

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):
DLW0098(FWAFER4B)

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

**Type of
Luminaire:** Downlights

Report Date: 2023-04-07

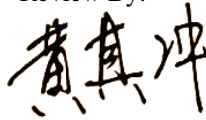
Prepared By:

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	DLW0098(FWAFER4B)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304070001	120.0	60	0.092	10.80	0.982

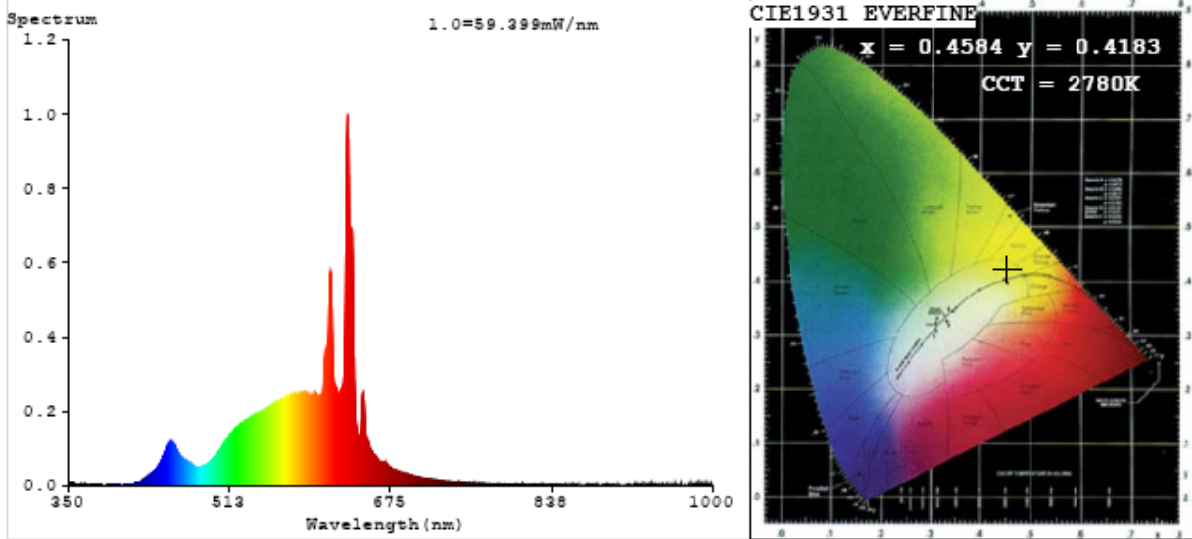
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	59
Frequency (Hz)	60	R2	94	R10	82
CCT (K)	2780	R3	91	R11	94
Duv	0.0030	R4	94	R12	74
Chromaticity (x, y)	x=0.4584 y=0.4183	R5	91	R13	93
Chromaticity (u', v')	u'=0.2582 v'=0.5300	R6	93	R14	93
Color Rendering Index (CRI)	91.9	R7	94	R15	89
R9	59	R8	84	--	--

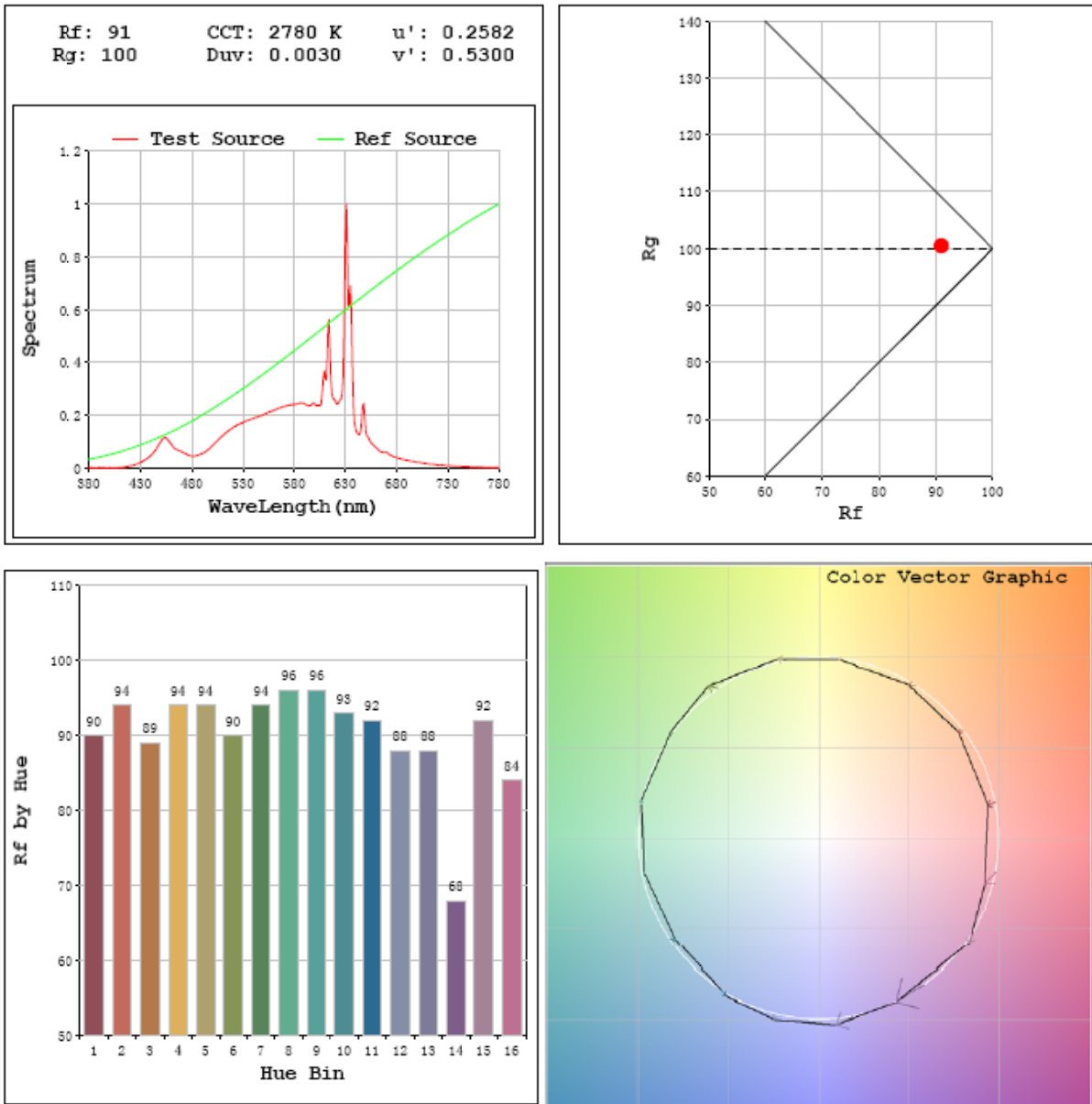
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	919.40
Luminous Efficacy (lm/W)	85.13
Beam Angle (°)	108.8
Center Beam Candle Power (cd)	339.7

