

**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):**  
**DLW0088(WFRL4S99FA120WS)**

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

**Type of  
Luminaire:** Downlights

**Report Date:** 2022-07-18

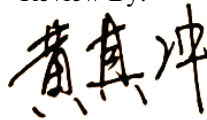
**Prepared By:**

Test & Report By:



Engineer: Sun Fangfang

Review By:



Manager: Huang Qichong

<b>1.1 Rated Values:</b>	
Rated Voltage / Frequency	120Vac, 60 Hz
Nominal Power	9.0 W
Rated Initial Lamp Lumen	550 lm
Declared CCT	2700K/3000K/3500K/4000K/5000K

### 1.2 Test Specifications:

Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
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	2022-07-18	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0088(WFRL4S99FA120WS)	2700K	

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120057	120.0	60	0.075	8.87	0.977

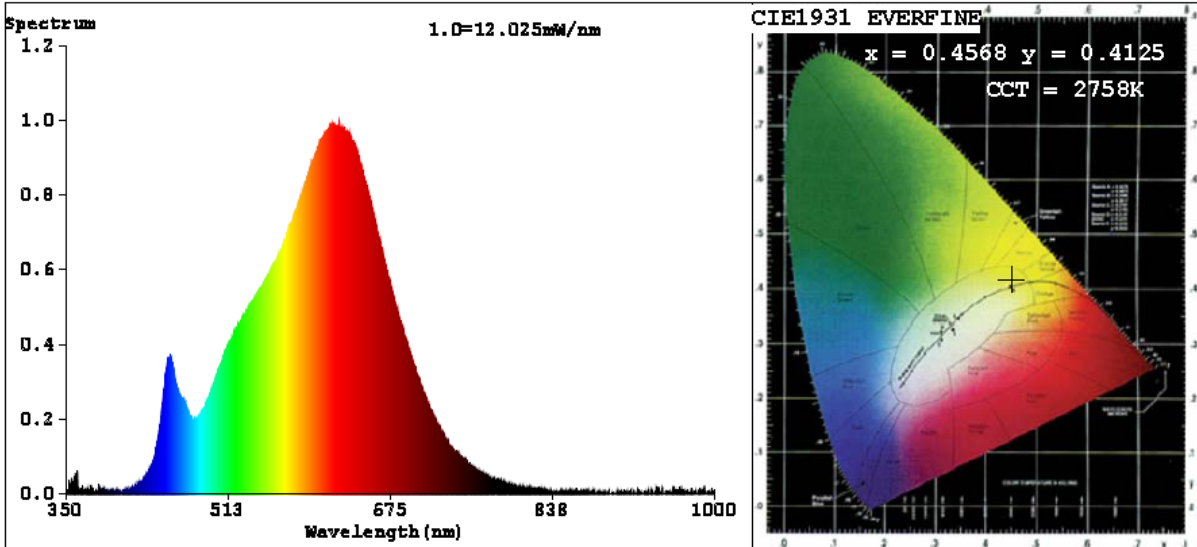
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	92	R9	54
Frequency (Hz)	60	R2	96	R10	91
CCT (K)	2758	R3	99	R11	93
Duv	-0.0010	R4	92	R12	83
Chromaticity (x, y)	x=0.4568 y=0.4125	R5	92	R13	93
Chromaticity (u', v')	u'=0.2597 v'=0.5276	R6	96	R14	99
Color Rendering Index (CRI)	92.0	R7	91	R15	87
R9	54	R8	79	--	--

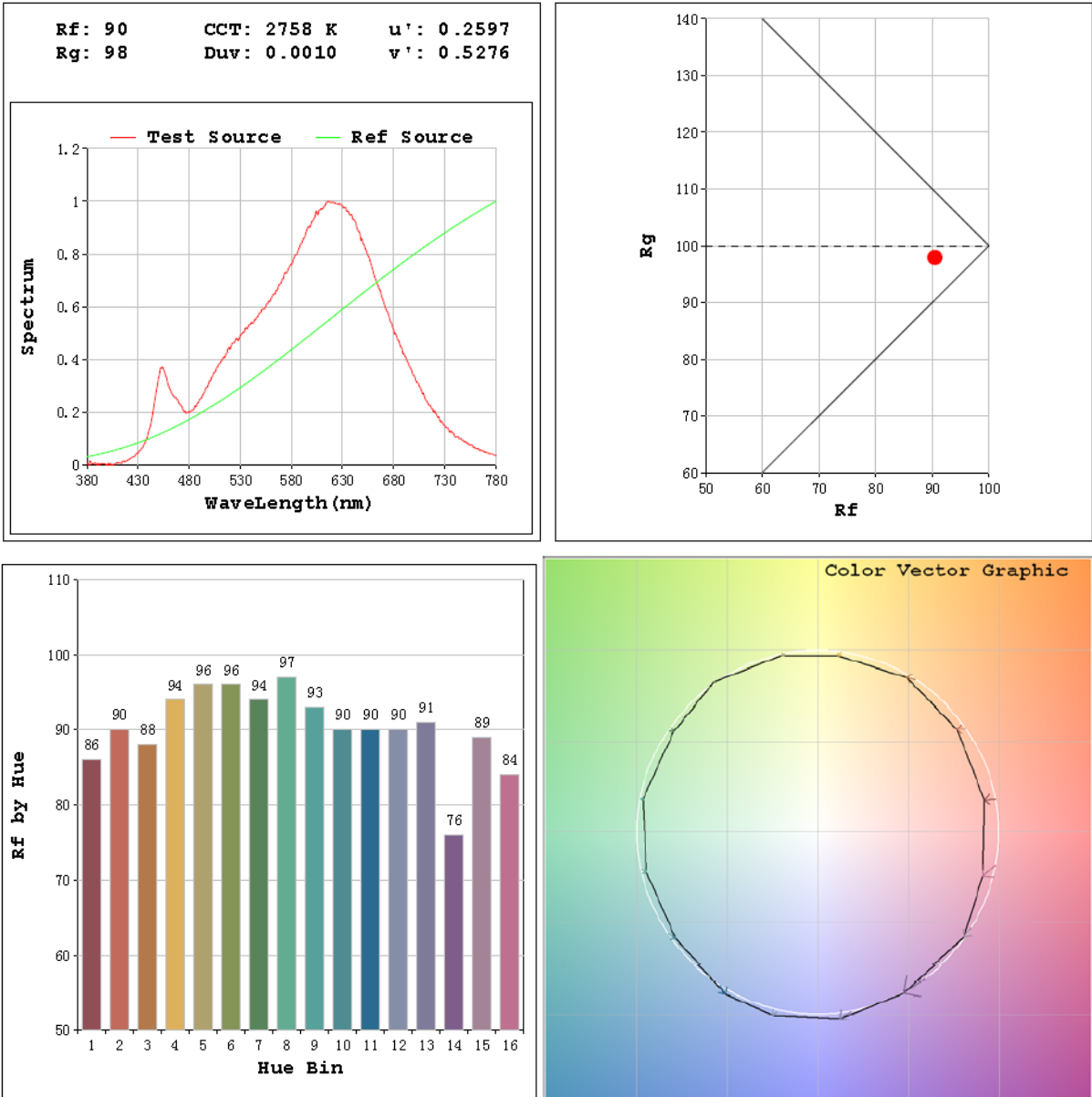
### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	558.8
Luminous Efficacy (lm/W)	63.0
Beam Angle (°)	109.9
Center Beam Candle Power (cd)	204.1

