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): DLW0074(WFRL4R10.59FA120WS)

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2021-08-30

Prepared By:

Test & Report By:

Engineer: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120Vac, 60 Hz
Nominal Power	10.5W
Rated Initial Lamp Lumen	800 lm
Declared CCT	2700K/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	2021-08-30	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0074(WFRL4R10.59FA120WS)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300004	120.0	60	0.084	10	0.982

Chromaticity Measurement - Sphere-Spectroradiometer Method:

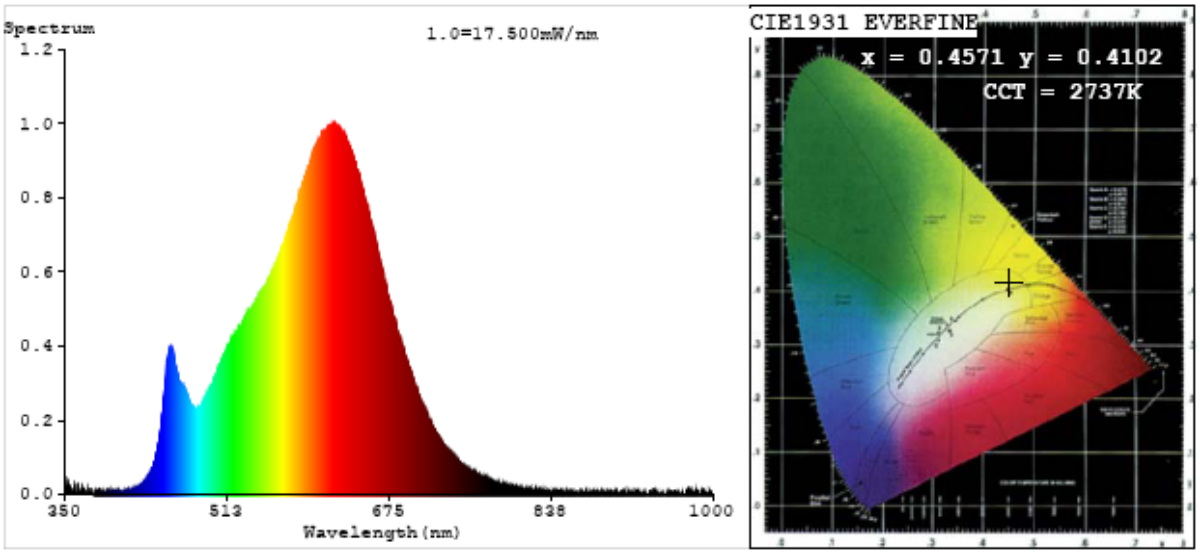
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2737
Duv	0.0001
Chromaticity (x, y)	x=0.4571 y=0.4102
Chromaticity (u', v')	u'=0.2609 v'=0.5268
Color Rendering Index (CRI)	91.3
R9	50

Special Color Rendering Indices			
R1	92	R9	50
R2	98	R10	94
R3	97	R11	92
R4	90	R12	83
R5	92	R13	94
R6	97	R14	99
R7	89	R15	86
R8	76	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	808.75
Luminous Efficacy (lm/W)	80.88
Beam Angle (°)	110.6
Center Beam Candle Power (cd)	285.6

Spectral Power Distribution & Chromaticity Diagram



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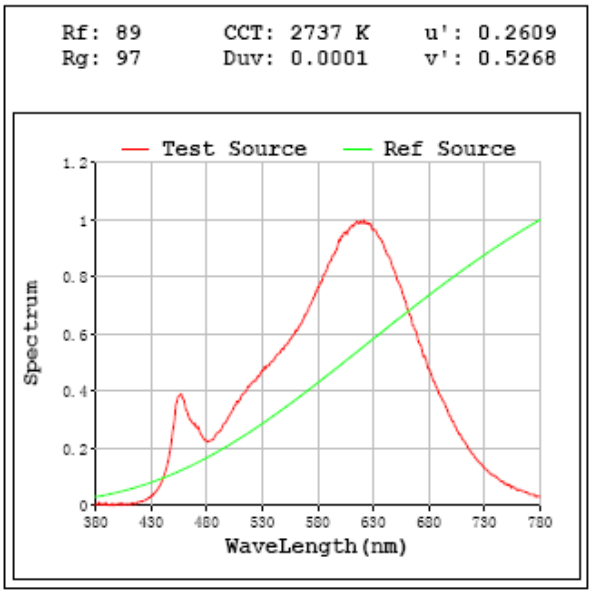
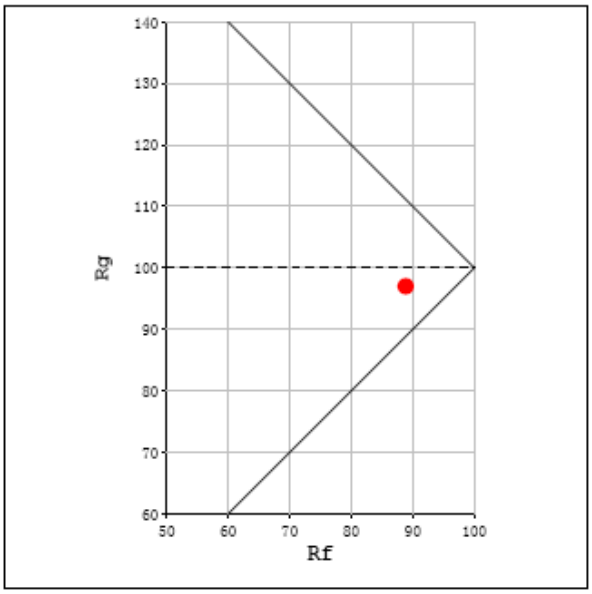
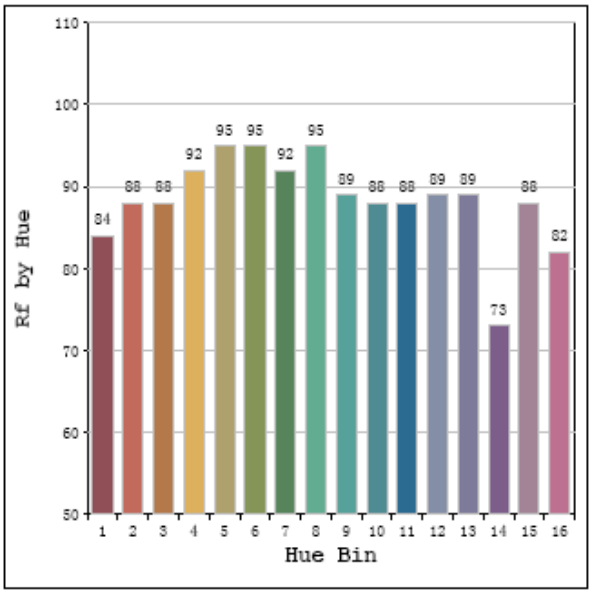
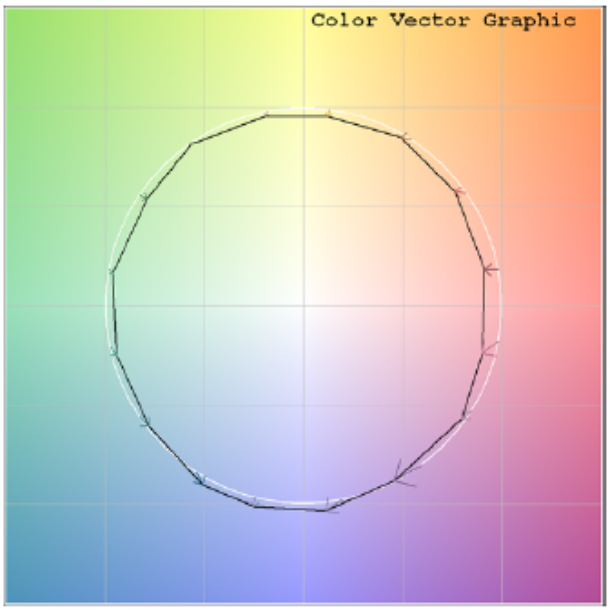






