



PHOTOMETRIC TESTING & EVALUATION TO IES LM-79-08

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

Prepared for:

Evan O'Sullivan

LEDnovation, Inc.
13053 W. Linebaugh Ave.
Tampa, FL 33626

Phone: 813-891-9600

Technical Report Number
30016412-8

November 12, 2010

Prepared by:

Bryan Cubitt, Technical Team Leader

Approved by:

Steven Longo, Technical Manager





Program Description

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

Executive Summary

Sample Tested = LED-PAR30L-75-1WD-INF

Luminous Efficacy* (Lumens/Watt)	Luminous Flux* (Lumens)	Input Power* (Watts)	Power Factor*
54.43	797.9	14.66	0.928

CCT (K)*	CRI*	Stabilization Time (Light & Power)
2959.7	82.3	31 minutes

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



TABLE OF CONTENTS

Sample.....	4
Test Results.....	5
Spectral Flux.....	6
Chromaticity Diagram.....	7
Flux Distribution – Zonal Lumen Summary.....	8
Illuminance Plots.....	9
Candela Plots.....	10
Candela Tabulation.....	11
Photometric Testing Information.....	12
Equipment List:.....	13

Sample

The following sample was submitted for evaluation:

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



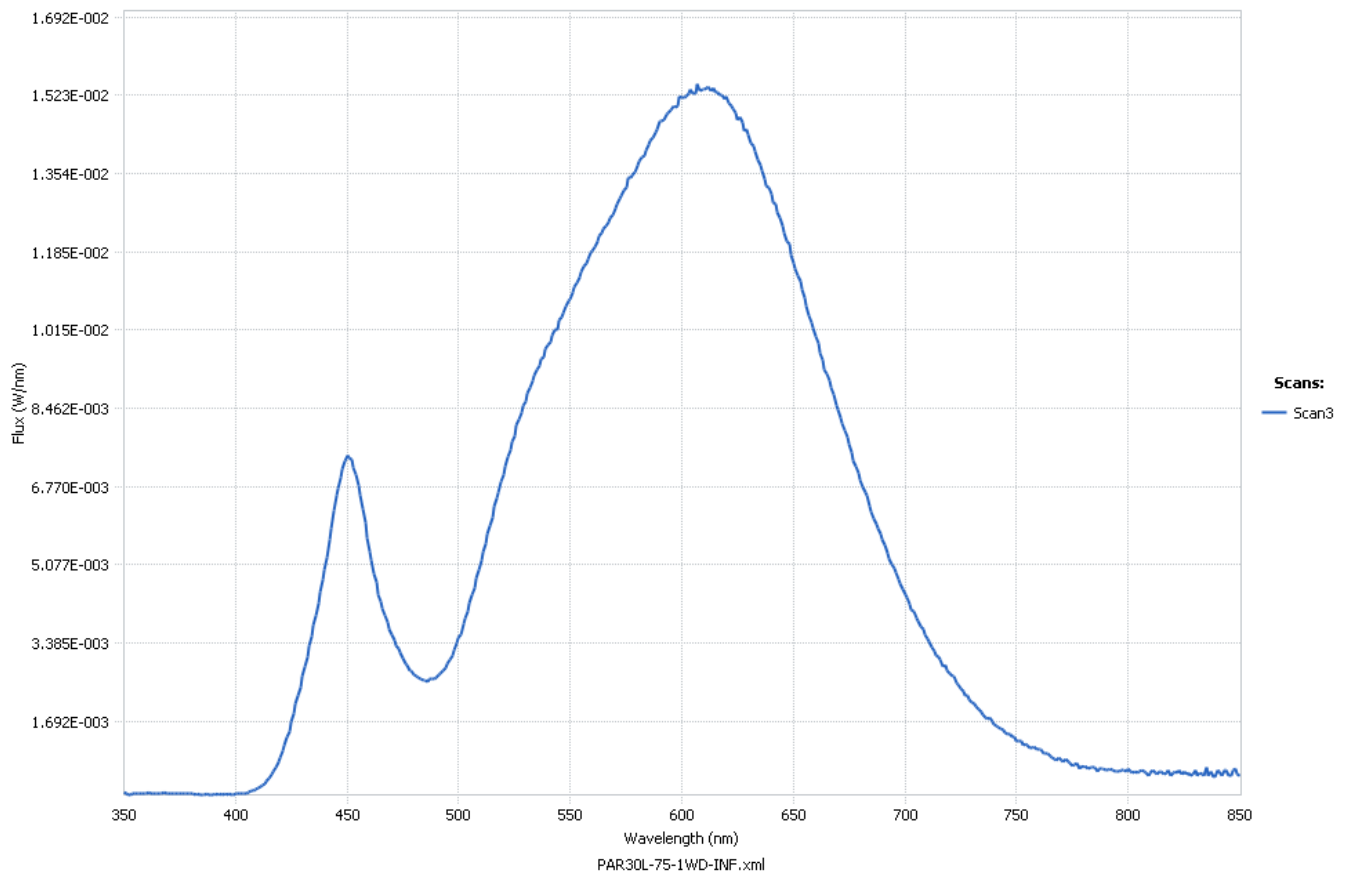
