

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) :

DLG0023 (GR3TL)

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

Type of Luminaire: Downlights

Report Date: 2023-12-18

1.1 Rated Values:	
Rated Voltage / Frequency	120V, 60HZ
Nominal Power	9W
Rated Initial Lamp Lumen	700lm (3000k) , 750lm (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	2023-12-18	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLG0023 (GR3TL)	CCT Setting	2700k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.073	8.61	0.977

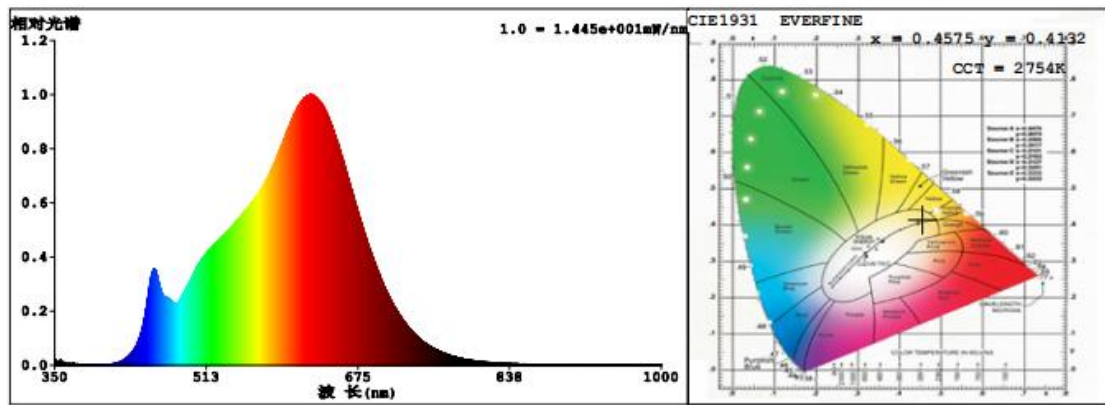
Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	67
Frequency (Hz)	60	R2	99	R10	98
CCT (K)	2754	R3	98	R11	98
Duv	0.00119	R4	96	R12	87
Chromaticity (x, y)	x=0.4575, y=0.4132	R5	96	R13	98
Chromaticity (u', v')	u' =0.2598, v' =0.5280	R6	97	R14	99
Color Rendering Index (CRI)	95	R7	92	R15	92
R9	67	R8	85	--	--

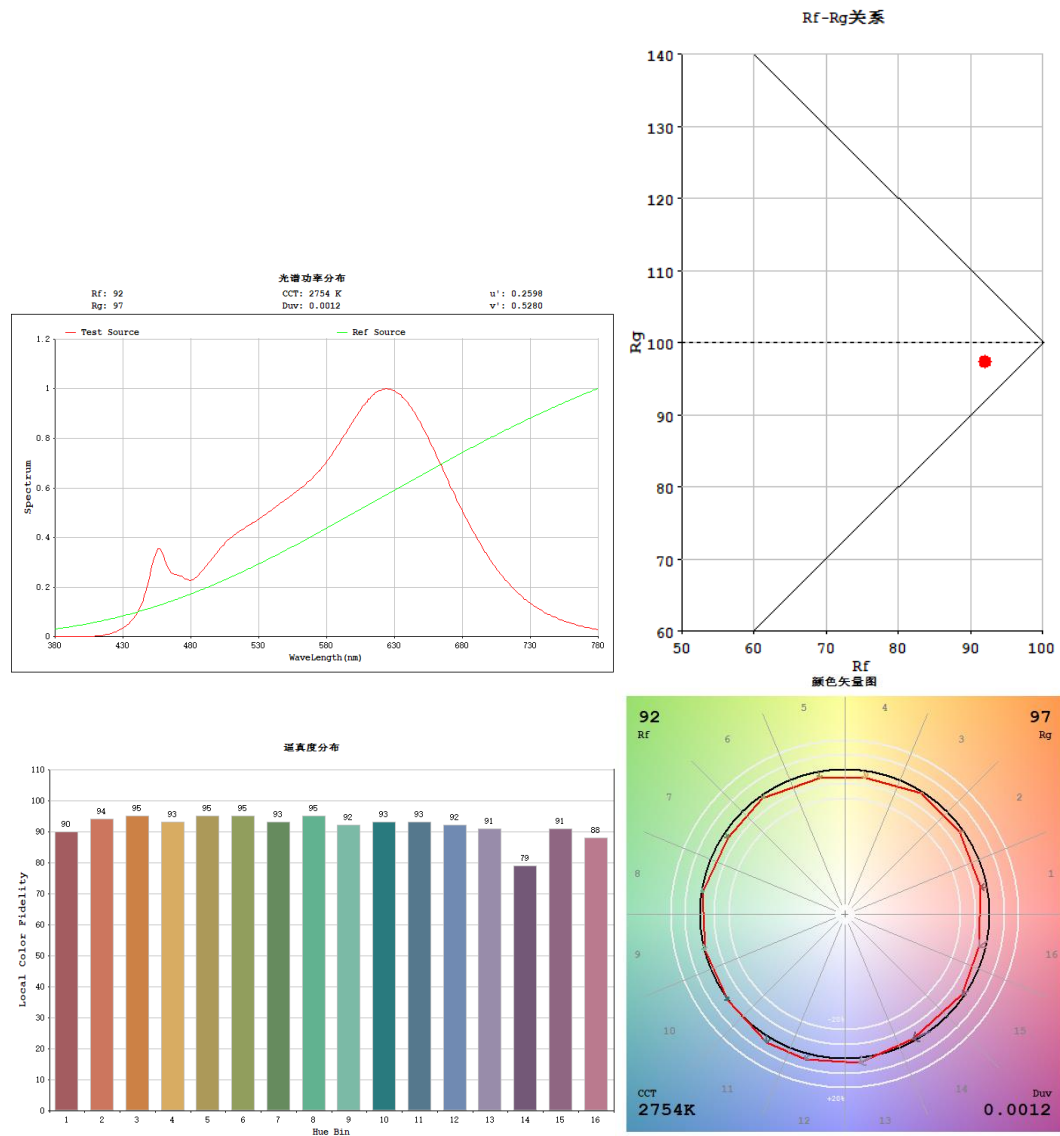
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	700.73
Luminous Efficacy (lm/W)	81.36
Beam Angle (°)	38.8
Center Beam Candle Power (cd)	1583

