



PHOTOMETRIC TESTING & EVALUATION TO IES LM-79-08

Sample Tested
LED-PAR30L-75-1WD-IF

Prepared for:

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Program Description

Photometric and electrical testing of an “LED-PAR30L-75-1WD-IF” replacement lamp to IES LM-79-08.

Executive Summary

Sample Tested = **LED-PAR30L-75-1WD-IF**

Luminous Efficacy* (Lumens/Watt)	Luminous Flux* (Lumens)	Input Power* (Watts)	Power Factor*
51.83	761.9	14.70	0.927

CCT (K)*	CRI*	Stabilization Time (Light & Power)
2933.8	82.9	43 minutes

* The above results are recorded / derived from measurements made using an Integrating Sphere



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October 18, 2010

Sample

The following sample was submitted for evaluation:

LEDnovation, Inc. - **LED-PAR30L-75-1WD-IF**



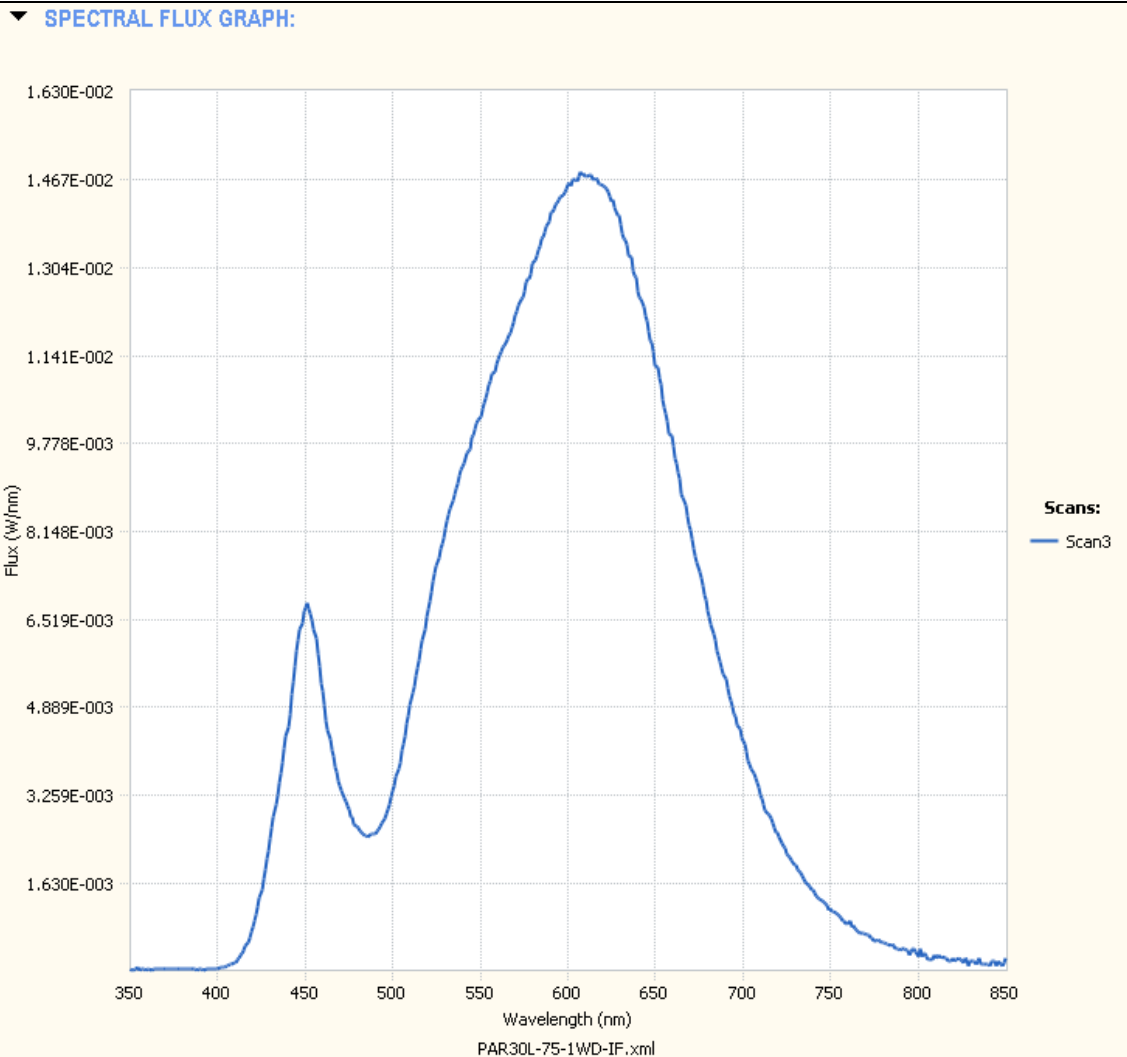
LED-PAR30L-75-1WD-IF

October 18, 2010

Test Results –		
The following results were measured after stabilization of the sample in the Integrating Sphere (unless otherwise stated). Stability is reached when the variation of 3 readings of light output and electrical power, taken 15 minutes apart, is less than 0.50% (in accordance with IES LM-79-08).		
Key Photometric Results	Sample Reference	
	LED-PAR30L-75-1WD-IF	
	Integrating Sphere	Goniophotometer
Luminous Efficacy (Lumens/Watt)	51.83	50.80
Total Luminous Flux (Lumens)	761.9	741.7
Total Radiant Flux (Watts)	2.52	
Correlated Color Temperature (CCT)	2933.8	
Color Rendering Index (CRI)	82.9	
Chromaticity (Chroma x / Chroma y)	0.4404 / 0.4032	
Chromaticity (Chroma u / Chroma v)	0.2532 / 0.3477	
Chromaticity (Chroma u' / Chroma v')	0.2532 / 0.5216	
D _{uv} Value	-0.00078	
Stabilization Time (Light and Power)	Approx. 43 minutes	
Total Run Time – Integrating Sphere	49 minutes	
Total Run Time – Goniophotometer	97 minutes	
Spacing Criteria	0.54 (0° – 180°) / 0.54 (90° – 270°)	
Electrical Input Results:	Sample Reference	
	LED-PAR30L-75-1WD-IF	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	14.70	14.60
Input Voltage (Volts AC)	120.0	120.0
Input Current (Amps)	0.132	0.134
Input Frequency (Hertz)	60.0	60.0
Power Factor	0.927	0.908
Additional Information	Sample Reference	
	LED-PAR30L-75-1WD-IF	
Ambient Temperature	25.6°C	
Integrating Sphere Detector	CDS 600 Spectroradiometer	
Absorption Correction used?	Yes	

