



IESNA LM79-2008 Test Report

TÜV SÜD America

Photometric Testing and Evaluation in Accordance with LM79-2008

Report Prepared for:

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Sample Tested: LS 30 75WE WW NFL 120 G1 BX
Manufacturer: Lighting Science Group Corporation

Technical Report Number: JI1400199-08-LM79
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Summary of Key Test Results

Model# **LS 30 75WE WW NFL 120 G1 BX**
 Manufacturer **LSGC**
 TÜV Sample# **1183-8**
 Date of Test **January 13th 2014**



Notes:

Tested in LBU orientation (Lamp-Base-Up)

Parameter	Measured Result
Luminous Flux	923.1 Lumens
Input Power	14.09 Watts
Efficacy	65.52 Lumens/Watt
C.C.T.	2916 K
C.R.I. (R _a)	83.6
Stabilization Time	60 minutes

The above results are recorded / derived from measurements in accordance with LM79-08



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Test Results –

The following results were obtained after stabilization of the sample in accordance with the requirements set forth in section 5.0 of IES LM79-2008. Stability is achieved when the variation of 3 readings of light output and electrical power over a period of 30 minutes, taken 15 minutes apart, is less than 0.5%.

Photometric Results	LS 30 75WE WW NFL 120 G1 BX	
	Integrating Sphere	Goniophotometer
Total Luminous Flux (Lumens)	923.1	926.1
Luminous Efficacy (Lumens/Watt)	65.52	65.87
Total Radiant Flux (Watts)	2.8	-
Correlated Color Temperature (CCT)	2916	-
Color Rendering Index (CRI – R _a)	83.6	-
R ₉ Value	6.4	-
Chromaticity (Chroma x / Chroma y)	0.4444 / 0.4091	-
Chromaticity (Chroma u / Chroma v)	0.2532 / 0.3496	-
Chromaticity (Chroma u' / Chroma v')	0.2532 / 0.5245	-
D _{uv} Value	0.00104	-

Electrical Results	LS 30 75WE WW NFL 120 G1 BX	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	14.09	14.06
Input Voltage (Volts AC)	120.02	120.04
Input Current (Amps)	0.123	0.120
Power Factor	0.954	0.954
Input Frequency (Hertz)	60.0	60.0
A-THD (Current %)	29.66 %	29.51 %

Additional Parameters	LS 30 75WE WW NFL 120 G1 BX	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	60 minutes	54 minutes
Test Geometry Configuration	4π	Type C
Spectroradiometer	Labsphere CDS1100	Gigahertz Optik P9801
Ambient Temperature	24.7 °C	24.4 °C
ISTMT (In-Situ Temperature Measurement)	Not tested	
Spacing Criteria	N/A	



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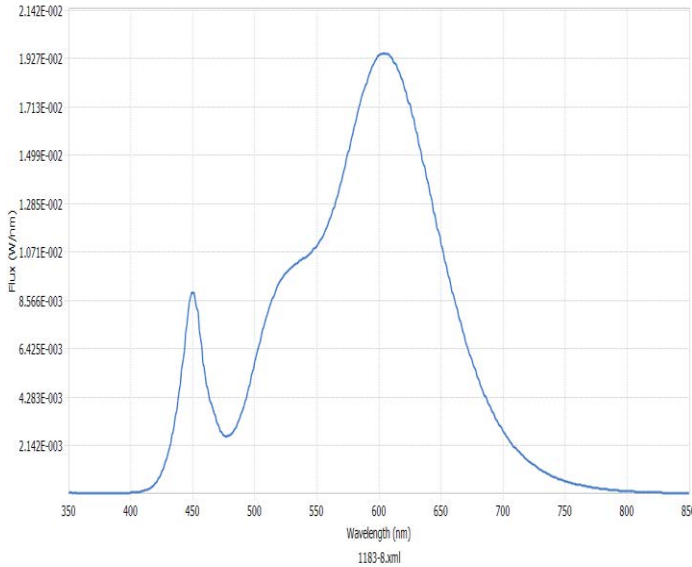
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Spectral Flux and Chromaticity Diagram

