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):
DLS0096(CRVFAS-11R-16-9CCT-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	16.0W
Rated Initial Lamp Lumen	1150 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	DLS0096(CRVFAS-11R-16-9CCT-120-W)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120037	120.0	60	0.137	15.90	0.969

Chromaticity Measurement - Sphere-Spectroradiometer Method:

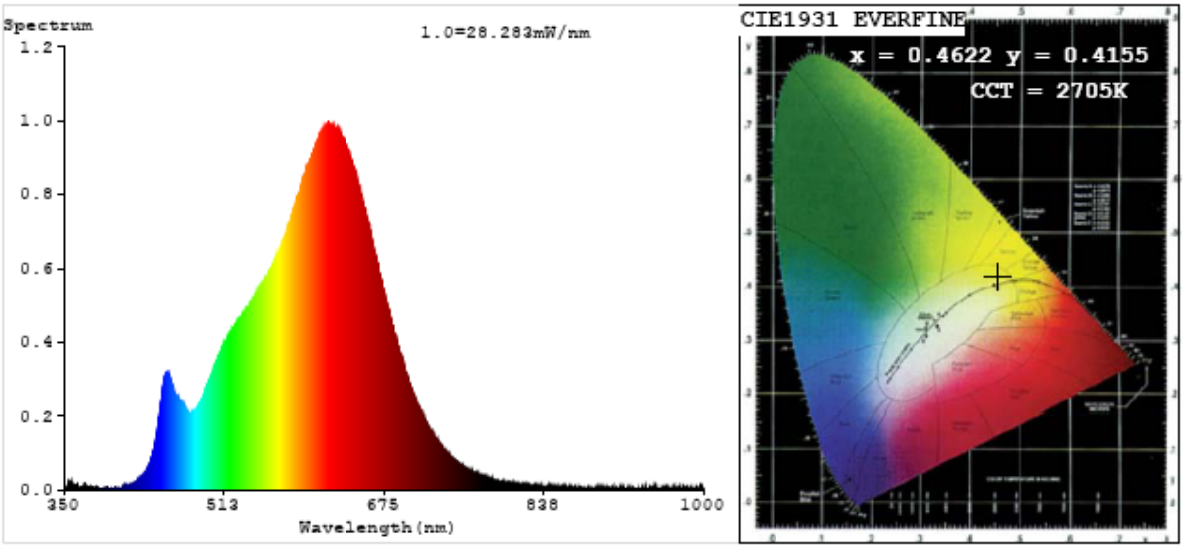
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2705
Duv	0.0016
Chromaticity (x, y)	x=0.4622 y=0.4155
Chromaticity (u', v')	u'=0.2618 v'=0.5295
Color Rendering Index (CRI)	92.7
R9	55

Special Color Rendering Indices			
R1	93	R9	55
R2	97	R10	93
R3	99	R11	95
R4	93	R12	85
R5	93	R13	94
R6	98	R14	100
R7	91	R15	87
R8	79	--	--

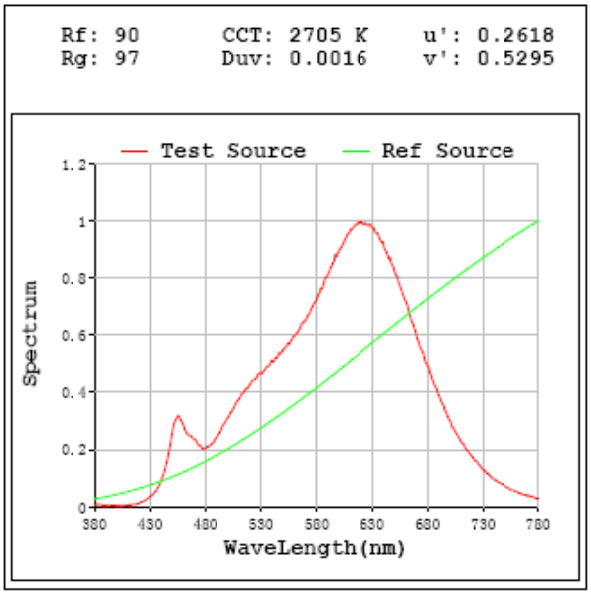
Photometric Measurement – Goniophotometer Method:

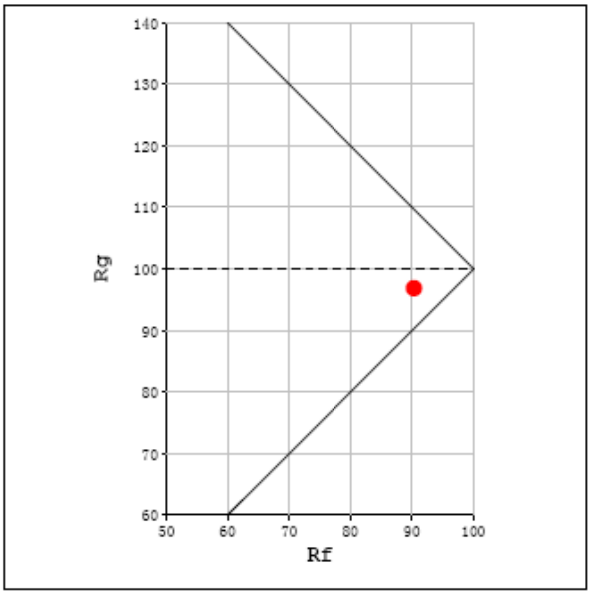
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1286.3
Luminous Efficacy (lm/W)	80.90
Beam Angle (°)	123.2
Center Beam Candle Power (cd)	340.0

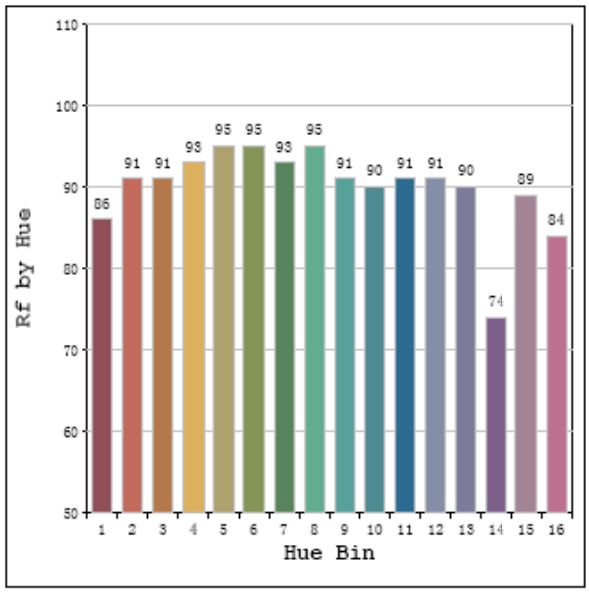
Spectral Power Distribution & Chromaticity Diagram

