

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) :

DLR0145 (R3TL)

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	15W
Rated Initial Lamp Lumen	1200lm (3000k) , 1250lm (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	DLR0145 (R3TL)	CCT Setting	2700k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.123	14.53	0.981

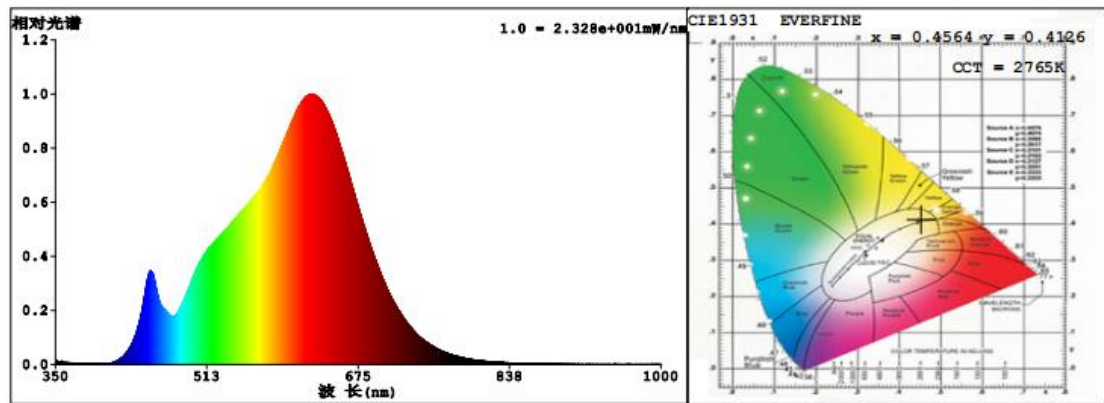
Chromaticity Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	68
Frequency (Hz)	60	R2	98	R10	94
CCT (K)	2765	R3	98	R11	99
Duv	0.00106	R4	97	R12	88
Chromaticity (x, y)	x=0.4564, y=0.4126	R5	96	R13	97
Chromaticity (u', v')	u' =0.2594, v' =0.5276	R6	98	R14	98
Color Rendering Index (CRI)	95.4	R7	94	R15	92
R9	68	R8	86	--	--

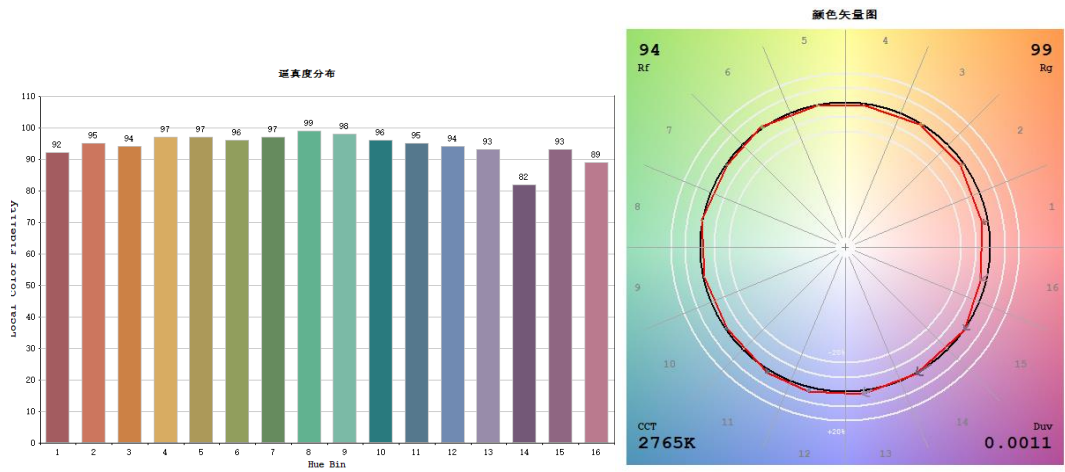
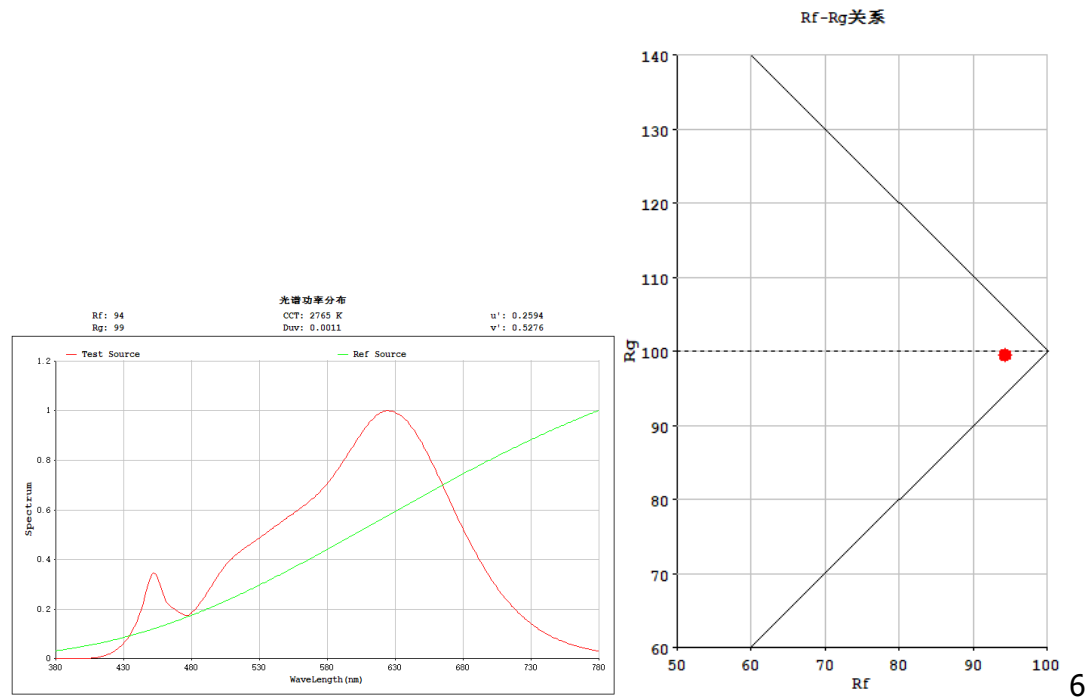
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1133.21
Luminous Efficacy (lm/W)	77.96
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	2690

