

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) :

DLR0137(R3-9)

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	9W
Rated Initial Lamp Lumen	600lm (2700k) , 650lm (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	DLR0137 (R3-9)	CCT Setting	2700k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07374	8.592	0.9672

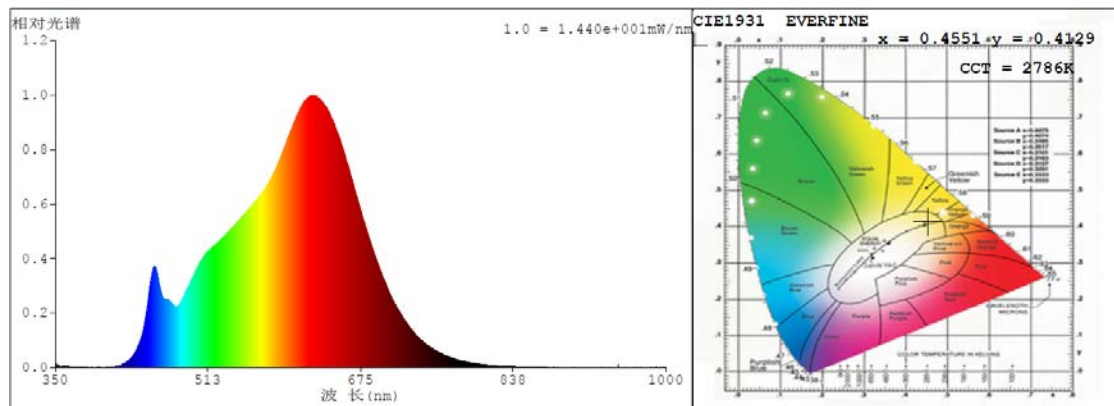
Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	72
Frequency (Hz)	60	R2	100	R10	99
CCT (K)	2786	R3	99	R11	99
Duv	0.00128	R4	97	R12	87
Chromaticity (x, y)	x=0.4551, y=0.4129	R5	97	R13	99
Chromaticity (u', v')	u' =0.2584, v' =0.5275	R6	97	R14	99
Color Rendering Index (CRI)	95.9	R7	93	R15	93
R9	72	R8	87	--	--

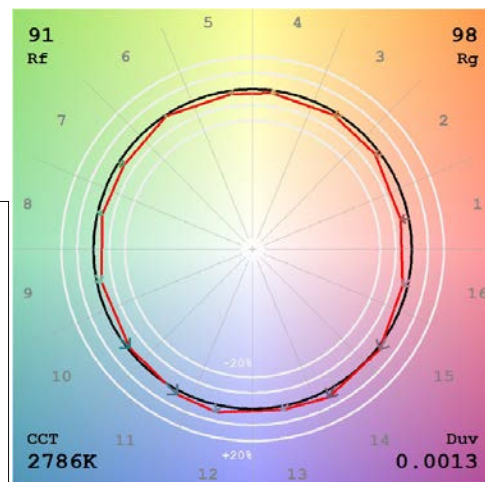
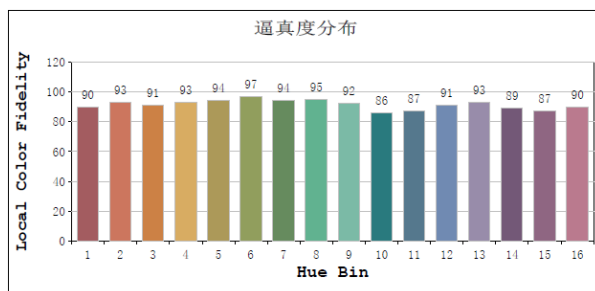
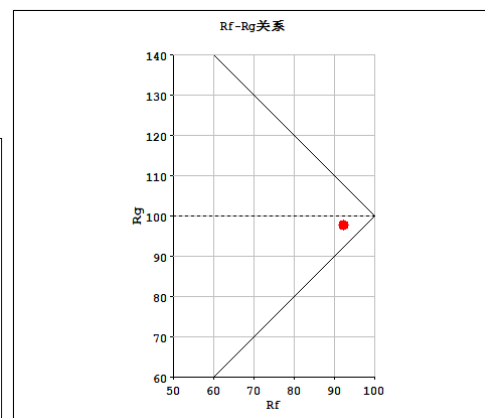
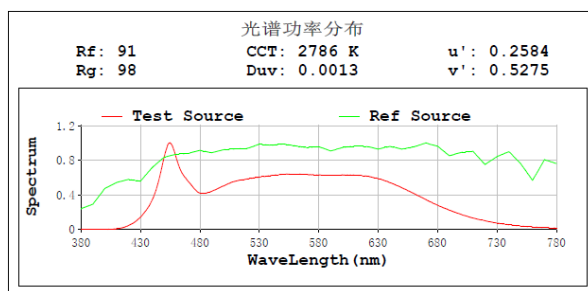
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	670.86
Luminous Efficacy (lm/W)	78.33
Beam Angle (°)	37.1
Center Beam Candle Power (cd)	1434

