

# Report of Test

## LLI-14224-2A

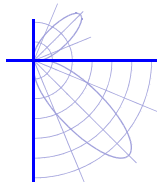
Lighting Services Inc. LED Adjustable Track Luminaire. Cat No. LX2030-T1912-8330S4.  
 Black cylindrical aluminum housing with aluminum accessory holder(extent: 5" x 2.7" dia).  
 "XTM19803020CCA 00" LED module screwed to support arm assembly. Plane of LED ~3" above opening.  
 Specular "parabolic" faceted "S4" reflector (1.1" x 1.8" dia).  
 One "LTF DA12W400C1530LP-000" dimmable LED driver mounted in track assembly.  
 L/O (accessory holder): 2.2" dia. Pivoting track stem adjusted to direct beam to nadir. Tested at 120 V, 60 Hz.



### Performance Summary

Total Light Output	671 lm	Power Factor	0.90
Luminaire Power	13.8 W	THD(i)*	14.2 %
Luminous Efficacy	48.6 lm/W		
CCT	2960 K	Beam at 10% I <sub>max</sub>	47.4°V x 47.4°H
CIE(x,y) 1931	(0.441, 0.406)	Beam at 50% I <sub>max</sub>	35.2°V x 35.2°H
CRI	84	Beam at 90% I <sub>max</sub>	21.1°V x 21.1°H

**PREPARED FOR : Lighting Services Inc., Stony Point, NY 10980.**



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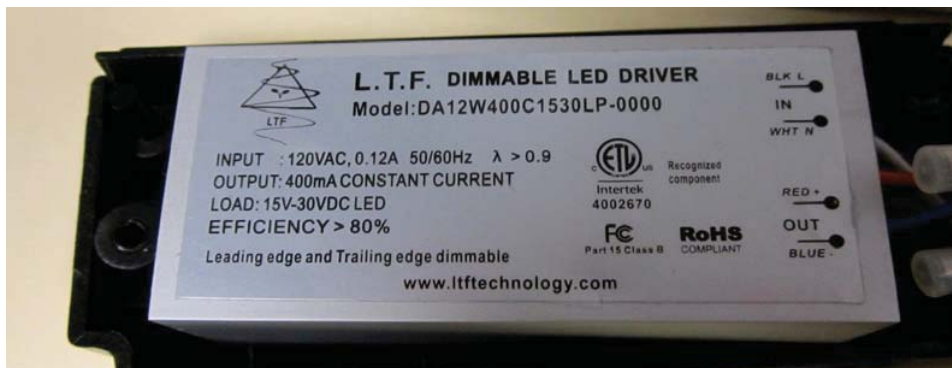
Black cylindrical aluminum housing with aluminum accessory holder(extent: 5" x 2.7" dia).

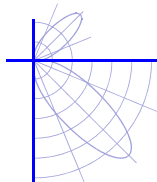
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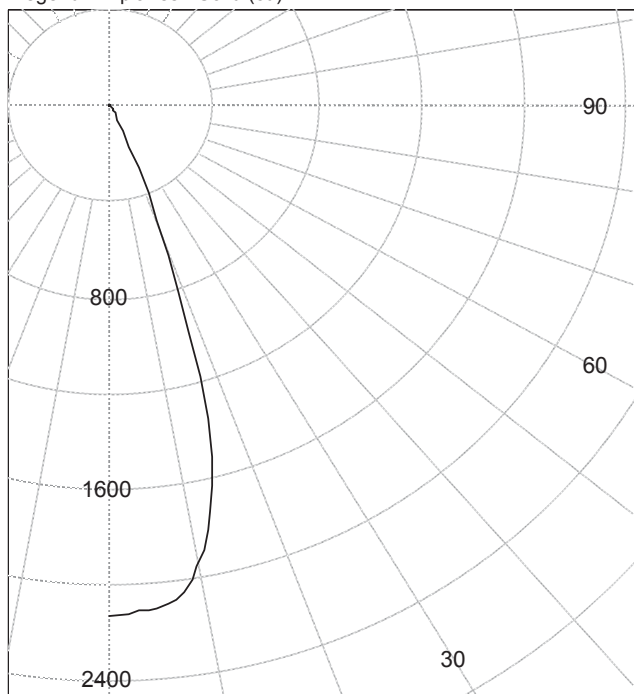
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Legend: All planes - Solid (cd)



