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): DLS0107(CRVFAD-18R-32-9CCT-UNV-BNMVS)

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2021-10-12

Prepared By:

Test & Report By:

Engineer: SunFangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120V-277Vac, 60 Hz
Nominal Power	32.0W
Rated Initial Lamp Lumen	2200 lm
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	2021-10-12	**Test Ambient:**	25.3 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	DLS0107(CRVFAD-18R-32-9CCT-UNV-BN/MVS)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120049	120.0	60	0.251	30.10	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2659
Duv	0.0011
Chromaticity (x, y)	x=0.4652 y=0.4148
Chromaticity (u', v')	u'=0.2641v'=0.5298
Color Rendering Index (CRI)	92.3
R9	53

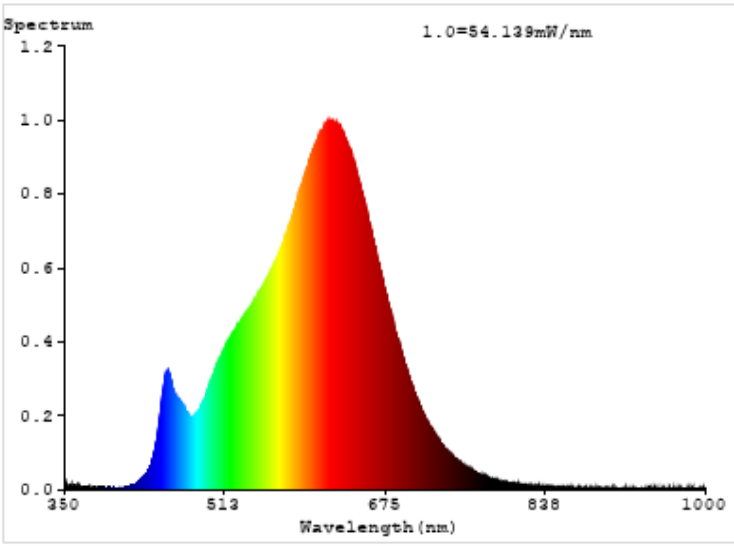
Special Color Rendering Indices			
R1	92	R9	53
R2	97	R10	93
R3	99	R11	94
R4	92	R12	85
R5	92	R13	94
R6	97	R14	100
R7	90	R15	87
R8	78	--	--

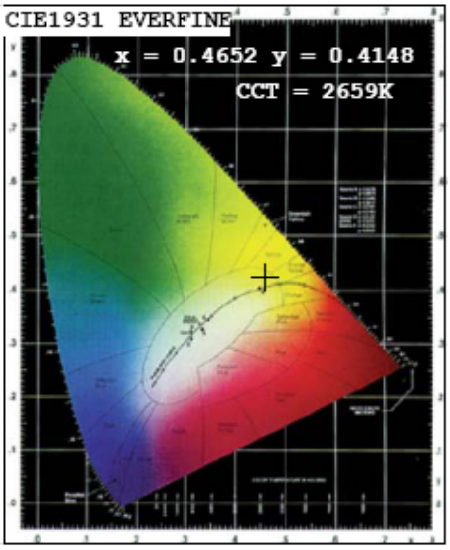
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2432.5
Luminous Efficacy (lm/W)	80.81
Beam Angle (°)	124.5
Center Beam Candle Power (cd)	624.1

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2452.0
Luminous Efficacy (lm/W)	79.89

Spectral Power Distribution & Chromaticity Diagram





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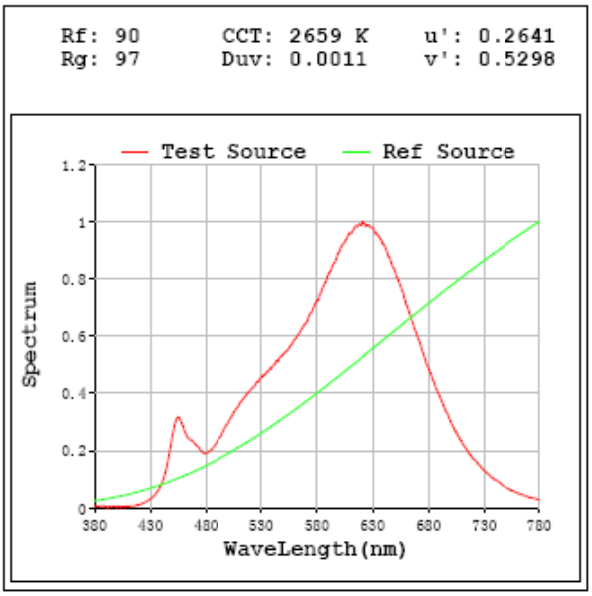
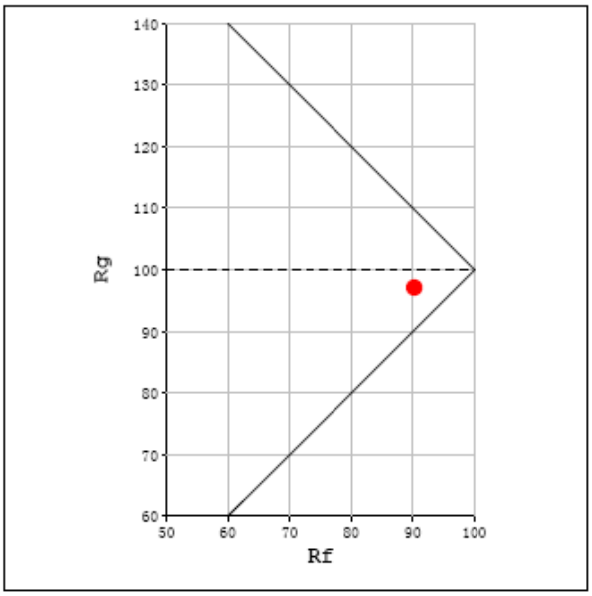
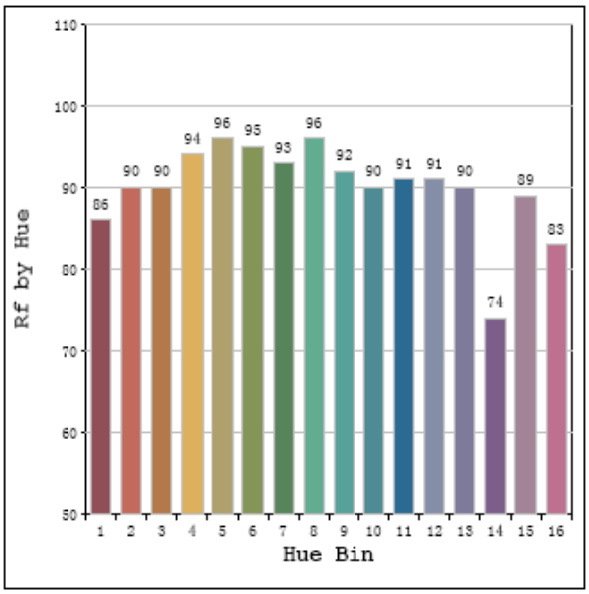
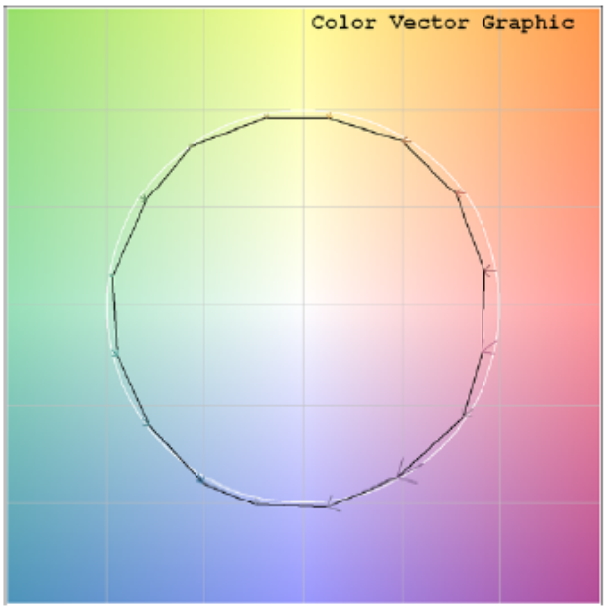