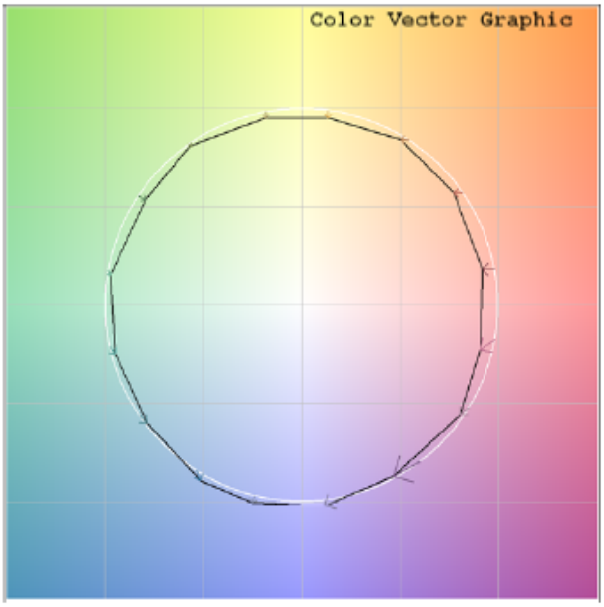


TM30







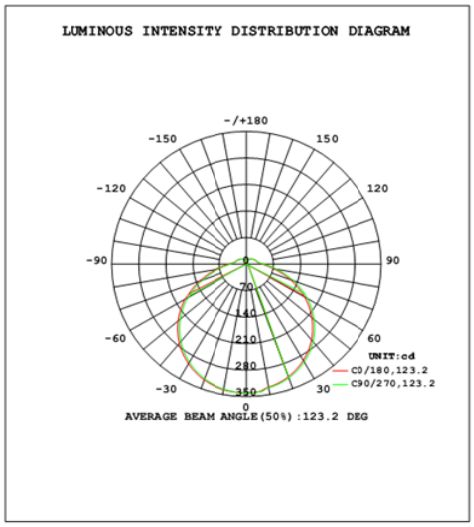


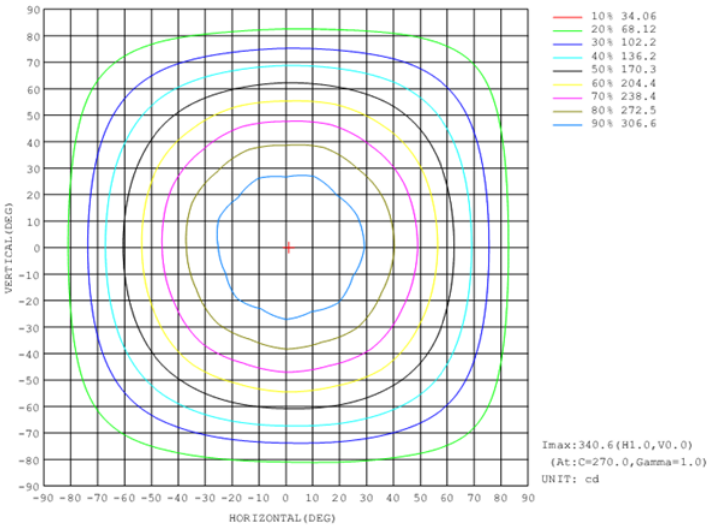
Zonal Lumen Tabulation

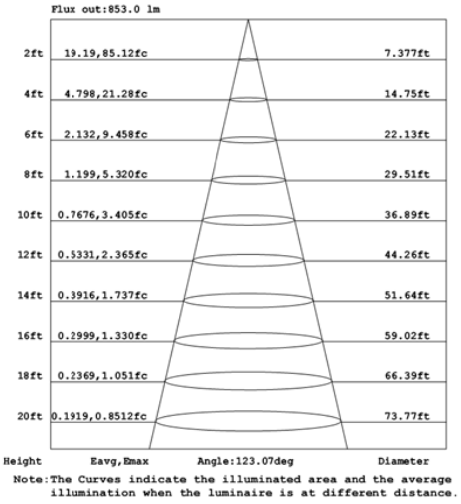
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	268.3	20.9%
0-40	446.1	34.7%
0-60	819.8	63.7%
60-90	319.1	24.8%
70-100	206.1	16.0%
90-120	92.4	7.2%
0-90	1138.8	88.5%
90-180	147.4	11.5%
0-180	1286.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	32.2	2.5%	90-100	37.9	2.9%
10-20	92.8	7.2%	100-110	29.8	2.3%
20-30	143.4	11.2%	110-120	24.8	1.9%
30-40	177.8	13.8%	120-130	19.6	1.5%
40-50	191.4	14.9%	130-140	14.6	1.1%
50-60	182.3	14.2%	140-150	10.1	0.8%
60-70	150.8	11.7%	150-160	6.3	0.5%
70-80	105.8	8.2%	160-170	3.3	0.3%
80-90	62.5	4.9%	170-180	1.0	0.1%