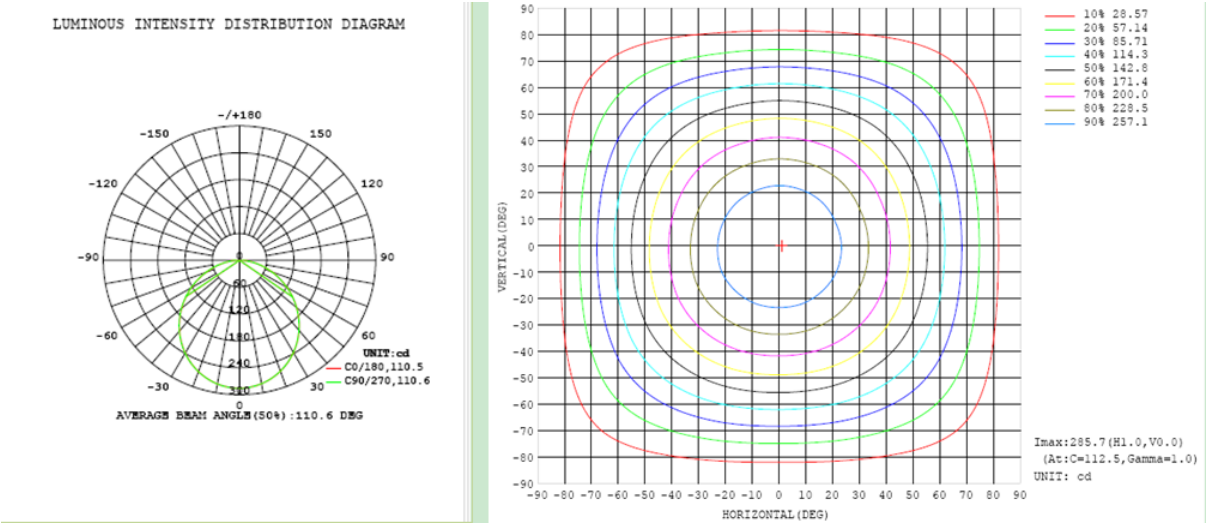


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	220.4	27.2%
0-40	359.6	44.5%
0-60	631.7	78.1%
60-90	177.1	21.9%
70-100	78.6	9.7%
90-120	0.0	0.0%
0-90	808.8	100.0%
90-180	0.0	0.0%
0-180	808.8	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	27.0	3.3%	90-100	0.0	0.0%
10-20	77.1	9.5%	100-110	0.0	0.0%
20-30	116.3	14.4%	110-120	0.0	0.0%
30-40	139.3	17.2%	120-130	0.0	0.0%
40-50	143.4	17.7%	130-140	0.0	0.0%
50-60	128.7	15.9%	140-150	0.0	0.0%
60-70	98.5	12.2%	150-160	0.0	0.0%
70-80	58.8	7.3%	160-170	0.0	0.0%
80-90	19.8	2.4%	170-180	0.0	0.0%