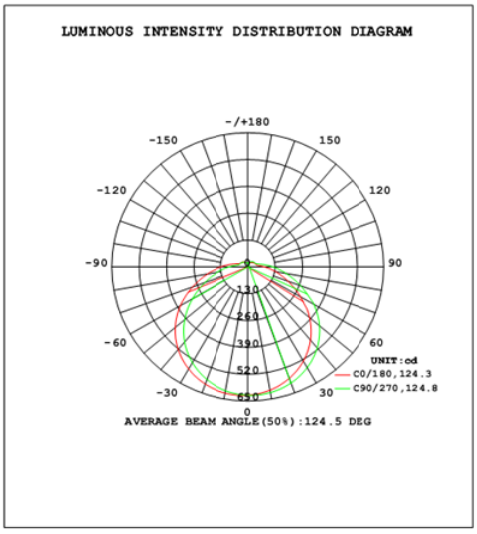


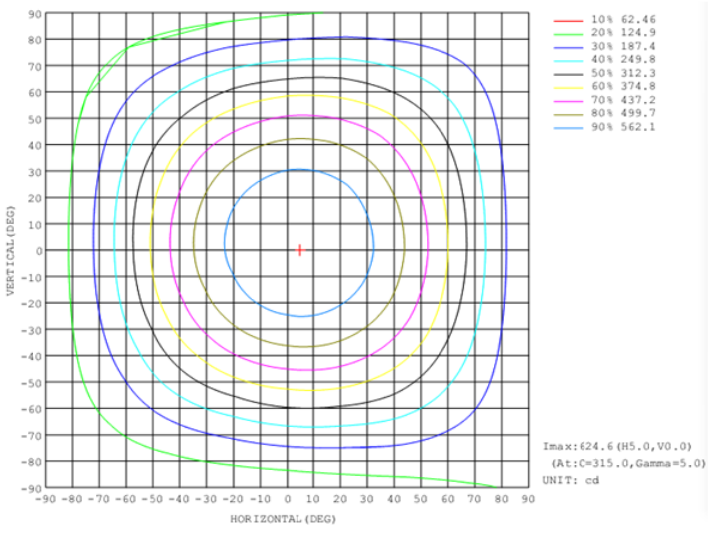
Zonal Lumen Tabulation

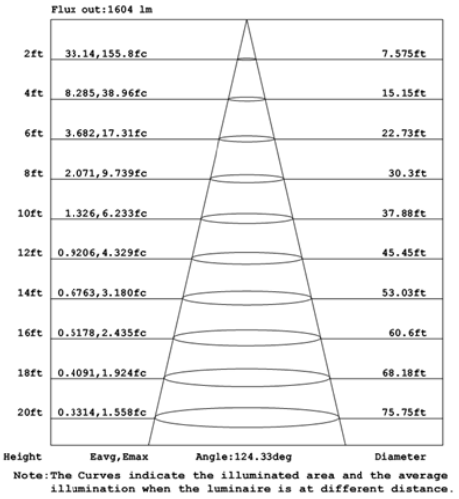
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	493.3	20.3%
0-40	820.7	33.7%
0-60	1511.9	62.2%
60-90	645.5	26.5%
70-100	449.0	18.5%
90-120	181.0	7.4%
0-90	2157.4	88.7%
90-180	275.1	11.3%
0-180	2432.5	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	59.0	2.4%	90-100	88.5	3.6%
10-20	170.6	7.0%	100-110	53.0	2.2%
20-30	263.7	10.8%	110-120	39.4	1.6%
30-40	327.4	13.5%	120-130	32.6	1.3%
40-50	353.5	14.5%	130-140	25.0	1.0%
50-60	337.7	13.9%	140-150	17.6	0.7%
60-70	285.0	11.7%	150-160	11.1	0.5%
70-80	215.0	8.8%	160-170	6.0	0.2%
80-90	145.4	6.0%	170-180	1.9	0.1%

