



PHOTOMETRIC TESTING & EVALUATION TO IES LM-79-08

Sample Tested
LED-PAR30S-75-1WD-INF

Prepared for:

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Program Description

Photometric and electrical testing of an “LED-PAR30S-75-1WD-INF” replacement lamp to IES LM-79-08.

Executive Summary

Sample Tested = **LED-PAR30S-75-1WD-INF**

Luminous Efficacy* (Lumens/Watt)	Luminous Flux* (Lumens)	Input Power* (Watts)	Power Factor*
50.77	749.4	14.76	0.927

CCT (K)*	CRI*	Stabilization Time (Light & Power)
2950.6	83.7	45 minutes

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



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Sample

The following sample was submitted for evaluation:

LEDnovation, Inc. - **LED-PAR30S-75-1WD-INF**

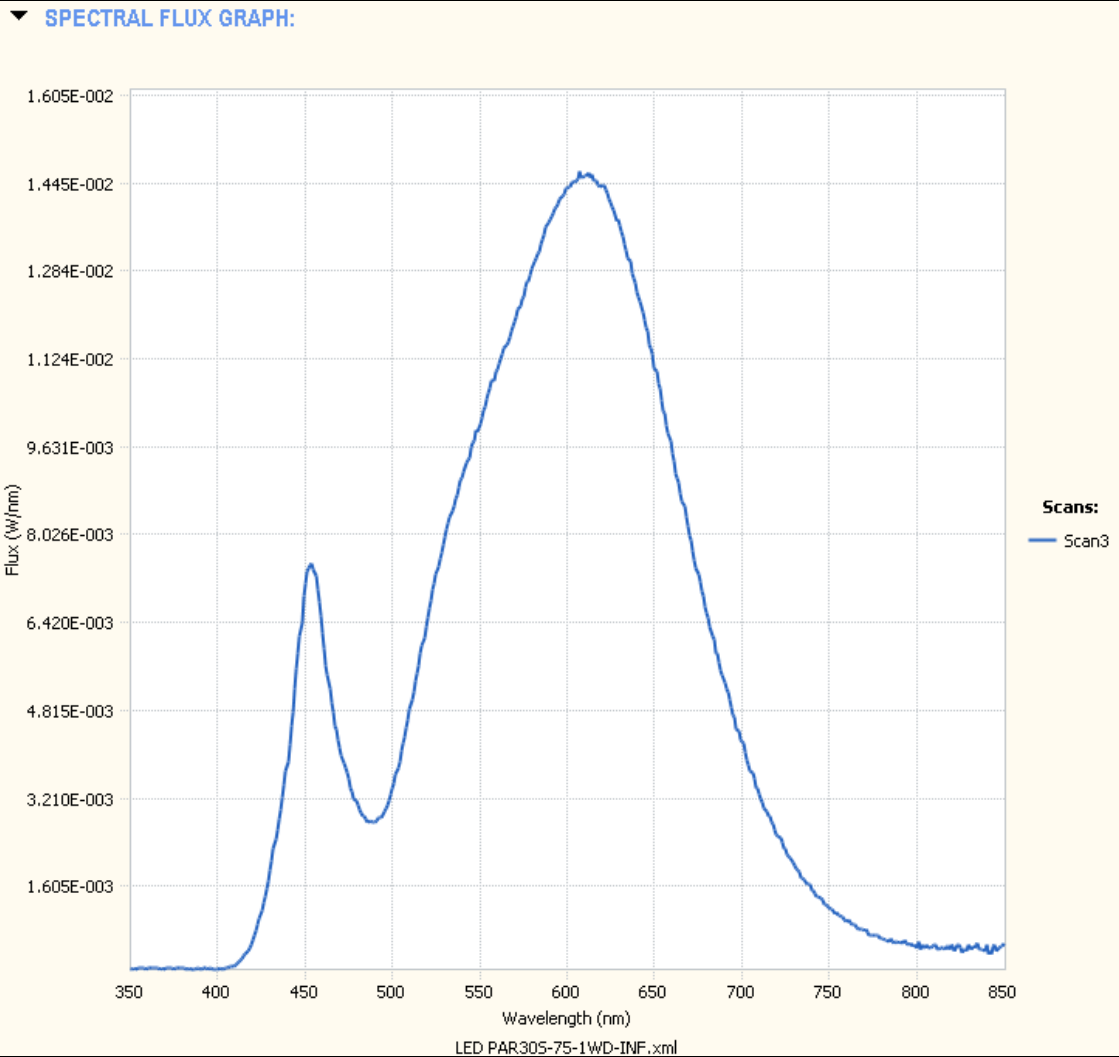


LED-PAR30S-75-1WD-INF

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-PAR30S-75-1WD-INF	
	Integrating Sphere	Goniophotometer
Luminous Efficacy (Lumens/Watt)	50.77	48.88
Total Luminous Flux (Lumens)	749.4	718.5