Photometric Data



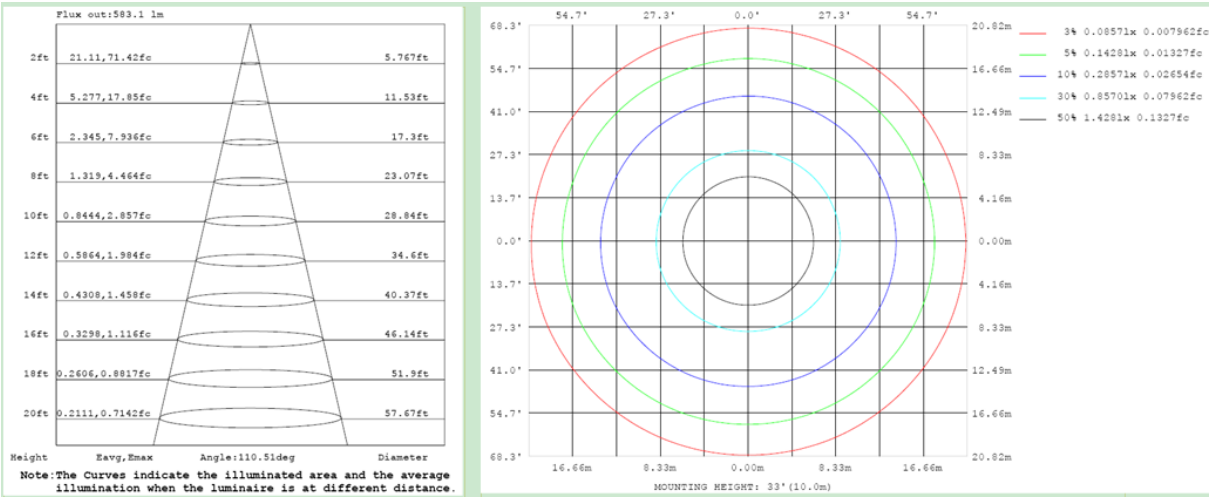


Table--1 UNIT: cd

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	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286
5	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284
10	280	281	280	281	280	280	280	280	280	279	279	279	280	280	280	280
15	274	274	274	274	274	274	274	274	273	272	272	272	273	273	273	273
20	264	265	265	265	265	265	265	265	263	263	263	263	263	263	264	263
25	253	253	253	254	253	254	253	253	252	251	251	251	252	251	252	252
30	239	240	239	240	240	240	240	240	238	237	237	237	238	237	238	238
35	223	224	224	224	224	224	224	224	222	221	221	221	222	222	222	222
40	206	206	206	207	206	207	207	207	204	203	203	203	204	204	204	204
45	187	187	187	188	187	188	188	188	185	184	184	183	185	184	185	185
50	166	167	167	167	167	168	167	167	164	163	163	163	164	164	165	164
55	145	146	145	146	146	147	146	146	143	142	142	141	143	142	143	143
60	123	123	123	124	124	124	124	124	121	120	120	119	120	120	121	121
65	100	101	101	101	101	102	101	101	98.7	97.2	97.3	96.9	98.0	97.8	98.6	98.1
70	77.8	78.7	78.3	79.1	78.6	79.4	78.8	78.9	76.3	75.0	75.1	74.8	75.7	75.5	76.3	75.8
75	56.0	57.0	56.7	57.3	56.9	57.5	57.0	57.1	54.8	53.6	53.8	53.4	54.2	54.0	54.6	54.3
80	35.8	36.7	36.4	37.0	36.5	37.0	36.5	36.6	34.7	33.7	33.8	33.5	34.1	33.9	34.5	34.2
85	17.6	18.3	18.2	18.7	18.2	18.6	18.2	18.3	16.8	16.0	16.1	15.8	16.3	16.0	16.4	16.3
90	5.61	5.63	5.71	5.73	5.74	5.71	5.71	5.66	5.84	5.84	5.82	5.84	5.84	5.82	5.82	5.82

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2021-08-30	Test Ambient:	25.3 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0074(WFRL4R10.59FA120WS)	3000K	

Electrical Measurement:

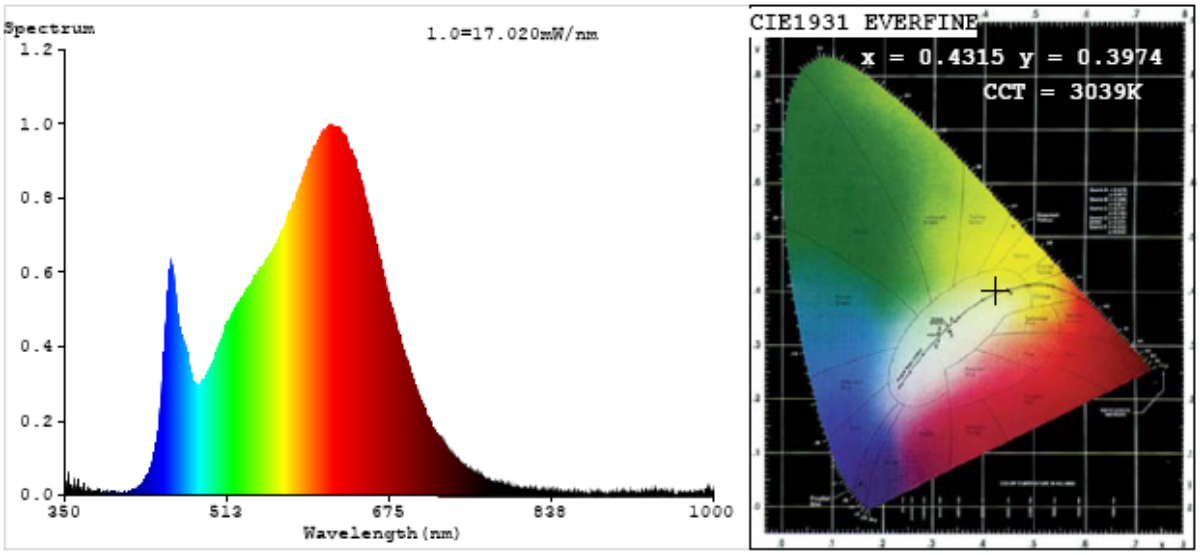
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300004	120.0	60	0.0839	9.877	0.9798

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3039
Duv	-0.0019
Chromaticity (x, y)	x=0.4315 y=0.3974
Chromaticity (u', v')	u'=0.2499 v'=0.5179
Color Rendering Index (CRI)	93
R9	62
Total Luminous (lm)	843.9
Luminous Efficacy (lm/W)	85.44