Photometric Data







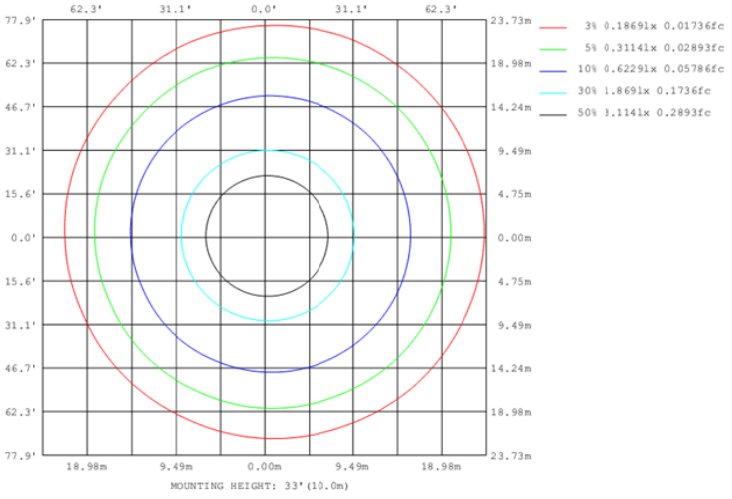


Table--1 UNIT: cd

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	622	622	622	622	622	622	622	622	622	622	622	622	622	622	622	622			
5	623	622	621	620	617	616	615	615	616	617	619	620	622	623	624	624			
10	621	619	616	613	609	607	605	605	607	609	612	615	618	621	622	622			
15	615	612	607	603	597	594	591	591	593	596	601	606	611	614	616	617			
20	605	600	594	588	581	576	573	573	575	579	586	592	599	604	607	607			
25	590	584	577	569	560	555	550	550	553	558	567	575	583	589	593	592			
30	571	565	556	546	536	529	524	523	527	533	544	553	564	571	575	575			
35	549	541	530	519	507	499	493	493	497	504	516	528	540	548	553	553			
40	522	513	500	488	475	465	458	458	462	471	485	498	512	521	527	526			
45	491	481	467	454	438	428	419	419	424	434	449	464	480	490	497	496			
50	456	446	430	414	398	386	377	377	383	393	410	426	444	455	462	462			
55	417	406	388	372	354	340	333	326	336	349	368	385	404	416	424	423			
60	375	363	344	323	309	292	287	281	288	304	318	341	361	374	382	381			
65	330	313	299	278	265	248	243	238	244	259	273	296	311	329	335	337			
70	284	268	255	235	222	208	202	197	203	217	230	251	266	284	288	291			
75	240	225	213	195	184	170	162	161	166	177	190	209	224	240	244	247			
80	200	187	172	159	147	137	130	128	133	141	154	169	185	199	203	205			
85	161	152	139	128	116	108	101	99.5	104	111	123	136	151	160	166	166			
90	129	121	109	99.4	89.7	82.6	77.0	75.7	79.4	84.9	95.2	107	120	128	134	133			
95	101	93.7	83.5	75.6	67.7	62.7	58.7	57.5	60.1	64.2	72.4	82.1	93.2	100	105	104			
100	76.8	71.0	63.1	57.1	51.9	49.0	46.8	45.7	47.4	49.8	55.7	62.5	71.1	76.8	80.5	80.1			
105	58.2	54.0	48.9	45.1	42.7	41.7	40.6	40.1	41.4	41.9	45.0	49.1	54.6	58.5	61.3	61.0			
110	46.1	43.6	40.9	39.9	40.1	39.9	39.3	38.8	40.0	39.6	40.2	41.9	44.6	46.5	48.3	48.0			
115	40.0	39.2	38.9	39.2	39.3	38.9	38.1	37.4	38.5	38.4	39.2	40.0	40.7	40.9	41.2	41.3			
120	38.3	38.0	37.8	37.8	37.7	37.2	36.2	35.5	36.6	36.7	37.9	39.0	39.8	39.9	39.8	39.6			
125	36.8	36.5	36.0	36.0	35.8	35.3	34.2	33.6	34.6	34.9	36.0	37.4	38.5	38.8	38.7	38.5			
130	35.0	34.6	34.1	34.1	33.8	33.2	32.1	31.4	32.4	32.8	34.0	35.4	36.5	36.9	37.0	36.8			
135	33.0	32.6	32.1	32.0	31.6	31.0	29.9	29.3	30.1	30.6	31.9	33.3	34.5	34.9	35.0	34.8			
140	30.8	30.3	30.0	29.8	29.4	28.7	27.7	26.9	27.8	28.4	29.7	31.1	32.3	32.8	32.9	32.6			
145	28.6	28.1	27.7	27.6	27.0	26.4	25.4	24.9	25.8	26.3	27.6	29.0	30.1	30.5	30.6	30.4			
150	26.3	25.9	25.5	25.3	24.6	24.0	23.4	22.9	23.8	24.3	25.5	26.8	27.9	28.2	28.3	28.0			
155	24.5	24.0	23.5	23.1	22.4	22.0	21.8	21.5	22.1	22.5	23.5	24.6	25.8	26.0	26.0	25.9			
160	22.5	22.0	21.7	21.3	20.9	20.9	21.0	21.1	21.4	21.5	22.0	22.7	23.7	23.8	23.9	23.8			
165	21.3	21.1	20.7	20.3	20.2	20.2	20.5	20.5	20.8	21.0	21.3	21.5	21.7	22.0	22.2	22.2			
170	20.8	20.4	19.9	19.8	19.7	19.8	20.0	20.2	20.2	20.2	20.4	20.6	20.7	20.8	21.2	21.5			
175	19.8	19.7	19.6	19.6	19.5	19.5	19.4	19.5	19.3	19.4	19.5	19.7	19.9	20.1	20.2	20.4			
180	19.5	19.4	19.4	19.5	19.6	19.7	19.8	19.9	19.5	19.4	19.4	19.5	19.6	19.7	19.8	19.9			

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2021-10-12	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0107(CRVFAD-18R-32-9CCT-UNV-BN/MVS)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120049	120.0	60	0.252	30.09	0.996

