

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):
DLS0147(SUMO-R-24/D10)

Report Type: Testing and Report According to IES LM-79-2008

**Type of
Luminaire:** Downlights

Report Date: 2022-07-25

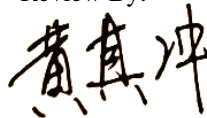
Prepared By:

Test & Report By:



Engineer: Sun Fangfang

Review By:



Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120V-277Vac, 60 Hz
Nominal Power	35.0 W
Rated Initial Lamp Lumen	2600 lm
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

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 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.

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 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.

2.1.1 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-25	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0147(SUMO-R-24/D10)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120049	120.0	60	0.276	33.00	0.997

Chromaticity Measurement - Sphere-Spectroradiometer Method:

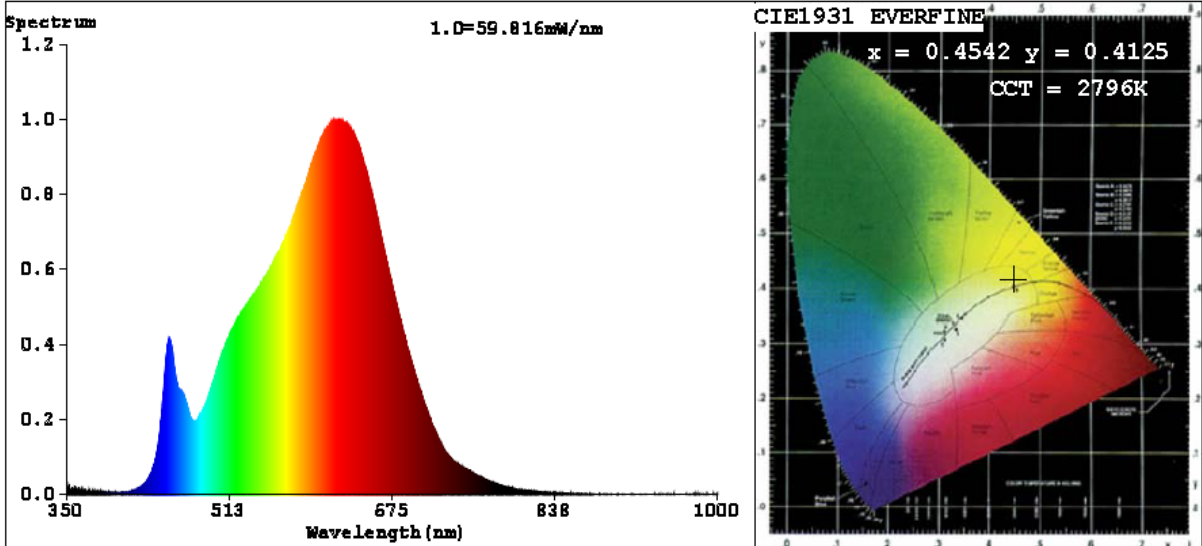
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	57
Frequency (Hz)	60	R2	97	R10	91
CCT (K)	2796	R3	99	R11	94
Duv	0.0012	R4	93	R12	82
Chromaticity (x, y)	x=0.4542 y=0.4125	R5	93	R13	94
Chromaticity (u', v')	u'=0.2580 v'=0.5272	R6	96	R14	99
Color Rendering Index (CRI)	92.8	R7	91	R15	88
R9	57	R8	80	--	--

Photometric Measurement – Goniophotometer Method:

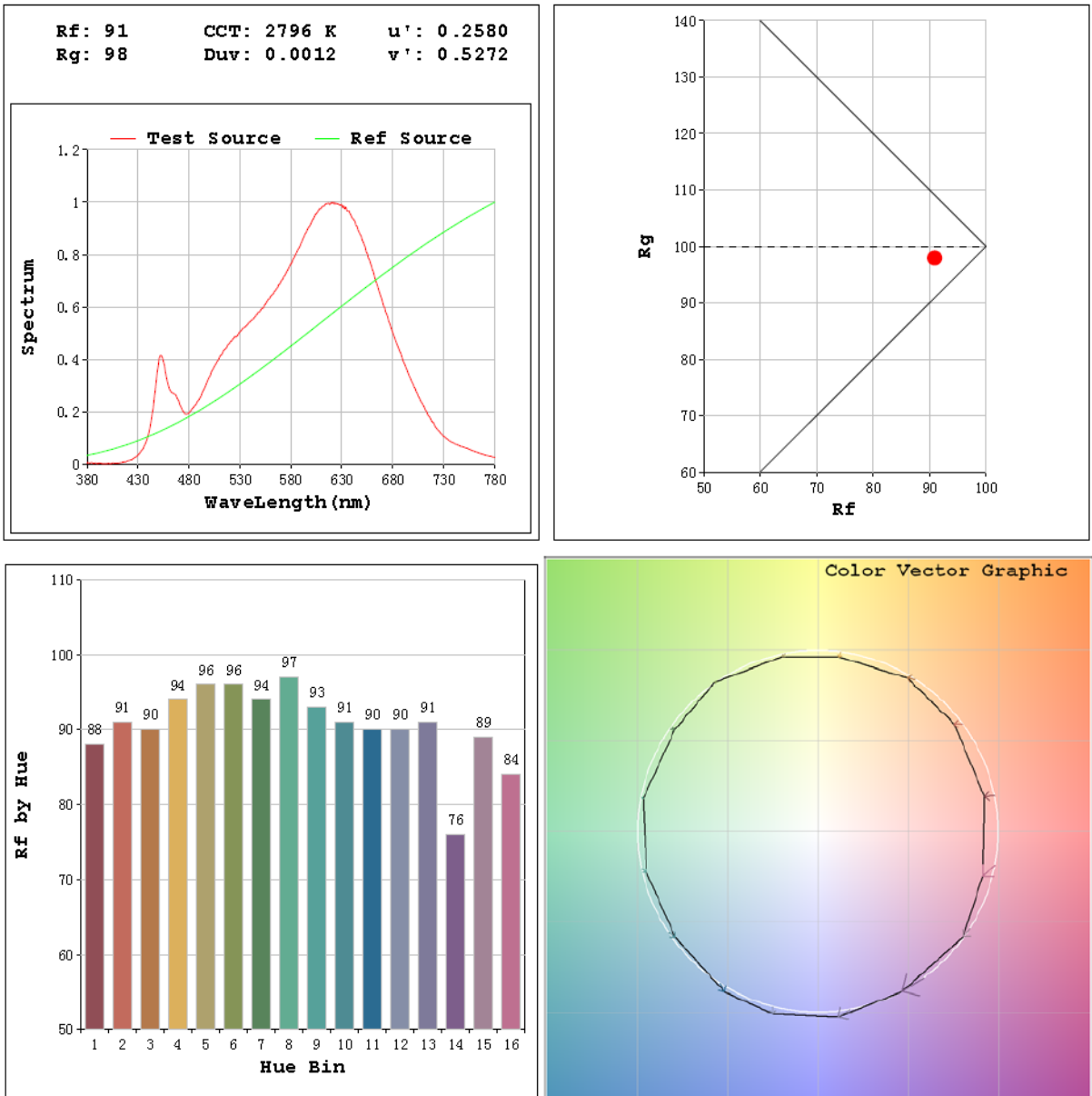
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2848.4
Luminous Efficacy (lm/W)	86.32
Beam Angle (°)	113.8
Center Beam Candle Power (cd)	982.8

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2797
Luminous Efficacy (lm/W)	84.36

