

LM-79-08 Test Report

For

RemPhos Technologies LLC

(Brand Name: **RemPhos**
TECHNOLOGIES)

90 Holten St, Danvers, MA 01923 USA □ □

Retrofit Kits for Outdoor Pole/Arm-mounted Decorative Luminaires

Model name(s): RPT-LEDSSEXT-18L-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

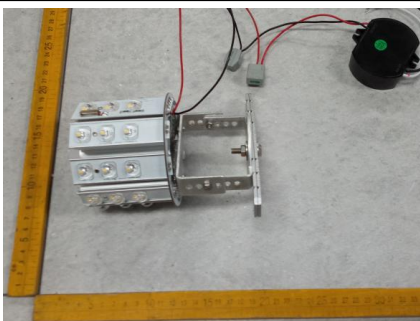
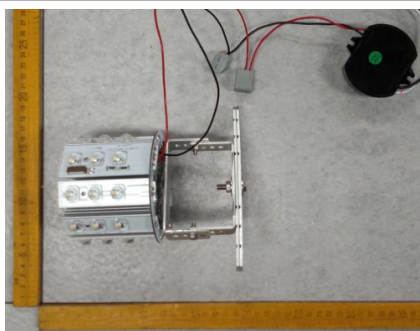
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1.1 Product Information:

Organization Name	RemPhos Technologies LLC	
Brand Name		
Model Number	RPT-LEDSEXT-18L-740-X-G2	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Retrofit Kits for Outdoor Pole/Arm-mounted Decorative Luminaires	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,4500K,5000K	
LED Manufacturer	NICHIA	
LED Model	NF2L757GRT-V1	
Sample Number	GZE161120-A1(4000K),A2(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-18L-740-X-G2		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161120-A1	120.0	60	0.1204	14.15	0.9797	15.25
	277.0	60	0.0575	14.46	0.9076	19.19
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

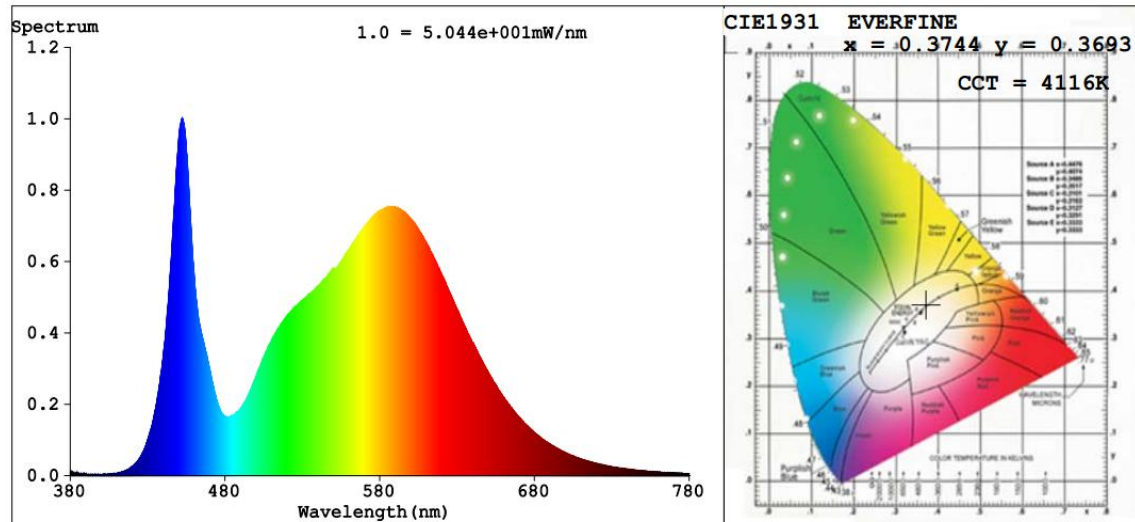
Chromaticity Measurement - Sphere-Spectroradiometer Method in LEXALITE LINDY MODEL 424:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	74	R9	0
Frequency (Hz)	60	R2	85	R10	65
CCT (K)	4116	R3	93	R11	71
Duv	-0.0017	R4	74	R12	51
Chromaticity (x, y)	x=0.3744 y=0.3693	R5	74	R13	77
Chromaticity (u', v')	u'=0.2241 v'=0.4973	R6	79	R14	96
Color Rendering Index (CRI)	76.8	R7	81	R15	67
R9	0	R8	54	--	--

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)	1320.6	1313.6	>=1000(-10%)	
Luminous Efficacy (lm/W)	93.33	90.84	Standard: >= 90(-3%)	Premium: >= 110(-3%)
Zonal lumens in the 0-90° zone (%)	91.5	--	>= 65(-3)	
Beam Angle (°)	181.2	--	--	
Center Beam Candle Power (cd)	54	--	--	

