LM-79-08 Test Report

For

RAB LIGHTING INC

(Brand Name: N/A)

170 Ludlow Ave,PO BOX 970,Northvale, NJ 07647-2305 USA

Model name(s):

DLC0057(CRLEDFA-10R-43S-9CCT-UNV-WS)

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2021-09-04

Prepared By:

Test & Report By:

Engineer: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120V-277Vac, 60 Hz
Nominal Power	32 W /37W /43W
Rated Initial Lamp Lumen	3000 lm /3500 lm /4000 lm
Declared CCT	3000K/3500K/4000K/5000K

1.2 Test Specifications:

Test item	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	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 25ºC ±1ºC. 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 25ºC ±1ºC. 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	2021-09-04	**Test Ambient:**	25.3 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	DLC0057(CRLEDFA-10R-43S-9CCT-UNV-WS)	43W 3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202109030002	120.0	60	0.351	41.92	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3008
Duv	0.0030
Chromaticity (x, y)	x=0.4321 y=0.3950
Chromaticity (u', v')	u'=0.2513 v'=0.5170
Color Rendering Index (CRI)	93.1
R9	60

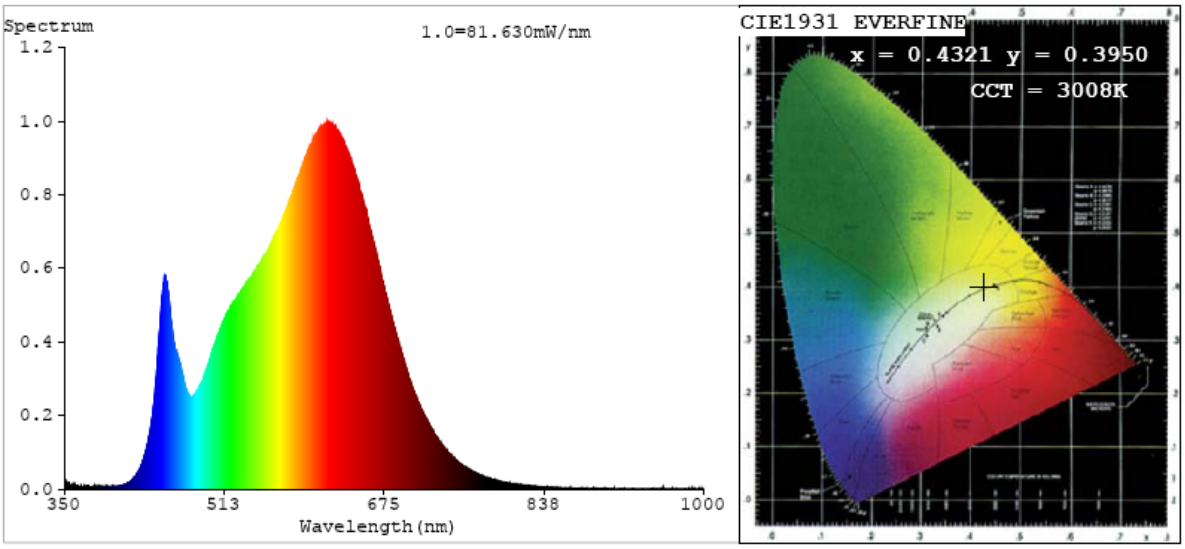
Special Color Rendering Indices			
R1	94	R9	60
R2	98	R10	94
R3	98	R11	94
R4	93	R12	84
R5	94	R13	95
R6	96	R14	99
R7	91	R15	90
R8	81	--	--

Photometric Measurement – Goniophotometer Method:

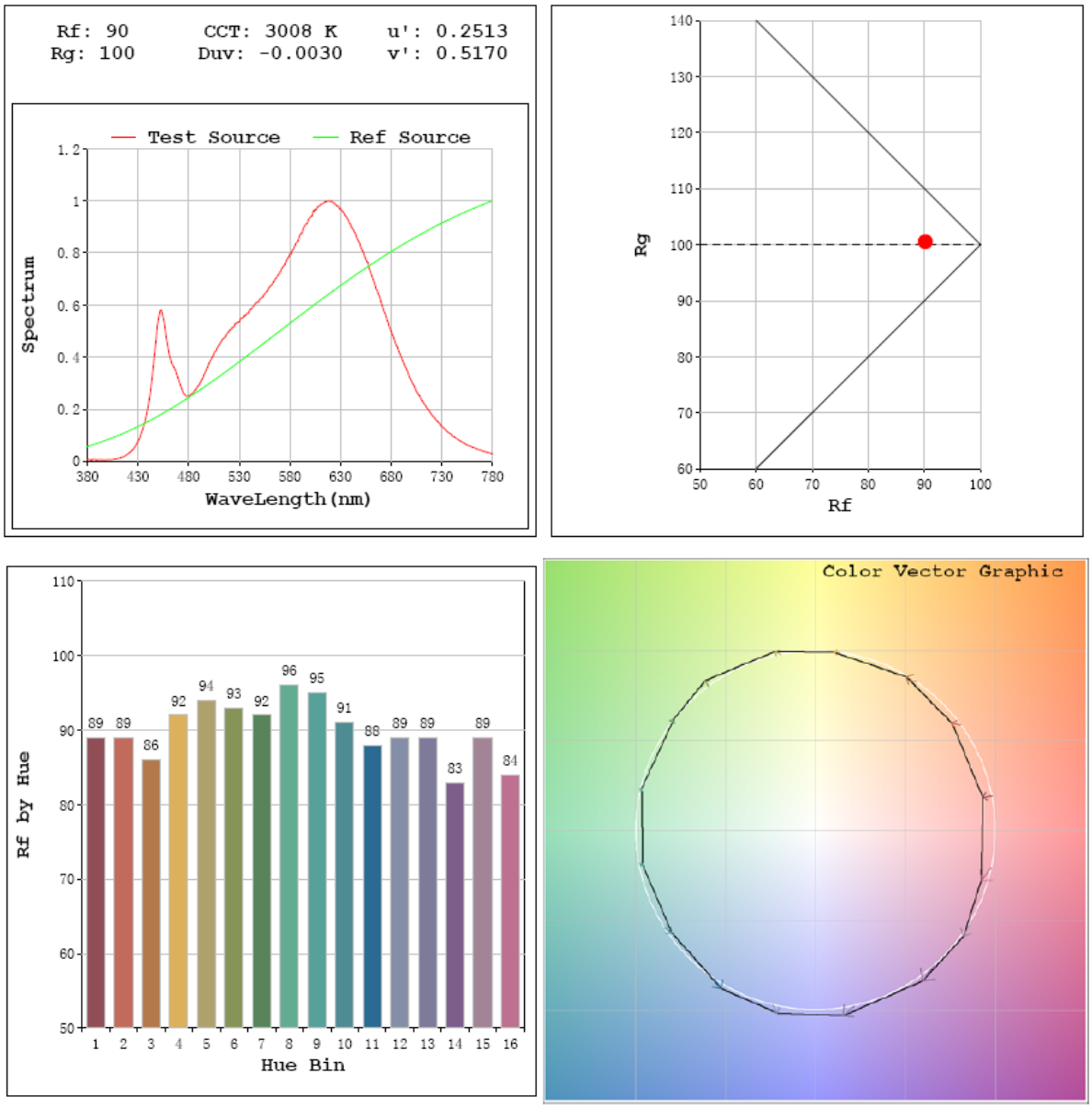
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	4020.1
Luminous Efficacy (lm/W)	96.18
Beam Angle (°)	92.3
Center Beam Candle Power (cd)	1966

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4003
Luminous Efficacy (lm/W)	96.74

