

# 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) :**

**GR2STLB**

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

**Type of Luminaire:** Downlights

**Report Date:** 2024-08-28

<b>1.1 Rated Values:</b>	
Rated Voltage / Frequency	120V, 60HZ
Nominal Power	6W
Rated Initial Lamp Lumen	450lm (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>	2024-08-28	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR2STLB	<b>CCT Setting</b>	2700k

#### Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.051	5.86	0.957

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

Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	2764
Duv	0.000228
Chromaticity (x, y)	x=0.4551, y=0.4101
Chromaticity (u', v')	u' =0.2596, v' =0.5264
Color Rendering Index (CRI)	94.2
R9	68

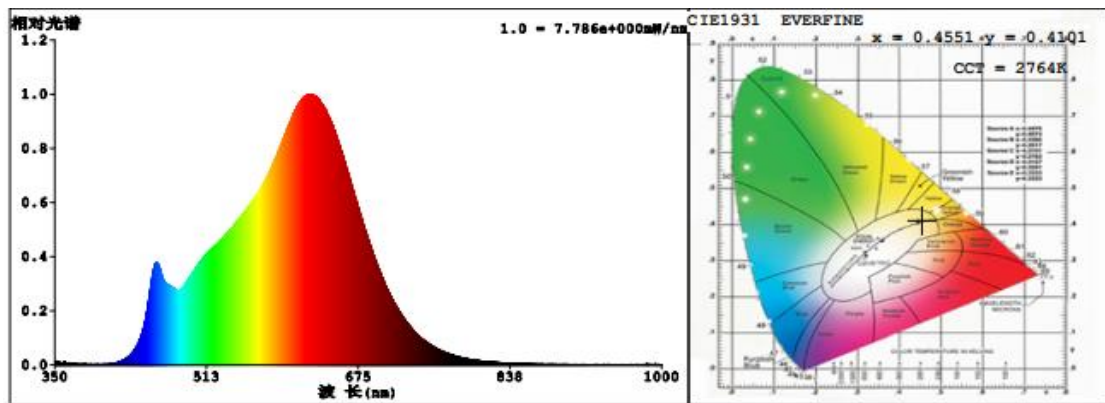
  

Special Color Rendering Indices			
R1	97	R9	68
R2	99	R10	99
R3	96	R11	97
R4	95	R12	86
R5	97	R13	99
R6	95	R14	99
R7	91	R15	92
R8	84	--	--

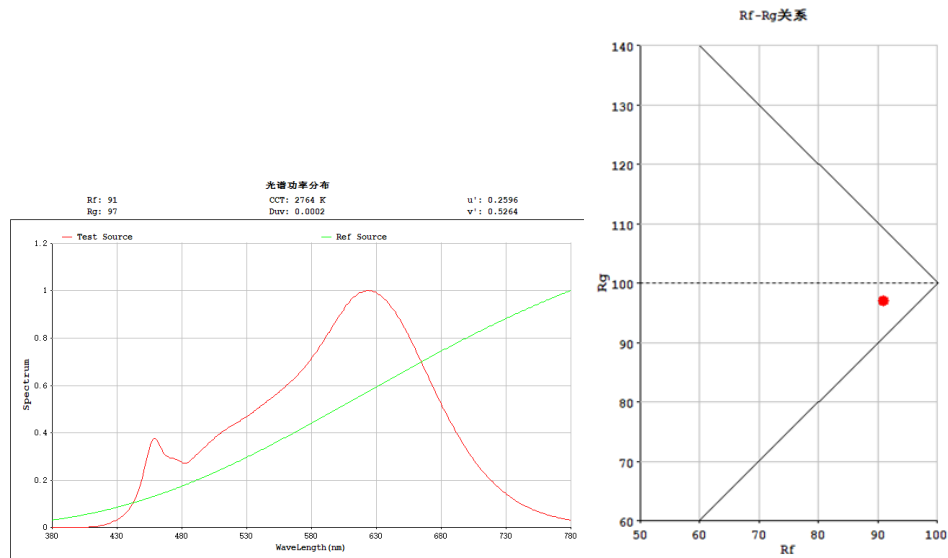
#### Photometric Measurement – Goniophotometer Method:

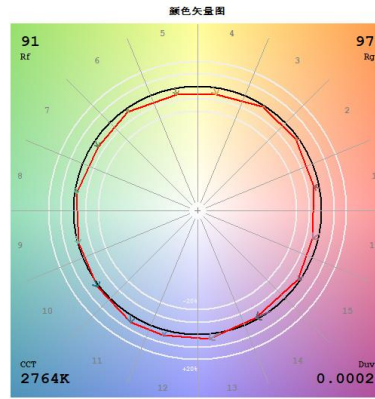
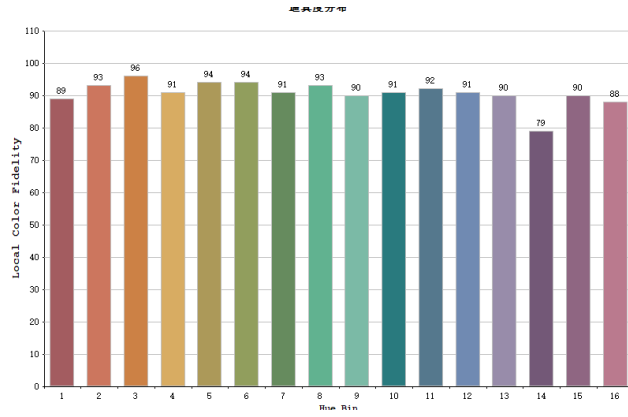
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	350.121
Luminous Efficacy (lm/W)	59.70
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	781.9

