

# 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) :**

**GR3STLB**

**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	9W
Rated Initial Lamp Lumen	750lm (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>	GR3STLB	<b>CCT Setting</b>	2700k

#### Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.073	8.57	0.977

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

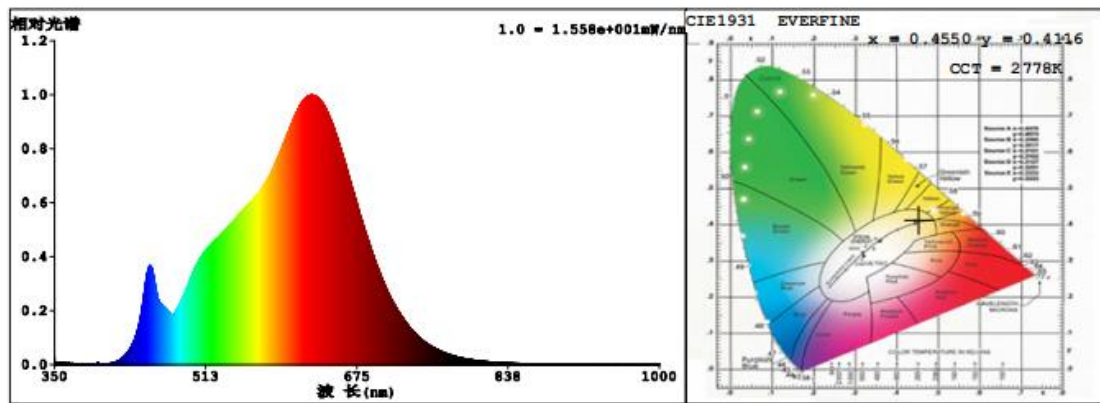
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	2778
Duv	0.000809
Chromaticity (x, y)	x=0.4550, y=0.4116
Chromaticity (u', v')	u' =0.2589, v' =0.5270
Color Rendering Index (CRI)	96.4
R9	73

Special Color Rendering Indices			
R1	97	R9	73
R2	99	R10	96
R3	99	R11	98
R4	98	R12	89
R5	98	R13	98
R6	98	R14	98
R7	94	R15	93
R8	88	--	--

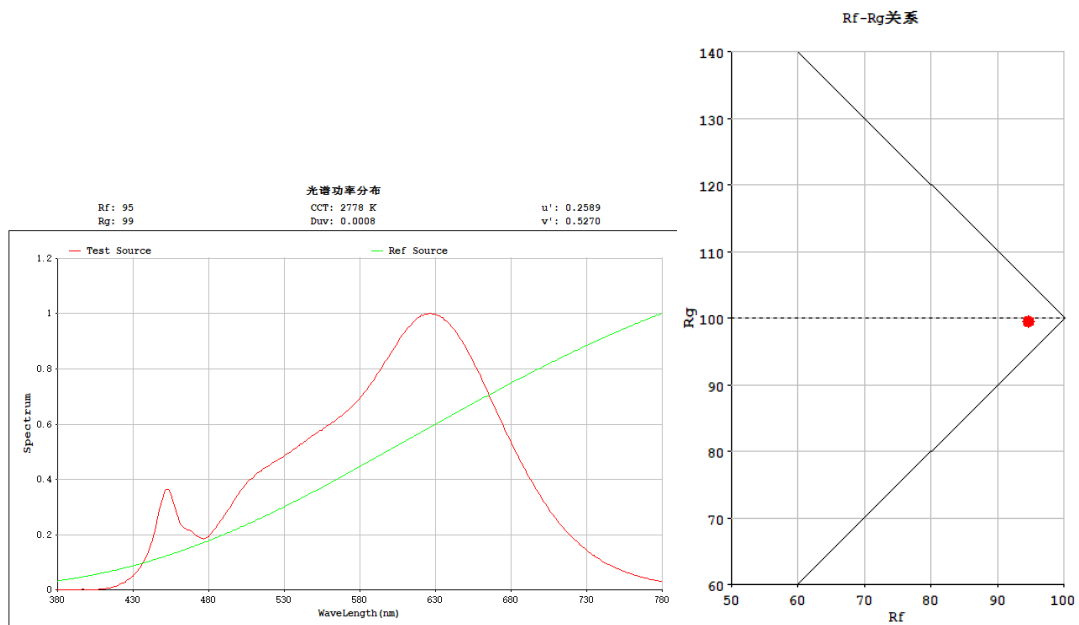
#### Photometric Measurement – Goniophotometer Method:

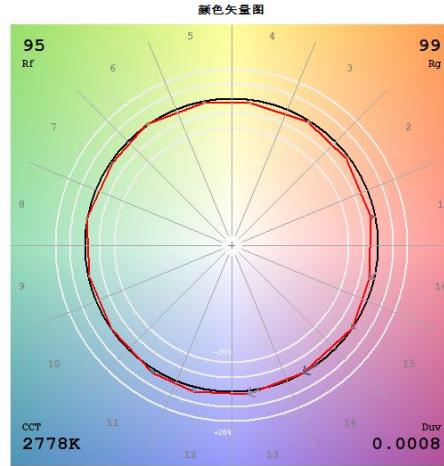
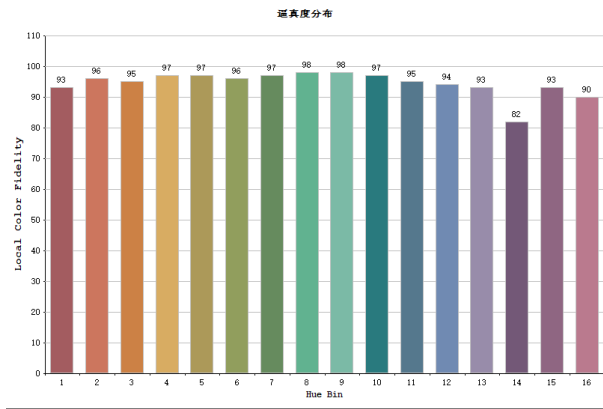
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	661.476
Luminous Efficacy (lm/W)	77.21
Beam Angle (°)	39.2
Center Beam Candle Power (cd)	1537

