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): DLC0043(C8R34/46/599FAUNVM)

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2020-09-09

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	34.0 W /46.0 W /59.0W
Rated Initial Lamp Lumen	2400 lm /3200 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	2020-09-09	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0043(C8R34/46/599FAUNVM)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202008310111	120.0	60	0.468	56.00	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3007
Duv	0.0001
Chromaticity (x, y)	x=0.4363 y=0.4036
Chromaticity (u', v')	u'=0.2504 v'=0.5211
Color Rendering Index (CRI)	93.2
R9	62

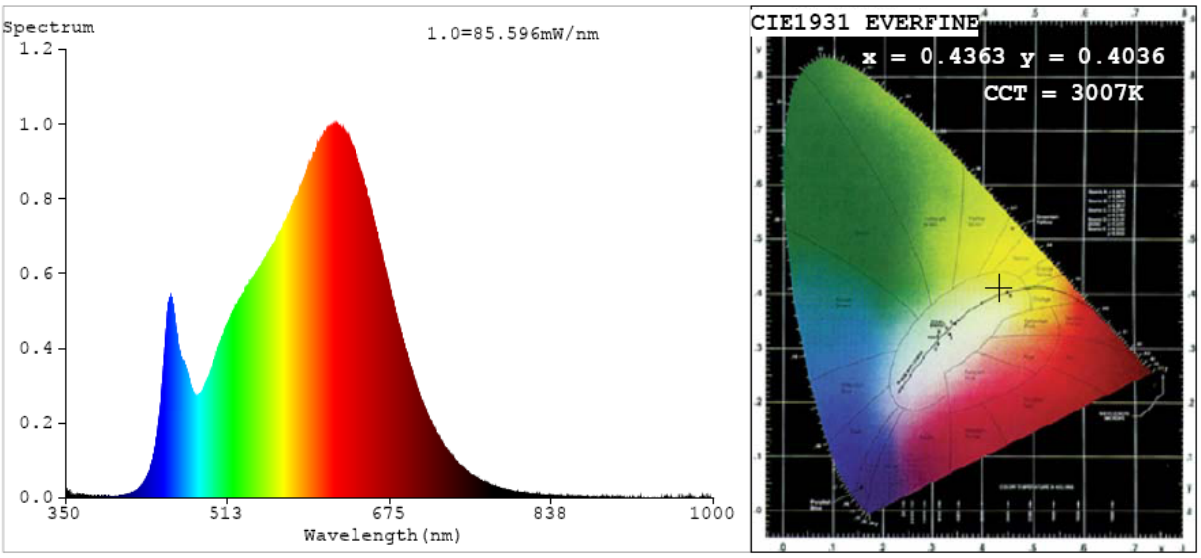
Special Color Rendering Indices			
R1	94	R9	62
R2	98	R10	94
R3	99	R11	93
R4	92	R12	80
R5	93	R13	95
R6	97	R14	99
R7	91	R15	90
R8	82	--	--

Photometric Measurement – Goniophotometer Method:

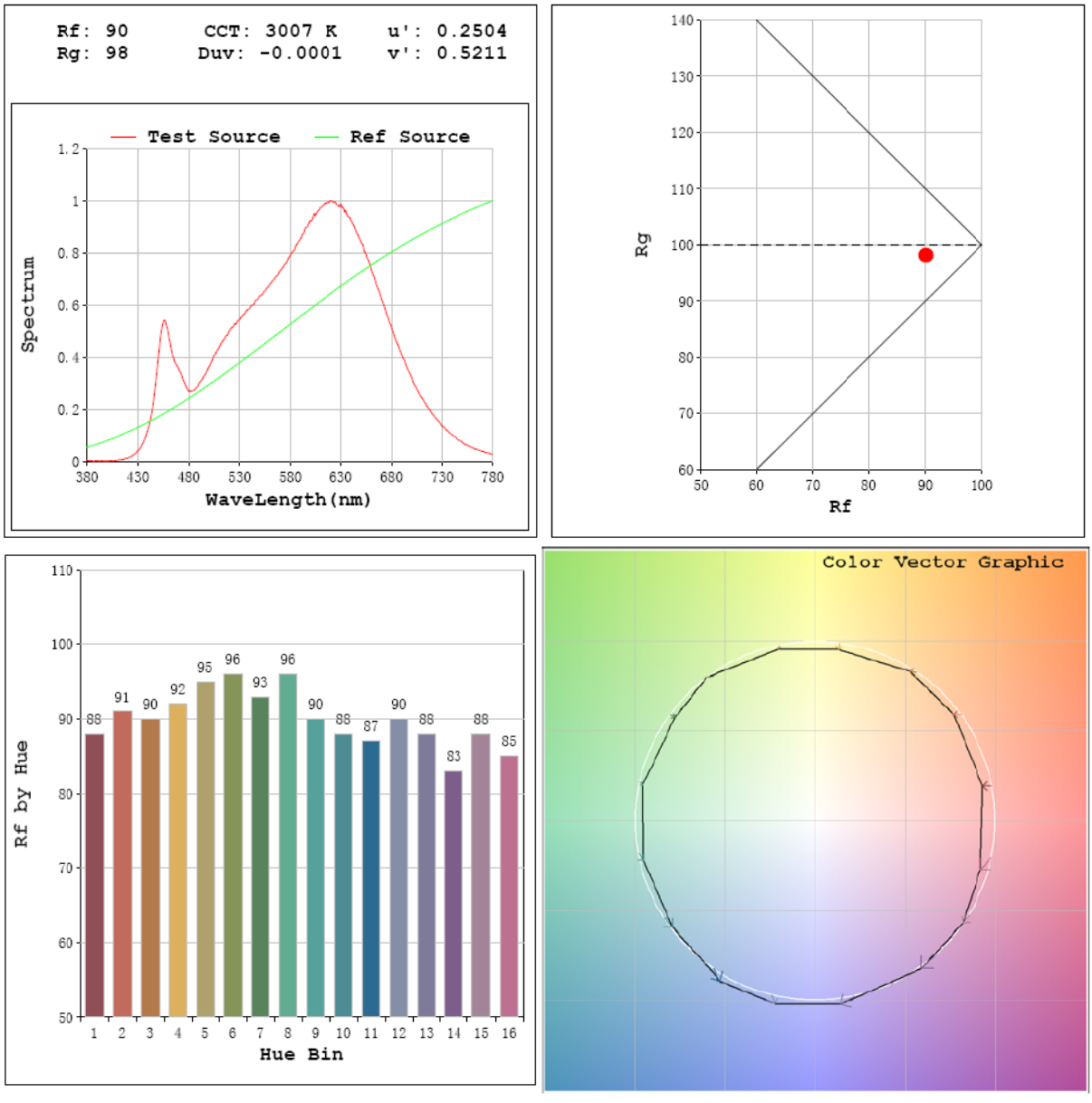
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	4271.3
Luminous Efficacy (lm/W)	76.27
Beam Angle (°)	72.3
Center Beam Candle Power (cd)	3203