Special Color Rendering Indices			
R1	95	R9	62
R2	99	R10	97
R3	97	R11	93
R4	92	R12	80
R5	94	R13	97
R6	96	R14	99
R7	90	R15	91
R8	81	--	--

Spectral Power Distribution & Chromaticity Diagram



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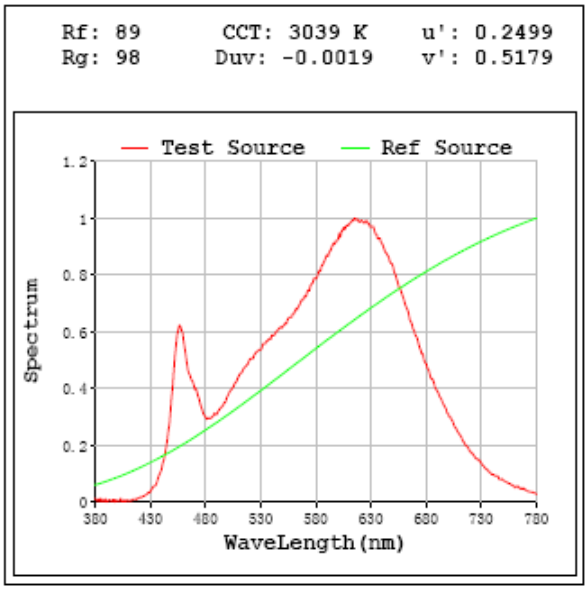
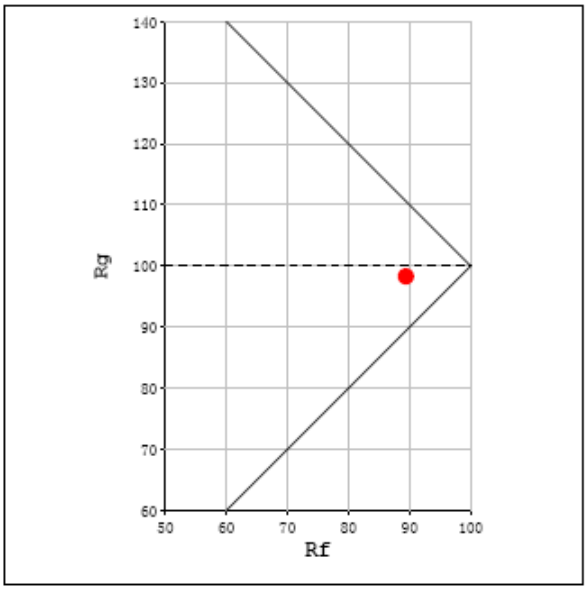
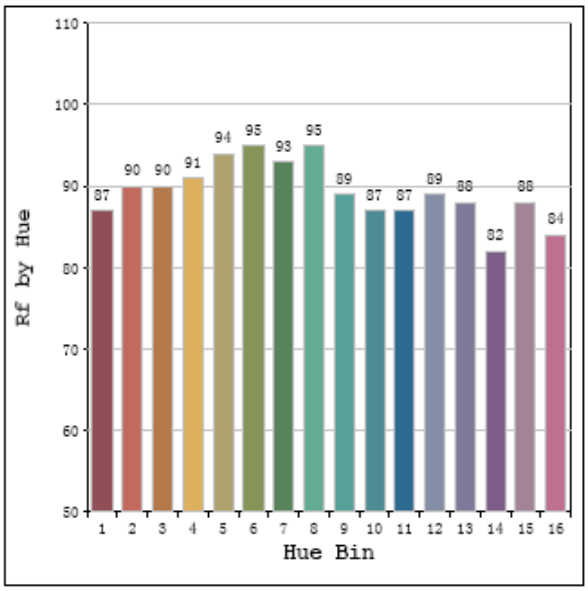
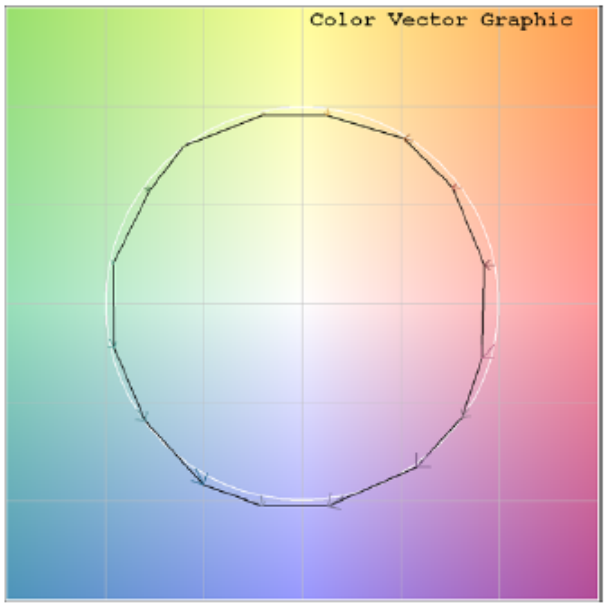

Rf: 89 CCT: 3039 K u': 0.2499
Rg: 98 Duv: -0.0019 v': 0.5179
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
87 90 90 91 94 95 93 95 89 87 87 89 88 82 88 84


Color Vector Graphic

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2021-08-30	Test Ambient:	25.3 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0074(WFRL4R10.59FA120WS)	3500K	

Electrical Measurement:

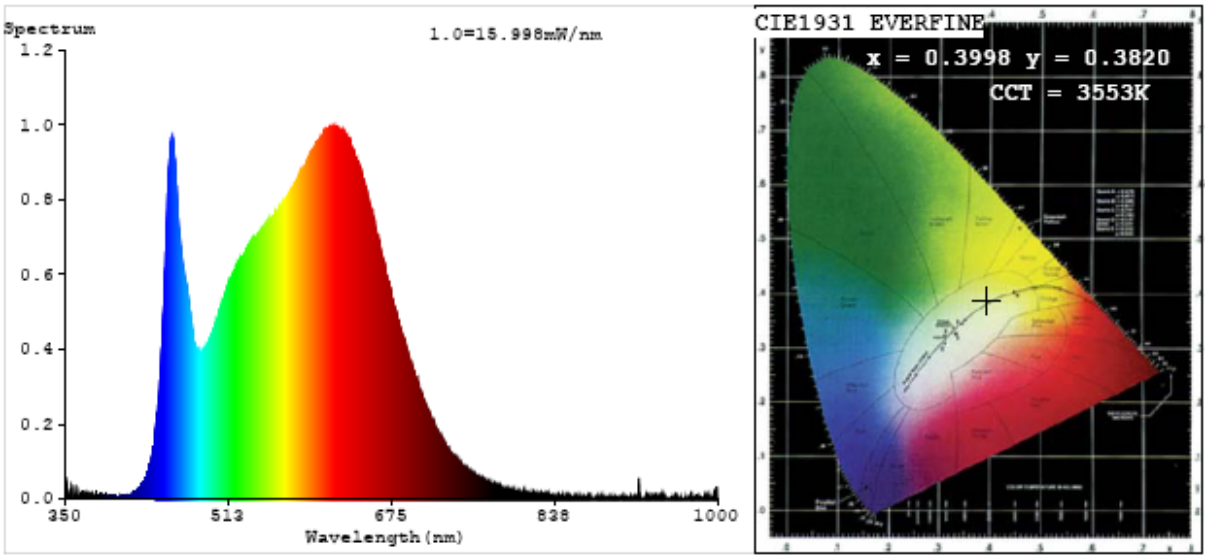
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300004	120.0	60	0.0825	9.698	0.9791

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3553
Duv	-0.0026
Chromaticity (x, y)	x=0.3998 y=0.3820
Chromaticity (u', v')	u'=0.2357 v'=0.5067
Color Rendering Index (CRI)	94.4
R9	73
Total Luminous (lm)	881.6
Luminous Efficacy (lm/W)	90.9

Special Color Rendering Indices			
R1	96	R9	73
R2	99	R10	98
R3	98	R11	94
R4	93	R12	75
R5	95	R13	98
R6	95	R14	100
R7	92	R15	94
R8	87	--	--

Spectral Power Distribution & Chromaticity Diagram



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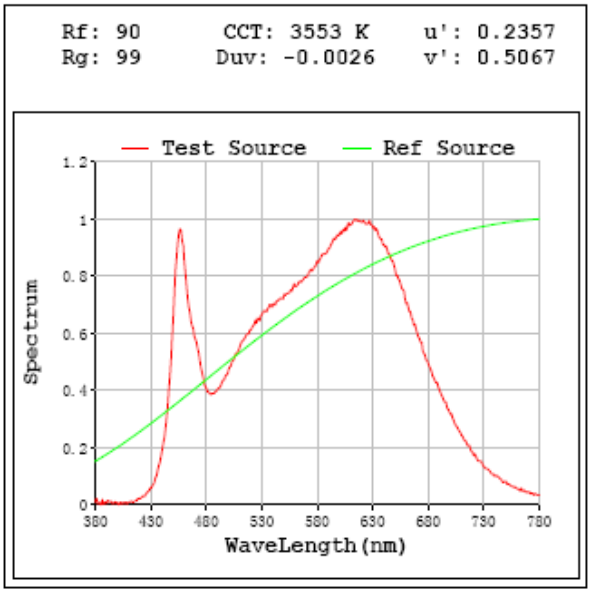
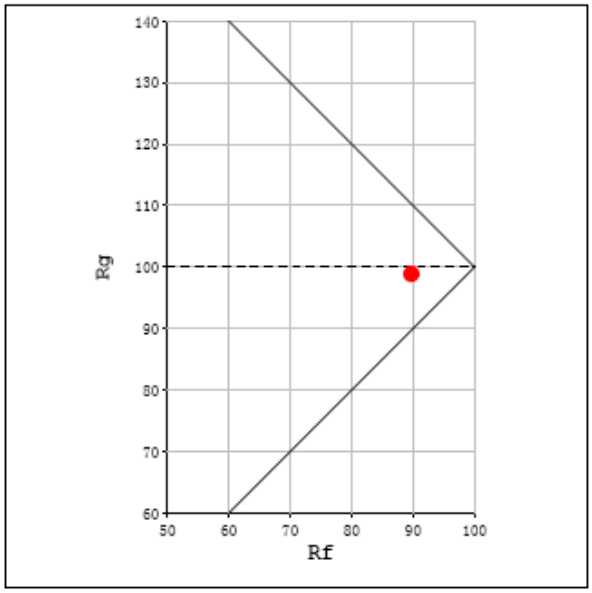
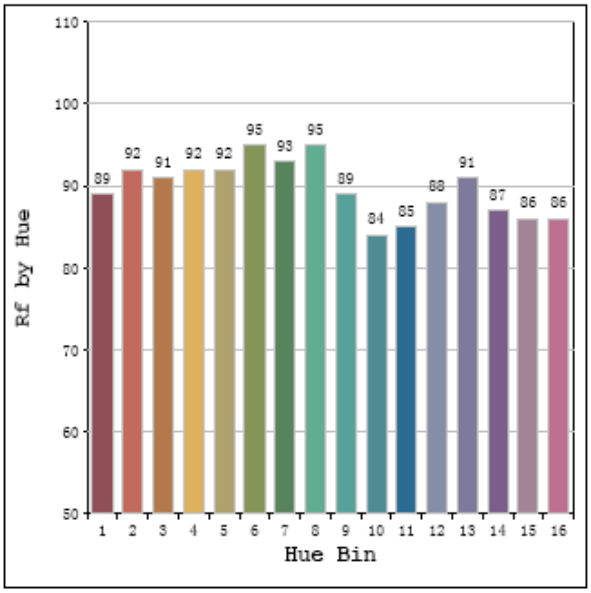

