

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) :

DLG0016 (GR3)

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

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

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.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

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.

3) Electrical Measurements:

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.

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	DLG0016(GR3)	CCT Setting	2700k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07225	8.538	0.9809

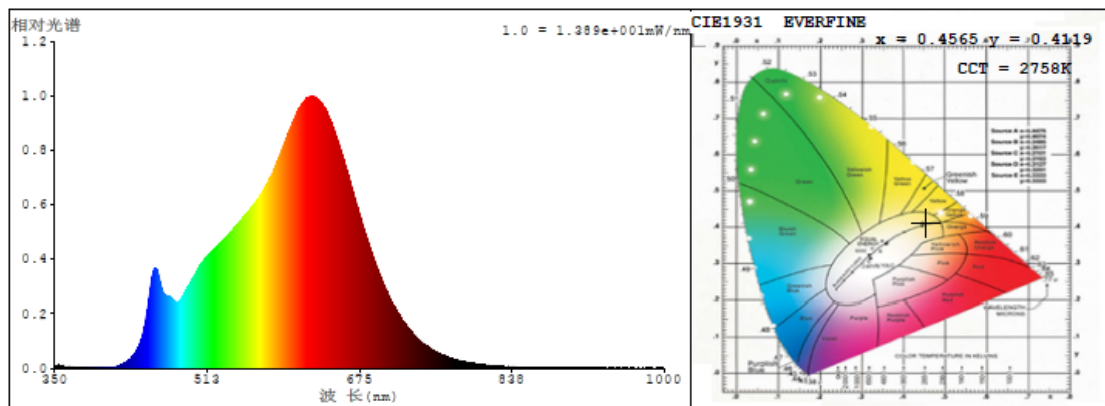
Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	69
Frequency (Hz)	60	R2	100	R10	99
CCT (K)	2758	R3	98	R11	98
Duv	0.000793	R4	96	R12	86
Chromaticity (x, y)	x=0.4565, y=0.4119	R5	97	R13	98
Chromaticity (u', v')	u' =0.2597, v' =0.5274	R6	96	R14	99
Color Rendering Index (CRI)	95.0	R7	92	R15	92
R9	69	R8	85	--	--

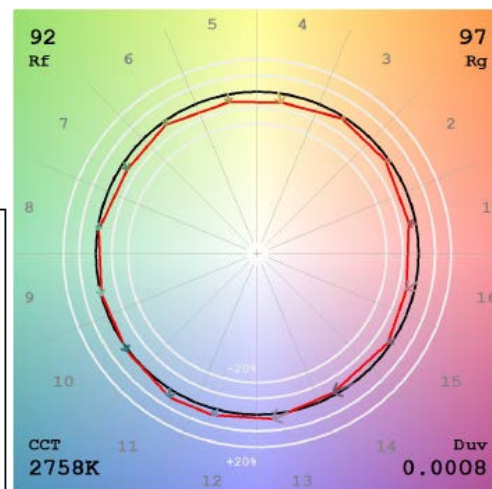
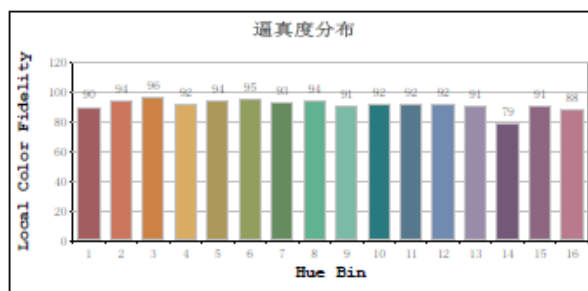
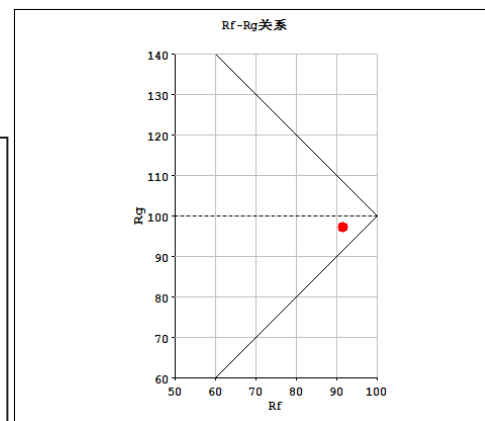
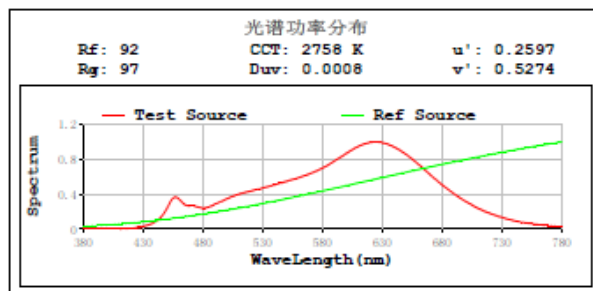
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	657.82
Luminous Efficacy (lm/W)	76.95
Beam Angle (°)	35.1
Center Beam Candle Power (cd)	1696