Spectral Power Distribution & Chromaticity Diagram



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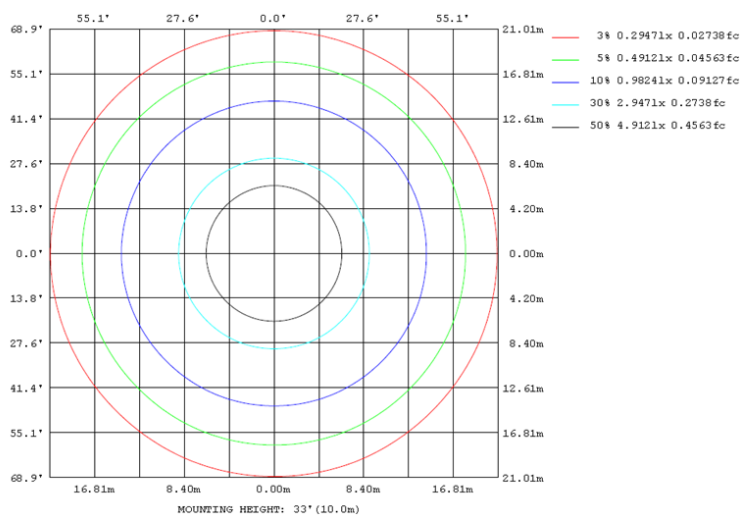
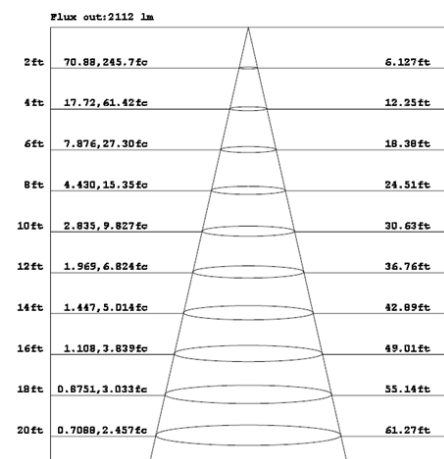
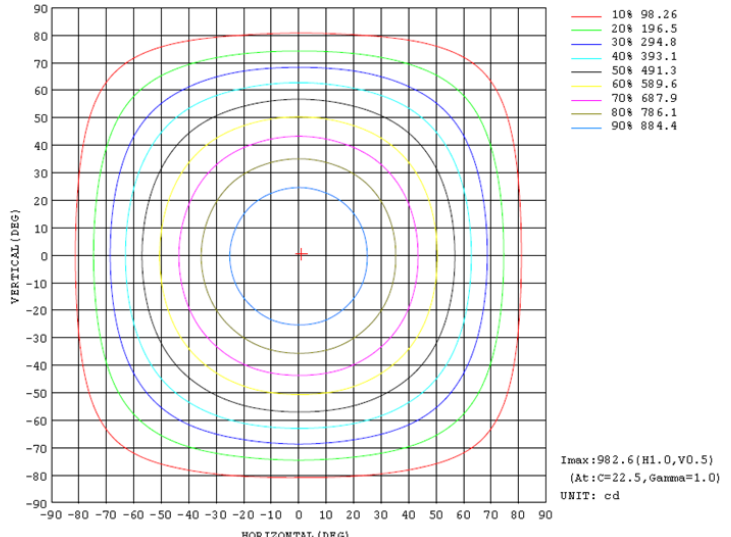
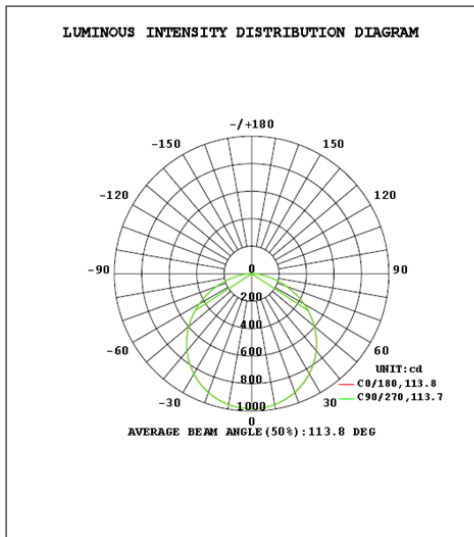


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	768.1	27.0%
0-40	1262.4	44.3%
0-60	2242.5	78.7%
60-90	605.9	21.3%
70-100	253.7	8.9%
90-120	0.0	0.0%
0-90	2848.4	100.0%
90-180	0.0	0.0%
0-180	2848.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	93.1	3.3%	90-100	0.0	0.0%
10-20	267.4	9.4%	100-110	0.0	0.0%
20-30	407.6	14.3%	110-120	0.0	0.0%
30-40	494.3	17.4%	120-130	0.0	0.0%
40-50	514.8	18.1%	130-140	0.0	0.0%
50-60	465.4	16.3%	140-150	0.0	0.0%
60-70	352.2	12.4%	150-160	0.0	0.0%
70-80	199.1	7.0%	160-170	0.0	0.0%
80-90	54.6	1.9%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-25	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0147(SUMO-R-24/D10)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120049	120.0	60	0.277	33.20	0.997

Chromaticity Measurement - Sphere-Spectroradiometer Method:

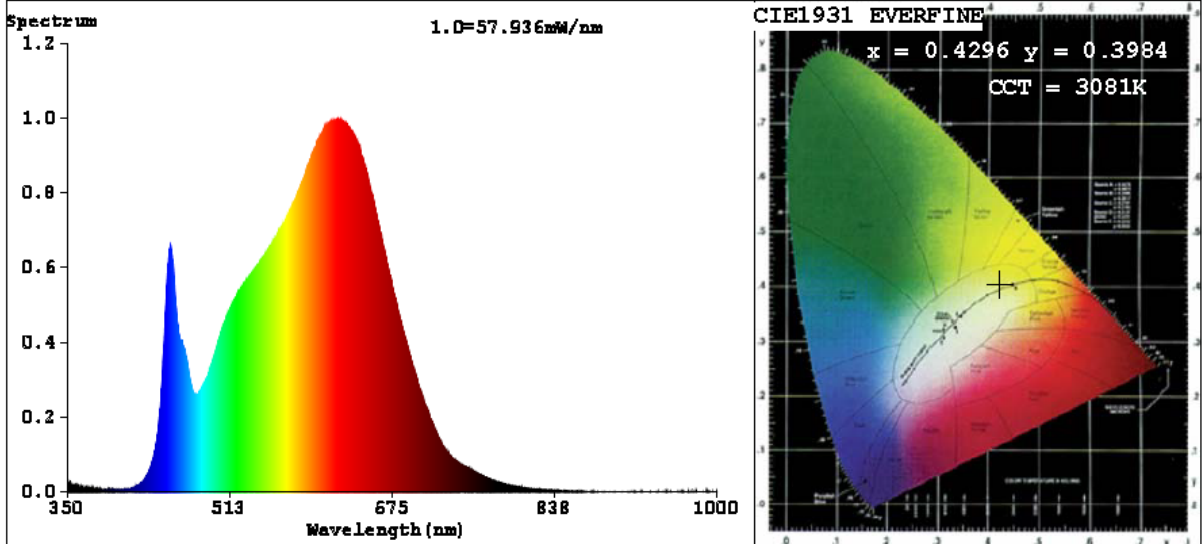
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	95	R9	64
Frequency (Hz)	60	R2	98	R10	95
CCT (K)	3081	R3	99	R11	95
Duv	-0.0012	R4	94	R12	80
Chromaticity (x, y)	x=0.4296 y=0.3984	R5	94	R13	96
Chromaticity (u', v')	u'=0.2482 v'=0.5180	R6	96	R14	99
Color Rendering Index (CRI)	94.0	R7	92	R15	91
R9	64	R8	84	--	--

Photometric Measurement – Goniophotometer Method:

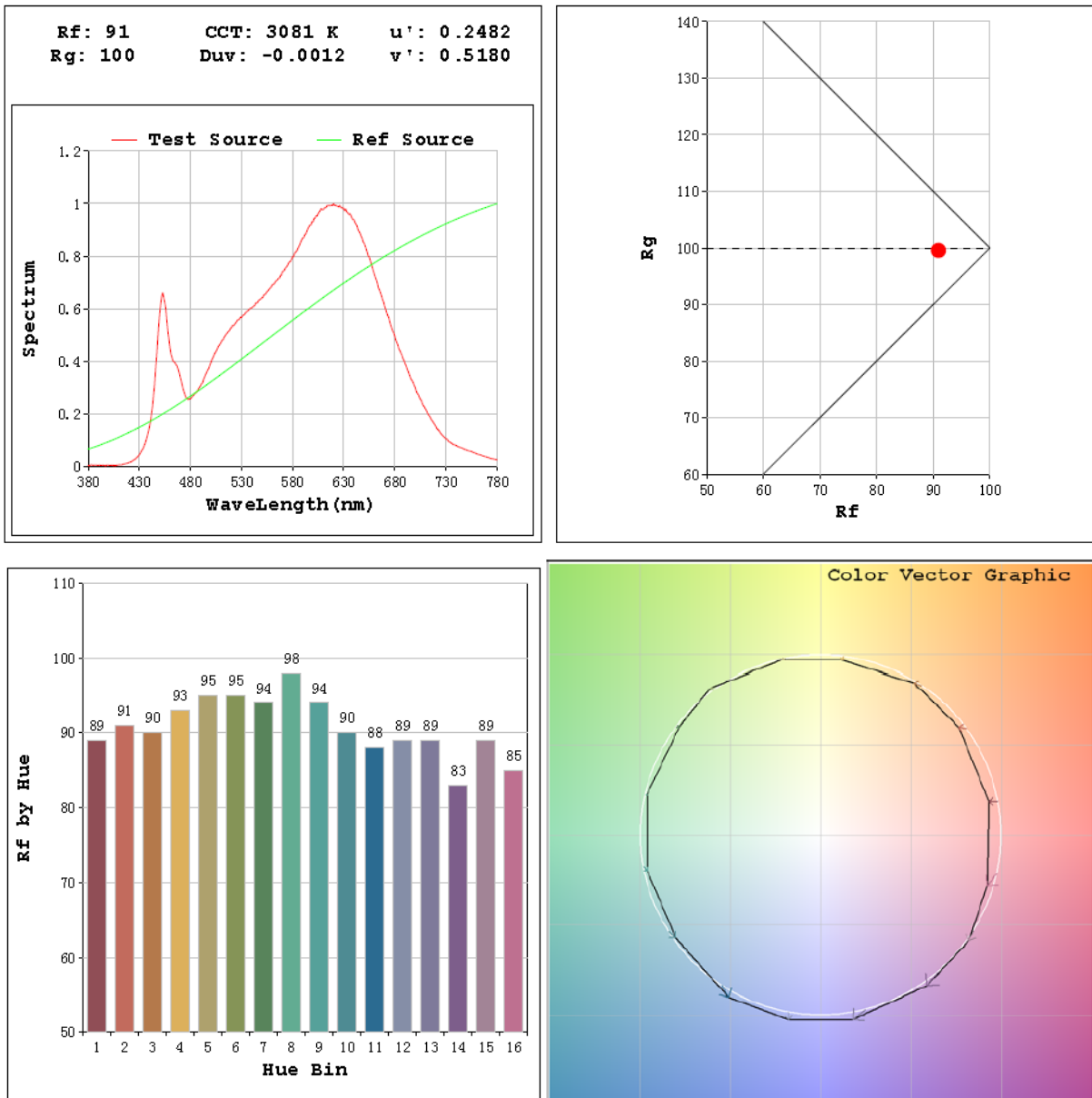
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	2937.7
Luminous Efficacy (lm/W)	88.48
Beam Angle (°)	113.8
Center Beam Candle Power (cd)	1014

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2889
Luminous Efficacy (lm/W)	86.8

Spectral Power Distribution & Chromaticity Diagram



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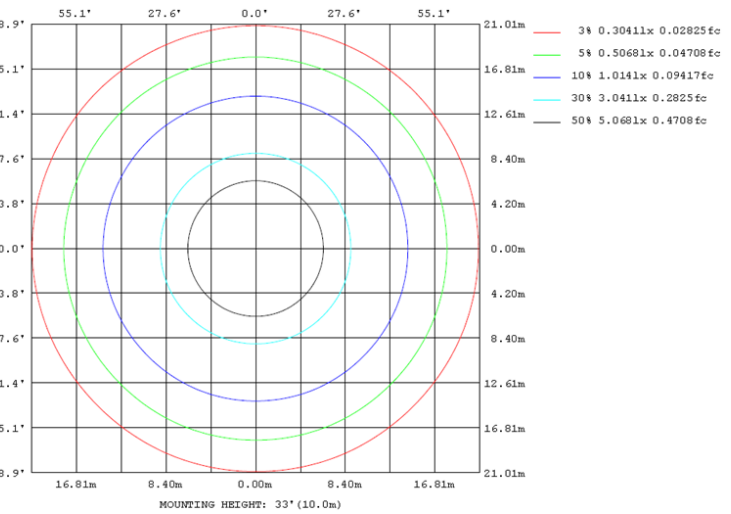
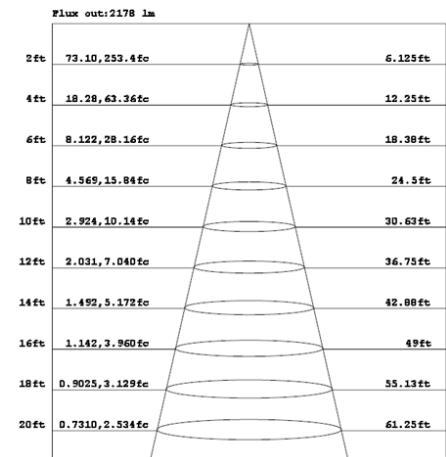
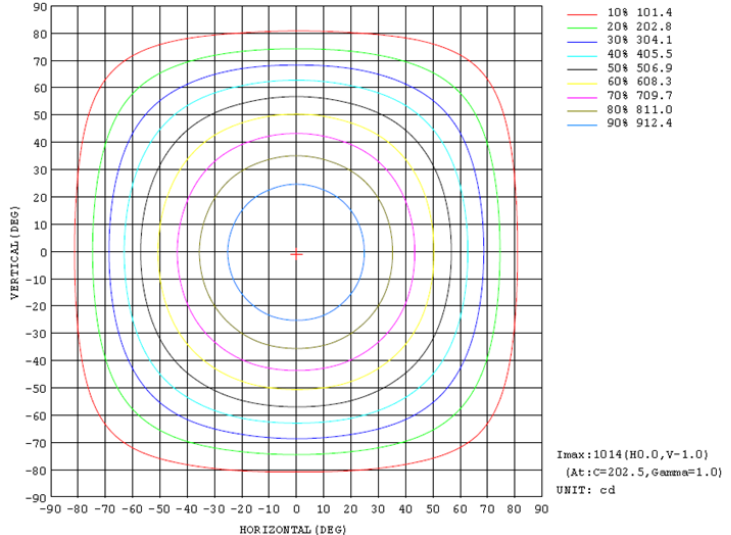
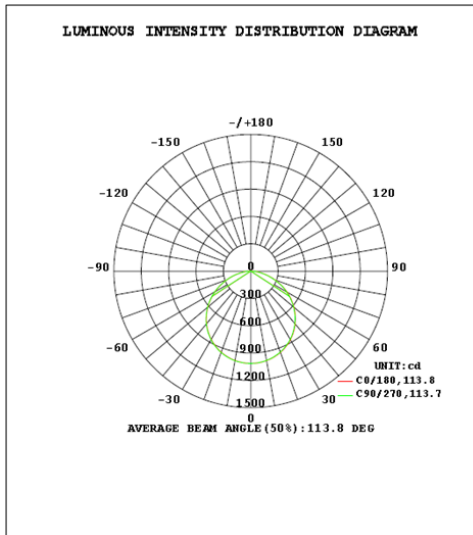


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	792.2	27.0%
0-40	1302.0	44.3%
0-60	2312.8	78.7%
60-90	624.9	21.3%
70-100	261.6	8.9%
90-120	0.0	0.0%
0-90	2937.7	100.0%
90-180	0.0	0.0%
0-180	2937.7	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	96.0	3.3%	90-100	0.0	0.0%
10-20	275.8	9.4%	100-110	0.0	0.0%
20-30	420.4	14.3%	110-120	0.0	0.0%
30-40	509.8	17.4%	120-130	0.0	0.0%
40-50	530.9	18.1%	130-140	0.0	0.0%
50-60	479.9	16.3%	140-150	0.0	0.0%
60-70	363.3	12.4%	150-160	0.0	0.0%
70-80	205.3	7.0%	160-170	0.0	0.0%
80-90	56.3	1.9%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013
5	1009	1010	1010	1010	1010	1010	1010	1010	1010	1009	1009	1009	1009	1009	1009	1009
10	997	998	998	999	999	999	998	998	998	997	997	996	996	996	997	997
15	976	978	978	979	978	979	978	978	978	977	976	975	975	975	976	976
20	948	950	950	952	950	951	950	950	950	948	947	946	946	946	947	947
25	911	914	914	916	914	915	913	913	914	911	910	908	909	908	910	911
30	866	869	869	872	870	871	869	869	870	866	866	864	864	863	866	866
35	813	817	817	819	817	819	816	817	817	814	813	811	812	810	813	813
40	753	758	757	760	758	759	756	757	758	754	754	751	752	751	753	754
45	687	691	690	693	691	693	689	691	691	687	687	684	685	684	687	687
50	614	618	617	621	618	619	616	618	619	614	614	611	613	611	614	614
55	535	539	538	542	539	541	537	539	541	536	536	533	535	533	536	536
60	452	456	455	459	456	457	454	456	458	453	454	450	452	450	454	453
65	367	370	369	372	369	371	368	371	373	368	368	364	367	364	369	368
70	280	278	281	279	280	278	281	279	281	281	276	277	274	277	277	282
75	195	194	195	193	194	194	196	196	197	196	192	191	190	192	194	197
80	116	117	113	115	113	116	115	118	120	115	114	110	112	112	116	117
85	49.1	50.2	47.9	49.0	47.5	49.5	48.8	50.8	52.4	48.9	48.0	45.1	46.9	46.8	50.0	50.2
90	1.40	1.41	1.42	1.51	1.49	1.27	1.29	1.30	1.39	1.29	1.22	1.26	1.22	1.25	1.28	1.58