Spectral Power Distribution & Chromaticity Diagram



TM30

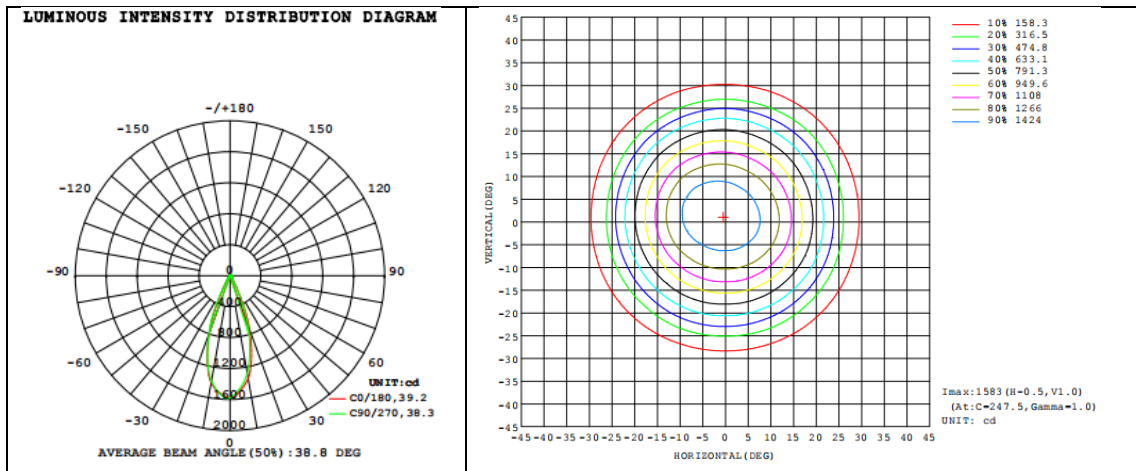


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	616.1	87.9%
0-40	661.65	94.4%
0-60	692.34	98.8%
60-90	8.4082	1.2%
70-100	3.5392	0.5%
90-120	0	0.0%
0-90	700.7482	100.0%
90-180	0	0.0%
0-180	700.7482	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	138.8	19.8%	90-100	0	0%
10-20	294.9	42.1%	100-110	0	0%
20-30	182.4	26.0%	110-120	0	0%
30-40	45.55	6.5%	120-130	0	0%
40-50	19.88	2.8%	130-140	0	0%
50-60	10.81	1.5%	140-150	0	0%
60-70	4.869	0.7%	150-160	0	0%
70-80	2.796	0.4%	160-170	0	0%
80-90	0.7432	0.1%	170-180	0	0%

Photometric Data



2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2023-12-18	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLG0023 (GR3TL)	CCT Setting	3000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.072	8.53	0.976

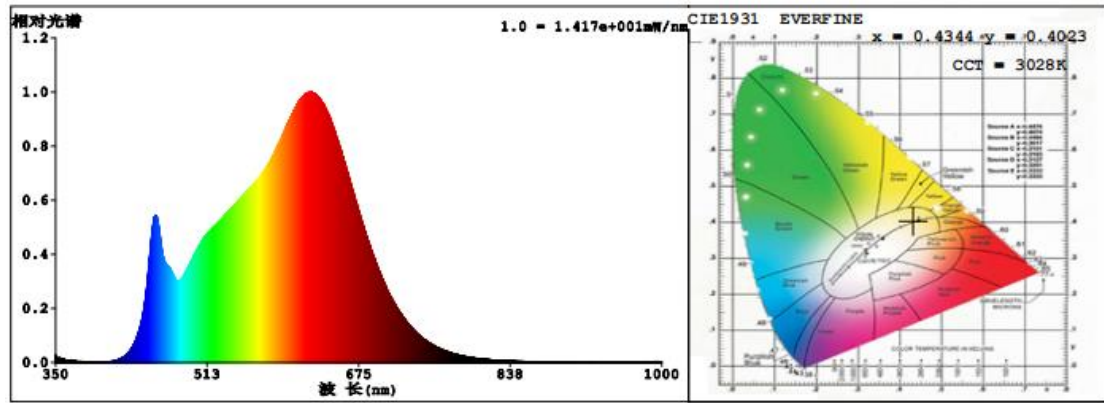
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	73
Frequency (Hz)	60	R2	99	R10	99
CCT (K)	3028	R3	98	R11	98
Duv	-0.000364	R4	96	R12	83
Chromaticity (x, y)	x=0.4344, y=0.4023	R5	97	R13	99
Chromaticity (u', v')	u' =0.2497, v' =0.5203	R6	96	R14	99
Color Rendering Index (CRI)	95.3	R7	92	R15	94
R9	73	R8	87	--	--

