NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

DONGGUAN THAILIGHT SEMICONDCTOR LIGHTING CO.,LTD

(Brand Name: THAILIGHT)

Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

Fuel Pump Canopy Luminaires

Model name(s): TLCLC45XYYZZ

Remark: The letter "X" in the model name stand for CCT as bellow : 4=4000K,5=5000K,6=5700K; "YY" stand for different mounting option as bellow CL=Ceiling, PD=Pendant; "ZZ" stand for different as bellow BR=Bronze, BK=Black, WH=White, GY=Gary.

Representative (Tested) Model: TLCLC454YYZZ
TLCLC456YYZZ

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Date: Jul.23,2016

Review By:

Tommy Liang

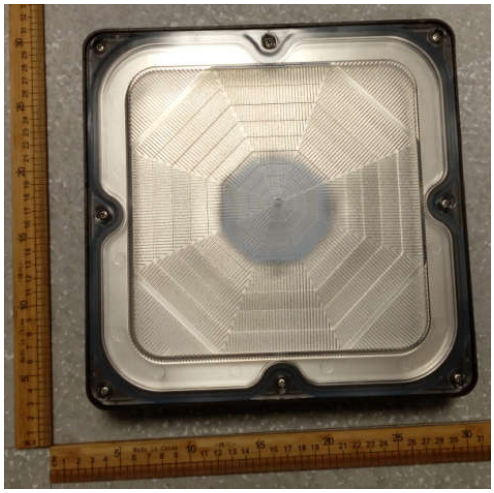
Manager: Tommy Liang

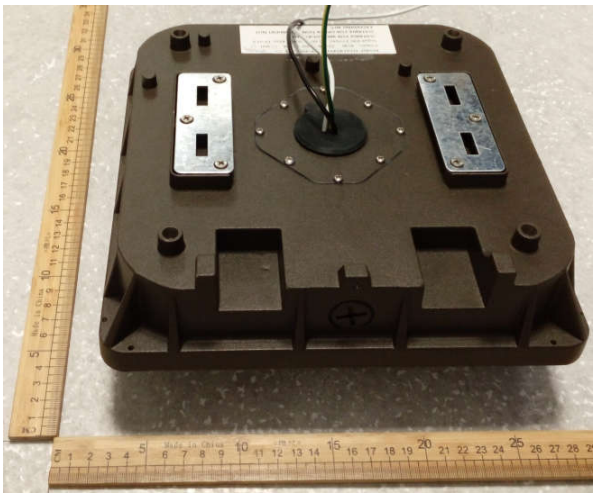
Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

1.1 Product Information:

Organization Name	DONGGUAN THAILIGHT SEMICONDCTOR LIGHTING CO.,LTD	
Brand Name	THAILIGHT	
Model Number	TLCLC45XYYZZ	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Fuel Pump Canopy Luminaires	
Rated Voltage / Frequency	120 -277Vac, 50/60 Hz	
Nominal Power	45W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K,5700K	
LED Manufacturer	Philips Lumileds	
LED Model	L130-xxyy003000W21	
Sample Number	GZE160765-C1(4000K),C2(5700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo





1.2 Test Specifications:

Date of Receipt	Jul.21,2016
Date of Test	Jul.22,2016
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25º C ± 1º C. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-22	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	TLCLC454YYZZ		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160765-C1	120.0	60	0.3710	44.31	0.9952	7.46
	277.0	60	0.1743	44.59	0.9237	10.52
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	4028
Duv	0.0026
Chromaticity (x, y)	x=0.3810 y=0.3828
Chromaticity (u', v')	u'=0.2231 v'=0.5043
Color Rendering Index (CRI)	82.3
R9	6

