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): DLS0101(CRVFAS-19R-32-9CCT-UNV-W/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: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120V-277Vac, 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	DLS0101(CRVFAS-19R-32-9CCT-UNV-W/MVS)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120043	120.0	60	0.261	31.2	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2690
Duv	0.0012
Chromaticity (x, y)	x=0.4628 y=0.4145
Chromaticity (u', v')	u'=0.2626 v'=0.5293
Color Rendering Index (CRI)	93.1
R9	57

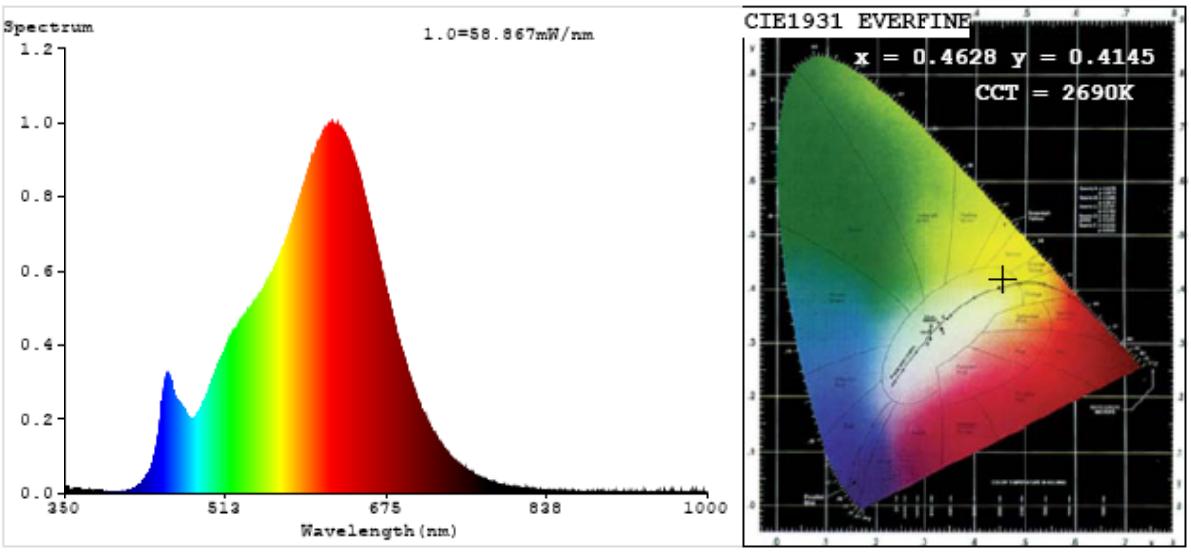
Special Color Rendering Indices			
R1	93	R9	57
R2	98	R10	94
R3	99	R11	95
R4	93	R12	85
R5	94	R13	95
R6	98	R14	100
R7	91	R15	88
R8	80	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2657.3
Luminous Efficacy (lm/W)	85.17
Beam Angle (°)	118.2
Center Beam Candle Power (cd)	802.8

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2816.0
Luminous Efficacy (lm/W)	83.57

Spectral Power Distribution & Chromaticity Diagram



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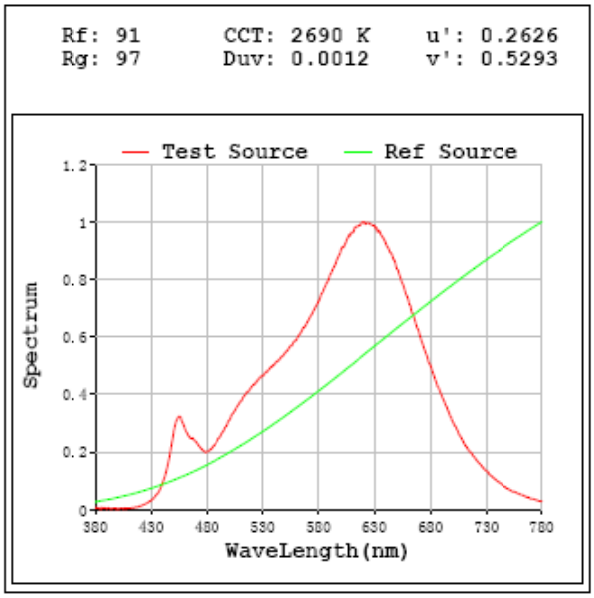
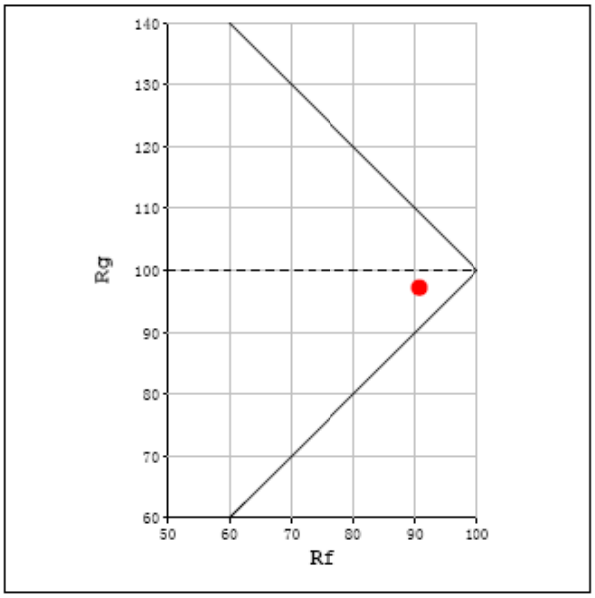
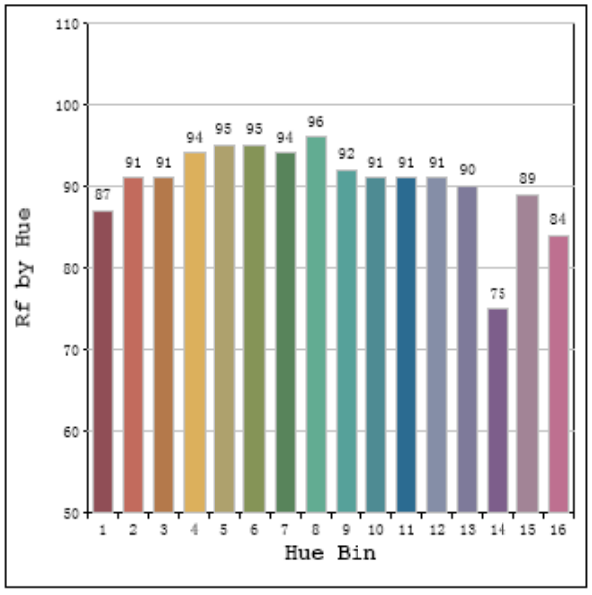
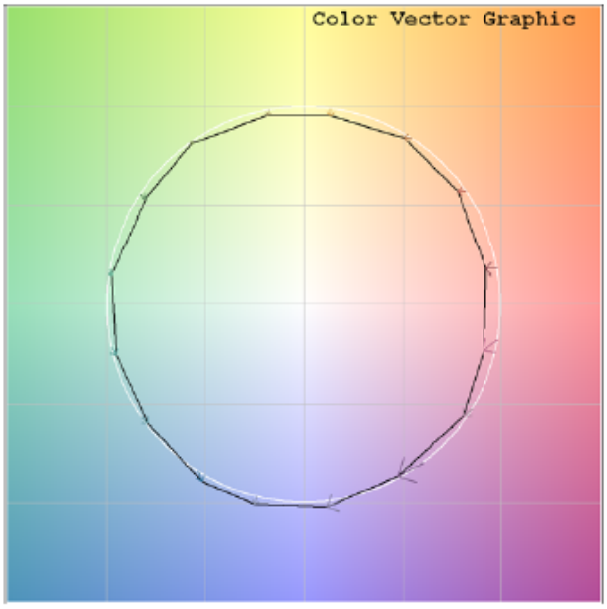