Spectral Power Distribution & Chromaticity Diagram



TM30

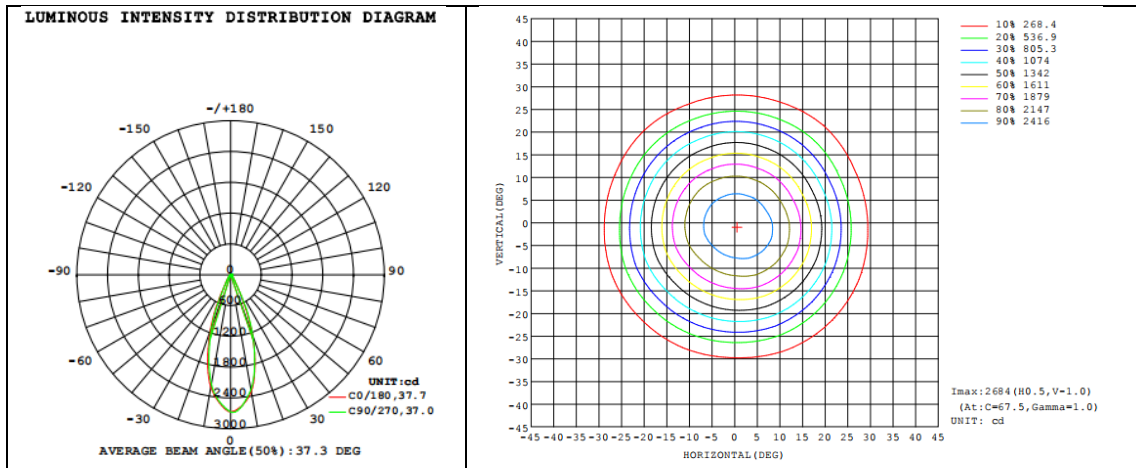


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	991.8	87.5%
0-40	1068.2	94.3%
0-60	1119.68	98.8%
60-90	13.496	1.2%
70-100	5.366	0.5%
90-120	0	0.0%
0-90	1133.176	100.0%
90-180	0	0.0%
0-180	1133.176	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	232.5	20.5%	90-100	0	0%
10-20	478.2	42.2%	100-110	0	0%
20-30	281.1	24.8%	110-120	0	0%
30-40	76.4	6.7%	120-130	0	0%
40-50	33.57	3.0%	130-140	0	0%
50-60	17.91	1.6%	140-150	0	0%
60-70	8.13	0.7%	150-160	0	0%
70-80	4.269	0.4%	160-170	0	0%
80-90	1.097	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	DLR0145 (R3TL)	CCT Setting	3000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.120	14.23	0.981

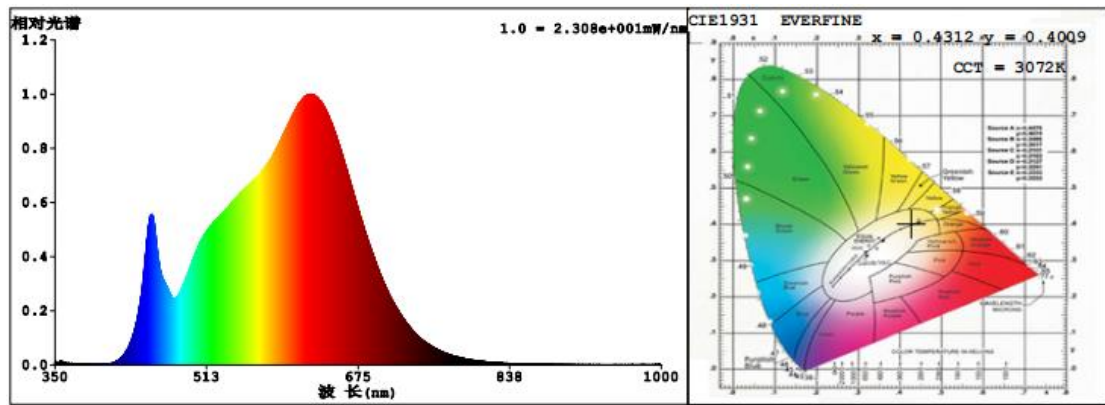
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	74
Frequency (Hz)	60	R2	99	R10	95
CCT (K)	3072	R3	98	R11	98
Duv	-0.00048	R4	97	R12	84
Chromaticity (x, y)	x=0.4312, y=0.4009	R5	97	R13	98
Chromaticity (u', v')	u' =0.2483, v' =0.5193	R6	97	R14	98
Color Rendering Index (CRI)	96.0	R7	95	R15	94
R9	74	R8	88	--	--