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4257
Luminous Efficacy (lm/W)	77.01

Spectral Power Distribution & Chromaticity Diagram



T30

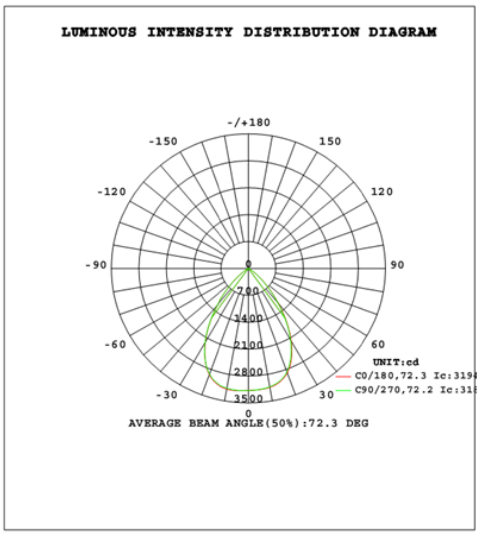


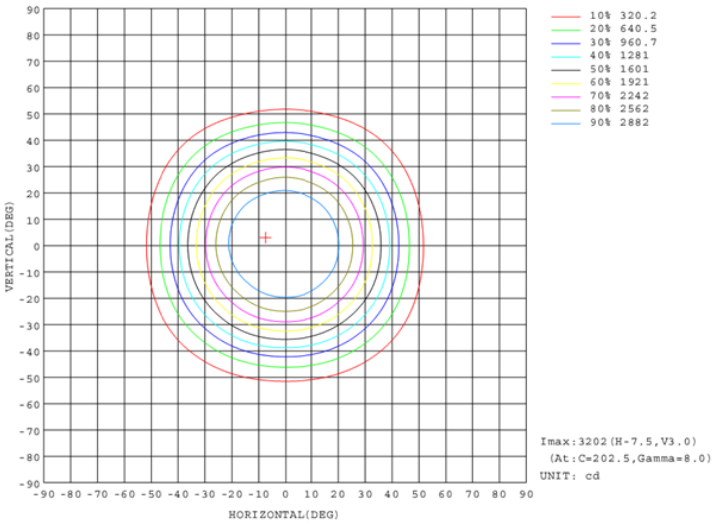
Zonal Lumen Tabulation

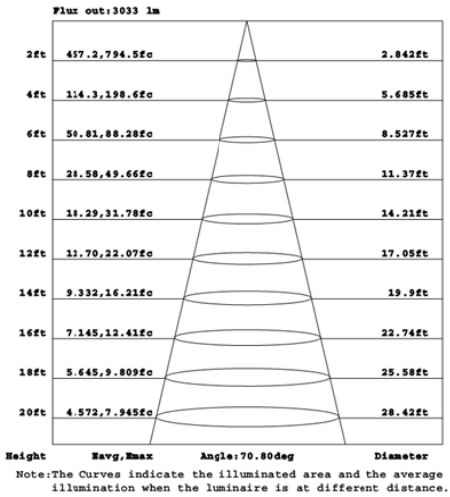
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2352.5	55.1%
0-40	3411.7	79.9%
0-60	4174.2	97.7%
60-90	97.1	2.3%
70-100	54.8	1.3%
90-120	0.0	0.0%
0-90	4271.3	100.0%
90-180	0.0	0.0%
0-180	4271.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	302.6	7.1%	90-100	0.0	0.0%
10-20	864.1	20.2%	100-110	0.0	0.0%
20-30	1185.8	27.8%	110-120	0.0	0.0%
30-40	1059.2	24.8%	120-130	0.0	0.0%
40-50	591.0	13.8%	130-140	0.0	0.0%
50-60	171.5	4.0%	140-150	0.0	0.0%
60-70	42.3	1.0%	150-160	0.0	0.0%
70-80	30.5	0.7%	160-170	0.0	0.0%
80-90	24.3	0.6%	170-180	0.0	0.0%