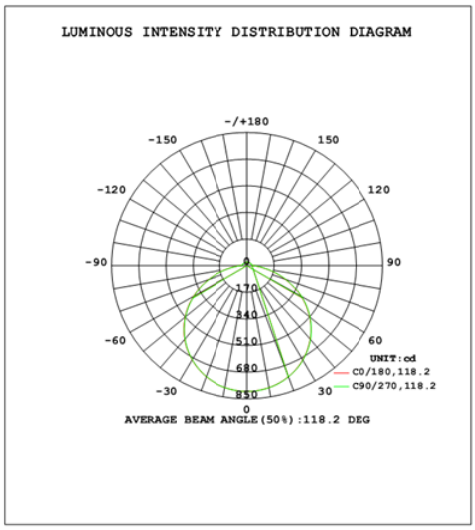


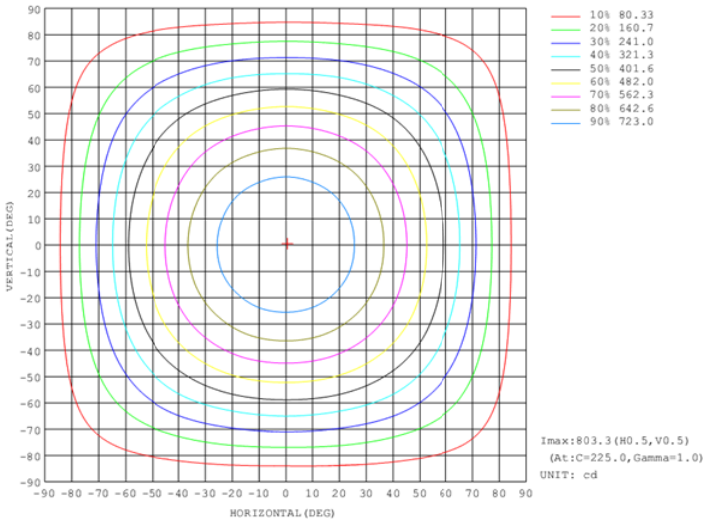
Zonal Lumen Tabulation

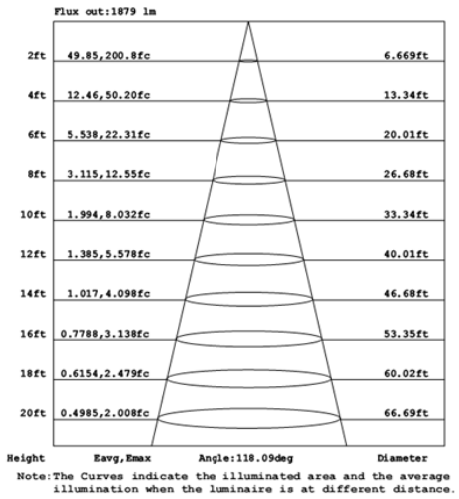
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	367.3	22.4%
0-40	608.6	37.1%
0-60	1105.9	67.3%
60-90	391.4	23.8%
70-100	230.4	14.0%
90-120	86.7	5.3%
0-90	1497.3	91.2%
90-180	145.1	8.8%
0-180	1642.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	44.1	2.7%	90-100	34.8	2.1%
10-20	127.3	7.8%	100-110	28.1	1.7%
20-30	195.9	11.9%	110-120	23.8	1.4%
30-40	241.3	14.7%	120-130	19.4	1.2%
40-50	256.7	15.6%	130-140	15.1	0.9%
50-60	240.7	14.7%	140-150	11.0	0.7%
60-70	195.8	11.9%	150-160	7.4	0.4%
70-80	129.6	7.9%	160-170	4.2	0.3%
80-90	66.1	4.0%	170-180	1.4	0.1%

