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): DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)

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	16.0W
Rated Initial Lamp Lumen	1100 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	DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120047	120.0	60	0.142	17.00	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2660
Duv	0.0013
Chromaticity (x, y)	x=0.4655 y=0.4154
Chromaticity (u', v')	u'=0.2639v'=0.5300
Color Rendering Index (CRI)	91.8
R9	51

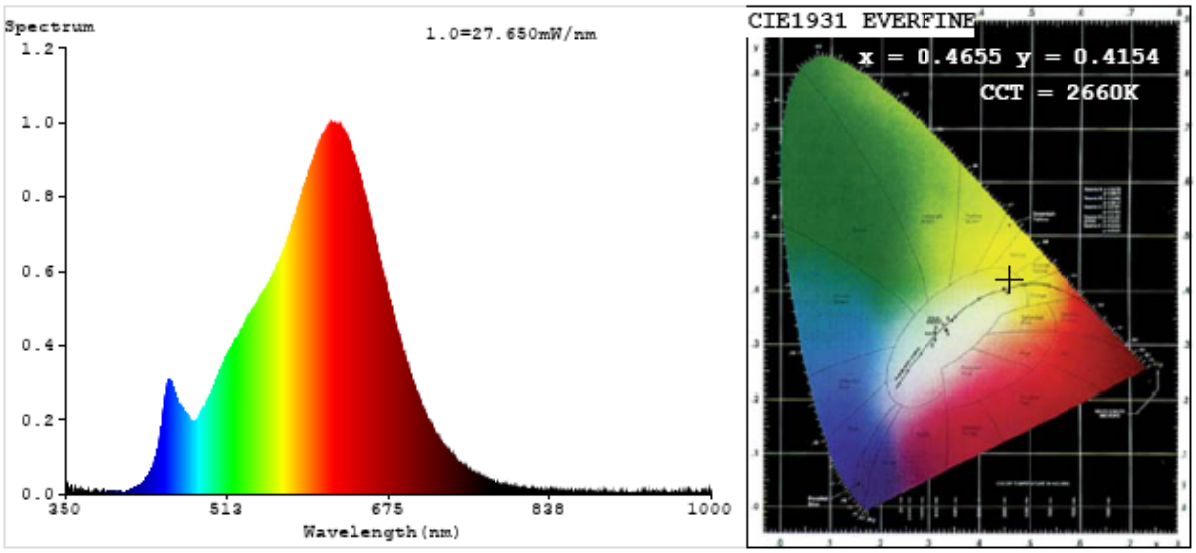
Special Color Rendering Indices			
R1	92	R9	51
R2	97	R10	92
R3	99	R11	93
R4	91	R12	84
R5	92	R13	93
R6	97	R14	100
R7	90	R15	86
R8	77	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1249.0
Luminous Efficacy (lm/W)	73.47
Beam Angle (°)	134.9
Center Beam Candle Power (cd)	273.6

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1241.0
Luminous Efficacy (lm/W)	72.23

Spectral Power Distribution & Chromaticity Diagram



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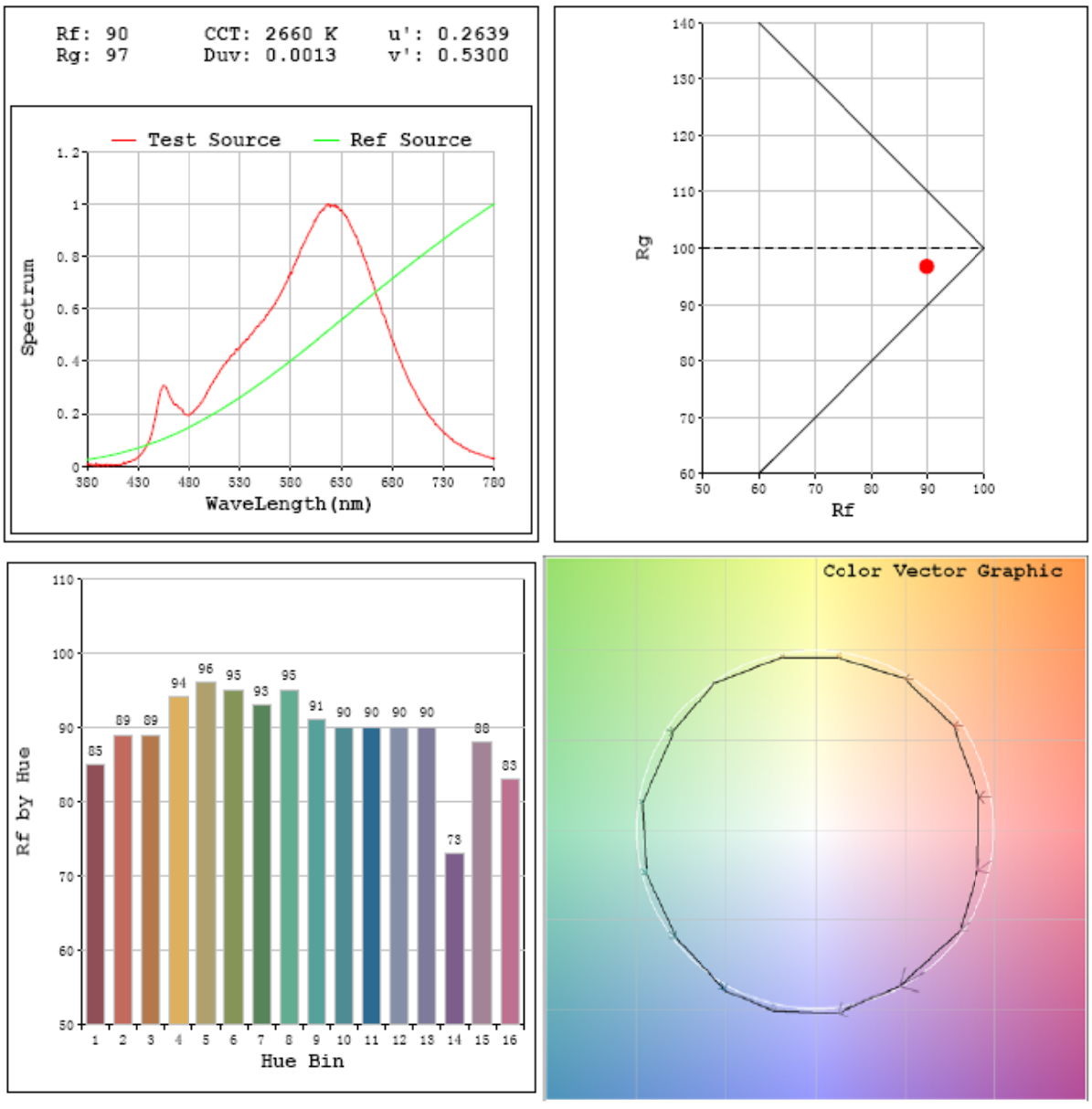
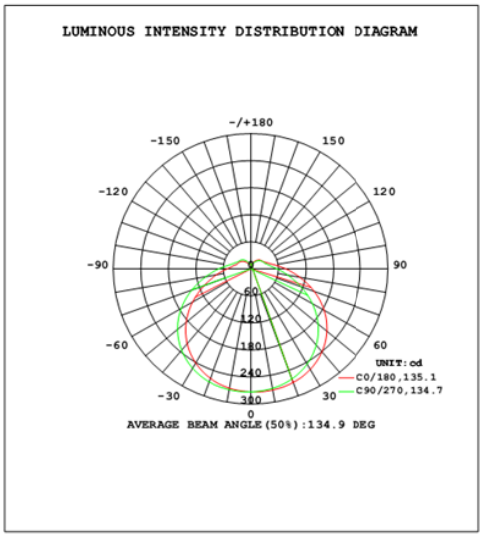