## Spectral Power Distribution & Chromaticity Diagram



## TM30



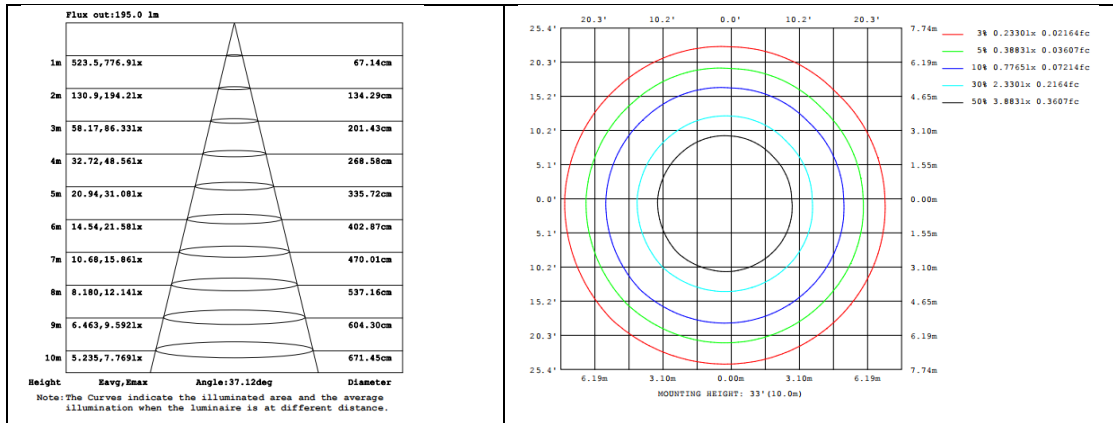
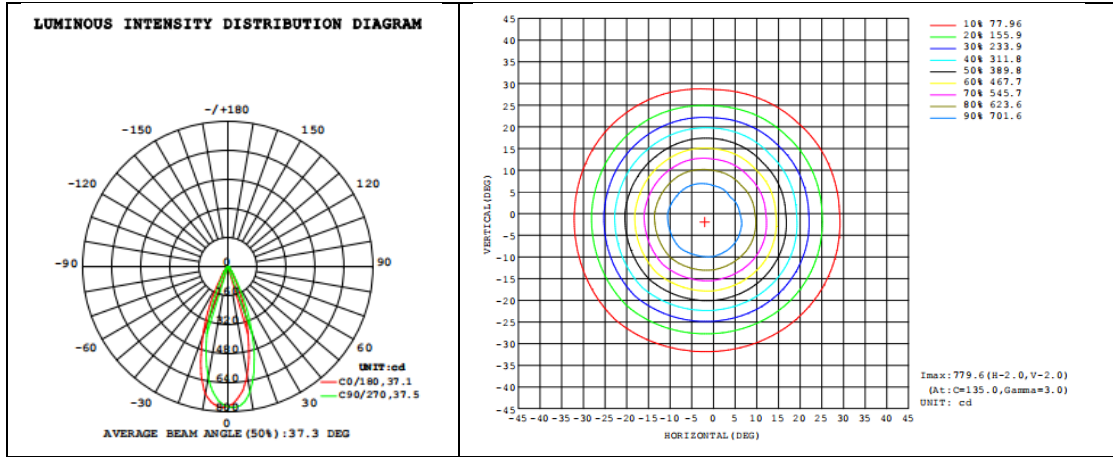


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	298.4	85.23%
0-40	330.1	94.29%
0-60	349.7	99.89%
60-90	0.4	0.11%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	350.1	100.00%
90-180	0.0	0.00%
0-180	350.1	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	68.51	19.57%	90-100	0	0%
10-20	139.8	39.93%	100-110	0	0%
20-30	90.14	25.75%	110-120	0	0%
30-40	31.66	9.04%	120-130	0.0446	0%
40-50	14.59	4.17%	130-140	0.0054	0%
50-60	5.033	1.44%	140-150	0	0%
60-70	0.3831	0.11%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

## Photometric Data





## 2.1.2 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-08-28	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR2STLB	<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	120.7	60	0.050	5.77	0.955

### Chromaticity Measurement – Sphere-Spectroradiometer Method:

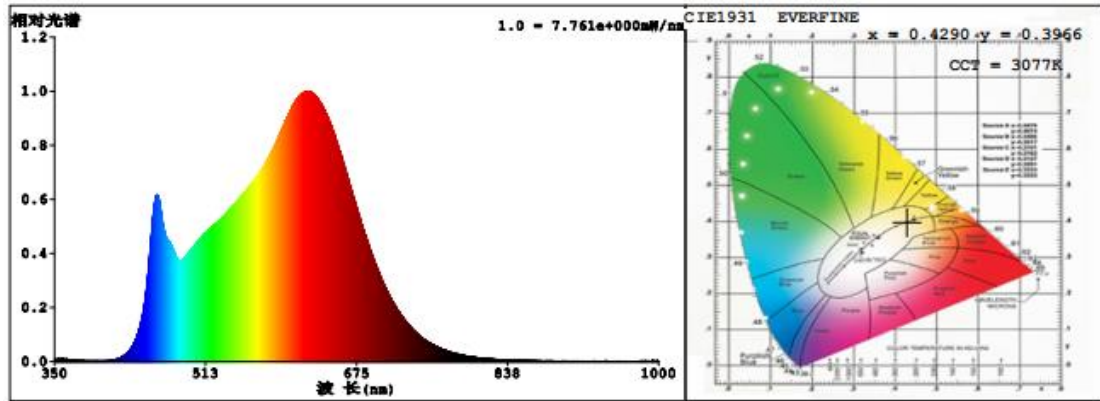
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3077
Duv	-0.00187
Chromaticity (x, y)	x=0.4290, y=0.3966
Chromaticity (u', v')	u' =0.2486, v' =0.5172
Color Rendering Index (CRI)	93.4
R9	77

<b>Special Color Rendering Indices</b>			
R1	98	R9	77
R2	96	R10	93
R3	94	R11	97
R4	94	R12	81
R5	96	R13	98
R6	92	R14	97
R7	90	R15	95
R8	87	--	--

