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): DLW0076(WFRL6R149FA120WS)

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	14.0W
Rated Initial Lamp Lumen	1200 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	DLW0076(WFRL6R149FA120WS)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300006	120.0	60	0.1130	13.4	0.988

Chromaticity Measurement - Sphere-Spectroradiometer Method:

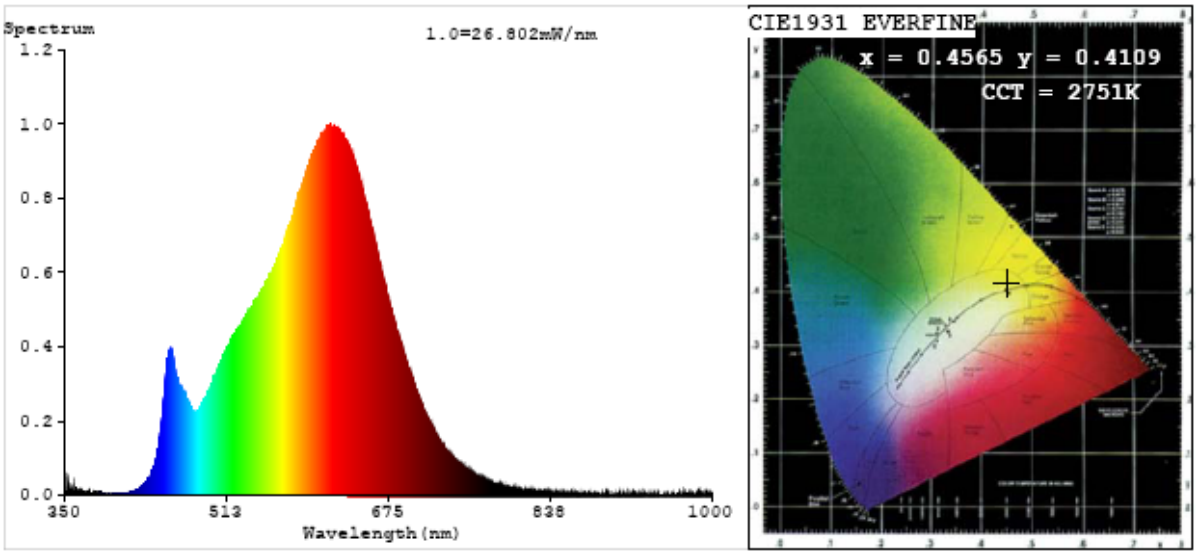
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2751
Duv	0.0004
Chromaticity (x, y)	x=0.4565 y=0.4109
Chromaticity (u', v')	u'=0.2602 v'=0.5270
Color Rendering Index (CRI)	91.4
R9	50

Special Color Rendering Indices			
R1	92	R9	50
R2	97	R10	93
R3	97	R11	92
R4	90	R12	83
R5	92	R13	93
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)	1249.9
Luminous Efficacy (lm/W)	93.28
Beam Angle (°)	111.4
Center Beam Candle Power (cd)	435.6

Spectral Power Distribution & Chromaticity Diagram



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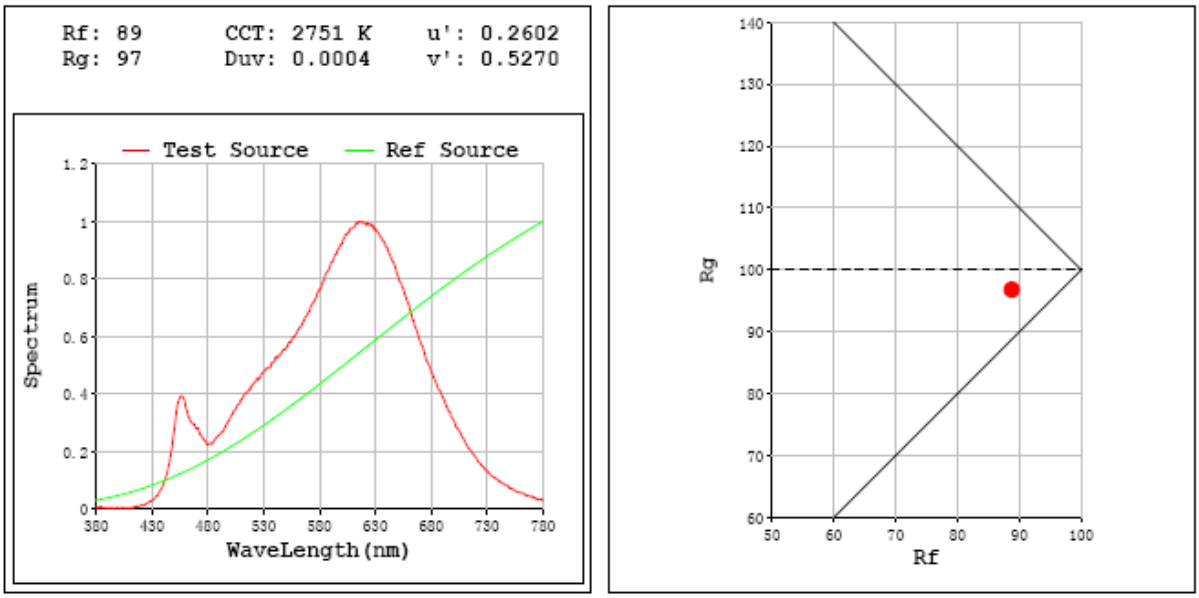
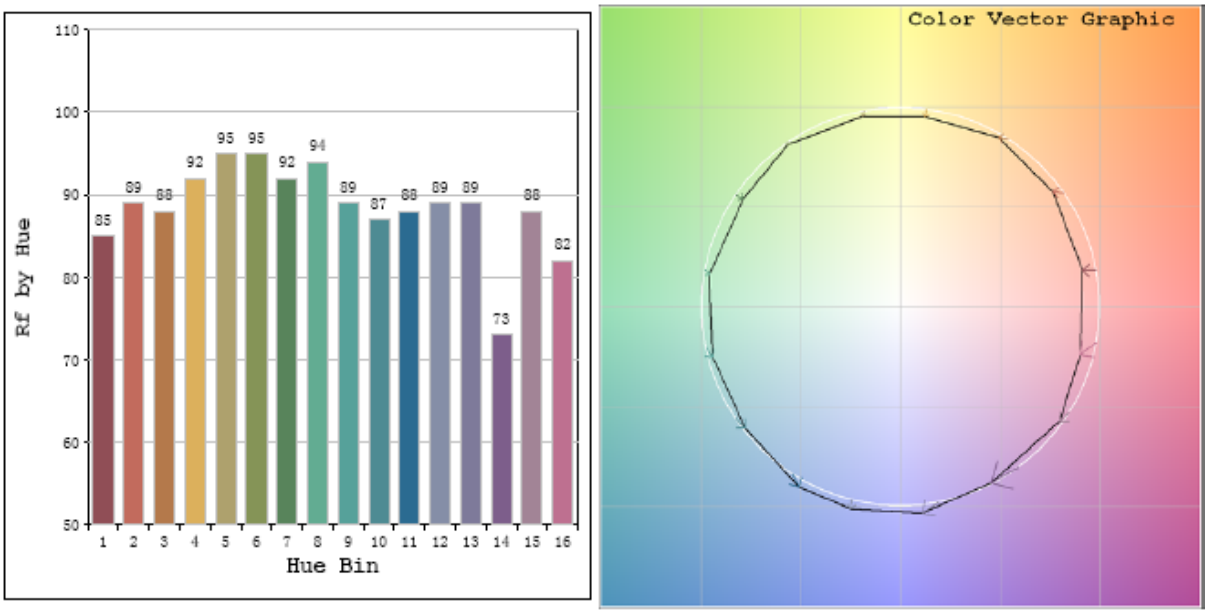


