

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) :

DLR0138(R3-15)

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

Type of Luminaire: Downlights

Report Date: 2023-6-17

1.1 Rated Values:	
Rated Voltage / Frequency	120V, 60HZ
Nominal Power	15W
Rated Initial Lamp Lumen	950lm (2700k) , 1000lm (3000k)
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	2023-6-17	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLR0138 (R3-15)	CCT Setting	2700k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.1206	14.28	0.9825

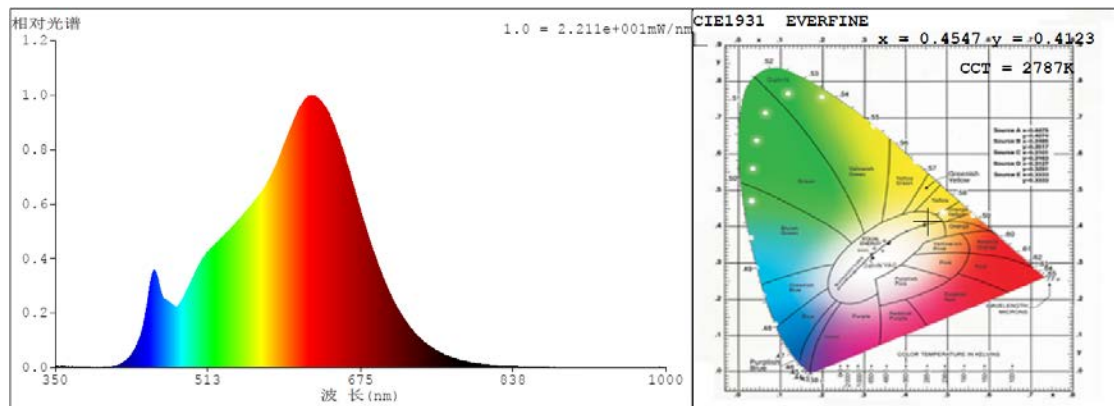
Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	69
Frequency (Hz)	60	R2	99	R10	98
CCT (K)	2787	R3	99	R11	99
Duv	0.00111	R4	97	R12	88
Chromaticity (x, y)	x=0.4547, y=0.4123	R5	97	R13	98
Chromaticity (u', v')	u' =0.2584, v' =0.5272	R6	97	R14	99
Color Rendering Index (CRI)	95.6	R7	93	R15	92
R9	69	R8	86	--	--

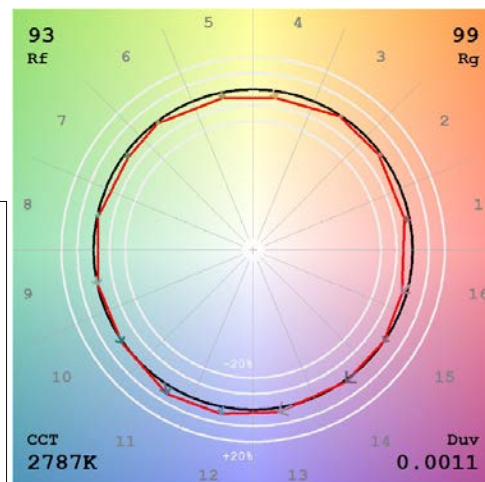
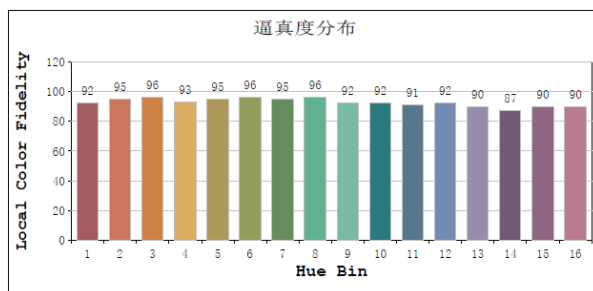
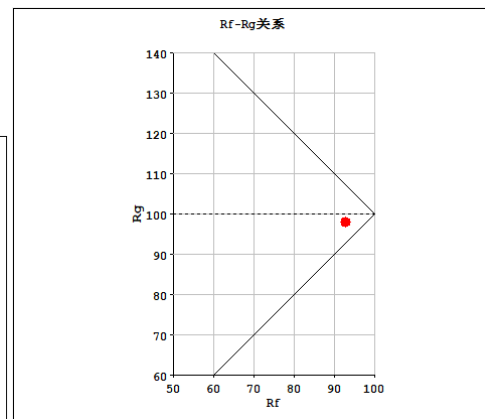
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1005.6
Luminous Efficacy (lm/W)	70.75
Beam Angle (°)	37.1
Center Beam Candle Power (cd)	2145