Photometric Data







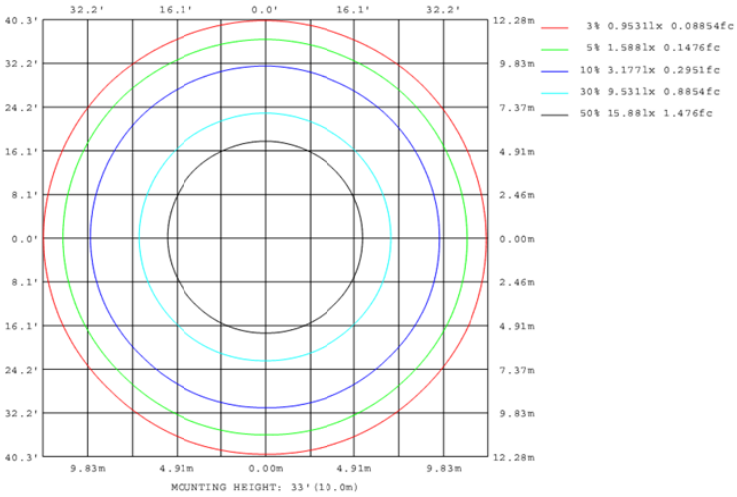


Table--1 UNIT: cd

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	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176			
5	3167	3164	3162	3162	3163	3167	3174	3184	3191	3196	3196	3191	3184	3178	3173	3168			
10	3141	3138	3133	3130	3128	3133	3144	3166	3187	3199	3195	3179	3167	3156	3149	3141			
15	3063	3060	3050	3046	3041	3046	3054	3085	3117	3133	3127	3105	3093	3078	3071	3062			
20	2893	2891	2876	2874	2866	2872	2875	2908	2943	2957	2956	2934	2927	2909	2906	2894			
25	2592	2589	2568	2570	2558	2569	2569	2601	2634	2646	2652	2631	2631	2614	2614	2598			
30	2178	2178	2155	2160	2148	2164	2162	2193	2222	2229	2240	2223	2229	2209	2211	2189			
35	1689	1696	1672	1675	1663	1685	1680	1715	1741	1744	1759	1747	1754	1728	1726	1700			
40	1192	1200	1178	1180	1160	1180	1179	1212	1234	1235	1251	1240	1242	1212	1213	1194			
45	749	757	739	744	728	735	730	760	778	781	793	775	776	756	759	747			
50	409	415	404	409	400	405	396	412	421	422	426	415	419	407	411	404			
55	174	177	173	174	173	177	176	181	179	176	176	171	173	170	171	168			
60	61.6	62.6	61.5	63.1	62.6	64.4	63.9	65.5	60.2	57.7	57.3	55.8	57.3	56.7	57.4	56.3			
65	42.3	42.5	42.2	42.4	42.2	42.5	42.4	42.9	40.2	39.9	39.9	39.6	39.8	39.6	39.7	39.5			
70	33.7	33.9	33.6	33.8	33.6	33.8	33.8	34.1	34.0	33.9	33.9	33.7	33.8	33.6	33.7	33.6			
75	27.6	27.7	27.5	27.7	27.6	27.7	27.7	27.9	29.8	29.8	29.8	29.7	29.7	29.5	29.5	29.5			
80	23.0	23.1	23.0	23.1	23.1	23.1	23.1	23.2	26.5	26.5	26.5	26.5	26.4	26.4	26.4	26.4			
85	19.9	19.9	19.9	20.0	20.0	20.0	20.0	20.0	24.3	24.3	24.3	24.3	24.2	24.2	24.2	24.2			
90	17.4	17.4	17.4	17.4	17.4	17.4	17.5	17.5	22.5	22.5	22.5	22.6	22.5	22.5	22.4	22.5			

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2020-09-09	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0043(C8R34/46/599FAUNVM)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202008310111	120.0	60	0.452	54.12	0.996