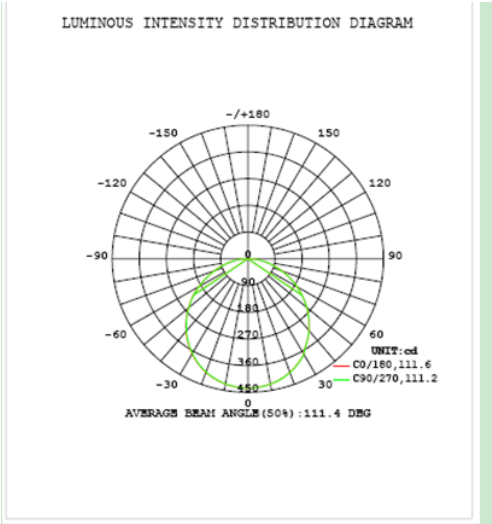


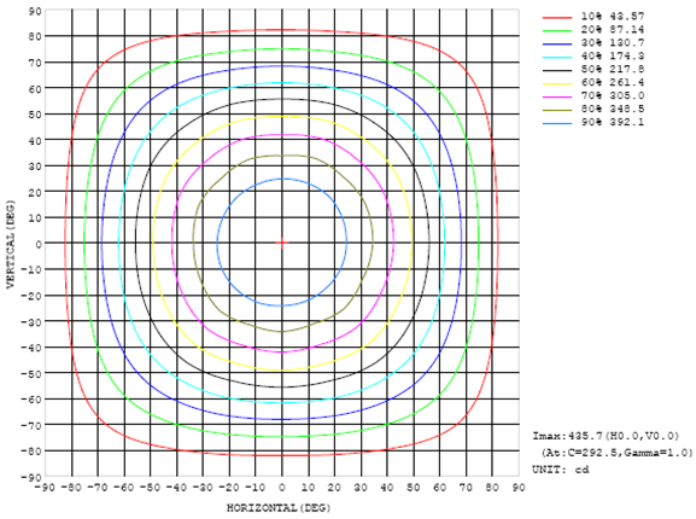
Zonal Lumen Tabulation

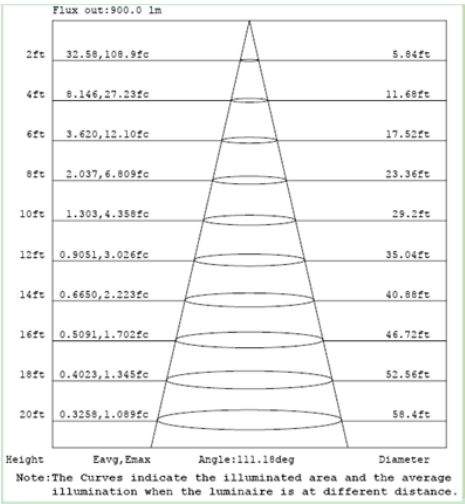
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	339.6	27.2%
0-40	554.6	44.4%
0-60	975.1	78.0%
60-90	274.9	22.0%
70-100	123.6	9.9%
90-120	0.0	0.0%
0-90	1249.9	100.0%
90-180	0.0	0.0%
0-180	1249.9	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	41.2	3.3%	90-100	0.0	0.0%
10-20	118.4	9.5%	100-110	0.0	0.0%
20-30	179.9	14.4%	110-120	0.0	0.0%
30-40	215.1	17.2%	120-130	0.0	0.0%
40-50	221.6	17.7%	130-140	0.0	0.0%
50-60	198.8	15.9%	140-150	0.0	0.0%
60-70	151.3	12.1%	150-160	0.0	0.0%
70-80	91.4	7.3%	160-170	0.0	0.0%
80-90	32.2	2.6%	170-180	0.0	0.0%

