

**LM-79-08 Test Report**

For

**LIGHT EFFICIENT DESIGN, LLC****(Brand Name: N/A)**

188 S.Northwest Highway, Cary, IL60013, USA

**LED Luminaires**

Model name(s): LED-7324-35K-G2

Representative (Tested) Model: LED-7324-35K-G2

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

Test &amp; Report By:

*Garman Mo*

Engineer: Garman Mo

Date: Feb.12,2017

Review By:

*Univ Xie*

Manager: Univ Xie

Note: 1.The results contained in this report pertain only to the tested samples.

2.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



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**1.1 Product Information:**

Organization Name	LIGHT EFFICIENT DESIGN, LLC	
Brand Name	N/A	
Model Number	LED-7324-35K-G2	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	LED Luminaires	
Rated Voltage / Frequency	120 -277Vac, 50/60 Hz	
Nominal Power	11W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K	
LED Manufacturer	SAMSUNG	
LED Model	SPMWHT327F*****	
Sample Number	GZE1707080-H-B1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
<b>Photo</b>		
		
		

**1.2 Test Specifications:**

Date of Receipt	Feb.05,2018
Date of Test	Feb.06,2018
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)*

Test date	2018-02-06	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-7324-35K-G2		

**Electrical Measurement:**

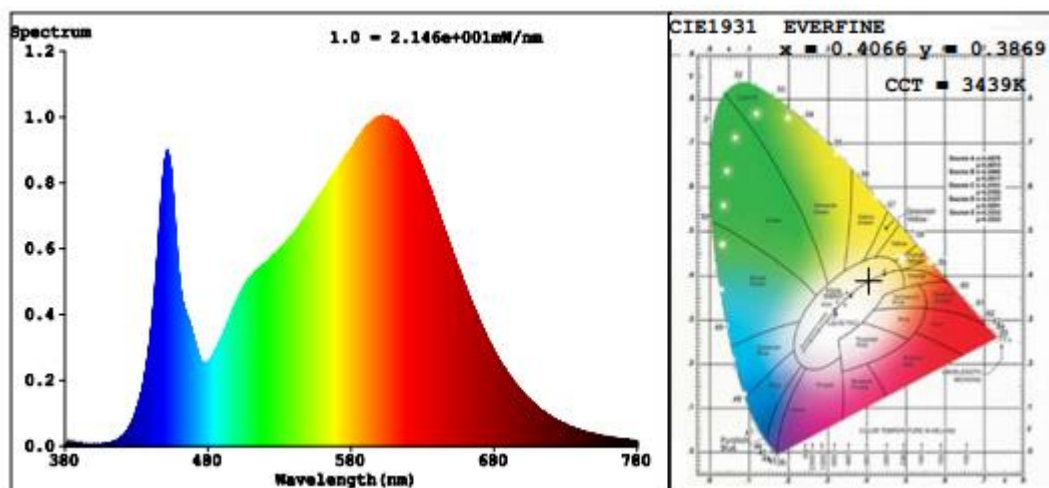
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170708	120.0	60	0.1021	11.30	0.9224	37.32
0-H-B1	277.0	60	0.0451	10.96	0.8773	54.25

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	85	R9	22
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	3439	R3	97	R11	84
Duv	-0.0020	R4	85	R12	72
Chromaticity (x, y)	x=0.4066 y=0.3869	R5	85	R13	87
Chromaticity (u', v')	u'=0.2382 v'=0.5099	R6	90	R14	99
Color Rendering Index (CRI)	85.9	R7	86	R15	79
R9	22	R8	67	--	--