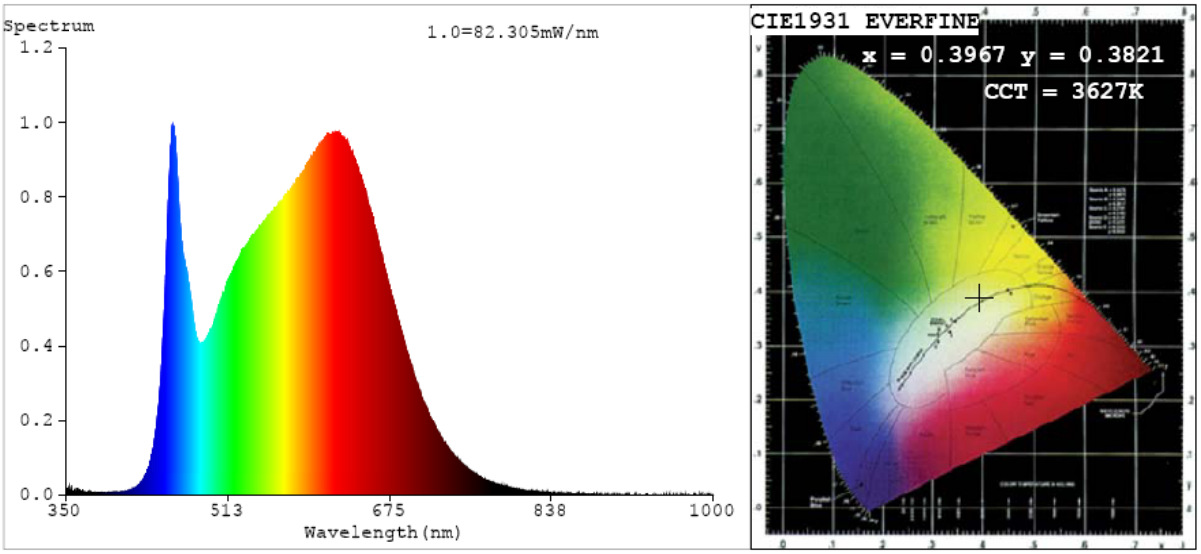
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3627
Duv	0.0019
Chromaticity (x, y)	x=0.3967 y=0.3821
Chromaticity (u', v')	u'=0.2336 v'=0.5063
Color Rendering Index (CRI)	94.4
R9	76
Total Luminous (lm)	4539
Luminous Efficacy (lm/W)	83.87

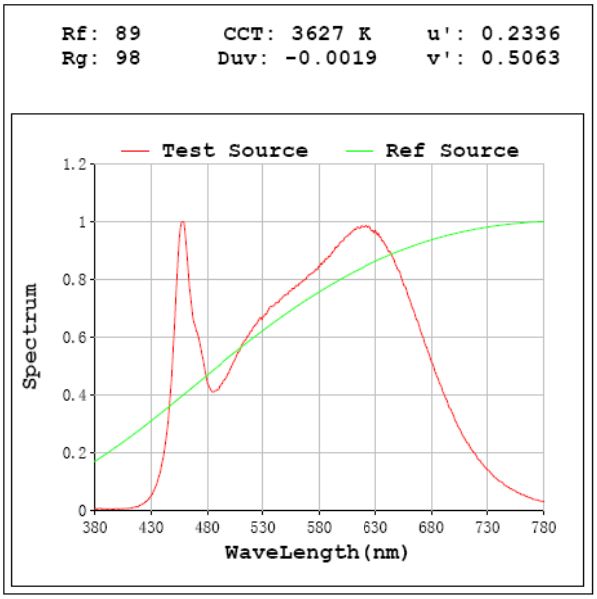
Special Color Rendering Indices			
R1	96	R9	75
R2	99	R10	96
R3	98	R11	94
R4	93	R12	75
R5	95	R13	98
R6	96	R14	99
R7	93	R15	94
R8	88	--	--

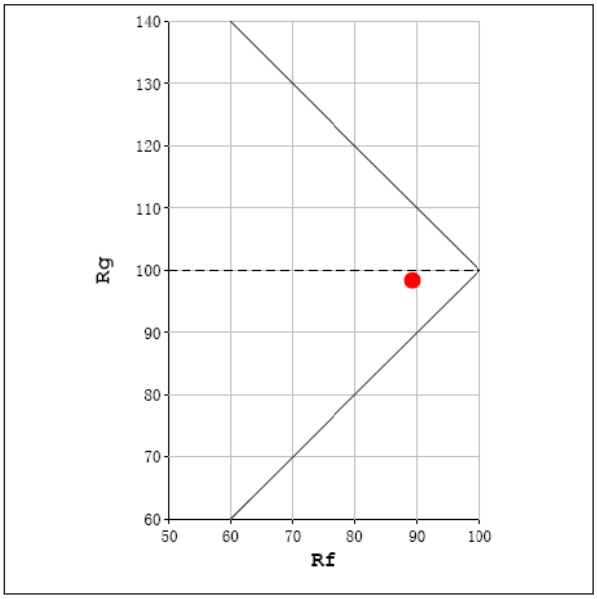
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4538
Luminous Efficacy (lm/W)	84.77

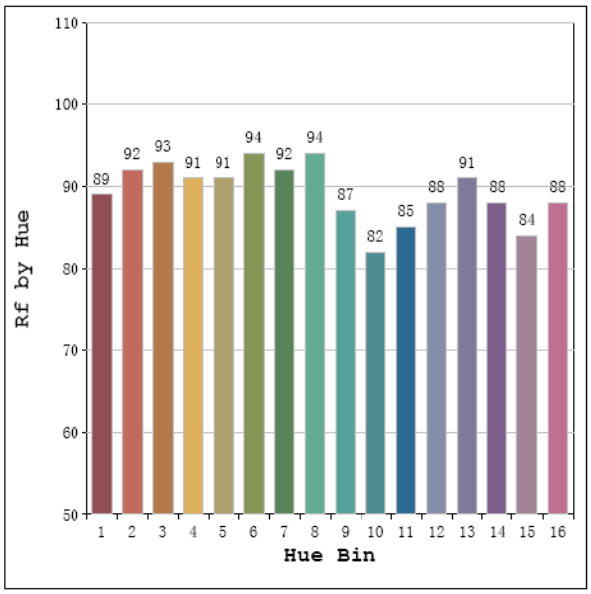
Spectral Power Distribution & Chromaticity Diagram