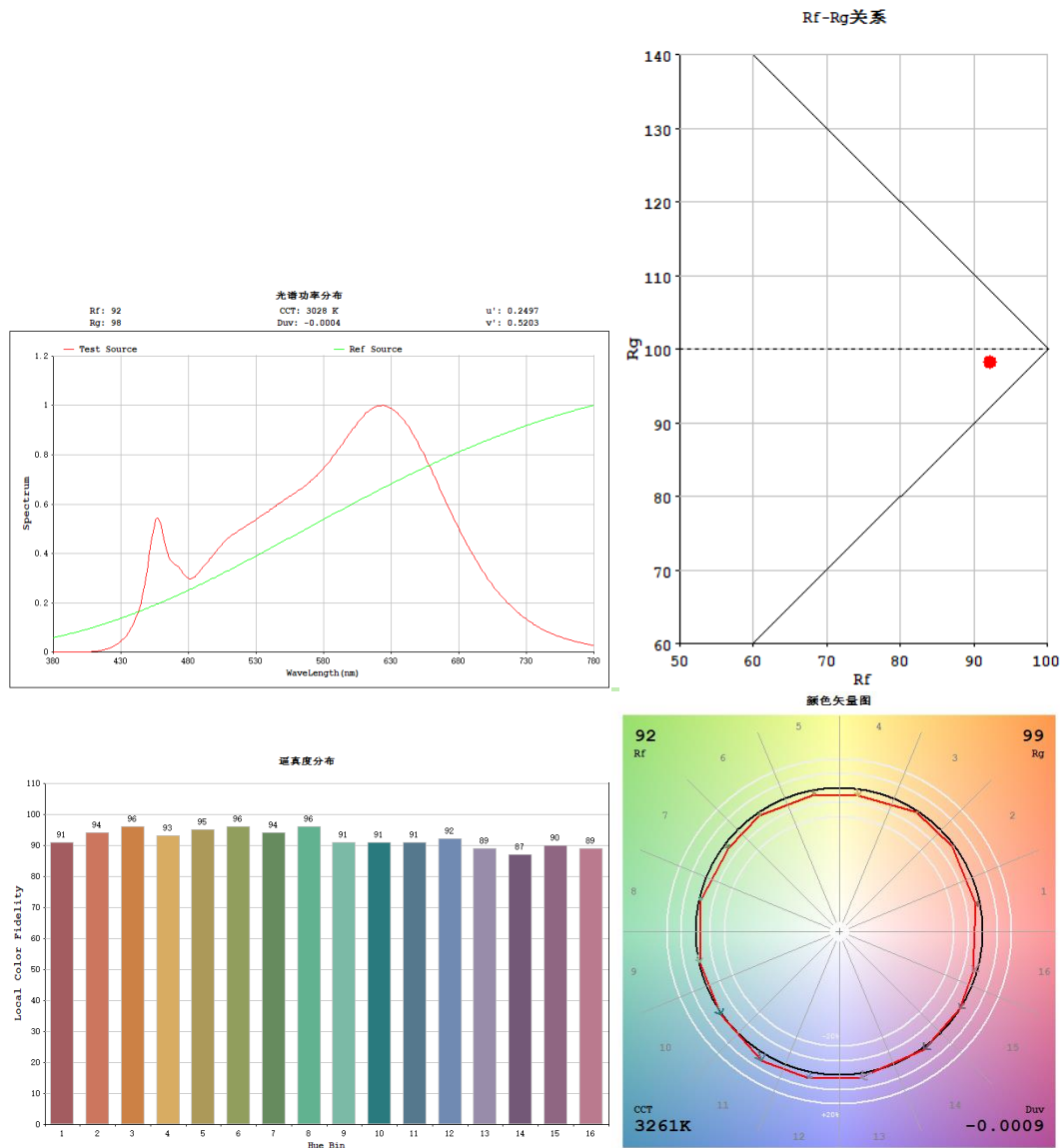
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	733.759
Luminous Efficacy (lm/W)	86.04
Beam Angle (°)	38.8
Center Beam Candle Power (cd)	1655

Spectral Power Distribution & Chromaticity Diagram



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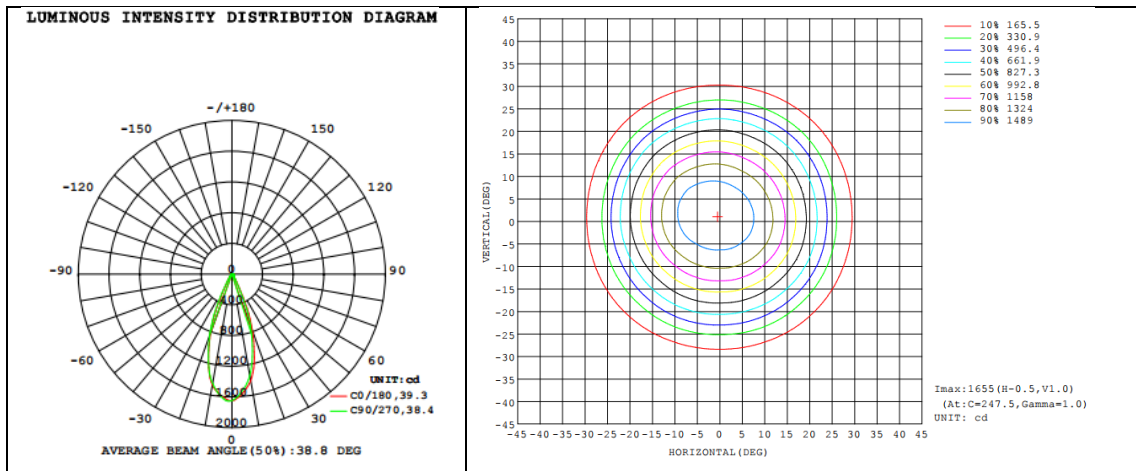


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	645	87.9%
0-40	692.79	94.4%
0-60	724.94	98.8%
60-90	8.8293	1.2%
70-100	3.7223	0.5%
90-120	0	0.0%
0-90	733.7693	100.0%
90-180	0	0.0%
0-180	733.7693	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	145.1	19.8%	90-100	0	0%
10-20	308.6	42.1%	100-110	0	0%
20-30	191.3	26.1%	110-120	0	0%
30-40	47.79	6.5%	120-130	0	0%
40-50	20.83	2.8%	130-140	0	0%
50-60	11.32	1.5%	140-150	0	0%
60-70	5.107	0.7%	150-160	0	0%
70-80	2.937	0.4%	160-170	0	0%
80-90	0.7853	0.1%	170-180	0	0%

Photometric Data



2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2023-12-18	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLG0023 (GR3TL)	CCT Setting	3500k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.071	8.34	0.975