# Spectral Power Distribution & Chromaticity Diagram



## TM30

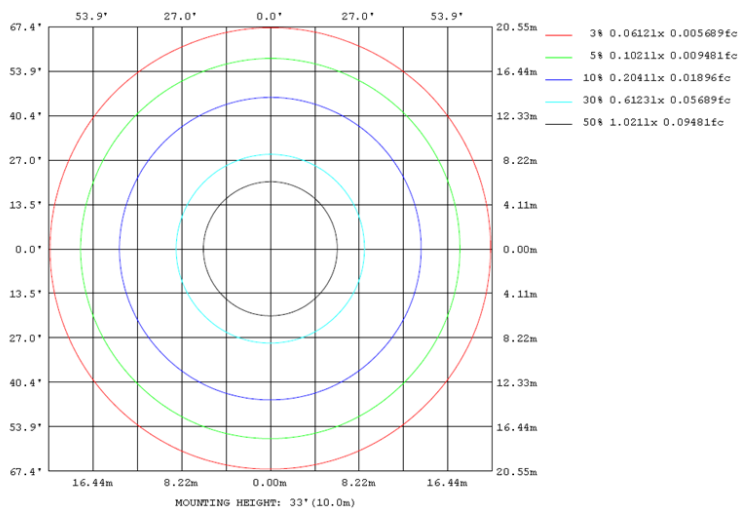
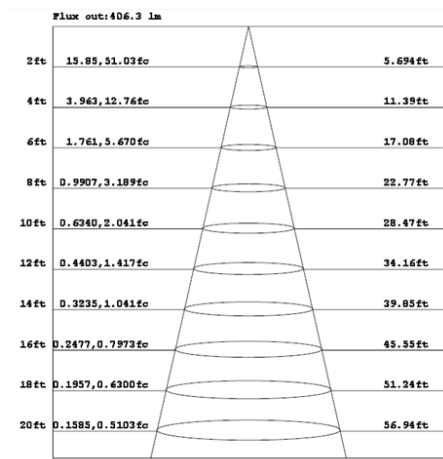
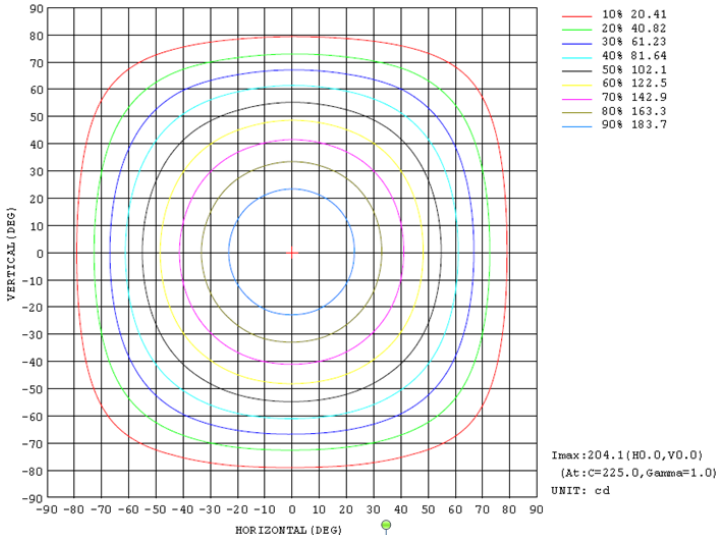
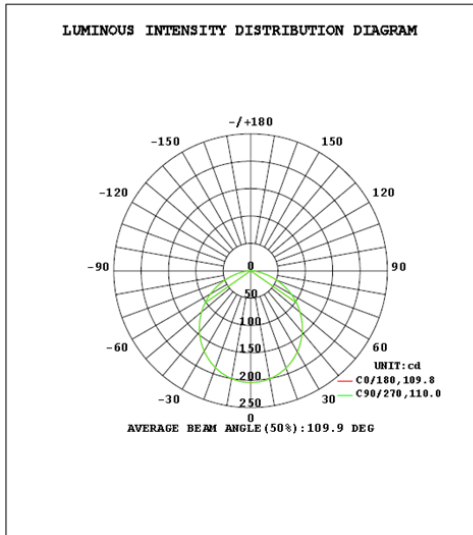


# Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	157.5	28.2%
0-40	256.8	46.0%
0-60	449.5	80.4%
60-90	109.4	19.6%
70-100	42.0	7.5%
90-120	0.0	0.0%
0-90	558.8	100.0%
90-180	0.0	0.0%
0-180	558.8	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	19.3	3.5%	90-100	0.0	0.0%
10-20	55.1	9.9%	100-110	0.0	0.0%
20-30	83.1	14.9%	110-120	0.0	0.0%
30-40	99.3	17.8%	120-130	0.0	0.0%
40-50	101.9	18.2%	130-140	0.0	0.0%
50-60	90.8	16.2%	140-150	0.0	0.0%
60-70	67.4	12.1%	150-160	0.0	0.0%
70-80	35.4	6.3%	160-170	0.0	0.0%
80-90	6.6	1.2%	170-180	0.0	0.0%

## Photometric Data





## 2.1.2 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2022-07-18	<b>Test Ambient:</b>	25.3 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	DLW0088(WFRL4S99FA120WS)	3000K	

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120057	120.0	60	0.074	8.78	0.977

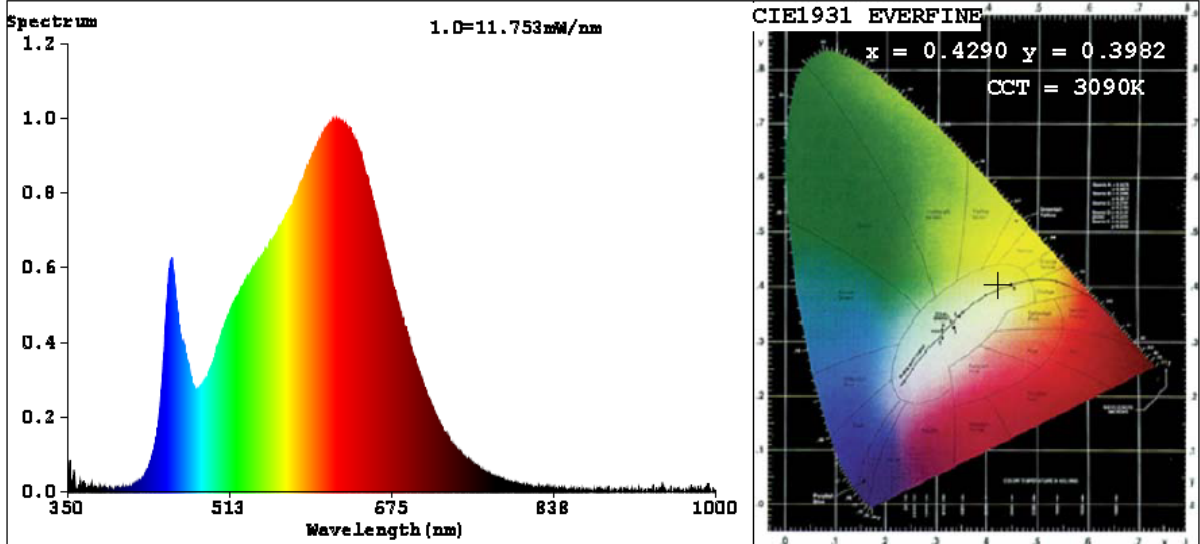
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	94	R9	64
Frequency (Hz)	60	R2	98	R10	94
CCT (K)	3090	R3	99	R11	94
Duv	-0.0012	R4	93	R12	80
Chromaticity (x, y)	x=0.4290 y=0.3982	R5	94	R13	96
Chromaticity (u', v')	u'=0.2480 v'=0.5178	R6	96	R14	99
Color Rendering Index (CRI)	93.8	R7	92	R15	91
R9	64	R8	84	--	--

