

LM-79-08 Test Report  
for  
**OSRAM SYLVANIA INC.**

100 Endicott Street  
Danvers, MA 01923

**Model(s): Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)**

**8 May 2011**

This test report presents the results of measurements performed on the product, Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248), in accordance with LM-79-08 Electrical and Photometric Measurements of Solid-State Lighting Products.

**Test Personnel:** M. Sapcoe P. Donhauser J. Evans

**Test Date:** 26 Apr 2011

**NVLAP  
Signatory:**



Dr. Ronald O. Daubach

**Laboratory:** Metrology & Analytics Services

**NVLAP Code: 100403-0**

**OSRAM SYLVANIA INC.**

71 Cherry Hill Drive  
Beverly, MA 01915

Voice: 978-750-1593

Fax: 978-646-2920

[ronald.daubach@sylvania.com](mailto:ronald.daubach@sylvania.com)

**Report Number:** LM792011050802



FOR THE SCOPE OF ACCREDITATION UNDER NVLAP LAB CODE 100403-0

This report does not imply product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

## General Information

### Product tested

The product tested is the Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248) ES BX containing one (1) OSRAM module ZNN2431853 Ev. 1.3 with twenty-four (24) phosphor converted white LED sources and driver.

### Purpose of test

This test report is prepared on behalf of OSRAM SYLVANIA INC. in accordance with American National Standards Institute standards, Illumination Engineering Society of North America Lighting Methods and International Commission on Illumination (CIE) publications listed below:

- IESNA LM-79-08, Approved Method for the Electrical and Photometric Testing of Solid-State Lighting Products
- IESNA LM-28-1989, Guide for the Selection, Care and Use of Electrical Instruments in the Photometric Laboratory
- CIE Publication No. 13.3-1995, Method of Measuring and Specifying the Color Rendering of Light Sources.

The objective is to demonstrate compliance of the product evaluated to LM-79-08 Electrical and Photometric Measurements of Solid-State Lighting Products.

### Laboratory Accreditation

Metrology & Analytics Services (MAS) is a department of the Central Research and Services Laboratory of OSRAM SYLVANIA INC. MAS is located at 71 Cherry Hill Drive, Beverly, MA 01915.

MAS is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), Energy Efficient Lighting (EEL) program. NVLAP is a division of the National Institute of Standards and Technology. MAS NVLAP Laboratory Code is 100403-0.

## Test Equipment

### Goniometric

Description	Manufacturer	Model No.	Serial No.	Calibration (Cycle in yrs.)
High Speed Goniophotometer OL 770 Multi-channel	Lighting Sciences, Inc.	6240	6240TE0168T	11/4/2010 (1)
Spectroradiometer	Gooch and Housego	770VIS/NIR	10414127	11/4/2010 (1)
Digital Power Meter	Yokogawa	WT1600	91K110635	10/5/2010 (1)
Power Supply	Kikusui	PCR4000L	DJ002858	Not Required
Digital Thermometer	Fluke	52	6200078	6/30/2010 (1)

Calibrated for lumimous intensity and spectral irradiance using NIST intensity standard lamp NBS 10189.  
Assigned candela reading per 844/257263-96 is 1537cd.

### Integrated Sphere

Description	Manufacturer	Model No.	S/N	Cal. Date (cvcle in vears)
2.4 Meter Integrating Sphere	-	-	-	Not required
Monochromator	Optronics	750-M-D	97410056	Not required
Silicon Detector Head	Optronics	DH-300	97101076	Not required
Detector Support Module	Optronics	DSM-1D	97199967	Not required
Flux Cal Lamp	Hoffman	1000W FEL	96521	9/1/2008(3)
AC Line Conditioner	ELGAR	5006B-230	454	Not required
Digital Power Meter	Yokogawa	2531	24AW2150	07/01/2010 (1)
D.C. Power Supply	Hewlett Packard	6030A	3332A03465	Not required
Shunt (S2)	Biddle Co.	4222	762253	7/5/2010(1)
Multimeter	Keithley	2000	0727509	6/30/2010(3)
Multimeter	Keithley	2000	0727306	6/30/2010(3)
Thermistor Indicator/Controller	Omega	DP25-TH-A1-R	3415059	7/13/2010(3)

Calibration intervals are based on critical evaluations of equipment and standards behavior as per ANS/ISO/IEC 17025:2005(E)  
5.10.4.4 All calibrations are directly traceable to a NMI (NIST) through an unbroken chain of calibrations or comparisons.