Spectral Power Distribution & Chromaticity Diagram



TM30

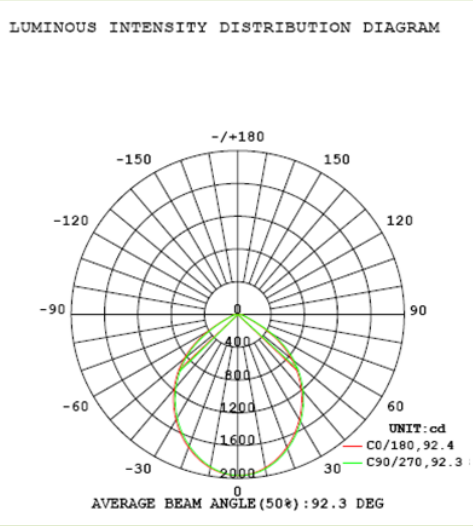


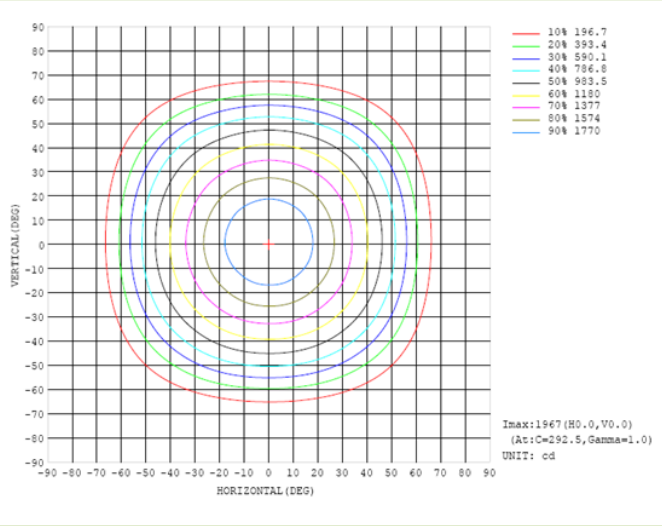
Zonal Lumen Tabulation

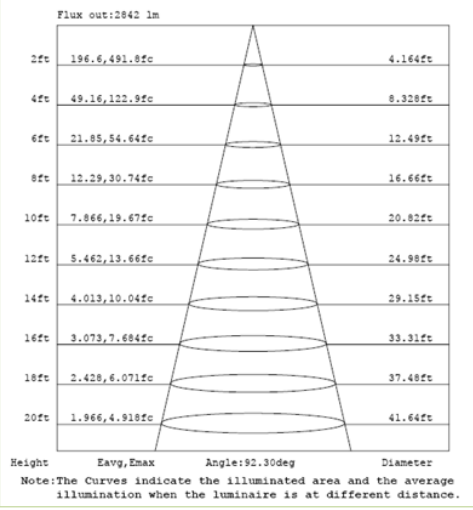
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1438.8	181.6%
0-40	2276.5	287.3%
0-60	3635.8	458.8%
60-90	384.3	48.5%
70-100	138.1	17.4%
90-120	0.0	0.0%
0-90	4020.2	507.3%
90-180	0.0	0.0%
0-180	792.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	184.4	23.3%	90-100	0.0	0.0%
10-20	513.2	64.8%	100-110	0.0	0.0%
20-30	741.2	93.5%	110-120	0.0	0.0%
30-40	837.7	105.7%	120-130	0.0	0.0%
40-50	786.8	99.3%	130-140	0.0	0.0%
50-60	572.6	72.3%	140-150	0.0	0.0%
60-70	246.2	31.1%	150-160	0.0	0.0%
70-80	94.0	11.9%	160-170	0.0	0.0%
80-90	44.1	5.6%	170-180	0.0	0.0%

Photometric Data







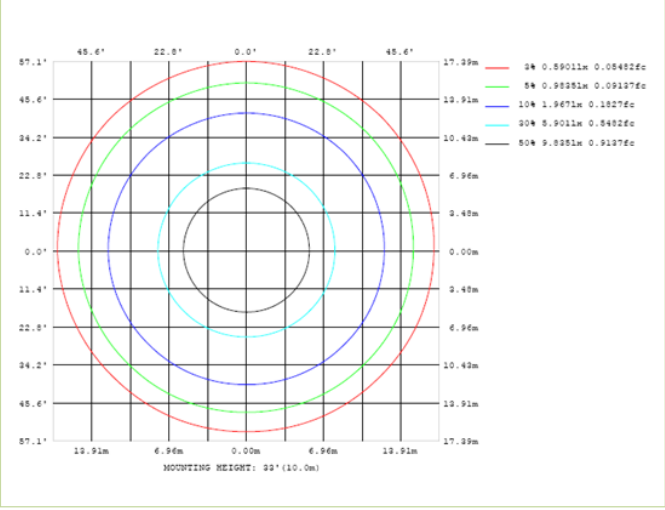


Table--1 UNIT: cd

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	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965	1965
5	1949	1949	1945	1943	1942	1942	1943	1946	1949	1951	1952	1953	1955	1954	1954	1952
10	1899	1897	1893	1890	1887	1889	1889	1893	1900	1903	1908	1909	1913	1910	1912	1906
15	1824	1821	1814	1812	1806	1807	1808	1814	1823	1827	1834	1836	1841	1838	1839	1832
20	1727	1724	1714	1711	1705	1706	1707	1714	1724	1729	1738	1739	1746	1743	1745	1736
25	1613	1610	1598	1595	1588	1591	1589	1598	1609	1615	1624	1626	1634	1632	1633	1624
30	1484	1481	1468	1464	1457	1460	1459	1468	1481	1485	1497	1499	1508	1505	1507	1497
35	1345	1339	1324	1321	1313	1316	1315	1326	1340	1345	1358	1361	1370	1367	1369	1358
40	1191	1184	1169	1165	1156	1160	1160	1172	1187	1193	1206	1210	1220	1218	1218	1205
45	1024	1017	1000	996	987	992	992	1005	1022	1029	1044	1048	1058	1055	1056	1041
50	844	835	817	814	804	810	811	827	846	854	870	874	885	882	882	865
55	641	630	610	606	596	605	607	626	651	661	679	683	696	689	688	668
60	420	409	389	386	377	385	388	407	435	446	466	469	480	471	469	447
65	229	218	209	204	200	201	207	217	238	250	260	266	270	266	260	248
70	127	124	119	118	116	117	119	124	132	135	141	141	144	141	140	134
75	84.0	82.4	79.8	79.4	78.3	79.5	80.3	83.2	87.7	89.5	92.3	92.4	93.7	91.9	91.2	87.8
80	59.1	58.0	56.1	55.8	55.0	55.9	56.4	58.7	63.1	64.2	66.0	66.1	66.8	65.9	65.3	63.2
85	37.2	36.3	34.8	34.5	33.9	34.5	35.0	36.7	41.9	42.8	44.3	44.5	45.2	44.4	44.1	42.2
90	22.4	22.3	22.2	22.2	22.2	22.2	22.3	22.3	25.8	26.1	26.7	27.2	27.4	27.2	26.7	26.0

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-04	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0057(CRLEDFA-10R-43S-9CCT-UNV-WS)	43W 3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202109030002	120.0	60	0.346	41.33	0.996

