

**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 2x2 Luminaires**

Model name(s): 159211-111  
159211-112  
159211-113  
159211-115

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

Representative (Tested) Model: 159211-111  
159211-115

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

Test &amp; 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	159211-111 159211-112 159211-113 159211-115	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Integrated Retrofit Kits for 2x2 Luminaires	
Rated Voltage / Frequency	120 -277Vac, 50/60 Hz	
Nominal Power	22W	
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-A1(3000K),A2(5000K)	
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	Jan.12,2017
Date of Test	Jan.13,2017
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

**1.3 Test Methods**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b></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><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b></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><b>3) Electrical Measurements:</b></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)*

<b>Test date</b>	2017-01-13	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	159211-111		

**Electrical Measurement in Lithonia 2GT8 lensed 2x2:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170146-A1	120.0	60	0.1897	21.96	0.9645	5.86
	277.0	60	0.0912	22.81	0.9028	12.23
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

**Chromaticity Measurement in Lithonia 2GT8 lensed 2x2- Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	3032	R3	95	R11	78
Duv	0.0012	R4	79	R12	68
Chromaticity (x, y)	x=0.4364 y=0.4069	R5	81	R13	83
Chromaticity (u', v')	u'=0.2490 v'=0.5224	R6	90	R14	98
Color Rendering Index (CRI)	82.0	R7	82	R15	72
R9	4	R8	57	--	--

**Photometric Measurement in Lithonia 2GT8 lensed 2x2– Goniophotometer Method:**

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2905.1	2890.1	>=2000(-10%)	
Luminous Efficacy (lm/W)	132.29	126.70	Standard: >= 100(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60° zone (%)	75.9	--	>=75(-3)	
SC: 0-180° (if applicable)	1.30	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.20	--	1.0-2.0(±0.1)	
Beam Angle (°)	115.3	--	--	
Center Beam Candle Power (cd)	986	--	--	

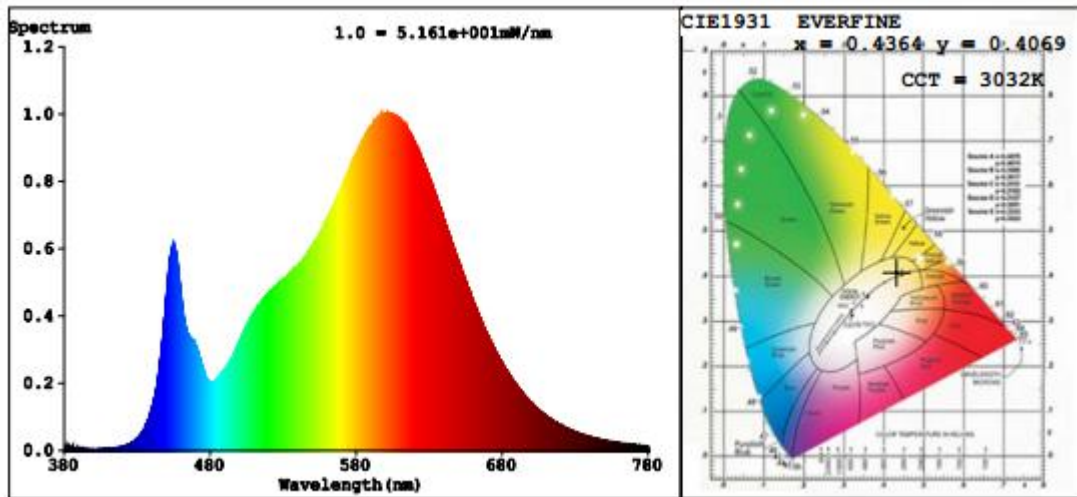
**Laboratory: Standard-Tech Co. Ltd Testing Center  
NVLAP CODE: 201011-0**

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**Spectral Power Distribution & Chromaticity Diagram**