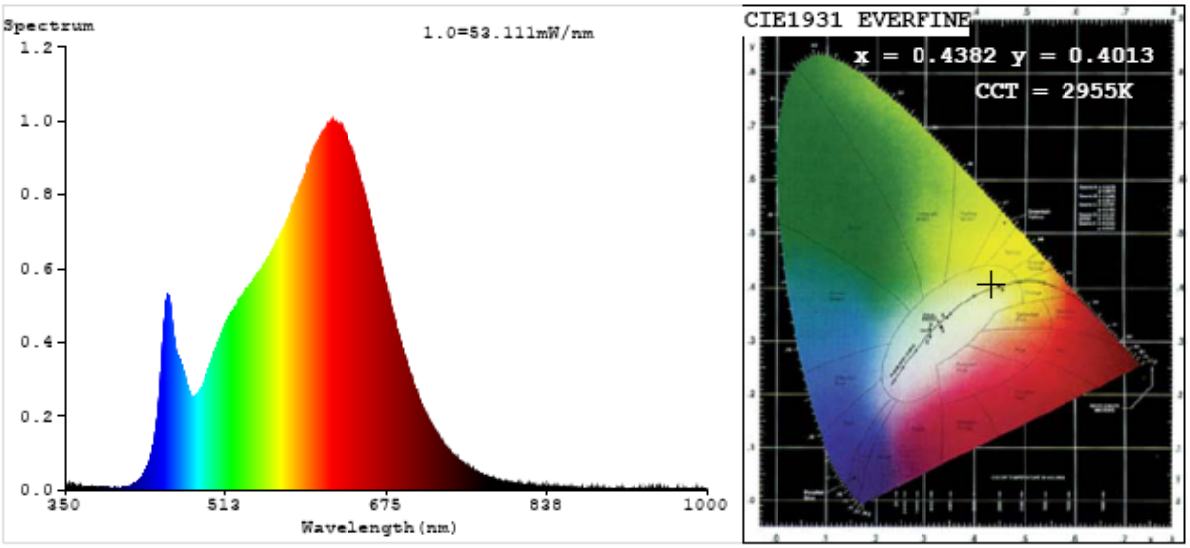
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2955
Duv	0.0013
Chromaticity (x, y)	x=0.4382 y=0.4013
Chromaticity (u', v')	u'=0.2526 v'=0.5205
Color Rendering Index (CRI)	94.2
R9	64
Total Luminous (lm)	2558.0
Luminous Efficacy (lm/W)	85.02

Special Color Rendering Indices			
R1	95	R9	64
R2	99	R10	96
R3	98	R11	95
R4	94	R12	83
R5	95	R13	97
R6	97	R14	100
R7	92	R15	91
R8	83	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2594.0
Luminous Efficacy (lm/W)	84.83

Spectral Power Distribution & Chromaticity Diagram



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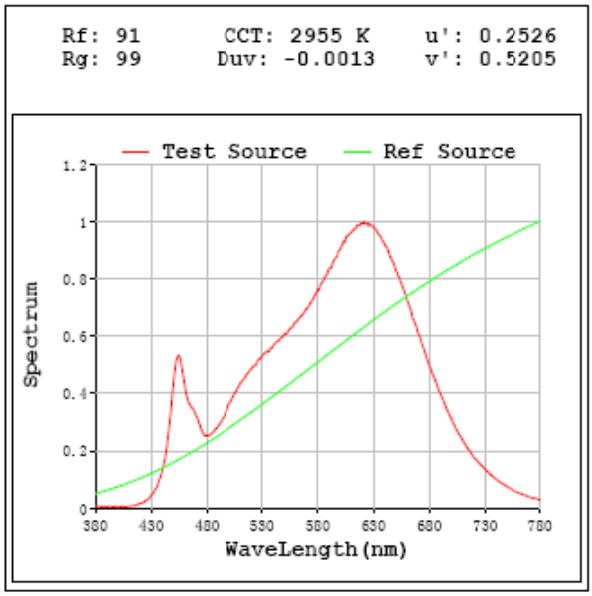
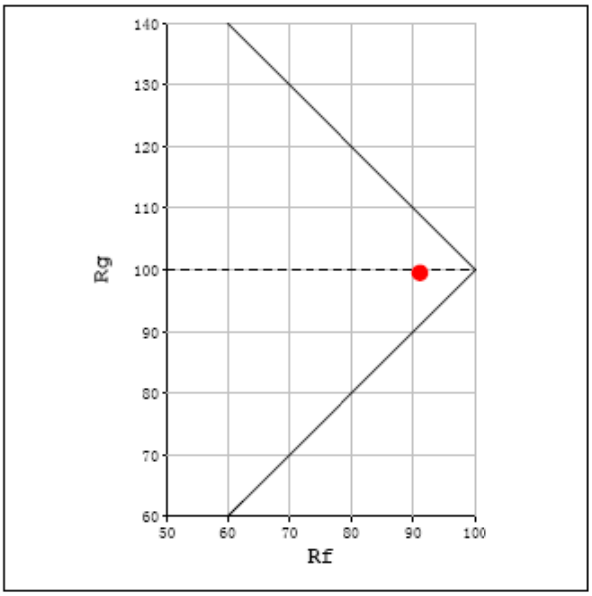
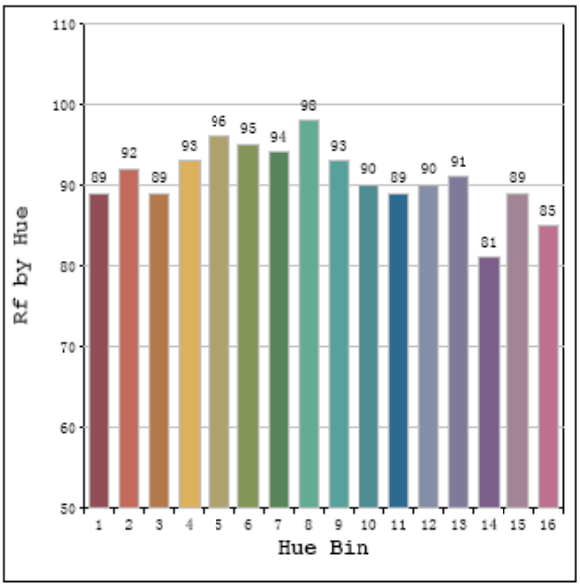
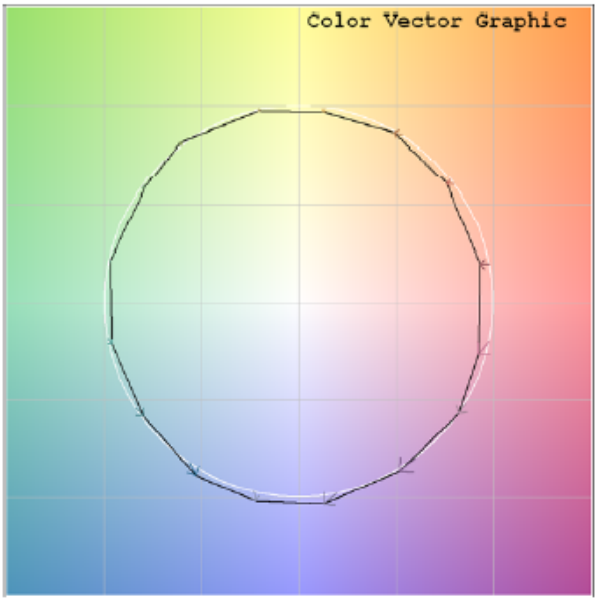

