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):
DLS0098(CRVFAS-19R-32-9CCT-120-W)

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: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120Vac, 60 Hz
Nominal Power	32.0W
Rated Initial Lamp Lumen	2450 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	DLS0098(CRVFAS-19R-32-9CCT-120-W)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120039	120.0	60	0.266	31.4	0.981

Chromaticity Measurement - Sphere-Spectroradiometer Method:

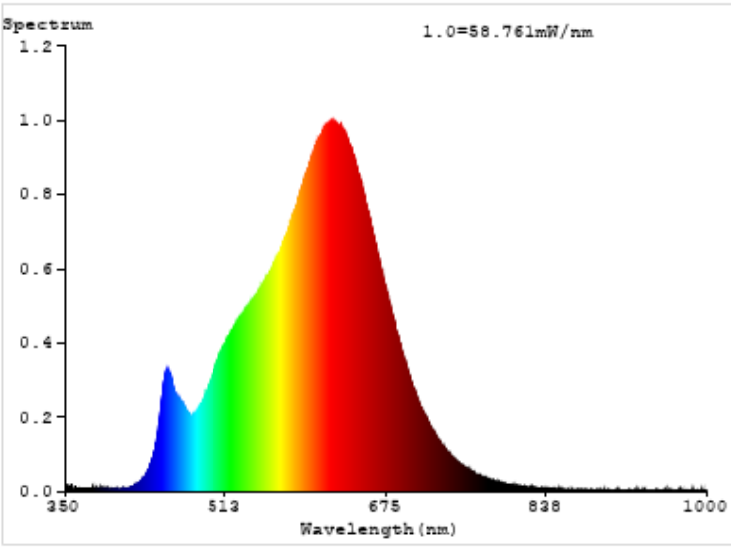
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2702
Duv	0.0015
Chromaticity (x, y)	x=0.4623 y=0.4152
Chromaticity (u', v')	u'=0.2620 v'=0.5294
Color Rendering Index (CRI)	93.1
R9	57

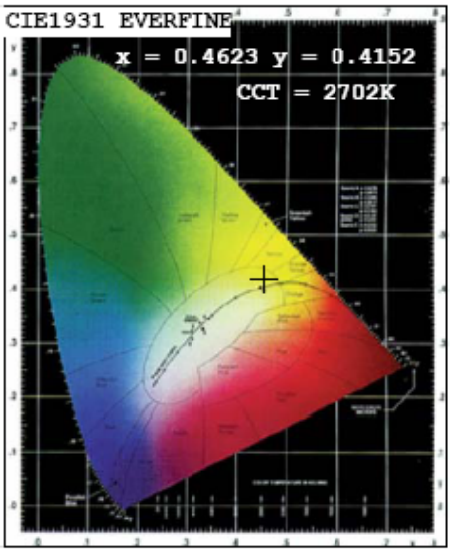
Special Color Rendering Indices			
R1	93	R9	57
R2	98	R10	93
R3	99	R11	95
R4	93	R12	85
R5	93	R13	95
R6	98	R14	100
R7	91	R15	88
R8	80	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2683.3
Luminous Efficacy (lm/W)	85.45
Beam Angle (°)	118.1
Center Beam Candle Power (cd)	813.9

Spectral Power Distribution & Chromaticity Diagram





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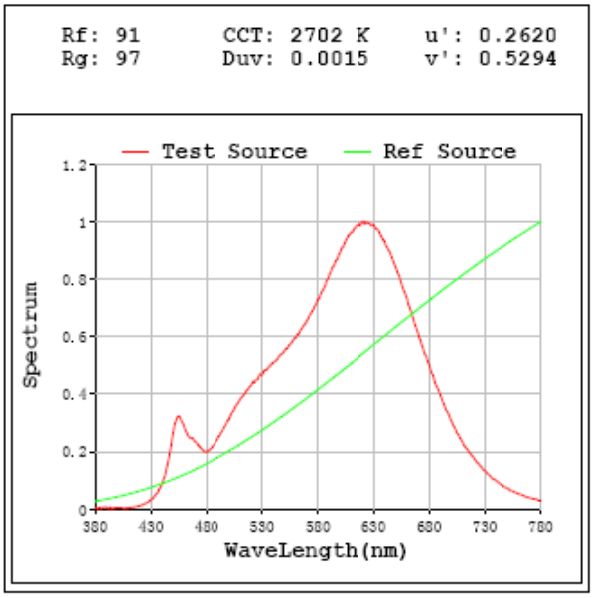
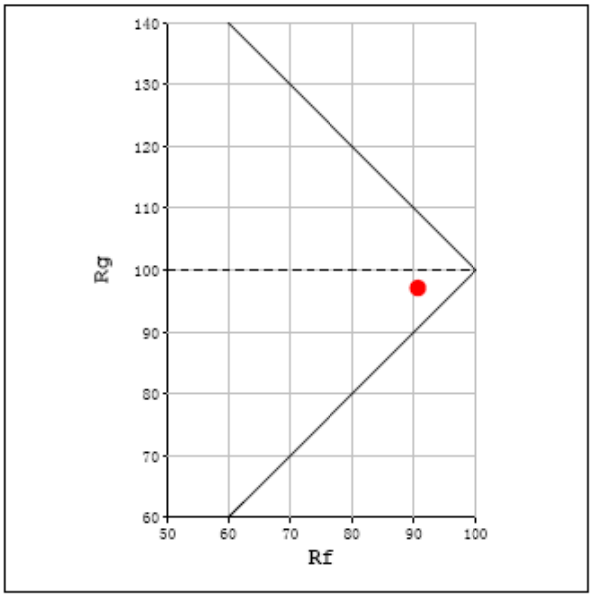
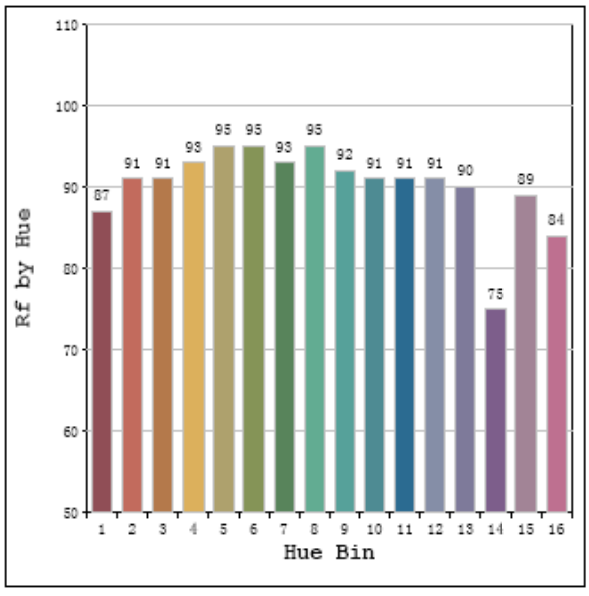
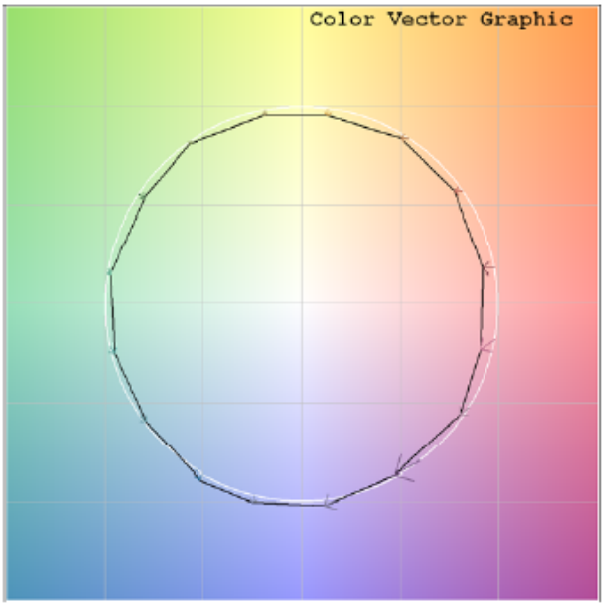