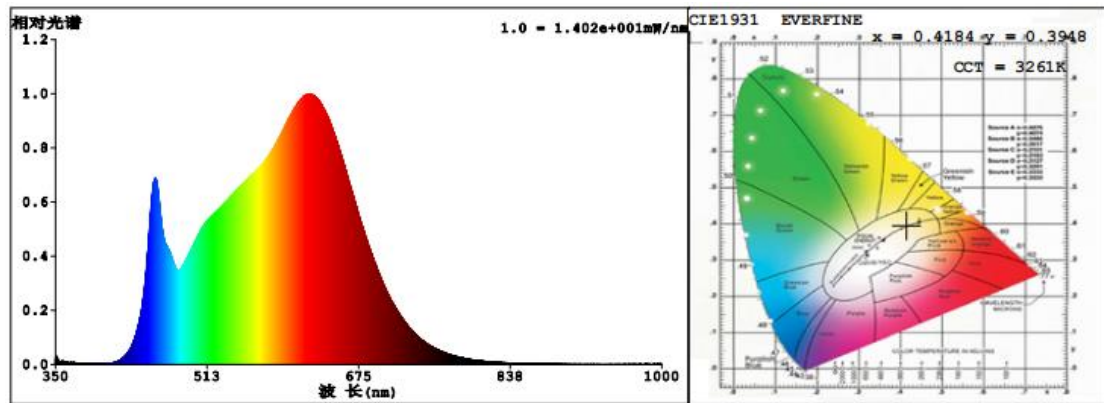
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	76
Frequency (Hz)	60	R2	99	R10	99
CCT (K)	3261	R3	98	R11	98
Duv	-0.000858	R4	95	R12	81
Chromaticity (x, y)	x=0.4184, y=0.3948	R5	97	R13	99
Chromaticity (u', v')	u' =0.2425, v' =0.5149	R6	96	R14	100
Color Rendering Index (CRI)	95.4	R7	93	R15	95
R9	76	R8	88	--	--

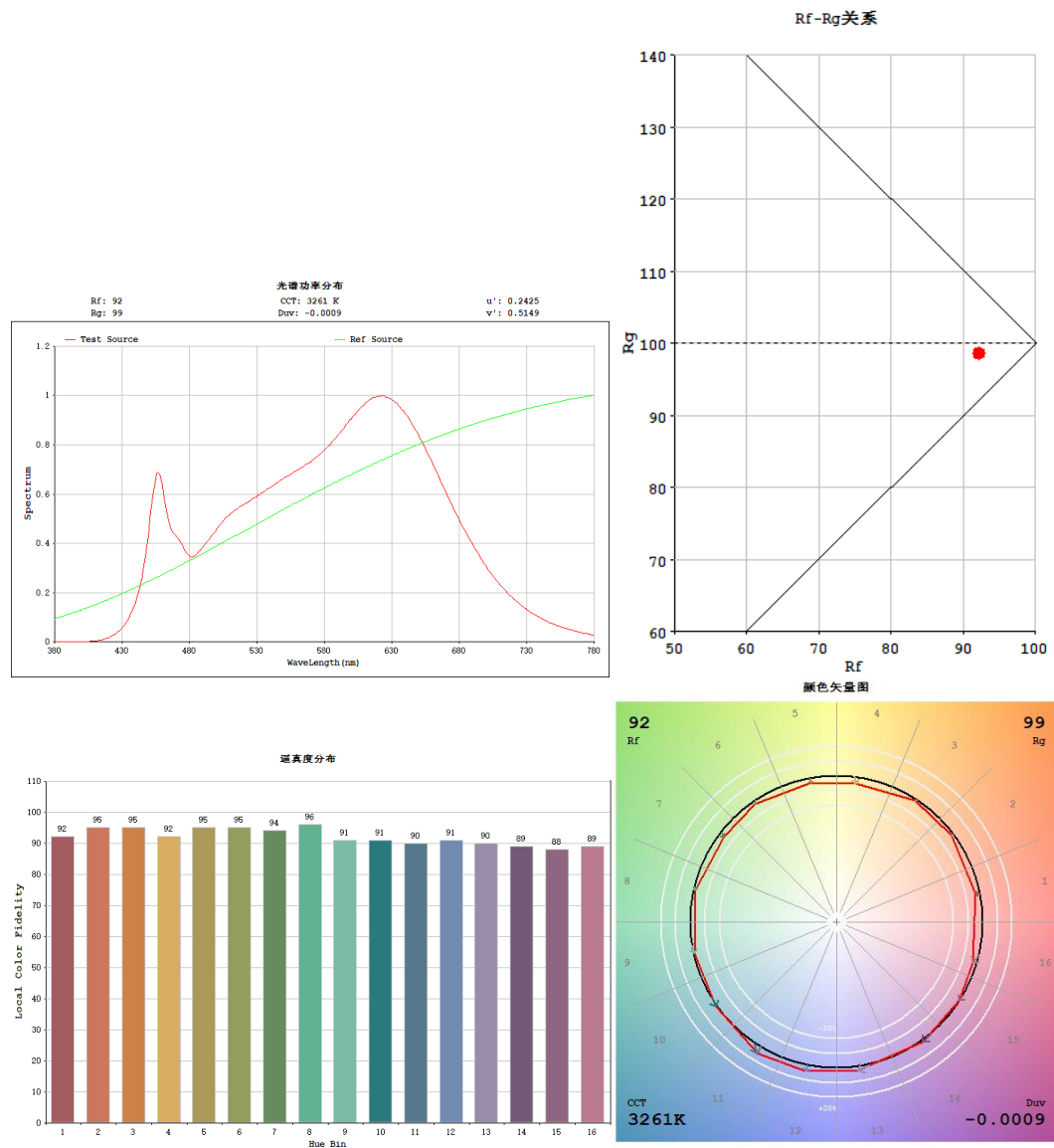
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	795.517
Luminous Efficacy (lm/W)	95.38
Beam Angle (°)	38.9
Center Beam Candle Power (cd)	1790