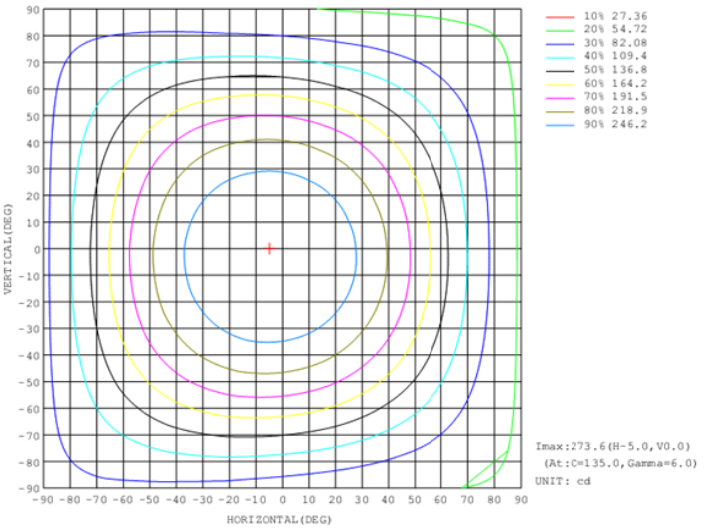
Zonal Lumen Tabulation

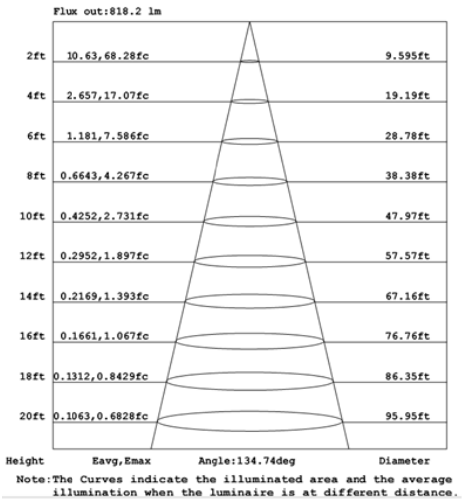
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	220.4	17.6%
0-40	370.5	29.7%
0-60	700.2	56.1%
60-90	343.3	27.5%
70-100	256.8	20.6%
90-120	133.3	10.7%
0-90	1043.6	83.6%
90-180	205.4	16.4%
0-180	1249.0	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	25.9	2.1%	90-100	58.3	4.7%
10-20	75.7	6.1%	100-110	42.2	3.4%
20-30	118.7	9.5%	110-120	32.8	2.6%
30-40	150.1	12.0%	120-130	26.6	2.1%
40-50	165.9	13.3%	130-140	20.3	1.6%
50-60	163.8	13.1%	140-150	13.5	1.1%
60-70	144.8	11.6%	150-160	7.4	0.6%
70-80	114.9	9.2%	160-170	3.4	0.3%
80-90	83.7	6.7%	170-180	1.0	0.1%

