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): CRVFAS-11R/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	21.0W
Rated Initial Lamp Lumen	1150lm（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	CRVFAS-11R/MVS/EM	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150011	120.0	60	0.149	17.60	0.983

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2758
Duv	0.0002
Chromaticity (x, y)	x=0.4555 y=0.4101
Chromaticity (u', v')	u'=0.2599 v'=0.5265
Color Rendering Index (CRI)	94.5
R9	60
Rg	99
Rf	93
Rcs,h1%	-5

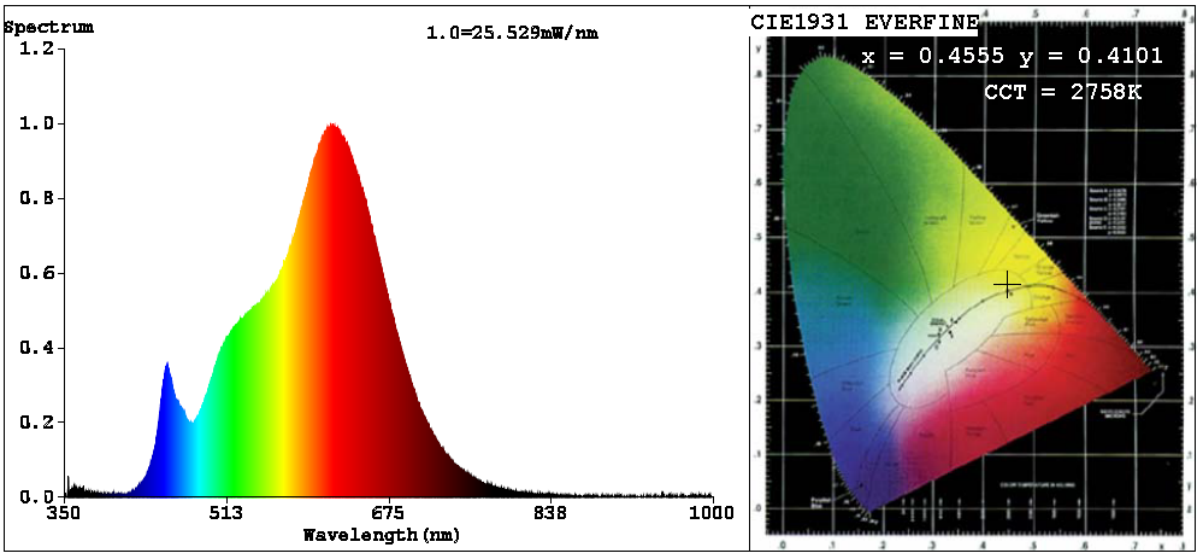
Special Color Rendering Indices			
R1	96	R9	60
R2	99	R10	98
R3	98	R11	99
R4	97	R12	90
R5	97	R13	98
R6	97	R14	99
R7	91	R15	90
R8	81	--	--

Photometric Measurement – Goniophotometer Method:

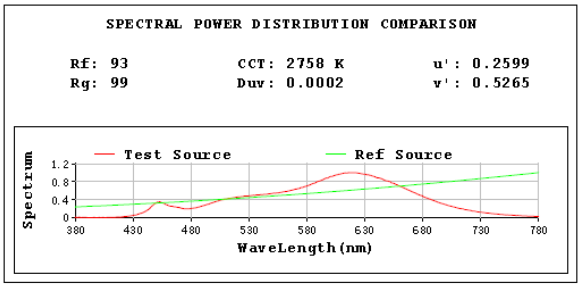
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1160.6
Luminous Efficacy (lm/W)	65.94
Beam Angle (°)	122.5
Center Beam Candle Power (cd)	322.5

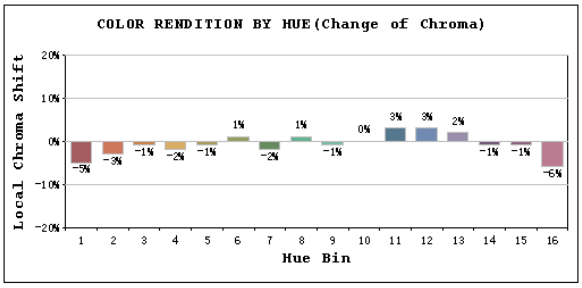
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1162.0
Luminous Efficacy (lm/W)	63.81

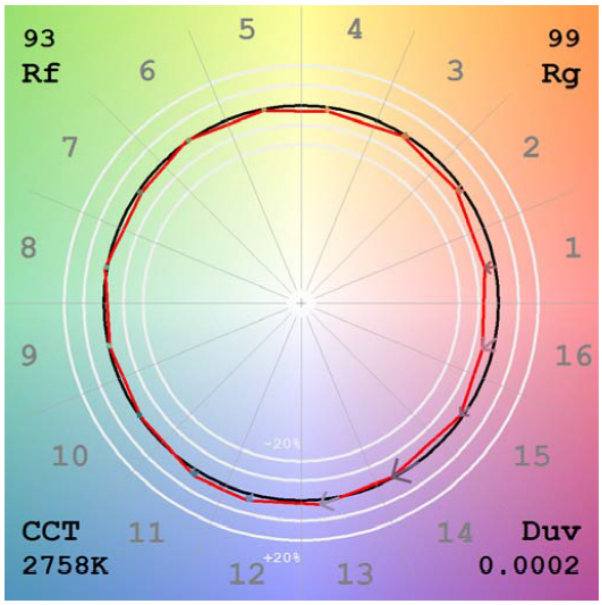
Spectral Power Distribution & Chromaticity Diagram

