

LM-79-08 Test Report

For

Revolution Lighting Technologies, Inc.

(Brand Name: Revolution Lighting Technologies)

2280 Ward Ave. Simi Valley CA. 93065

Integrated Retrofit Kits for 2x4 Luminaires

Model name(s): 159311-111
159311-112
159311-113
159311-115

Remark: This is a multiple list report, the original report NO. is GZE170146-B.

Representative (Tested) Model: 159311-111
159311-115

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Jan.17,2017

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.

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

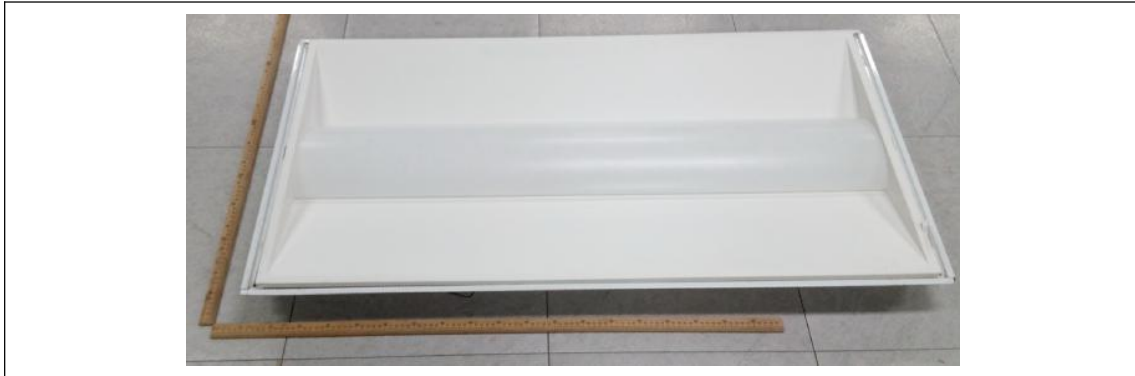
Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	159311-111 159311-112 159311-113 159311-115	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Integrated Retrofit Kits for 2x4 Luminaires	
Rated Voltage / Frequency	120 -277Vac, 50/60 Hz	
Nominal Power	36W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	62-217D Series(3000K)	
Sample Number	GZE170146-B1(3000K),B2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo





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1.2 Test Specifications:

Date of Receipt	Jan.12,2017
Date of Test	Jan.13,2017
Test item	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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

<p>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</p> <p>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.</p>
<p>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</p> <p>Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° 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.</p>
<p>3) Electrical Measurements:</p> <p>Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25° C ± 1° 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.</p>

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2017-01-13	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	159311-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170146-B1	120.0	60	0.2914	34.73	0.9931	5.24
	277.0	60	0.1401	34.64	0.8924	12.92
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

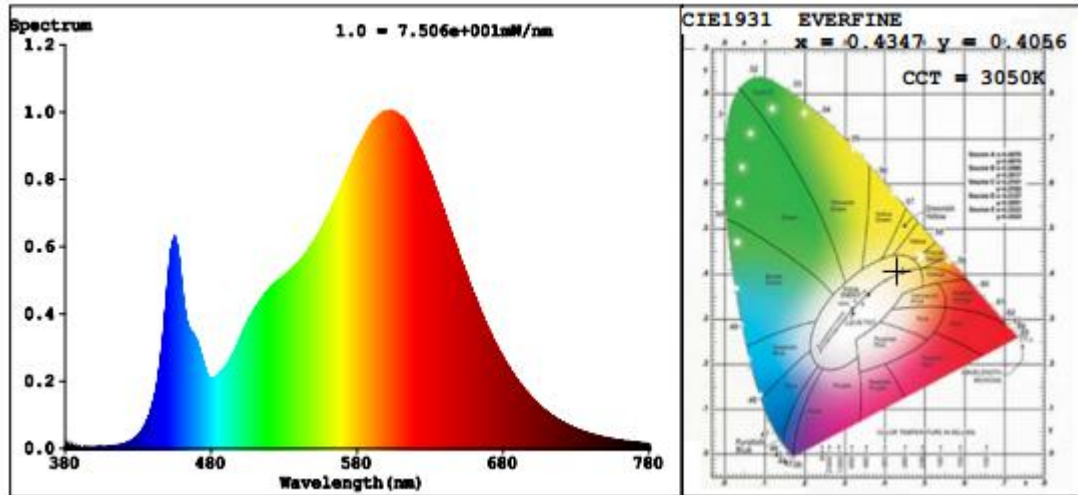
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	3050	R3	95	R11	79
Duv	0.0009	R4	79	R12	68
Chromaticity (x, y)	x=0.4347 y=0.4056	R5	81	R13	84
Chromaticity (u', v')	u'=0.2485 v'=0.5216	R6	90	R14	98
Color Rendering Index (CRI)	82.3	R7	82	R15	73
R9	5	R8	58	--	--