Spectral Power Distribution & Chromaticity Diagram



TM30

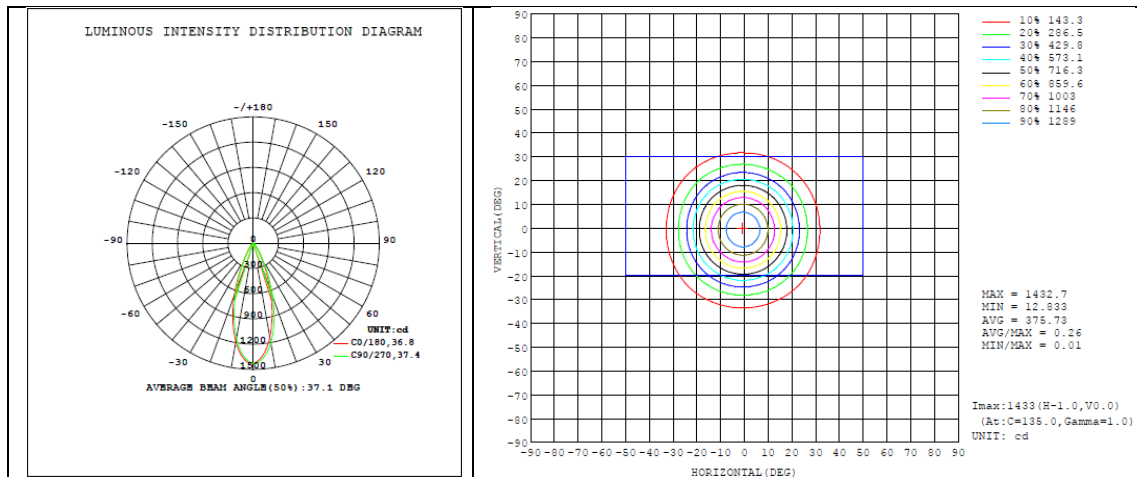


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	548.8	81.8%
0-40	617.2	92.0%
0-60	658.8	98.2%
60-90	12.1	1.7%
70-100	4.7	0.7%
90-120	0.0	0.0%
0-90	670.9	100.0%
90-180	0.0	0.0%
0-180	670.9	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	123.4	18.4%	90-100	0	0%
10-20	250.2	37.3%	100-110	0	0%
20-30	175.1	26.1%	110-120	0	0%
30-40	68.4	10.2%	120-130	0	0%
40-50	27.5	4.1%	130-140	0	0%
50-60	14.1	2.1%	140-150	0	0%
60-70	7.4	1.1%	150-160	0	0%
70-80	4.0	0.6%	160-170	0	0%
80-90	0.7	0.1%	170-180	0	0%

Photometric Data



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	DLR0137 (R3-9)	CCT Setting	3000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07261	8.452	0.9662

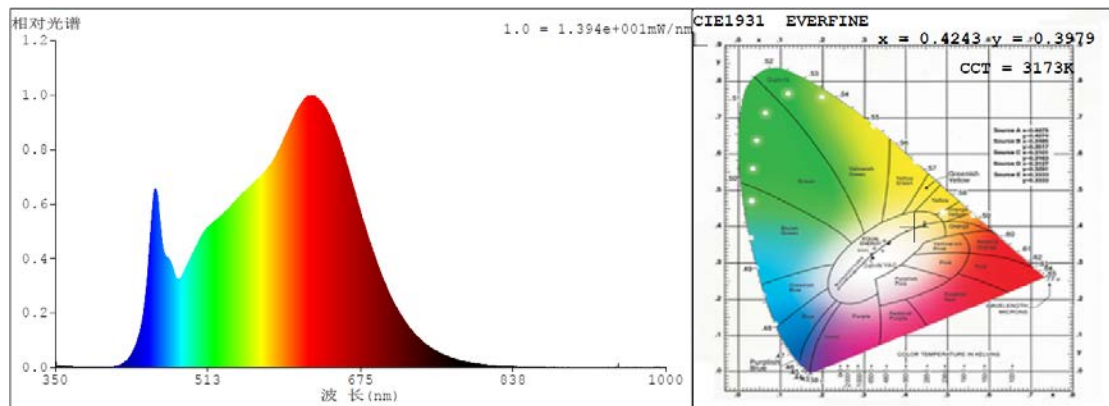
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	99	R9	80
Frequency (Hz)	60	R2	98	R10	98
CCT (K)	3173	R3	98	R11	99
Duv	-0.000593	R4	96	R12	82
Chromaticity (x, y)	x=0.4243, y=0.3979	R5	97	R13	99
Chromaticity (u', v')	u' =0.2451, v' =0.5171	R6	95	R14	99
Color Rendering Index (CRI)	95.8	R7	93	R15	96
R9	80	R8	90	--	--

