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):
DLS0104(CRVFAD-18R-32-9CCT-120-BN)

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	120Vac, 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	DLS0104(CRVFAD-18R-32-9CCT-120-BN)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120046	120.0	60	0.274	31.90	0.972

Chromaticity Measurement - Sphere-Spectroradiometer Method:

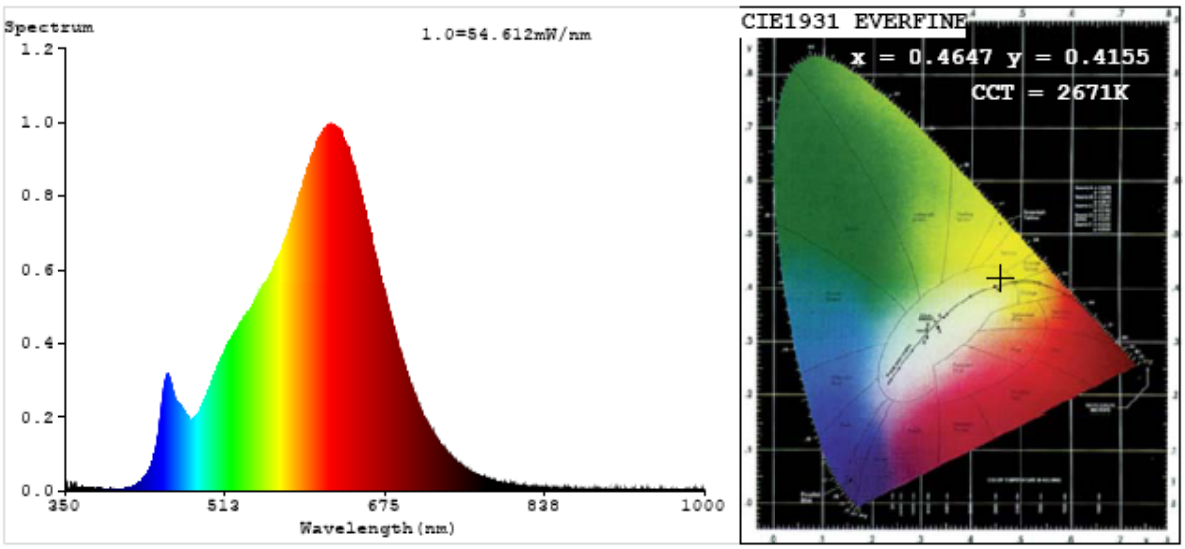
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2671
Duv	0.0014
Chromaticity (x, y)	x=0.4647 y=0.4155
Chromaticity (u', v')	u'=0.2635v'=0.5299
Color Rendering Index (CRI)	92.2
R9	53

Special Color Rendering Indices			
R1	92	R9	53
R2	97	R10	92
R3	99	R11	94
R4	92	R12	84
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)	2470.2
Luminous Efficacy (lm/W)	77.44
Beam Angle (°)	124.4
Center Beam Candle Power (cd)	631.5

Spectral Power Distribution & Chromaticity Diagram



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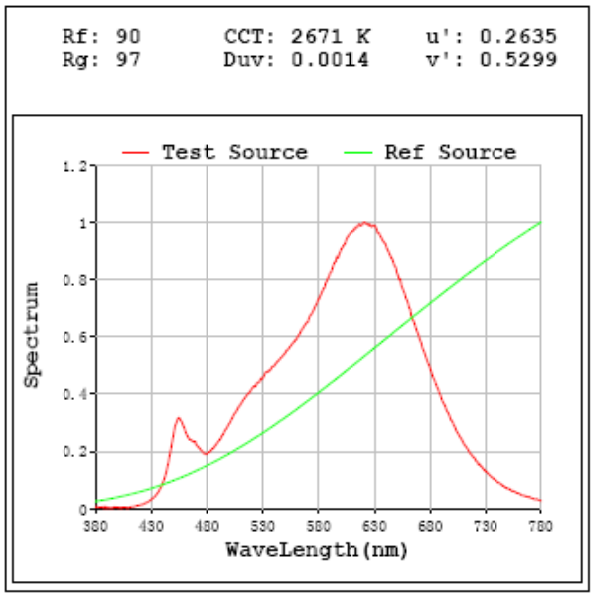
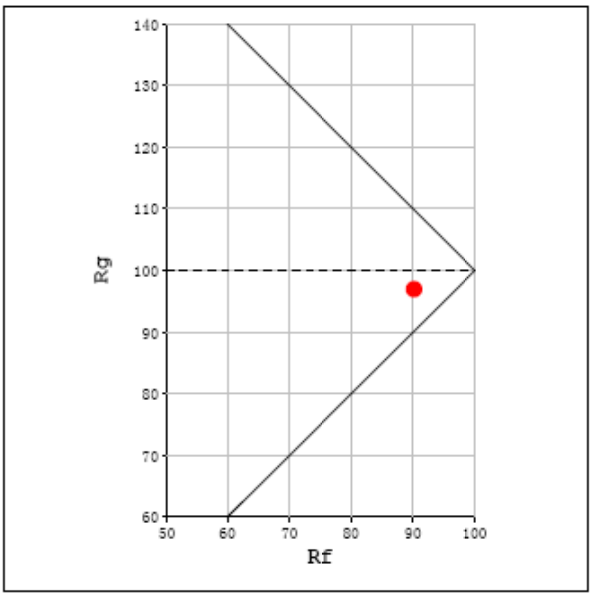
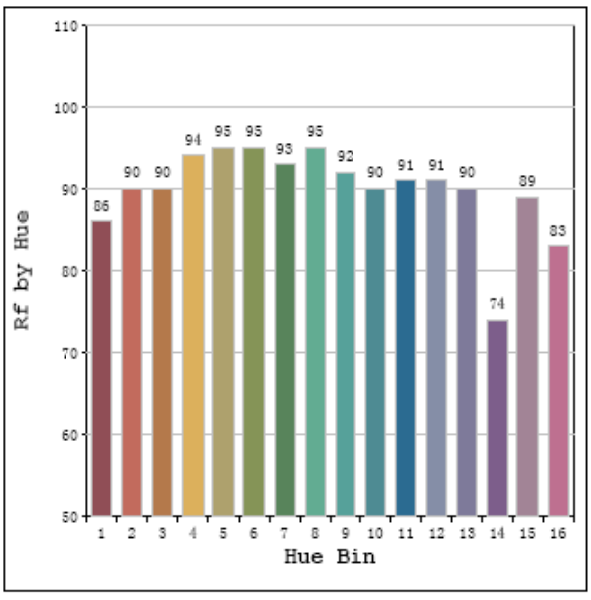
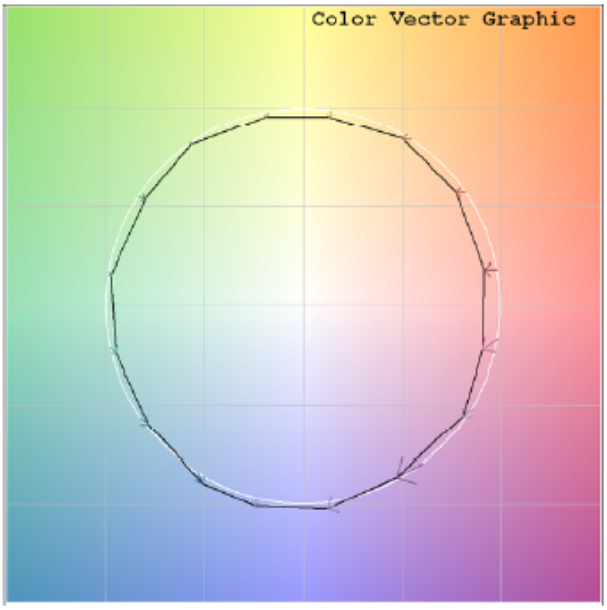






