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-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	CRVFAS-14R/MVS/EM	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150012	120.0	60	0.181	21.50	0.990

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2773
Duv	0.0000
Chromaticity (x, y)	x=0.4540 y=0.4091
Chromaticity (u', v')	u'=0.2594 v'=0.5259
Color Rendering Index (CRI)	94.7
R9	60
Rg	99
Rf	94
Rcs,h1%	-5

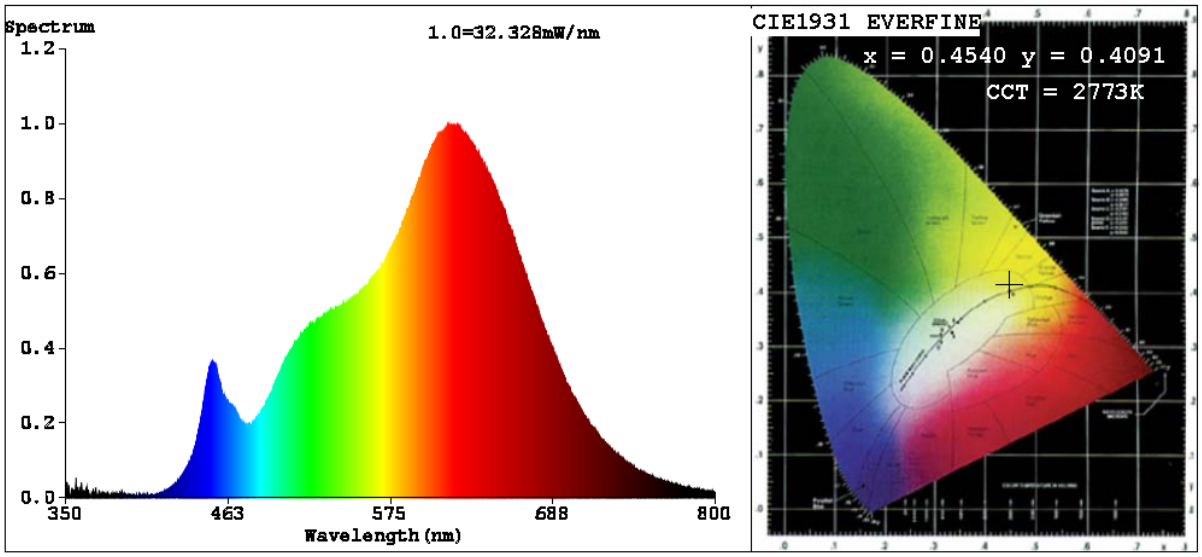
Special Color Rendering Indices			
R1	96	R9	60
R2	99	R10	98
R3	98	R11	98
R4	97	R12	91
R5	97	R13	98
R6	96	R14	99
R7	91	R15	90
R8	82	--	--

Photometric Measurement – Goniophotometer Method:

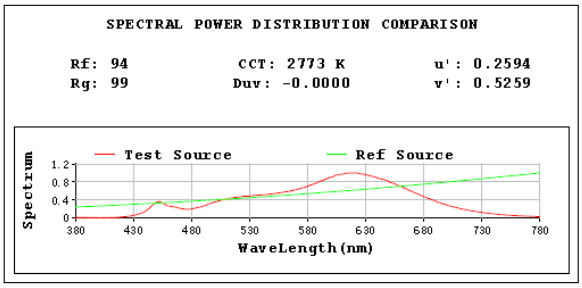
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1449.3
Luminous Efficacy (lm/W)	67.41
Beam Angle (°)	119.6
Center Beam Candle Power (cd)	434.1

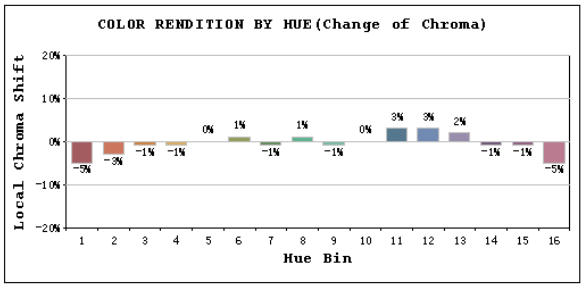
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1452.0
Luminous Efficacy (lm/W)	65.46

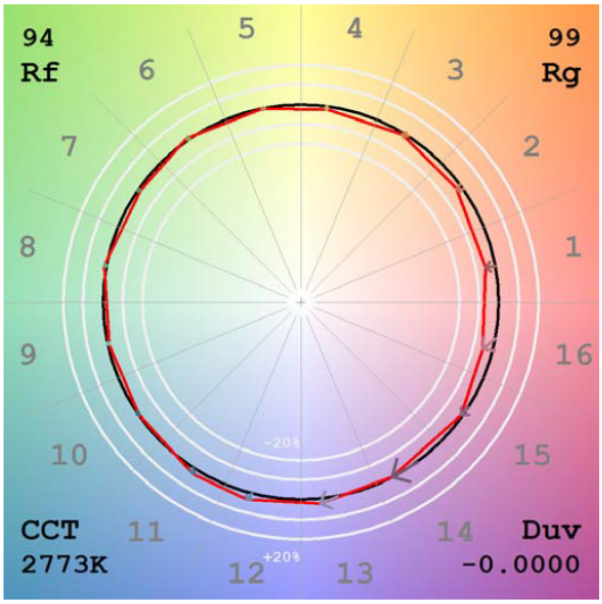
Spectral Power Distribution & Chromaticity Diagram