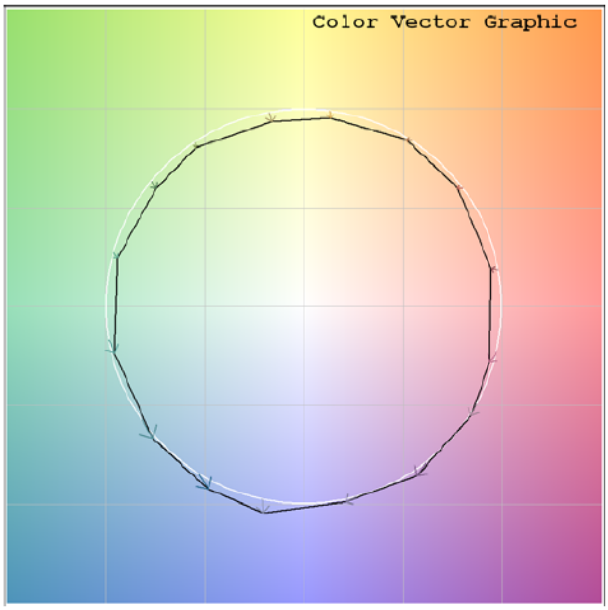


T30


Rf: 89 CCT: 3627 K u': 0.2336
Rg: 98 Duv: -0.0019 v': 0.5063
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
89 92 93 91 91 94 92 94 87 82 85 88 91 88 84 88


Color Vector Graphic

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2020-09-09	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0043(C8R34/46/599FAUNVM)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202008310111	120.0	60	0.451	53.99	0.996

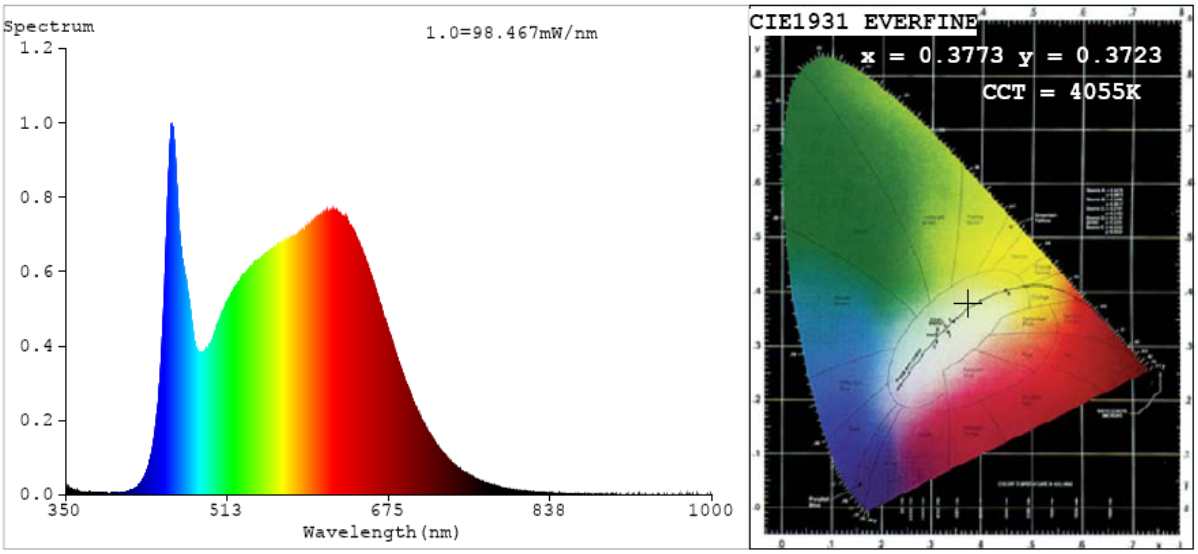
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4055
Duv	0.0012
Chromaticity (x, y)	x=0.3773 y=0.3723
Chromaticity (u', v')	u'=0.2248 v'=0.4991
Color Rendering Index (CRI)	94.3
R9	80
Total Luminous (lm)	4598
Luminous Efficacy (lm/W)	85.17

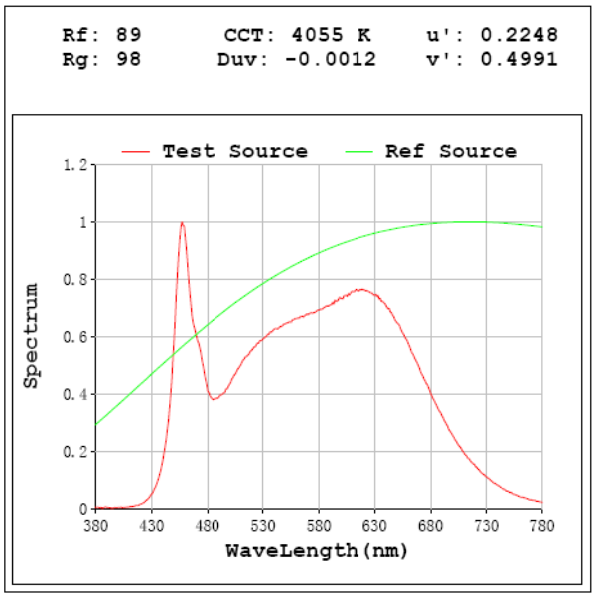
Special Color Rendering Indices			
R1	96	R9	80
R2	99	R10	98
R3	98	R11	93
R4	91	R12	70
R5	94	R13	99
R6	95	R14	100
R7	92	R15	94
R8	89	--	--

