

# LM-79-08 Test Report

For

## RAB LIGHTING INC

(Brand Name : RAB)

170 Ludlow Ave , PO BOX 970, Northvale, NJ 07647-2305 USA

**Model name(s) :**

**DLR0141 (R2TL)**

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

**Type of Luminaire:** Downlights

**Report Date:** 2023-12-18

<b>1.1 Rated Values:</b>	
Rated Voltage / Frequency	120V, 60HZ
Nominal Power	9W
Rated Initial Lamp Lumen	570lm (3000k) , 600lm (5000k)
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

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b></p> <p>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.</p>
<p><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b></p> <p>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.</p>
<p><b>3) Electrical Measurements:</b></p> <p>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.</p>

### 2.1.1 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2023-12-18	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	DLR0141 (R2TL)	CCT Setting	2700k

#### Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.076	8.94	0.979

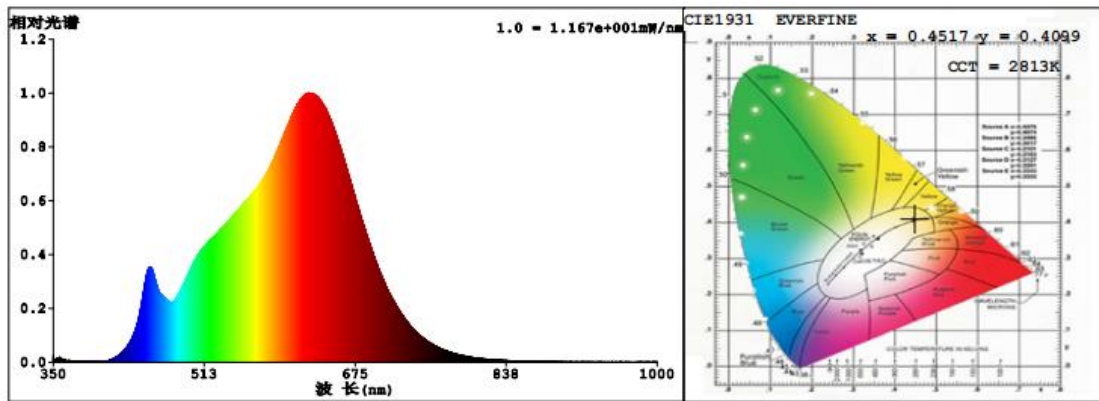
#### Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	74
Frequency (Hz)	60	R2	99	R10	98
CCT (K)	2813	R3	100	R11	99
Duv	0.00052	R4	98	R12	89
Chromaticity (x, y)	x=0.4517, y=0.4099	R5	98	R13	98
Chromaticity (u', v')	u' =0.2575, v' =0.5259	R6	97	R14	99
Color Rendering Index (CRI)	96.6	R7	94	R15	94
R9	74	R8	88	--	--

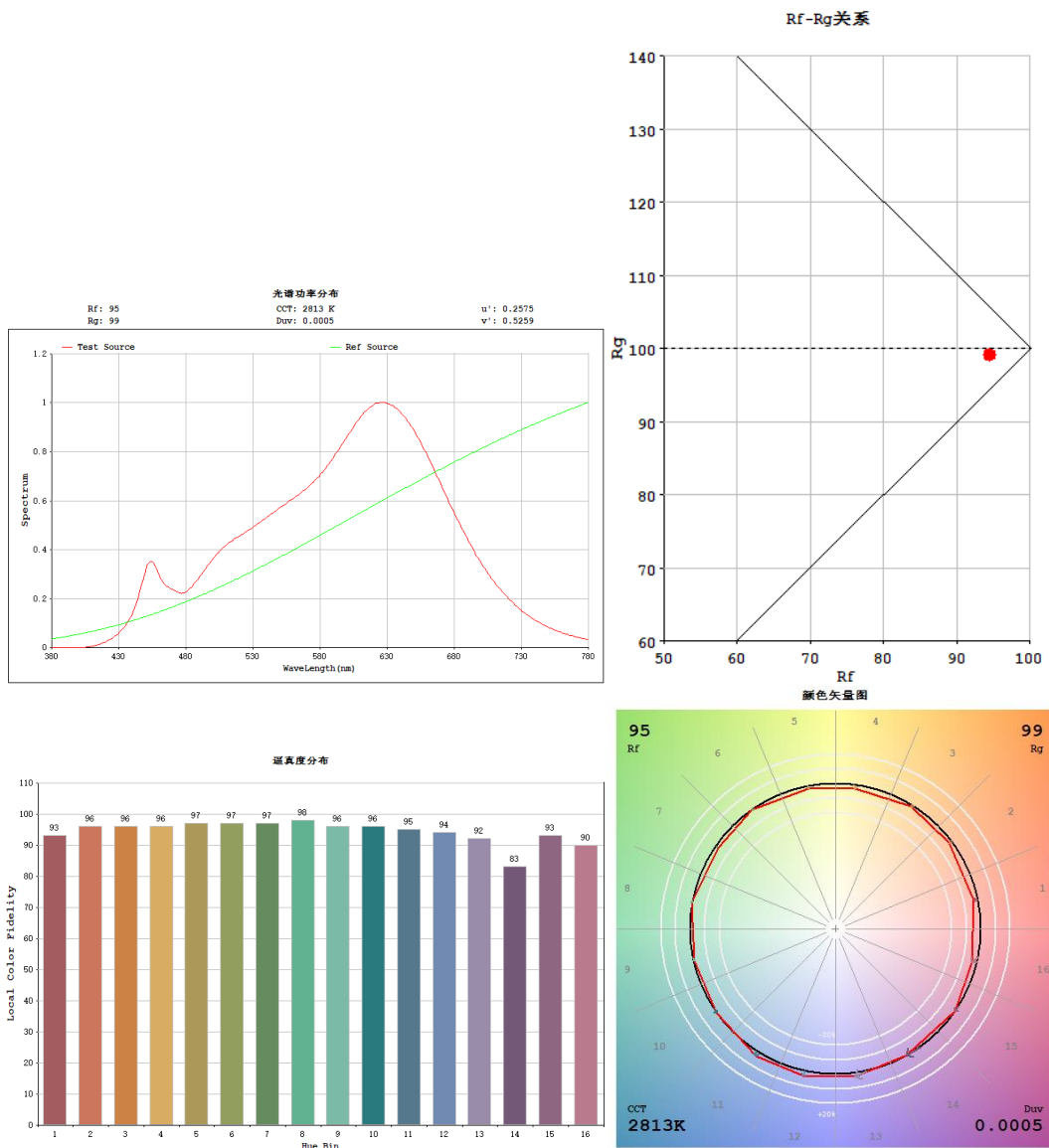
#### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	563.725
Luminous Efficacy (lm/W)	63.04
Beam Angle (°)	37.7
Center Beam Candle Power (cd)	1167