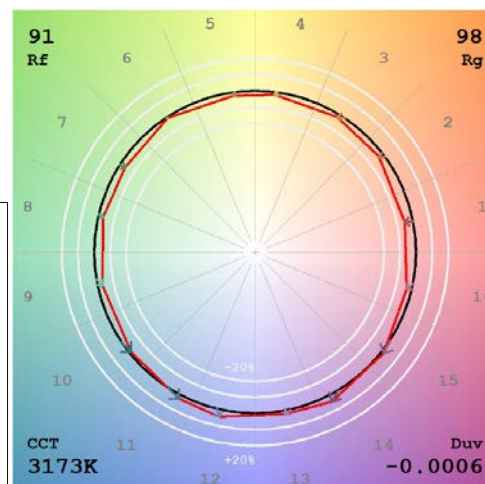
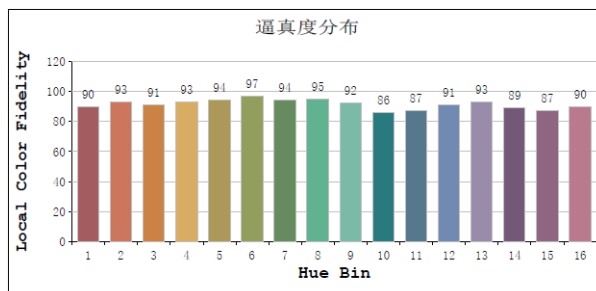
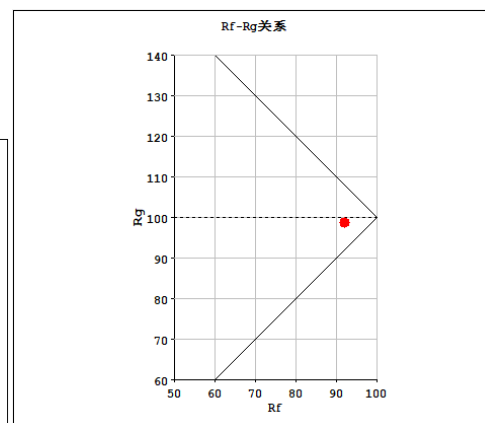
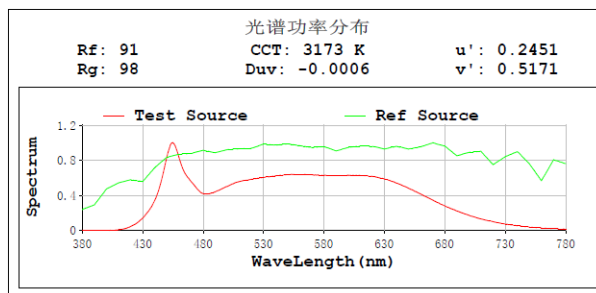
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	716.55
Luminous Efficacy (lm/W)	85.06
Beam Angle (°)	37.1
Center Beam Candle Power (cd)	1526

Spectral Power Distribution & Chromaticity Diagram



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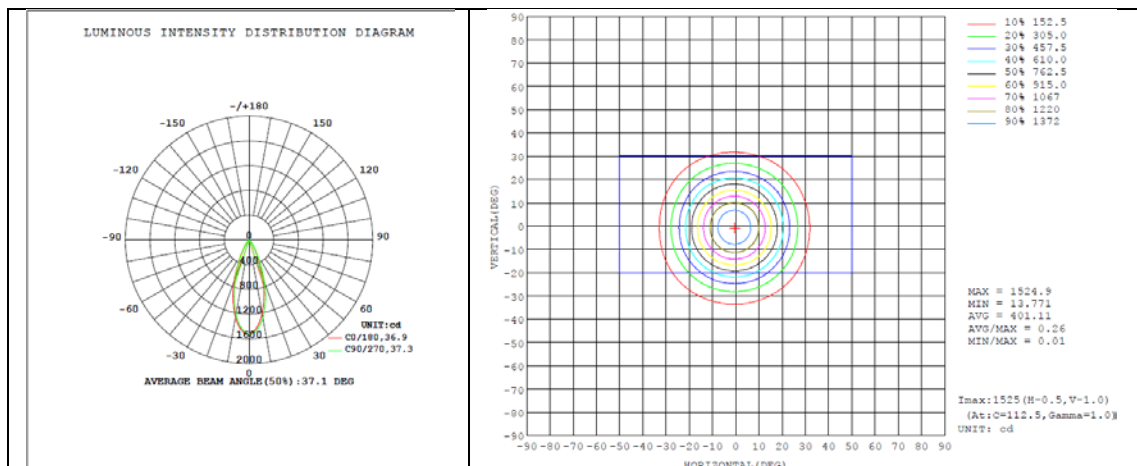


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	586.1	81.8%
0-40	659.2	92.0%
0-60	703.7	98.2%
60-90	12.9	1.7%
70-100	5.0	0.7%
90-120	0.0	0.0%
0-90	716.6	100.0%
90-180	0.0	0.0%
0-180	716.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	131.1	18.3%	90-100	0	0%
10-20	266.6	37.2%	100-110	0	0%
20-30	188.5	26.3%	110-120	0	0%
30-40	73.1	10.2%	120-130	0	0%
40-50	29.4	4.1%	130-140	0	0%
50-60	15.0	2.1%	140-150	0	0%
60-70	7.9	1.1%	150-160	0	0%
70-80	4.3	0.6%	160-170	0	0%
80-90	0.7	0.1%	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	DLR0137 (R3-9)	CCT Setting	3500k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07127	8.286	0.9650