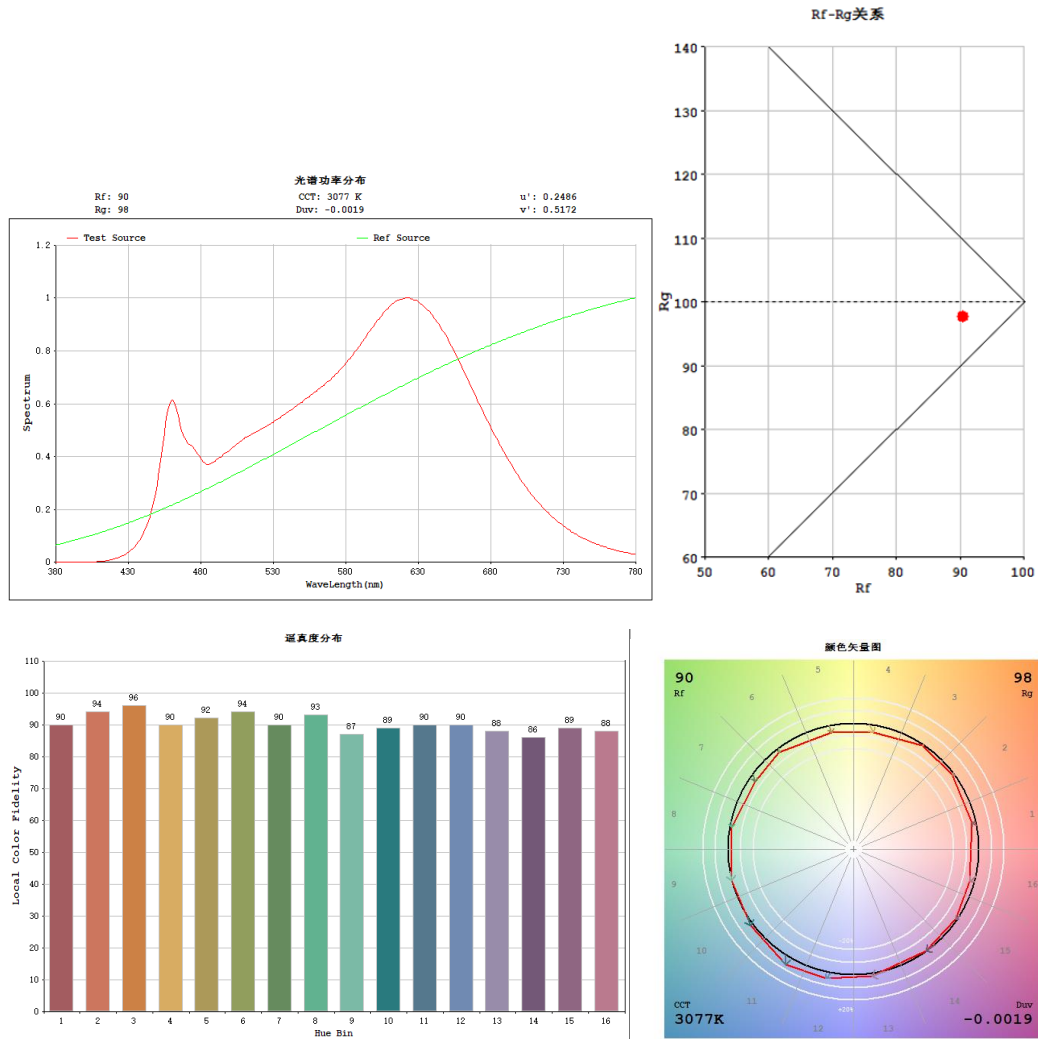
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	377.42
Luminous Efficacy (lm/W)	65.44
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	842.9

## Spectral Power Distribution & Chromaticity Diagram



## TM30



## Zonal Lumen Tabulation

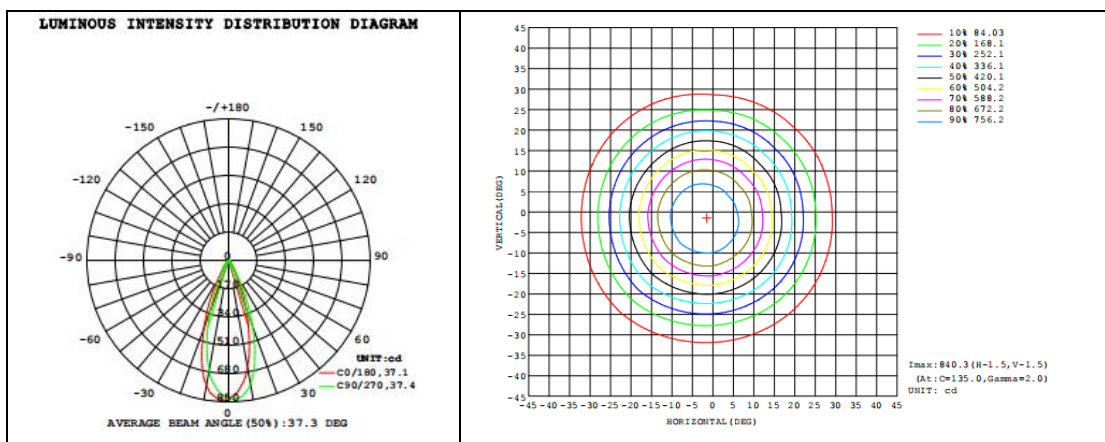
### Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	321.6	85.21%
0-40	355.8	94.28%
0-60	376.9	99.87%
60-90	0.5	0.13%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	377.4	100.00%
90-180	0.0	0.00%
0-180	377.4	100.00%

### Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	73.73	19.54%	90-100	0	0%
10-20	150.5	39.88%	100-110	0	0%
20-30	97.38	25.80%	110-120	0	0%
30-40	34.19	9.06%	120-130	0.0530	0%
40-50	15.75	4.17%	130-140	0.0061	0%
50-60	5.442	1.44%	140-150	0	0%
60-70	0.4184	0.11%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

### Photometric Data





### 2.1.3 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-08-28	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR2STLB	<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	120.7	60	0.049	5.64	0.954

