

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):
DLS0144(SUMO-R-12/D10)

Report Type: Testing and Report According to IES LM-79-2008

**Type of
Luminaire:** Downlights

Report Date: 2022-07-28

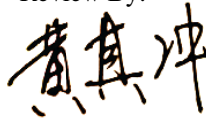
Prepared By:

Test & Report By:



Engineer: Sun Fangfang

Review By:



Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120V-277Vac, 60 Hz
Nominal Power	24.0 W
Rated Initial Lamp Lumen	1800 lm
Declared CCT	2700K/3000K/3500K/4000K/5000K

1.2 Test Specifications:

Test item	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 25°C ±1°C. 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 25°C ±1°C. 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	2022-07-28	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0144(SUMO-R-12/D10)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207210029	120.0	60	0.199	23.80	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

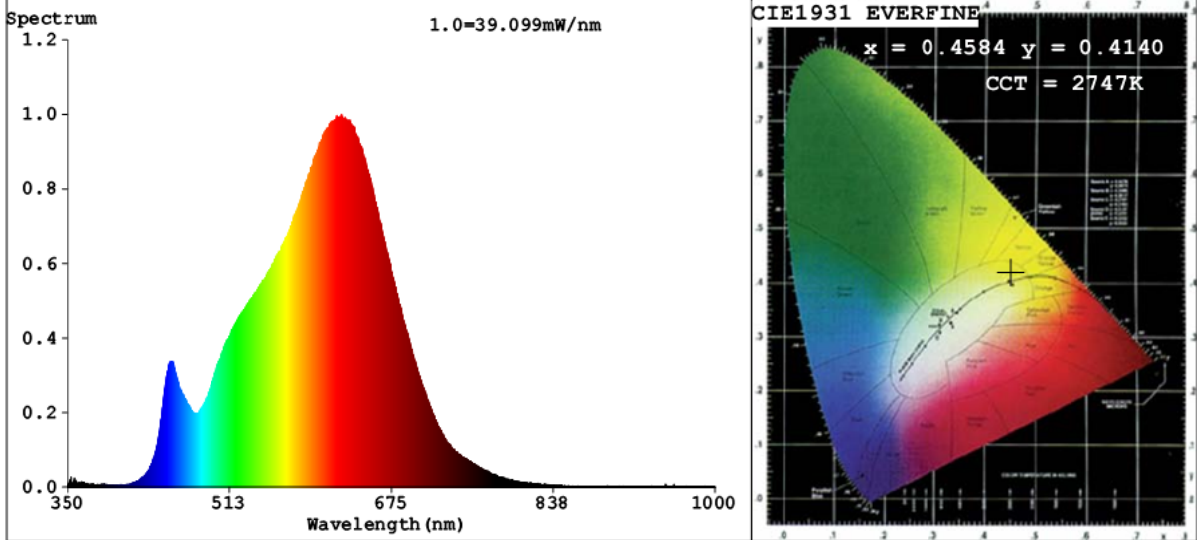
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	59
Frequency (Hz)	60	R2	97	R10	92
CCT (K)	2747	R3	99	R11	95
Duv	0.0014	R4	93	R12	84
Chromaticity (x, y)	x=0.4584 y=0.4140	R5	93	R13	94
Chromaticity (u', v')	u'=0.2600 v'=0.5284	R6	97	R14	99
Color Rendering Index (CRI)	93.2	R7	92	R15	88
R9	59	R8	81	--	--

Photometric Measurement – Goniophotometer Method:

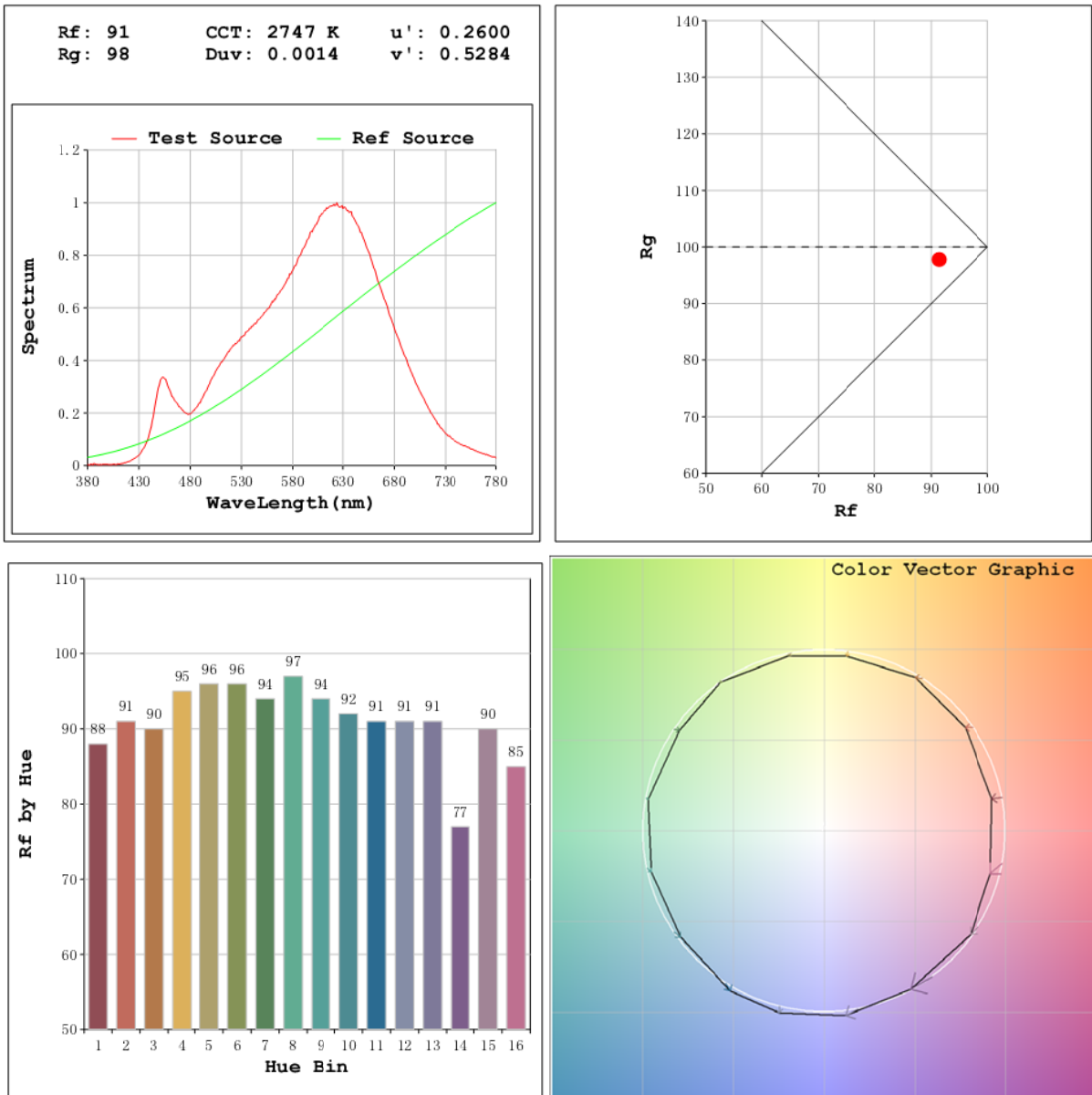
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1815.9
Luminous Efficacy (lm/W)	76.30
Beam Angle (°)	113.5
Center Beam Candle Power (cd)	624.4

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1766
Luminous Efficacy (lm/W)	73.87