**Photometric Measurement – Goniophotometer Method:**

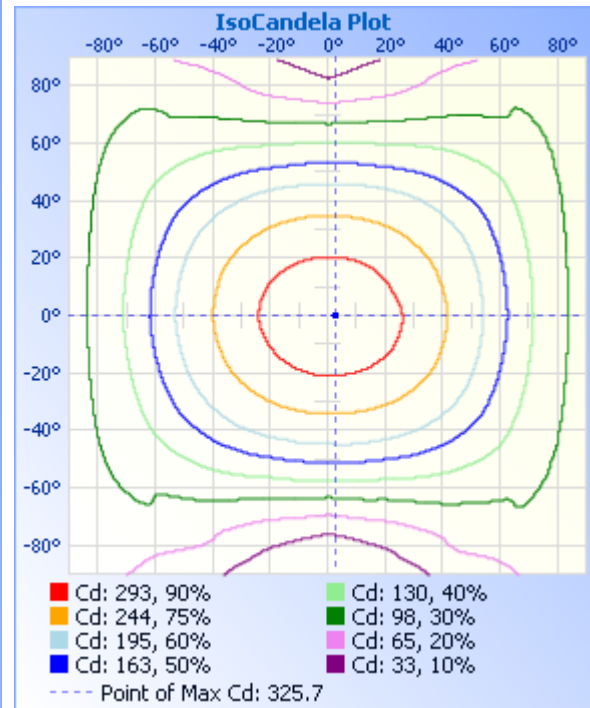
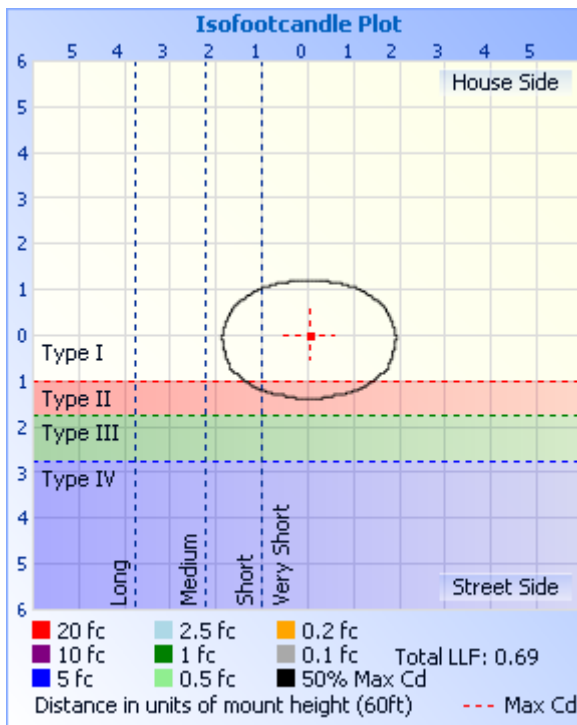
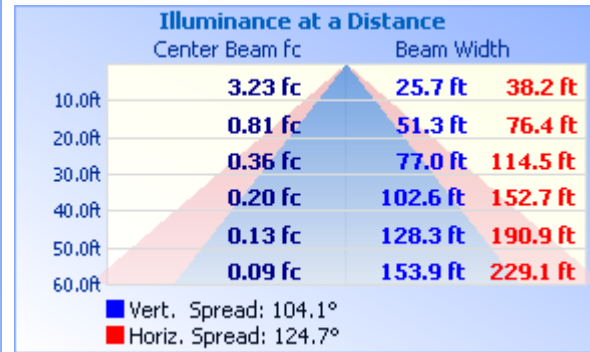
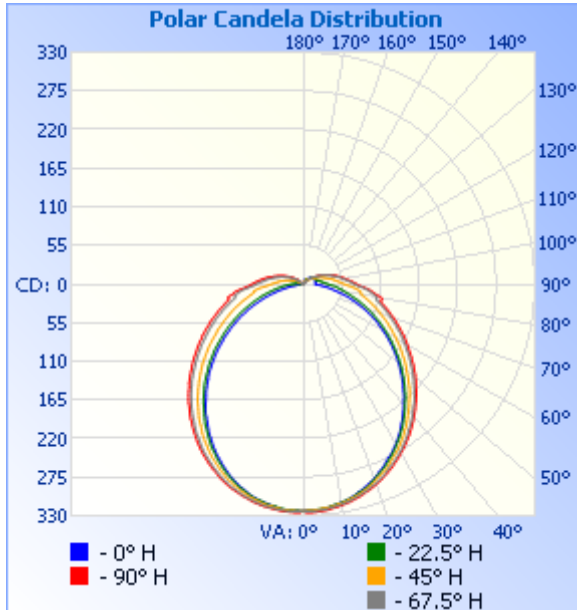
Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	1113.9	1063.6
Luminous Efficacy (lm/W)	98.58	97.04
Beam Angle (°)	114.5	--
Center Beam Candle Power (cd)	323	--