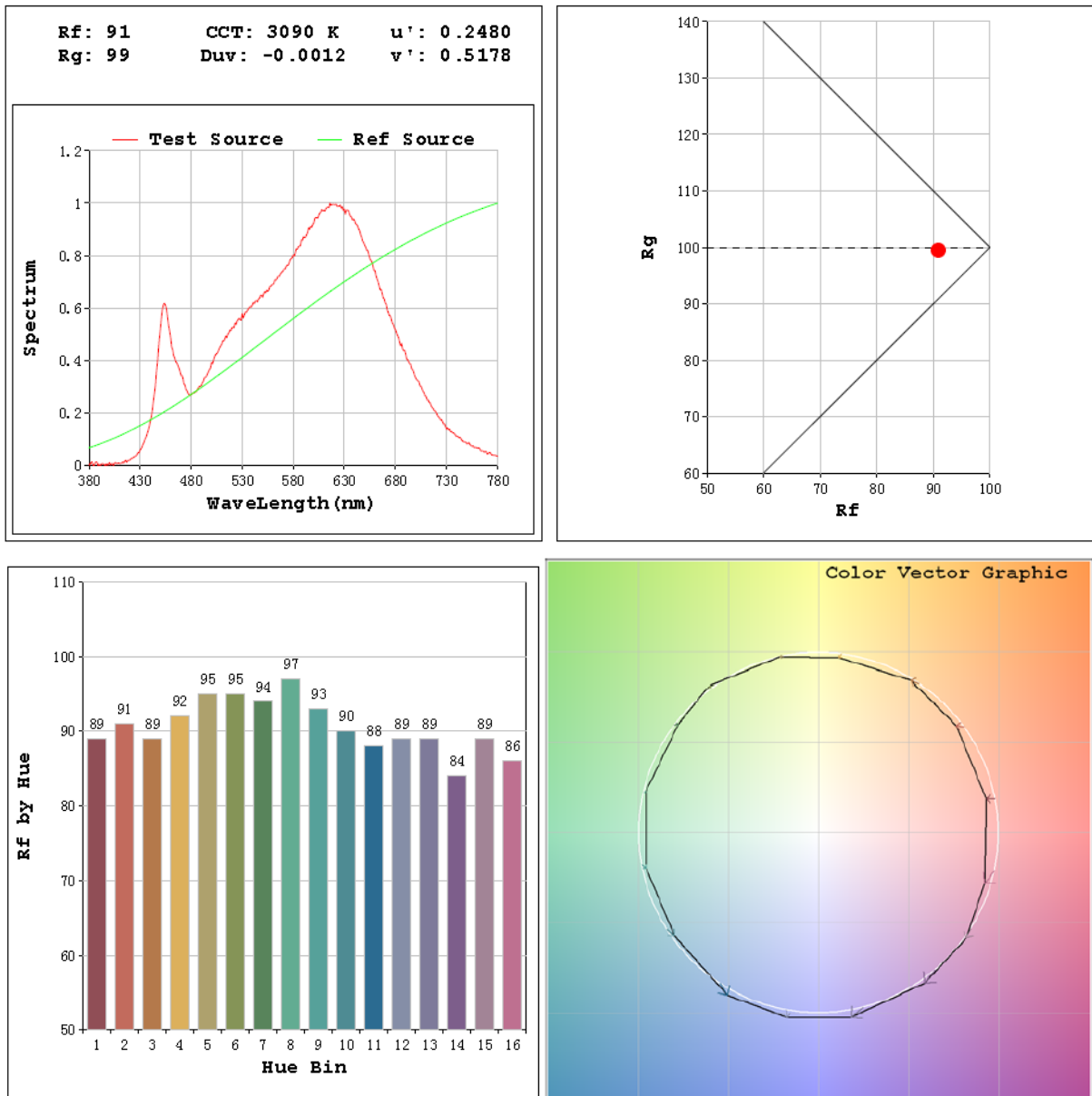
### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	595.3
Luminous Efficacy (lm/W)	67.8
Beam Angle (°)	109.9
Center Beam Candle Power (cd)	217.4

# Spectral Power Distribution & Chromaticity Diagram



## TM30

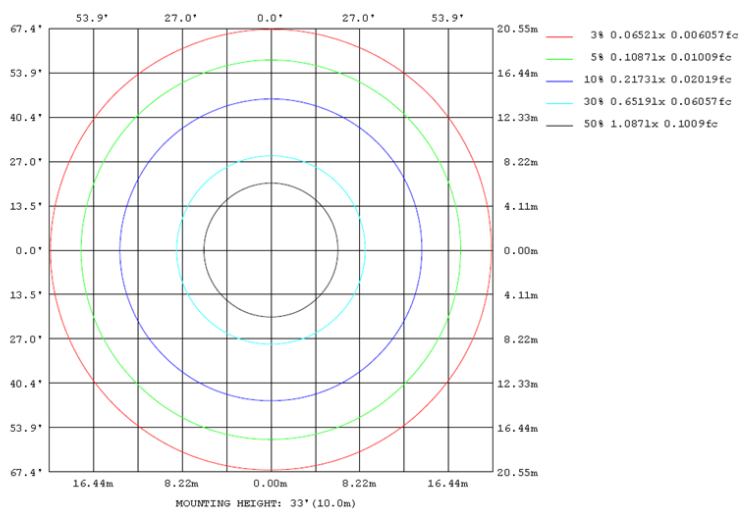
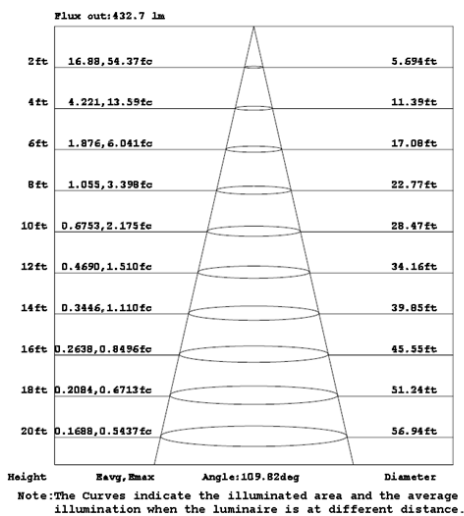
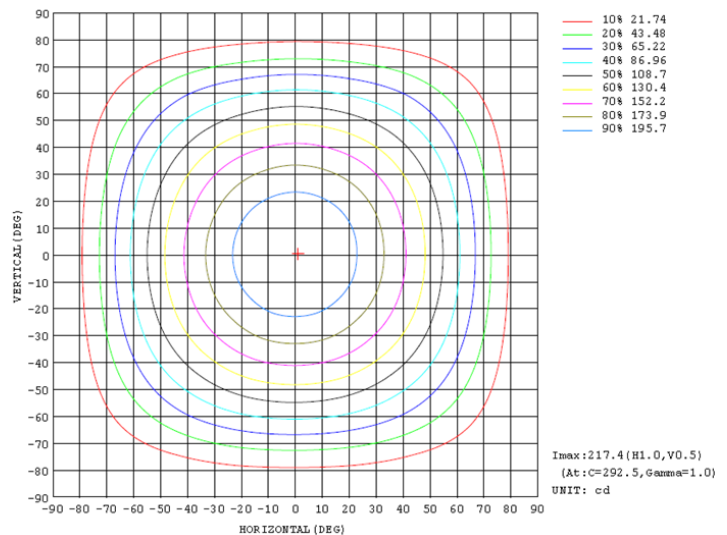
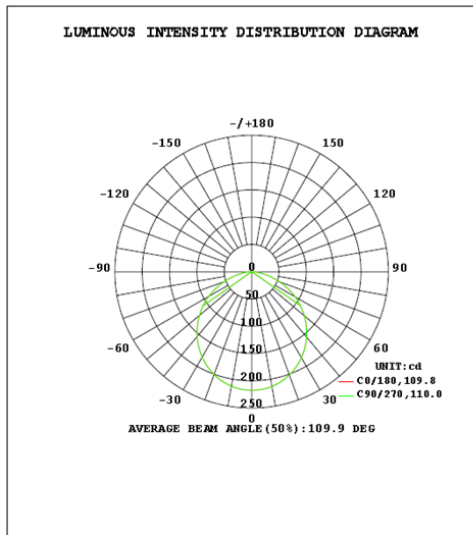


# Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	167.8	28.2%
0-40	273.5	46.0%
0-60	478.8	80.4%
60-90	116.5	19.6%
70-100	44.7	7.5%
90-120	0.0	0.0%
0-90	595.3	100.0%
90-180	0.0	0.0%
0-180	595.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	20.6	3.5%	90-100	0.0	0.0%
10-20	58.7	9.9%	100-110	0.0	0.0%
20-30	88.5	14.9%	110-120	0.0	0.0%
30-40	105.8	17.8%	120-130	0.0	0.0%
40-50	108.5	18.2%	130-140	0.0	0.0%
50-60	96.7	16.2%	140-150	0.0	0.0%
60-70	71.8	12.1%	150-160	0.0	0.0%
70-80	37.7	6.3%	160-170	0.0	0.0%
80-90	7.0	1.2%	170-180	0.0	0.0%