Photometric Data







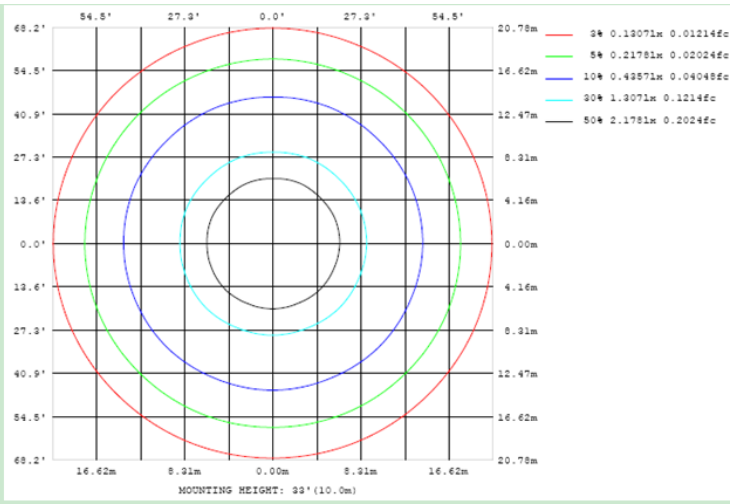


Table--1 UNIT: cd

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	436	436	436	436	436	436	436	436	436	436	436	436	436	436	436	436
5	434	434	433	433	433	434	434	434	434	434	434	434	434	434	434	434
10	428	428	427	428	428	428	428	429	429	428	429	428	429	429	429	429
15	419	419	418	418	419	419	420	420	420	419	420	419	420	420	421	420
20	407	406	405	405	406	407	407	408	407	406	407	407	408	408	409	408
25	390	389	388	389	389	391	391	392	391	390	390	390	392	392	393	392
30	370	370	368	366	368	371	371	372	371	370	370	369	372	372	373	371
35	346	340	344	339	344	341	347	342	342	346	341	346	342	348	344	347
40	319	314	317	312	317	315	320	316	315	319	315	319	315	320	317	320
45	289	285	287	283	287	285	290	287	286	290	286	289	286	290	287	290
50	258	254	256	252	256	254	258	255	255	258	254	257	254	258	255	258
55	224	221	223	219	222	221	224	222	222	225	222	224	222	224	222	224
60	187	187	185	186	185	187	187	188	189	188	188	187	187	187	188	187
65	152	153	151	152	151	152	152	154	155	154	154	153	153	153	154	153
70	118	119	118	118	117	118	118	120	121	120	120	119	119	119	119	119
75	85.6	86.2	85.1	85.5	84.8	85.9	85.7	87.0	87.9	87.3	87.6	86.4	86.9	86.1	86.8	86.0
80	55.0	55.7	54.8	55.2	54.6	55.5	55.3	56.4	57.3	56.7	57.1	56.2	56.5	55.8	56.4	55.7
85	27.6	28.1	27.5	27.9	27.4	28.2	27.9	28.8	29.8	29.3	29.7	28.9	29.3	28.6	29.0	28.4
90	8.59	8.56	8.58	8.59	8.60	8.60	8.64	8.63	9.04	9.04	9.00	9.03	9.02	9.04	9.03	9.02

2.1.2 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	DLW0076(WFRL6R149FA120WS)	3000K	

Electrical Measurement:

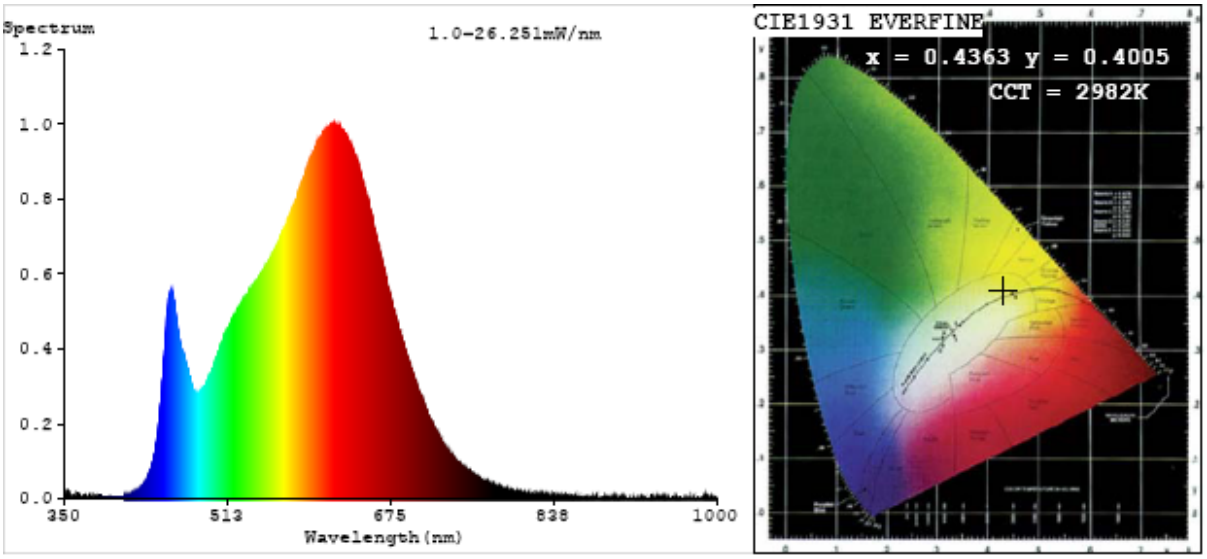
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300006	120.0	60	0.1116	13.22	0.9869

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2982
Duv	-0.0013
Chromaticity (x, y)	x=0.4363 y=0.4005
Chromaticity (u', v')	u'=0.2517 v'=0.5199
Color Rendering Index (CRI)	92.8
R9	59
Total Luminous (lm)	1290
Luminous Efficacy (lm/W)	97.53