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

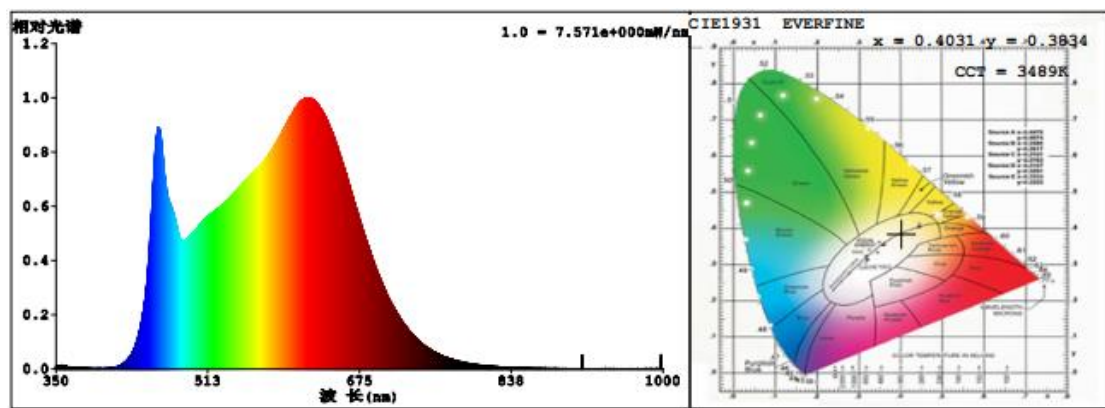
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3489
Duv	-0.00274
Chromaticity (x, y)	x=0.4031, y=0.3834
Chromaticity (u', v')	u' =0.2373, v' =0.5079
Color Rendering Index (CRI)	92.8
R9	82

<b>Special Color Rendering Indices</b>			
R1	98	R9	82
R2	95	R10	91
R3	93	R11	96
R4	93	R12	77
R5	95	R13	97
R6	91	R14	97
R7	89	R15	96
R8	88	--	--

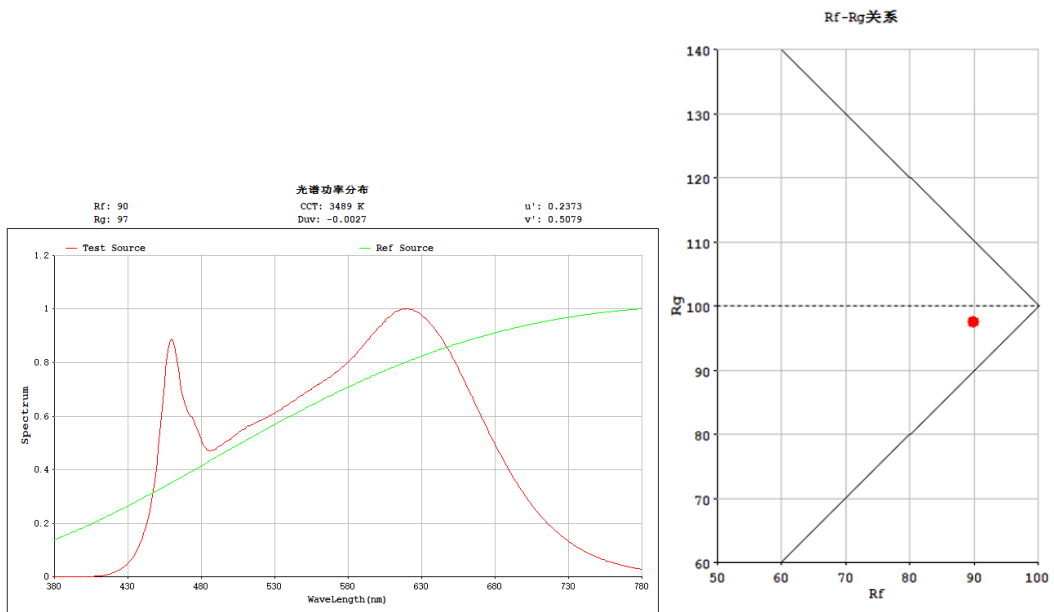
#### Photometric Measurement – Goniophotometer Method:

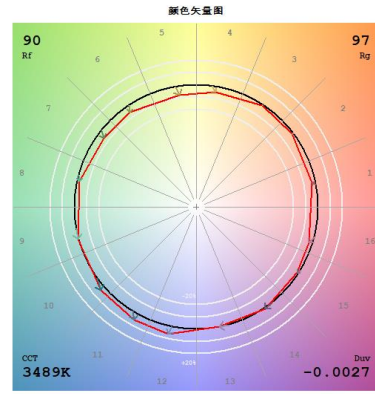
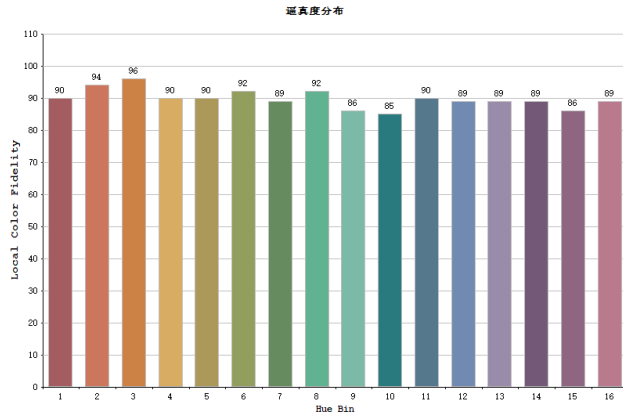
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	401.71
Luminous Efficacy (lm/W)	71.19
Beam Angle (°)	37.2
Center Beam Candle Power (cd)	894.9