Spectral Power Distribution & Chromaticity Diagram



TM30

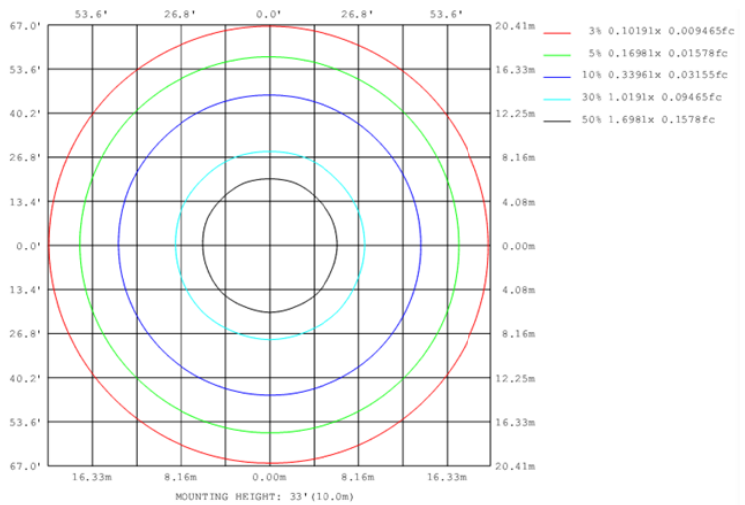
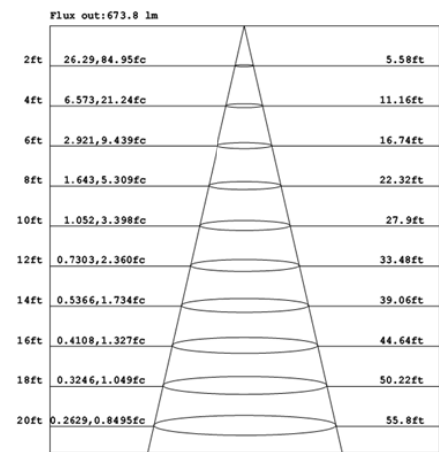
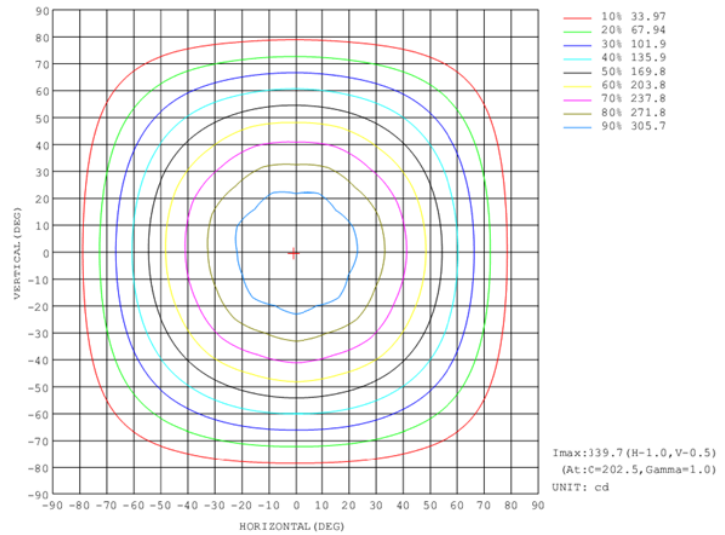
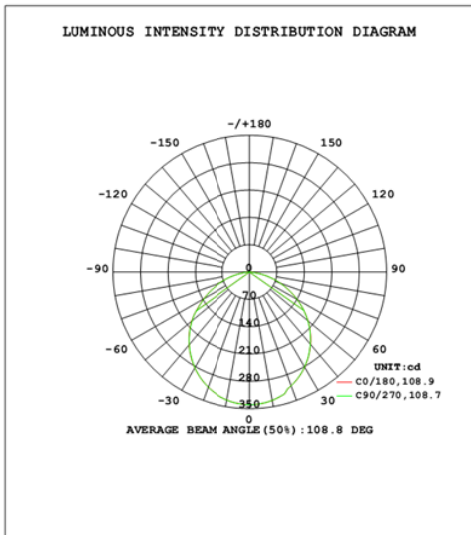


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	261.3	28.4%
0-40	426.0	46.3%
0-60	744.2	80.9%
60-90	175.2	19.1%
70-100	66.2	7.2%
90-120	0.0	0.0%
0-90	919.4	100.0%
90-180	0.0	0.0%
0-180	919.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	32.1	3.5%	90-100	0.0	0.0%
10-20	91.6	10.0%	100-110	0.0	0.0%
20-30	137.5	15.0%	110-120	0.0	0.0%
30-40	164.7	17.9%	120-130	0.0	0.0%
40-50	169.2	18.4%	130-140	0.0	0.0%
50-60	149.0	16.2%	140-150	0.0	0.0%
60-70	109.0	11.9%	150-160	0.0	0.0%
70-80	56.9	6.2%	160-170	0.0	0.0%
80-90	9.3	1.0%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

Test date	2023-04-07	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0098(FWAFER4B)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304070001	120.0	60	0.091	10.70	0.981

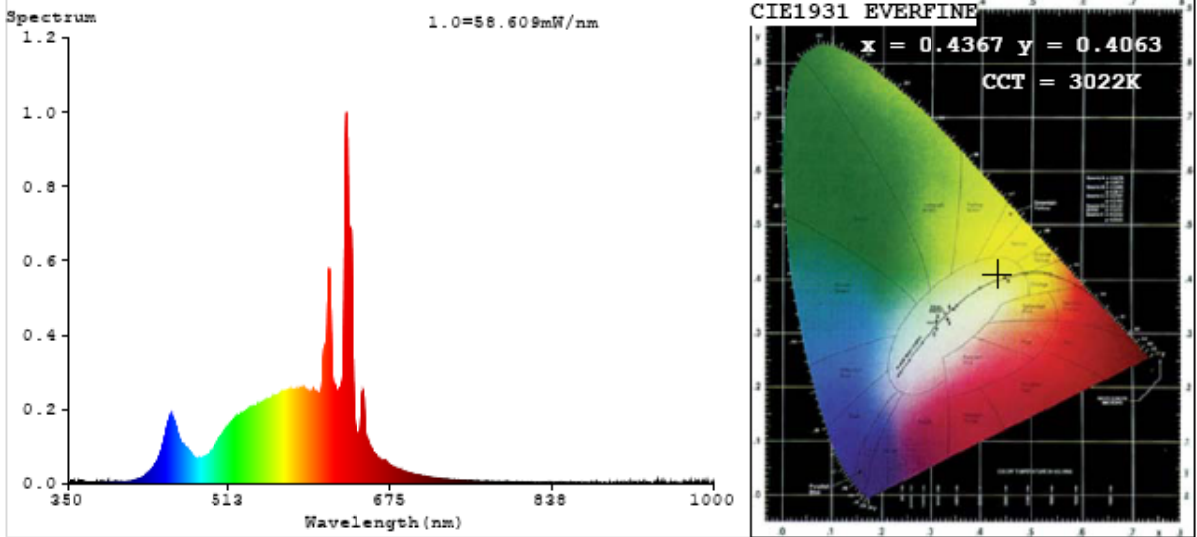
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	95	R9	67
Frequency (Hz)	60	R2	95	R10	86
CCT (K)	3022	R3	93	R11	95
Duv	0.0009	R4	95	R12	76
Chromaticity (x, y)	x=0.4367 y=0.4063	R5	94	R13	95
Chromaticity (u', v')	u'=0.2495 v'=0.5222	R6	95	R14	94
Color Rendering Index (CRI)	93.6	R7	95	R15	92
R9	67	R8	87	--	--