Spectral Power Distribution & Chromaticity Diagram



TM30

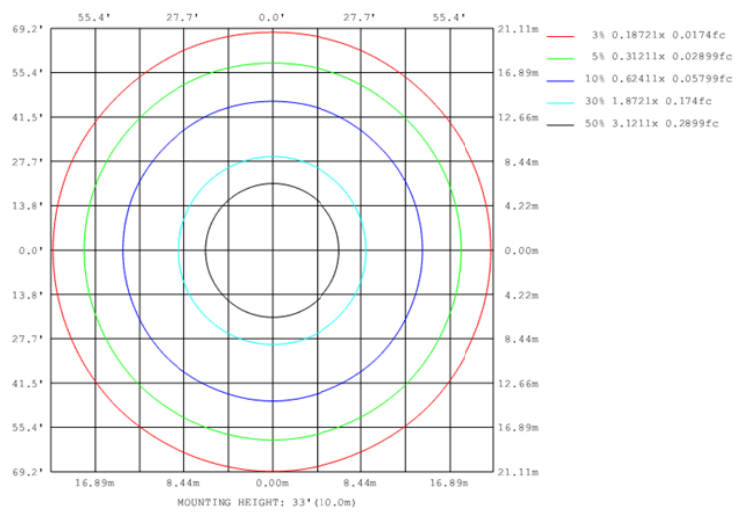
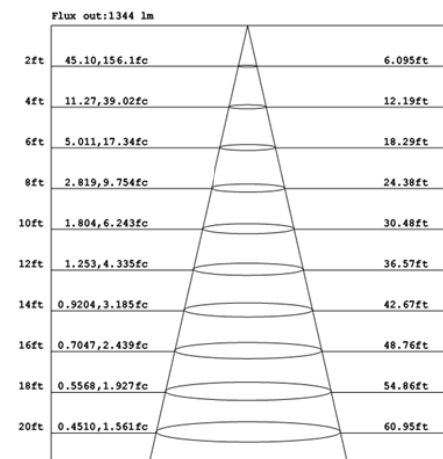
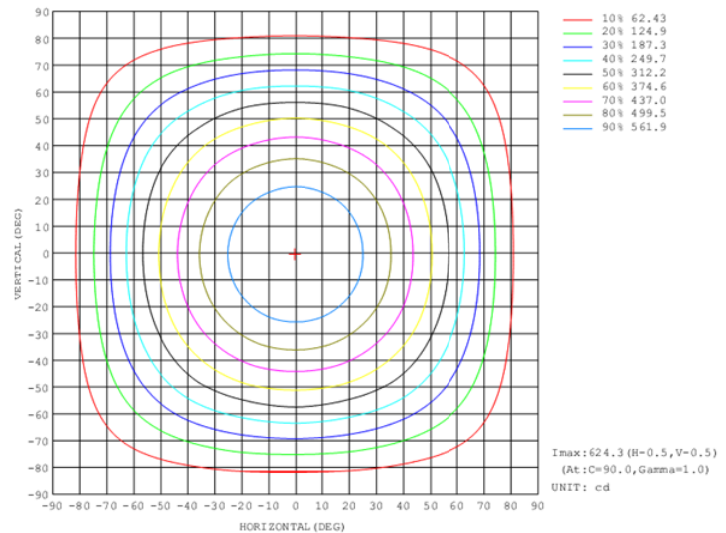
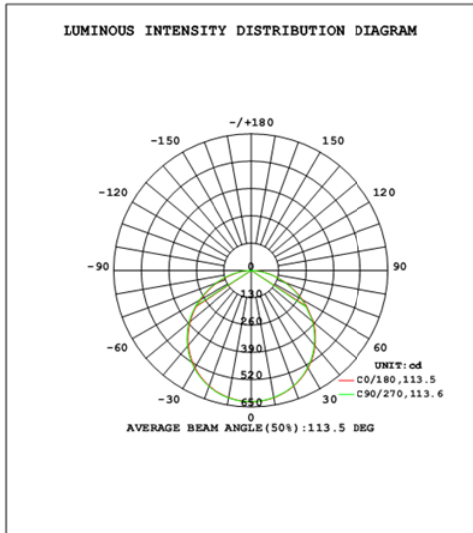


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	488.5	26.9%
0-40	803.3	44.2%
0-60	1426.4	78.5%
60-90	389.6	21.5%
70-100	165.4	9.1%
90-120	0.0	0.0%
0-90	1815.9	100.0%
90-180	0.0	0.0%
0-180	1815.9	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	59.1	3.3%	90-100	0.0	0.0%
10-20	170.0	9.4%	100-110	0.0	0.0%
20-30	259.4	14.3%	110-120	0.0	0.0%
30-40	314.8	17.3%	120-130	0.0	0.0%
40-50	328.0	18.1%	130-140	0.0	0.0%
50-60	295.0	16.2%	140-150	0.0	0.0%
60-70	224.2	12.3%	150-160	0.0	0.0%
70-80	128.4	7.1%	160-170	0.0	0.0%
80-90	37.0	2.0%	170-180	0.0	0.0%

Photometric Data



2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-28	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0144(SUMO-R-12/D10)		3000K

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207210029	120.0	60	0.199	23.80	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

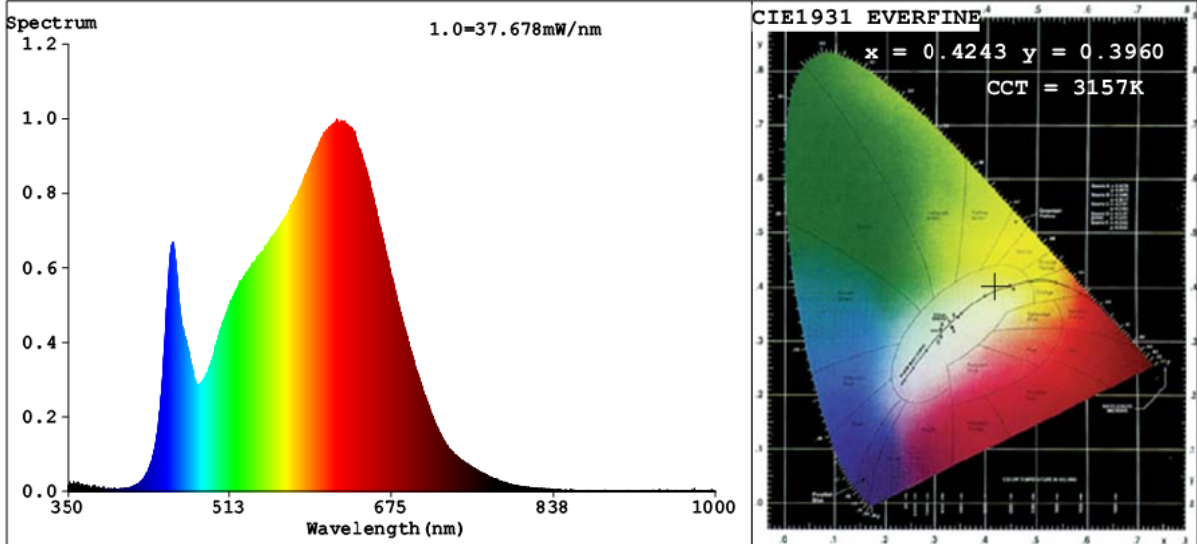
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	71
Frequency (Hz)	60	R2	99	R10	95
CCT (K)	3157	R3	99	R11	96
Duv	-0.0014	R4	95	R12	80
Chromaticity (x, y)	x=0.4243 y=0.3960	R5	95	R13	97
Chromaticity (u', v')	u'=0.2459 v'=0.5163	R6	96	R14	99
Color Rendering Index (CRI)	94.9	R7	93	R15	93
R9	71	R8	87	--	--

Photometric Measurement – Goniophotometer Method:

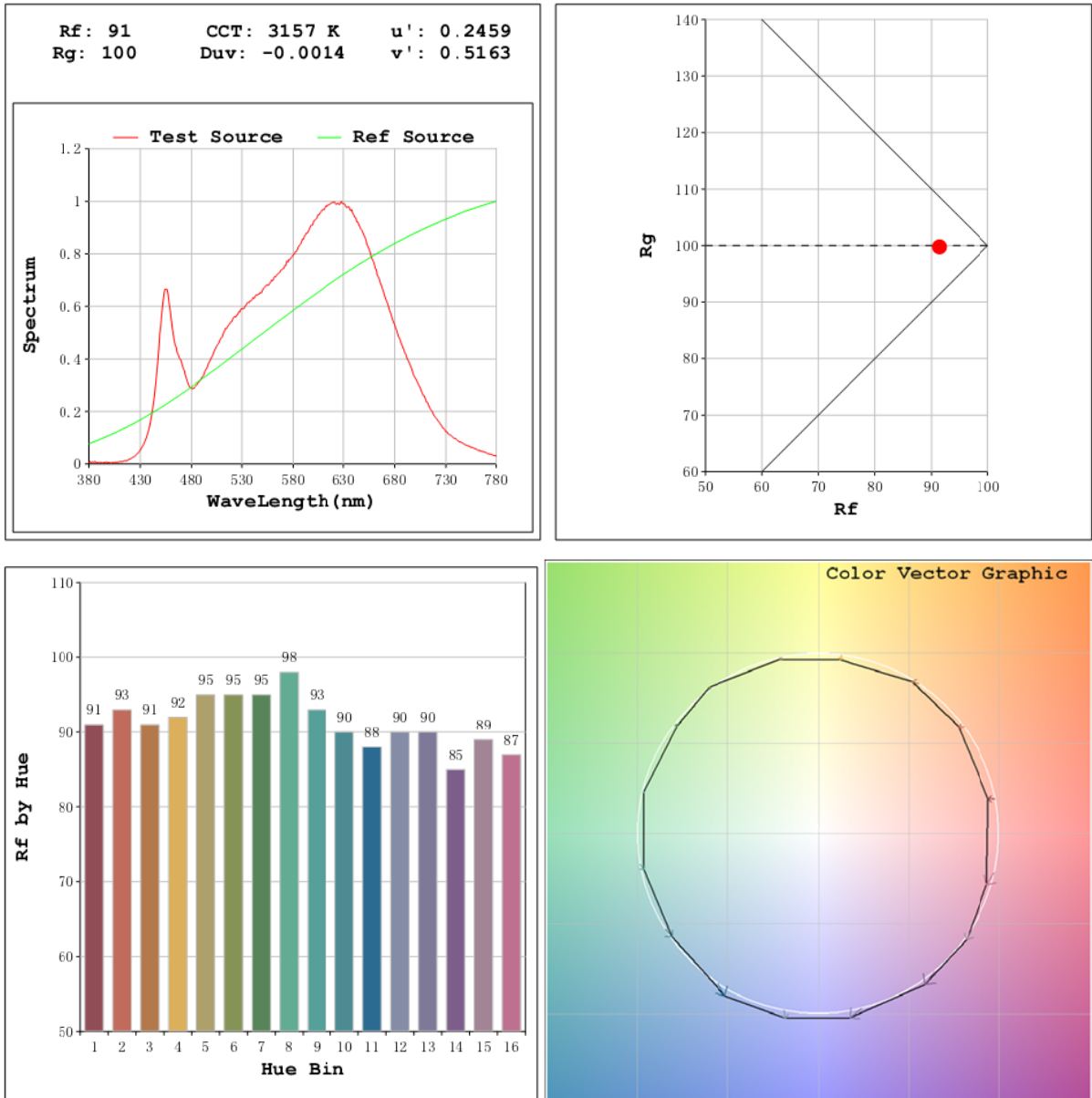
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1929.8
Luminous Efficacy (lm/W)	81.08
Beam Angle (°)	113.5
Center Beam Candle Power (cd)	663.4

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1878
Luminous Efficacy (lm/W)	78.54

Spectral Power Distribution & Chromaticity Diagram



TM30

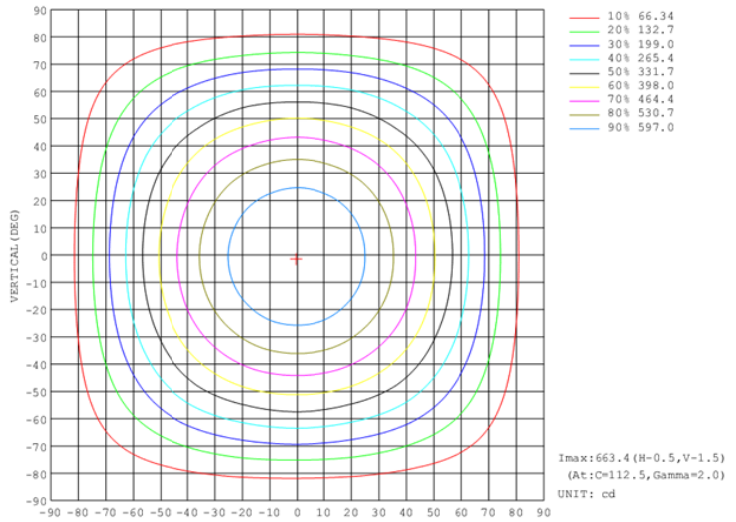
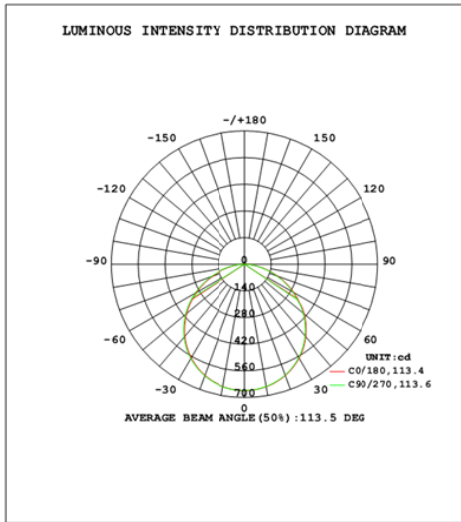


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	519.0	26.9%
0-40	853.3	44.2%
0-60	1515.7	78.5%
60-90	414.1	21.5%
70-100	175.9	9.1%
90-120	0.0	0.0%
0-90	1929.8	100.0%
90-180	0.0	0.0%
0-180	1929.8	100.0%

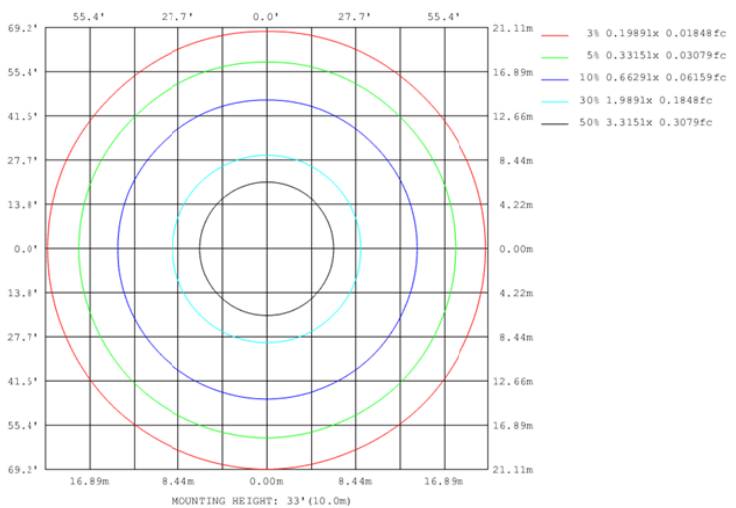
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	62.8	3.3%	90-100	0.0	0.0%
10-20	180.6	9.4%	100-110	0.0	0.0%
20-30	275.5	14.3%	110-120	0.0	0.0%
30-40	334.4	17.3%	120-130	0.0	0.0%
40-50	348.4	18.1%	130-140	0.0	0.0%
50-60	314.0	16.3%	140-150	0.0	0.0%
60-70	238.2	12.3%	150-160	0.0	0.0%
70-80	136.5	7.1%	160-170	0.0	0.0%
80-90	39.4	2.0%	170-180	0.0	0.0%

Photometric Data



Flux out: 1428 lm

Height	Eavg, Emax	Angle: 113.43deg	Diameter
2ft	47.92, 165.9fc		6.093ft
4ft	11.98, 41.47fc		12.19ft
6ft	5.325, 18.43fc		18.28ft
8ft	2.995, 10.37fc		24.37ft
10ft	1.917, 6.635fc		30.46ft
12ft	1.331, 4.608fc		36.56ft
14ft	0.9780, 3.385fc		42.65ft
16ft	0.7488, 2.592fc		48.74ft
18ft	0.5916, 2.048fc		54.84ft
20ft	0.4792, 1.659fc		60.93ft



2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-28	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0144(SUMO-R-12/D10)		3500K