**Spectral Power Distribution & Chromaticity Diagram**

**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	249.6	22.4%
0-40	407.4	36.6%
0-60	722.2	64.8%
60-90	285.7	25.6%
70-100	203.3	18.3%
90-120	89.3	8%
0-90	1,007.9	90.5%
90-180	105.9	9.5%
0-180	1,113.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	30.6	2.7%	90-100	43.0	3.9%
10-20	87.3	7.8%	100-110	28.8	2.6%
20-30	131.7	11.8%	110-120	17.5	1.6%
30-40	157.8	14.2%	120-130	9.2	0.8%
40-50	163.7	14.7%	130-140	4.0	0.4%
50-60	151.1	13.6%	140-150	1.9	0.2%
60-70	125.4	11.3%	150-160	1.0	0.1%
70-80	94.0	8.4%	160-170	0.4	0%
80-90	66.2	5.9%	170-180	0.1	0%

**Photometric Data**



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	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
1	322	323	323	324	326	322	322	322	323	323	323	324	326	321	322	323	322
2	322	323	322	324	325	321	322	321	323	323	323	324	325	321	322	322	322
3	322	322	322	323	325	321	322	321	323	322	323	324	325	321	322	322	322
4	322	321	321	323	325	320	322	321	322	322	323	324	325	321	321	321	322
5	321	321	321	323	324	321	321	321	322	321	322	323	325	321	321	320	321
6	320	320	320	322	324	320	320	320	321	320	321	323	324	319	321	320	320
7	319	319	320	321	323	320	319	320	320	319	320	322	323	319	320	318	319
8	318	317	318	320	321	318	318	319	318	318	320	322	323	319	319	318	318
9	317	316	317	319	321	317	317	317	317	318	319	321	322	318	318	317	317
10	315	316	317	318	320	316	316	316	316	316	318	320	321	317	317	316	315
11	314	314	315	317	318	315	315	314	315	314	317	319	320	316	315	314	314
12	313	313	314	316	317	313	313	313	313	313	315	318	319	315	313	312	313
13	311	311	312	314	316	312	312	312	311	312	314	316	318	313	312	311	311
14	309	309	311	313	314	311	310	310	310	310	312	315	316	312	311	310	309
15	306	307	309	311	313	310	309	307	307	308	310	313	315	310	309	308	306
16	304	306	307	309	311	308	306	305	304	306	308	312	314	308	307	306	304
17	302	304	305	308	309	307	304	303	302	304	307	310	312	306	306	303	302
18	300	302	303	306	308	304	302	300	300	301	304	308	310	305	303	302	300
19	297	299	301	304	306	302	300	297	297	299	302	307	309	303	302	299	297
20	295	296	298	302	304	300	297	295	294	296	300	305	307	302	299	297	295
21	292	293	296	300	302	298	295	292	291	293	298	302	305	300	297	294	292
22	288	290	293	297	299	295	292	289	288	291	295	301	303	297	295	290	288
23	286	288	291	295	297	293	289	288	285	287	292	298	301	295	292	288	286
24	283	285	289	292	294	291	286	284	282	284	290	296	298	292	289	285	283
25	279	282	286	289	292	288	284	280	278	281	286	293	295	290	286	282	279
26	276	278	282	287	290	286	281	276	275	278	284	290	293	288	284	278	276
27	273	276	279	284	287	283	278	273	271	274	281	287	290	285	281	275	273
28	270	272	276	281	284	280	274	269	268	270	278	285	288	282	278	272	270