# Spectral Power Distribution & Chromaticity Diagram



## TM30

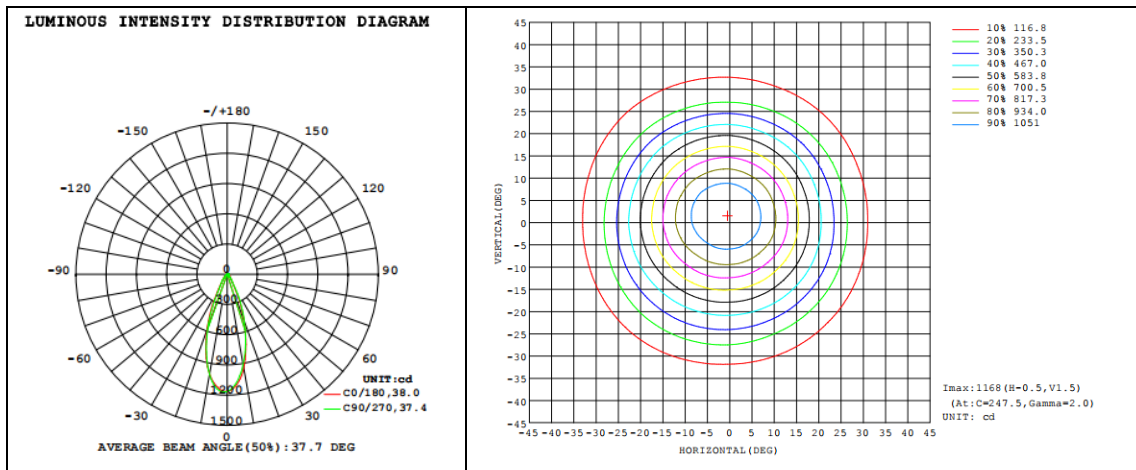


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	455.9	80.9%
0-40	514.17	91.2%
0-60	555.9	98.6%
60-90	7.7942	1.4%
70-100	3.0142	0.5%
90-120	0	0.0%
0-90	563.6942	100.0%
90-180	0	0.0%
0-180	563.6942	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	101.5	18.0%	90-100	0	0%
10-20	207.8	36.9%	100-110	0	0%
20-30	146.6	26.0%	110-120	0	0%
30-40	58.27	10.3%	120-130	0	0%
40-50	28.95	5.1%	130-140	0	0%
50-60	12.78	2.3%	140-150	0	0%
60-70	4.78	0.8%	150-160	0	0%
70-80	2.439	0.4%	160-170	0	0%
80-90	0.5752	0.1%	170-180	0	0%

## Photometric Data





## 2.1.2 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2023-12-18	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	DLR0141 (R2TL)	<b>CCT Setting</b>	3000k

### Electrical Measurement:

<b>Sampel No.</b>	<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>
#1	120	60	0.074	8.78	0.978

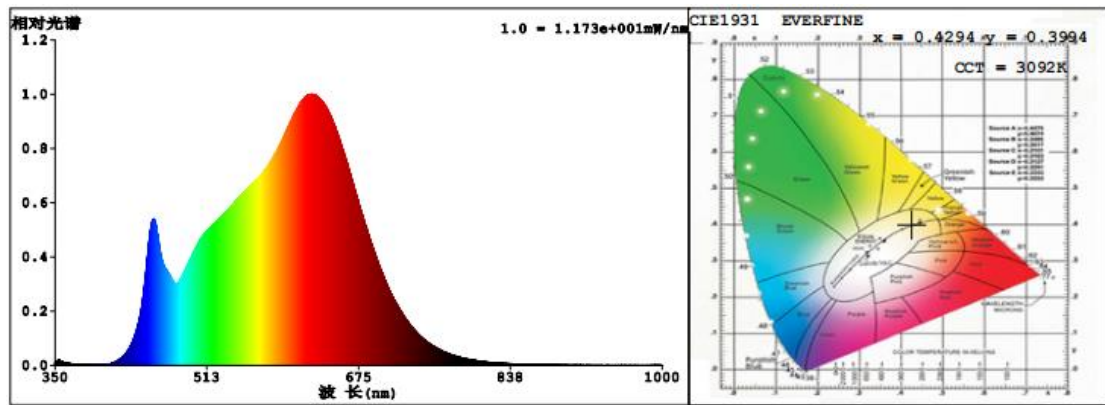
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

<b>Parameter</b>	<b>Result</b>	<b>Special Color Rendering Indices</b>			
Test Voltage (V)	120	R1	99	R9	79
Frequency (Hz)	60	R2	99	R10	100
CCT (K)	3092	R3	99	R11	99
Duv	-0.000706	R4	98	R12	85
Chromaticity (x, y)	x=0.4294, y=0.3994	R5	98	R13	100
Chromaticity (u', v')	u' =0.2477, v' =0.5184	R6	96	R14	100
Color Rendering Index (CRI)	96.6	R7	94	R15	96
R9	79	R8	90	--	--

