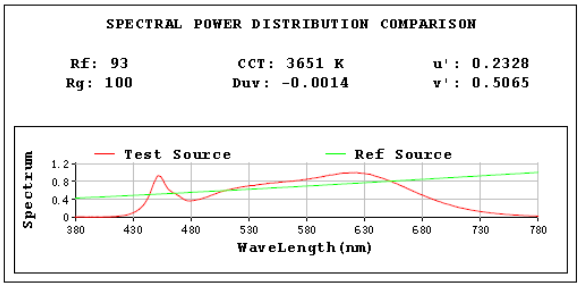
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1677.5
Luminous Efficacy (lm/W)	80.65

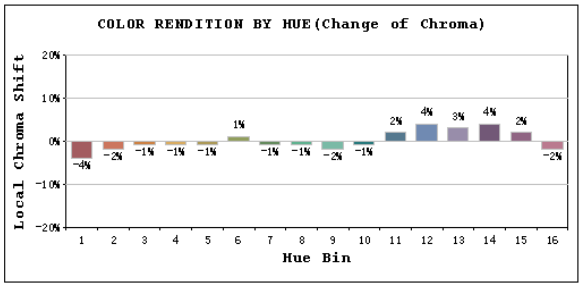
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1690.5
Luminous Efficacy (lm/W)	78.17

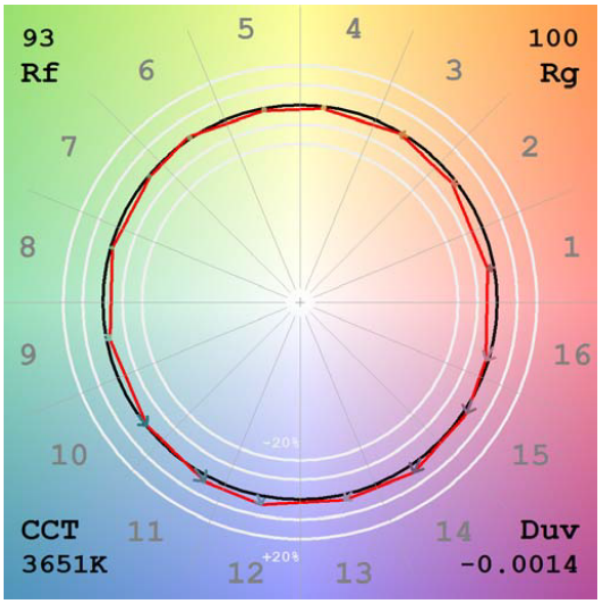
Spectral Power Distribution & Chromaticity Diagram