Photometric Measurement in Lithonia 2GT8 lensed 2x4- Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4740.1	4724.8	>=3000(-10%)	
Luminous Efficacy (lm/W)	136.48	136.40	Standard: >= 100(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60° zone (%)	75.2	--	>=75(-3)	
SC: 0-180° (if applicable)	1.29	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.20	--	1.0-2.0(±0.1)	
Beam Angle (°)	115.0	--	--	
Center Beam Candle Power (cd)	1599	--	--	

Spectral Power Distribution & Chromaticity Diagram

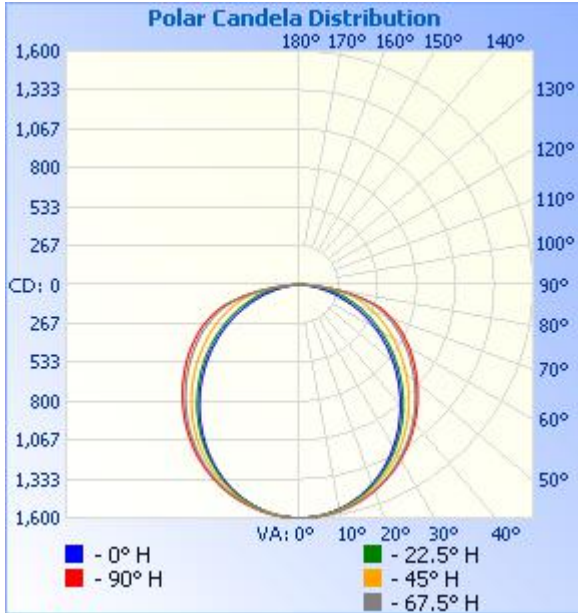


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,232.0	26%
0-40	2,010.4	42.4%
0-60	3,566.4	75.2%
60-90	1,163.1	24.5%
70-100	547.8	11.6%
90-120	5.3	0.1%
0-90	4,729.5	99.8%
90-180	10.2	0.2%
0-180	4,739.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	151.1	3.2%	90-100	1.6	0%
10-20	431.3	9.1%	100-110	1.8	0%
20-30	649.6	13.7%	110-120	1.8	0%
30-40	778.4	16.4%	120-130	1.6	0%
40-50	808.0	17.0%	130-140	1.3	0%
50-60	748.0	15.8%	140-150	0.9	0%
60-70	616.9	13.0%	150-160	0.7	0%
70-80	420.4	8.9%	160-170	0.3	0%
80-90	125.7	2.7%	170-180	0.2	0%

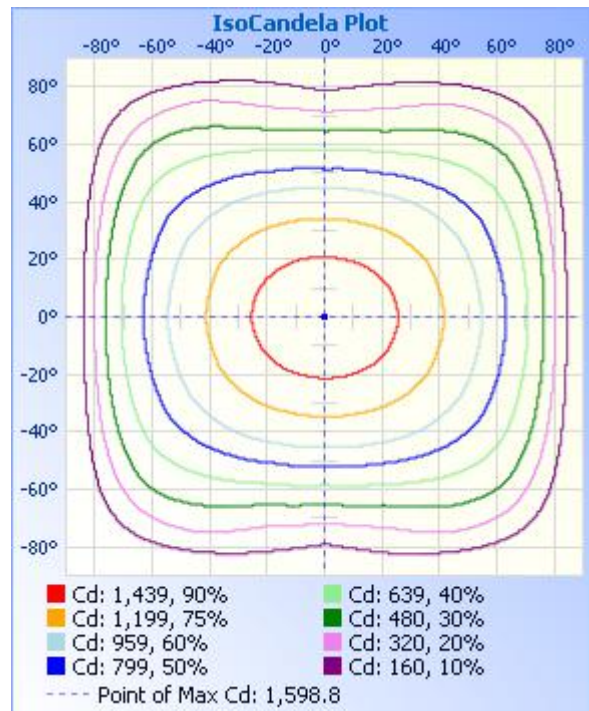
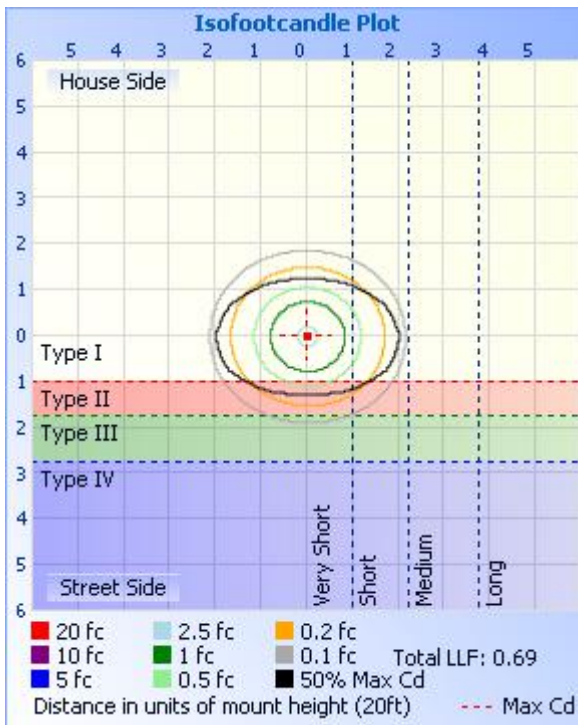
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	5.53 fc	43.0 ft	67.6 ft
34.0ft	1.38 fc	86.0 ft	135.2 ft
51.0ft	0.61 fc	129.0 ft	202.8 ft
68.0ft	0.35 fc	172.0 ft	270.4 ft
85.0ft	0.22 fc	215.0 ft	338.0 ft
102.0ft	0.15 fc	258.0 ft	405.6 ft