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-25	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0147(SUMO-R-24/D10)		3500K

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120049	120.0	60	0.272	32.50	0.996

Chromaticity Measurement - Sphere-Spectroradiometer Method:

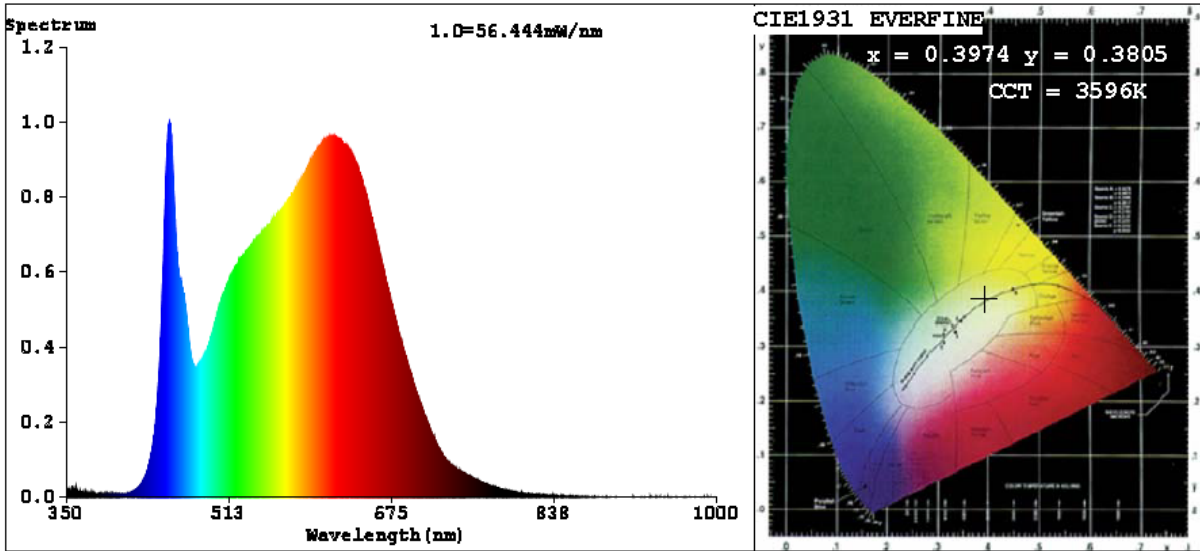
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	71
Frequency (Hz)	60	R2	99	R10	96
CCT (K)	3596	R3	98	R11	95
Duv	-0.0028	R4	94	R12	76
Chromaticity (x, y)	x=0.3974 y=0.3805	R5	95	R13	97
Chromaticity (u', v')	u'=0.2347 v'=0.5058	R6	95	R14	99
Color Rendering Index (CRI)	94.7	R7	93	R15	94
R9	71	R8	87	--	--

Photometric Measurement – Goniophotometer Method:

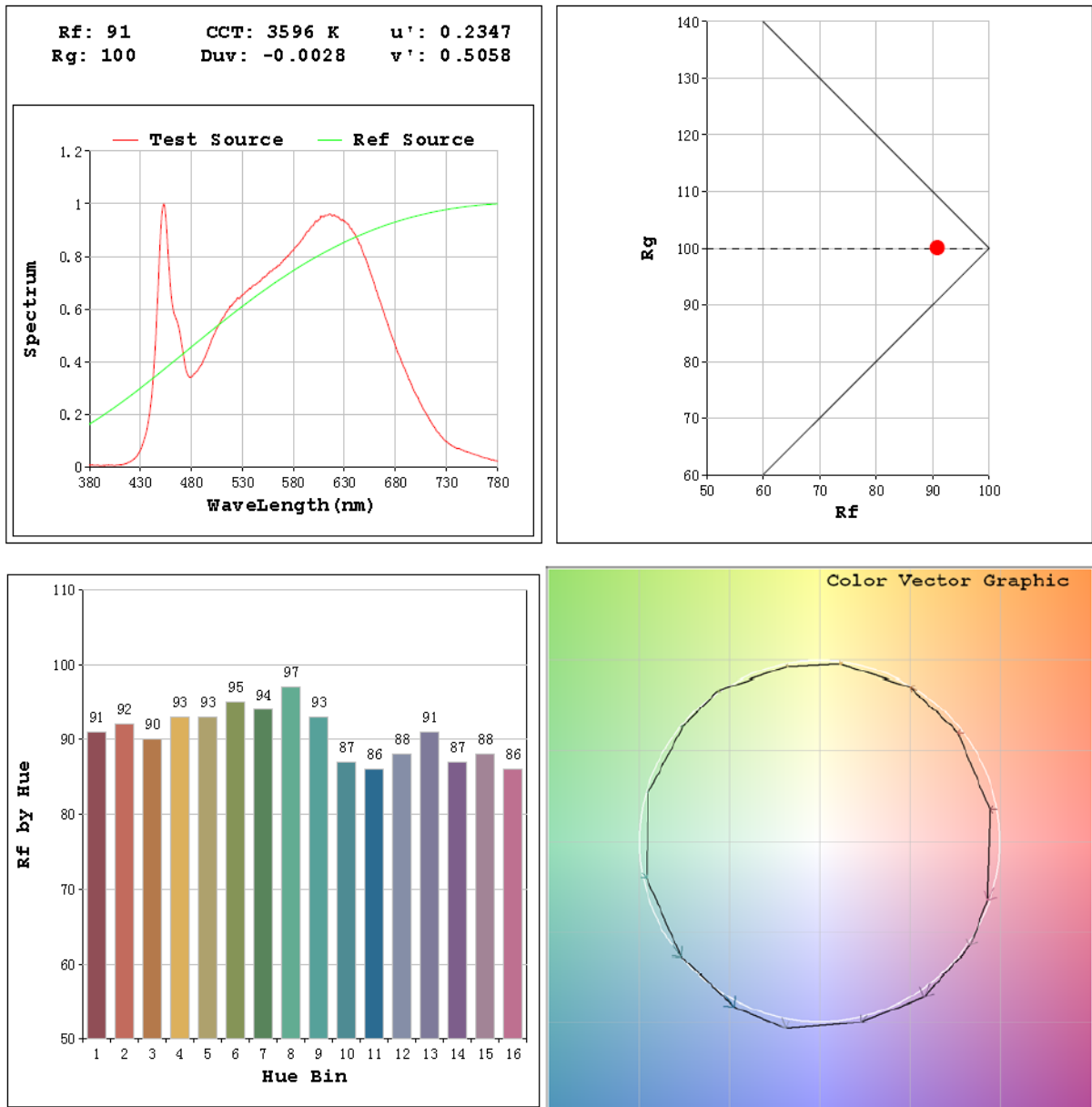
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	3054.3
Luminous Efficacy (lm/W)	93.98
Beam Angle (°)	113.7
Center Beam Candle Power (cd)	1054

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	3012
Luminous Efficacy (lm/W)	92.21