Rf: 90 CCT: 3553 K u': 0.2357
Rg: 99 Duv: -0.0026 v': 0.5067
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
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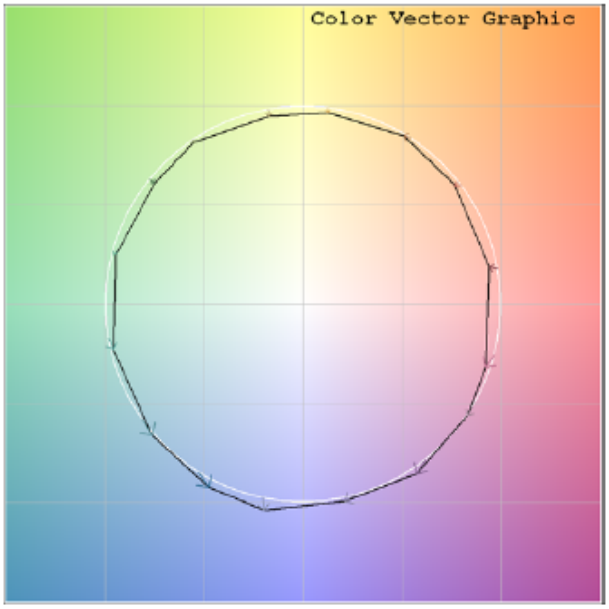

Color Vector Graphic

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2021-08-30	Test Ambient:	25.3 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0074(WFRL4R10.59FA120WS)	4000K	

Electrical Measurement:

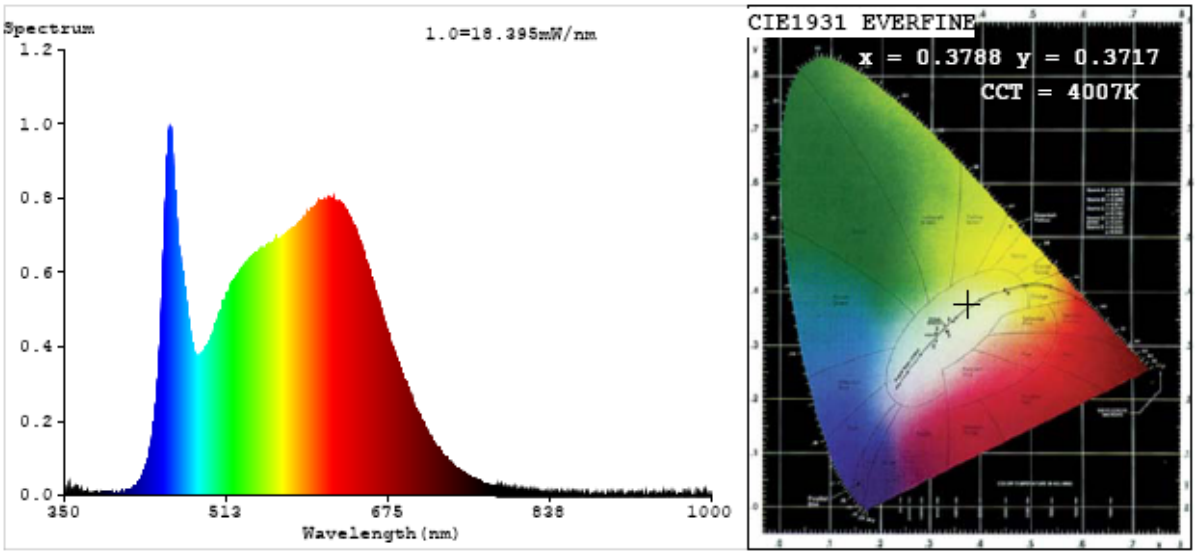
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300004	120.0	60	0.0828	9.743	0.9793

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4007
Duv	-0.0019
Chromaticity (x, y)	x=0.3788 y=0.3717
Chromaticity (u', v')	u'=0.2260 v'=0.4991
Color Rendering Index (CRI)	94.7
R9	77
Total Luminous (lm)	890.4
Luminous Efficacy (lm/W)	91.39

Special Color Rendering Indices			
R1	96	R9	77
R2	99	R10	97
R3	98	R11	93
R4	93	R12	71
R5	94	R13	98
R6	95	R14	99
R7	93	R15	94
R8	89	--	--