Special Color Rendering Indices			
R1	94	R9	59
R2	99	R10	96
R3	97	R11	93
R4	92	R12	81
R5	94	R13	96
R6	96	R14	99
R7	90	R15	90
R8	81	--	--

Spectral Power Distribution & Chromaticity Diagram



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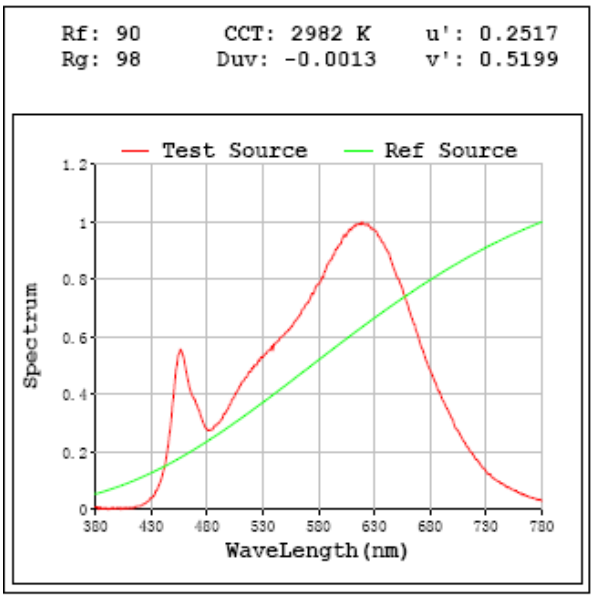
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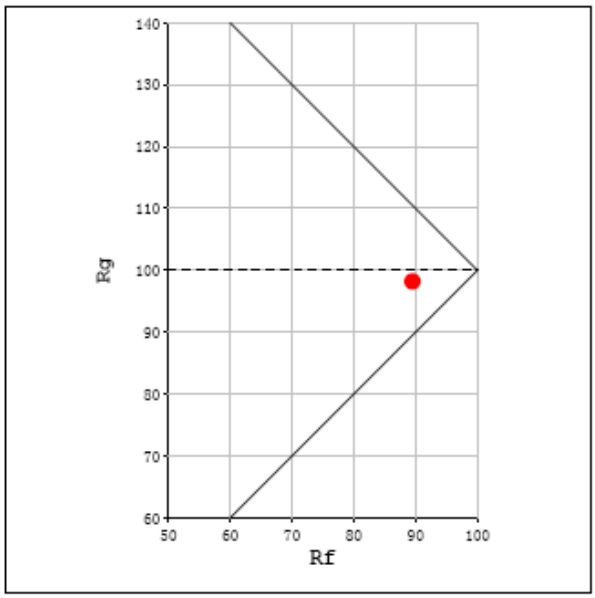
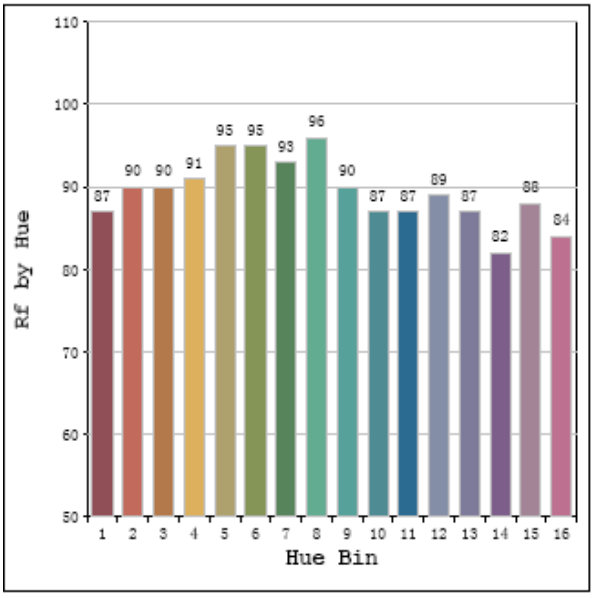
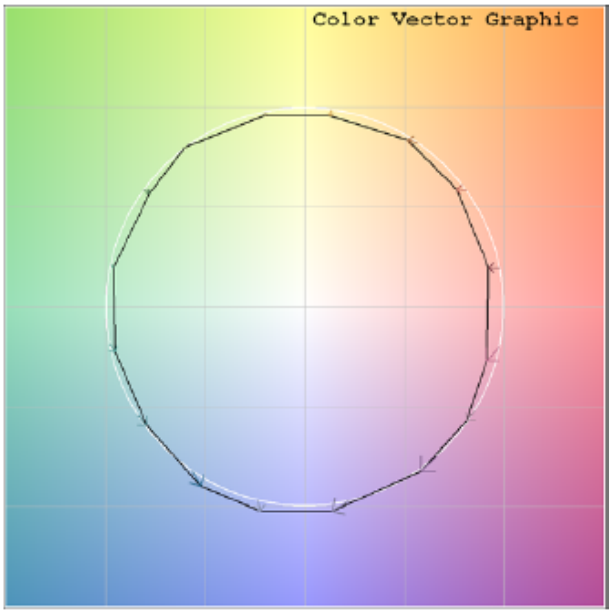
Rg: 98 Duv: -0.0013 v': 0.5199
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
87 90 90 91 95 95 93 96 90 87 87 89 87 82 88 84


Color Vector Graphic

2.1.3 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	DLW0076(WFRL6R149FA120WS)	3500K	

Electrical Measurement:

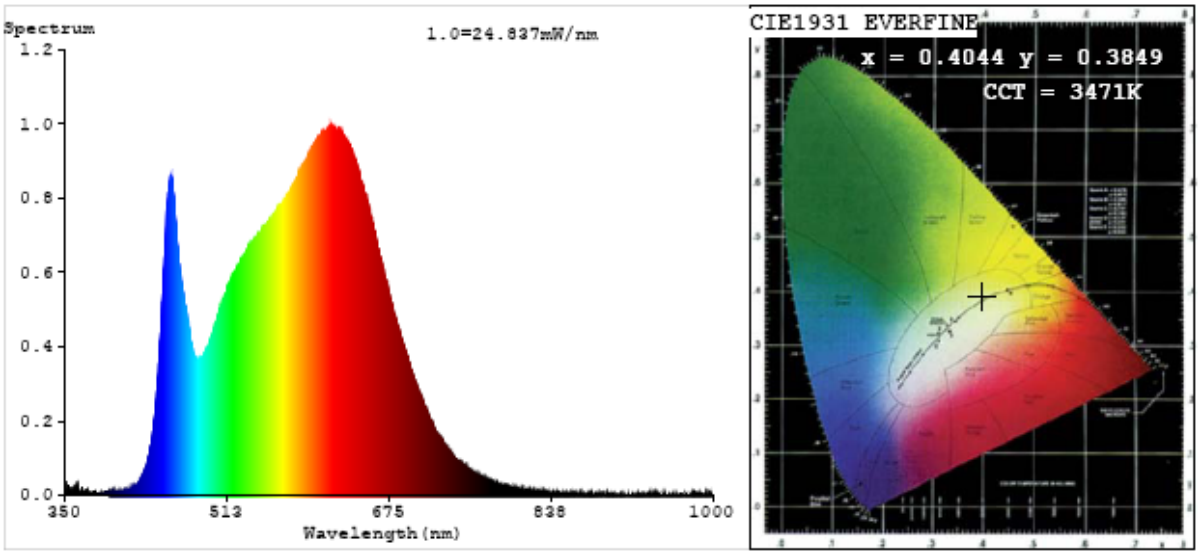
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300006	120.0	60	0.1096	12.99	0.9864

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3471
Duv	-0.0024
Chromaticity (x, y)	x=0.4044 y=0.3849
Chromaticity (u', v')	u'=0.2376 v'=0.5087
Color Rendering Index (CRI)	94.3
R9	70
Total Luminous (lm)	1349
Luminous Efficacy (lm/W)	103.85

Special Color Rendering Indices			
R1	96	R9	70
R2	99	R10	96
R3	98	R11	94
R4	93	R12	76
R5	95	R13	97
R6	96	R14	99
R7	92	R15	93
R8	86	--	--

Spectral Power Distribution & Chromaticity Diagram



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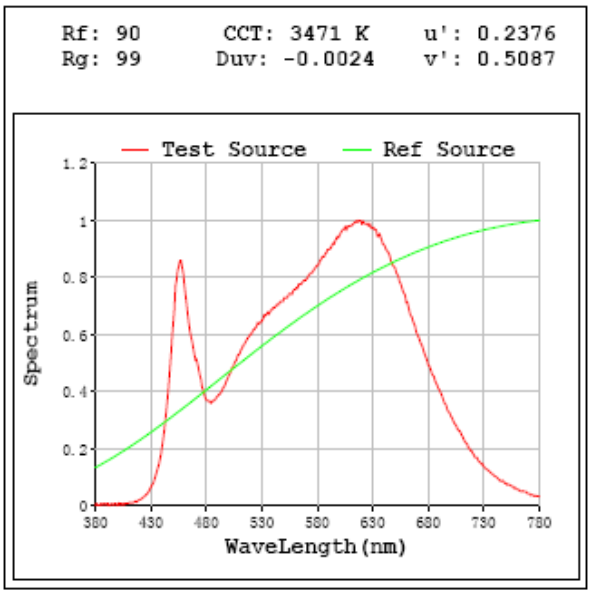
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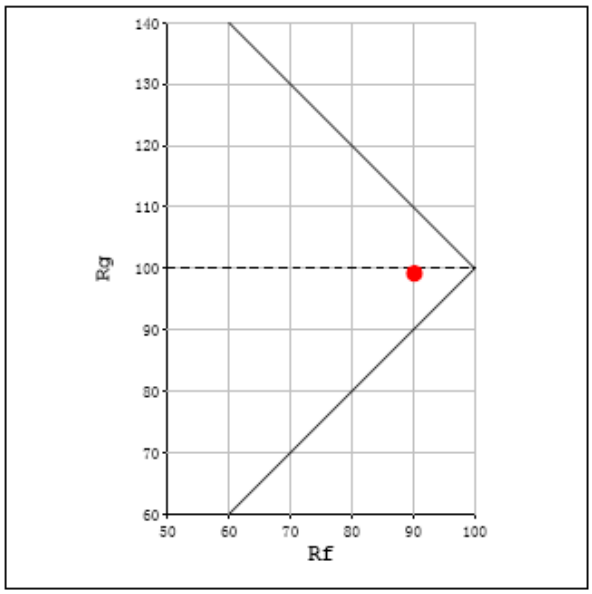
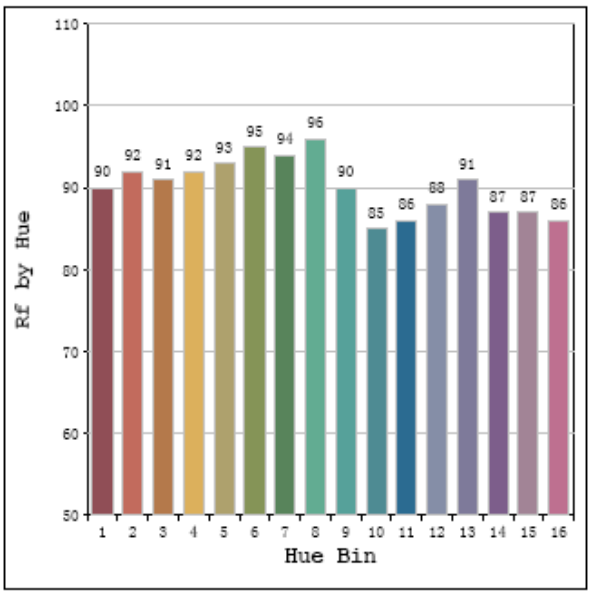
Rg: 99 Duv: -0.0024 v': 0.5087
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
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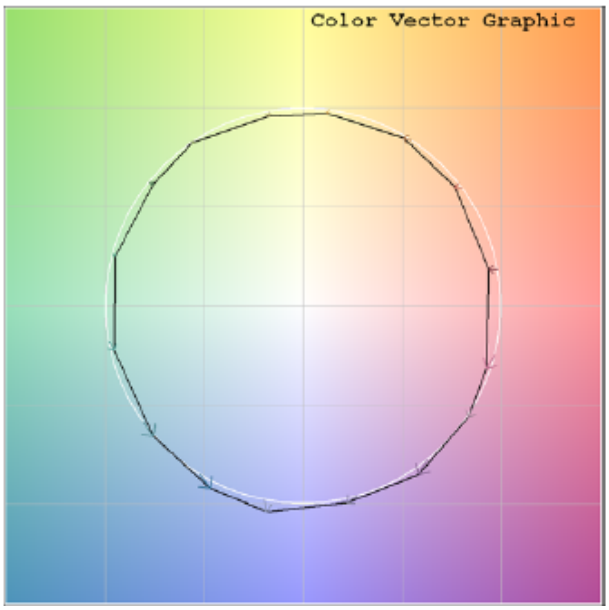