## Spectral Power Distribution & Chromaticity Diagram



## TM30



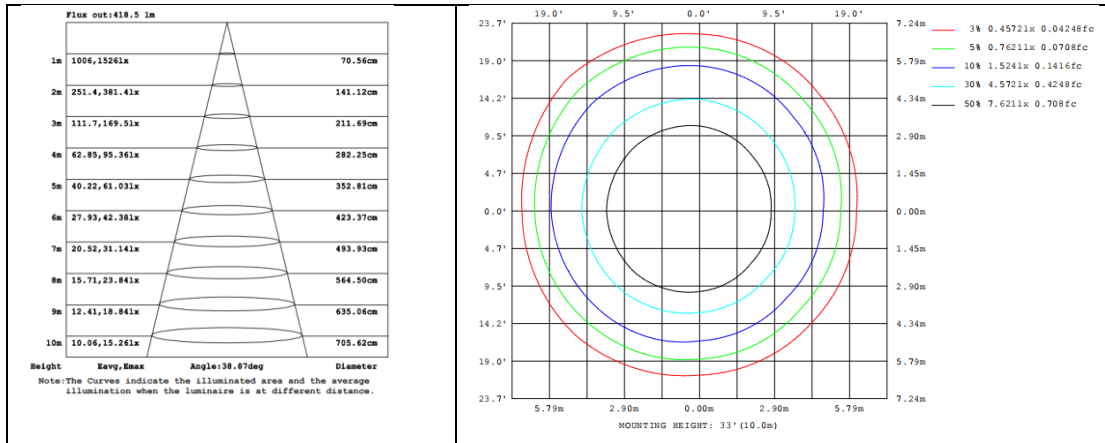
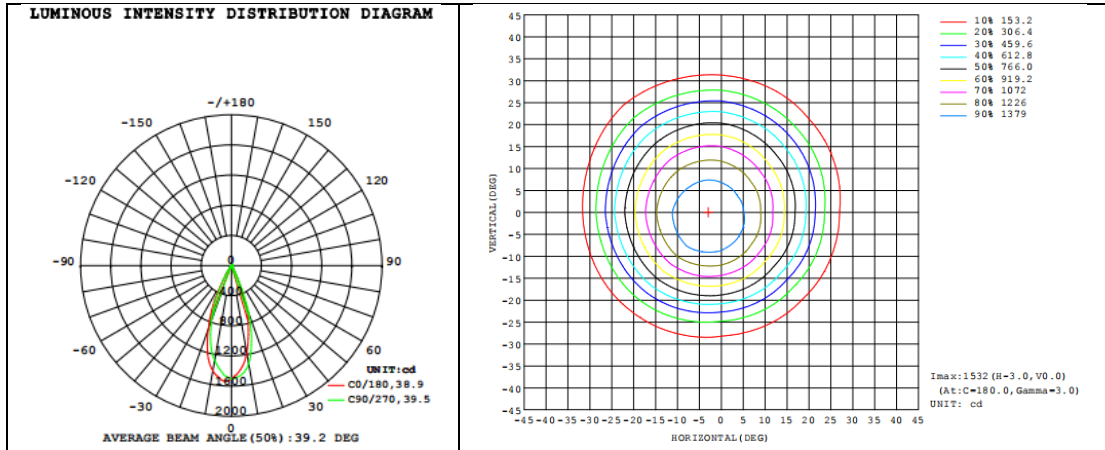


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	599.7	90.66%
0-40	643.9	97.34%
0-60	661.3	99.97%
60-90	0.1	0.02%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	661.4	99.98%
90-180	0.1	0.02%
0-180	661.5	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	133.50	20.18%	90-100	0	0%
10-20	285.0	43.08%	100-110	0	0%
20-30	181.20	27.39%	110-120	0	0%
30-40	44.22	6.68%	120-130	0.0639	0%
40-50	13.99	2.11%	130-140	0.0083	0%
50-60	3.440	0.52%	140-150	0	0%
60-70	0.0837	0.01%	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>	GR3STLB	<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	0.072	8.46	0.977

### Chromaticity Measurement – Sphere-Spectroradiometer Method:

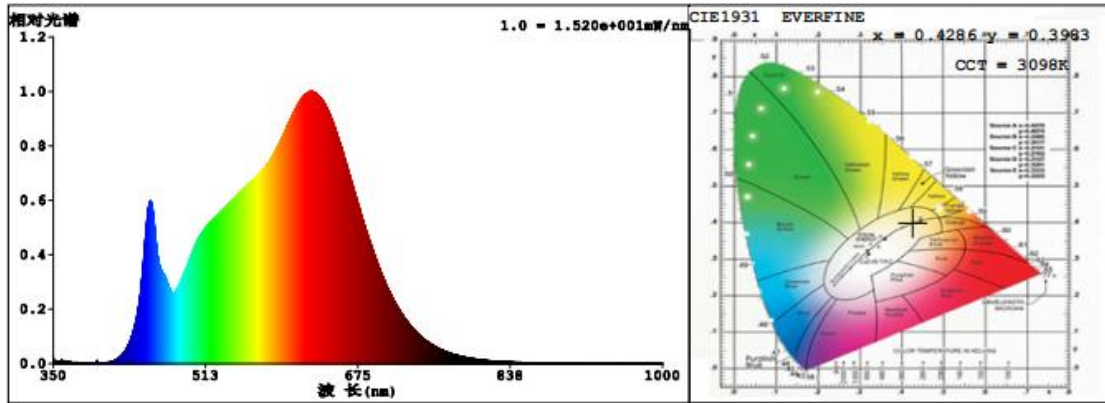
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3089
Duv	-0.00113
Chromaticity (x, y)	x=0.4286, y=0.3983
Chromaticity (u', v')	u' =0.2477, v' =0.5178
Color Rendering Index (CRI)	97.0
R9	79

<b>Special Color Rendering Indices</b>			
R1	98	R9	79
R2	100	R10	98
R3	99	R11	98
R4	98	R12	85
R5	98	R13	99
R6	97	R14	99
R7	95	R15	96
R8	91	--	--