Spectral Power Distribution & Chromaticity Diagram



TM30

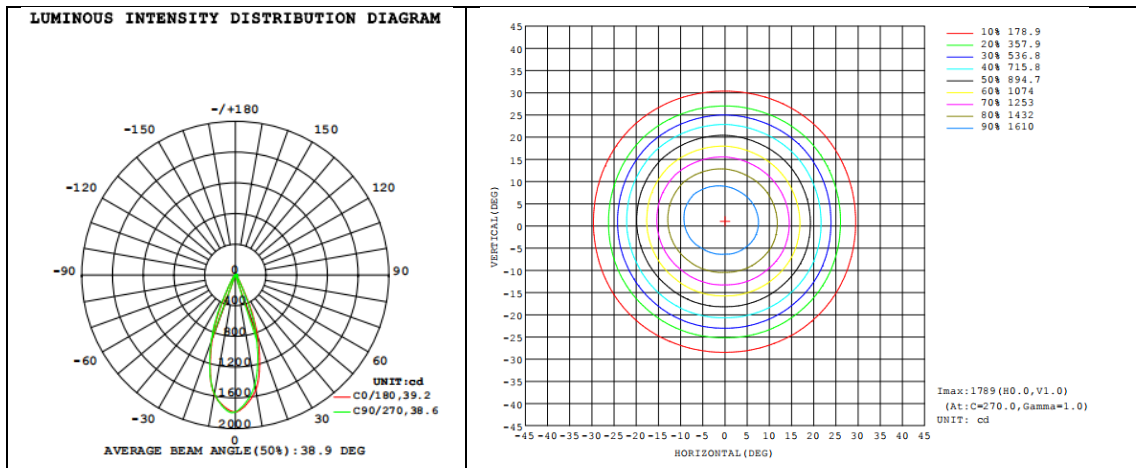


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	698.9	87.8%
0-40	750.99	94.4%
0-60	785.96	98.8%
60-90	9.6299	1.2%
70-100	4.0699	0.5%
90-120	0	0.0%
0-90	795.5899	100.0%
90-180	0	0.0%
0-180	795.5899	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	157	19.7%	90-100	0	0%
10-20	334.1	42.0%	100-110	0	0%
20-30	207.8	26.1%	110-120	0	0%
30-40	52.09	6.5%	120-130	0	0%
40-50	22.66	2.8%	130-140	0	0%
50-60	12.31	1.5%	140-150	0	0%
60-70	5.56	0.7%	150-160	0	0%
70-80	3.204	0.4%	160-170	0	0%
80-90	0.8659	0.1%	170-180	0	0%

Photometric Data



2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2023-12-18	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLG0023 (GR3TL)	CCT Setting	4000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.071	8.38	0.976

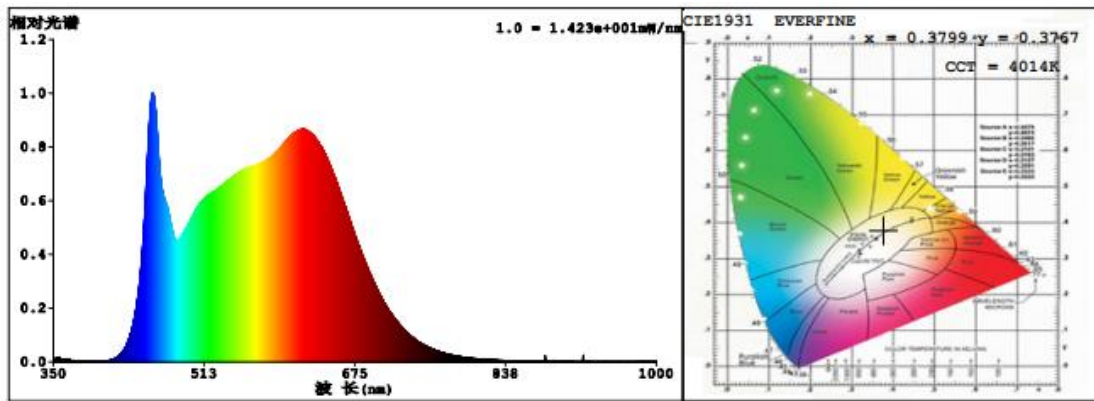
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	82
Frequency (Hz)	60	R2	98	R10	98
CCT (K)	4014	R3	98	R11	95
Duv	0.000127	R4	93	R12	74
Chromaticity (x, y)	x=0.3799, y=0.3767	R5	95	R13	99
Chromaticity (u', v')	u' =0.2248, v' =0.5015	R6	96	R14	99
Color Rendering Index (CRI)	94.9	R7	92	R15	95
R9	82	R8	90	--	--

