

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) :

R4TLB

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

Type of Luminaire: Downlights

Report Date: 2024-09-02

1.1 Rated Values:	
Rated Voltage / Frequency	120V, 60HZ
Nominal Power	20W
Rated Initial Lamp Lumen	1900lm (5000k)
Declared CCT	2700k/3000k/3500k/4000k/5000k

1.2 Test Specifications:

Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

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

Test date	2024-09-02	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	R4TLB	CCT Setting	2700k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.167	19.81	0.984

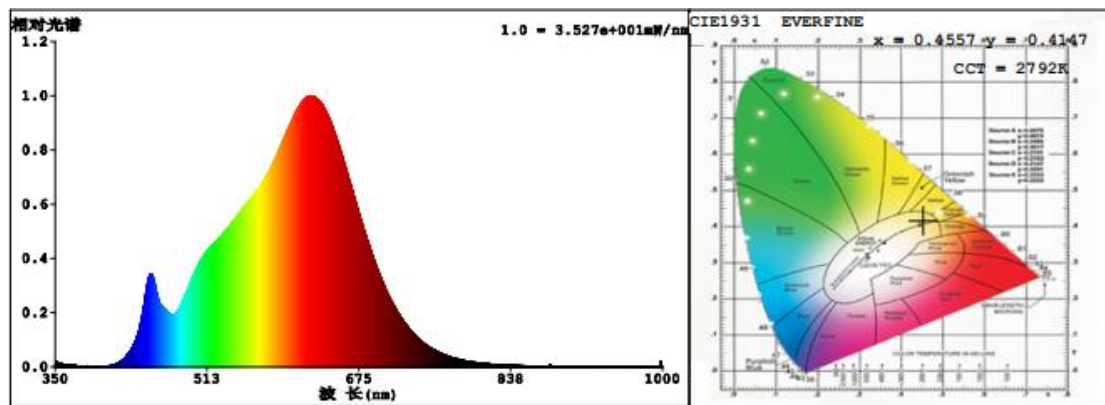
Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	2792
Duv	0.0019
Chromaticity (x, y)	x=0.4557, y=0.4147
Chromaticity (u', v')	u' =0.2580, v' =0.5283
Color Rendering Index (CRI)	94.5
R9	63
Special Color Rendering Indices	
R1	95
R2	97
R3	99
R4	95
R5	95
R6	98
R7	93
R8	84
R9	63
R10	93
R11	97
R12	87
R13	95
R14	99
R15	90
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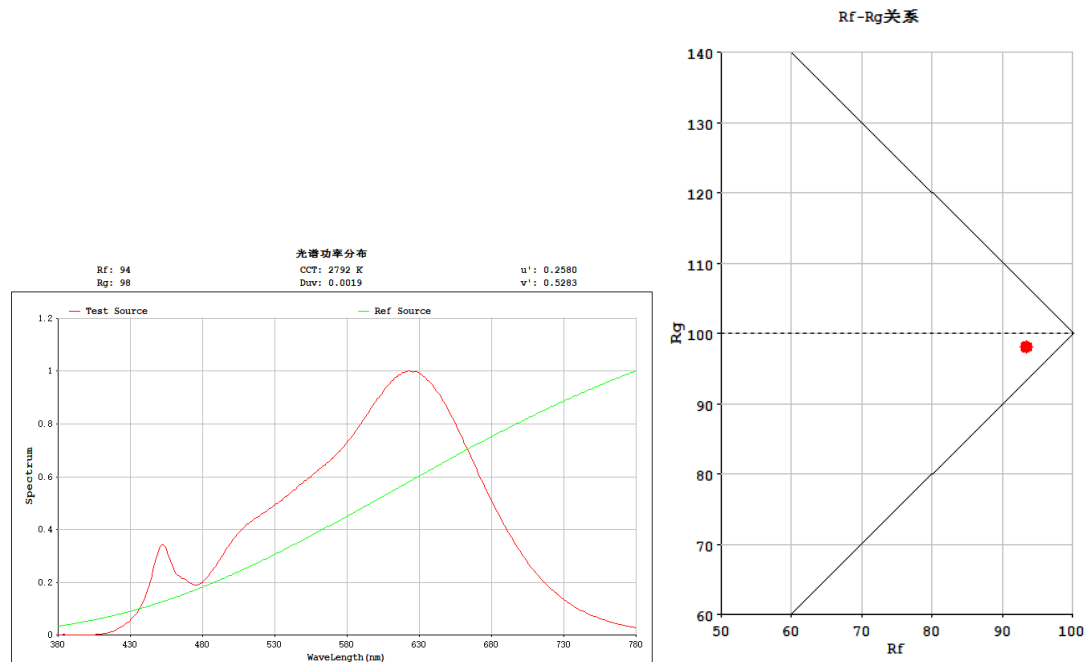
Photometric Measurement – Goniophotometer Method:

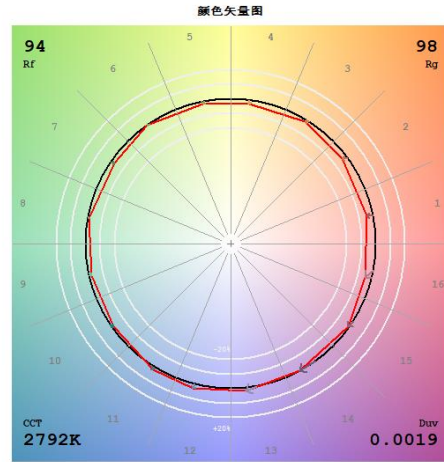
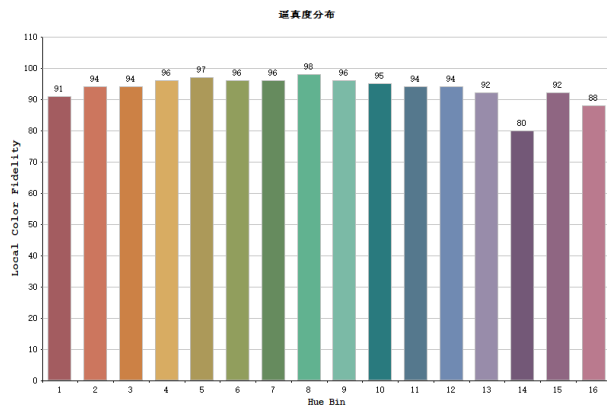
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1549.9
Luminous Efficacy (lm/W)	78.25
Beam Angle (°)	41.4
Center Beam Candle Power (cd)	2923