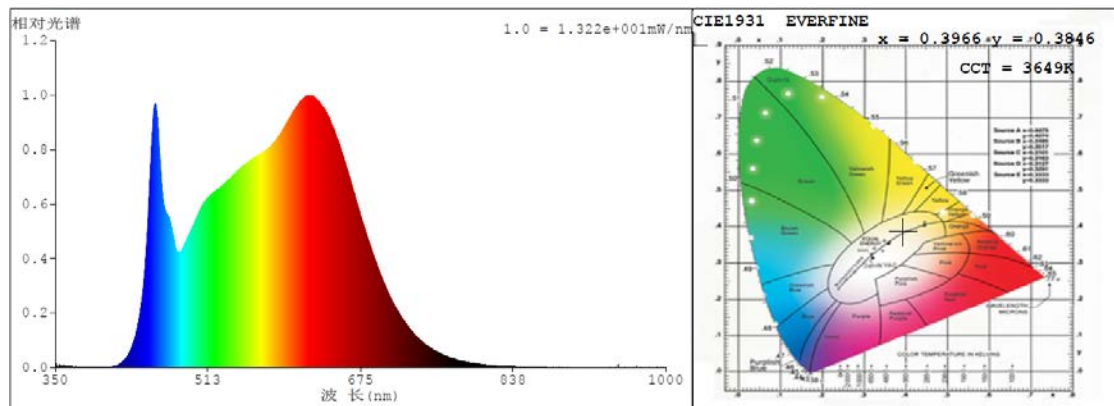
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	83
Frequency (Hz)	60	R2	98	R10	98
CCT (K)	3649	R3	98	R11	98
Duv	-0.000704	R4	95	R12	77
Chromaticity (x, y)	x=0.3966, y=0.3846	R5	96	R13	99
Chromaticity (u', v')	u' =0.2325, v' =0.5074	R6	96	R14	99
Color Rendering Index (CRI)	95.7	R7	93	R15	96
R9	83	R8	91	--	--

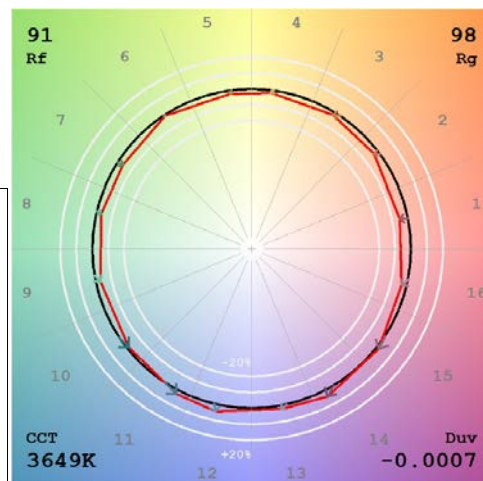
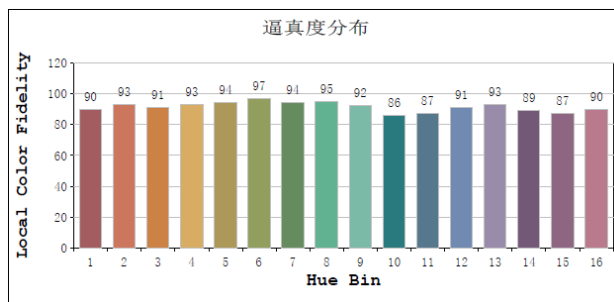
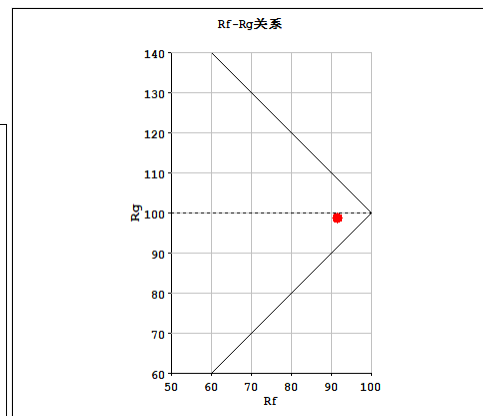
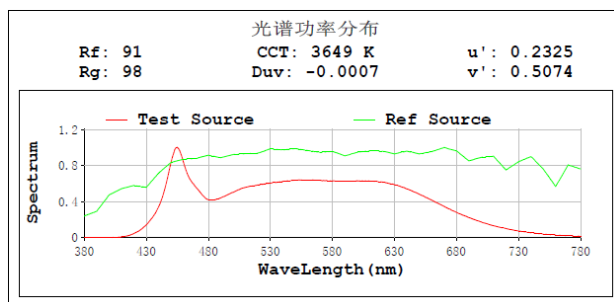
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	757.73
Luminous Efficacy (lm/W)	91.73
Beam Angle (°)	37.2
Center Beam Candle Power (cd)	1610