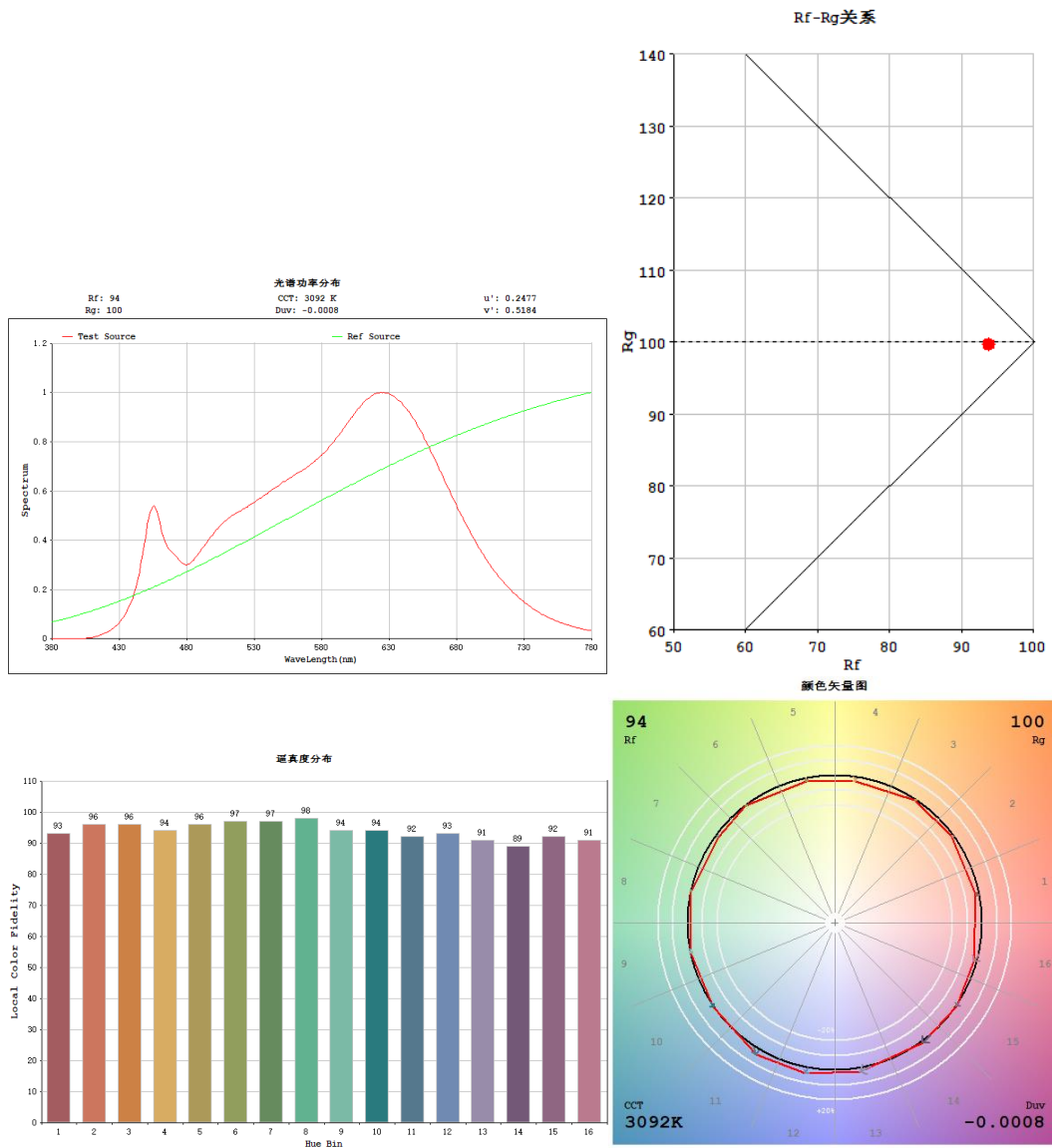
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	607.743
Luminous Efficacy (lm/W)	69.26
Beam Angle (°)	37.8
Center Beam Candle Power (cd)	1255

# Spectral Power Distribution & Chromaticity Diagram



## TM30

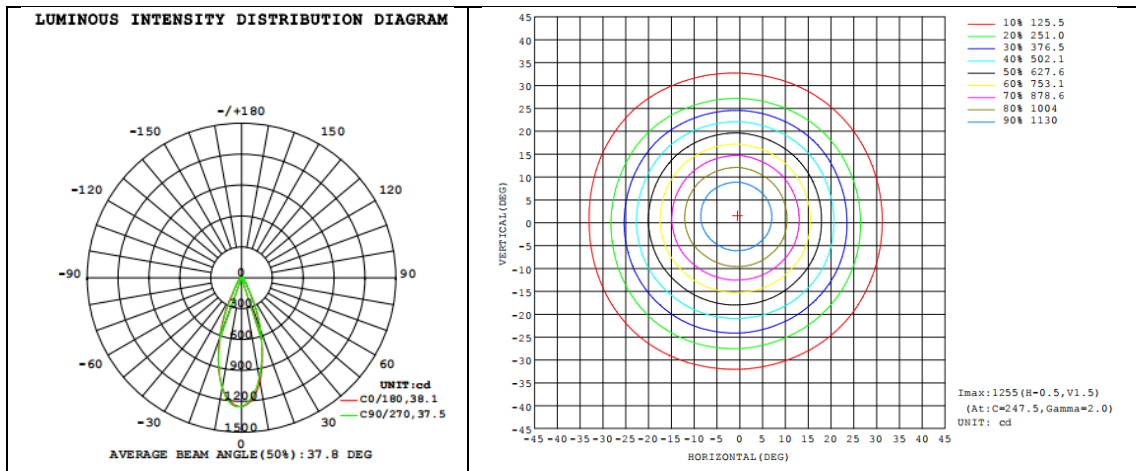


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	491.1	80.8%
0-40	554.1	91.2%
0-60	599.2	98.6%
60-90	8.4648	1.4%
70-100	3.2828	0.5%
90-120	0	0.0%
0-90	607.6648	100.0%
90-180	0	0.0%
0-180	607.6648	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	109.2	18.0%	90-100	0	0%
10-20	223.7	36.8%	100-110	0	0%
20-30	158.2	26.0%	110-120	0	0%
30-40	63	10.4%	120-130	0	0%
40-50	31.28	5.1%	130-140	0	0%
50-60	13.82	2.3%	140-150	0	0%
60-70	5.182	0.9%	150-160	0	0%
70-80	2.651	0.4%	160-170	0	0%
80-90	0.6318	0.1%	170-180	0	0%

## Photometric Data





### 2.1.3 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2023-12-18	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	DLR0141 (R2TL)	<b>CCT Setting</b>	3500k

#### Electrical Measurement:

<b>Sampel No.</b>	<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>
#1	120	60	0.072	8.48	0.976