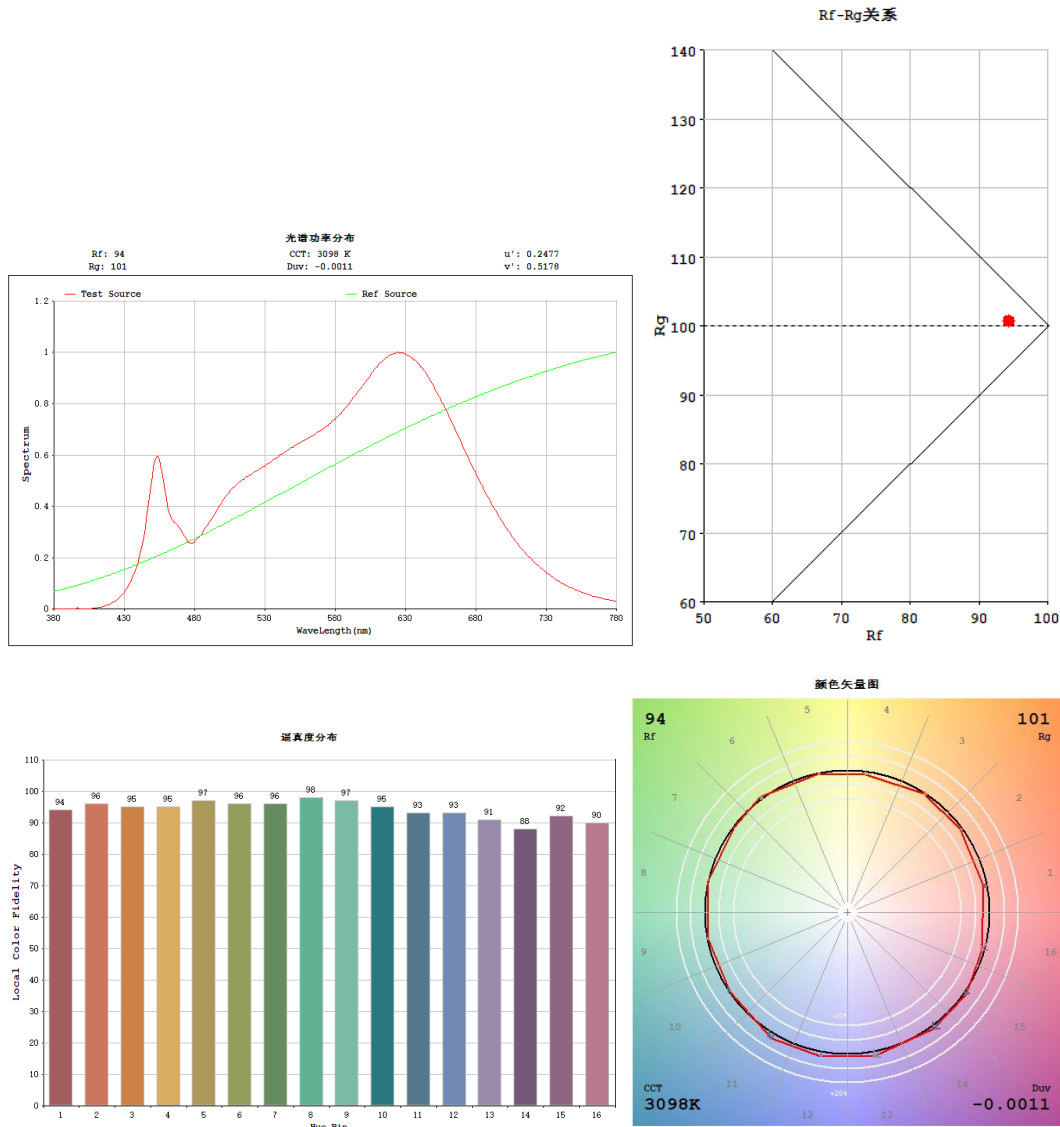
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	697.638
Luminous Efficacy (lm/W)	82.51
Beam Angle (°)	39.2
Center Beam Candle Power (cd)	1615

# Spectral Power Distribution & Chromaticity Diagram



## TM30

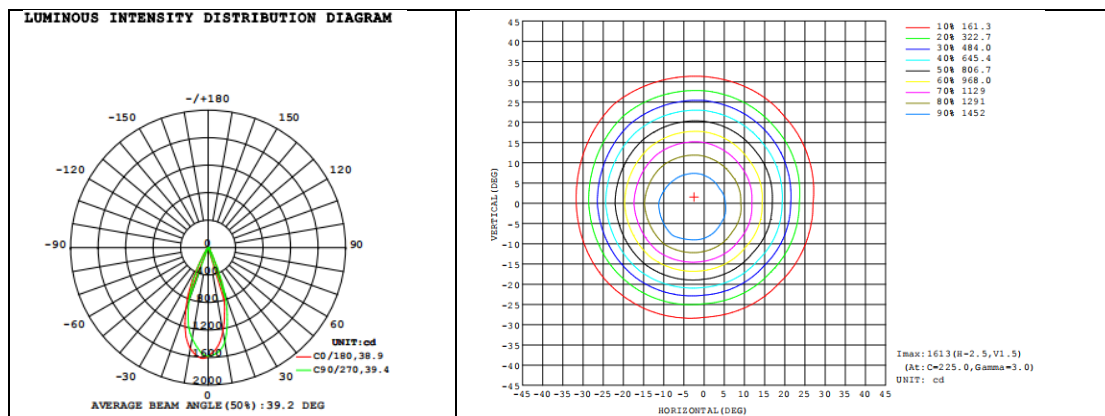


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	632.2	90.63%
0-40	679.0	97.33%
0-60	697.5	99.99%
60-90	0.1	0.01%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	697.6	100.00%
90-180	0.0	0.00%
0-180	697.6	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	140.80	20.18%	90-100	0	0%
10-20	300.3	43.05%	100-110	0	0%
20-30	191.10	27.39%	110-120	0	0%
30-40	46.81	6.71%	120-130	0.0705	0%
40-50	14.79	2.12%	130-140	0.0087	0%
50-60	3.638	0.52%	140-150	0	0%
60-70	0.0911	0.01%	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>	GR3STLB	<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	0.071	8.32	0.976