## Photometric Data





### 2.1.3 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2022-07-18	<b>Test Ambient:</b>	25.3 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	DLW0088(WFRL4S99FA120WS)	3500K	

#### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120057	120.0	60	0.073	8.65	0.976

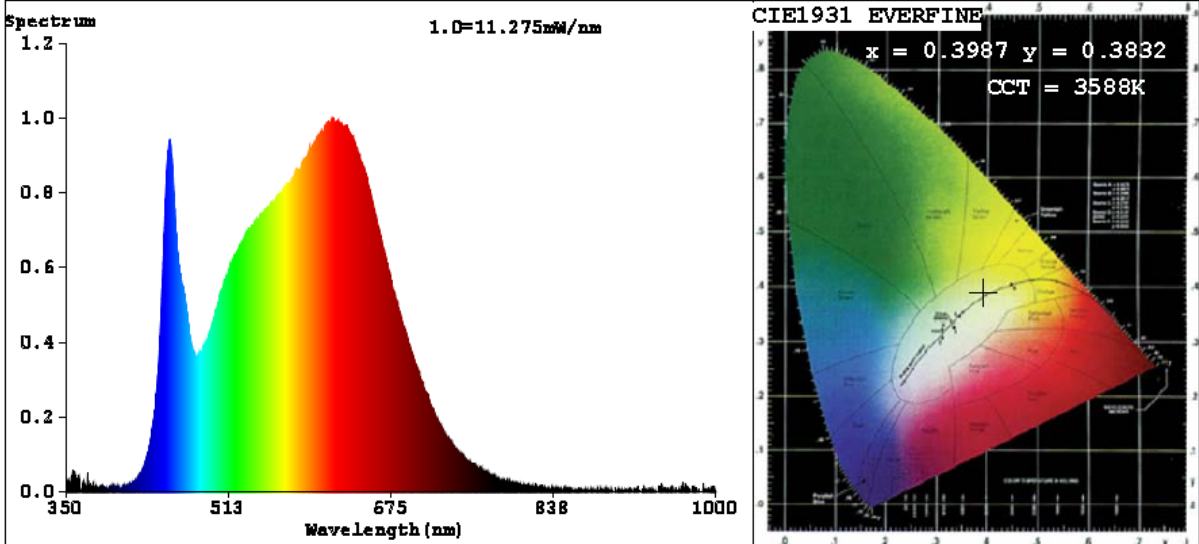
#### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	73
Frequency (Hz)	60	R2	98	R10	94
CCT (K)	3588	R3	98	R11	95
Duv	-0.0052	R4	94	R12	76
Chromaticity (x, y)	x=0.3987 y=0.3832	R5	95	R13	97
Chromaticity (u', v')	u'=0.2345 v'=0.5071	R6	95	R14	98
Color Rendering Index (CRI)	94.9	R7	94	R15	94
R9	73	R8	88	--	--

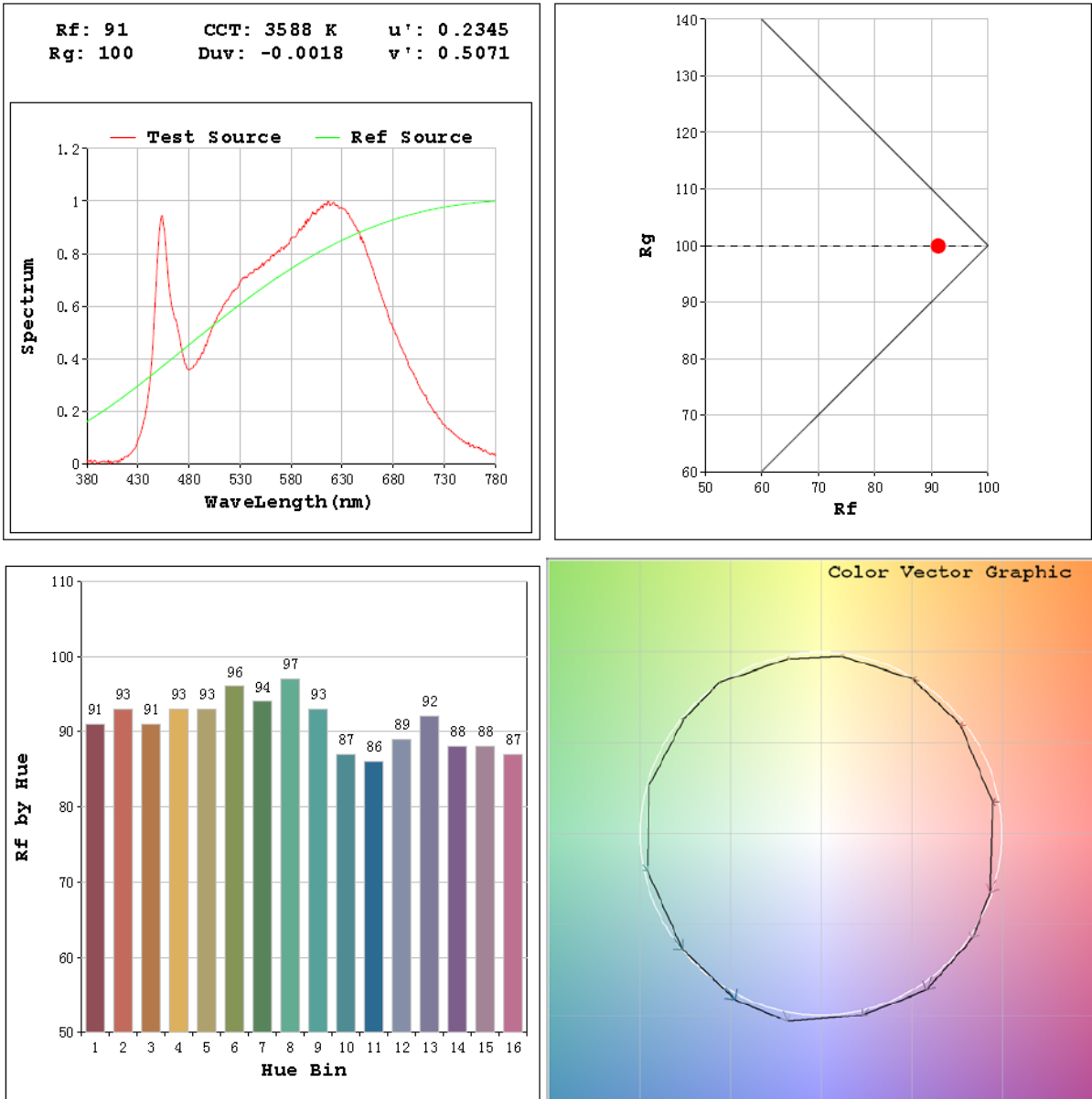
#### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	629.2
Luminous Efficacy (lm/W)	72.74
Beam Angle (°)	109.9
Center Beam Candle Power (cd)	229.8