Spectral Power Distribution & Chromaticity Diagram



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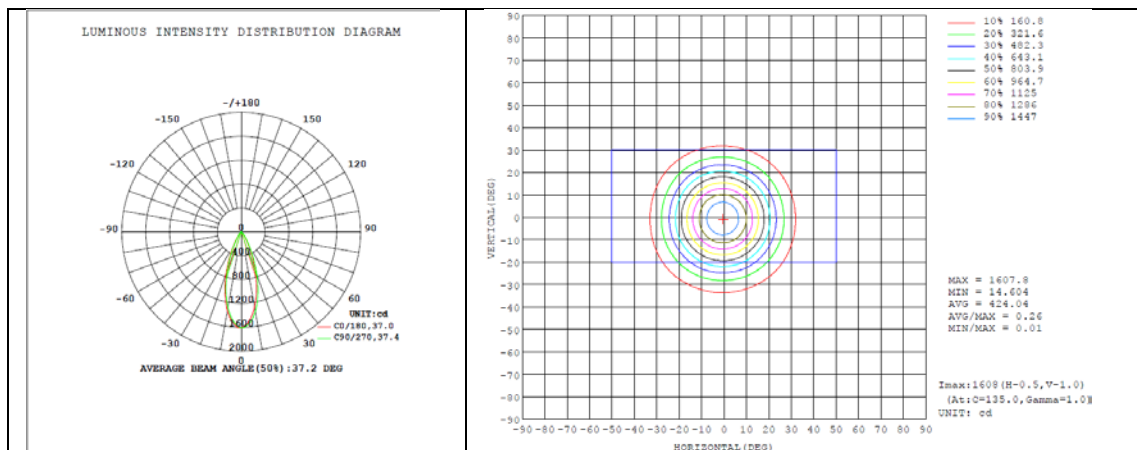


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	619.1	81.7%
0-40	696.4	91.9%
0-60	744.1	98.2%
60-90	13.6	1.7%
70-100	5.3	0.7%
90-120	0.0	0.0%
0-90	757.7	100.0%
90-180	0.0	0.0%
0-180	757.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	138.7	18.3%	90-100	0	0%
10-20	281.1	37.1%	100-110	0	0%
20-30	199.3	26.3%	110-120	0	0%
30-40	77.3	10.2%	120-130	0	0%
40-50	31.1	4.1%	130-140	0	0%
50-60	16.7	2.2%	140-150	0	0%
60-70	8.3	1.1%	150-160	0	0%
70-80	4.5	0.6%	160-170	0	0%
80-90	0.8	0.1%	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	DLR0137 (R3-9)	CCT Setting	4000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07161	8.328	0.9653

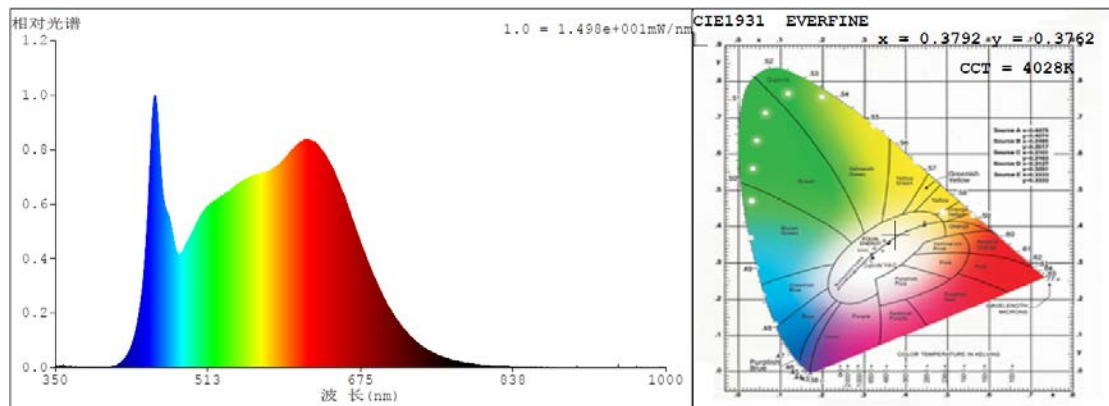
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	82
Frequency (Hz)	60	R2	99	R10	99
CCT (K)	4028	R3	98	R11	96
Duv	0.0000751	R4	94	R12	74
Chromaticity (x, y)	x=0.3792, y=0.3762	R5	95	R13	99
Chromaticity (u', v')	u' =0.2246, v' =0.5011	R6	96	R14	100
Color Rendering Index (CRI)	95.4	R7	93	R15	95
R9	82	R8	90	--	--