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

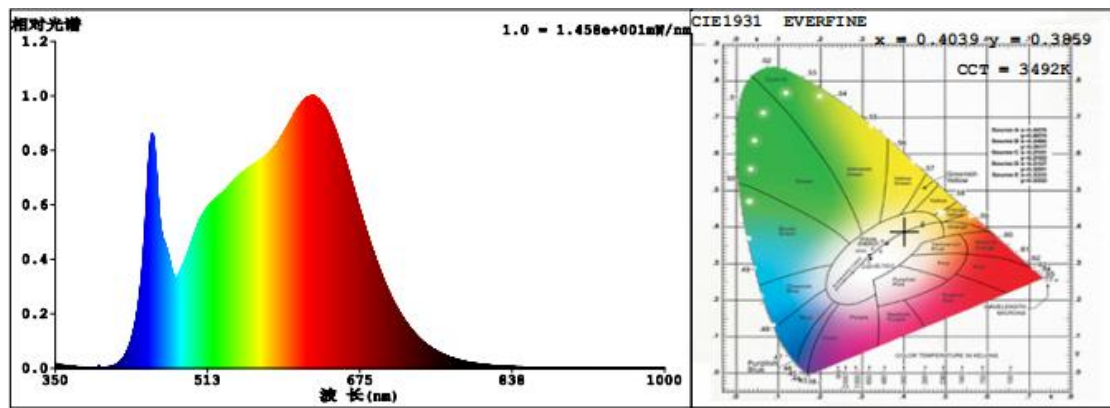
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3492
Duv	-0.00182
Chromaticity (x, y)	x=0.4039, y=0.3859
Chromaticity (u', v')	u' =0.2368, v' =0.5090
Color Rendering Index (CRI)	97.0
R9	83

<b>Special Color Rendering Indices</b>			
R1	98	R9	83
R2	99	R10	98
R3	98	R11	98
R4	98	R12	81
R5	98	R13	99
R6	96	R14	99
R7	96	R15	97
R8	92	--	--

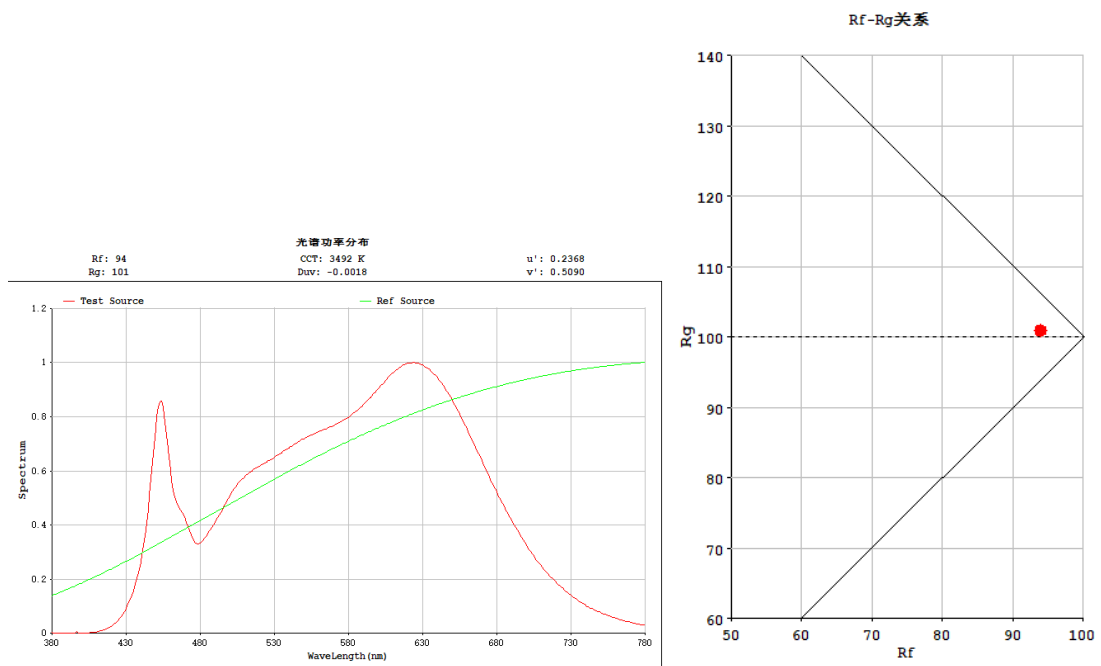
#### Photometric Measurement – Goniophotometer Method:

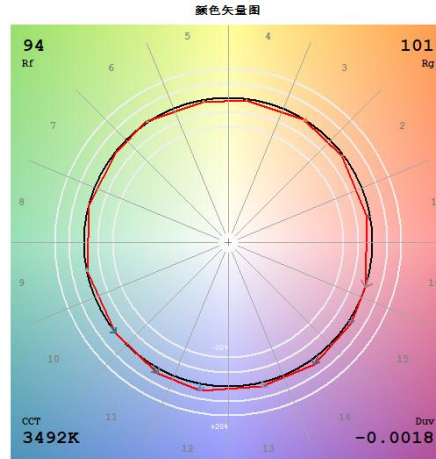
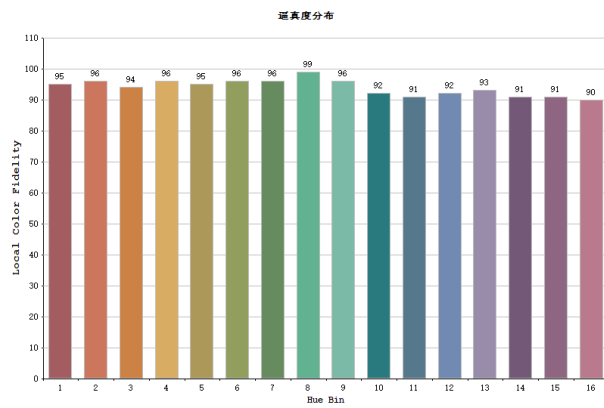
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	733.257
Luminous Efficacy (lm/W)	88.18
Beam Angle (°)	39.2
Center Beam Candle Power (cd)	1699