Photometric Data







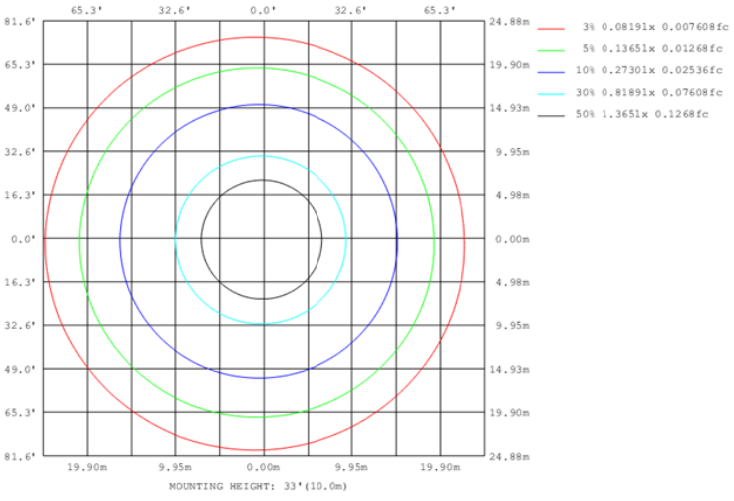


Table--1

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	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273			
5	271	272	272	273	273	273	274	274	273	273	272	272	272	271	271	271			
10	269	270	271	271	272	273	273	273	273	272	271	270	269	268	268	268			
15	265	266	267	269	270	271	272	272	271	270	269	267	265	264	264	264			
20	259	260	262	265	267	268	269	269	268	267	265	262	260	258	257	257			
25	251	253	256	259	262	264	265	265	264	261	259	255	253	250	250	249			
30	241	244	248	251	255	258	259	259	258	255	251	247	244	241	240	240			
35	230	233	237	242	246	249	251	251	250	246	242	237	233	230	228	228			
40	217	221	225	231	236	240	241	242	240	236	231	225	221	217	215	215			
45	202	206	212	218	223	228	230	231	229	224	218	212	206	202	200	199			
50	185	190	196	203	209	215	217	218	215	210	204	196	190	185	183	182			
55	166	172	179	186	193	199	202	203	200	194	188	179	173	167	164	164			
60	147	153	160	168	176	182	186	186	184	177	170	161	154	148	145	145			
65	128	134	141	149	157	164	168	168	165	159	151	142	135	128	126	125			
70	109	114	121	130	137	145	148	149	146	139	131	122	115	109	107	106			
75	91.5	96.6	103	111	118	125	129	130	127	120	112	104	97.4	92.3	89.9	89.4			
80	76.3	80.8	86.2	93.3	100	107	110	111	108	101	94.5	86.7	81.7	77.3	75.2	74.7			
85	62.6	66.6	71.6	78.0	84.1	89.9	92.6	93.2	90.6	84.9	79.0	72.2	68.1	64.4	62.4	61.6			
90	51.7	54.7	58.9	64.6	70.1	75.2	77.4	78.0	75.8	70.7	65.6	59.7	56.5	53.5	51.7	51.0			
95	44.0	46.2	49.2	53.5	57.8	62.2	64.0	64.6	62.7	58.3	54.2	50.0	47.6	45.3	44.0	43.5			
100	39.0	40.6	42.6	45.4	48.4	51.4	52.7	53.1	51.8	48.7	46.0	43.4	41.6	39.9	38.7	38.5			
105	34.6	36.5	38.3	40.2	42.1	43.9	44.7	44.7	44.0	42.1	40.5	38.8	37.6	35.9	34.8	34.4			
110	31.8	33.0	34.8	36.6	37.9	39.0	39.2	39.1	38.8	37.6	36.7	35.1	34.2	32.8	31.7	31.6			
115	30.8	31.8	32.5	33.3	34.5	35.2	35.0	34.9	34.8	33.9	33.1	32.2	31.9	31.0	30.4	30.6			
120	29.5	30.6	31.5	32.0	32.0	32.0	31.5	31.4	31.5	31.5	31.7	31.4	30.9	29.9	29.2	29.2			
125	27.9	29.0	30.2	30.9	31.0	30.7	30.0	29.7	30.3	30.5	30.6	30.3	29.6	28.3	27.6	27.6			
130	25.8	27.2	28.5	29.4	29.7	29.5	28.9	28.6	29.0	29.2	29.2	28.8	27.9	26.4	25.5	25.5			
135	23.5	24.9	26.4	27.6	28.1	28.0	27.6	27.2	27.6	27.3	27.3	26.9	25.7	24.1	23.2	23.1			
140	20.8	22.3	24.1	25.4	26.0	26.1	25.7	25.3	25.6	25.3	25.1	24.7	23.4	21.6	20.6	20.4			
145	18.2	19.6	21.4	22.9	23.6	23.8	23.7	23.1	23.4	22.9	22.6	22.1	20.9	18.8	17.8	17.6			
150	15.2	16.7	18.5	20.0	20.8	21.2	21.0	20.7	20.8	20.3	19.9	19.4	17.9	15.9	15.0	14.8			
155	12.6	13.7	15.2	16.6	17.6	18.2	18.3	17.9	18.1	17.6	16.9	16.3	14.6	13.1	12.6	12.5			
160	11.6	12.1	12.5	13.2	14.1	15.0	15.3	15.3	15.4	14.7	13.9	13.1	12.5	11.9	11.6	11.6			
165	11.1	11.2	11.2	11.6	12.0	12.5	12.7	12.8	13.0	12.6	12.2	11.6	11.4	11.3	11.2	11.1			
170	10.7	10.5	10.7	10.9	11.1	11.4	11.6	11.7	11.9	11.7	11.4	10.9	10.6	10.6	10.7	10.7			

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	DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120047	120.0	60	0.140	16.74	0.996

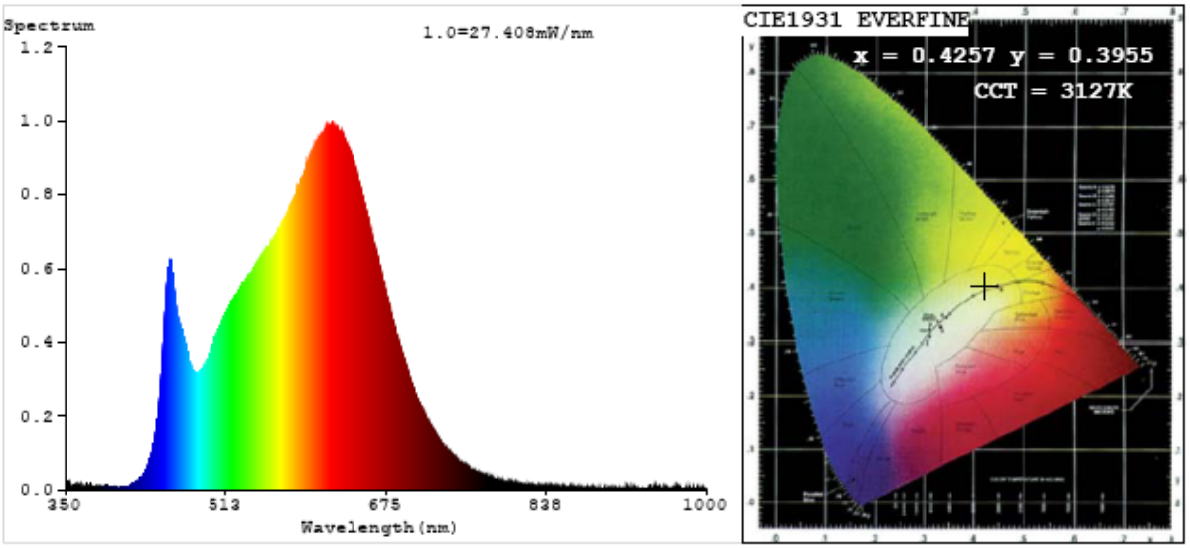
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3127
Duv	0.0018
Chromaticity (x, y)	x=0.4257 y=0.3955
Chromaticity (u', v')	u'=0.2470 v'=0.5163
Color Rendering Index (CRI)	94.2
R9	67
Total Luminous (lm)	1361.0
Luminous Efficacy (lm/W)	81.31