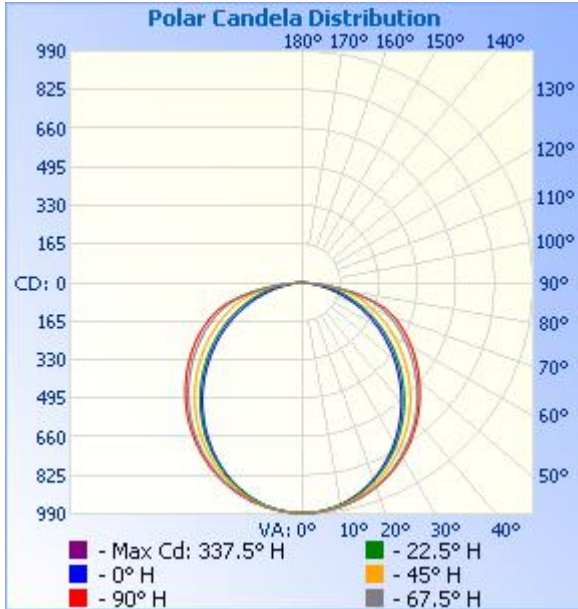


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	760.2	26.2%
0-40	1,241.7	42.7%
0-60	2,204.6	75.9%
60-90	692.2	23.8%
70-100	315.3	10.9%
90-120	3.3	0.1%
0-90	2,896.8	99.7%
90-180	8.0	0.3%
0-180	2,904.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	93.2	3.2%	90-100	0.9	0%
10-20	266.0	9.2%	100-110	1.1	0%
20-30	401.1	13.8%	110-120	1.4	0%
30-40	481.4	16.6%	120-130	1.4	0%
40-50	500.6	17.2%	130-140	1.3	0%
50-60	462.3	15.9%	140-150	0.9	0%
60-70	377.8	13.0%	150-160	0.6	0%
70-80	249.8	8.6%	160-170	0.3	0%
80-90	64.6	2.2%	170-180	0.1	0%

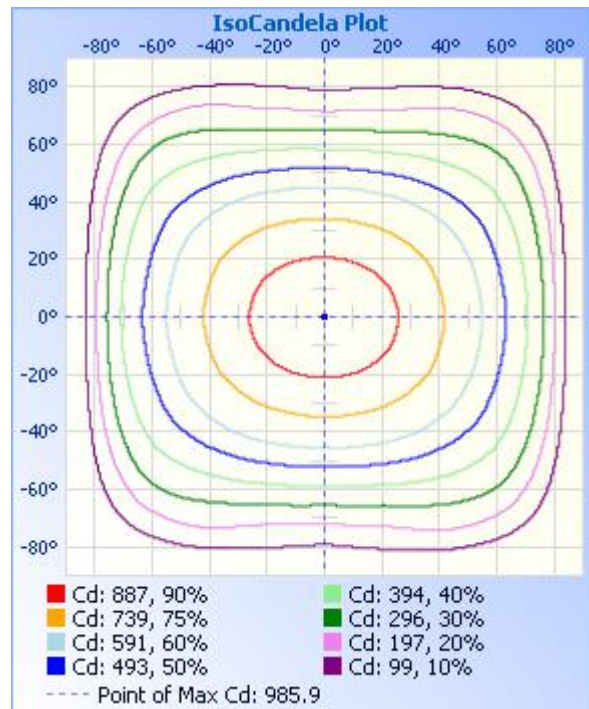
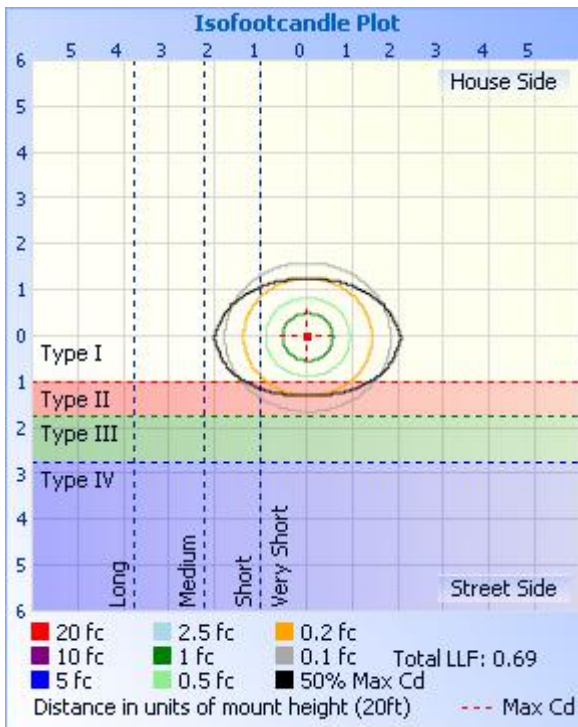
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	3.41 fc	43.2 ft	68.1 ft
34.0ft	0.85 fc	86.5 ft	136.1 ft
51.0ft	0.38 fc	129.7 ft	204.2 ft
68.0ft	0.21 fc	173.0 ft	272.2 ft
85.0ft	0.14 fc	216.2 ft	340.3 ft
102.0ft	0.09 fc	259.5 ft	408.4 ft

