



Report No.: GZE160820-F

NVLAP LAB CODE 201011-0

## LM-79-08 Test Report

For

# LIGHT EFFICIENT DESIGN

(Brand Name:N/A)

188 S. Northwest Highway Cary, IL60013

## LED Lamp

Model name(s): LED-7312-40A

Representative (Tested) Model: LED-7312-40A

Model Different: N/A

Test & Report By:

*Garman Mo*

Engineer: Garman Mo

Date: Aug 19,2016

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.

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

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<http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-7312-40A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	LED Lamp	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	7W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K	
LED Manufacturer	Samsung Electronics LED Business	
LED Model	SPMWHT327F*****	
Sample Number	GZE160820-F1(4000K)	
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	Aug 13,2016
Date of Test	Aug.14,2016
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

### 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  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)

<b>Test date</b>	2016-08-14	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	LED-7312-40A		

### Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160820-F1	120.0	60	0.0641	6.96	0.9044	18.22

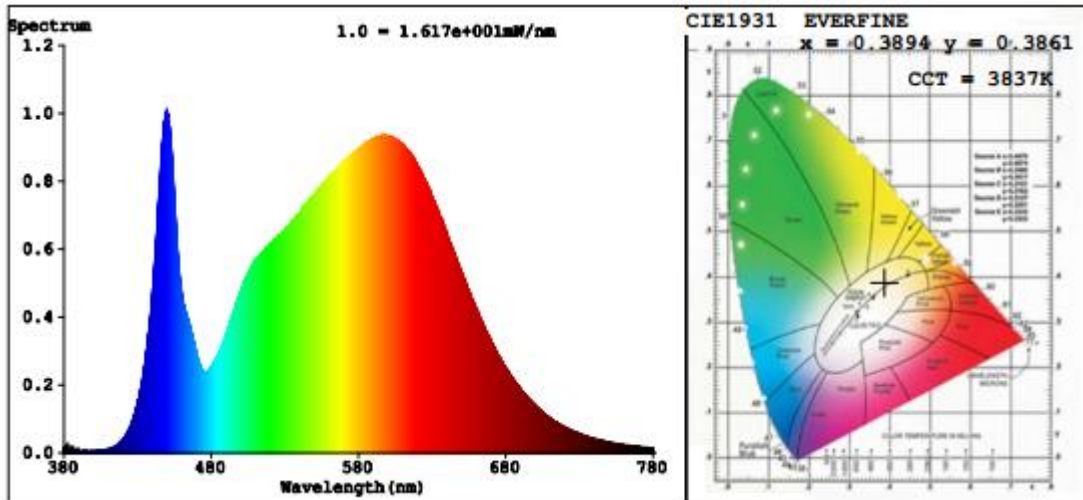
### Chromaticity Measurement - Sphere-Spectroradiometer Method :

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	15
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	3837	R3	95	R11	83
Duv	0.0018	R4	84	R12	65
Chromaticity (x, y)	x=0.3894 y=0.3861	R5	82	R13	84
Chromaticity (u', v')	u'=0.2272 v'=0.5070	R6	85	R14	97
Color Rendering Index (CRI)	83.9	R7	87	R15	76
R9	15	R8	67	--	--

### Photometric Measurement – Goniophotometer Method :

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	914.24
Luminous Efficacy (lm/W)	131.36
Beam Angle (°)	109.5
Center Beam Candle Power (cd)	303

**Spectral Power Distribution & Chromaticity Diagram**

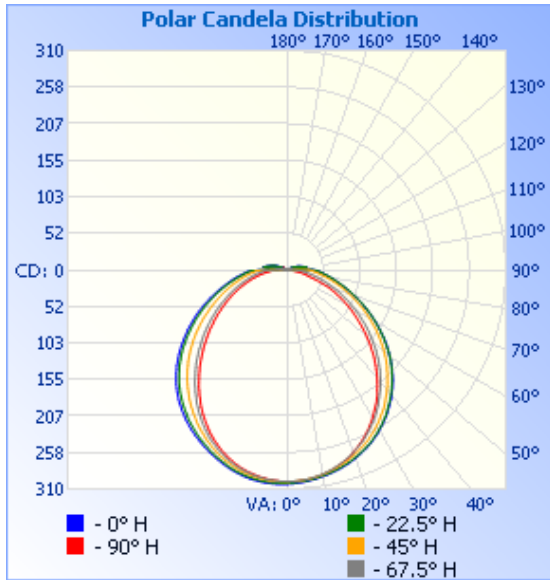


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	231.9	25.4%
0-40	378.7	41.4%
0-60	665.6	72.8%
60-90	224.3	24.5%
70-100	127.6	14%
90-120	22.9	2.5%
0-90	889.9	97.3%
90-180	24.4	2.7%
0-180	914.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	28.3	3.1%	90-100	10.0	1.1%
10-20	81.1	8.9%	100-110	9.5	1%
20-30	122.5	13.4%	110-120	3.3	0.4%
30-40	146.8	16.1%	120-130	0.6	0.1%
40-50	151.1	16.5%	130-140	0.3	0%
50-60	135.8	14.9%	140-150	0.2	0%
60-70	106.6	11.7%	150-160	0.2	0%
70-80	73.2	8.0%	160-170	0.1	0%
80-90	44.4	4.9%	170-180	0.0	0%