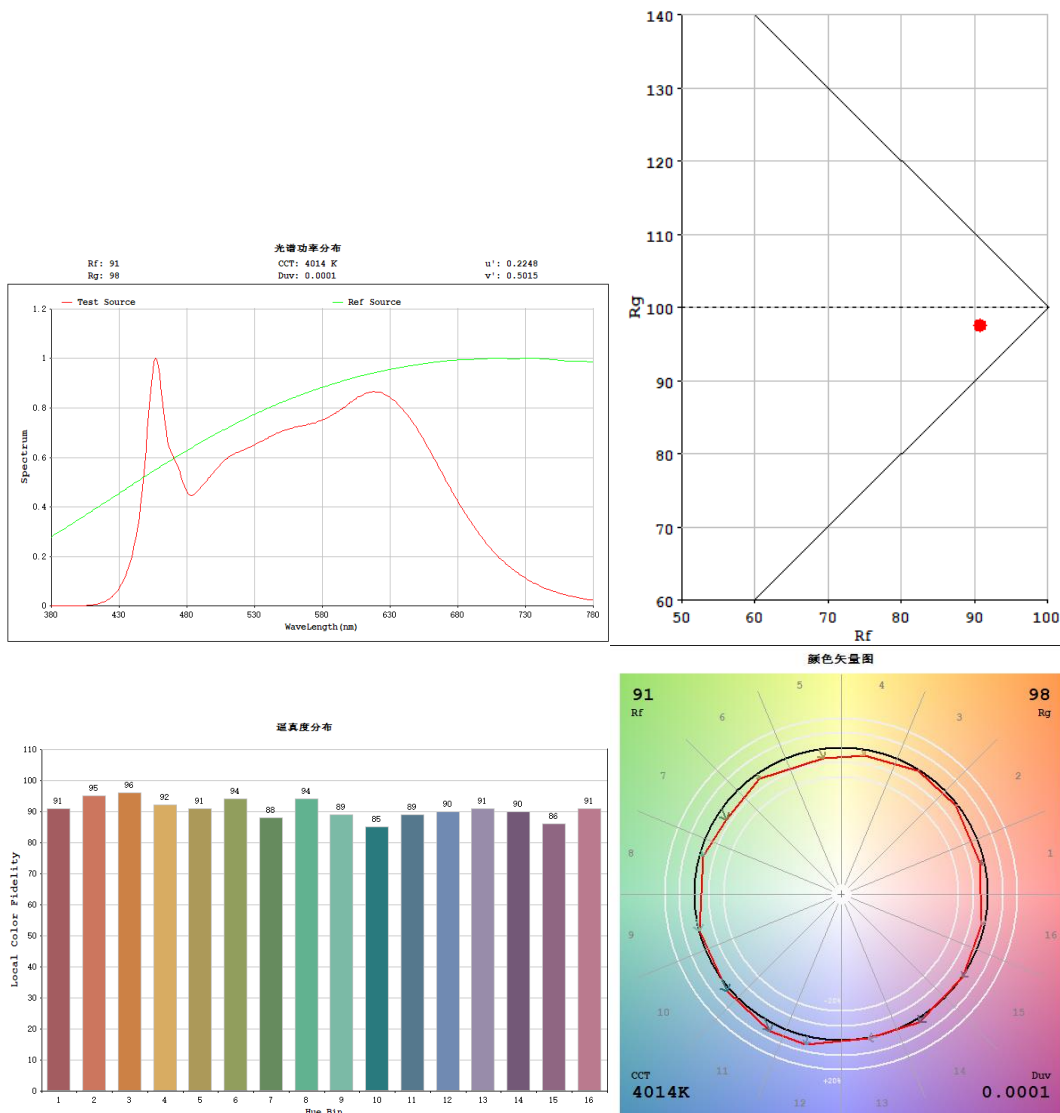
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	816.805
Luminous Efficacy (lm/W)	97.43
Beam Angle (°)	38.9
Center Beam Candle Power (cd)	1836

Spectral Power Distribution & Chromaticity Diagram



TM30

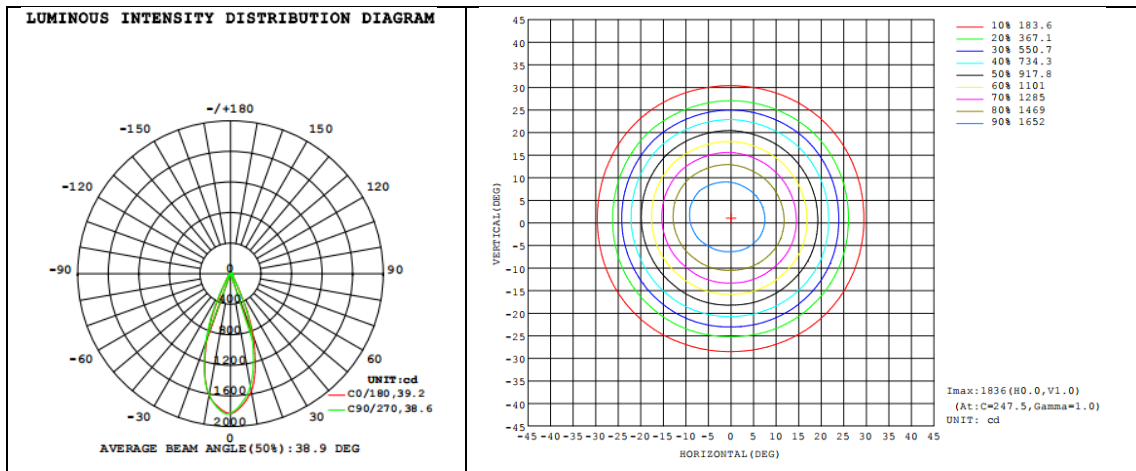


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	717.3	87.8%
0-40	770.94	94.4%
0-60	806.9	98.8%
60-90	9.9119	1.2%
70-100	4.1929	0.5%
90-120	0	0.0%
0-90	816.8119	100.0%
90-180	0	0.0%
0-180	816.8119	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	161	19.7%	90-100	0	0%
10-20	342.7	42.0%	100-110	0	0%
20-30	213.6	26.2%	110-120	0	0%
30-40	53.64	6.6%	120-130	0	0%
40-50	23.31	2.9%	130-140	0	0%
50-60	12.65	1.5%	140-150	0	0%
60-70	5.719	0.7%	150-160	0	0%
70-80	3.298	0.4%	160-170	0	0%
80-90	0.8949	0.1%	170-180	0	0%

Photometric Data



2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2023-12-18	Test Ambient:	25.3
Test Orientation	As intended	Stabilization Time (min)	15
Model Number	DLG0023 (GR3TL)	CCT Setting	5000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.073	8.62	0.977

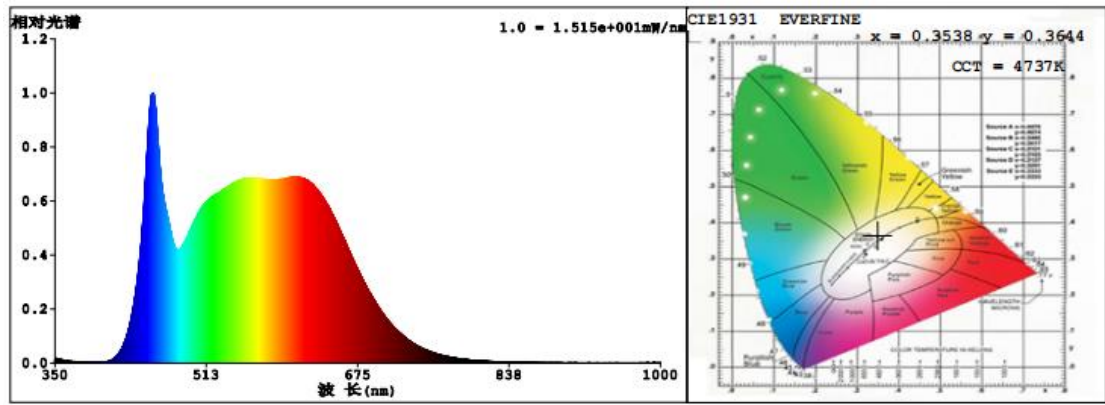
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	66
Frequency (Hz)	60	R2	97	R10	91
CCT (K)	4737	R3	98	R11	91
Duv	0.00294	R4	90	R12	69
Chromaticity (x, y)	x=0.3538, y=0.3644	R5	91	R13	94
Chromaticity (u', v')	u' =0.2123, v' =0.4921	R6	93	R14	99
Color Rendering Index (CRI)	92.8	R7	94	R15	90
R9	66	R8	86	--	--