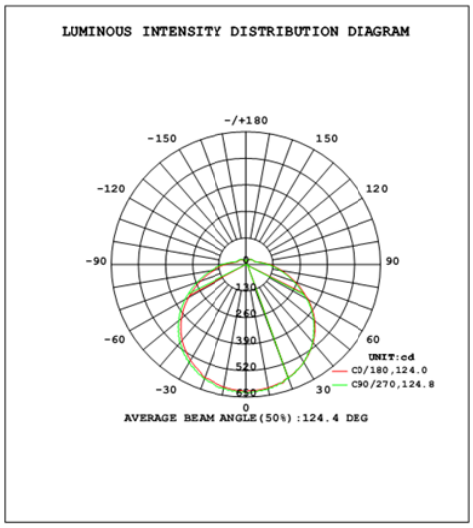


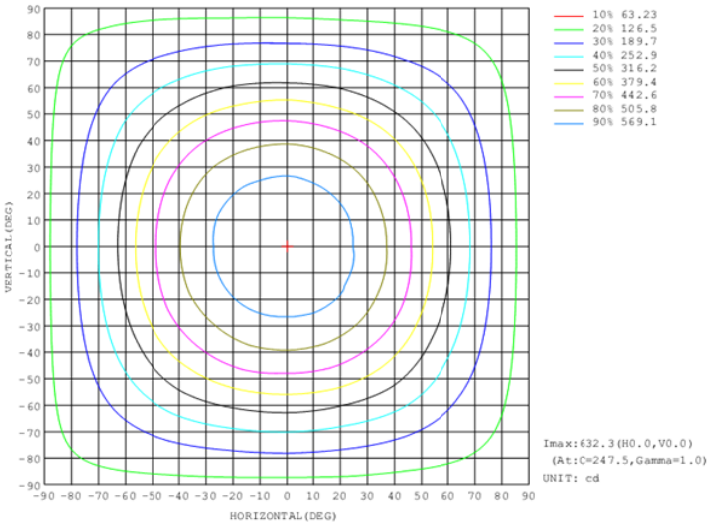
Zonal Lumen Tabulation

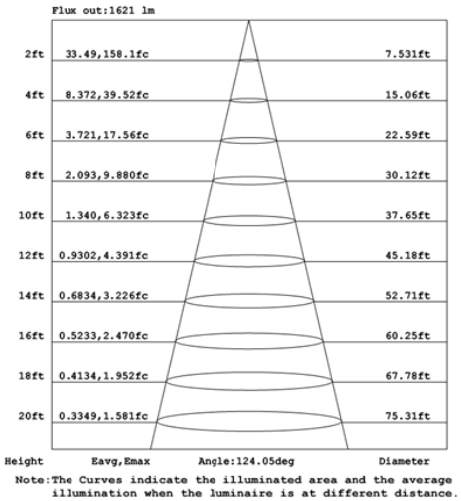
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	497.2	20.1%
0-40	827.7	33.5%
0-60	1527.6	61.8%
60-90	657.3	26.6%
70-100	459.6	18.6%
90-120	187.0	7.6%
0-90	2184.8	88.4%
90-180	285.4	11.6%
0-180	2470.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	59.4	2.4%	90-100	91.2	3.7%
10-20	171.9	7.0%	100-110	54.4	2.2%
20-30	265.9	10.8%	110-120	41.4	1.7%
30-40	330.5	13.4%	120-130	34.4	1.4%
40-50	357.4	14.5%	130-140	26.2	1.1%
50-60	342.4	13.9%	140-150	18.2	0.7%
60-70	288.9	11.7%	150-160	11.4	0.5%
70-80	219.1	8.9%	160-170	6.2	0.3%
80-90	149.3	6.0%	170-180	2.0	0.1%