Spectral Power Distribution & Chromaticity Diagram



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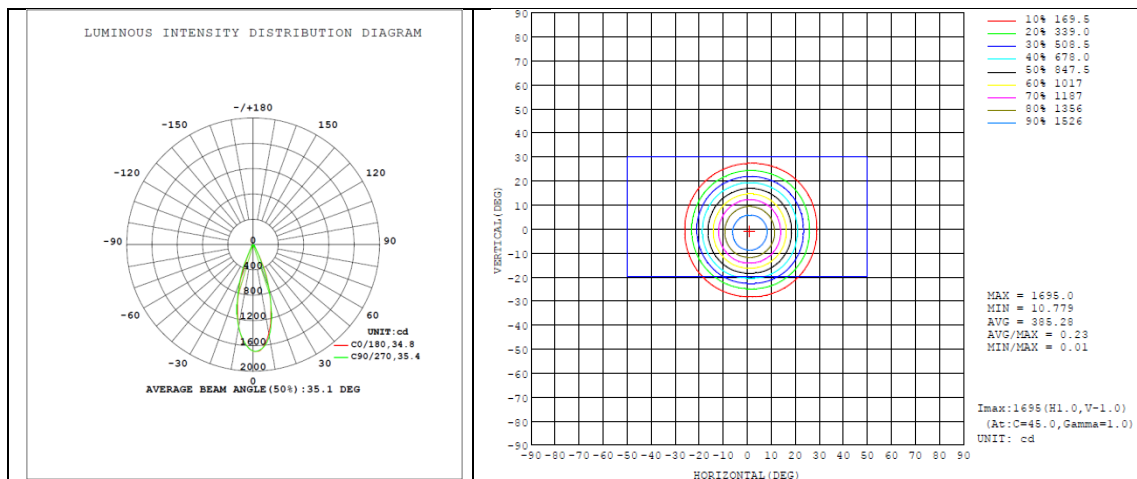


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	578.2	87.9%
0-40	616.4	93.7%
0-60	648.6	98.6%
60-90	9.2	1.3%
70-100	3.9	0.6%
90-120	0.0	0.0%
0-90	657.8	100.0%
90-180	0.0	0.0%
0-180	657.8	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	146.0	22.2%	90-100	0	0%
10-20	282.9	43.0%	100-110	0	0%
20-30	149.3	22.7%	110-120	0	0%
30-40	38.2	5.8%	120-130	0	0%
40-50	20.4	3.1%	130-140	0	0%
50-60	11.8	1.8%	140-150	0	0%
60-70	5.3	0.8%	150-160	0	0%
70-80	3.3	0.5%	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	DLG0016(GR3)	CCT Setting	3000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07128	8.418	0.9803

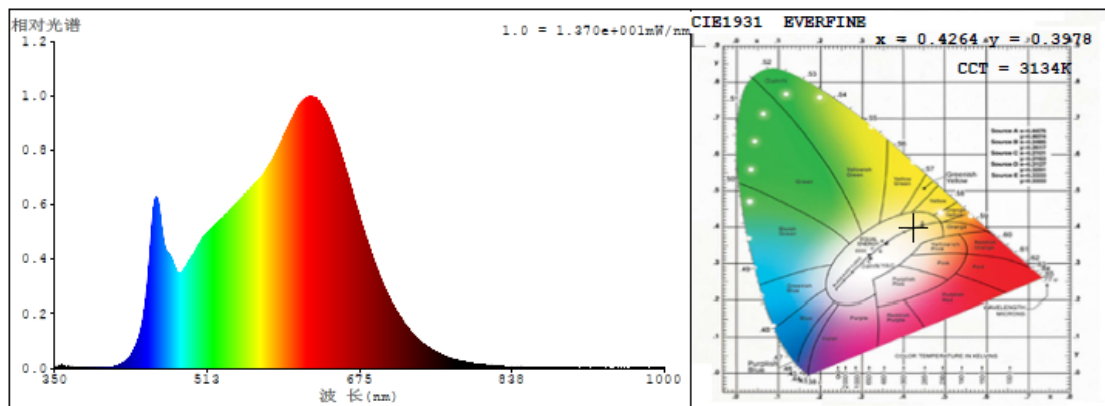
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	77
Frequency (Hz)	60	R2	98	R10	96
CCT (K)	3134	R3	96	R11	98
Duv	-0.000969	R4	95	R12	81
Chromaticity (x, y)	x=0.4264, y=0.3978	R5	97	R13	99
Chromaticity (u', v')	u' =0.2464, v' =0.5173	R6	94	R14	99
Color Rendering Index (CRI)	94.7	R7	91	R15	95
R9	77	R8	88	--	--