Spectral Power Distribution & Chromaticity Diagram



TM30

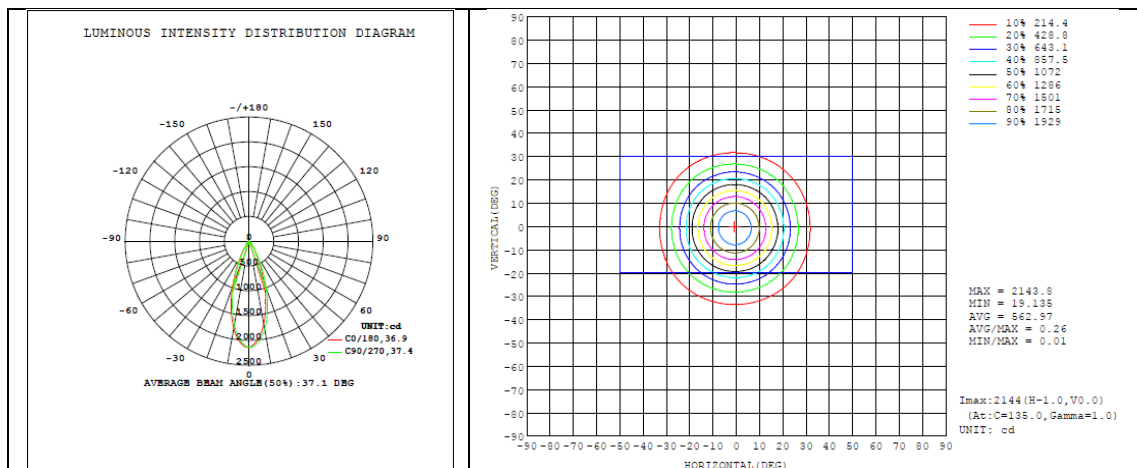


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	822.6	81.8%
0-40	925.2	92.0%
0-60	987.5	98.2%
60-90	18.1	1.7%
70-100	7.0	0.7%
90-120	0.0	0.0%
0-90	1005.6	100.0%
90-180	0.0	0.0%
0-180	1005.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	185.0	18.4%	90-100	0	0%
10-20	374.1	37.2%	100-110	0	0%
20-30	263.5	26.2%	110-120	0	0%
30-40	102.6	10.2%	120-130	0	0%
40-50	41.2	4.1%	130-140	0	0%
50-60	21.1	2.1%	140-150	0	0%
60-70	11.1	1.1%	150-160	0	0%
70-80	6.0	0.6%	160-170	0	0%
80-90	1.0	0.1%	170-180	0	0%