Spectral Power Distribution & Chromaticity Diagram



TM30



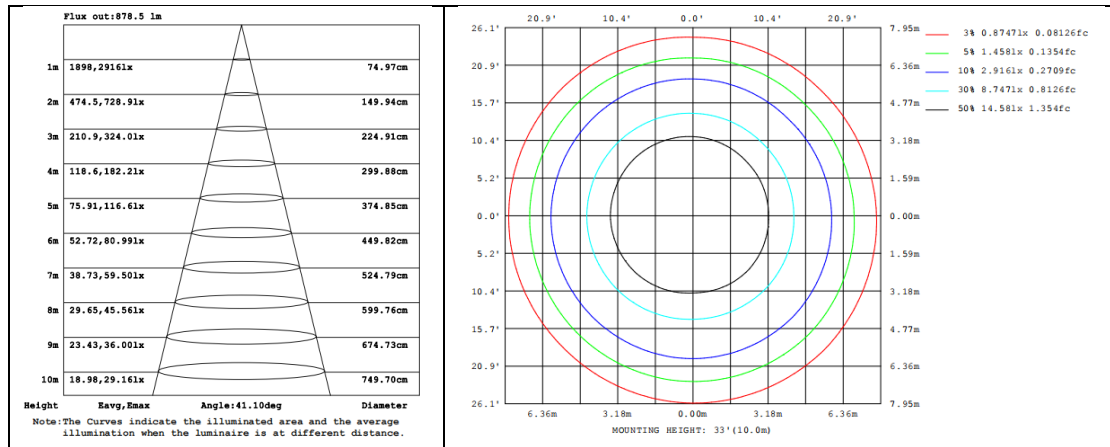
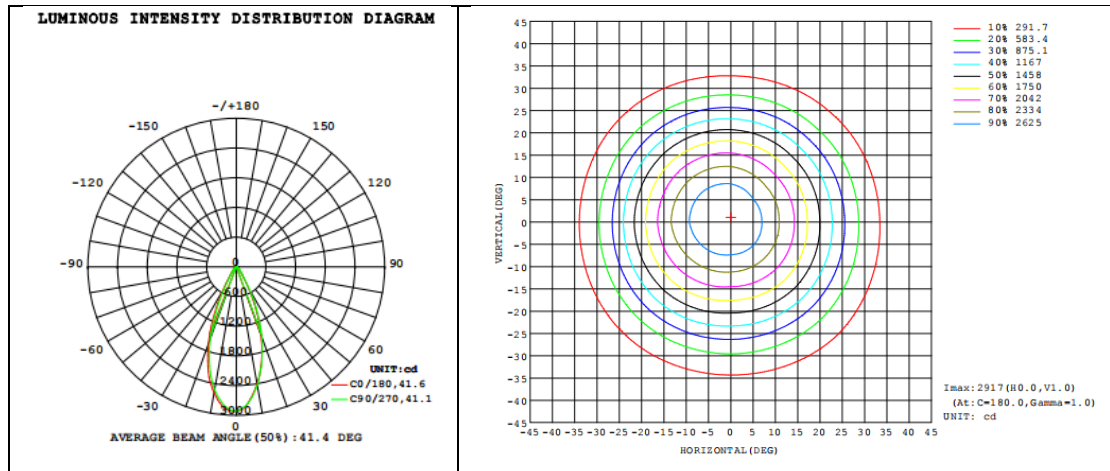


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1269.0	81.87%
0-40	1435.0	92.58%
0-60	1544.0	99.61%
60-90	6.0	0.39%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	1550.0	100.00%
90-180	0.0	0.00%
0-180	1550.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	256.50	16.55%	90-100	0	0%
10-20	565.0	36.45%	100-110	0	0%
20-30	447.30	28.86%	110-120	0	0%
30-40	165.90	10.70%	120-130	0	0%
40-50	75.06	4.84%	130-140	0	0%
50-60	34.600	2.23%	140-150	0	0%
60-70	5.5600	0.36%	150-160	0	0%
70-80	0.0001	0.00%	160-170	0	0%
80-90	0.0000	0.00%	170-180	0	0%

Photometric Data



2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2024-09-02	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	R4TLB	CCT Setting	3000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.165	19.56	0.984

Chromaticity Measurement – Sphere-Spectroradiometer Method:

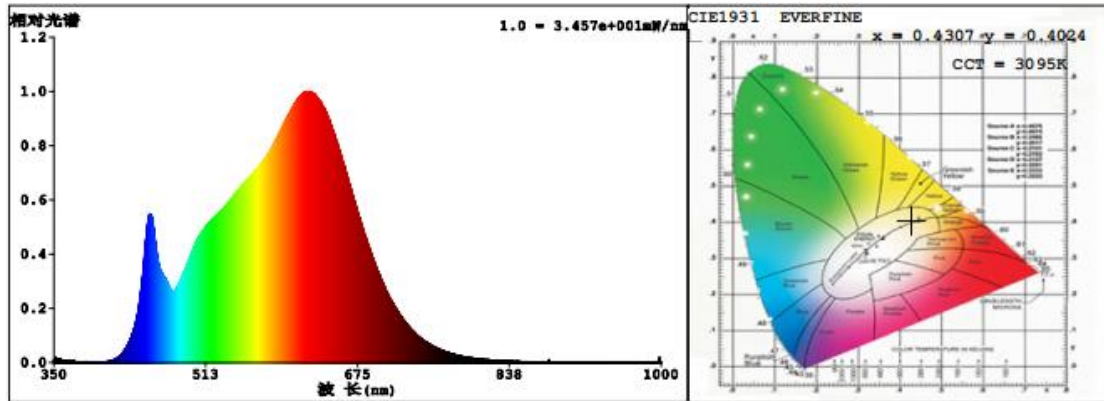
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3095
Duv	0.000239
Chromaticity (x, y)	x=0.4307, y=0.4024
Chromaticity (u', v')	u' =0.2472, v' =0.5198
Color Rendering Index (CRI)	95.2
R9	69