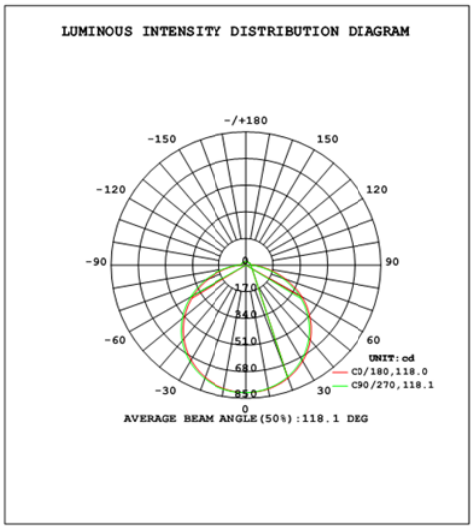


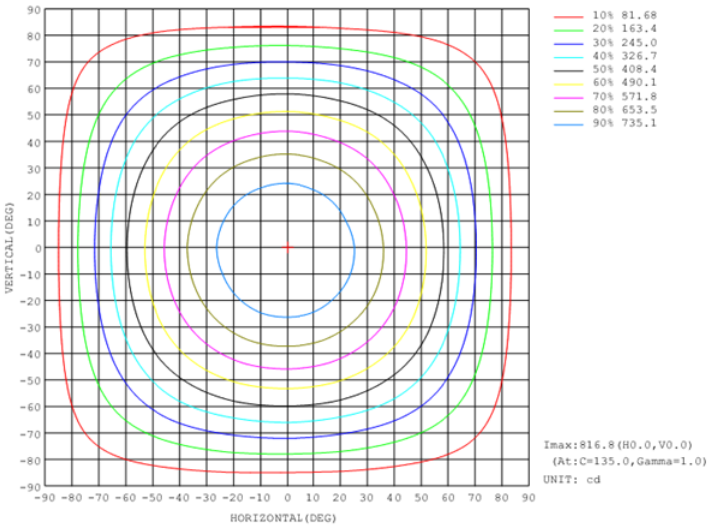
Zonal Lumen Tabulation

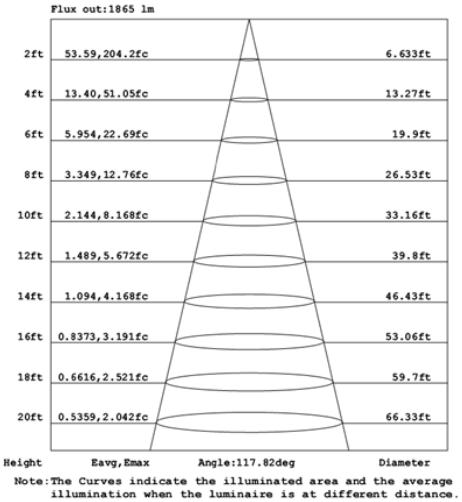
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	638.9	23.8%
0-40	1054.7	39.3%
0-60	1903.2	70.9%
60-90	610.7	22.8%
70-100	323.3	12.1%
90-120	93.2	3.5%
0-90	2513.9	93.7%
90-180	169.4	6.3%
0-180	2683.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	77.1	2.9%	90-100	36.1	1.3%
10-20	222.0	8.3%	100-110	30.4	1.1%
20-30	339.9	12.7%	110-120	26.6	1.0%
30-40	415.8	15.5%	120-130	22.8	0.8%
40-50	439.9	16.4%	130-140	18.9	0.7%
50-60	408.5	15.2%	140-150	14.9	0.6%
60-70	323.5	12.1%	150-160	10.8	0.4%
70-80	202.2	7.5%	160-170	6.6	0.2%
80-90	85.0	3.2%	170-180	2.2	0.1%