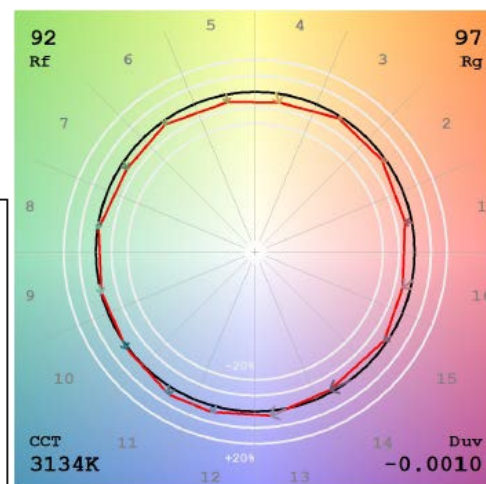
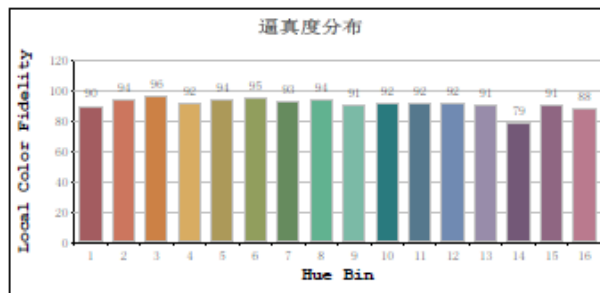
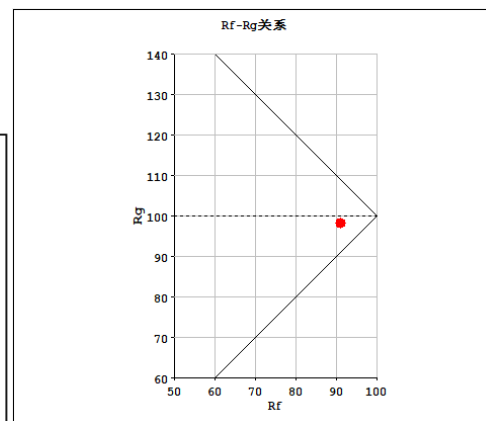
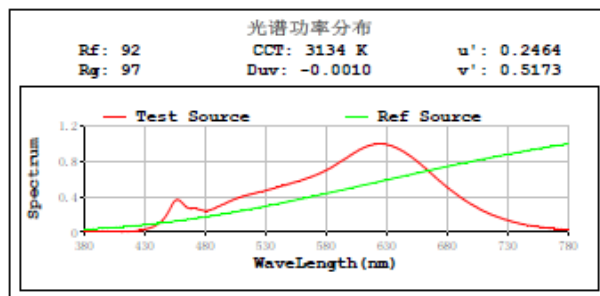
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	704.67
Luminous Efficacy (lm/W)	83.54
Beam Angle (°)	35.1
Center Beam Candle Power (cd)	1813

Spectral Power Distribution & Chromaticity Diagram



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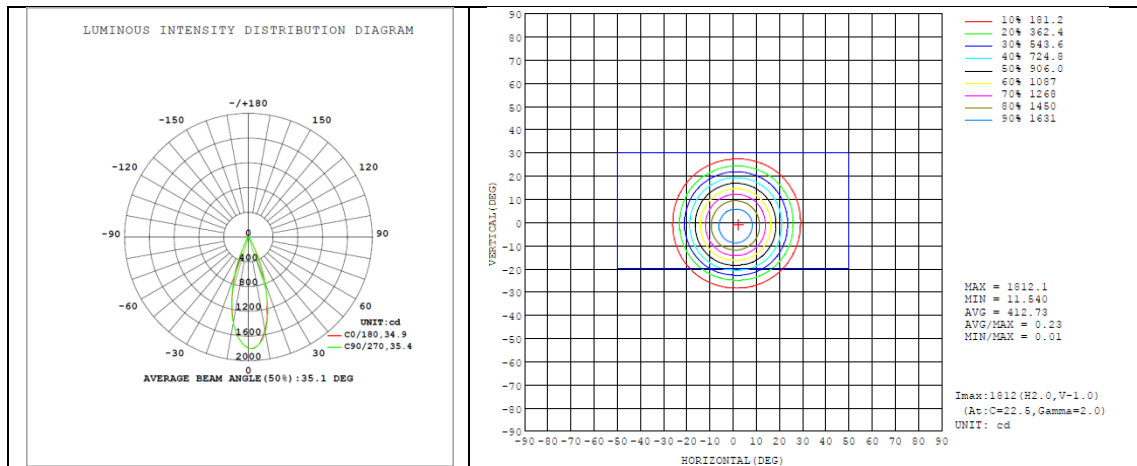


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	619.4	87.9%
0-40	660.3	93.7%
0-60	694.8	98.6%
60-90	9.9	1.3%
70-100	4.2	0.6%
90-120	0.0	0.0%
0-90	704.7	100.0%
90-180	0.0	0.0%
0-180	704.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	156.4	22.2%	90-100	0	0%
10-20	302.3	42.9%	100-110	0	0%
20-30	160.7	22.8%	110-120	0	0%
30-40	40.9	5.8%	120-130	0	0%
40-50	21.8	3.1%	130-140	0	0%
50-60	12.7	1.8%	140-150	0	0%
60-70	5.6	0.8%	150-160	0	0%
70-80	3.5	0.5%	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	DLG0016(GR3)	CCT Setting	3500k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07014	8.278	0.9796