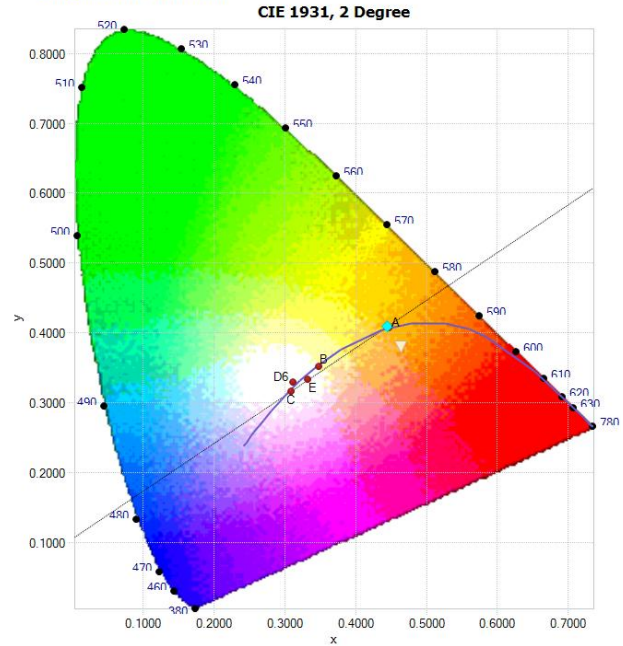
Spectral Flux

Chromaticity Diagram

▼ SPECTRAL FLUX GRAPH:



▼ CHROMATICITY DIAGRAM:



**Spectral response of the Radiant Flux
(350nm to 850nm)**

Tristimulus values (from page 5):

$$x / y = 0.4444 / 0.4091$$

The locations on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Parameter	Stable Data
Peak Wavelength (nm)	603.7
Dominant Wavelength (nm)	582.8

Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0 - 60	875.3	94.5 %
60 - 90	50.9	5.5 %
0 - 90	926.1	100 %
90 - 180	0.0	0.0 %
0 - 180	926.1	100 %

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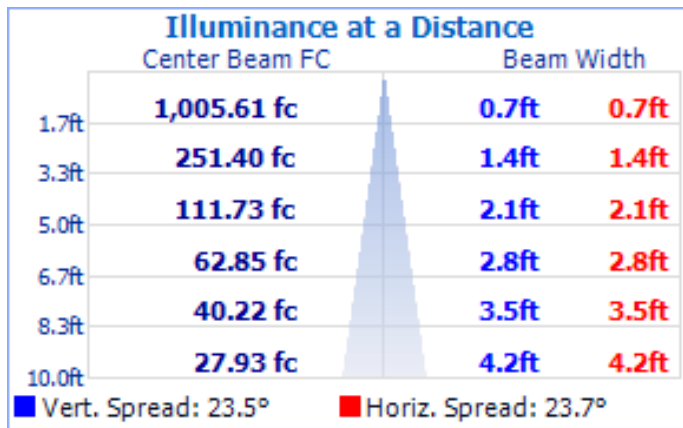


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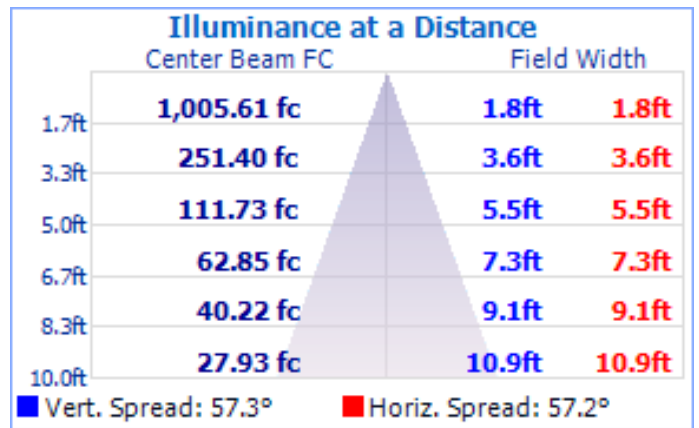
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Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.