Photometric Data







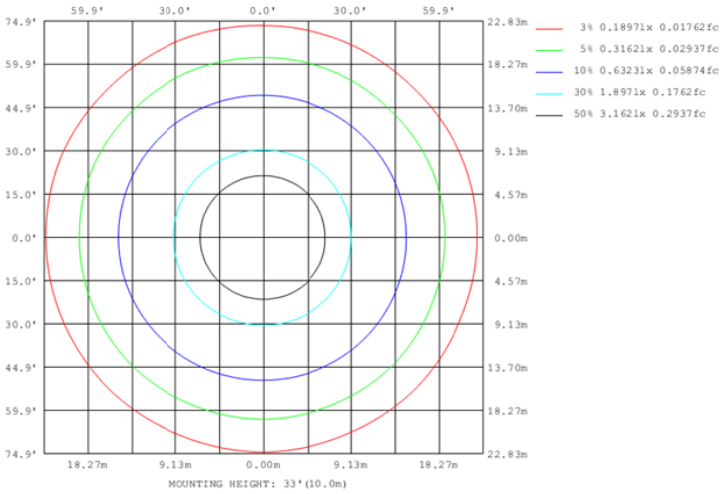


Table--1 UNIT: cd

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	628	628	628	628	628	628	628	628	628	628	628	628	628	628	628	628			
5	616	625	622	628	620	630	625	629	618	627	622	626	625	630	627	628			
10	610	616	618	623	620	617	623	618	613	622	617	624	620	619	616	621			
15	598	606	609	610	610	615	612	616	604	612	611	614	606	612	604	605			
20	588	591	592	591	595	595	600	594	591	597	598	596	595	595	594	595			
25	563	574	571	580	575	582	582	585	574	580	575	576	571	578	575	573			
30	542	551	551	558	557	563	559	558	553	559	555	559	551	555	552	553			
35	514	524	526	530	529	531	531	538	528	532	533	532	528	521	521	521			
40	484	487	496	499	501	507	503	508	500	499	503	498	498	496	493	488			
45	448	455	461	466	467	468	471	475	466	470	468	462	456	462	458	457			
50	410	416	422	429	424	431	434	435	429	432	431	428	422	422	419	418			
55	369	372	379	388	388	394	392	395	388	390	389	383	382	377	375	371			
60	324	323	335	340	344	348	344	352	345	345	343	339	333	334	325	330			
65	279	279	289	293	297	300	304	300	296	297	292	294	287	288	282	284			
70	236	240	244	250	254	256	259	257	252	254	249	251	242	242	236	241			
75	197	197	206	210	214	214	216	214	211	213	209	209	202	203	197	199			
80	159	162	166	173	175	176	177	177	174	174	171	169	167	164	162	162			
85	128	131	134	140	141	143	140	142	141	138	138	137	135	131	130	130			
90	99.9	102	106	111	111	113	111	113	113	110	108	108	106	103	102	102			
95	76.3	79.2	81.1	85.0	85.5	86.5	85.7	87.3	86.3	84.9	82.9	82.6	81.8	79.8	79.1	78.8			
100	58.4	59.8	62.0	65.4	65.9	66.8	65.2	66.4	66.1	64.9	63.7	63.1	62.7	61.2	60.5	60.2			
105	46.7	47.9	48.8	51.6	52.4	52.3	51.8	51.8	51.8	51.3	51.0	50.4	49.8	48.8	48.6	48.8			
110	41.9	41.9	42.5	44.4	44.8	44.8	43.5	43.8	43.9	43.6	43.9	44.0	43.6	43.4	42.9	42.9			
115	39.5	40.5	41.5	42.8	42.4	41.9	41.1	41.1	41.6	41.6	41.5	42.7	42.6	42.1	41.4	41.4			
120	38.1	39.2	40.3	41.3	41.3	41.0	40.1	39.6	40.5	40.4	40.4	40.7	40.7	40.2	40.0	40.1			
125	36.2	37.0	37.9	39.5	39.5	39.1	38.2	38.1	38.4	38.2	38.5	38.8	38.7	38.6	38.2	38.3			
130	34.1	34.9	36.1	37.4	36.9	36.9	35.8	35.5	36.4	36.3	36.3	36.8	36.6	36.4	35.7	35.7			
135	31.7	32.9	33.4	35.1	35.0	34.6	33.8	33.5	34.0	33.8	34.1	34.4	34.2	33.7	33.6	33.6			
140	29.3	30.4	31.3	32.6	32.4	32.0	31.2	31.2	31.5	31.5	31.7	31.7	31.8	31.6	31.1	30.8			
145	26.7	27.5	29.0	30.0	29.6	29.7	28.7	28.7	29.0	29.0	29.3	29.5	29.5	29.2	28.5	28.4			
150	24.7	25.3	26.6	27.1	27.2	27.1	26.5	26.4	26.9	26.8	26.9	27.0	27.1	26.6	26.2	26.0			
155	22.7	23.6	24.1	24.5	24.5	24.5	24.4	24.4	24.7	24.7	24.7	25.0	25.0	24.8	24.3	24.0			
160	21.6	21.8	22.0	22.5	22.4	22.6	22.6	22.3	22.9	22.7	23.0	23.6	23.4	23.3	22.7	22.7			
165	21.0	21.1	20.8	21.4	21.2	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.6	22.0	22.0			
170	20.4	20.4	20.5	20.8	20.7	20.7	20.9	21.1	21.2	21.5	21.5	21.6	21.7	21.8	21.6	21.4			
175	19.7	20.1	20.2	20.4	20.2	20.5	20.4	20.5	20.3	20.5	20.8	20.7	20.5	20.7	21.0	21.0			
180	19.6	19.8	19.9	20.0	19.8	20.0	20.1	20.0	19.6	19.8	19.8	20.0	19.7	20.0	20.0	19.8			

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	DLS0104(CRVFAD-18R-32-9CCT-120-BN)	3000K	

Electrical Measurement:

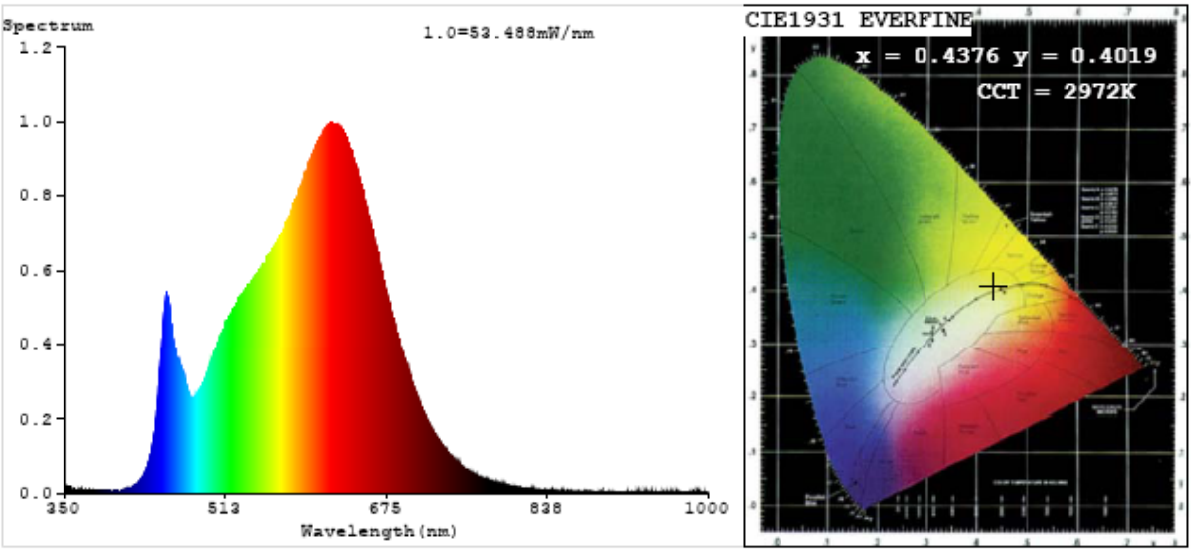
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120046	120.0	60	0.273	31.82	0.972