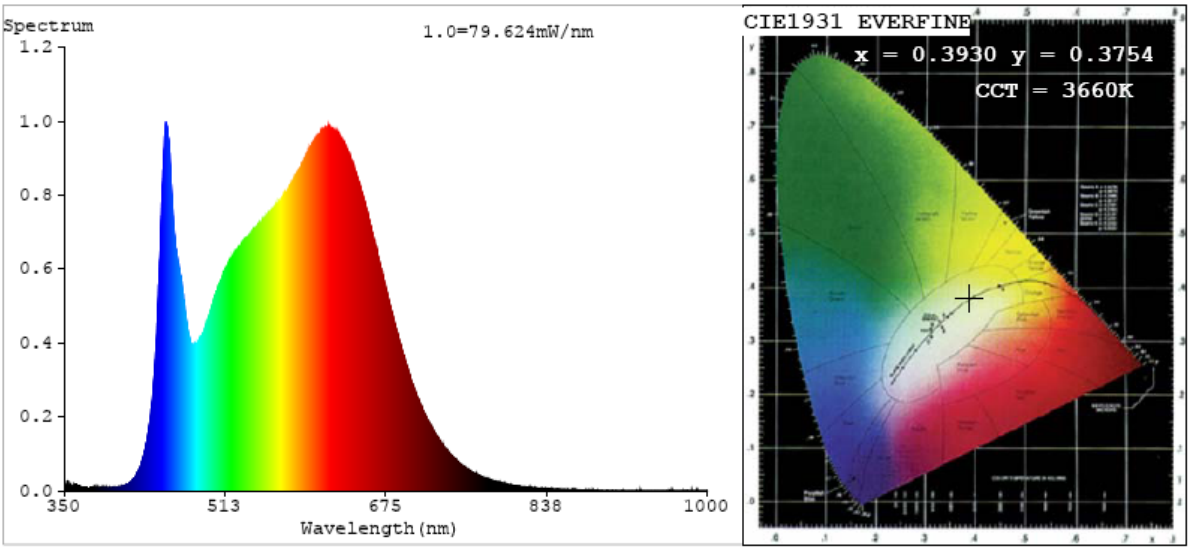
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3660
Duv	0.0040
Chromaticity (x, y)	x=0.3930 y=0.3754
Chromaticity (u', v')	u'=0.2340 v'=0.5029
Color Rendering Index (CRI)	95.5
R9	77
Total Luminous (lm)	4380
Luminous Efficacy (lm/W)	105.99

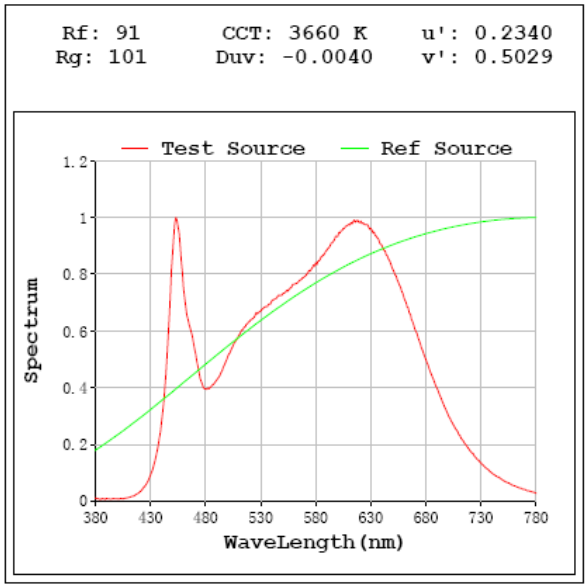
Special Color Rendering Indices			
R1	98	R9	77
R2	99	R10	98
R3	98	R11	97
R4	96	R12	78
R5	97	R13	99
R6	95	R14	99
R7	93	R15	96
R8	89	--	--

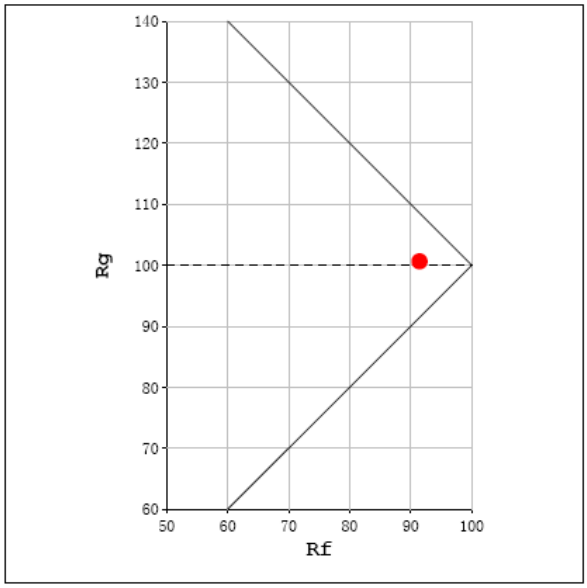
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4331
Luminous Efficacy (lm/W)	105.91

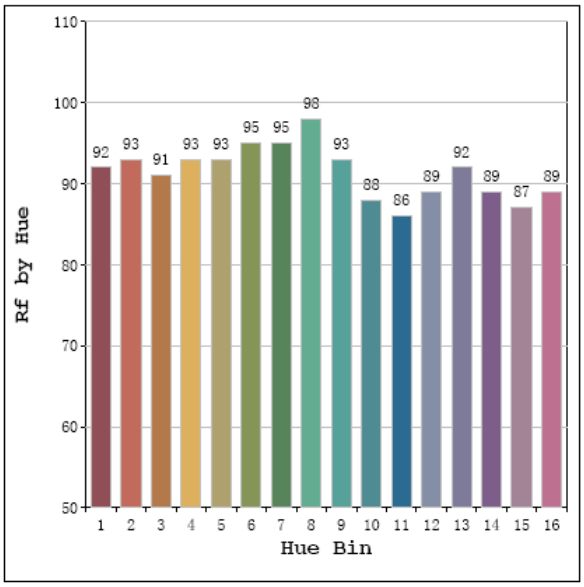
Spectral Power Distribution & Chromaticity Diagram