## Spectral Power Distribution & Chromaticity Diagram



## TM30



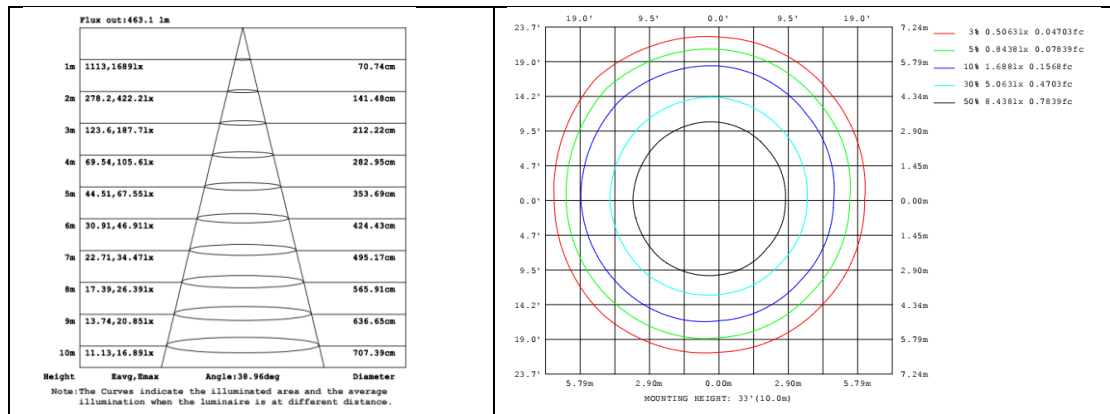
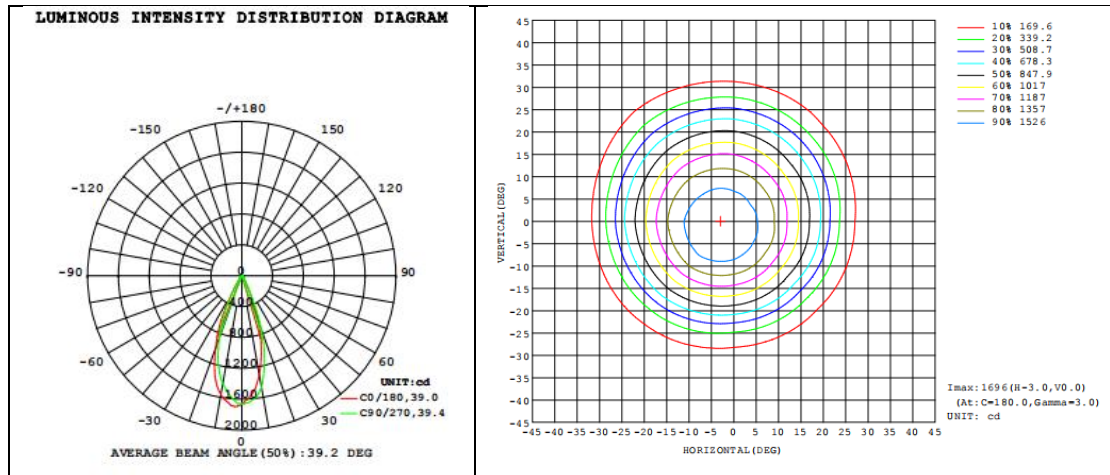


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	664.3	90.59%
0-40	713.7	97.33%
0-60	733.1	99.97%
60-90	0.1	0.01%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	733.2	99.99%
90-180	0.1	0.01%
0-180	733.3	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	147.80	20.16%	90-100	0	0%
10-20	315.3	43.00%	100-110	0	0%
20-30	201.20	27.44%	110-120	0	0%
30-40	49.40	6.74%	120-130	0.0783	0%
40-50	15.57	2.12%	130-140	0.0094	0%
50-60	3.836	0.52%	140-150	0	0%
60-70	0.0986	0.01%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

# Photometric Data





## 2.1.4 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>	GR3STLB	<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	0.071	8.33	0.976

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

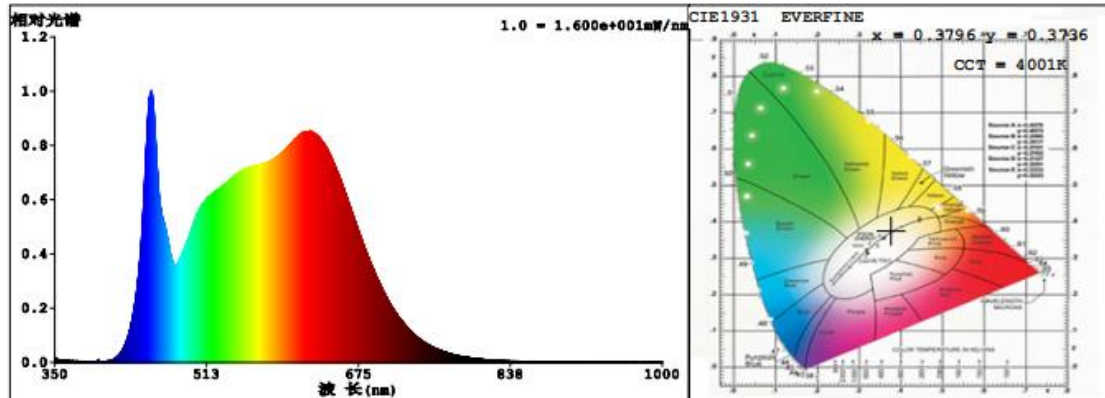
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	4001
Duv	-0.00125
Chromaticity (x, y)	x=0.3796, y=0.3736
Chromaticity (u', v')	u' =0.2258, v' =0.5000
Color Rendering Index (CRI)	96.3
R9	83