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2972
Duv	0.0010
Chromaticity (x, y)	x=0.4376 y=0.4019
Chromaticity (u', v')	u'=0.2519 v'=0.5206
Color Rendering Index (CRI)	94.1
R9	64
Total Luminous (lm)	2602.0
Luminous Efficacy (lm/W)	81.78

Special Color Rendering Indices			
R1	95	R9	64
R2	98	R10	95
R3	99	R11	96
R4	94	R12	82
R5	95	R13	96
R6	97	R14	99
R7	92	R15	91
R8	83	--	--

Spectral Power Distribution & Chromaticity Diagram



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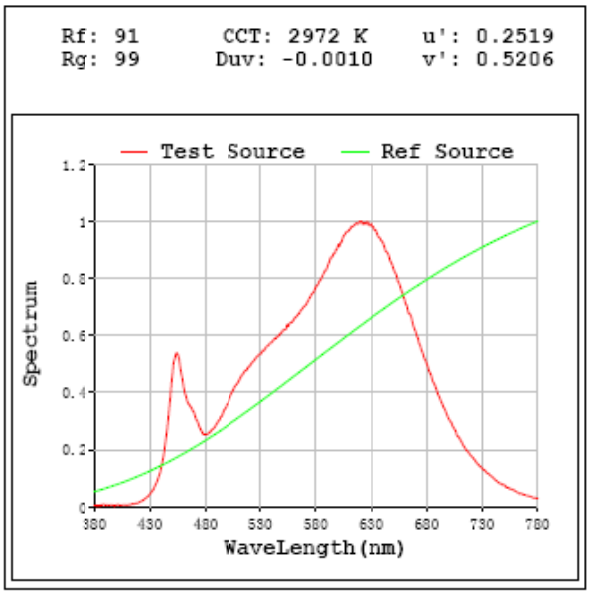
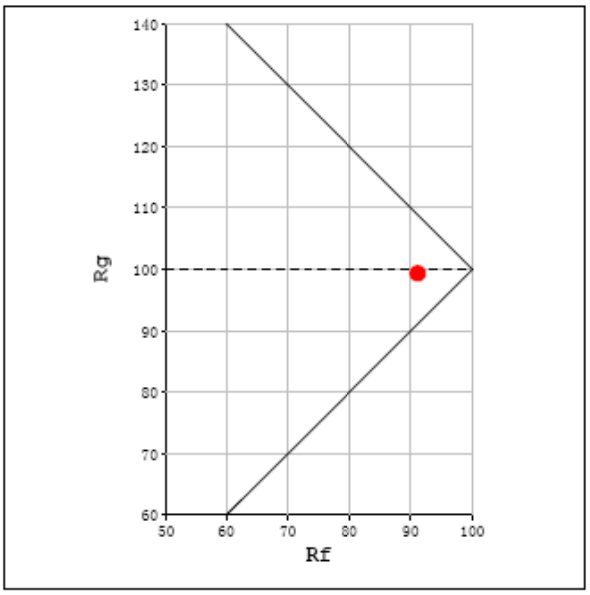
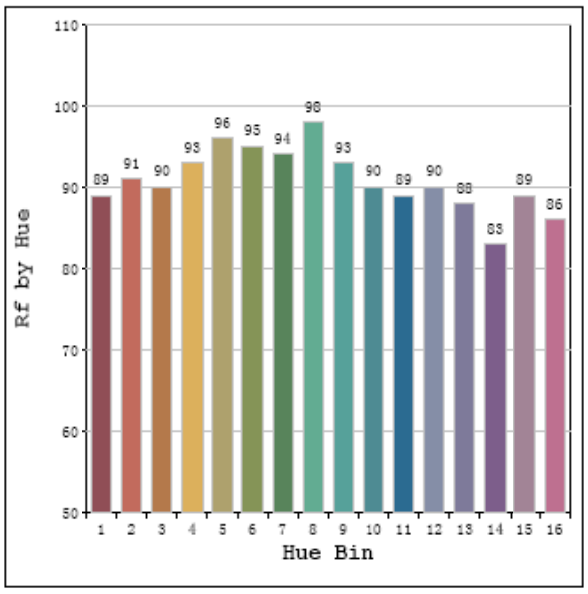

Rf: 91
CCT: 2972 K
u': 0.2519
Rg: 99
Duv: -0.0010
v': 0.5206
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
89
91
90
93
96
95
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98
93
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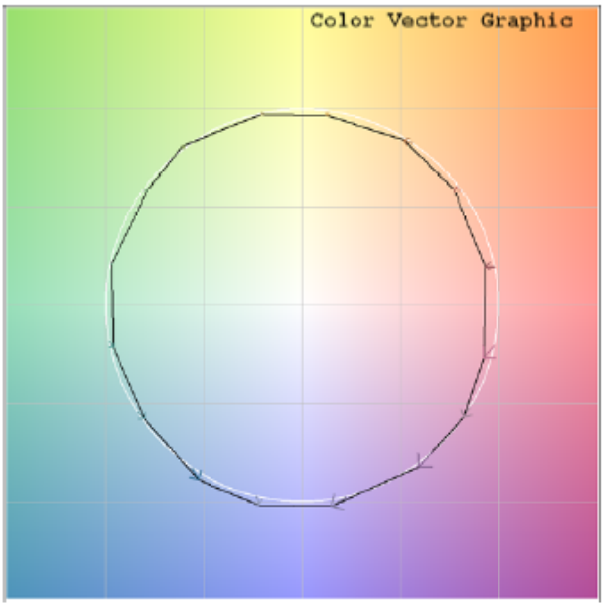
89
90
88
83
89
86


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	DLS0104(CRVFAD-18R-32-9CCT-120-BN)	3500K	

Electrical Measurement:

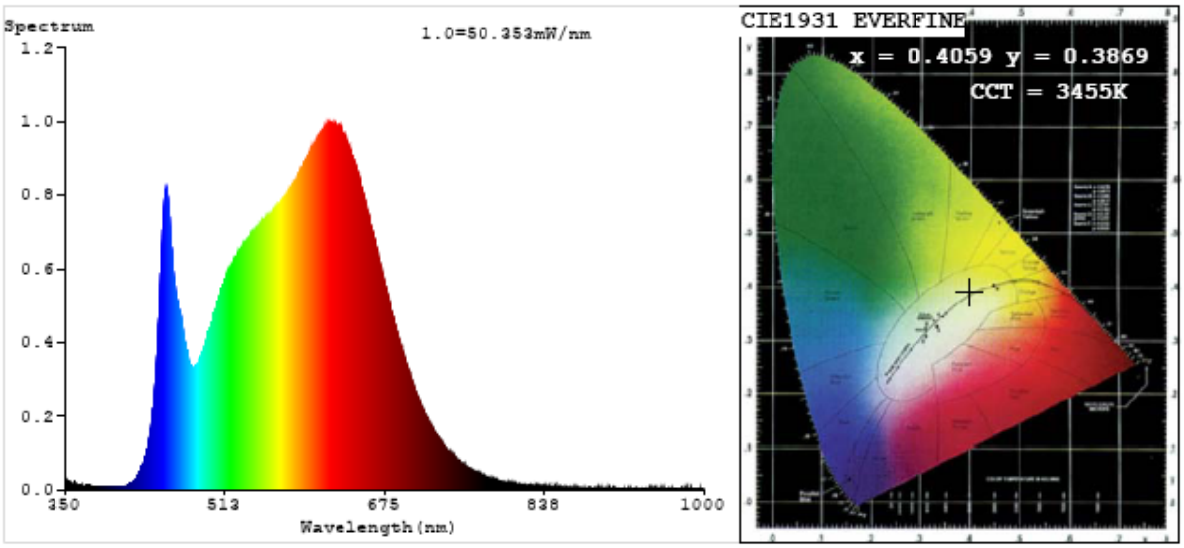
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120046	120.0	60	0.267	31.05	0.971

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3455
Duv	0.0018
Chromaticity (x, y)	x=0.4059 y=0.3869
Chromaticity (u', v')	u'=0.2377 v'=0.5098
Color Rendering Index (CRI)	95.4
R9	74
Total Luminous (lm)	2721.0
Luminous Efficacy (lm/W)	87.63

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

Spectral Power Distribution & Chromaticity Diagram



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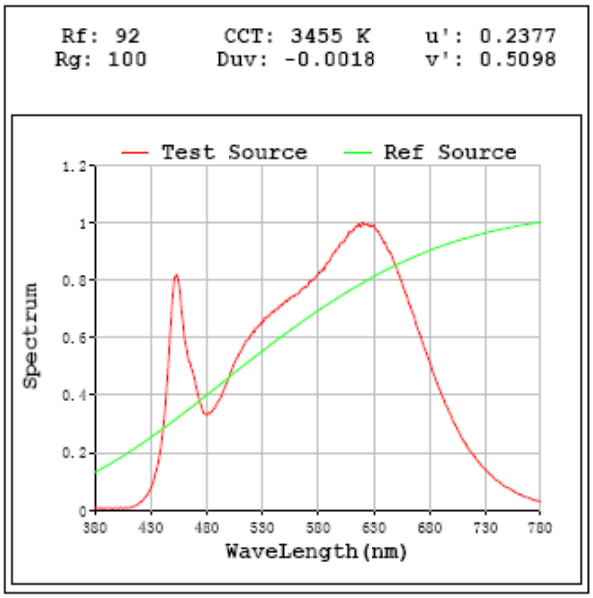
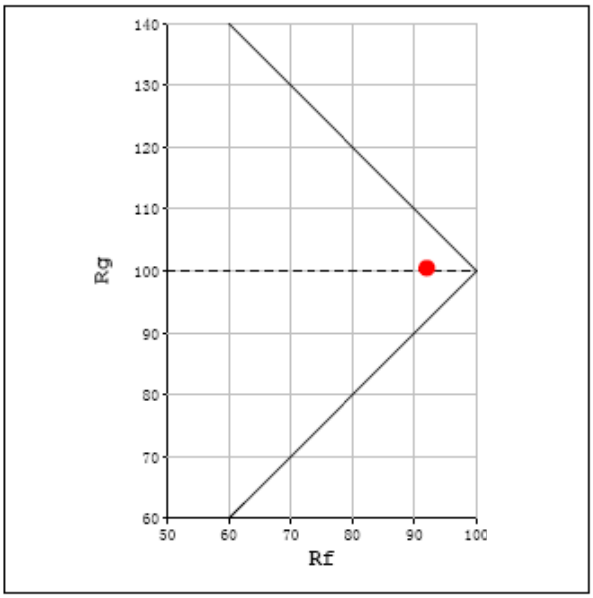
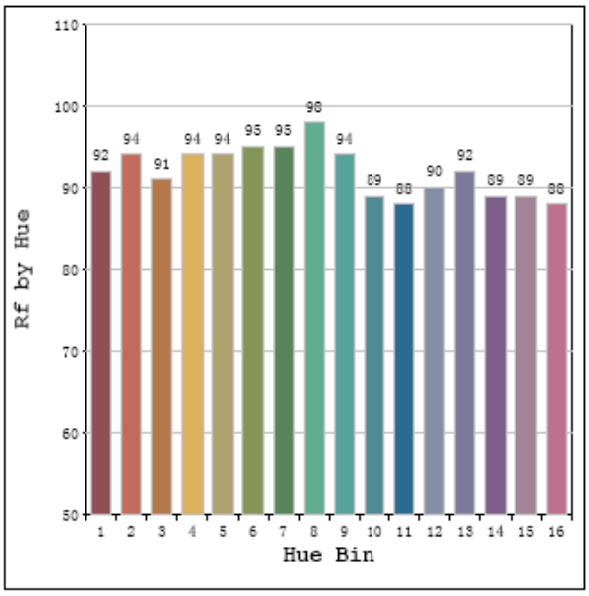
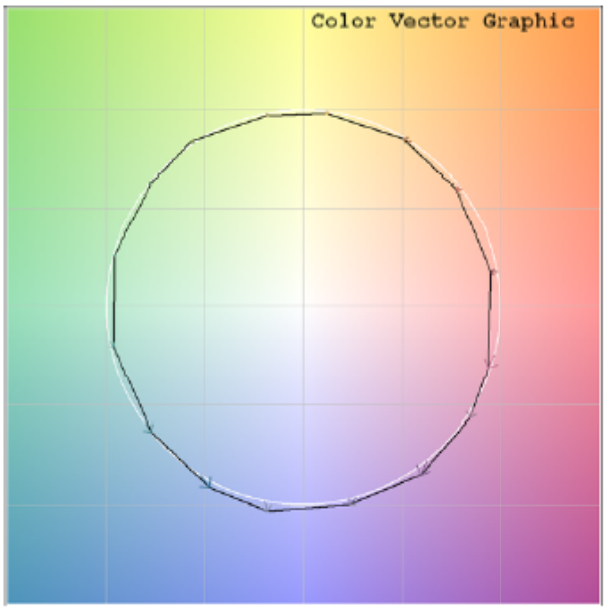