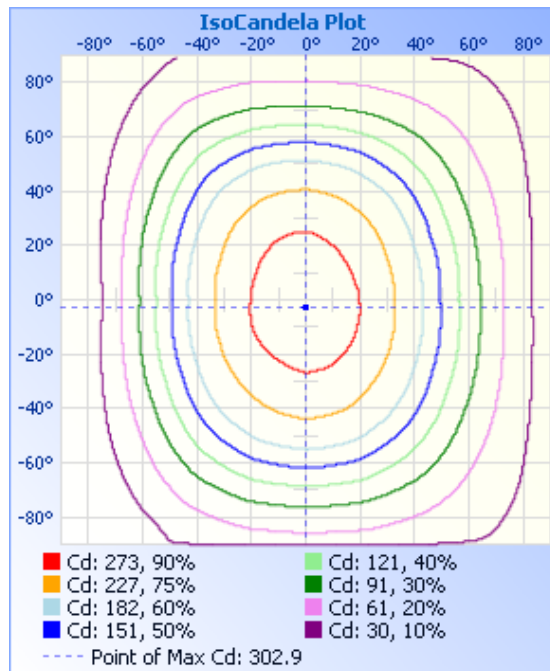
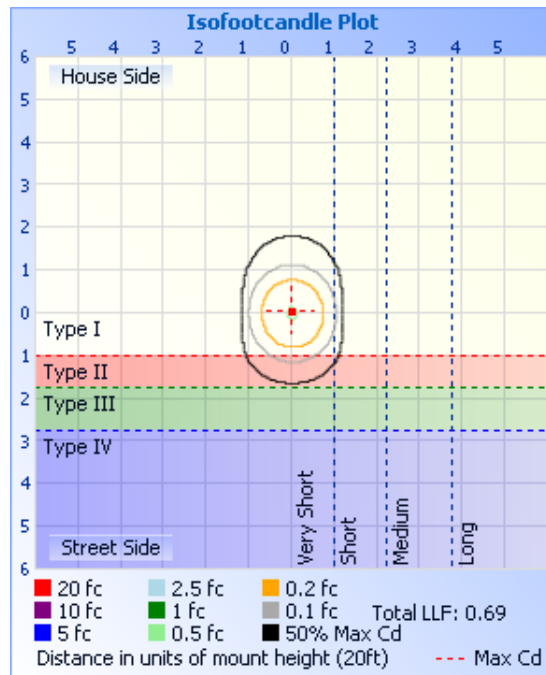
**Photometric Data**



**Illuminance at a Distance**

Center Beam fc	Beam Width	
17.0ft	1.05 fc	58.9 ft 39.6 ft
34.0ft	0.26 fc	117.8 ft 79.3 ft
51.0ft	0.12 fc	176.7 ft 118.9 ft
68.0ft	0.07 fc	235.6 ft 158.6 ft
85.0ft	0.04 fc	294.5 ft 198.2 ft
102.0ft	0.03 fc	353.4 ft 237.8 ft