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207210029	120.0	60	0.195	23.40	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

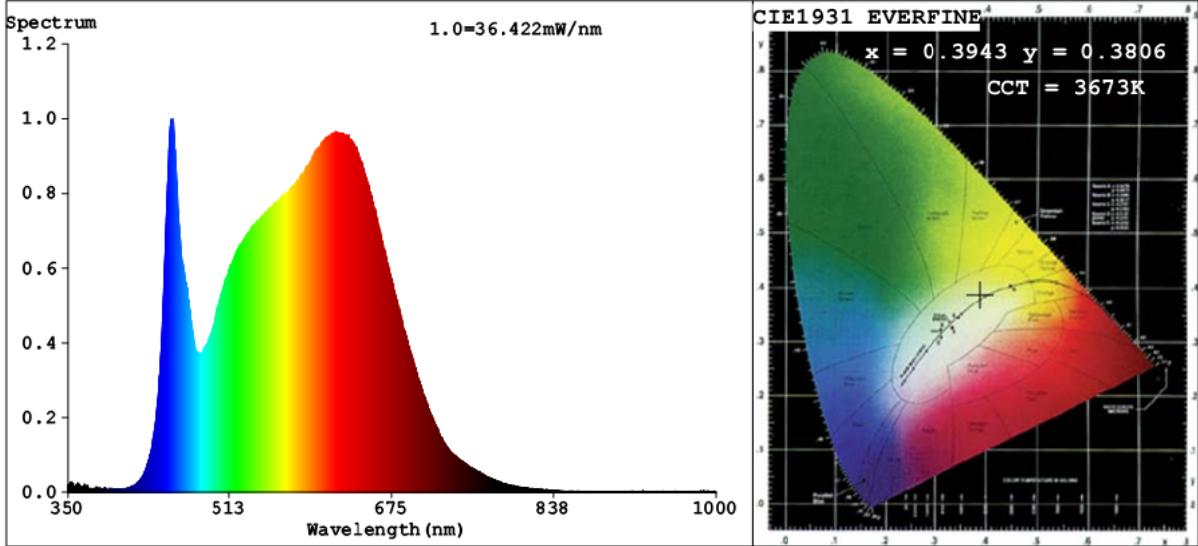
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	78
Frequency (Hz)	60	R2	99	R10	95
CCT (K)	3673	R3	98	R11	95
Duv	-0.0020	R4	95	R12	74
Chromaticity (x, y)	x=0.3943 y=0.3806	R5	95	R13	98
Chromaticity (u', v')	u'=0.2327v'=0.5053	R6	94	R14	98
Color Rendering Index (CRI)	95.3	R7	90	R15	95
R9	78	R8	78	--	--

Photometric Measurement – Goniophotometer Method:

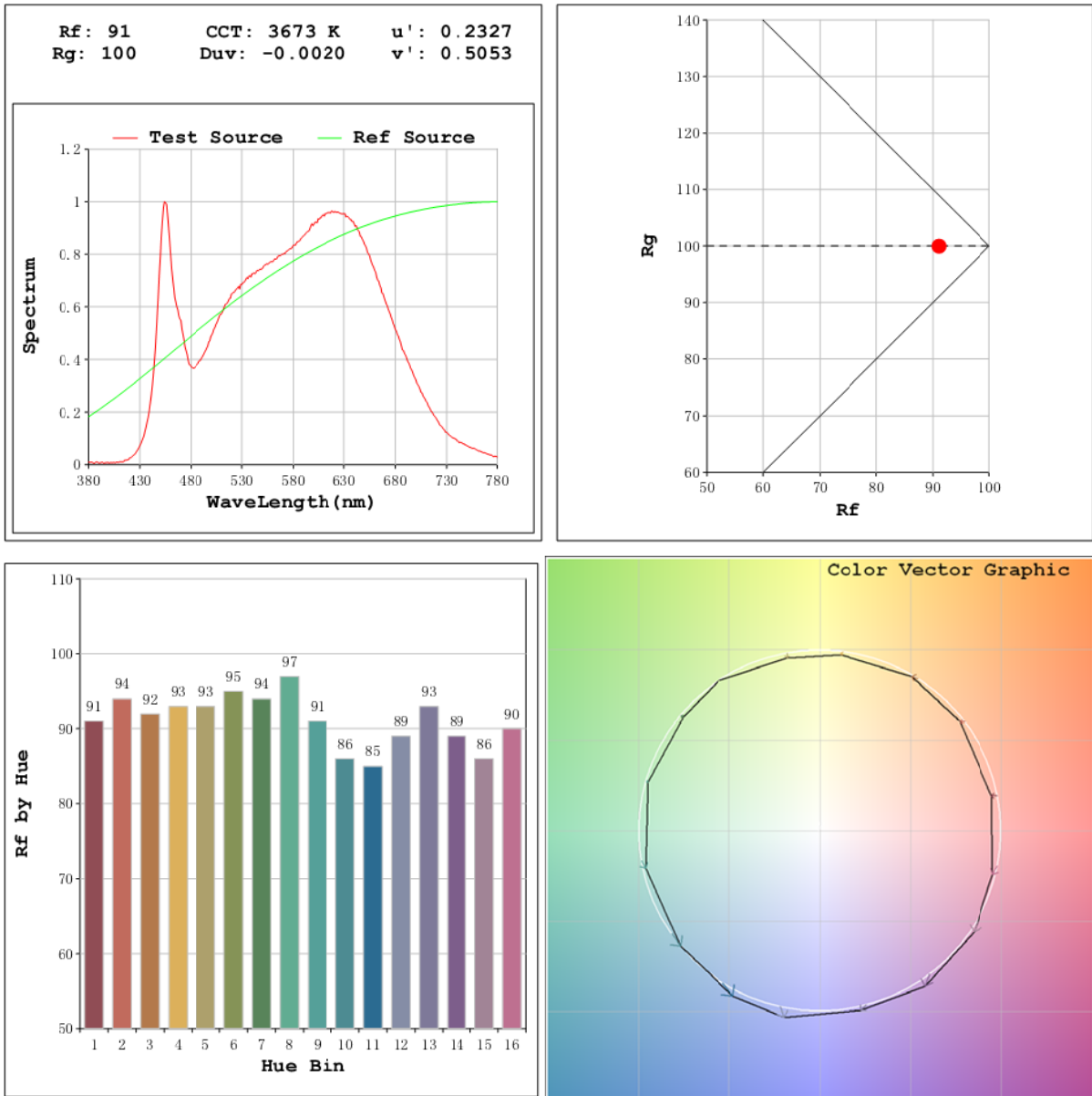
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2018.4
Luminous Efficacy (lm/W)	86.26
Beam Angle (°)	113.5
Center Beam Candle Power (cd)	693.8

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1959
Luminous Efficacy (lm/W)	83.43