Special Color Rendering Indices			
R1	96	R9	69
R2	98	R10	95
R3	99	R11	97
R4	96	R12	84
R5	96	R13	97
R6	97	R14	99
R7	93	R15	92
R8	86	--	--

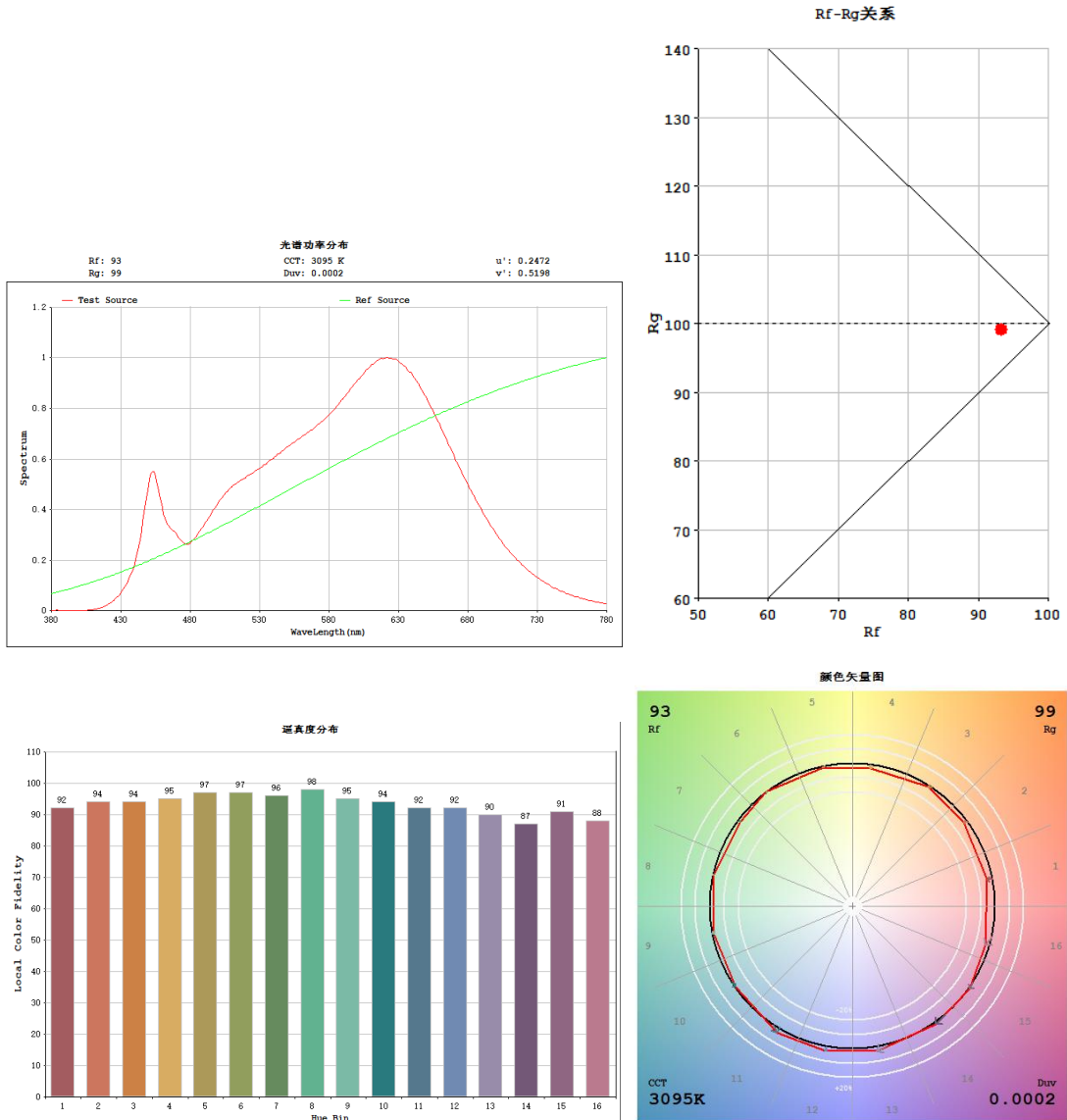
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1651.09
Luminous Efficacy (lm/W)	84.42
Beam Angle (°)	41.3
Center Beam Candle Power (cd)	3120