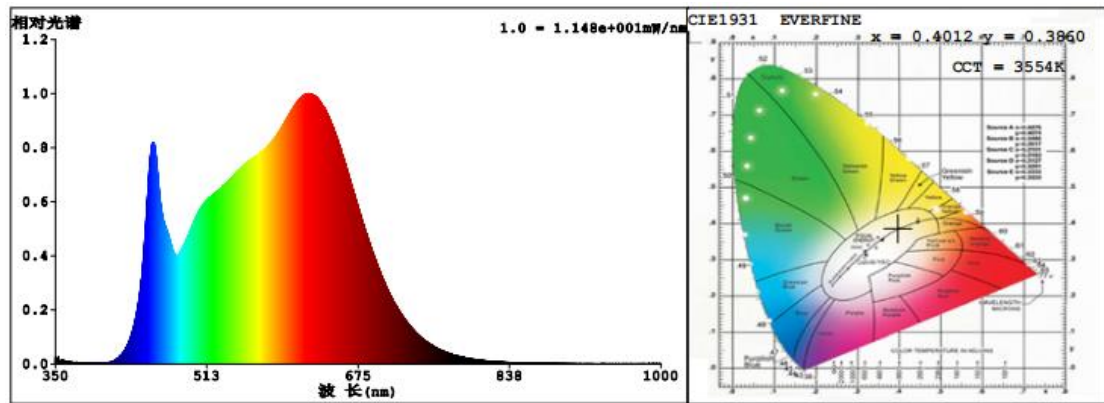
#### Chromaticity Measurement - Sphere-Spectroradiometer Method:

<b>Parameter</b>	<b>Result</b>	<b>Special Color Rendering Indices</b>			
Test Voltage (V)	120	R1	98	R9	82
Frequency (Hz)	60	R2	99	R10	100
CCT (K)	3554	R3	99	R11	99
Duv	-0.00116	R4	97	R12	81
Chromaticity (x, y)	x=0.4012, y=0.3860	R5	97	R13	100
Chromaticity (u', v')	u' =0.2350, v' =0.5087	R6	96	R14	100
Color Rendering Index (CRI)	96.5	R7	94	R15	96
R9	82	R8	91	--	--

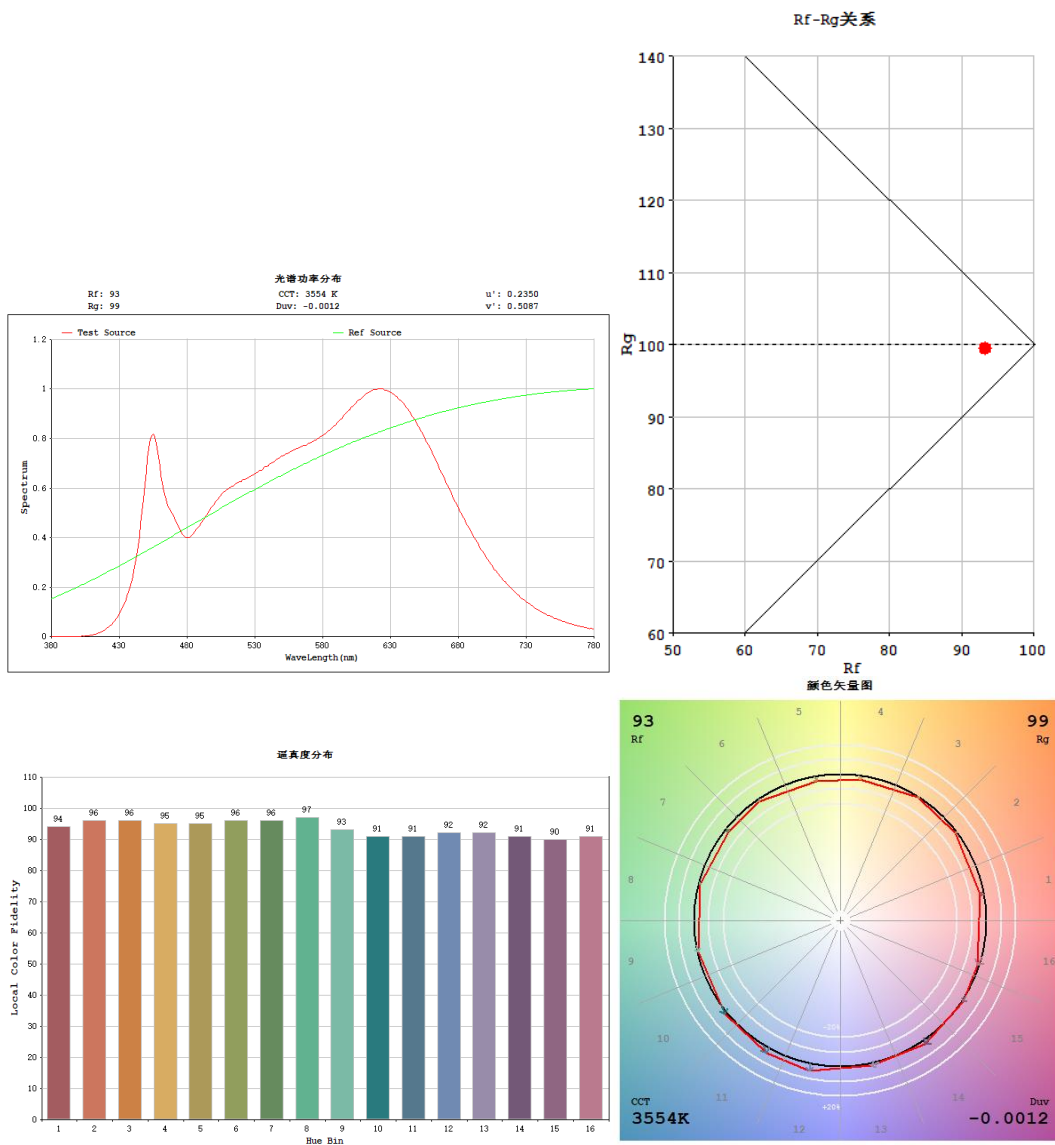
#### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	657.886
Luminous Efficacy (lm/W)	77.58
Beam Angle (°)	37.9
Center Beam Candle Power (cd)	1355