Spectral Power Distribution & Chromaticity Diagram

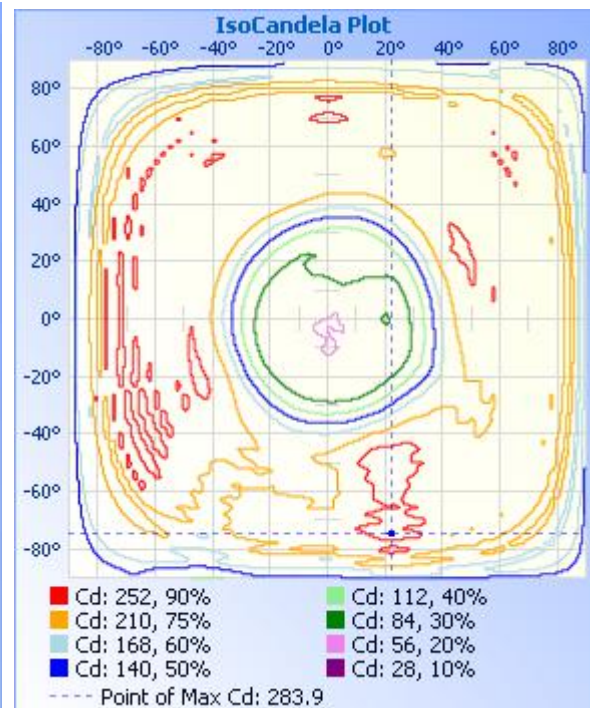
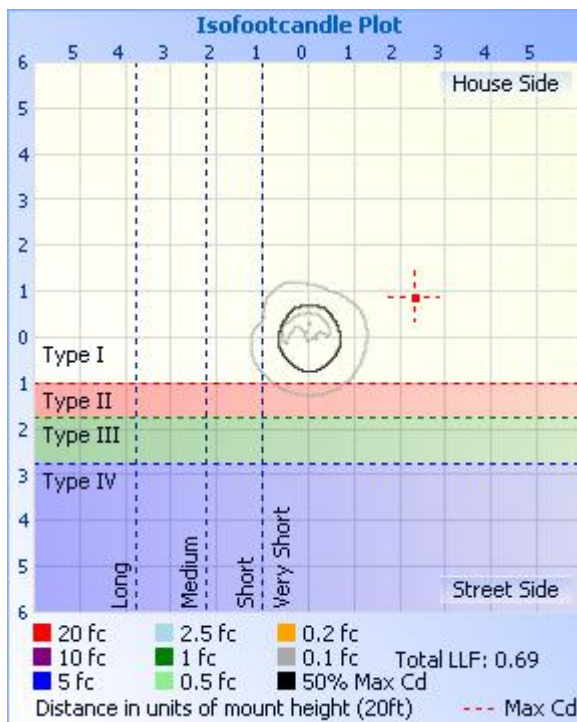
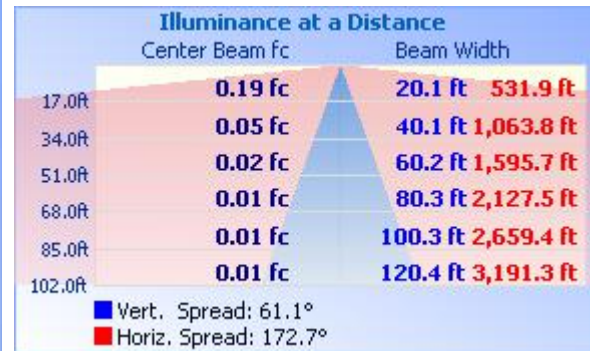
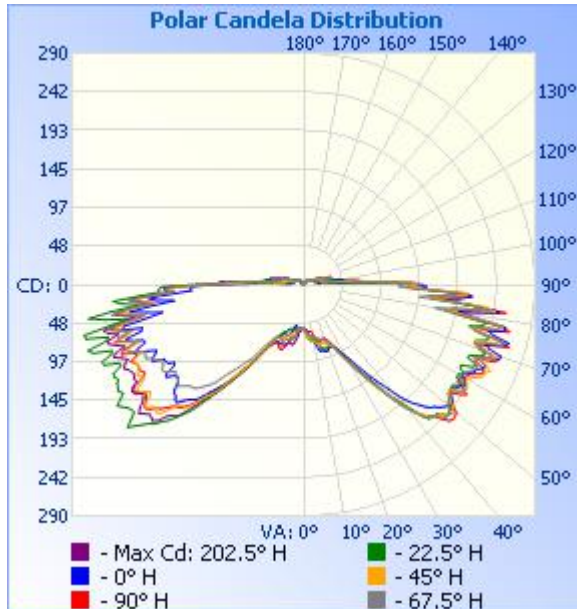