(Rotational symmetry)

**INTENSITY SUMMARY (cd)**

Gamma	All Planes	Flux (lm)	Gamma	C0	Flux (lm)
0	2133		90	0	
5	2107	197	95	0	0
10	1953		100	0	0
15	1517	384	105	0	0
20	658		110	0	0
25	110	81	115	0	0
30	17		120	0	0
35	11	7	125	0	0
40	6		130	0	0
45	2	2	135	0	0
50	1		140	0	0
55	1	1	145	0	0
60	0		150	0	0
65	0	0	155	0	0
70	0		160	0	0
75	0	0	165	0	0
80	0		170	0	0
85	0	0	175	0	0
90	0		180	0	0

**ZONAL FLUX AND PERCENTAGES**

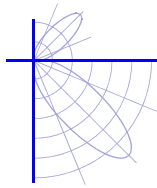
Zone	Flux (lm)	%Lamp	%Luminaire
0-30	662	N / A	98.6
0-40	668	N / A	99.6
0-60	671	N / A	100.0
0-90	671	N / A	100.0
40-90	3	N / A	0.4
60-90	0	N / A	0.0
90-180	0	N / A	0.0
0-180	671	N / A	100.0

Total Light Output = 671 lm

Signed:

P. Lawrance  
Authorized Signatory

Date of test 15-Aug-2014  
Date of report 26-Aug-2014



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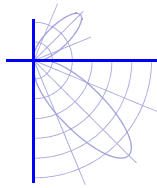
One "LTF DA12W400C1530LP-000" dimmable LED driver mounted in track assembly.

L/O (accessory holder): 2.2" dia. Pivoting track stem adjusted to direct beam to nadir. Tested at 120 V, 60 Hz.

**Intensity (cd) and Flux (lm) data**

Gamma	Intensity	Flux	Gamma	Intensity	Flux
0.0	2133		90.0	0	
2.5	2114		92.5	0	
5.0	2107	197	95.0	0	
7.5	2060		97.5	0	0
10.0	1953		100.0	0	
12.5	1778		102.5	0	
15.0	1517	384	105.0	0	
17.5	1090		107.5	0	0
20.0	658		110.0	0	
22.5	332		112.5	0	
25.0	110	81	115.0	0	
27.5	29		117.5	0	0
30.0	17		120.0	0	
32.5	13		122.5	0	
35.0	11	7	125.0	0	
37.5	9		127.5	0	0
40.0	6		130.0	0	
42.5	3		132.5	0	
45.0	2	2	135.0	0	
47.5	1		137.5	0	0
50.0	1		140.0	0	
52.5	1		142.5	0	
55.0	1	1	145.0	0	
57.5	1		147.5	0	0
60.0	0		150.0	0	
62.5	0		152.5	0	
65.0	0	0	155.0	0	
67.5	0		157.5	0	0
70.0	0		160.0	0	
72.5	0		162.5	0	
75.0	0	0	165.0	0	
77.5	0		167.5	0	0
80.0	0		170.0	0	
82.5	0		172.5	0	
85.0	0	0	175.0	0	
87.5	0		177.5	0	0
90.0	0		180.0	0	





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Specular "parabolic" faceted "S4" reflector (1.1" x 1.8" dia).

One "LTF DA12W400C1530LP-000" dimmable LED driver mounted in track assembly.

L/O (accessory holder): 2.2" dia. Pivoting track stem adjusted to direct beam to nadir. Tested at 120 V, 60 Hz.