# Spectral Power Distribution & Chromaticity Diagram



## TM30

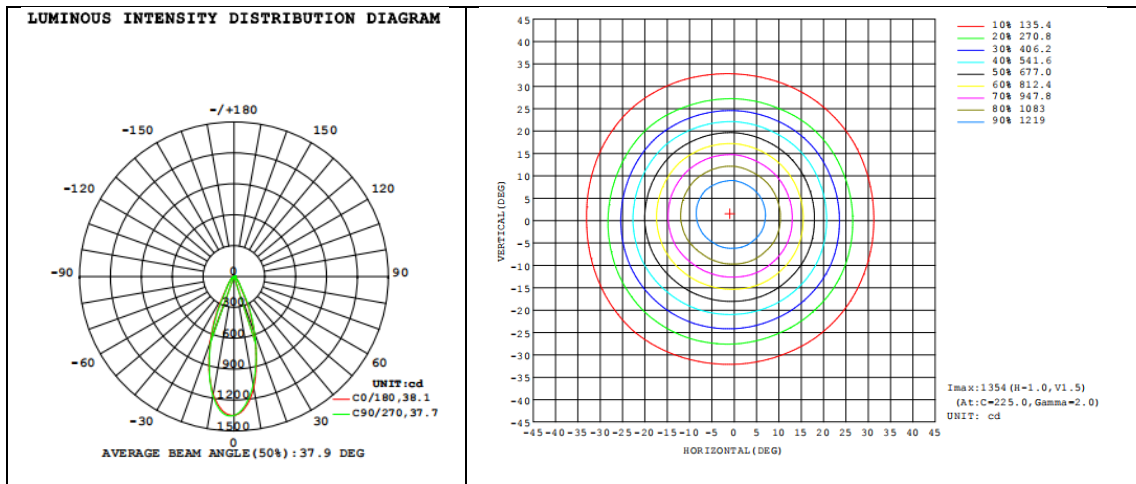


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	531.1	80.7%
0-40	599.56	91.2%
0-60	648.53	98.6%
60-90	9.226	1.4%
70-100	3.589	0.5%
90-120	0	0.0%
0-90	657.756	100.0%
90-180	0	0.0%
0-180	657.756	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	117.9	17.9%	90-100	0	0%
10-20	241.7	36.7%	100-110	0	0%
20-30	171.5	26.1%	110-120	0	0%
30-40	68.46	10.4%	120-130	0	0%
40-50	33.97	5.2%	130-140	0	0%
50-60	15	2.3%	140-150	0	0%
60-70	5.637	0.9%	150-160	0	0%
70-80	2.891	0.4%	160-170	0	0%
80-90	0.698	0.1%	170-180	0	0%

## Photometric Data





## 2.1.4 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2023-12-18	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	DLR0141 (R2TL)	<b>CCT Setting</b>	4000k

### Electrical Measurement:

<b>Sampel No.</b>	<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>
#1	120	60	0.073	8.60	0.977

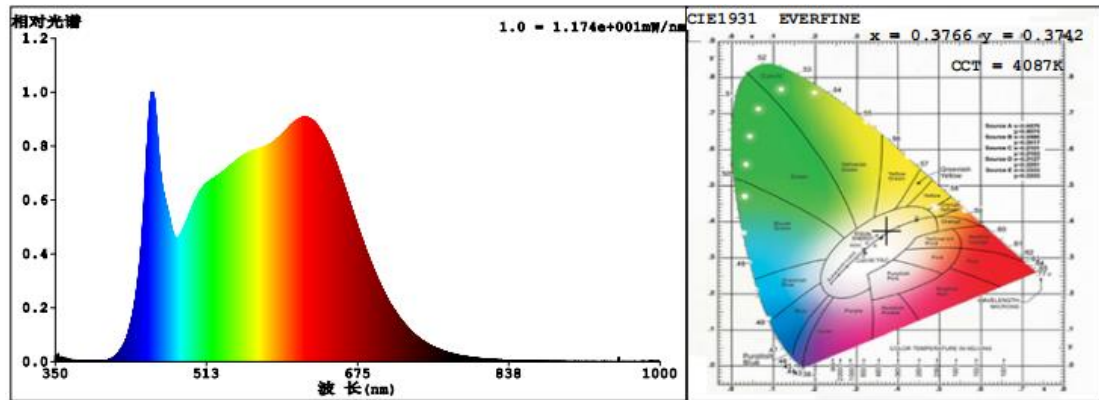
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

<b>Parameter</b>	<b>Result</b>	<b>Special Color Rendering Indices</b>			
Test Voltage (V)	120	R1	97	R9	79
Frequency (Hz)	60	R2	100	R10	98
CCT (K)	4087	R3	99	R11	96
Duv	-0.0000762	R4	95	R12	76
Chromaticity (x, y)	x=0.3766, y=0.3742	R5	96	R13	98
Chromaticity (u', v')	u' =0.2236, v' =0.4999	R6	96	R14	100
Color Rendering Index (CRI)	95.9	R7	94	R15	95
R9	79	R8	90	--	--

