

LM-79-08 Test Report

For

RemPhos Technologies LLC**(Brand Name: **

90 Holten St, Danvers, MA 01923 USA

**Replacement Lamps for Outdoor
Pole/Arm-mounted Decorative Luminaires (Type C)**

Model name(s): RPT-LEDSSEXT-44L-740-X-G2

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

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Date: Nov.10,2016

Review By:

Tommy Liang

Manager: Tommy Liang

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>

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

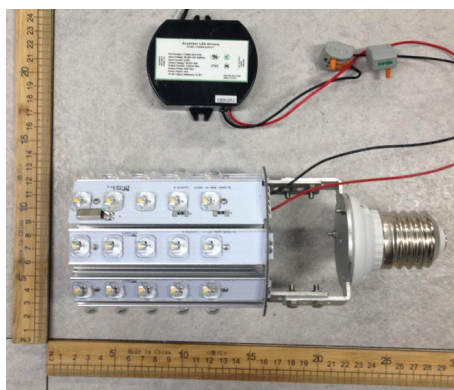
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1.1 Product Information:

Organization Name	RemPhos Technologies LLC	
Brand Name		
Model Number	RPT-LEDSEXT-44L-740-X-G2	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Replacement Lamps for Outdoor Pole/Arm-mounted Decorative Luminaires (Type C)	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	40W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,4500K,5000K	
LED Manufacturer	NICHIA	
LED Model	NF2L757GRT-V1	
Sample Number	GZE161120-C1(4000K),C2(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	Nov.04,2016
Date of Test	Nov.05,2016
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 C78.377-2015 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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	2016-11-05	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	RPT-LEDSSEXT-44L-740-X-G2		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161120-C1	120.0	60	0.3188	37.46	0.9793	15.43
	277.0	60	0.1471	37.07	0.9098	18.27
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

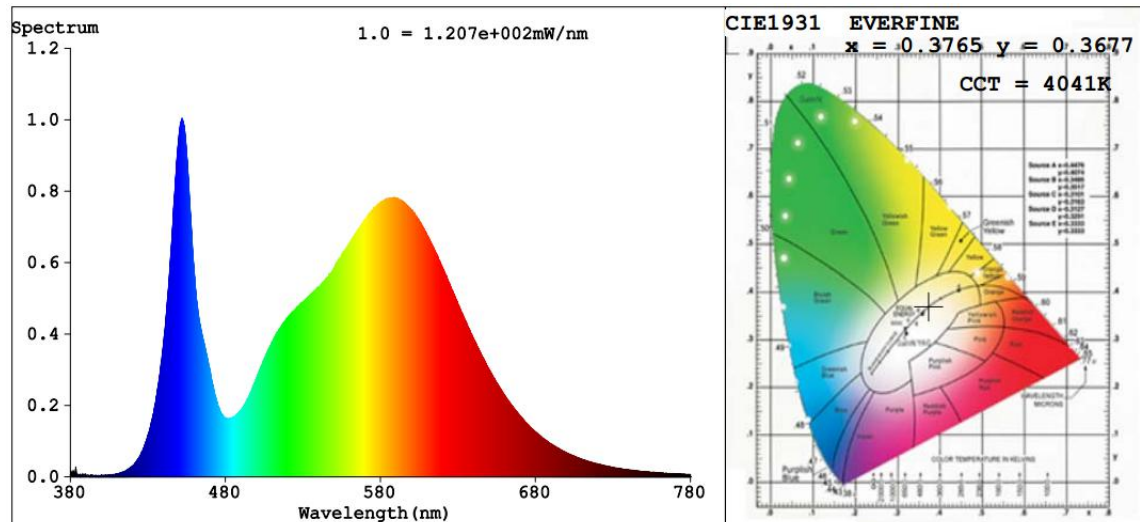
Chromaticity Measurement - Sphere-Spectroradiometer Method in LEXALITE LINDY MODEL 424:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	74	R9	0
Frequency (Hz)	60	R2	85	R10	65
CCT (K)	4041	R3	93	R11	70
Duv	-0.0031	R4	73	R12	52
Chromaticity (x, y)	x=0.3765 y=0.3677	R5	74	R13	76
Chromaticity (u', v')	u'=0.2261 v'=0.4970	R6	79	R14	96
Color Rendering Index (CRI)	76.4	R7	81	R15	67
R9	0	R8	53	--	--

Photometric Measurement – Goniophotometer Method in LEXALITE LINDY MODEL 424:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3505.5	3443.5	>=1000(-10%)	
Luminous Efficacy (lm/W)	93.58	92.89	Standard: >= 90(-3%)	--
Zonal lumens in the 0-90° zone (%)	93.1	--	>= 65(-3)	
Beam Angle (°)	169.5	--	--	
Center Beam Candle Power (cd)	192	--	--	