Photometric Data







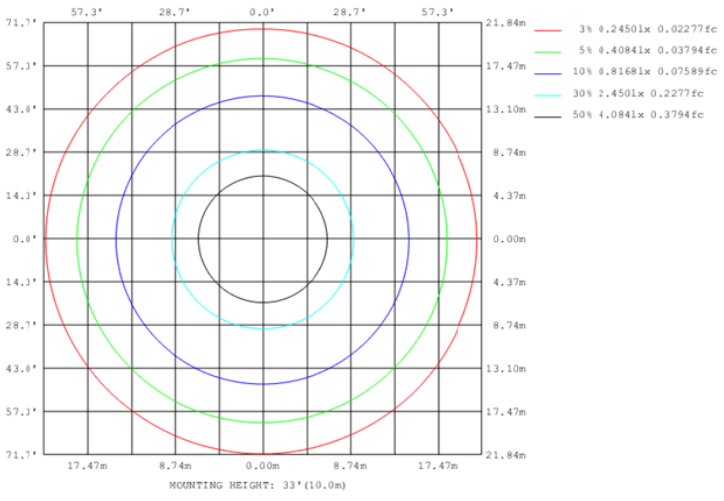


Table--1

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	814	814	814	814	814	814	814	814	814	814	814	814	814	814	814	814			
5	809	811	811	812	812	812	812	812	811	810	810	809	809	809	809	809			
10	800	802	803	804	804	805	804	803	803	801	801	799	799	798	799	799			
15	784	786	787	790	791	791	790	790	788	786	785	783	782	781	782	782			
20	762	765	767	770	770	771	770	769	767	764	763	760	759	758	759	760			
25	733	738	739	743	744	745	744	743	740	737	735	732	731	729	730	731			
30	699	704	707	711	712	714	712	711	707	703	701	697	696	694	696	696			
35	659	665	668	673	673	676	674	673	669	664	661	657	656	654	655	656			
40	614	620	624	629	630	633	630	629	625	620	617	612	610	608	610	611			
45	564	570	574	580	582	584	582	580	576	570	567	561	560	557	559	560			
50	509	516	520	526	528	531	528	526	522	516	512	506	505	502	504	505			
55	449	457	461	468	470	473	470	469	464	457	453	447	445	442	444	445			
60	386	394	398	406	408	411	408	407	402	395	391	384	382	379	381	382			
65	319	322	332	338	342	343	342	339	334	329	320	318	311	312	310	315			
70	251	255	264	268	274	273	274	269	265	261	253	250	244	244	243	248			
75	184	188	196	200	206	206	206	202	198	194	187	183	178	176	177	180			
80	119	125	129	136	138	141	139	138	135	128	125	119	117	114	116	116			
85	67.5	72.2	74.9	80.1	81.5	84.2	82.4	81.9	80.7	75.9	73.7	69.2	68.0	65.5	66.6	66.7			
90	38.4	40.5	42.1	45.0	46.0	47.1	46.0	45.6	45.4	43.3	42.4	40.5	39.9	38.5	38.7	38.7			
95	30.0	30.5	31.0	31.9	32.1	32.4	32.2	32.1	32.9	32.3	32.0	31.7	31.4	31.1	30.9	30.9			
100	28.4	28.7	29.2	29.7	29.9	30.0	29.8	29.6	31.0	30.8	30.7	30.5	30.3	30.0	29.8	29.8			
105	27.1	27.4	27.8	28.3	28.5	28.5	28.4	28.2	30.0	29.8	29.8	29.6	29.4	29.1	28.9	28.9			
110	26.0	26.3	26.7	27.1	27.2	27.3	27.1	27.0	29.1	28.9	28.9	28.7	28.5	28.3	28.1	28.0			
115	25.1	25.4	25.7	26.1	26.2	26.2	26.0	25.9	28.2	28.1	28.1	27.9	27.7	27.5	27.3	27.3			
120	24.4	24.6	24.9	25.2	25.3	25.3	25.2	25.1	27.4	27.3	27.3	27.2	27.0	26.8	26.6	26.6			
125	23.8	24.0	24.3	24.5	24.6	24.6	24.4	24.4	26.7	26.6	26.6	26.5	26.4	26.2	26.0	26.0			
130	23.4	23.5	23.7	24.0	24.0	24.0	23.9	23.8	26.1	26.0	26.1	25.9	25.9	25.7	25.6	25.5			
135	23.0	23.2	23.3	23.5	23.5	23.5	23.4	23.3	25.5	25.5	25.6	25.5	25.4	25.3	25.2	25.1			
140	22.8	22.9	23.1	23.1	23.1	23.2	23.1	23.0	25.1	25.1	25.1	25.0	25.0	24.9	24.9	24.8			
145	22.7	22.7	22.9	22.9	22.9	22.9	22.8	22.7	24.7	24.7	24.7	24.7	24.7	24.7	24.6	24.5			
150	22.6	22.7	22.8	22.8	22.6	22.7	22.6	22.9	24.3	24.4	24.4	24.4	24.4	24.4	24.4	24.5			
155	22.7	22.7	22.8	22.7	22.5	22.5	22.6	22.5	24.1	24.1	24.1	24.0	24.2	24.2	24.2	24.0			
160	22.8	22.8	22.8	22.5	22.5	22.5	22.5	22.5	23.8	23.9	23.9	23.7	23.8	24.0	23.9	23.8			
165	22.9	22.9	22.6	22.5	22.5	22.4	22.5	22.6	23.7	23.6	23.5	23.4	23.5	23.7	23.7	23.7			
170	23.1	22.8	22.7	22.7	22.6	22.5	22.5	22.6	23.4	23.4	23.4	23.4	23.4	23.4	23.5	23.6			
175	23.1	23.1	23.0	23.0	22.9	22.9	22.8	22.9	23.4	23.4	23.5	23.4	23.4	23.4	23.4	23.4			
180	23.4	23.5	23.5	23.5	23.4	23.4	23.4	23.4	23.5	23.5	23.5	23.4	23.4	23.4	23.4	23.4			

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	DLS0098(CRVFAS-19R-32-9CCT-120-W)	3000K	

Electrical Measurement:

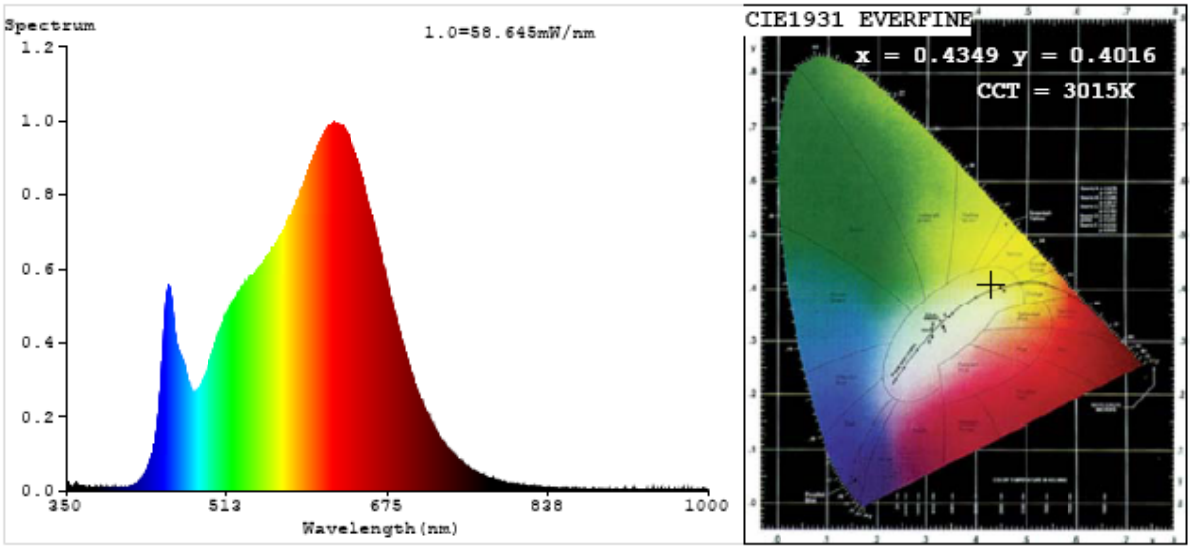
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120039	120.0	60	0.268	31.57	0.980

