

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):
DLW0096(FWAFER4)

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

**Type of
Luminaire:** Downlights

Report Date: 2023-04-11

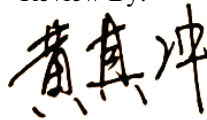
Prepared By:

Test & Report By:



Engineer: Sun Fangfang

Review By:



Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120Vac, 60 Hz
Nominal Power	11.0 W
Rated Initial Lamp Lumen	900 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	2023-04-07	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0096(FWAFER4)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304060012	120.0	60	0.091	10.7	0.981

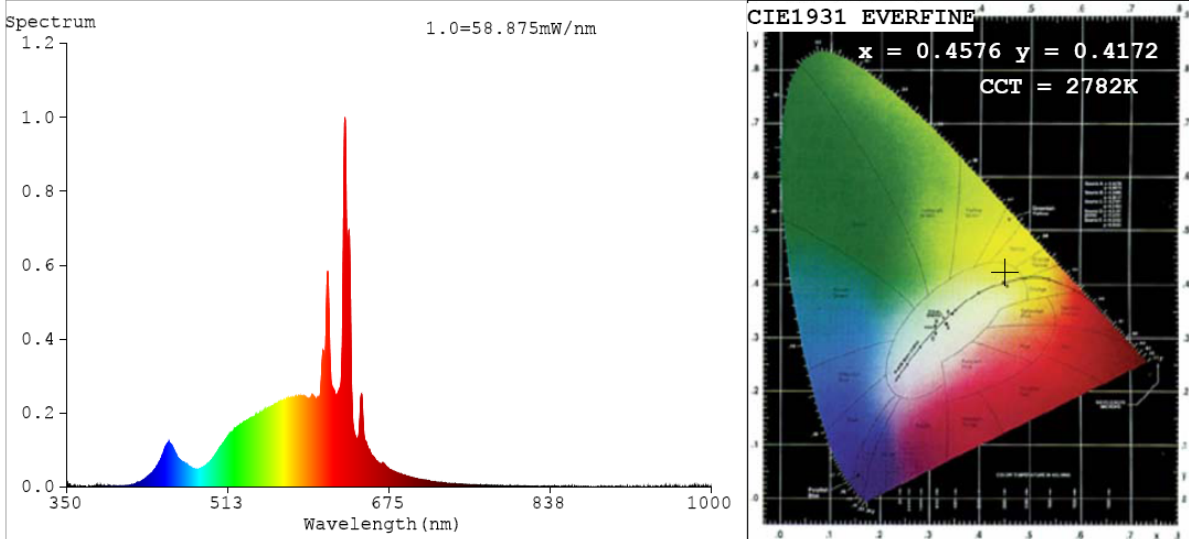
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	94	R9	62
Frequency (Hz)	60	R2	94	R10	83
CCT (K)	2782	R3	91	R11	95
Duv	0.0026	R4	95	R12	76
Chromaticity (x, y)	x=0.4586 y=0.4172	R5	92	R13	94
Chromaticity (u', v')	u'=0.2582 v'=0.5295	R6	94	R14	93
Color Rendering Index (CRI)	92.6	R7	95	R15	90
R9	62	R8	85	--	--

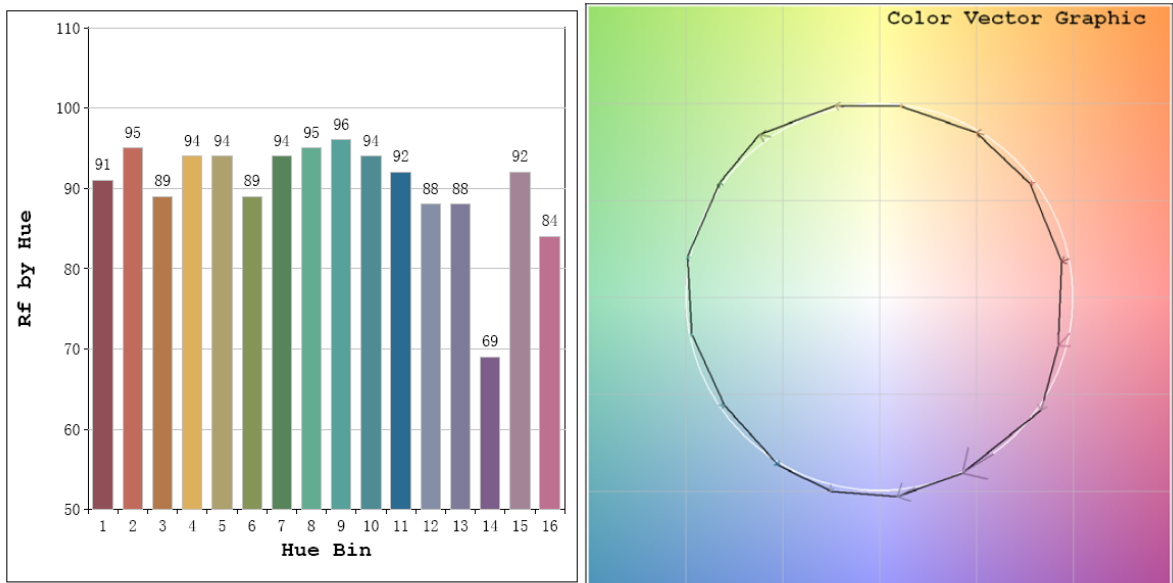
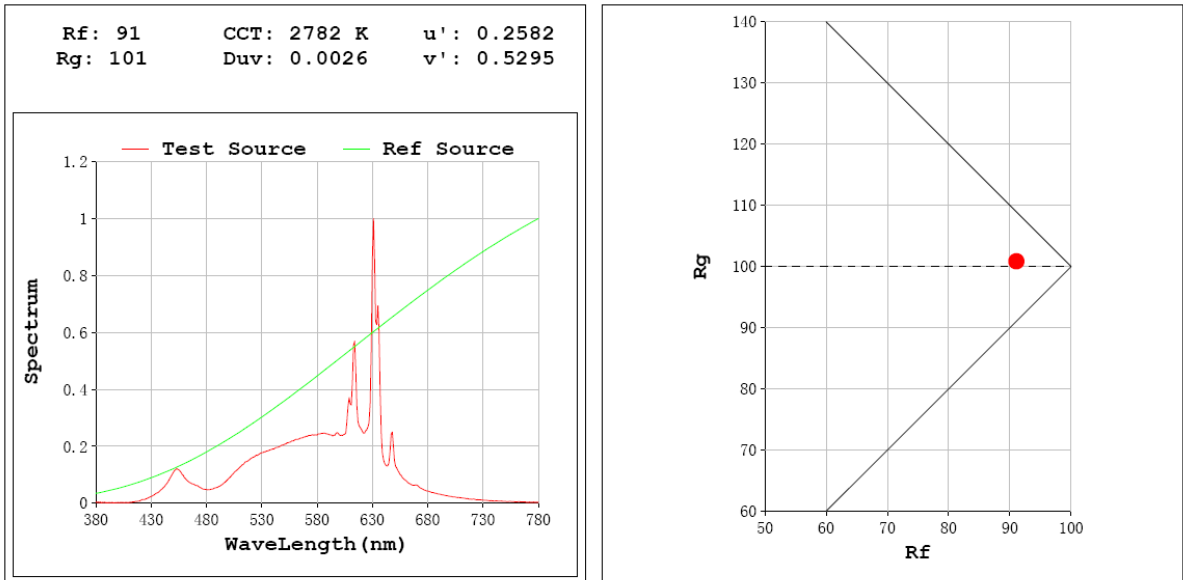
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	919.02
Luminous Efficacy (lm/W)	85.89
Beam Angle (°)	108.4
Center Beam Candle Power (cd)	336.2