Photometric Data







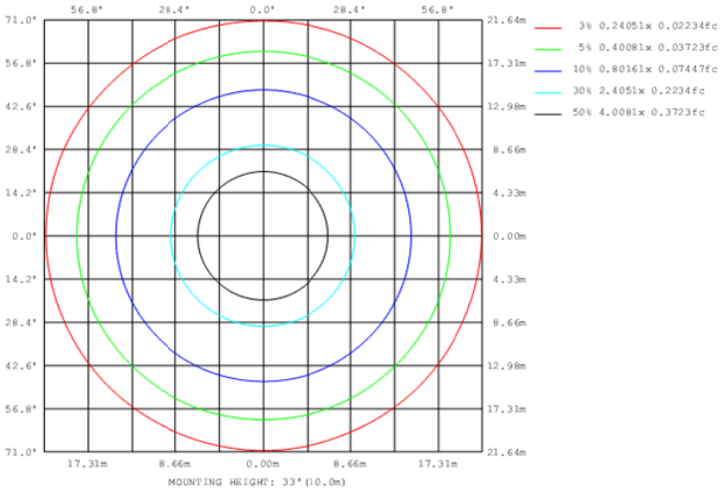


Table--1

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	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802			
5	799	800	799	799	799	800	799	800	799	799	800	800	800	800	799	800			
10	790	791	790	790	790	790	790	791	791	791	791	791	791	791	791	791			
15	775	776	775	776	775	775	775	776	775	775	776	776	776	776	776	775			
20	754	755	754	754	754	754	753	755	754	754	755	754	755	755	755	754			
25	727	728	727	727	726	727	726	728	727	727	728	727	729	728	728	728			
30	695	695	694	694	693	694	693	695	694	694	696	694	696	695	695	695			
35	656	657	656	656	654	656	654	656	656	656	657	656	657	656	657	656			
40	612	613	611	612	610	612	611	612	612	611	614	612	614	613	614	613			
45	564	565	562	563	561	563	561	563	563	562	564	563	565	564	565	564			
50	510	511	509	510	507	509	507	509	510	509	510	510	512	511	512	510			
55	453	453	451	452	449	450	449	451	451	451	453	452	454	453	455	453			
60	391	392	389	390	387	389	387	389	389	389	391	390	393	391	393	392			
65	326	322	324	320	322	319	322	319	320	324	321	325	323	327	324	327			
70	259	256	257	254	255	253	254	253	254	257	256	259	257	260	258	260			
75	192	190	190	188	188	187	187	187	188	190	190	192	192	194	192	194			
80	127	128	125	126	123	124	122	124	126	125	128	128	130	129	131	129			
85	75.2	75.7	73.5	73.7	71.5	72.0	70.5	71.9	73.9	73.4	75.8	75.8	78.0	77.0	78.4	77.0			
90	43.1	43.0	41.8	41.9	41.0	41.3	41.0	41.8	43.2	43.0	44.0	44.1	45.2	44.8	45.4	44.6			
95	31.3	31.2	31.1	31.3	31.3	31.4	31.5	32.0	33.4	33.5	33.8	33.8	33.7	33.3	33.0	32.7			
100	29.5	29.3	29.2	29.3	29.5	29.7	29.8	30.2	31.9	32.1	32.1	32.1	32.0	31.7	31.5	31.3			
105	28.1	27.9	27.9	28.0	28.1	28.3	28.4	28.8	30.8	30.9	31.0	30.9	30.8	30.6	30.5	30.3			
110	26.9	26.8	26.8	26.9	27.0	27.1	27.2	27.5	29.7	29.8	29.9	29.8	29.7	29.6	29.5	29.3			
115	25.9	25.8	25.8	25.9	26.0	26.1	26.1	26.3	28.7	28.8	28.9	28.8	28.7	28.7	28.6	28.4			
120	25.1	25.0	25.0	25.2	25.2	25.3	25.3	25.4	27.8	27.9	27.9	27.9	27.8	27.8	27.7	27.6			
125	24.4	24.4	24.4	24.5	24.6	24.6	24.6	24.7	27.0	27.1	27.1	27.0	27.0	27.0	27.0	26.9			
130	23.9	23.9	23.9	24.0	24.1	24.1	24.0	24.0	26.3	26.3	26.3	26.2	26.3	26.3	26.3	26.2			
135	23.5	23.5	23.5	23.6	23.6	23.6	23.6	23.5	25.6	25.7	25.7	25.6	25.7	25.7	25.7	25.7			
140	23.2	23.2	23.3	23.3	23.3	23.3	23.2	23.1	25.0	25.1	25.1	25.0	25.1	25.2	25.2	25.2			
145	22.9	23.0	23.0	23.0	23.1	23.0	23.0	22.8	24.5	24.6	24.5	24.4	24.6	24.8	24.8	24.8			
150	22.8	22.9	22.9	22.9	22.9	22.9	22.8	22.9	24.1	24.1	24.1	24.0	24.2	24.4	24.4	24.6			
155	22.7	22.9	22.9	22.8	22.7	22.8	22.7	22.5	23.7	23.7	23.7	23.6	23.9	24.0	24.1	24.1			
160	22.8	22.9	22.9	22.7	22.7	22.7	22.7	22.5	23.4	23.4	23.4	23.3	23.4	23.8	23.7	23.8			
165	22.8	22.9	22.7	22.7	22.6	22.6	22.7	22.6	23.2	23.2	23.2	23.1	23.1	23.4	23.4	23.6			
170	23.0	22.7	22.8	22.7	22.7	22.6	22.7	22.7	23.2	23.2	23.1	22.9	23.0	23.1	23.2	23.6			
175	23.0	23.0	23.0	23.0	22.9	22.9	22.8	22.8	23.0	23.0	23.0	23.0	23.0	23.1	23.2	23.3			
180	23.4	23.5	23.5	23.4	23.3	23.4	23.4	23.3	23.4	23.5	23.5	23.4	23.3	23.3	23.3	23.3			

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	DLS0101(CRVFAS-19R-32-9CCT-UNV-W/MVS)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120043	120.0	60	0.262	31.24	0.996

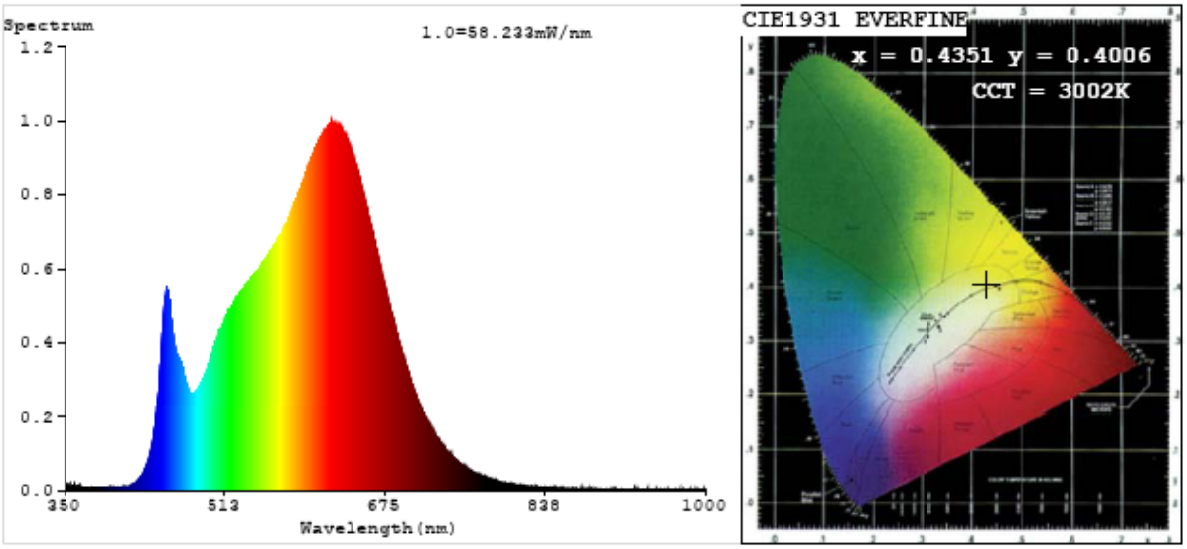
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3002
Duv	0.0011
Chromaticity (x, y)	x=0.4351 y=0.4006
Chromaticity (u', v')	u'=0.2509 v'=0.5198
Color Rendering Index (CRI)	94.9
R9	68
Total Luminous (lm)	2829.0
Luminous Efficacy (lm/W)	90.54