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	206.0	5.9%
0-40	497.9	14.2%
0-60	1,586.3	45.3%
60-90	1,678.3	47.9%
70-100	1,090.5	31.1%
90-120	186.8	5.3%
0-90	3,264.6	93.1%
90-180	241.0	6.9%
0-180	3,505.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	18.4	0.5%	90-100	101.4	2.9%
10-20	58.0	1.7%	100-110	50.6	1.4%
20-30	129.7	3.7%	110-120	34.8	1%
30-40	291.8	8.3%	120-130	22.9	0.7%
40-50	479.9	13.7%	130-140	16.5	0.5%
50-60	608.5	17.4%	140-150	9.7	0.3%
60-70	689.2	19.7%	150-160	3.9	0.1%
70-80	623.1	17.8%	160-170	0.9	0%
80-90	366.1	10.4%	170-180	0.1	0%

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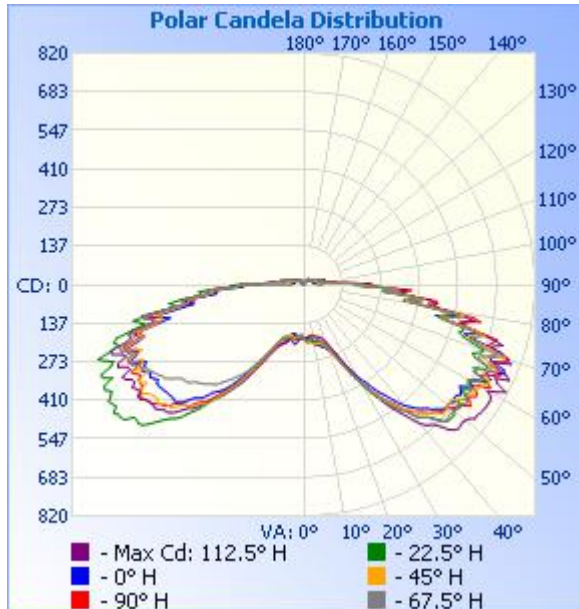
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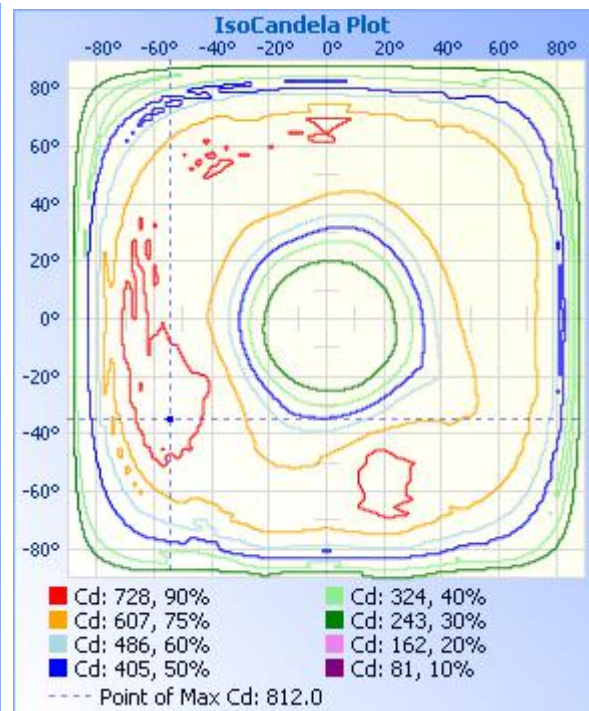
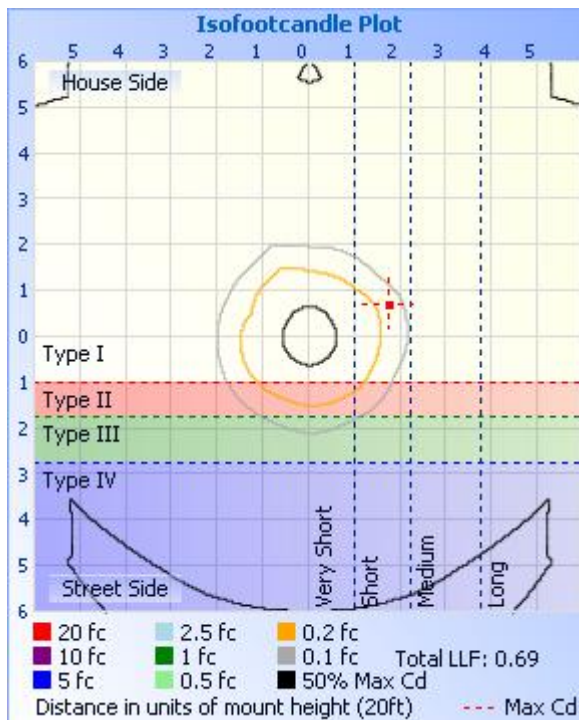
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width
17.0ft	0.66 fc	133.4 ft 233.9 ft
34.0ft	0.17 fc	266.9 ft 467.9 ft
51.0ft	0.07 fc	400.3 ft 701.8 ft
68.0ft	0.04 fc	533.8 ft 935.8 ft
85.0ft	0.03 fc	667.2 ft 1,169.7 ft
102.0ft	0.02 fc	800.7 ft 1,403.7 ft