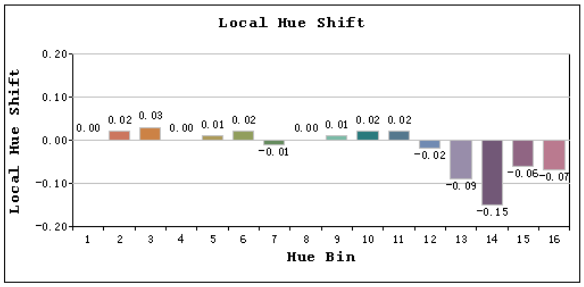


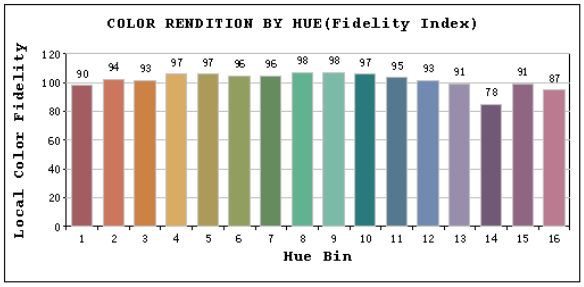
TM30

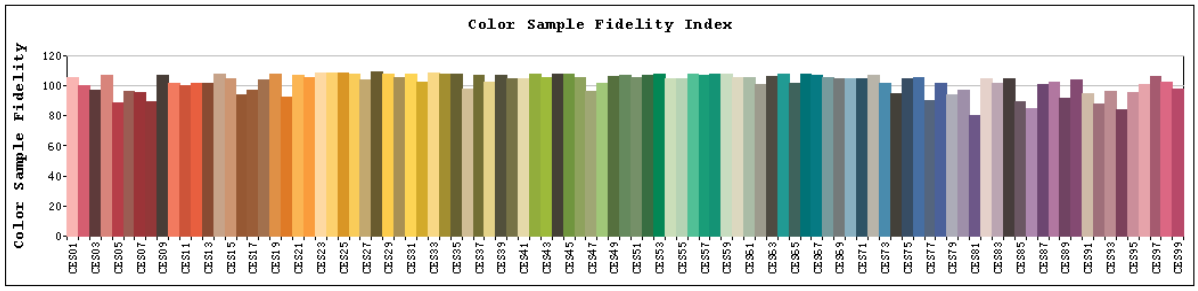

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 94
Rg: 99
CCT: 2773 K
Duv: -0.0000
u': 0.2594
v': 0.5259
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


94
Rf
99
Rg
CCT
2773K
Duv
-0.0000


Local Hue Shift
Local Hue Shift
Hue Bin


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

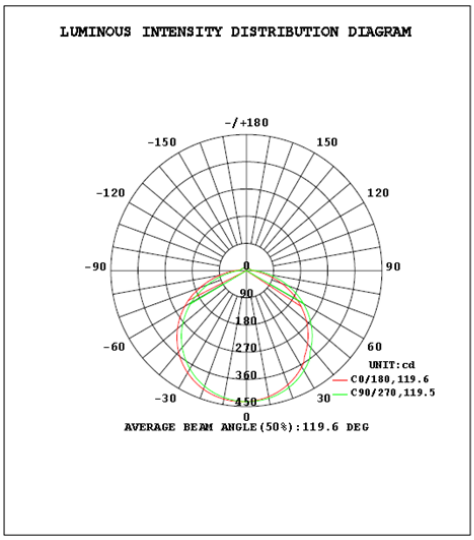

Color Sample Fidelity Index
Color Sample Fidelity

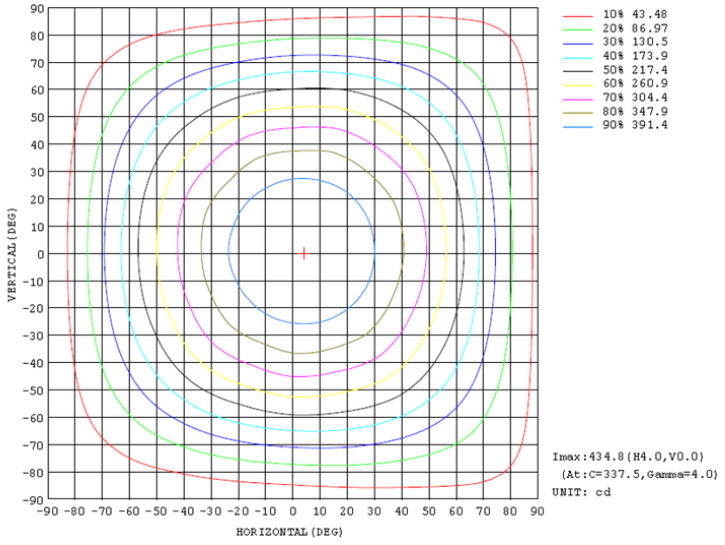
Zonal Lumen Tabulation

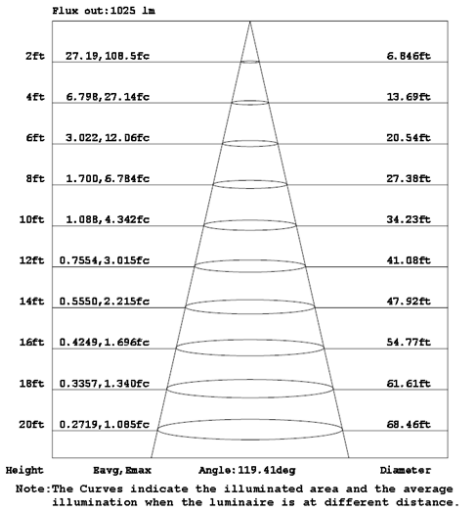
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	342.3	23.6%
0-40	566.1	39.1%
0-60	1025.2	70.7%
60-90	343.1	23.7%
70-100	187.0	12.9%
90-120	51.9	3.6%
0-90	1368.3	94.4%
90-180	81.0	5.6%
0-180	1449.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	41.1	2.8%	90-100	21.6	1.5%
10-20	118.7	8.2%	100-110	16.5	1.1%
20-30	182.5	12.6%	110-120	13.8	1.0%
30-40	223.8	15.4%	120-130	10.9	0.7%
40-50	237.1	16.4%	130-140	8.0	0.5%
50-60	222.0	15.3%	140-150	5.3	0.4%
60-70	177.7	12.3%	150-160	3.1	0.2%
70-80	113.8	7.9%	160-170	1.5	0.1%
80-90	51.6	3.6%	170-180	0.4	0.0%