Photometric Data



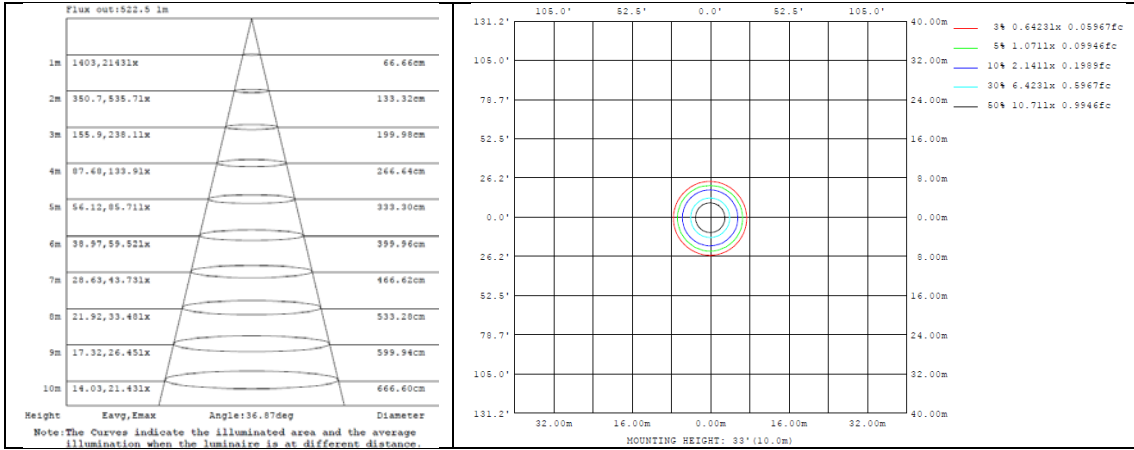


Table--1

UNIT: cd

γ (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	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138	2138				
5	1997	2009	2020	2040	2049	2059	2063	2060	2050	2038	2035	2019	2010	1997	1994	1990				
10	1700	1724	1750	1786	1804	1819	1813	1807	1788	1770	1758	1734	1719	1697	1692	1688				
15	1303	1335	1371	1413	1435	1453	1444	1436	1411	1389	1372	1343	1323	1297	1291	1284				
20	887	918	953	999	1019	1034	1029	1018	993	969	954	924	903	877	871	866				
25	517	543	569	606	626	639	630	619	598	581	574	553	536	515	509	504				
30	270	287	301	324	339	348	343	336	323	312	304	288	276	263	260	260				
35	144	152	165	174	183	182	179	170	161	154	146	142	136	134	131	135				
40	74.8	79.3	84.0	90.8	94.3	96.4	95.1	93.0	89.0	84.9	83.1	79.9	77.8	74.3	73.1	72.2				
45	46.7	48.3	50.0	52.4	53.5	54.7	55.1	55.3	54.1	52.7	51.9	50.4	49.1	47.5	46.6	45.9				
50	31.7	32.3	33.2	34.4	34.9	35.7	36.6	37.3	36.7	35.9	35.3	34.3	33.3	32.4	31.9	31.4				
55	21.7	22.2	22.6	23.7	24.4	25.0	25.4	25.5	24.9	24.3	23.8	23.1	22.5	21.6	21.5	21.2				
60	14.1	14.1	14.2	14.8	15.6	16.3	16.5	16.3	15.9	15.8	15.6	15.1	14.5	14.0	13.8	13.9				
65	10.5	10.5	10.5	10.7	10.9	11.1	11.2	11.4	11.4	11.4	11.3	11.2	11.0	10.8	10.6	10.5				
70	7.62	7.66	7.76	7.96	8.16	8.39	8.59	8.73	8.74	8.72	8.64	8.47	8.26	8.01	7.83	7.66				
75	5.03	5.06	5.15	5.32	5.49	5.71	5.87	6.01	6.03	5.99	5.94	5.80	5.63	5.39	5.23	5.06				
80	2.82	2.85	2.92	3.07	3.22	3.40	3.53	3.64	3.68	3.64	3.59	3.45	3.31	3.12	2.97	2.85				
85	0.99	1.00	1.09	1.19	1.34	1.45	1.57	1.63	1.66	1.64	1.57	1.47	1.33	1.21	1.07	1.01				
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				

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2023-6-17	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLR0138 (R3-15)	CCT Setting	3000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.1181	13.97	0.9819

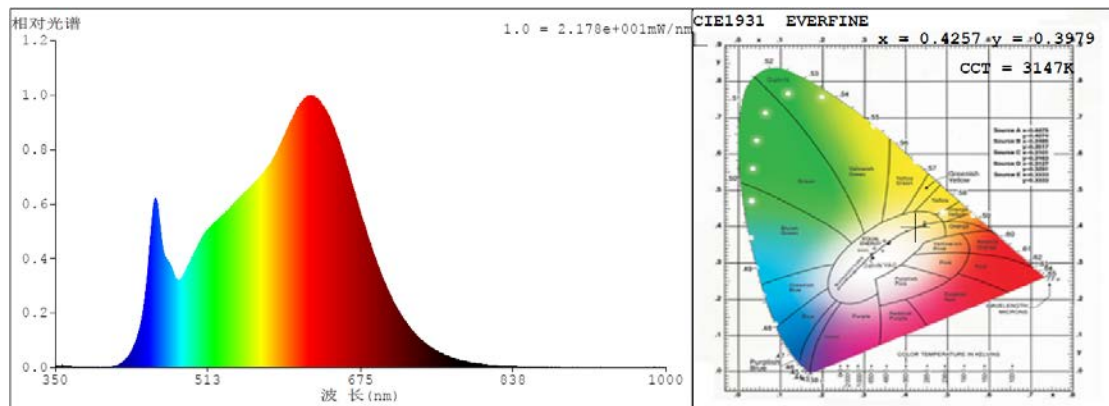
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	77
Frequency (Hz)	60	R2	99	R10	99
CCT (K)	3147	R3	98	R11	99
Duv	-0.000838	R4	96	R12	83
Chromaticity (x, y)	x=0.4257, y=0.3979	R5	97	R13	100
Chromaticity (u', v')	u' =0.2460, v' =0.5172	R6	96	R14	99
Color Rendering Index (CRI)	95.7	R7	93	R15	95
R9	77	R8	89	--	--