Photometric Data







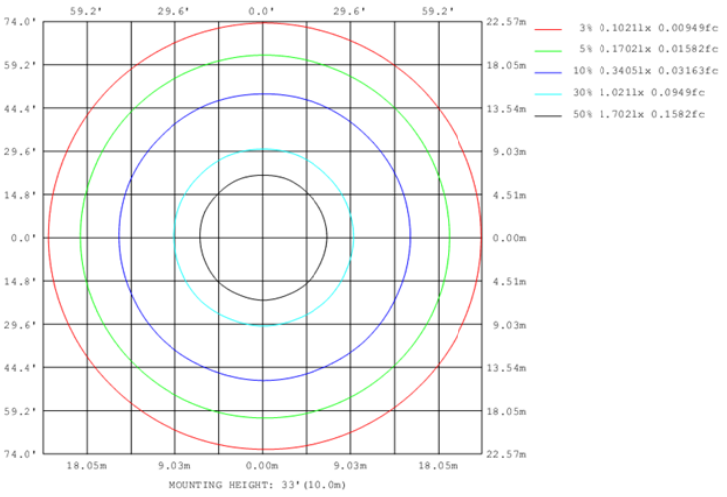


Table--1

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	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340			
5	339	339	339	339	339	339	338	336	339	338	339	339	339	339	339	339			
10	337	332	336	331	335	330	335	330	330	335	331	336	332	337	332	337			
15	332	327	331	326	330	325	329	324	325	330	325	331	327	332	327	332			
20	325	320	324	318	322	317	321	316	317	322	318	323	320	325	321	325			
25	316	311	314	309	312	307	310	306	306	311	308	313	310	315	312	316			
30	304	299	302	296	299	294	297	293	294	298	295	301	298	304	300	304			
35	290	285	287	282	284	279	282	278	279	283	281	286	284	289	286	290			
40	273	268	270	265	267	262	264	261	261	266	264	269	268	273	270	273			
45	254	250	251	246	247	242	245	241	242	246	245	250	249	254	251	255			
50	233	229	230	225	226	221	223	220	221	225	224	229	228	233	231	234			
55	211	206	207	202	203	198	199	197	198	202	201	206	206	210	208	211			
60	186	182	182	178	175	173	171	172	173	174	177	180	181	185	184	187			
65	158	157	154	152	149	147	146	146	147	148	151	153	156	157	159	158			
70	131	130	127	126	122	121	119	120	121	122	125	126	130	131	133	132			
75	105	104	101	99.2	96.2	95.0	93.3	93.7	95.2	96.0	98.6	100	103	104	106	106			
80	80.0	79.2	76.5	75.1	72.5	71.4	70.0	70.5	71.9	72.6	74.9	76.3	78.9	79.8	81.6	81.2			
85	59.5	58.9	57.0	55.8	53.8	53.0	51.9	52.3	53.6	54.1	55.8	56.8	58.8	59.6	61.0	60.7			
90	44.5	44.1	42.9	42.1	40.8	40.3	39.5	39.6	40.6	41.0	42.1	42.7	44.1	44.6	45.6	45.4			
95	35.0	34.8	34.1	33.7	33.0	32.7	32.3	32.3	33.0	33.0	33.6	33.9	34.7	35.0	35.7	35.7			
100	30.2	30.2	30.0	29.8	29.5	29.4	29.1	29.0	29.7	29.7	29.9	30.0	30.3	30.5	30.8	30.8			
105	28.2	28.2	28.1	28.0	27.7	27.6	27.4	27.3	28.1	28.1	28.2	28.3	28.6	28.7	28.9	29.0			
110	26.5	26.5	26.4	26.3	26.0	25.9	25.7	25.6	26.5	26.5	26.7	26.8	27.0	27.1	27.3	27.4			
115	24.9	24.8	24.7	24.6	24.4	24.3	24.1	24.0	24.9	25.0	25.1	25.2	25.4	25.6	25.8	25.8			
120	23.3	23.2	23.1	23.0	22.8	22.7	22.5	22.4	23.4	23.4	23.6	23.7	23.9	24.1	24.2	24.2			
125	21.7	21.7	21.5	21.5	21.3	21.2	21.0	20.9	21.8	21.9	22.0	22.1	22.4	22.5	22.6	22.6			
130	20.2	20.1	20.0	20.0	19.8	19.7	19.5	19.5	20.4	20.4	20.5	20.6	20.9	21.0	21.1	21.1			
135	18.7	18.7	18.5	18.5	18.3	18.2	18.1	18.1	18.9	18.9	19.1	19.2	19.4	19.5	19.6	19.6			
140	17.3	17.2	17.1	17.0	16.8	16.8	16.7	16.7	17.5	17.5	17.7	17.7	17.9	18.0	18.2	18.1			
145	16.0	15.9	15.8	15.6	15.5	15.4	15.4	15.4	16.1	16.2	16.3	16.4	16.6	16.6	16.8	16.7			
150	14.7	14.6	14.5	14.3	14.1	14.2	14.2	14.1	14.8	14.9	15.0	15.1	15.2	15.3	15.4	15.4			
155	13.5	13.4	13.3	13.2	12.9	13.0	13.0	13.0	13.6	13.7	13.9	13.9	14.0	14.0	14.2	14.1			
160	12.4	12.4	12.3	12.1	11.9	11.9	12.0	12.0	12.5	12.6	12.8	12.8	12.9	12.8	13.1	13.0			
165	11.6	11.5	11.5	11.2	11.1	11.1	11.3	11.3	11.7	11.7	11.9	11.9	11.9	11.8	11.9	12.0			
170	11.0	11.0	10.8	10.7	10.7	10.7	10.8	10.9	11.2	11.2	11.2	11.2	11.1	11.2	11.2	11.2			
175	10.8	10.8	10.8	10.8	10.8	10.8	10.9	10.9	10.9	10.9	10.9	11.0	11.0	11.0	11.0	11.0			
180	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0			

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	DLS0096(CRVFAS-11R-16-9CCT-120-W)	3000K	

Electrical Measurement:

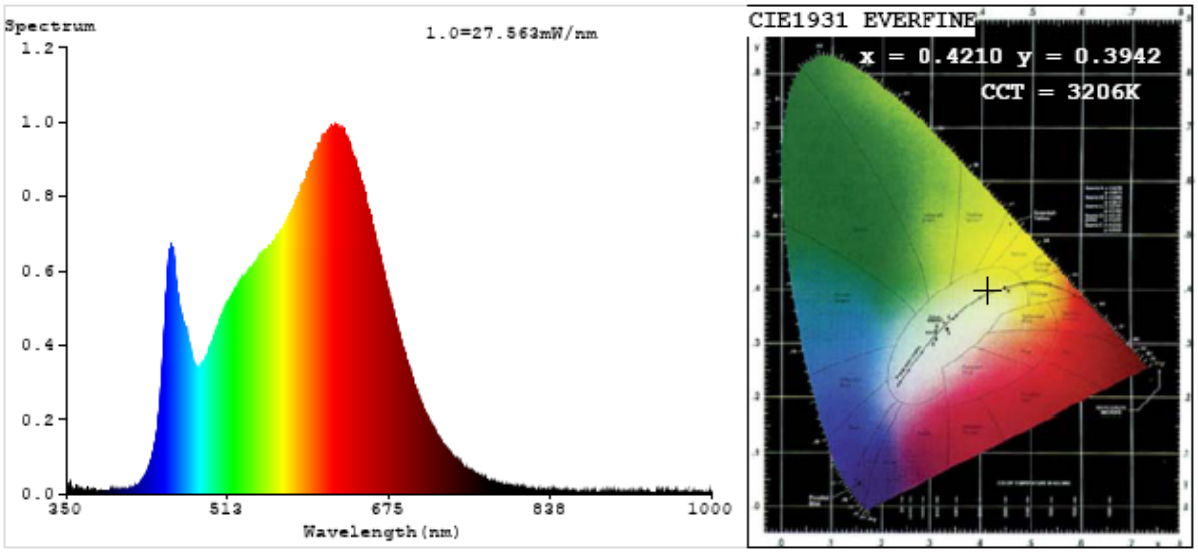
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120037	120.0	60	0.136	15.74	0.966