Spectral Power Distribution & Chromaticity Diagram



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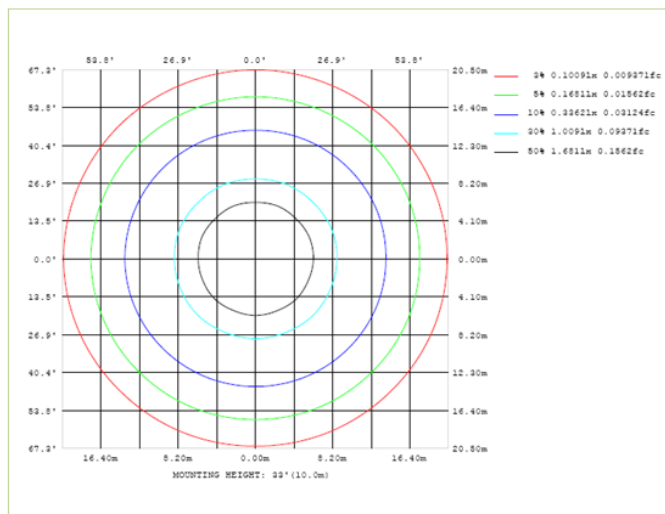
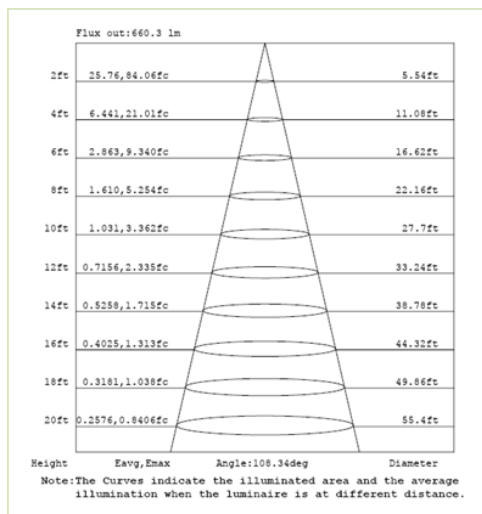
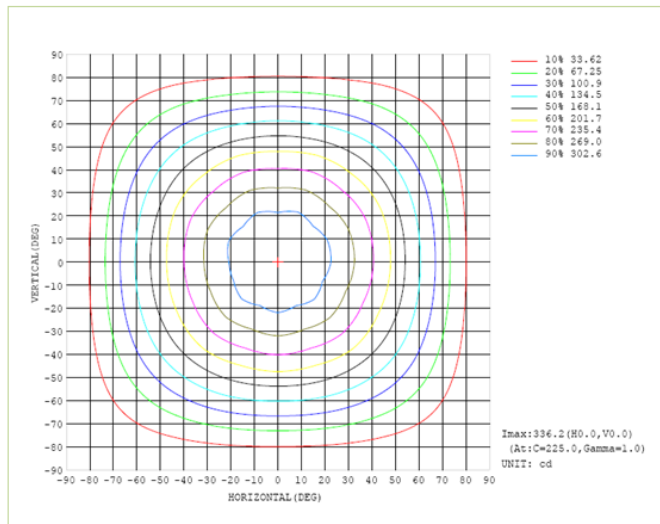
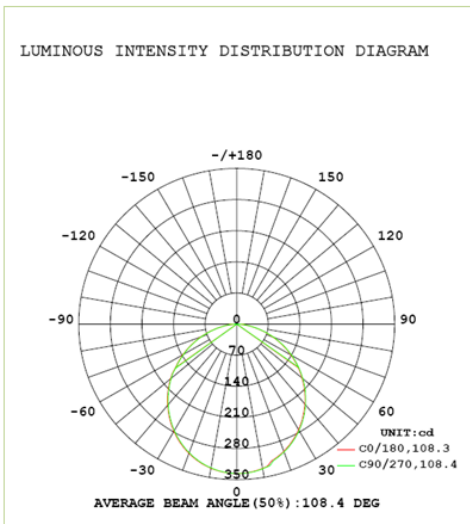


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	256.8	27.9%
0-40	417.9	45.5%
0-60	730.2	79.4%
60-90	188.9	20.6%
70-100	78.2	8.5%
90-120	0.0	0.0%
0-90	919.0	100.0%
90-180	0.0	0.0%
0-180	919.0	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	31.8	3.5%	90-100	0.0	0.0%
10-20	90.0	9.8%	100-110	0.0	0.0%
20-30	135.0	14.7%	110-120	0.0	0.0%
30-40	161.1	17.5%	120-130	0.0	0.0%
40-50	165.3	18.0%	130-140	0.0	0.0%
50-60	147.0	16.0%	140-150	0.0	0.0%
60-70	110.6	12.0%	150-160	0.0	0.0%
70-80	62.4	6.8%	160-170	0.0	0.0%
80-90	15.8	1.7%	170-180	0.0	0.0%

Photometric Data



2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2023-04-07	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0096(FWAFFER4)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304060012	120.0	60	0.090	10.6	0.981

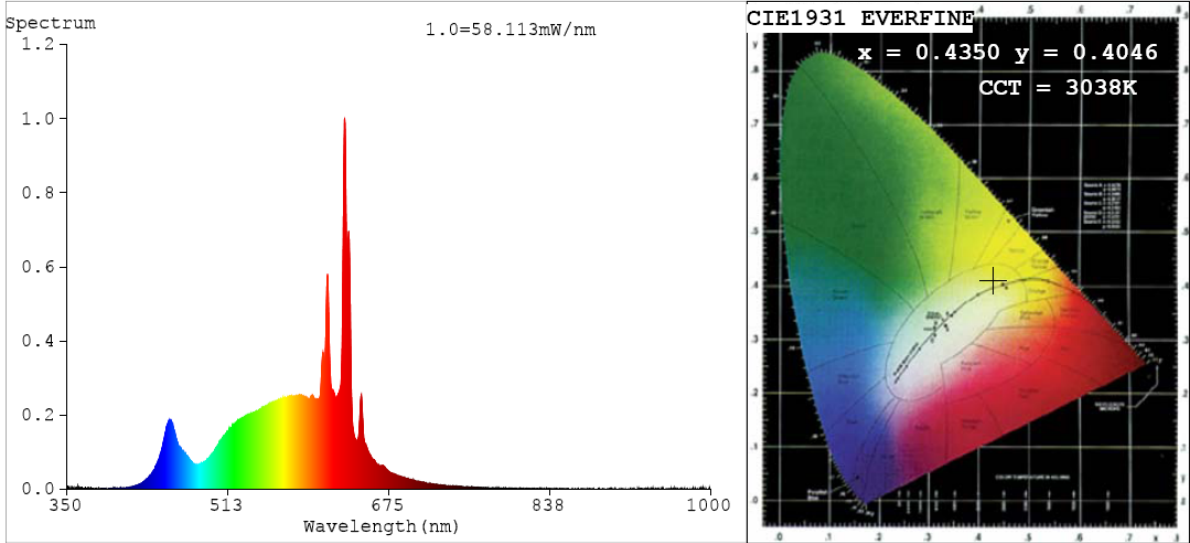
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	70
Frequency (Hz)	60	R2	96	R10	87
CCT (K)	3038	R3	93	R11	96
Duv	0.0005	R4	96	R12	77
Chromaticity (x, y)	x=0.4350 y=0.4046	R5	95	R13	96
Chromaticity (u', v')	u'=0.2491 v'=0.5213	R6	95	R14	94
Color Rendering Index (CRI)	94.3	R7	95	R15	93
R9	70	R8	89	--	--