## Procedure

### Goniometry

The luminaire was operated in its intended orientation in application. The luminaire reference plane was located at the center of the luminaire goniometer at a test distance of 45 feet from the detectors. The module was operated at an input voltage of 120VAC supplied by a four contact connection.

The module was stabilized per the criteria of LM-79 prior to the measurement.

Five vertical scans were taken due to symmetry of the source output. Color uniformity was measured at two horizontal angles, 0° and 90°.

Total operating time prior to measurement is approximately 8 hours. Ambient temperature during testing was maintained at 25°C ± 1°C.

### Integrating Sphere Photometry

Relative spectral system response was determined from 380 nm to 800 nm by measurement of the FEL standard lamp. Absolute lumen level for the system is based on the lumen standards. Spectroradiometer bandwidth is approximately 2 nm.

The lamp was operated base up supplied by a four contact socket. Electrical power was applied at 120 VAC 60Hz.

Radiometric and input electrical measurements were performed every 30 seconds until stabilization.

The last reading for the lamp operating within the required stabilization window is corrected for self-absorption determined spectrally and is reported.

Total operating time prior to measurement is approximately 6 hours. Ambient temperature during testing was maintained at 25°C ± 1°C.

**Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)**

**Measured and Derived Performance Parameters**

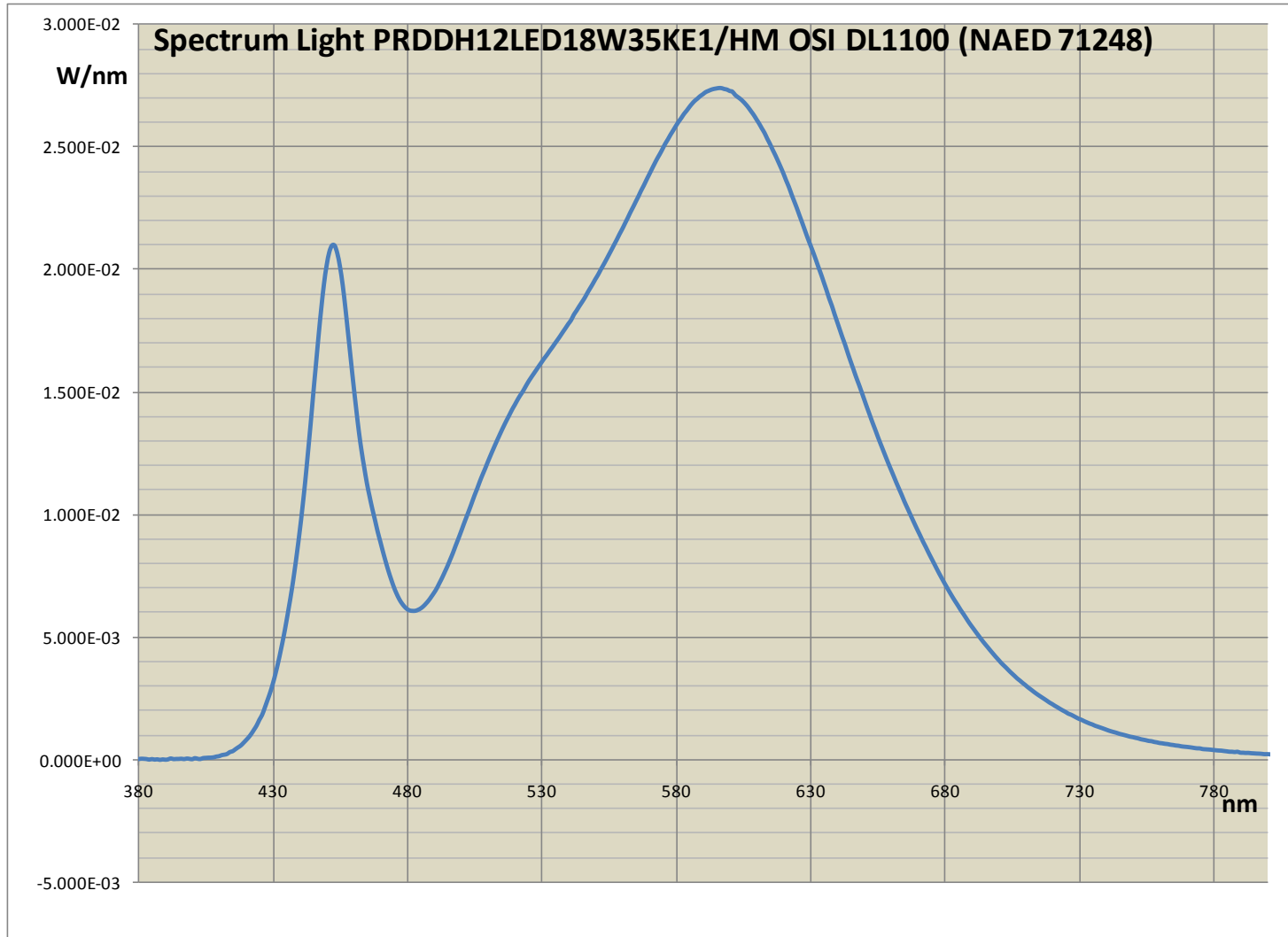
<b>Integrating Sphere Values</b>		
Voltage /V	120.06	
Current /A	0.1945	
Wattage /W	23.2	
Power Factor	0.994	
Lumens	1456	
Efficacy /LPW	62.8	
x	0.4087	
y	0.3911	
u'	0.2377	
v'	0.5119	
Duv	-0.0005	
CCT /K	3430	
CRI	80.4	
R9	0.0	
T <sub>amb</sub> /°C	24.7	