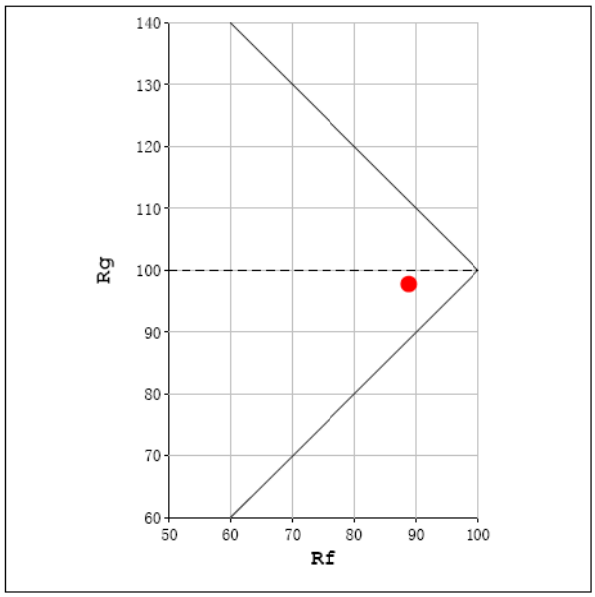
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4599
Luminous Efficacy (lm/W)	86.09

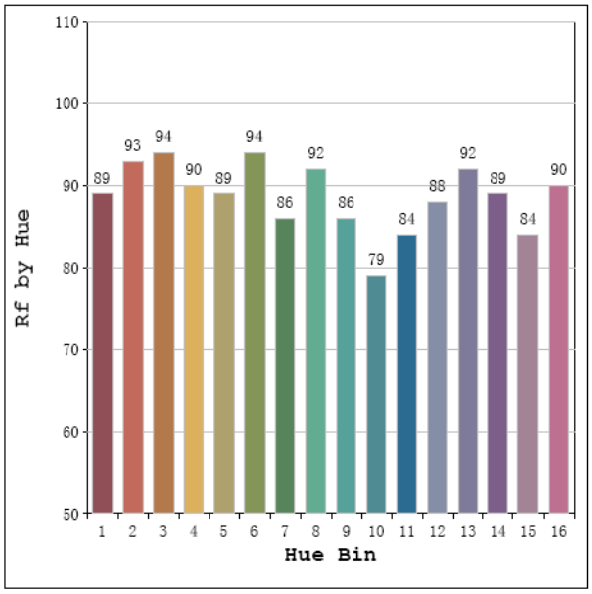
Spectral Power Distribution & Chromaticity Diagram

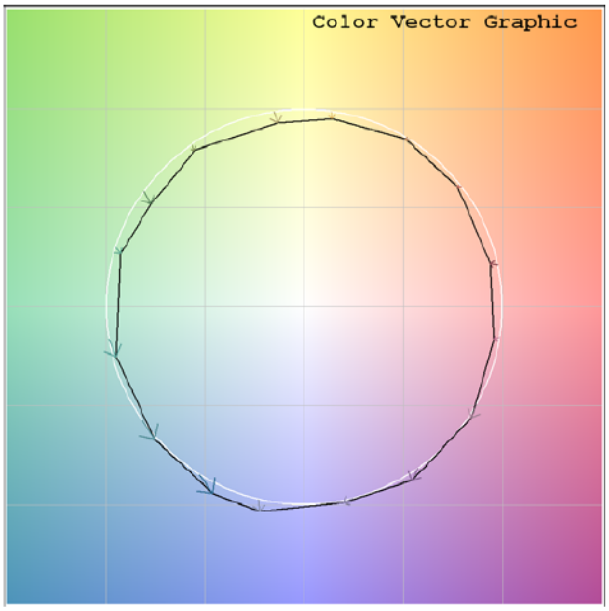


T30


Rf: 89
CCT: 4055 K
u': 0.2248
Rg: 98
Duv: -0.0012
v': 0.4991
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
89
93
94
90
89
94
86
92
86
79
84
88
92
89
84
90


Color Vector Graphic

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2020-09-09	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLC0043(C8R34/46/599FAUNVM)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202008310111	120.0	60	0.462	55.30	0.996