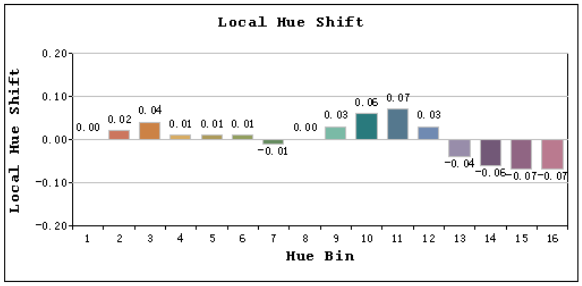


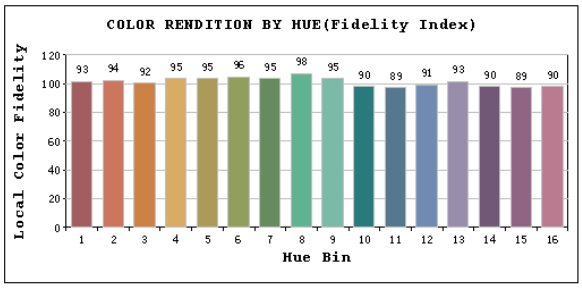
TM30

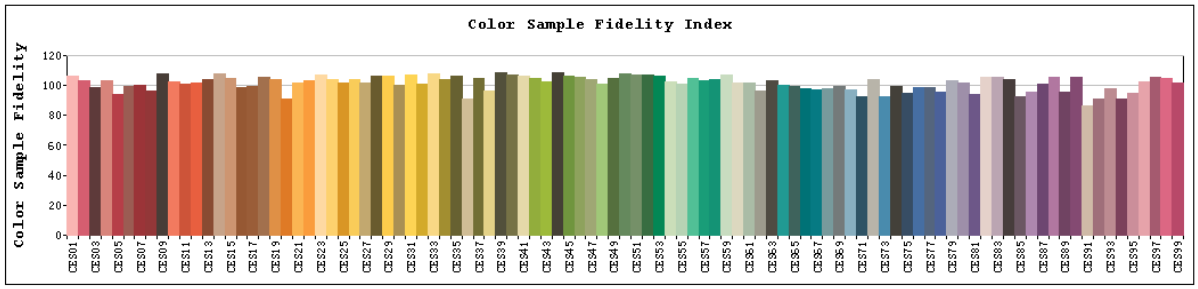

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 100
CCT: 3651 K
Duv: -0.0014
u': 0.2328
v': 0.5065
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
100
Rg
CCT
3651K
Duv
-0.0014


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	2024-06-26	Test Ambient:	25.1 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	CRVFAD-14R/MVS/EM	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150010	120.0	60	0.178	21.10	0.988

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3954
Duv	-0.0008
Chromaticity (x, y)	x=0.3819 y=0.3759
Chromaticity (u', v')	u'=0.2264 v'=0.5014
Color Rendering Index (CRI)	94.9
R9	74
Rg	100
Rf	93
Rcs,h1%	-4

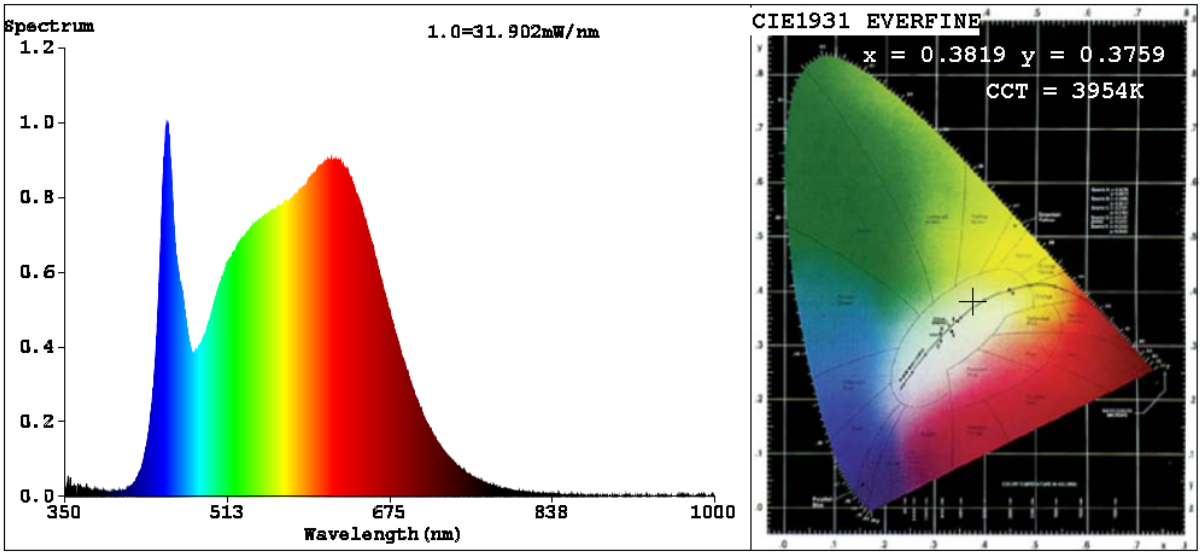
Special Color Rendering Indices			
R1	96	R9	74
R2	98	R10	93
R3	97	R11	95
R4	95	R12	75
R5	95	R13	97
R6	95	R14	98
R7	95	R15	94
R8	89	--	--

Photometric Measurement – Goniophotometer Method:

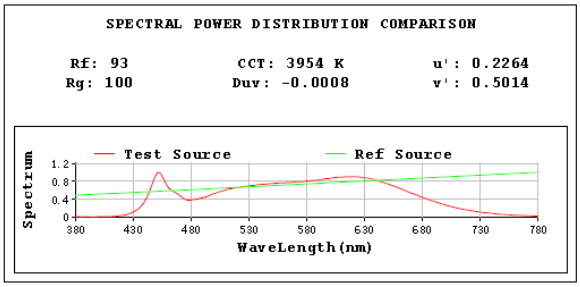
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1689.4
Luminous Efficacy (lm/W)	80.07