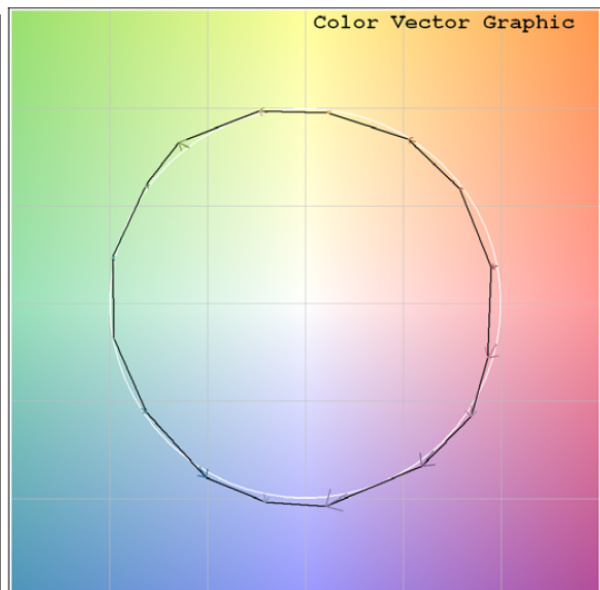
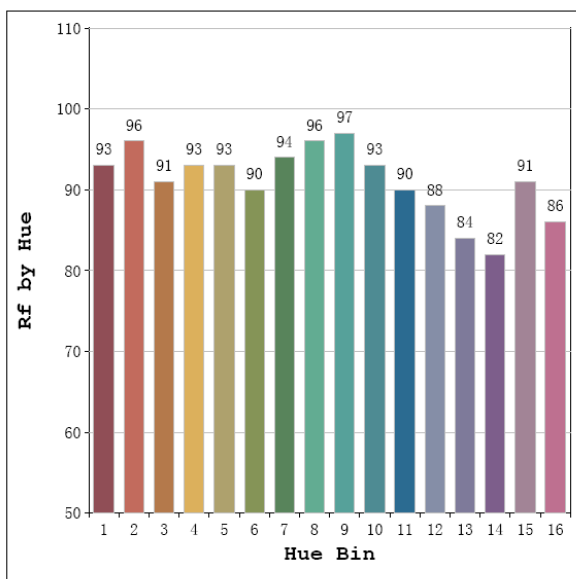
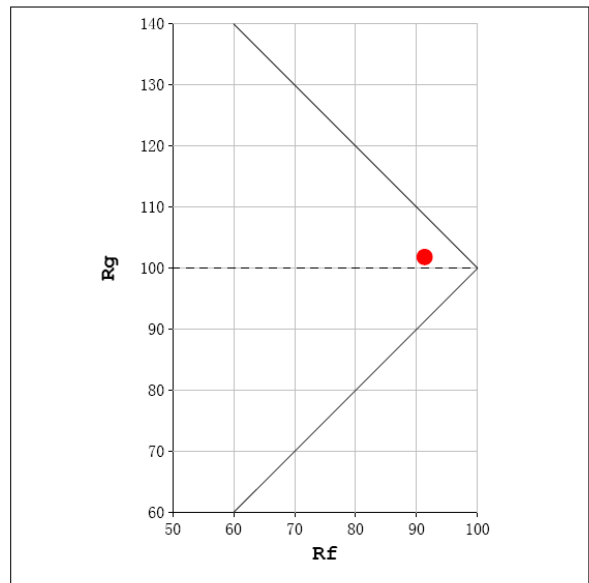
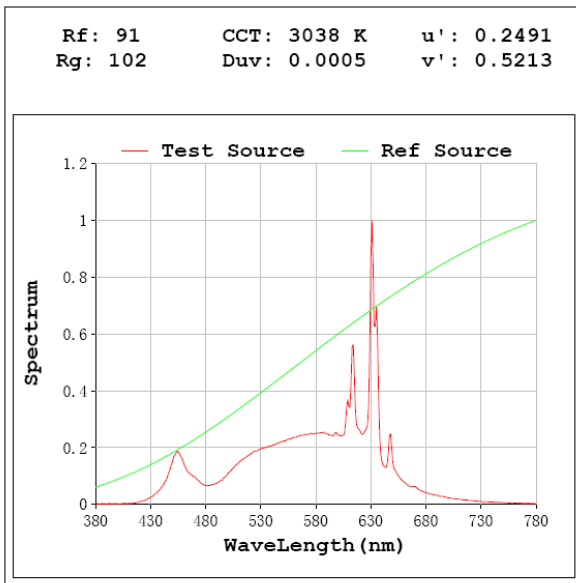
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	956.69
Luminous Efficacy (lm/W)	90.25
Beam Angle (°)	108.8
Center Beam Candle Power (cd)	349.4

Spectral Power Distribution & Chromaticity Diagram



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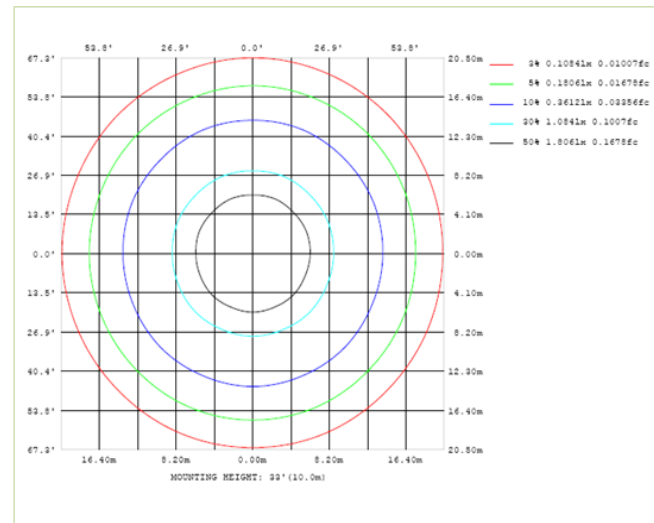
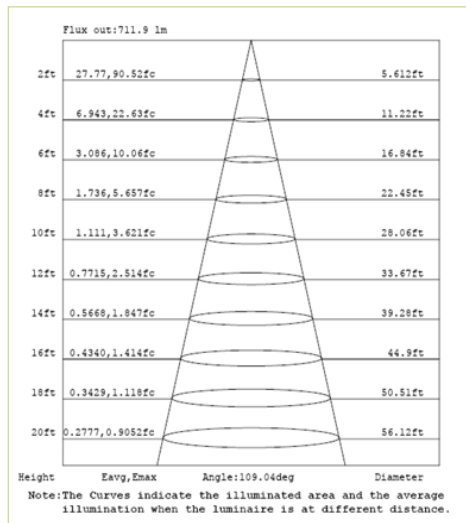
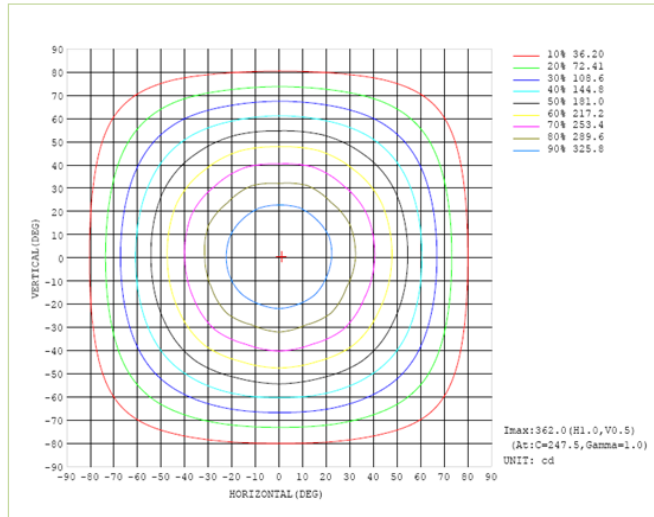
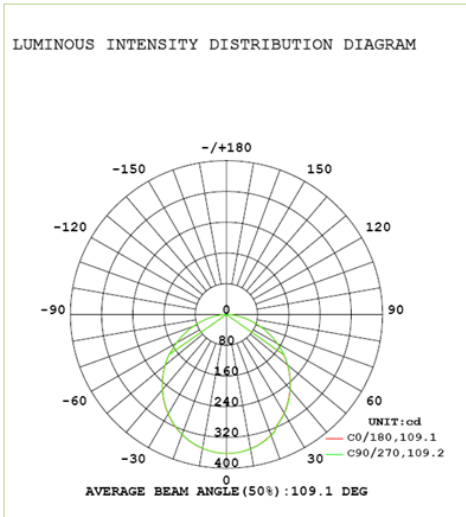


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	267.4	27.9%
0-40	434.9	45.5%
0-60	759.9	79.4%
60-90	196.8	20.6%
70-100	81.6	8.5%
90-120	0.0	0.0%
0-90	956.7	100.0%
90-180	0.0	0.0%
0-180	956.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	33.0	3.5%	90-100	0.0	0.0%
10-20	94.0	9.8%	100-110	0.0	0.0%
20-30	140.3	14.7%	110-120	0.0	0.0%
30-40	167.5	17.5%	120-130	0.0	0.0%
40-50	171.9	18.0%	130-140	0.0	0.0%
50-60	153.1	16.0%	140-150	0.0	0.0%
60-70	115.2	12.0%	150-160	0.0	0.0%
70-80	65.1	6.8%	160-170	0.0	0.0%
80-90	16.5	1.7%	170-180	0.0	0.0%

Photometric Data



2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2023-04-07	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0096(FWAFAER4)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304060012	120.0	60	0.089	10.5	0.981