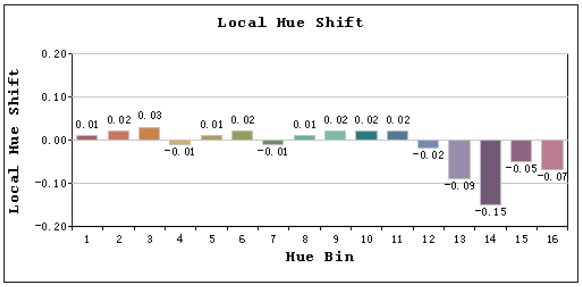


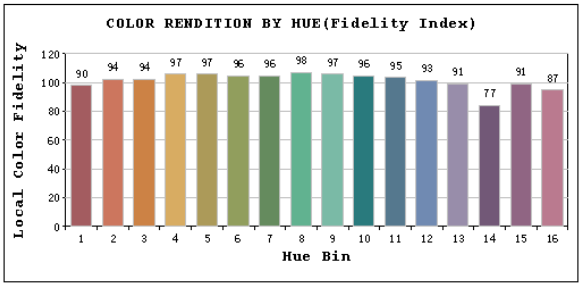
TM30

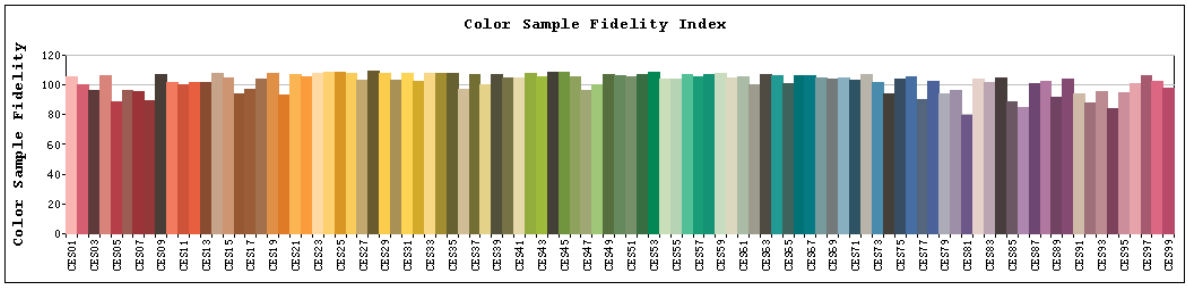

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 99
CCT: 2758 K
Duv: 0.0002
u': 0.2599
v': 0.5265
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
99
Rg
CCT
2758K
Duv
0.0002


Local Hue Shift
Local Hue Shift
Hue Bin


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

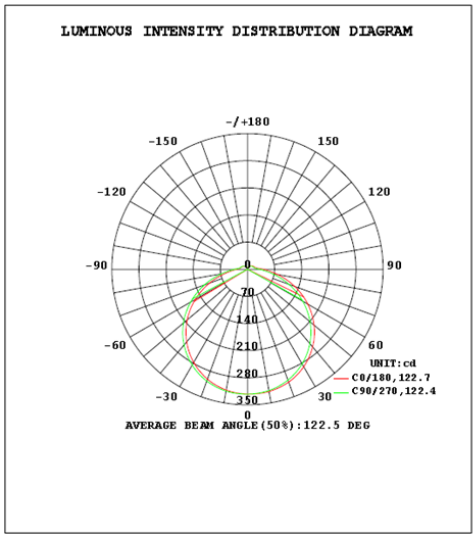

Color Sample Fidelity Index
Color Sample Fidelity

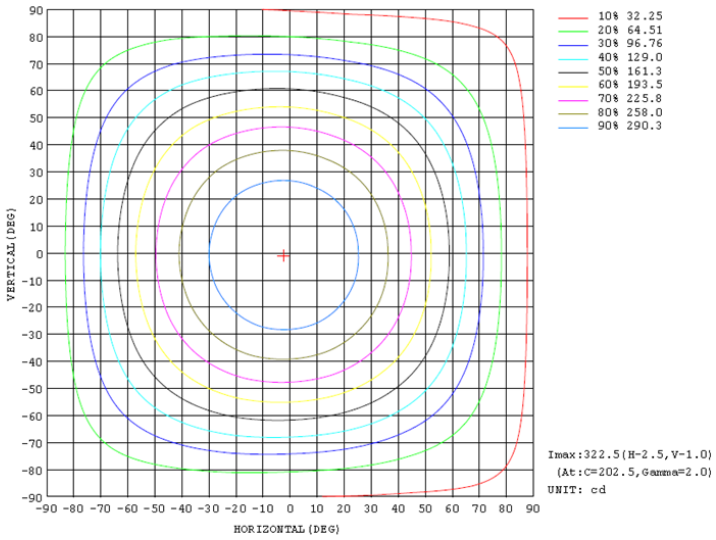
Zonal Lumen Tabulation

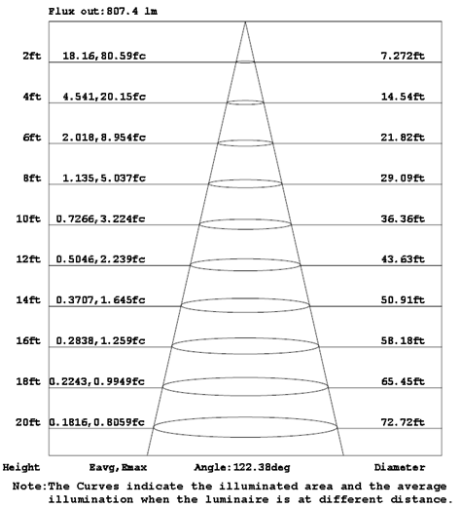
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	255.7	22.0%
0-40	424.4	36.6%
0-60	776.3	66.9%
60-90	289.5	24.9%
70-100	175.9	15.2%
90-120	63.2	5.4%
0-90	1065.8	91.8%
90-180	94.8	8.2%
0-180	1160.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	30.6	2.6%	90-100	27.2	2.3%
10-20	88.5	7.6%	100-110	19.8	1.7%
20-30	136.6	11.8%	110-120	16.2	1.4%
30-40	168.7	14.5%	120-130	12.5	1.1%
40-50	180.8	15.6%	130-140	8.8	0.8%
50-60	171.1	14.7%	140-150	5.6	0.5%
60-70	140.8	12.1%	150-160	3.1	0.3%
70-80	96.2	8.3%	160-170	1.3	0.1%
80-90	52.5	4.5%	170-180	0.4	0.0%