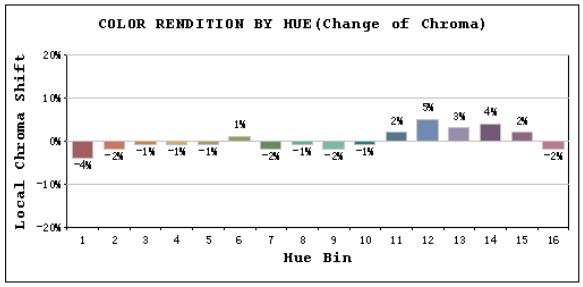
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1699.0
Luminous Efficacy (lm/W)	77.65

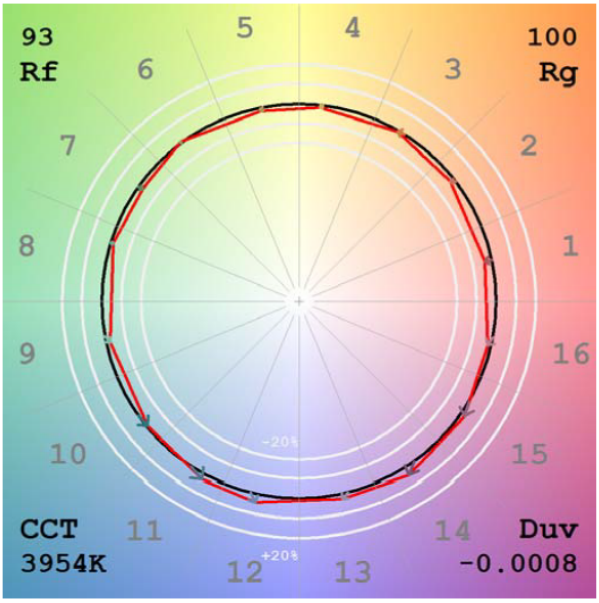
Spectral Power Distribution & Chromaticity Diagram

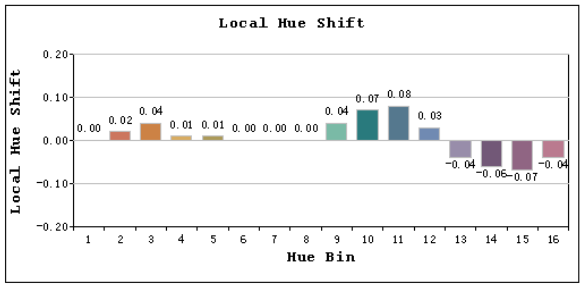


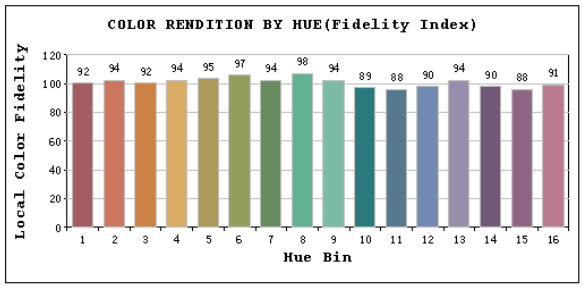
TM30

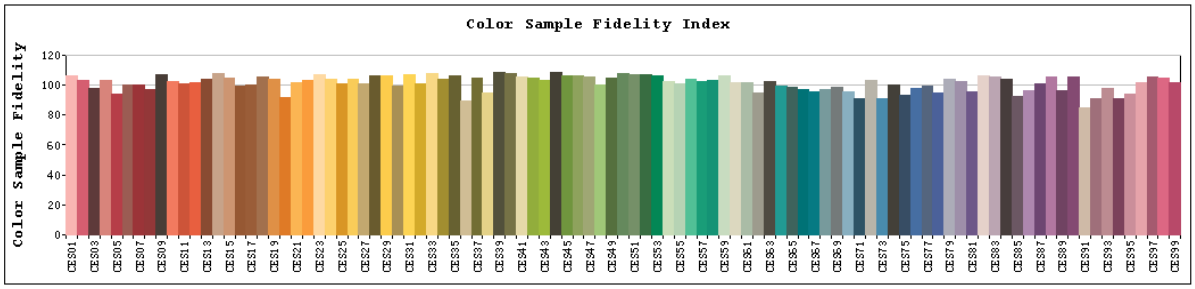

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
CCT: 3954 K
u': 0.2264
Rg: 100
Duv: -0.0008
v': 0.5014
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
100
Rg
CCT
3954K
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

2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2024-06-26	**Test Ambient:**	25.1 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CRVFAD-14R/MVS/EM	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150010	120.0	60	0.181	21.50	0.989