Spectral Power Distribution & Chromaticity Diagram



TM30



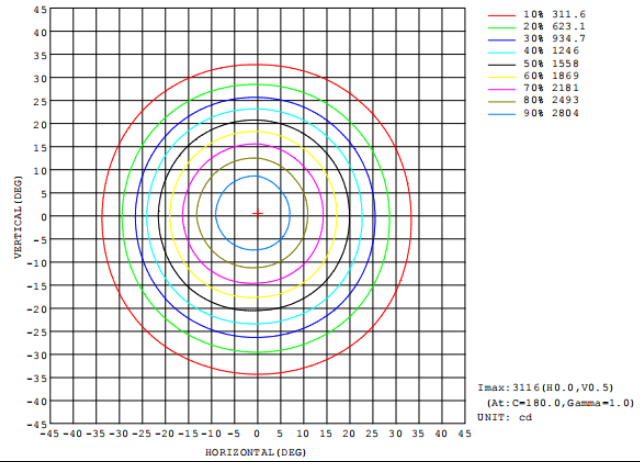
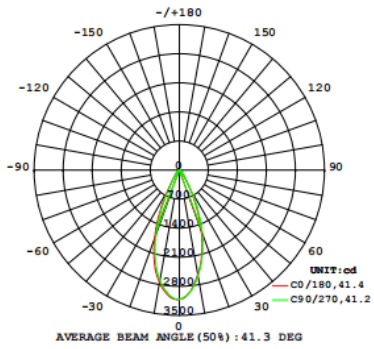
Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1353.0	81.95%
0-40	1528.0	92.55%
0-60	1645.0	99.64%
60-90	6.0	0.36%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	1651.0	100.00%
90-180	0.0	0.00%
0-180	1651.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	273.80	16.58%	90-100	0	0%
10-20	603.2	36.54%	100-110	0	0%
20-30	475.80	28.82%	110-120	0	0%
30-40	175.70	10.64%	120-130	0	0%
40-50	79.82	4.83%	130-140	0	0%
50-60	36.860	2.23%	140-150	0	0%
60-70	5.9310	0.36%	150-160	0	0%
70-80	0.0001	0.00%	160-170	0	0%
80-90	0.0000	0.00%	170-180	0	0%

Photometric Data

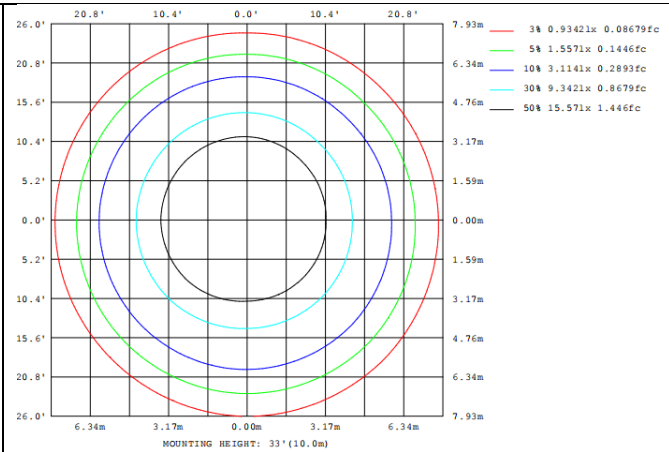
LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Flux out: 937.9 lm

Height	Eavg, Emax	Angle: 41.22deg	Diameter
1m	2026, 3118lx		75.21cm
2m	506.5, 779.6lx		150.42cm
3m	225.1, 346.5lx		225.63cm
4m	126.6, 194.9lx		300.84cm
5m	81.04, 124.7lx		376.05cm
6m	56.28, 86.62lx		451.26cm
7m	41.35, 63.64lx		526.46cm
8m	31.66, 48.72lx		601.67cm
9m	25.01, 38.50lx		676.88cm
10m	20.26, 31.18lx		752.09cm

Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.



2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2024-09-02	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	R4TLB	CCT Setting	3500k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.161	19.17	0.984

Chromaticity Measurement - Sphere-Spectroradiometer Method:

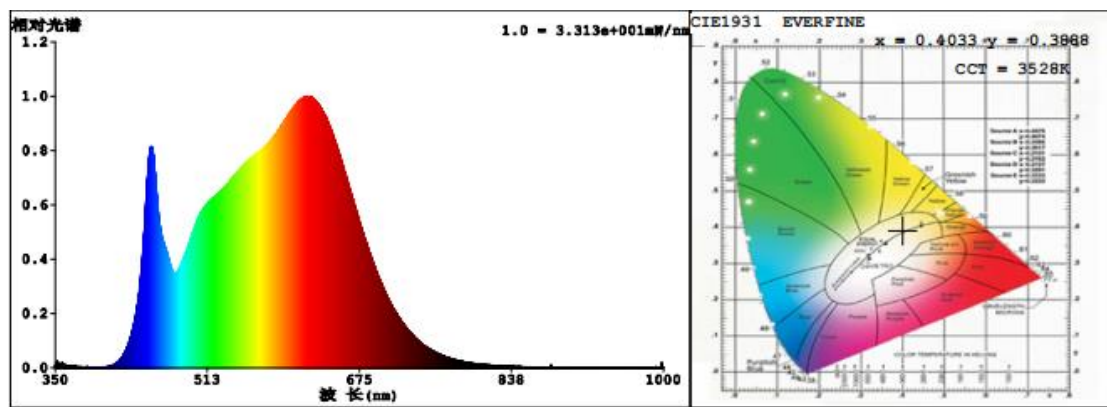
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3528
Duv	-0.000417
Chromaticity (x, y)	x=0.4033, y=0.3888
Chromaticity (u', v')	u' =0.2352, v' =0.5102
Color Rendering Index (CRI)	95.2
R9	71

Special Color Rendering Indices			
R1	96	R9	71
R2	98	R10	95
R3	99	R11	96
R4	95	R12	80
R5	95	R13	97
R6	96	R14	99
R7	94	R15	93
R8	88	--	--