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3015
Duv	0.0007
Chromaticity (x, y)	x=0.4349 y=0.4016
Chromaticity (u', v')	u'=0.2503 v'=0.5201
Color Rendering Index (CRI)	94.9
R9	68
Total Luminous (lm)	2875.0
Luminous Efficacy (lm/W)	91.06

Special Color Rendering Indices			
R1	96	R9	68
R2	99	R10	96
R3	99	R11	97
R4	95	R12	82
R5	96	R13	97
R6	97	R14	99
R7	93	R15	92
R8	85	--	--

Spectral Power Distribution & Chromaticity Diagram



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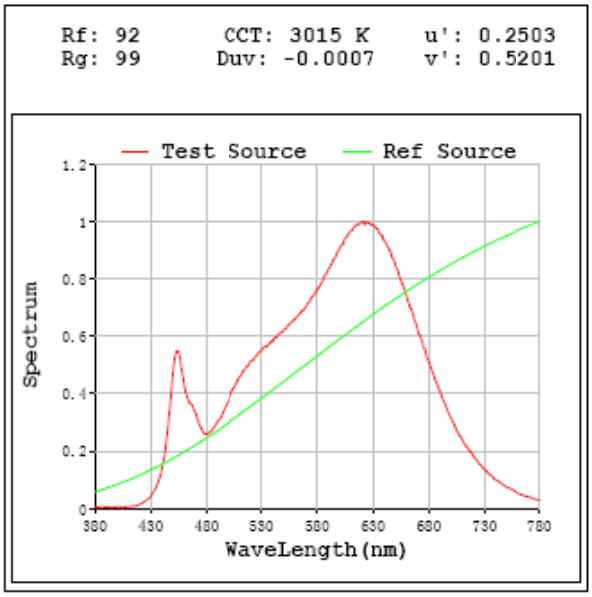
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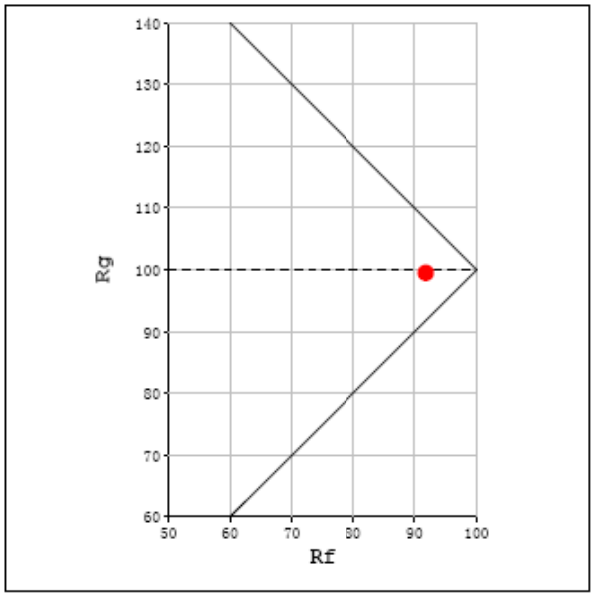
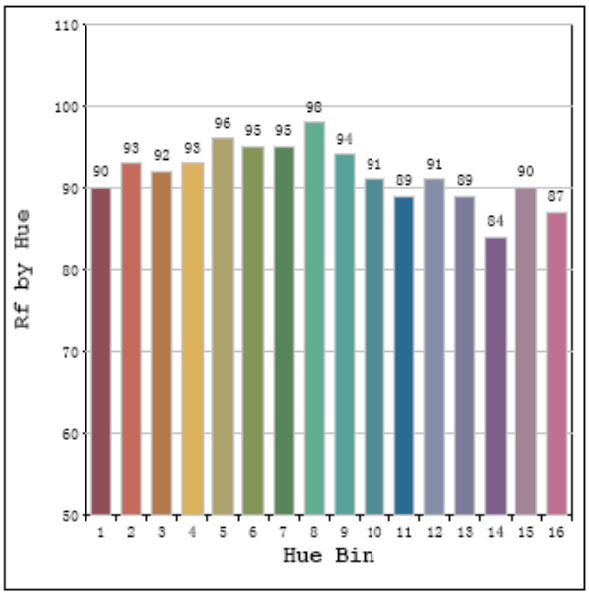
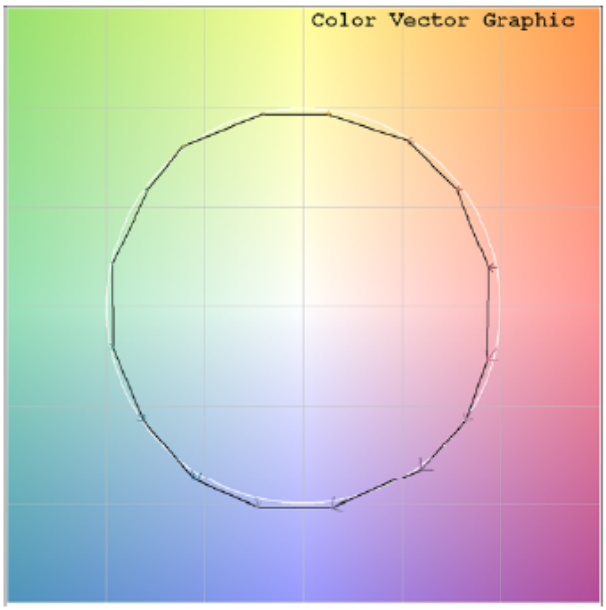
CCT: 3015 K
u': 0.2503
Rg: 99
Duv: -0.0007
v': 0.5201
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
90
93
92
93
96
95
95
98
94
91
89
91
89
84
90
87


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	DLS0098(CRVFAS-19R-32-9CCT-120-W)	3500K	

Electrical Measurement:

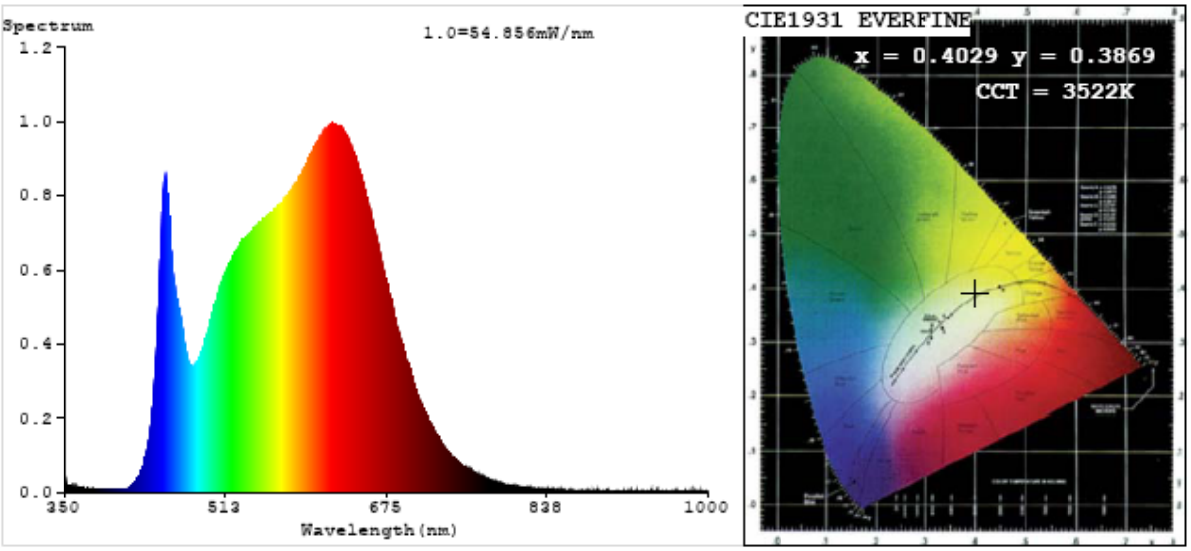
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120039	120.0	60	0.262	30.82	0.980

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3522
Duv	0.0011
Chromaticity (x, y)	x=0.4029 y=0.3869
Chromaticity (u', v')	u'=0.2357 v'=0.5093
Color Rendering Index (CRI)	96.0
R9	78
Total Luminous (lm)	3007.0
Luminous Efficacy (lm/W)	97.58

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

Spectral Power Distribution & Chromaticity Diagram



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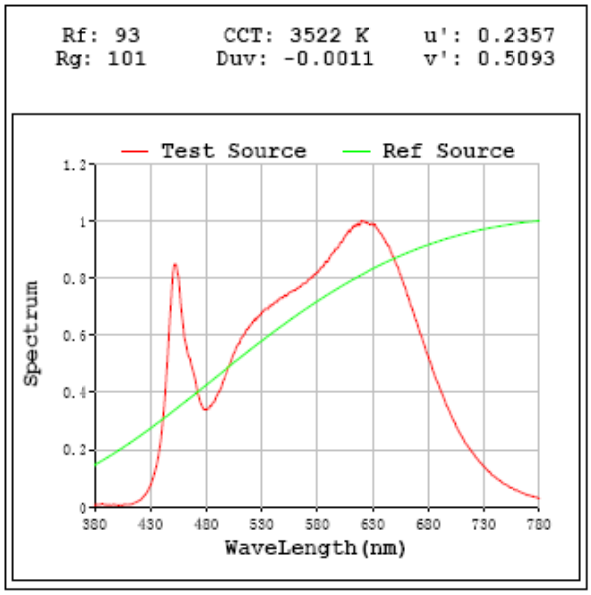
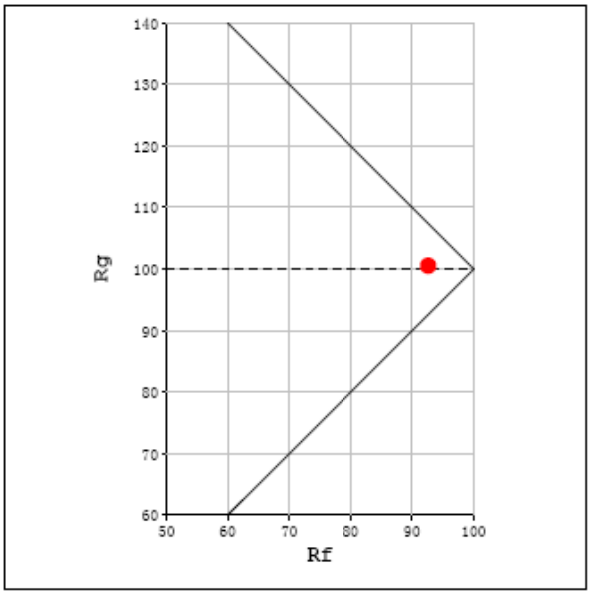
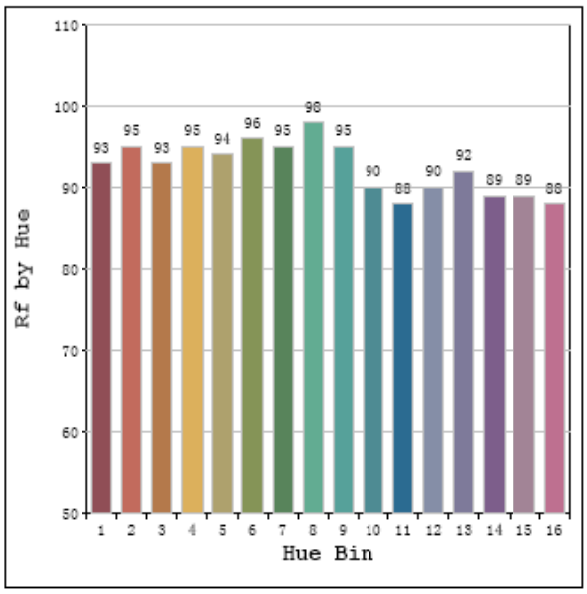
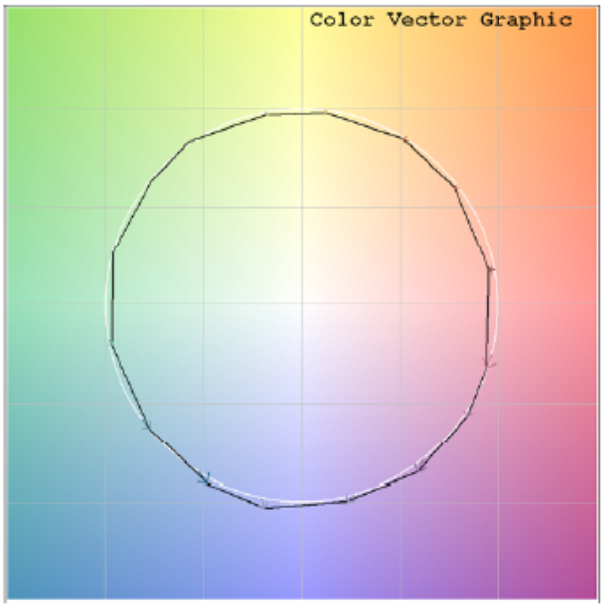