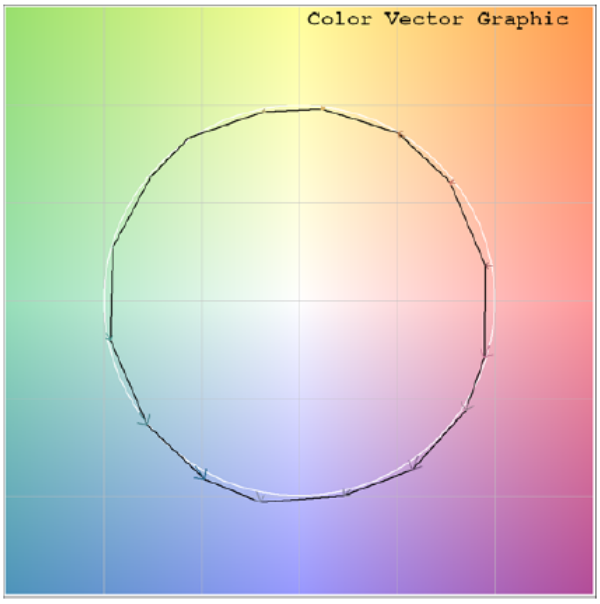


TM30


Rf: 91
CCT: 3660 K
u': 0.2340
Rg: 101
Duv: -0.0040
v': 0.5029
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
92 93 91 93 93 95 95 98 93 88 86 89 92 89 87 89


Color Vector Graphic

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-04	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0057(CRLEDFA-10R-43S-9CCT-UNV-WS)	43W 4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202109030002	120.0	60	0.344	41.15	0.996

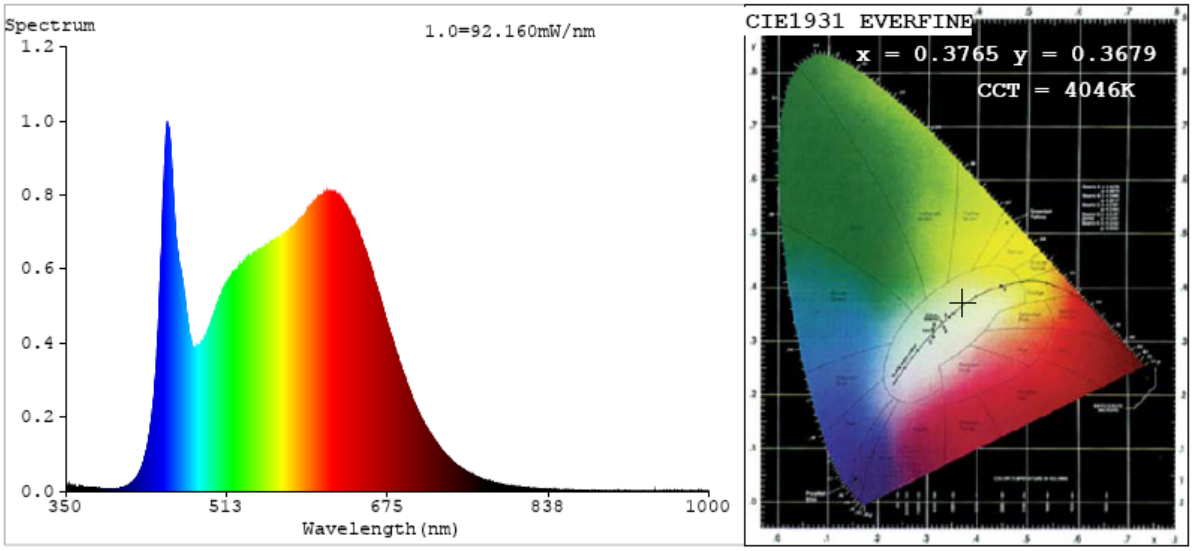
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4046
Duv	0.0030
Chromaticity (x, y)	x=0.3765 y=0.3679
Chromaticity (u', v')	u'=0.2260 v'=0.4970
Color Rendering Index (CRI)	95.9
R9	81
Total Luminous (lm)	4458
Luminous Efficacy (lm/W)	108.33

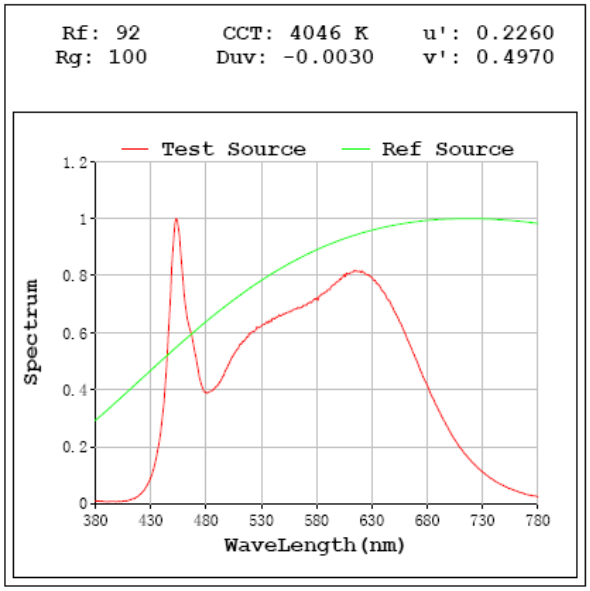
Special Color Rendering Indices			
R1	98	R9	81
R2	99	R10	98
R3	98	R11	97
R4	96	R12	75
R5	96	R13	99
R6	95	R14	99
R7	94	R15	96
R8	91	--	--