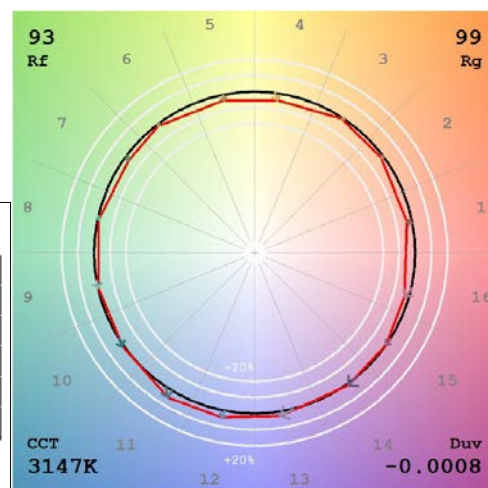
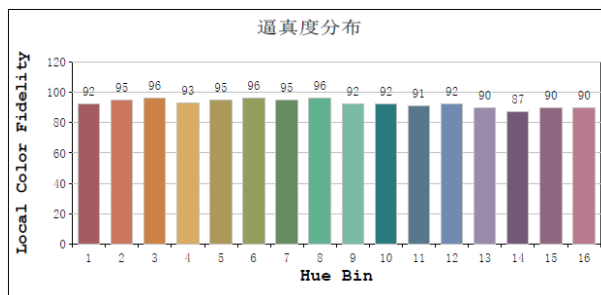
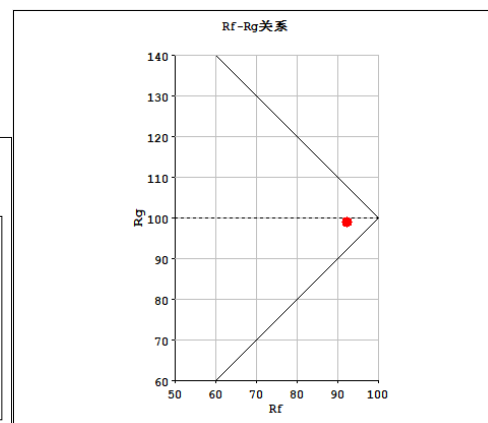
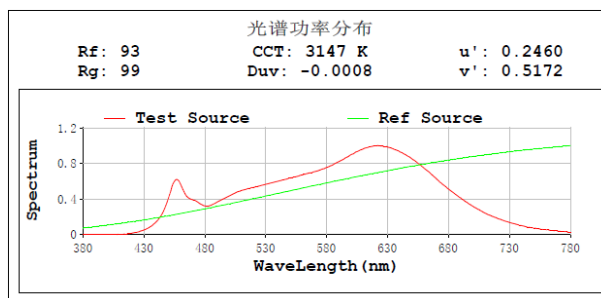
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1090.6
Luminous Efficacy (lm/W)	78.25
Beam Angle (°)	37.2
Center Beam Candle Power (cd)	2319

Spectral Power Distribution & Chromaticity Diagram



TM30

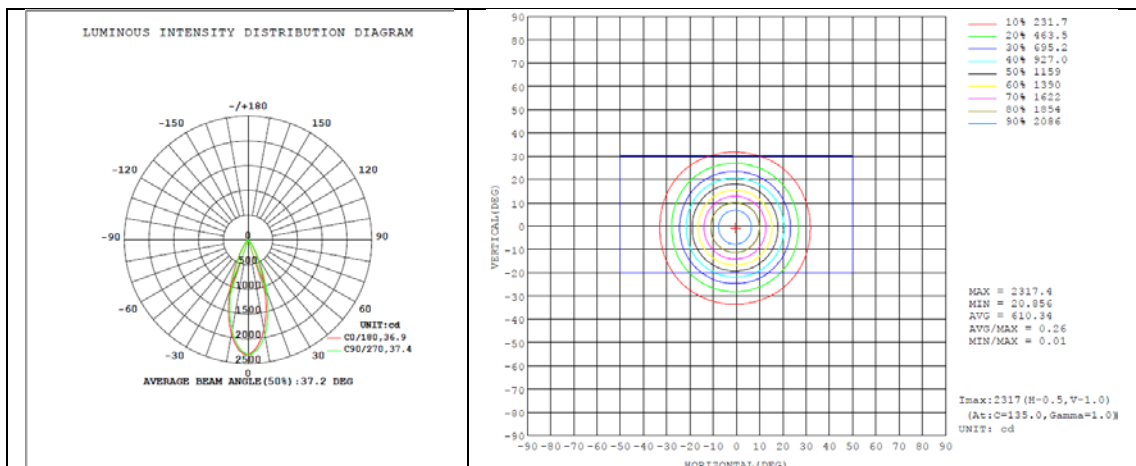


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	891.0	81.7%
0-40	1003.4	92.0%
0-60	1071.0	98.2%
60-90	19.6	1.6%
70-100	7.6	0.7%
90-120	0.0	0.0%
0-90	1090.6	100.0%
90-180	0.0	0.0%
0-180	1090.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	199.6	18.3%	90-100	0	0%
10-20	405.7	37.2%	100-110	0	0%
20-30	285.7	26.2%	110-120	0	0%
30-40	112.3	10.3%	120-130	0	0%
40-50	44.7	4.1%	130-140	0	0%
50-60	22.9	2.1%	140-150	0	0%
60-70	12.0	1.1%	150-160	0	0%
70-80	5.5	0.5%	160-170	0	0%
80-90	2.2	0.2%	170-180	0	0%

Photometric Data



2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2023-6-17	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLR0138 (R3-15)	CCT Setting	3500k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.1149	13.58	0.9811