Special Color Rendering Indices			
R1	96	R9	68
R2	99	R10	97
R3	99	R11	97
R4	95	R12	83
R5	96	R13	97
R6	97	R14	99
R7	92	R15	92
R8	85	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2996.0
Luminous Efficacy (lm/W)	89.57

Spectral Power Distribution & Chromaticity Diagram



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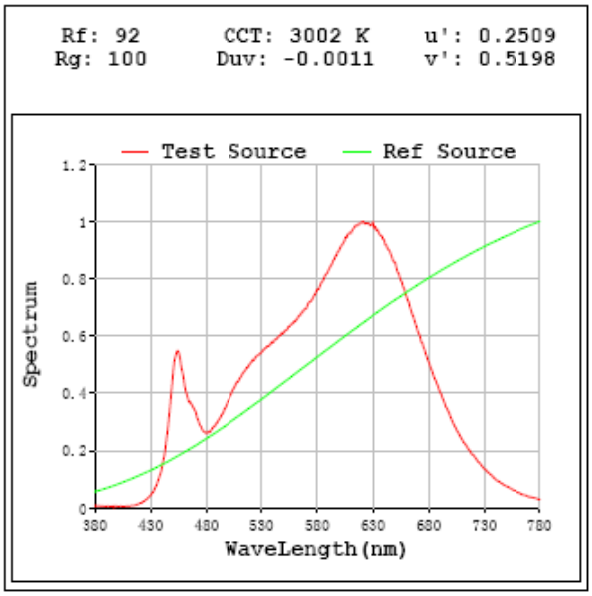
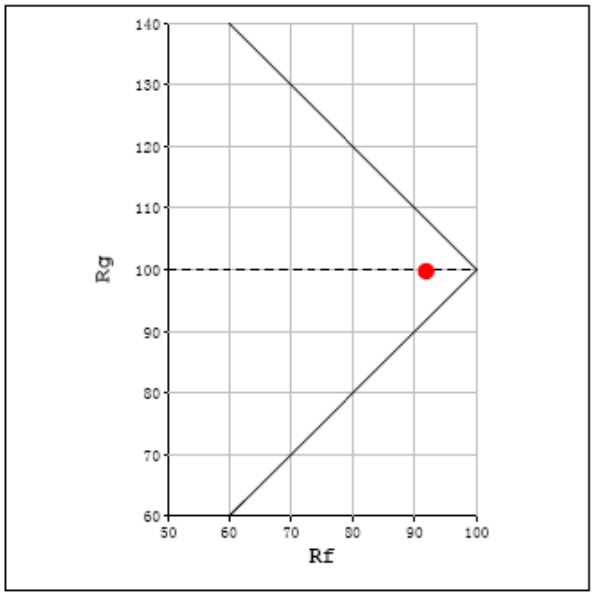
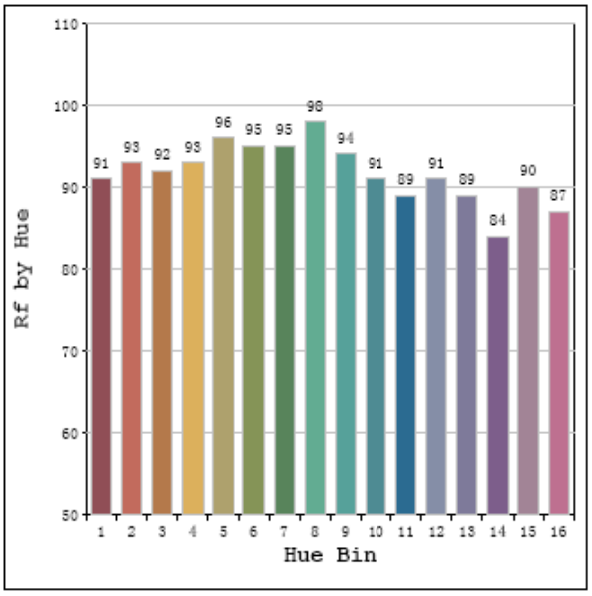
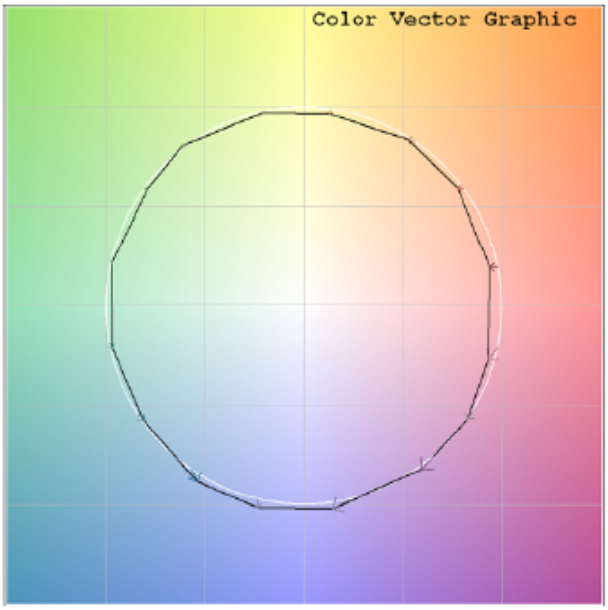