Color Vector Graphic

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2021-08-30	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0076(WFRL6R149FA120WS)	4000K	

Electrical Measurement:

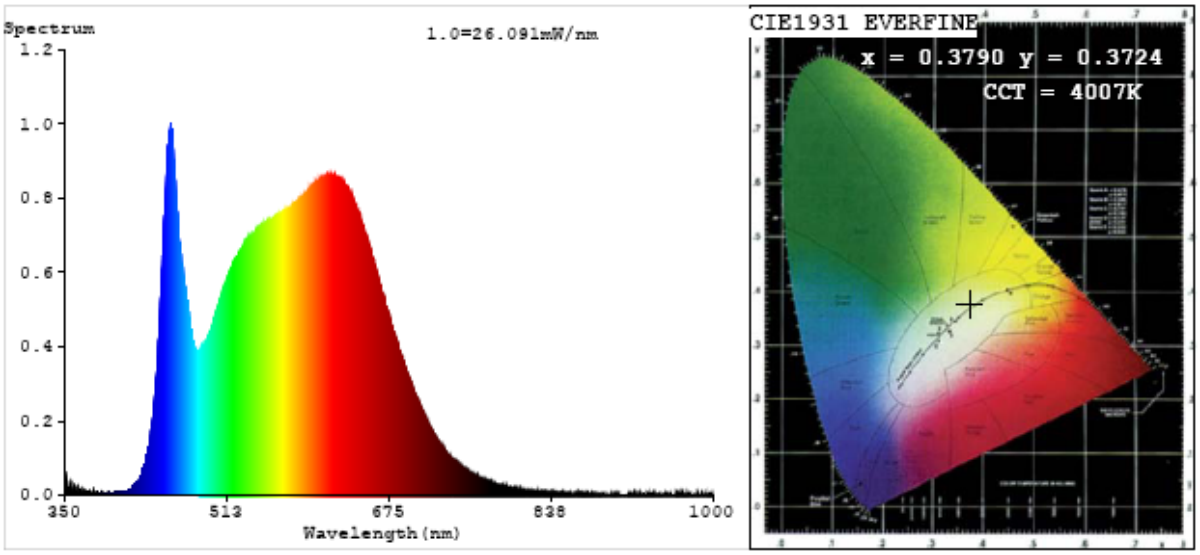
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300006	120.0	60	0.1103	13.07	0.9865

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4007
Duv	-0.0016
Chromaticity (x, y)	x=0.3790 y=0.3724
Chromaticity (u', v')	u'=0.2259 v'=0.4995
Color Rendering Index (CRI)	94.5
R9	75
Total Luminous (lm)	1365
Luminous Efficacy (lm/W)	104.49

Special Color Rendering Indices			
R1	96	R9	75
R2	99	R10	94
R3	98	R11	93
R4	93	R12	71
R5	94	R13	97
R6	95	R14	98
R7	94	R15	94
R8	89	--	--