Spectral Flux

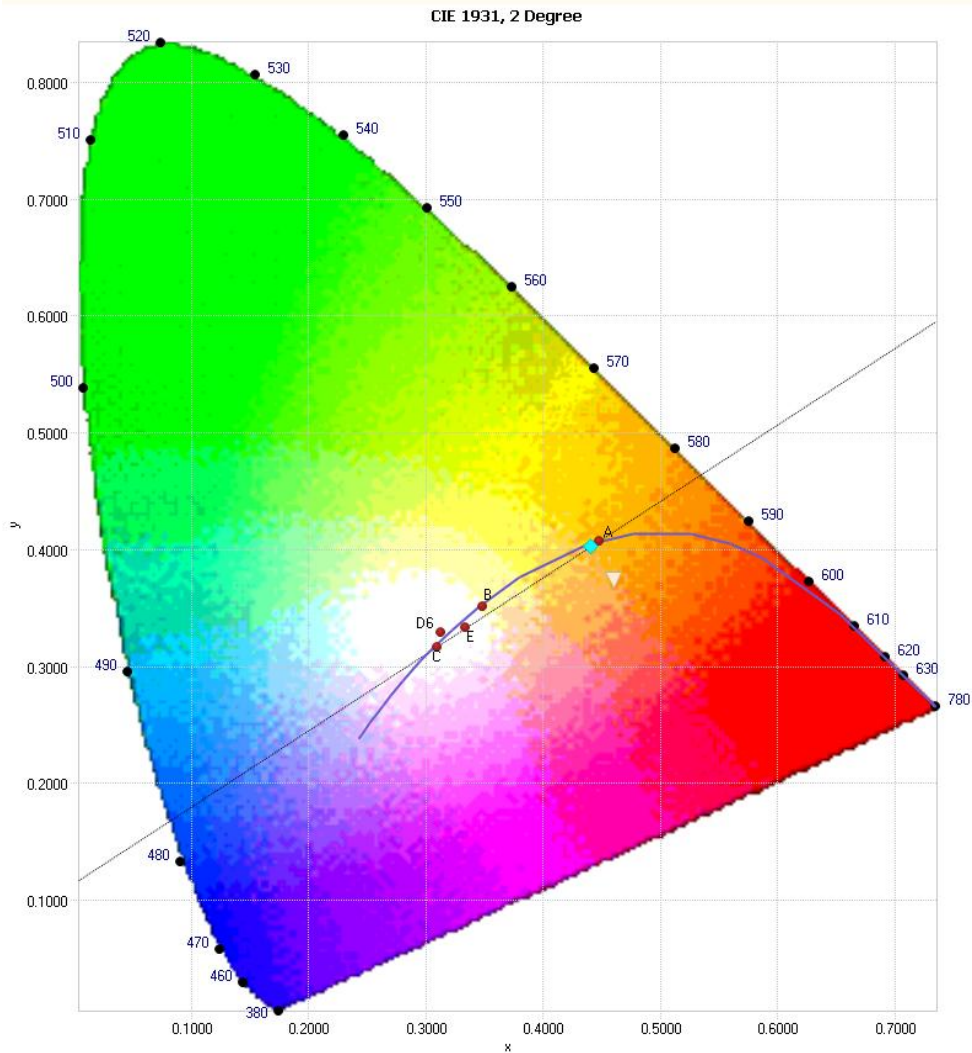
The following graph shows the spectral response curve of the radiant flux for the sample:



Spectral response of the Radiant Flux
(350nm to 850nm – calibrated range of the Spectroradiometer).

Chromaticity Diagram

The following image shows the chromaticity diagram for the sample:



Tristimulus values (from page 5):
x / y = 0.4390 / 0.4027

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

Test Results – Flux Distribution – Zonal Lumen Summary

The following table depicts the zonal lumen distribution for the sample:

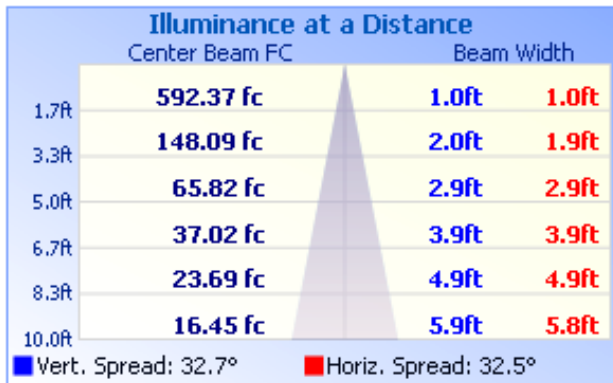
Zone	Lumens	% Total
0 - 10	139.1	18.7%
10 - 20	251.6	33.9%
20 - 30	168.7	22.7%
30 - 40	80.5	10.9%
40 - 50	40.1	5.4%
50 - 60	26.0	3.5%
60 - 70	20.5	2.8%
70 - 80	12.1	1.6%
80 - 90	3.3	0.4%
Total	741.7 Lumens	100%

Zonal Lumen Summary

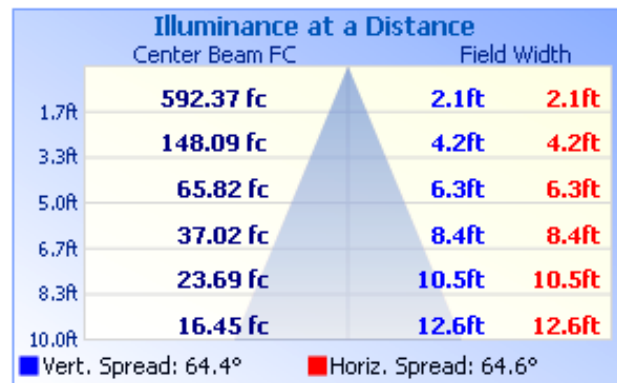
Zone	Lumens	% Lamp / Luminaire
0 - 60	705.9	95.2%
60 - 90	35.8	4.8%
0 - 90	741.7	100%
90 - 180	0.0	0.0%
0 - 180	741.7	100%