Spectral Power Distribution & Chromaticity Diagram



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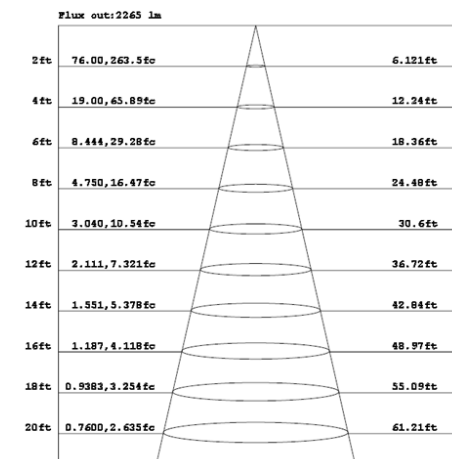
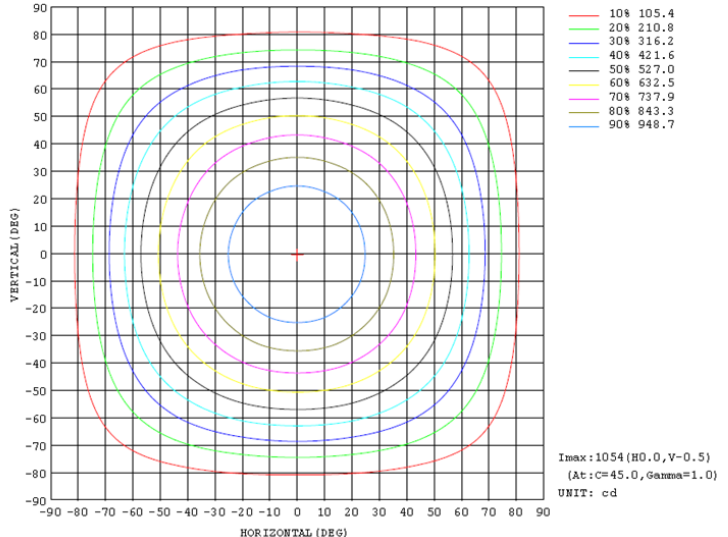
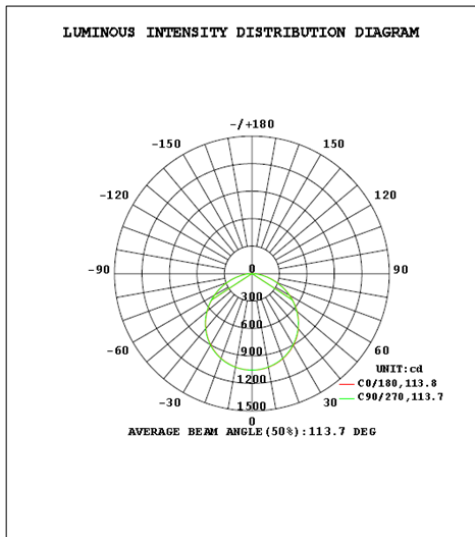


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	823.7	27.0%
0-40	1353.7	44.3%
0-60	2404.4	78.7%
60-90	649.9	21.3%
70-100	272.0	8.9%
90-120	0.0	0.0%
0-90	3054.3	100.0%
90-180	0.0	0.0%
0-180	3054.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	99.8	3.3%	90-100	0.0	0.0%
10-20	286.8	9.4%	100-110	0.0	0.0%
20-30	437.1	14.3%	110-120	0.0	0.0%
30-40	530.0	17.4%	120-130	0.0	0.0%
40-50	551.9	18.1%	130-140	0.0	0.0%
50-60	498.9	16.3%	140-150	0.0	0.0%
60-70	377.9	12.4%	150-160	0.0	0.0%
70-80	213.5	7.0%	160-170	0.0	0.0%
80-90	58.5	1.9%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

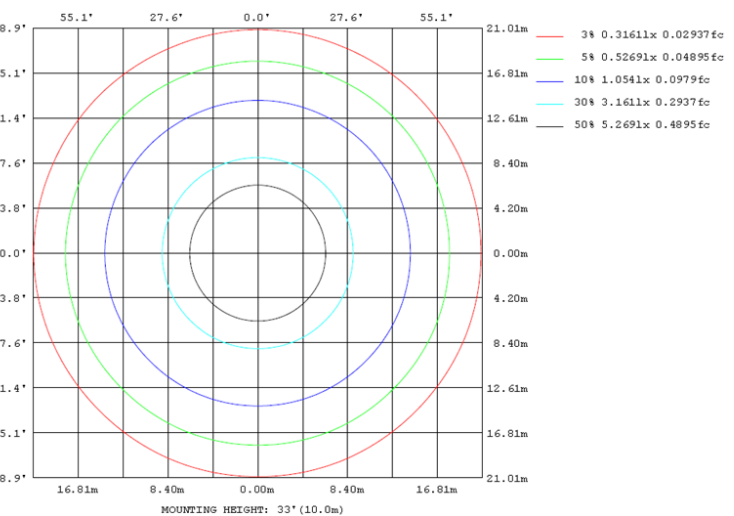


Table--1

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	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054			
5	1049	1050	1050	1050	1051	1051	1050	1050	1051	1049	1050	1049	1049	1049	1049	1049			
10	1037	1037	1038	1039	1038	1039	1038	1038	1038	1037	1037	1035	1035	1035	1036	1036			
15	1015	1017	1017	1018	1017	1019	1017	1018	1018	1015	1015	1014	1014	1014	1015	1015			
20	985	987	988	989	989	989	988	988	988	986	986	983	984	983	985	985			
25	947	949	950	951	951	952	950	950	951	947	947	945	945	944	946	947			
30	900	903	903	906	905	906	904	904	904	901	901	898	899	898	899	900			
35	846	849	849	851	850	851	849	850	851	847	847	843	844	842	845	845			
40	783	787	786	790	788	789	787	788	789	784	784	781	782	780	783	784			
45	714	717	717	720	719	720	717	718	719	714	714	711	712	711	714	714			
50	638	642	641	645	642	644	641	642	643	639	639	635	637	635	638	638			
55	556	560	559	563	561	562	559	561	562	557	558	554	556	554	557	557			
60	470	474	473	476	474	475	472	475	476	471	472	468	471	468	472	471			
65	381	384	383	386	384	385	383	386	387	382	383	379	381	379	383	382			
70	291	289	292	290	291	289	292	290	292	292	287	288	285	288	288	292			
75	203	202	202	201	201	201	204	203	205	204	199	198	197	200	201	205			
80	120	122	118	119	117	120	120	123	125	120	119	115	117	116	121	121			
85	51.0	52.1	49.8	50.8	49.5	51.5	50.6	52.9	54.6	50.8	49.9	46.9	48.7	48.6	51.9	52.1			
90	1.44	1.50	1.51	1.57	1.56	1.32	1.34	1.35	1.46	1.36	1.28	1.32	1.28	1.32	1.32	1.64			

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-25	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0147(SUMO-R-24/D10)		4000K

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120049	120.0	60	0.274	32.80	0.997

Chromaticity Measurement - Sphere-Spectroradiometer Method:

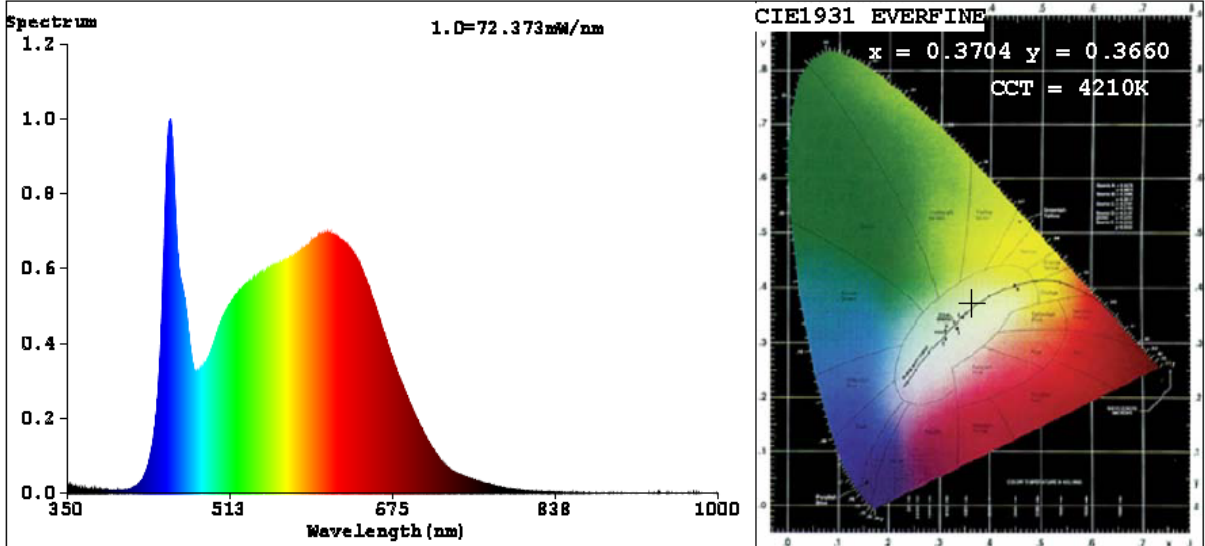
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	96	R9	73
Frequency (Hz)	60	R2	98	R10	94
CCT (K)	4210	R3	98	R11	94
Duv	-0.0021	R4	94	R12	71
Chromaticity (x, y)	x=0.3704 y=0.3660	R5	94	R13	97
Chromaticity (u', v')	u'=0.2228 v'=0.4952	R6	94	R14	99
Color Rendering Index (CRI)	94.4	R7	94	R15	94
R9	73	R8	88	--	--