■ Vert. Spread: 151.4°
 ■ Horiz. Spread: 163.5°



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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	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	
5	192	196	196	195	199	197	205	200	194	184	180	178	184	190	183	185	
10	189	208	199	213	213	202	213	192	182	193	180	183	176	182	189	197	
15	207	203	212	221	223	218	215	199	208	192	185	178	189	186	186	192	
20	224	223	236	239	241	240	237	229	226	211	205	198	207	197	201	204	
25	256	266	274	273	288	300	301	295	284	267	266	250	245	240	248	238	
30	339	360	358	346	369	403	395	400	388	388	374	333	324	331	334	312	
35	444	463	458	429	465	513	501	506	495	523	482	414	425	447	450	392	
40	542	550	536	515	561	604	579	598	586	643	587	498	500	572	546	453	
45	598	639	619	590	620	677	642	687	642	725	618	543	580	673	602	498	
50	659	685	664	631	665	693	665	698	681	748	635	578	614	764	656	539	
55	704	706	687	631	679	708	699	707	717	776	655	626	626	801	671	580	
60	674	692	662	615	680	673	728	674	718	753	658	648	626	789	673	617	
65	639	689	677	649	727	711	718	728	768	803	652	729	670	784	627	649	
70	680	721	692	680	763	679	760	726	773	764	619	715	676	775	686	688	
75	585	629	599	604	629	587	640	587	631	619	481	584	537	630	549	604	
80	435	476	440	444	455	457	452	428	484	491	387	457	396	477	445	473	
85	308	331	311	288	290	297	287	282	319	345	286	347	312	365	322	329	
90	209	227	215	196	200	193	186	192	228	232	195	212	206	238	214	217	
95	81.1	77.7	55.3	46.0	41.3	45.9	65.1	98.4	115	95.1	58.5	68.8	47.5	58.6	55.8	83.5	
100	65.6	64.5	54.6	43.8	50.0	47.3	49.4	56.1	62.4	60.9	51.7	41.9	38.3	43.3	55.0	68.3	
105	59.2	58.7	44.0	34.4	33.6	35.5	47.4	59.5	65.1	59.7	44.2	32.9	31.6	36.5	44.7	60.2	
110	46.8	49.5	39.8	36.3	34.2	33.6	40.2	48.3	54.1	50.9	40.7	38.0	36.1	36.5	38.0	47.6	
115	36.4	35.5	30.2	35.2	39.3	36.3	31.5	36.2	39.6	36.4	30.6	32.6	34.5	32.2	28.6	34.9	
120	31.0	28.3	28.6	30.8	33.2	32.0	26.5	29.5	33.7	29.1	27.7	28.2	29.3	27.2	25.0	28.2	
125	25.1	22.8	28.5	27.1	29.6	28.5	24.9	22.7	26.8	22.5	27.0	24.8	23.9	23.3	24.1	22.1	
130	22.1	20.9	26.4	23.1	26.7	25.6	25.5	19.4	22.5	19.9	25.2	21.2	21.5	20.3	22.7	21.5	
135	24.8	24.0	22.9	21.0	15.2	21.9	23.1	23.8	25.5	23.9	21.6	18.8	13.4	17.6	19.9	24.4	
140	25.7	23.7	18.2	16.2	16.0	17.6	19.5	25.3	27.2	24.9	17.5	14.0	12.9	13.5	16.4	23.1	
145	20.8	20.8	13.7	10.8	10.8	12.0	15.2	22.6	24.4	22.6	14.6	8.21	6.67	7.90	12.2	19.5	
150	18.0	16.8	10.8	6.51	3.67	8.08	12.6	18.5	19.4	18.5	12.8	6.44	3.25	5.59	9.30	15.0	
155	12.8	12.1	7.96	3.85	3.02	5.90	9.68	13.2	13.7	13.3	9.99	5.50	2.66	3.24	5.77	10.0	
160	7.30	6.78	4.98	2.72	2.72	3.96	6.26	8.28	8.23	8.13	6.31	3.84	2.40	2.17	2.77	5.36	
165	3.56	3.45	2.37	2.43	1.95	2.30	2.89	4.37	4.20	3.49	3.01	1.89	2.00	1.41	1.65	2.23	
170	1.57	2.08	2.07	1.95	1.60	1.65	1.71	2.36	1.42	1.42	1.48	1.65	1.42	1.12	1.18	0.89	
175	1.13	1.60	1.13	1.18	1.01	1.41	1.47	1.53	1.48	1.08	1.09	1.19	1.36	1.30	1.18	0.90	
180	1.13	1.19	1.36	1.42	1.53	1.42	1.47	0.94	1.13	1.13	1.13	1.12	1.24	1.30	1.24	1.07	