Test Results – Illuminance Plots

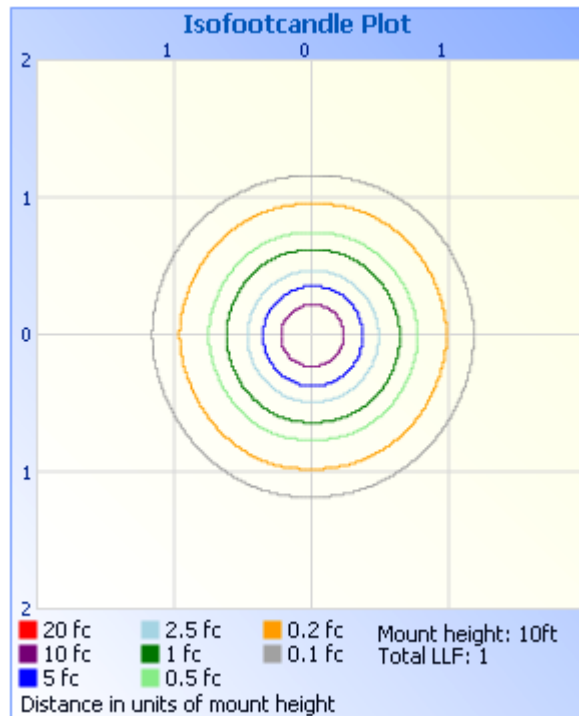
The following images depict the illuminance characteristics of the luminaire.