Special Color Rendering Indices			
R1	96	R9	67
R2	99	R10	98
R3	97	R11	95
R4	94	R12	81
R5	96	R13	98
R6	96	R14	100
R7	91	R15	93
R8	84	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1355.0
Luminous Efficacy (lm/W)	79.96

Spectral Power Distribution & Chromaticity Diagram



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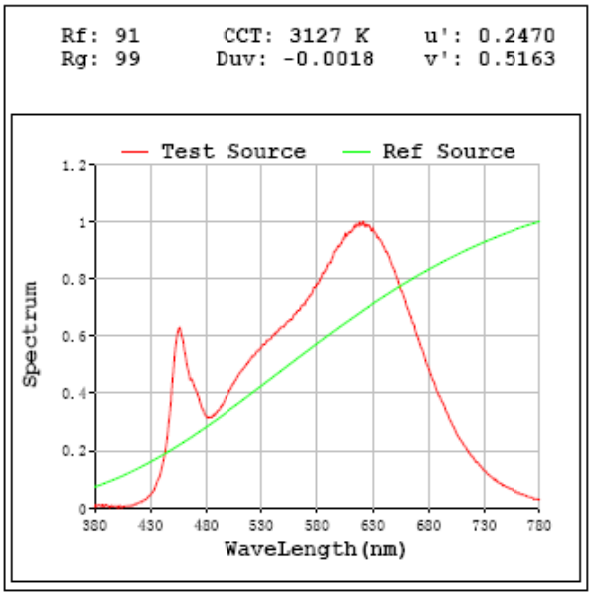
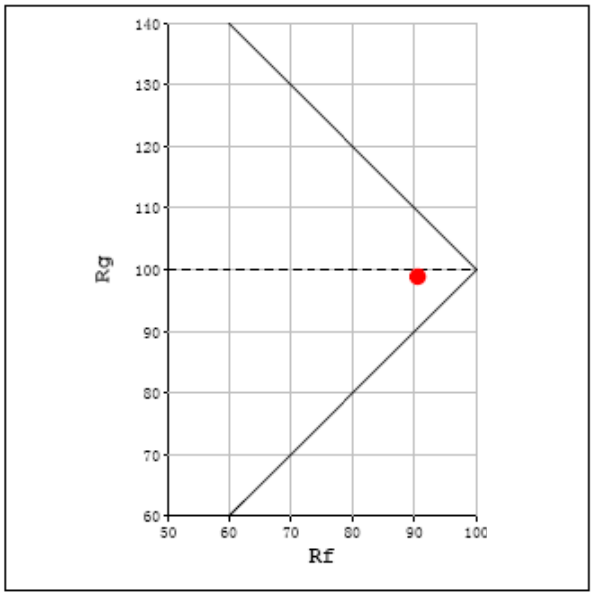
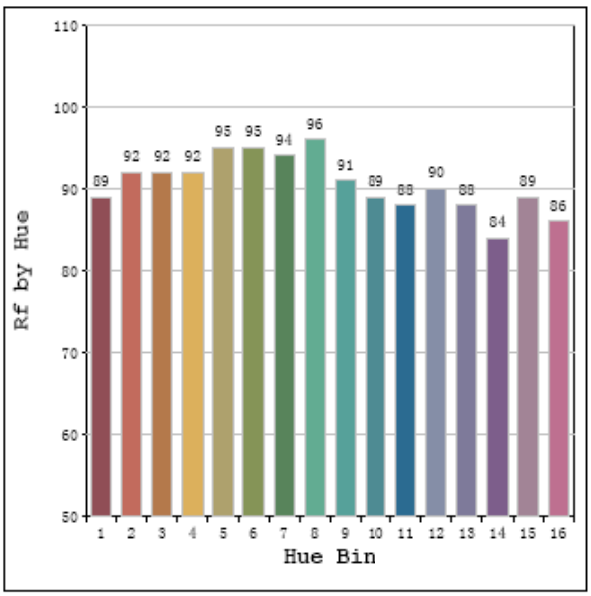

Rf: 91 CCT: 3127 K u': 0.2470
Rg: 99 Duv: -0.0018 v': 0.5163
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf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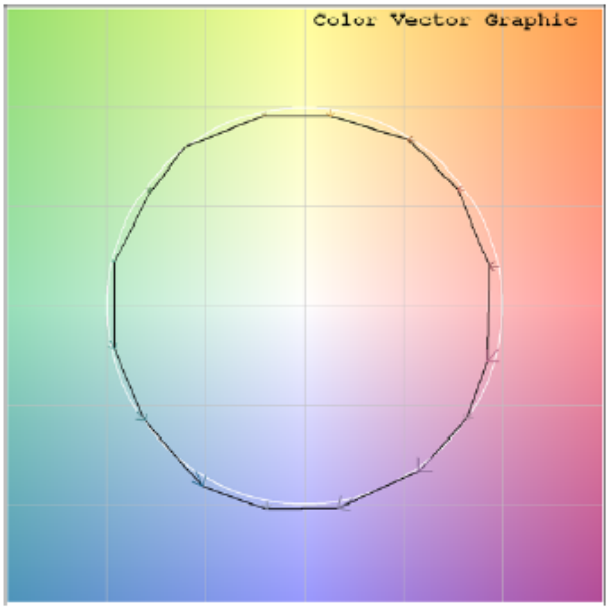

Color Vector Graphic

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	DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120047	120.0	60	0.137	16.34	0.996