## Spectral Power Distribution & Chromaticity Diagram



## TM30





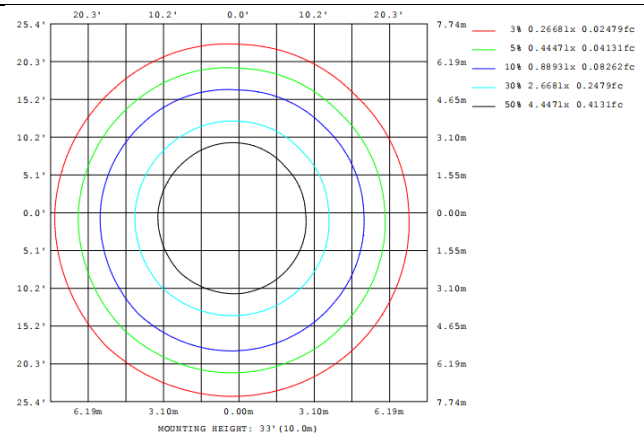
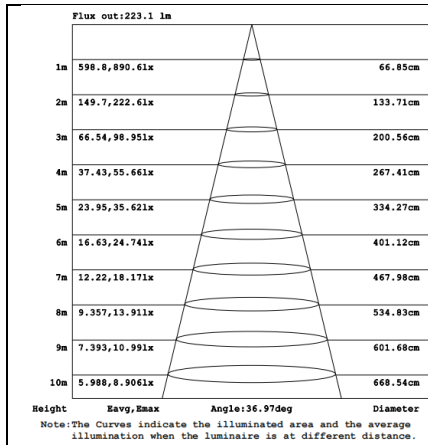
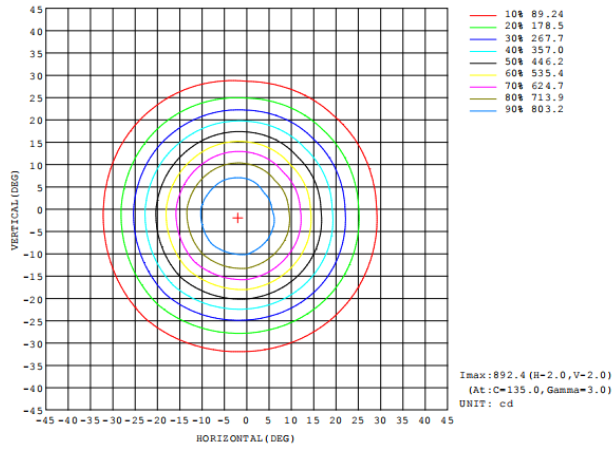
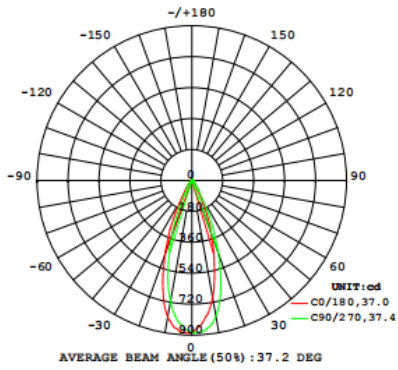
## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	342.1	85.16%
0-40	378.6	94.25%
0-60	401.2	99.88%
60-90	0.4	0.10%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	401.6	99.98%
90-180	0.1	0.02%
0-180	401.7	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	78.33	19.50%	90-100	0	0%
10-20	159.9	39.81%	100-110	0	0%
20-30	103.80	25.84%	110-120	0	0%
30-40	36.52	9.09%	120-130	0.0612	0%
40-50	16.80	4.18%	130-140	0.0068	0%
50-60	5.803	1.44%	140-150	0	0%
60-70	0.4498	0.11%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

## Photometric Data

**LUMINOUS INTENSITY DISTRIBUTION DIAGRAM**





## 2.1.4 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-08-28	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR2STLB	<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	120.7	60	0.049	5.65	0.954

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

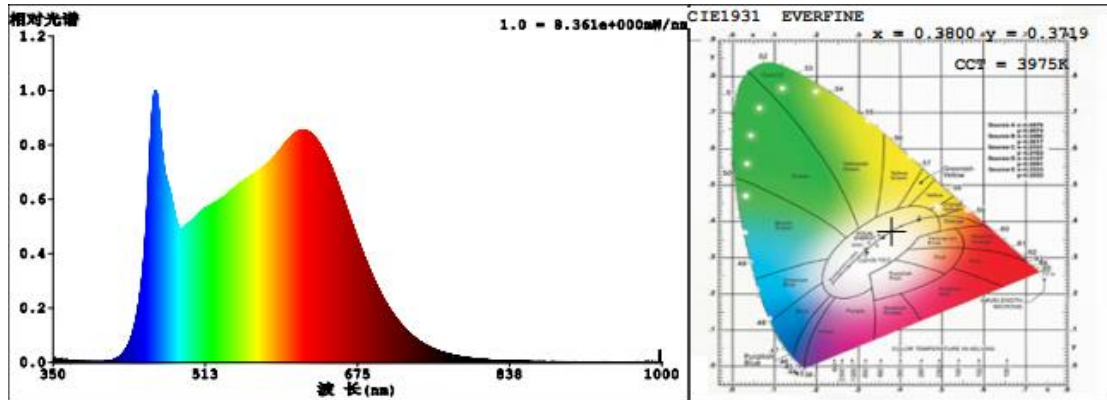
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3975
Duv	-0.00219
Chromaticity (x, y)	x=0.3800, y=0.3719
Chromaticity (u', v')	u' =0.2268, v' =0.4993
Color Rendering Index (CRI)	92.5
R9	84

<b>Special Color Rendering Indices</b>			
R1	97	R9	84
R2	95	R10	91
R3	93	R11	94
R4	91	R12	74
R5	94	R13	97
R6	92	R14	97
R7	89	R15	95
R8	88	--	--