■ Vert. Spread: 103.7°  
■ Horiz. Spread: 126.9°



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Table--1 UNIT: cd

C(DEG)\ γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	986	986	986	986	986	986	986	986	986	986	986	986	986	986	986	986
5	981	981	981	981	980	981	982	983	983	982	981	980	979	979	981	981
10	968	968	966	963	963	965	968	972	972	971	967	963	961	962	966	968
15	949	948	942	936	935	939	946	953	955	952	943	935	932	934	940	947
20	924	919	908	898	896	903	915	927	931	924	911	898	892	897	908	919
25	891	884	867	852	848	857	876	894	899	890	871	851	844	850	867	884
30	851	842	819	799	793	804	829	854	861	849	823	798	789	798	820	842
35	805	794	764	739	731	746	777	808	817	801	769	738	727	738	766	794
40	755	740	705	674	664	681	719	756	768	748	710	674	661	675	708	742
45	702	682	641	606	594	613	656	699	714	691	646	606	591	607	645	685
50	646	622	575	535	522	543	591	640	657	631	580	535	518	538	581	626
55	588	561	508	463	448	472	523	578	599	569	511	462	444	466	515	566
60	529	499	439	390	374	398	455	516	540	507	442	388	369	393	448	505
65	468	435	372	317	299	326	388	454	480	443	373	315	293	321	382	442
70	402	369	305	245	224	254	321	390	416	378	306	242	219	249	316	378
75	318	294	238	176	152	185	255	311	325	298	238	172	146	181	247	301
80	194	183	158	110	85.3	120	169	191	195	180	154	106	80.7	116	164	188
85	65.9	64.0	58.2	42.1	30.5	48.4	63.3	66.2	64.4	58.9	53.1	38.4	27.4	43.7	58.6	64.1
90	1.44	2.20	1.35	0.43	0.04	0.21	0.67	1.06	1.34	1.44	0.45	0.00	0.00	0.30	1.24	1.54
95	1.34	1.74	0.94	0.10	0.00	0.00	0.35	1.25	1.29	1.39	0.45	0.00	0.00	0.40	1.34	1.39
100	1.29	1.69	0.94	0.15	0.00	0.00	0.64	1.20	1.59	1.54	0.84	0.00	0.00	0.59	1.54	1.54
105	1.39	1.88	1.19	0.49	0.00	0.44	0.89	1.35	1.89	1.79	1.09	0.40	0.05	0.94	1.64	1.70
110	1.84	1.94	1.39	0.69	0.30	0.74	1.34	1.69	2.04	1.89	1.24	0.59	0.25	1.09	1.64	1.99
115	1.99	2.14	1.64	0.79	0.54	0.89	1.39	1.99	2.04	1.89	1.34	0.59	0.45	0.94	1.64	1.99
120	2.19	2.09	1.79	1.08	0.59	0.94	1.54	2.04	2.04	1.84	1.24	0.89	0.55	1.29	1.54	1.99
125	2.29	2.09	1.83	1.24	1.19	1.24	1.59	2.04	2.04	1.84	1.24	1.09	0.95	1.59	1.54	1.89
130	2.29	2.09	1.84	1.34	1.34	1.39	1.59	2.04	2.04	1.84	1.24	1.33	1.39	1.59	1.54	1.89
135	2.29	2.09	1.59	1.49	1.39	1.59	1.64	2.04	1.99	1.84	0.89	1.19	1.44	1.54	1.39	1.74
140	2.29	2.09	1.54	1.09	1.39	1.59	1.44	2.04	1.99	1.84	0.84	0.59	1.44	0.89	1.39	1.69
145	2.14	1.99	1.39	1.04	1.44	0.99	1.14	1.74	1.94	1.84	0.99	0.54	1.24	1.05	1.39	1.69
150	2.09	1.79	1.39	1.24	1.14	0.79	1.14	1.69	1.94	1.89	1.14	0.45	1.58	1.59	1.19	1.39
155	1.89	1.64	0.51	1.34	1.88	1.24	1.24	1.69	1.79	1.94	1.14	0.45	1.44	1.58	0.50	1.29
160	1.64	0.86	0.35	1.39	2.03	1.24	0.65	1.59	1.39	1.54	0.59	0.74	1.14	1.29	1.14	0.50
165	0.65	0.45	0.84	1.39	1.69	1.24	0.95	0.60	0.70	0.85	0.60	0.89	1.14	1.24	1.24	1.25
170	1.24	0.99	1.14	1.29	1.49	1.59	1.14	0.94	1.29	1.24	1.34	1.14	1.78	1.94	1.59	1.25
175	1.44	0.94	0.89	1.49	2.08	1.59	1.19	1.20	1.19	1.24	1.34	1.19	2.08	2.18	1.99	1.24
180	1.24	0.94	0.84	1.48	2.18	1.49	1.14	0.75	1.34	1.24	0.94	0.84	1.53	2.03	1.54	1.10