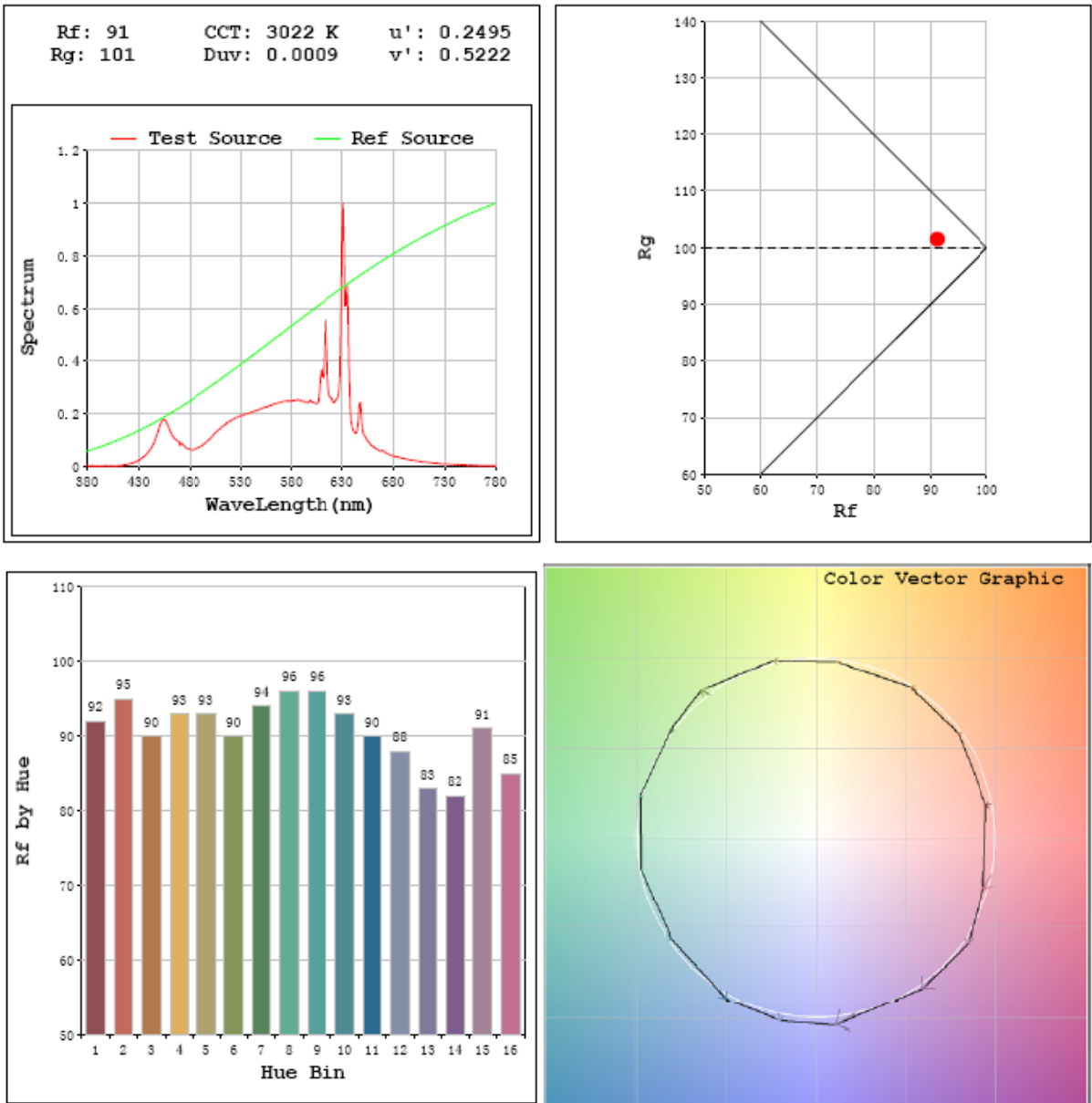
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	956.35
Luminous Efficacy (lm/W)	89.38
Beam Angle (°)	109.1
Center Beam Candle Power (cd)	353.1

Spectral Power Distribution & Chromaticity Diagram



TM30

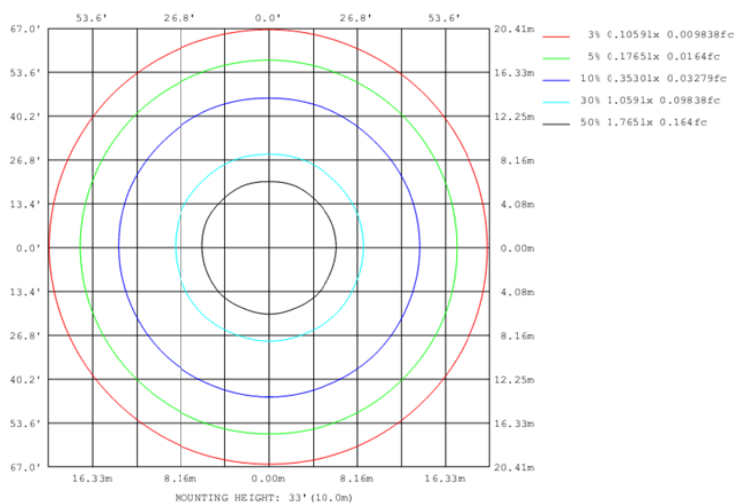
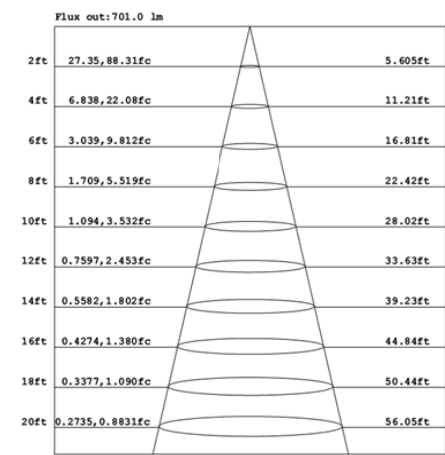
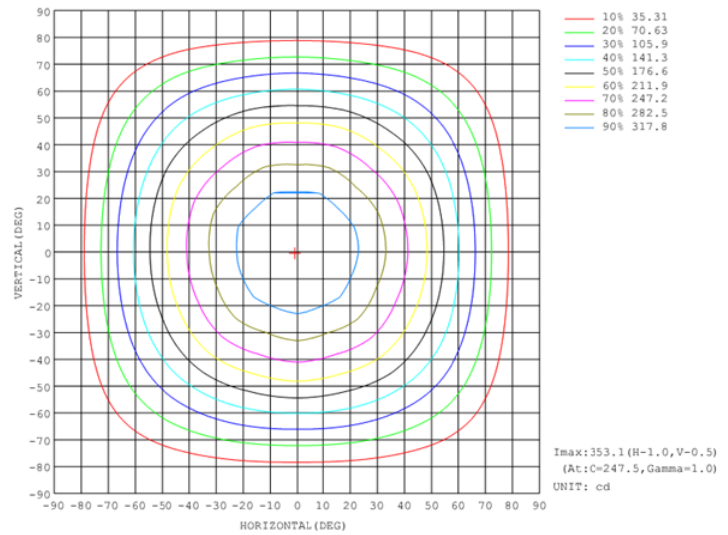
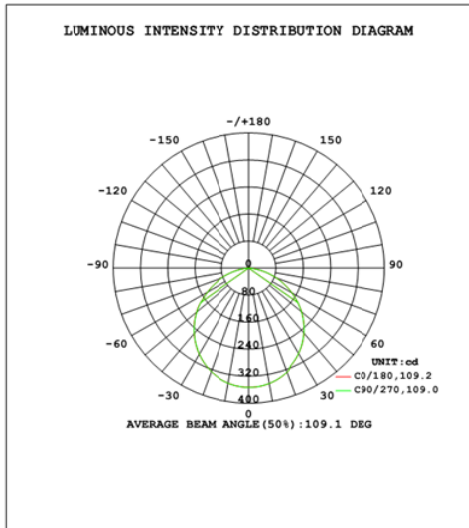


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	272.0	28.4%
0-40	443.3	46.3%
0-60	774.3	81.0%
60-90	182.1	19.0%
70-100	68.8	7.2%
90-120	0.0	0.0%
0-90	956.4	100.0%
90-180	0.0	0.0%
0-180	956.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	33.4	3.5%	90-100	0.0	0.0%
10-20	95.5	10.0%	100-110	0.0	0.0%
20-30	143.2	15.0%	110-120	0.0	0.0%
30-40	171.2	17.9%	120-130	0.0	0.0%
40-50	175.9	18.4%	130-140	0.0	0.0%
50-60	155.1	16.2%	140-150	0.0	0.0%
60-70	113.3	11.8%	150-160	0.0	0.0%
70-80	59.2	6.2%	160-170	0.0	0.0%
80-90	9.6	1.0%	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	DLW0098(FWAFER4B)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304070001	120.0	60	0.090	10.60	0.981