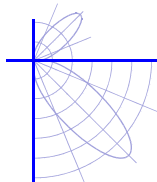
**Candela trace through origin.**

Vertical Trace			
Angle	Intensity (cd)	Angle	Intensity (cd)
90.0	0	0.0	2133
87.0	0	-3.0	2112
84.0	0	-6.0	2095
81.0	0	-9.0	2004
78.0	0	-12.0	1818
75.0	0	-15.0	1517
72.0	0	-18.0	997
69.0	0	-21.0	516
66.0	0	-24.0	183
63.0	0	-27.0	36
60.0	0	-30.0	17
57.0	1	-33.0	13
54.0	1	-36.0	10
51.0	1	-39.0	7
48.0	1	-42.0	4
45.0	2	-45.0	2
42.0	4	-48.0	1
39.0	7	-51.0	1
36.0	10	-54.0	1
33.0	13	-57.0	1
30.0	17	-60.0	0
27.0	36	-63.0	0
24.0	183	-66.0	0
21.0	516	-69.0	0
18.0	997	-72.0	0
15.0	1517	-75.0	0
12.0	1818	-78.0	0
9.0	2004	-81.0	0
6.0	2095	-84.0	0
3.0	2112	-87.0	0
0.0	2133	-90.0	0

Horizontal Trace			
Angle	Intensity (cd)	Angle	Intensity (cd)
90.0	0	0.0	2133
87.0	0	-3.0	2112
84.0	0	-6.0	2095
81.0	0	-9.0	2004
78.0	0	-12.0	1818
75.0	0	-15.0	1517
72.0	0	-18.0	997
69.0	0	-21.0	516
66.0	0	-24.0	183
63.0	0	-27.0	36
60.0	0	-30.0	17
57.0	1	-33.0	13
54.0	1	-36.0	10
51.0	1	-39.0	7
48.0	1	-42.0	4
45.0	2	-45.0	2
42.0	4	-48.0	1
39.0	7	-51.0	1
36.0	10	-54.0	1
33.0	13	-57.0	1
30.0	17	-60.0	0
27.0	36	-63.0	0
24.0	183	-66.0	0
21.0	516	-69.0	0
18.0	997	-72.0	0
15.0	1517	-75.0	0
12.0	1818	-78.0	0
9.0	2004	-81.0	0
6.0	2095	-84.0	0
3.0	2112	-87.0	0
0.0	2133	-90.0	0

Note: Luminaire orientation as tested.  
The left and right sides of photometric data have been averaged.





