

# 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) :**

**GR4STL**

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

**Type of Luminaire:** Downlights

**Report Date:** 2024-09-04

<b>1.1 Rated Values:</b>	
Rated Voltage / Frequency	120V, 60HZ
Nominal Power	15W
Rated Initial Lamp Lumen	1250lm (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>	2024-09-04	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR4STL	<b>CCT Setting</b>	2700k

#### 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	0.121	14.34	0.981

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

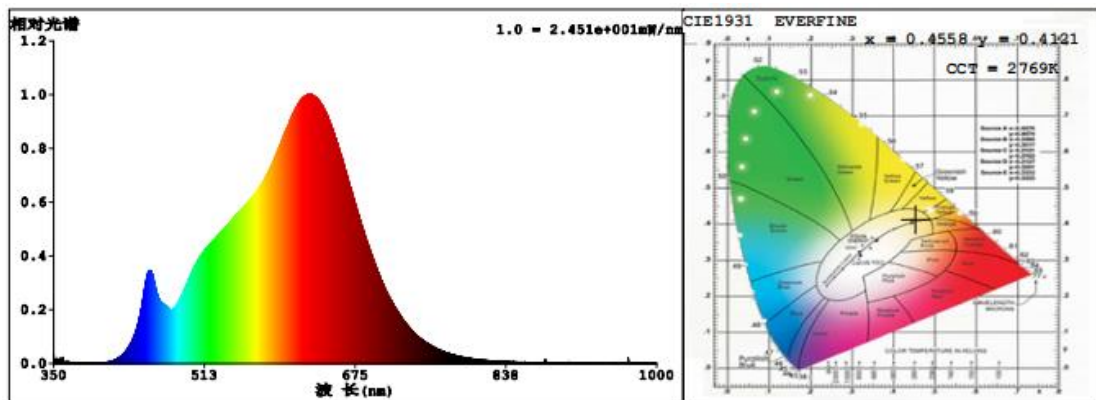
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	2769
Duv	0.000901
Chromaticity (x, y)	x=0.4558, y=0.4121
Chromaticity (u', v')	u' =0.2592, v' =0.5273
Color Rendering Index (CRI)	96.1
R9	71

<b>Special Color Rendering Indices</b>			
R1	97	R9	71
R2	99	R10	96
R3	99	R11	99
R4	97	R12	89
R5	97	R13	98
R6	98	R14	99
R7	94	R15	93
R8	87	--	--

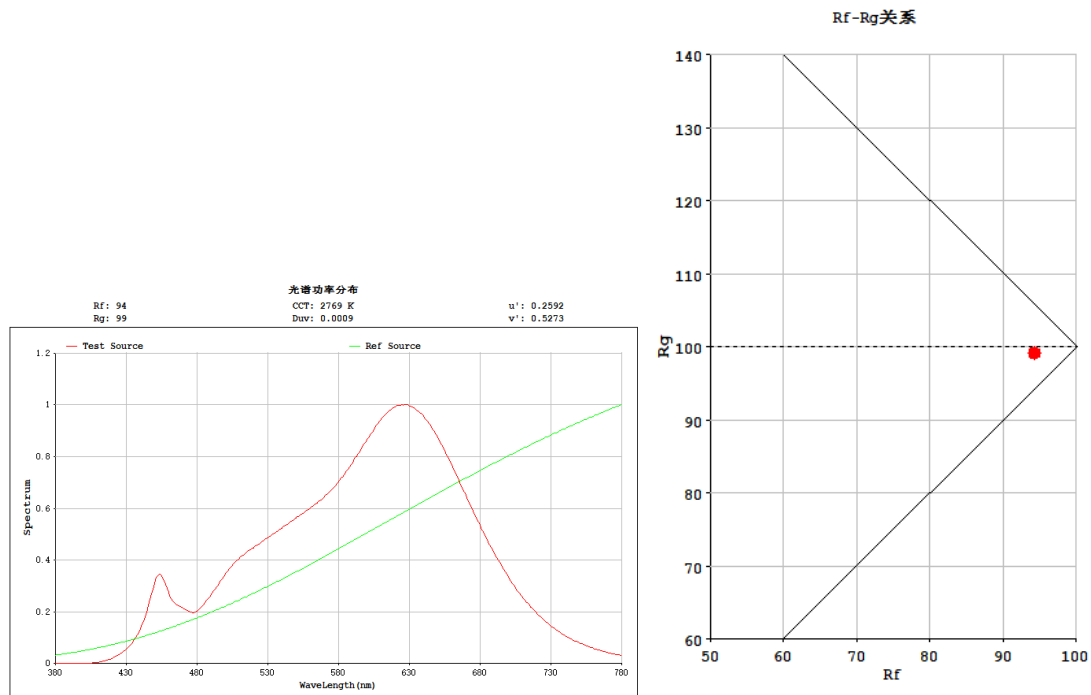
#### Photometric Measurement – Goniophotometer Method:

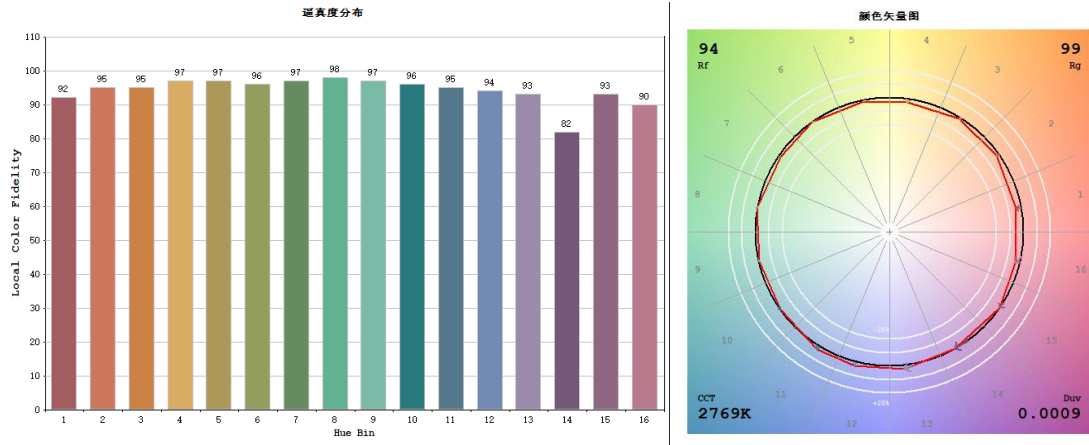
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1055.76
Luminous Efficacy (lm/W)	73.61
Beam Angle (°)	36.1
Center Beam Candle Power (cd)	2970

## Spectral Power Distribution & Chromaticity Diagram



## TM30



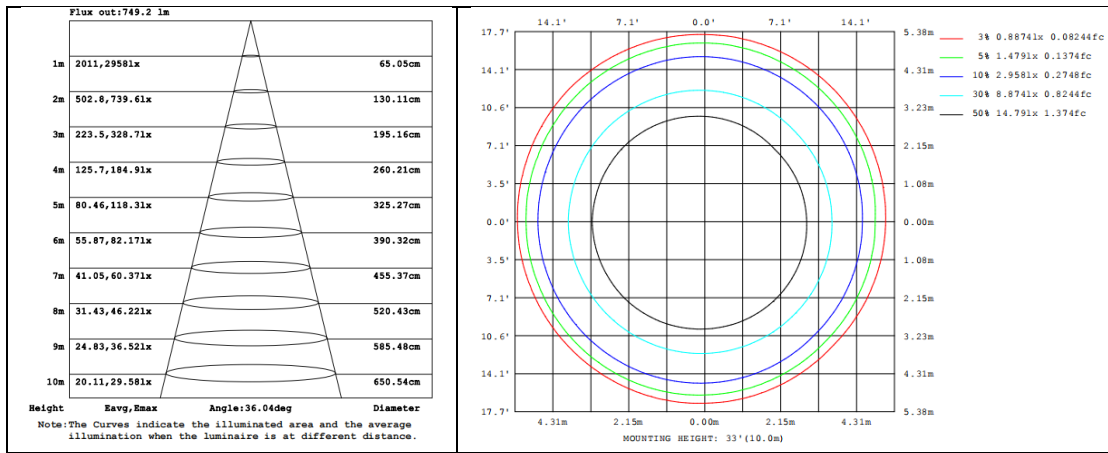
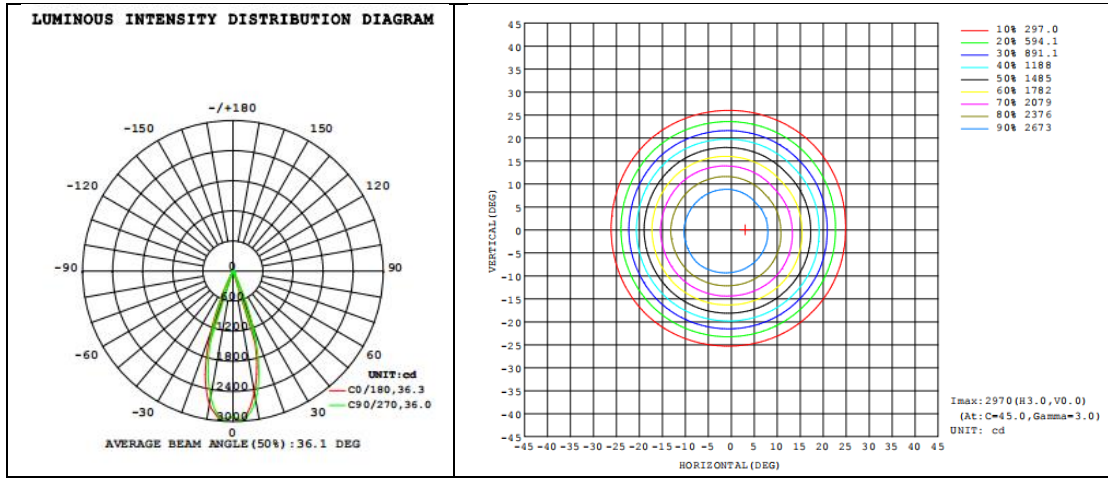


### Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	988.4	93.60%
0-40	1015.0	96.12%
0-60	1048.0	99.24%
60-90	7.9	0.75%
70-100	2.8	0.27%
90-120	0.0	0.00%
0-90	1056.0	100.00%
90-180	0.0	0.00%
0-180	1056.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	268.00	25.38%	90-100	0	0%
10-20	526.8	49.89%	100-110	0	0%
20-30	193.60	18.33%	110-120	0	0%
30-40	26.44	2.50%	120-130	0	0%
40-50	19.82	1.88%	130-140	0	0%
50-60	13.160	1.25%	140-150	0	0%
60-70	5.1230	0.49%	150-160	0	0%
70-80	2.2580	0.21%	160-170	0	0%
80-90	0.5614	0.05%	170-180	0	0%

# Photometric Data





## 2.1.2 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-09-04	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR4STL	<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	0.119	14.05	0.980