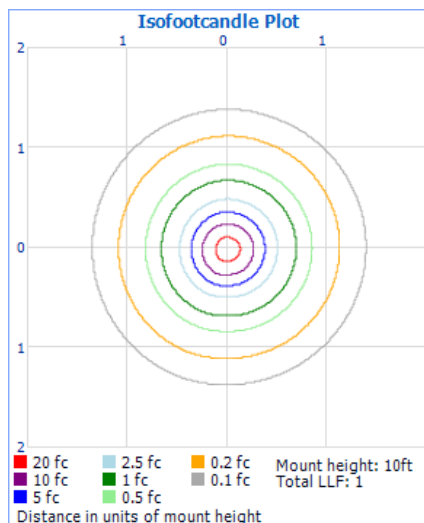
Beam Angle = 23.5°



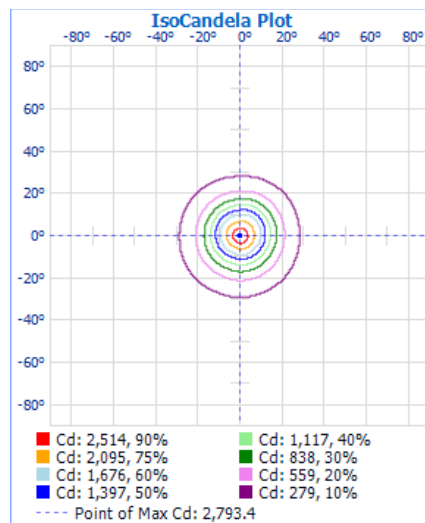
Field Angle = 57.3°

Test Results – Candela Plots

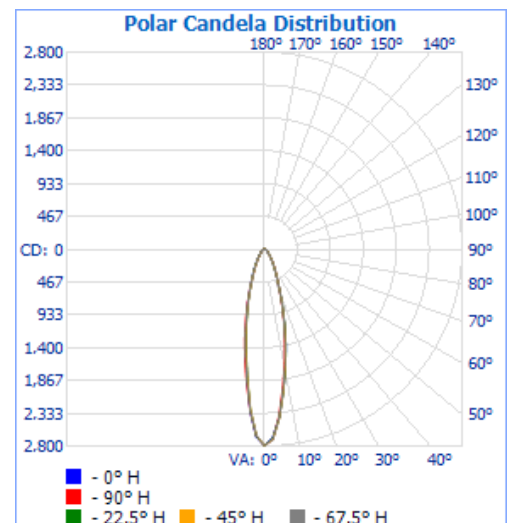
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela



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Test Results – Candela Tabulation

The table below displays the tabulated Candela measurements from the IES file:

Horizontal (lateral) angles are shown in **red** across the top of the table, in increments of 22.5°.

Vertical (longitudinal) angles are shown in **blue** down the side of the table, in increments of 2.5°.

	0.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0	202.5	225.0	247.5	270.0	292.5	315.0	337.5	360.0
0.0	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793
2.5	2678	2689	2705	2711	2703	2685	2650	2622	2671	2656	2650	2646	2659	2674	2691	2706	2678
5.0	2402	2401	2411	2402	2374	2338	2286	2230	2318	2294	2287	2297	2318	2354	2394	2442	2402
7.5	2040	2044	2042	2017	1982	1921	1860	1805	1873	1856	1861	1891	1931	1988	2046	2093	2040
10.0	1712	1712	1697	1677	1637	1578	1515	1463	1513	1490	1507	1545	1605	1669	1730	1778	1712
12.5	1393	1400	1382	1360	1328	1285	1232	1187	1220	1203	1216	1250	1305	1367	1425	1465	1393
15.0	1089	1093	1085	1071	1052	1013	980	944	974	955	958	978	1017	1079	1127	1167	1089
17.5	842	845	842	835	822	800	776	752	774	759	754	768	794	826	865	890	842
20.0	638	644	644	639	632	620	604	587	606	592	587	591	607	628	656	674	638
22.5	480	490	495	495	491	485	475	464	478	468	459	459	466	484	500	514	480
25.0	381	386	389	391	394	393	386	376	385	374	365	363	365	375	387	398	381
27.5	301	308	314	316	320	318	313	305	311	301	294	290	292	299	309	315	301
30.0	244	250	254	257	259	258	254	247	253	244	237	233	234	240	248	254	244
32.5	198	203	207	209	210	209	206	201	204	198	191	189	189	193	200	205	198
35.0	162	165	168	170	171	171	169	164	168	162	157	154	155	158	164	168	162
37.5	131	133	136	138	138	138	138	134	137	132	128	125	126	128	133	137	131
40.0	108	110	111	113	114	114	114	112	113	110	107	104	104	106	110	112	108
42.5	90	92	93	95	96	96	96	95	96	93	90	88	88	89	92	94	90
45.0	77	78	79	81	82	82	82	81	82	80	78	76	76	76	78	80	77
47.5	67	67	68	70	71	72	72	71	71	70	68	66	66	66	68	69	67
50.0	58	59	60	61	62	62	63	62	63	61	60	58	58	58	59	60	58
52.5	51	52	52	53	54	55	55	54	55	54	52	51	51	51	52	53	51
55.0	46	46	46	47	48	48	48	48	49	48	47	46	45	45	46	47	46
57.5	41	41	42	42	43	44	44	43	43	43	42	41	40	41	41	42	41
60.0	37	37	37	38	39	39	39	38	39	38	37	37	36	37	37	38	37
62.5	33	33	33	34	34	34	34	33	34	34	33	33	32	33	33	34	33
65.0	29	29	30	30	30	30	29	29	30	30	29	29	29	29	29	30	29
67.5	26	26	26	27	26	26	26	25	26	26	26	26	25	26	26	26	26
70.0	22	22	23	23	23	23	22	22	23	23	23	22	22	22	23	23	22
72.5	19	19	20	20	20	19	19	19	20	19	19	19	19	19	19	20	19
75.0	16	16	16	16	16	16	16	15	16	16	16	16	16	16	16	17	16
77.5	13	13	13	13	13	13	12	12	13	13	13	12	12	13	13	13	13
80.0	9	10	10	10	10	9	9	9	10	9	9	9	9	10	10	10	9
82.5	6	7	7	7	7	6	6	6	7	7	6	6	6	7	7	7	6
85.0	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4
87.5	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2
90.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Maximum Candela = **2793.4** at Horizontal 0.0°, Vertical: 0.0°