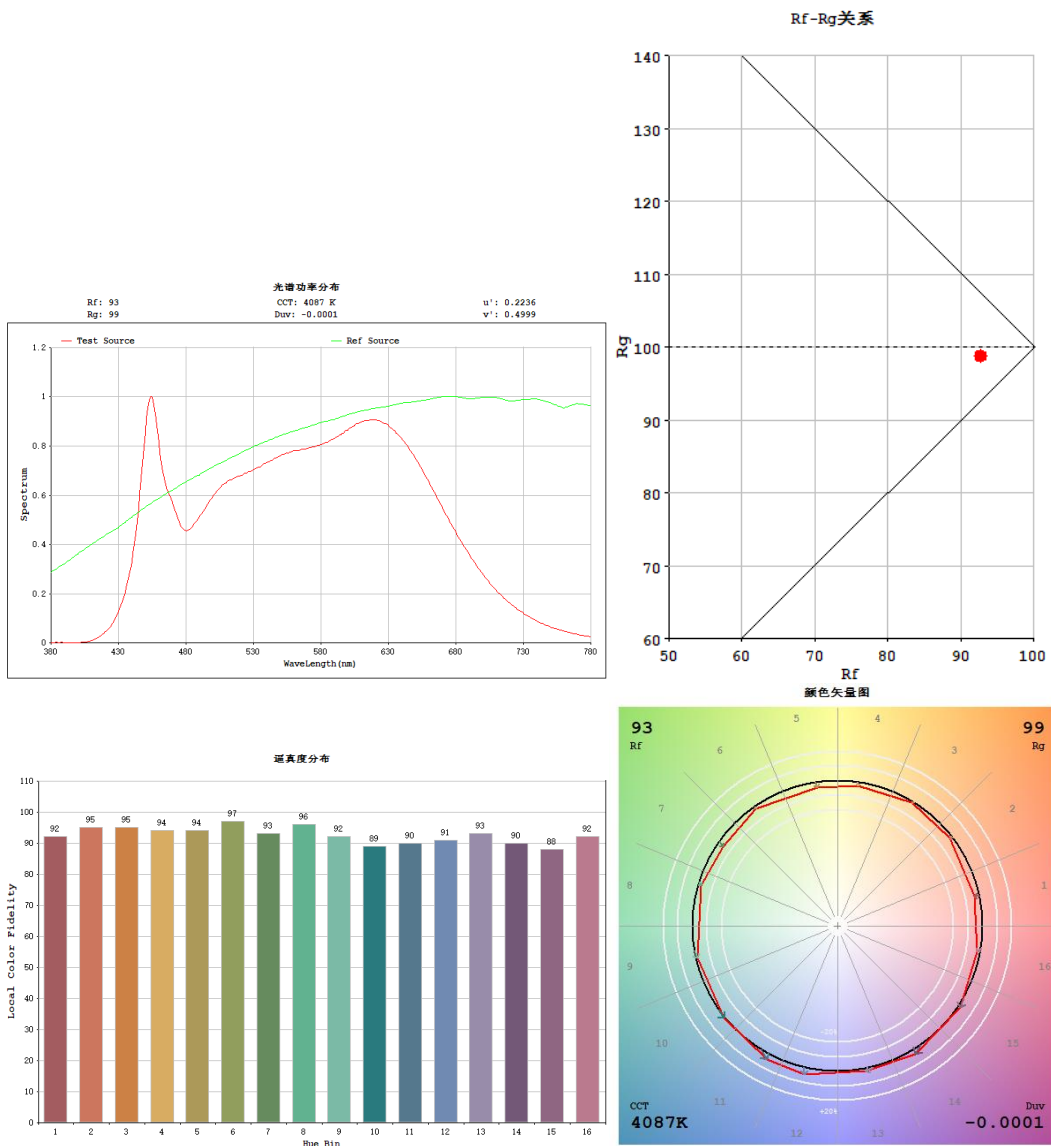
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	678.787
Luminous Efficacy (lm/W)	78.94
Beam Angle (°)	37.9
Center Beam Candle Power (cd)	1395

# Spectral Power Distribution & Chromaticity Diagram



## TM30

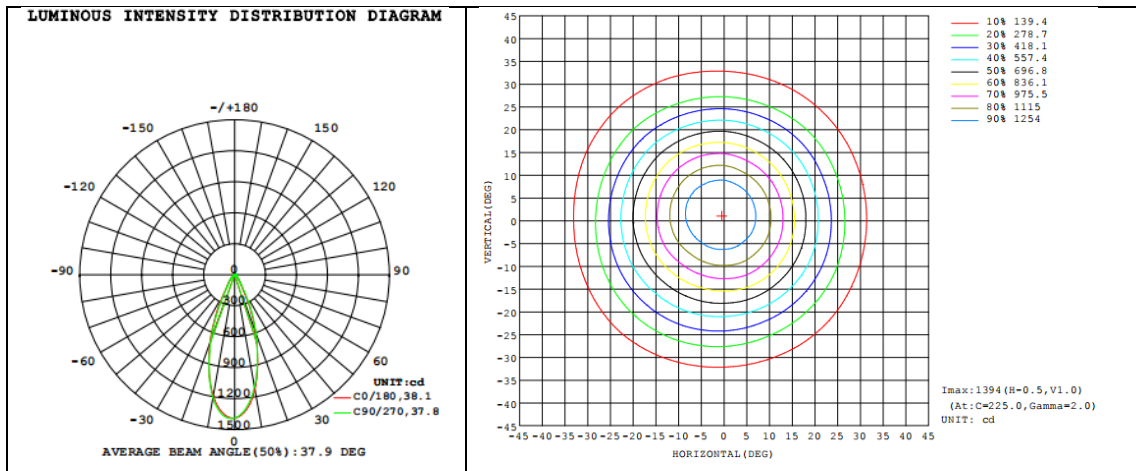


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	547.6	80.7%
0-40	618.5	91.1%
0-60	669.17	98.6%
60-90	9.5557	1.4%
70-100	3.7227	0.5%
90-120	0	0.0%
0-90	678.7257	100.0%
90-180	0	0.0%
0-180	678.7257	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	121.4	17.9%	90-100	0	0%
10-20	249	36.7%	100-110	0	0%
20-30	177.2	26.1%	110-120	0	0%
30-40	70.9	10.4%	120-130	0	0%
40-50	35.15	5.2%	130-140	0	0%
50-60	15.52	2.3%	140-150	0	0%
60-70	5.833	0.9%	150-160	0	0%
70-80	2.996	0.4%	160-170	0	0%
80-90	0.7267	0.1%	170-180	0	0%

## Photometric Data





## 2.1.5 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2023-12-18	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	DLR0141 (R2TL)	<b>CCT Setting</b>	5000k

### Electrical Measurement:

<b>Sampel No.</b>	<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>
#1	120	60	0.076	9.02	0.979

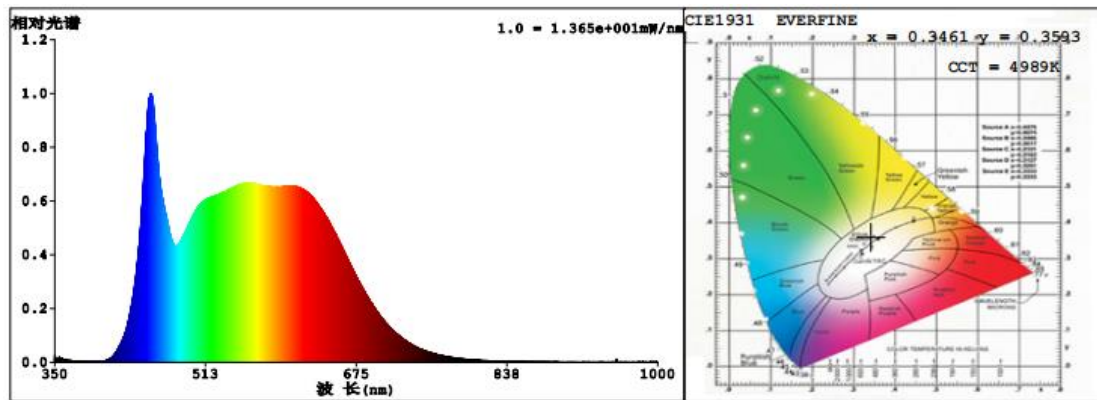
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