### Chromaticity Measurement – Sphere-Spectroradiometer Method:

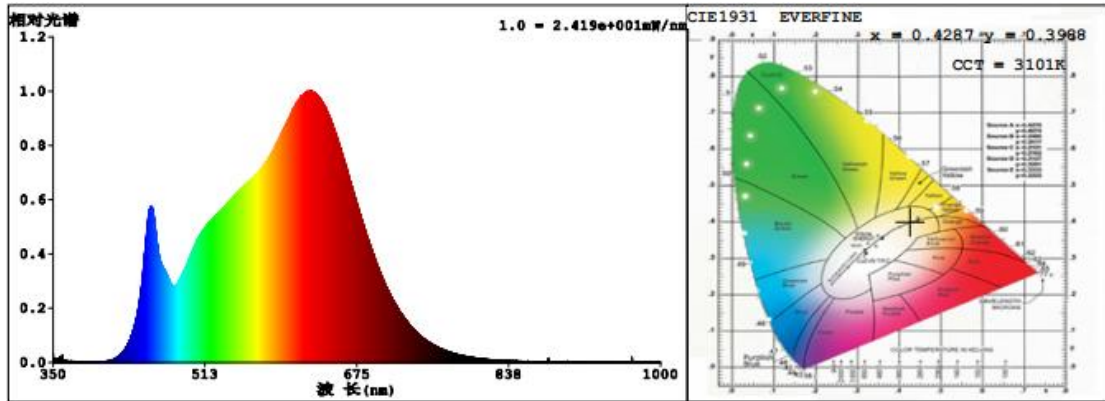
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3101
Duv	-0.000940
Chromaticity (x, y)	x=0.4287, y=0.3988
Chromaticity (u', v')	u' =0.2475, v' =0.5180
Color Rendering Index (CRI)	96.6
R9	77

<b>Special Color Rendering Indices</b>			
R1	98	R9	77
R2	100	R10	98
R3	99	R11	99
R4	98	R12	84
R5	98	R13	99
R6	97	R14	99
R7	94	R15	95
R8	90	--	--

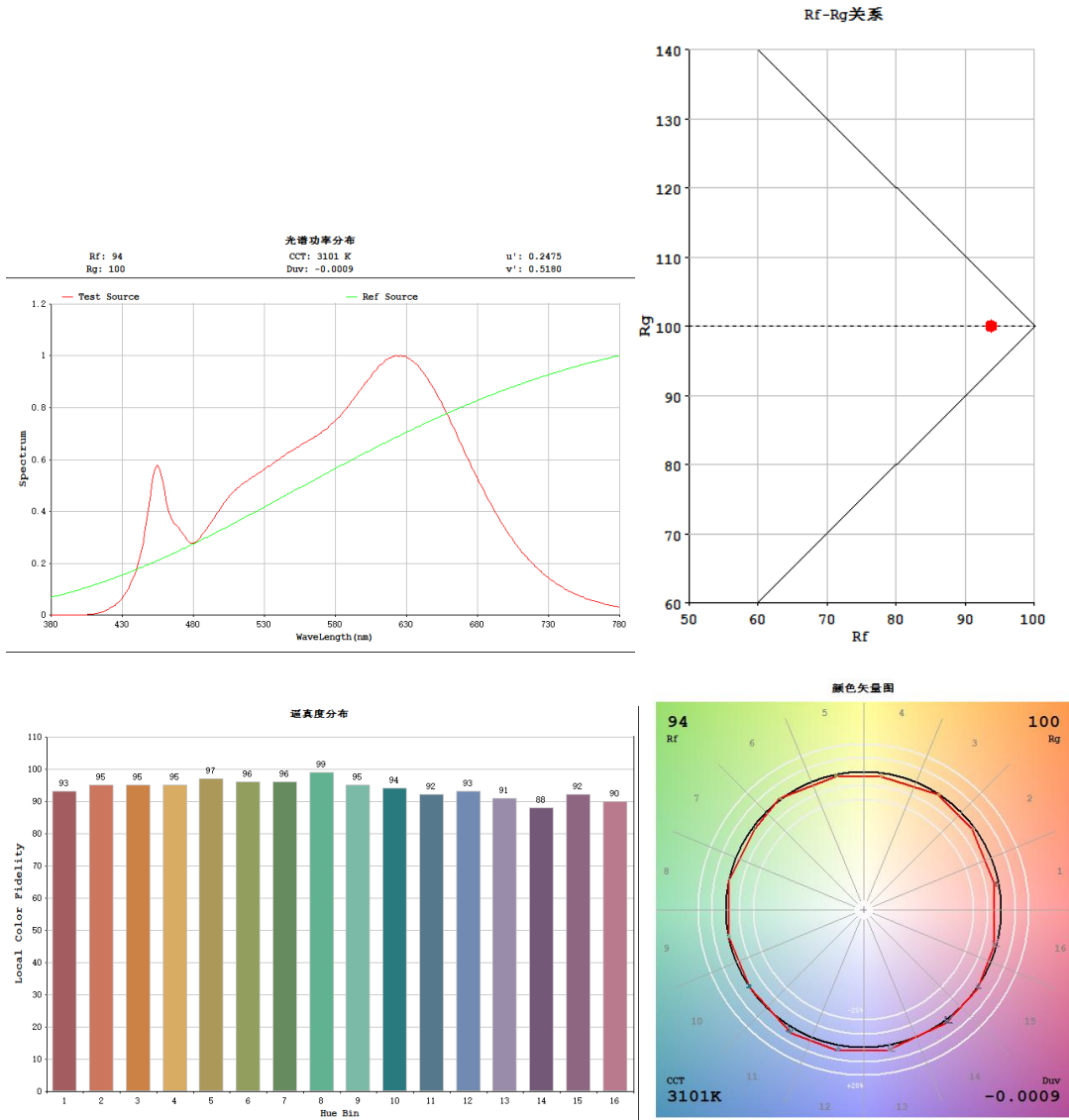
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1157.46
Luminous Efficacy (lm/W)	82.37
Beam Angle (°)	36.1
Center Beam Candle Power (cd)	3257