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**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2017-01-13	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	159211-115		

**Electrical Measurement in Lithonia 2GT8 lensed 2x2:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170146-A2	120.0	60	0.1921	22.19	0.9627	6.18
	277.0	60	0.0924	23.04	0.9005	12.41
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

**Chromaticity Measurement in Lithonia 2GT8 lensed 2x2 - Sphere-Spectroradiometer Method:**

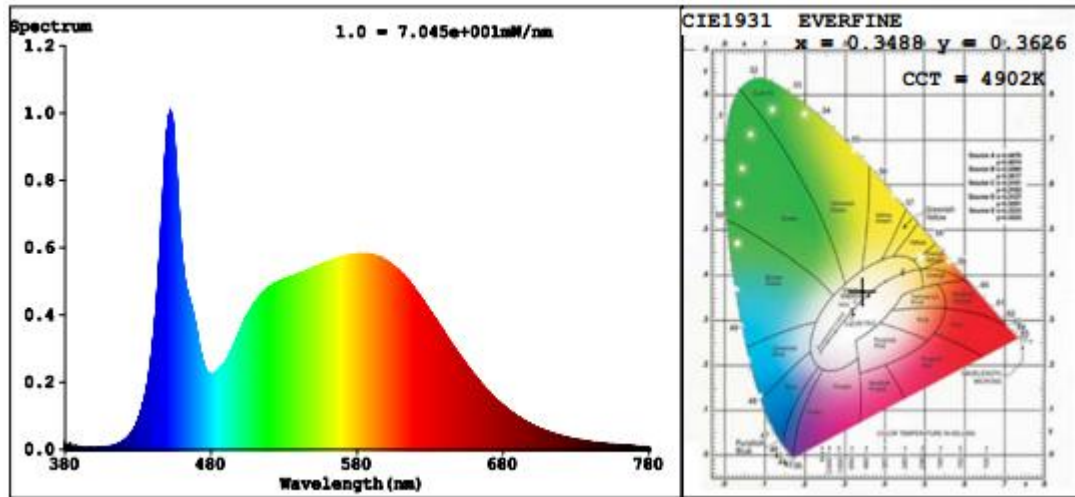
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	4902	R3	94	R11	80
Duv	0.0040	R4	81	R12	54
Chromaticity (x, y)	x=0.3488 y=0.3626	R5	81	R13	83
Chromaticity (u', v')	u'=0.2097 v'=0.4905	R6	83	R14	97
Color Rendering Index (CRI)	83.1	R7	88	R15	75
R9	9	R8	68	--	--

**Photometric Measurement in Lithonia 2GT8 lensed 2x2 – Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3008	2997	>=2000(-10%)	
Luminous Efficacy (lm/W)	135.57	130.08	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)
159211-111	3000K	2905.1	21.96	132.29
159211-112	3500K	2931 <sup>*1</sup>	22.08 <sup>*2</sup>	132.74 <sup>*3</sup>
159211-113	4000K	2957 <sup>*1</sup>	22.08 <sup>*2</sup>	133.92 <sup>*3</sup>
159211-115	5000K	3008	22.19	135.57

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

$$2931 = (3008 - 2905.1) / 4 + 2905.1$$

$$2957 = (3008 - 2905.1) / 4 + 2931$$

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

$$22.08 = (21.96 + 22.19) / 2$$

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

$$132.74 = 2931 / 22.08$$

$$133.92 = 2957 / 22.08$$

**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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