Chromaticity Measurement - Sphere-Spectroradiometer Method:

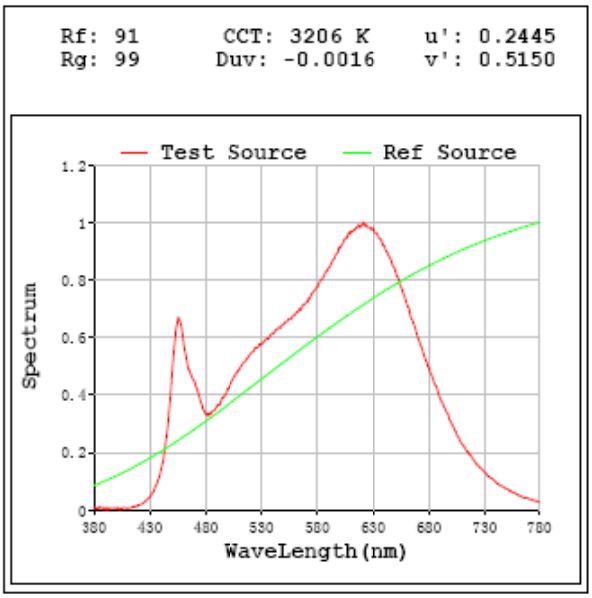
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3206
Duv	0.0016
Chromaticity (x, y)	x=0.4210 y=0.3942
Chromaticity (u', v')	u'=0.2445 v'=0.5150
Color Rendering Index (CRI)	94.9
R9	72
Total Luminous (lm)	1396.0
Luminous Efficacy (lm/W)	88.71

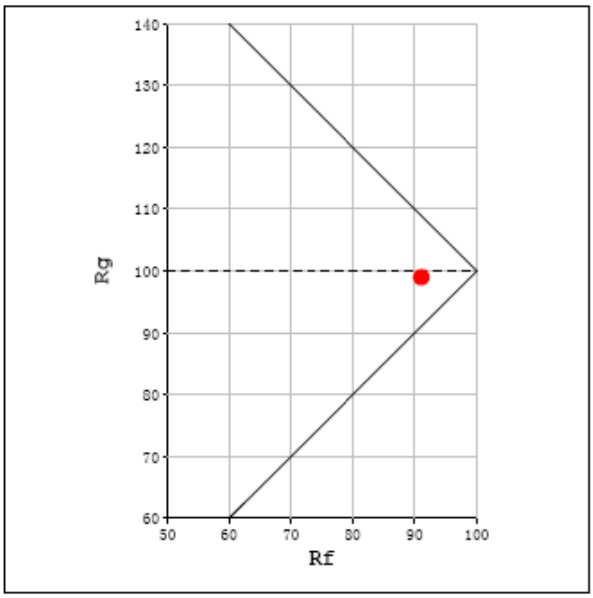
Special Color Rendering Indices			
R1	97	R9	72
R2	99	R10	100
R3	98	R11	97
R4	95	R12	81
R5	96	R13	99
R6	96	R14	100
R7	92	R15	94
R8	86	--	--

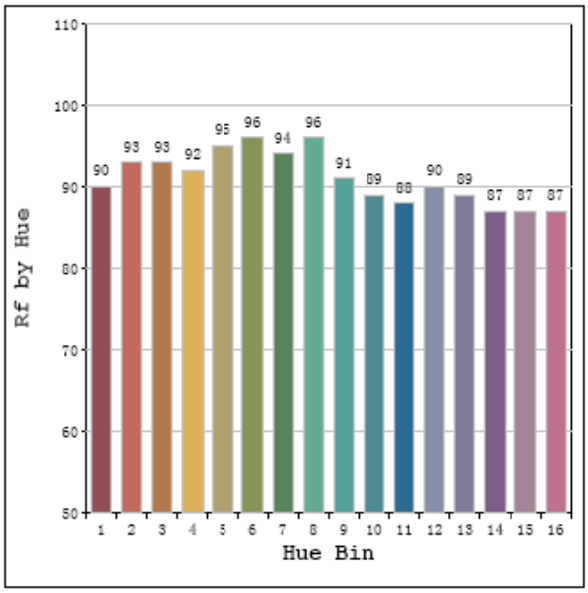
Spectral Power Distribution & Chromaticity Diagram

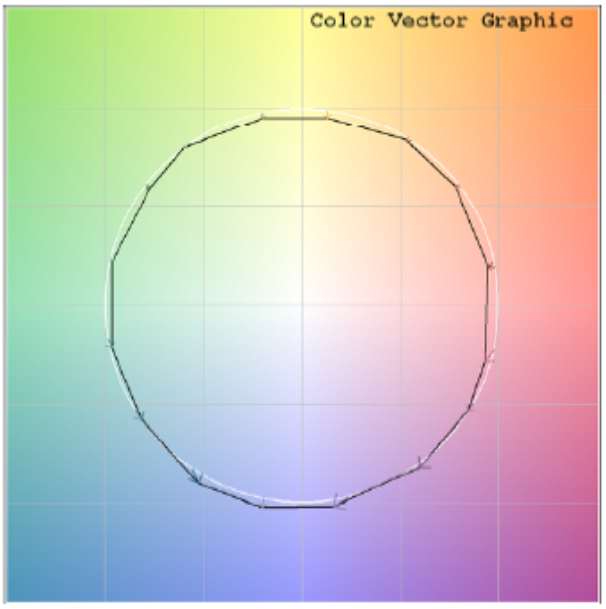


TM30


Rf: 91
CCT: 3206 K
u': 0.2445
Rg: 99
Duv: -0.0016
v': 0.5150
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
90
93
93
92
95
96
94
96
91
89
88
90
89
87
87
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	DLS0096(CRVFAS-11R-16-9CCT-120-W)	3500K	

Electrical Measurement:

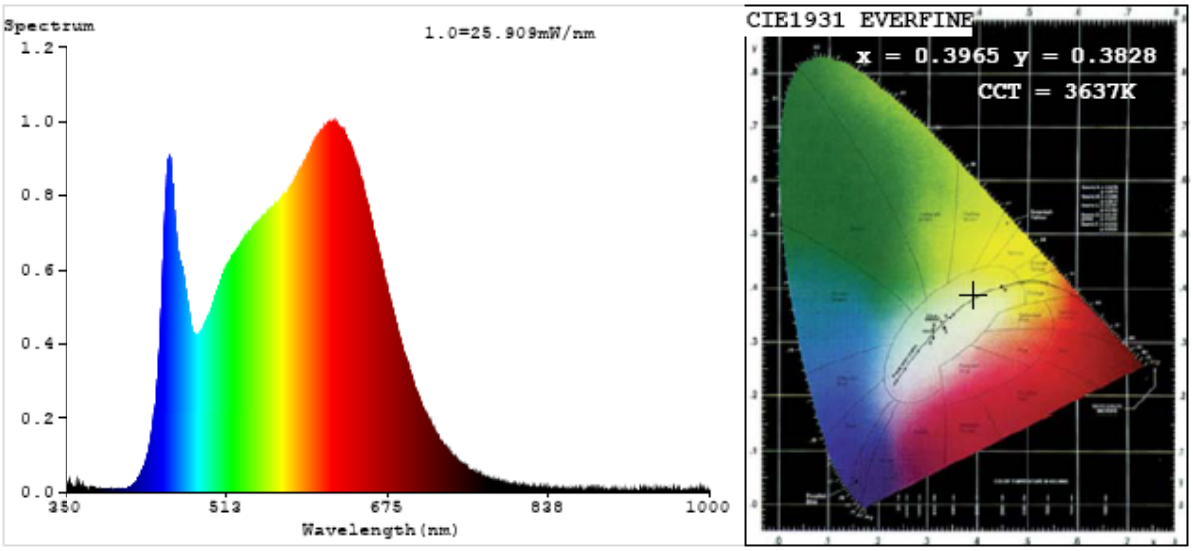
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120037	120.0	60	0.133	15.36	0.965

Chromaticity Measurement - Sphere-Spectroradiometer Method:

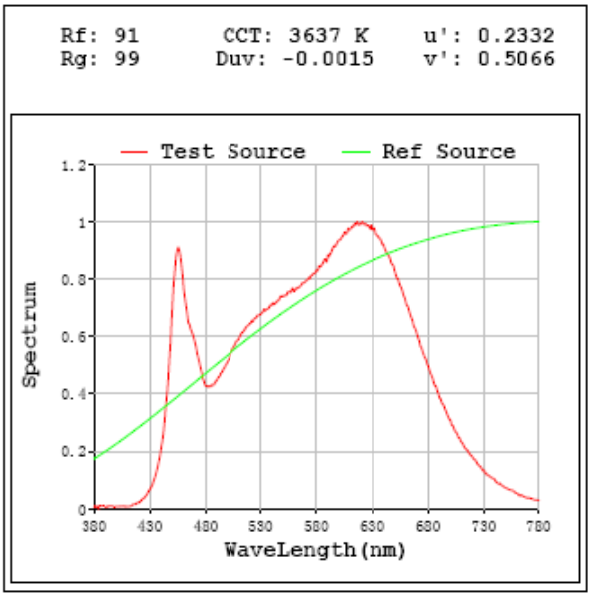
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3637
Duv	0.0015
Chromaticity (x, y)	x=0.3965 y=0.3828
Chromaticity (u', v')	u'=0.2332 v'=0.5066
Color Rendering Index (CRI)	95.5
R9	78
Total Luminous (lm)	1438.0
Luminous Efficacy (lm/W)	93.59

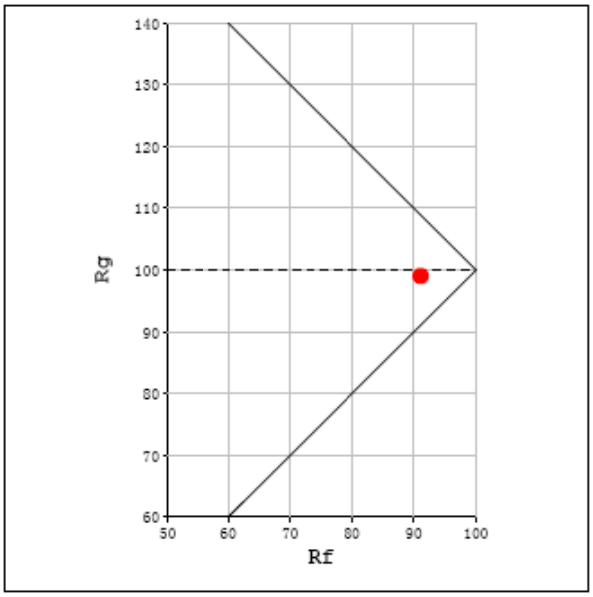
Special Color Rendering Indices			
R1	98	R9	78
R2	99	R10	100
R3	98	R11	97
R4	95	R12	77
R5	96	R13	99
R6	96	R14	100
R7	93	R15	95
R8	89	--	--

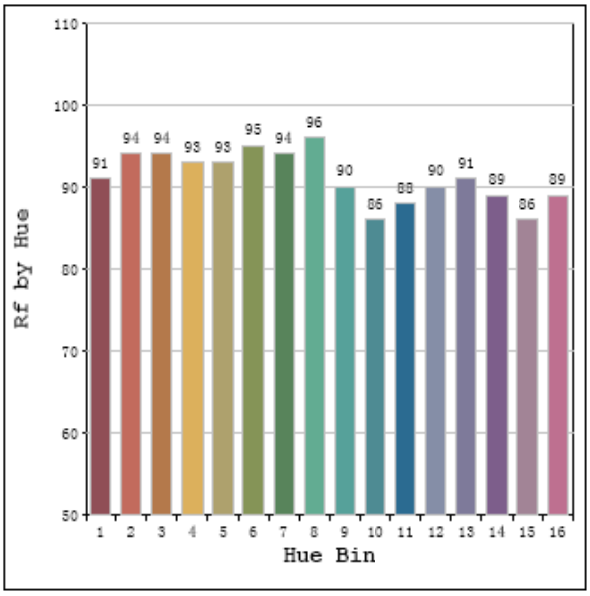
Spectral Power Distribution & Chromaticity Diagram