Photometric Data







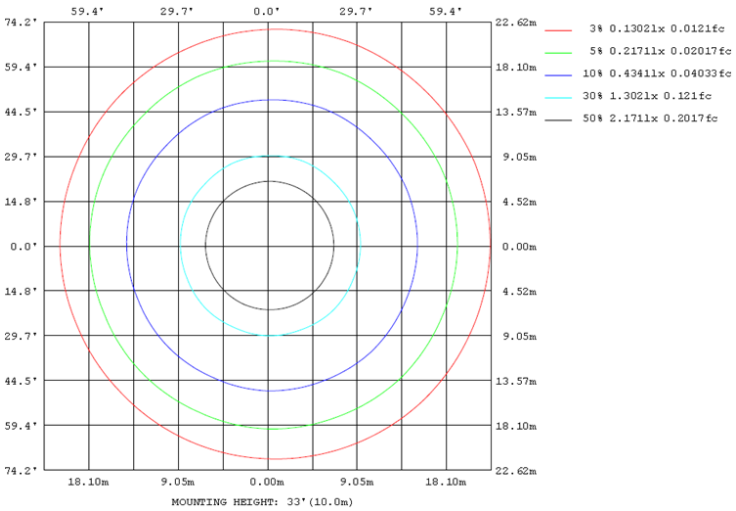


Table--1 UNIT: cd

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	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
5	434	434	433	433	432	431	430	430	430	430	431	432	432	433	434	434
10	432	432	430	428	426	425	424	423	424	424	426	427	429	430	432	432
15	426	426	424	421	419	416	414	413	414	415	417	419	422	424	426	427
20	418	417	414	411	407	405	402	400	402	403	405	408	412	415	418	418
25	406	405	401	398	393	390	386	385	386	388	391	394	398	402	405	407
30	391	390	385	381	375	371	367	366	367	369	373	377	382	386	390	392
35	372	371	366	362	355	344	346	338	340	347	346	356	363	367	372	374
40	351	343	344	333	332	321	321	314	316	323	322	333	334	345	344	352
45	326	319	319	308	306	294	294	287	289	296	296	307	309	320	320	328
50	299	292	291	280	277	266	264	258	260	267	268	278	281	292	293	301
55	269	262	261	250	245	234	232	226	229	235	237	247	251	262	264	271
60	236	230	228	217	212	201	198	193	195	201	204	213	218	229	232	238
65	202	196	193	182	173	166	160	158	160	163	169	175	184	194	197	204
70	162	160	153	147	138	131	124	122	125	127	133	139	148	155	162	164
75	126	124	117	111	102	95.8	89.3	87.5	89.9	92.0	97.7	103	112	119	125	128
80	90.3	88.8	82.6	76.9	69.2	63.6	57.7	56.2	58.1	59.7	64.6	69.7	77.6	83.5	89.9	92.1
85	58.6	57.5	52.7	48.4	42.7	38.5	34.3	32.8	33.9	34.7	38.0	41.6	47.8	52.4	57.8	59.8
90	35.2	34.8	32.0	29.6	26.4	24.0	21.5	20.4	20.3	20.4	21.6	23.4	26.8	29.9	33.5	35.4
95	22.8	23.1	22.0	21.0	19.8	18.7	17.4	16.6	16.1	15.6	15.3	15.3	16.4	17.8	19.9	21.8
100	18.7	19.5	19.3	18.9	18.3	17.5	16.5	15.7	15.1	14.6	14.0	13.7	13.8	14.4	15.6	17.3
105	17.7	18.4	18.2	17.9	17.4	16.6	15.6	14.9	14.3	13.9	13.4	13.0	13.2	13.7	14.8	16.3
110	16.7	17.4	17.2	16.9	16.4	15.7	14.8	14.1	13.6	13.2	12.7	12.4	12.5	13.0	14.0	15.4
115	15.7	16.3	16.1	15.8	15.4	14.7	13.9	13.3	12.8	12.4	12.0	11.7	11.8	12.2	13.2	14.5
120	14.7	15.2	15.0	14.8	14.3	13.8	13.0	12.5	12.0	11.7	11.3	11.1	11.1	11.5	12.4	13.6
125	13.6	14.1	13.9	13.7	13.3	12.8	12.1	11.6	11.2	10.9	10.6	10.4	10.4	10.7	11.5	12.6
130	12.5	13.0	12.8	12.5	12.2	11.7	11.2	10.7	10.4	10.1	9.89	9.67	9.68	9.99	10.7	11.6
135	11.4	11.8	11.6	11.4	11.1	10.7	10.2	9.84	9.55	9.33	9.13	8.93	8.95	9.20	9.84	10.7
140	10.3	10.6	10.5	10.3	9.98	9.67	9.28	8.95	8.70	8.54	8.38	8.20	8.21	8.42	8.98	9.68
145	9.22	9.49	9.35	9.15	8.91	8.64	8.33	8.06	7.87	7.74	7.63	7.48	7.47	7.66	8.12	8.71
150	8.14	8.38	8.26	8.06	7.85	7.64	7.41	7.20	7.09	7.00	6.89	6.78	6.77	6.90	7.30	7.76
155	7.13	7.31	7.20	7.04	6.86	6.70	6.54	6.39	6.32	6.25	6.18	6.12	6.07	6.21	6.50	6.85
160	6.19	6.30	6.22	6.09	5.97	5.86	5.76	5.67	5.61	5.58	5.55	5.49	5.45	5.56	5.78	6.03
165	5.39	5.43	5.41	5.32	5.24	5.16	5.12	5.08	5.04	5.04	5.00	4.95	4.95	5.01	5.15	5.29
170	4.74	4.79	4.78	4.74	4.73	4.67	4.69	4.68	4.68	4.64	4.59	4.57	4.56	4.61	4.64	4.72
175	4.41	4.47	4.52	4.54	4.57	4.58	4.61	4.64	4.63	4.56	4.45	4.41	4.39	4.40	4.38	4.38
180	4.55	4.57	4.54	4.54	4.53	4.52	4.53	4.53	4.56	4.56	4.55	4.53	4.55	4.54	4.54	4.53

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-14R/MVS/EM	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150012	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)	3097
Duv	-0.0025
Chromaticity (x, y)	x=0.4268 y=0.3943
Chromaticity (u', v')	u'=0.2482 v'=0.5160
Color Rendering Index (CRI)	95.7
R9	71
Rg	101
Rf	94
Rcs,h1%	-4

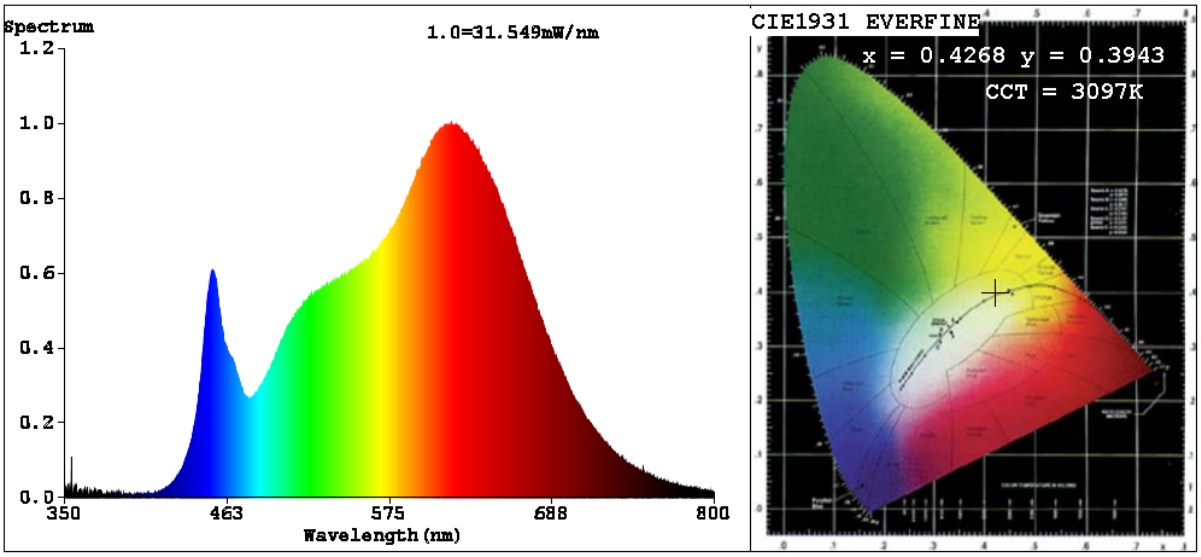
Special Color Rendering Indices			
R1	98	R9	71
R2	99	R10	99
R3	98	R11	97
R4	98	R12	86
R5	98	R13	99
R6	95	R14	100
R7	92	R15	94
R8	86	--	--