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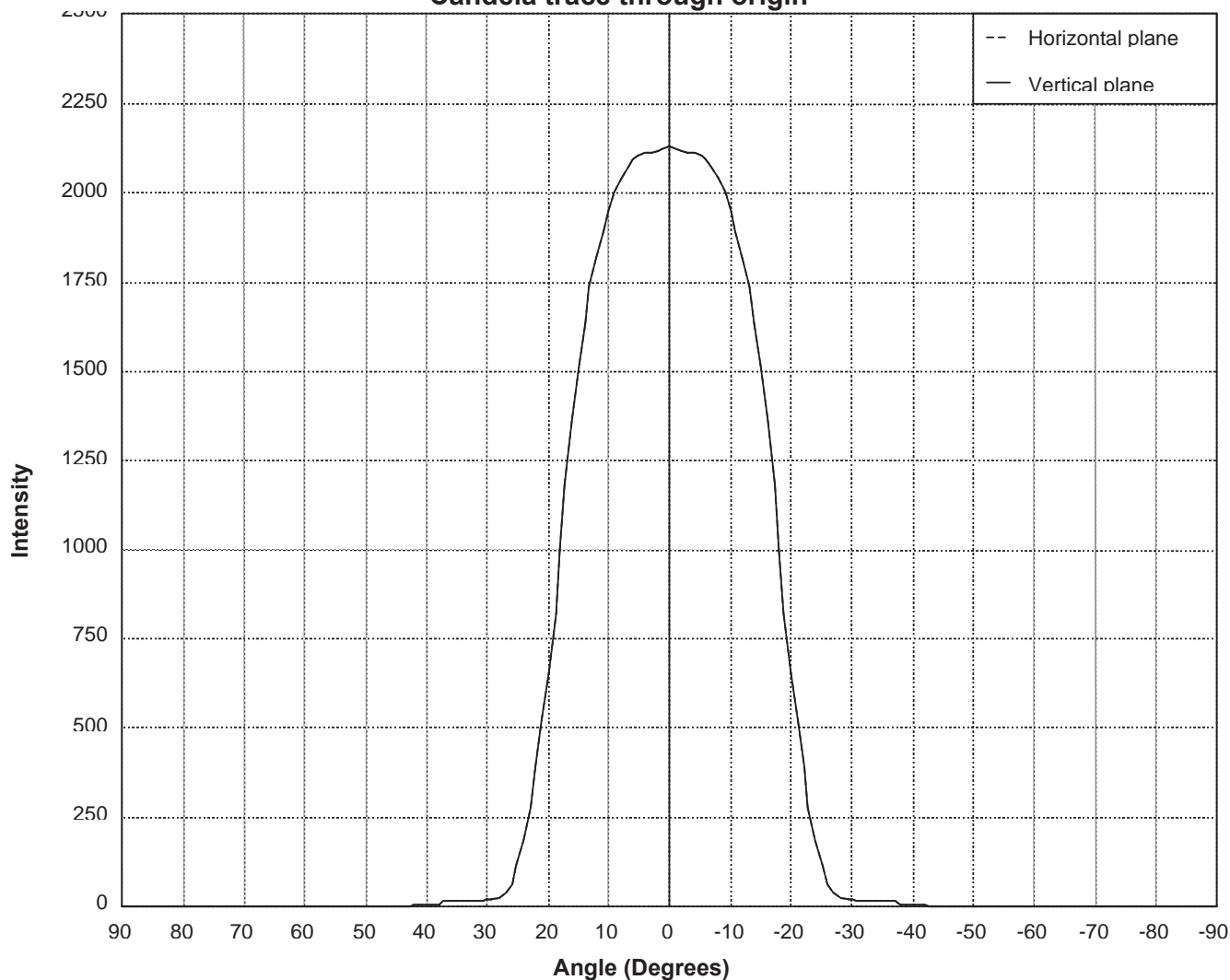
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Specular "parabolic" faceted "S4" reflector (1.1" x 1.8" dia).

One "LTF DA12W400C1530LP-000" dimmable LED driver mounted in track assembly.

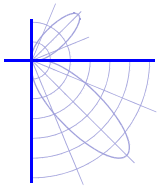
L/O (accessory holder): 2.2" dia. Pivoting track stem adjusted to direct beam to nadir. Tested at 120 V, 60 Hz.

**Candela trace through origin**



Note: The intensity units are expressed as candelas.  
The left and right sides of photometric data have been averaged.  
Both the vertical and the horizontal trace pass through the nadir.