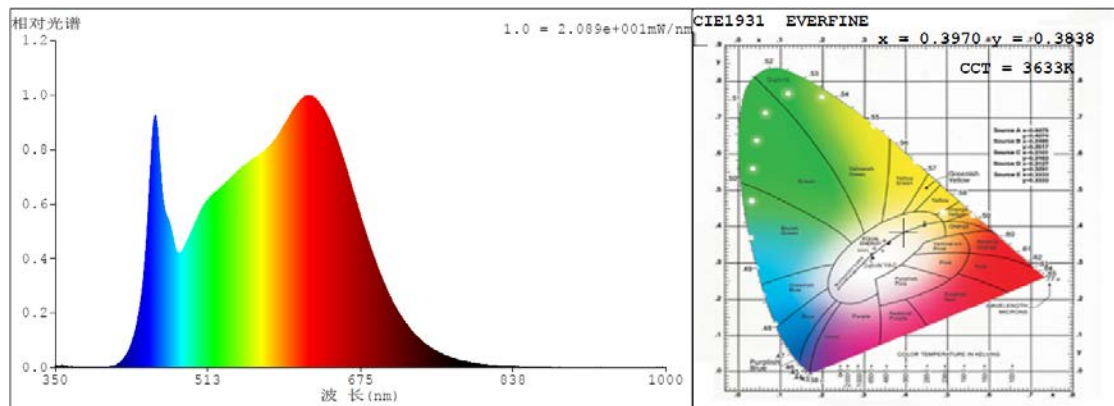
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	81
Frequency (Hz)	60	R2	99	R10	99
CCT (K)	3633	R3	98	R11	98
Duv	-0.00115	R4	95	R12	78
Chromaticity (x, y)	x=0.3970, y=0.3838	R5	96	R13	99
Chromaticity (u', v')	u' =0.2331, v' =0.5071	R6	96	R14	100
Color Rendering Index (CRI)	95.7	R7	93	R15	96
R9	81	R8	90	--	--

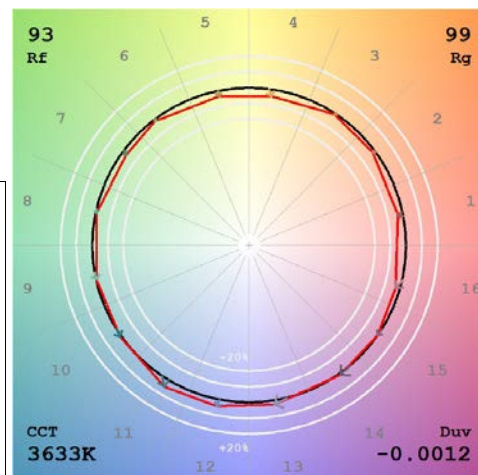
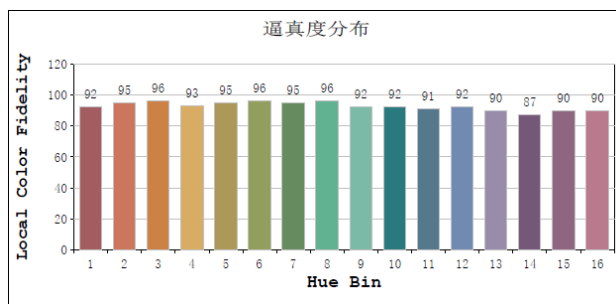
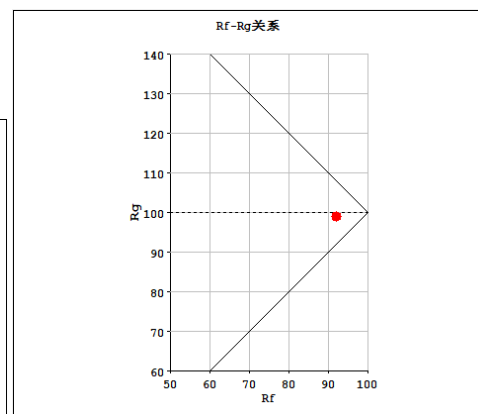
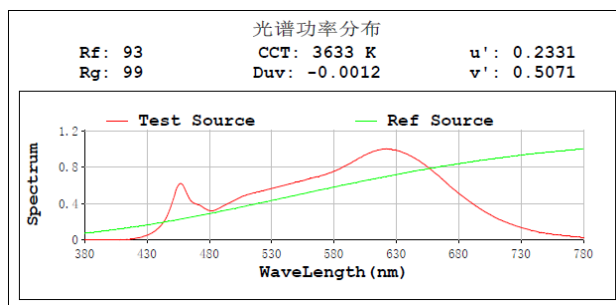
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1171.3
Luminous Efficacy (lm/W)	86.34
Beam Angle (°)	37.2
Center Beam Candle Power (cd)	2487