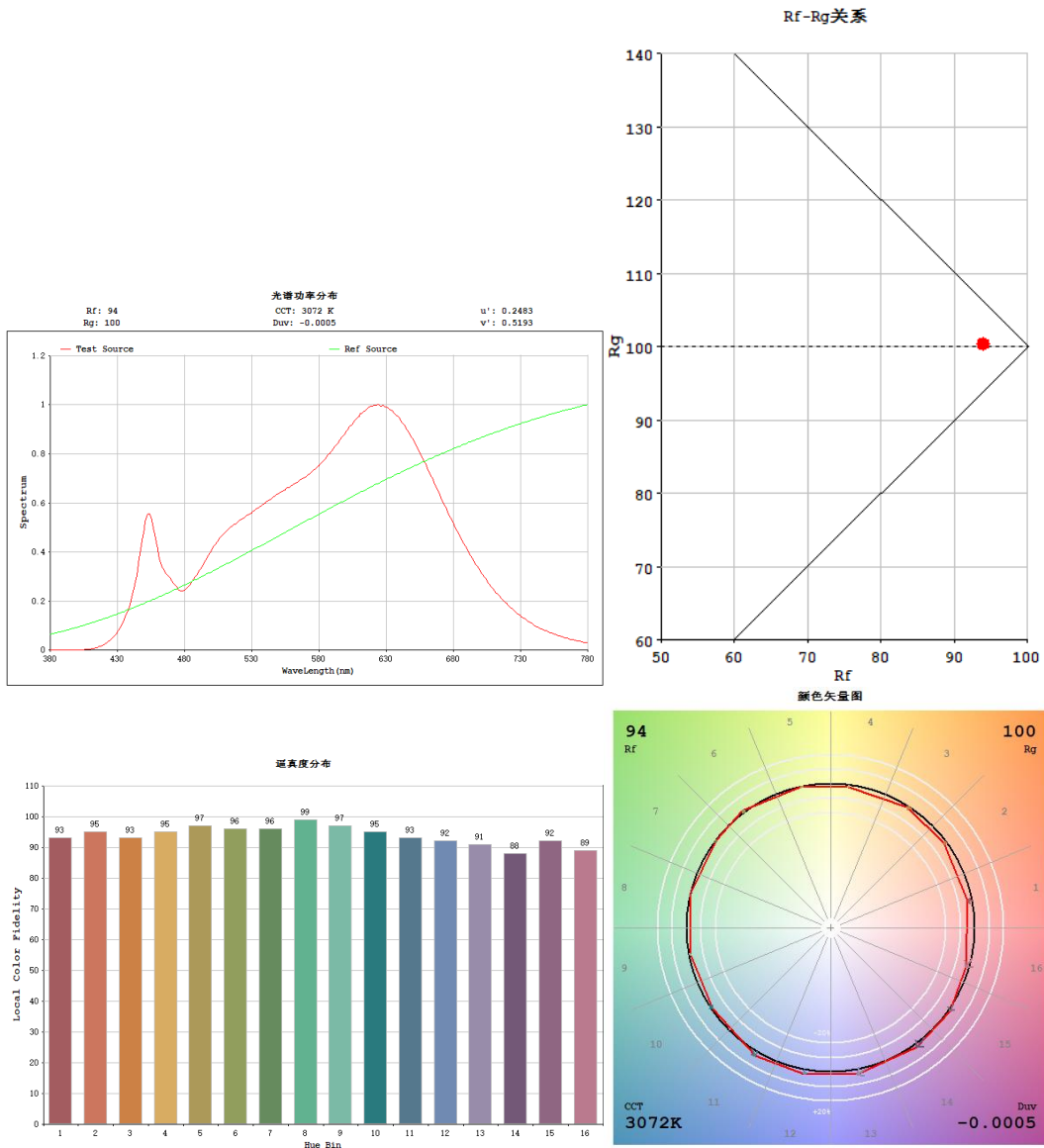
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1232.9
Luminous Efficacy (lm/W)	86.62
Beam Angle (°)	37.3
Center Beam Candle Power (cd)	2917

Spectral Power Distribution & Chromaticity Diagram



TM30

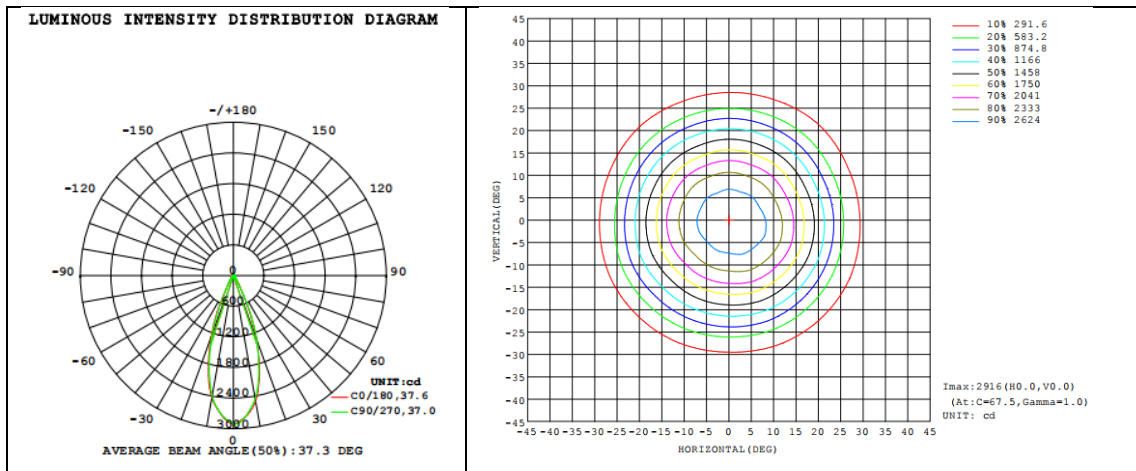


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1078.7	87.5%
0-40	1161.97	94.2%
0-60	1218.19	98.8%
60-90	14.772	1.2%
70-100	5.89	0.5%
90-120	0	0.0%
0-90	1232.962	100.0%
90-180	0	0.0%
0-180	1232.962	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	253	20.5%	90-100	0	0%
10-20	520	42.2%	100-110	0	0%
20-30	305.7	24.8%	110-120	0	0%
30-40	83.27	6.8%	120-130	0	0%
40-50	36.65	3.0%	130-140	0	0%
50-60	19.57	1.6%	140-150	0	0%
60-70	8.882	0.7%	150-160	0	0%
70-80	4.681	0.4%	160-170	0	0%
80-90	1.209	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	DLR0145 (R3TL)	CCT Setting	3500k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.117	13.83	0.980