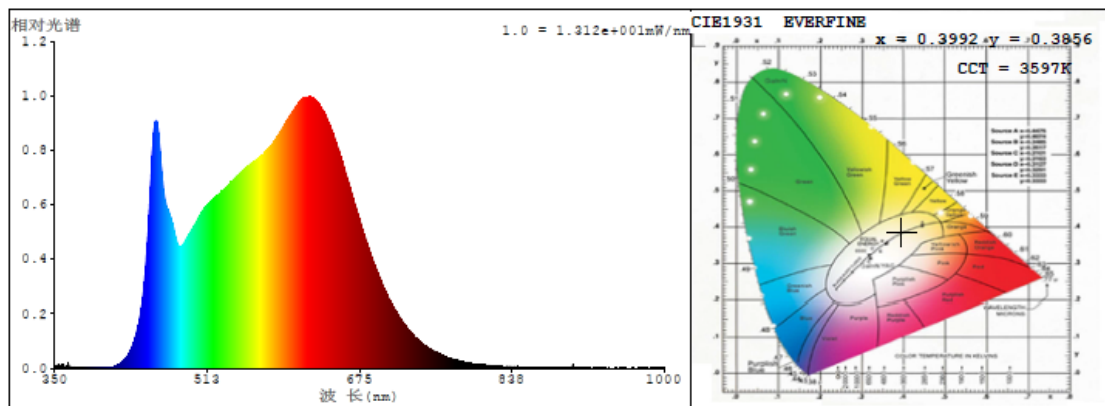
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	98	R9	81
Frequency (Hz)	60	R2	98	R10	97
CCT (K)	3597	R3	97	R11	96
Duv	-0.000884	R4	93	R12	77
Chromaticity (x, y)	x=0.3992, y=0.3856	R5	96	R13	99
Chromaticity (u', v')	u' =0.2338, v' =0.5082	R6	95	R14	99
Color Rendering Index (CRI)	94.6	R7	91	R15	95
R9	81	R8	89	--	--

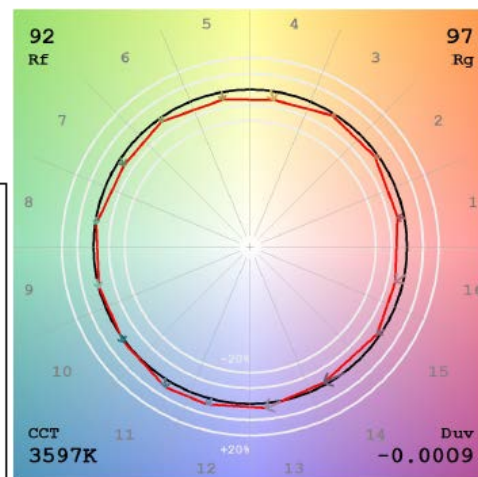
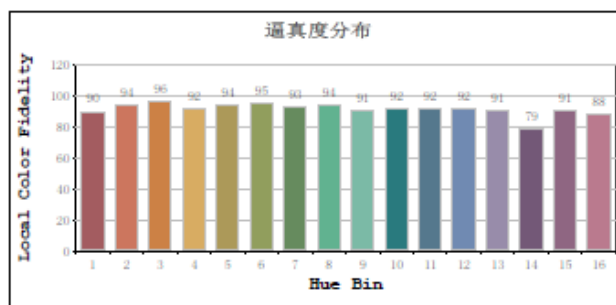
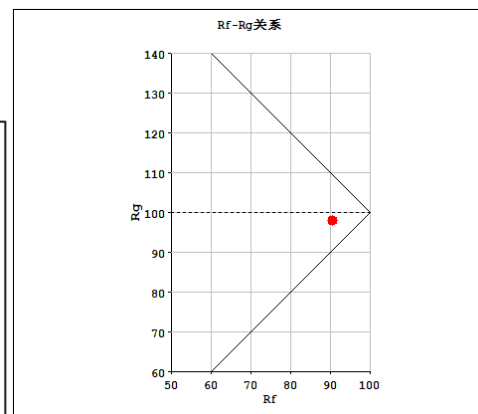
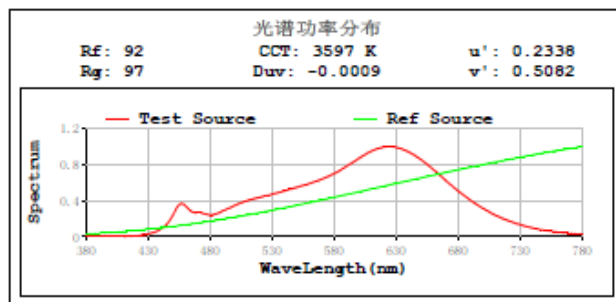
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	746.20
Luminous Efficacy (lm/W)	89.94
Beam Angle (°)	35.2
Center Beam Candle Power (cd)	1914