Rf: 92 CCT: 3002 K u': 0.2509
Rg: 100 Duv: -0.0011 v': 0.5198
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
91 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	DLS0101(CRVFAS-19R-32-9CCT-UNV-W/MVS)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120043	120.0	60	0.255	30.45	0.995

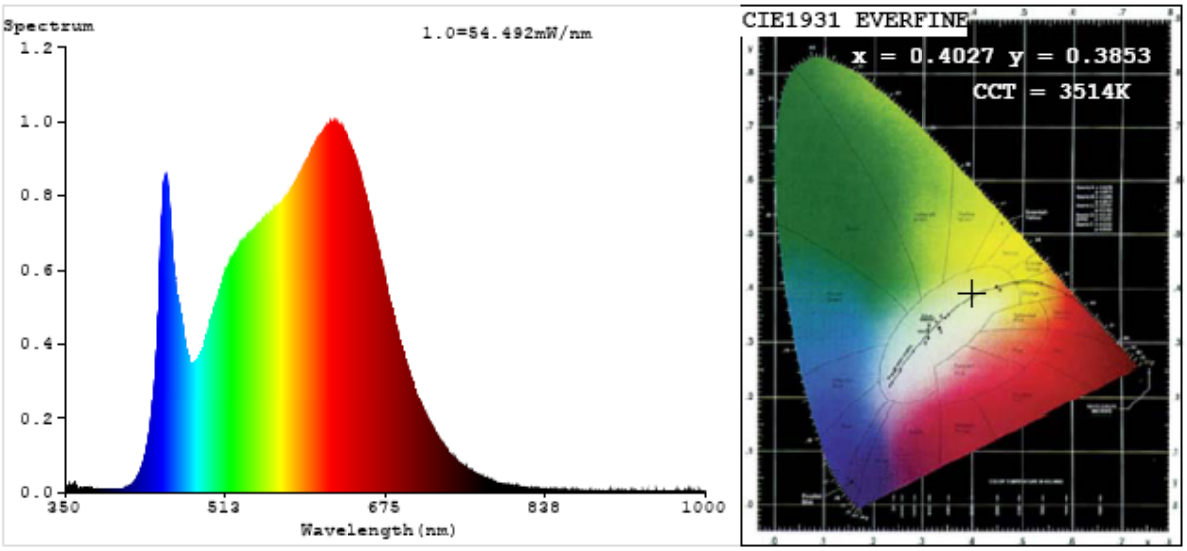
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3514
Duv	0.0018
Chromaticity (x, y)	x=0.4027 y=0.3853
Chromaticity (u', v')	u'=0.2362 v'=0.5086
Color Rendering Index (CRI)	96.2
R9	79
Total Luminous (lm)	2969.0
Luminous Efficacy (lm/W)	97.52

Special Color Rendering Indices			
R1	98	R9	79
R2	99	R10	96
R3	98	R11	97
R4	97	R12	79
R5	97	R13	98
R6	96	R14	98
R7	95	R15	96
R8	91	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	3166.0
Luminous Efficacy (lm/W)	96.71

Spectral Power Distribution & Chromaticity Diagram



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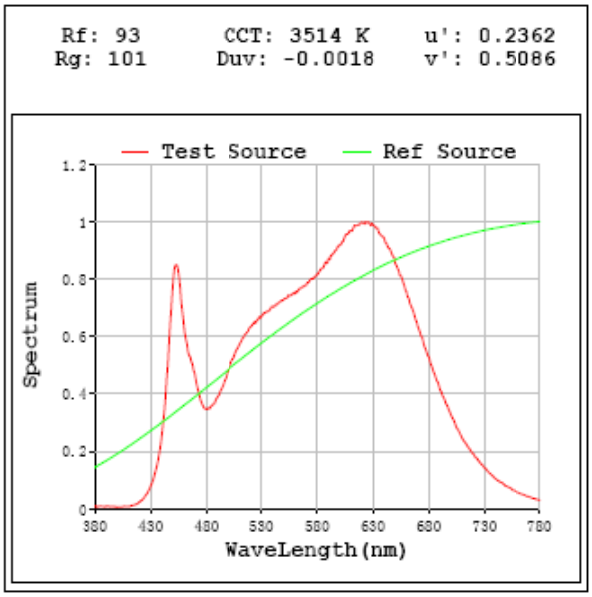
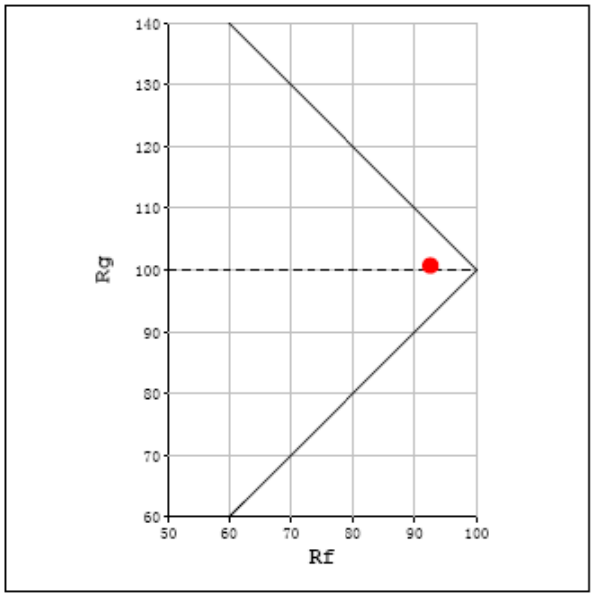
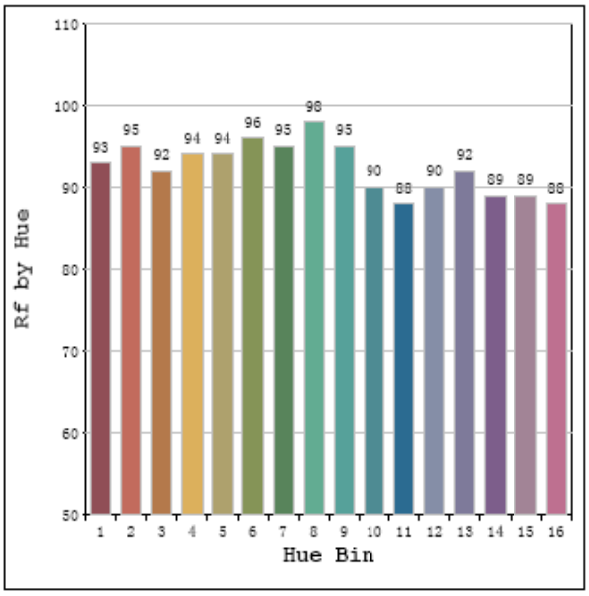
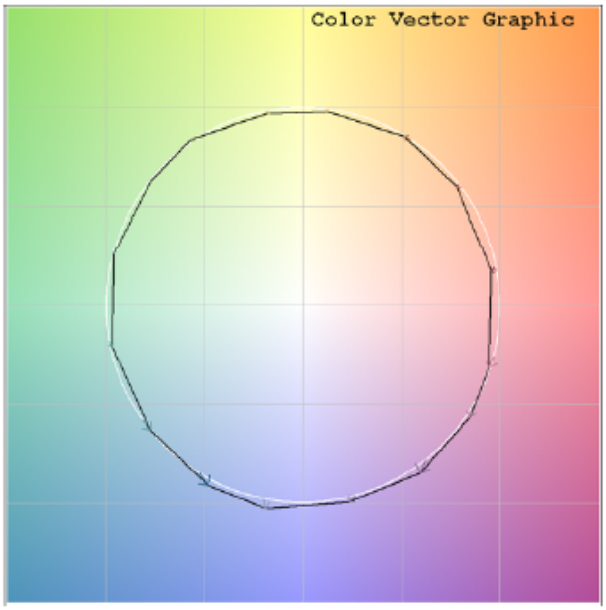