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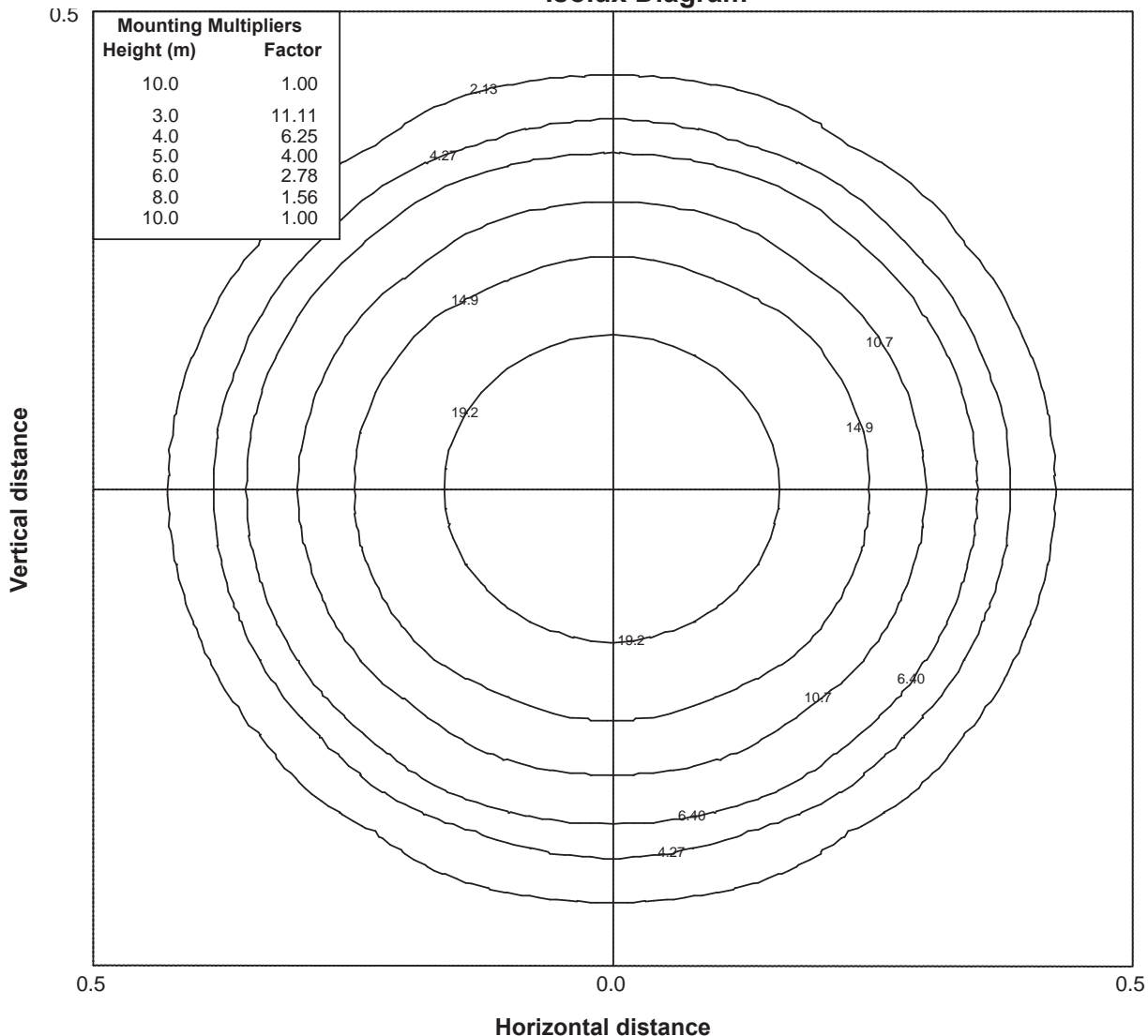
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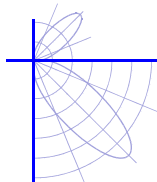
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**Isolux Diagram**



Note: The isolux levels are based on a mounting height of H = 10.0 metres. Grid values show multiples of mounting height.  
 The isolux contours are set to 10%, 20%, 30%, 50%, 70%, 90% of the maximum.  
 The isolux contour units are expressed as lux. The left and right sides of photometric data have been averaged.





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**LM-79 Performance Data**

<b>Spectral</b>	CIE 1931 (x, y) <sup>(1)</sup>	(0.441, 0.406)
	CIE 1976 (u', v') <sup>(1)</sup>	(0.252, 0.523)
	Correlated Color Temperature (CCT) <sup>(1)</sup>	2960 K
	Color Spatial Uniformity <sup>(2)</sup>	0.0069
	Color Rendering Index (Ra) <sup>(1)</sup>	84
	Special CRI 9 (R <sub>g</sub> ) <sup>(1),(3)</sup>	20
	Distance from Planckian Locus (Duv) <sup>(1),(3)</sup>	0.0004
Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.3	