Beam Angle



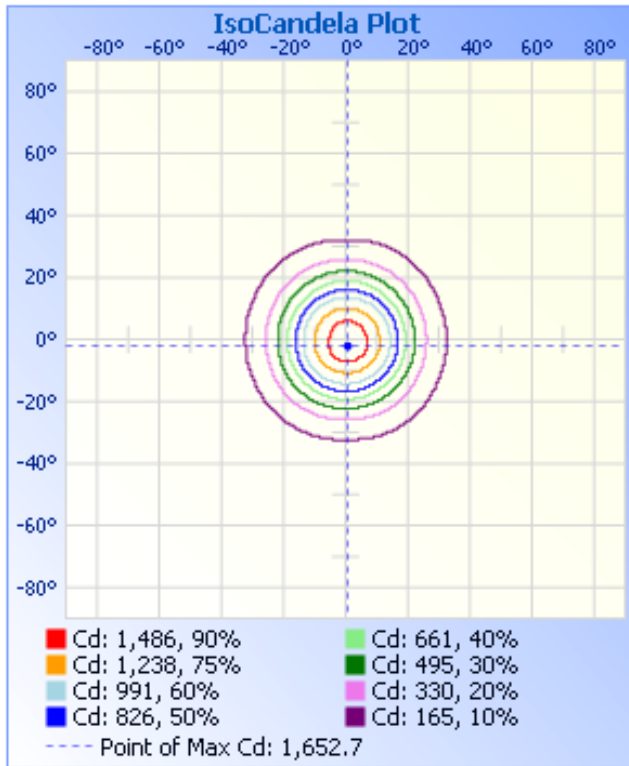
Field Angle



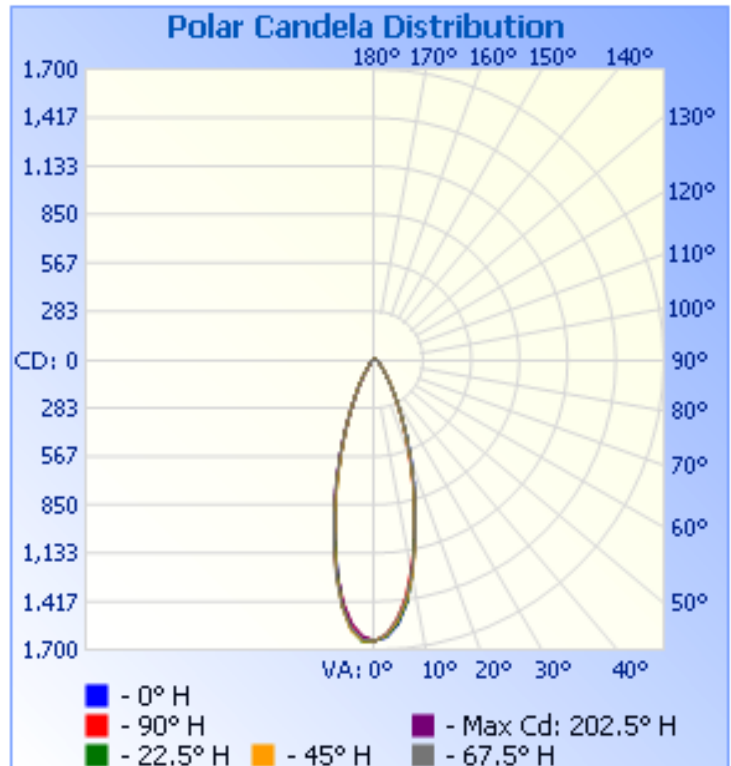
Illuminance Plot (Footcandles)

Test Results – Candela Plots

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



Isocandela Plot



Polar Candela Distribution

Test Results – Candela Tabulation

The following table provides the tabulated Candela measurements:

	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	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645	1645
2.5	1626	1621	1614	1606	1608	1619	1631	1640	1647	1653	1649	1639	1627	1622	1621	1623	1623
5.0	1558	1549	1536	1521	1519	1540	1564	1576	1581	1588	1592	1581	1557	1552	1556	1558	1555
7.5	1436	1433	1422	1408	1398	1422	1441	1449	1454	1460	1462	1460	1436	1436	1447	1443	1433
10.0	1264	1268	1274	1258	1242	1270	1281	1276	1273	1281	1293	1301	1278	1282	1291	1275	1256
12.5	1081	1078	1096	1094	1077	1107	1111	1097	1088	1091	1104	1118	1099	1110	1113	1088	1079
15.0	915	908	912	921	904	928	927	920	916	911	910	933	917	929	926	915	913
17.5	759	751	746	759	743	761	754	755	750	742	732	756	748	757	754	753	758
20.0	619	610	601	610	595	607	602	600	590	587	578	594	592	599	597	607	618
22.5	489	483	474	481	470	473	470	467	458	456	452	458	459	463	464	480	488
25.0	376	375	369	370	365	363	360	358	347	350	348	348	352	353	355	370	376
27.5	285	287	283	281	281	276	274	273	263	268	266	263	270	267	272	285	285