Photometric Measurement – Goniophotometer Method:

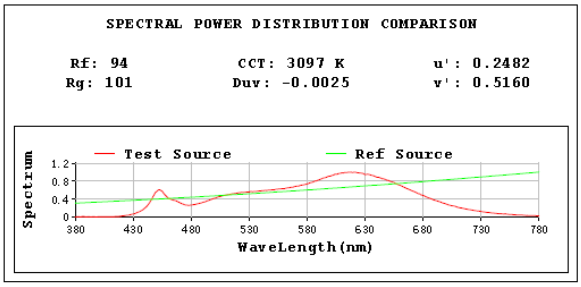
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1554.4
Luminous Efficacy (lm/W)	72.98

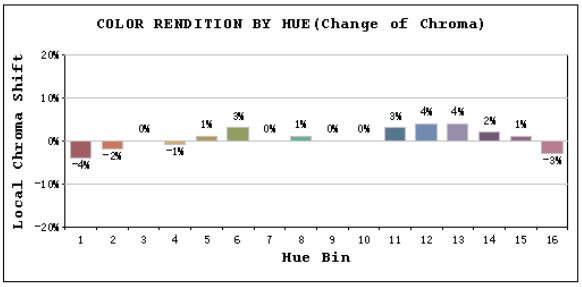
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1553.0
Luminous Efficacy (lm/W)	70.78

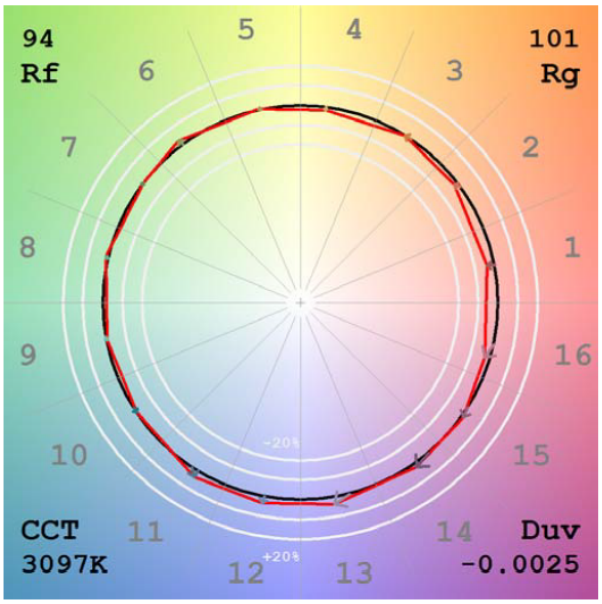
Spectral Power Distribution & Chromaticity Diagram

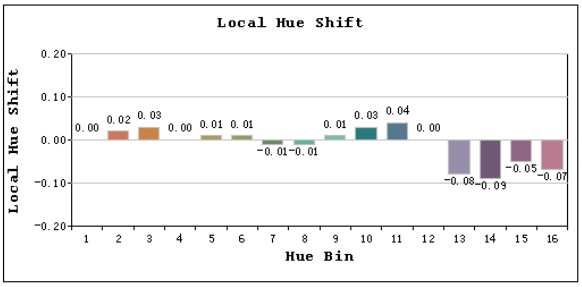


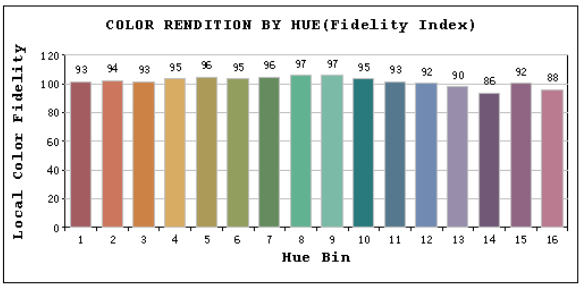
TM30

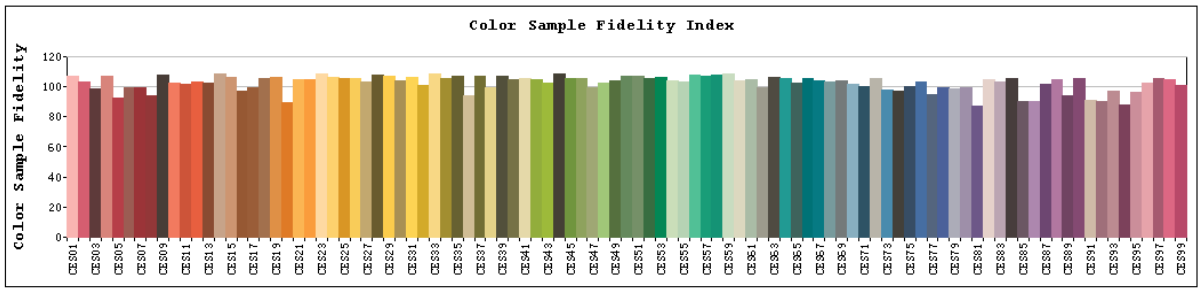

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 94
Rg: 101
CCT: 3097 K
Duv: -0.0025
u': 0.2482
v': 0.5160
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


94
Rf
101
Rg
CCT
3097K
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

2.1.3 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-14R/MVS/EM	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150012	120.0	60	0.176	20.90	0.989

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3586
Duv	-0.0034
Chromaticity (x, y)	x=0.3973 y=0.3790
Chromaticity (u', v')	u'=0.2353 v'=0.5051
Color Rendering Index (CRI)	96.6
R9	79
Rg	101
Rf	94
Rcs,h1%	-3

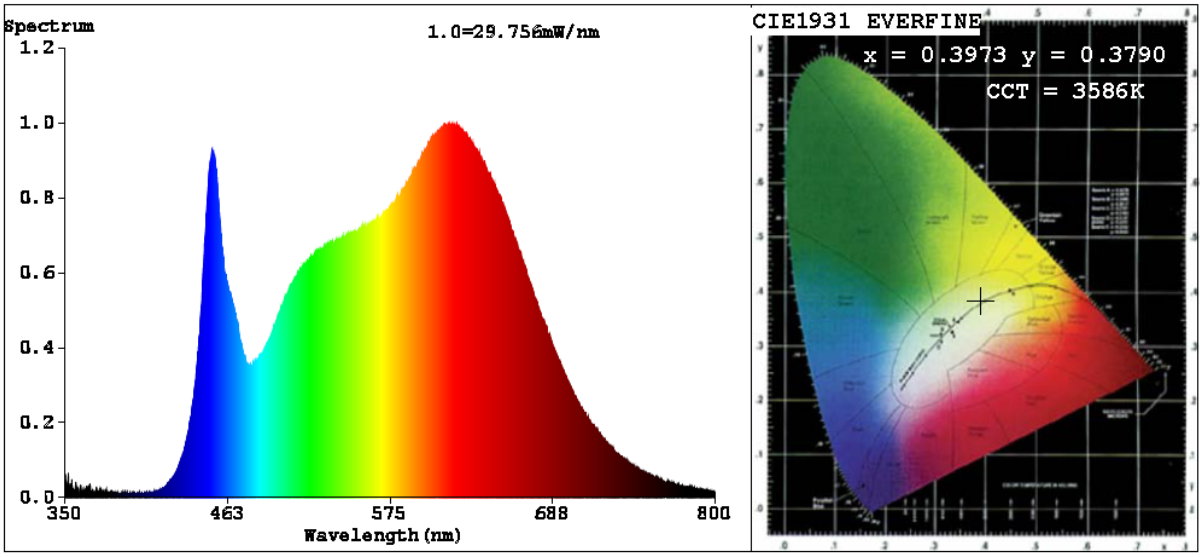
Special Color Rendering Indices			
R1	98	R9	79
R2	99	R10	99
R3	98	R11	97
R4	98	R12	81
R5	98	R13	99
R6	96	R14	99
R7	94	R15	97
R8	90	--	--