Rf: 91 CCT: 2955 K u': 0.2526
Rg: 99 Duv: -0.0013 v': 0.5205
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
89 92 89 93 96 95 94 96 93 90 89 90 91 81 89 85


Color Vector Graphic

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2021-10-12	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0107(CRVFAD-18R-32-9CCT-UNV-BN/MVS)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120049	120.0	60	0.245	29.30	0.995

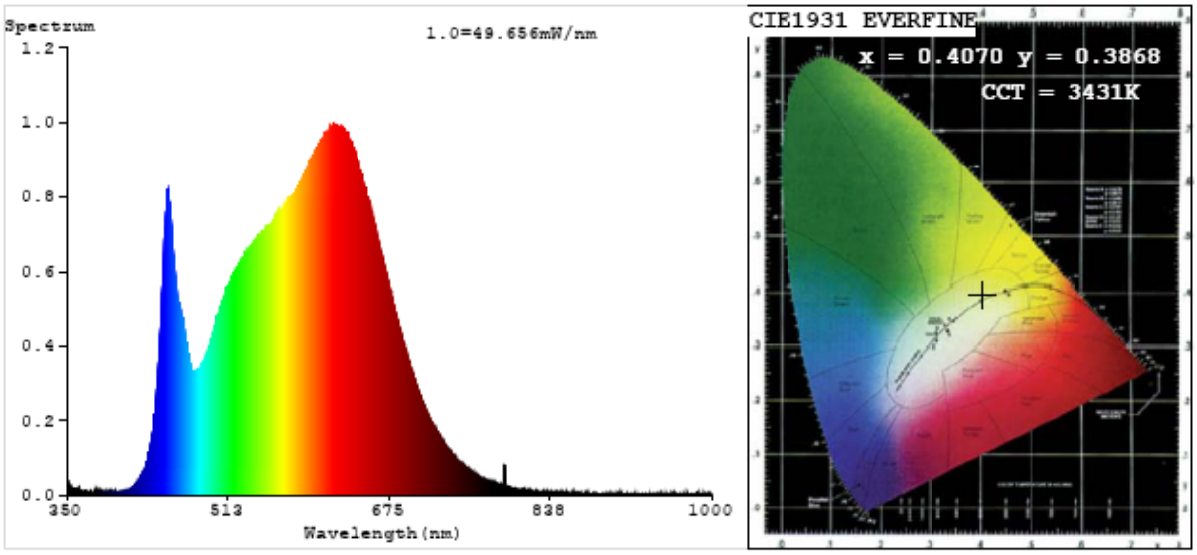
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3431
Duv	0.0021
Chromaticity (x, y)	x=0.4070 y=0.3868
Chromaticity (u', v')	u'=0.2384 v'=0.5099
Color Rendering Index (CRI)	95.5
R9	75
Total Luminous (lm)	2672.0
Luminous Efficacy (lm/W)	91.18

Special Color Rendering Indices			
R1	97	R9	75
R2	99	R10	95
R3	98	R11	96
R4	96	R12	79
R5	96	R13	98
R6	96	R14	98
R7	94	R15	95
R8	89	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2716.0
Luminous Efficacy (lm/W)	90.89

Spectral Power Distribution & Chromaticity Diagram



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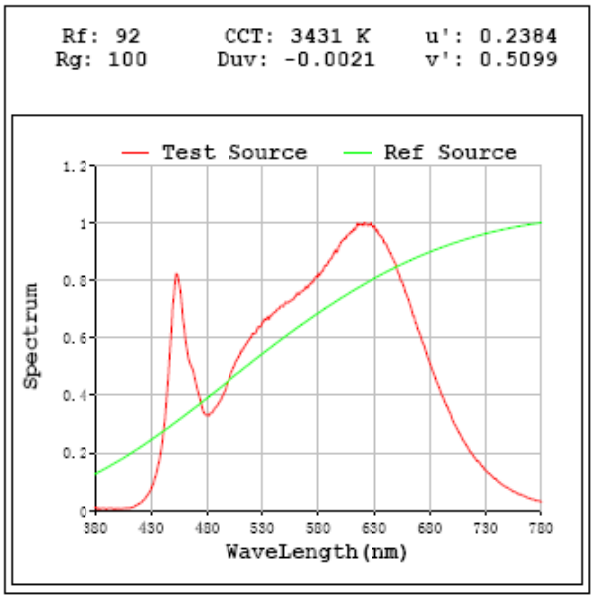
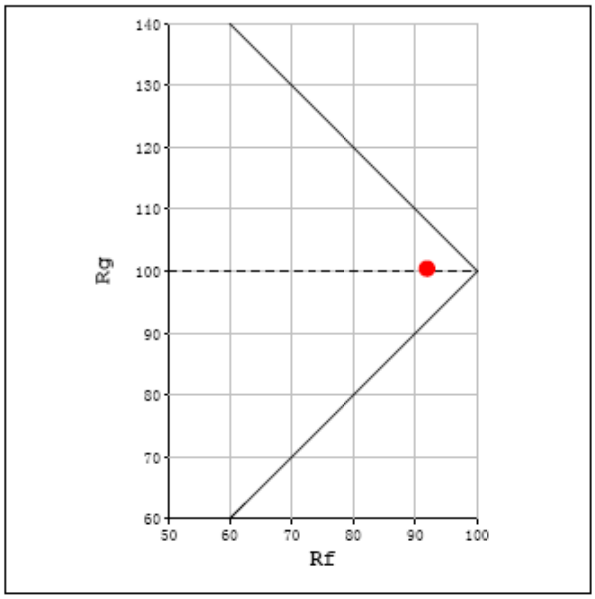
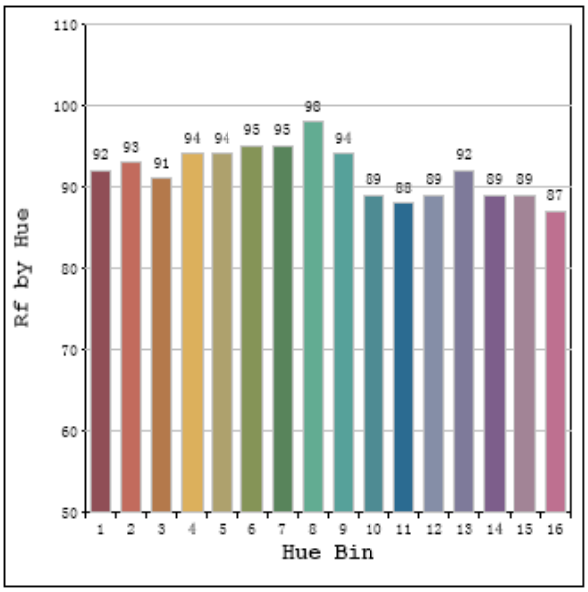
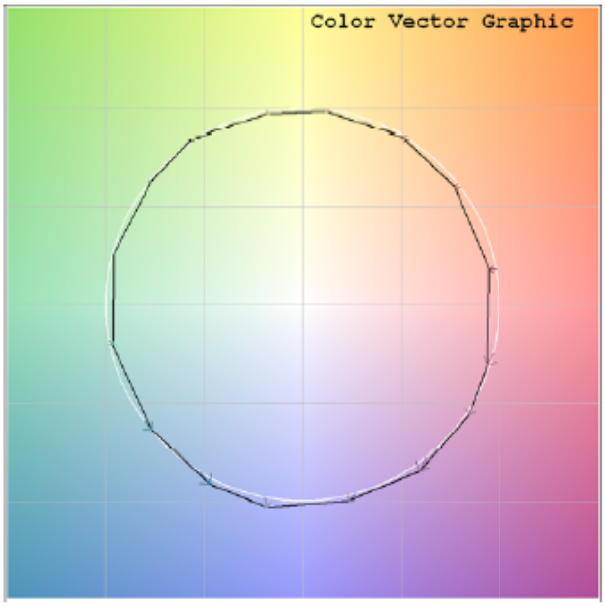