<b>Special Color Rendering Indices</b>		
R1	78	
R2	88	
R3	95	
R4	78	
R5	78	
R6	84	
R7	83	
R8	59	
R9	0	
R10	72	
R11	75	
R12	61	
R13	80	
R14	98	

<b>Goniophotometer Values</b>		
<b>Goniometric Values</b>		
Voltage /V	120.08	
Current /A	0.1978	
Wattage /W	23.07	
Power Factor	0.971	
Lumens	1479	
Efficacy /LPW	64.1	
T <sub>amb</sub> /°C	24.5	

Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)  
Absolute Spectral Radiant Flux



**Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)**  
**Absolute Spectral Radiant Flux**

Absolute Spectral Flux									
nm	W/nm	nm	W/nm	nm	W/nm	nm	W/nm	nm	W/nm
380	-8.856E-07	464	1.192E-02	548	1.923E-02	632	2.043E-02	716	2.535E-03
382	1.079E-05	466	1.073E-02	550	1.961E-02	634	1.981E-02	718	2.389E-03
384	-1.974E-05	468	9.772E-03	552	1.999E-02	636	1.917E-02	720	2.250E-03
386	-1.976E-05	470	8.883E-03	554	2.039E-02	638	1.853E-02	722	2.116E-03
388	-3.025E-05	472	8.068E-03	556	2.081E-02	640	1.787E-02	724	1.986E-03
390	-2.422E-05	474	7.354E-03	558	2.123E-02	642	1.722E-02	726	1.858E-03
392	2.727E-05	476	6.771E-03	560	2.165E-02	644	1.657E-02	728	1.760E-03
394	5.911E-06	478	6.368E-03	562	2.210E-02	646	1.594E-02	730	1.645E-03
396	1.487E-05	480	6.127E-03	564	2.254E-02	648	1.533E-02	732	1.547E-03
398	2.294E-05	482	6.057E-03	566	2.299E-02	650	1.471E-02	734	1.452E-03
400	-3.583E-06	484	6.098E-03	568	2.343E-02	652	1.410E-02	736	1.363E-03
402	1.441E-05	486	6.244E-03	570	2.388E-02	654	1.351E-02	738	1.288E-03
404	4.052E-05	488	6.485E-03	572	2.432E-02	656	1.293E-02	740	1.209E-03
406	5.818E-05	490	6.798E-03	574	2.472E-02	658	1.237E-02	742	1.133E-03
408	7.476E-05	492	7.194E-03	576	2.514E-02	660	1.183E-02	744	1.072E-03
410	1.207E-04	494	7.651E-03	578	2.552E-02	662	1.130E-02	746	1.008E-03
412	1.819E-04	496	8.155E-03	580	2.588E-02	664	1.080E-02	748	9.485E-04
414	2.885E-04	498	8.714E-03	582	2.620E-02	666	1.029E-02	750	8.983E-04
416	3.982E-04	500	9.285E-03	584	2.650E-02	668	9.807E-03	752	8.470E-04
418	5.478E-04	502	9.877E-03	586	2.678E-02	670	9.337E-03	754	7.922E-04
420	7.703E-04	504	1.046E-02	588	2.699E-02	672	8.876E-03	756	7.426E-04
422	1.035E-03	506	1.104E-02	590	2.716E-02	674	8.434E-03	758	7.016E-04
424	1.380E-03	508	1.161E-02	592	2.730E-02	676	8.006E-03	760	6.572E-04
426	1.805E-03	510	1.214E-02	594	2.738E-02	678	7.579E-03	762	6.252E-04
428	2.408E-03	512	1.266E-02	596	2.742E-02	680	7.179E-03	764	5.901E-04
430	3.083E-03	514	1.316E-02	598	2.738E-02	682	6.794E-03	766	5.567E-04
432	3.957E-03	516	1.362E-02	600	2.730E-02	684	6.434E-03	768	5.239E-04
434	5.001E-03	518	1.406E-02	602	2.714E-02	686	6.087E-03	770	4.998E-04
436	6.231E-03	520	1.447E-02	604	2.697E-02	688	5.757E-03	772	4.716E-04
438	7.634E-03	522	1.485E-02	606	2.675E-02	690	5.435E-03	774	4.403E-04
440	9.315E-03	524	1.521E-02	608	2.646E-02	692	5.134E-03	776	4.106E-04
442	1.130E-02	526	1.557E-02	610	2.614E-02	694	4.842E-03	778	3.949E-04
444	1.362E-02	528	1.590E-02	612	2.577E-02	696	4.573E-03	780	3.725E-04
446	1.608E-02	530	1.622E-02	614	2.535E-02	698	4.311E-03	782	3.512E-04
448	1.840E-02	532	1.652E-02	616	2.490E-02	700	4.061E-03	784	3.296E-04
450	2.017E-02	534	1.683E-02	618	2.443E-02	702	3.826E-03	786	3.023E-04
452	2.099E-02	536	1.714E-02	620	2.393E-02	704	3.607E-03	788	2.883E-04
454	2.066E-02	538	1.746E-02	622	2.339E-02	706	3.400E-03	790	2.630E-04
456	1.936E-02	540	1.779E-02	624	2.280E-02	708	3.208E-03	792	2.516E-04
458	1.739E-02	542	1.816E-02	626	2.221E-02	710	3.027E-03	794	2.418E-04
460	1.530E-02	544	1.850E-02	628	2.160E-02	712	2.852E-03	796	2.277E-04
462	1.339E-02	546	1.884E-02	630	2.101E-02	714	2.684E-03	798	2.155E-04
								800	2.033E-04

## Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248) Spatial Distribution Photometry

Luminaire: Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)

Lamp Cat: N/A. LUMINAIRE OUTPUT = 1478 LMS

Lamp Output: 1 lamp(s), rated Lumens/lamp: 1478.844

Max Candela: 746.6 at Horizontal: 0°, Vertical: 17.5°

Input Wattage: 23.1

Luminous Circular (Dia: 1ft)

Opening:

Test: 20114210

Test Lab: OSRAM SYLVANIA

Photometry : Type C

CIE Class: Semi-Direct

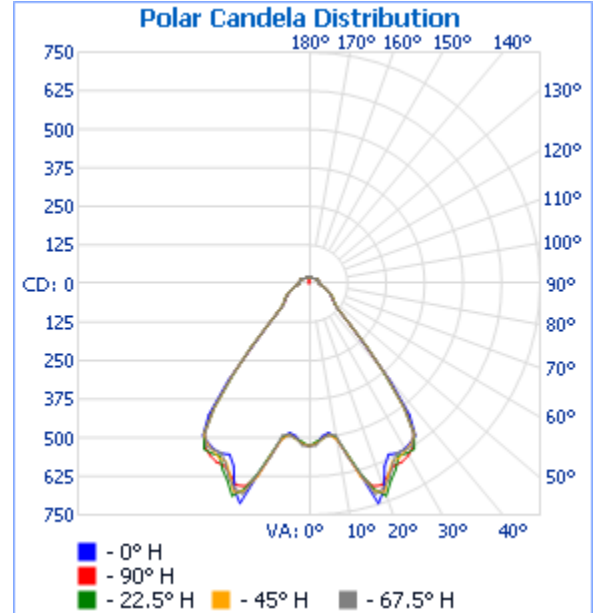
### Roadway Summary

Cutoff Classification: CUTOFF

Distribution: Type VS

Max Cd, 90 Deg Vert: 33.8

Max Cd, 80 to <90 Deg: 44.3



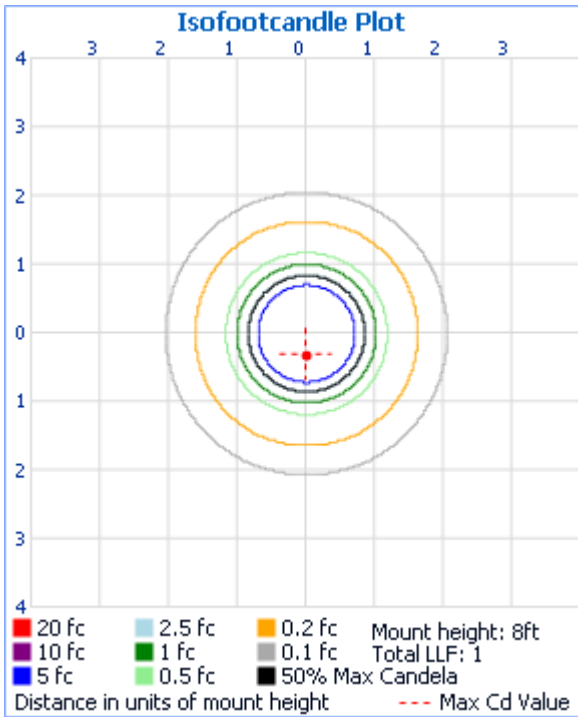
### Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	532.4	36%
0-40	880.7	59.6%
0-60	1,132.8	76.6%
60-90	172.1	11.6%
70-100	133.2	9%
90-120	98.6	6.7%
0-90	1,304.9	88.2%
90-180	173.9	11.8%
0-180	1,478.8	100%

### Lumens Per Zone

Zone	Lumens	% Total Zone	Zone	Lumens	% Total
0-10	47.9	3.2%	90-100	35.1	2.4%
10-20	182.7	12.4%	100-110	33.3	2.2%
20-30	301.8	20.4%	110-120	30.2	2%
30-40	348.3	23.5%	120-130	24.3	1.6%
40-50	163.9	11.1%	130-140	18.1	1.2%
50-60	88.2	6.0%	140-150	13.6	0.9%
60-70	74.0	5.0%	150-160	10.4	0.7%
70-80	56.5	3.8%	160-170	6.7	0.5%
80-90	41.6	2.8%	170-180	2.1	0.1%

**Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)  
Spatial Distribution Photometry**



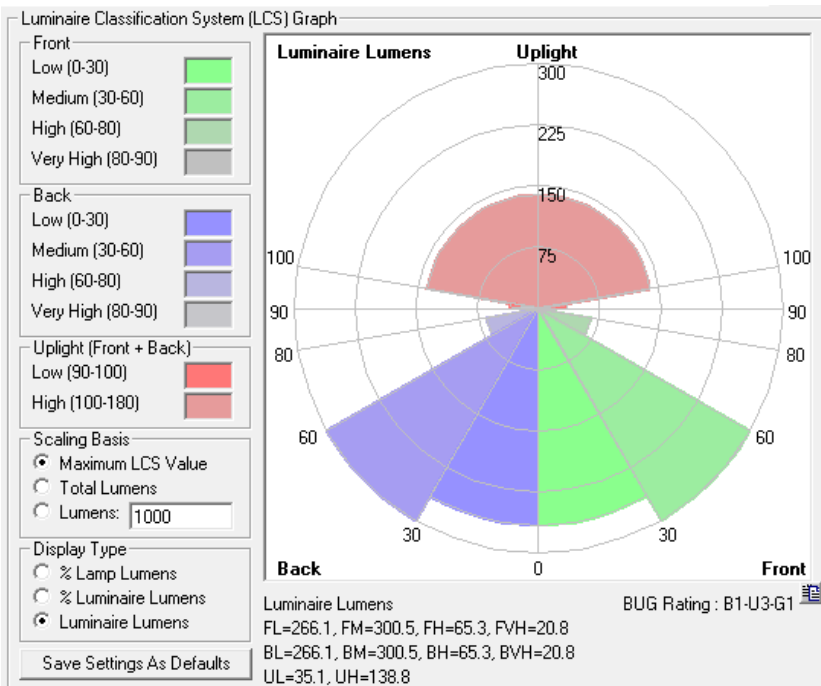
**Illuminance at a Distance**

	Center Beam FC	Beam Width
1.3ft	295.76 fc	2.3ft 2.0ft
2.7ft	73.94 fc	4.6ft 4.0ft
4.0ft	32.86 fc	6.9ft 6.0ft
5.3ft	18.49 fc	9.1ft 8.0ft
6.7ft	11.83 fc	11.4ft 10.0ft
8.0ft	8.22 fc	13.7ft 12.0ft