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29	266	269	273	279	281	276	271	265	264	267	274	282	285	278	274	269	266
30	264	265	271	276	278	274	268	261	260	263	271	279	282	277	272	265	264
31	260	261	267	273	275	271	264	258	255	259	267	276	279	273	268	262	260
32	256	258	263	270	272	267	260	254	252	255	264	273	276	270	265	258	256
33	252	254	261	267	269	263	257	250	247	251	260	269	273	266	262	255	252
34	248	250	257	263	266	260	253	246	243	247	256	265	270	264	258	252	248
35	243	247	253	260	263	257	248	241	238	243	252	263	266	260	254	247	243
36	240	243	250	256	260	254	244	237	234	239	248	259	263	257	251	243	240
37	235	238	245	253	256	250	241	233	231	234	245	256	260	254	247	239	235
38	231	234	241	249	253	246	237	229	226	229	241	251	256	250	243	235	231
39	227	230	237	246	249	242	233	224	221	225	236	248	252	247	239	231	227
40	223	226	234	243	245	239	229	219	215	221	232	245	250	244	236	226	223
41	218	221	230	238	242	235	224	214	210	216	228	241	246	240	232	223	218
42	214	218	226	234	238	231	220	210	206	212	225	237	242	237	228	218	214
43	209	213	222	232	235	227	216	205	201	207	220	233	238	233	224	214	209
44	205	208	218	228	231	223	212	200	196	203	215	229	235	229	219	210	205
45	201	204	214	224	228	219	208	195	191	198	211	226	231	225	216	205	201
46	196	199	210	220	224	215	203	190	187	193	207	222	227	222	212	201	196
47	192	196	205	216	220	211	198	186	182	188	203	217	223	218	207	197	192
48	187	191	201	211	216	207	195	181	177	182	198	213	219	214	204	192	187
49	182	186	197	208	213	204	190	176	171	178	194	210	215	211	199	188	182
50	179	182	193	204	209	199	185	170	166	173	189	205	211	206	195	183	179
51	173	177	189	201	205	195	180	165	161	168	185	201	207	203	191	179	173
52	169	173	185	197	201	191	176	161	156	163	181	197	203	199	186	175	169
53	164	168	181	192	197	187	172	156	150	159	176	192	199	195	183	169	164
54	159	163	177	189	194	184	167	151	145	154	172	189	195	191	178	165	159
55	155	159	172	185	189	179	163	145	139	148	167	185	191	187	175	160	155
56	150	154	169	181	186	175	158	141	135	143	163	181	187	184	171	156	150
57	146	150	164	177	182	171	153	136	129	138	159	176	183	180	167	152	146
58	141	146	160	173	178	167	150	131	124	134	154	172	179	176	163	146	141
59	136	141	156	170	175	163	145	126	118	129	149	169	176	173	158	142	136
60	131	137	153	166	171	159	141	121	113	124	144	164	172	168	154	138	131

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61	126	132	148	163	168	155	136	117	108	118	140	160	168	165	150	134	126
62	122	128	144	159	164	151	133	111	103	113	137	156	164	161	147	130	122
63	117	124	141	156	161	148	128	107	97	109	132	152	161	157	143	126	117
64	113	120	137	152	156	144	124	102	91	104	127	149	157	154	140	121	113
65	108	115	133	148	153	140	120	98	87	99	124	145	153	149	135	116	108
66	102	110	129	144	149	136	116	93	81	94	120	141	149	146	131	112	102
67	98	107	126	141	146	132	113	88	76	90	116	138	145	143	128	107	98
68	93	102	122	138	143	129	108	83	70	86	112	134	142	140	123	103	93
69	89	99	118	134	139	126	105	79	65	81	109	131	138	137	120	99	89
70	84	94	115	131	136	122	101	75	60	76	105	127	134	133	116	96	84
71	80	91	111	127	132	118	98	70	55	73	101	123	131	129	113	91	80
72	74	87	108	124	129	116	94	66	50	68	97	120	128	126	110	88	74
73	71	83	105	121	126	112	91	62	45	64	94	117	124	123	106	84	71
74	66	79	102	118	122	108	87	58	40	60	90	113	121	119	103	80	66
75	62	75	99	115	119	105	84	54	35	57	87	110	117	117	100	76	62
76	57	72	96	112	116	102	81	51	31	53	84	107	115	113	97	72	57
77	52	69	92	109	114	101	77	47	26	49	80	103	111	111	94	69	52
78	49	66	90	106	113	103	74	44	22	45	77	100	108	107	91	66	49
79	45	62	87	106	115	101	72	41	18	42	74	98	108	105	88	63	45
80	42	60	84	106	113	97	73	38	14	39	72	99	108	102	85	59	42
81	38	57	82	104	109	92	71	35	11	36	70	98	105	100	82	58	38
82	36	55	83	100	105	89	68	32	8	33	71	94	101	100	79	55	36
83	32	52	82	97	101	85	65	30	5	31	67	91	99	99	78	52	32
84	30	50	79	95	98	82	61	28	3	30	65	89	95	95	78	49	30
85	27	48	75	91	95	77	57	25	2	27	62	84	91	92	76	48	27
86	25	46	72	88	91	73	54	23	1	24	57	79	86	90	73	45	25
87	23	43	69	83	87	71	50	20	1	22	52	75	82	87	69	43	23
88	21	40	65	78	82	68	48	18	1	20	50	71	78	82	66	40	21
89	18	37	61	75	79	66	45	17	1	18	47	68	76	78	62	37	18
90	17	36	59	72	76	63	43	15	1	16	45	66	73	74	59	35	17
91	18	34	56	71	74	61	41	14	1	15	43	64	71	72	57	33	18
92	18	32	55	69	72	59	40	13	1	14	41	62	69	70	55	32	18