Rf: 92
Rg: 100
CCT: 3431 K
Duv: -0.0021
u': 0.2384
v': 0.5099
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
92 93 91 94 94 95 95 98 94 89 88 89 92 89 89 87


Color Vector Graphic

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2021-10-12	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0107(CRVFAD-18R-32-9CCT-UNV-BN/MVS)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120049	120.0	60	0.251	29.95	0.996

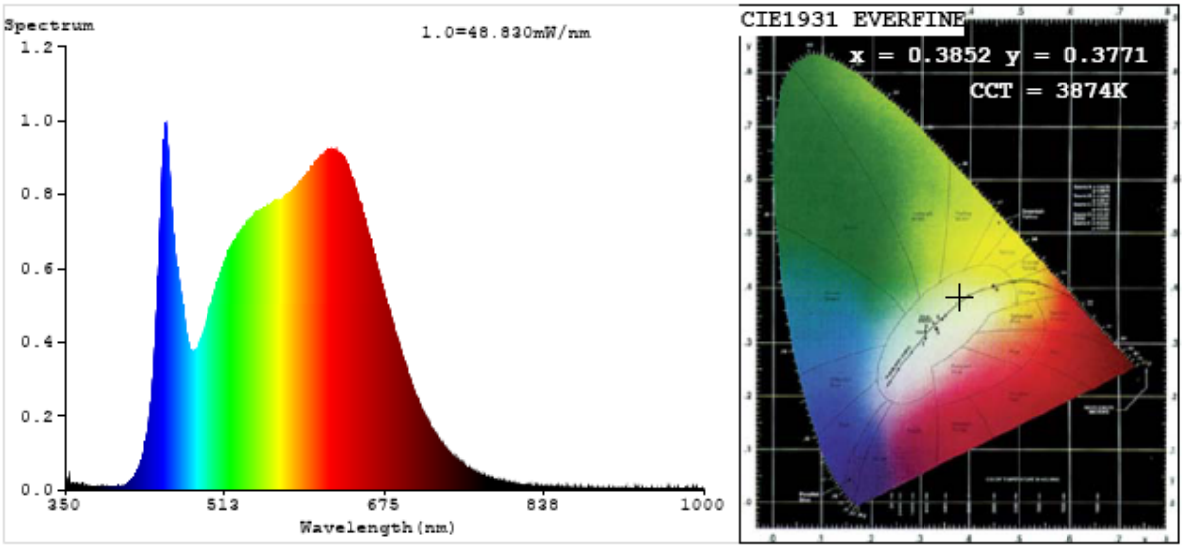
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3874
Duv	0.0012
Chromaticity (x, y)	x=0.3852y=0.3771
Chromaticity (u', v')	u'=0.2281 v'=0.5025
Color Rendering Index (CRI)	95.3
R9	78
Total Luminous (lm)	2674.0
Luminous Efficacy (lm/W)	89.28

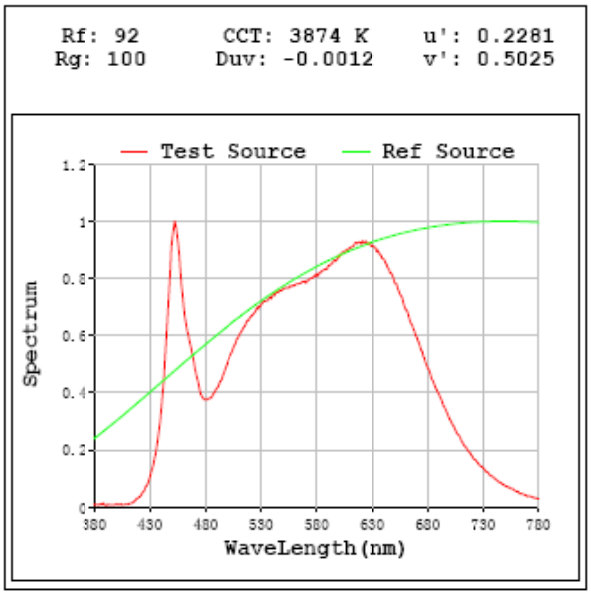
Special Color Rendering Indices			
R1	96	R9	78
R2	98	R10	92
R3	96	R11	95
R4	96	R12	75
R5	95	R13	97
R6	95	R14	97
R7	96	R15	95
R8	91	--	--