Special Color Rendering Indices			
R1	80	R9	6
R2	89	R10	73
R3	95	R11	78
R4	80	R12	57
R5	80	R13	83
R6	84	R14	97
R7	86	R15	74
R8	64	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4948.2	4910.5	>=2000(-10%)	
Luminous Efficacy (lm/W)	111.67	110.13	Standard: >= 90(-3%)	Premium: >= 110(-3%)
Zonal lumens in the 0-40° zone (%)	44.4	--	>= 40(-3)	
Zonal lumens in the 40-70° zone (%)	45.1	--	>= 40(-3)	
SC: 0-180° (if applicable)	--	--	--	
SC: 90-270° (if applicable)	--	--	--	
Beam Angle (°)	109.9	--	--	
Center Beam Candle Power (cd)	1699	--	--	

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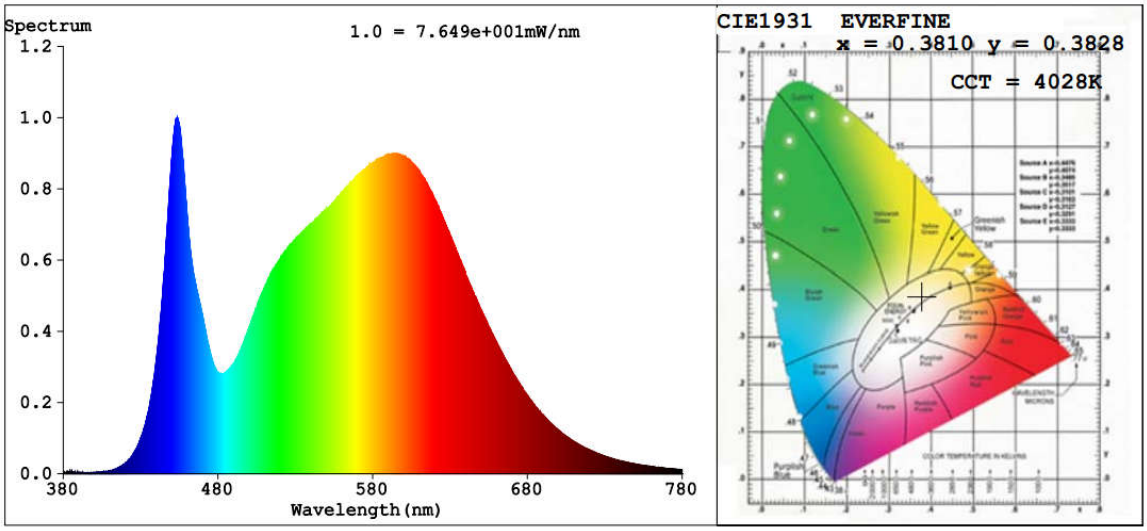
Spectral Power Distribution & Chromaticity Diagram