Rf: 93
Rg: 101
CCT: 3522 K
Duv: -0.0011
u': 0.2357
v': 0.5093
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
93
95
93
95
94
96
95
98
95
90
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 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0098(CRVFAS-19R-32-9CCT-120-W)	4000K	

Electrical Measurement:

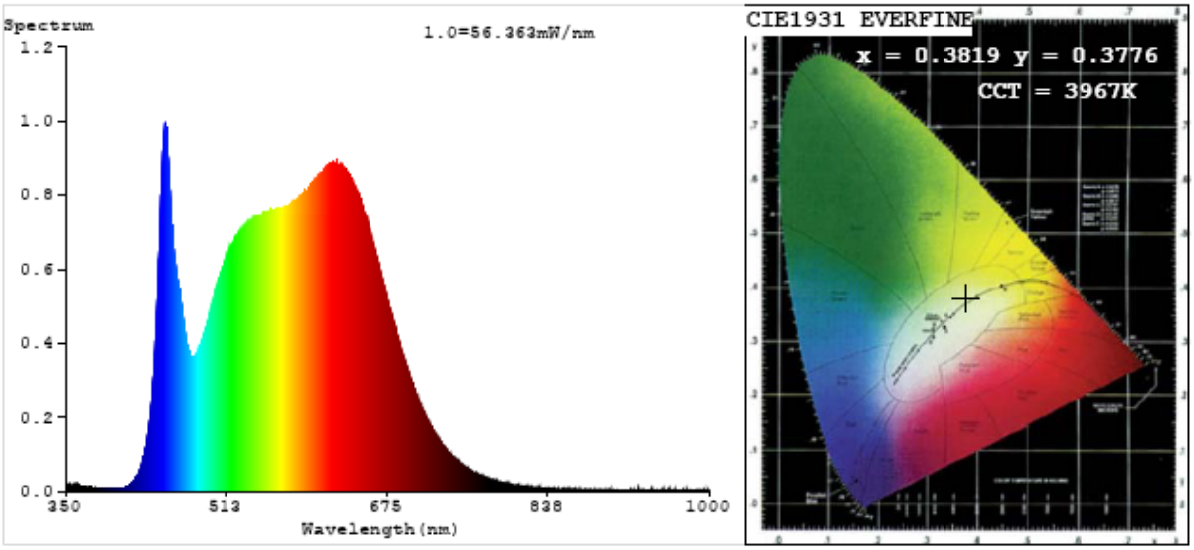
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120039	120.0	60	0.269	31.68	0.981

Chromaticity Measurement - Sphere-Spectroradiometer Method:

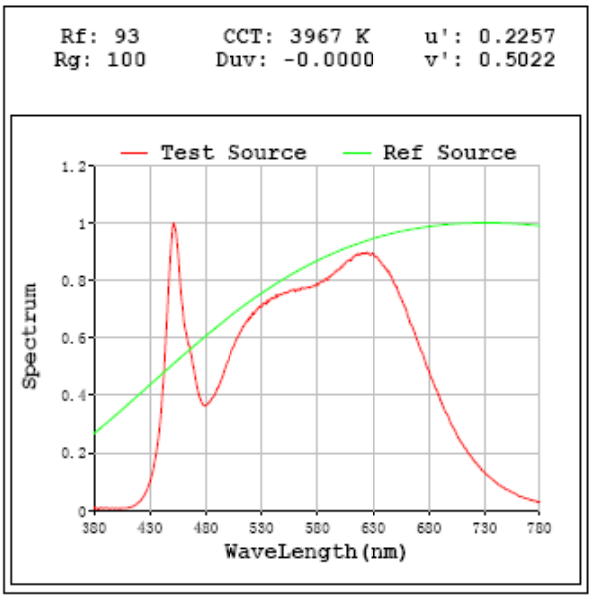
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3967
Duv	0.0000
Chromaticity (x, y)	x=0.3819 y=0.3776
Chromaticity (u', v')	u'=0.2257 v'=0.5022
Color Rendering Index (CRI)	95.6
R9	81
Total Luminous (lm)	3029.0
Luminous Efficacy (lm/W)	95.61

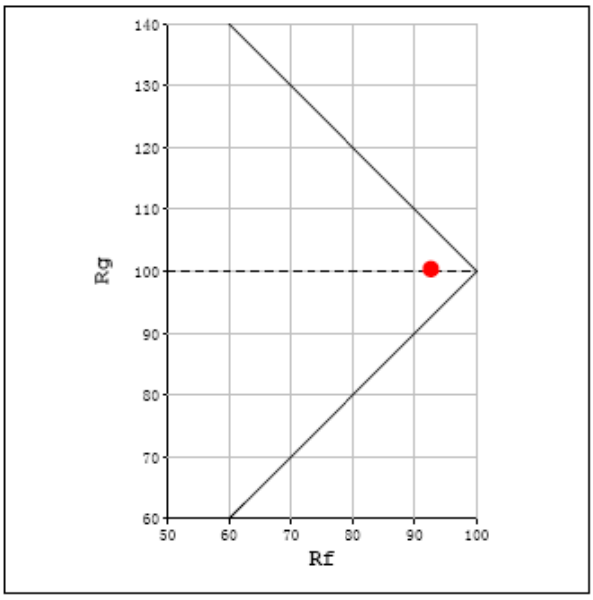
Special Color Rendering Indices			
R1	97	R9	81
R2	97	R10	92
R3	96	R11	96
R4	96	R12	74
R5	95	R13	97
R6	94	R14	97
R7	97	R15	95
R8	93	--	--