# Spectral Power Distribution & Chromaticity Diagram



## TM30

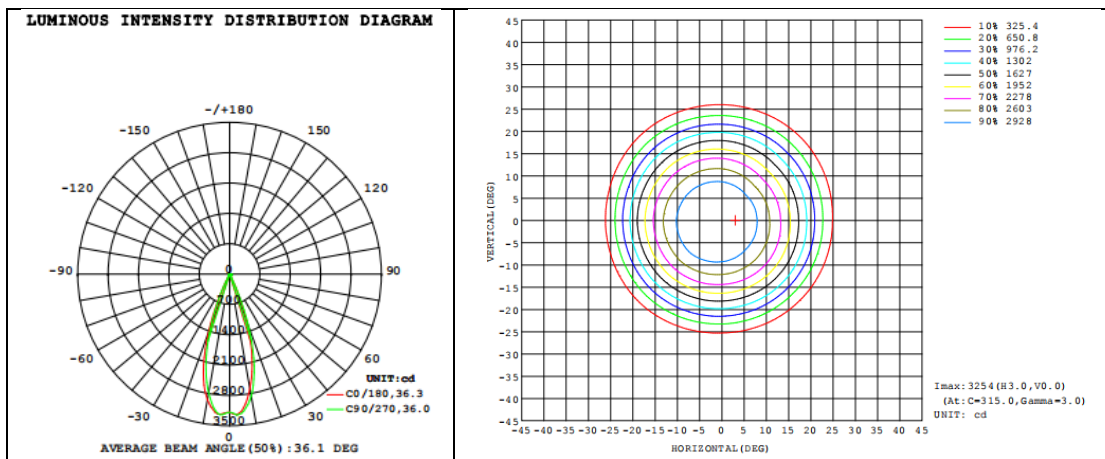


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1083.0	93.60%
0-40	1112.0	96.11%
0-60	1149.0	99.31%
60-90	8.8	0.76%
70-100	3.1	0.27%
90-120	0.0	0.00%
0-90	1157.0	100.00%
90-180	0.0	0.00%
0-180	1157.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	293.20	25.34%	90-100	0	0%
10-20	577.4	49.90%	100-110	0	0%
20-30	212.80	18.39%	110-120	0	0%
30-40	29.07	2.51%	120-130	0	0%
40-50	21.78	1.88%	130-140	0	0%
50-60	14.460	1.25%	140-150	0	0%
60-70	5.6370	0.49%	150-160	0	0%
70-80	2.4940	0.22%	160-170	0	0%
80-90	0.6307	0.05%	170-180	0	0%

## Photometric Data





### 2.1.3 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-09-04	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR4STL	<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	0.116	13.66	0.979

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

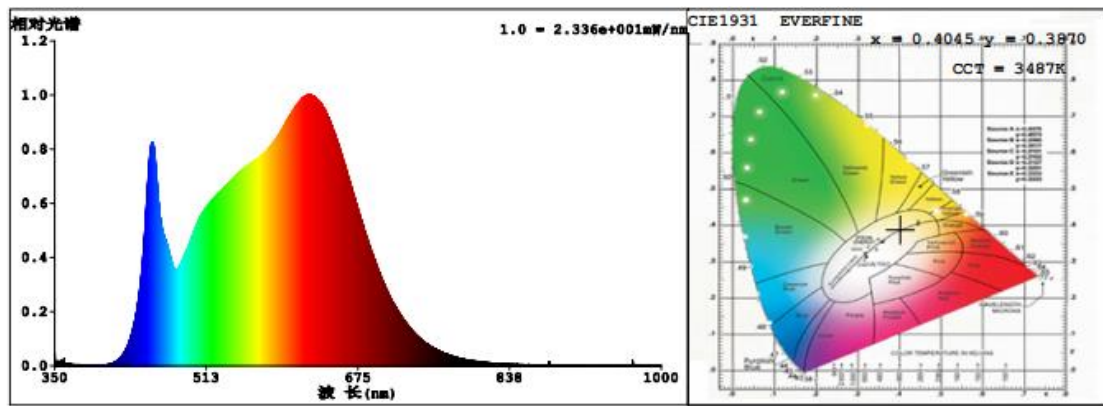
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3487
Duv	-0.00149
Chromaticity (x, y)	x=0.4045, y=0.3870
Chromaticity (u', v')	u' =0.2367, v' =0.5096
Color Rendering Index (CRI)	96.7
R9	81

<b>Special Color Rendering Indices</b>			
R1	98	R9	81
R2	100	R10	98
R3	99	R11	98
R4	97	R12	80
R5	97	R13	99
R6	96	R14	99
R7	95	R15	96
R8	91	--	--