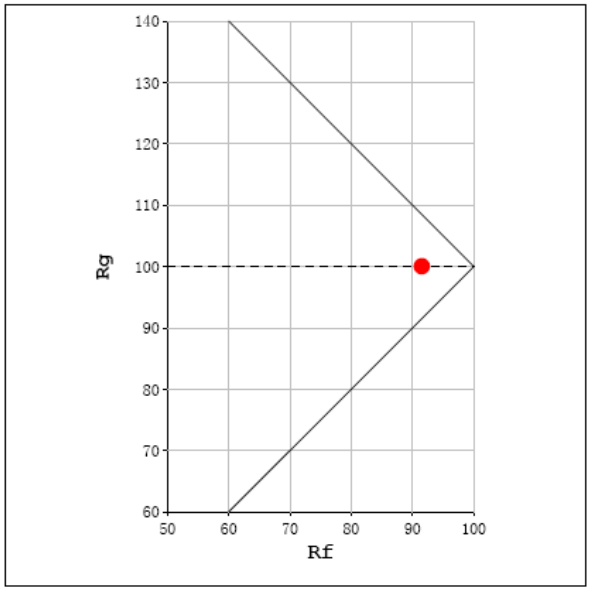
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4424
Luminous Efficacy (lm/W)	108.5

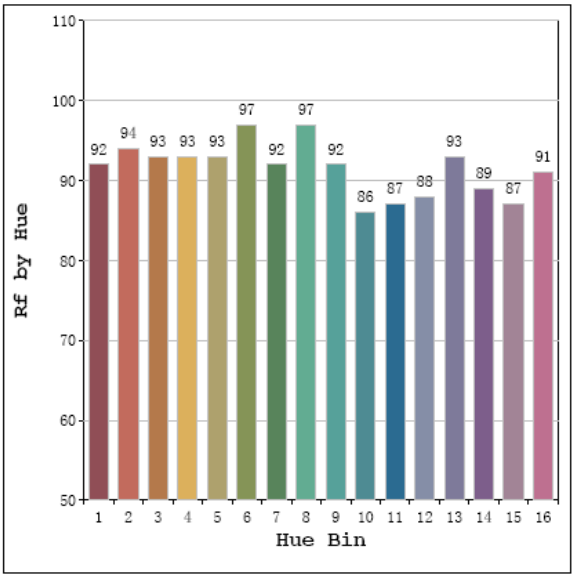
Spectral Power Distribution & Chromaticity Diagram

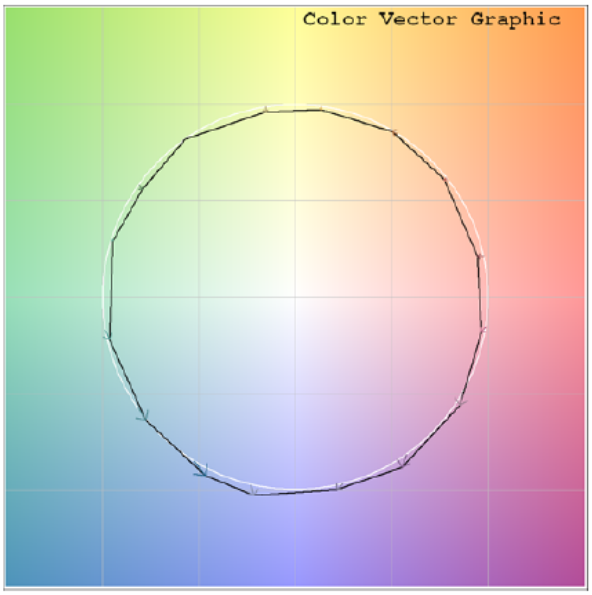


TM30


Rf: 92
CCT: 4046 K
u': 0.2260
Rg: 100
Duv: -0.0030
v': 0.4970
Test Source
Ref Source
Spectrum
WaveLength (nm)


Rg
Rf


Rf by Hue
Hue Bin
92
94
93
93
93
97
92
97
92
86
87
88
93
89
87
91


Color Vector Graphic

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-04	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0057(CRLEDFA-10R-43S-9CCT-UNV-WS)	43W 5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202109030002	120.0	60	0.35	41.79	0.996