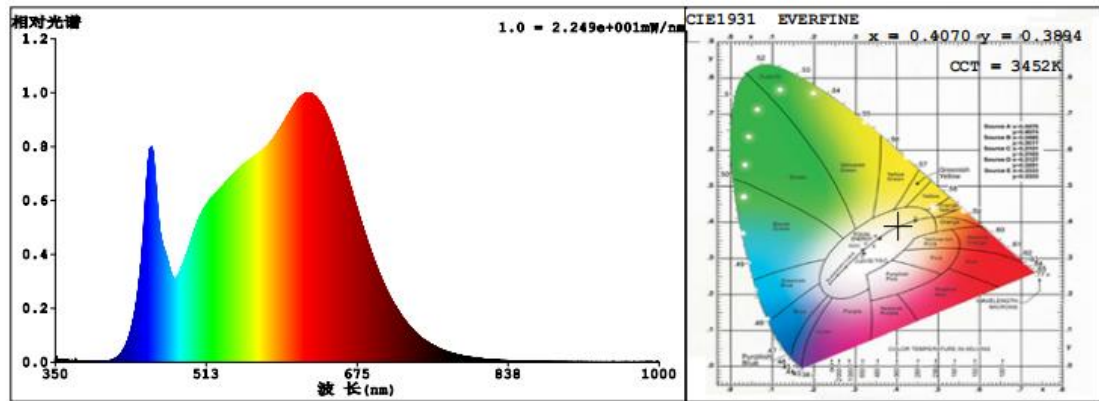
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	97	R9	76
Frequency (Hz)	60	R2	98	R10	94
CCT (K)	3452	R3	97	R11	97
Duv	-0.000943	R4	97	R12	80
Chromaticity (x, y)	x=0.4070, y=0.3894	R5	96	R13	98
Chromaticity (u', v')	u' =0.2374, v' =0.5110	R6	96	R14	98
Color Rendering Index (CRI)	95.9	R7	95	R15	95
R9	76	R8	91	--	--

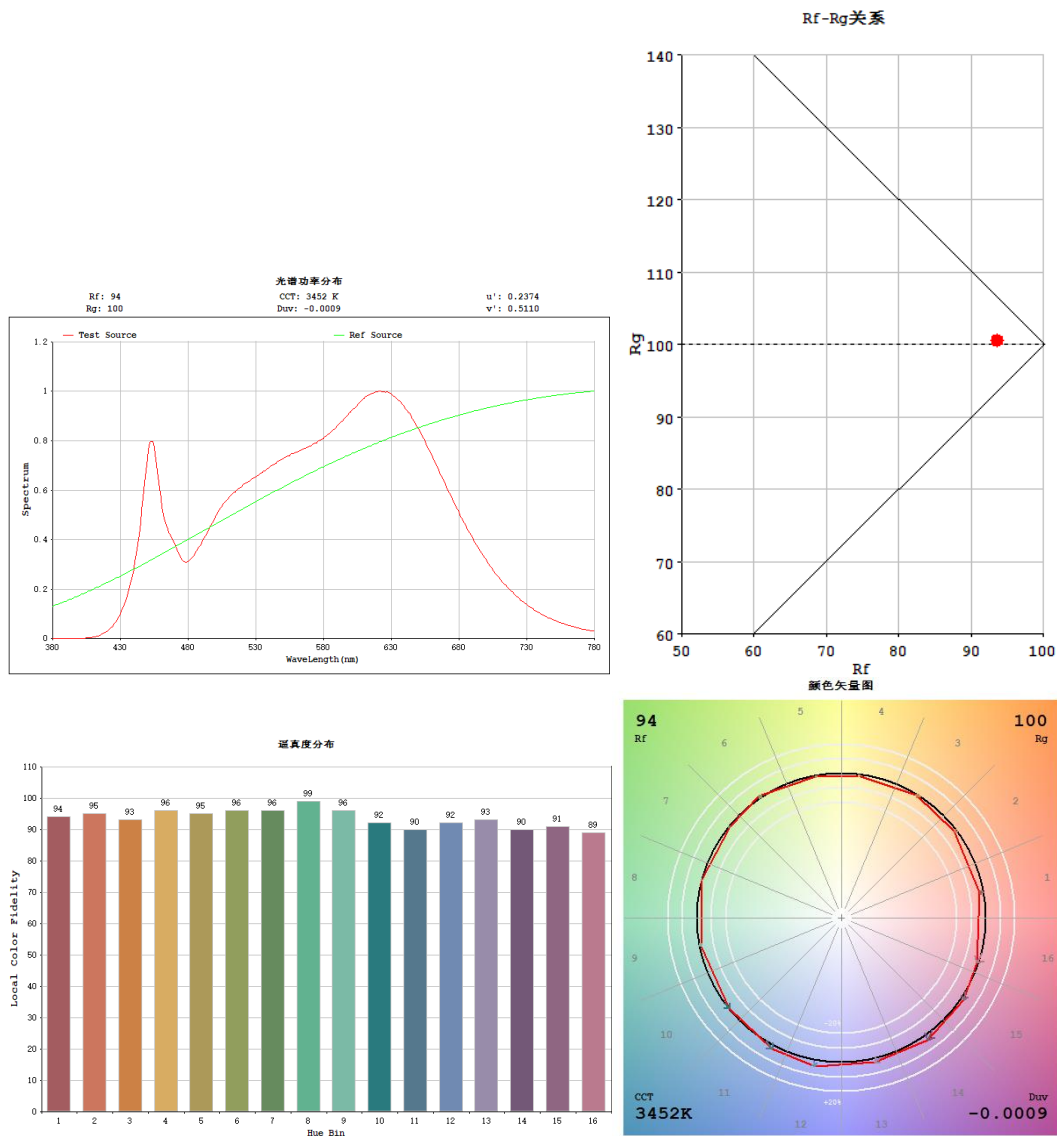
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1301.6
Luminous Efficacy (lm/W)	94.11
Beam Angle (°)	37.4
Center Beam Candle Power (cd)	3074