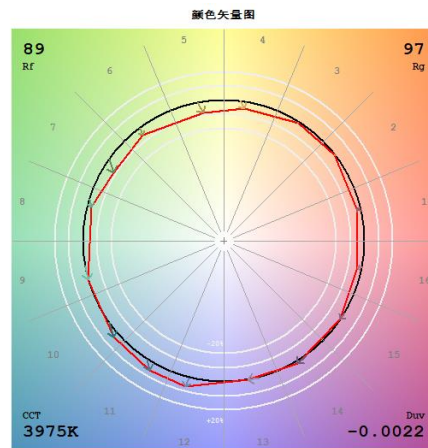
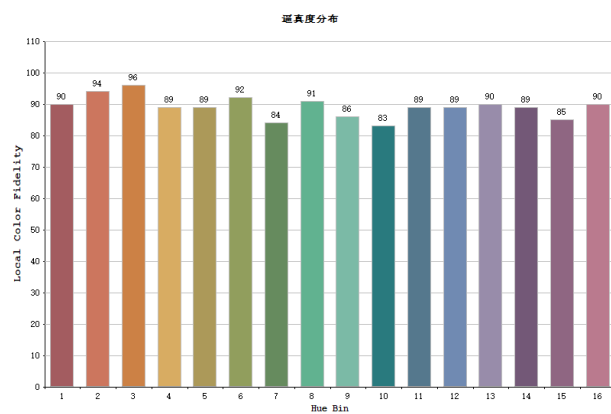
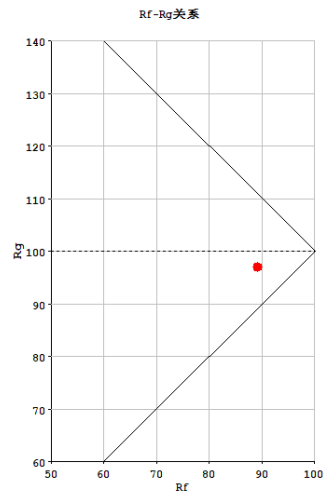
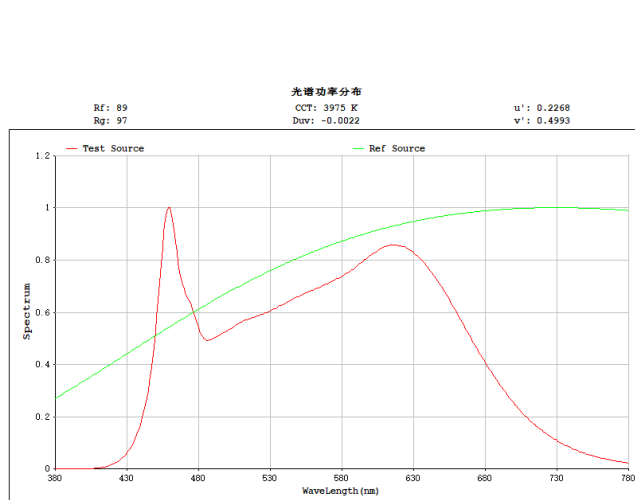
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	413.431
Luminous Efficacy (lm/W)	73.14
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	923.1

## Spectral Power Distribution & Chromaticity Diagram



## TM30



## Zonal Lumen Tabulation

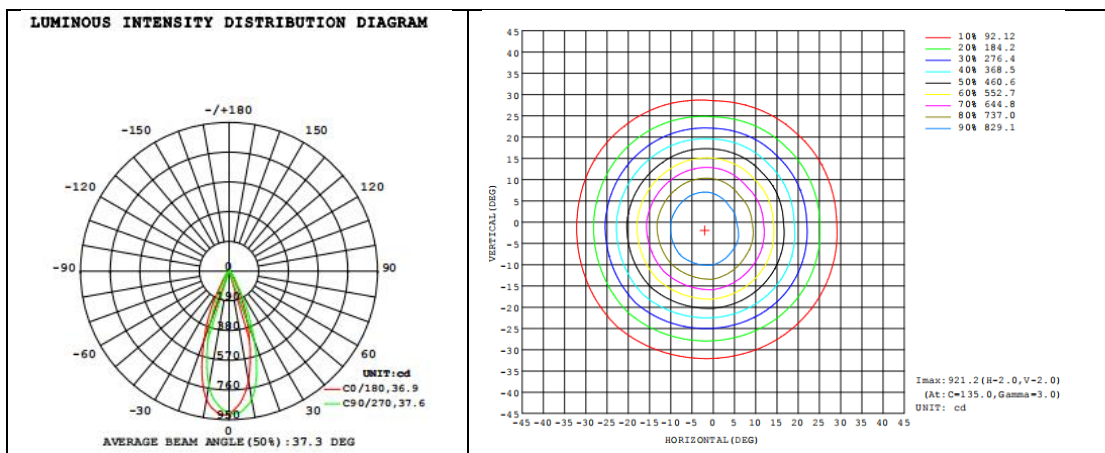
### Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	351.9	85.12%
0-40	389.6	94.24%
0-60	412.9	99.88%
60-90	0.5	0.12%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	413.4	100.00%
90-180	0.0	0.00%
0-180	413.4	100.00%

### Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	80.44	19.46%	90-100	0	0%
10-20	164.3	39.74%	100-110	0	0%
20-30	107.10	25.91%	110-120	0	0%
30-40	37.70	9.12%	120-130	0.0659	0%
40-50	17.34	4.19%	130-140	0.0073	0%
50-60	5.985	1.45%	140-150	0	0%
60-70	0.4660	0.11%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