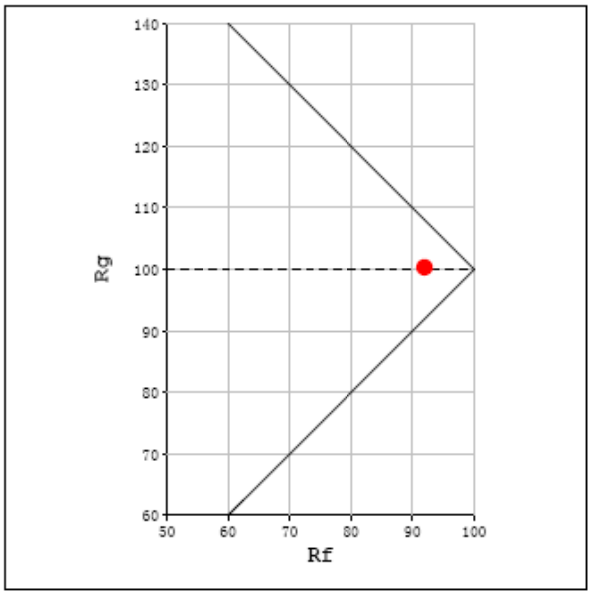
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2712.0
Luminous Efficacy (lm/W)	88.99

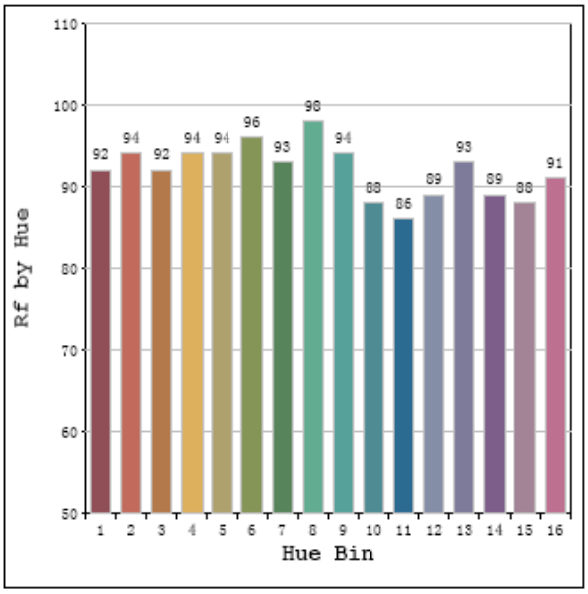
Spectral Power Distribution & Chromaticity Diagram

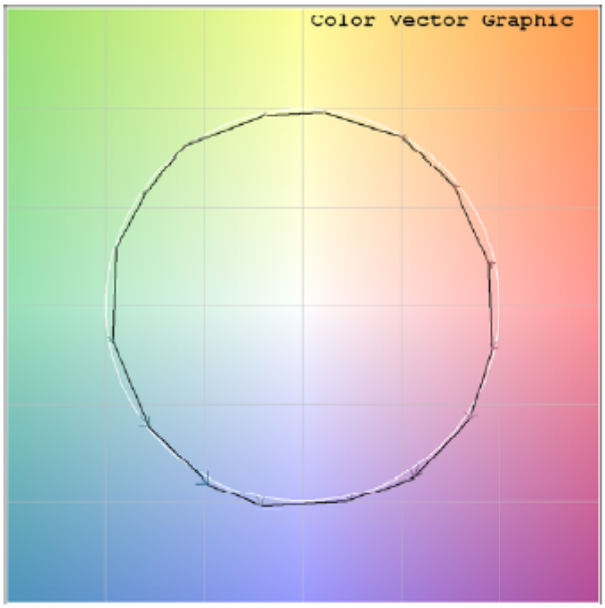


TM30


Rf: 92
Rg: 100
CCT: 3874 K
Duv: -0.0012
u': 0.2281
v': 0.5025
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
92 94 92 94 94 96 93 98 94 88 86 89 93 89 88 91


Color Vector Graphic

2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2021-10-12	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0107(CRVFAD-18R-32-9CCT-UNV-BN/MVS)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120049	120.0	60	0.255	30.41	0.996

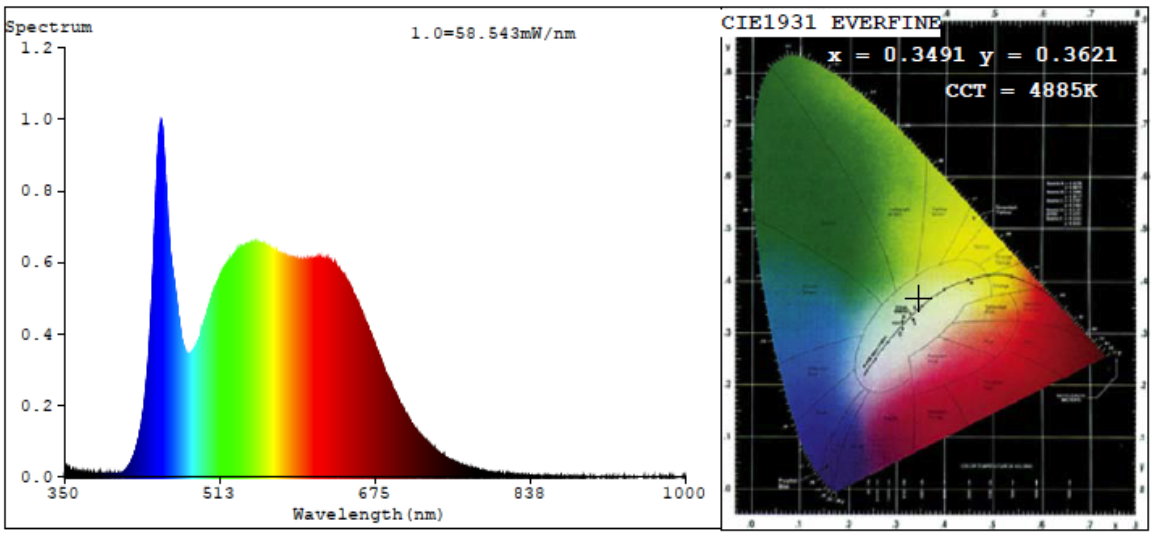
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4885
Duv	0.0036
Chromaticity (x, y)	x=0.3491y=0.3621
Chromaticity (u', v')	u'=0.2100 v'=0.4902
Color Rendering Index (CRI)	92.4
R9	72
Total Luminous (lm)	2527.0
Luminous Efficacy (lm/W)	83.08