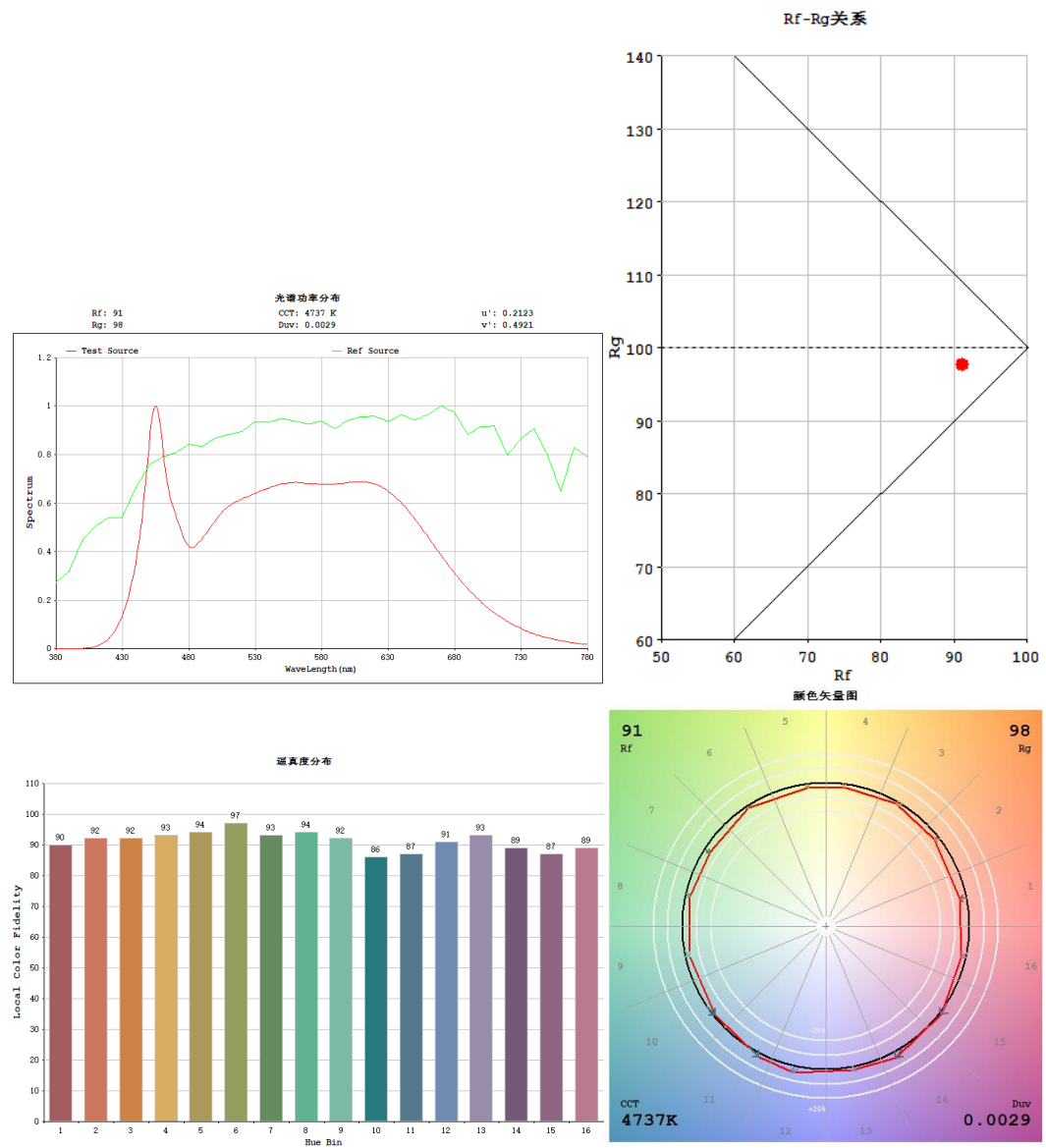
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	833.313
Luminous Efficacy (lm/W)	96.64
Beam Angle (°)	39.0
Center Beam Candle Power (cd)	1868