Photometric Data







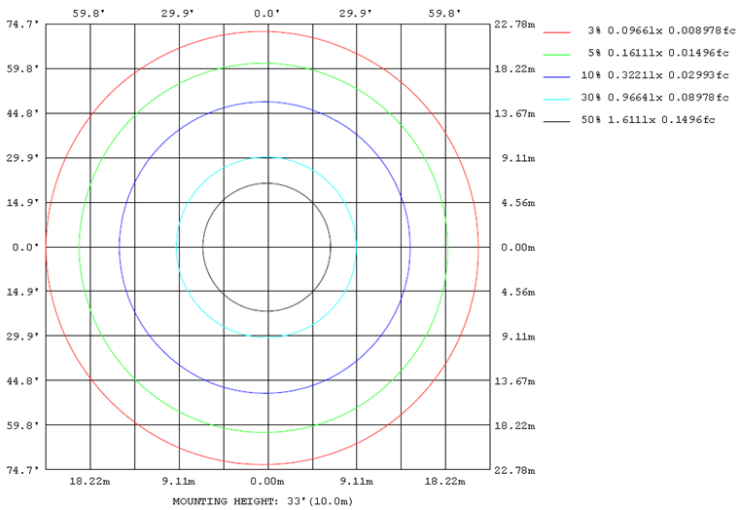


Table--1 UNIT: cd

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	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
5	320	321	321	321	322	322	322	322	322	322	322	321	321	321	320	321
10	317	317	318	319	319	320	320	320	320	320	319	318	318	317	317	317
15	310	312	312	313	314	315	316	316	316	316	315	313	312	311	311	310
20	302	303	304	306	307	309	309	310	310	309	308	306	304	303	302	302
25	291	293	294	296	298	299	300	301	301	300	299	296	294	292	291	291
30	278	280	281	284	286	288	289	290	290	289	287	284	282	279	278	278
35	262	265	267	269	271	274	275	276	277	276	274	270	267	264	263	262
40	245	247	249	253	255	258	259	261	262	260	258	254	250	247	246	245
45	225	228	230	234	237	240	242	243	244	242	240	235	232	228	226	225
50	203	206	209	213	216	220	222	224	224	222	220	215	211	207	205	204
55	180	183	186	191	194	198	200	202	203	201	198	193	188	184	182	180
60	156	159	162	166	170	174	176	179	180	178	174	169	164	159	157	156
65	130	133	136	141	145	149	151	154	155	153	150	144	139	134	132	130
70	104	107	110	115	119	123	126	128	130	127	124	118	113	108	106	104
75	78.9	82.1	84.8	89.2	92.6	97.2	99.7	102	104	102	98.5	92.7	87.9	82.8	80.7	79.1
80	56.7	59.4	61.5	65.4	68.2	72.3	74.7	77.3	78.9	76.8	73.9	68.5	64.2	59.7	57.9	56.7
85	39.3	41.4	43.0	45.7	47.8	51.0	53.1	55.4	56.9	55.2	52.8	48.3	44.8	41.3	40.0	39.2
90	27.6	29.1	30.1	31.7	32.9	35.1	36.7	38.5	39.7	38.8	37.0	33.7	31.0	28.6	27.7	27.3
95	21.4	22.5	23.1	23.7	23.9	25.1	26.0	27.4	28.3	27.9	26.8	24.6	22.8	21.2	20.6	20.7
100	19.3	20.1	20.4	20.3	20.0	20.2	20.7	21.5	22.1	22.1	21.5	20.3	19.0	18.1	18.0	18.4
105	18.1	18.9	19.2	19.0	18.7	18.7	18.9	19.4	19.9	20.1	19.7	18.7	17.7	17.0	16.9	17.3
110	16.9	17.7	17.9	17.8	17.5	17.5	17.8	18.2	18.7	18.9	18.5	17.6	16.6	15.9	15.8	16.2
115	15.7	16.4	16.6	16.6	16.3	16.3	16.6	17.1	17.5	17.7	17.3	16.4	15.6	14.9	14.7	15.1
120	14.5	15.1	15.3	15.3	15.1	15.1	15.4	15.8	16.3	16.4	16.1	15.3	14.4	13.8	13.6	13.9
125	13.2	13.8	14.0	14.0	13.8	13.9	14.1	14.6	15.0	15.1	14.8	14.1	13.3	12.7	12.5	12.7
130	12.0	12.5	12.7	12.7	12.5	12.6	12.9	13.3	13.7	13.9	13.6	12.9	12.2	11.6	11.4	11.5
135	10.7	11.2	11.3	11.3	11.2	11.4	11.6	12.1	12.4	12.5	12.3	11.6	11.0	10.4	10.2	10.4
140	9.46	9.83	9.98	10.0	9.95	10.1	10.4	10.8	11.1	11.2	11.0	10.4	9.83	9.29	9.10	9.17
145	8.23	8.53	8.67	8.70	8.69	8.88	9.13	9.50	9.80	9.88	9.72	9.21	8.68	8.20	7.98	8.01
150	7.05	7.28	7.40	7.46	7.46	7.66	7.92	8.25	8.51	8.60	8.46	8.03	7.58	7.15	6.91	6.90
155	5.92	6.09	6.22	6.27	6.33	6.50	6.75	7.04	7.29	7.35	7.26	6.90	6.51	6.14	5.91	5.84
160	4.91	5.03	5.12	5.19	5.27	5.41	5.68	5.91	6.13	6.19	6.11	5.85	5.54	5.21	4.99	4.90
165	4.08	4.14	4.21	4.25	4.38	4.50	4.73	4.91	5.09	5.15	5.10	4.91	4.69	4.42	4.21	4.08
170	3.55	3.54	3.56	3.63	3.68	3.79	3.96	4.09	4.21	4.26	4.21	4.10	3.96	3.84	3.68	3.58
175	3.51	3.49	3.50	3.50	3.47	3.52	3.57	3.57	3.62	3.66	3.64	3.64	3.61	3.64	3.64	3.60
180	3.57	3.57	3.60	3.64	3.64	3.63	3.61	3.59	3.57	3.57	3.60	3.64	3.64	3.62	3.61	3.60

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	CRVFAS-11R/MVS/EM	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150011	120.0	60	0.147	17.40	0.983

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3129
Duv	-0.0026
Chromaticity (x, y)	x=0.4246 y=0.3932
Chromaticity (u', v')	u'=0.2472 v'=0.5152
Color Rendering Index (CRI)	95.6
R9	71
Rg	101
Rf	93
Rcs,h1%	-4

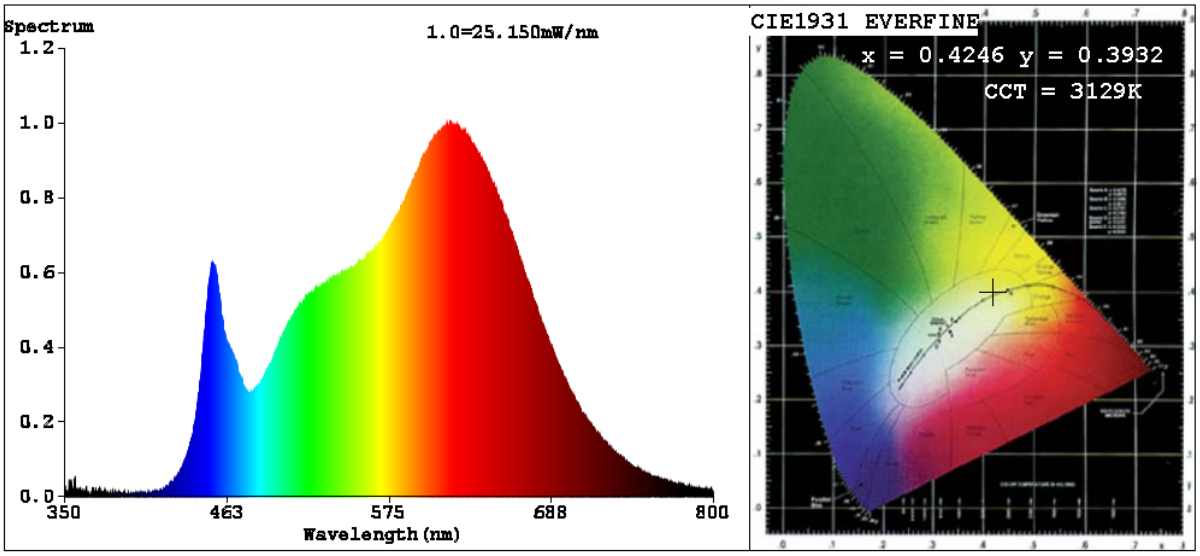
Special Color Rendering Indices			
R1	98	R9	71
R2	99	R10	99
R3	98	R11	98
R4	98	R12	85
R5	98	R13	99
R6	95	R14	100
R7	92	R15	94
R8	86	--	--