<b>Parameter</b>	<b>Result</b>	<b>Special Color Rendering Indices</b>			
Test Voltage (V)	120	R1	93	R9	64
Frequency (Hz)	60	R2	97	R10	91
CCT (K)	4989	R3	98	R11	91
Duv	0.00341	R4	90	R12	70
Chromaticity (x, y)	x=0.3461, y=0.3593	R5	91	R13	94
Chromaticity (u', v')	u' =0.2092, v' =0.4885	R6	94	R14	99
Color Rendering Index (CRI)	92.7	R7	94	R15	89
R9	64	R8	86	--	--

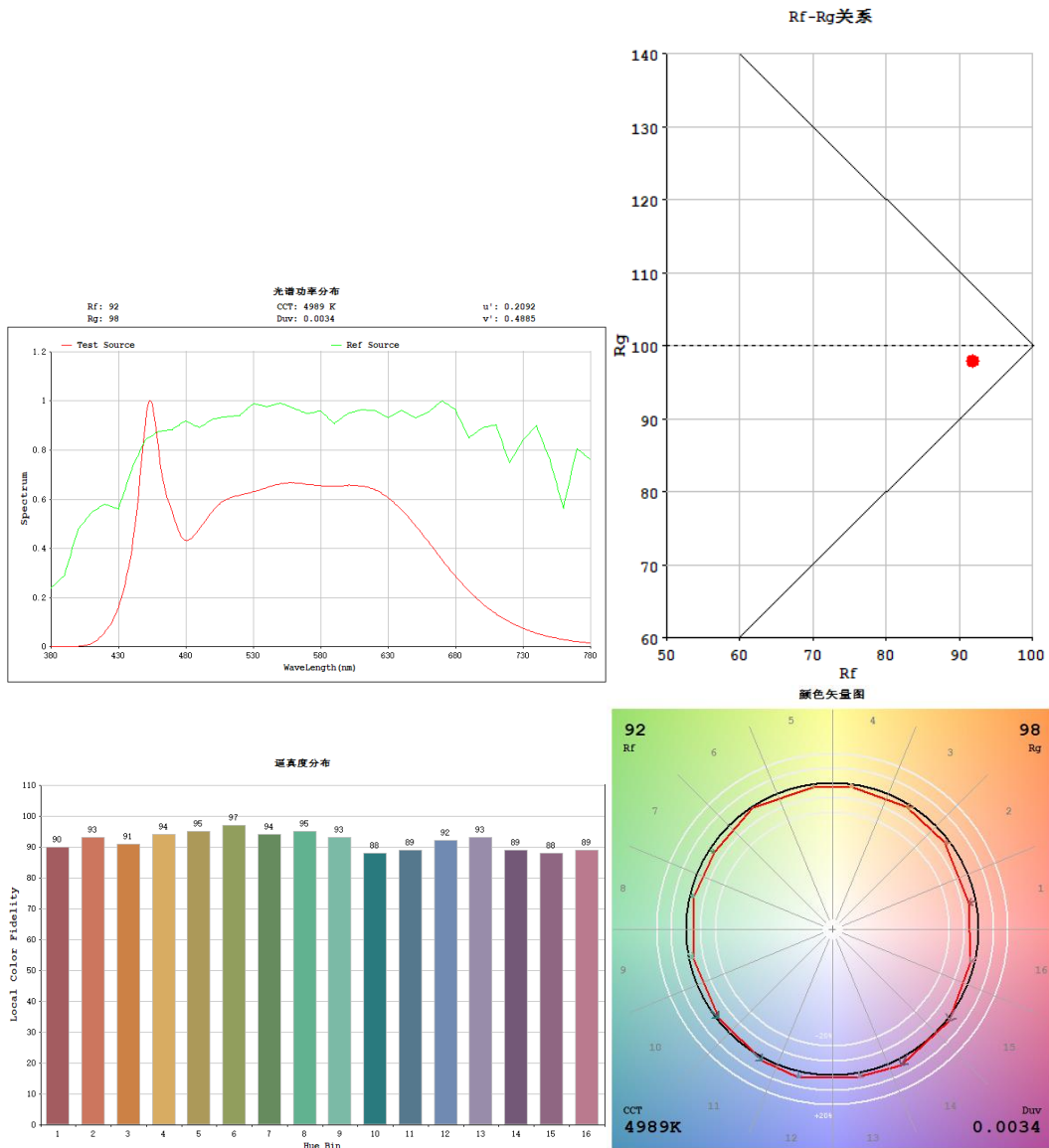
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	657.74
Luminous Efficacy (lm/W)	72.89
Beam Angle (°)	38.0
Center Beam Candle Power (cd)	1347