Spectral Power Distribution & Chromaticity Diagram



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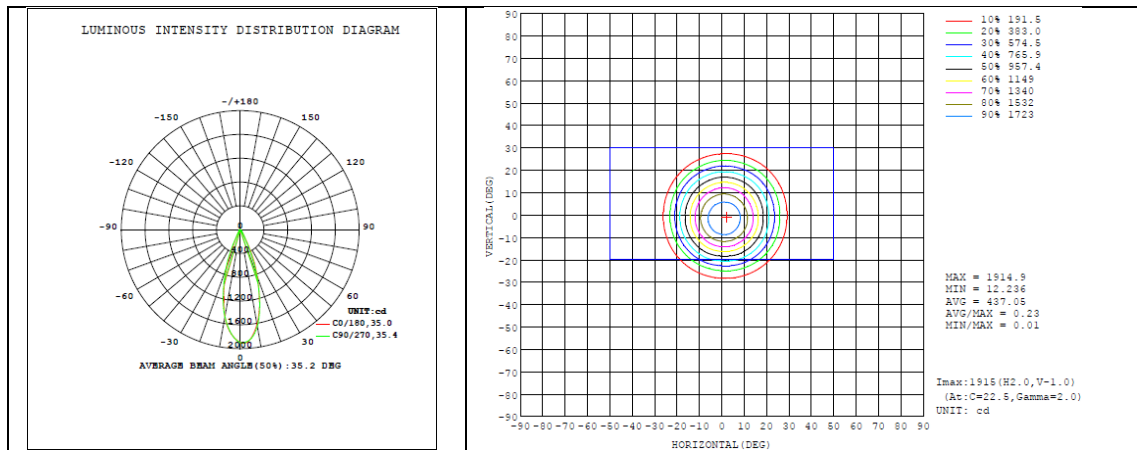


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	655.2	87.8%
0-40	699.2	93.7%
0-60	735.8	98.6%
60-90	10.4	1.3%
70-100	4.5	0.6%
90-120	0.0	0.0%
0-90	746.2	100.0%
90-180	0.0	0.0%
0-180	746.2	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	164.9	22.1%	90-100	0	0%
10-20	320.1	42.9%	100-110	0	0%
20-30	170.1	22.8%	110-120	0	0%
30-40	44.0	5.9%	120-130	0	0%
40-50	23.1	3.1%	130-140	0	0%
50-60	13.4	1.8%	140-150	0	0%
60-70	6.0	0.8%	150-160	0	0%
70-80	3.7	0.5%	160-170	0	0%
80-90	0.7	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	DLG0016 (GR3)	CCT Setting	4000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07051	8.323	0.9798

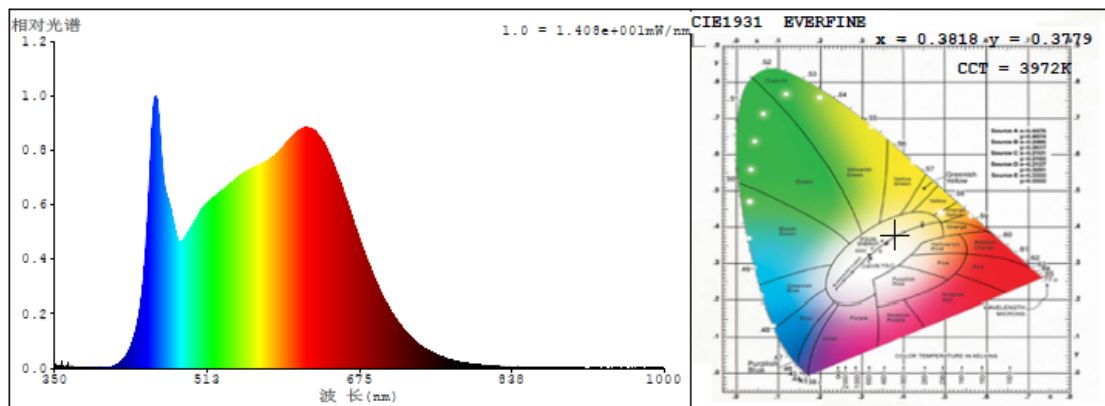
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	80
Frequency (Hz)	60	R2	98	R10	98
CCT (K)	3972	R3	97	R11	95
Duv	0.000137	R4	92	R12	74
Chromaticity (x, y)	x=0.3818, y=0.3779	R5	95	R13	99
Chromaticity (u', v')	u' =0.2256, v' =0.5023	R6	96	R14	99
Color Rendering Index (CRI)	94.4	R7	91	R15	94
R9	80	R8	89	--	--

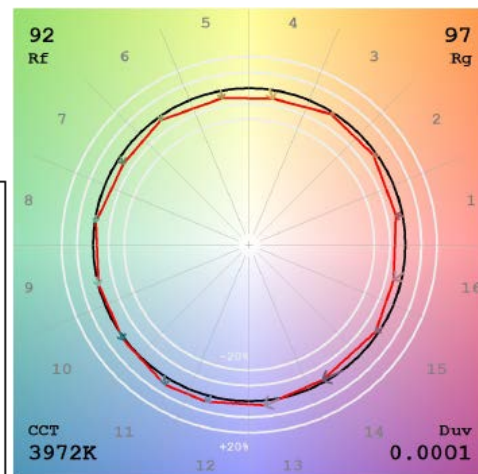
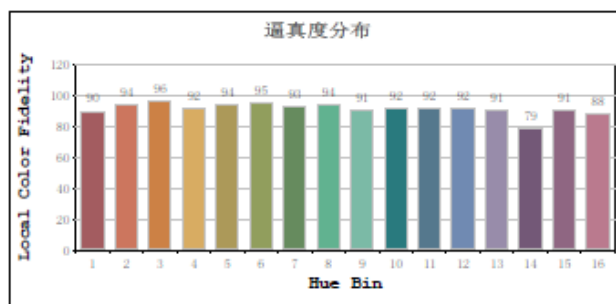
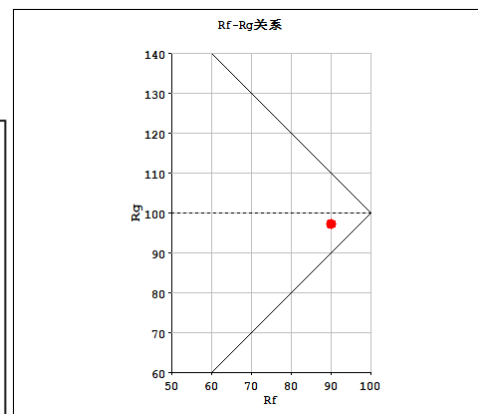
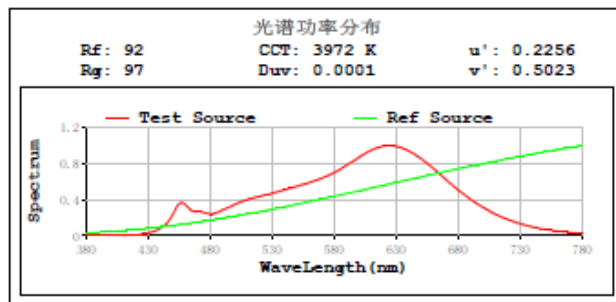
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	766.36
Luminous Efficacy (lm/W)	91.89
Beam Angle (°)	35.3
Center Beam Candle Power (cd)	1965