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5003
Duv	0.0031
Chromaticity (x, y)	x=0.3456 y=0.3582
Chromaticity (u', v')	u'=0.2092 v'=0.4879
Color Rendering Index (CRI)	92.1
R9	61
Rg	99
Rf	91
Rcs,h1%	-6

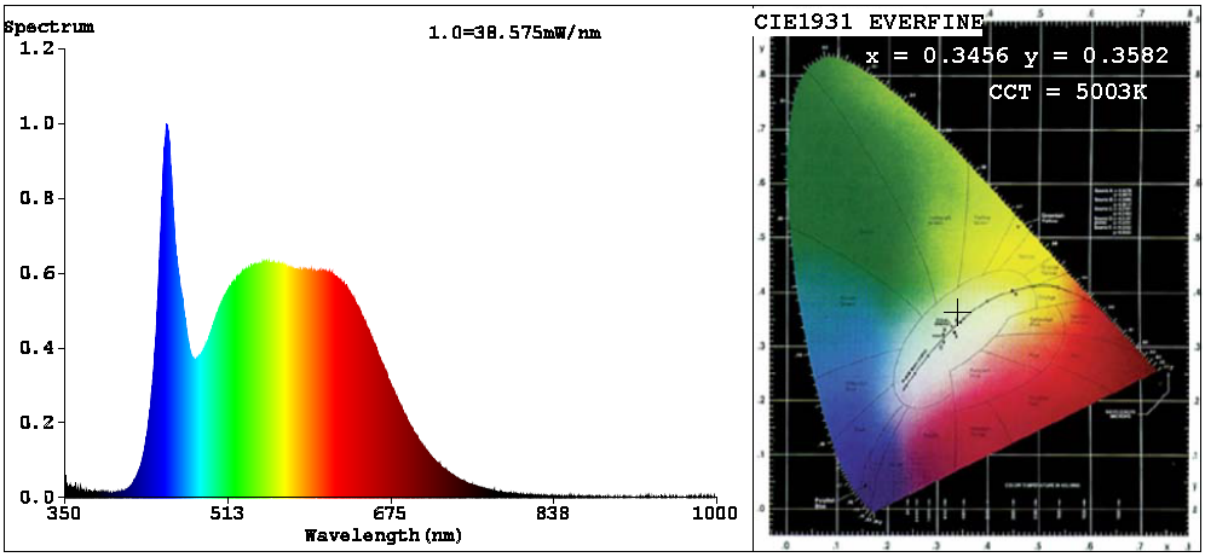
Special Color Rendering Indices			
R1	92	R9	61
R2	94	R10	86
R3	95	R11	92
R4	92	R12	73
R5	92	R13	93
R6	91	R14	97
R7	94	R15	90
R8	86	--	--

Photometric Measurement – Goniophotometer Method:

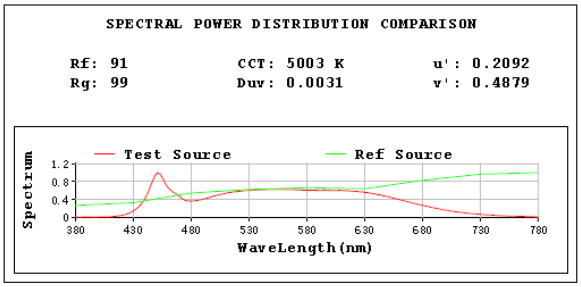
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1604.0
Luminous Efficacy (lm/W)	74.60

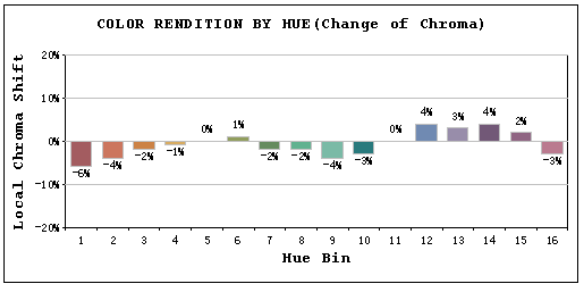
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1612.0
Luminous Efficacy (lm/W)	72.88