LED-PAR30L-75-1WD-INF

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-PAR30L-75-1WD-INF	
	Integrating Sphere	Goniophotometer
Luminous Efficacy (Lumens/Watt)	54.43	52.37
Total Luminous Flux (Lumens)	797.9	764.6
Total Radiant Flux (Watts)	2.67	
Correlated Color Temperature (CCT)	2959.7	
Color Rendering Index (CRI)	82.3	
Chromaticity (Chroma x / Chroma y)	0.4382 / 0.4020	
Chromaticity (Chroma u / Chroma v)	0.2523 / 0.3472	
Chromaticity (Chroma u' / Chroma v')	0.2523 / 0.5207	
D _{uv} Value	-0.00104	
Stabilization Time (Light and Power)	Approx. 31 minutes	
Total Run Time – Integrating Sphere	37 minutes	
Total Run Time – Goniophotometer	89 minutes	
Spacing Criteria	0.44 (0° – 180°) / 0.48 (90° – 270°)	
Electrical Input Results:	Sample Reference	
	LED-PAR30L-75-1WD-INF	
	Integrating Sphere	Goniophotometer
Input Power (Watts)	14.66	14.60
Input Voltage (Volts AC)	120.0	120.0
Input Current (Amps)	0.131	0.132
Input Frequency (Hertz)	60.0	60.0
Power Factor	0.928	0.924
Additional Information	Sample Reference	
	LED-PAR30L-75-1WD-INF	
Ambient Temperature	25.7°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:

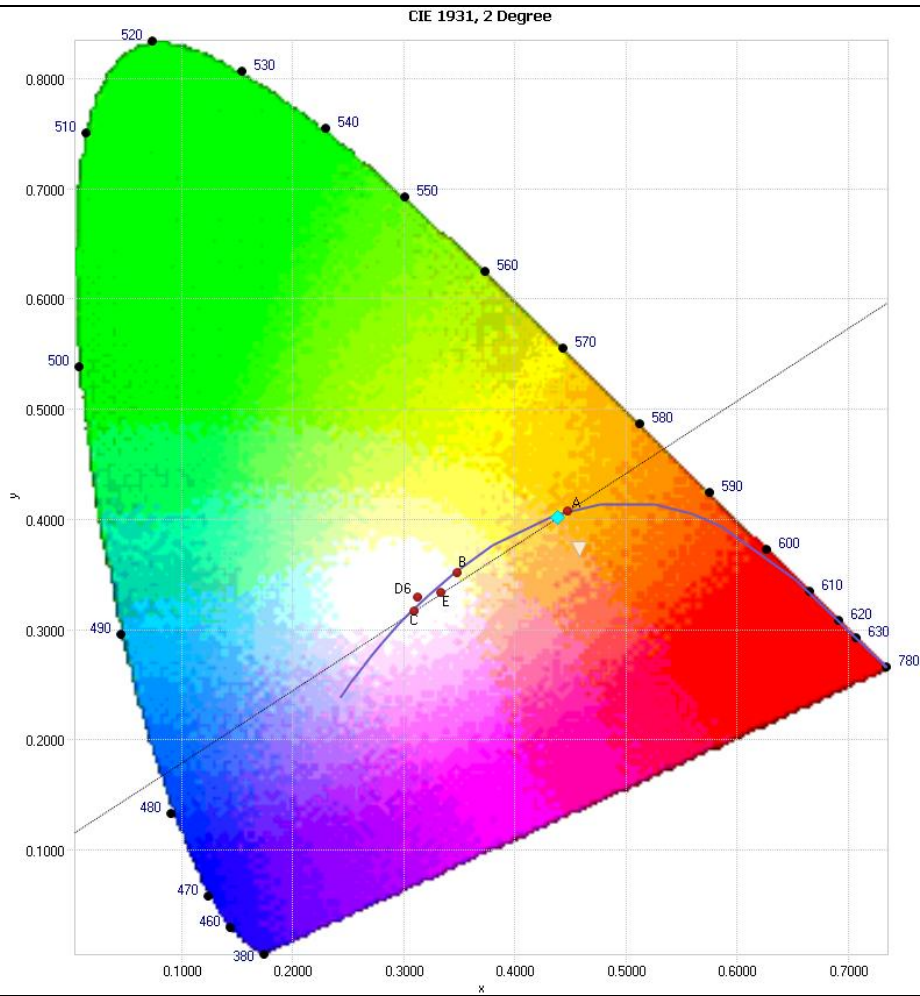
▼ SPECTRAL FLUX GRAPH:



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 = 0.4382 / 0.4020

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:

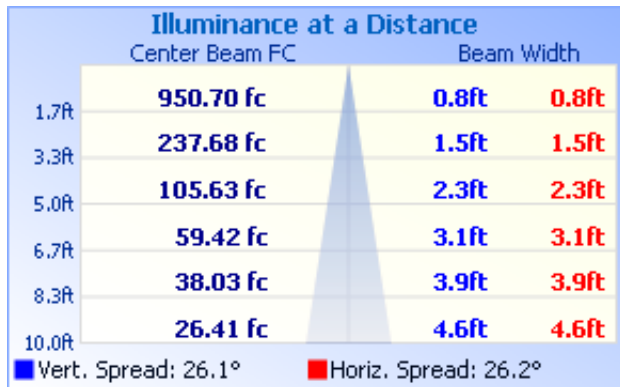
Zone	Lumens	% Total
0 - 10	216.1	28.30%
10 - 20	297.9	39.00%
20 - 30	128.6	16.80%
30 - 40	51.8	6.80%
40 - 50	27.5	3.60%
50 - 60	17.3	2.30%
60 - 70	13.6	1.80%
70 - 80	9.2	1.20%
80 - 90	2.6	0.30%
Total	764.6 Lumens	100%

Zonal Lumen Summary

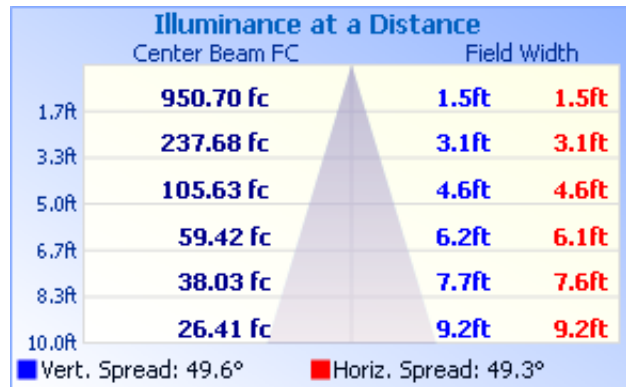
Zone	Lumens	% Lamp / Luminaire
0 - 60	739.1	96.7%
60 - 90	25.5	3.3%
0 - 90	764.6	100%
90 - 180	0.0	0.0%
0 - 180	764.6	100%