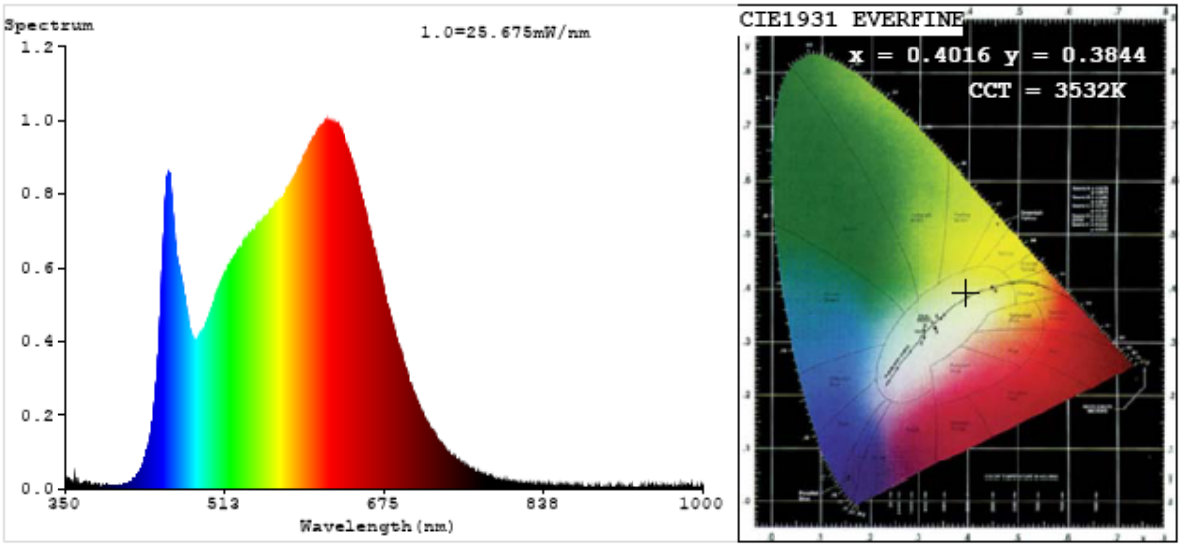
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3532
Duv	0.0020
Chromaticity (x, y)	x=0.4016 y=0.3844
Chromaticity (u', v')	u'=0.2359 v'=0.5081
Color Rendering Index (CRI)	95.1
R9	75
Total Luminous (lm)	1400.0
Luminous Efficacy (lm/W)	85.67

Special Color Rendering Indices			
R1	97	R9	75
R2	99	R10	99
R3	98	R11	96
R4	94	R12	78
R5	96	R13	99
R6	96	R14	100
R7	93	R15	95
R8	88	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1396.0
Luminous Efficacy (lm/W)	84.23

Spectral Power Distribution & Chromaticity Diagram



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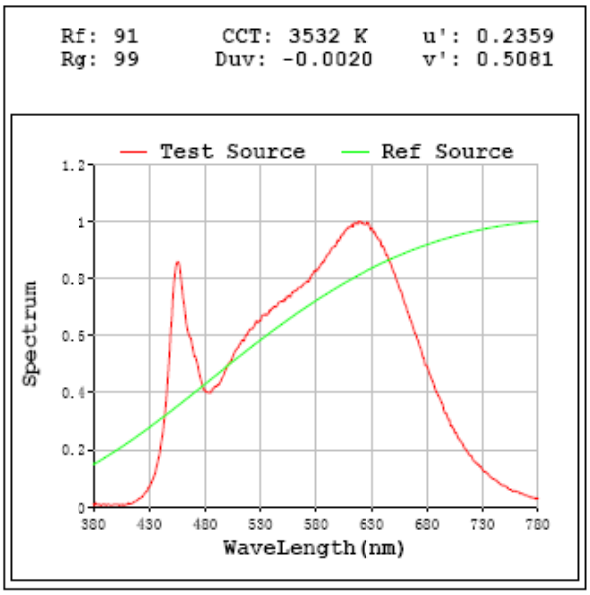
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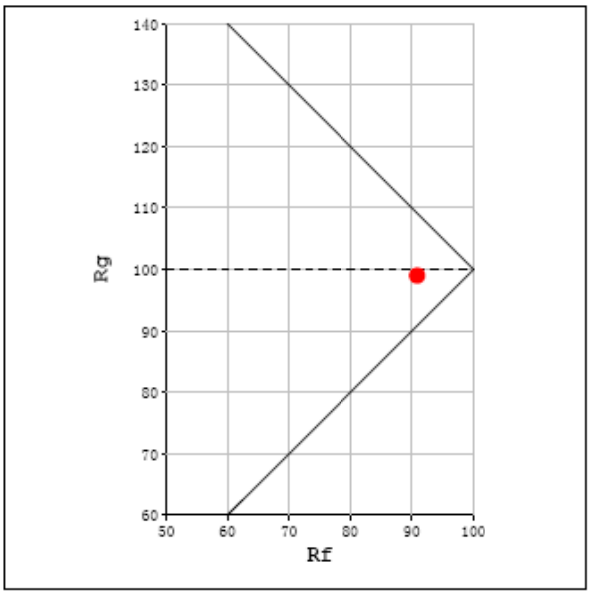
Rg: 99 Duv: -0.0020 v': 0.5081
Test Source
Ref Source
Spectrum
WaveLength(nm)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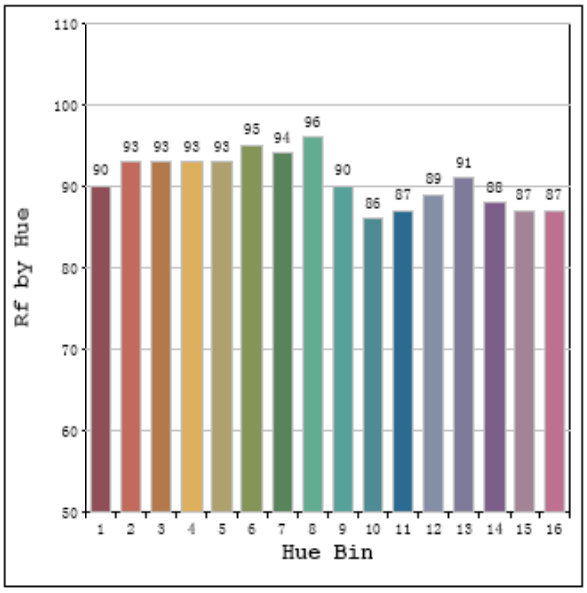
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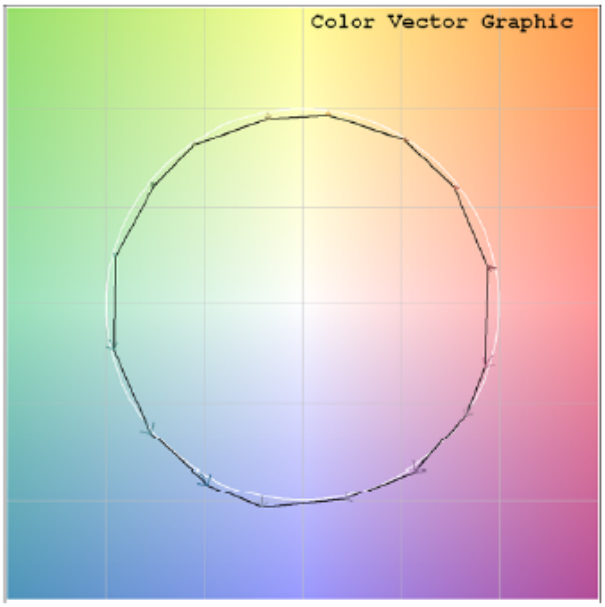