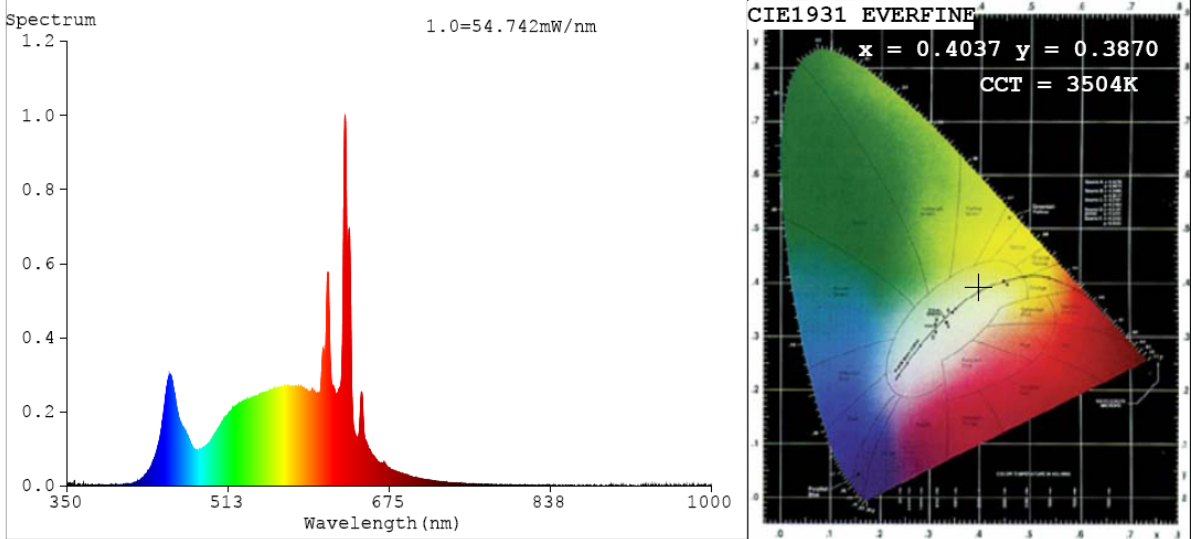
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	79
Frequency (Hz)	60	R2	98	R10	91
CCT (K)	3504	R3	94	R11	96
Duv	-0.0013	R4	97	R12	75
Chromaticity (x, y)	x=0.4037 y=0.3870	R5	96	R13	98
Chromaticity (u', v')	u'=0.2362 v'=0.5095	R6	95	R14	95
Color Rendering Index (CRI)	95.8	R7	96	R15	96
R9	79	R8	92	--	--

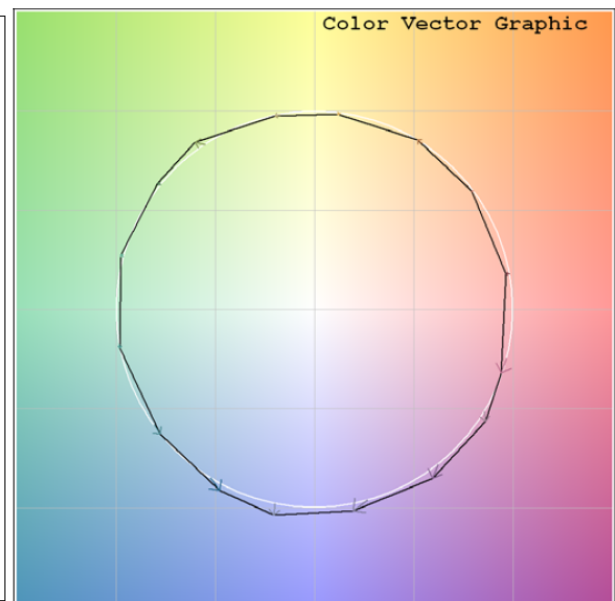
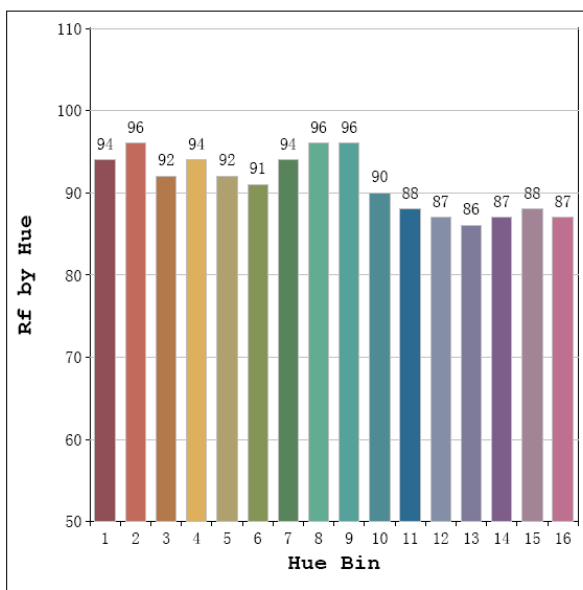
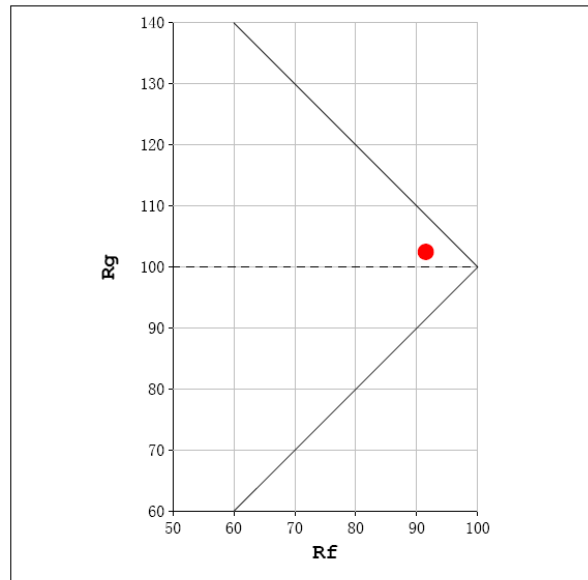
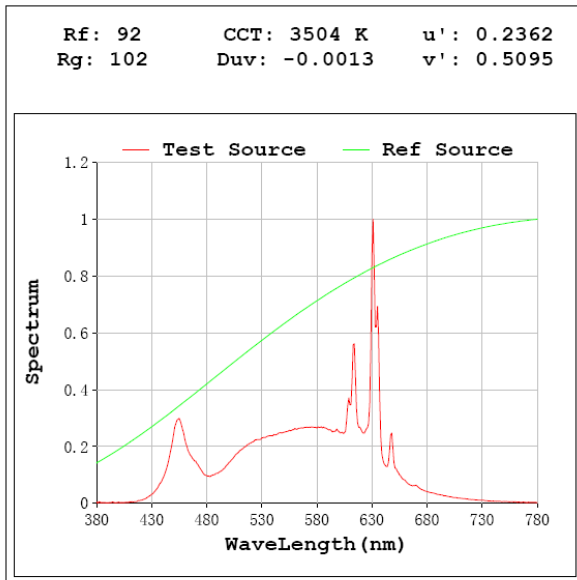
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	991.08
Luminous Efficacy (lm/W)	94.39
Beam Angle (°)	109.1
Center Beam Candle Power (cd)	361.6