■ Vert. Spread: 81.2°    ■ Horiz. Spread: 73.9°

**Flood Summary**

	Efficiency	Lumens	Horizontal Spread	Vertical Spread
Field (10%):	79.3%	1,172.8	126.7	129.3
Beam (50%):	60.1%	889.1	73.9	81.2
<b>Total:</b>	<b>100%</b>	<b>1,478.9</b>		



**Lum. Classification System (LCS)**

LCS Zone	Lumens	%Lamp	%Lum
FL (0-30)	266.1	N.A.	18.0
FM (30-60)	300.5	N.A.	20.3
FH (60-80)	65.3	N.A.	4.4
FVH (80-90)	20.8	N.A.	1.4
BL (0-30)	266.1	N.A.	18.0
BM (30-60)	300.5	N.A.	20.3
BH (60-80)	65.3	N.A.	4.4
BVH (80-90)	20.8	N.A.	1.4
UL (90-100)	35.1	N.A.	2.4
UH (100-180)	138.8	N.A.	9.4
<b>Total</b>	<b>1479.3</b>	<b>N.A.</b>	<b>100.0</b>

**BUG Rating B1-U3-G1**

**Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)**  
**Spatial Distribution Photometry (continued)**

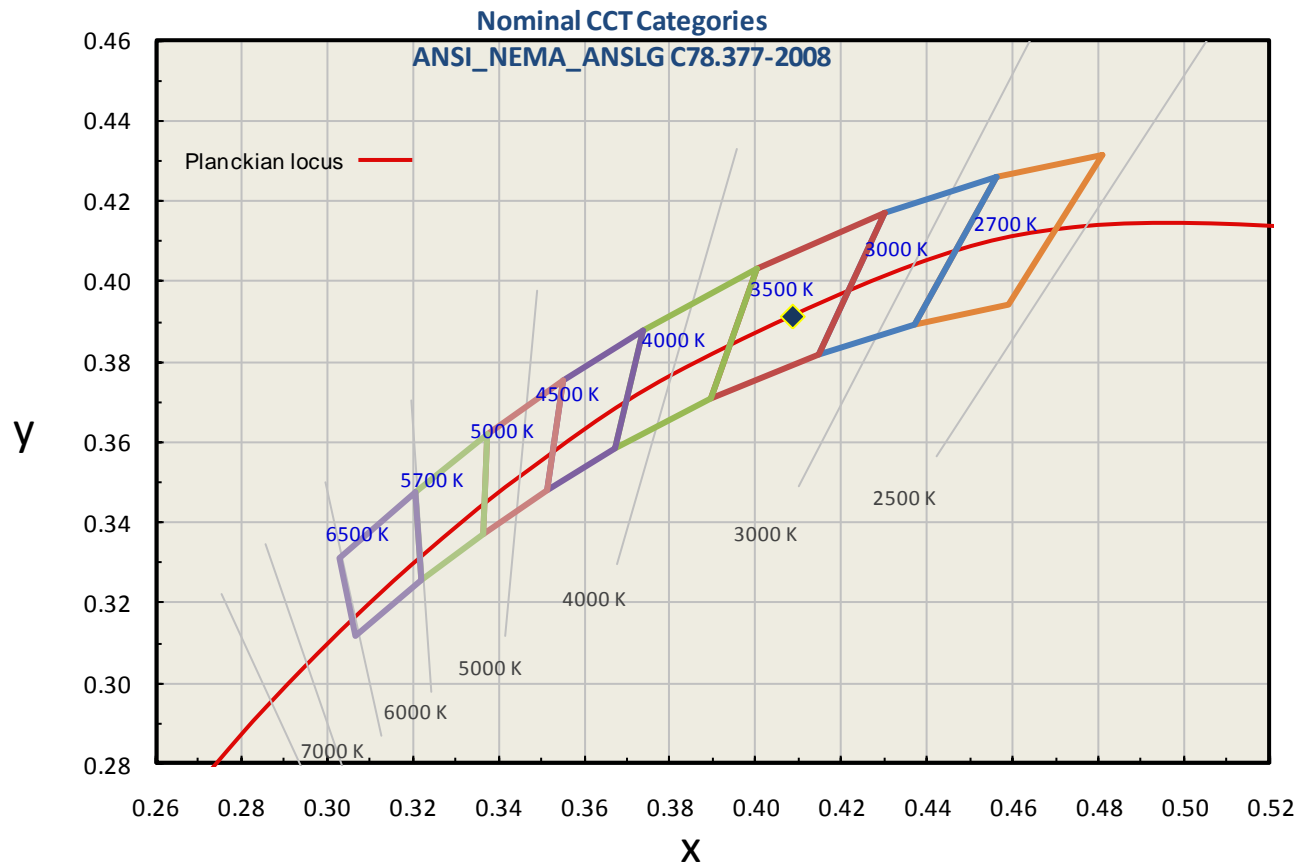
Candela Table - Type C					
	0	22.5	45	67.5	90
0	526	526	526	526	526