Rf: 93
CCT: 3514 K
u': 0.2362
Rg: 101
Duv: -0.0018
v': 0.5086
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
93
95
92
94
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	DLS0101(CRVFAS-19R-32-9CCT-UNV-W/MVS)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120043	120.0	60	0.260	31.10	0.996

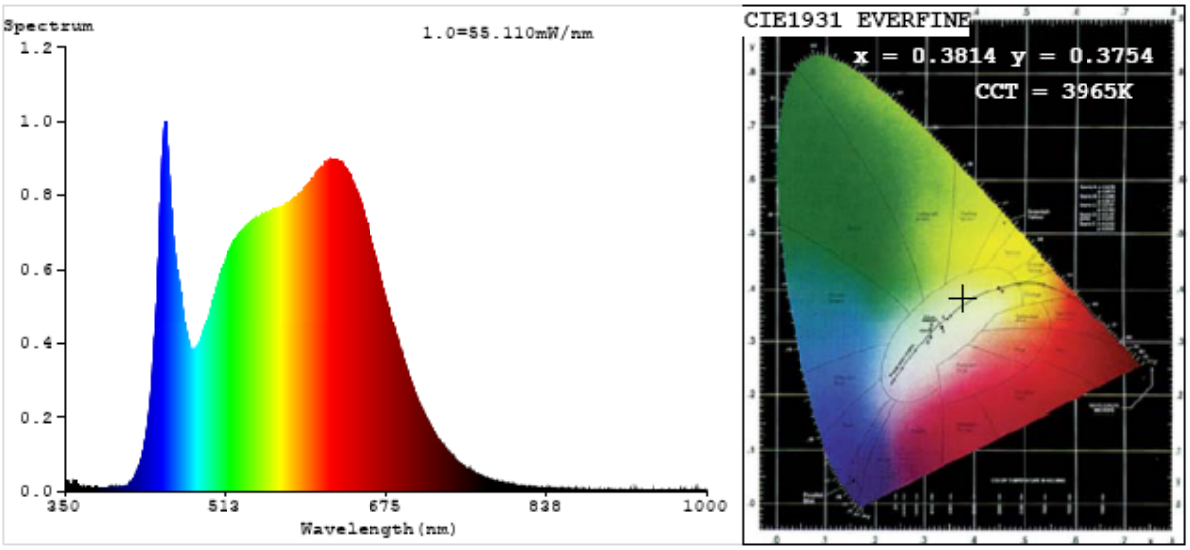
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3965
Duv	0.0009
Chromaticity (x, y)	x=0.3814 y=0.3754
Chromaticity (u', v')	u'=0.2263 v'=0.5011
Color Rendering Index (CRI)	96.0
R9	82
Total Luminous (lm)	2972.0
Luminous Efficacy (lm/W)	95.54

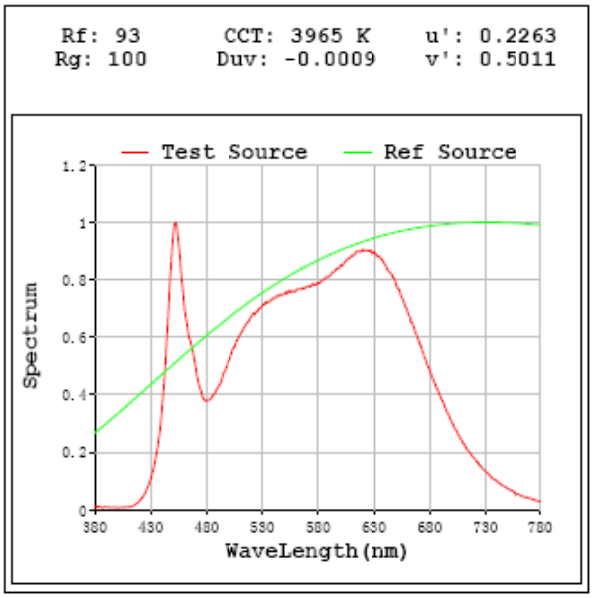
Special Color Rendering Indices			
R1	97	R9	82
R2	98	R10	93
R3	96	R11	96
R4	97	R12	75
R5	96	R13	98
R6	95	R14	97
R7	97	R15	96
R8	93	--	--

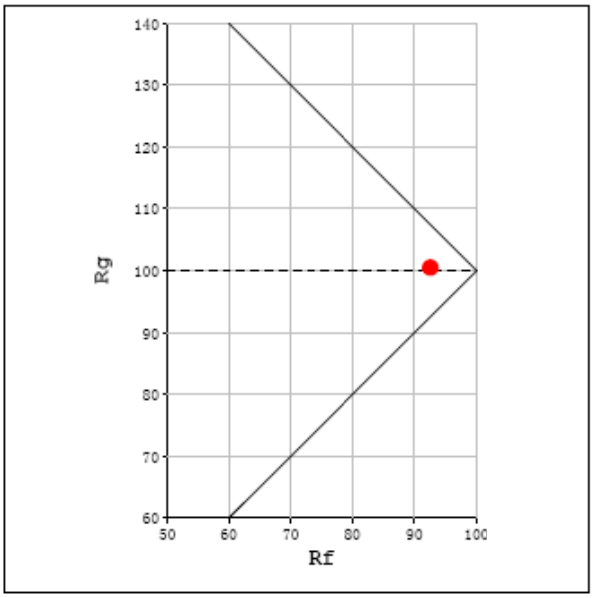
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	3159.0
Luminous Efficacy (lm/W)	94.75