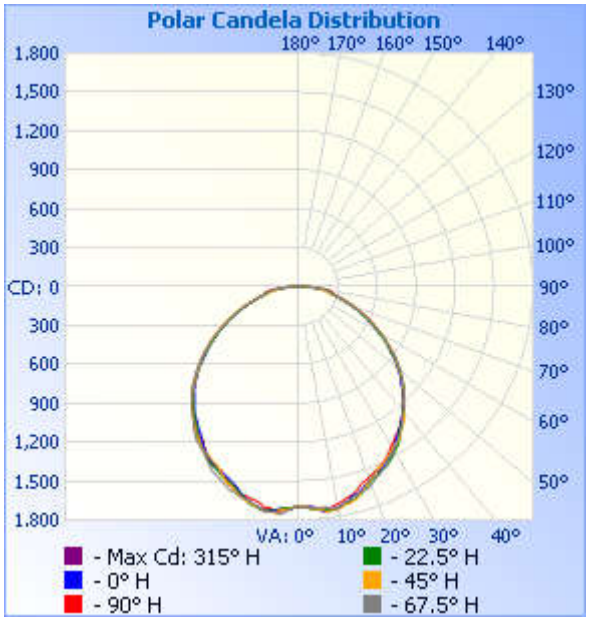


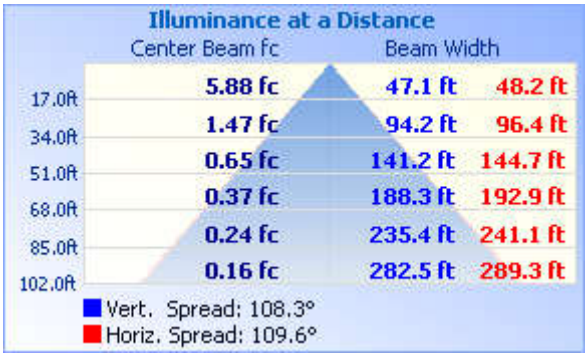
Zonal Lumen Tabulation

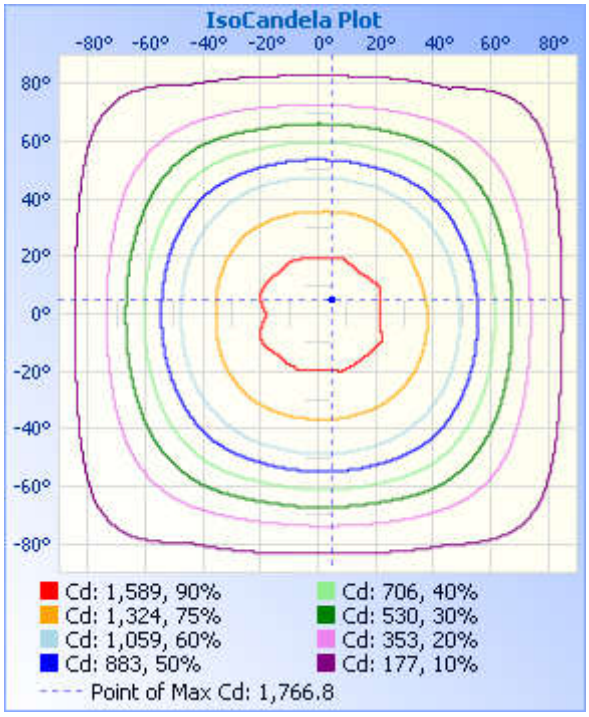
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,344.4	27.2%
0-40	2,196.4	44.4%
0-60	3,854.8	77.9%
60-90	1,075.2	21.7%
70-100	507.6	10.3%
90-120	12.4	0.3%
0-90	4,930.0	99.6%
90-180	17.7	0.4%
0-180	4,947.8	100%

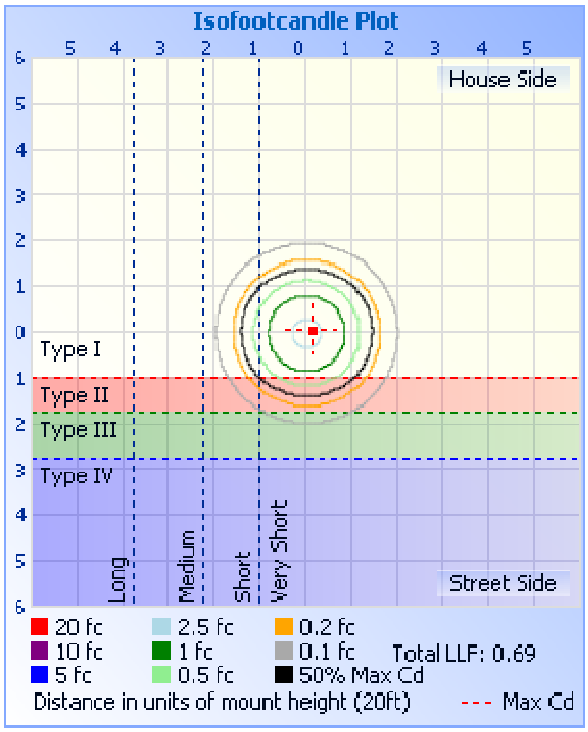
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	165.4	3.3%	90-100	7.7	0.2%
10-20	471.9	9.5%	100-110	3.9	0.1%
20-30	707.2	14.3%	110-120	0.9	0%
30-40	851.9	17.2%	120-130	1.1	0%
40-50	880.2	17.8%	130-140	1.2	0%
50-60	778.2	15.7%	140-150	1.1	0%
60-70	575.3	11.6%	150-160	1.0	0%
70-80	340.6	6.9%	160-170	0.7	0%
80-90	159.3	3.2%	170-180	0.3	0%