■ Vert. Spread: 103.3°
■ Horiz. Spread: 126.6°



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Table--1 UNIT: cd

C (DEG) \ y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
5	1592	1592	1591	1589	1589	1591	1592	1594	1594	1592	1591	1590	1589	1589	1590	1591
10	1572	1571	1568	1562	1562	1565	1570	1575	1576	1572	1568	1563	1560	1562	1565	1570
15	1540	1536	1529	1519	1516	1522	1532	1543	1546	1539	1529	1518	1514	1517	1526	1535
20	1498	1491	1475	1458	1453	1464	1480	1498	1503	1493	1475	1457	1451	1457	1473	1489
25	1443	1434	1408	1383	1376	1391	1415	1442	1450	1435	1408	1381	1373	1382	1408	1432
30	1378	1364	1331	1296	1285	1305	1339	1374	1385	1365	1329	1294	1281	1295	1331	1363
35	1303	1287	1242	1198	1184	1208	1252	1298	1311	1286	1241	1196	1179	1198	1243	1285
40	1221	1199	1146	1093	1075	1103	1158	1212	1229	1199	1143	1090	1069	1093	1148	1199
45	1133	1107	1043	981	961	992	1057	1122	1142	1108	1041	978	954	982	1047	1108
50	1043	1010	937	866	843	878	953	1028	1051	1013	936	862	835	867	942	1012
55	951	913	829	750	723	762	848	933	961	918	829	745	714	751	835	916
60	857	815	723	633	602	645	744	838	869	822	724	628	592	634	729	821
65	759	717	618	517	480	531	641	741	772	724	620	513	471	519	625	723
70	653	612	516	405	361	420	539	638	669	622	517	401	351	407	522	619
75	519	493	412	299	245	315	434	522	542	508	413	297	237	303	418	498
80	322	317	286	203	140	218	307	339	342	328	289	200	133	208	288	318
85	124	125	121	98.9	53.7	110	134	133	131	126	118	93.7	48.7	98.6	119	125
90	2.79	3.54	2.76	1.43	0.15	0.93	2.24	2.56	1.79	2.33	1.88	0.64	0.35	1.09	2.34	3.04
95	2.15	2.44	1.83	0.89	0.00	0.45	1.29	1.60	1.39	1.79	1.39	0.69	0.79	0.89	1.89	2.34
100	2.09	2.39	1.98	1.13	0.15	0.45	1.30	1.50	1.39	1.94	1.69	1.04	1.29	1.24	2.19	2.54
105	2.19	2.39	2.18	1.23	0.50	0.64	1.69	1.64	1.74	2.14	2.08	1.23	1.29	1.24	2.44	2.84
110	2.84	2.78	2.58	1.28	0.69	0.74	1.99	1.95	2.19	2.14	1.93	1.23	1.29	1.14	2.44	2.74
115	2.94	2.89	2.87	1.28	0.64	0.94	1.99	2.05	2.19	2.14	1.93	0.84	1.04	1.04	2.34	2.74
120	2.94	2.88	2.83	1.04	0.59	0.55	2.04	2.09	2.14	1.99	1.73	0.84	0.79	0.74	2.29	2.74
125	2.94	2.88	2.78	1.04	0.55	0.55	2.04	2.09	2.14	1.89	1.54	0.84	0.84	0.89	2.09	2.64
130	2.99	2.74	2.53	0.99	0.69	0.55	1.99	2.00	2.04	1.89	1.49	0.84	0.94	0.94	2.04	2.60
135	2.74	2.64	2.23	1.04	0.94	0.55	1.59	2.00	2.04	1.89	1.49	0.84	1.04	0.89	1.84	2.54
140	2.89	2.69	1.93	0.69	0.94	0.40	1.44	2.00	1.99	1.64	1.49	0.64	1.29	0.64	1.84	2.29
145	2.39	2.29	1.73	0.44	1.23	0.40	1.30	1.60	1.89	1.74	1.49	0.59	1.53	0.30	1.84	2.09
150	2.29	2.29	1.73	0.39	0.70	0.45	1.34	1.60	1.99	1.69	1.44	0.59	1.63	1.24	1.79	2.04
155	2.34	2.19	1.64	0.99	1.04	0.54	0.86	1.60	1.69	1.54	1.19	1.23	1.84	1.84	0.40	1.89
160	1.95	1.89	0.40	1.58	1.19	1.29	0.70	0.90	1.53	1.42	0.45	1.23	2.03	1.84	1.29	0.60
165	0.50	0.40	1.09	1.68	1.73	1.34	1.10	0.45	0.70	0.51	1.09	1.58	1.53	1.64	1.45	1.25
170	1.24	1.19	1.63	1.68	1.68	1.49	1.69	1.25	1.44	1.39	1.44	1.87	2.03	1.93	1.84	1.85
175	1.34	1.34	1.69	1.73	1.73	1.79	1.79	1.45	1.44	1.39	1.44	1.73	1.93	1.93	1.84	1.85
180	1.34	1.59	1.54	1.82	1.78	1.79	1.84	1.55	1.69	1.39	1.44	1.58	1.83	1.89	1.79	1.85