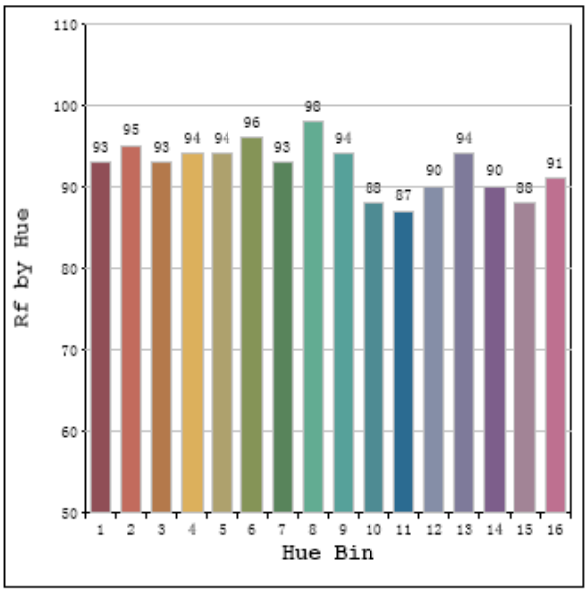
Spectral Power Distribution & Chromaticity Diagram

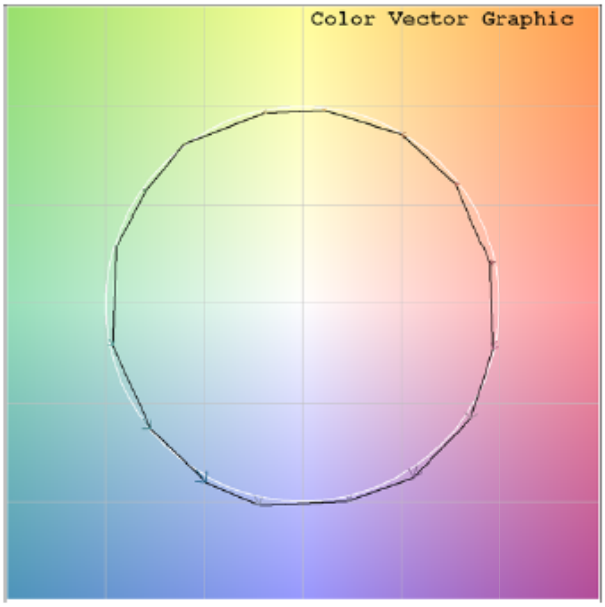


TM30


Rf: 93 CCT: 3965 K u': 0.2263
Rg: 100 Duv: -0.0009 v': 0.5011
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	DLS0101(CRVFAS-19R-32-9CCT-UNV-W/MVS)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202110120043	120.0	60	0.265	31.60	0.996

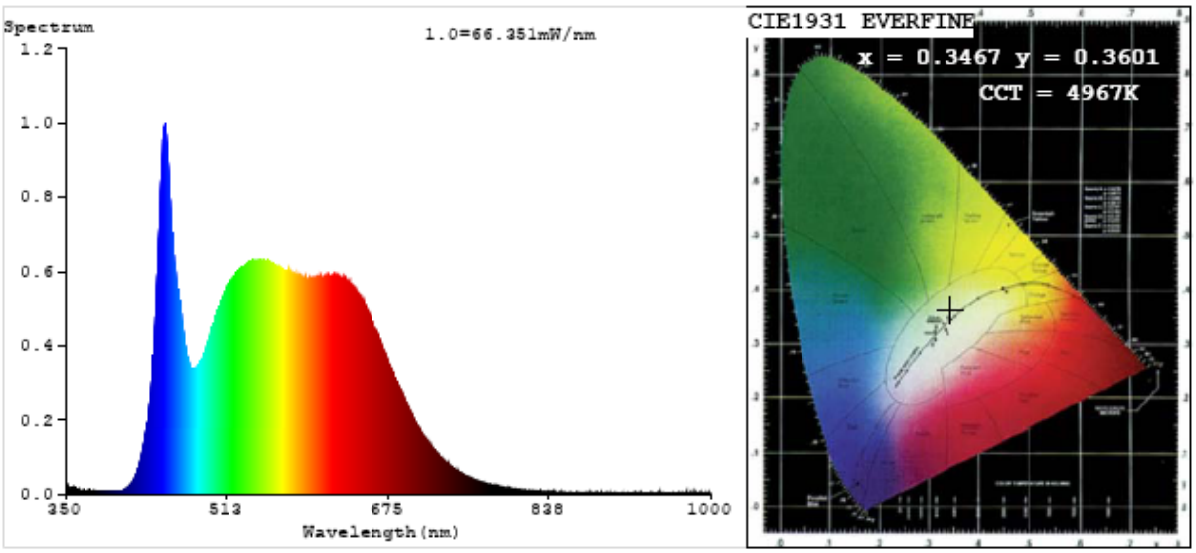
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4967
Duv	0.0036
Chromaticity (x, y)	x=0.3467 y=0.3601
Chromaticity (u', v')	u'=0.2093 v'=0.4890
Color Rendering Index (CRI)	92.9
R9	75
Total Luminous (lm)	2819.0
Luminous Efficacy (lm/W)	89.21