# Spectral Power Distribution & Chromaticity Diagram



## TM30

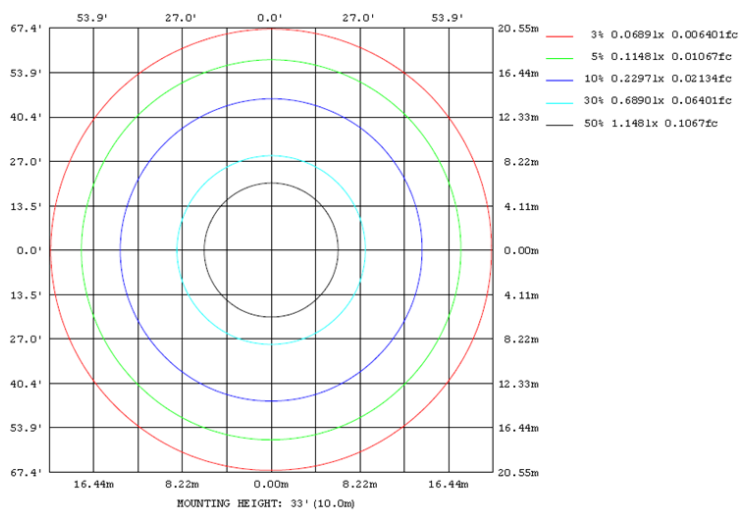
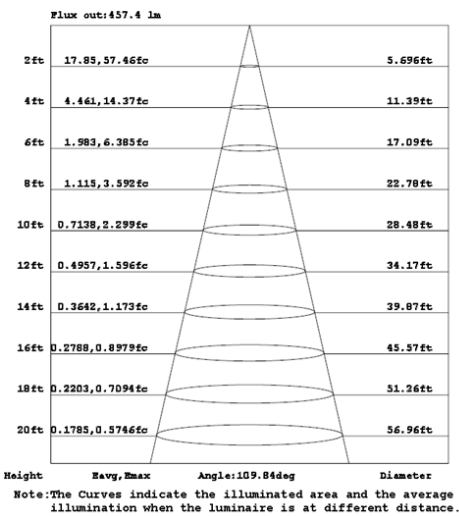
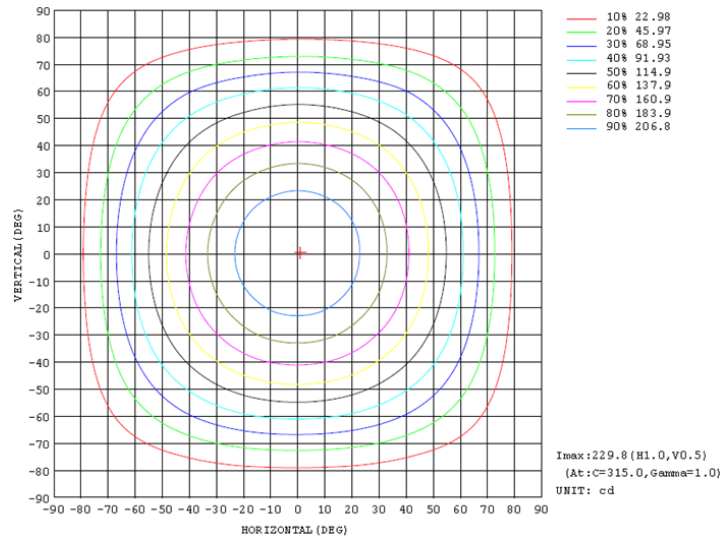
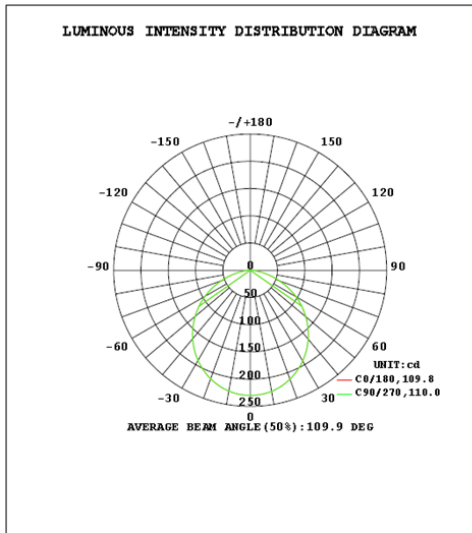


# Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	177.3	28.2%
0-40	289.1	45.9%
0-60	506.1	80.4%
60-90	123.2	19.6%
70-100	47.3	7.5%
90-120	0.0	0.0%
0-90	629.2	100.0%
90-180	0.0	0.0%
0-180	629.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	21.7	3.5%	90-100	0.0	0.0%
10-20	62.1	9.9%	100-110	0.0	0.0%
20-30	93.5	14.9%	110-120	0.0	0.0%
30-40	111.8	17.8%	120-130	0.0	0.0%
40-50	114.7	18.2%	130-140	0.0	0.0%
50-60	102.2	16.2%	140-150	0.0	0.0%
60-70	75.9	12.1%	150-160	0.0	0.0%
70-80	39.8	6.3%	160-170	0.0	0.0%
80-90	7.4	1.2%	170-180	0.0	0.0%

## Photometric Data





## 2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-18	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0088(WFRL4S99FA120WS)	4000K	

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120057	120.0	60	0.074	8.70	0.977

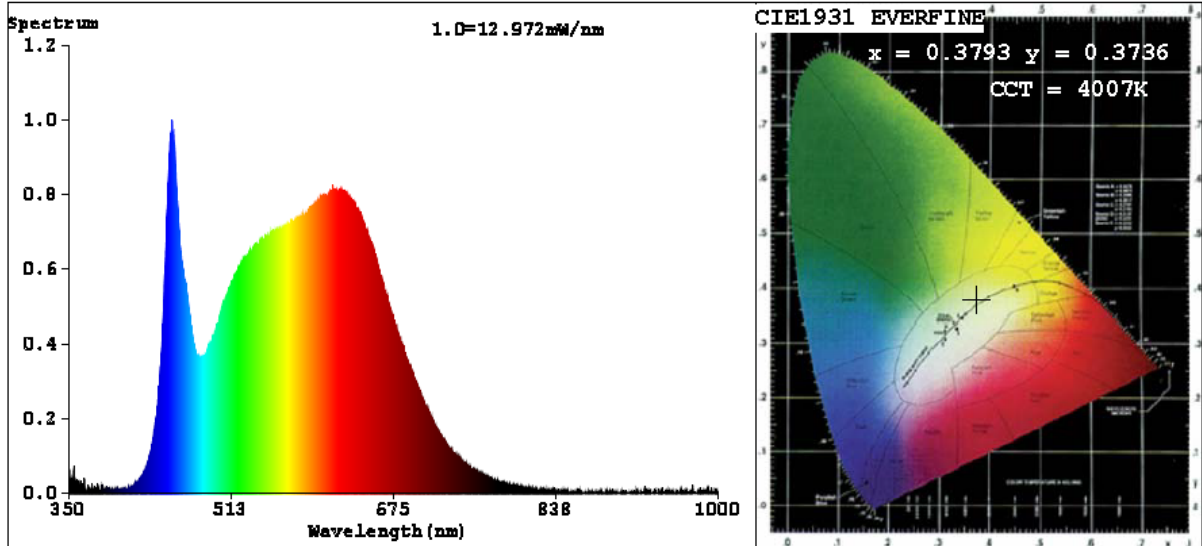
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	76
Frequency (Hz)	60	R2	98	R10	93
CCT (K)	4007	R3	97	R11	94
Duv	-0.0012	R4	94	R12	72
Chromaticity (x, y)	x=0.3793 y=0.3736	R5	94	R13	97
Chromaticity (u', v')	u'=0.2256 v'=0.5000	R6	94	R14	98
Color Rendering Index (CRI)	94.8	R7	95	R15	94
R9	76	R8	90	--	--