Spectral Power Distribution & Chromaticity Diagram



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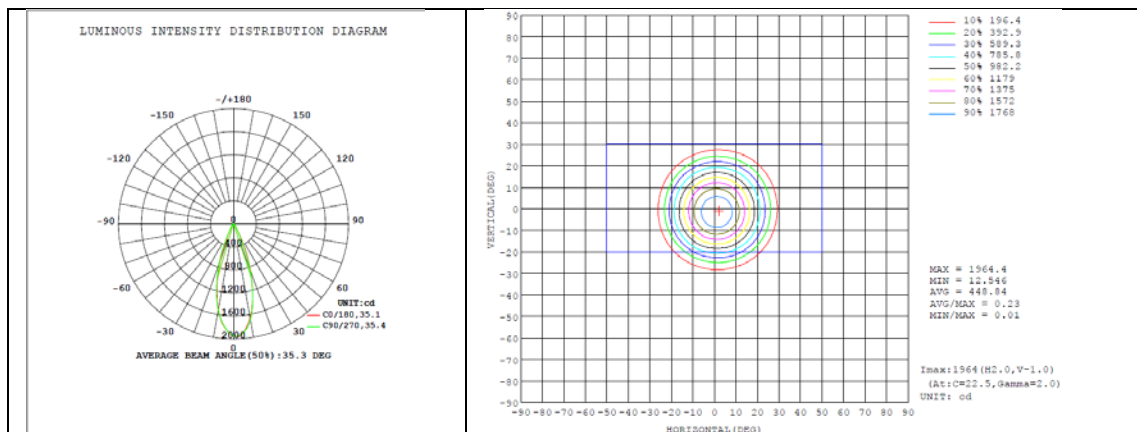


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	672.9	87.8%
0-40	718.1	93.7%
0-60	755.6	98.6%
60-90	10.7	1.3%
70-100	4.6	0.6%
90-120	0.0	0.0%
0-90	766.4	100.0%
90-180	0.0	0.0%
0-180	766.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	168.6	22.0%	90-100	0	0%
10-20	328.8	42.9%	100-110	0	0%
20-30	175.5	22.9%	110-120	0	0%
30-40	45.2	5.9%	120-130	0	0%
40-50	23.8	3.1%	130-140	0	0%
50-60	13.8	1.8%	140-150	0	0%
60-70	6.1	0.8%	150-160	0	0%
70-80	3.8	0.5%	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	DLG0016(GR3)	CCT Setting	5000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.07232	8.547	0.9809

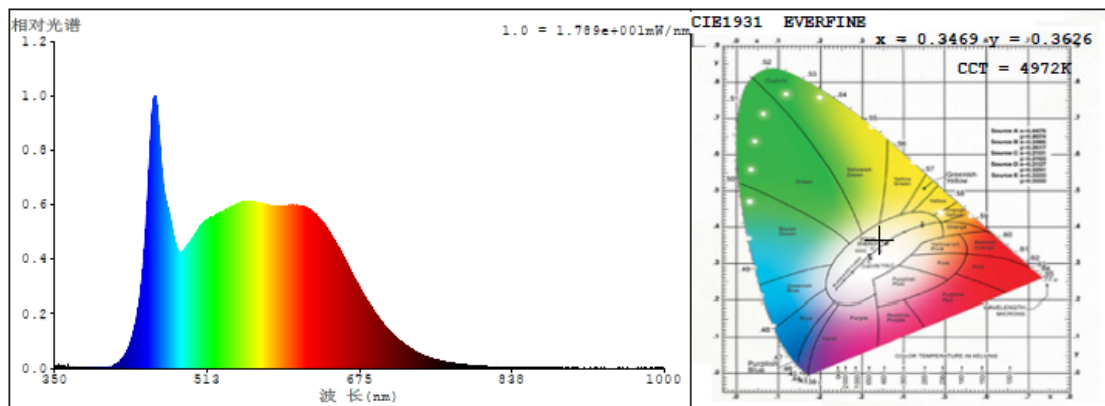
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	66
Frequency (Hz)	60	R2	98	R10	94
CCT (K)	4972	R3	97	R11	88
Duv	0.00472	R4	87	R12	66
Chromaticity (x, y)	x=0.3469, y=0.3626	R5	90	R13	95
Chromaticity (u', v')	u' =0.2084, v' =0.4902	R6	95	R14	99
Color Rendering Index (CRI)	91.8	R7	90	R15	89
R9	66	R8	85	--	--