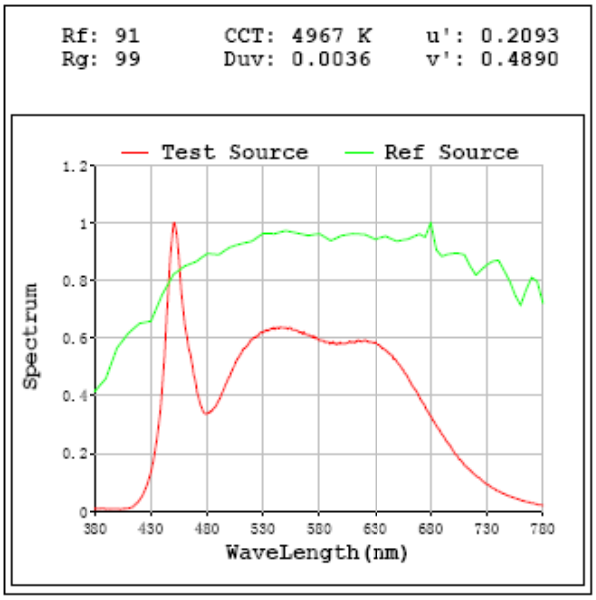
Special Color Rendering Indices			
R1	93	R9	75
R2	94	R10	85
R3	94	R11	92
R4	93	R12	66
R5	91	R13	93
R6	90	R14	96
R7	98	R15	91
R8	91	--	--

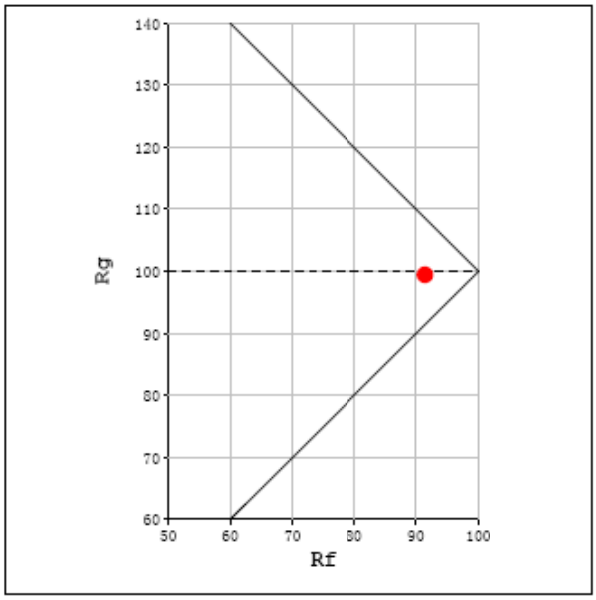
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2986.0
Luminous Efficacy (lm/W)	88.04

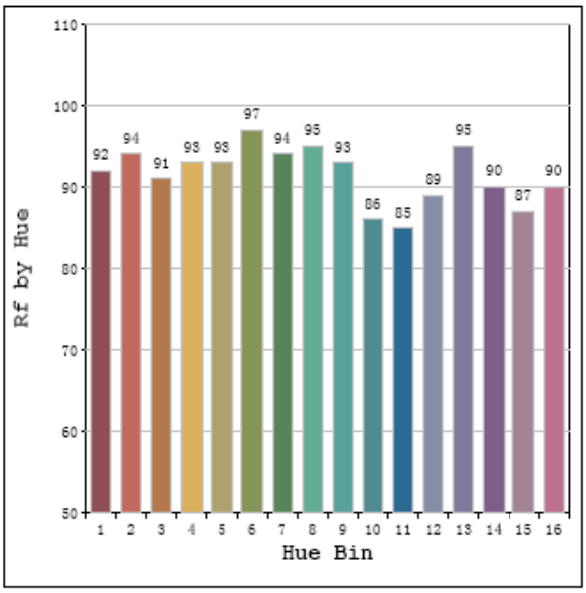
Spectral Power Distribution & Chromaticity Diagram

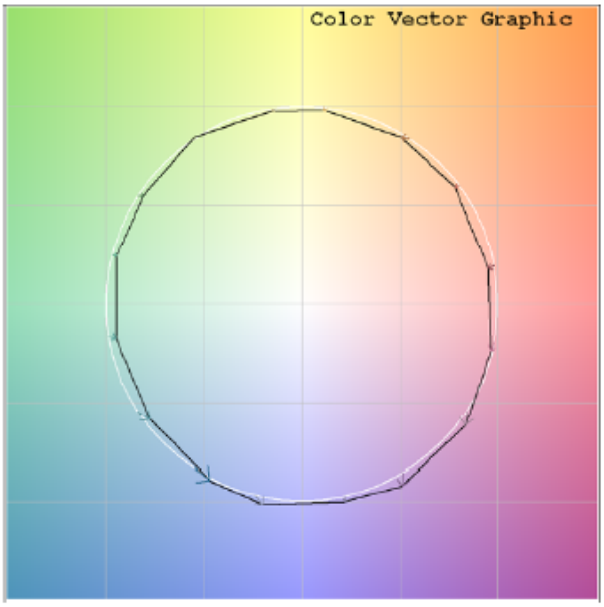


TM30



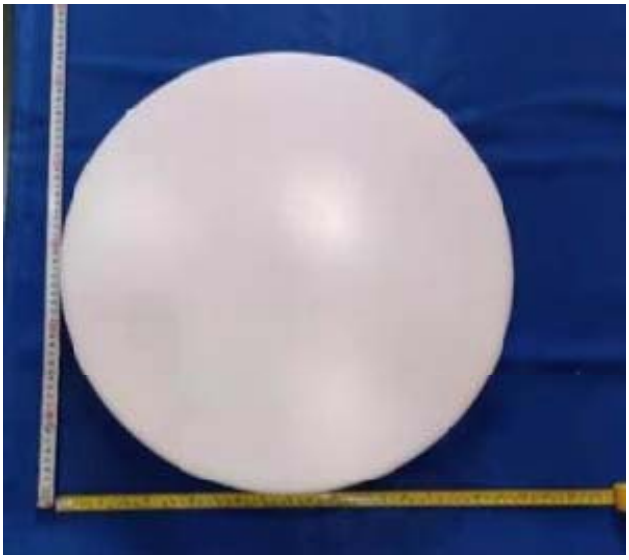






Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0101(CRVFAS-19R-32-9CCT-UNV-W/MVS)	2700K setting	120.0	2657.3	31.20	85.17
		277.0	2816.0	33.69	83.57
	3000K setting	120.0	2829.0	31.24	90.54
		277.0	2996.0	33.45	89.57
	3500K setting	120.0	2969.0	30.45	97.52
		277.0	3166.0	32.73	96.71
	4000K setting	120.0	2972.0	31.10	95.54
		277.0	3159.0	33.34	94.75
	5000K setting	120.0	2819.0	31.60	89.21
		277.0	2986.0	33.91	88.04

3. Product Photo



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