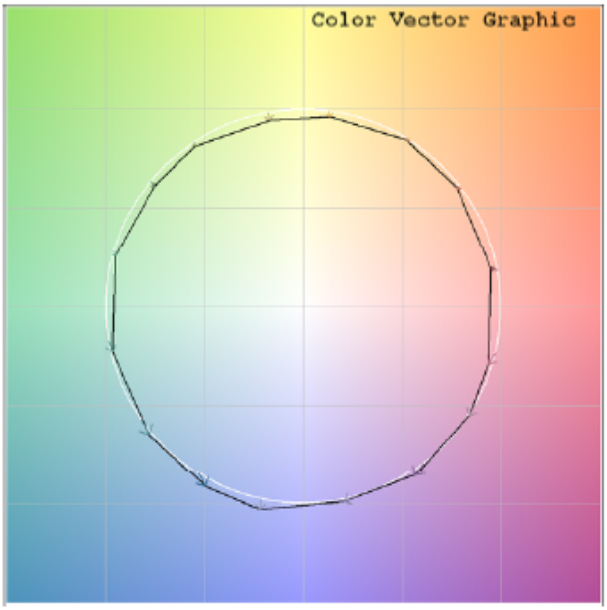


TM30


Rf: 91
CCT: 3637 K
u': 0.2332
Rg: 99
Duv: -0.0015
v': 0.5066
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
91
94
94
93
93
95
94
96
90
86
88
90
91
89
86
89


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	DLS0096(CRVFAS-11R-16-9CCT-120-W)	4000K	

Electrical Measurement:

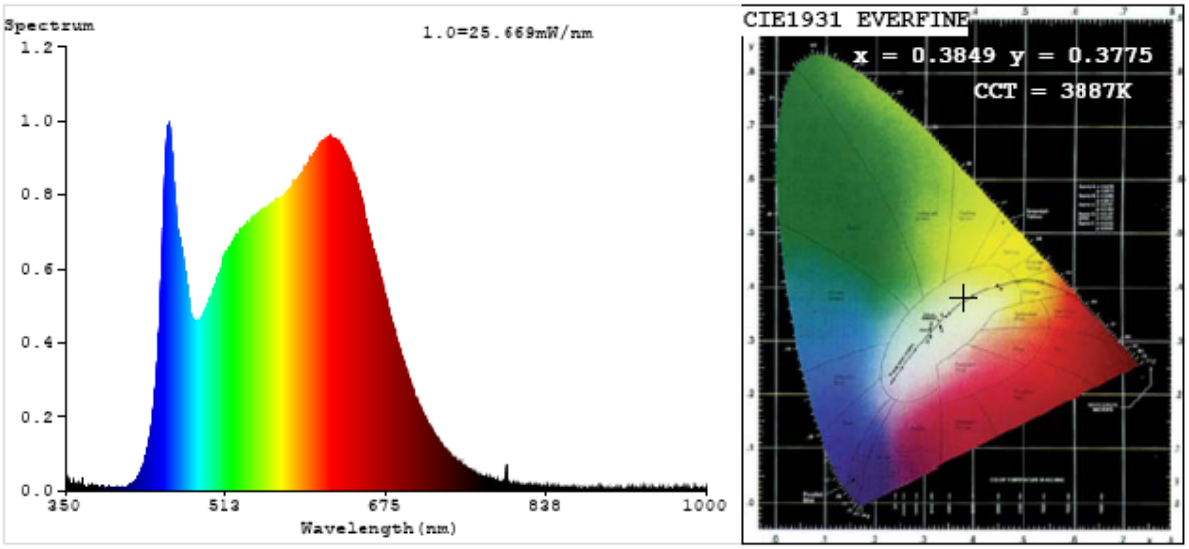
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120037	120.0	60	0.134	15.54	0.965

Chromaticity Measurement - Sphere-Spectroradiometer Method:

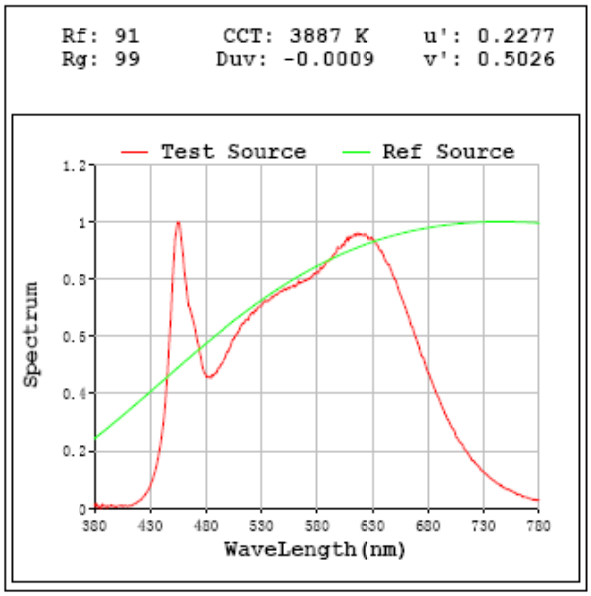
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3887
Duv	0.0009
Chromaticity (x, y)	x=0.3849 y=0.3775
Chromaticity (u', v')	u'=0.2277 v'=0.5026
Color Rendering Index (CRI)	95.6
R9	80
Total Luminous (lm)	1437.0
Luminous Efficacy (lm/W)	92.45

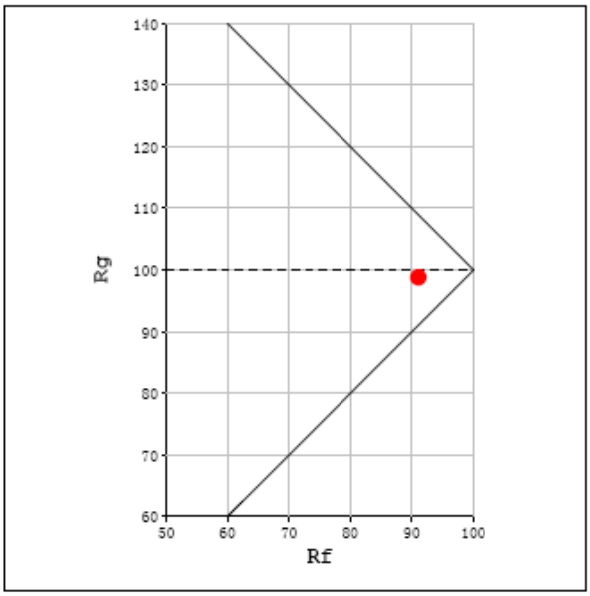
Special Color Rendering Indices			
R1	98	R9	80
R2	99	R10	99
R3	99	R11	97
R4	95	R12	75
R5	96	R13	99
R6	96	R14	100
R7	93	R15	95
R8	90	--	--