Spectral Power Distribution & Chromaticity Diagram



TM30

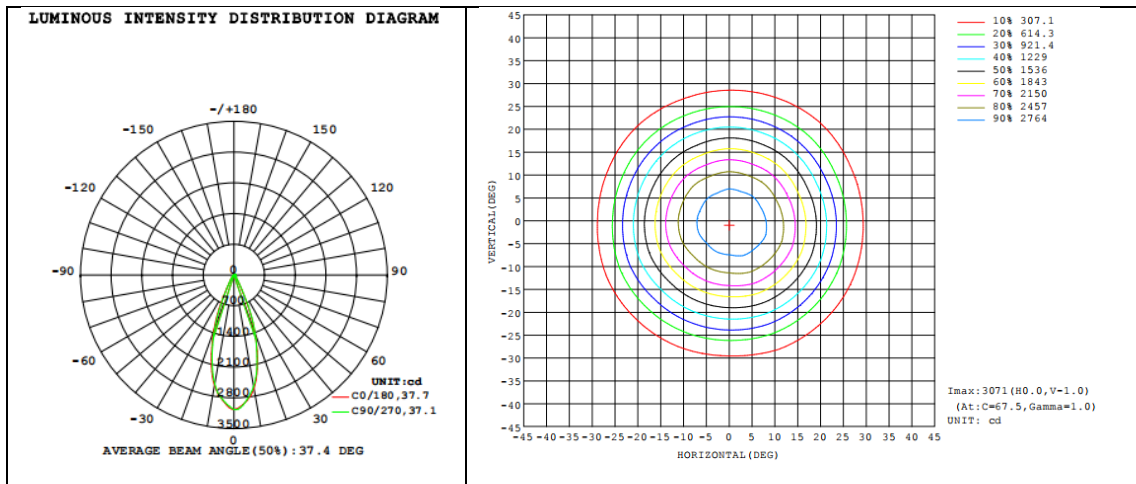


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1138.4	87.5%
0-40	1226.66	94.2%
0-60	1286.02	98.8%
60-90	15.622	1.2%
70-100	6.237	0.5%
90-120	0	0.0%
0-90	1301.642	100.0%
90-180	0	0.0%
0-180	1301.642	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	266.4	20.5%	90-100	0	0%
10-20	548.6	42.1%	100-110	0	0%
20-30	323.4	24.8%	110-120	0	0%
30-40	88.26	6.8%	120-130	0	0%
40-50	38.7	3.0%	130-140	0	0%
50-60	20.66	1.6%	140-150	0	0%
60-70	9.385	0.7%	150-160	0	0%
70-80	4.951	0.4%	160-170	0	0%
80-90	1.286	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	DLR0145 (R3TL)	CCT Setting	4000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.117	13.88	0.980

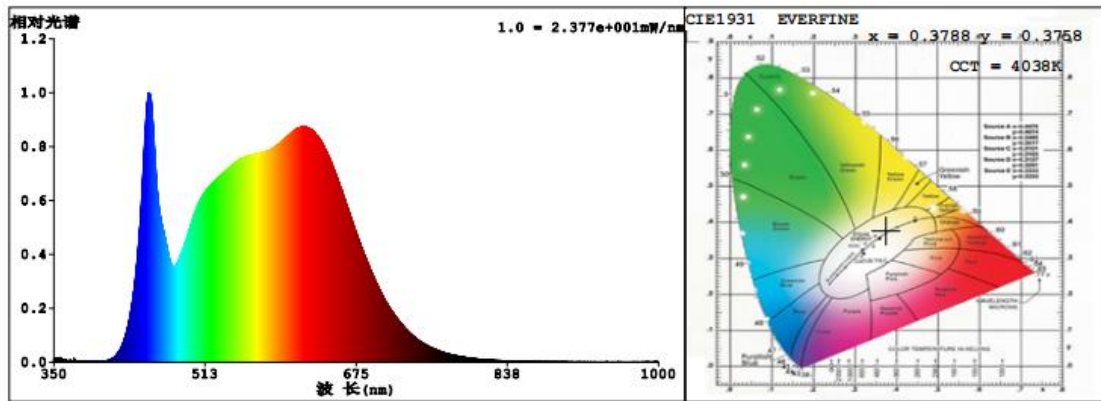
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	95	R9	74
Frequency (Hz)	60	R2	97	R10	91
CCT (K)	4038	R3	96	R11	95
Duv	-0.0000455	R4	95	R12	74
Chromaticity (x, y)	x=0.3788, y=0.3758	R5	94	R13	96
Chromaticity (u', v')	u' =0.2244, v' =0.5009	R6	94	R14	97
Color Rendering Index (CRI)	94.6	R7	96	R15	93
R9	74	R8	90	--	--