Photometric Measurement – Goniophotometer Method:

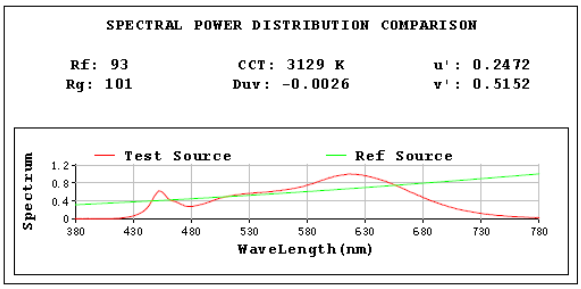
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1258.1
Luminous Efficacy (lm/W)	72.31

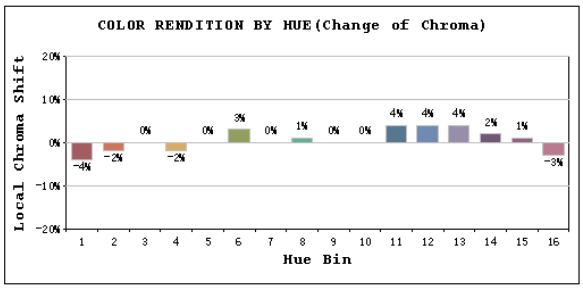
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1259.0
Luminous Efficacy (lm/W)	70.14

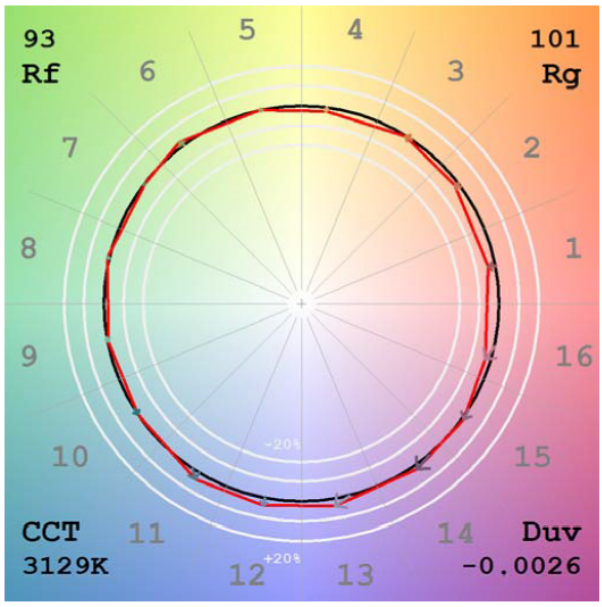
Spectral Power Distribution & Chromaticity Diagram

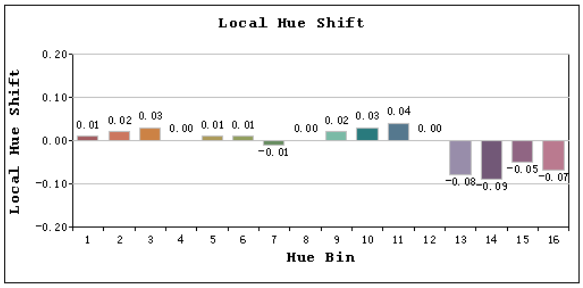


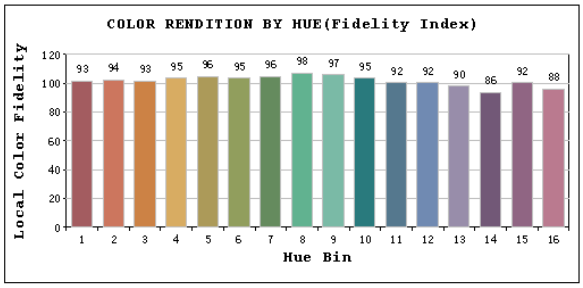
TM30

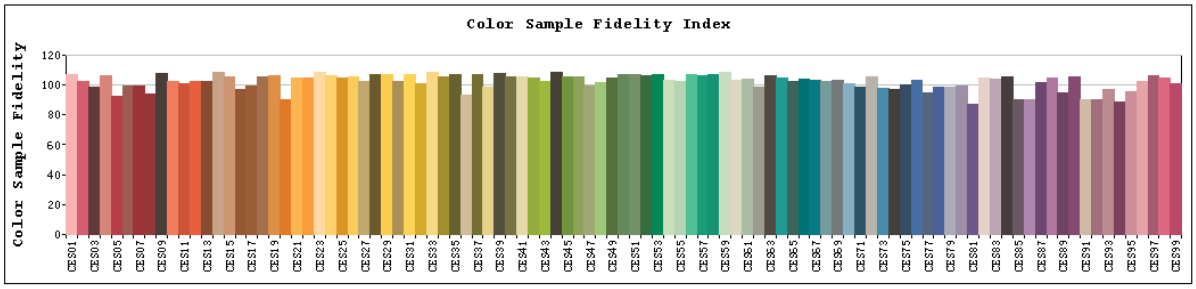

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
Rg: 101
CCT: 3129 K
Duv: -0.0026
u': 0.2472
v': 0.5152
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
101
Rg
CCT
3129K
Duv
-0.0026


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	CRVFAS-11R/MVS/EM	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150011	120.0	60	0.144	17.00	0.983

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3559
Duv	-0.0033
Chromaticity (x, y)	x=0.3988 y=0.3801
Chromaticity (u', v')	u'=0.2359 v'=0.5058
Color Rendering Index (CRI)	96.5
R9	78
Rg	101
Rf	94
Rcs,h1%	-3