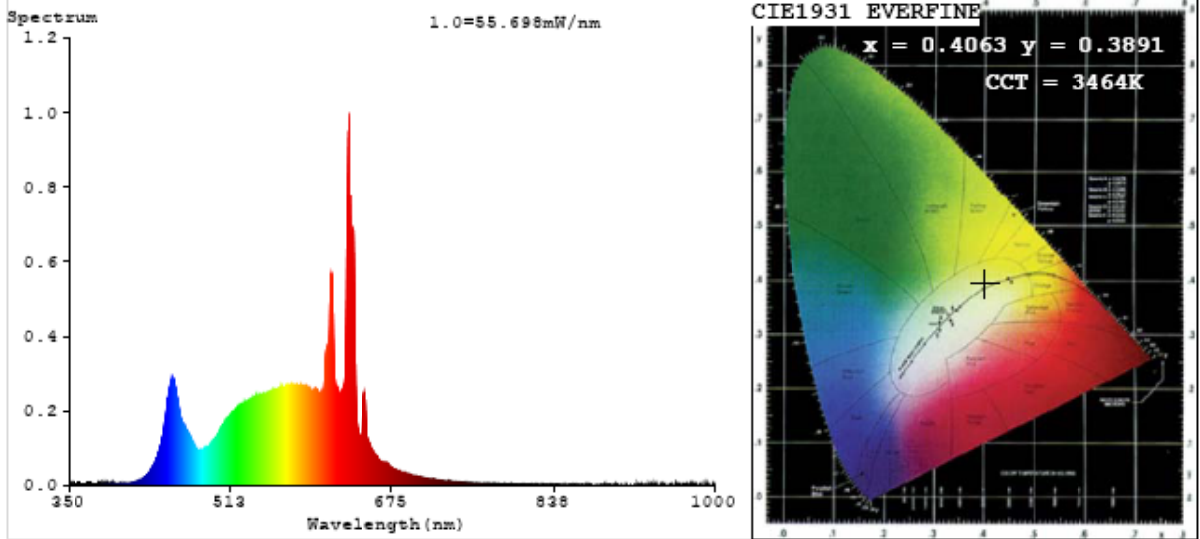
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	76
Frequency (Hz)	60	R2	97	R10	89
CCT (K)	3464	R3	94	R11	96
Duv	-0.0009	R4	96	R12	74
Chromaticity (x, y)	x=0.4063 y=0.3891	R5	95	R13	97
Chromaticity (u', v')	u'=0.2370 v'=0.5108	R6	95	R14	95
Color Rendering Index (CRI)	95.2	R7	96	R15	95
R9	76	R8	91	--	--

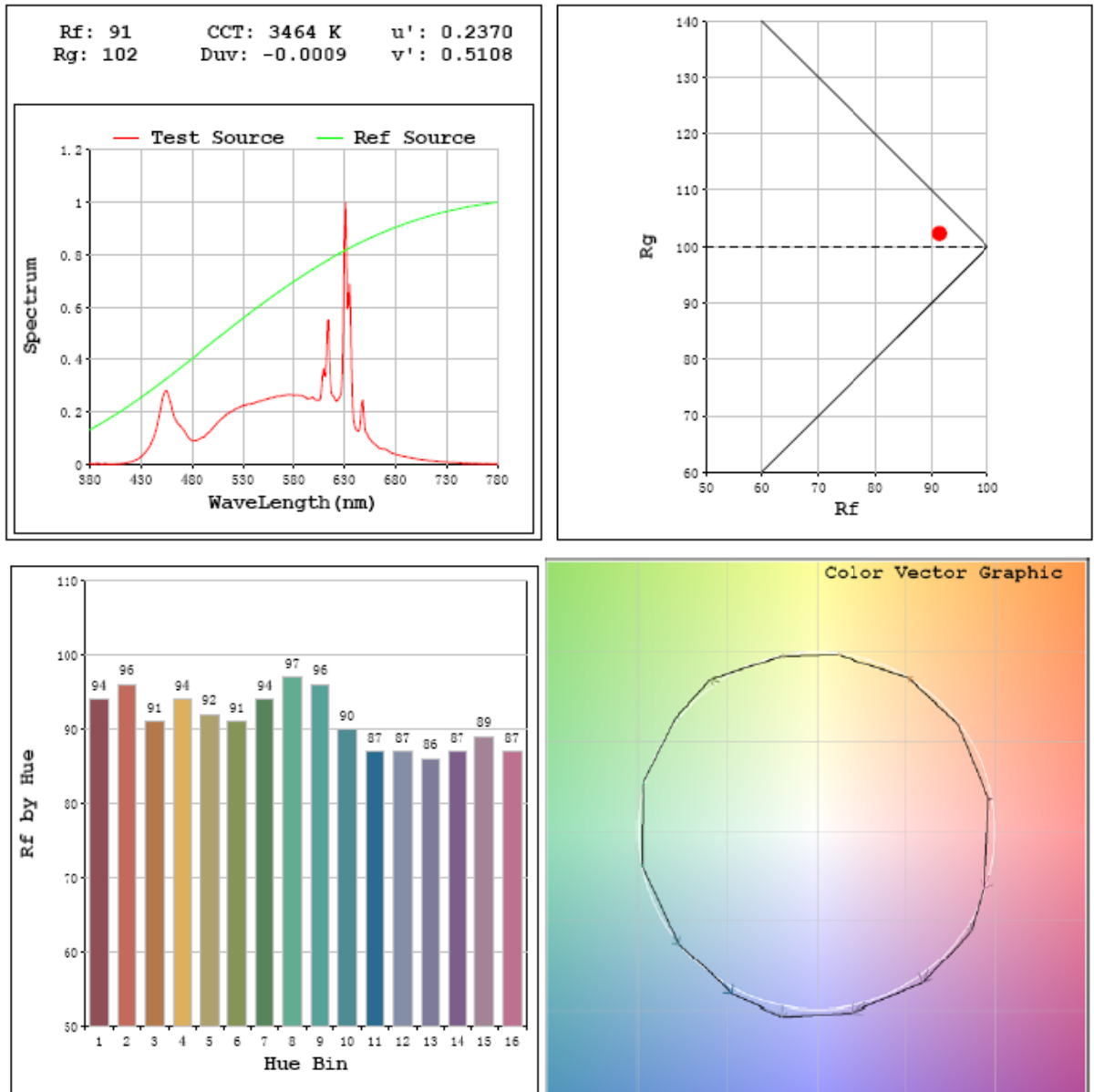
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	990.71
Luminous Efficacy (lm/W)	93.46
Beam Angle (°)	109.2
Center Beam Candle Power (cd)	365.5