2.5	520	513	519	525	519
5	496	504	504	502	502
7.5	487	492	494	496	492
10	508	507	512	499	510
12.5	565	562	567	574	568
15	638	633	646	634	643
17.5	747	697	707	716	688
20	710	732	717	705	695
22.5	640	692	672	682	670
25	611	665	637	642	651
27.5	620	629	636	618	652
30	619	634	624	621	643
32.5	611	635	615	624	628
35	601	594	598	590	593
37.5	534	507	504	507	516
40	407	381	389	387	390
42.5	265	281	278	281	268
45	187	191	191	195	190
47.5	140	143	143	144	140
50	114	116	116	115	113
52.5	103	105	105	103	102
55	97	99	99	97	96
57.5	91	93	93	91	90
60	86	87	87	86	85
62.5	80	81	81	80	79
65	74	75	75	74	74
67.5	68	69	69	69	69
70	63	64	64	63	63
72.5	58	58	59	58	58
75	53	53	54	53	53
77.5	48	48	49	48	48
80	44	44	44	44	44
82.5	40	40	41	41	40
85	37	38	38	38	38
87.5	35	35	36	36	36
90	34	34	34	34	34
92.5	32	32	33	33	33
95	32	32	32	32	32
97.5	32	32	32	32	32
100	31	31	31	32	31
102.5	31	31	31	31	31