Spectral Power Distribution & Chromaticity Diagram



TM30

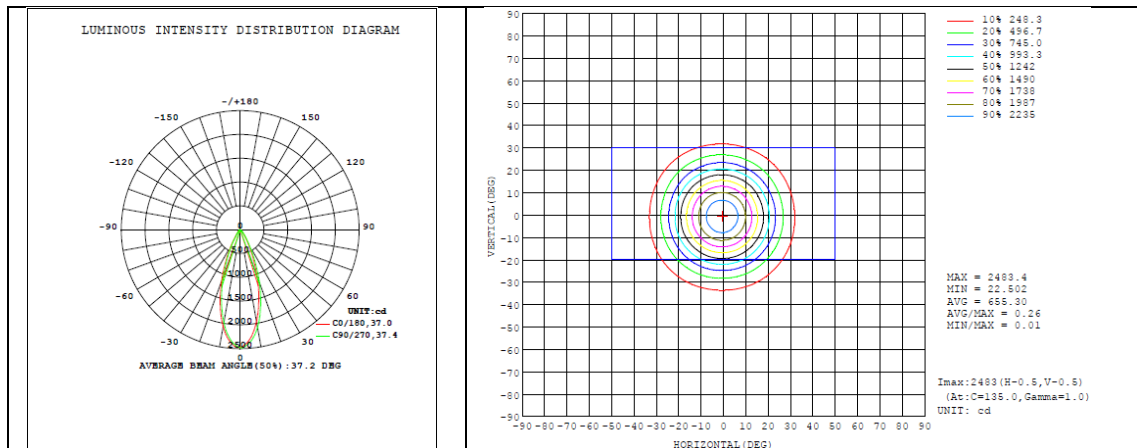


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	955.8	81.6%
0-40	1076.4	91.9%
0-60	1149.0	98.1%
60-90	22.3	1.7%
70-100	8.2	0.7%
90-120	0.0	0.0%
0-90	1171.3	100.0%
90-180	0.0	0.0%
0-180	1171.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	214.3	18.3%	90-100	0	0%
10-20	433.4	37.0%	100-110	0	0%
20-30	308.1	26.3%	110-120	0	0%
30-40	120.6	10.3%	120-130	0	0%
40-50	48.0	4.1%	130-140	0	0%
50-60	24.6	2.1%	140-150	0	0%
60-70	14.1	1.2%	150-160	0	0%
70-80	5.9	0.5%	160-170	0	0%
80-90	2.3	0.2%	170-180	0	0%

Photometric Data



2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2023-6-17	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLR0138 (R3-15)	CCT Setting	4000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.1160	13.71	0.9814

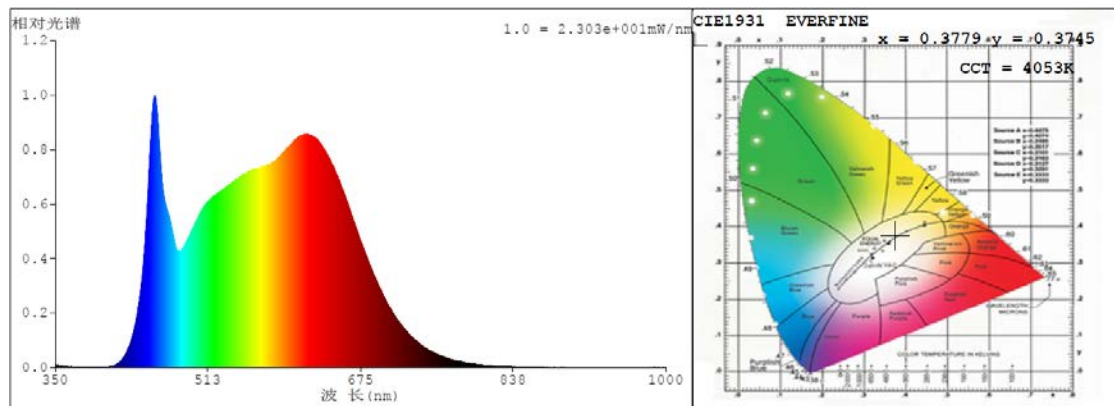
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	80
Frequency (Hz)	60	R2	99	R10	99
CCT (K)	4053	R3	99	R11	96
Duv	-0.000338	R4	94	R12	74
Chromaticity (x, y)	x=0.3779, y=0.3745	R5	95	R13	99
Chromaticity (u', v')	u' =0.2244, v' =0.5002	R6	96	R14	100
Color Rendering Index (CRI)	95.5	R7	93	R15	95
R9	80	R8	90	--	--