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2017-01-13	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	159311-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170146-B2	120.0	60	0.2965	35.29	0.9917	5.73
	277.0	60	0.1427	35.18	0.8901	13.29
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

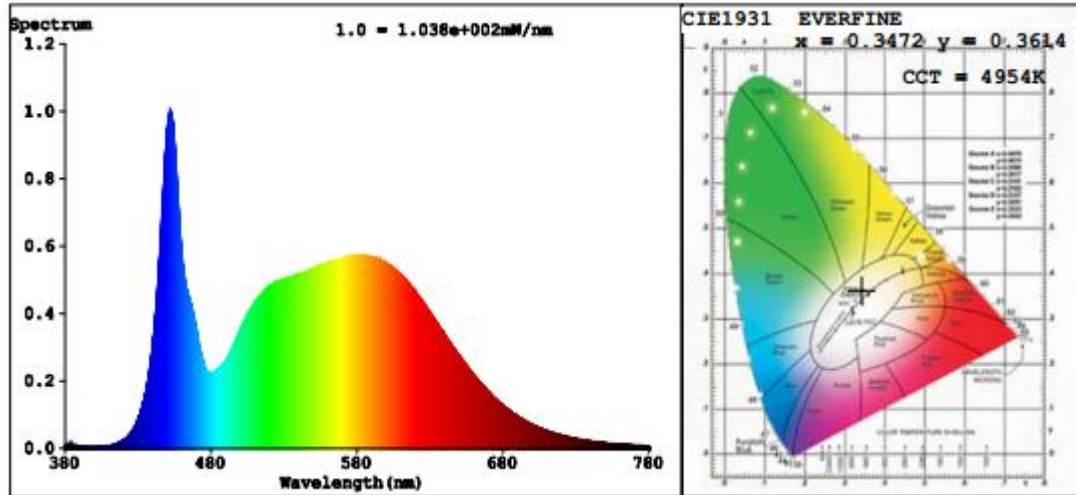
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	4954	R3	94	R11	80
Duv	0.0040	R4	81	R12	54
Chromaticity (x, y)	x=0.3472 y=0.3614	R5	81	R13	83
Chromaticity (u', v')	u'=0.2091 v'=0.4897	R6	83	R14	97
Color Rendering Index (CRI)	83.1	R7	88	R15	75
R9	9	R8	68	--	--

Photometric Measurement in Lithonia 2GT8 lensed 2x4 – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4940	4921	>=3000(-10%)	
Luminous Efficacy (lm/W)	139.98	139.89	Standard: >= 100(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
159311-111	3000K	4740.1	34.73	136.48
159311-112	3500K	4790 ^{*1}	35.01 ^{*2}	136.82 ^{*3}
159311-113	4000K	4840 ^{*1}	35.01 ^{*2}	138.25 ^{*3}
159311-115	5000K	4940	35.29	139.98

*1: This value is calculated and the calculation formula is as below:

$$4790 = (4940 - 4740.1) / 4 + 4740.1$$

$$4840 = (4940 - 4740.1) / 4 + 4790$$

*2: This value is calculated and the calculation formula is as below:

$$35.01 = (34.73 + 35.29) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$136.82 = 4790 / 35.01$$

$$138.25 = 4840 / 35.01$$

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 *******

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