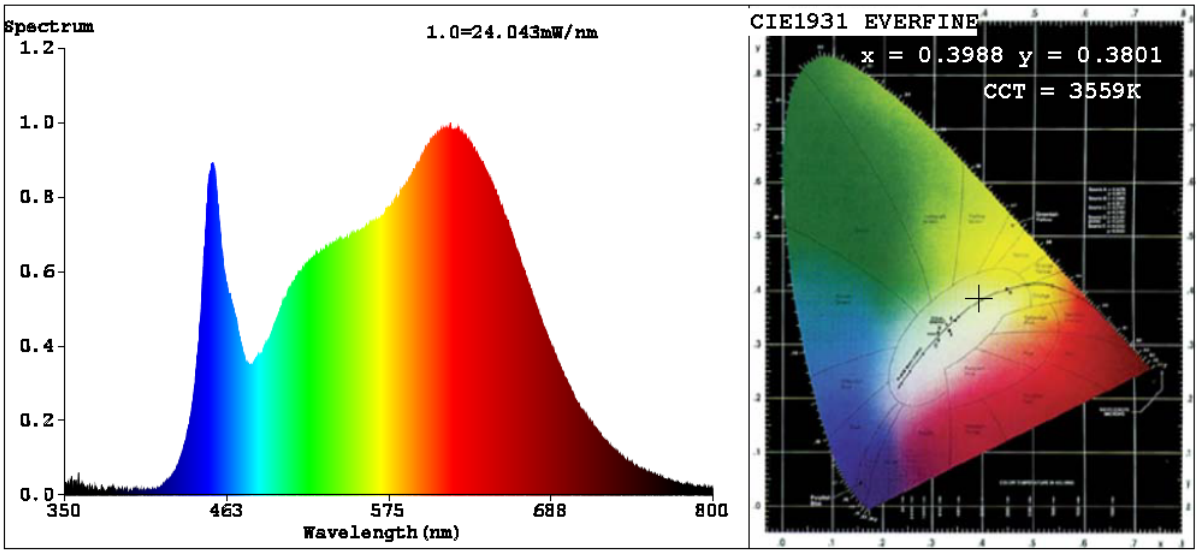
Special Color Rendering Indices			
R1	98	R9	78
R2	99	R10	99
R3	99	R11	97
R4	98	R12	81
R5	98	R13	99
R6	96	R14	99
R7	94	R15	97
R8	90	--	--

Photometric Measurement – Goniophotometer Method:

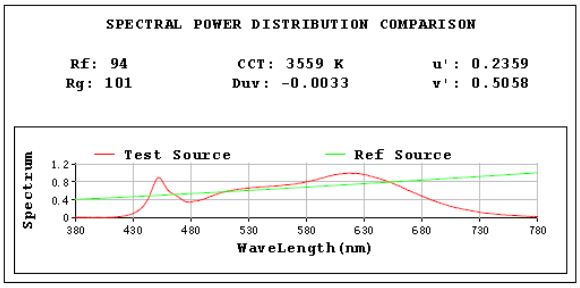
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1305.4
Luminous Efficacy (lm/W)	76.79

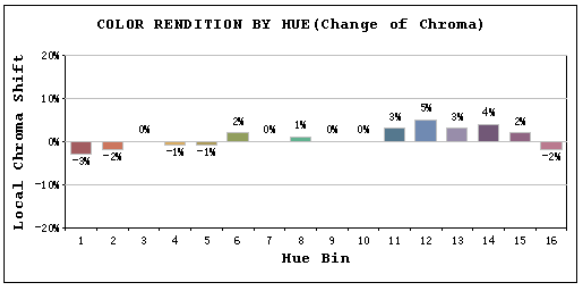
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1301.0
Luminous Efficacy (lm/W)	74.13

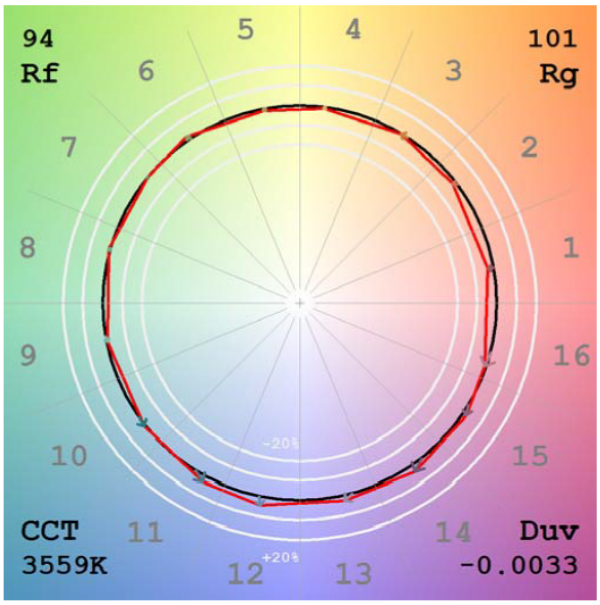
Spectral Power Distribution & Chromaticity Diagram

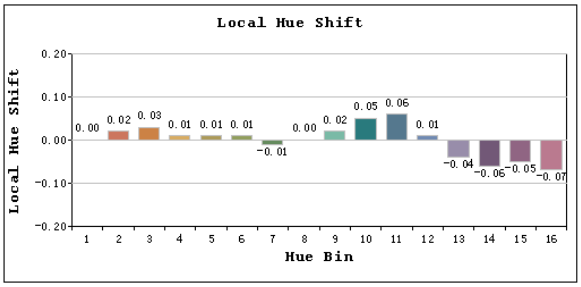


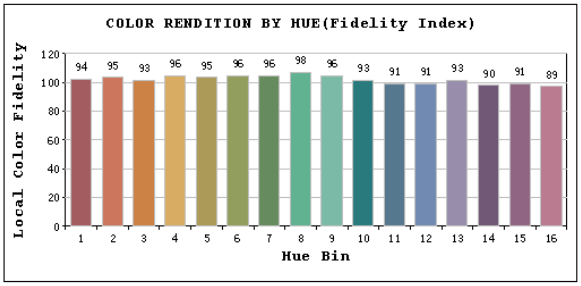
TM30

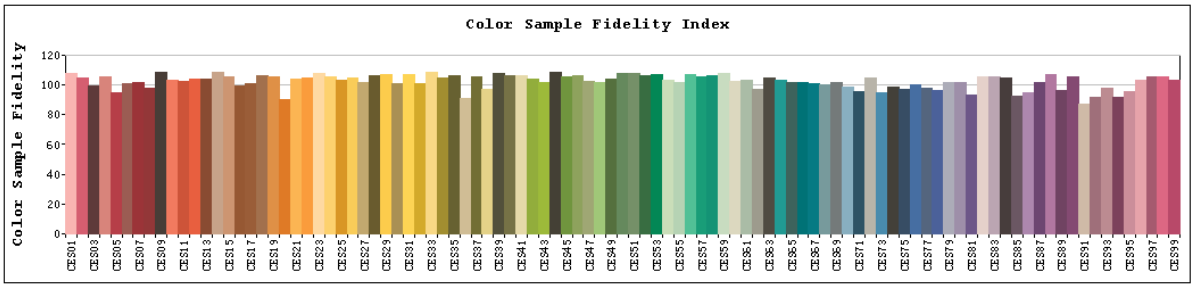

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 94
Rg: 101
CCT: 3559 K
Duv: -0.0033
u': 0.2359
v': 0.5058
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


94
Rf
101
Rg
CCT
3559K
Duv
-0.0033


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	CRVFAS-11R/MVS/EM	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150011	120.0	60	0.146	17.20	0.984

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3929
Duv	-0.0025
Chromaticity (x, y)	x=0.3818 y=0.3723
Chromaticity (u', v')	u'=0.2278 v'=0.4998
Color Rendering Index (CRI)	96.4
R9	89
Rg	101
Rf	93
Rcs,h1%	-3