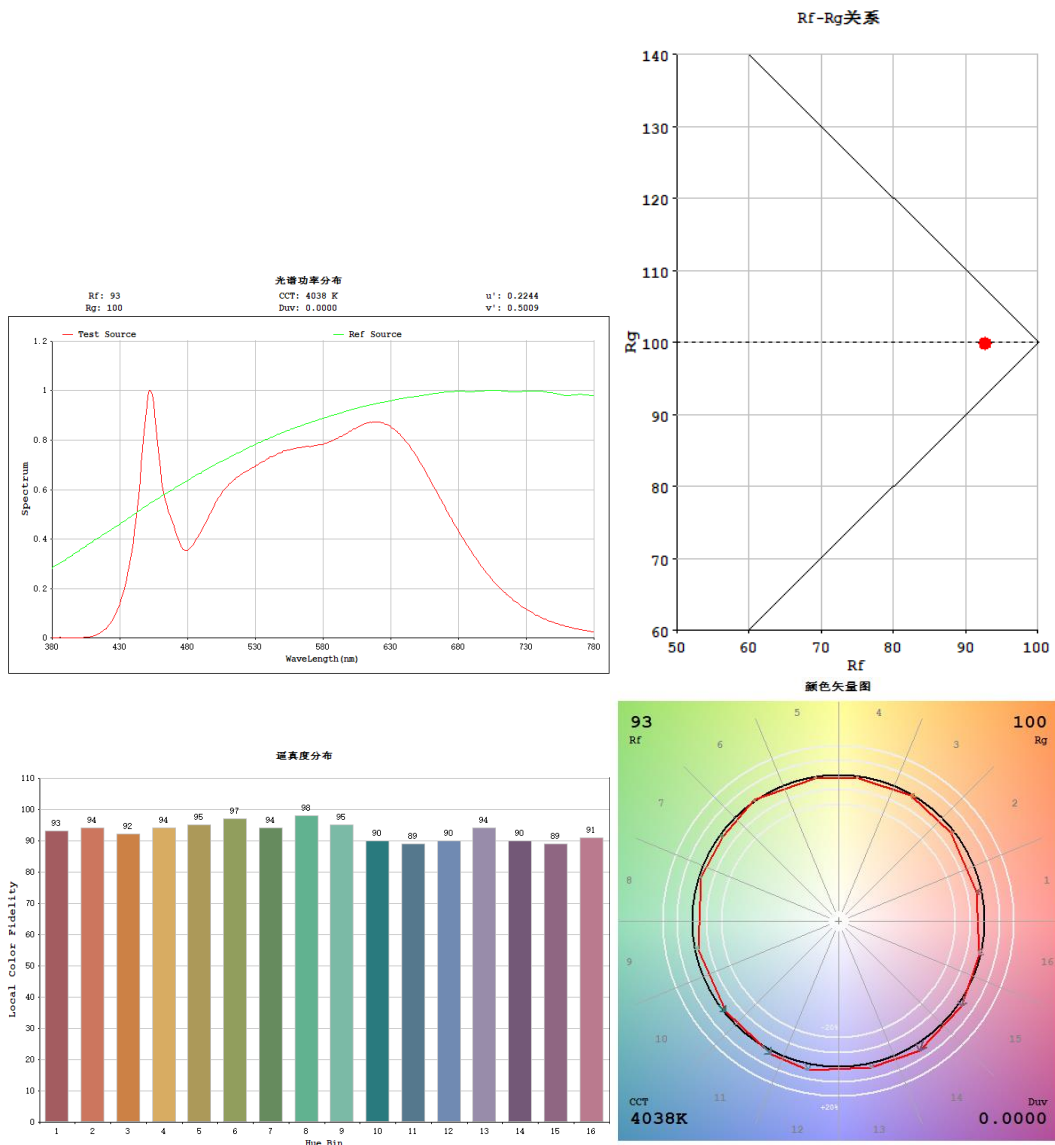
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1353.6
Luminous Efficacy (lm/W)	97.52
Beam Angle (°)	37.4
Center Beam Candle Power (cd)	3192

Spectral Power Distribution & Chromaticity Diagram



TM30

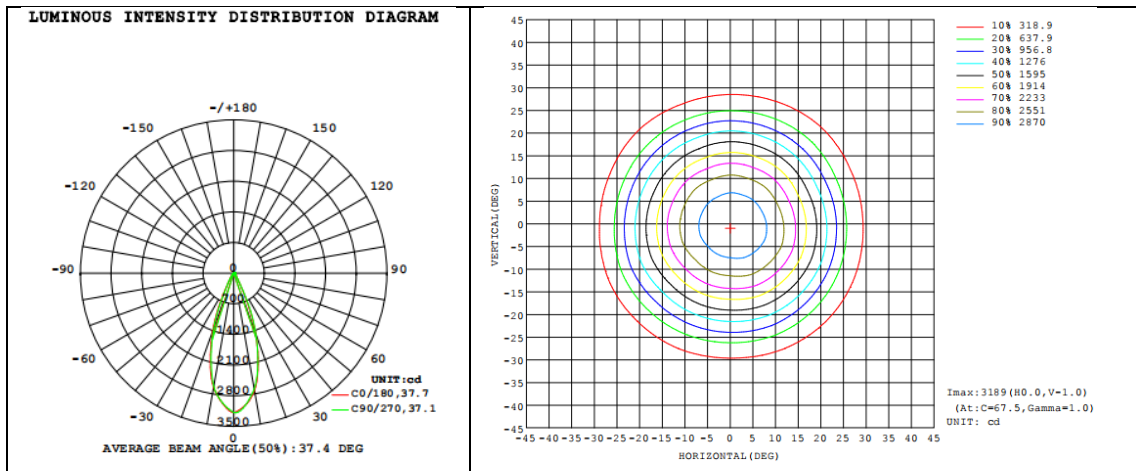


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1183.5	87.4%
0-40	1275.55	94.2%
0-60	1337.36	98.8%
60-90	16.285	1.2%
70-100	6.508	0.5%
90-120	0	0.0%
0-90	1353.645	100.0%
90-180	0	0.0%
0-180	1353.645	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	276.5	20.4%	90-100	0	0%
10-20	570	42.1%	100-110	0	0%
20-30	337	24.9%	110-120	0	0%
30-40	92.05	6.8%	120-130	0	0%
40-50	40.31	3.0%	130-140	0	0%
50-60	21.5	1.6%	140-150	0	0%
60-70	9.777	0.7%	150-160	0	0%
70-80	5.161	0.4%	160-170	0	0%
80-90	1.347	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	DLR0145 (R3TL)	CCT Setting	5000k

Electrical Measurement:

Sampel No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
#1	120	60	0.123	14.58	0.981

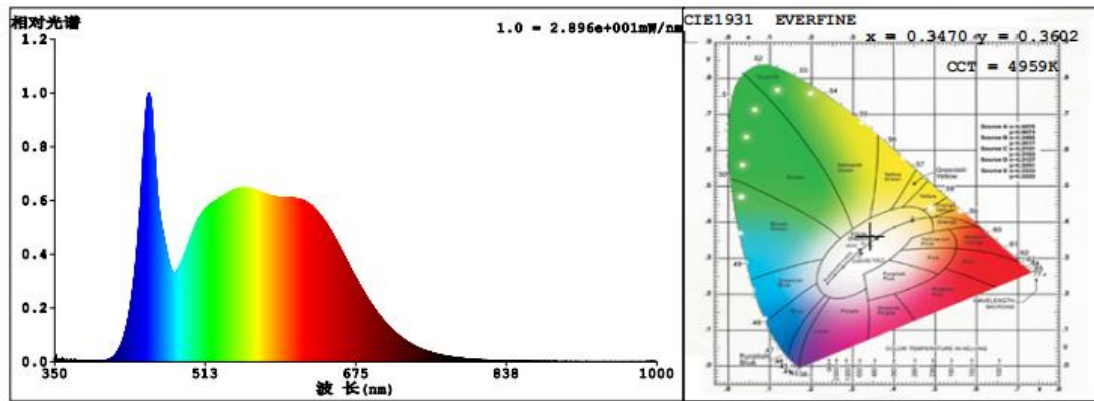
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	90	R9	60
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	4959	R3	94	R11	90
Duv	0.0035	R4	91	R12	66
Chromaticity (x, y)	x=0.3470, y=0.3602	R5	89	R13	91
Chromaticity (u', v')	u' =0.2094, v' =0.4891	R6	89	R14	97
Color Rendering Index (CRI)	91.1	R7	95	R15	88
R9	60	R8	86	--	--