Spectral Power Distribution & Chromaticity Diagram



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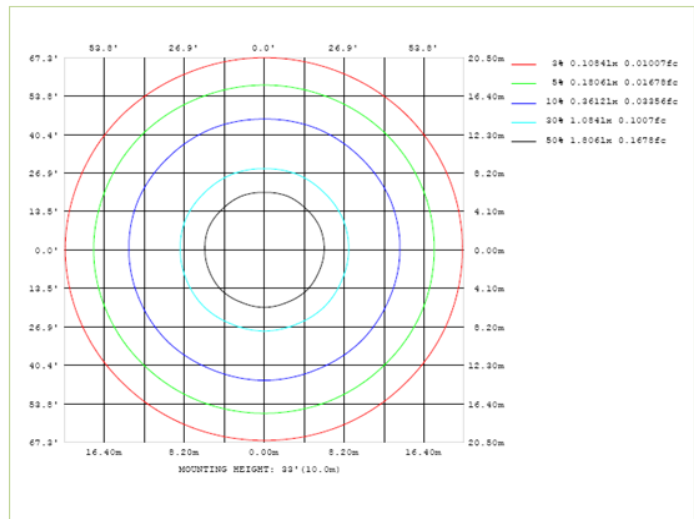
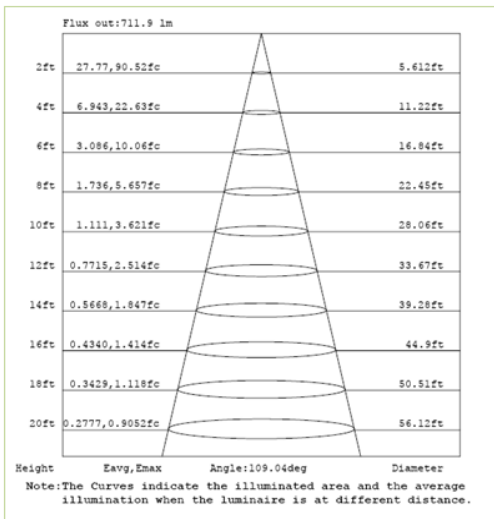
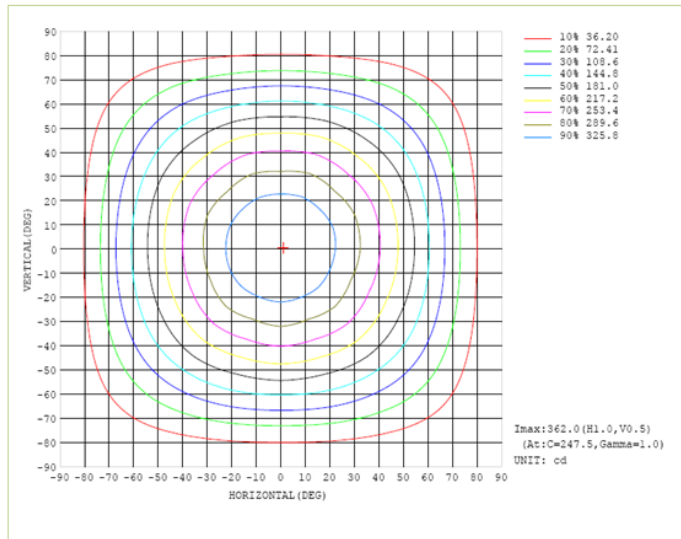
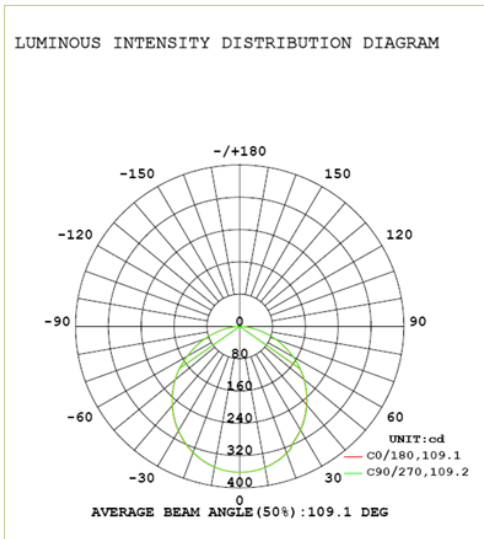


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	277.2	28.0%
0-40	450.6	45.5%
0-60	787.3	79.4%
60-90	203.8	20.6%
70-100	84.6	8.5%
90-120	0.0	0.0%
0-90	991.1	100.0%
90-180	0.0	0.0%
0-180	991.1	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	34.2	3.4%	90-100	0.0	0.0%
10-20	97.5	9.8%	100-110	0.0	0.0%
20-30	145.6	14.7%	110-120	0.0	0.0%
30-40	173.4	17.5%	120-130	0.0	0.0%
40-50	178.0	18.0%	130-140	0.0	0.0%
50-60	158.7	16.0%	140-150	0.0	0.0%
60-70	119.3	12.0%	150-160	0.0	0.0%
70-80	67.4	6.8%	160-170	0.0	0.0%
80-90	17.1	1.7%	170-180	0.0	0.0%

Photometric Data



2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2023-04-07	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0096(FWAFER4)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304060012	120.0	60	0.089	10.5	0.981

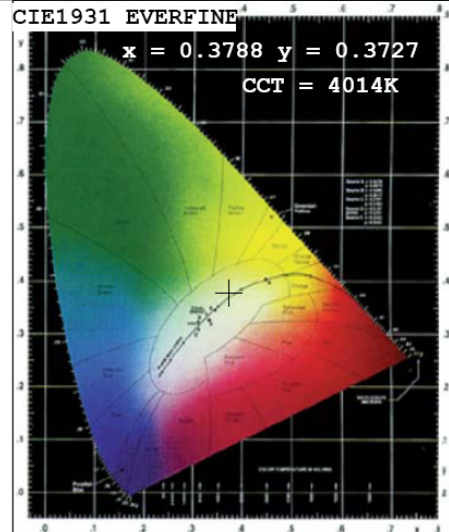
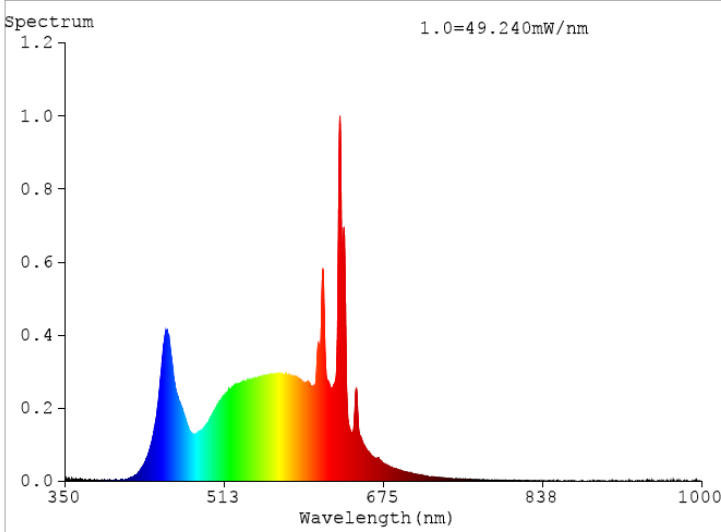
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	84
Frequency (Hz)	60	R2	98	R10	91
CCT (K)	4014	R3	94	R11	96
Duv	-0.0014	R4	97	R12	72
Chromaticity (x, y)	x=0.3788 y=0.3727	R5	96	R13	99
Chromaticity (u', v')	u'=0.2257 v'=0.4995	R6	95	R14	95
Color Rendering Index (CRI)	96.1	R7	97	R15	97
R9	84	R8	94	--	--