Candela Table - Type C					
	0	22.5	45	67.5	90
105	31	32	32	32	31
107.5	32	32	32	32	32
110	32	32	32	32	32
112.5	31	31	31	31	31
115	30	30	31	30	30
117.5	30	30	30	30	30
120	29	29	29	29	29
122.5	28	28	28	28	28
125	27	27	27	27	27
127.5	26	26	26	26	26
130	25	25	25	25	25
132.5	24	24	24	24	24
135	23	23	23	23	23
137.5	22	22	22	22	22
140	22	22	22	22	22
142.5	22	22	22	22	22
145	22	22	22	22	22
147.5	22	22	22	22	22
150	22	22	22	22	22
152.5	22	22	22	22	22
155	23	23	22	22	22
157.5	23	23	23	23	23
160	24	24	24	24	23
162.5	24	24	24	24	24
165	24	24	24	24	24
167.5	24	24	24	24	24
170	24	24	24	23	23
172.5	23	23	23	22	22
175	21	21	21	21	21
177.5	21	20	21	20	21
180	21	21	21	21	0

**Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)**  
**Spatial Color Deviation**

Horizontal	Vertical	Average Weighted u', v'		$\Delta u'v'$
		0.237	0.512	
		Spatial u', v'		
90	60	0.237	0.514	0.002
90	50	0.237	0.514	0.001
90	40	0.237	0.513	0.000
90	30	0.237	0.511	0.001
90	20	0.238	0.513	0.001
90	10	0.239	0.515	0.003
90	0	0.239	0.515	0.003
0	60	0.237	0.514	0.002
0	50	0.238	0.514	0.001
0	40	0.236	0.509	0.004
0	30	0.237	0.513	0.000
0	20	0.238	0.513	0.001
0	10	0.239	0.515	0.003
0	0	0.239	0.515	0.003

Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)  
Compliance to Specification for Chromaticity of Solid State Lighting Products



Spectrum Light PRDDH12LED18W35KE1/HM OSI DL1100 (NAED 71248)