Color Vector Graphic

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	DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120047	120.0	60	0.139	16.55	0.996

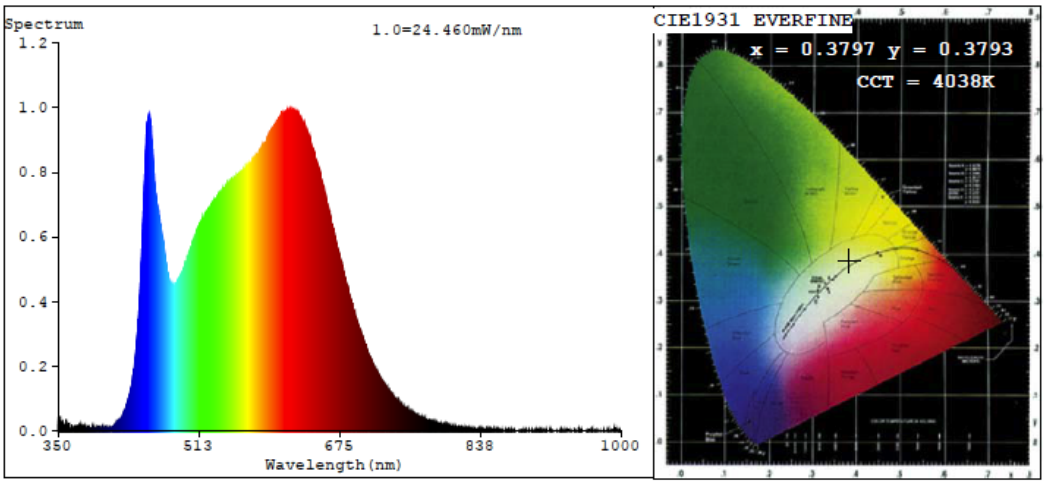
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4038
Duv	0.0014
Chromaticity (x, y)	x=0.3797y=0.3793
Chromaticity (u', v')	u'=0.2236 v'=0.5026
Color Rendering Index (CRI)	95.3
R9	76
Total Luminous (lm)	1399.0
Luminous Efficacy (lm/W)	84.55

Special Color Rendering Indices			
R1	97	R9	76
R2	100	R10	93
R3	99	R11	96
R4	94	R12	76
R5	95	R13	99
R6	96	R14	100
R7	93	R15	95
R8	89	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1394.0
Luminous Efficacy (lm/W)	83.14

Spectral Power Distribution & Chromaticity Diagram



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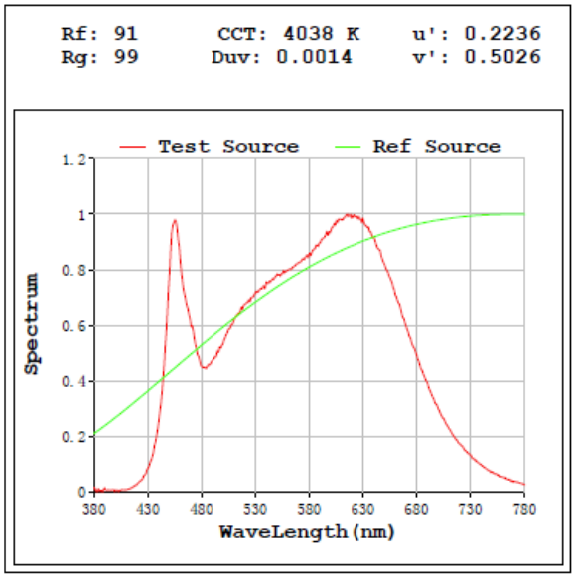
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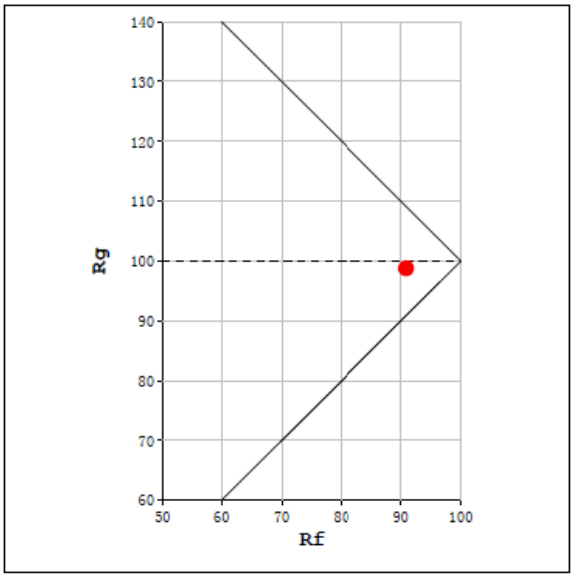
Rg: 99 Duv: 0.0014 v': 0.5026
Test Source
Ref Source
Spectrum
WaveLength (nm)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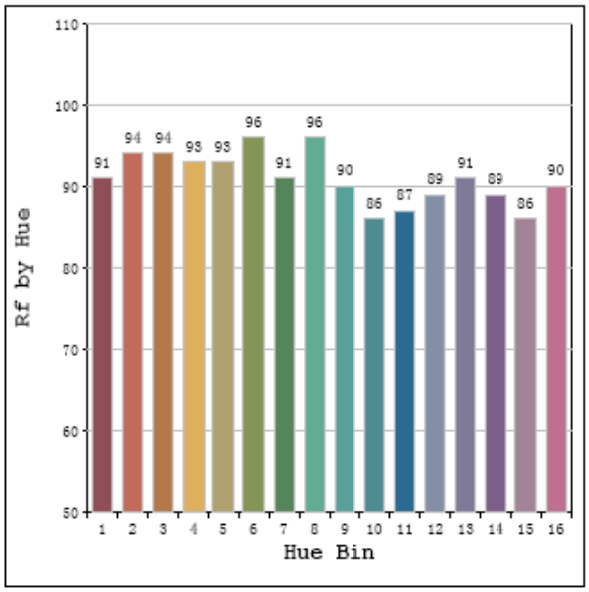
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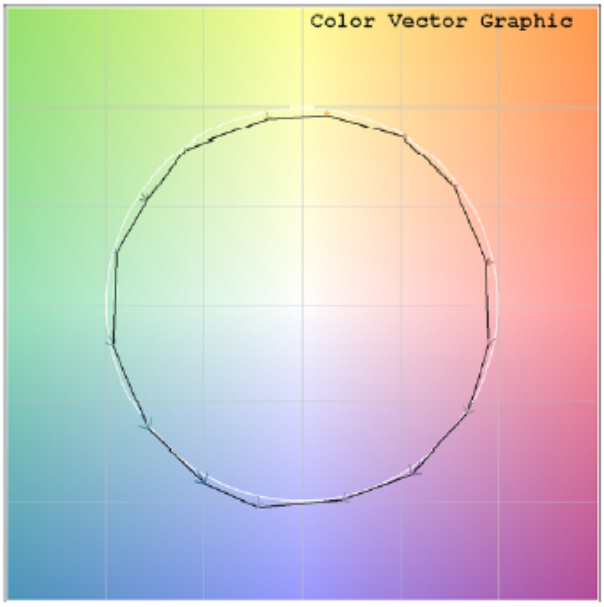