Total Radiant Flux (Watts)	2.53	
Correlated Color Temperature (CCT)	2950.6	
Color Rendering Index (CRI)	83.7	
Chromaticity (Chroma x / Chroma y)	0.4373 / 0.3990	
Chromaticity (Chroma u / Chroma v)	0.2530 / 0.3463	
Chromaticity (Chroma u' / Chroma v')	0.2530 / 0.5194	
D _{uv} Value	-0.00209	
Stabilization Time (Light and Power)	Approx. 45 minutes	
Total Run Time – Integrating Sphere	52 minutes	
Total Run Time – Goniophotometer	95 minutes	
Spacing Criteria	0.46 (0° – 180°) / 0.46 (90° – 270°)	
Electrical Input Results:	Sample Reference	
	LED-PAR30S-75-1WD-INF	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	14.76	14.70
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	0.913
Additional Information	Sample Reference	
	LED-PAR30S-75-1WD-INF	
Ambient Temperature	25.3°C	
Integrating Sphere Detector	CDS 600 Spectroradiometer	
Absorption Correction used?	Yes	

Spectral Flux

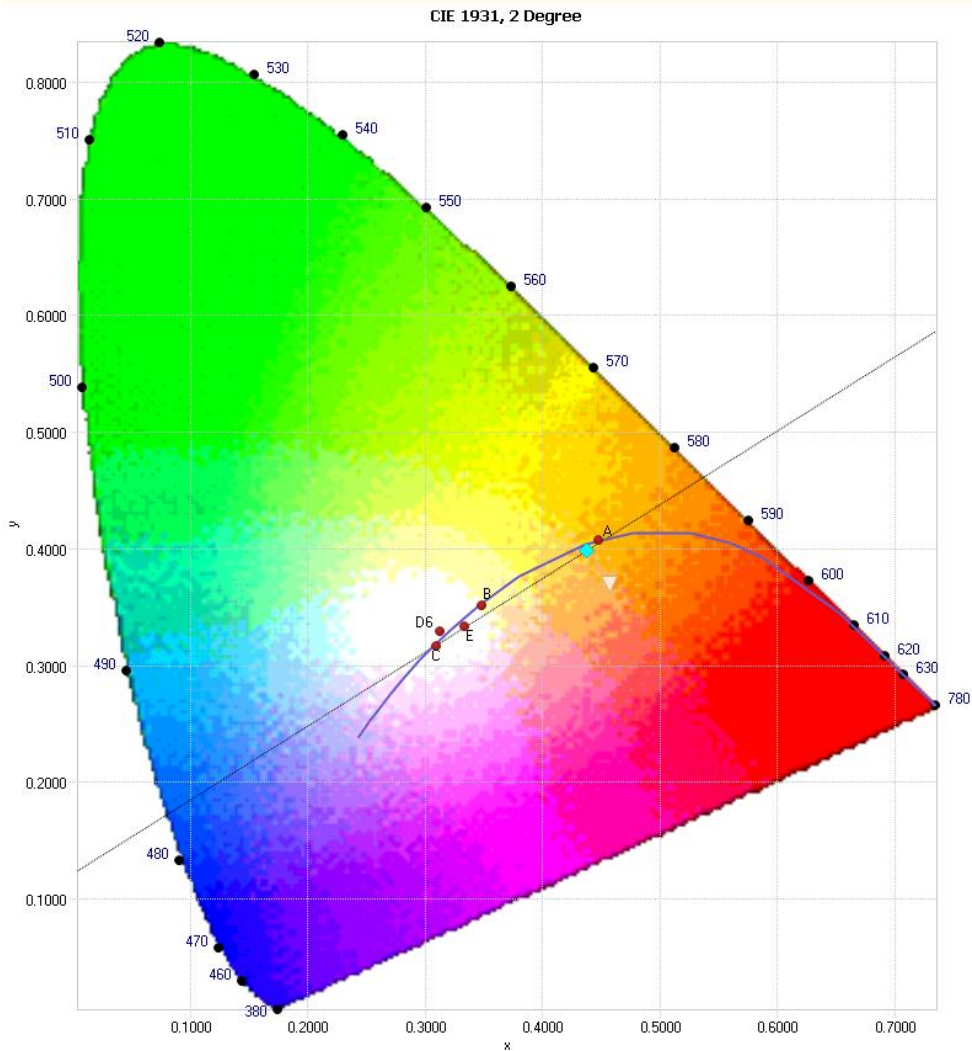
The following graph shows the spectral response curve of the radiant flux for the sample:



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 = 0.4373 / 0.3990

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:

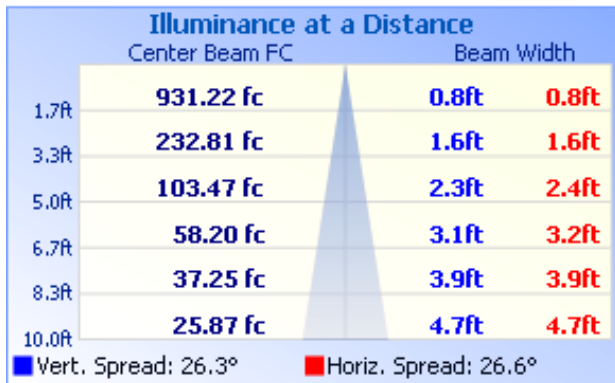
Zone	Lumens	% Total
0 - 10	214.2	29.8%
10 - 20	294.7	41.0%
20 - 30	123.0	17.1%
30 - 40	44.6	6.2%
40 - 50	19.5	2.7%
50 - 60	9.2	1.3%
60 - 70	6.8	0.9%
70 - 80	5.1	0.7%
80 - 90	1.6	0.2%
Total	718.5 Lumens	100%

Zonal Lumen Summary

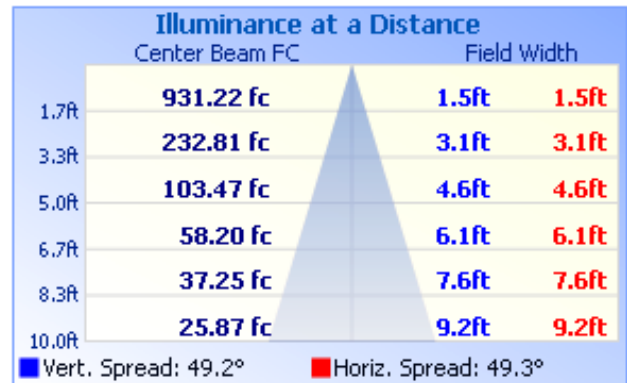
Zone	Lumens	% Lamp / Luminaire
0 - 60	705.1	98.1%
60 - 90	13.4	1.9%
0 - 90	718.5	100%
90 - 180	0.0	0.0%
0 - 180	718.5	100%