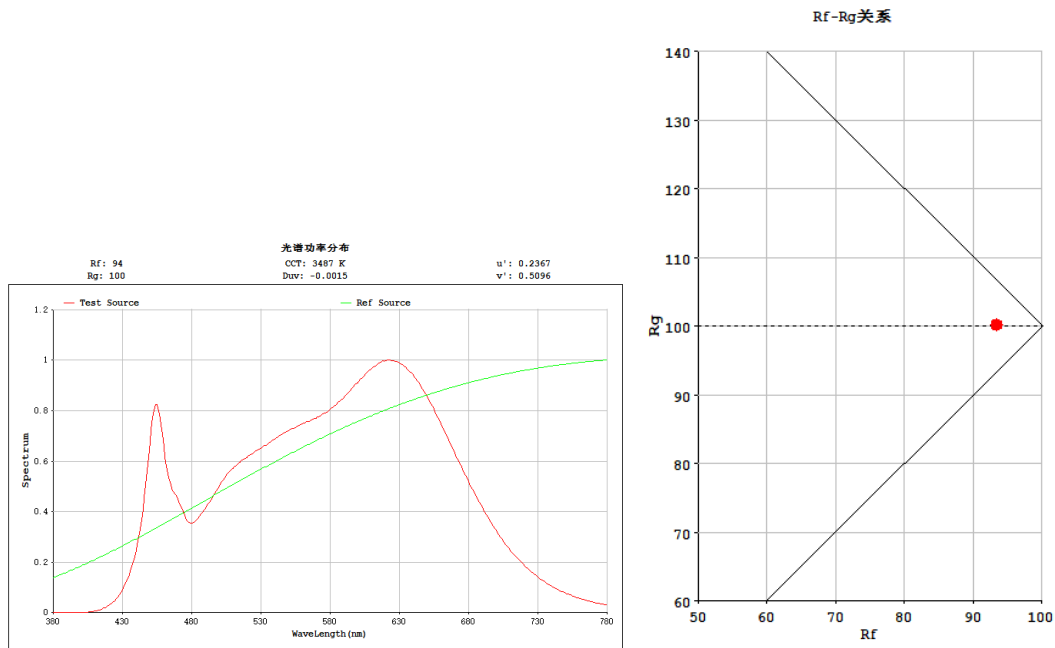
#### Photometric Measurement – Goniophotometer Method:

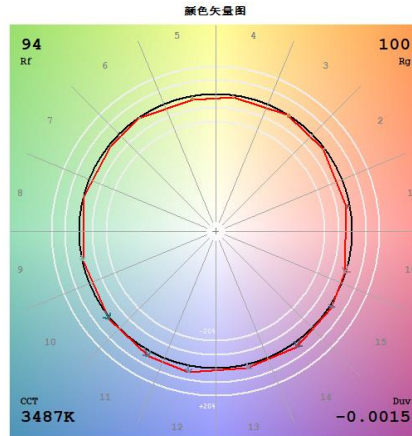
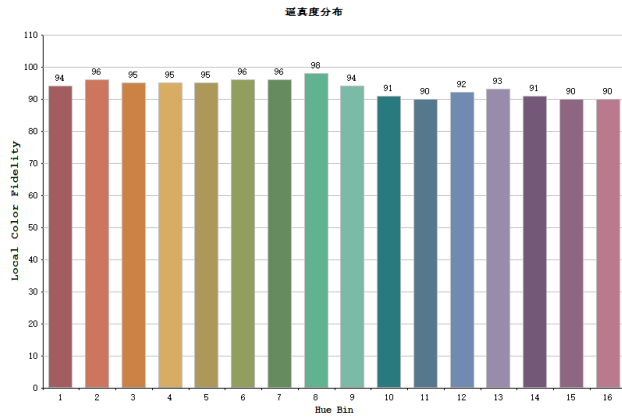
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1243.06
Luminous Efficacy (lm/W)	91.02
Beam Angle (°)	36.2
Center Beam Candle Power (cd)	3491

## Spectral Power Distribution & Chromaticity Diagram



## TM30



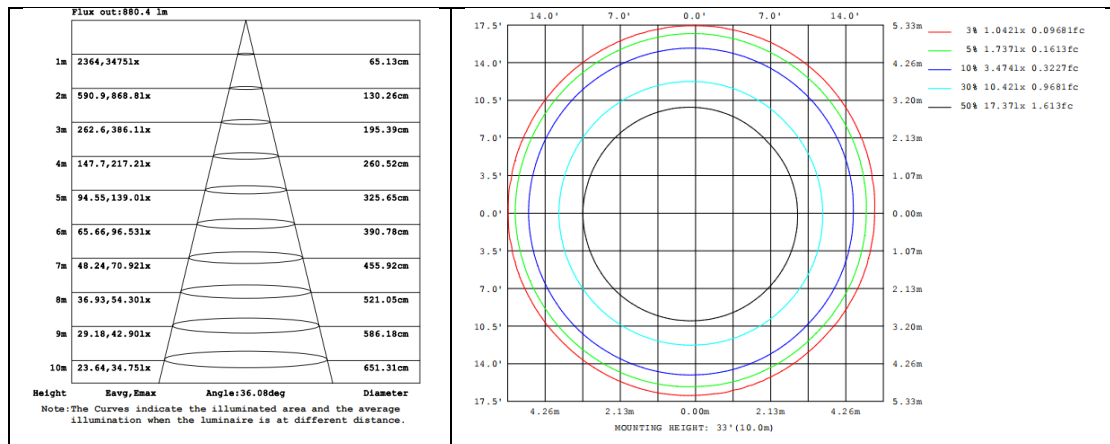
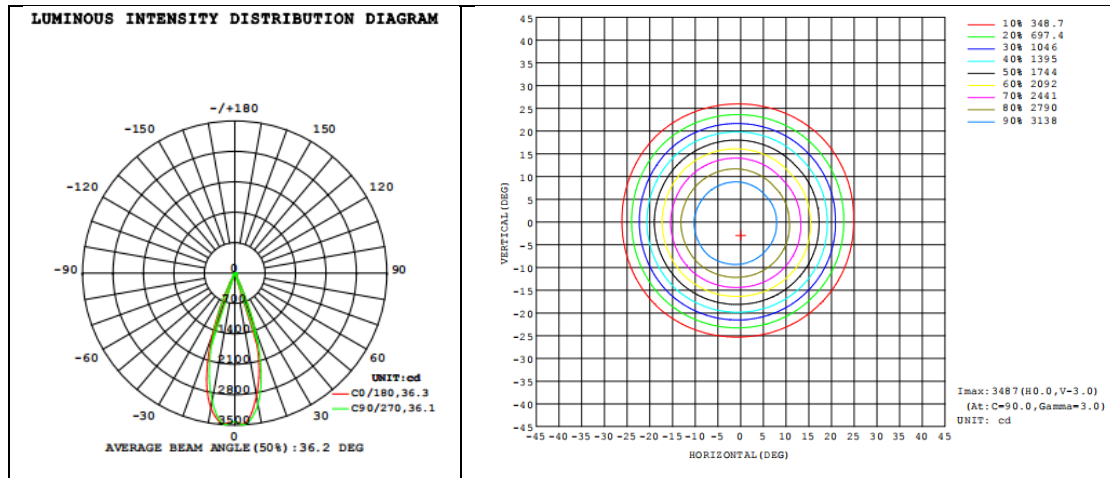


### Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1163.0	93.56%
0-40	1195.0	96.14%
0-60	1234.0	99.28%
60-90	9.5	0.76%
70-100	3.4	0.27%
90-120	0.0	0.00%
0-90	1243.0	100.00%
90-180	0.0	0.00%
0-180	1243.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	314.60	25.31%	90-100	0	0%
10-20	619.5	49.84%	100-110	0	0%
20-30	229.20	18.44%	110-120	0	0%
30-40	31.30	2.52%	120-130	0	0%
40-50	23.43	1.88%	130-140	0	0%
50-60	15.550	1.25%	140-150	0	0%
60-70	6.0700	0.49%	150-160	0	0%
70-80	2.6940	0.22%	160-170	0	0%
80-90	0.6891	0.06%	170-180	0	0%

# Photometric Data





## 2.1.4 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-09-04	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR4STL	<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	0.117	13.79	0.980

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

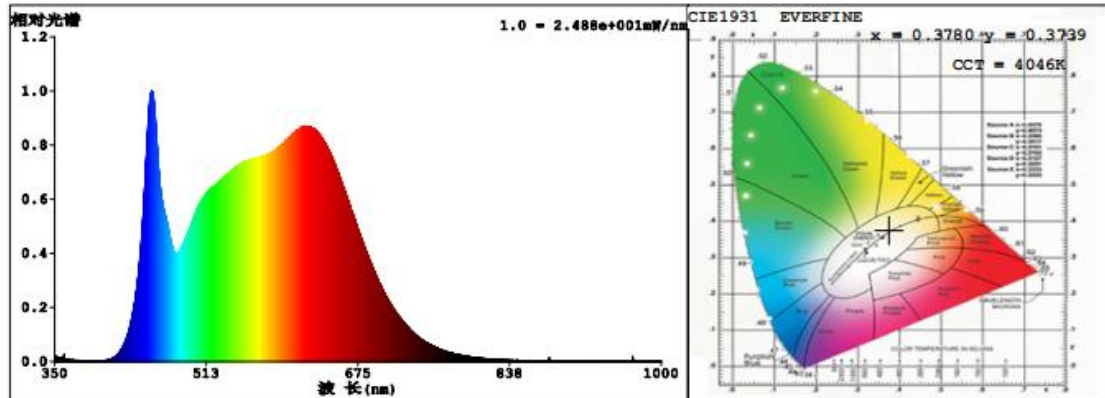
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	4046
Duv	-0.000639
Chromaticity (x, y)	x=0.3780, y=0.3739
Chromaticity (u', v')	u' =0.2247, v' =0.5000
Color Rendering Index (CRI)	95.9
R9	80

<b>Special Color Rendering Indices</b>			
R1	97	R9	80
R2	99	R10	95
R3	98	R11	96
R4	96	R12	75
R5	96	R13	98
R6	96	R14	99
R7	95	R15	95
R8	91	--	--

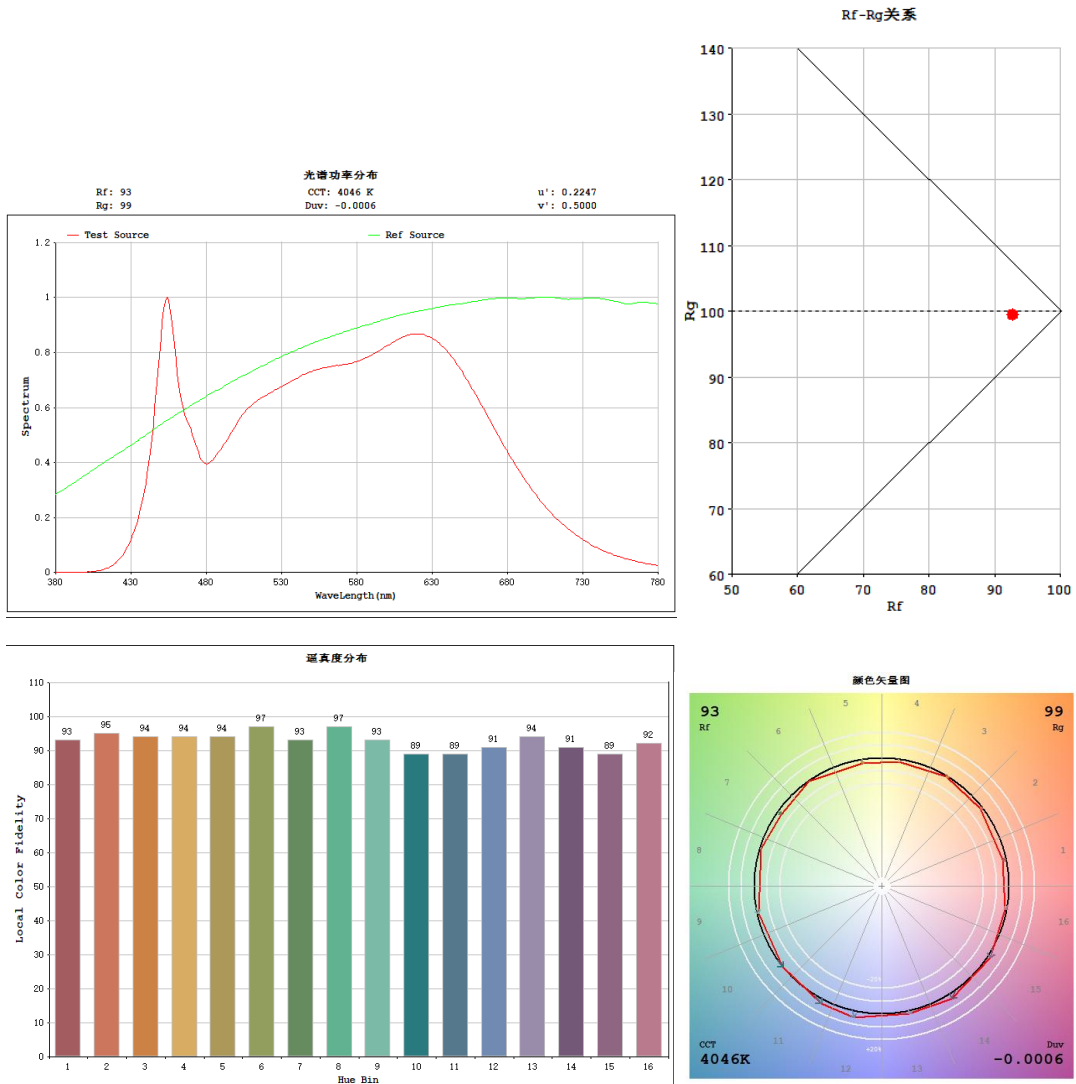
### Photometric Measurement – Goniophotometer Method:

<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1276.7
Luminous Efficacy (lm/W)	92.60
Beam Angle (°)	36.2
Center Beam Candle Power (cd)	3590

# Spectral Power Distribution & Chromaticity Diagram



## TM30

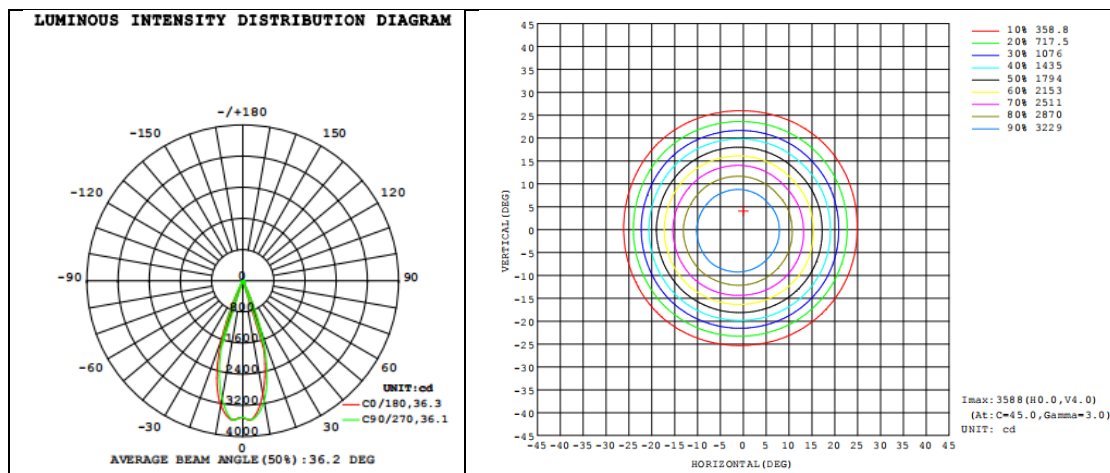


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1195.0	93.58%
0-40	1227.0	96.08%
0-60	1267.0	99.22%
60-90	9.7	0.76%
70-100	3.5	0.27%
90-120	0.0	0.00%
0-90	1277.0	100.00%
90-180	0.0	0.00%
0-180	1277.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	323.00	25.29%	90-100	0	0%
10-20	635.9	49.80%	100-110	0	0%
20-30	235.70	18.46%	110-120	0	0%
30-40	32.24	2.52%	120-130	0	0%
40-50	24.10	1.89%	130-140	0	0%
50-60	15.990	1.25%	140-150	0	0%
60-70	6.2460	0.49%	150-160	0	0%
70-80	2.7740	0.22%	160-170	0	0%
80-90	0.7127	0.06%	170-180	0	0%

## Photometric Data





## 2.1.5 Electrical, Photometric and Chromaticity Measurements

<b>Test date</b>	2024-09-04	<b>Test Ambient:</b>	25.3
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	15
<b>Model Number</b>	GR4STL	<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	0.122	14.39	0.981

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

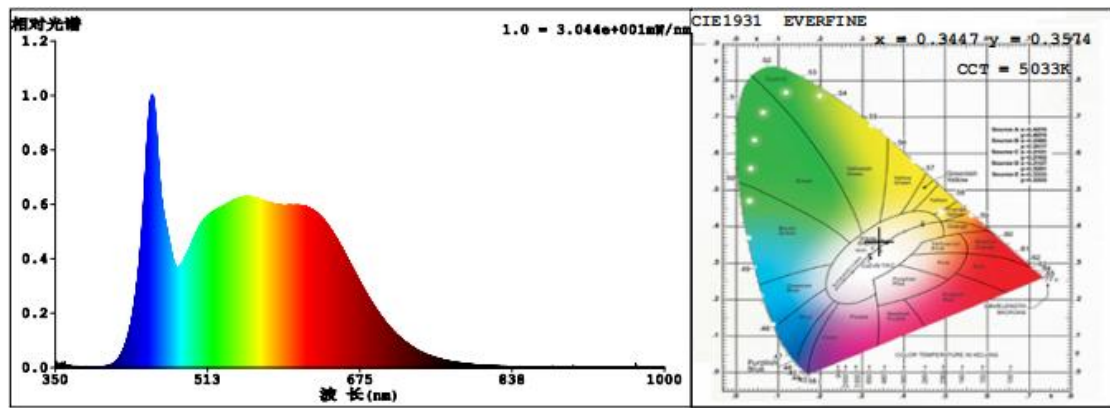
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	5033
Duv	0.00301
Chromaticity (x, y)	x=0.3447, y=0.3574
Chromaticity (u', v')	u' =0.2090, v' =0.4874
Color Rendering Index (CRI)	92.8
R9	66