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TÜV SÜD Photometric Testing Information

Testing is performed in accordance with the procedures outlined in IESNA LM79-2008. The sample is evaluated for photometric and electrical characteristics using an integrating sphere and a goniophotometer, located in an accredited, temperature and humidity-controlled, draft free photometric laboratory.

Sphere Geometry

The integrating spheres used for measurement utilize a “ 4π geometry” configuration in accordance with section 9 of IES LM-79-2008 and is applicable for all types of SSL products (directional and non-directional light projections). The spectroradiometer is an array-type detector manufactured and calibrated by Labsphere (Model# CDS1100).

Self-Absorption Correction

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. This auxiliary correction lamp is a halogen type lamp powered by a calibrated Lamp Power Supply manufactured and calibrated by Labsphere (model LPS150). Ambient temperature is measured using a thermocouple located inside the integrating sphere at the same height as the sample under test (UUT) and not more than 1 meter in horizontal distance away from the sample (section 2.2 of LM79-2008). The thermocouple is located behind a baffle in order to eliminate any direct optical radiation from the sample under test.

Sample Stabilization

The sample (UUT) is placed inside the integrating sphere and powered by a regulated and conditioned alternating or direct current supply. The stabilization times shown on the results pages of this report denote the time of the 3rd measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization in accordance with section 5.0 of LM79-2008.

Sphere Calibration

The integrating sphere is calibrated using a quartzline halogen lamp with the following specifications:

Manufacturer: EYE Lighting International

Model# J94/JD28V75W

Voltage = 28.0 Volts DC

Wattage = 75.0 Watts

Calibration Current = 2.679 Amperes

Luminous Flux = 1685 Lumens

Calibration Date = 2-17-2011 (calibrated by Labsphere – NIST traceable).

Continued.....

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TÜV SÜD Photometric Testing Information (continued)

Goniophotometer

The Goniophotometer is a Type C optical measurement system in accordance with section 9.3.1 of IESNA LM79-2008.

Goniophotometer Calibration

The Goniophotometer is calibrated using a frosted tungsten filament FDS/DZE lamp with the following specifications:

- Manufacturer: General Electric
- Part Number: CSB-110
- Lamp Number: 105-A
- Voltage: 16.71 Volts DC
- Wattage: 150.0 Watts
- Calibration Current: 4.847 Amperes
- Luminous Intensity: 166.3 Candelas
- Calibration Date: 11-07-2011 (NIST traceable)

TÜV SÜD Test Equipment List:

TÜV SÜD Sphere System – contains the following:			
Description	Manufacturer / Model#	TÜV SÜD Ref#	Calibration Due Date
Integrating Sphere	Labsphere LM760	SPH003	weekly
Spectroradiometer	Labsphere CDS1100	ATLE0048	9/7/2016
Power Analyzer	Yokogawa WT210	ATLE0058	3/7/2014
Power Source	Chroma 61602	AC003	N/A
Thermometer	Fluke 52-II	ATLE0008	11/17/2014
TÜV SÜD Goniophotometer System – contains the following:			
Goniophotometer	M.E. GONC01	GON001	weekly
Spectroradiometer	Gigahertz Optik P9801	GIG001	weekly
Power Analyzer	Yokogawa WT210	ATLE0031	11/16/2014
Power Source	Chroma 61602	AC006	N/A

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