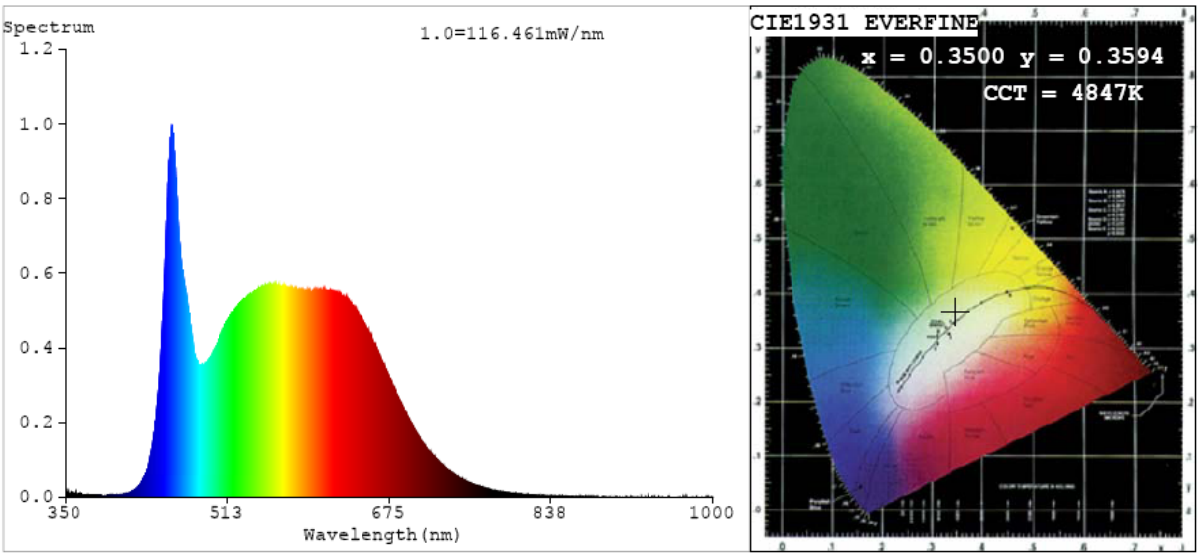
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4847
Duv	0.0019
Chromaticity (x, y)	x=0.3500 y=0.3594
Chromaticity (u', v')	u'=0.2117 v'=0.4891
Color Rendering Index (CRI)	92.8
R9	75
Total Luminous (lm)	2524
Luminous Efficacy (lm/W)	81.82

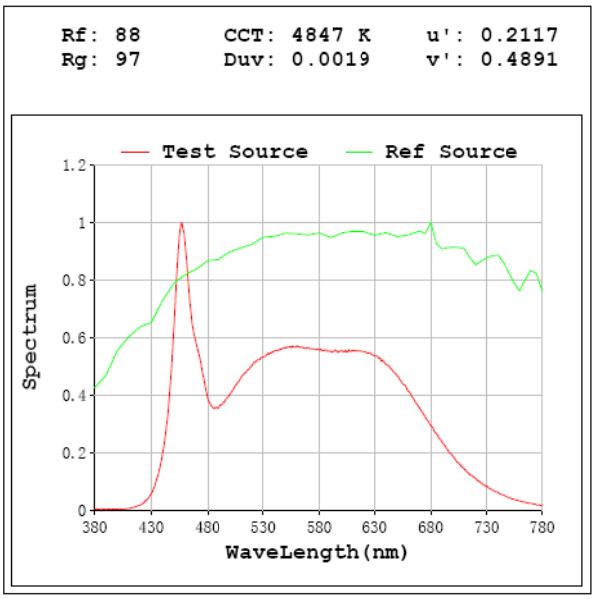
Special Color Rendering Indices			
R1	94	R9	75
R2	98	R10	94
R3	98	R11	89
R4	88	R12	64
R5	91	R13	96
R6	94	R14	99
R7	92	R15	91
R8	88	--	--

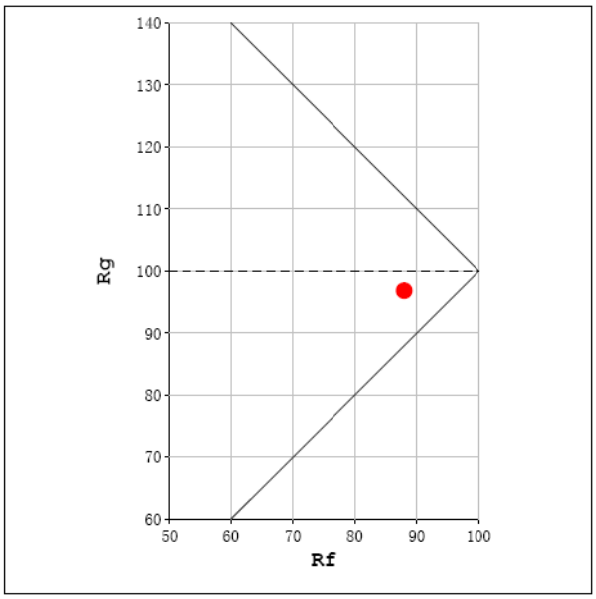
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	4525
Luminous Efficacy (lm/W)	82.79

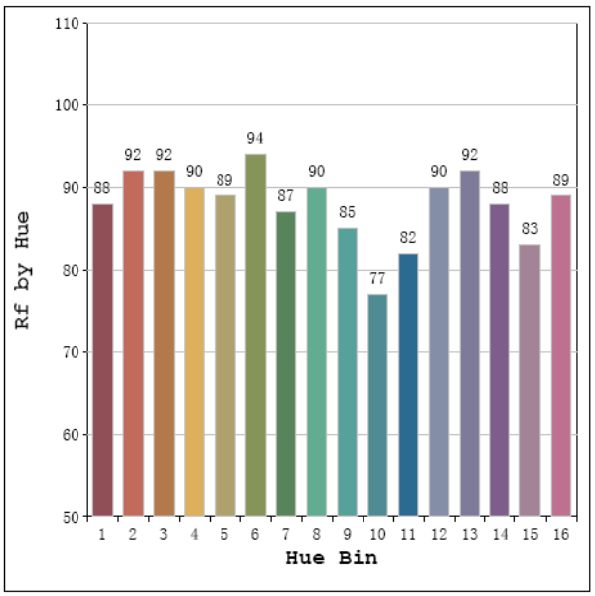
Spectral Power Distribution & Chromaticity Diagram