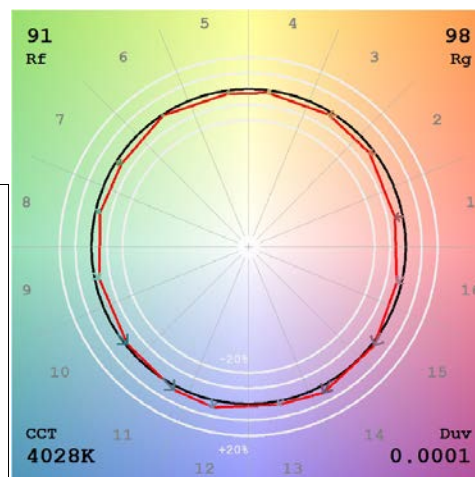
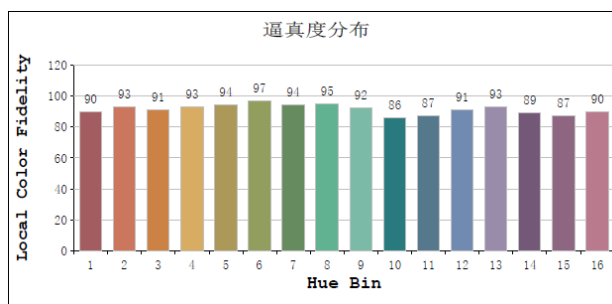
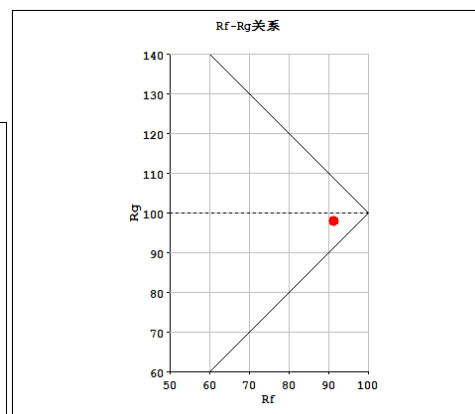
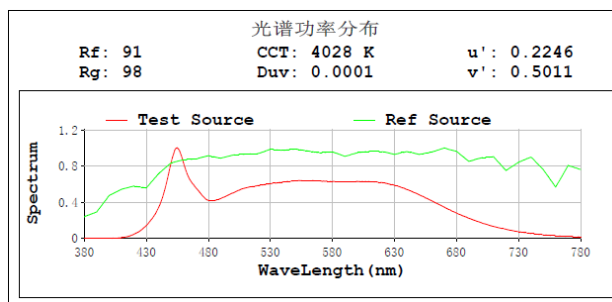
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	778.29
Luminous Efficacy (lm/W)	93.69
Beam Angle (°)	37.2
Center Beam Candle Power (cd)	1650

Spectral Power Distribution & Chromaticity Diagram



TM30

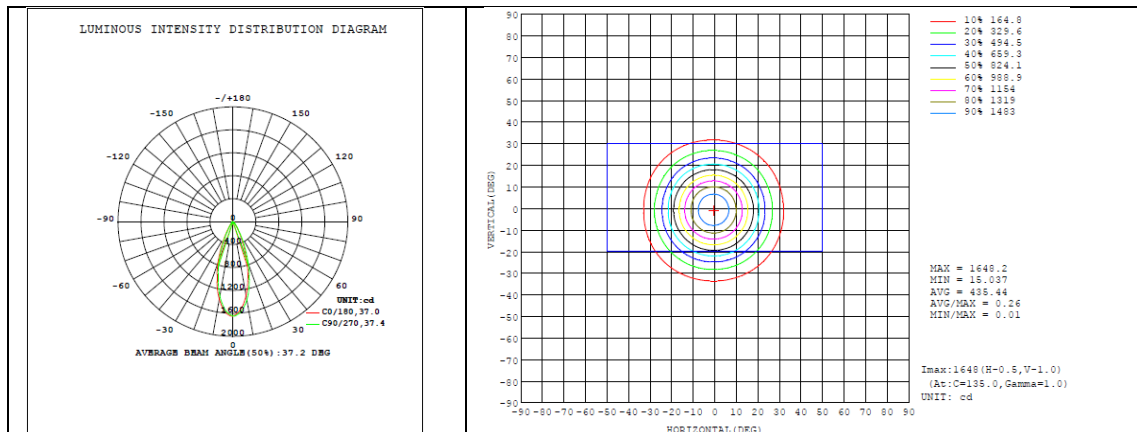


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	635.1	81.6%
0-40	715.2	91.9%
0-60	764.3	98.2%
60-90	14.0	1.7%
70-100	5.4	0.7%
90-120	0.0	0.0%
0-90	778.3	100.0%
90-180	0.0	0.0%
0-180	778.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	142.4	18.3%	90-100	0	0%
10-20	288.0	37.0%	100-110	0	0%
20-30	204.7	26.3%	110-120	0	0%
30-40	80.2	10.3%	120-130	0	0%
40-50	31.9	4.1%	130-140	0	0%
50-60	17.1	2.2%	140-150	0	0%
60-70	8.6	1.1%	150-160	0	0%
70-80	4.7	0.6%	160-170	0	0%
80-90	0.8	0.1%	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	DLR0137 (R3-9)	CCT Setting	5000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07366	8.583	0.9671

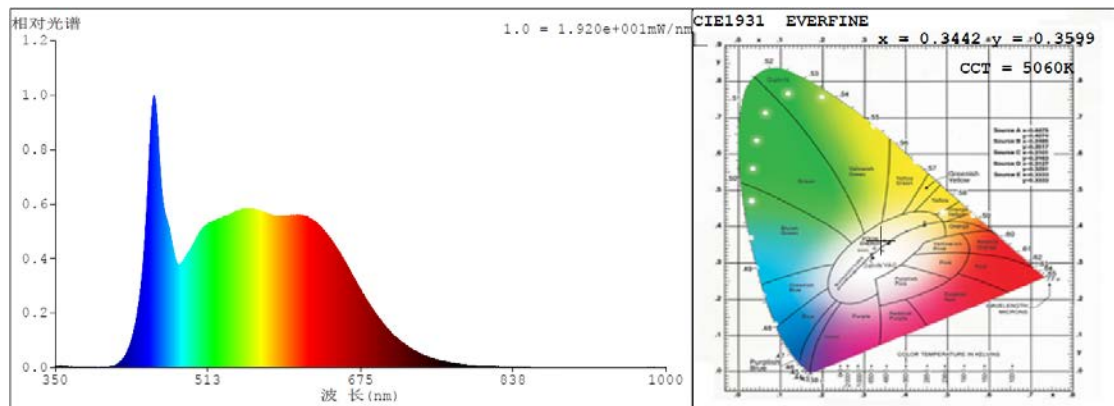
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	66
Frequency (Hz)	60	R2	97	R10	92
CCT (K)	5060	R3	98	R11	92
Duv	0.00444	R4	91	R12	72
Chromaticity (x, y)	x=0.3442, y=0.3599	R5	92	R13	95
Chromaticity (u', v')	u' =0.2077, v' =0.4885	R6	94	R14	99
Color Rendering Index (CRI)	93.1	R7	93	R15	91
R9	66	R8	86	--	--