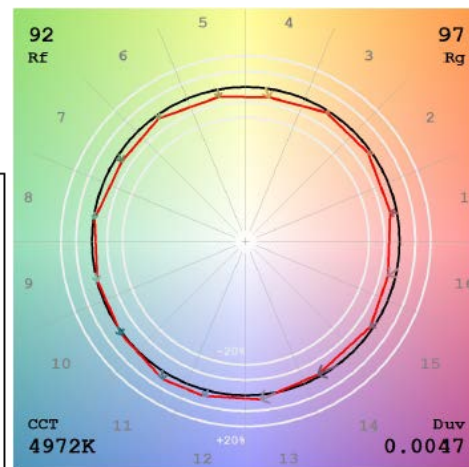
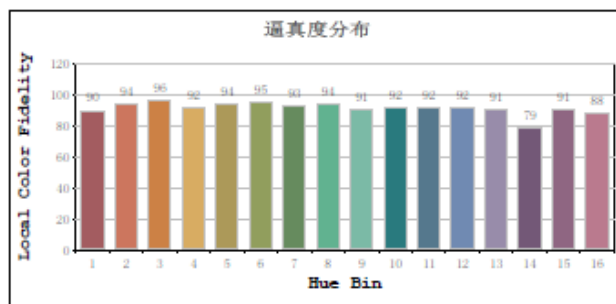
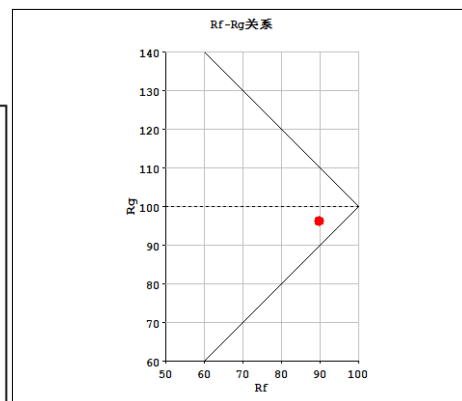
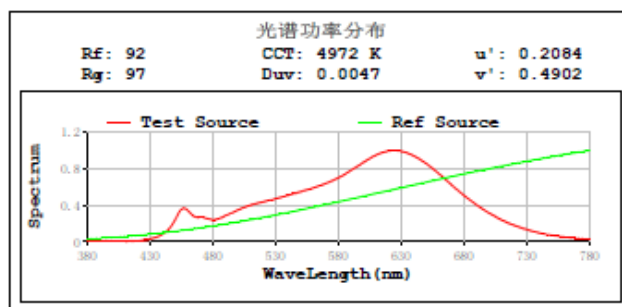
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	779.70
Luminous Efficacy (lm/W)	91.03
Beam Angle (°)	35.4
Center Beam Candle Power (cd)	1989

Spectral Power Distribution & Chromaticity Diagram



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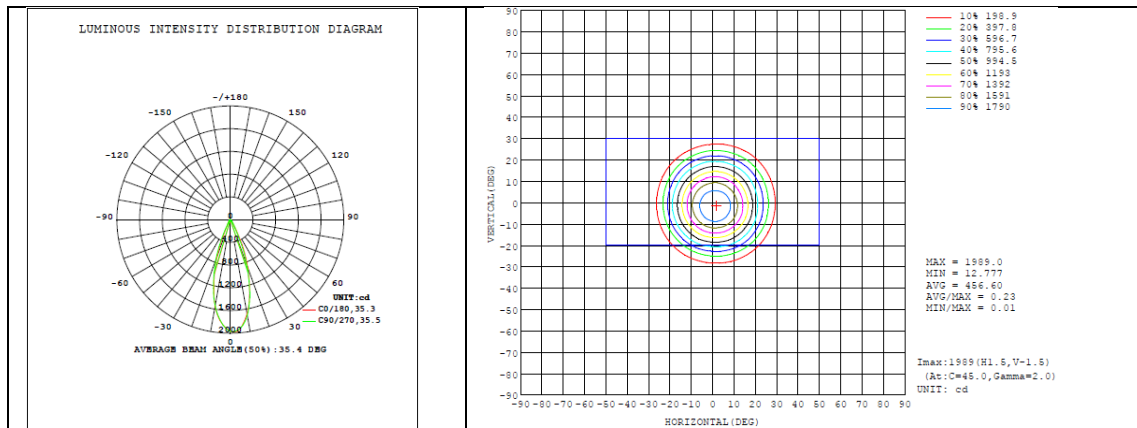