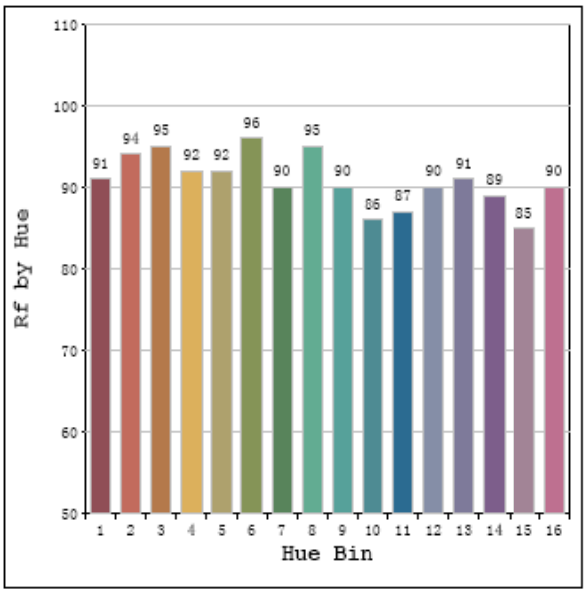
Spectral Power Distribution & Chromaticity Diagram

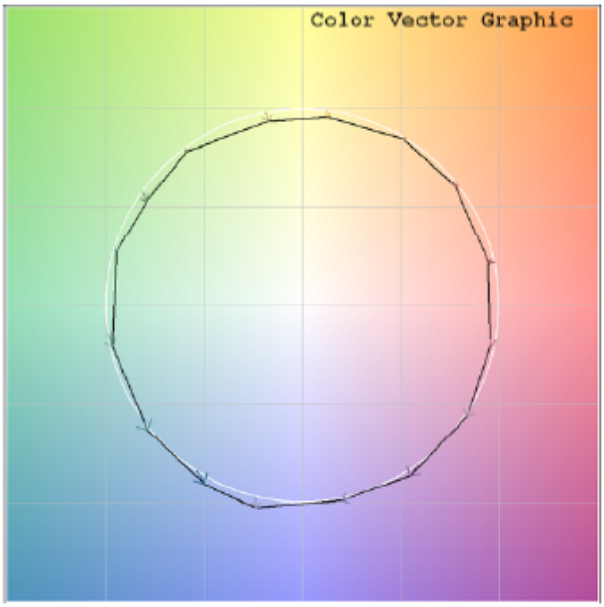


TM30


Rf: 91
Rg: 99
CCT: 3887 K
Duv: -0.0009
u': 0.2277
v': 0.5026
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
91
94
95
92
92
96
90
95
90
86
87
90
91
89
85
90


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	DLS0096(CRVFAS-11R-16-9CCT-120-W)	5000K	

Electrical Measurement:

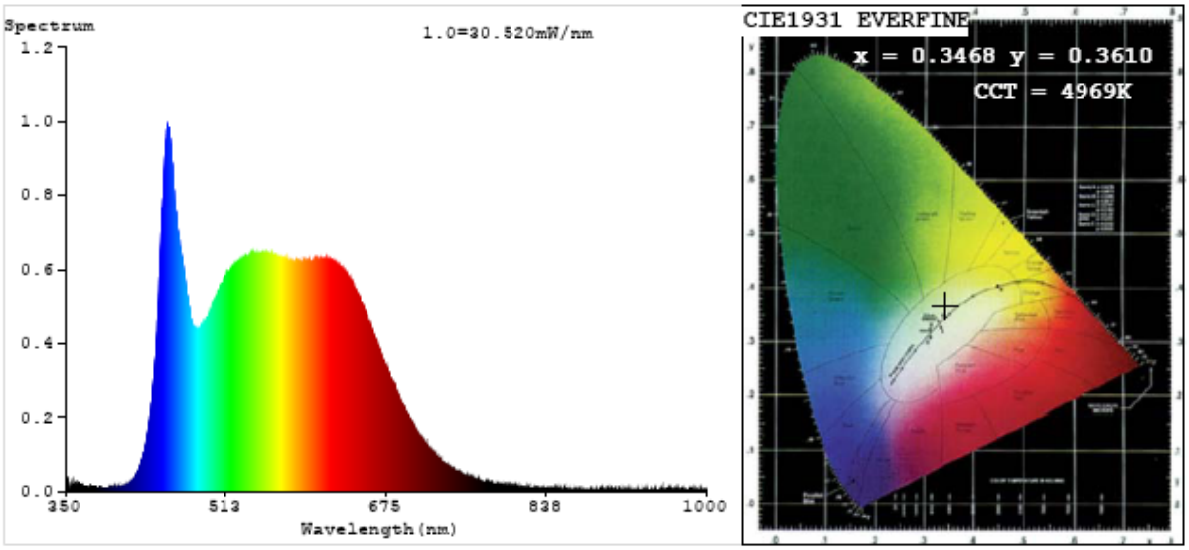
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120037	120.0	60	0.137	15.87	0.966

Chromaticity Measurement - Sphere-Spectroradiometer Method:

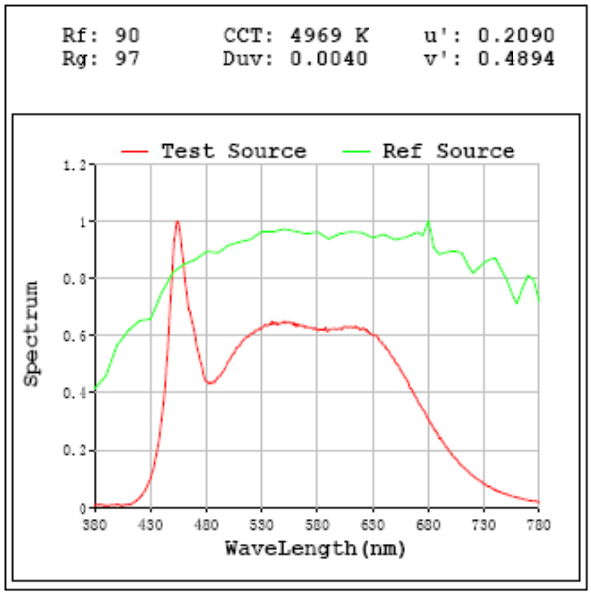
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4969
Duv	0.0040
Chromaticity (x, y)	x=0.3468 y=0.3610
Chromaticity (u', v')	u'=0.2090 v'=0.4894
Color Rendering Index (CRI)	93.5
R9	72
Total Luminous (lm)	1348.0
Luminous Efficacy (lm/W)	84.95