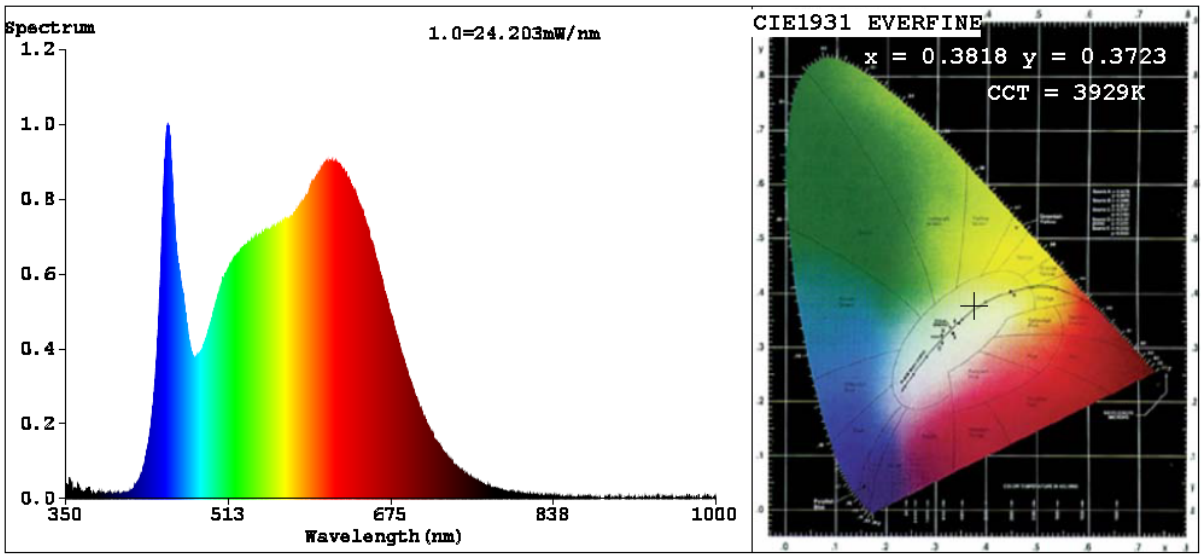
Special Color Rendering Indices			
R1	98	R9	80
R2	99	R10	96
R3	98	R11	97
R4	97	R12	78
R5	97	R13	99
R6	96	R14	98
R7	95	R15	96
R8	91	--	--

Photometric Measurement – Goniophotometer Method:

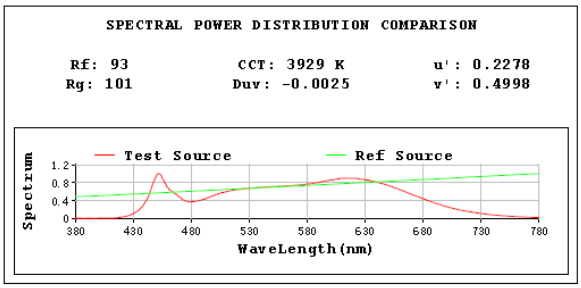
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1308.1
Luminous Efficacy (lm/W)	76.05

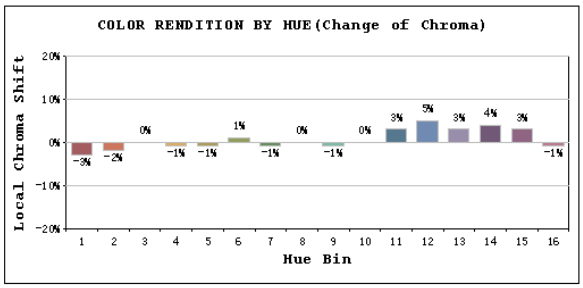
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1306.0
Luminous Efficacy (lm/W)	73.58

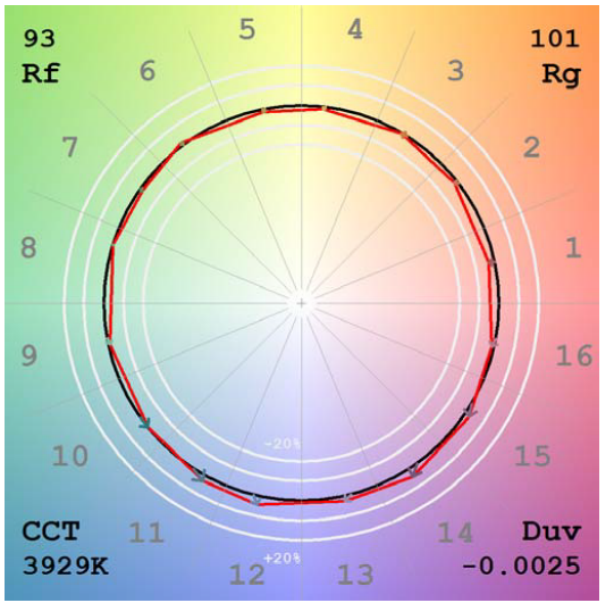
Spectral Power Distribution & Chromaticity Diagram

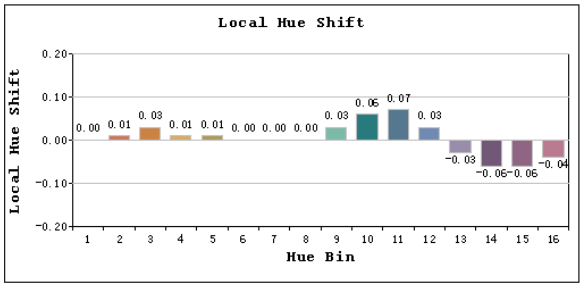


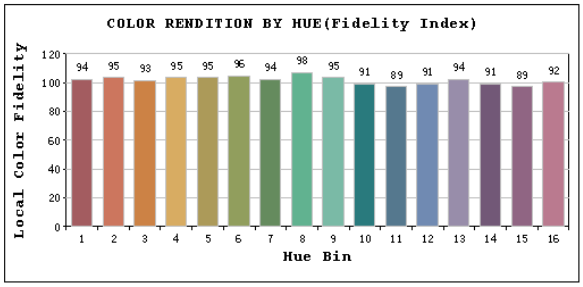
TM30

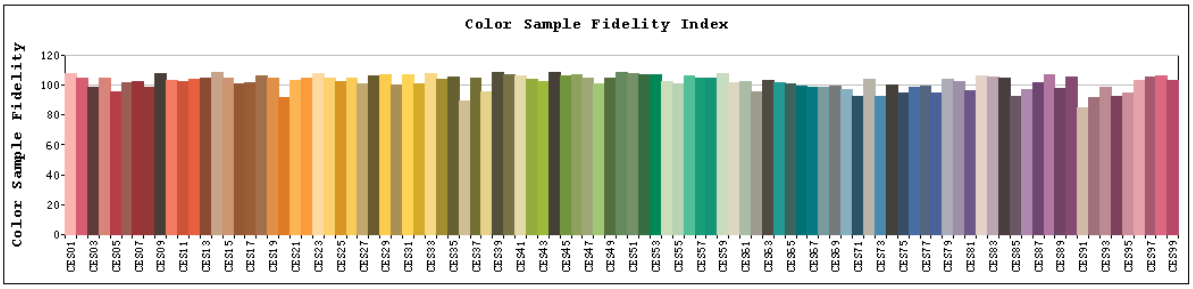

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
CCT: 3929 K
u': 0.2278
Rg: 101
Duv: -0.0025
v': 0.4998
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
101
Rg
CCT
3929K
Duv
-0.0025