Spectral Power Distribution & Chromaticity Diagram



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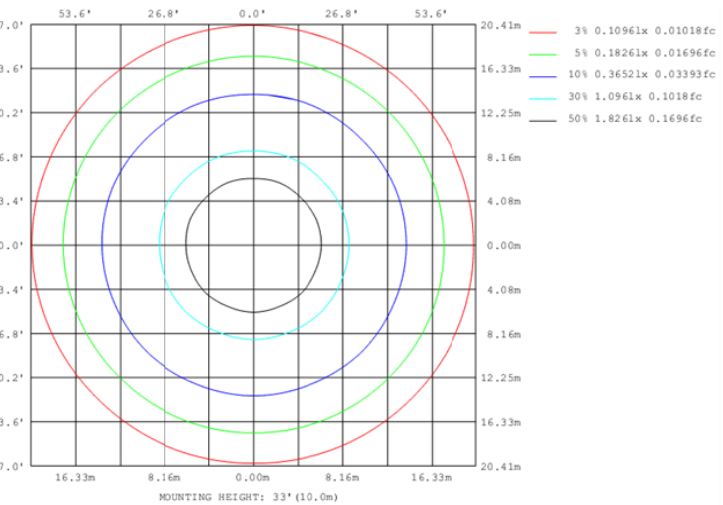
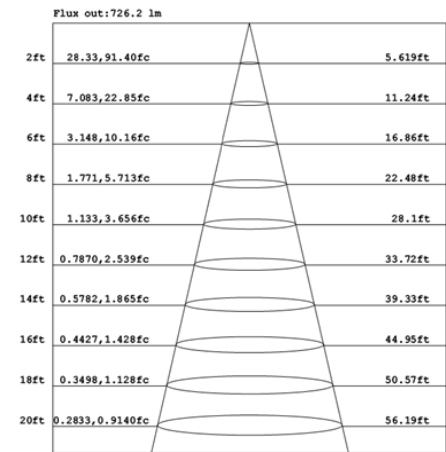
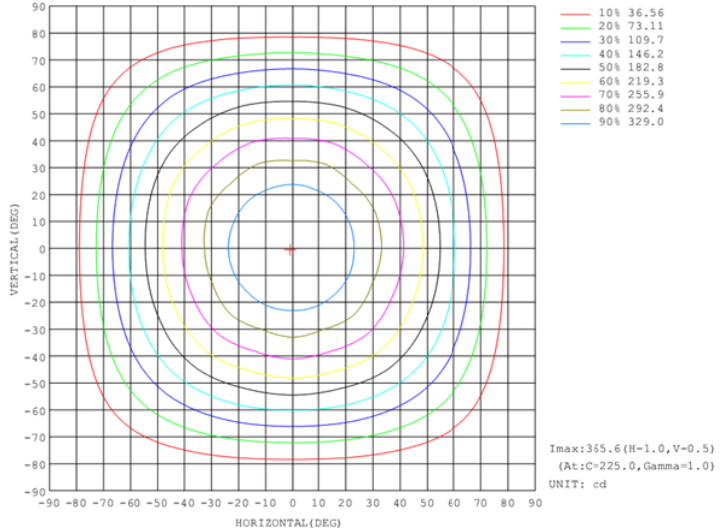
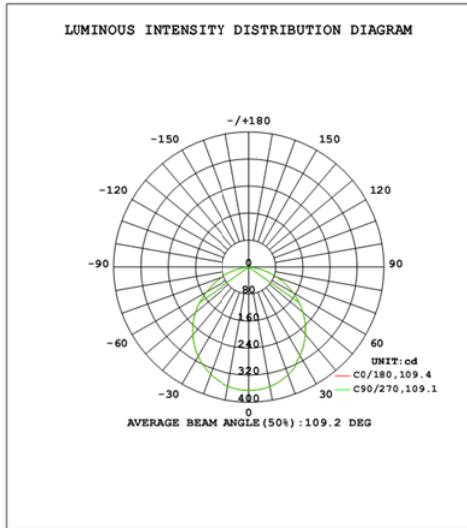


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	282.1	28.5%
0-40	459.3	46.4%
0-60	802.2	81.0%
60-90	188.5	19.0%
70-100	71.2	7.2%
90-120	0.0	0.0%
0-90	990.7	100.0%
90-180	0.0	0.0%
0-180	990.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	34.6	3.5%	90-100	0.0	0.0%
10-20	98.8	10.0%	100-110	0.0	0.0%
20-30	148.7	15.0%	110-120	0.0	0.0%
30-40	177.2	17.9%	120-130	0.0	0.0%
40-50	182.1	18.4%	130-140	0.0	0.0%
50-60	160.8	16.2%	140-150	0.0	0.0%
60-70	117.3	11.8%	150-160	0.0	0.0%
70-80	61.3	6.2%	160-170	0.0	0.0%
80-90	9.9	1.0%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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	DLW0098(FWAFER4B)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304070001	120.0	60	0.090	10.60	0.981

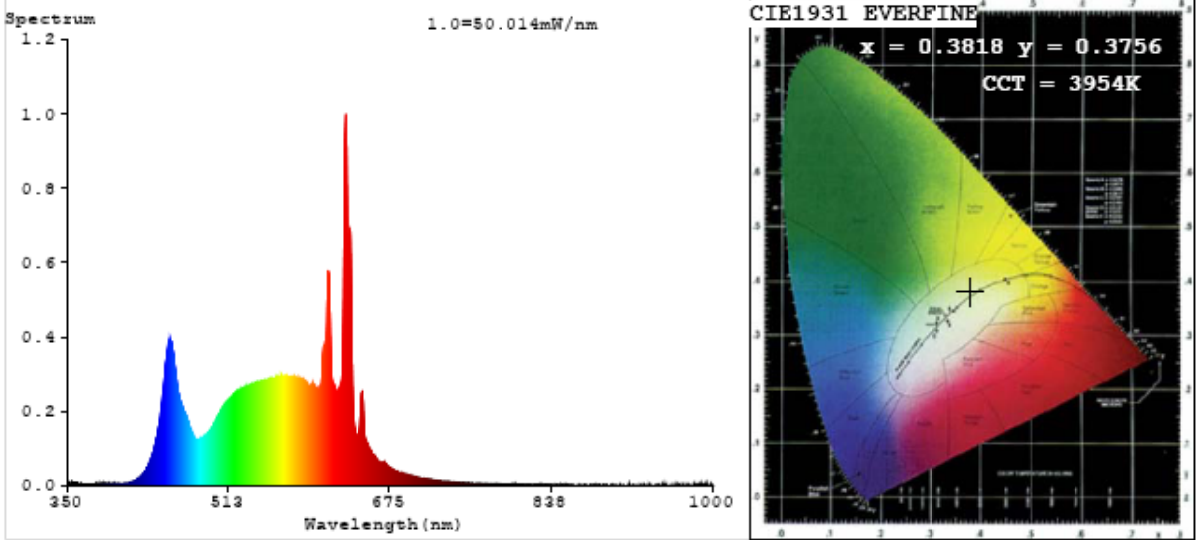
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	79
Frequency (Hz)	60	R2	97	R10	90
CCT (K)	3954	R3	94	R11	96
Duv	-0.0009	R4	96	R12	71
Chromaticity (x, y)	x=0.3818 y=0.3756	R5	95	R13	97
Chromaticity (u', v')	u'=0.2265 v'=0.5013	R6	94	R14	95
Color Rendering Index (CRI)	95.3	R7	96	R15	96
R9	79	R8	93	--	--