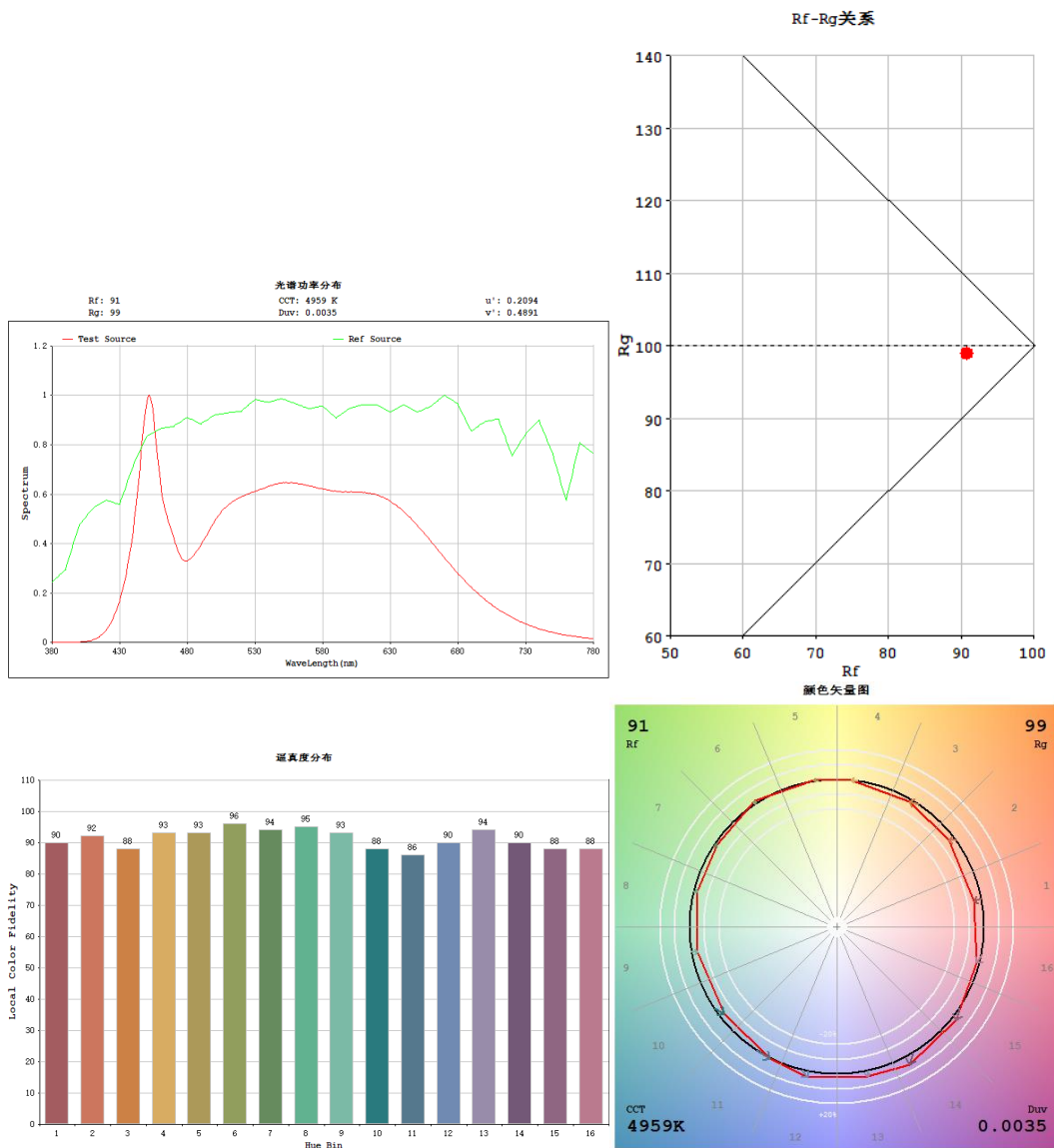
Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1351.9
Luminous Efficacy (lm/W)	92.71
Beam Angle (°)	37.4
Center Beam Candle Power (cd)	3181