■ Vert. Spread: 120.0°  
■ Horiz. Spread: 98.8°



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**Candela Table - Type C**

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	303	301	300	299	299	299	298	298	303	301	300	299	299	299	298	298	303
1	302	301	299	299	299	299	298	299	303	301	299	299	299	298	298	298	302
2	302	301	299	299	299	299	299	299	303	301	299	299	299	298	298	298	302
3	302	300	299	298	299	299	298	299	303	301	299	298	298	298	297	297	302
4	301	300	298	298	299	298	298	299	303	301	299	298	298	297	296	297	301
5	301	299	298	298	298	298	298	298	303	301	299	298	297	296	296	296	301
6	300	299	297	297	298	298	298	298	302	301	298	297	296	295	295	295	300
7	299	298	296	296	297	297	297	298	302	300	297	296	295	294	294	295	299
8	298	297	295	295	296	296	297	297	301	300	297	295	294	293	293	294	298
9	297	296	295	294	295	296	296	297	301	299	296	294	293	292	292	293	297
10	296	295	294	293	294	295	295	296	300	298	295	293	292	290	291	292	296
11	295	294	292	292	293	294	294	295	299	297	294	292	290	289	289	291	295
12	294	293	291	290	291	292	293	294	298	296	293	290	289	287	288	290	294
13	293	292	290	289	290	291	292	293	296	295	291	289	287	286	286	288	293
14	292	291	289	287	288	289	290	292	295	294	290	287	285	284	285	287	292
15	291	290	287	285	286	287	289	290	294	292	288	285	283	282	283	286	291
16	290	288	285	283	284	286	287	289	292	291	287	283	281	280	281	284	290
17	288	287	284	281	282	284	286	287	291	289	285	281	278	277	279	283	288
18	287	286	282	279	280	282	284	285	289	287	283	279	276	275	277	281	287
19	285	284	280	277	278	280	282	284	287	285	281	277	273	272	275	279	285
20	284	282	279	275	275	277	280	282	285	283	279	274	271	270	273	278	284
21	282	281	276	272	272	275	278	280	284	282	276	272	268	267	271	276	282
22	280	279	274	270	269	273	275	278	282	279	274	269	265	264	269	274	280
23	278	277	272	267	266	270	273	276	280	278	272	266	262	262	267	272	278
24	276	275	270	265	263	267	271	273	278	275	269	264	258	258	264	270	276
25	274	273	268	262	260	264	268	271	276	273	267	260	255	255	262	268	274
26	272	271	265	258	256	261	265	269	274	271	264	257	252	252	259	265	272
27	270	269	262	255	254	258	262	267	272	268	260	254	248	248	256	263	270
28	267	266	260	252	250	255	259	264	269	267	258	250	244	245	253	261	267

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29	265	264	257	248	246	251	256	262	268	264	255	247	240	241	251	259	265
30	262	261	254	246	243	247	253	260	265	261	252	243	237	238	247	256	262
31	259	259	252	243	238	244	250	257	263	259	249	239	232	234	244	253	259
32	257	255	248	239	234	240	247	255	260	256	245	236	229	230	241	250	257
33	253	252	245	235	230	236	244	252	258	254	242	231	224	226	237	247	253
34	251	250	242	231	227	232	241	249	255	251	239	228	220	222	234	244	251
35	247	246	239	226	222	228	237	246	253	248	236	223	216	218	230	241	247
36	244	243	235	223	218	223	234	243	250	245	232	219	211	214	227	237	244
37	241	239	232	218	212	220	230	240	247	242	229	215	207	210	223	234	241
38	238	236	228	215	208	215	227	238	244	239	225	210	202	205	219	231	238
39	235	233	224	210	203	211	223	234	242	236	221	207	197	201	216	228	235
40	231	230	220	207	199	206	220	232	238	233	218	202	193	197	212	224	231
41	227	226	217	202	194	202	216	228	235	230	214	197	188	192	207	220	227
42	224	222	213	197	189	197	212	225	232	226	211	194	184	188	204	216	224
43	220	219	209	193	185	192	208	222	228	223	207	189	179	184	199	212	220
44	216	214	205	188	179	187	204	218	225	220	202	185	174	179	196	209	216
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46	207	206	197	179	169	178	196	211	217	212	195	175	165	170	187	200	207
47	203	203	193	174	164	174	193	207	214	208	191	171	161	166	183	197	203
48	199	198	189	170	159	168	188	204	210	205	187	167	156	161	178	192	199
49	195	195	184	165	154	164	184	199	206	200	182	162	151	156	173	187	195
50	190	190	179	159	148	159	179	195	202	196	179	158	147	153	170	183	190
51	186	186	176	155	144	155	175	191	198	192	174	153	142	148	165	179	186
52	181	181	171	150	138	149	171	187	194	188	170	149	139	144	161	175	181
53	177	176	166	146	133	144	167	183	189	184	166	145	134	139	156	170	177
54	172	171	162	140	128	140	162	179	185	179	161	140	129	134	151	165	172
55	168	167	157	136	122	134	158	174	181	175	157	136	125	131	147	161	168
56	163	162	153	131	118	130	153	170	176	171	153	131	121	126	142	156	163
57	158	158	148	125	112	125	148	165	172	166	148	128	117	121	138	152	158
58	154	153	143	121	108	120	145	162	167	161	144	123	113	118	134	147	154
59	149	148	139	116	103	115	140	157	163	157	140	119	108	113	129	142	149
60	144	144	134	112	99	110	136	152	158	153	136	115	105	109	125	138	144