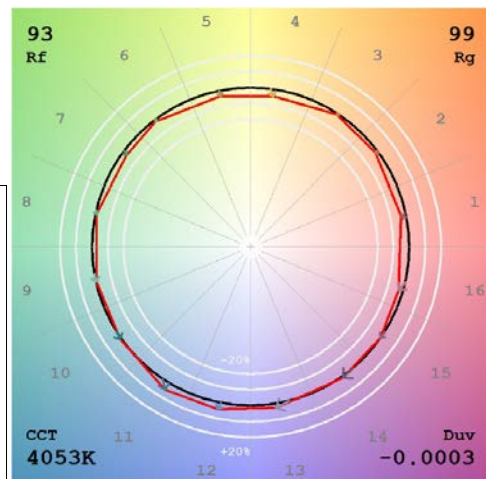
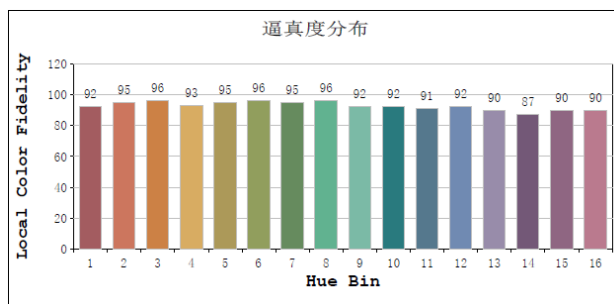
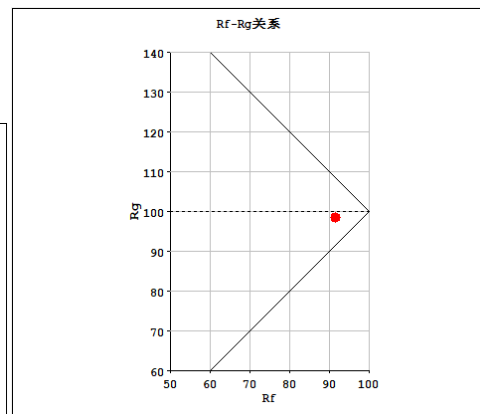
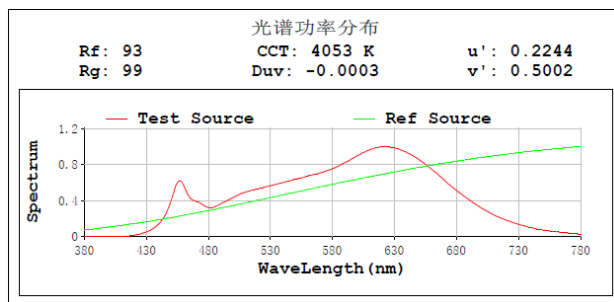
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1207.7
Luminous Efficacy (lm/W)	88.18
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	2555

Spectral Power Distribution & Chromaticity Diagram



TM30

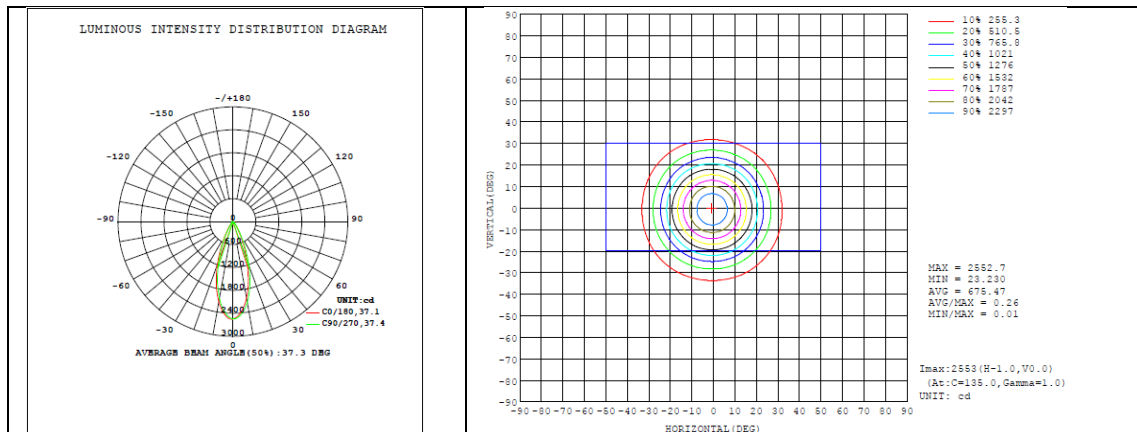


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	985.5	81.6%
0-40	1109.9	91.9%
0-60	1184.8	98.1%
60-90	22.9	1.7%
70-100	8.5	0.7%
90-120	0.0	0.0%
0-90	1207.7	100.0%
90-180	0.0	0.0%
0-180	1207.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	219.8	18.2%	90-100	0	0%
10-20	446.8	37.0%	100-110	0	0%
20-30	318.8	26.4%	110-120	0	0%
30-40	124.4	10.3%	120-130	0	0%
40-50	49.5	4.1%	130-140	0	0%
50-60	25.4	2.1%	140-150	0	0%
60-70	14.5	1.2%	150-160	0	0%
70-80	6.0	0.5%	160-170	0	0%
80-90	2.4	0.2%	170-180	0	0%

Photometric Data



2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2023-6-17	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLR0138 (R3-15)	CCT Setting	5000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.1206	14.27	0.9826