<b>Special Color Rendering Indices</b>			
R1	93	R9	66
R2	95	R10	88
R3	96	R11	93
R4	93	R12	73
R5	92	R13	93
R6	92	R14	98
R7	95	R15	91
R8	87	--	--

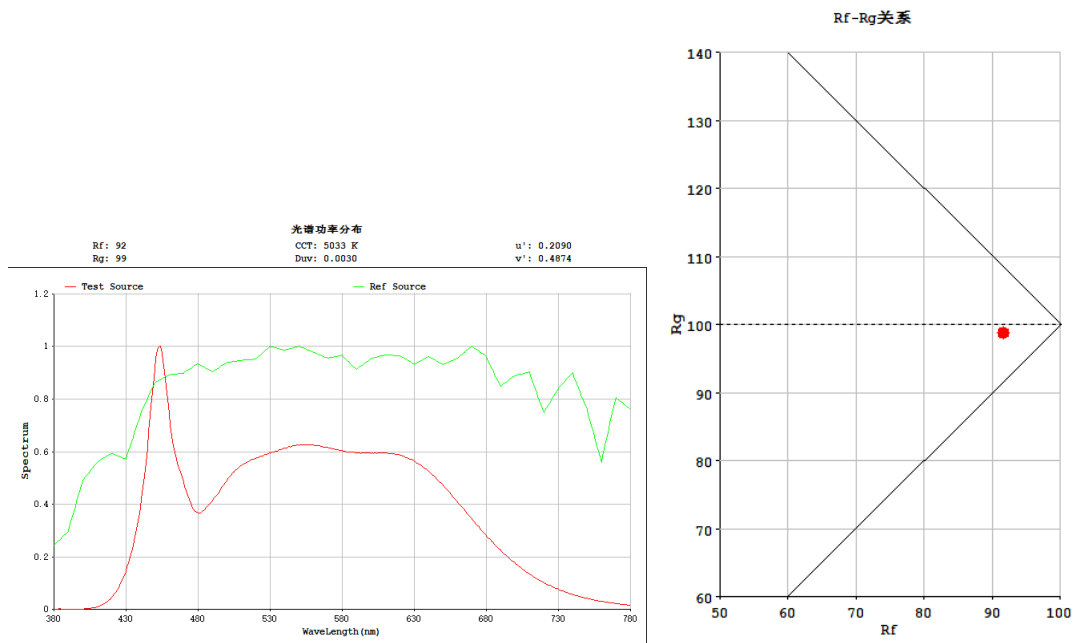
### Photometric Measurement – Goniophotometer Method:

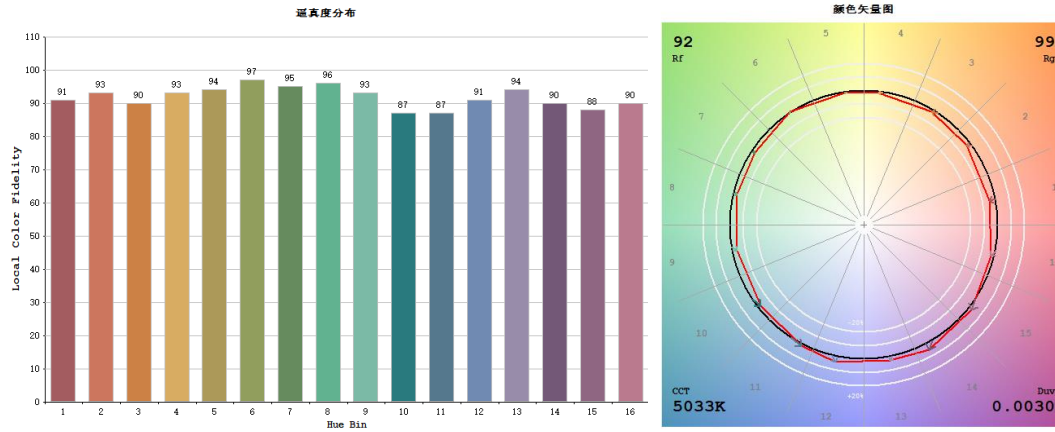
<b>Parameter</b>	<b>Result</b>
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1263.52
Luminous Efficacy (lm/W)	87.78
Beam Angle (°)	36.2
Center Beam Candle Power (cd)	3552

## Spectral Power Distribution & Chromaticity Diagram



## TM30





## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1182.0	93.51%
0-40	1214.0	96.04%
0-60	1254.0	99.21%
60-90	9.6	0.76%
70-100	3.5	0.27%
90-120	0.0	0.00%
0-90	1264.0	100.00%
90-180	0.0	0.00%
0-180	1264.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	319.30	25.26%	90-100	0	0%
10-20	628.8	49.75%	100-110	0	0%
20-30	233.90	18.50%	110-120	0	0%
30-40	32.08	2.54%	120-130	0	0%
40-50	23.93	1.89%	130-140	0	0%
50-60	15.860	1.25%	140-150	0	0%
60-70	6.1940	0.49%	150-160	0	0%
70-80	2.7500	0.22%	160-170	0	0%
80-90	0.7051	0.06%	170-180	0	0%

# Photometric Data