Rf: 92
CCT: 3455 K
u': 0.2377
Rg: 100
Duv: -0.0018
v': 0.5098
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
92 94 91 94 94 95 95 98 94 89 88 90 92 89 89 88


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	DLS0104(CRVFAD-18R-32-9CCT-120-BN)	4000K	

Electrical Measurement:

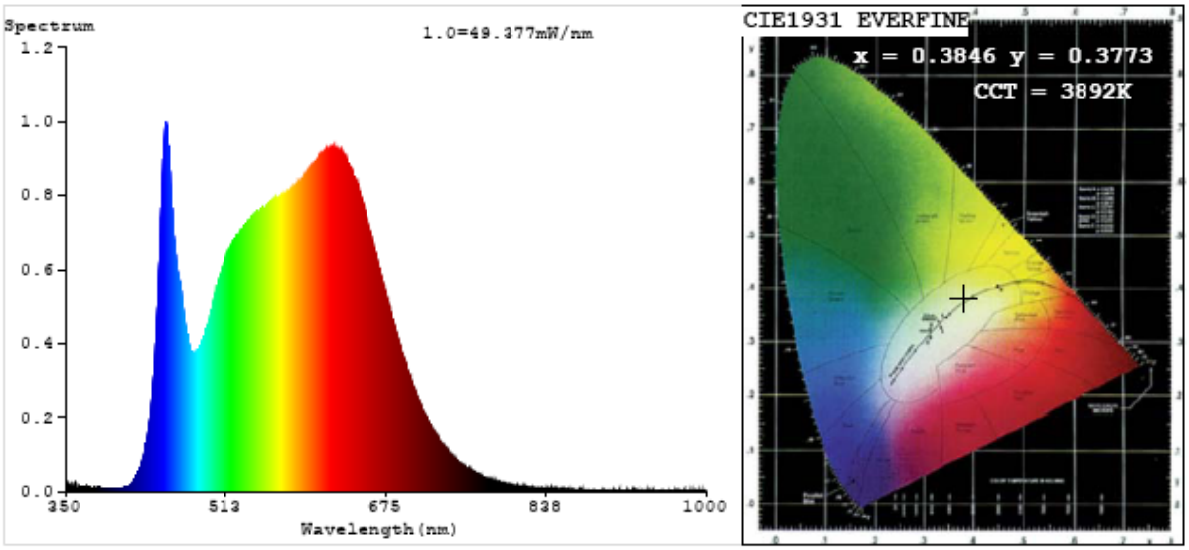
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120046	120.0	60	0.274	31.83	0.969

Chromaticity Measurement - Sphere-Spectroradiometer Method:

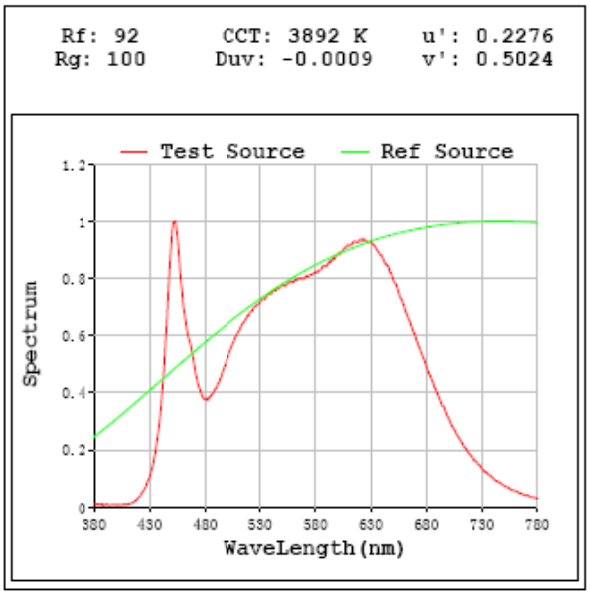
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3892
Duv	0.0009
Chromaticity (x, y)	x=0.3846y=0.3773
Chromaticity (u', v')	u'=0.2276 v'=0.5024
Color Rendering Index (CRI)	95.2
R9	78
Total Luminous (lm)	2726.0
Luminous Efficacy (lm/W)	85.64

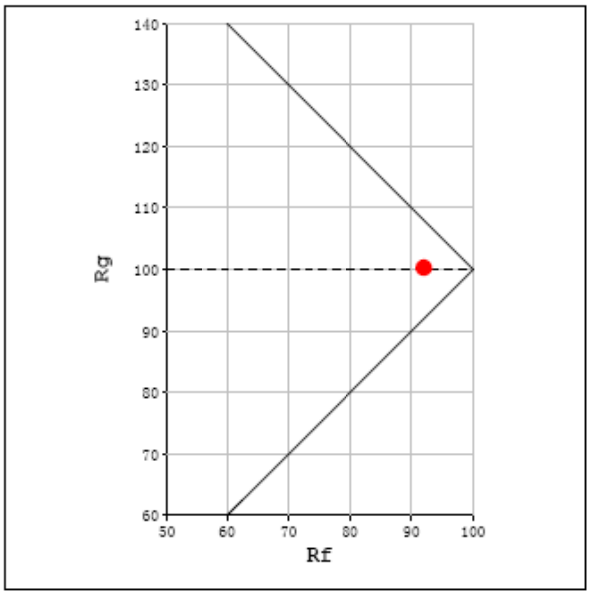
Special Color Rendering Indices			
R1	96	R9	78
R2	97	R10	92
R3	96	R11	95
R4	95	R12	74
R5	95	R13	97
R6	94	R14	97
R7	96	R15	95
R8	91	--	--