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	CRVFAS-11R/MVS/EM	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150011	120.0	60	0.148	17.50	0.984

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5013
Duv	0.0019
Chromaticity (x, y)	x=0.3451 y=0.3554
Chromaticity (u', v')	u'=0.2100 v'=0.4865
Color Rendering Index (CRI)	93.4
R9	70
Rg	100
Rf	92
Rcs,h1%	-4

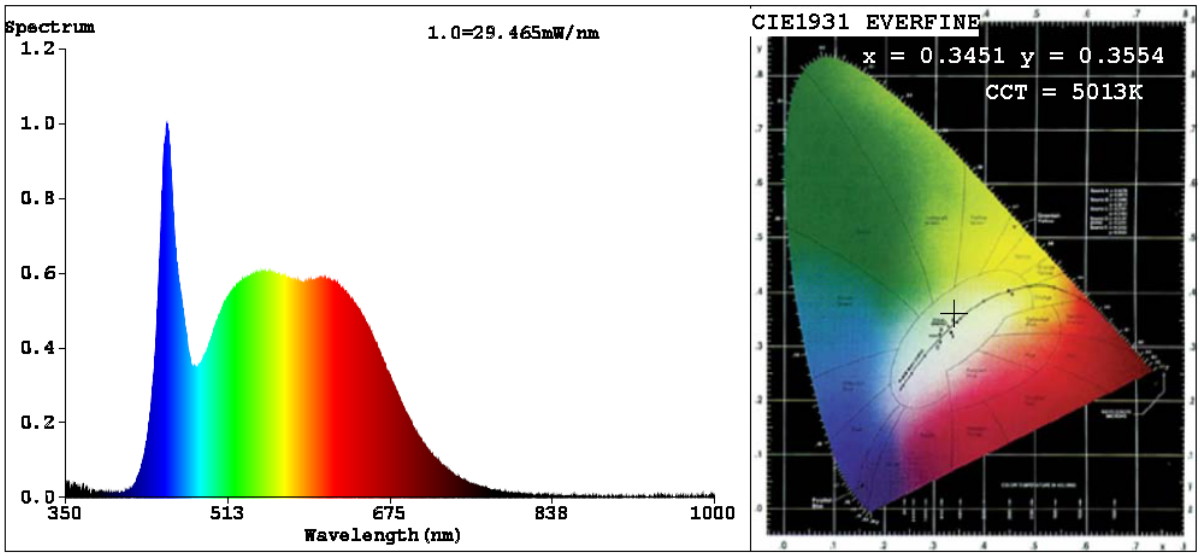
Special Color Rendering Indices			
R1	94	R9	70
R2	95	R10	87
R3	95	R11	94
R4	94	R12	74
R5	93	R13	94
R6	92	R14	97
R7	95	R15	92
R8	89	--	--

Photometric Measurement – Goniophotometer Method:

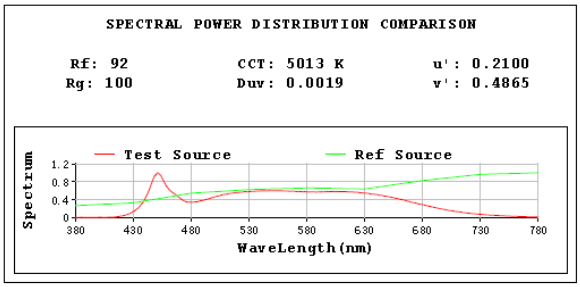
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1235.3
Luminous Efficacy (lm/W)	70.59

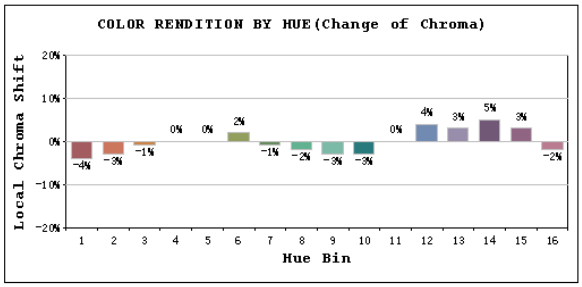
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1231.0
Luminous Efficacy (lm/W)	68.29

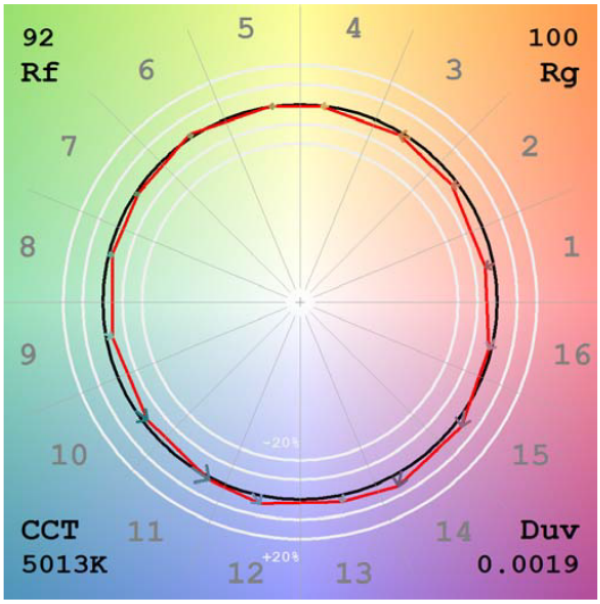
Spectral Power Distribution & Chromaticity Diagram