Photometric Measurement – Goniophotometer Method:

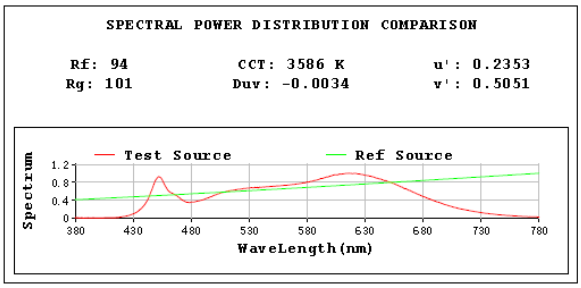
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1607.6
Luminous Efficacy (lm/W)	76.92

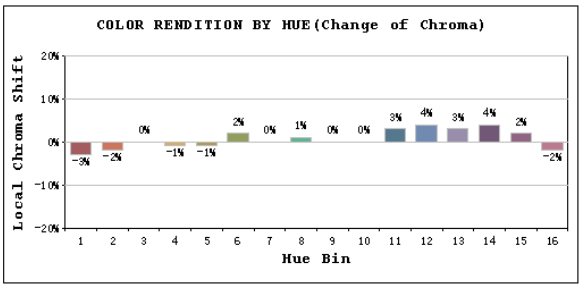
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1613.0
Luminous Efficacy (lm/W)	74.06

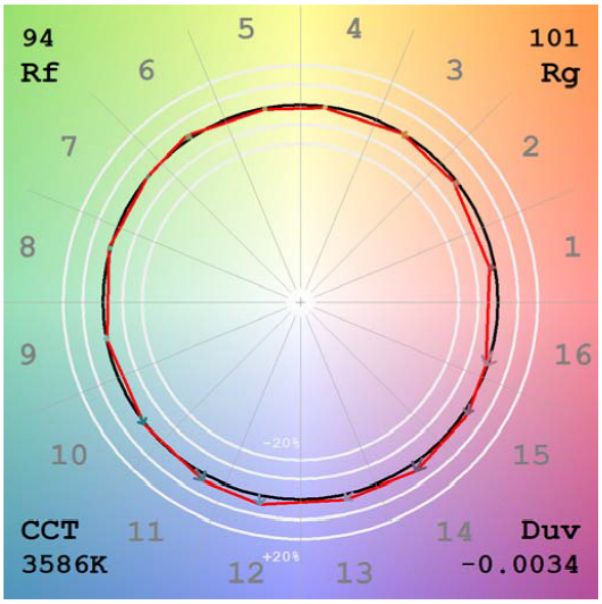
Spectral Power Distribution & Chromaticity Diagram

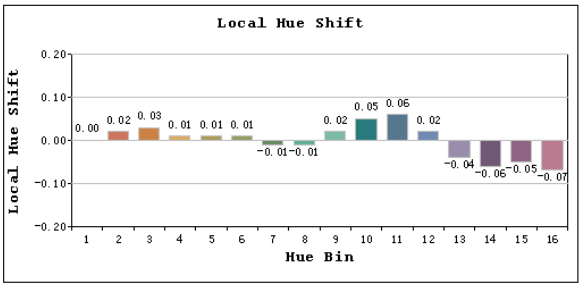


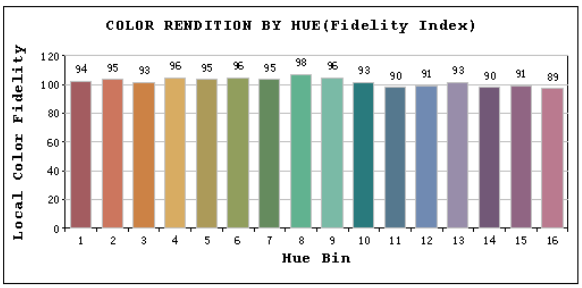
TM30

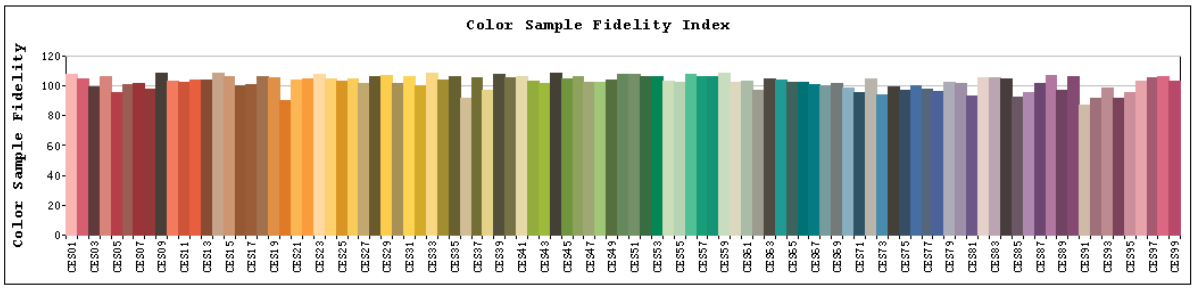

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 94
CCT: 3586 K
u': 0.2353
Rg: 101
Duv: -0.0034
v': 0.5051
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


94
Rf
101
Rg
CCT
3586K
Duv
-0.0034


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-14R/MVS/EM	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150012	120.0	60	0.178	21.20	0.990

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4055
Duv	-0.0026
Chromaticity (x, y)	x=0.3763 y=0.3688
Chromaticity (u', v')	u'=0.2256 v'=0.4974
Color Rendering Index (CRI)	96.5
R9	81
Rg	101
Rf	93
Rcs,h1%	-3