Spectral Power Distribution & Chromaticity Diagram



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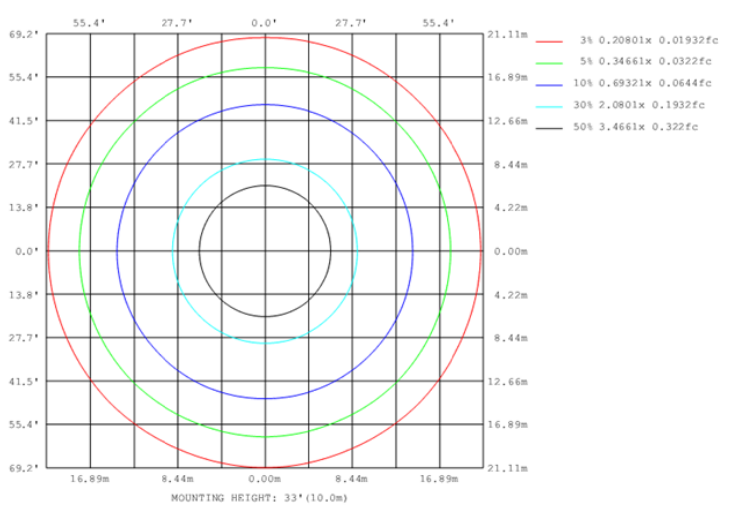
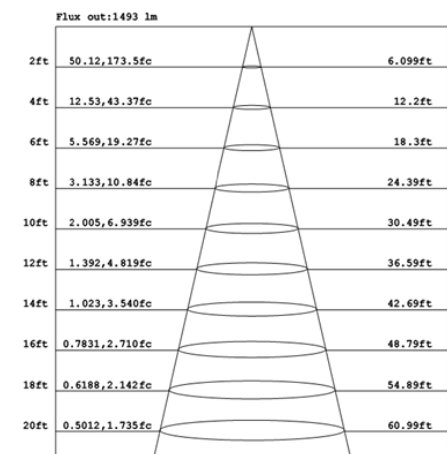
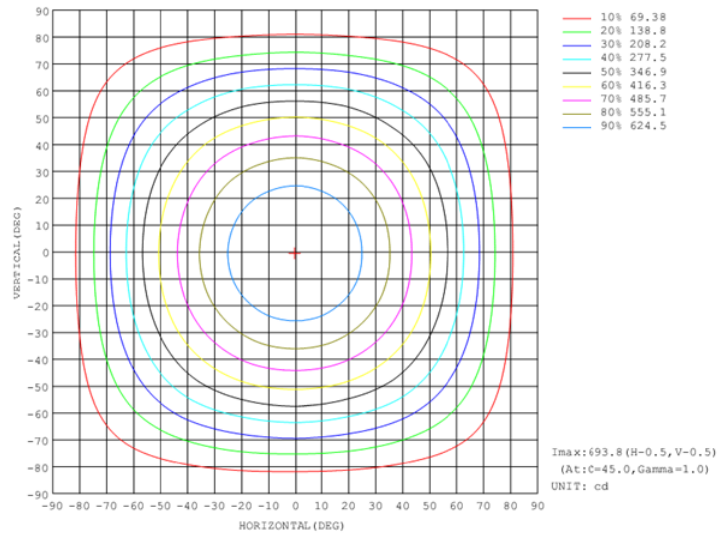
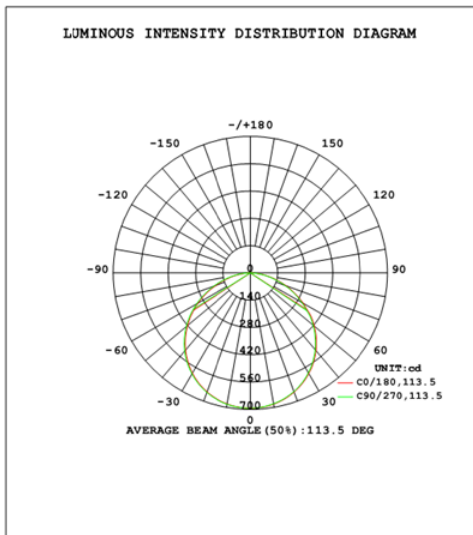


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	542.7	26.9%
0-40	892.3	44.2%
0-60	1585.2	78.5%
60-90	433.2	21.5%
70-100	184.1	9.1%
90-120	0.0	0.0%
0-90	2018.4	100.0%
90-180	0.0	0.0%
0-180	2018.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	65.7	3.3%	90-100	0.0	0.0%
10-20	188.9	9.4%	100-110	0.0	0.0%
20-30	288.1	14.3%	110-120	0.0	0.0%
30-40	349.6	17.3%	120-130	0.0	0.0%
40-50	364.3	18.0%	130-140	0.0	0.0%
50-60	328.6	16.3%	140-150	0.0	0.0%
60-70	249.1	12.3%	150-160	0.0	0.0%
70-80	142.9	7.1%	160-170	0.0	0.0%
80-90	41.2	2.0%	170-180	0.0	0.0%

Photometric Data



2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-28	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0144(SUMO-R-12/D10)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207210029	120.0	60	0.198	23.70	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

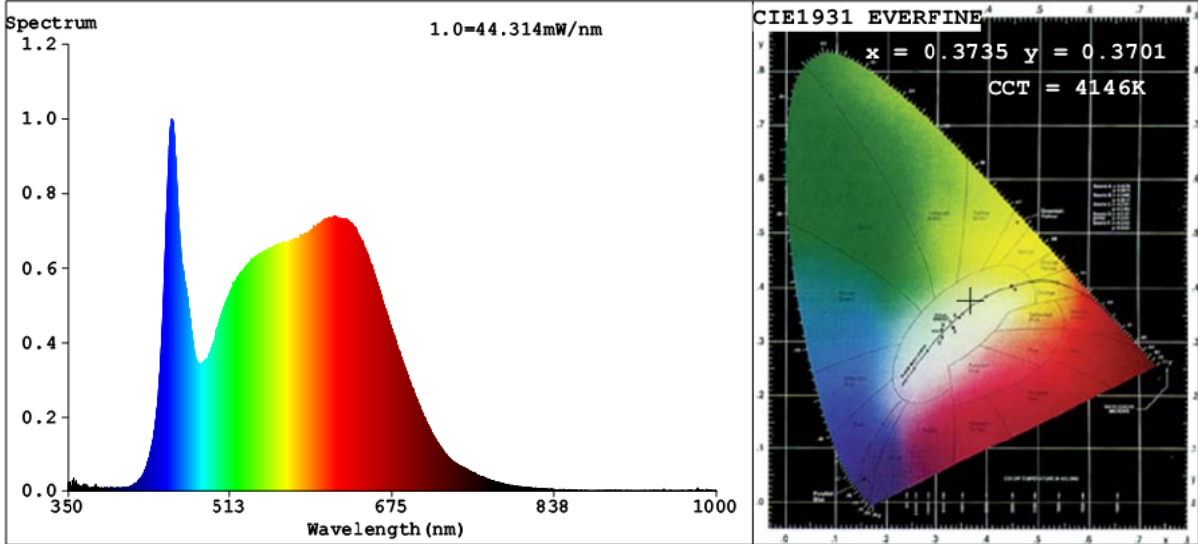
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	79
Frequency (Hz)	60	R2	98	R10	93
CCT (K)	4146	R3	97	R11	94
Duv	-0.0011	R4	94	R12	70
Chromaticity (x, y)	x=0.3735 y=0.3701	R5	94	R13	97
Chromaticity (u', v')	u'=0.2232 v'=0.4976	R6	94	R14	98
Color Rendering Index (CRI)	94.8	R7	95	R15	94
R9	79	R8	91	--	--

Photometric Measurement – Goniophotometer Method:

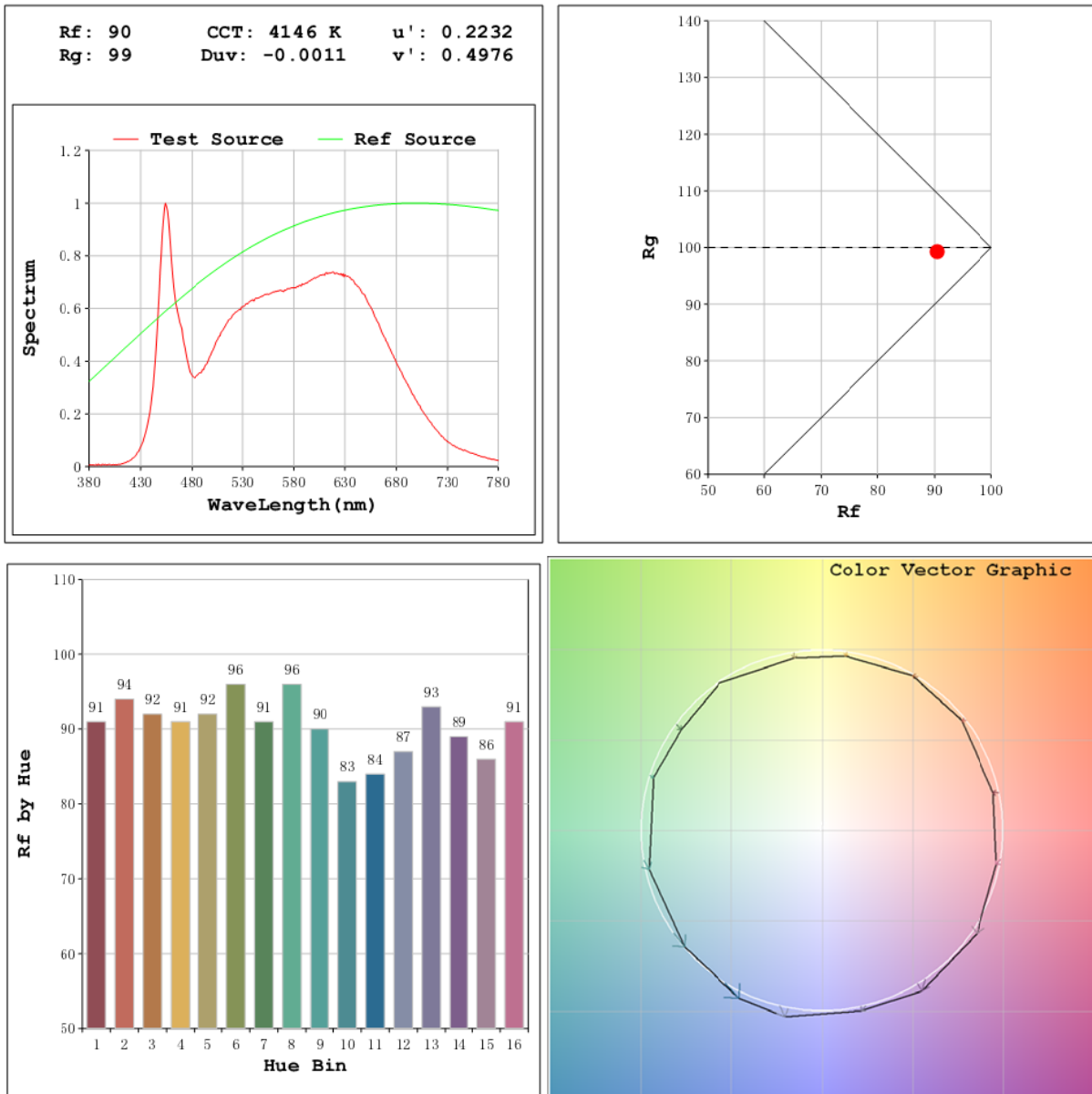
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2050.0
Luminous Efficacy (lm/W)	86.50
Beam Angle (°)	113.6
Center Beam Candle Power (cd)	704.9

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1998
Luminous Efficacy (lm/W)	83.75

Spectral Power Distribution & Chromaticity Diagram



TM30

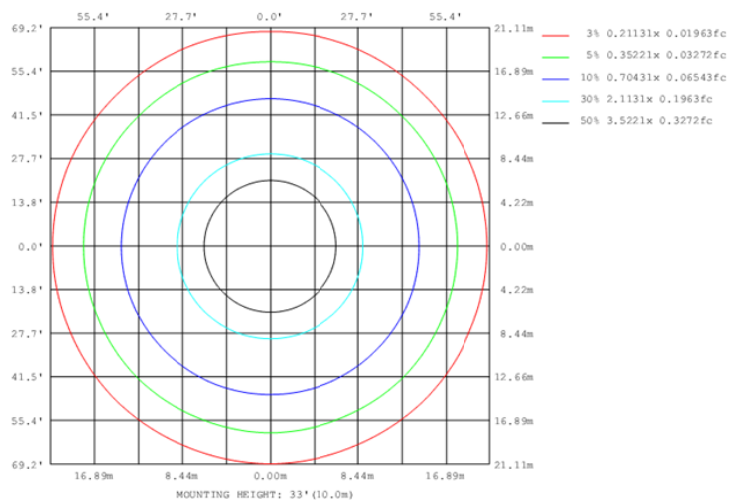
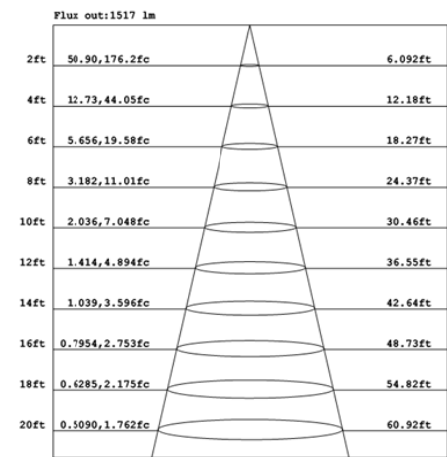
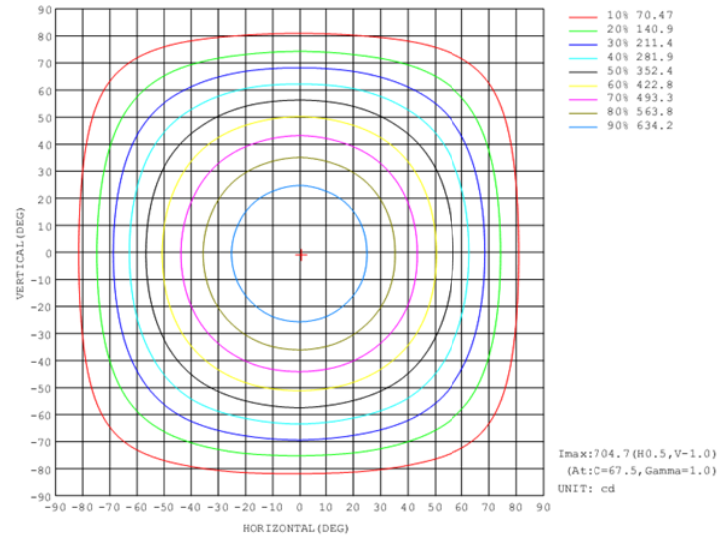
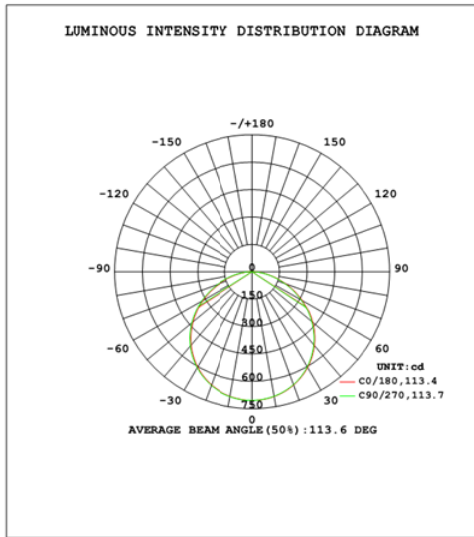


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	551.2	26.9%
0-40	906.2	44.2%
0-60	1610.0	78.5%
60-90	440.1	21.5%
70-100	187.1	9.1%
90-120	0.0	0.0%
0-90	2050.1	100.0%
90-180	0.0	0.0%
0-180	2050.1	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	66.7	3.3%	90-100	0.0	0.0%
10-20	191.9	9.4%	100-110	0.0	0.0%
20-30	292.6	14.3%	110-120	0.0	0.0%
30-40	355.0	17.3%	120-130	0.0	0.0%
40-50	369.9	18.0%	130-140	0.0	0.0%
50-60	333.9	16.3%	140-150	0.0	0.0%
60-70	253.0	12.3%	150-160	0.0	0.0%
70-80	145.2	7.1%	160-170	0.0	0.0%
80-90	41.9	2.0%	170-180	0.0	0.0%

Photometric Data



2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-28	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0144(SUMO-R-12/D10)		5000K

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207210029	120.0	60	0.199	23.80	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