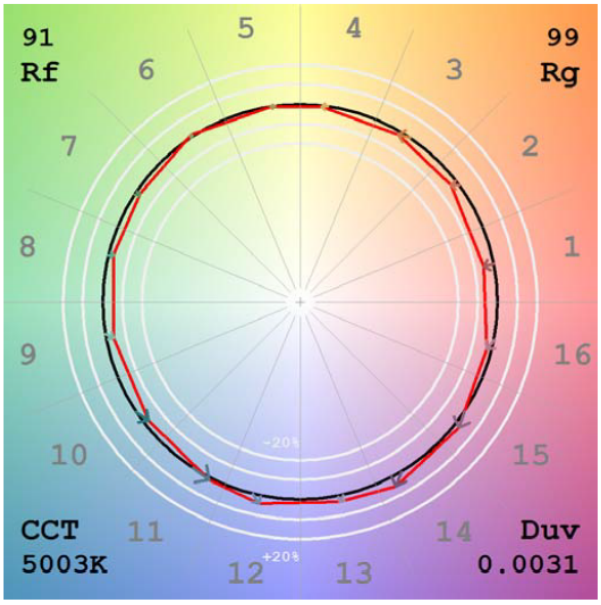
Spectral Power Distribution & Chromaticity Diagram

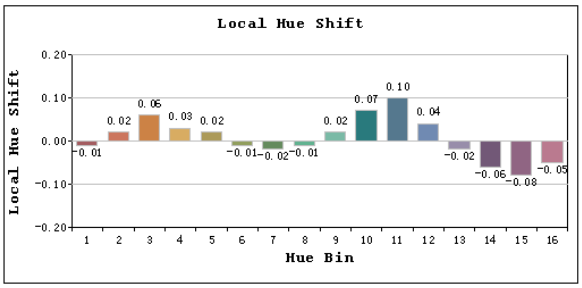


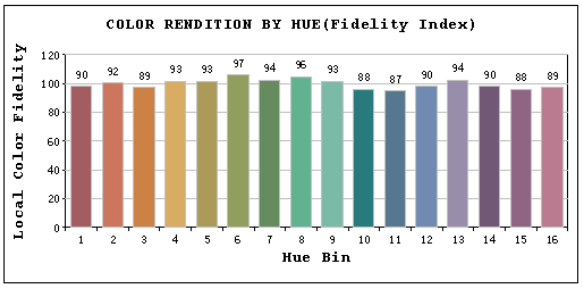
TM30

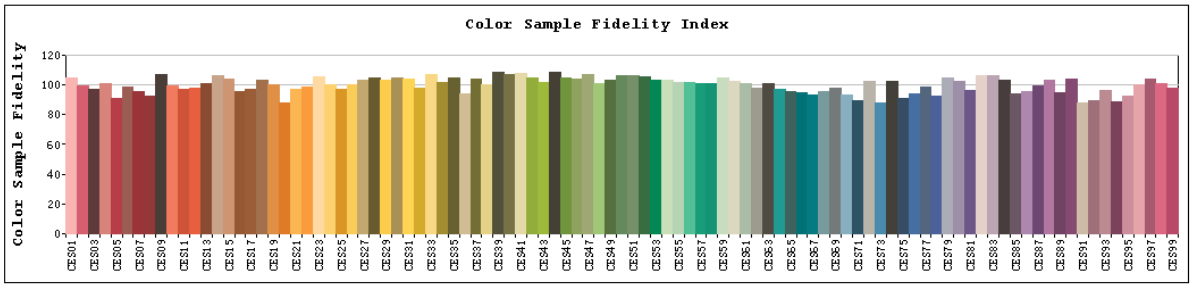

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 91
Rg: 99
CCT: 5003 K
Duv: 0.0031
u': 0.2092
v': 0.4879
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