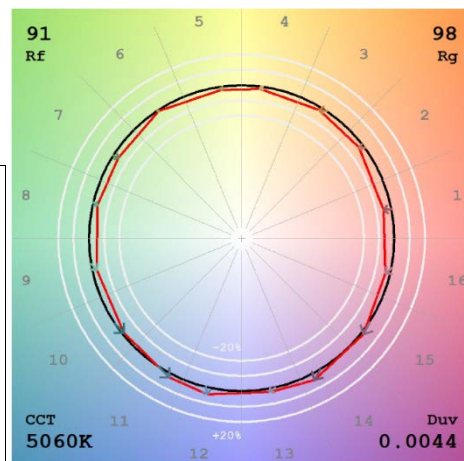
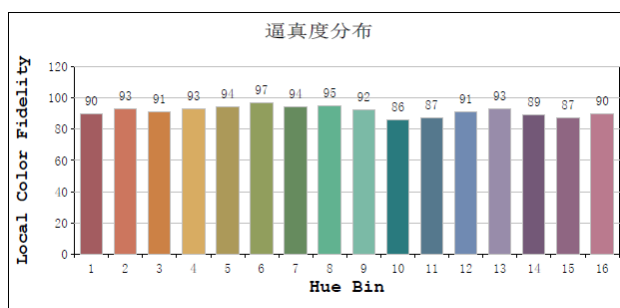
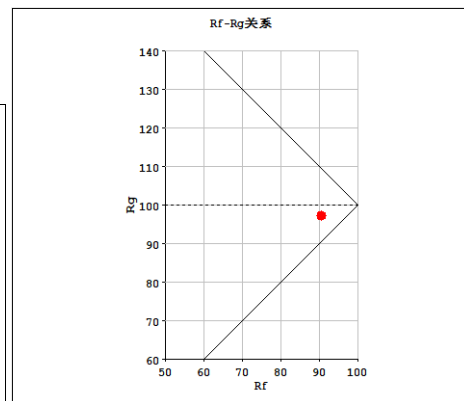
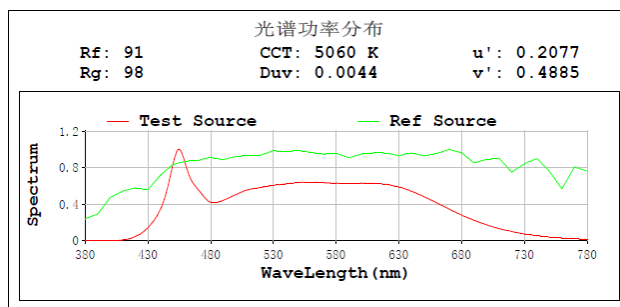
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	795.63
Luminous Efficacy (lm/W)	92.93
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	1679

Spectral Power Distribution & Chromaticity Diagram



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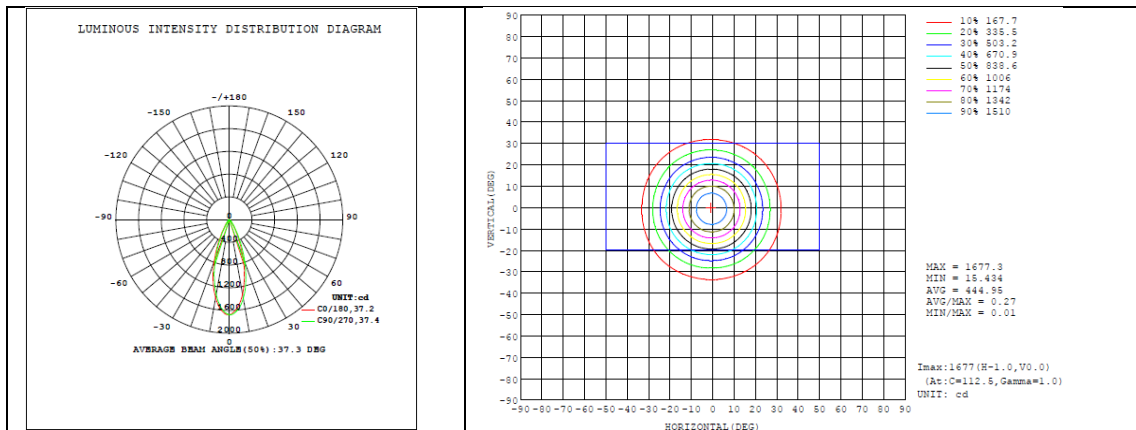