### Photometric Data



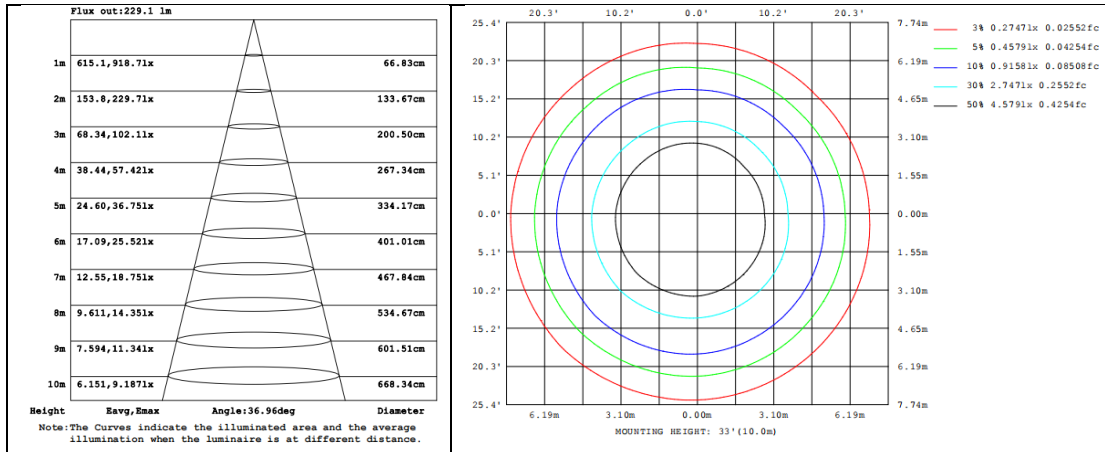


Table--1 UNIT: cd

γ (DEG)	C (DEG)							
	0	45	90	135	180	225	270	315
0	909	909	909	909	909	909	909	909
5	843	868	901	915	906	878	855	836
10	712	769	828	855	832	781	742	695
15	520	592	682	700	674	601	552	506
20	339	405	473	505	475	401	349	326
25	187	232	275	317	292	228	174	165
30	81.1	100	131	152	132	96.8	75.4	72.4
35	49.5	57.4	66.3	71.9	67.0	55.3	47.1	44.9
40	31.6	37.3	39.7	44.7	40.4	35.5	30.6	30.3
45	16.9	25.2	19.7	29.5	20.1	24.3	16.6	21.1
50	8.79	16.4	9.62	18.6	9.93	16.2	8.61	14.5
55	3.70	8.44	4.11	9.30	4.41	8.57	3.90	7.78
60	0.53	3.26	0.88	3.85	1.05	3.51	0.67	2.90
65	0.00	0.36	0.00	0.67	0.00	0.48	0.00	0.22
70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01
125	0.00	0.00	0.00	0.00	0.10	0.10	0.17	0.18
130	0.00	0.00	0.00	0.00	0.25	0.32	0.39	0.44
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## 2.1.5 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-08-28	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR2STLB	<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	120.7	60	0.051	5.88	0.957

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

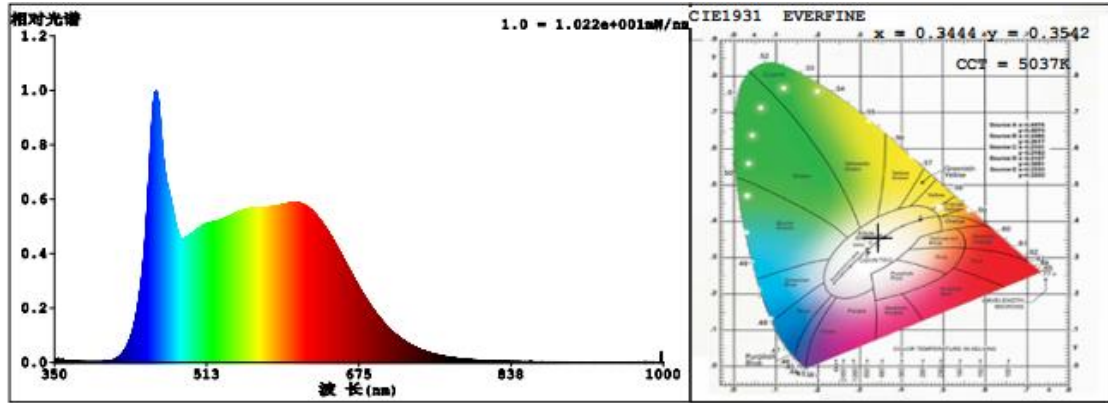
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	5037
Duv	0.00158
Chromaticity (x, y)	x=0.3444, y=0.3542
Chromaticity (u', v')	u' =0.2099, v' =0.4858
Color Rendering Index (CRI)	92.2
R9	72

<b>Special Color Rendering Indices</b>			
R1	96	R9	72
R2	98	R10	96
R3	94	R11	91
R4	89	R12	75
R5	93	R13	99
R6	94	R14	97
R7	89	R15	93
R8	85	--	--

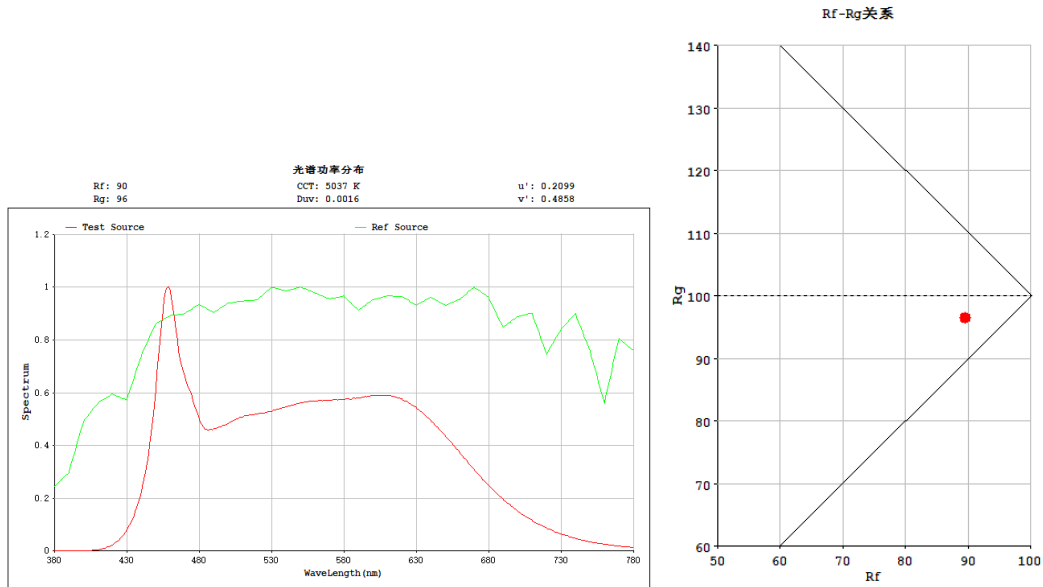
**Photometric Measurement – Goniophotometer Method:**

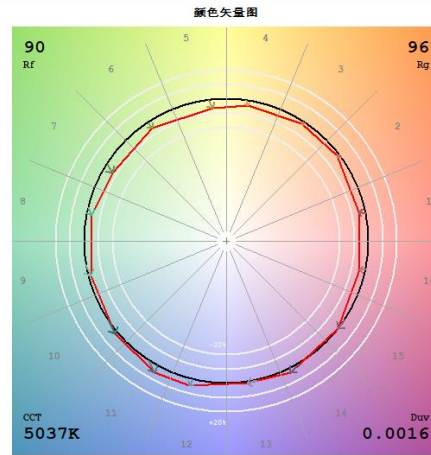
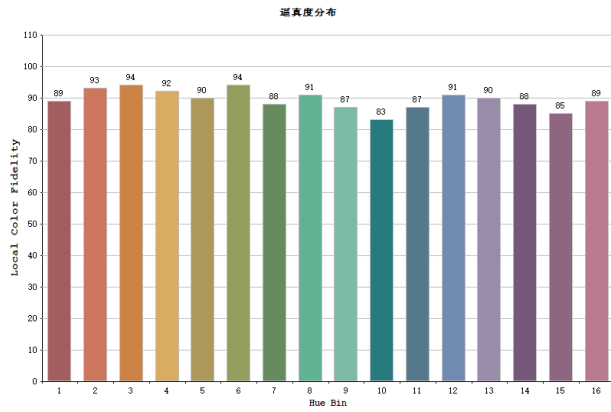
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	402.452
Luminous Efficacy (lm/W)	68.42
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	895.6