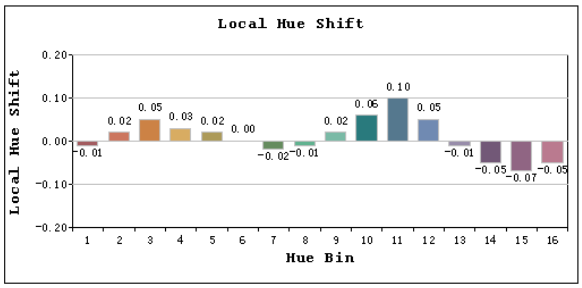


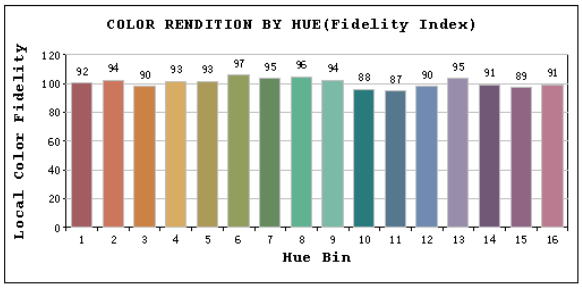
TM30

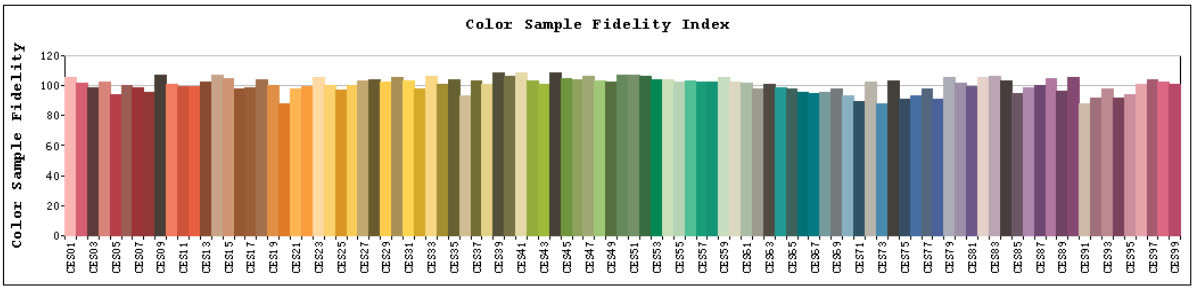

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 92
Rg: 100
CCT: 5013 K
Duv: 0.0019
u': 0.2100
v': 0.4865
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


92
Rf
100
Rg
CCT
5013K
Duv
0.0019

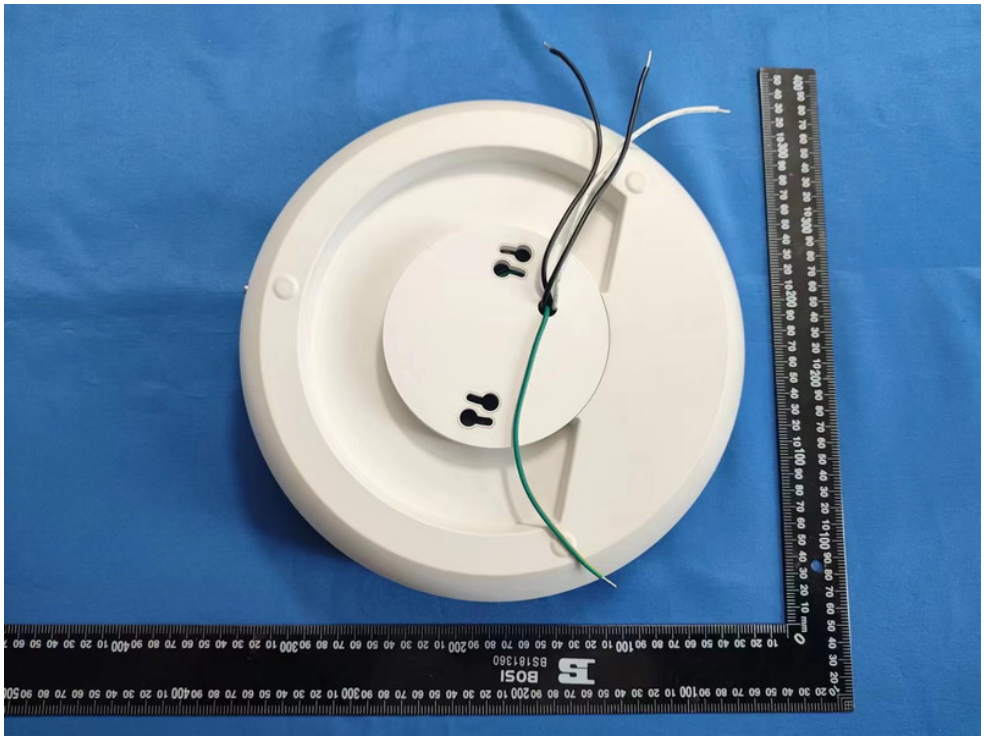

Local Hue Shift
Local Hue Shift
Hue Bin

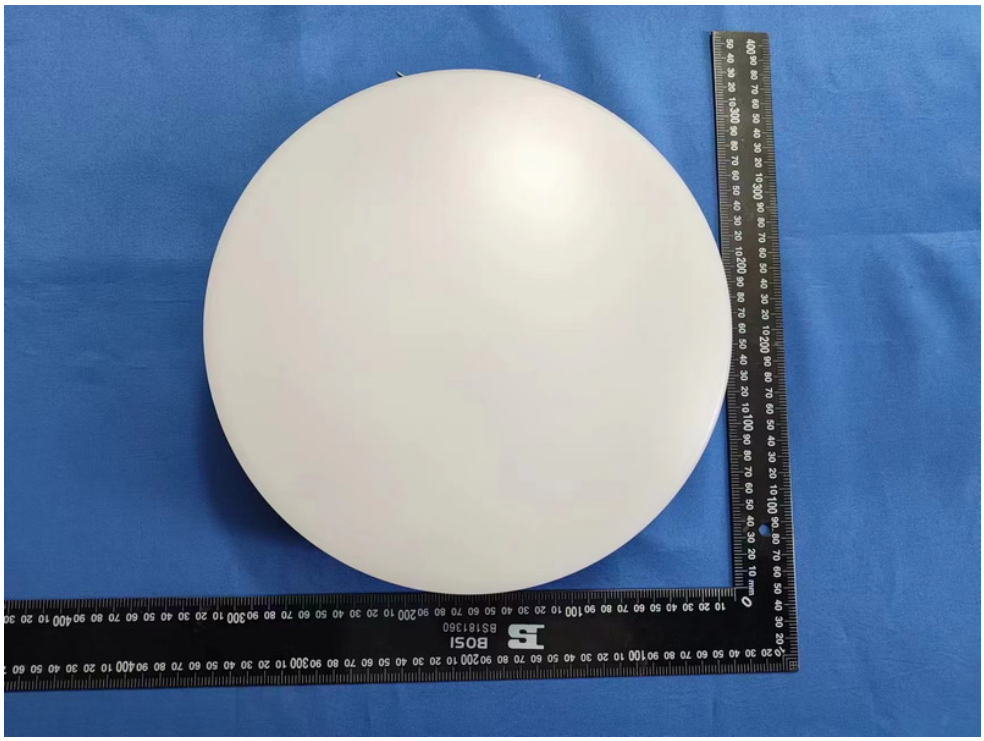

COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
CRVFAS-11R/MVS/EM	2700K setting	120	1160.6	17.60	65.94
		277	1162.0	18.21	63.81
	3000K setting	120	1258.1	17.40	72.31
		277	1259.0	17.95	70.14
	3500K setting	120	1305.4	17.00	76.79
		277	1301.0	17.55	74.13
	4000K setting	120	1308.1	17.20	76.05
		277	1306.0	17.75	73.58
	5000K setting	120	1235.3	17.50	70.59
		277	1232.0	18.04	68.29

3. Product Photo





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