Spectral Power Distribution & Chromaticity Diagram



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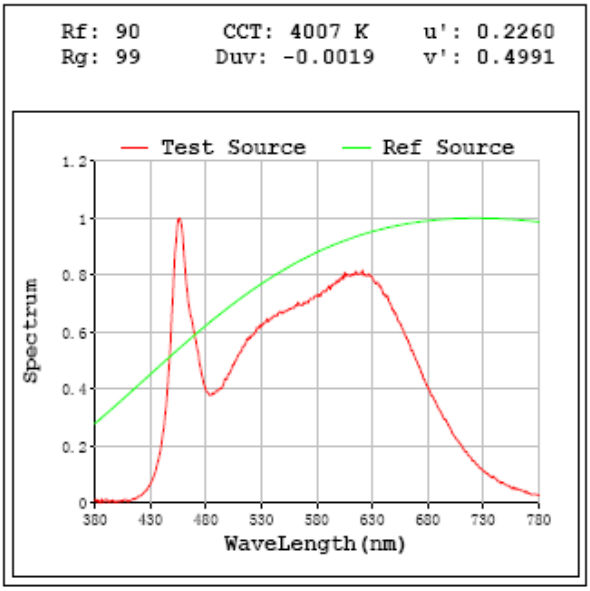
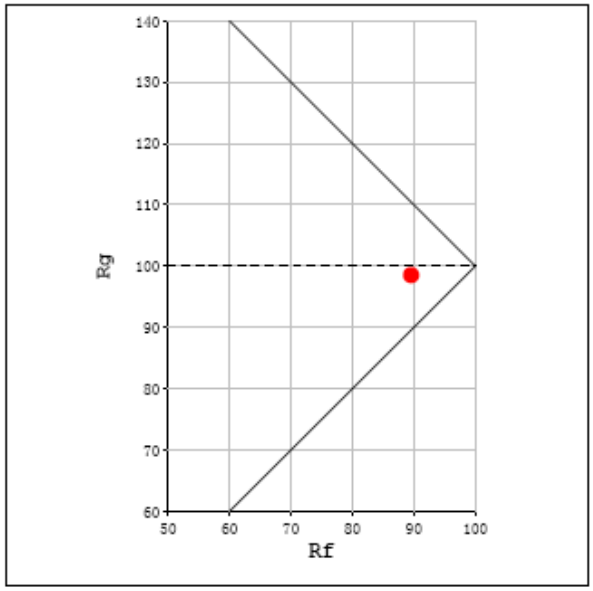
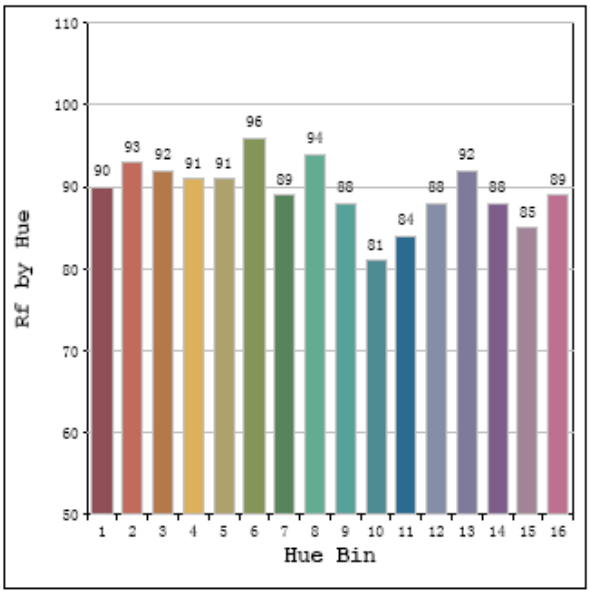
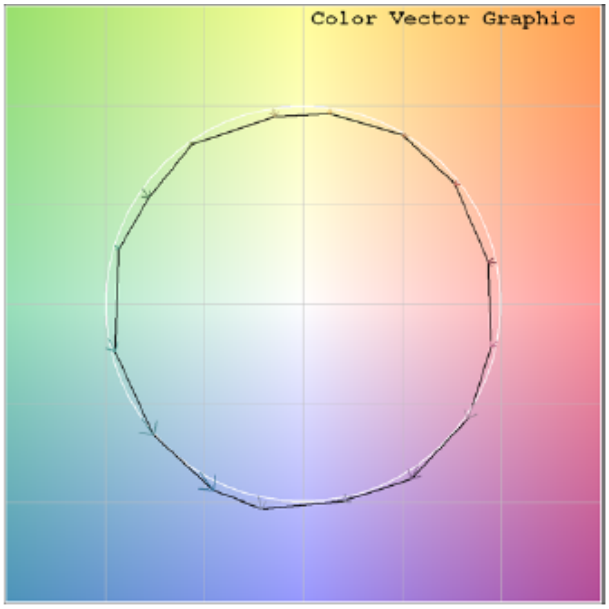

Rf: 90 CCT: 4007 K u': 0.2260
Rg: 99 Duv: -0.0019 v': 0.4991
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
90 93 92 91 91 96 89 94 88 81 84 88 92 88 85 89


Color Vector Graphic

2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2021-08-30	Test Ambient:	25.3 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0074(WFRL4R10.59FA120WS)	5000K	

Electrical Measurement:

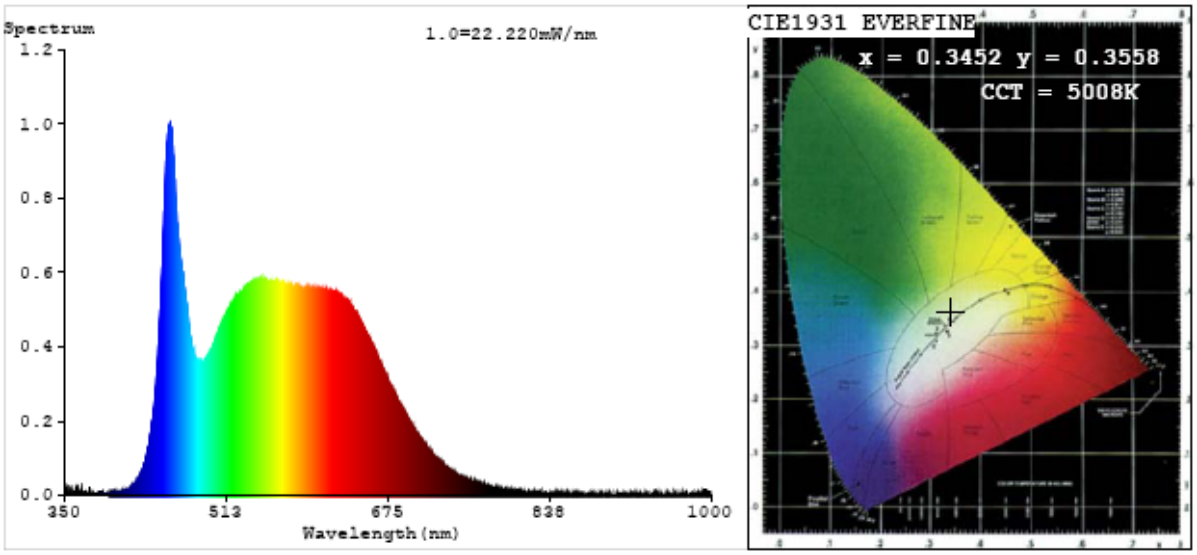
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300004	120.0	60	0.08441	9.937	0.9801