30.0	216	219	219	215	217	209	209	209	201	207	205	200	207	201	209	218	215
32.5	163	167	168	164	167	160	161	160	155	160	157	153	160	154	161	168	163
35.0	124	128	128	125	129	123	124	123	119	124	121	117	123	117	124	130	124
37.5	96	100	100	97	100	96	97	96	92	96	94	91	96	91	96	101	96
40.0	76	79	79	76	79	76	77	76	73	76	75	73	76	72	76	81	76
42.5	62	63	63	61	63	61	62	62	59	61	61	59	62	58	61	65	62
45.0	51	51	51	50	51	50	51	51	49	50	50	48	50	48	50	53	51
47.5	42	42	42	41	42	42	43	42	41	41	41	41	42	40	41	44	42
50.0	36	36	35	35	36	36	36	36	35	35	35	35	35	34	35	37	36
52.5	32	31	30	30	31	31	32	32	31	31	31	31	31	30	31	32	32
55.0	28	28	27	27	28	29	29	29	30	29	29	29	28	28	28	28	28
57.5	26	25	25	25	26	27	28	27	28	28	27	28	27	26	26	26	26
60.0	25	24	23	23	24	25	26	26	26	26	26	26	25	25	25	24	25
62.5	23	22	21	21	22	23	24	24	24	24	24	24	23	23	23	23	23
65.0	21	20	19	19	20	21	22	22	21	22	22	22	21	20	20	20	21
67.5	18	17	17	17	17	19	20	19	19	19	20	20	19	18	18	18	18
70.0	16	15	14	15	15	17	18	17	16	17	17	17	16	16	15	15	16
72.5	14	12	12	12	13	14	15	15	14	14	15	15	14	13	13	13	14
75.0	11	10	10	10	11	12	13	13	11	12	13	13	11	11	11	10	11
77.5	9	8	8	8	9	10	11	10	9	10	10	10	9	9	8	8	9
80.0	7	6	6	6	7	8	9	8	7	8	8	8	7	6	6	6	7
82.5	5	4	4	4	5	6	6	6	5	6	6	6	5	4	4	4	5
85.0	3	1	2	2	3	4	4	4	3	4	4	3	3	2	2	1	3
87.5	1	0	0	0	1	2	2	2	1	2	2	1	1	0	0	0	1
90.0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Photometric Testing Information