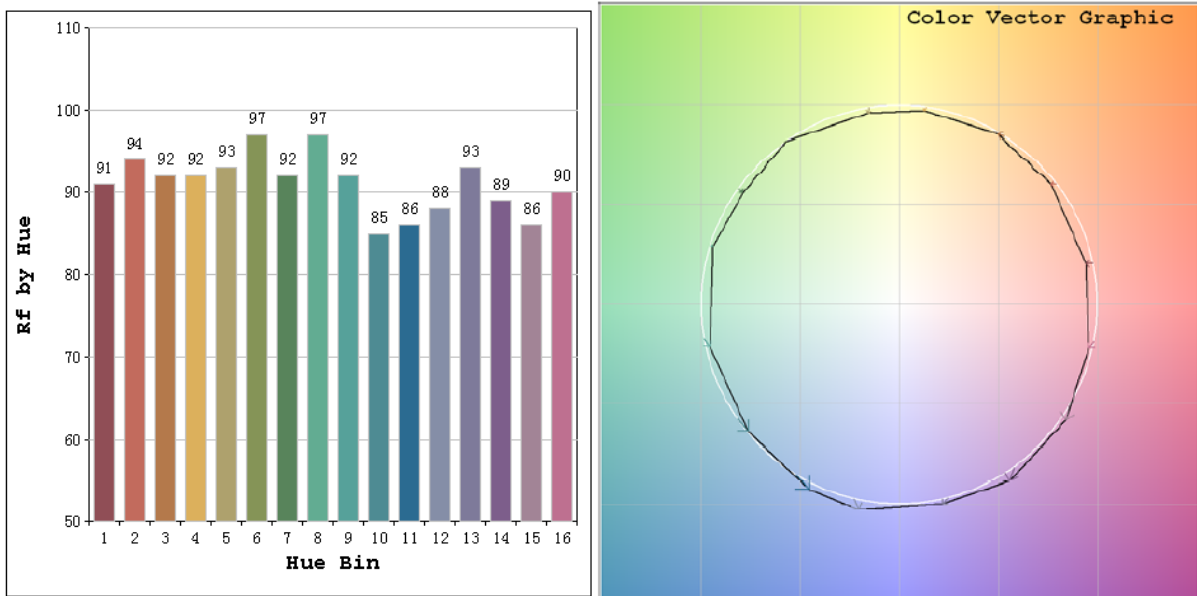
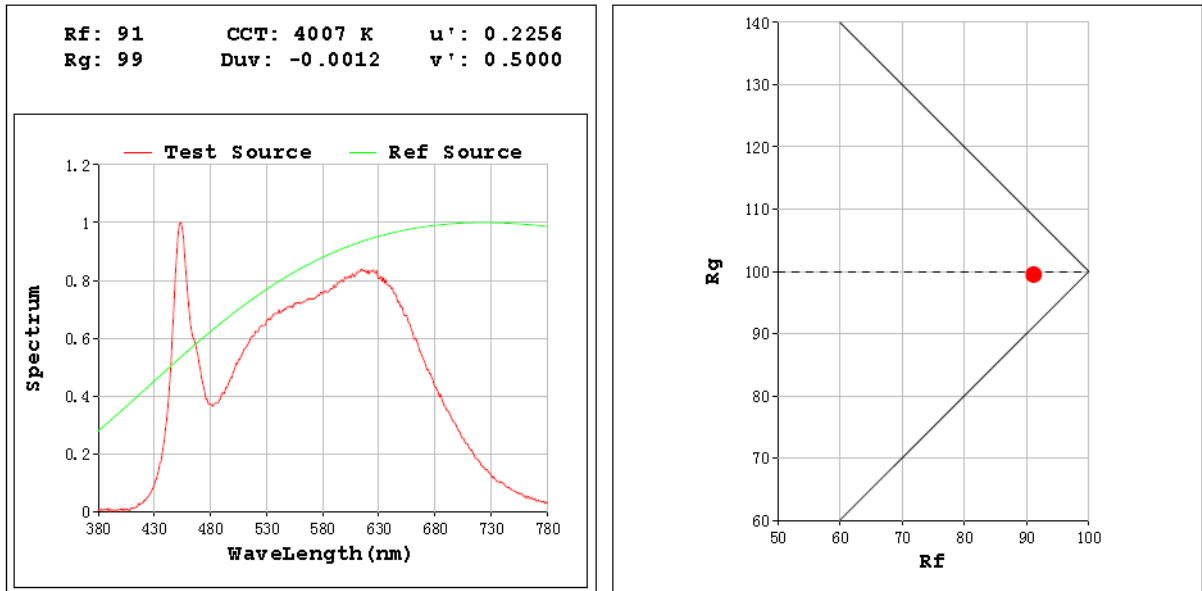
### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	640.9
Luminous Efficacy (lm/W)	73.66
Beam Angle (°)	109.9
Center Beam Candle Power (cd)	234.0

# Spectral Power Distribution & Chromaticity Diagram



## TM30

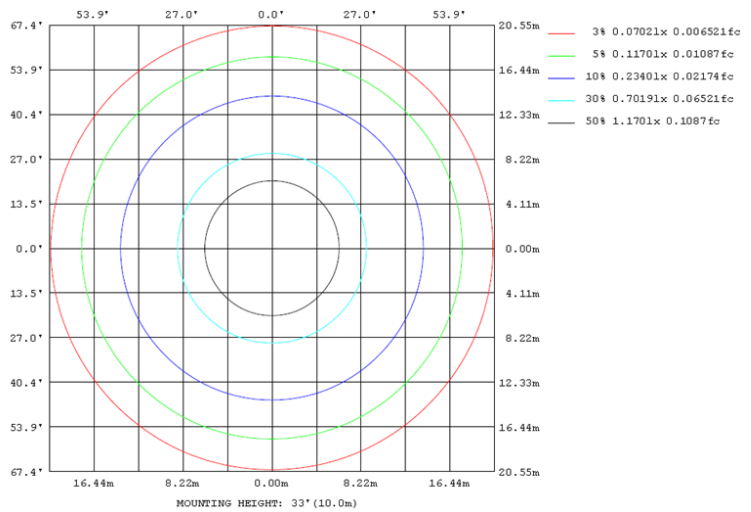
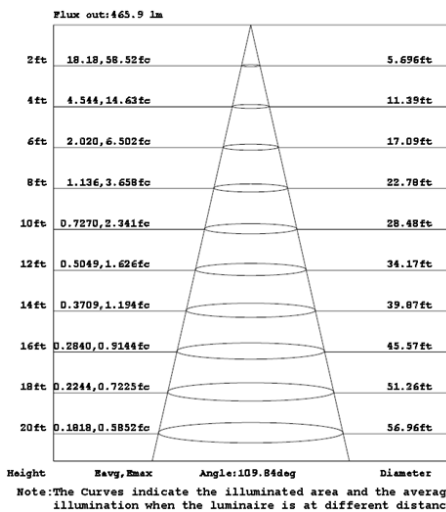
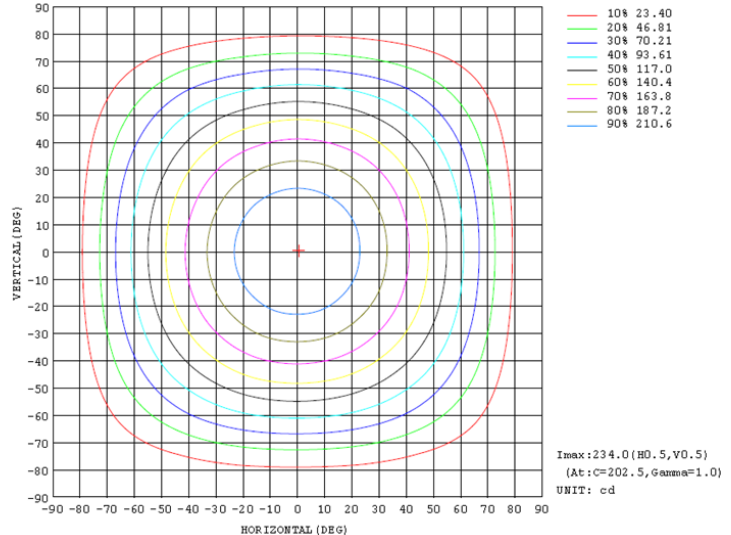
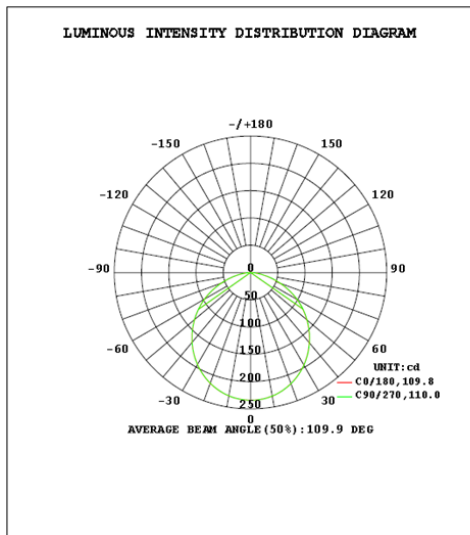


# Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	180.6	28.2%
0-40	294.5	45.9%
0-60	515.4	80.4%
60-90	125.5	19.6%
70-100	48.2	7.5%
90-120	0.0	0.0%
0-90	640.9	100.0%
90-180	0.0	0.0%
0-180	640.9	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	22.1	3.5%	90-100	0.0	0.0%
10-20	63.2	9.9%	100-110	0.0	0.0%
20-30	95.3	14.9%	110-120	0.0	0.0%
30-40	113.9	17.8%	120-130	0.0	0.0%
40-50	116.8	18.2%	130-140	0.0	0.0%
50-60	104.1	16.2%	140-150	0.0	0.0%
60-70	77.3	12.1%	150-160	0.0	0.0%
70-80	40.6	6.3%	160-170	0.0	0.0%
80-90	7.6	1.2%	170-180	0.0	0.0%