<b>Special Color Rendering Indices</b>			
R1	97	R9	83
R2	99	R10	95
R3	97	R11	97
R4	97	R12	76
R5	96	R13	98
R6	95	R14	98
R7	96	R15	96
R8	93	--	--

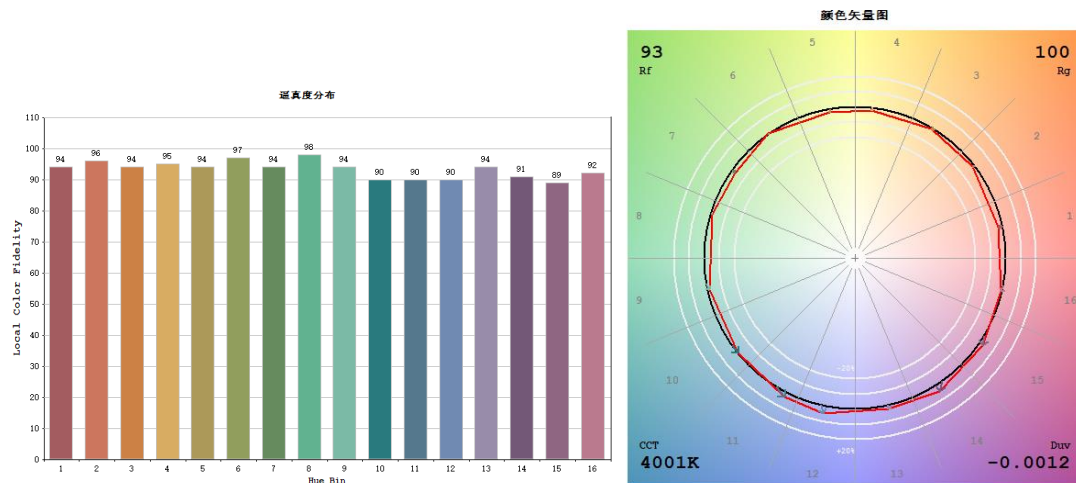
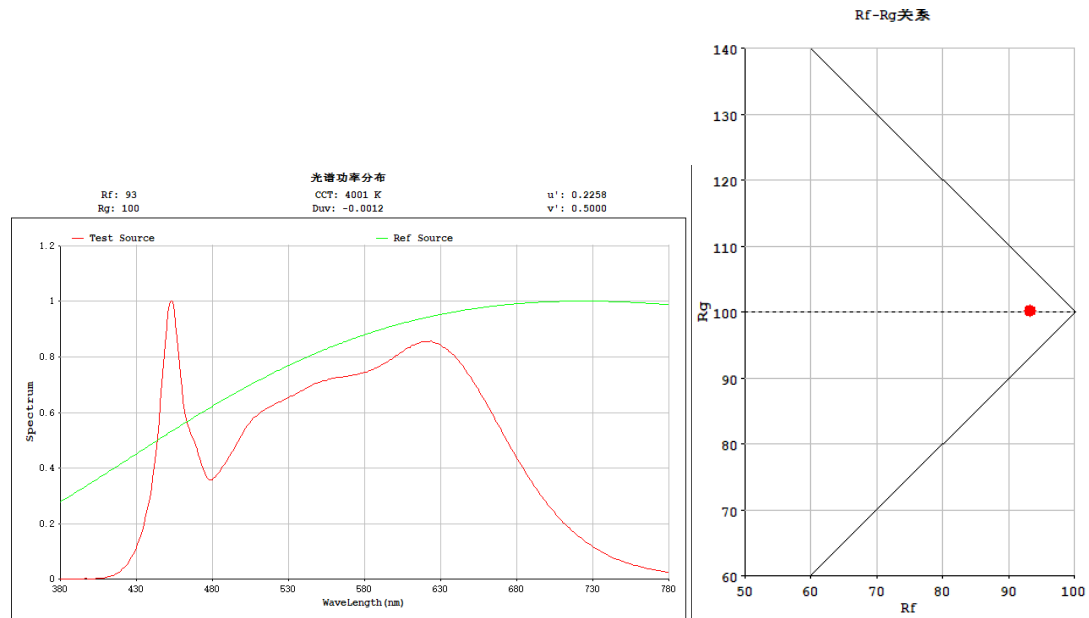
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	761.172
Luminous Efficacy (lm/W)	91.42
Beam Angle (°)	39.3
Center Beam Candle Power (cd)	1756

# Spectral Power Distribution & Chromaticity Diagram



## TM30

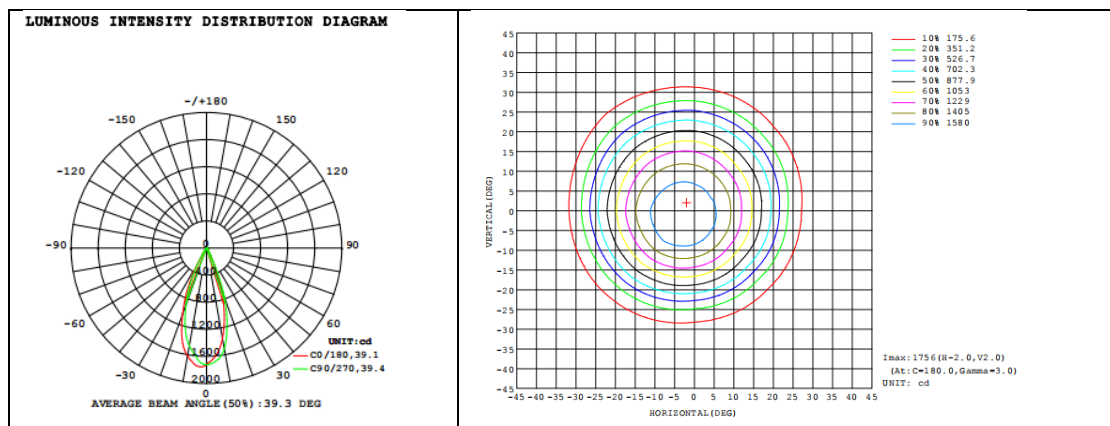


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	689.3	90.55%
0-40	740.8	97.32%
0-60	761.0	99.97%
60-90	0.1	0.01%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	761.1	99.99%
90-180	0.1	0.01%
0-180	761.2	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	153.20	20.13%	90-100	0	0%
10-20	327.0	42.96%	100-110	0	0%
20-30	209.10	27.47%	110-120	0	0%
30-40	51.49	6.76%	120-130	0.0841	0%
40-50	16.18	2.13%	130-140	0.0102	0%
50-60	3.991	0.52%	140-150	0	0%
60-70	0.1049	0.01%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