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	5008
Duv	0.0021
Chromaticity (x, y)	x=0.3452 y=0.3558
Chromaticity (u', v')	u'=0.2099 v'=0.4867
Color Rendering Index (CRI)	93.2
R9	71
Total Luminous (lm)	873.1
Luminous Efficacy (lm/W)	87.86

Special Color Rendering Indices			
R1	94	R9	71
R2	97	R10	91
R3	97	R11	91
R4	91	R12	69
R5	92	R13	95
R6	93	R14	98
R7	94	R15	92
R8	88	--	--

Spectral Power Distribution & Chromaticity Diagram



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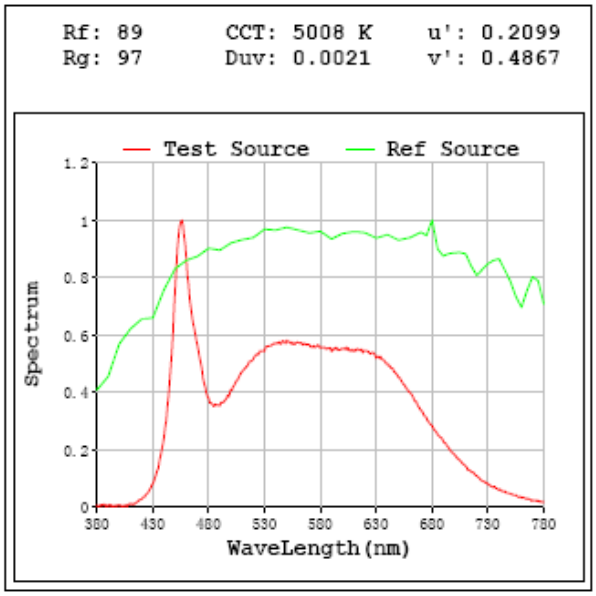

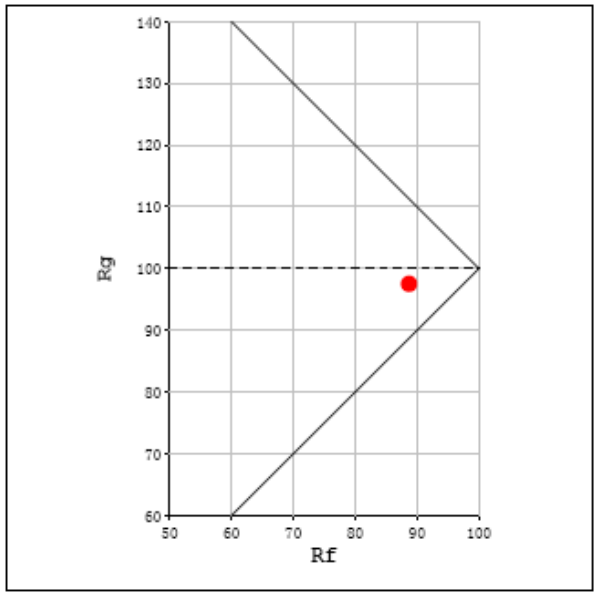

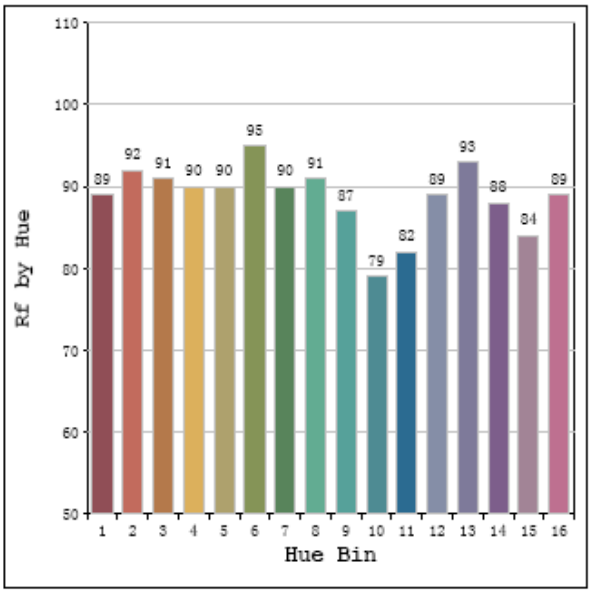

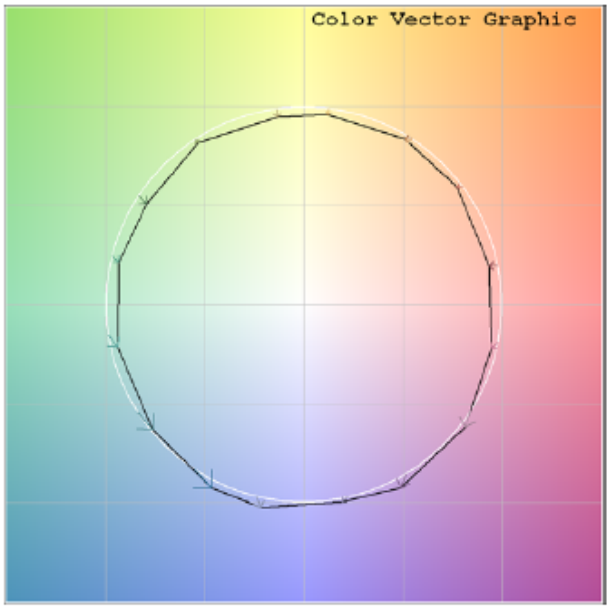

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLW0074(WFRL4R10.59FA120WS)	2700K setting	120.0	808.8	10.0	80.88
	3000K setting	120.0	843.9	9.88	85.44
	3500K setting	120.0	881.6	9.70	90.9
	4000K setting	120.0	890.4	9.74	91.39
	5000K setting	120.0	873.1	9.94	87.86

3. Product Photo

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