## Photometric Data





## 2.1.5 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2022-07-18	<b>Test Ambient:</b>	25.3 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	DLW0088(WFRL4S99FA120WS)	5000K	

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
202207120057	120.0	60	0.075	8.87	0.978

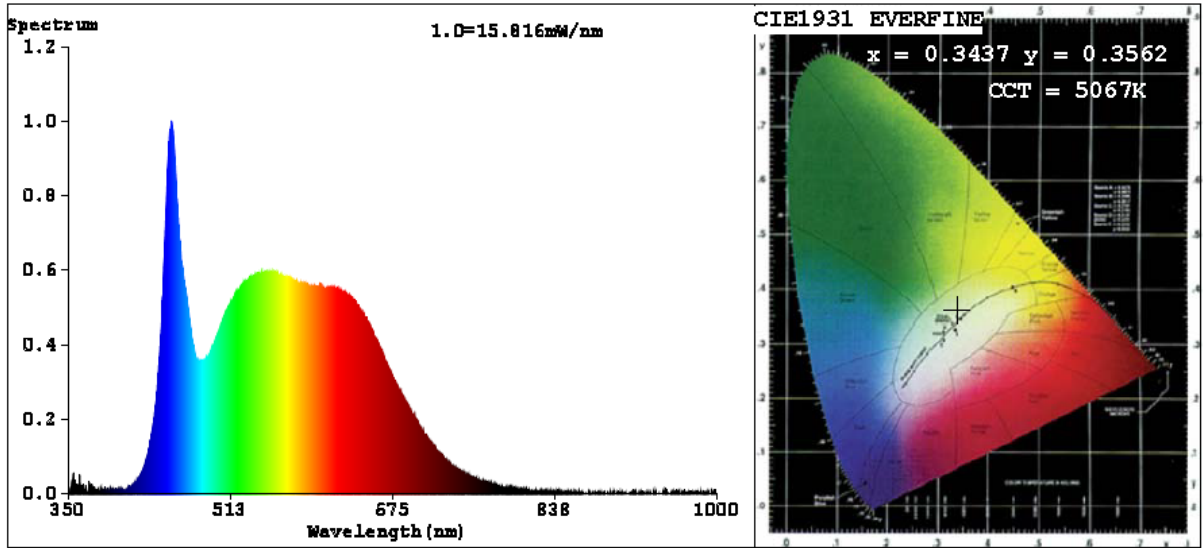
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	69
Frequency (Hz)	60	R2	95	R10	87
CCT (K)	5067	R3	95	R11	92
Duv	-0.0029	R4	92	R12	70
Chromaticity (x, y)	x=0.3437 y=0.3562	R5	92	R13	94
Chromaticity (u', v')	u'=0.2087 v'=0.4867	R6	92	R14	97
Color Rendering Index (CRI)	92.8	R7	95	R15	92
R9	69	R8	88	--	--

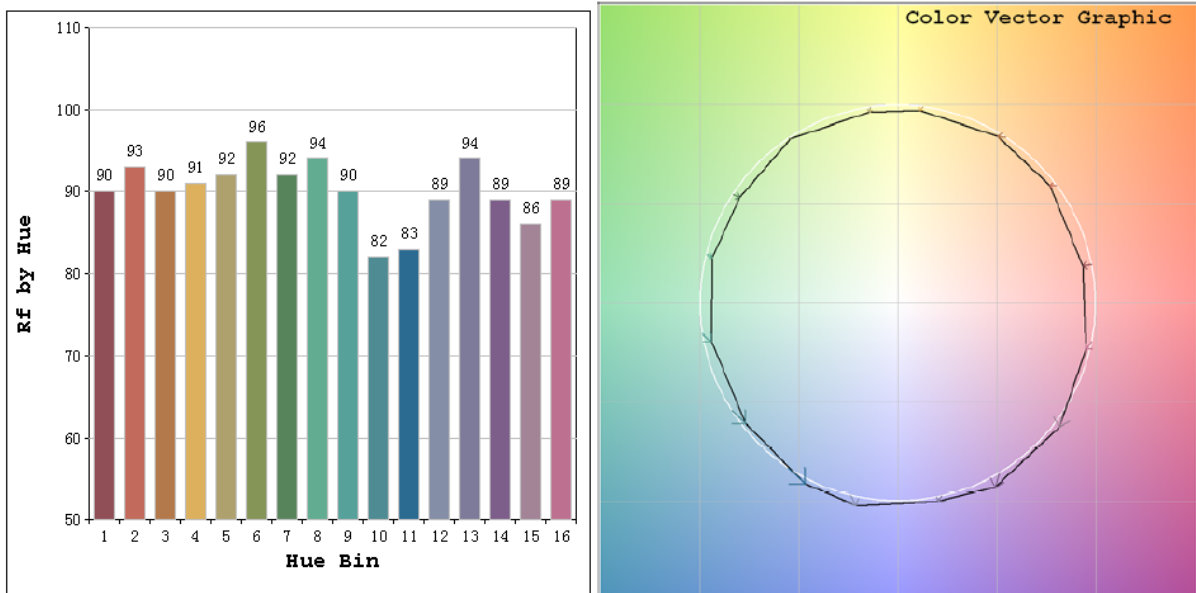
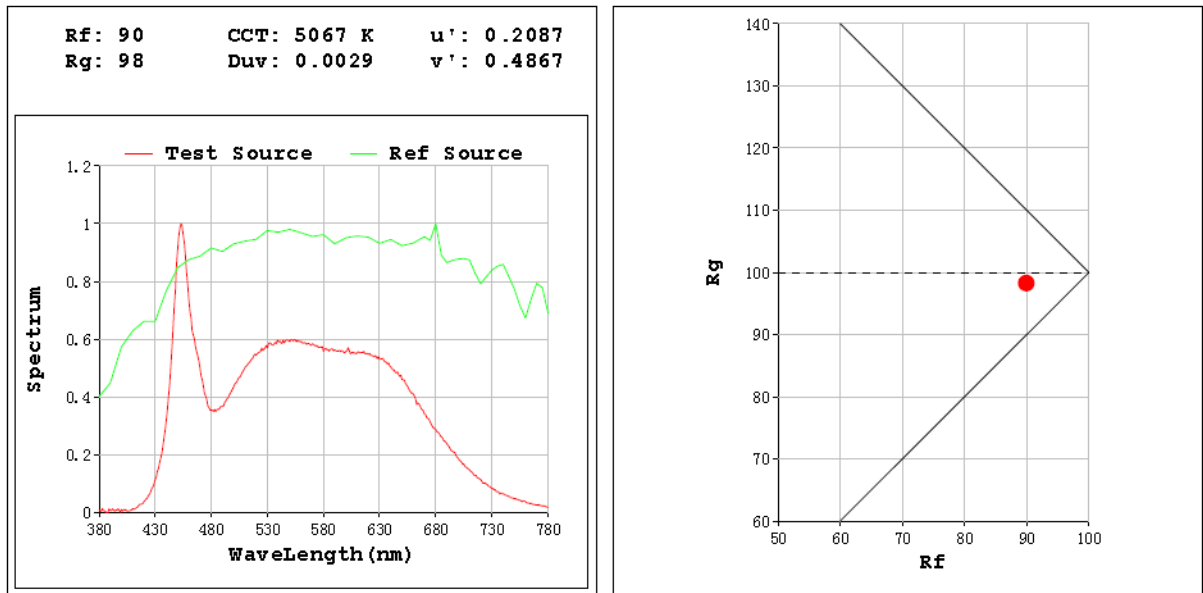
### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	630.9
Luminous Efficacy (lm/W)	71.12
Beam Angle (°)	110.0
Center Beam Candle Power (cd)	230.4