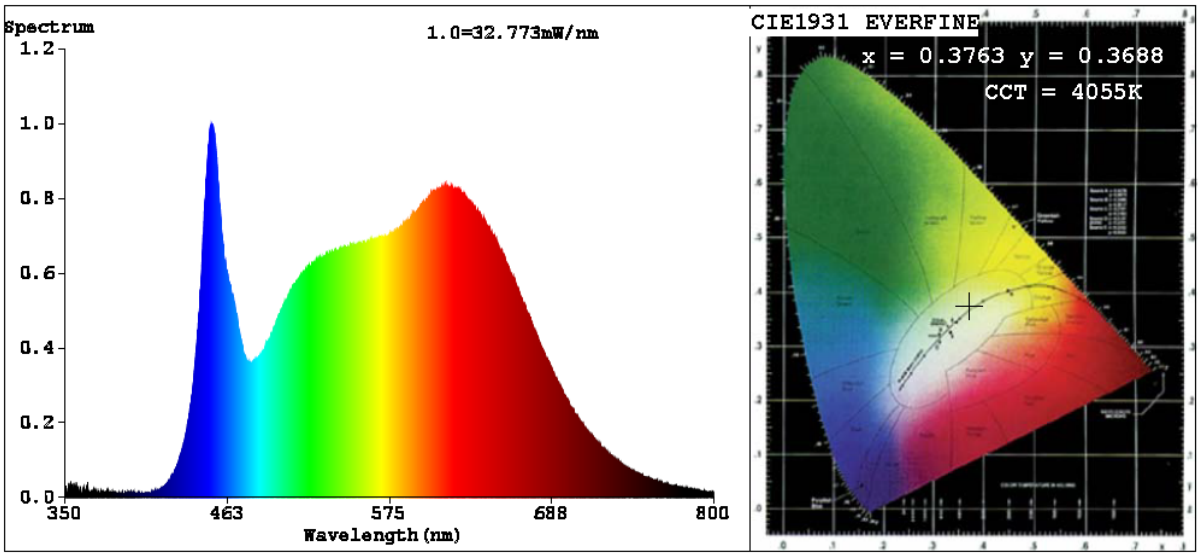
Special Color Rendering Indices			
R1	98	R9	81
R2	99	R10	96
R3	97	R11	97
R4	98	R12	77
R5	97	R13	99
R6	95	R14	98
R7	96	R15	97
R8	92	--	--

Photometric Measurement – Goniophotometer Method:

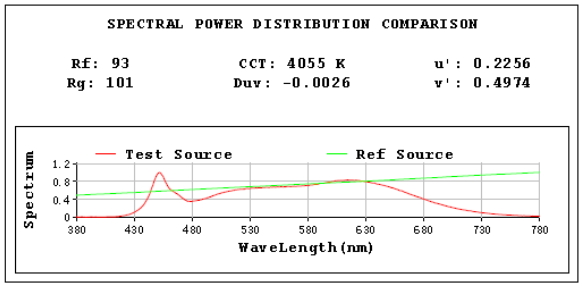
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1609.4
Luminous Efficacy (lm/W)	75.92

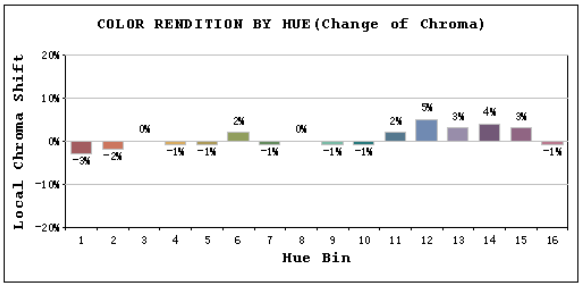
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1611.0
Luminous Efficacy (lm/W)	75.07

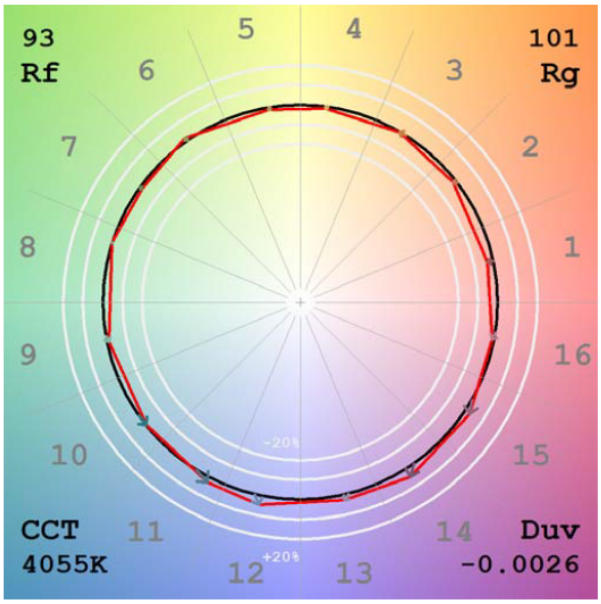
Spectral Power Distribution & Chromaticity Diagram

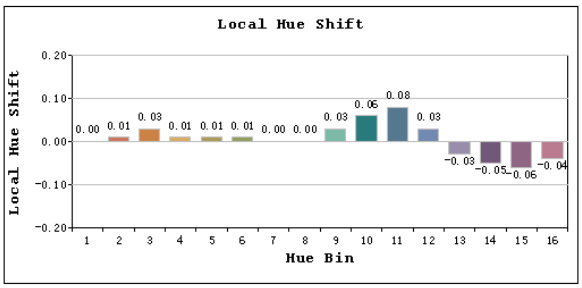


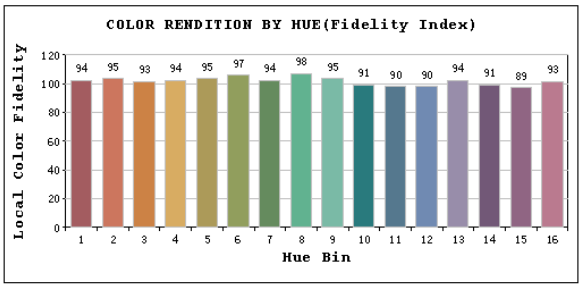
TM30

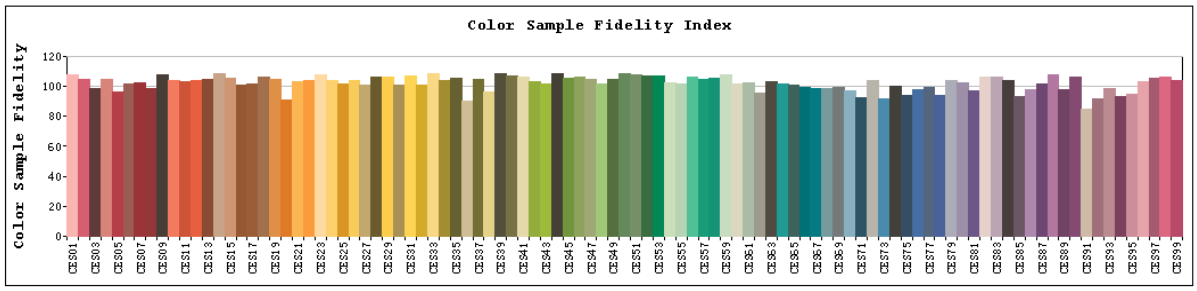

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 93
CCT: 4055 K
u': 0.2256
Rg: 101
Duv: -0.0026
v': 0.4974
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