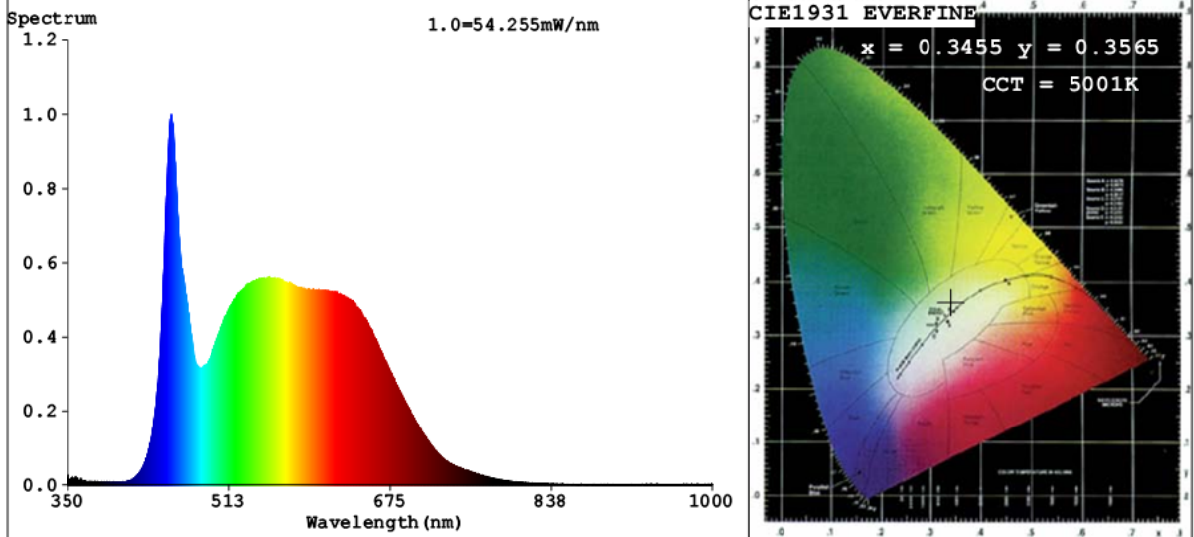
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	71
Frequency (Hz)	60	R2	96	R10	87
CCT (K)	5001	R3	95	R11	91
Duv	0.0023	R4	92	R12	68
Chromaticity (x, y)	x=0.3455 y=0.3565	R5	92	R13	94
Chromaticity (u', v')	u'=0.2098 v'=0.4871	R6	92	R14	97
Color Rendering Index (CRI)	92.8	R7	95	R15	92
R9	71	R8	89	--	--

Photometric Measurement – Goniophotometer Method:

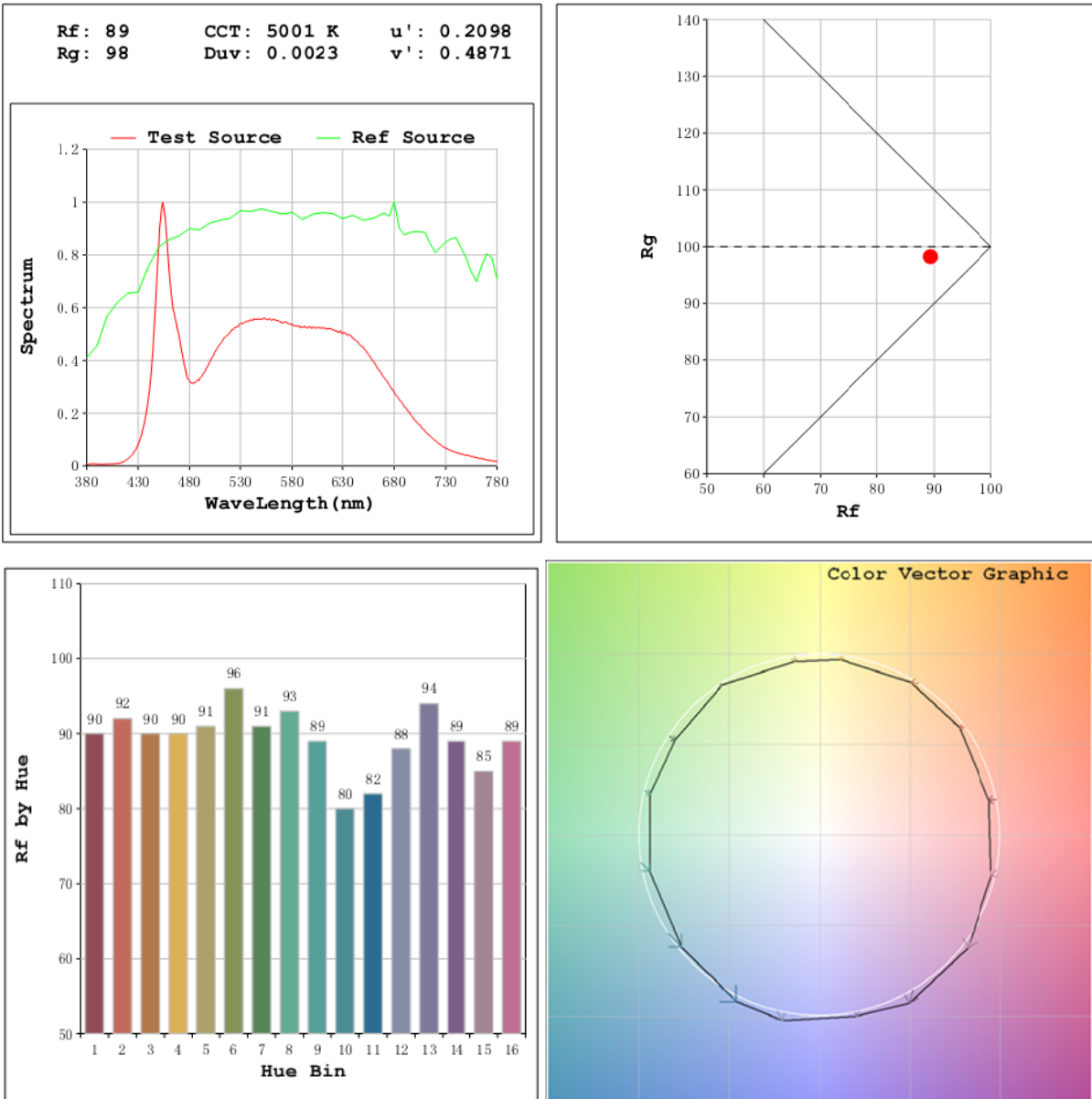
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2049.6
Luminous Efficacy (lm/W)	86.12
Beam Angle (°)	113.5
Center Beam Candle Power (cd)	704.8

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1997
Luminous Efficacy (lm/W)	83.48

Spectral Power Distribution & Chromaticity Diagram



TM30

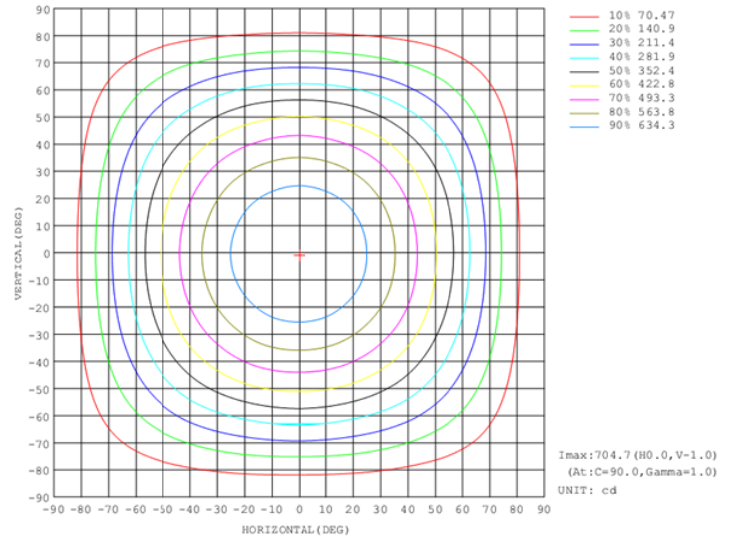
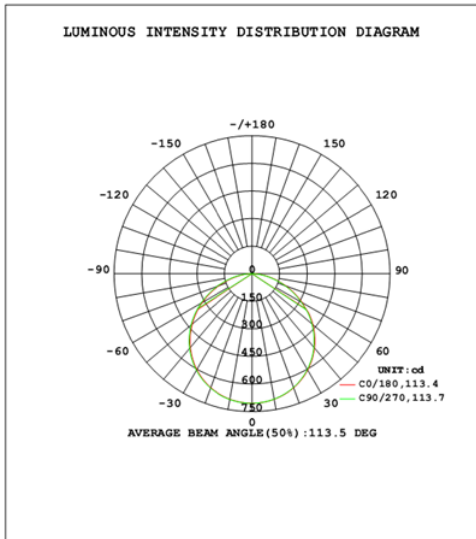