## Spectral Power Distribution & Chromaticity Diagram



## TM30





## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	342.2	85.02%
0-40	379.2	94.21%
0-60	401.9	99.85%
60-90	0.5	0.12%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	402.4	99.98%
90-180	0.1	0.02%
0-180	402.5	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	77.88	19.35%	90-100	0	0%
10-20	159.5	39.63%	100-110	0	0%
20-30	104.80	26.04%	110-120	0	0%
30-40	36.99	9.19%	120-130	0.0452	0%
40-50	16.92	4.20%	130-140	0.0053	0%
50-60	5.826	1.45%	140-150	0	0%
60-70	0.4590	0.11%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

# Photometric Data

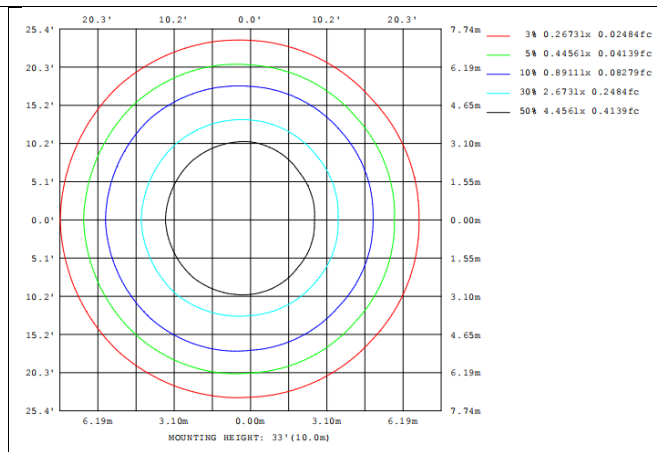
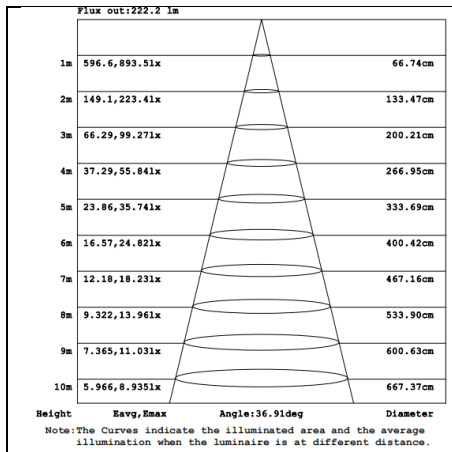
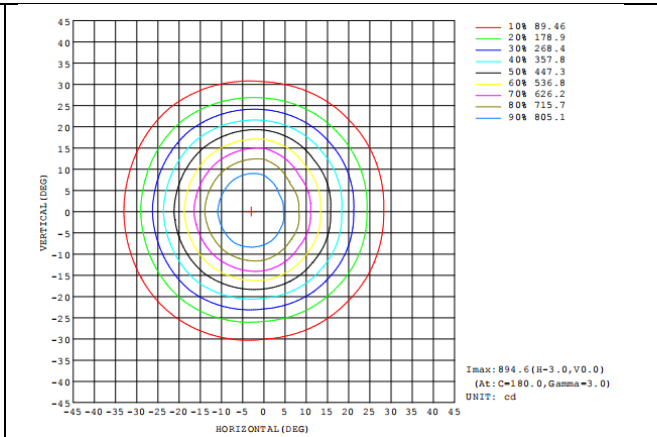
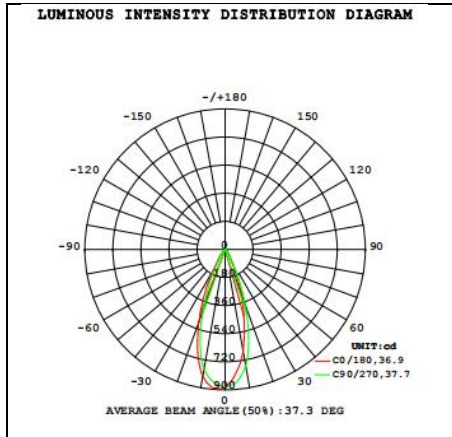


Table--1

UNIT: cd

γ (DEG)	C (DEG)																			
	0	45	90	135	180	225	270	315												
0	881	881	881	881	881	881	881	881												
5	797	817	851	878	890	881	854	811												
10	661	687	758	810	824	814	781	682												
15	475	504	585	643	685	664	623	513												
20	306	325	372	452	494	470	416	343												
25	161	167	203	278	313	290	234	186												
30	71.3	74.9	90.0	126	152	139	97.8	78.3												
35	45.0	46.9	53.4	64.4	70.6	66.5	55.4	47.3												
40	29.0	31.1	32.7	40.5	42.1	41.4	35.2	31.6												
45	15.9	21.4	16.3	26.9	20.5	27.6	19.3	21.8												
50	8.36	14.4	8.20	16.9	10.0	17.8	9.76	15.0												
55	3.60	7.31	3.26	8.23	4.28	9.46	4.69	8.39												
60	0.48	2.62	0.46	3.26	1.04	3.96	1.13	3.31												
65	0.00	0.13	0.00	0.43	0.00	0.72	0.00	0.40												
70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
125	0.00	0.00	0.00	0.00	0.07	0.03	0.10	0.13												
130	0.00	0.00	0.00	0.00	0.18	0.20	0.27	0.36												
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
180	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
DLG0018(GF4)	2700K setting	120.7	350.121	5.86	59.70
	3000K setting	120.7	377.42	5.77	65.44
	3500K setting	120.7	401.71	5.64	71.19
	4000K setting	120.7	413.431	5.65	73.14
	5000K setting	120.7	402.452	5.88	68.42