93
Rf
101
Rg
CCT
4055K
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

2.1.5 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-14R/MVS/EM	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202406150012	120.0	60	0.182	21.60	0.990

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5149
Duv	0.0017
Chromaticity (x, y)	x=0.3413 y=0.3519
Chromaticity (u', v')	u'=0.2087 v'=0.4842
Color Rendering Index (CRI)	93.6
R9	72
Rg	100
Rf	92
Rcs,h1%	-4

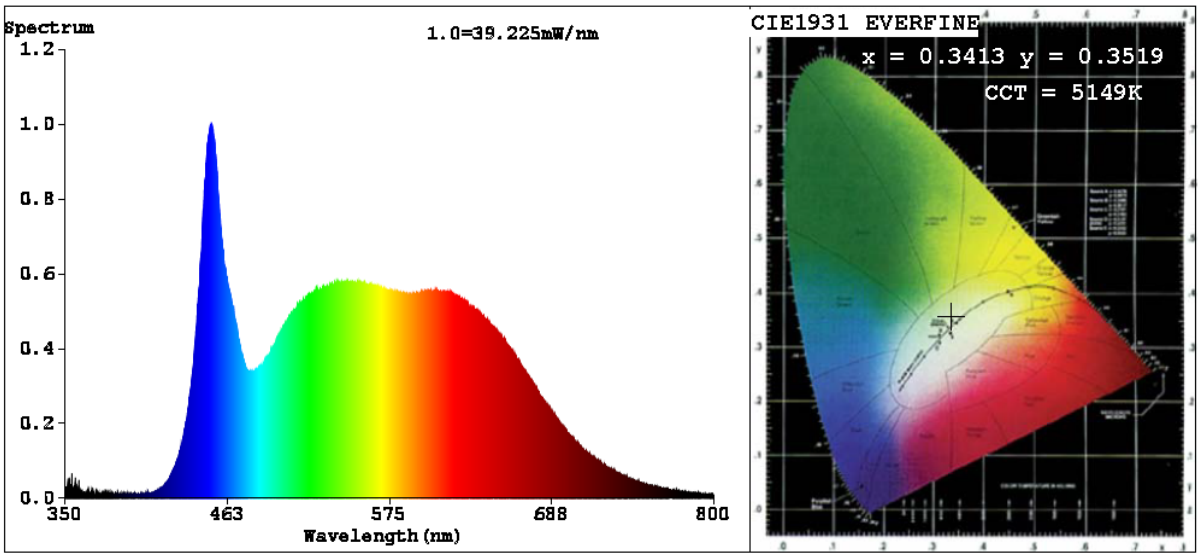
Special Color Rendering Indices			
R1	94	R9	72
R2	95	R10	88
R3	94	R11	94
R4	94	R12	74
R5	94	R13	95
R6	92	R14	97
R7	95	R15	93
R8	90	--	--

Photometric Measurement – Goniophotometer Method:

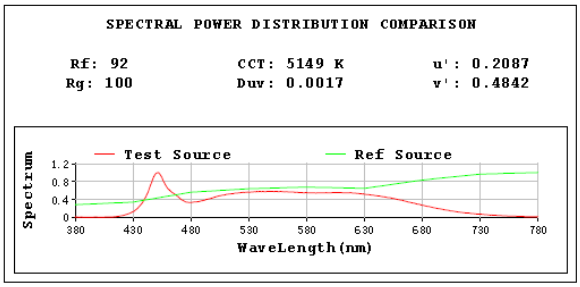
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1524.7
Luminous Efficacy (lm/W)	70.59

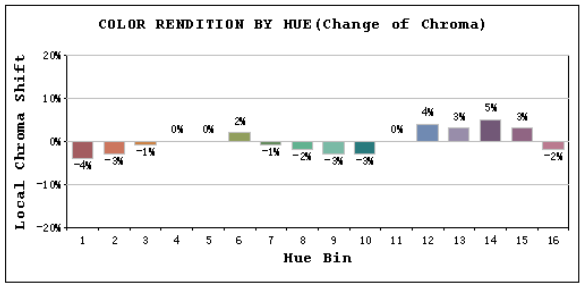
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1529.0
Luminous Efficacy (lm/W)	68.17

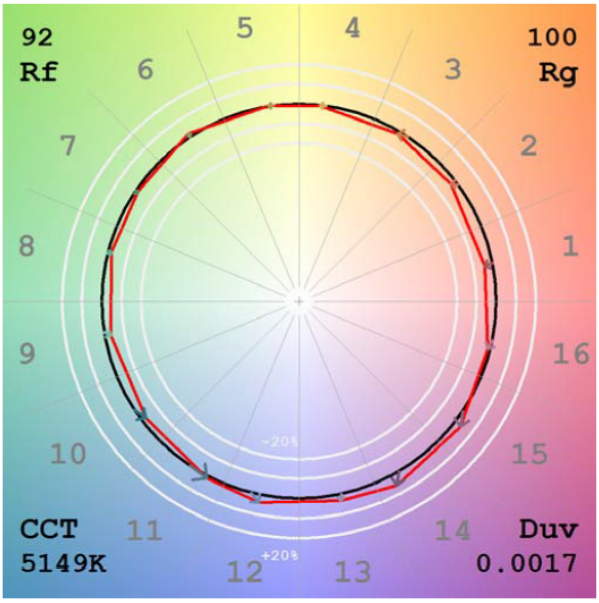
Spectral Power Distribution & Chromaticity Diagram