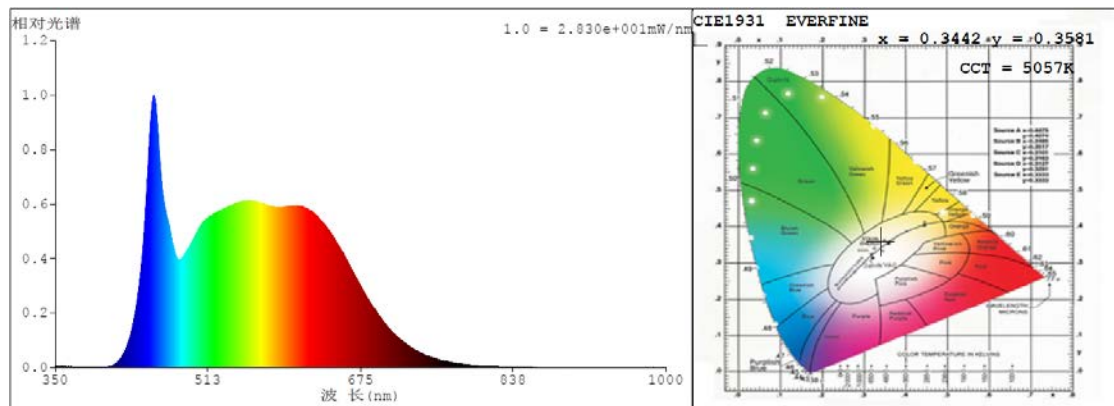
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	66
Frequency (Hz)	60	R2	97	R10	92
CCT (K)	5057	R3	98	R11	92
Duv	0.000362	R4	92	R12	73
Chromaticity (x, y)	x=0.3442, y=0.3581	R5	92	R13	95
Chromaticity (u', v')	u' =0.2083, v' =0.4877	R6	94	R14	99
Color Rendering Index (CRI)	93.2	R7	93	R15	91
R9	66	R8	86	--	--

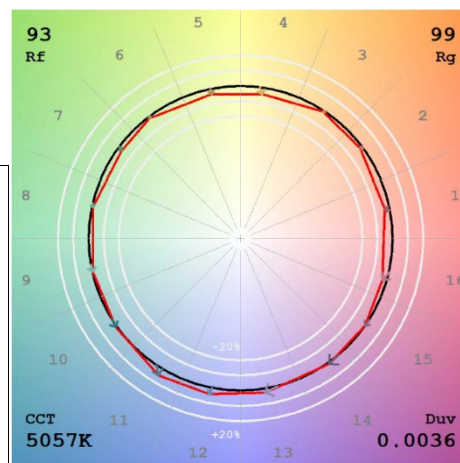
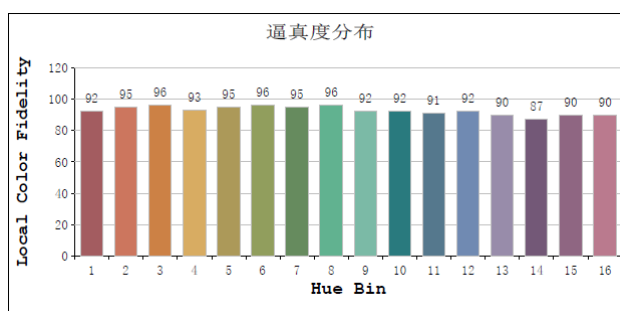
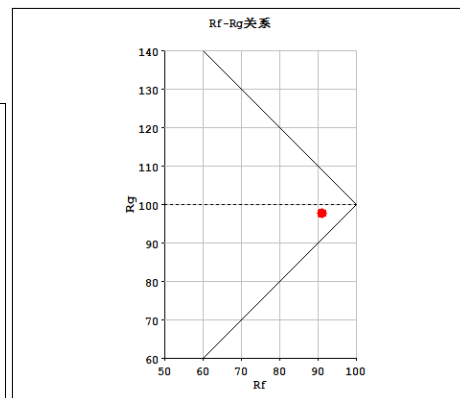
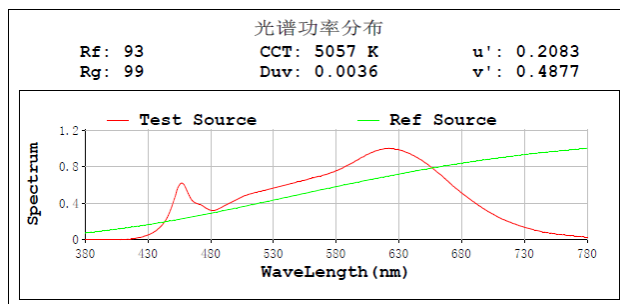
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1203.2
Luminous Efficacy (lm/W)	84.41
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	2539

Spectral Power Distribution & Chromaticity Diagram



TM30



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	980.6	81.5%
0-40	1105.7	91.9%
0-60	1180.3	98.1%
60-90	22.9	1.7%
70-100	9.6	0.8%
90-120	0.0	0.0%
0-90	1203.2	100.0%
90-180	0.0	0.0%
0-180	1203.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	219.0	18.2%	90-100	0	0%
10-20	444.0	36.9%	100-110	0	0%
20-30	317.6	26.4%	110-120	0	0%
30-40	125.1	10.4%	120-130	0	0%
40-50	49.3	4.1%	130-140	0	0%
50-60	25.3	2.1%	140-150	0	0%
60-70	13.2	1.1%	150-160	0	0%
70-80	7.2	0.6%	160-170	0	0%
80-90	2.4	0.2%	170-180	0	0%

Photometric Data