Spectral Power Distribution & Chromaticity Diagram



TM30

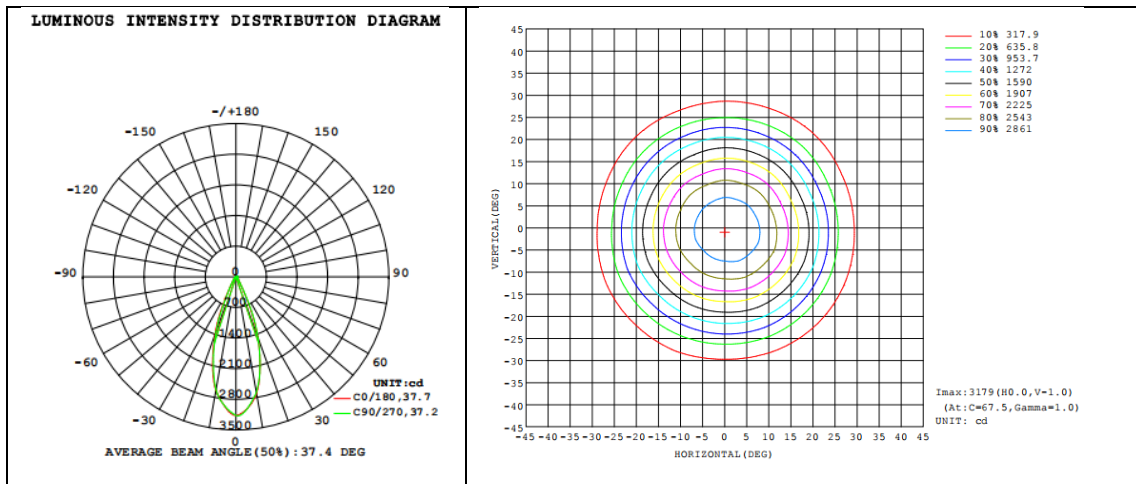


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1181.3	87.4%
0-40	1273.73	94.2%
0-60	1335.58	98.8%
60-90	16.289	1.2%
70-100	6.51	0.5%
90-120	0	0.0%
0-90	1351.869	100.0%
90-180	0	0.0%
0-180	1351.869	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	275.5	20.4%	90-100	0	0%
10-20	568.4	42.0%	100-110	0	0%
20-30	337.4	25.0%	110-120	0	0%
30-40	92.43	6.8%	120-130	0	0%
40-50	40.35	3.0%	130-140	0	0%
50-60	21.5	1.6%	140-150	0	0%
60-70	9.779	0.7%	150-160	0	0%
70-80	5.162	0.4%	160-170	0	0%
80-90	1.348	0.1%	170-180	0	0%

Photometric Data



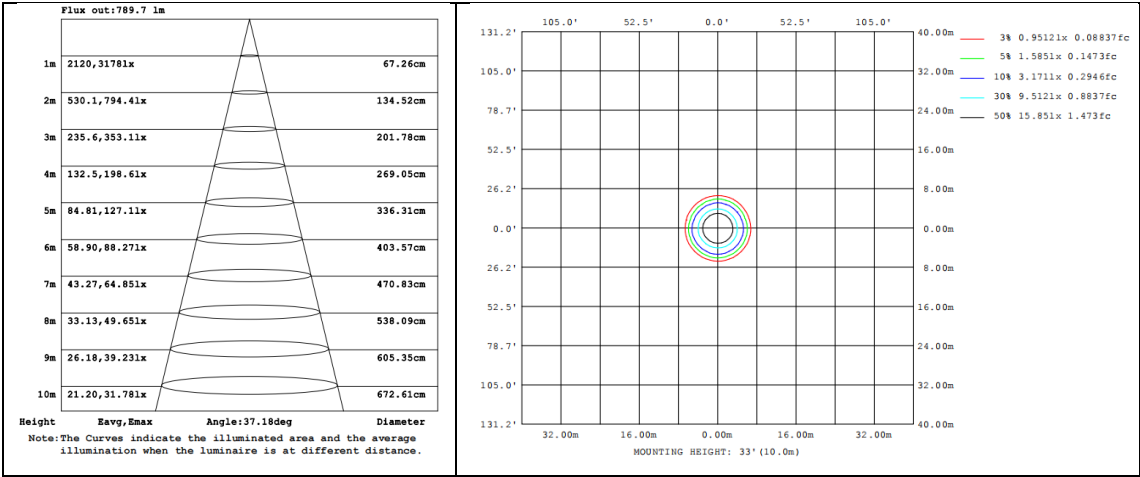


Table--1

		UNIT: cd																		
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			
y (DEG)	0	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169	3169			
5	3021	3038	3037	3045	3023	3015	2995	2993	2972	2955	2949	2949	2963	2972	2988	2993				
10	2710	2761	2730	2735	2684	2670	2640	2657	2638	2614	2617	2594	2623	2620	2663	2672				
15	2140	2205	2194	2188	2132	2130	2102	2104	2070	2022	2004	1979	2005	2025	2067	2072				
20	1463	1521	1516	1514	1476	1455	1420	1445	1400	1345	1329	1309	1335	1341	1362	1378				
25	728	782	806	837	816	795	775	789	716	657	631	614	624	641	666	671				
30	285	303	308	310	300	311	284	287	264	249	243	244	259	258	272	268				
35	147	151	153	150	147	145	142	141	136	134	130	129	129	134	135	137				
40	78.6	83.0	83.7	83.5	82.6	82.7	81.1	80.0	76.5	75.1	73.4	71.4	72.0	73.5	74.1	73.8				
45	49.7	51.8	53.0	53.6	53.6	53.9	53.3	53.2	50.7	49.5	49.0	47.5	47.3	47.1	47.1	47.3				
50	34.9	36.0	36.8	37.7	38.0	38.3	38.2	38.4	36.4	35.5	35.0	34.0	33.7	33.2	33.1	33.5				
55	22.5	23.7	24.4	25.2	25.3	25.5	25.5	25.7	24.3	23.4	22.8	21.7	21.5	21.1	21.1	21.5				
60	14.1	14.8	15.4	15.9	16.0	16.1	16.0	16.2	15.5	14.9	14.3	13.8	13.6	13.4	13.3	13.3				
65	8.88	9.20	9.47	9.71	9.79	9.89	9.90	10.1	9.82	9.56	9.26	9.04	8.86	8.75	8.69	8.59				
70	6.75	6.91	7.02	7.15	7.19	7.30	7.36	7.45	7.35	7.19	7.02	6.86	6.74	6.64	6.58	6.57				
75	4.63	4.82	4.95	5.09	5.12	5.21	5.25	5.32	5.16	4.93	4.76	4.61	4.53	4.47	4.44	4.43				
80	2.67	2.83	2.96	3.09	3.13	3.19	3.22	3.24	3.08	2.88	2.73	2.63	2.55	2.54	2.52	2.51				
85	1.04	1.15	1.27	1.35	1.42	1.44	1.47	1.45	1.31	1.19	1.06	1.00	0.92	0.94	0.88	0.92				
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
DLR0145 (R3TL)	2700K setting	120	1133.21	14.53	77.96
	3000K setting	120	1232.9	14.23	86.62
	3500K setting	120	1301.6	13.83	94.11
	4000K setting	120	1353.6	13.88	97.52
	5000K setting	120	1351.9	14.58	92.71