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93	18	31	52	67	70	57	38	12	1	12	39	60	66	68	53	30	18
94	18	30	51	64	68	55	36	11	1	11	38	57	64	66	51	29	18
95	18	29	49	63	65	54	35	10	1	10	36	56	62	64	49	28	18
96	18	28	47	60	63	52	33	9	1	9	35	54	60	61	47	27	18
97	18	27	46	59	61	50	32	8	1	8	33	52	58	59	46	26	18
98	18	26	44	57	59	49	30	7	1	8	31	50	57	58	45	25	18
99	18	25	43	55	58	46	29	7	0	7	30	48	55	56	43	25	18
100	19	24	41	54	56	45	27	6	0	6	28	47	52	54	42	24	19
101	19	24	39	52	54	43	26	5	0	6	26	44	51	53	40	23	19
102	19	23	38	50	52	41	24	5	0	5	25	43	48	51	38	22	19
103	19	22	37	48	50	39	23	4	0	5	24	41	47	49	37	22	19
104	19	22	35	47	49	38	22	4	0	4	22	39	44	47	35	21	19
105	19	21	34	45	47	36	20	4	0	4	21	38	43	46	35	21	19
106	18	21	33	43	45	34	19	4	0	4	20	36	41	44	33	20	18
107	18	21	32	41	43	33	18	4	0	4	19	34	39	42	32	19	18
108	18	20	30	40	42	31	17	4	0	3	17	33	38	41	30	19	18
109	18	20	29	38	40	30	15	3	0	3	16	31	36	39	29	19	18
110	19	19	28	37	39	28	14	3	0	3	15	29	34	37	28	19	19
111	19	19	27	35	37	27	13	3	1	3	14	28	33	36	27	18	19
112	19	19	25	34	35	25	12	3	1	3	13	27	31	34	26	18	19
113	18	18	24	32	34	23	10	3	1	3	12	25	29	33	25	18	18
114	19	18	23	31	32	22	9	3	1	3	11	23	28	31	23	17	19
115	18	18	22	29	31	16	9	3	1	3	10	22	27	30	22	17	18
116	18	17	21	28	29	13	8	3	1	3	9	21	25	29	21	17	18
117	17	17	20	27	28	16	7	2	1	2	8	20	24	27	20	17	17
118	17	17	20	25	26	16	7	2	1	2	8	18	22	26	19	16	17
119	16	16	19	24	25	15	6	2	1	2	7	17	21	25	19	16	16
120	16	16	18	22	23	14	5	2	1	2	7	16	19	23	18	16	16
121	15	16	18	21	22	13	4	2	1	2	6	14	18	22	17	15	15
122	15	16	17	20	19	11	4	2	1	2	5	13	17	21	16	15	15
123	15	15	16	19	17	11	3	2	1	2	5	12	16	20	15	15	15
124	14	15	15	18	16	10	2	2	1	2	4	11	14	19	15	14	14