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	684.6	87.8%
0-40	730.6	93.7%
0-60	768.8	98.6%
60-90	10.9	1.3%
70-100	4.7	0.6%
90-120	0.0	0.0%
0-90	779.7	100.0%
90-180	0.0	0.0%
0-180	779.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	170.8	21.9%	90-100	0	0%
10-20	334.5	42.9%	100-110	0	0%
20-30	179.3	23.0%	110-120	0	0%
30-40	46.0	5.9%	120-130	0	0%
40-50	24.2	3.1%	130-140	0	0%
50-60	14.0	1.8%	140-150	0	0%
60-70	6.2	0.8%	150-160	0	0%
70-80	3.9	0.5%	160-170	0	0%
80-90	0.8	0.1%	170-180	0	0%

Photometric Data



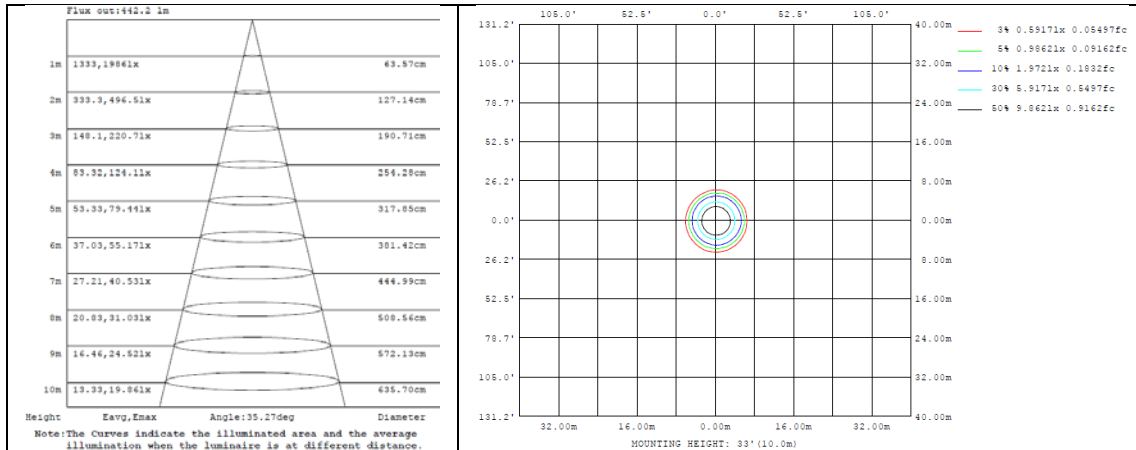


Table--1

UNIT: cd

C (DEG) \ γ (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	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968	1968
5	1932	1944	1945	1943	1926	1905	1880	1850	1822	1808	1808	1807	1817	1837	1876	1902
10	1691	1728	1745	1743	1714	1679	1630	1584	1547	1521	1520	1523	1546	1574	1604	1642
15	1314	1362	1371	1359	1316	1278	1215	1165	1126	1103	1102	1115	1155	1195	1234	1264
20	886	920	923	905	849	822	767	727	691	677	695	711	747	773	822	850
25	487	501	486	445	392	350	307	289	270	259	283	302	349	387	438	466
30	170	169	165	158	151	139	128	115	107	103	104	107	117	134	145	159
35	76.0	79.2	79.5	80.9	79.1	75.7	69.2	63.3	59.6	57.3	56.4	57.1	61.3	65.7	69.2	71.6
40	43.1	45.2	45.9	47.6	48.8	48.6	45.9	43.6	41.8	40.6	39.5	38.8	40.1	40.7	41.2	41.3
45	29.3	29.9	30.7	32.3	33.2	34.0	33.6	33.0	32.1	31.0	30.0	29.3	29.7	29.6	29.2	28.8
50	20.9	21.1	21.5	22.4	23.1	24.0	24.4	24.4	23.8	23.3	22.6	21.9	21.9	21.7	21.2	20.9
55	14.5	14.8	15.1	15.7	16.1	16.7	17.1	17.2	17.0	16.6	16.3	15.8	15.7	15.4	14.9	14.5
60	8.80	8.93	9.14	9.51	9.86	10.3	10.7	10.9	10.9	10.9	10.7	10.2	9.92	9.38	8.98	8.74
65	5.10	5.19	5.32	5.60	5.84	6.21	6.49	6.69	6.71	6.62	6.59	6.26	5.92	5.53	5.29	5.12
70	3.48	3.47	3.61	3.77	4.04	4.28	4.54	4.69	4.74	4.74	4.59	4.42	4.15	3.93	3.69	3.55
75	2.94	2.93	3.05	3.18	3.42	3.63	3.86	3.98	4.04	4.04	3.91	3.77	3.53	3.33	3.11	3.02
80	1.98	1.97	2.05	2.16	2.33	2.49	2.64	2.73	2.75	2.75	2.67	2.56	2.41	2.25	2.10	2.03
85	0.73	0.72	0.79	0.87	0.94	1.07	1.19	1.24	1.25	1.26	1.19	1.12	1.00	0.89	0.78	0.75
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
DLG0016(GR3)	2700K setting	120	657.82	8.55	76.95
	3000K setting	120	704.67	8.44	83.54
	3500K setting	120	746.20	8.30	89.94
	4000K setting	120	766.36	8.34	91.89
	5000K setting	120	779.70	8.56	91.03