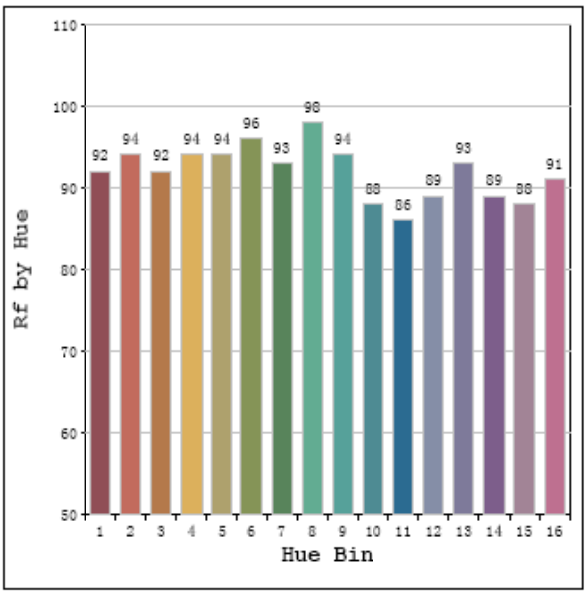
Spectral Power Distribution & Chromaticity Diagram

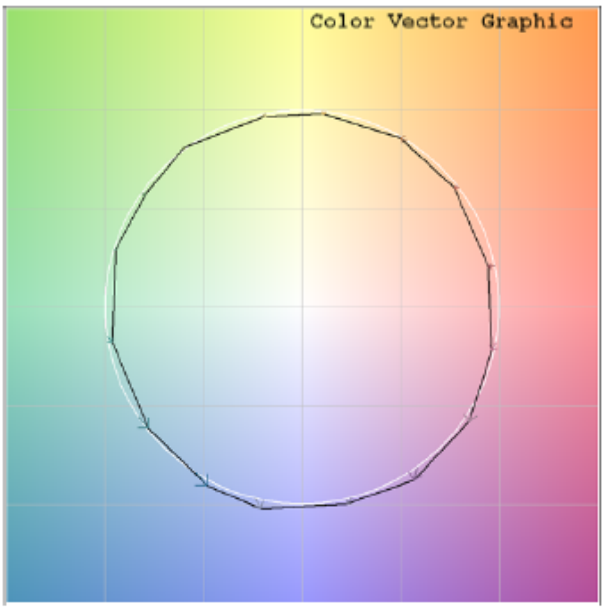


TM30


Rf: 92
CCT: 3892 K
u': 0.2276
Rg: 100
Duv: -0.0009
v': 0.5024
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 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0104(CRVFAD-18R-32-9CCT-120-BN)	5000K	

Electrical Measurement:

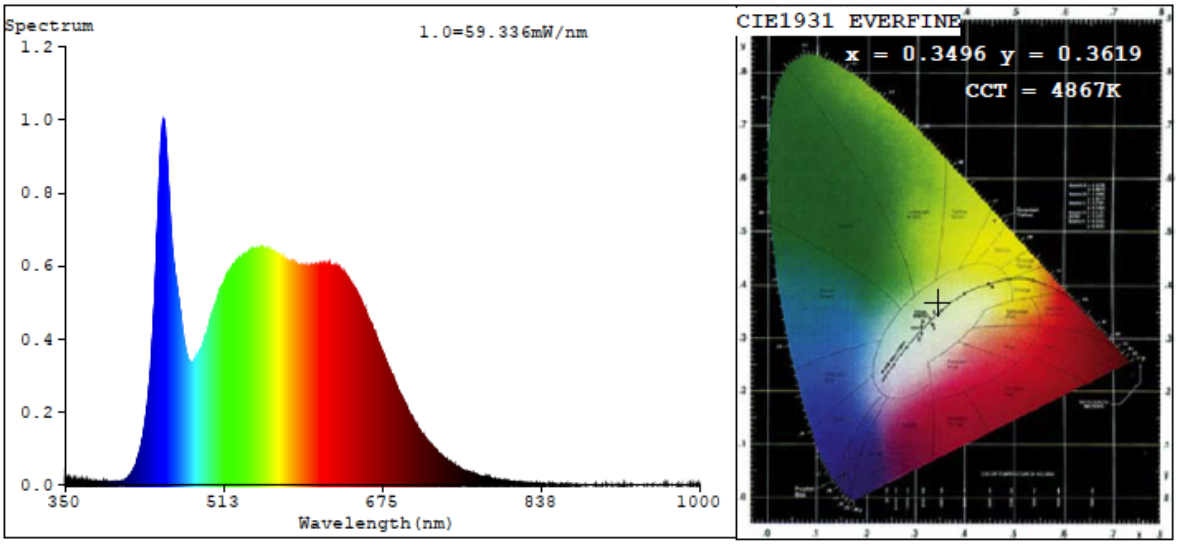
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120046	120.0	60	0.277	32.31	0.971

Chromaticity Measurement - Sphere-Spectroradiometer Method:

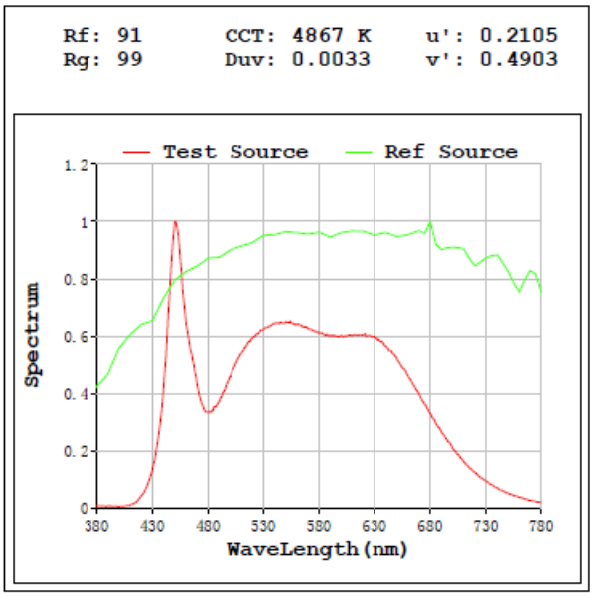
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4867
Duv	0.0033
Chromaticity (x, y)	x=0.3496y=0.3619
Chromaticity (u', v')	u'=0.2105 v'=0.4903
Color Rendering Index (CRI)	92.3
R9	71
Total Luminous (lm)	2576.0
Luminous Efficacy (lm/W)	79.73