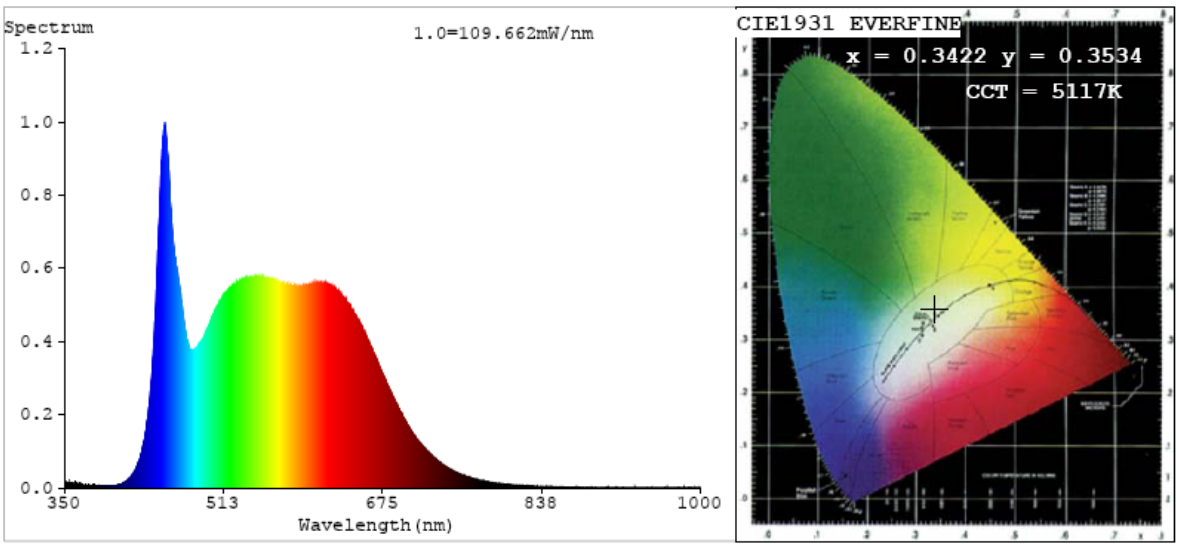
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5117
Duv	0.0021
Chromaticity (x, y)	x=0.3422 y=0.3534
Chromaticity (u', v')	u'=0.2088 v'=0.4851
Color Rendering Index (CRI)	94.8
R9	76
Total Luminous (lm)	4355
Luminous Efficacy (lm/W)	104.22

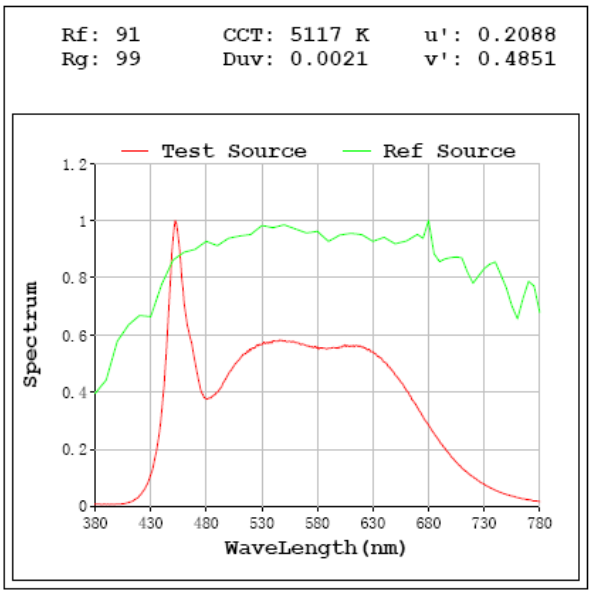
Special Color Rendering Indices			
R1	95	R9	76
R2	97	R10	92
R3	97	R11	95
R4	95	R12	74
R5	95	R13	96
R6	94	R14	98
R7	96	R15	94
R8	91	--	--

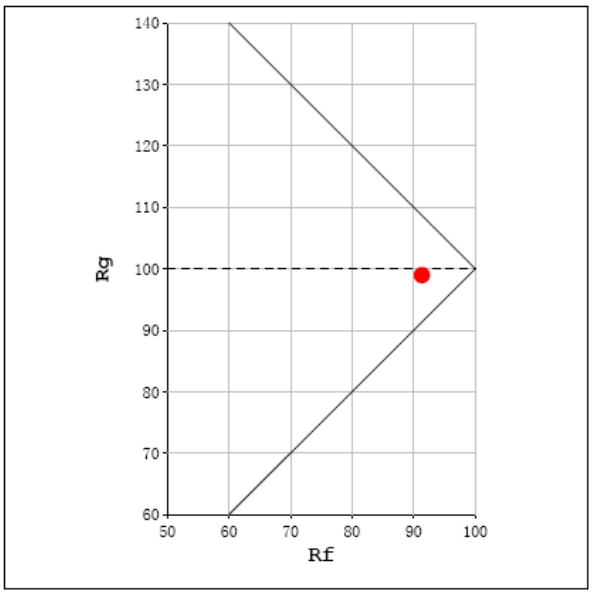
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4314
Luminous Efficacy (lm/W)	104.37

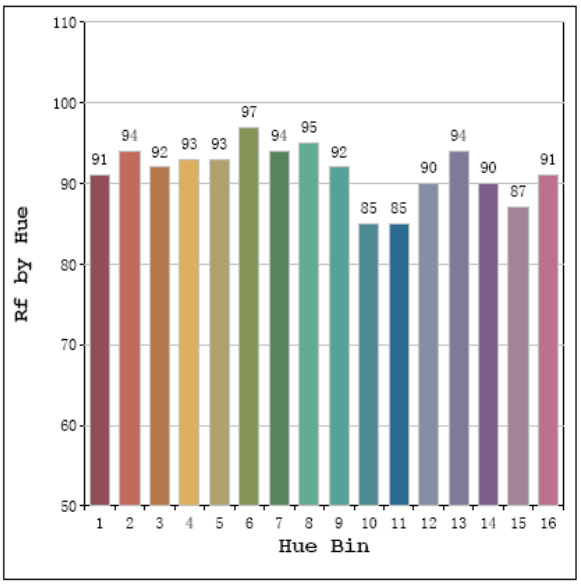
Spectral Power Distribution & Chromaticity Diagram