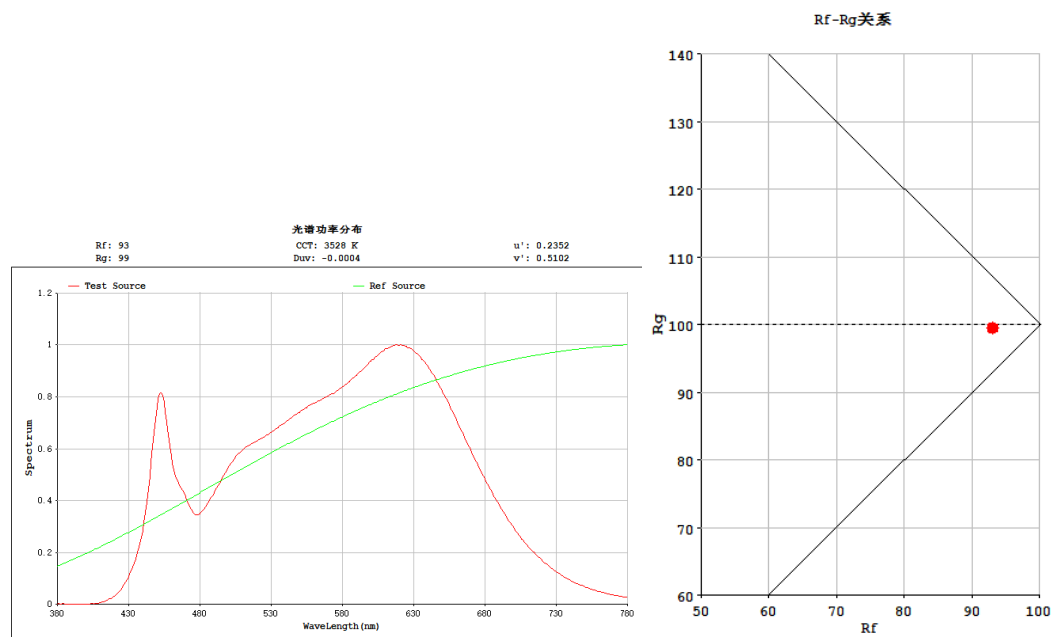
Photometric Measurement – Goniophotometer Method:

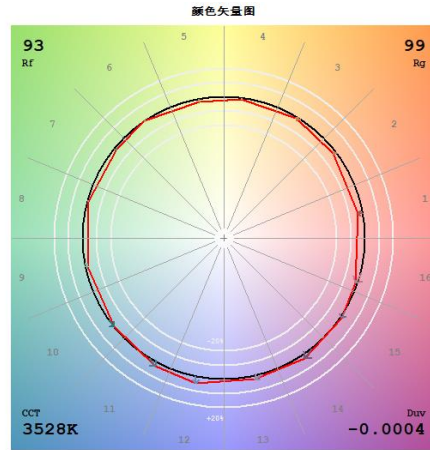
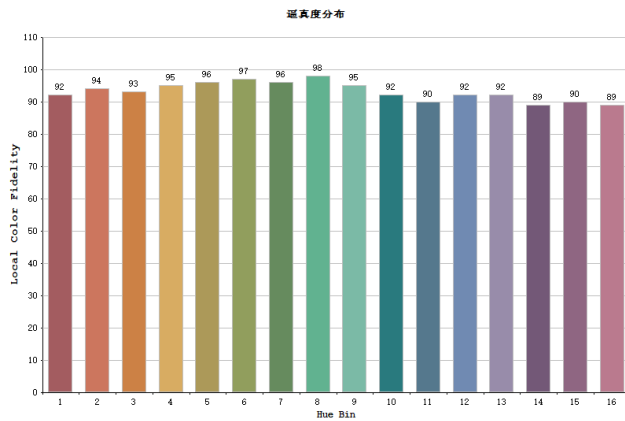
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1753.34
Luminous Efficacy (lm/W)	91.49
Beam Angle (°)	41.3
Center Beam Candle Power (cd)	3330

Spectral Power Distribution & Chromaticity Diagram



TM30



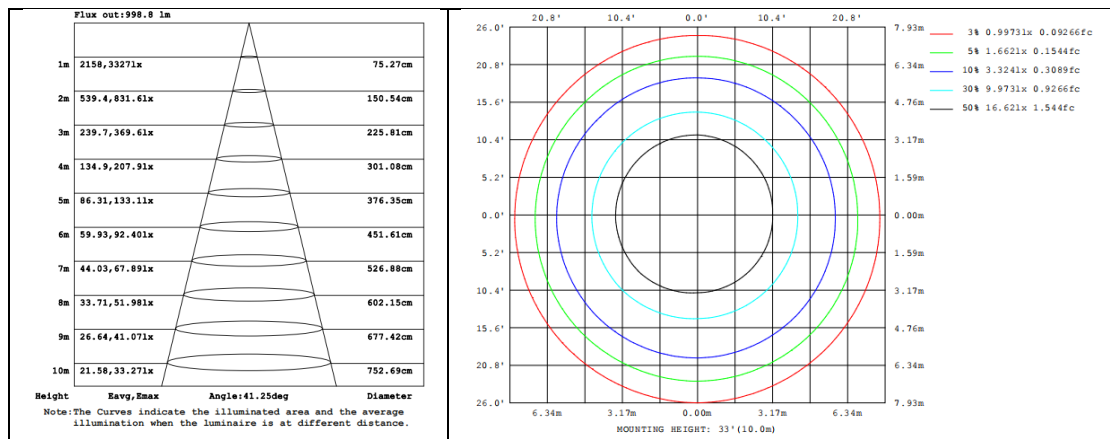
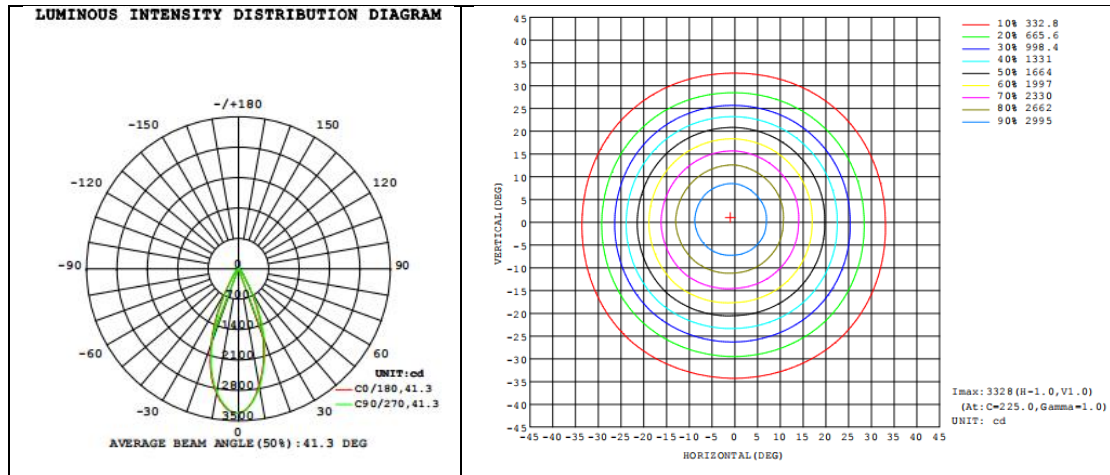