Spectral Power Distribution & Chromaticity Diagram



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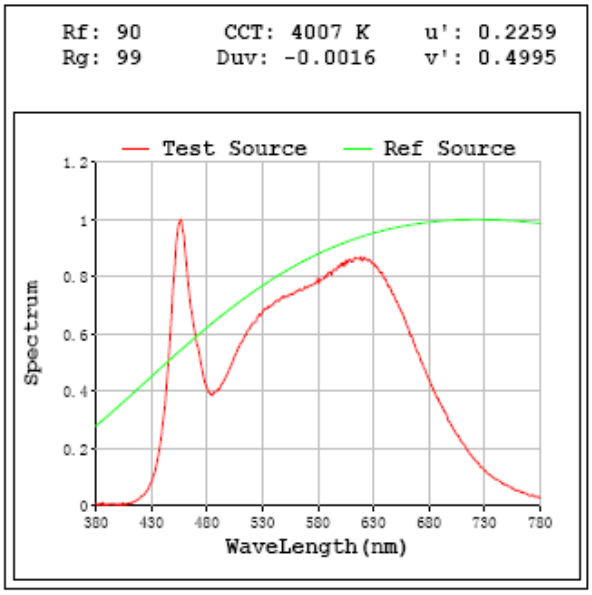
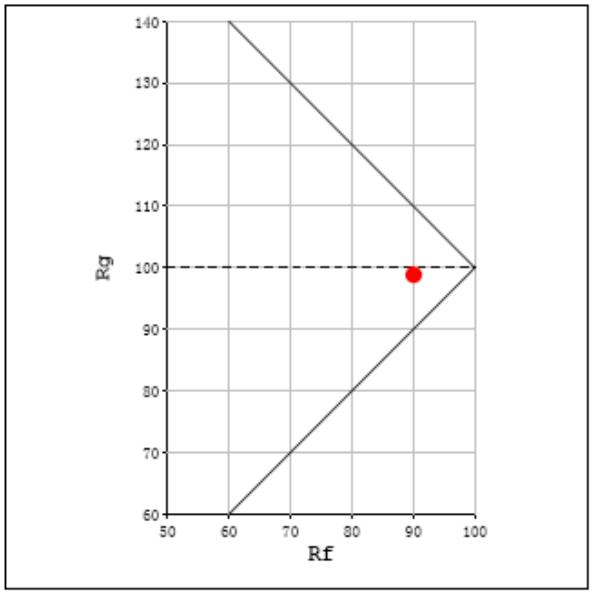
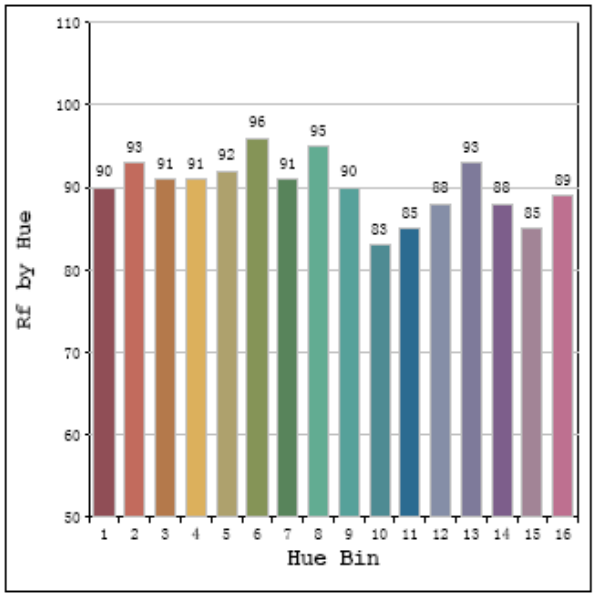
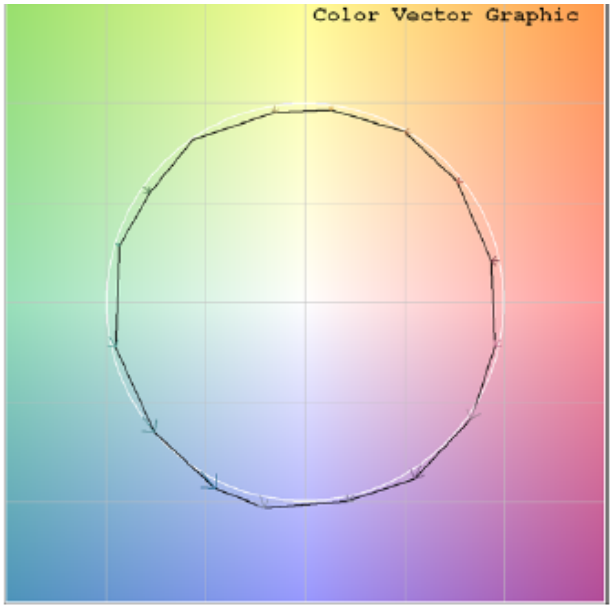

Rf: 90 CCT: 4007 K u': 0.2259
Rg: 99 Duv: -0.0016 v': 0.4995
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
90 93 91 91 92 96 91 95 90 83 85 88 93 88 85 89


Color Vector Graphic

2.1.5 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	DLW0076(WFRL6R149FA120WS)	5000K	

Electrical Measurement:

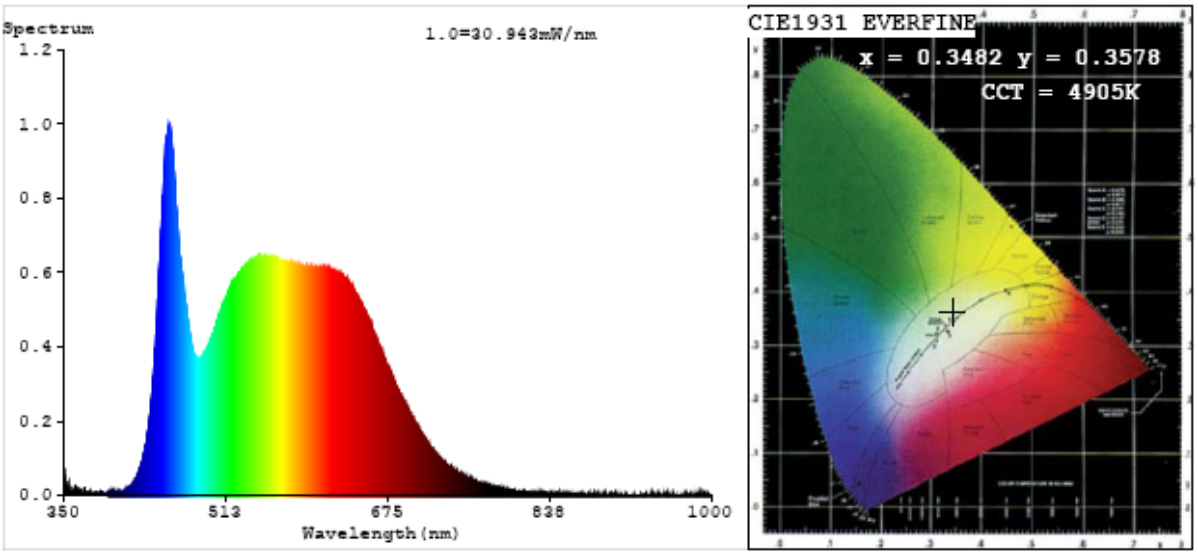
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108300006	120.0	60	0.1123	13.31	0.987