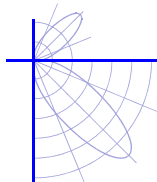
<b>Electrical</b>	Voltage	120 V
	Frequency	60 Hz
	Current	0.128 A
	Power	13.8 W
	Power Factor	0.90
	Current THD	14.2 %

Performance data in accordance with IESNA LM-79-08. Spectral calculations are for a CIE 2° observer

- (1) Value is computed from the weighted average of the spatial measurements
- (2) Value is the maximum deviation of the spatial u' and v' measurements from the weighted average
- (3) Quantity is in addition to the scope of IESNA LM-79-08







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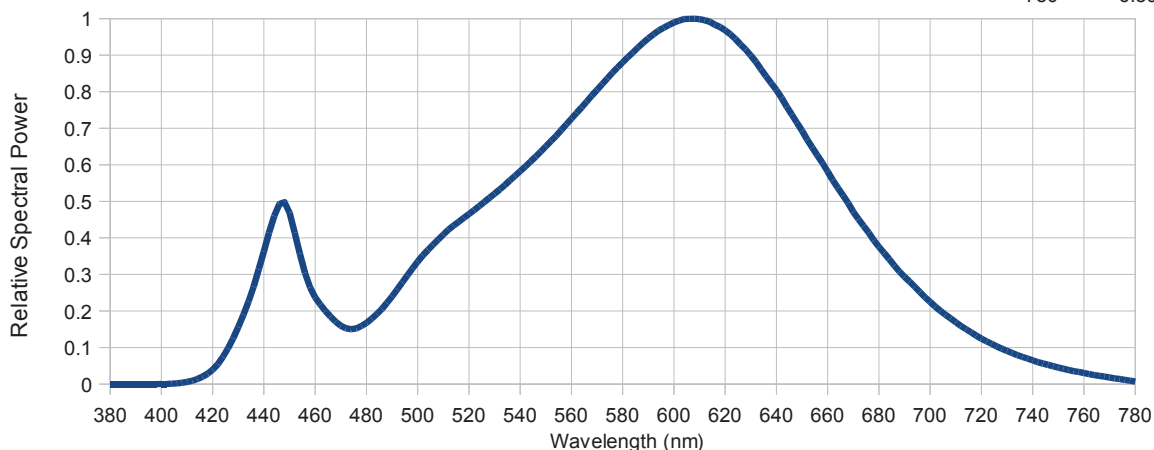
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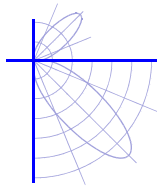
**LM-79 Performance Data**

**Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)**

380	0.00E+00	480	1.67E-01	580	8.80E-01	680	3.76E-01
385	0.00E+00	485	1.98E-01	585	9.14E-01	685	3.33E-01
390	0.00E+00	490	2.40E-01	590	9.46E-01	690	2.93E-01
395	0.00E+00	495	2.88E-01	595	9.71E-01	695	2.59E-01
400	0.00E+00	500	3.35E-01	600	9.90E-01	700	2.25E-01
405	1.40E-03	505	3.74E-01	605	9.99E-01	705	1.95E-01
410	5.74E-03	510	4.09E-01	610	9.99E-01	710	1.69E-01
415	1.67E-02	515	4.39E-01	615	9.87E-01	715	1.46E-01
420	3.96E-02	520	4.65E-01	620	9.68E-01	720	1.24E-01
425	8.60E-02	525	4.92E-01	625	9.37E-01	725	1.07E-01
430	1.56E-01	530	5.21E-01	630	8.99E-01	730	9.09E-02
435	2.46E-01	535	5.51E-01	635	8.52E-01	735	7.67E-02
440	3.62E-01	540	5.82E-01	640	8.04E-01	740	6.48E-02
445	4.76E-01	545	6.16E-01	645	7.48E-01	745	5.42E-02
450	4.69E-01	550	6.50E-01	650	6.93E-01	750	4.50E-02
455	3.31E-01	555	6.87E-01	655	6.37E-01	755	3.71E-02
460	2.37E-01	560	7.26E-01	660	5.82E-01	760	3.01E-02
465	1.92E-01	565	7.65E-01	665	5.26E-01	765	2.36E-02
470	1.60E-01	570	8.05E-01	670	4.71E-01	770	1.78E-02
475	1.51E-01	575	8.44E-01	675	4.24E-01	775	1.24E-02
						780	6.89E-03



\* The spectral power distribution combines the weighted spectral power distributions of all spatial measurements.