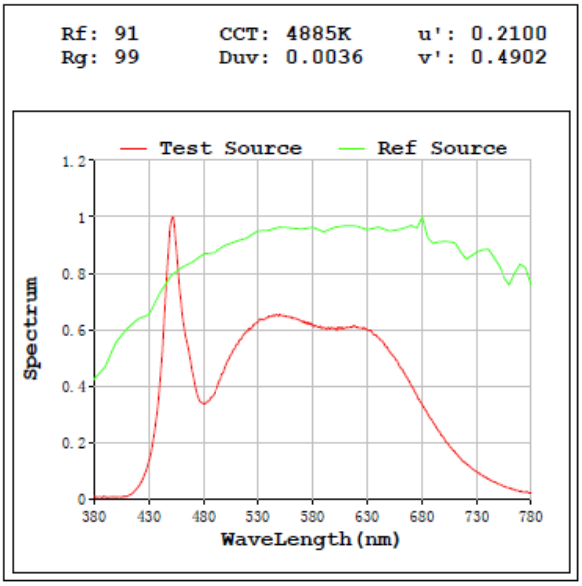
Special Color Rendering Indices			
R1	92	R9	72
R2	94	R10	84
R3	93	R11	91
R4	92	R12	66
R5	91	R13	93
R6	90	R14	96
R7	97	R15	91
R8	90	--	--

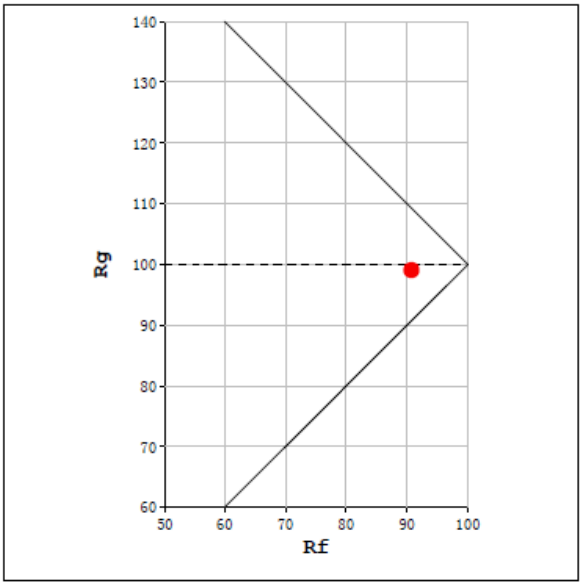
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2564.0
Luminous Efficacy (lm/W)	82.83

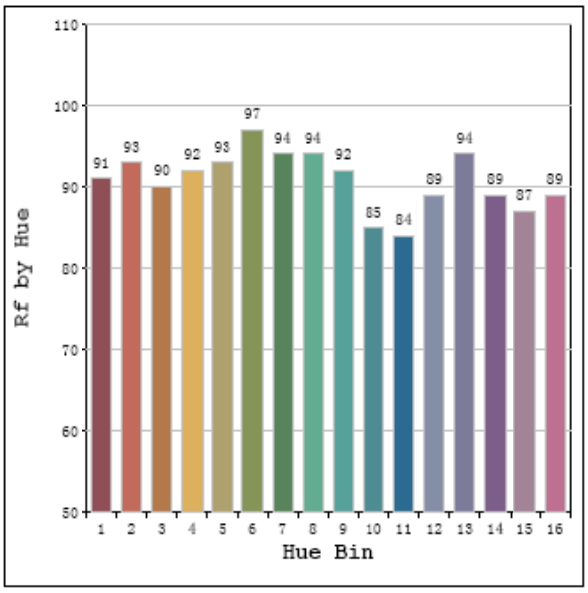
Spectral Power Distribution & Chromaticity Diagram

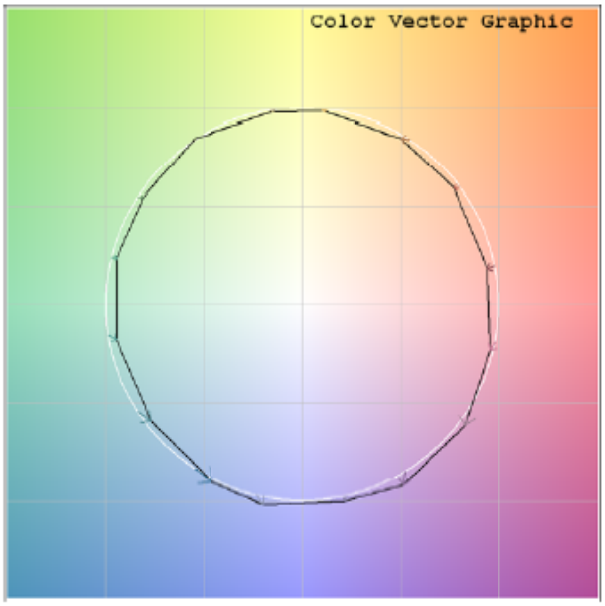


TM30



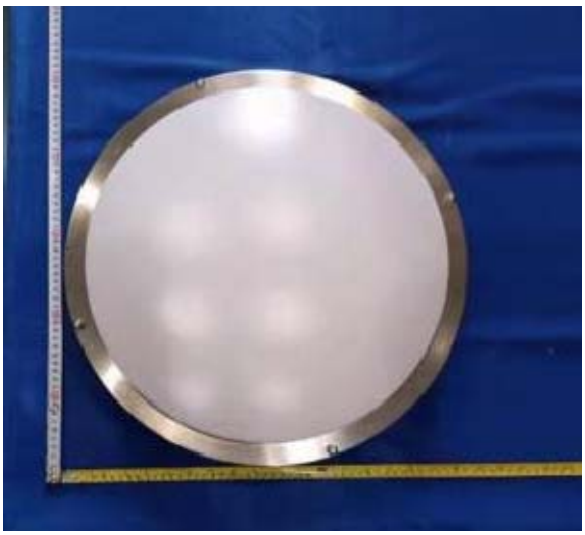






Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0107(CRVFAD-18R-32-9CCT-UNV-BN/MVS)	2700K setting	120.0	2432.5	30.10	80.81
		277.0	2452.0	30.70	79.89
	3000K setting	120.0	2558.0	30.09	85.02
		277.0	2594.0	30.58	84.83
	3500K setting	120.0	2672.0	29.30	91.18
		277.0	2716.0	29.88	90.89
	4000K setting	120.0	2674.0	29.95	89.28
		277.0	2712.0	30.47	88.99
	5000K setting	120.0	2527.0	30.41	83.08
		277.0	2564.0	30.95	82.83

3. Product Photo



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