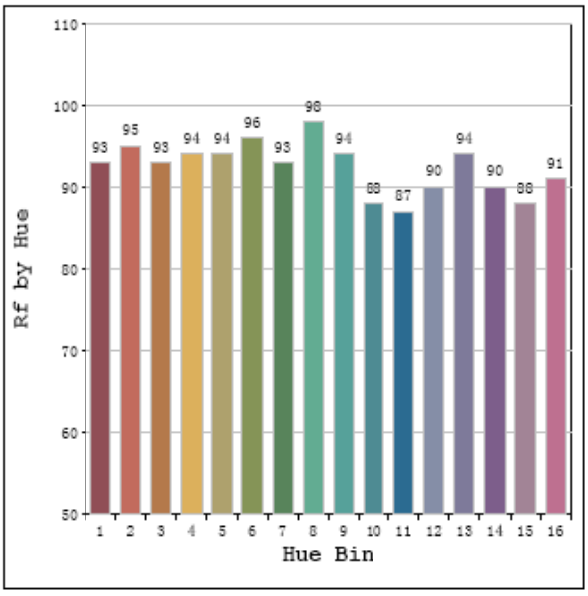
Spectral Power Distribution & Chromaticity Diagram

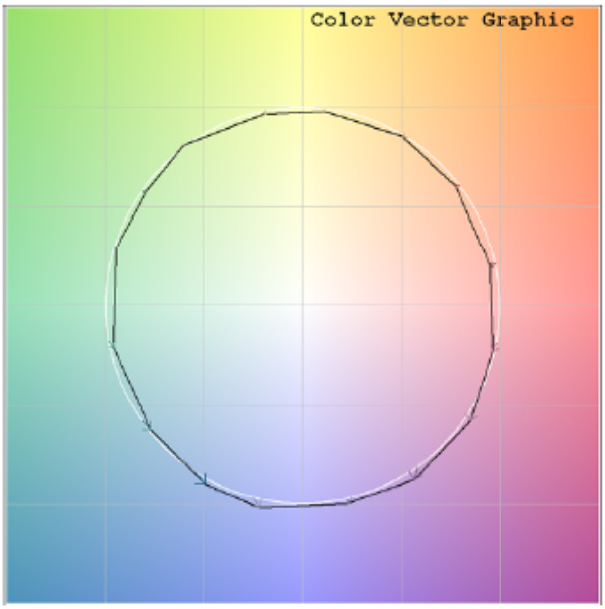


TM30


Rf: 93
CCT: 3967 K
u': 0.2257
Rg: 100
Duv: -0.0000
v': 0.5022
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
93 95 93 94 94 96 93 98 94 88 87 90 94 90 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	DLS0098(CRVFAS-19R-32-9CCT-120-W)	5000K	

Electrical Measurement:

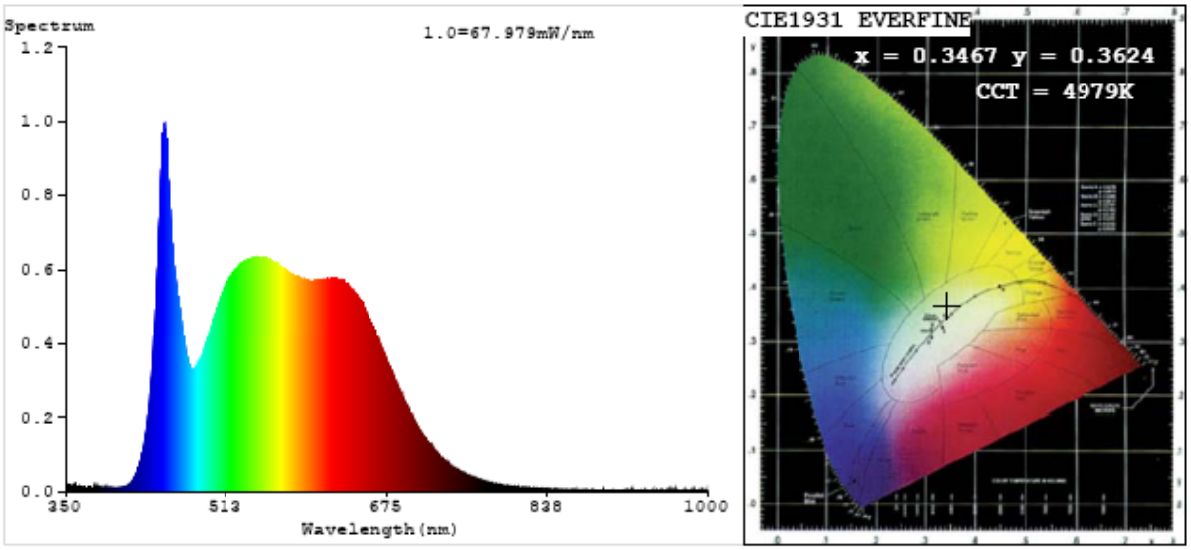
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120039	120.0	60	0.274	32.21	0.981

Chromaticity Measurement - Sphere-Spectroradiometer Method:

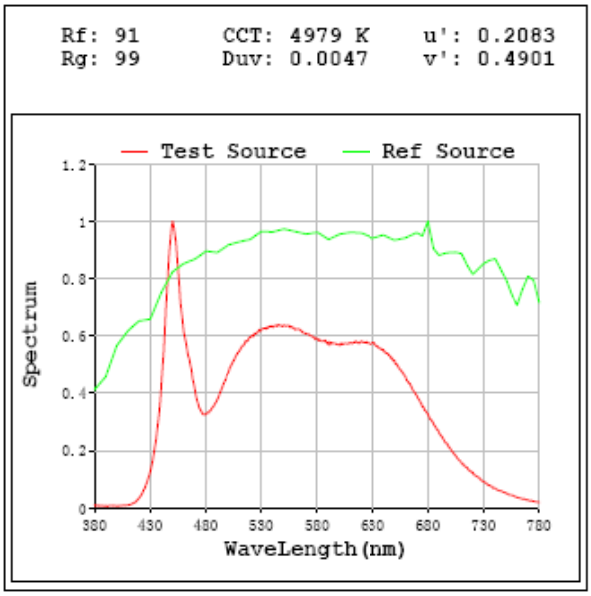
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4979
Duv	0.0047
Chromaticity (x, y)	x=0.3467 y=0.3624
Chromaticity (u', v')	u'=0.2083 v'=0.4901
Color Rendering Index (CRI)	92.2
R9	72
Total Luminous (lm)	2879.0
Luminous Efficacy (lm/W)	89.38