Photometric Data









C (DEG) / γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699	1699
5	1739	1731	1739	1730	1725	1722	1725	1715	1720	1723	1723	1724	1720	1726	1731	1762
10	1700	1746	1752	1732	1729	1738	1743	1737	1703	1740	1740	1731	1734	1738	1743	1744
15	1665	1682	1690	1682	1660	1687	1698	1665	1645	1670	1678	1666	1670	1674	1690	1684
20	1611	1642	1594	1601	1584	1605	1592	1622	1567	1621	1585	1589	1576	1590	1615	1635
25	1525	1559	1528	1552	1535	1543	1520	1546	1506	1544	1502	1535	1529	1536	1511	1574
30	1449	1481	1460	1479	1443	1469	1443	1459	1421	1446	1444	1473	1452	1472	1463	1473
35	1369	1369	1373	1363	1341	1348	1366	1360	1338	1356	1364	1358	1345	1370	1381	1395
40	1280	1259	1275	1248	1250	1240	1257	1252	1235	1233	1250	1241	1256	1256	1279	1273
45	1157	1149	1138	1136	1137	1138	1143	1144	1130	1139	1140	1138	1144	1168	1165	1166
50	1029	1017	1003	999	995	1010	1009	1020	1007	1014	1008	1005	1014	1026	1021	1036
55	887	869	862	851	855	862	878	878	881	866	872	857	870	873	893	890
60	742	718	715	702	713	709	733	727	728	722	727	710	730	729	750	739
65	590	571	573	560	571	565	592	583	593	580	587	569	585	581	605	592
70	446	431	429	427	431	433	448	442	453	444	442	432	441	443	461	455
75	316	312	302	306	308	313	317	322	327	320	313	309	315	321	326	327
80	256	232	201	228	240	230	211	243	261	239	207	232	242	233	214	244
85	159	159	138	131	132	139	147	174	175	168	138	128	125	132	141	158
90	49.0	48.6	53.7	49.2	61.2	56.5	62.6	58.6	58.6	53.5	49.3	31.4	43.7	40.1	50.4	49.9
95	0.26	1.34	0.05	8.49	12.1	9.49	0.16	1.02	0.16	0.16	8.39	6.81	8.87	6.51	0.21	0.22
100	19.1	8.46	0.31	0.05	0.05	0.18	0.32	10.1	11.9	9.68	0.36	0.13	0.00	1.75	0.80	12.0
105	13.2	7.95	0.69	0.10	0.10	0.25	1.06	8.84	13.2	7.86	0.45	0.28	0.17	0.34	0.63	9.06
110	3.63	1.28	0.71	0.42	0.34	0.48	0.74	1.25	3.58	1.72	0.50	0.40	0.37	0.43	0.62	2.24
115	1.28	1.16	0.73	0.46	0.53	0.60	0.74	1.10	0.95	0.85	0.79	0.46	0.53	0.53	0.74	1.32
120	1.39	1.17	1.00	0.63	0.74	0.69	1.00	1.22	1.11	1.01	0.90	0.85	0.90	0.81	0.87	1.01
125	1.45	1.26	1.15	1.27	1.48	1.30	1.22	1.41	1.32	1.16	0.9993	1.22	1.34	1.22	1.06	1.09
130	1.61	1.37	1.23	1.38	1.64	1.56	1.31	1.50	1.55	1.29	1.11	1.43	1.54	1.59	1.17	1.36
135	1.70	1.41	1.30	1.54	1.70	1.70	1.34	1.51	1.70	1.38	1.28	1.69	1.70	1.70	1.20	1.49
140	1.73	1.46	1.36	1.82	1.94	1.88	1.38	1.52	1.85	1.70	1.30	1.92	1.84	1.93	1.22	1.75
145	1.80	1.52	1.41	1.93	1.99	1.96	1.41	1.53	2.11	1.85	1.43	2.03	1.94	2.12	1.59	1.81
150	2.01	1.58	1.69	2.06	2.20	2.18	1.64	1.65	2.21	2.07	1.90	2.10	2.08	2.10	2.14	1.97
155	1.85	1.75	2.07	2.17	2.32	2.20	2.06	1.91	2.07	2.11	2.11	2.19	2.13	2.07	2.20	2.11
160	1.92	1.93	2.17	2.26	2.31	2.22	2.13	2.03	2.11	2.15	2.27	2.22	2.17	2.18	2.29	2.23
165	2.06	2.04	2.27	2.38	2.29	2.26	2.17	2.15	2.48	2.17	2.38	2.33	2.23	2.40	2.38	2.52
170	2.32	2.19	2.85	2.54	2.49	2.73	2.81	2.22	2.85	2.59	2.69	2.84	3.03	3.06	2.89	2.81
175	2.53	2.54	2.95	2.83	3.07	3.03	2.97	2.34	2.80	2.68	2.69	2.93	3.07	3.23	2.98	2.97
180	2.59	2.70	2.95	2.91	3.29	3.03	3.02	2.55	2.59	2.59	2.69	2.96	2.91	3.29	3.02	3.03