Photometric Measurement – Goniophotometer Method:

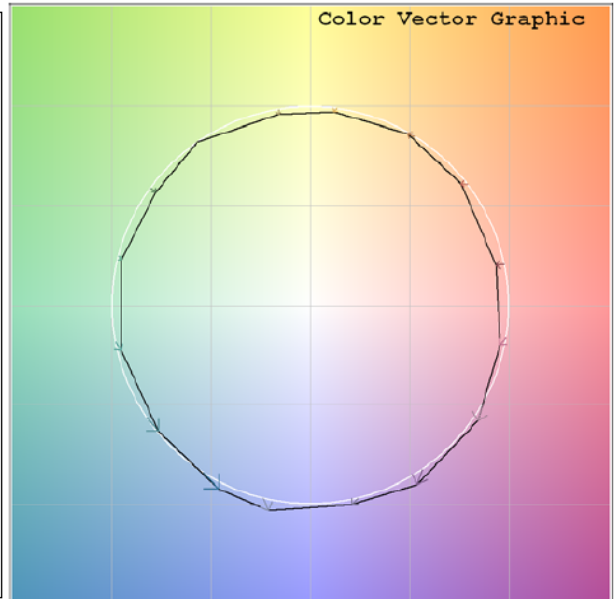
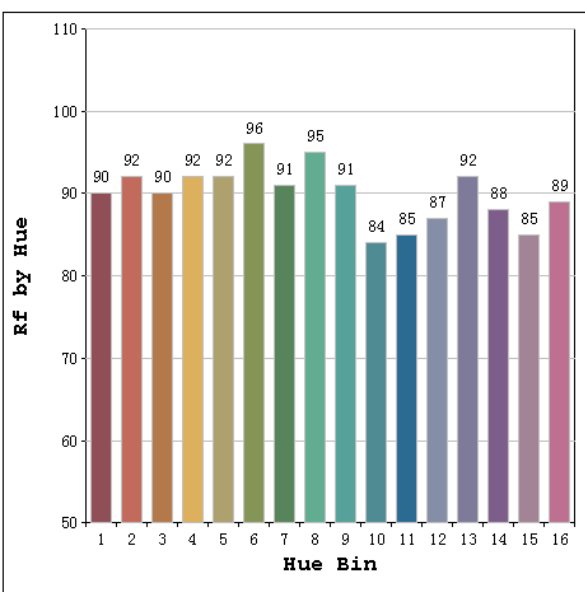
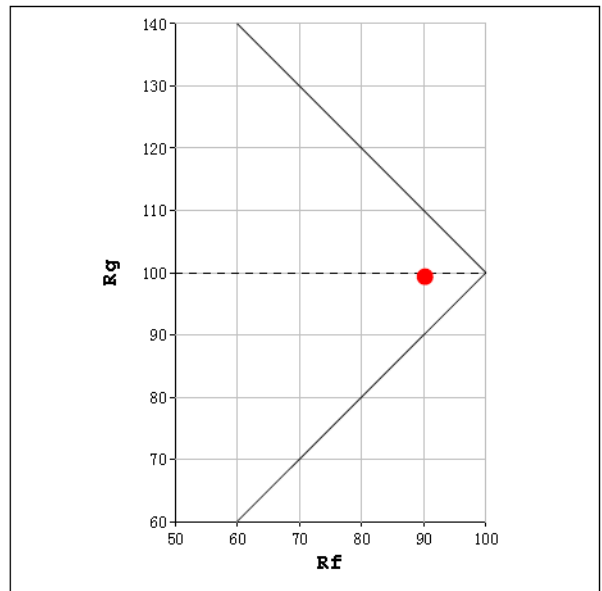
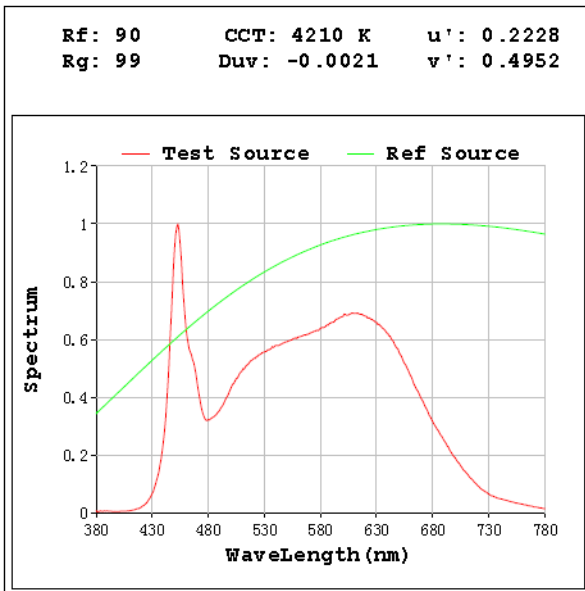
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	3115.3
Luminous Efficacy (lm/W)	94.98
Beam Angle (°)	113.7
Center Beam Candle Power (cd)	1075

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	3075
Luminous Efficacy (lm/W)	93.34

Spectral Power Distribution & Chromaticity Diagram



TM30

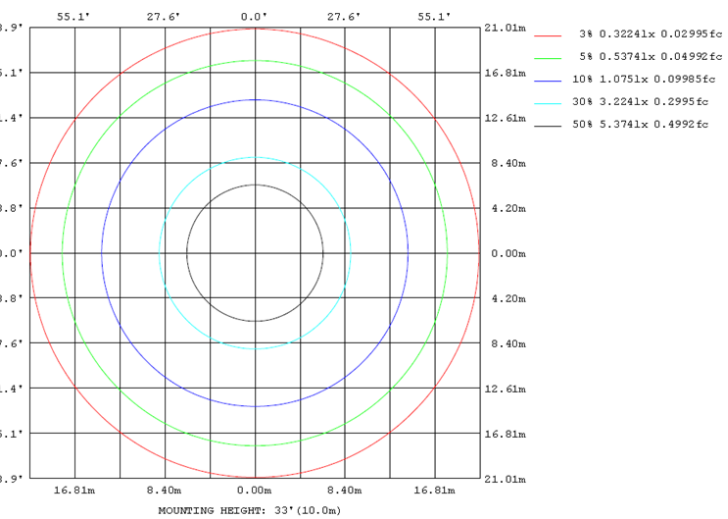
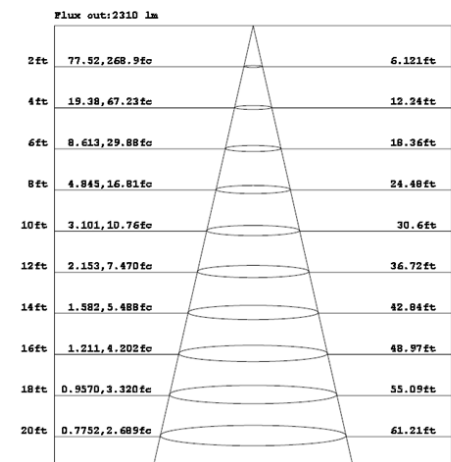
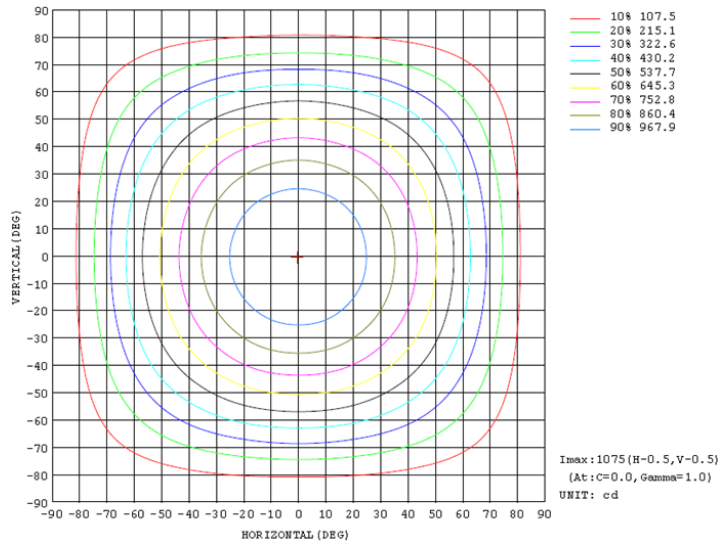
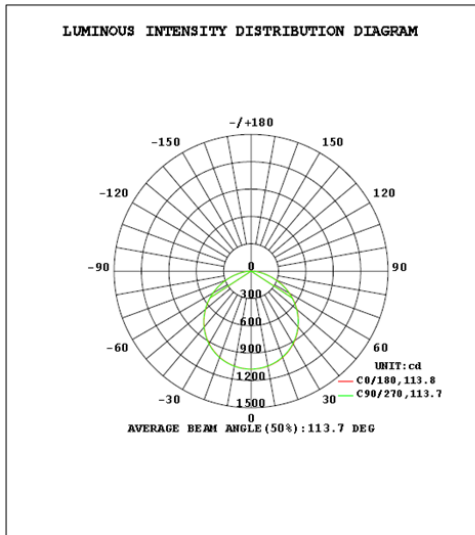