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61	139	139	130	107	93	106	131	148	154	149	131	111	101	105	120	133	139
62	135	135	125	102	88	101	127	143	150	144	127	107	97	101	117	129	135
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64	125	125	116	93	79	92	118	135	141	135	119	99	89	93	108	119	125
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67	112	112	103	80	66	79	105	122	128	123	107	88	78	82	96	107	112
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70	99	99	90	68	49	66	93	110	115	110	96	78	69	72	85	94	99
71	94	95	87	64	44	63	89	106	110	107	92	74	65	69	81	90	94
72	91	91	82	60	40	59	85	102	107	102	88	71	61	65	78	87	91
73	87	87	79	56	36	56	81	98	102	98	85	68	59	63	74	83	87
74	83	83	75	53	32	52	77	94	98	95	81	65	55	60	71	79	83
75	79	79	72	50	30	48	74	90	95	91	79	62	53	57	68	76	79
76	76	76	68	46	28	45	71	87	91	88	75	59	50	54	65	72	76
77	73	73	65	43	26	42	68	83	88	84	72	56	46	51	61	69	73
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79	67	66	58	37	20	36	62	76	80	77	66	51	41	46	56	63	67
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81	61	61	53	32	14	31	55	70	74	71	60	46	35	42	51	58	61
82	58	58	50	30	11	28	53	67	71	68	58	44	33	40	49	55	58
83	55	55	47	27	8	25	50	64	68	65	55	42	30	38	46	53	55
84	53	53	45	25	6	22	47	61	65	62	53	39	27	35	44	50	53
85	51	50	43	23	4	18	45	58	62	59	51	38	25	34	42	48	51
86	48	48	40	21	2	15	42	55	59	57	48	35	23	31	40	46	48
87	46	46	38	19	2	13	40	53	57	54	46	33	21	30	38	44	46
88	44	44	36	18	1	13	38	50	54	52	44	31	19	28	36	42	44
89	42	41	34	16	0	14	35	47	50	49	41	28	17	25	34	40	42
90	37	36	31	14	0	12	24	28	27	25	23	19	11	17	28	35	37
91	15	17	14	5	0	4	2	5	5	6	2	4	3	4	6	13	15
92	2	1	1	0	0	0	1	1	1	1	1	1	1	1	1	2	2

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93	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1
94	1	1	2	0	0	0	2	1	1	1	7	1	1	1	2	1
95	3	8	5	2	0	1	3	13	5	14	11	5	1	2	7	8
96	20	24	5	7	0	5	3	31	26	30	10	12	5	8	10	26
97	29	28	5	8	0	6	3	32	34	33	9	14	7	10	10	28
98	28	27	5	7	0	5	3	30	33	31	9	13	9	8	9	26
99	27	26	5	6	0	4	3	28	31	30	8	10	8	6	8	25
100	25	24	5	5	0	3	2	27	29	28	8	8	8	4	3	24
101	24	23	5	2	0	1	2	25	28	27	7	5	7	2	3	23
102	23	22	4	1	0	0	2	24	27	26	7	3	4	1	6	22
103	22	21	4	1	0	0	2	23	25	24	6	2	2	1	6	20
104	21	20	4	0	0	0	2	21	24	23	6	1	1	1	5	19
105	20	18	4	0	0	0	2	20	23	22	6	1	1	1	5	18
106	19	17	3	0	0	0	2	19	21	20	5	1	3	1	4	17
107	18	16	3	0	0	0	2	18	20	19	5	1	4	1	3	16
108	17	15	2	0	0	0	1	17	19	18	4	1	5	1	3	15
109	15	14	2	0	0	0	1	15	18	17	3	1	5	1	2	14
110	14	12	2	0	0	0	1	14	17	15	3	1	5	1	2	12
111	13	11	1	0	0	0	1	13	16	14	2	1	5	1	1	11
112	11	9	1	0	0	0	1	11	14	12	2	1	5	1	1	9
113	10	8	1	0	0	0	0	9	13	11	1	1	5	1	1	8
114	8	7	0	0	0	0	0	8	11	9	1	1	5	1	1	6
115	7	5	0	0	0	0	0	6	10	8	1	1	5	1	1	5
116	6	4	0	0	0	0	0	5	8	6	1	1	5	1	1	4
117	5	3	0	0	0	0	0	4	7	5	0	1	6	1	1	3
118	4	2	0	0	0	0	0	3	6	4	0	1	5	1	0	2
119	2	1	0	0	0	0	0	2	5	3	0	1	5	1	0	1
120	1	0	0	0	0	0	0	1	4	2	0	1	5	1	0	1
121	1	0	0	0	0	0	0	0	2	1	0	1	5	1	0	0
122	0	0	0	0	0	0	0	0	1	0	1	1	5	1	0	0
123	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	0
124	0	0	0	0	0	0	0	0	0	0	1	0	5	0	0	0

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125	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0
129	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
130	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
139	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
140	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
141	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
142	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
143	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
144	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
146	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
148	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
149	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
152	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
154	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0

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157	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
158	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
159	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
160	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
161	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
162	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
163	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0
164	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
165	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
166	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0
167	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0
168	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
170	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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### 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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