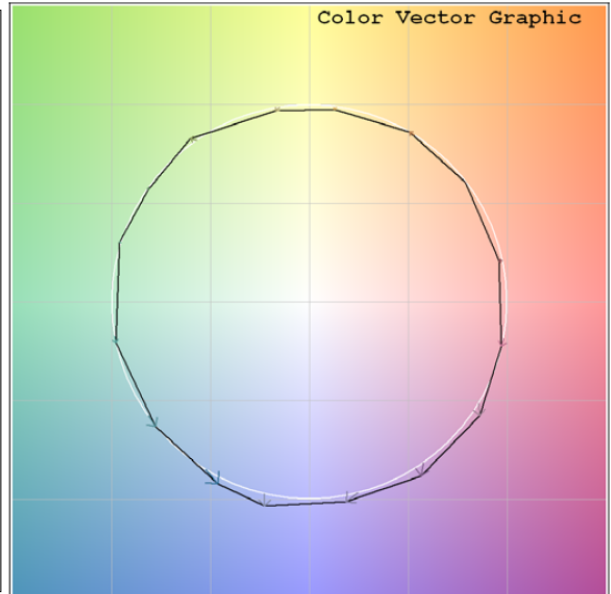
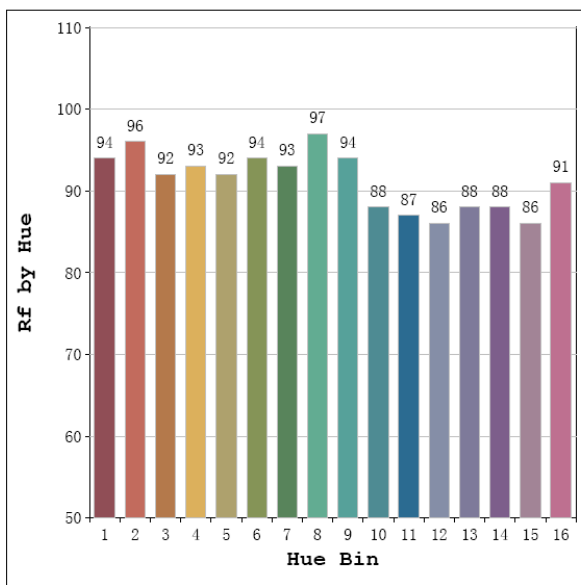
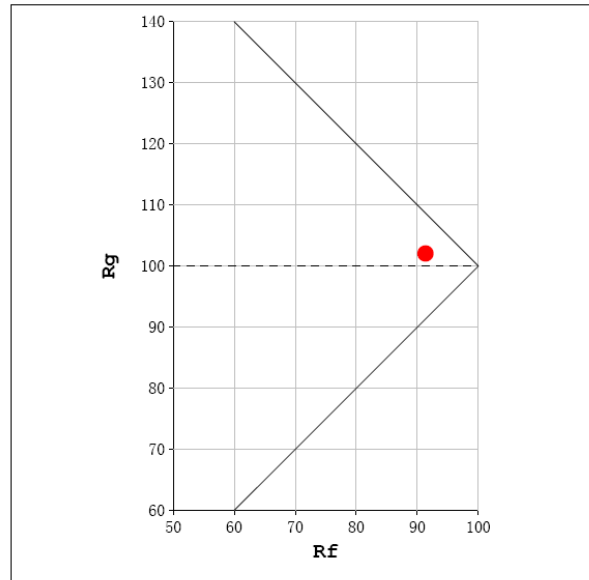
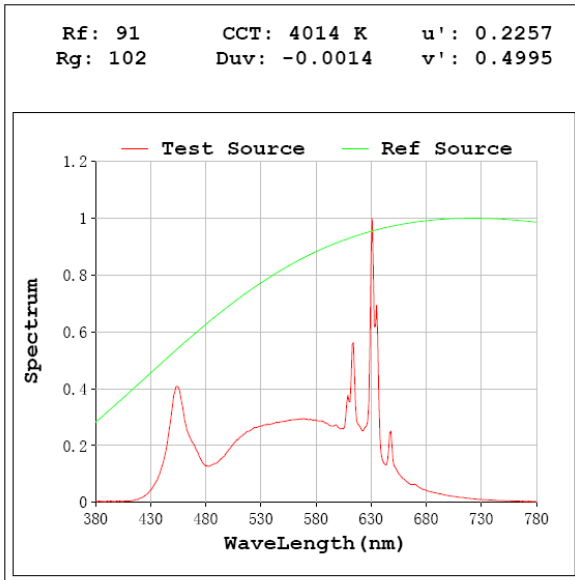
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	988.34
Luminous Efficacy (lm/W)	94.13
Beam Angle (°)	109.1
Center Beam Candle Power (cd)	360.6

Spectral Power Distribution & Chromaticity Diagram



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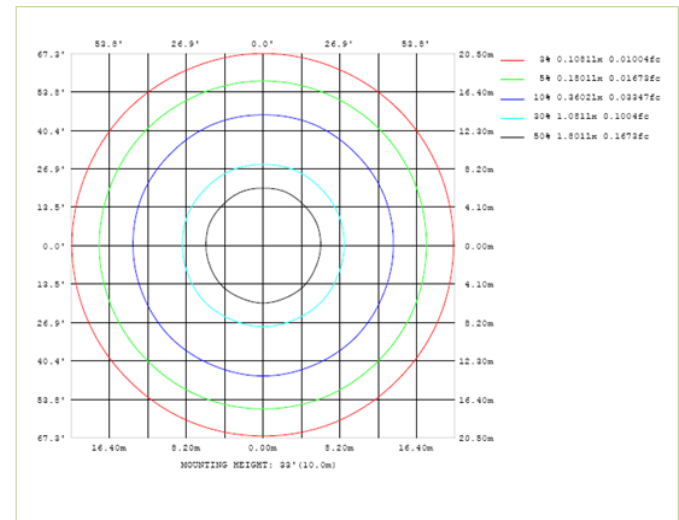
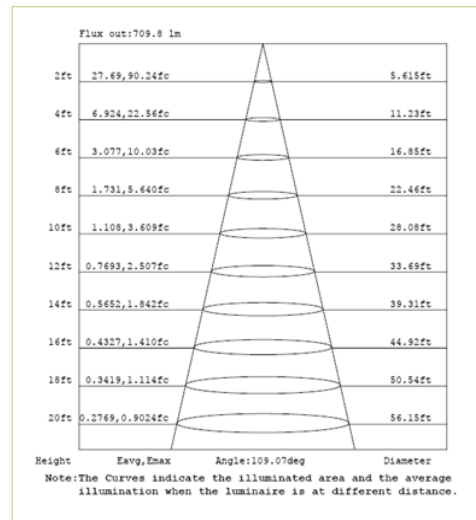
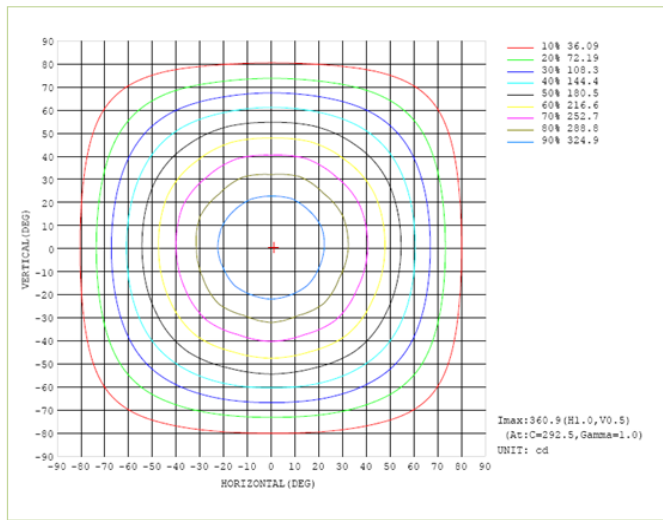
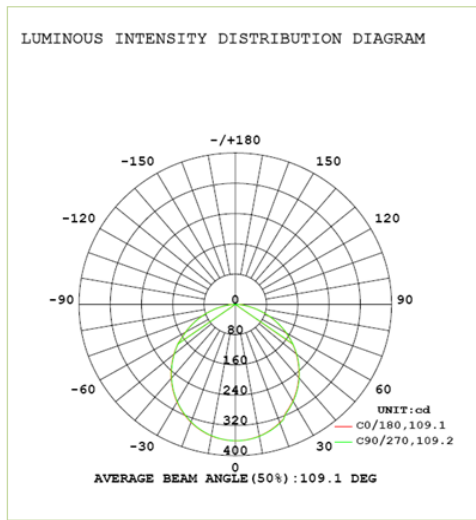


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	276.4	28.0%
0-40	449.2	45.5%
0-60	785.0	79.4%
60-90	203.3	20.6%
70-100	84.4	8.5%
90-120	0.0	0.0%
0-90	988.3	100.0%
90-180	0.0	0.0%
0-180	988.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	34.1	3.4%	90-100	0.0	0.0%
10-20	97.2	9.8%	100-110	0.0	0.0%
20-30	145.1	14.7%	110-120	0.0	0.0%
30-40	172.9	17.5%	120-130	0.0	0.0%
40-50	177.5	18.0%	130-140	0.0	0.0%
50-60	158.3	16.0%	140-150	0.0	0.0%
60-70	119.0	12.0%	150-160	0.0	0.0%
70-80	67.3	6.8%	160-170	0.0	0.0%
80-90	17.1	1.7%	170-180	0.0	0.0%

Photometric Data



2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2023-04-07	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0096(FWAFER4)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304060012	120.0	60	0.091	10.7	0.981