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-22	Test Ambient:	25.2 º C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	TLCLC456YYZZ		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160765-C2	120.0	60	0.3693	44.09	0.9949	7.53
	277.0	60	0.1734	44.37	0.9235	10.59
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

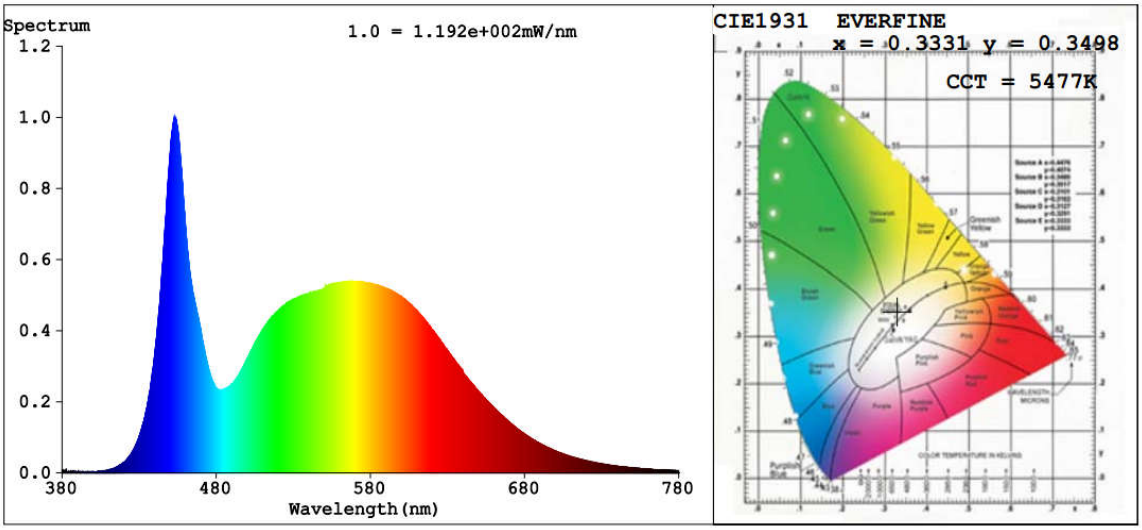
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5477
Duv	0.0042
Chromaticity (x, y)	x=0.3331 y=0.3498
Chromaticity (u', v')	u'=0.2040 v'=0.4820
Color Rendering Index (CRI)	82.0
R9	3

Special Color Rendering Indices			
R1	80	R9	3
R2	88	R10	70
R3	92	R11	79
R4	81	R12	56
R5	80	R13	82
R6	82	R14	96
R7	87	R15	75
R8	66	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4998	4961	>=2000(-10%)	
Luminous Efficacy (lm/W)	113.36	111.81	Standard: >= 90(-3%)	Premium: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

****** END OF REPORT ******