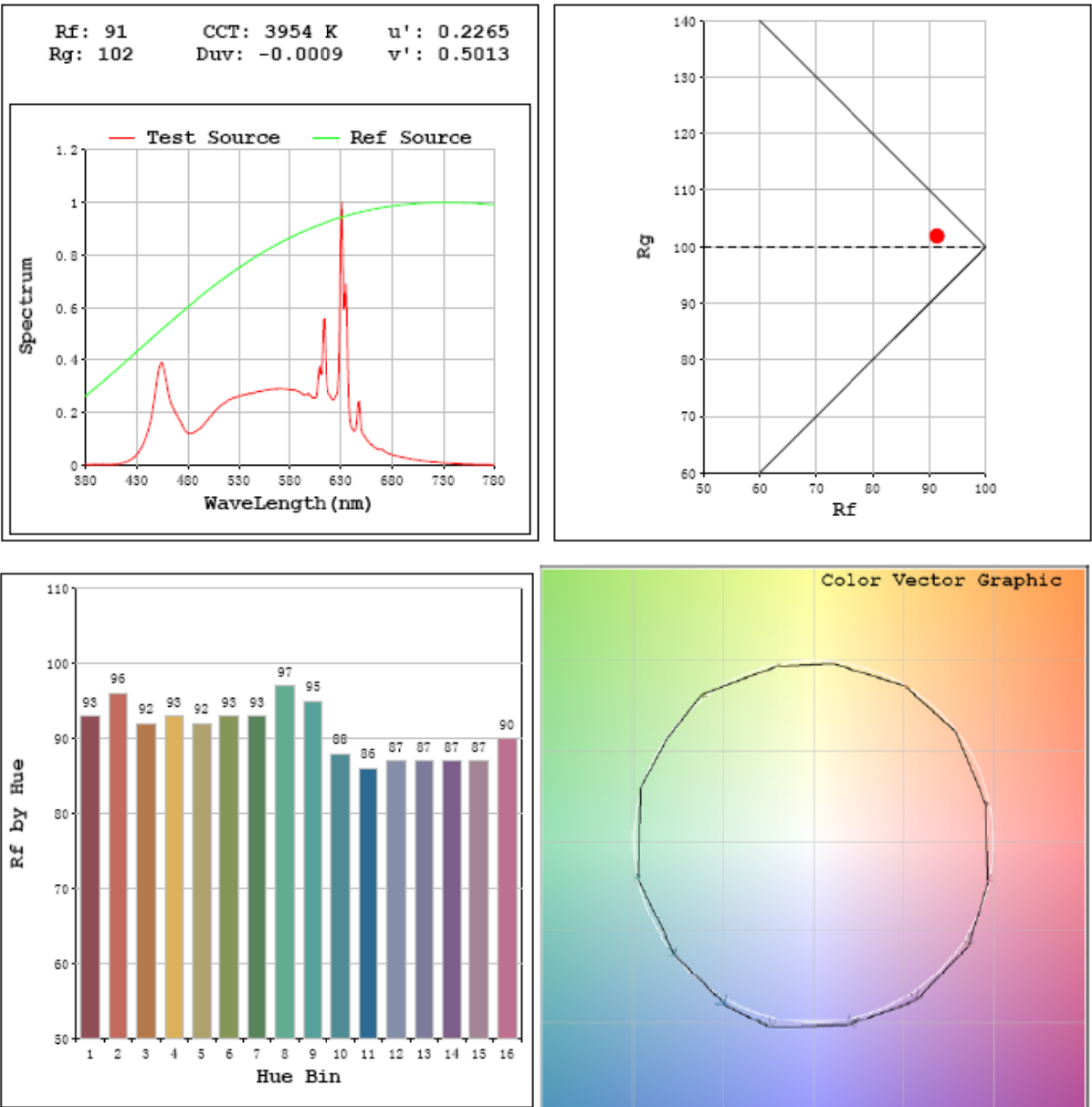
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	989.24
Luminous Efficacy (lm/W)	93.32
Beam Angle (°)	109.2
Center Beam Candle Power (cd)	364.9

Spectral Power Distribution & Chromaticity Diagram



TM30

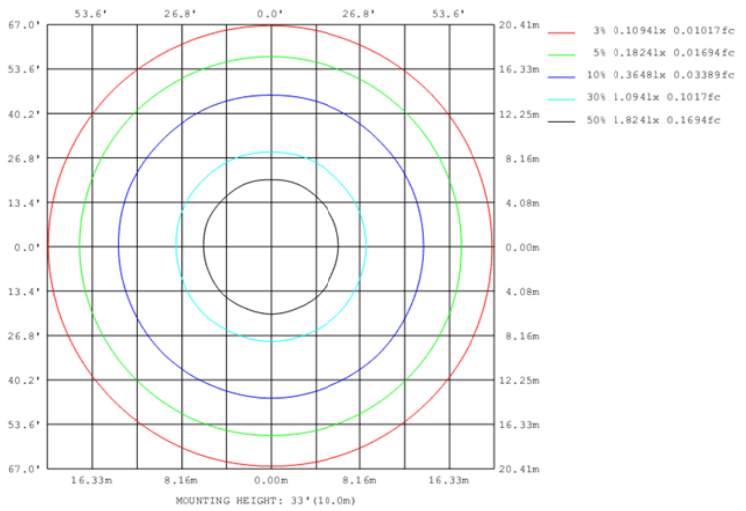
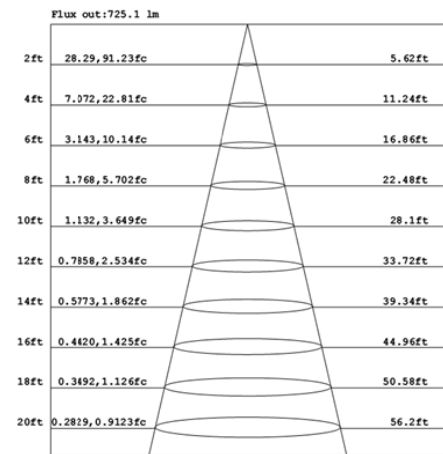
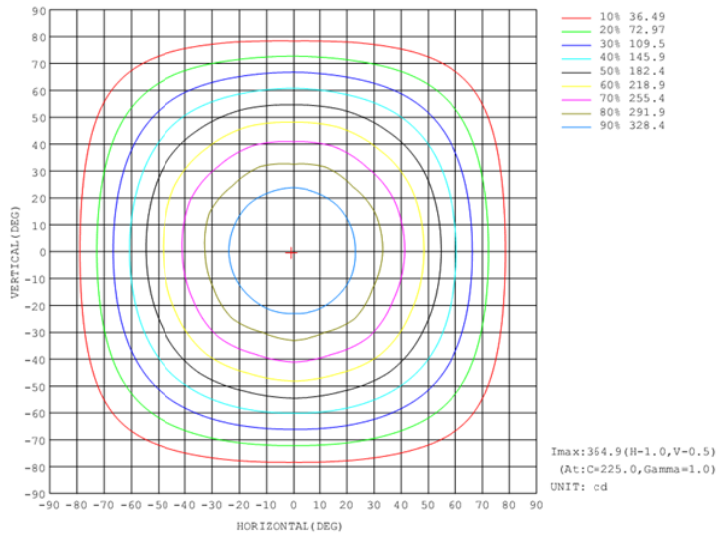
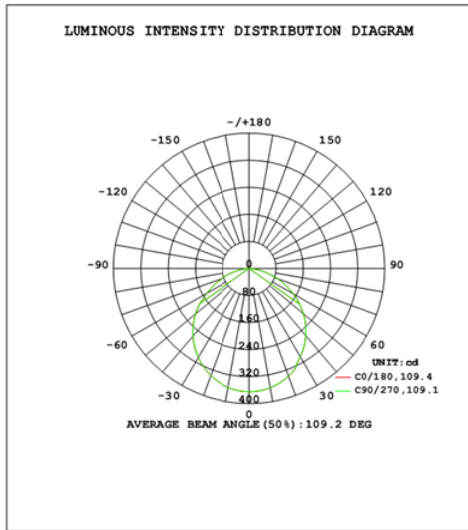


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	281.6	28.5%
0-40	458.6	46.4%
0-60	800.9	81.0%
60-90	188.3	19.0%
70-100	71.1	7.2%
90-120	0.0	0.0%
0-90	989.2	100.0%
90-180	0.0	0.0%
0-180	989.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	34.5	3.5%	90-100	0.0	0.0%
10-20	98.7	10.0%	100-110	0.0	0.0%
20-30	148.4	15.0%	110-120	0.0	0.0%
30-40	177.0	17.9%	120-130	0.0	0.0%
40-50	181.9	18.4%	130-140	0.0	0.0%
50-60	160.5	16.2%	140-150	0.0	0.0%
60-70	117.2	11.8%	150-160	0.0	0.0%
70-80	61.2	6.2%	160-170	0.0	0.0%
80-90	9.9	1.0%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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	DLW0098(FWAFER4B)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202304070001	120.0	60	0.092	10.80	0.982