Spectral Power Distribution & Chromaticity Diagram



TM30

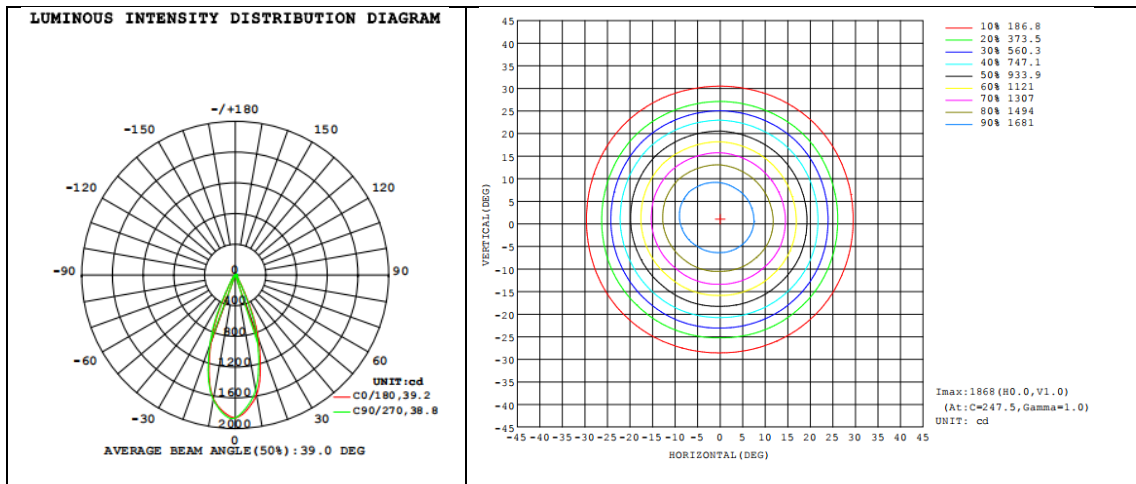


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	731.3	87.8%
0-40	786.35	94.4%
0-60	823.16	98.8%
60-90	10.1444	1.2%
70-100	4.2934	0.5%
90-120	0	0.0%
0-90	833.3044	100.0%
90-180	0	0.0%
0-180	833.3044	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	163.7	19.6%	90-100	0	0%
10-20	349.1	41.9%	100-110	0	0%
20-30	218.5	26.2%	110-120	0	0%
30-40	55.05	6.6%	120-130	0	0%
40-50	23.87	2.9%	130-140	0	0%
50-60	12.94	1.6%	140-150	0	0%
60-70	5.851	0.7%	150-160	0	0%
70-80	3.375	0.4%	160-170	0	0%
80-90	0.9184	0.1%	170-180	0	0%

Photometric Data



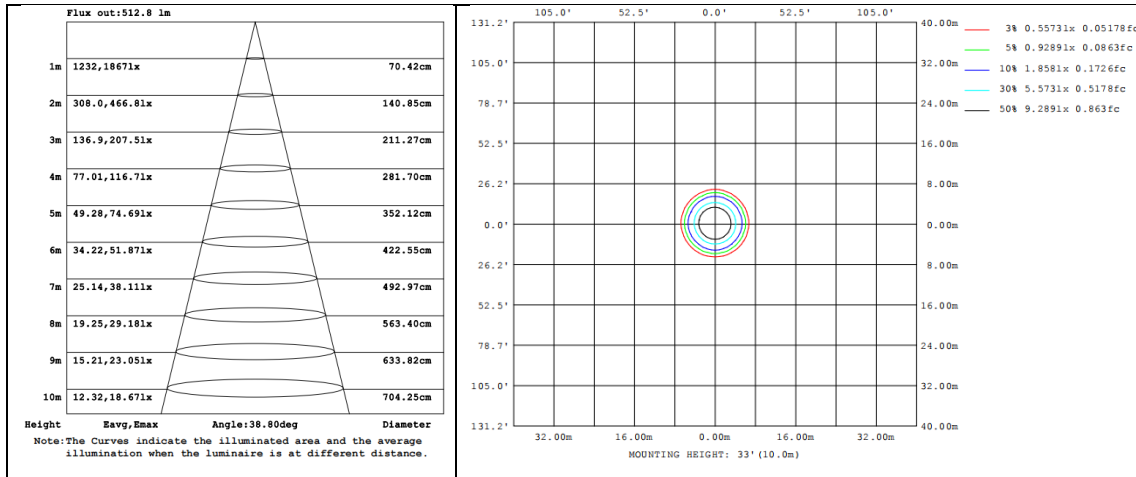


Table--1 UNIT: cd

C (DEG) \ y (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	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859
5	1762	1749	1736	1729	1727	1734	1746	1768	1788	1803	1814	1812	1812	1802	1789	1773
10	1589	1570	1547	1532	1524	1541	1565	1600	1639	1666	1678	1663	1646	1624	1608	1593
15	1268	1244	1208	1192	1187	1204	1222	1273	1326	1365	1383	1367	1361	1330	1302	1282
20	876	860	828	812	805	820	833	869	921	960	985	978	974	943	923	896
25	463	438	410	402	394	408	418	454	485	517	549	554	563	543	529	495
30	167	156	148	143	142	146	153	162	173	185	196	203	205	200	191	179
35	80.5	78.1	74.6	72.8	72.8	74.6	75.7	80.0	84.3	87.8	90.3	90.1	90.5	88.1	85.8	82.7
40	45.5	44.4	42.5	42.4	42.7	43.4	43.5	45.7	47.7	48.7	49.6	49.5	50.0	48.5	47.3	45.7
45	29.5	29.0	28.3	28.2	28.3	28.9	29.3	30.3	31.0	31.4	31.6	31.5	31.6	30.8	30.3	29.5
50	20.6	20.3	20.1	20.0	20.1	20.5	20.8	21.4	21.7	22.0	22.1	22.0	21.9	21.5	21.3	20.8
55	13.7	13.5	13.3	13.2	13.4	13.6	13.8	14.2	14.4	14.8	15.1	15.0	15.0	14.5	14.4	13.9
60	8.53	8.33	8.21	8.29	8.37	8.57	8.71	8.98	9.18	9.38	9.53	9.51	9.46	9.24	9.07	8.72
65	5.30	5.19	5.20	5.30	5.40	5.49	5.57	5.69	5.79	5.81	5.89	5.83	5.80	5.64	5.55	5.39
70	4.06	4.04	4.12	4.16	4.28	4.33	4.41	4.42	4.45	4.46	4.39	4.35	4.25	4.20	4.09	4.09
75	3.07	3.02	3.04	3.08	3.15	3.22	3.31	3.37	3.43	3.46	3.44	3.41	3.34	3.27	3.17	3.12
80	1.84	1.78	1.79	1.80	1.86	1.91	1.99	2.04	2.11	2.15	2.14	2.13	2.07	2.02	1.93	1.88
85	0.72	0.66	0.67	0.66	0.72	0.73	0.82	0.85	0.90	0.96	0.94	0.96	0.89	0.87	0.79	0.76
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
DLG0023 (GR3TL)	2700K setting	120	700.73	8.61	81.36
	3000K setting	120	733.759	8.53	86.04
	3500K setting	120	795.517	8.34	95.38
	4000K setting	120	816.805	8.38	97.43
	5000K setting	120	833.313	8.62	96.64