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1438.0	82.03%
0-40	1623.0	92.58%
0-60	1747.0	99.66%
60-90	6.0	0.34%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	1753.0	100.00%
90-180	0.0	0.00%
0-180	1753.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	291.60	16.63%	90-100	0	0%
10-20	642.3	36.64%	100-110	0	0%
20-30	504.40	28.77%	110-120	0	0%
30-40	185.00	10.55%	120-130	0	0%
40-50	84.55	4.82%	130-140	0	0%
50-60	39.160	2.23%	140-150	0	0%
60-70	6.3060	0.36%	150-160	0	0%
70-80	0.0002	0.00%	160-170	0	0%
80-90	0.0000	0.00%	170-180	0	0%

Photometric Data



2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2024-09-02	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	R4TLB	CCT Setting	4000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.165	19.57	0.984

Chromaticity Measurement - Sphere-Spectroradiometer Method:

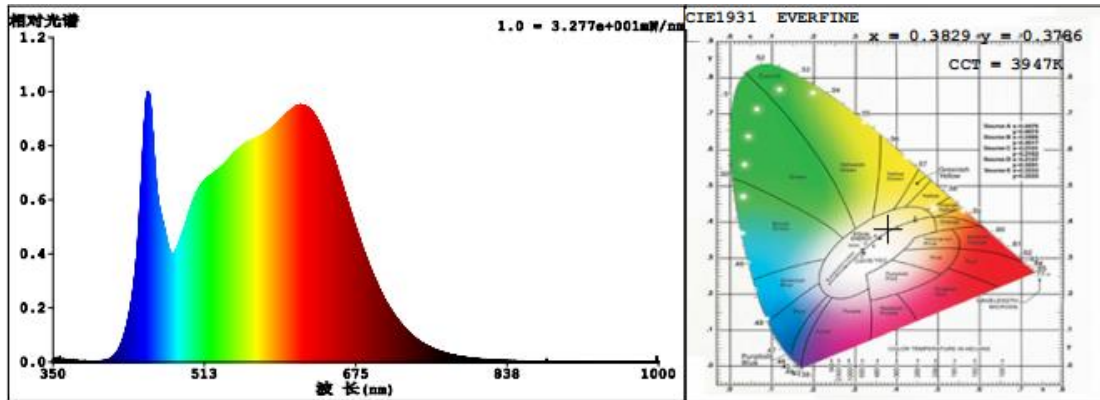
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	3947
Duv	0.000141
Chromaticity (x, y)	x=0.3829, y=0.3786
Chromaticity (u', v')	u' =0.2260, v' =0.5028
Color Rendering Index (CRI)	94.5
R9	70

Special Color Rendering Indices			
R1	95	R9	70
R2	97	R10	93
R3	98	R11	95
R4	95	R12	77
R5	94	R13	96
R6	95	R14	99
R7	95	R15	92
R8	88	--	--

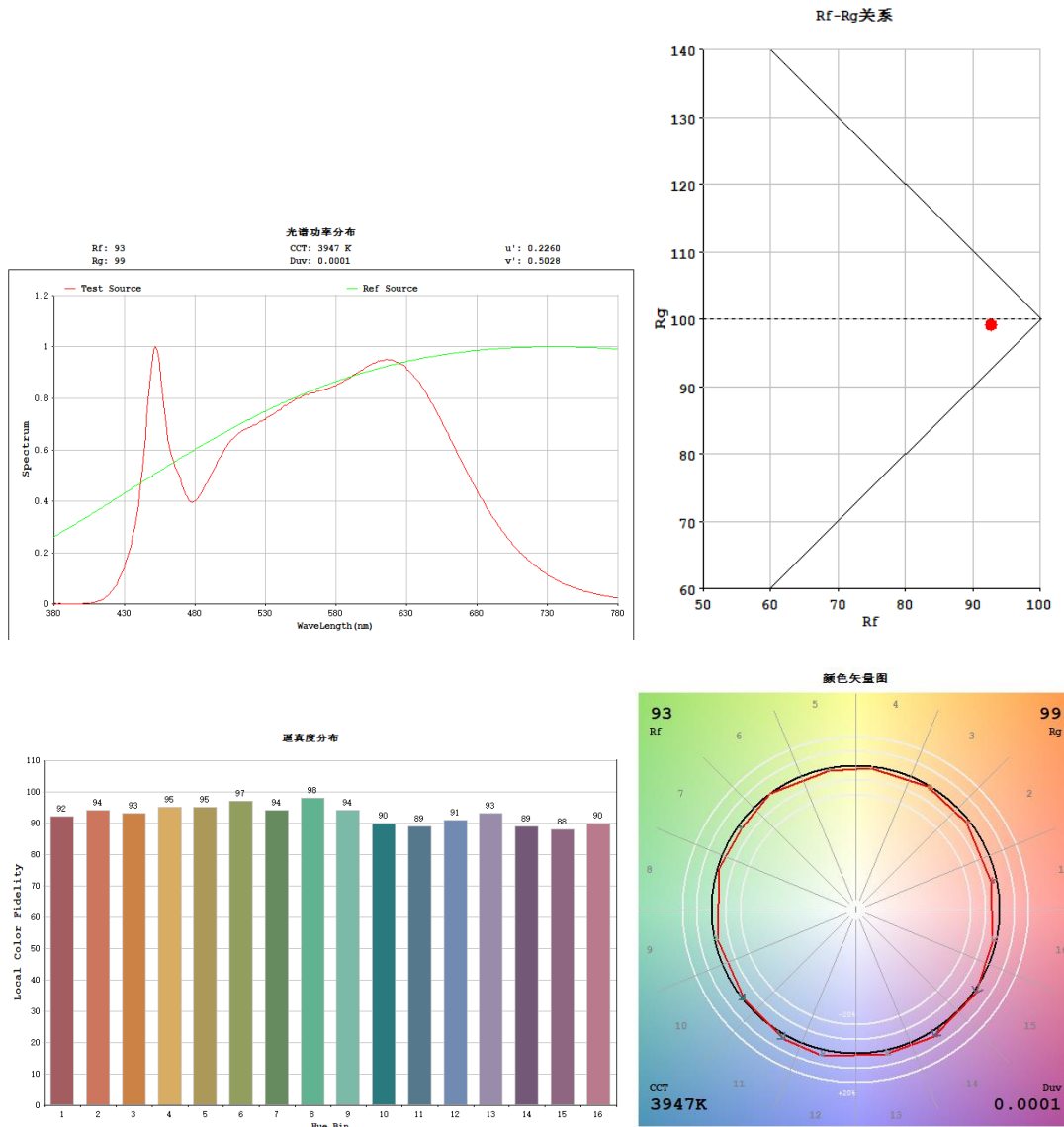
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1796.89
Luminous Efficacy (lm/W)	91.80
Beam Angle (°)	41.2
Center Beam Candle Power (cd)	3425