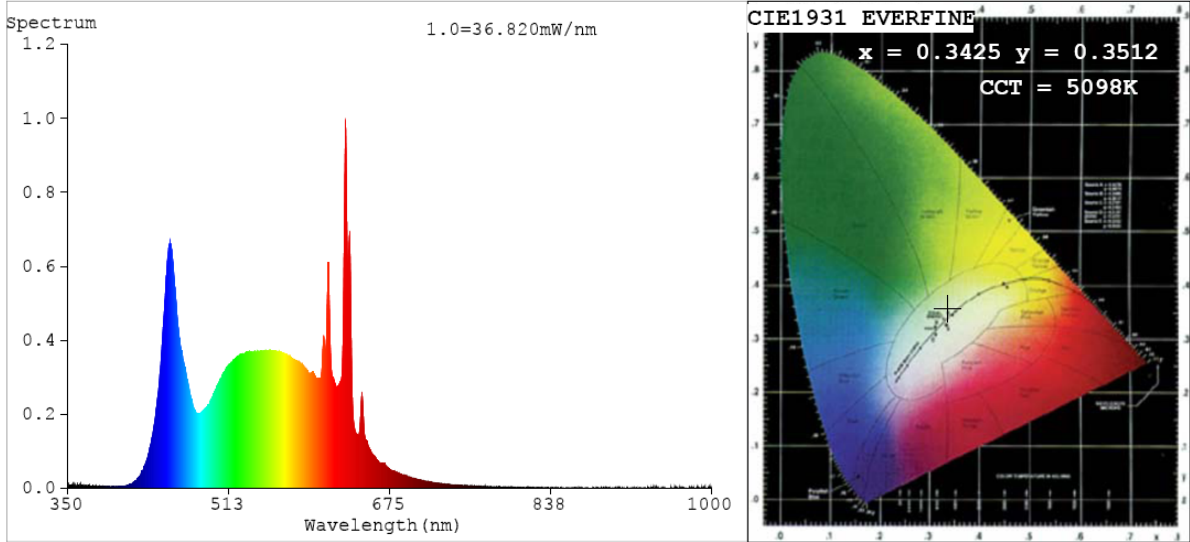
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	79
Frequency (Hz)	60	R2	96	R10	89
CCT (K)	5098	R3	93	R11	95
Duv	0.0008	R4	96	R12	72
Chromaticity (x, y)	x=0.3425 y=0.3512	R5	95	R13	97
Chromaticity (u', v')	u'=0.2098 v'=0.4841	R6	93	R14	96
Color Rendering Index (CRI)	94.9	R7	96	R15	96
R9	79	R8	93	--	--

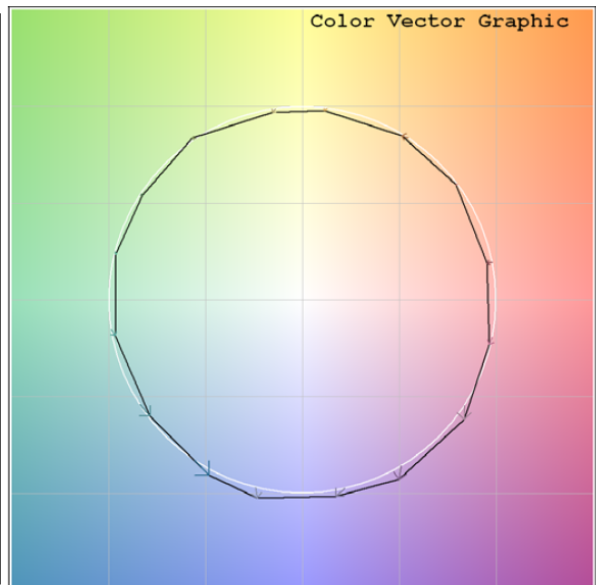
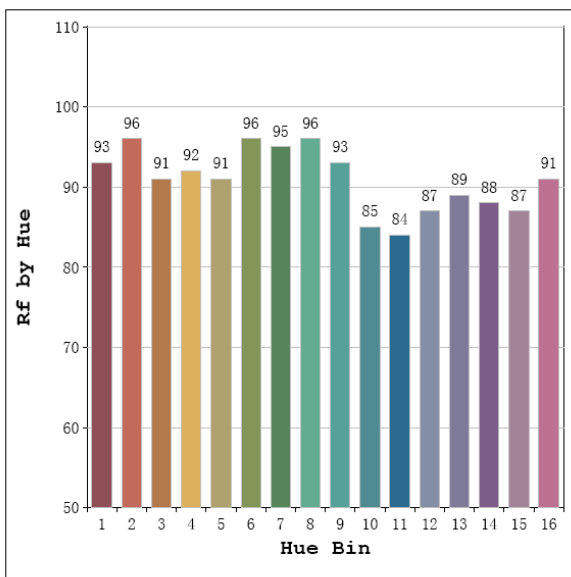
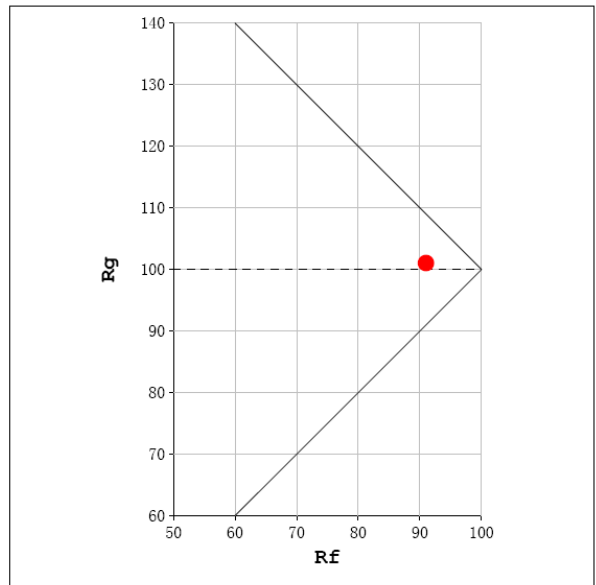
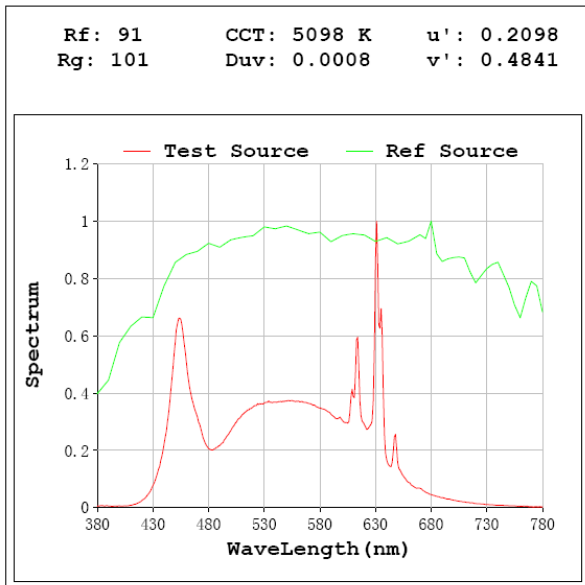
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	928.82
Luminous Efficacy (lm/W)	86.81
Beam Angle (°)	108.6
Center Beam Candle Power (cd)	339

Spectral Power Distribution & Chromaticity Diagram



TM30



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	259.2	27.9%
0-40	421.8	45.4%
0-60	737.5	79.4%
60-90	191.4	20.6%
70-100	79.4	8.5%
90-120	0.0	0.0%
0-90	928.8	100.0%
90-180	0.0	0.0%
0-180	928.8	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	32.0	3.4%	90-100	0.0	0.0%
10-20	90.9	9.8%	100-110	0.0	0.0%
20-30	136.2	14.7%	110-120	0.0	0.0%
30-40	162.6	17.5%	120-130	0.0	0.0%
40-50	167.0	18.0%	130-140	0.0	0.0%
50-60	148.7	16.0%	140-150	0.0	0.0%
60-70	112.0	12.1%	150-160	0.0	0.0%
70-80	63.3	6.8%	160-170	0.0	0.0%
80-90	16.1	1.7%	170-180	0.0	0.0%