## Photometric Data





## 2.1.5 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>	GR3STLB	<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	0.073	8.58	0.978

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

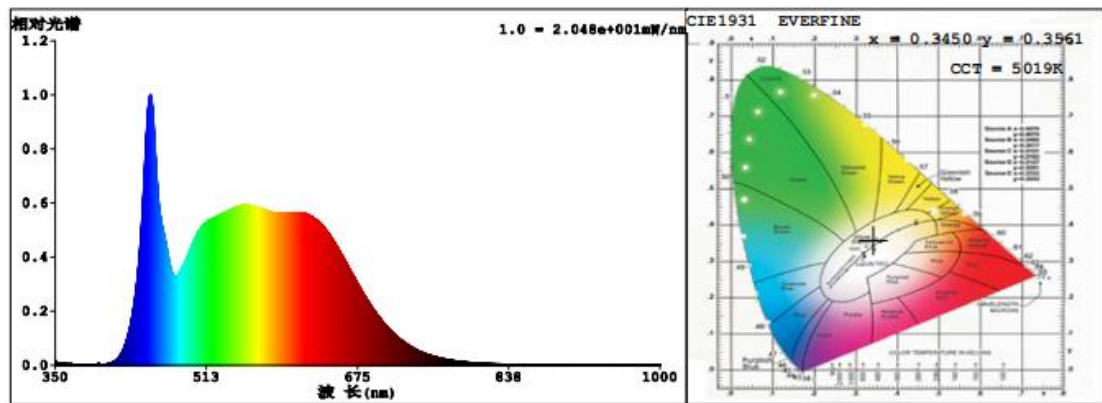
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	5019
Duv	0.00228
Chromaticity (x, y)	x=0.3450, y=0.3561
Chromaticity (u', v')	u' =0.2096, v' =0.4868
Color Rendering Index (CRI)	93.2
R9	68

<b>Special Color Rendering Indices</b>			
R1	93	R9	68
R2	95	R10	88
R3	95	R11	93
R4	94	R12	74
R5	93	R13	94
R6	92	R14	97
R7	95	R15	92
R8	88	--	--

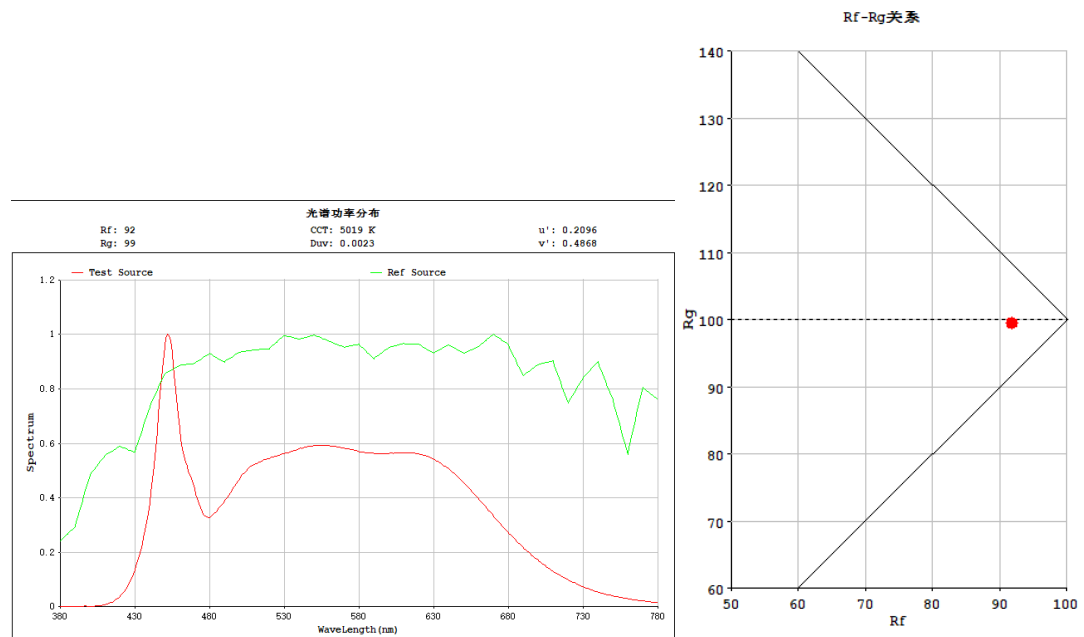
### Photometric Measurement – Goniophotometer Method:

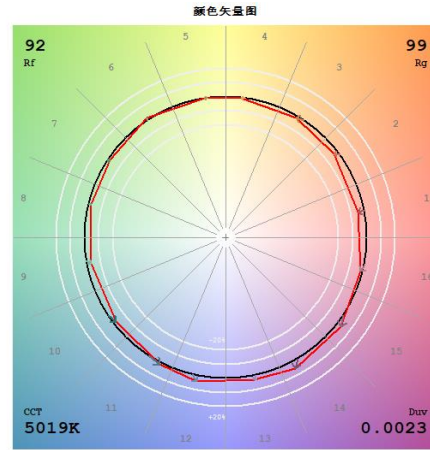
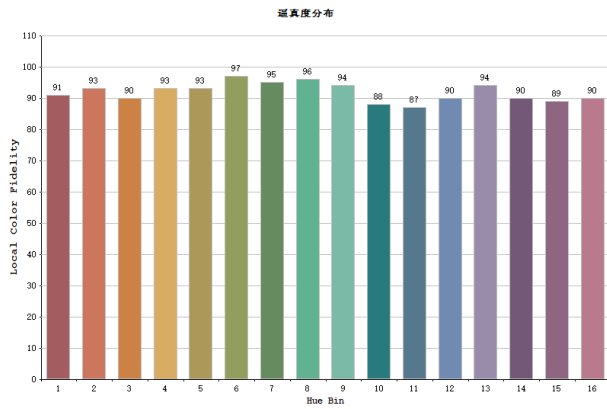
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	776.983
Luminous Efficacy (lm/W)	90.56
Beam Angle (°)	39.2
Center Beam Candle Power (cd)	1804