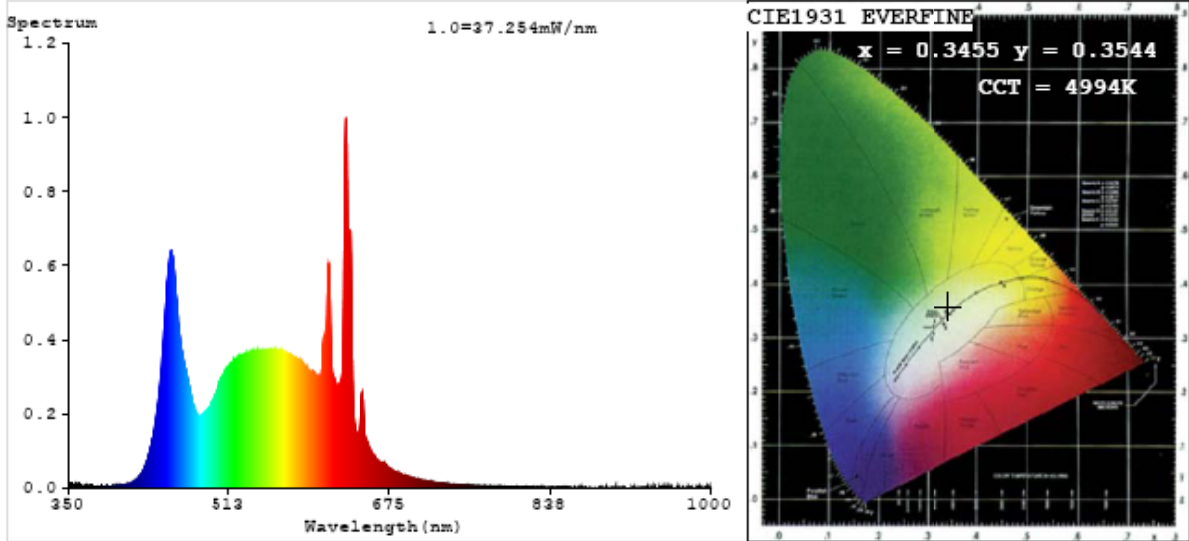
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	95	R9	75
Frequency (Hz)	60	R2	96	R10	87
CCT (K)	4994	R3	94	R11	93
Duv	0.0012	R4	94	R12	65
Chromaticity (x, y)	x=0.3455 y=0.3544	R5	93	R13	95
Chromaticity (u', v')	u'=0.2106 v'=0.4861	R6	92	R14	96
Color Rendering Index (CRI)	93.8	R7	96	R15	93
R9	75	R8	91	--	--

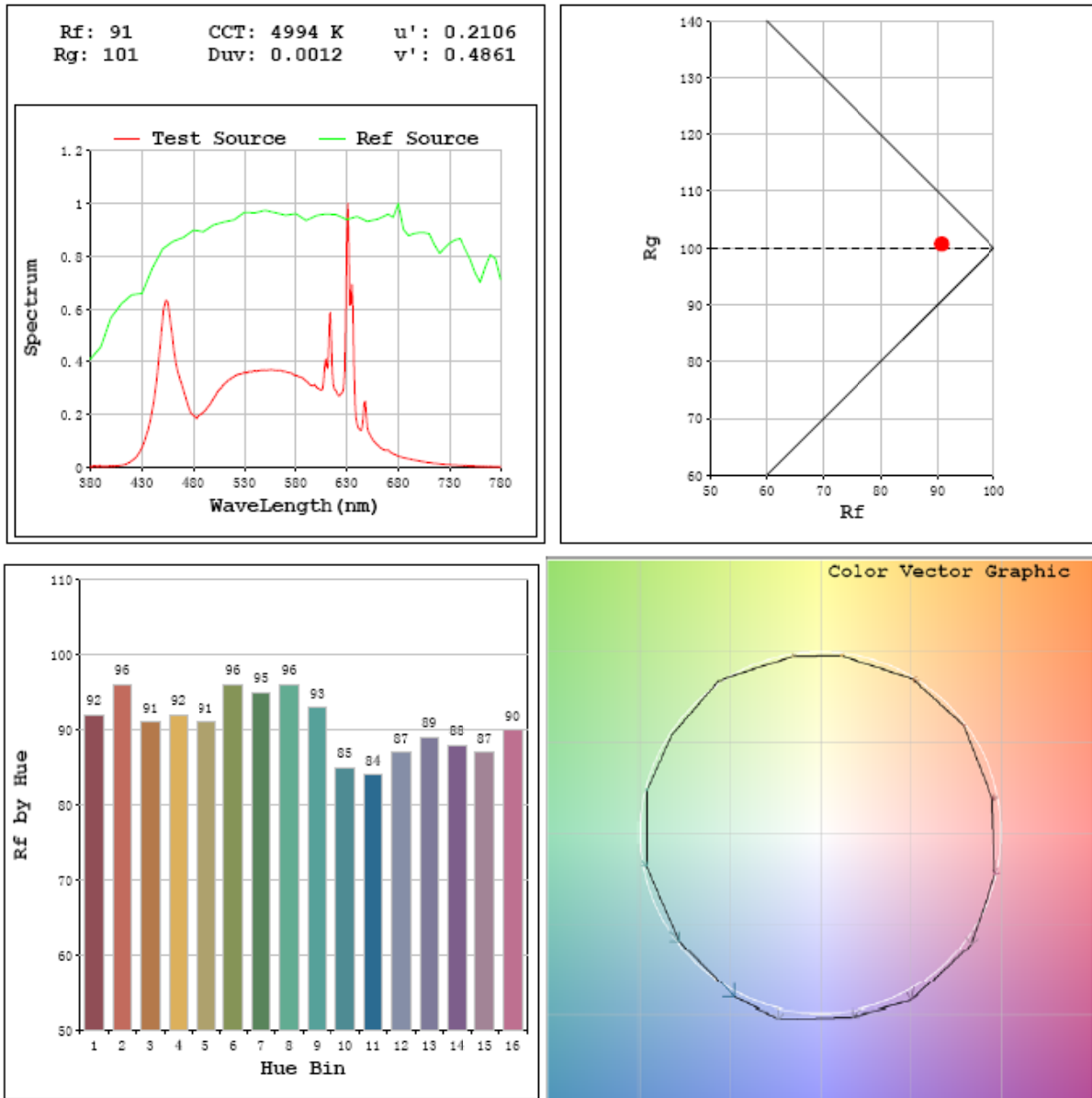
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	930.21
Luminous Efficacy (lm/W)	86.13
Beam Angle (°)	108.9
Center Beam Candle Power (cd)	343.5