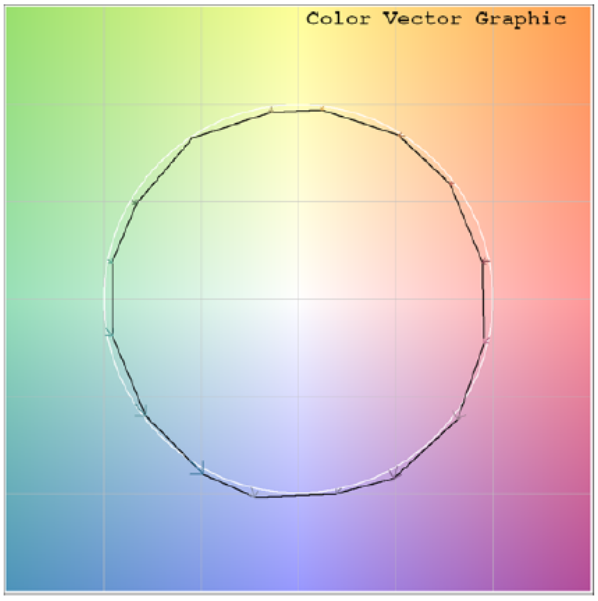


TM30



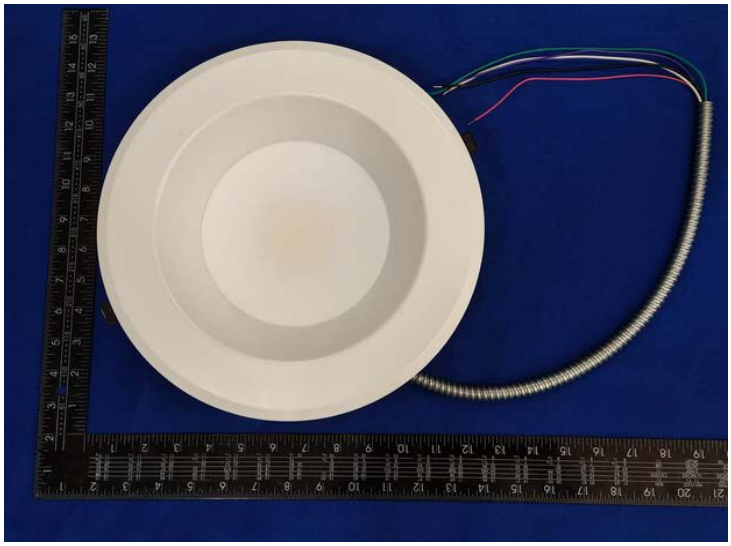


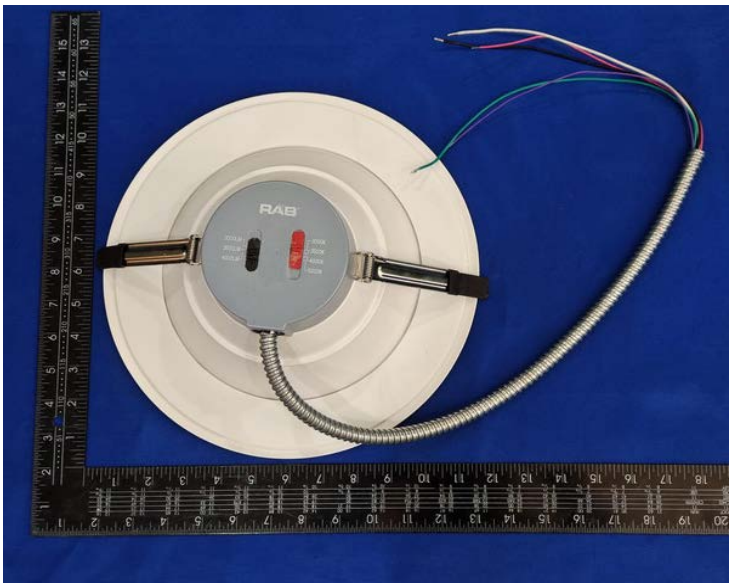




Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLC0057(CRLEDFA-10R-43S-9CCT-UNV-WS)	32W 3000K setting	120.0	3026	29.48	102.68
		277.0	3032	29.78	101.83
	37W 3000K setting	120.0	3531	35.37	99.84
		277.0	3507	35.27	99.43
	43W 3000K setting	120.0	4020.1	41.92	96.18
		277.0	4003	41.37	96.74
	43W 3500K setting	120.0	4380	41.33	105.99
		277.0	4331	40.9	105.91
	43W 4000K setting	120.0	4458	41.15	108.33
		277.0	4424	40.78	108.5
	43W 5000K setting	120.0	4355	41.79	104.22
		277.0	4314	41.33	104.37

3. Product Photo





****** END OF REPORT ******