# Spectral Power Distribution & Chromaticity Diagram



## TM30

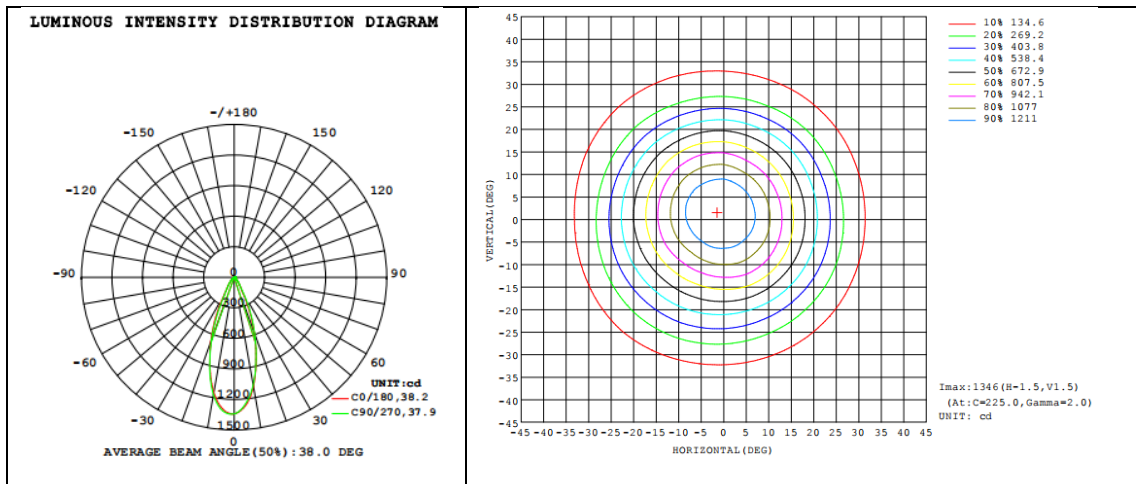


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	530.2	80.5%
0-40	600.18	91.1%
0-60	649.44	98.6%
60-90	9.2777	1.4%
70-100	3.6127	0.5%
90-120	0	0.0%
0-90	658.7177	100.0%
90-180	0	0.0%
0-180	658.7177	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	117.3	17.8%	90-100	0	0%
10-20	240.8	36.6%	100-110	0	0%
20-30	172.1	26.1%	110-120	0	0%
30-40	69.98	10.6%	120-130	0	0%
40-50	34.18	5.2%	130-140	0	0%
50-60	15.08	2.3%	140-150	0	0%
60-70	5.665	0.9%	150-160	0	0%
70-80	2.91	0.4%	160-170	0	0%
80-90	0.7027	0.1%	170-180	0	0%

## Photometric Data



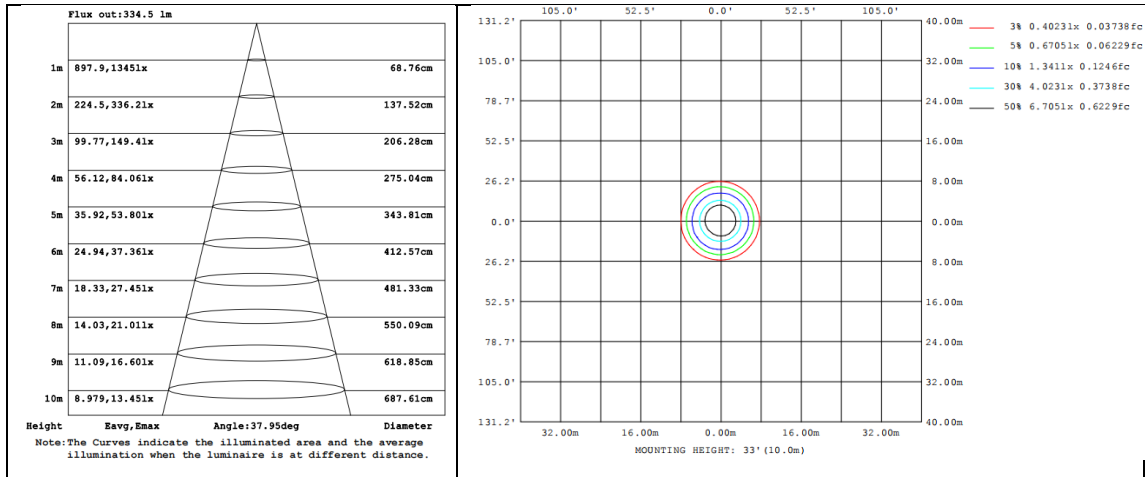


Table--1

y (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	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341	1341
5	1267	1259	1252	1253	1253	1260	1268	1284	1299	1312	1322	1318	1315	1303	1291	1277
10	1091	1087	1083	1084	1076	1079	1088	1122	1151	1174	1186	1179	1173	1142	1121	1100
15	832	835	842	846	834	833	855	896	922	942	958	953	930	886	862	840
20	578	576	573	577	589	603	619	648	675	685	689	671	656	625	607	586
25	343	346	344	352	373	392	402	418	427	421	418	399	383	364	356	341
30	158	158	163	171	182	196	206	203	200	200	198	191	180	171	163	159
35	97.0	96.4	96.0	98.3	100	105	109	111	113	117	119	116	111	105	101	97.6
40	63.7	63.9	64.1	65.5	66.3	69.9	72.8	74.5	74.9	76.0	77.4	74.9	71.8	67.5	65.5	63.6
45	39.5	40.5	41.1	42.3	42.3	44.3	46.3	47.1	46.6	46.5	46.7	44.8	42.7	40.1	39.3	38.5
50	24.7	25.7	26.0	26.6	26.4	27.5	28.8	29.2	28.5	28.2	27.8	26.4	25.2	24.1	23.8	23.8
55	15.6	16.4	16.8	17.3	17.2	17.8	18.5	18.6	18.2	17.7	17.2	16.2	15.5	14.8	14.8	14.9
60	8.54	9.00	9.53	10.3	10.7	10.9	10.9	10.7	10.2	9.64	9.20	8.63	8.25	7.95	7.97	8.13
65	4.80	4.98	5.19	5.52	5.74	5.99	5.97	5.84	5.54	5.28	5.13	4.93	4.78	4.69	4.65	4.70
70	3.75	3.78	3.88	3.93	4.02	4.04	4.08	4.05	4.01	3.98	3.87	3.80	3.69	3.68	3.68	3.69
75	2.59	2.64	2.74	2.83	2.93	2.99	3.02	3.01	2.96	2.91	2.80	2.68	2.57	2.52	2.48	2.51
80	1.44	1.47	1.57	1.64	1.74	1.78	1.82	1.80	1.77	1.73	1.63	1.55	1.45	1.41	1.37	1.40
85	0.45	0.46	0.56	0.59	0.70	0.72	0.78	0.76	0.74	0.72	0.62	0.58	0.47	0.45	0.39	0.43
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Model Number	CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLR0141 (R2TL)	2700K setting	120	563.725	8.94	63.04
	3000K setting	120	607.743	8.78	69.26
	3500K setting	120	657.886	8.48	77.58
	4000K setting	120	678.787	8.60	78.94
	5000K setting	120	657.74	9.02	72.89