The sample was evaluated for photometric and electrical characteristics using an integrating sphere and a goniophotometer, each located in purpose-built, temperature and humidity-controlled, draft free environments.

The integrating sphere is a 65-inch diameter sphere manufactured by Labsphere (Model# LMS650) which exhibits a “ 4π geometry” configuration according to IES LM-79-08 and is applicable for all types of LED products (directional and non-directional light projections). Its spectroradiometer is an array-type detector manufactured and calibrated by Labsphere (Model# CDS600).

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. The auxiliary lamp used to perform this task is a halogen type lamp powered by a calibrated *Lamp Power Supply* manufactured and calibrated by Labsphere (model LPS 200). Ambient temperature (for photometric analysis) is measured using a “J-Type” thermocouple located inside the integrating sphere at the same height as the sample under test and not more than 1 meter in horizontal distance away from the sample. The thermocouple is located behind the baffle of the photo detector in order to eliminate any direct optical radiation from the sample under test.

Luminaire Stabilization.

The sample was placed inside the integrating sphere and powered by a regulated and conditioned 120.0 Volt, alternating current supply. The correlated color temperature, color rendering index, chromaticity coordinates and electrical power measurements contained in this report are the numeric **averages** of the three readings upon which stabilization is verified. The stabilization times shown on the results pages of this report denote the time of the 1st measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization.

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

Manufacturer: Sylvania

Model# 75Q/CL-28V

Voltage = 28.0 Volt

Wattage = 75.0 Watts

Calibration Current = 2.679 Amperes

Luminous Flux = 1538.8 Lumens

Calibration Date = 8-18-2005 (calibrated by Labsphere – NIST traceable).

Continued.....

Photometric Testing Information (continued)

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

Manufacturer: General Electric
 Part Number: CSB-110
 Bulb Number: 108-A
 Voltage: 24.0 Volts
 Wattage: 150.0 Watts
 Calibration Current: 4.799 Amperes
 Luminous Intensity: 150.3 Candelas
 Calibration Date: 4-14-2009 (NIST traceable)

A *Power Analyzer* was used to measure all electrical characteristics of the sample.

Equipment List:

Description	Manufacturer and Model Number	OnSpeX Instrument Reference Number	Calibration Due Date
Integrating Sphere 65"	Labsphere LMS650	IS100	N/A
Spectroradiometer	Labsphere CDS600	CDS600	5-20-2011
Auxiliary Lamp PSU	Labsphere LPS200	LPS200	2-16-2011
Power Analyzer	Voltech PM1000+	PA110	4-27-2011
Power Analyzer	Yokogawa WT210	PA107	3-23-2011
Regulated Power Supply	California Instruments 1001P	AC100	N/A
Regulated Power Supply	Chroma Instruments 61602	AC300	N/A
Thermometer (Thermocouple)	Fluke 52	TH100	8-04-2011

All equipment is calibrated by TMI (Technical Maintenance, Inc.) ISO / IEC 17025-2005 Accredited (Cert. 1378.01) except: Labsphere CDS600 and Labsphere LPS200 which is calibrated by Labsphere, USA.