Color Vector Graphic

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	DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120047	120.0	60	0.142	16.90	0.996

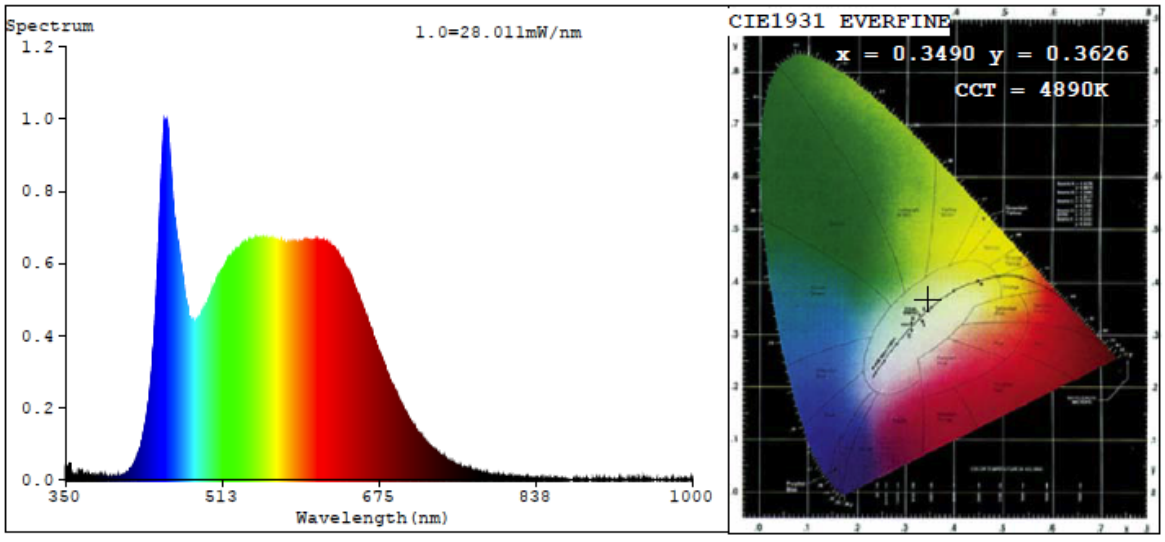
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4890
Duv	0.0039
Chromaticity (x, y)	x=0.3490y=0.3626
Chromaticity (u', v')	u'=0.2098 v'=0.4905
Color Rendering Index (CRI)	93.2
R9	70
Total Luminous (lm)	1295.0
Luminous Efficacy (lm/W)	76.66

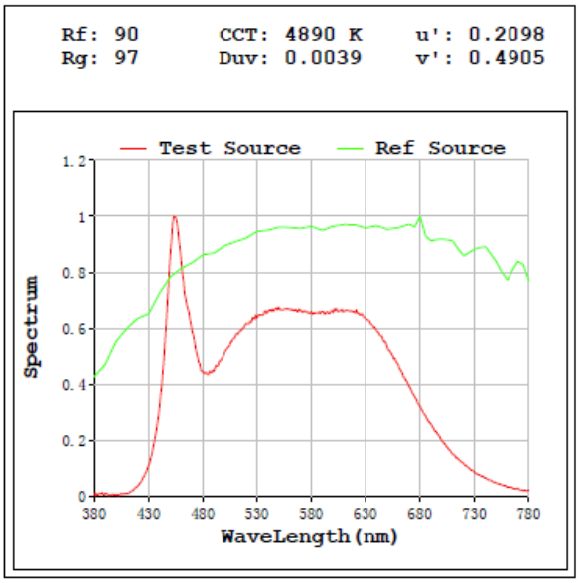
Special Color Rendering Indices			
R1	94	R9	70
R2	97	R10	92
R3	98	R11	91
R4	90	R12	68
R5	92	R13	95
R6	94	R14	99
R7	94	R15	91
R8	88	--	--