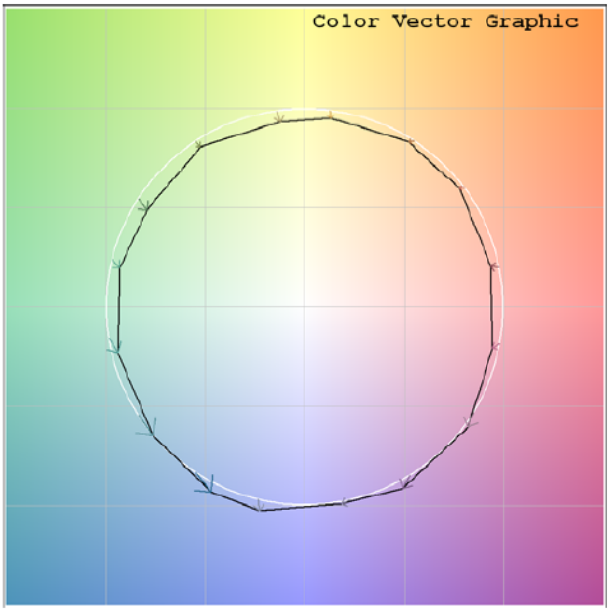


T30



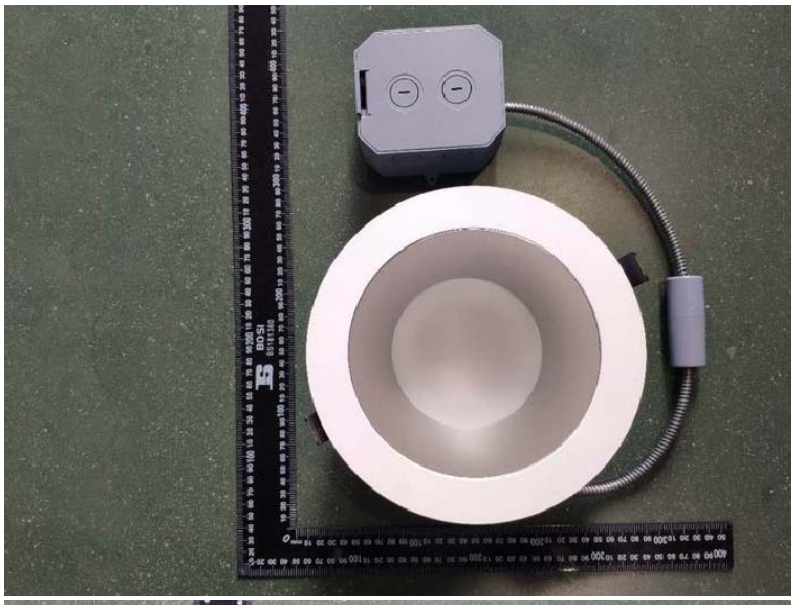


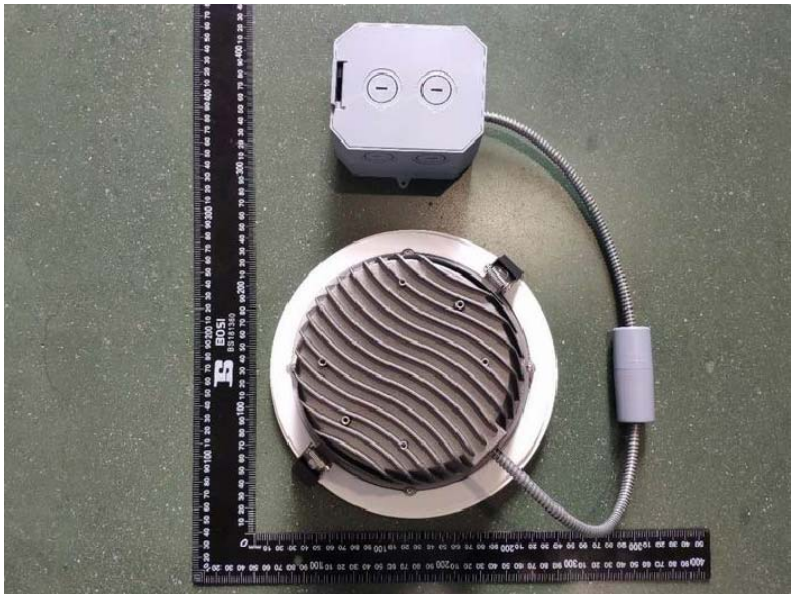




Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLC0043(C8R34/46/599FAUNVM)	34W 3000K setting	120.0	2554.0	31.14	82.04
		277.0	2560.0	31.47	81.36
	46W 3000K setting	120.0	3426.0	43.15	79.41
		277.0	3425.0	43.13	79.42
	59W 3000K setting	120.0	4261.0	56.00	76.09
		277.0	4257.0	55.28	77.01
	59W 3500K setting	120.0	4539.0	54.12	83.87
		277.0	4538.0	53.53	84.77
	59W 4000K setting	120.0	4598.0	53.99	85.17
		277.0	4599.0	53.41	86.09
	59W 5000K setting	120.0	4524.0	55.30	81.82
		277.0	4525.0	54.66	82.79

3. Product Photo





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