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-05	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	RPT-LEDSSEXT-44L-740-X-G2		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161120-C2	120.0	60	0.3185	37.41	0.9789	15.51
	277.0	60	0.1470	37.02	0.9093	18.35
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

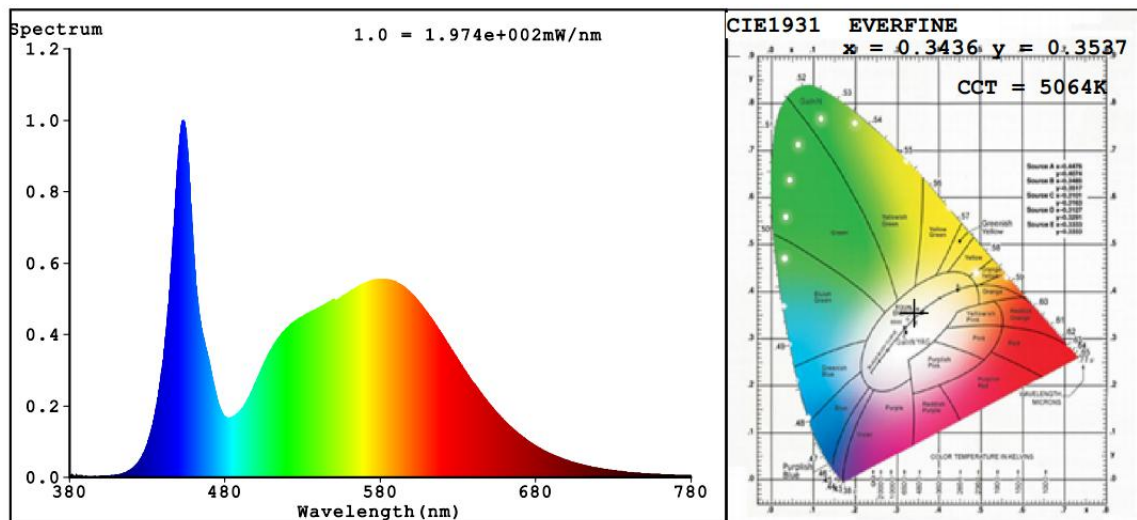
Chromaticity Measurement - Sphere-Spectroradiometer Method in LEXALITE LINDY MODEL 424:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	76	R9	0
Frequency (Hz)	60	R2	85	R10	64
CCT (K)	5064	R3	91	R11	75
Duv	0.0017	R4	77	R12	3
Chromaticity (x, y)	x=0.3436 y=0.3537	R5	77	R13	78
Chromaticity (u', v')	u'=0.2096 v'=0.4855	R6	79	R14	95
Color Rendering Index (CRI)	78.4	R7	84	R15	70
R9	0	R8	59	--	--

Photometric Measurement – Sphere-Spectroradiometer Method in LEXALITE LINDY MODEL 424:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3562	3499	>=1000(-10%)	
Luminous Efficacy (lm/W)	95.22	94.52	Standard: >= 90(-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)
RPT-LEDSSEXT-44L-740-X-G2	4000K	3617.9	37.46	96.58
RPT-LEDSSEXT-44L-745-X-G2	4500K	3646.0 ^{*1}	37.44 ^{*2}	97.39 ^{*3}
RPT-LEDSSEXT-44L-750-X-G2	5000K	3674	37.41	98.21

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

$$3646.0 = (3674 - 3617.9) / 2 + 3617.9$$

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

$$37.44 = (37.41 + 37.46) / 2$$

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

$$97.39 = 3646.0 / 37.44$$

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%			

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