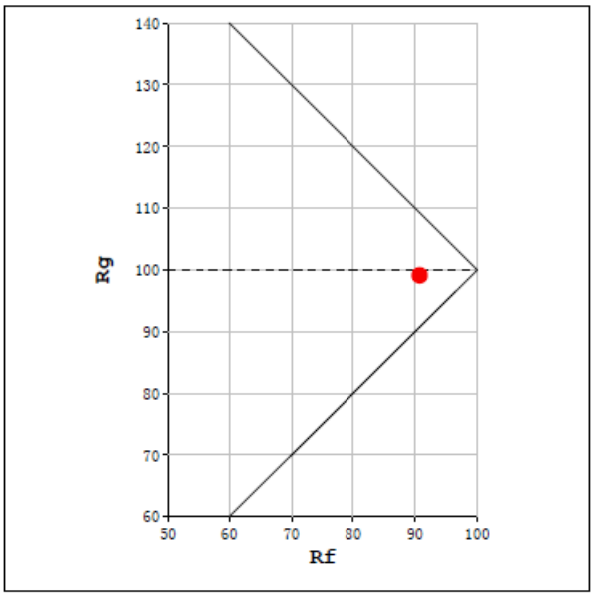
Special Color Rendering Indices			
R1	92	R9	71
R2	94	R10	84
R3	93	R11	91
R4	92	R12	66
R5	91	R13	92
R6	89	R14	96
R7	97	R15	91
R8	90	--	--

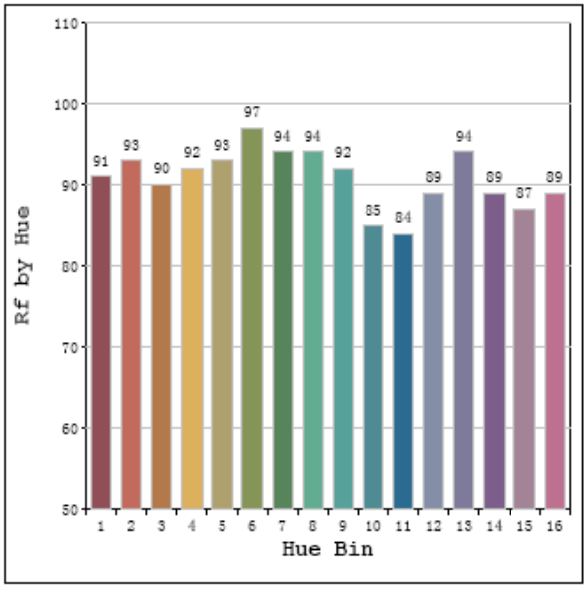
Spectral Power Distribution & Chromaticity Diagram

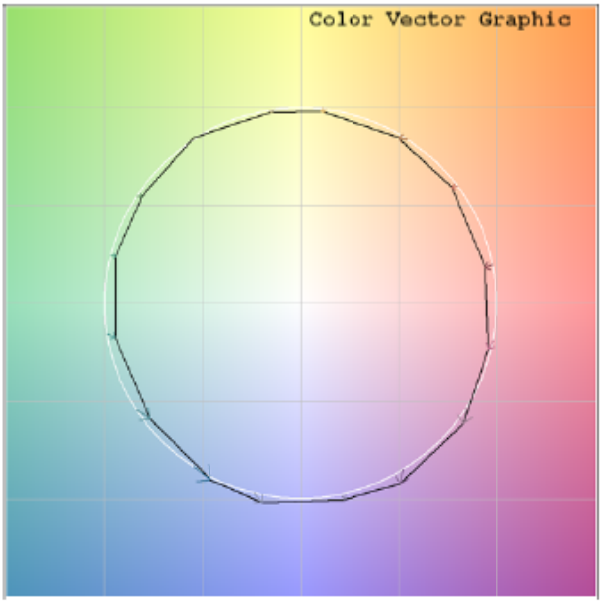


TM30



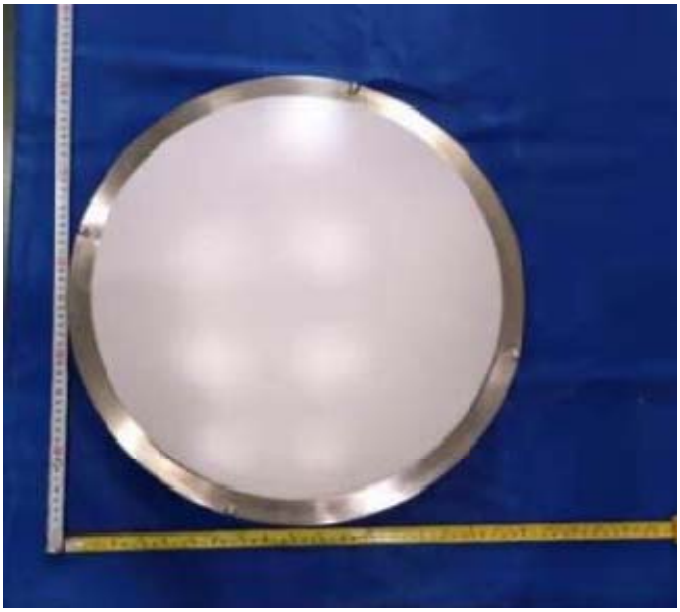


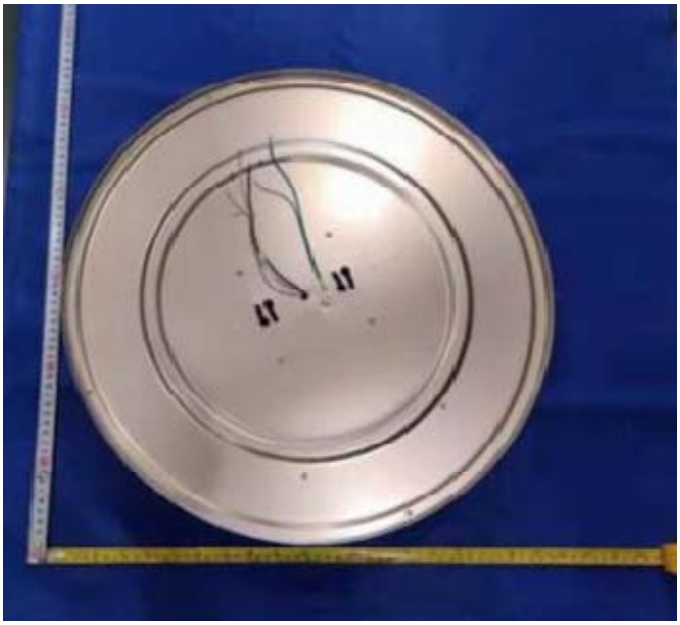




Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0104(CRVFAD-18R-32-9CCT-120-BN)	2700K setting	120.0	2470.2	31.90	77.44
	3000K setting	120.0	2602.0	31.82	81.78
	3500K setting	120.0	2721.0	31.05	87.63
	4000K setting	120.0	2726.0	31.83	85.64
	5000K setting	120.0	2576.0	32.31	78.73

3. Product Photo





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