Test Results – Illuminance Plots

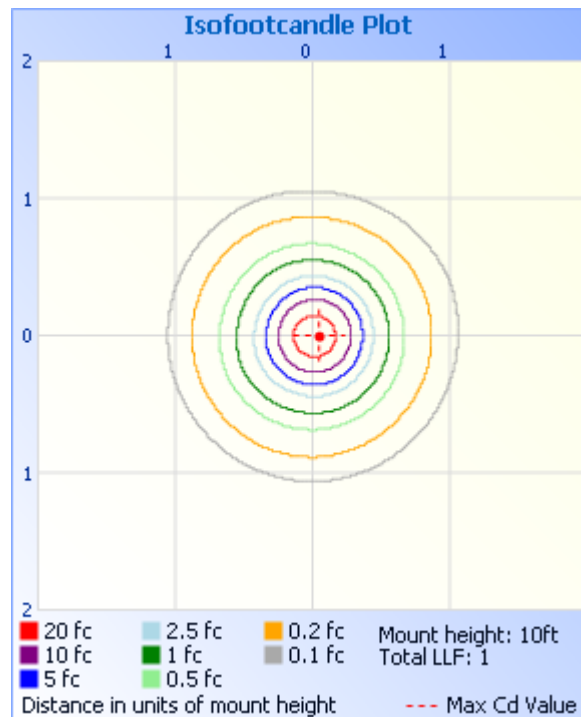
The following images depict the illuminance characteristics of the luminaire.



Beam Angle



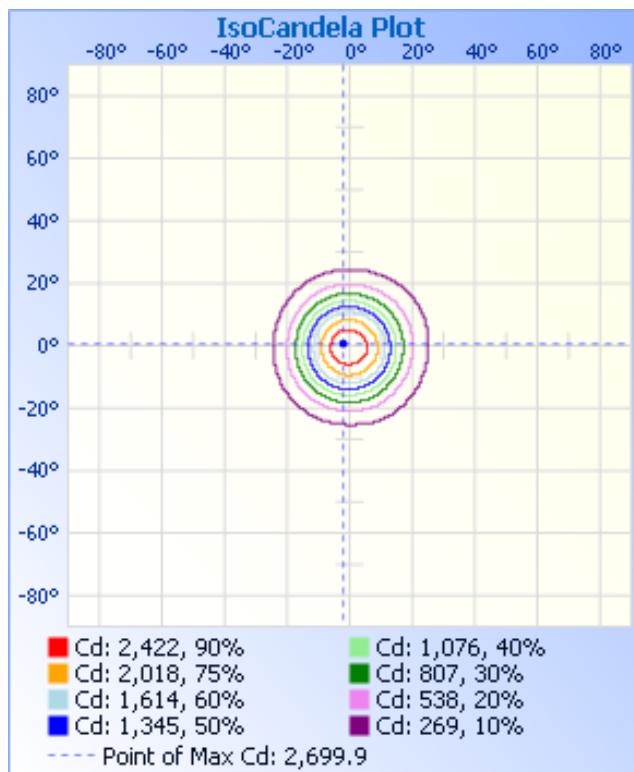
Field Angle



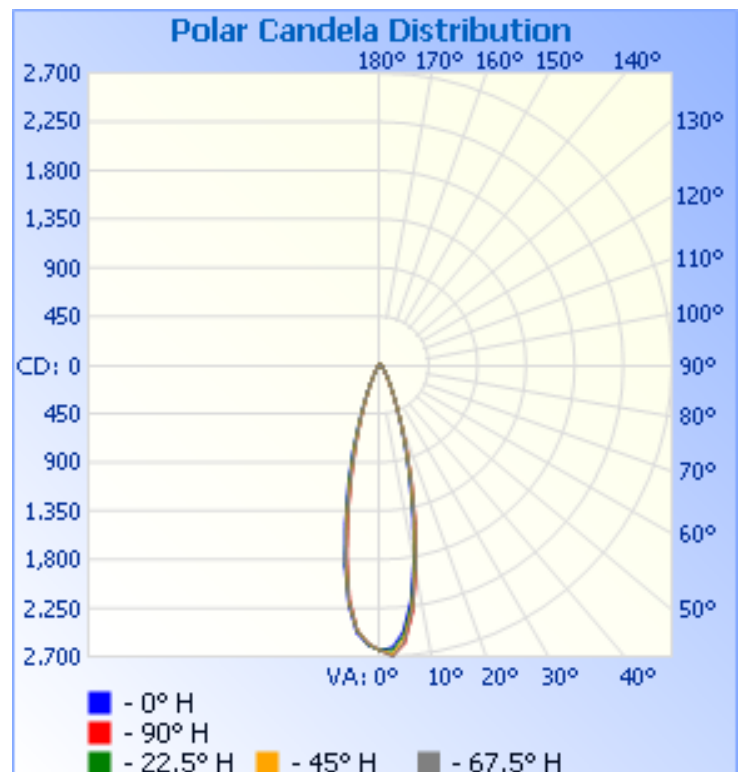
Illuminance Plot (Footcandles)