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	648.4	81.5%
0-40	731.2	91.9%
0-60	780.5	98.1%
60-90	15.1	1.8%
70-100	5.6	0.7%
90-120	0.0	0.0%
0-90	795.6	100.0%
90-180	0.0	0.0%
0-180	795.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	144.8	18.2%	90-100	0	0%
10-20	293.6	36.9%	100-110	0	0%
20-30	210.0	26.4%	110-120	0	0%
30-40	82.7	10.4%	120-130	0	0%
40-50	32.6	4.1%	130-140	0	0%
50-60	16.7	2.1%	140-150	0	0%
60-70	9.5	1.2%	150-160	0	0%
70-80	4.8	0.6%	160-170	0	0%
80-90	0.8	0.1%	170-180	0	0%

Photometric Data



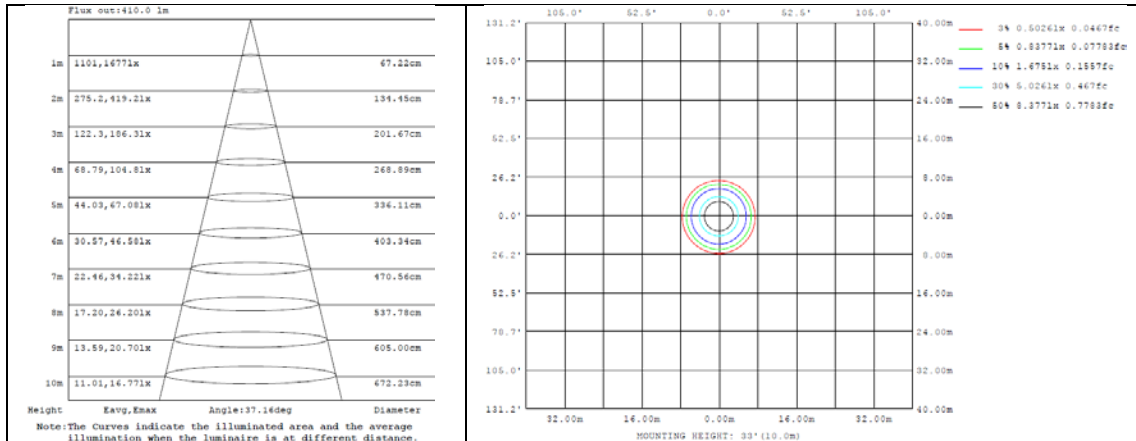


Table--1

UNIT: cd

Y (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	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675	1675
5	1564	1577	1584	1598	1605	1613	1615	1614	1605	1598	1593	1580	1573	1563	1560	1559
10	1337	1357	1374	1399	1411	1425	1421	1416	1400	1388	1376	1354	1342	1328	1327	1325
15	1028	1055	1080	1109	1123	1139	1133	1127	1109	1091	1074	1048	1032	1017	1014	1013
20	707	732	753	786	801	813	811	805	787	767	750	725	709	691	688	688
25	419	438	456	482	495	507	502	497	481	465	456	437	424	409	406	406
30	220	230	242	261	271	278	275	273	264	252	241	229	217	210	206	211
35	117	124	132	139	146	145	144	139	131	125	116	111	108	104	105	109
40	61.2	64.5	67.4	72.4	75.0	76.6	76.2	75.9	73.0	68.9	66.4	63.4	61.7	59.2	58.7	58.5
45	37.7	39.0	40.1	41.9	42.8	43.8	44.2	44.7	43.8	42.5	41.6	40.2	39.2	38.1	37.4	37.0
50	25.5	26.0	26.6	27.5	27.9	28.6	29.3	29.9	29.5	28.8	28.3	27.4	26.7	26.0	25.6	25.2
55	17.4	17.9	18.2	19.0	19.5	20.1	20.4	20.5	19.9	19.5	19.1	18.5	18.0	17.4	17.2	17.1
60	11.3	11.3	11.4	11.9	12.5	13.1	13.2	13.1	12.8	12.7	12.5	12.1	11.6	11.2	11.1	11.1
65	8.38	8.41	8.44	8.58	8.70	8.86	9.00	9.11	9.11	9.10	9.07	8.93	8.82	8.64	8.52	8.41
70	6.10	6.13	6.20	6.36	6.52	6.72	6.87	6.99	7.01	6.98	6.92	6.76	6.60	6.40	6.26	6.13
75	4.02	4.06	4.10	4.24	4.38	4.56	4.68	4.80	4.83	4.80	4.75	4.61	4.48	4.30	4.17	4.06
80	2.24	2.27	2.33	2.43	2.56	2.69	2.81	2.90	2.92	2.90	2.85	2.74	2.62	2.47	2.36	2.27
85	0.77	0.77	0.85	0.92	1.05	1.13	1.24	1.28	1.30	1.31	1.22	1.15	1.03	0.94	0.83	0.79
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

Model Number	CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLR0137 (R3-9)	2700K setting	120	670.86	8.56	78.33
	3000K setting	120	716.55	8.42	85.06
	3500K setting	120	757.73	8.26	91.73
	4000K setting	120	778.29	8.31	93.69
	5000K setting	120	795.63	8.56	92.93