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4905
Duv	0.0019
Chromaticity (x, y)	x=0.3482 y=0.3578
Chromaticity (u', v')	u'=0.2111 v'=0.4881
Color Rendering Index (CRI)	92.4
R9	71
Total Luminous (lm)	1340
Luminous Efficacy (lm/W)	100.63

Special Color Rendering Indices			
R1	93	R9	71
R2	96	R10	88
R3	96	R11	89
R4	90	R12	64
R5	90	R13	94
R6	91	R14	98
R7	95	R15	91
R8	88	--	--

Spectral Power Distribution & Chromaticity Diagram



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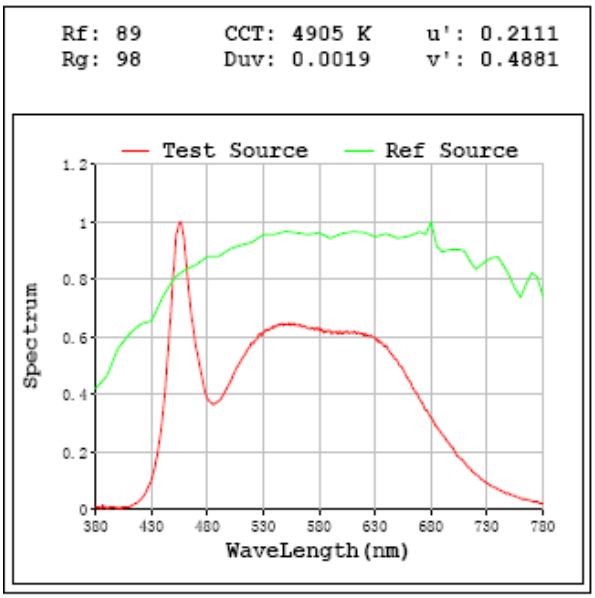

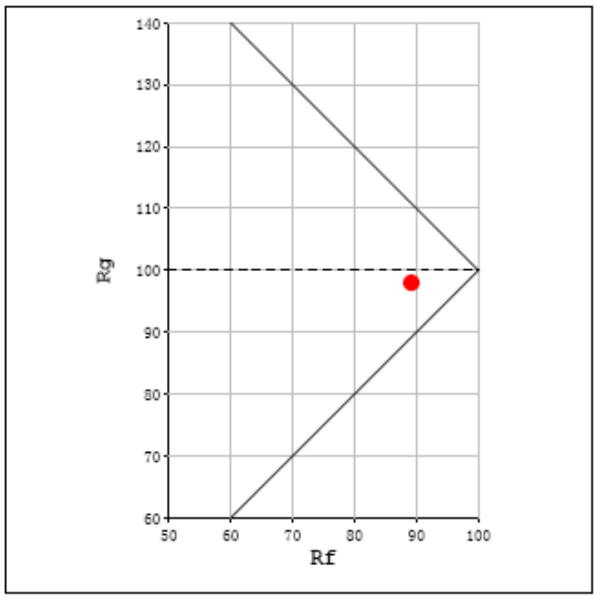

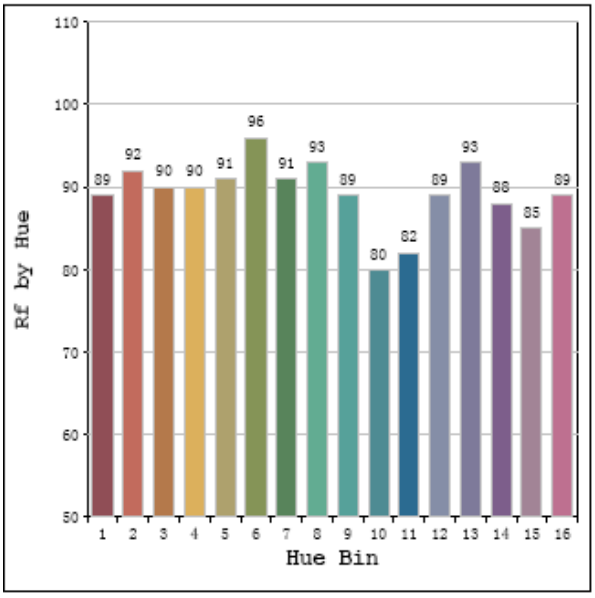

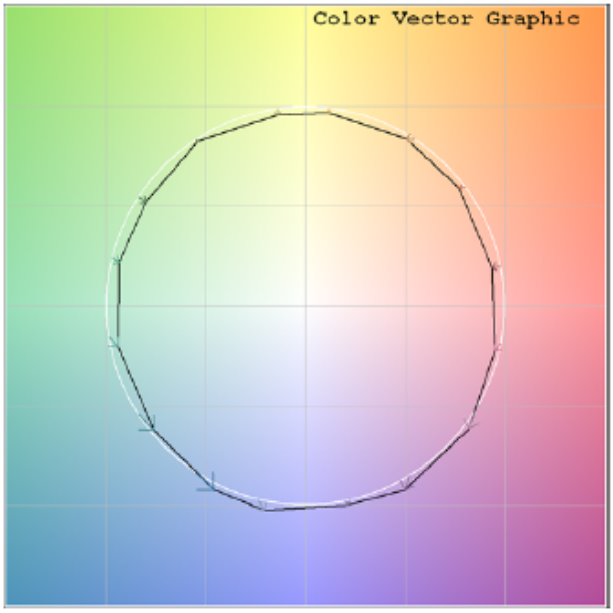

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLW0076(WFRL6R149FA120WS)	2700K setting	120.0	1249.9	13.40	93.28
	3000K setting	120.0	1290	13.22	97.53
	3500K setting	120.0	1349	12.99	103.85
	4000K setting	120.0	1365	13.07	104.49
	5000K setting	120.0	1340	13.31	100.63

3. Product Photo

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