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	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641	2641
2.5	2616	2643	2679	2700	2691	2659	2626	2603	2593	2588	2581	2575	2577	2582	2588	2597	2612
5.0	2471	2509	2542	2575	2589	2573	2546	2518	2487	2463	2460	2460	2459	2450	2438	2442	2467
7.5	2191	2232	2268	2284	2305	2305	2294	2269	2238	2216	2212	2200	2185	2164	2154	2160	2188
10.0	1804	1846	1881	1904	1922	1937	1936	1910	1882	1860	1834	1806	1788	1769	1759	1768	1798
12.5	1395	1428	1454	1487	1504	1528	1537	1519	1491	1459	1422	1396	1364	1351	1345	1353	1385
15.0	1032	1064	1093	1115	1124	1165	1174	1155	1132	1099	1052	1024	1005	999	995	1002	1029
17.5	750	774	793	801	805	845	859	839	829	801	752	732	723	730	727	723	749
20.0	533	547	553	552	559	591	600	580	580	567	526	517	516	534	531	514	532
22.5	370	377	375	371	375	394	403	392	394	391	366	362	363	383	379	362	369
25.0	258	260	255	251	252	260	268	264	267	269	257	252	254	270	269	255	257
27.5	183	183	178	176	173	178	183	183	188	189	184	181	182	193	192	184	183
30.0	135	134	130	127	124	126	130	131	135	138	135	134	136	142	141	136	135
32.5	103	101	98	96	94	94	97	98	104	104	105	104	108	110	108	105	103
35.0	81	79	76	74	73	74	75	76	80	83	84	82	84	86	84	82	80
37.5	64	62	60	59	59	59	61	61	63	65	64	66	67	68	67	66	64
40.0	52	50	48	48	48	49	50	49	50	52	53	54	54	54	54	53	52
42.5	42	41	40	40	40	41	42	41	42	44	44	44	44	43	43	43	42
45.0	35	34	33	33	33	35	35	34	35	37	37	36	36	35	35	35	35
47.5	28	28	28	28	28	30	30	29	29	31	31	30	29	29	28	28	28
50.0	24	24	23	24	24	26	26	25	25	26	26	25	24	24	24	24	24
52.5	21	20	20	20	21	23	22	22	22	23	23	21	21	20	20	20	20
55.0	18	18	18	18	19	20	20	19	19	20	20	19	18	18	18	18	18
57.5	17	16	17	17	17	19	18	18	18	18	18	17	17	16	16	16	17
60.0	15	15	15	15	16	17	17	17	16	17	17	16	15	15	15	15	15
62.5	14	14	14	14	15	16	16	16	15	16	15	15	14	14	14	14	14
65.0	13	13	13	13	14	15	15	15	14	15	14	14	13	13	12	13	13
67.5	12	12	12	12	13	14	14	14	13	14	13	13	12	12	11	12	12
70.0	11	11	11	11	12	13	13	13	12	13	12	12	11	11	10	10	11
72.5	10	9	10	10	11	11	12	12	11	11	11	10	10	9	9	9	10
75.0	8	8	8	8	9	10	10	10	10	10	9	9	8	8	8	8	8
77.5	7	6	6	7	7	8	9	8	8	8	8	7	7	6	6	6	7
80.0	5	5	5	5	6	6	7	6	6	6	6	6	5	5	4	5	5
82.5	4	3	3	3	4	5	5	5	4	4	4	4	3	3	3	3	4
85.0	2	2	2	2	3	3	3	3	2	3	3	2	2	2	1	1	2
87.5	1	0	0	1	1	2	2	2	1	1	1	1	0	0	0	0	1
90.0	0	0	0	0	0	0	1	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.