Spectral Power Distribution & Chromaticity Diagram



TM30



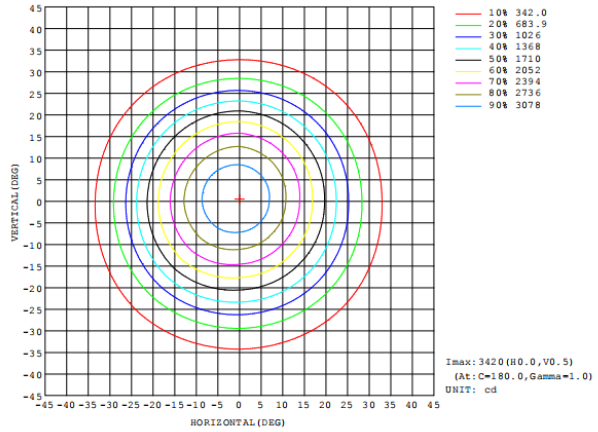
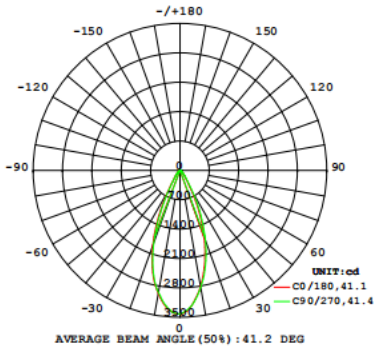
Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1475.0	82.08%
0-40	1664.0	92.60%
0-60	1790.0	99.61%
60-90	7.0	0.39%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	1797.0	100.00%
90-180	0.0	0.00%
0-180	1797.0	100.00%

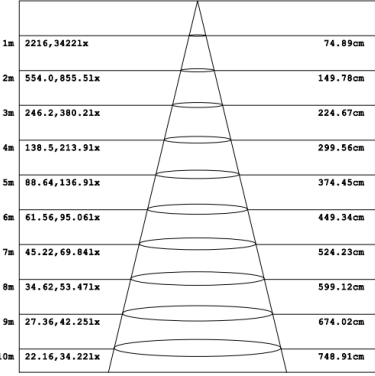
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	299.70	16.68%	90-100	0	0%
10-20	659.6	36.71%	100-110	0	0%
20-30	516.10	28.72%	110-120	0	0%
30-40	188.40	10.48%	120-130	0	0%
40-50	86.45	4.81%	130-140	0	0%
50-60	40.140	2.23%	140-150	0	0%
60-70	6.4630	0.36%	150-160	0	0%
70-80	0.0003	0.00%	160-170	0	0%
80-90	0.0000	0.00%	170-180	0	0%

Photometric Data

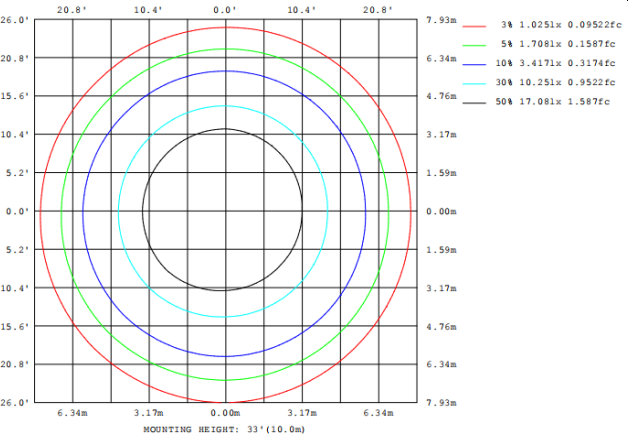
LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Flux out: 1026 lm



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.



2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2024-09-02	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	R4TLB	CCT Setting	5000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120.7	60	0.171	20.33	0.985

Chromaticity Measurement - Sphere-Spectroradiometer Method:

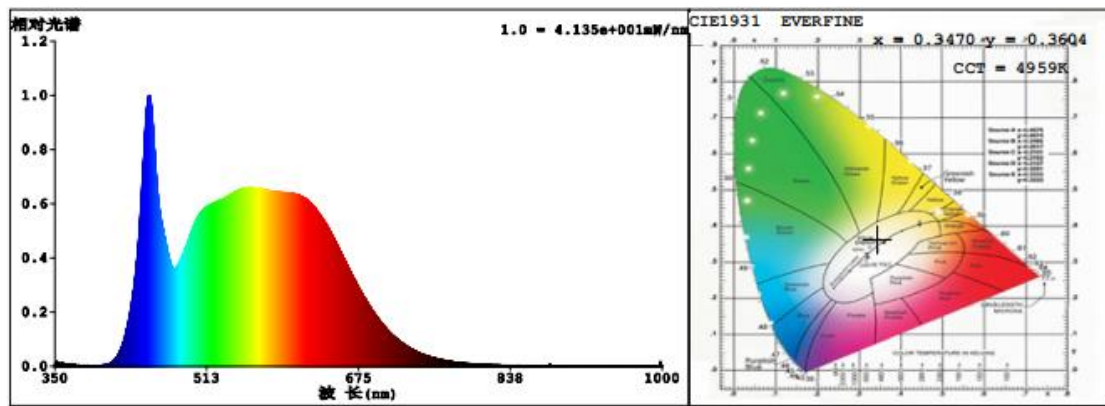
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
CCT (K)	4959
Duv	0.00362
Chromaticity (x, y)	x=0.3470, y=0.3604
Chromaticity (u', v')	u' =0.2093, v' =0.4892
Color Rendering Index (CRI)	90.9
R9	54