## Spectral Power Distribution & Chromaticity Diagram



## TM30





## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	703.2	90.50%
0-40	756.1	97.31%
0-60	776.8	99.97%
60-90	0.1	0.01%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	776.9	99.99%
90-180	0.1	0.01%
0-180	777.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	156.20	20.10%	90-100	0	0%
10-20	333.2	42.88%	100-110	0	0%
20-30	213.80	27.52%	110-120	0	0%
30-40	52.92	6.81%	120-130	0.0873	0%
40-50	16.56	2.13%	130-140	0.0104	0%
50-60	4.080	0.53%	140-150	0	0%
60-70	0.1080	0.01%	150-160	0	0%
70-80	0	0.00%	160-170	0	0%
80-90	0	0.00%	170-180	0	0%

# Photometric Data

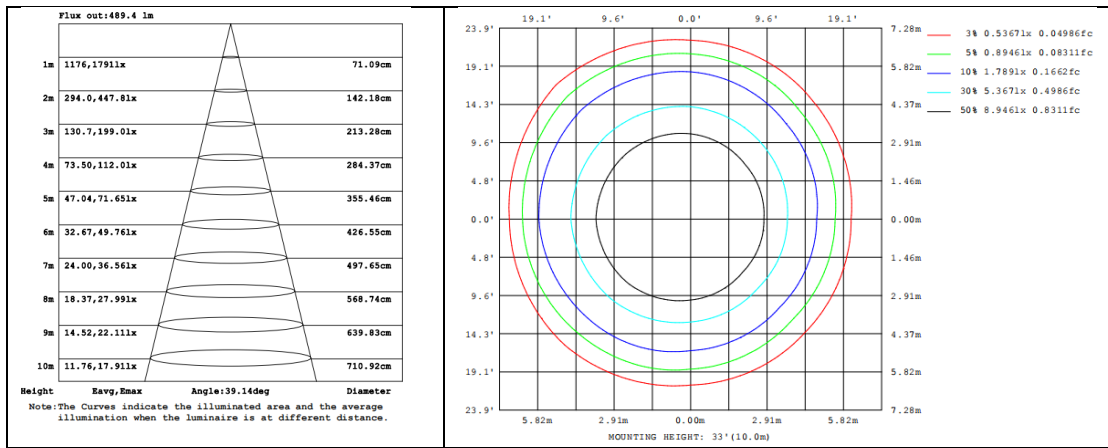
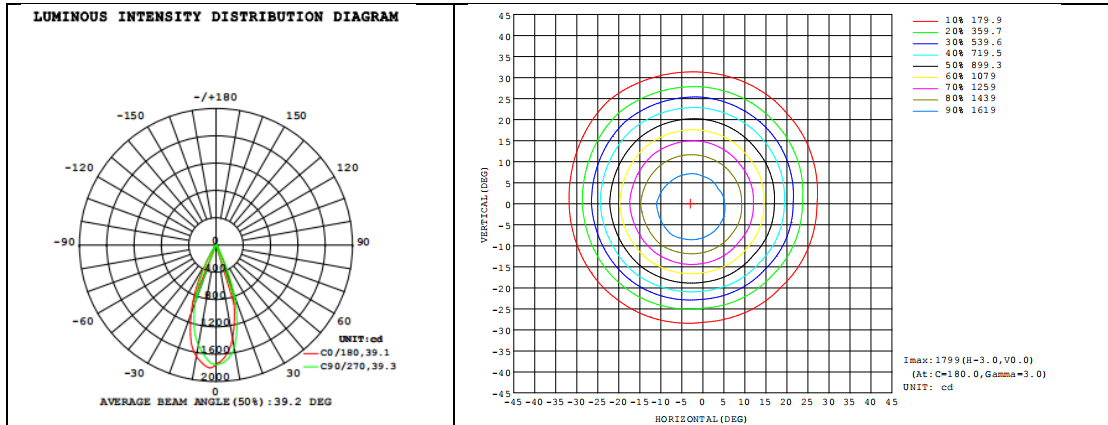


Table--1

UNIT: cd

γ (DEG)	C (DEG)																			
	0	45	90	135	180	225	270	315												
0	1752	1752	1752	1752	1752	1752	1752	1752												
5	1630	1658	1701	1756	1781	1759	1661	1617												
10	1393	1438	1529	1634	1661	1581	1488	1426												
15	1046	1069	1193	1358	1431	1360	1241	1106												
20	673	666	790	965	1064	1013	901	765												
25	278	273	347	528	674	660	561	394												
30	107	107	131	188	277	306	229	146												
35	50.0	56.1	56.7	84.1	88.9	117	81.2	68.8												
40	24.7	35.3	26.1	44.7	32.7	56.0	32.7	39.6												
45	14.5	22.7	15.5	26.3	17.3	28.8	18.0	24.4												
50	6.82	12.5	7.08	14.3	8.26	15.5	8.20	13.6												
55	1.87	4.99	1.92	6.15	2.54	7.05	2.51	5.81												
60	0.09	0.92	0.10	1.33	0.06	1.70	0.05	1.25												
65	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00												
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	0.02	0.02											
125	0.00	0.00	0.00	0.00	0.14	0.10	0.18	0.26												
130	0.00	0.03	0.00	0.00	0.39	0.39	0.49	0.70												
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
GR3STLB	2700K setting	120.7	661.476	8.57	77.21
	3000K setting	120.7	697.638	8.46	82.51
	3500K setting	120.7	733.257	8.32	88.18
	4000K setting	120.7	761.172	8.33	91.42
	5000K setting	120.7	776.983	8.58	90.56