Photometric Data

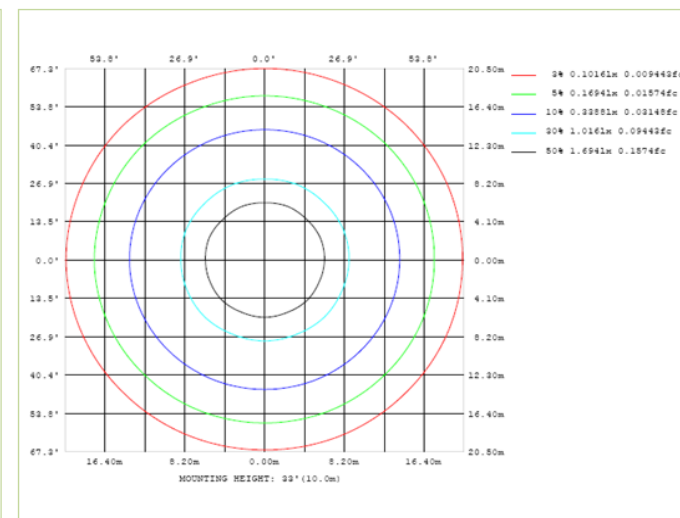
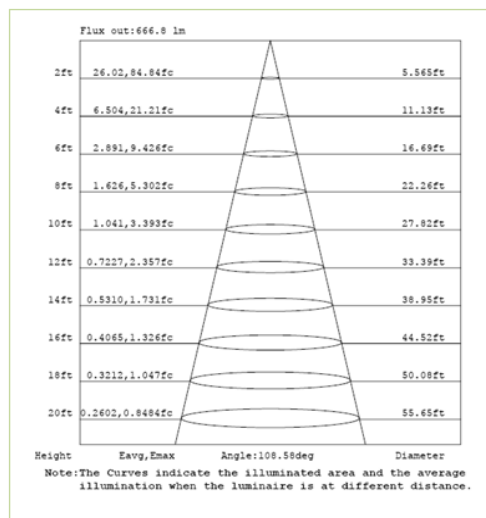
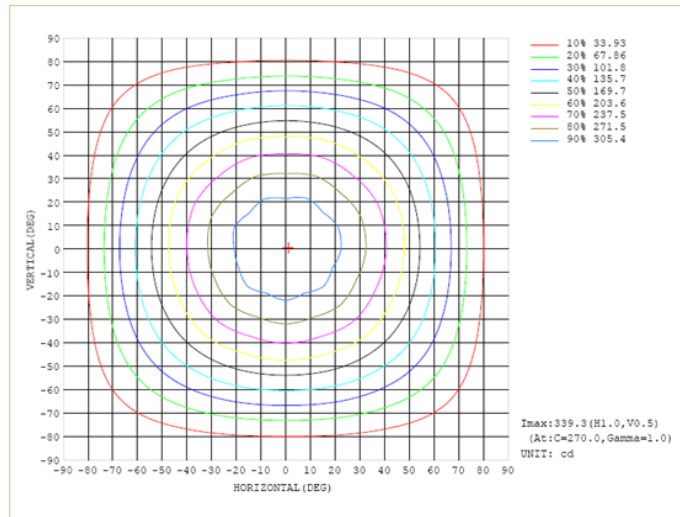
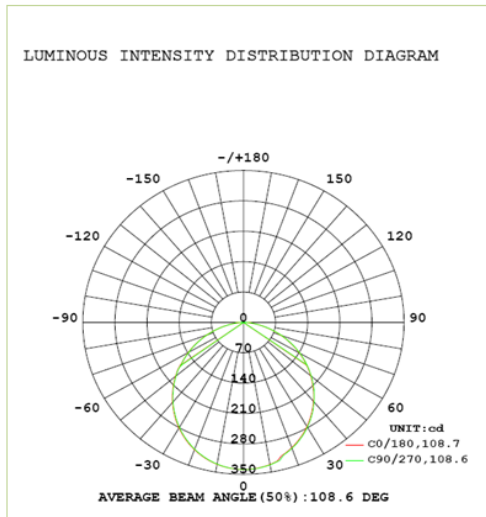
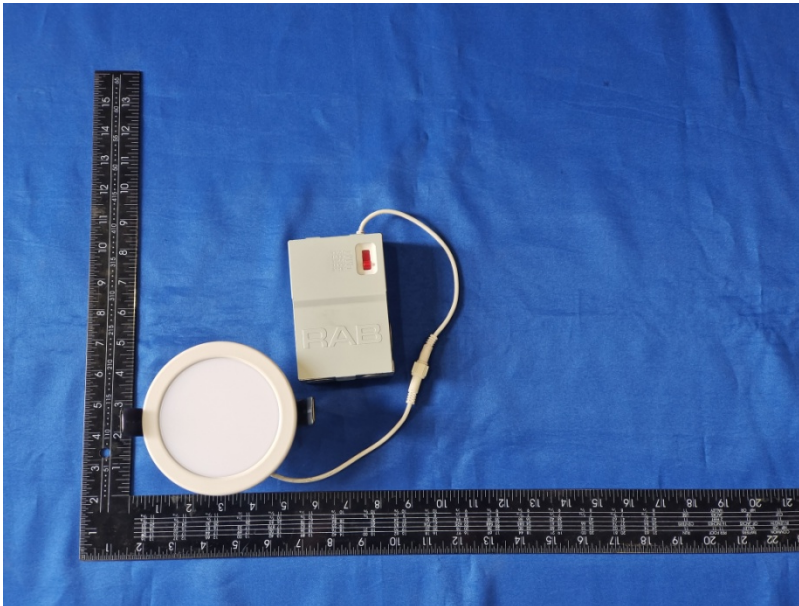
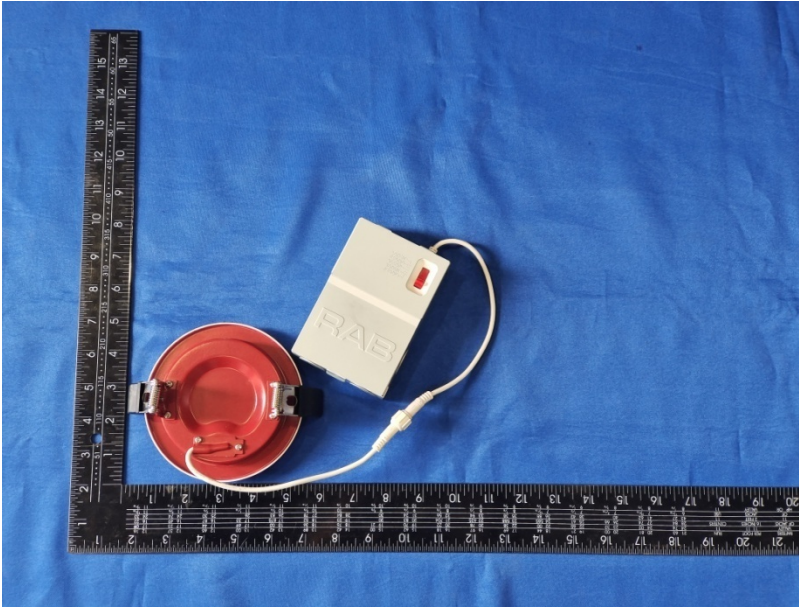


Table--1 UNIT: cd

C (DEG) y (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	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339			
5	337	337	337	337	337	337	337	337	337	337	338	338	338	338	338	337			
10	332	332	332	332	331	332	331	332	332	333	333	333	333	333	333	333			
15	324	318	323	318	323	317	323	318	319	324	322	325	322	325	322	325			
20	312	307	311	306	311	306	311	306	307	313	308	314	309	314	309	313			
25	298	293	297	292	296	292	297	292	293	299	295	300	295	300	295	299			
30	281	276	280	275	279	275	279	276	277	282	278	283	279	283	279	282			
35	262	257	261	256	260	256	260	257	258	263	259	264	260	264	260	263			
40	241	236	239	236	239	235	239	236	237	242	239	243	239	243	239	242			
45	218	214	217	213	216	213	216	214	215	219	216	220	217	220	217	220			
50	193	190	192	190	192	189	192	190	191	195	193	195	193	196	193	195			
55	165	165	164	165	164	164	164	165	166	166	168	167	168	168	168	167			
60	139	139	138	139	138	138	138	139	140	140	142	141	142	141	142	141			
65	112	112	111	112	111	112	111	112	114	114	115	114	115	115	115	114			
70	85.3	85.6	84.5	85.5	84.5	85.1	84.3	85.4	86.9	86.8	87.9	87.0	87.9	87.5	88.1	87.1			
75	58.9	59.2	58.2	59.2	58.3	58.8	58.1	59.0	60.5	60.3	61.3	60.3	61.2	60.8	61.3	60.5			
80	34.2	34.5	33.8	34.7	34.0	34.4	33.8	34.5	35.9	35.7	36.4	35.4	36.2	35.7	36.2	35.5			
85	12.9	13.3	12.7	13.5	12.9	13.2	12.8	13.3	14.4	14.2	14.8	13.9	14.4	14.1	14.5	13.9			
90	0.41	0.40	0.41	0.41	0.41	0.41	0.41	0.40	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38			

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLW0096(FWAFER4)	2700K setting	120.0	919.02	10.7	85.89
	3000K setting	120.0	956.69	10.6	90.25
	3500K setting	120.0	991.08	10.5	94.39
	4000K setting	120.0	988.34	10.5	94.13
	5000K setting	120.0	928.82	10.7	86.81

3. Product Photo



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