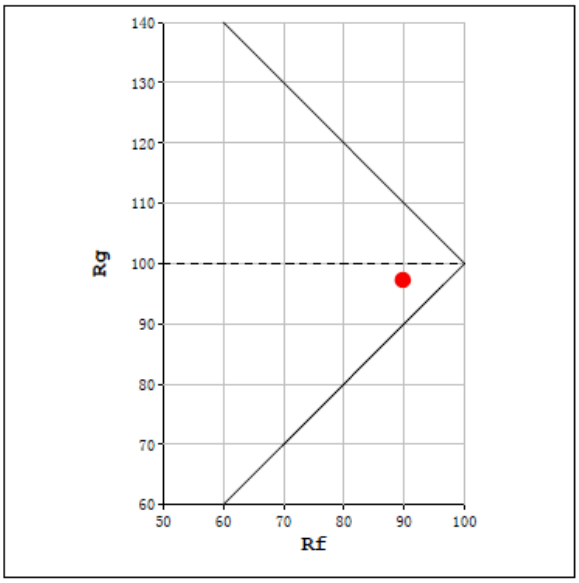
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1291.0
Luminous Efficacy (lm/W)	75.50

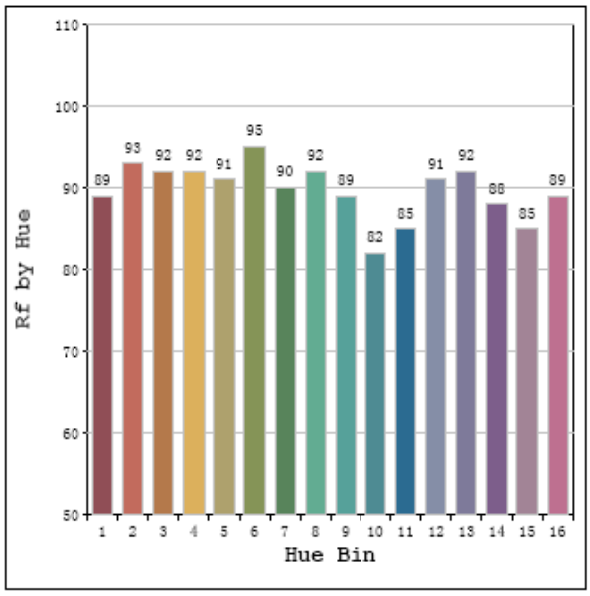
Spectral Power Distribution & Chromaticity Diagram

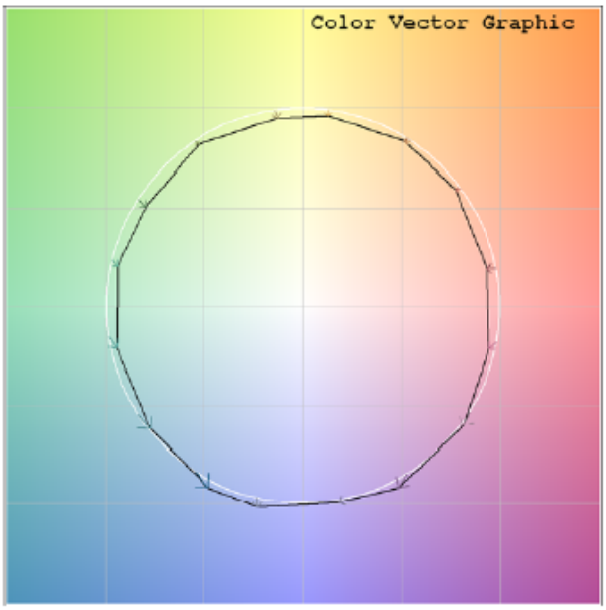


TM30



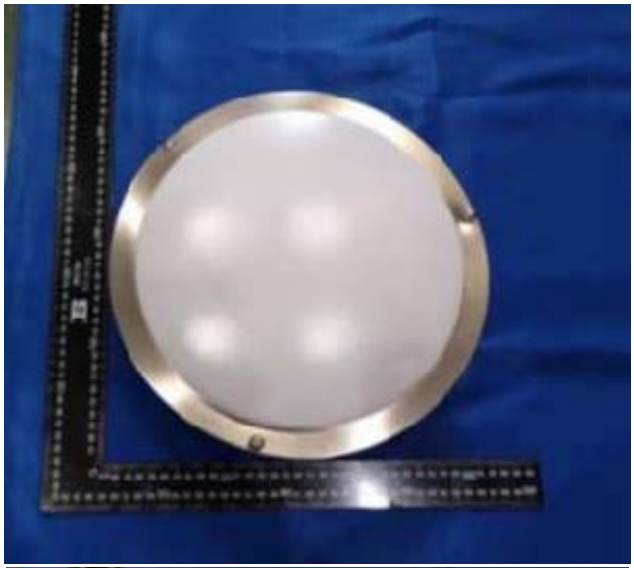


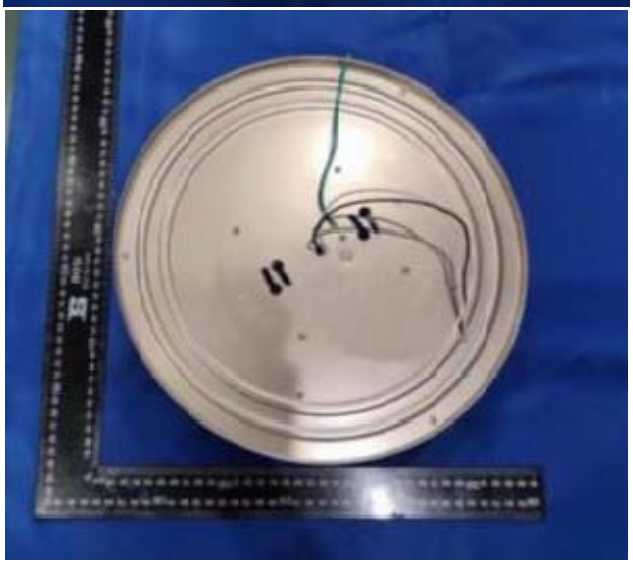




Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0105(CRVFAD-12R-16-9CCT-UNV-BN/MVS)	2700K setting	120.0	1249.0	17.00	73.47
		277.0	1241.0	17.18	72.23
	3000K setting	120.0	1361.0	16.74	81.31
		277.0	1355.0	16.94	79.96
	3500K setting	120.0	1400.0	16.34	85.67
		277.0	1396.0	16.57	84.23
	4000K setting	120.0	1399.0	16.55	84.55
		277.0	1394.0	16.76	83.14
	5000K setting	120.0	1295.0	16.90	76.66
		277.0	1291.0	17.10	75.50

3. Product Photo





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