Spectral Power Distribution & Chromaticity Diagram



TM30

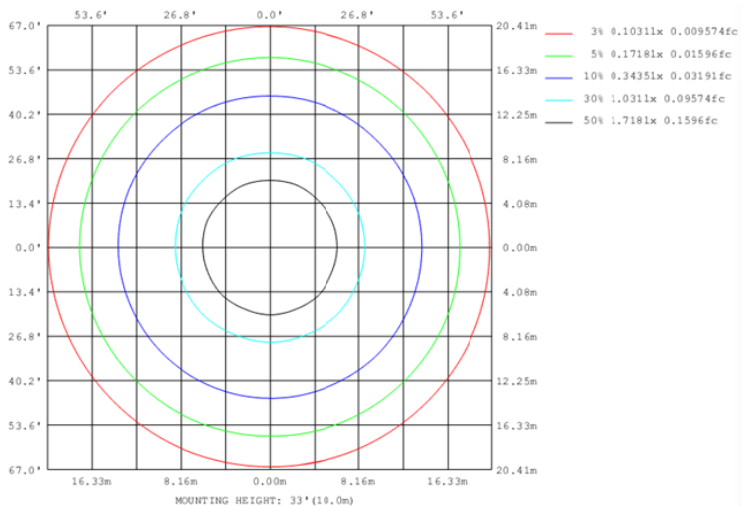
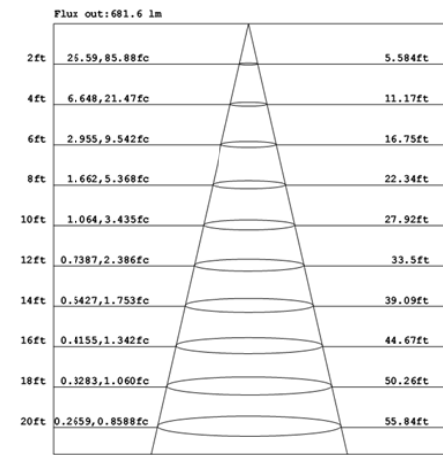
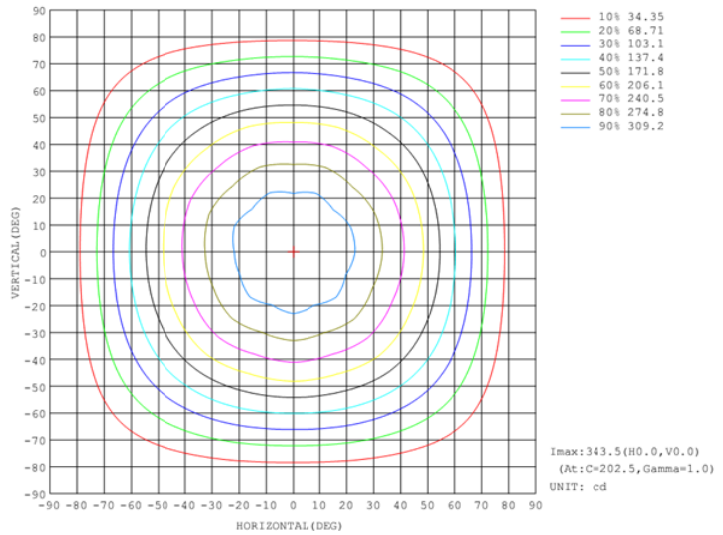
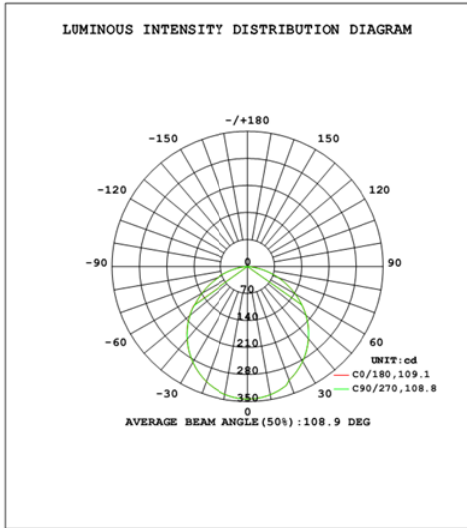


Zonal Lumen Tabulation

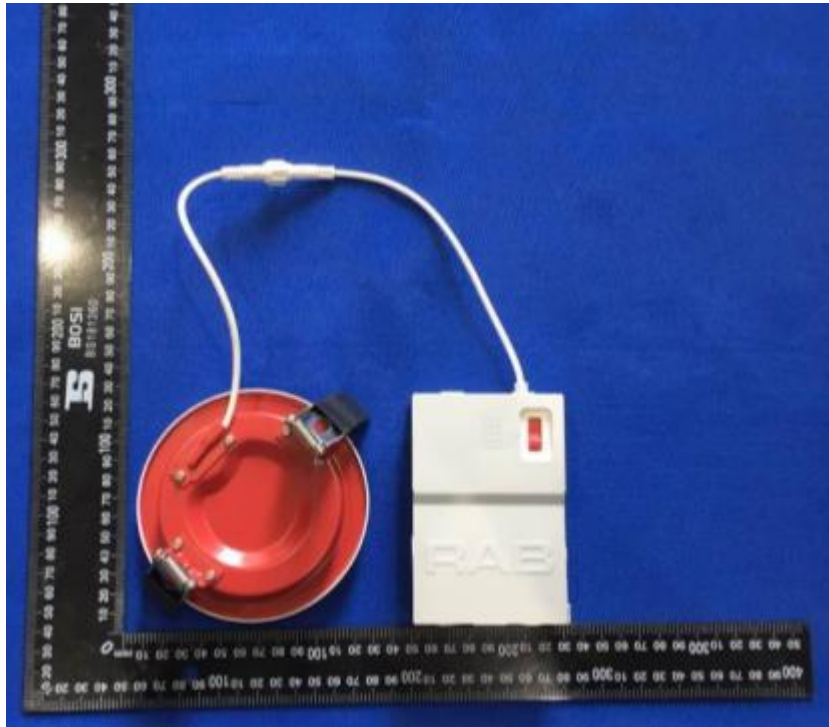
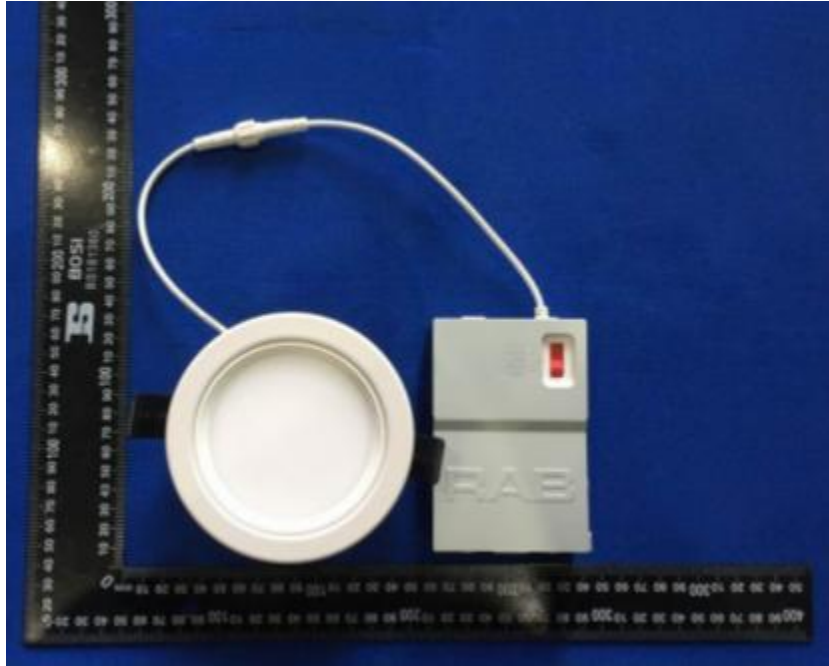
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	264.3	28.4%
0-40	430.8	46.3%
0-60	752.9	80.9%
60-90	177.4	19.1%
70-100	67.0	7.2%
90-120	0.0	0.0%
0-90	930.2	100.0%
90-180	0.0	0.0%
0-180	930.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	32.5	3.5%	90-100	0.0	0.0%
10-20	92.7	10.0%	100-110	0.0	0.0%
20-30	139.0	14.9%	110-120	0.0	0.0%
30-40	166.5	17.9%	120-130	0.0	0.0%
40-50	171.2	18.4%	130-140	0.0	0.0%
50-60	150.9	16.2%	140-150	0.0	0.0%
60-70	110.3	11.9%	150-160	0.0	0.0%
70-80	57.7	6.2%	160-170	0.0	0.0%
80-90	9.4	1.0%	170-180	0.0	0.0%

Photometric Data



3. Product Photo



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