Special Color Rendering Indices			
R1	90	R9	54
R2	94	R10	85
R3	96	R11	90
R4	90	R12	69
R5	89	R13	91
R6	90	R14	98
R7	94	R15	87
R8	83	--	--

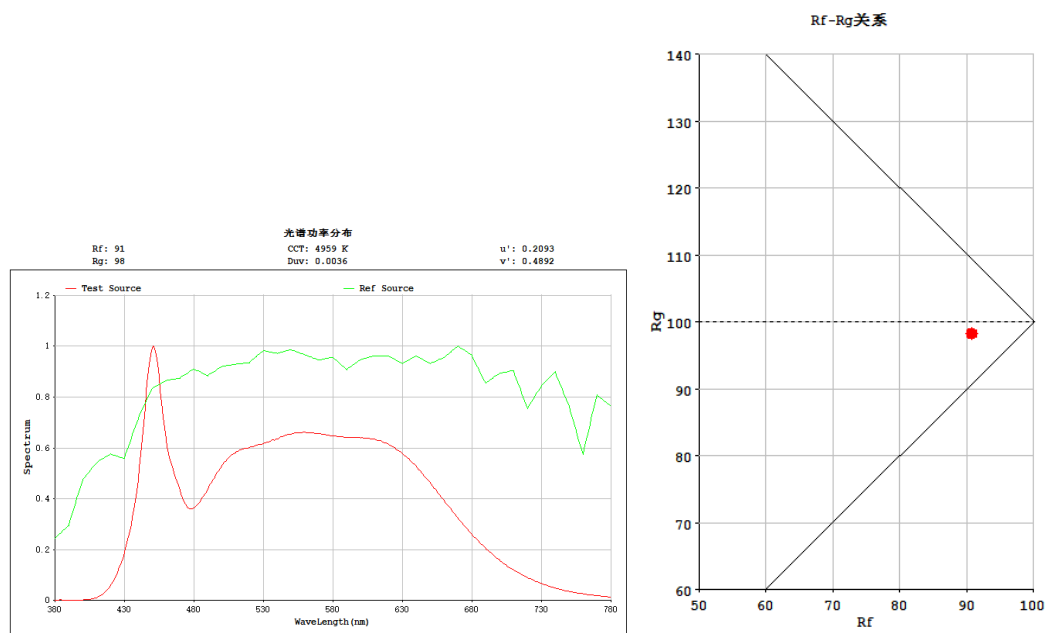
Photometric Measurement – Goniophotometer Method:

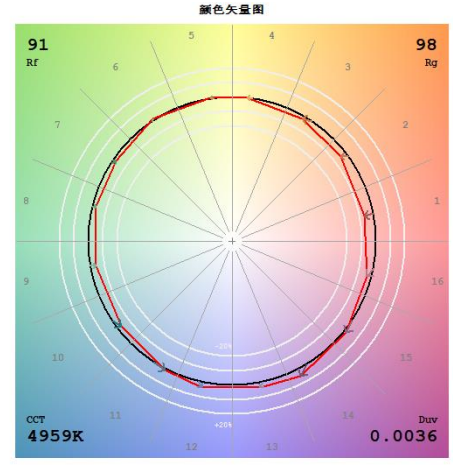
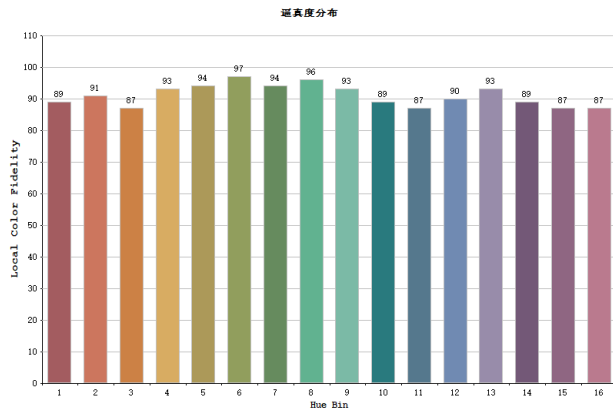
Parameter	Result
Test Voltage (V)	120.7
Frequency (Hz)	60
Total Luminous (lm)	1771.55
Luminous Efficacy (lm/W)	87.13
Beam Angle (°)	41.1
Center Beam Candle Power (cd)	3405

Spectral Power Distribution & Chromaticity Diagram



TM30





Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1457.0	82.22%
0-40	1641.0	92.61%
0-60	1765.0	99.60%
60-90	7.0	0.40%
70-100	0.0	0.00%
90-120	0.0	0.00%
0-90	1772.0	100.00%
90-180	0.0	0.00%
0-180	1772.0	100.00%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	296.80	16.75%	90-100	0	0%
10-20	652.8	36.84%	100-110	0	0%
20-30	507.60	28.65%	110-120	0	0%
30-40	183.50	10.36%	120-130	0	0%
40-50	84.86	4.79%	130-140	0	0%
50-60	39.600	2.23%	140-150	0	0%
60-70	6.3620	0.36%	150-160	0	0%
70-80	0.0001	0.00%	160-170	0	0%
80-90	0.0000	0.00%	170-180	0	0%

Photometric Data