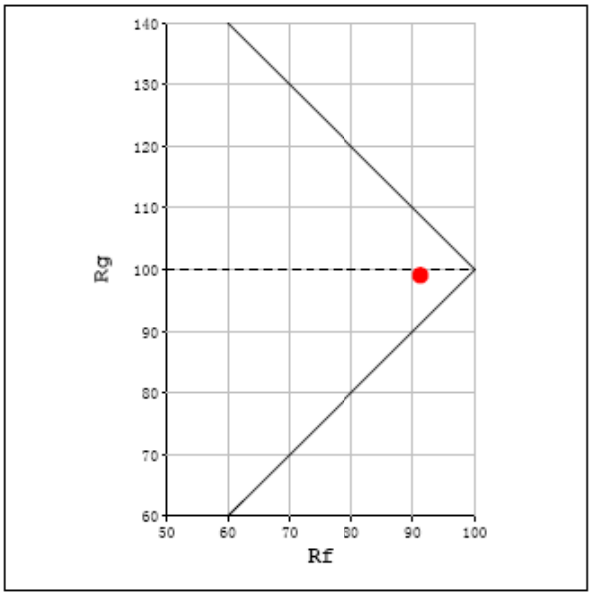
Special Color Rendering Indices			
R1	92	R9	72
R2	93	R10	83
R3	93	R11	91
R4	92	R12	65
R5	90	R13	92
R6	89	R14	96
R7	97	R15	90
R8	91	--	--

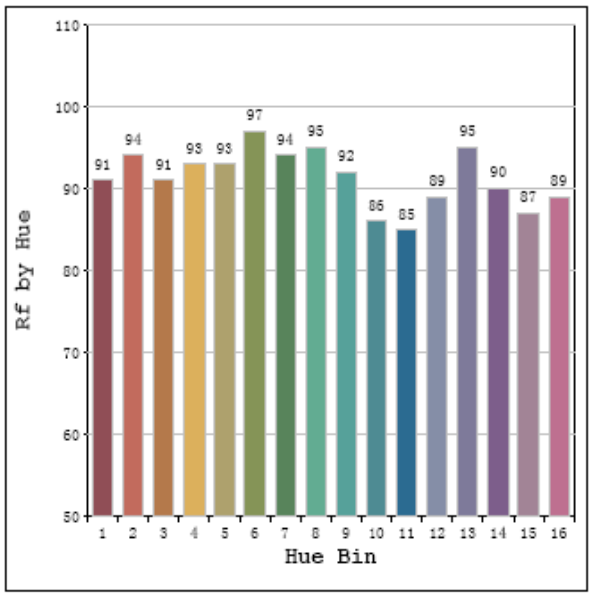
Spectral Power Distribution & Chromaticity Diagram

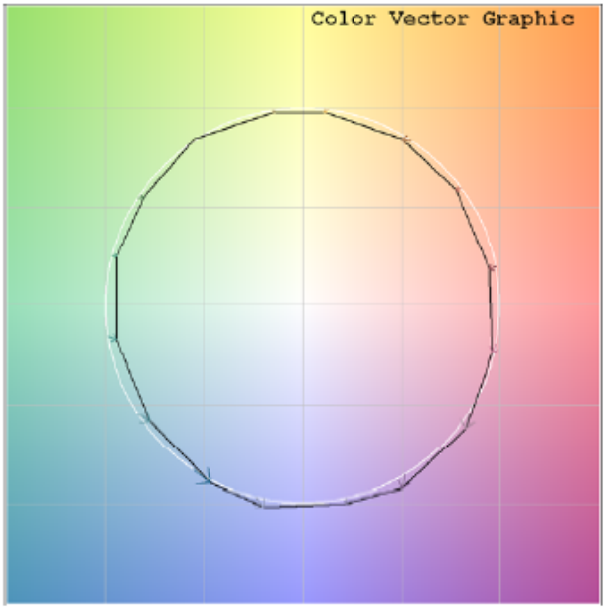


TM30



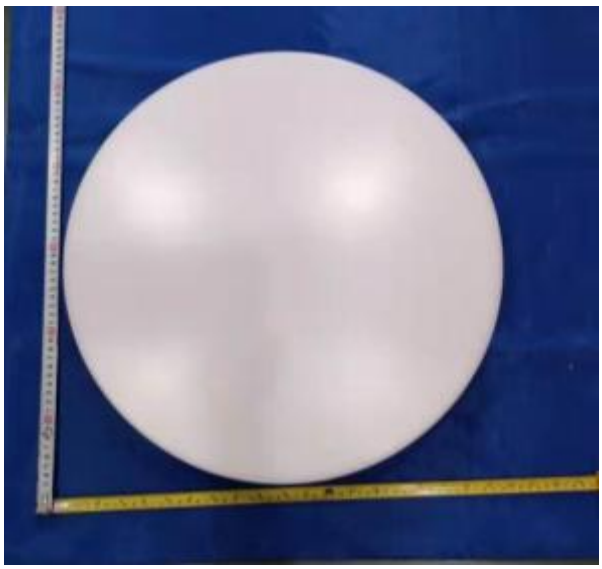


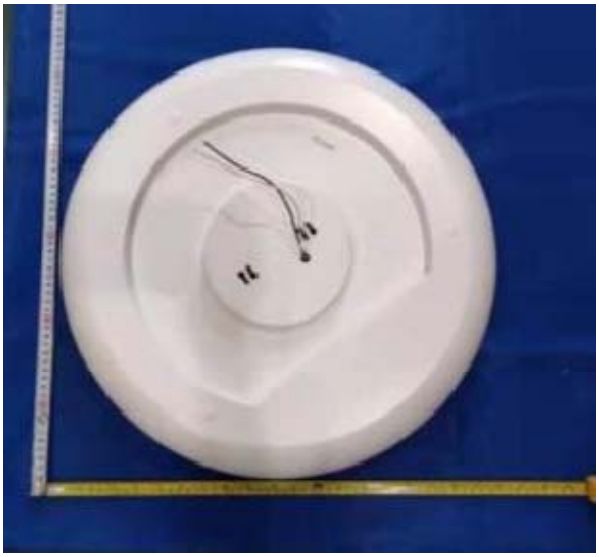




Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0098(CRVFAS-19R-32-9CCT-120-W)	2700K setting	120.0	2683.3	31.40	85.45
	3000K setting	120.0	2875.0	31.57	91.06
	3500K setting	120.0	3007.0	30.82	97.58
	4000K setting	120.0	3029.0	31.68	95.61
	5000K setting	120.0	2879.0	32.21	89.38

3. Product Photo





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