Test Results – Illuminance Plots

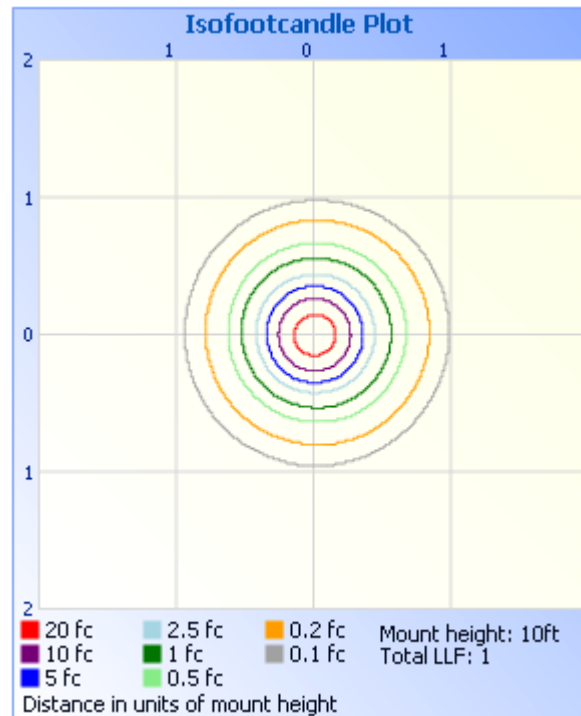
The following images depict the illuminance characteristics of the luminaire.



Beam Angle



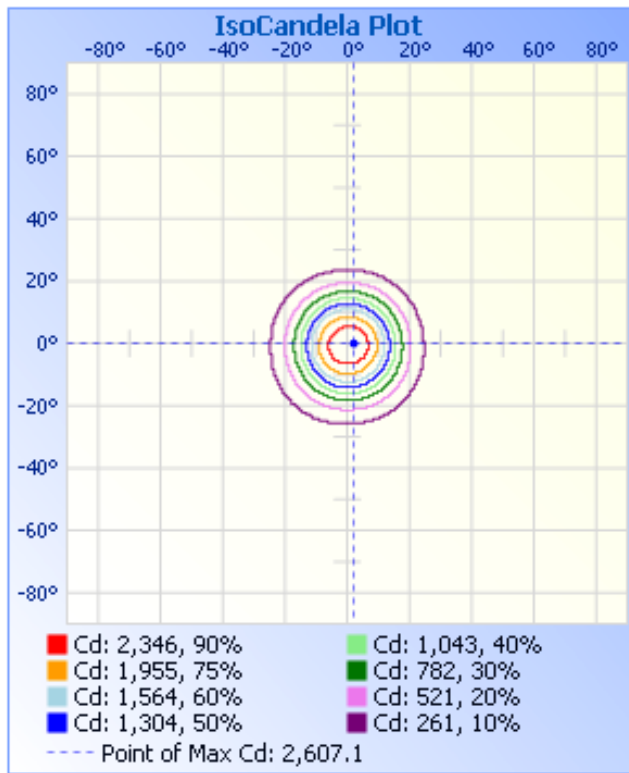
Field Angle



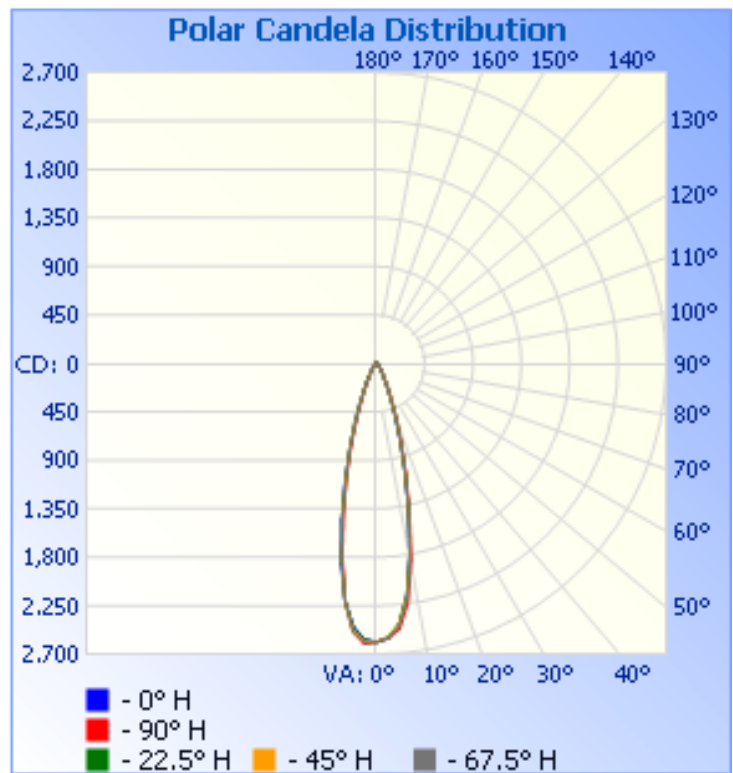
Illuminance Plot (Footcandles)