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	64.3	4.9%
0-40	152.3	11.5%
0-60	528.7	40%
60-90	679.1	51.4%
70-100	505.9	38.3%
90-120	95.6	7.2%
0-90	1,207.9	91.5%
90-180	112.7	8.5%
0-180	1,320.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	5.9	0.4%	90-100	58.4	4.4%
10-20	20.3	1.5%	100-110	23.2	1.8%
20-30	38.1	2.9%	110-120	14.1	1.1%
30-40	88.1	6.7%	120-130	7.7	0.6%
40-50	168.8	12.8%	130-140	5.3	0.4%
50-60	207.7	15.7%	140-150	3.0	0.2%
60-70	231.6	17.5%	150-160	1.0	0.1%
70-80	245.2	18.6%	160-170	0.1	0%
80-90	202.3	15.3%	170-180	0	0%

Photometric Data



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Table--1 UNIT: °C

C (DEG) T (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	
5	58.6	59.0	56.9	58.4	63.1	67.4	65.2	62.5	58.9	54.3	53.3	53.9	55.8	58.5	56.9	55.5	
10	66.4	75.8	70.0	78.9	71.7	69.4	71.6	67.1	62.1	63.4	56.5	58.0	51.8	57.4	65.6	67.7	
15	75.0	74.5	79.6	86.8	84.7	80.0	76.5	69.9	72.6	67.2	60.0	57.4	63.3	57.1	65.2	71.8	
20	86.0	79.3	83.3	89.0	88.2	85.2	78.6	73.8	71.6	66.9	62.5	61.2	66.0	62.3	71.1	76.3	
25	79.2	79.1	87.1	84.2	86.8	85.3	87.4	84.0	80.9	77.3	74.1	71.0	71.8	69.9	73.2	72.3	
30	89.4	93.5	94.7	94.8	102	107	113	112	110	109	104	94.7	92.8	89.9	90.1	81.7	
35	128	133	130	123	134	145	153	152	149	159	146	130	132	133	131	113	
40	175	185	173	167	178	197	202	204	202	218	191	172	171	186	180	144	
45	218	232	219	207	217	232	234	233	234	247	209	191	204	241	213	182	
50	241	252	243	237	236	242	244	236	250	256	220	202	212	276	240	197	
55	241	245	235	215	227	226	230	232	240	256	218	210	199	269	235	196	
60	233	242	232	202	231	225	236	227	234	252	204	209	197	268	231	203	
65	233	249	237	222	248	239	258	238	249	248	198	218	205	263	233	218	
70	240	251	251	239	263	234	245	242	240	238	191	226	212	257	231	237	
75	224	240	230	224	247	227	229	223	224	228	184	231	209	254	224	226	
80	223	226	212	189	198	182	183	168	181	199	165	206	200	254	216	220	
85	219	219	200	187	198	164	167	157	179	198	160	202	195	240	210	221	
90	118	129	122	137	148	137	139	124	135	138	108	118	116	140	124	123	
95	52.8	47.2	25.5	25.6	17.7	24.5	47.6	61.8	64.9	59.4	29.7	22.4	24.1	25.2	24.8	45.4	
100	28.5	28.2	24.2	24.0	32.2	29.2	26.2	25.7	27.6	25.5	20.4	18.8	21.2	21.2	21.4	29.6	
105	28.3	29.2	19.9	14.5	13.6	15.5	24.5	34.7	35.8	38.1	21.9	15.6	12.1	14.5	18.8	27.8	
110	21.1	23.5	16.7	14.6	13.5	14.6	17.0	22.0	22.7	22.2	15.7	15.8	12.4	15.1	16.3	20.4	
115	14.1	14.2	11.5	13.8	15.8	15.1	14.6	16.6	18.3	17.0	12.6	12.5	13.1	12.8	11.1	13.8	
120	11.0	10.1	9.71	10.5	11.7	11.7	9.93	11.3	12.3	10.7	9.65	9.65	9.85	9.39	8.62	10.1	
125	8.40	7.39	9.40	8.84	10.1	9.91	8.42	7.92	9.26	7.73	8.72	7.99	7.76	7.93	8.21	7.21	
130	7.05	6.54	8.57	7.53	8.97	8.66	8.23	6.13	7.49	6.51	7.94	6.78	6.87	6.88	7.47	7.07	
135	8.19	7.79	7.43	6.74	4.91	7.26	7.69	7.22	7.88	7.54	6.64	5.74	4.28	5.79	6.39	8.16	
140	8.36	7.54	5.77	5.07	5.13	5.69	6.29	8.05	8.75	7.91	5.24	4.07	3.75	4.27	4.93	7.53	
145	7.41	6.66	4.01	3.09	3.39	3.60	4.78	7.38	7.87	7.37	4.20	1.93	1.34	2.13	3.63	6.28	
150	5.60	5.05	3.07	1.52	0.79	1.93	3.69	5.88	6.17	5.86	3.53	1.30	0.42	1.19	2.33	4.41	
155	3.73	3.33	2.03	0.74	0.42	1.15	2.55	3.95	3.88	3.83	2.59	0.93	0.00	0.21	1.19	2.64	
160	1.97	1.72	0.94	0.26	0.16	0.47	1.35	2.03	1.91	1.91	1.19	0.31	0.00	0.00	0.21	1.08	
165	0.57	0.27	0.00	0.00	0.00	0.05	0.26	0.57	0.46	0.31	0.00	0.00	0.00	0.00	0.00	0.00	
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