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**LM-79 Performance Data**

**Spatial measurements**

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 270 plane
0	(0.250, 0.521)	(0.250, 0.521)
2	(0.250, 0.521)	(0.251, 0.521)
4	(0.251, 0.521)	(0.250, 0.521)
6	(0.251, 0.521)	(0.250, 0.521)
8	(0.251, 0.522)	(0.251, 0.521)
10	(0.251, 0.522)	(0.251, 0.521)
12	(0.251, 0.523)	(0.251, 0.522)
14	(0.252, 0.524)	(0.252, 0.523)
16	(0.253, 0.524)	(0.252, 0.524)
18	(0.253, 0.524)	(0.253, 0.524)

**Spatial measurements**

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 270 plane
18	(0.253, 0.524)	(0.253, 0.524)
20	(0.254, 0.525)	(0.253, 0.524)
22	(0.255, 0.526)	(0.254, 0.525)
24	(0.257, 0.528)	I <= 10 %
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

**Test procedure**

All measurements were performed in an environmentally controlled laboratory employing suitable baffling to minimize stray light. The sample was mounted in its normal operating orientation on a rotating mirror goniophotometer and operated from a stabilized supply. The photometric output was monitored and measurements were performed once stability was achieved.

The goniophotometer was used to measure the spatial distribution of both luminous intensity and, in conjunction with a spectroradiometer, spectral irradiance. The distribution locus comprises points in two or more planes (as indicated in the table above) at no more than 10° vertical intervals. The CIE (x,y) coordinates and other derived metrics (CIE (u', v'), CCT and CRI) are calculated from the weighted sum (weighted for intensity and represented solid angle) of the measured spectral irradiances.

Sample Orientation	Beam to nadir	Stabilization Time	0.75 hour
		Total Operation Time	3 hour

**Equipment and uncertainties**

LightLab International R80A C-gamma rotating mirror goniophotometer with a test distance of 8 m.

Luminous Intensity	± 4 %	Temperature	± 1 °C
Luminous Flux	± 4 %	Luminous Efficacy	± 4.5 %
Horizontal, Vertical Angles	± 0.25°		

PhotoResearch PR-670 spectroradiometer (380 - 780 nm., 2 nm. per pixel) measuring at a distance from the sample deemed greater than five times the maximum observed luminous opening dimension.

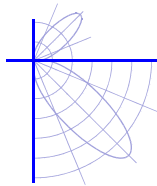
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

Yokogawa WT210 power meter connected in circuit to the sample electrical supply

Voltage	± 0.5 %	Frequency *	± 0.1 Hz
Current	± 0.5 %	Power	± 0.5 %
Current THD *	± 3 %	Power Factor	± 0.02

This report contains data that are not covered by the NVLAP accreditation. Quantities marked with \* are not covered. IESNA LM-79-08 Calculator v4.7 (13th Sep 2013)





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L/O (accessory holder): 2.2" dia. Pivoting track stem adjusted to direct beam to nadir. Tested at 120 V, 60 Hz.

**Test Distance:** 8.0 metres  
**Test Temperature:** 24.7 degrees Celsius

**Significance:** The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

**Test Procedure:** Tested in accordance with the applicable sections of IESNA publication LM-79-08.

**Notes:** The luminous intensity values, and other derived quantities, contained in this report are based on the absolute data, as measured.

Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

This report is free of erasures and corrections.

Photometric intensity values are reported using the CIE Gamma coordinate system as defined in CIE publication number 121.

This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with \* are not covered.