# Spectral Power Distribution & Chromaticity Diagram



## TM30

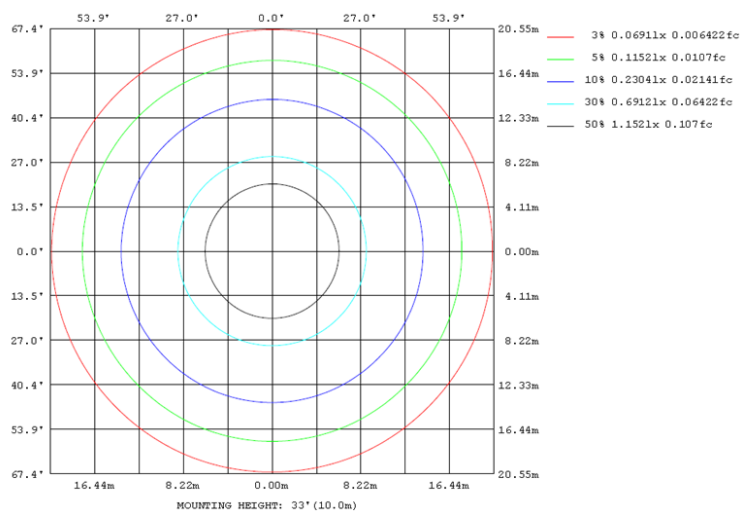
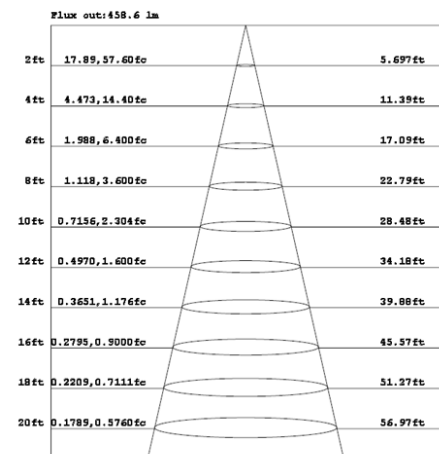
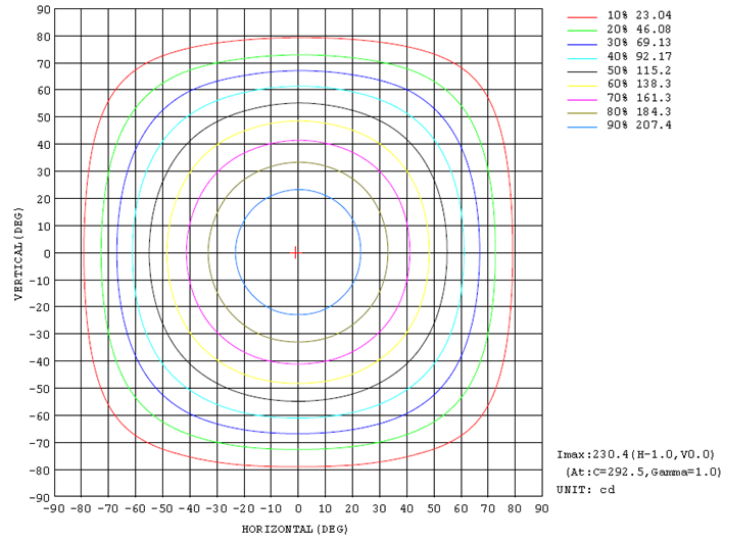
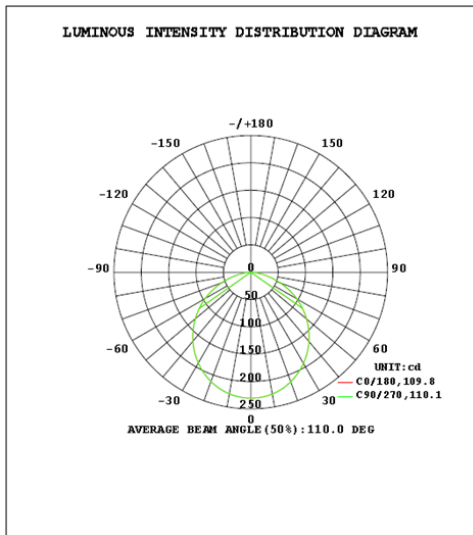


# Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	177.8	28.2%
0-40	289.8	45.9%
0-60	507.4	80.4%
60-90	123.5	19.6%
70-100	47.4	7.5%
90-120	0.0	0.0%
0-90	630.9	100.0%
90-180	0.0	0.0%
0-180	630.9	100.0%

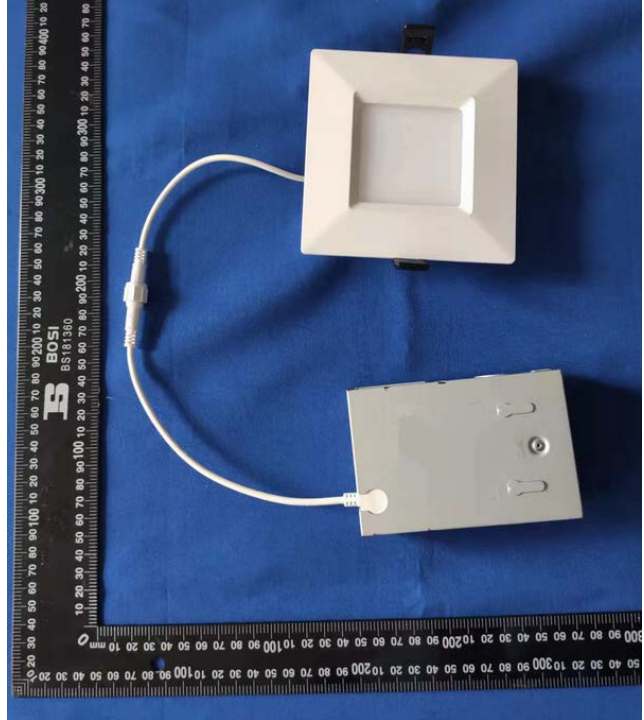
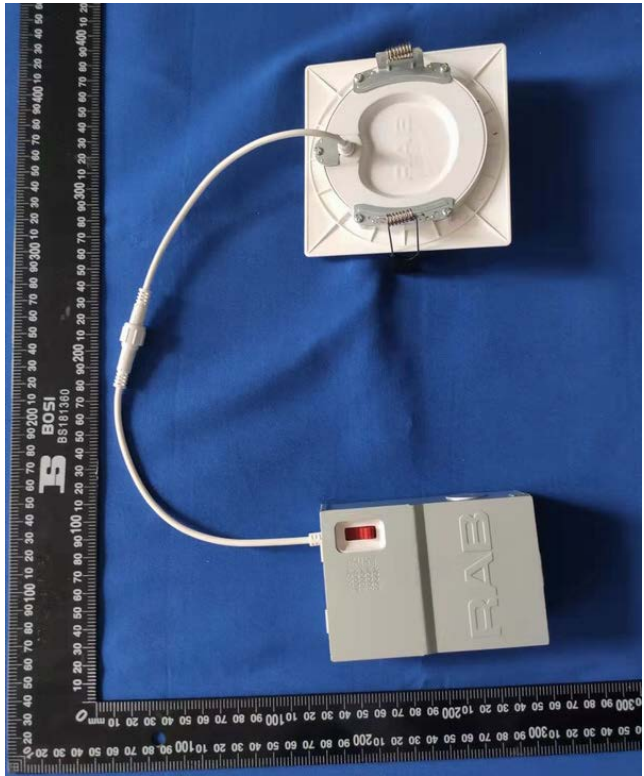
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	21.8	3.5%	90-100	0.0	0.0%
10-20	62.2	9.9%	100-110	0.0	0.0%
20-30	93.8	14.9%	110-120	0.0	0.0%
30-40	112.1	17.8%	120-130	0.0	0.0%
40-50	115.0	18.2%	130-140	0.0	0.0%
50-60	102.5	16.3%	140-150	0.0	0.0%
60-70	76.1	12.1%	150-160	0.0	0.0%
70-80	39.9	6.3%	160-170	0.0	0.0%
80-90	7.5	1.2%	170-180	0.0	0.0%

## Photometric Data





**3. Product Photo**



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