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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-18L-740-X-G2		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161120-A2	120.0	60	0.1198	14.08	0.9793	15.31
	277.0	60	0.0573	14.39	0.9072	19.25
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

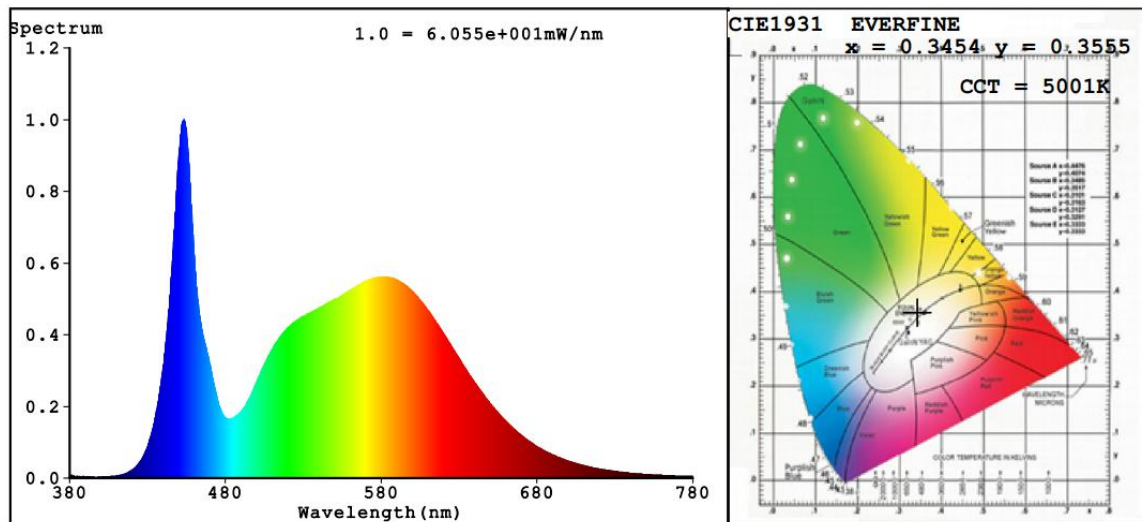
Chromaticity Measurement - Sphere-Spectroradiometer Method in LEXALITE LINDY MODEL 424:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	75	R9	0
Frequency (Hz)	60	R2	85	R10	64
CCT (K)	5001	R3	91	R11	75
Duv	0.0018	R4	77	R12	52
Chromaticity (x, y)	x=0.3454 y=0.3555	R5	76	R13	78
Chromaticity (u', v')	u'=0.2101 v'=0.4866	R6	79	R14	95
Color Rendering Index (CRI)	78.1	R7	83	R15	69
R9	0	R8	58	--	--

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)	1339	1332	>=1000(-10%)	
Luminous Efficacy (lm/W)	95.10	92.56	Standard: >= 90(-3%)	Premium: >= 110(-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-18L-740-X-G2	4000K	1363.0	14.15	96.33
RPT-LEDSSEXT-18L-745-X-G2	4500K	1372.0 ^{*1}	14.12 ^{*2}	97.20 ^{*3}
RPT-LEDSSEXT-18L-750-X-G2	5000K	1381	14.08	98.08

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

$$1372.0 = (1381 - 1363.0) / 2 + 1363.0$$

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

$$14.12 = (14.08 + 14.15) / 2$$

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

$$97.20 = 1372.0 / 14.12$$

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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