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	840.2	27.0%
0-40	1380.8	44.3%
0-60	2452.4	78.7%
60-90	663.0	21.3%
70-100	277.5	8.9%
90-120	0.0	0.0%
0-90	3115.3	100.0%
90-180	0.0	0.0%
0-180	3115.3	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	101.8	3.3%	90-100	0.0	0.0%
10-20	292.6	9.4%	100-110	0.0	0.0%
20-30	445.8	14.3%	110-120	0.0	0.0%
30-40	540.6	17.4%	120-130	0.0	0.0%
40-50	562.8	18.1%	130-140	0.0	0.0%
50-60	508.8	16.3%	140-150	0.0	0.0%
60-70	385.5	12.4%	150-160	0.0	0.0%
70-80	217.8	7.0%	160-170	0.0	0.0%
80-90	59.7	1.9%	170-180	0.0	0.0%

Photometric Data



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2022-07-25	Test Ambient:	25.3 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLS0147(SUMO-R-24/D10)		5000K

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202207120049	120.0	60	0.276	33.00	0.997

Chromaticity Measurement - Sphere-Spectroradiometer Method:

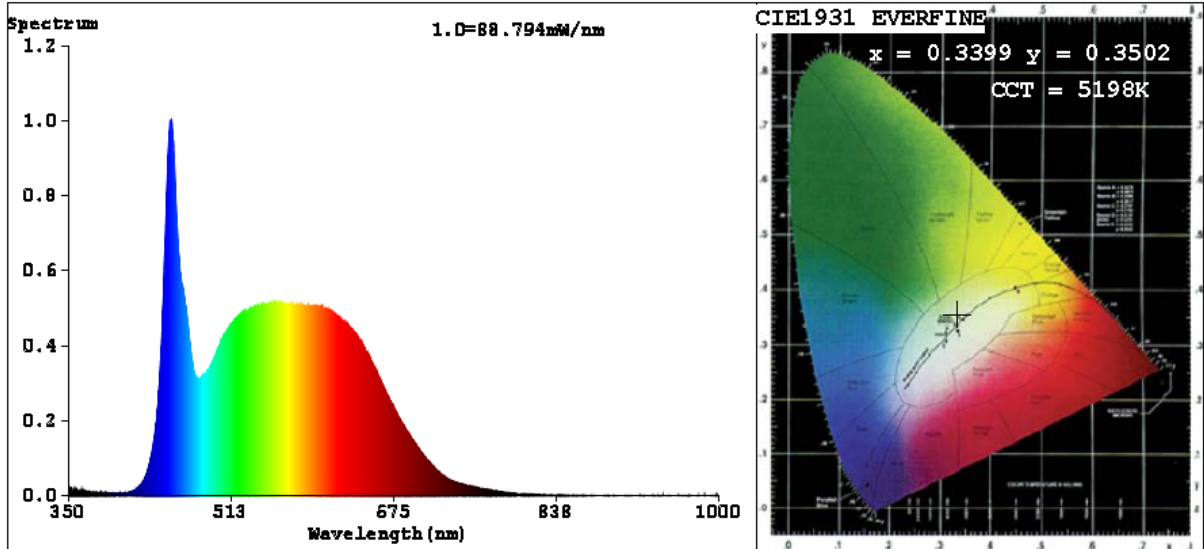
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	93	R9	62
Frequency (Hz)	60	R2	96	R10	89
CCT (K)	5198	R3	96	R11	92
Duv	0.0014	R4	92	R12	70
Chromaticity (x, y)	x=0.3399 y=0.3502	R5	92	R13	94
Chromaticity (u', v')	u'=0.2085 v'=0.4832	R6	92	R14	98
Color Rendering Index (CRI)	92.5	R7	93	R15	91
R9	62	R8	86	--	--

Photometric Measurement – Goniophotometer Method:

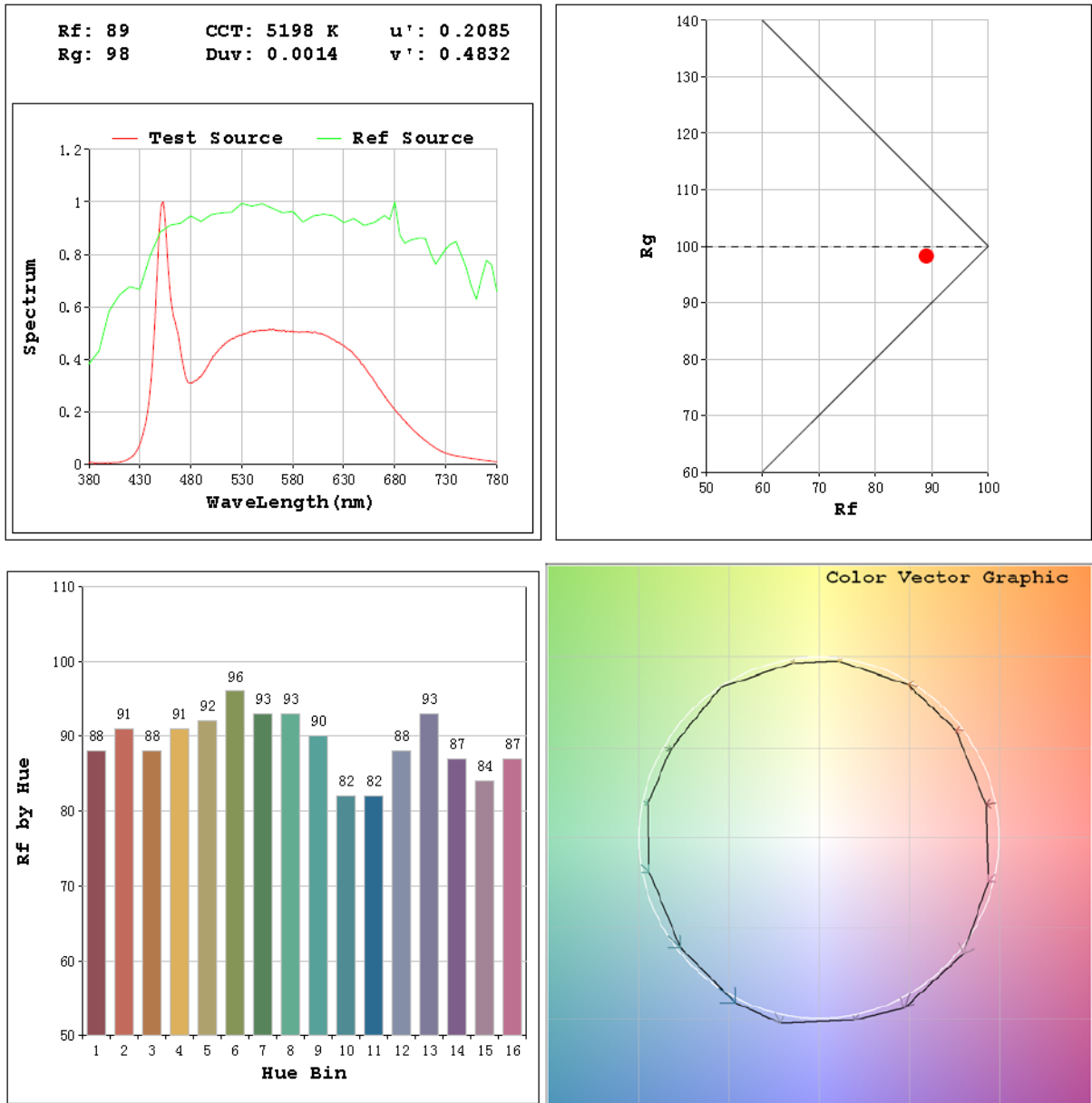
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	3129.6
Luminous Efficacy (lm/W)	94.83
Beam Angle (°)	113.7
Center Beam Candle Power (cd)	1081