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	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587	2587
2.5	2554	2542	2546	2554	2555	2554	2554	2559	2564	2570	2579	2594	2607	2603	2586	2568	2550
5.0	2434	2426	2429	2453	2477	2486	2480	2466	2454	2462	2487	2503	2500	2504	2479	2452	2430
7.5	2178	2171	2187	2209	2244	2268	2273	2254	2233	2226	2232	2236	2228	2221	2206	2194	2173
10.0	1792	1796	1804	1828	1852	1882	1912	1897	1886	1867	1856	1847	1824	1814	1804	1793	1787
12.5	1376	1382	1395	1406	1427	1453	1477	1494	1489	1473	1458	1436	1418	1399	1380	1372	1365
15.0	1011	1023	1031	1042	1055	1074	1099	1120	1121	1118	1101	1079	1060	1036	1028	1016	1008
17.5	716	734	744	761	770	779	800	816	818	822	808	789	762	740	738	732	714
20.0	489	501	519	537	547	555	578	592	580	586	571	551	520	503	508	501	488
22.5	323	333	351	366	379	388	410	419	403	399	388	369	343	331	334	328	323
25.0	214	224	237	249	261	268	286	291	277	271	261	245	226	216	217	214	214
27.5	147	156	164	173	183	189	200	203	195	189	181	168	153	146	145	144	146
30.0	105	113	116	125	135	138	145	145	138	133	128	118	109	102	101	102	104
32.5	79	85	88	92	100	103	108	107	103	100	94	86	79	74	74	76	79
35.0	60	63	65	69	75	78	81	80	78	75	69	63	59	56	56	56	59
37.5	46	48	50	53	57	59	61	60	58	56	52	48	45	44	44	44	46
40.0	36	37	39	41	44	46	47	46	45	43	40	38	36	35	35	35	36
42.5	29	29	30	32	34	35	36	36	35	33	31	29	28	28	28	28	29
45.0	23	23	23	24	26	27	28	27	27	26	24	23	22	22	23	22	23
47.5	18	18	18	19	20	21	21	21	20	20	19	18	17	17	18	18	18
50.0	14	14	14	15	15	16	16	16	16	15	15	14	14	14	15	14	14
52.5	12	11	11	12	12	12	12	12	12	12	12	11	11	11	12	11	12
55.0	10	10	10	10	10	10	10	10	10	10	10	9	9	10	10	10	10
57.5	9	9	9	9	9	9	8	8	8	9	8	8	8	9	9	9	9
60.0	8	8	8	8	8	8	7	7	8	8	8	8	7	8	8	8	8
62.5	8	7	7	7	7	7	7	7	7	7	7	7	7	7	8	8	8
65.0	7	7	7	7	7	7	6	6	6	7	7	7	7	7	7	7	7
67.5	7	6	7	7	6	6	6	6	6	6	6	6	6	7	7	7	7
70.0	6	6	6	6	6	6	5	6	6	6	6	6	6	6	7	6	6
72.5	6	6	6	6	6	5	5	5	5	5	5	5	6	6	6	6	6
75.0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
77.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
80.0	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
82.5	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
85.0	2	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	2
87.5	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1
90.0	0	0	0	0	0	0	0	0	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.