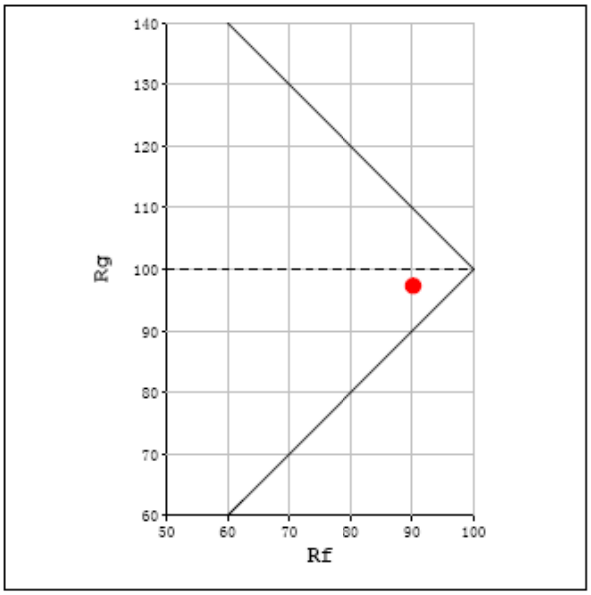
Special Color Rendering Indices			
R1	94	R9	72
R2	97	R10	92
R3	98	R11	91
R4	90	R12	67
R5	92	R13	95
R6	94	R14	99
R7	94	R15	91
R8	88	--	--

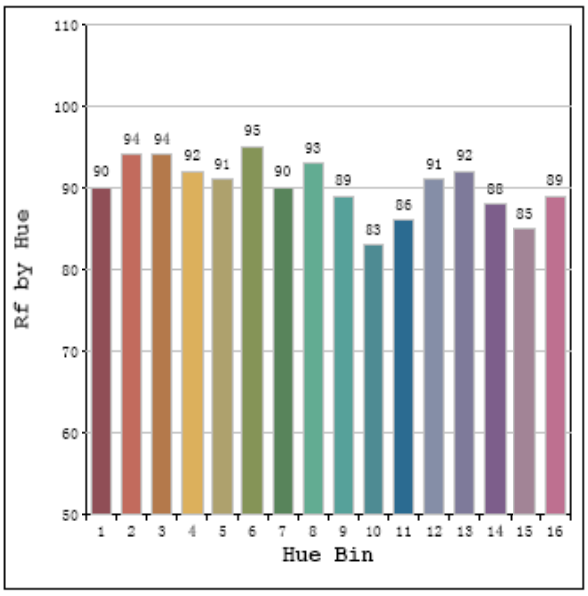
Spectral Power Distribution & Chromaticity Diagram

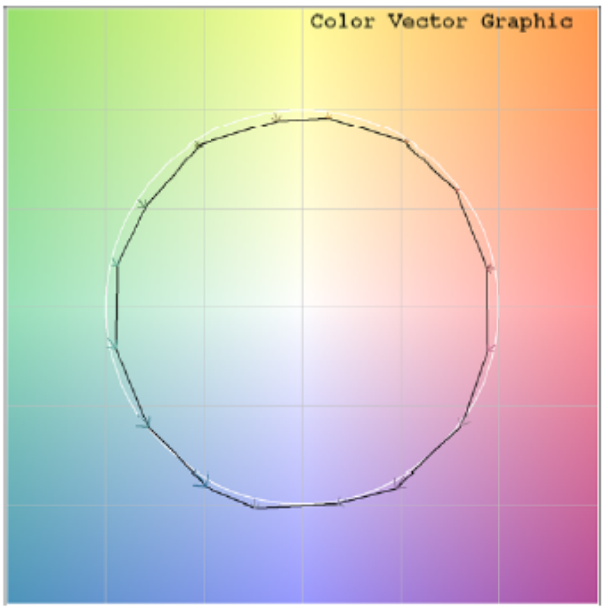


TM30



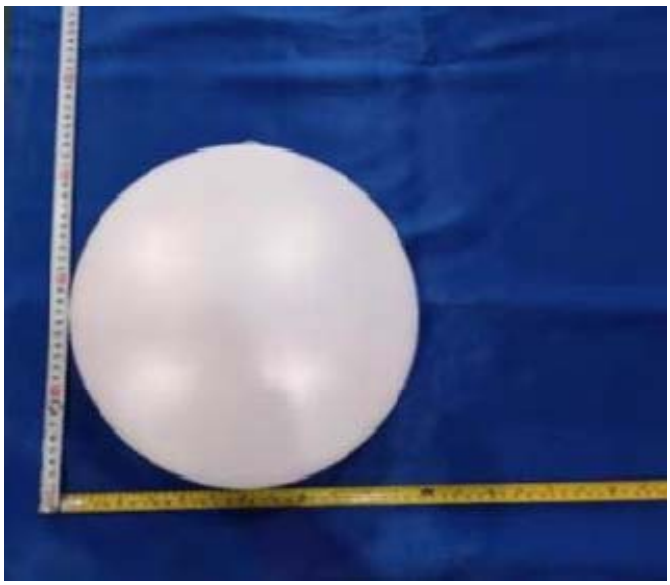


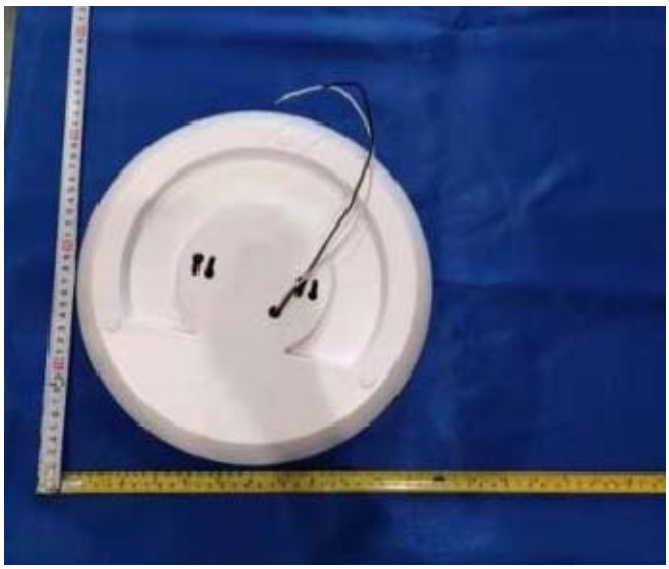




Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0096(CRVFAS-11R-16-9CCT-120-W)	2700K setting	120.0	1286.3	15.90	80.90
	3000K setting	120.0	1396.0	15.74	88.71
	3500K setting	120.0	1438.0	15.36	93.59
	4000K setting	120.0	1437.0	15.54	92.45
	5000K setting	120.0	1348.0	15.87	84.95

3. Product Photo





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