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	551.1	26.9%
0-40	906.0	44.2%
0-60	1609.6	78.5%
60-90	440.1	21.5%
70-100	187.1	9.1%
90-120	0.0	0.0%
0-90	2049.6	100.0%
90-180	0.0	0.0%
0-180	2049.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	66.7	3.3%	90-100	0.0	0.0%
10-20	191.8	9.4%	100-110	0.0	0.0%
20-30	292.6	14.3%	110-120	0.0	0.0%
30-40	354.9	17.3%	120-130	0.0	0.0%
40-50	369.8	18.0%	130-140	0.0	0.0%
50-60	333.8	16.3%	140-150	0.0	0.0%
60-70	253.0	12.3%	150-160	0.0	0.0%
70-80	145.1	7.1%	160-170	0.0	0.0%
80-90	42.0	2.0%	170-180	0.0	0.0%

Photometric Data



Height	Eavg, Emax	Angle: 113.39deg	Diameter
2ft	50.89, 176.2fc		6.088ft
4ft	12.72, 44.04fc		12.18ft
6ft	5.655, 19.57fc		18.26ft
8ft	3.181, 11.01fc		24.35ft
10ft	2.036, 7.047fc		30.44ft
12ft	1.414, 4.893fc		36.53ft
14ft	1.039, 3.595fc		42.62ft
16ft	0.7952, 2.753fc		48.71ft
18ft	0.6283, 2.175fc		54.79ft
20ft	0.5089, 1.762fc		60.88ft

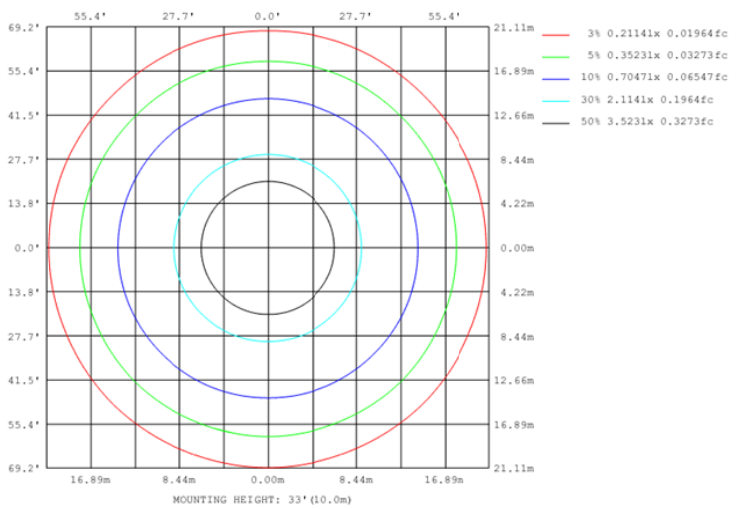


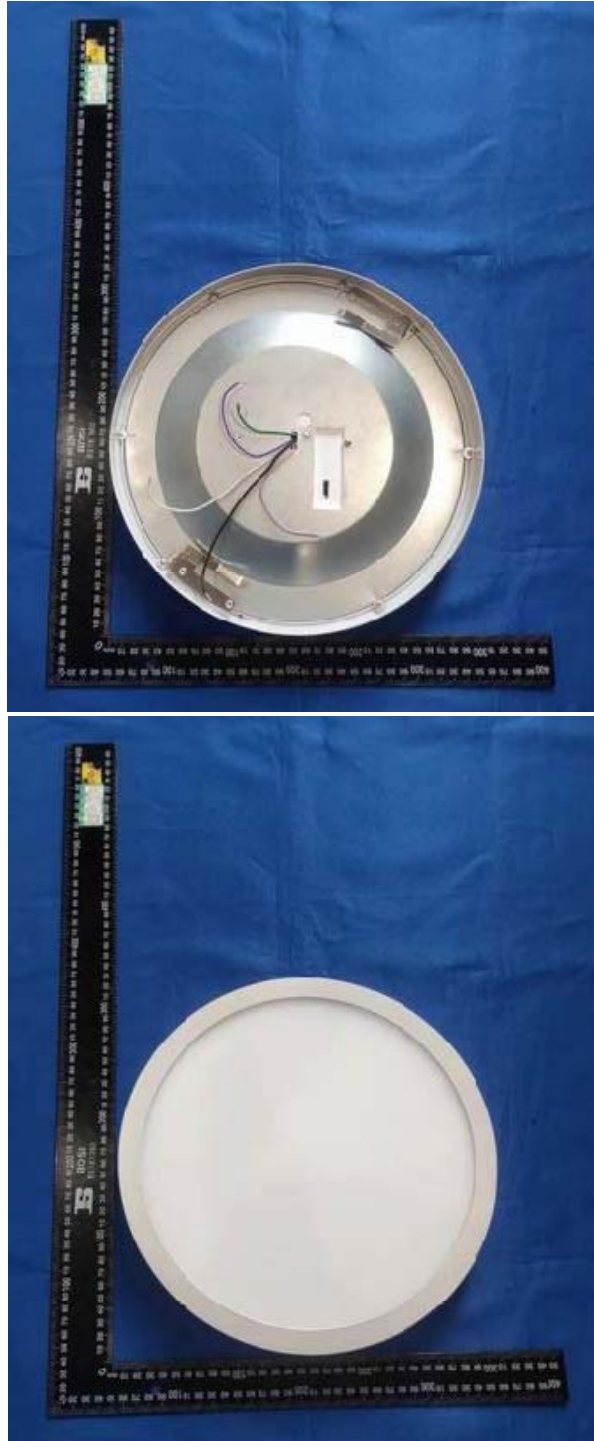
Table--1

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	705	705	705	705	705	705	705	705	705	705	705	705	705	705	705	705
5	702	702	702	702	702	702	702	702	702	701	702	701	701	701	701	702
10	693	694	694	694	694	694	694	694	693	693	693	692	692	692	693	693
15	679	680	680	681	681	681	680	680	680	679	679	677	678	678	679	679
20	659	661	661	662	662	662	661	661	661	659	659	658	658	658	659	659
25	634	636	636	638	637	638	636	636	635	633	633	632	632	632	633	634
30	602	605	606	607	607	608	605	605	605	602	602	600	601	600	602	602
35	565	569	569	572	571	572	570	569	569	566	565	563	564	563	565	566
40	524	527	528	531	530	531	529	528	527	524	524	521	523	521	524	524
45	477	481	482	485	484	486	483	482	481	478	477	474	476	475	477	477
50	426	430	431	434	434	436	433	432	431	427	426	423	425	423	426	426
55	371	376	377	380	380	382	379	378	377	373	373	369	370	369	371	371
60	314	313	319	318	323	320	322	316	315	315	310	311	308	311	308	313
65	254	254	260	259	264	261	263	257	256	256	251	252	249	252	250	254
70	193	195	199	200	204	202	203	198	197	196	192	192	190	192	191	194
75	132	137	138	142	143	145	142	140	139	134	134	132	133	132	133	133
80	79.0	82.7	83.6	88.1	88.9	90.5	87.4	86.5	85.1	81.3	80.6	79.0	80.1	78.6	79.8	79.3
85	33.6	36.5	36.9	40.5	41.4	42.6	39.7	39.7	39.0	35.7	34.6	33.2	34.0	32.8	33.4	33.6
90	0.93	0.96	1.49	2.50	3.45	3.24	2.20	1.24	1.02	0.94	0.92	0.94	0.92	0.94	0.93	0.95

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0144(SUMO-R-12/D10)	2700K setting	120.0	1815.9	23.80	76.30
		277.0	1766	23.91	73.87
	3000K setting	120.0	1929.8	23.80	81.08
		277.0	1878	23.92	78.54
	3500K setting	120.0	2018.4	23.40	86.26
		277.0	1959	23.48	83.43
	4000K setting	120.0	2050.1	23.70	86.50
		277.0	1998	23.85	83.75
	5000K setting	120.0	2049.6	23.80	86.12
		277.0	1997	23.92	83.48

3. Product Photo



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