91
Rf
99
Rg
CCT
5003K
Duv
0.0031

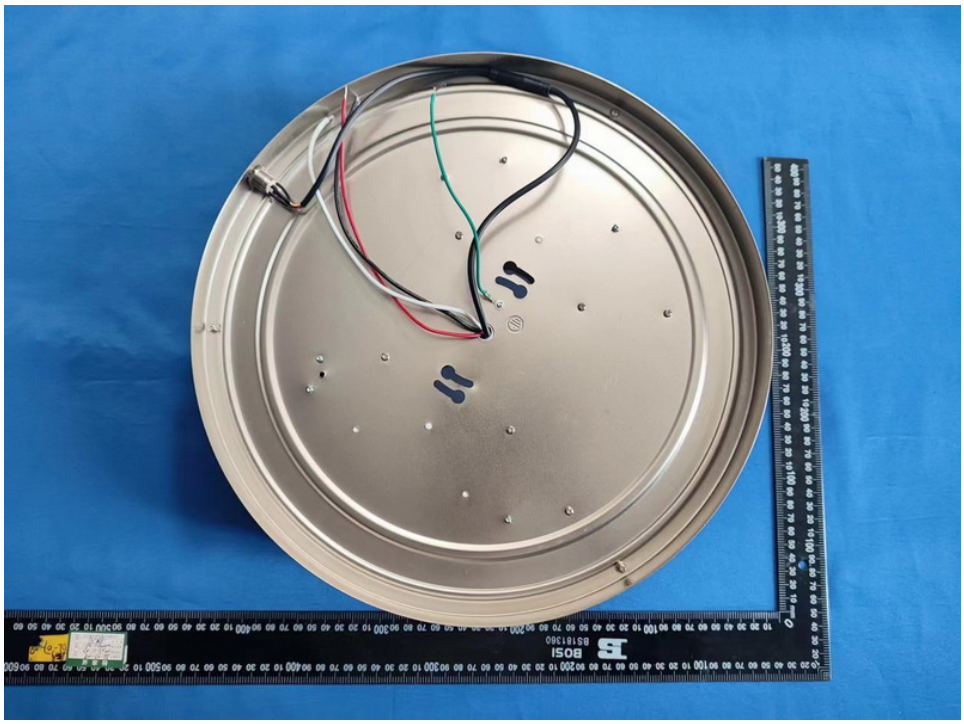

Local Hue Shift
Local Hue Shift
Hue Bin

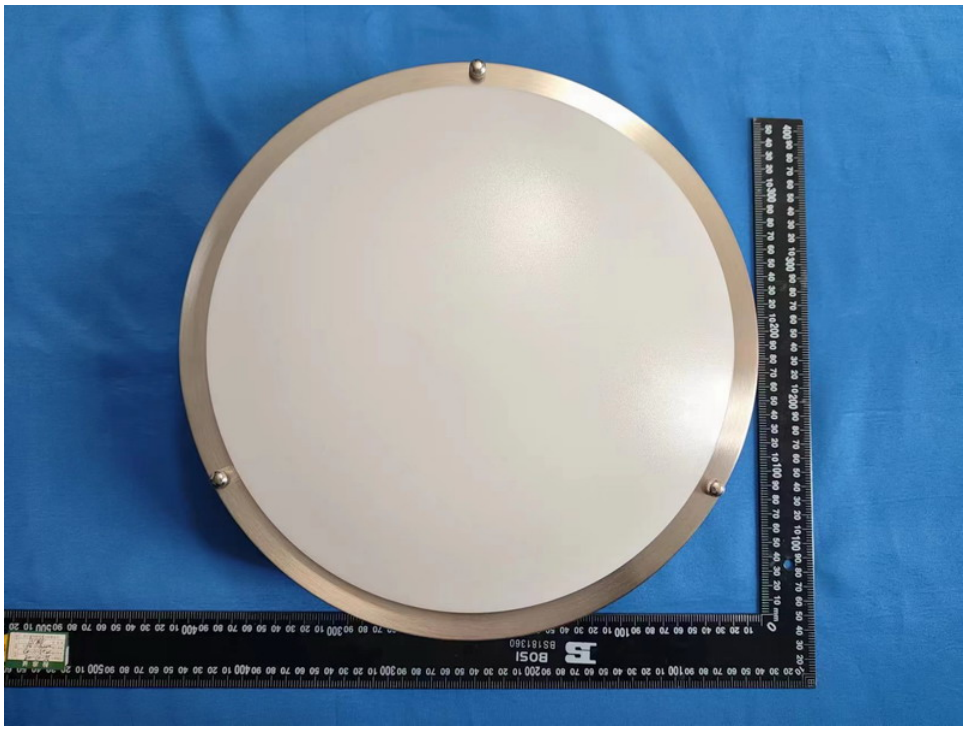

COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
CRVFAD-14R/MVS/EM	2700K setting	120	1435.1	21.50	66.75
		277	1440.0	22.28	64.63
	3000K setting	120	1593.2	21.30	74.80
		277	1599.0	22.06	72.48
	3500K setting	120	1677.5	20.80	80.65
		277	1690.0	21.62	78.17
	4000K setting	120	1689.4	21.10	80.07
		277	1699.0	21.88	77.65
	5000K setting	120	1604.0	21.50	74.60
		277	1612.0	22.12	72.88

3. Product Photo





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