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	3091
Luminous Efficacy (lm/W)	94.59

Spectral Power Distribution & Chromaticity Diagram



TM30



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	844.2	27.0%
0-40	1387.2	44.3%
0-60	2463.6	78.7%
60-90	666.0	21.3%
70-100	278.8	8.9%
90-120	0.0	0.0%
0-90	3129.6	100.0%
90-180	0.0	0.0%
0-180	3129.6	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	102.3	3.3%	90-100	0.0	0.0%
10-20	294.0	9.4%	100-110	0.0	0.0%
20-30	447.9	14.3%	110-120	0.0	0.0%
30-40	543.0	17.4%	120-130	0.0	0.0%
40-50	565.3	18.1%	130-140	0.0	0.0%
50-60	511.1	16.3%	140-150	0.0	0.0%
60-70	387.3	12.4%	150-160	0.0	0.0%
70-80	218.8	7.0%	160-170	0.0	0.0%
80-90	60.0	1.9%	170-180	0.0	0.0%

Photometric Data

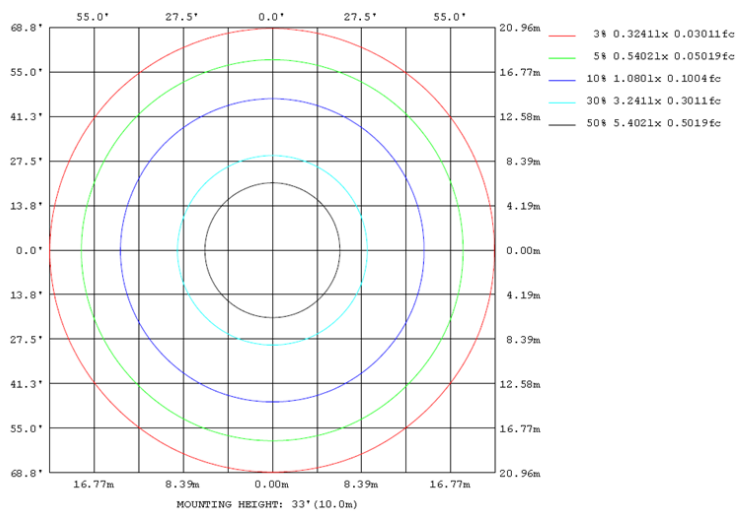
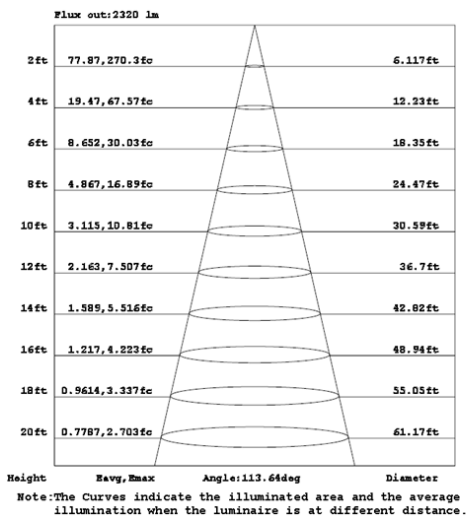
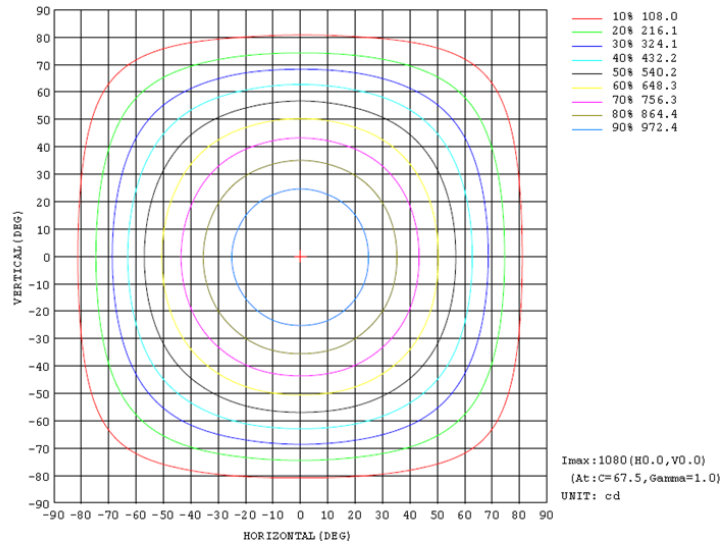
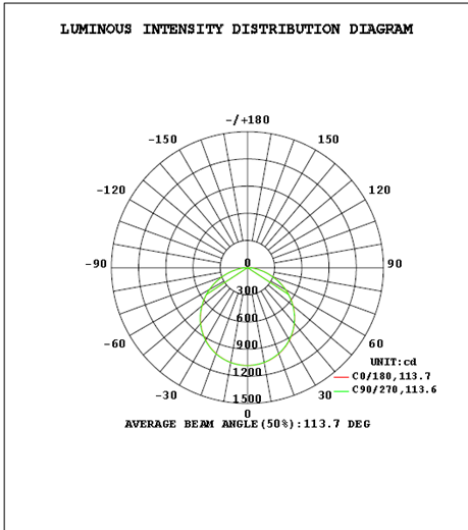


Table--1 UNIT: cd

C (DEG) γ (DEG)	UNIT: cd																			
	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	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080				
5	1076	1077	1076	1077	1077	1077	1076	1076	1076	1076	1076	1075	1076	1075	1076	1075				
10	1062	1064	1064	1065	1064	1065	1064	1063	1063	1062	1062	1062	1062	1062	1063	1062				
15	1041	1043	1043	1044	1043	1044	1042	1042	1042	1040	1040	1039	1039	1039	1041	1040				
20	1010	1013	1013	1014	1013	1014	1012	1011	1012	1009	1009	1008	1008	1008	1010	1010				
25	971	974	974	976	974	975	973	972	973	970	970	968	969	968	971	971				
30	923	927	927	929	927	928	925	925	925	922	922	920	921	920	923	923				
35	867	871	870	873	871	872	869	869	870	866	866	864	864	864	867	867				
40	803	807	807	810	807	808	805	806	806	802	802	799	801	800	803	803				
45	732	736	735	739	736	737	734	735	735	731	731	728	730	729	732	732				
50	654	658	657	661	658	659	656	657	658	653	654	651	653	651	655	654				
55	570	575	574	577	574	576	572	573	575	570	571	567	570	568	572	571				
60	482	486	485	489	485	487	484	485	488	482	483	480	482	480	484	483				
65	391	394	393	396	393	395	392	394	396	391	392	388	390	388	393	392				
70	298	297	299	297	298	296	299	297	299	299	294	295	292	295	295	300				
75	209	207	207	206	207	206	208	208	210	208	204	203	202	205	206	210				
80	123	125	121	122	120	123	123	126	128	123	121	117	119	119	124	125				
85	52.3	53.5	51.0	52.1	50.6	52.7	51.8	54.0	55.7	52.0	51.1	48.0	49.9	49.9	53.4	53.7				
90	1.50	1.56	1.55	1.60	1.58	1.37	1.37	1.38	1.51	1.40	1.32	1.36	1.32	1.34	1.35	1.68				

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLS0147(SUMO-R-24/D10)	2700K setting	120.0	2848.4	33.00	86.32
		277.0	2797	33.15	84.36
	3000K setting	120.0	2937.7	33.20	88.48
		277.0	2889	33.28	86.80
	3500K setting	120.0	3054.3	32.50	93.98
		277.0	3012	32.66	92.21
	4000K setting	120.0	3115.3	32.80	94.98
		277.0	3075	32.95	93.34
	5000K setting	120.0	3129.6	33.00	94.83
		277.0	3091	32.68	94.59

3. Product Photo



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