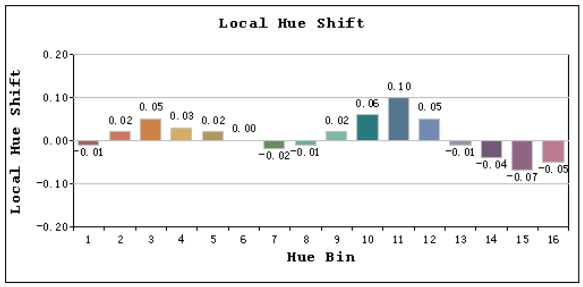


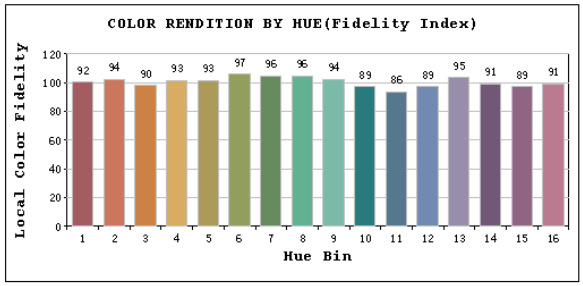
TM30

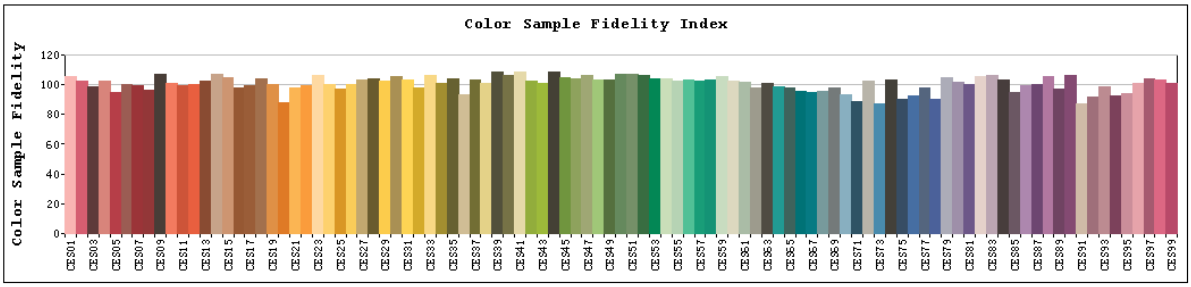

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 92
Rg: 100
CCT: 5149 K
Duv: 0.0017
u': 0.2087
v': 0.4842
Test Source
Ref Source
Spectrum
WaveLength(nm)


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


92
Rf
100
Rg
CCT
5149K
Duv
0.0017

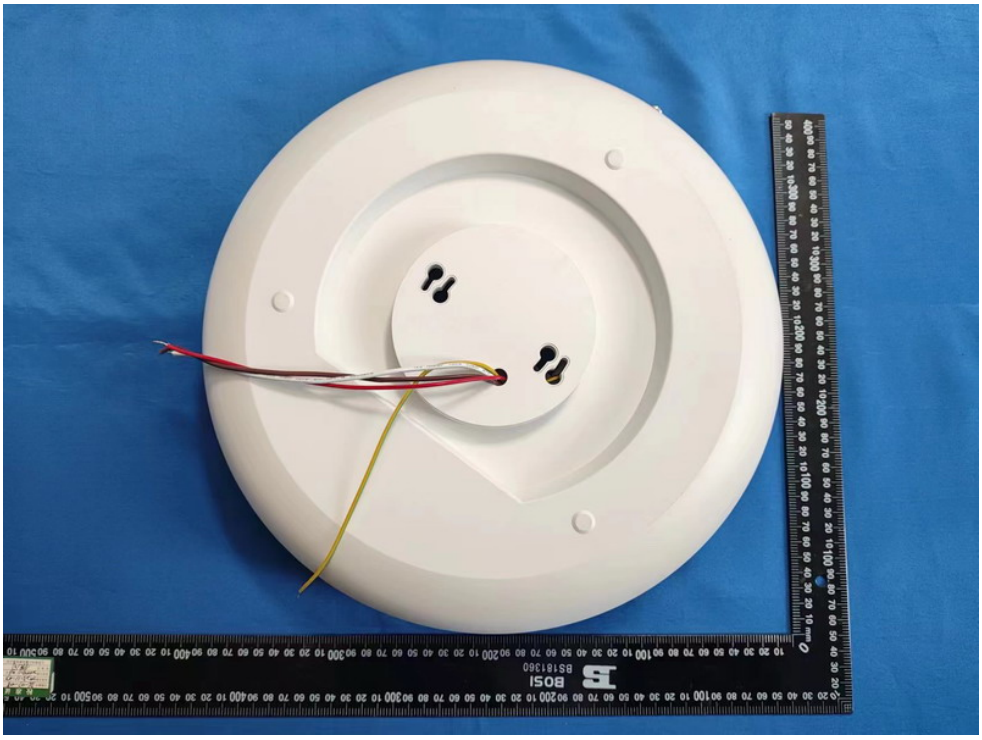

Local Hue Shift
Local Hue Shift
Hue Bin

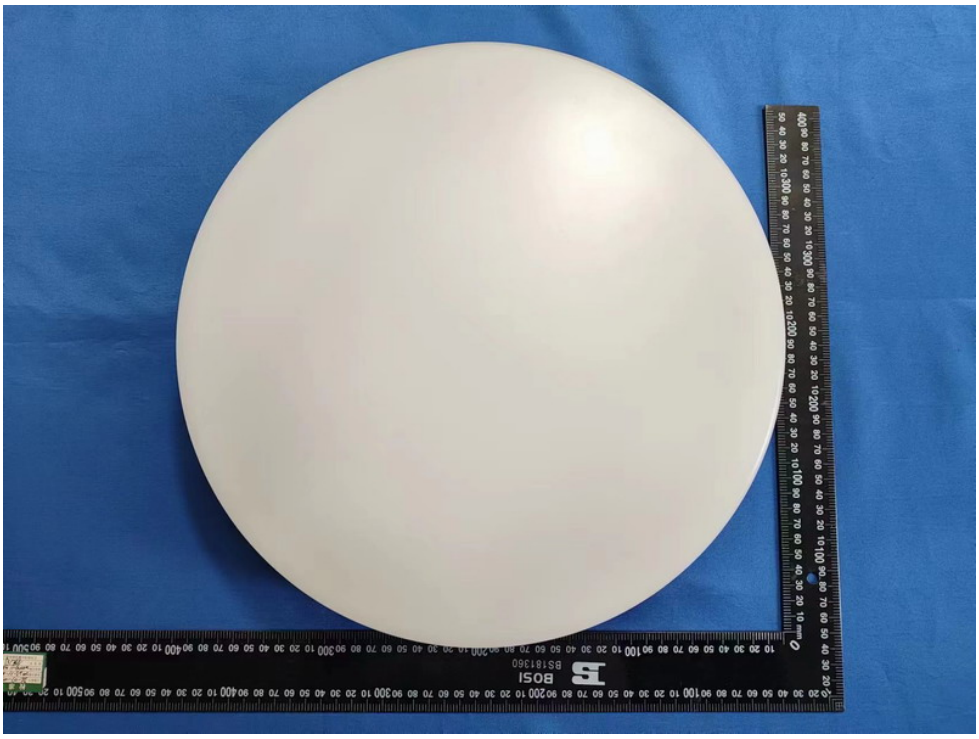

COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


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-14R/MVS/EM	2700K setting	120	1449.3	21.50	67.41
		277	1452.0	22.18	65.46
	3000K setting	120	1554.4	21.30	72.98
		277	1553.0	21.94	70.78
	3500K setting	120	1607.6	20.90	76.92
		277	1613.0	21.78	74.06
	4000K setting	120	1609.4	21.20	75.92
		277	1611.0	21.46	75.07
	5000K setting	120	1524.7	21.60	70.59
		277	1529.0	22.43	68.17

3. Product Photo





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