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125	14	14	14	17	15	9	2	1	1	2	3	10	13	17	14	14	14
126	14	14	13	16	14	8	1	1	1	1	2	9	12	16	14	14	14
127	14	14	11	15	13	7	1	1	1	1	2	8	11	15	13	13	14
128	14	13	11	14	12	6	1	1	1	1	2	8	10	14	12	13	14
129	14	13	10	13	11	4	1	1	1	1	2	7	9	13	11	13	14
130	13	13	10	12	11	3	1	1	1	1	1	6	8	12	10	12	13
131	13	12	9	11	10	1	1	1	1	1	1	5	8	11	9	12	13
132	12	12	9	10	9	1	1	1	1	1	1	4	7	11	9	12	12
133	12	11	9	8	8	1	1	1	1	1	1	3	6	10	9	11	12
134	12	11	8	6	7	1	1	1	1	1	1	1	5	10	8	11	12
135	12	11	8	5	6	1	1	1	1	1	1	1	4	9	8	11	12
136	11	10	8	4	4	1	1	1	1	1	1	1	2	7	8	10	11
137	11	10	8	4	2	1	1	1	1	1	1	1	1	6	8	10	11
138	11	10	7	4	1	1	1	1	1	1	1	1	1	5	7	10	11
139	10	10	7	4	1	1	1	1	1	1	1	1	1	4	7	10	10
140	10	9	7	4	1	1	1	1	0	1	1	1	1	4	7	9	10
141	10	9	7	4	1	1	1	1	0	1	1	1	1	4	7	9	10
142	9	9	7	3	1	1	1	1	1	1	1	1	1	3	7	9	9
143	9	8	6	3	1	1	1	1	0	1	1	1	1	3	6	9	9
144	9	8	6	3	1	1	1	1	0	1	1	1	1	3	6	8	9
145	9	8	6	3	1	1	1	0	0	1	1	1	1	3	6	8	9
146	8	8	6	3	1	1	1	1	0	1	1	1	1	3	6	8	8
147	8	7	6	3	1	1	1	0	0	1	1	1	1	3	6	8	8
148	8	7	6	3	1	1	1	0	0	1	1	1	1	3	6	7	8
149	8	7	5	3	1	1	1	0	0	1	1	1	1	3	5	7	8
150	7	7	5	3	1	1	1	0	0	1	1	1	1	3	5	7	7
151	7	7	5	2	1	1	1	0	0	1	1	1	1	3	5	7	7
152	7	6	5	2	1	1	0	0	1	1	1	1	1	2	5	7	7
153	7	6	5	2	1	1	0	1	0	1	1	1	1	2	5	6	7
154	6	6	4	2	0	1	0	0	0	1	1	1	1	2	5	6	6
155	6	6	4	2	0	1	0	0	0	1	1	1	1	2	4	6	6
156	6	5	4	2	1	1	0	1	0	1	1	1	1	2	4	6	6

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157	6	5	4	2	1	0	0	0	1	1	1	1	1	2	4	5	6
158	5	5	4	1	1	0	0	0	0	1	1	1	1	2	4	5	5
159	5	5	3	1	0	0	0	0	0	1	1	1	1	2	4	5	5
160	5	4	3	1	0	0	0	0	0	1	1	1	1	2	4	5	5
161	5	4	3	1	0	0	0	0	0	1	1	1	1	2	3	4	5
162	4	4	3	1	0	0	0	0	0	1	1	1	1	2	3	4	4
163	4	4	2	1	0	0	0	0	0	1	1	1	1	2	3	4	4
164	4	4	1	1	0	0	0	0	0	1	1	1	1	2	3	4	4
165	4	3	1	1	0	0	0	0	1	1	1	1	1	2	3	4	4
166	3	3	1	1	0	0	0	0	0	1	1	1	1	2	3	3	3
167	3	3	1	1	0	1	0	0	0	0	1	1	1	2	3	3	3
168	3	2	1	1	0	0	0	0	0	0	1	1	1	2	2	3	3
169	3	1	1	1	0	0	0	0	0	0	0	1	1	1	2	3	3
170	2	2	1	1	0	0	0	0	0	0	0	1	1	1	2	2	2
171	2	1	1	1	0	0	0	0	0	0	1	1	1	1	2	2	2
172	2	1	1	1	0	0	0	0	0	0	0	1	0	1	2	2	2
173	2	1	1	1	0	0	0	0	0	0	1	1	1	1	1	2	2
174	2	1	1	0	0	0	0	0	0	1	0	0	0	1	1	1	2
175	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1
176	1	1	1	1	0	0	0	0	0	1	0	1	0	1	1	1	1
177	1	1	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1
178	1	1	1	1	0	0	0	0	1	1	1	0	0	1	1	1	1
179	0	1	1	1	1	0	0	1	1	0	1	1	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-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

**\*\*\*\*\* END OF REPORT \*\*\*\*\***