NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN

(Brand Name:N/A)

188 S. Northwest HighwayCary, IL60013

LED Luminaires

Model name(s): LED-8090M30-A

Representative (Tested) Model: LED-8090M30-A (3000K)

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

Test & Report By:

Review By:

Engineer: Garman Mo

Manager: Tommy Liang

Date: Jul.12,2016

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	N/A	
Model Number	LED-8090M30-A	
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	120W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K	
LED Manufacturer	CREE	
LED Model	XHP50A-00-0000-0DOHG230G	
Sample Number	GZE160698-D1(3000K)	
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	Jul.11,2016
Date of Test	Jul.12,2016
Test item	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	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 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° 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.

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° 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.

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° 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.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-11	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-8090M30-A(3000K)		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160698-D1	120.0	60	0.9790	115.74	0.9850	13.39
	277.0	60	0.4810	122.04	0.9161	20.25
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method :

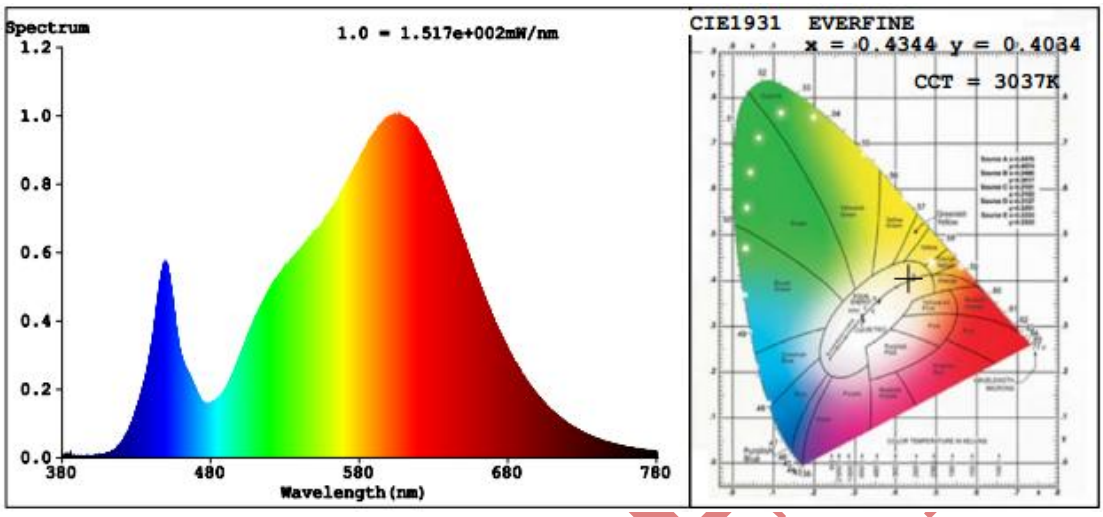
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3037
Duv	0.0001
Chromaticity (x, y)	x=0.4344 y=0.4034
Chromaticity (u', v')	u'=0.2493 v'=0.5207
Color Rendering Index (CRI)	83.2
R9	15

Special Color Rendering Indices			
R1	82	R9	15
R2	89	R10	74
R3	95	R11	82
R4	83	R12	68
R5	81	R13	83
R6	86	R14	97
R7	86	R15	76
R8	64	--	--

Photometric Measurement – Goniophotometer Method :

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	10157	10667	--	
Luminous Efficacy (lm/W)	87.76	87.41	--	--
Beam Angle (°)	112.3	--	--	
Center Beam Candle Power (cd)	3662	--	--	

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

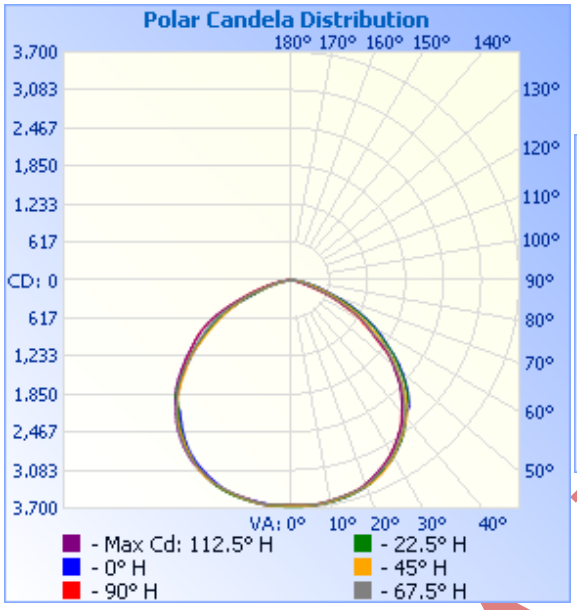
Zonal Lumen Summary

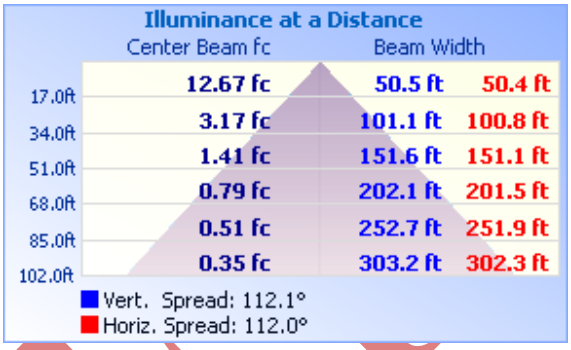
Zone	Lumens	% Luminaire
0-30	2,946.7	29%
0-40	4,881.2	48.1%
0-60	8,565.2	84.3%
60-90	1,578.7	15.5%
70-100	494.4	4.9%
90-120	5.9	0.1%
0-90	10,143.9	99.9%
90-180	12.6	0.1%
0-180	10,156.5	100%

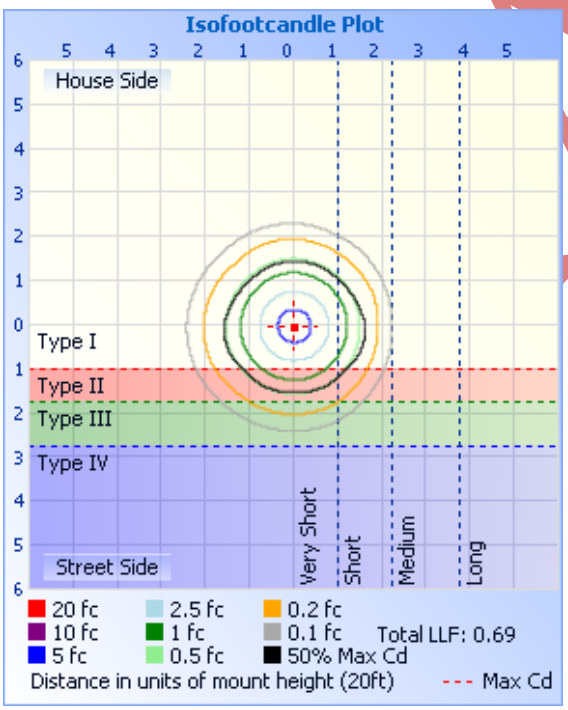
Lumens Per Zone

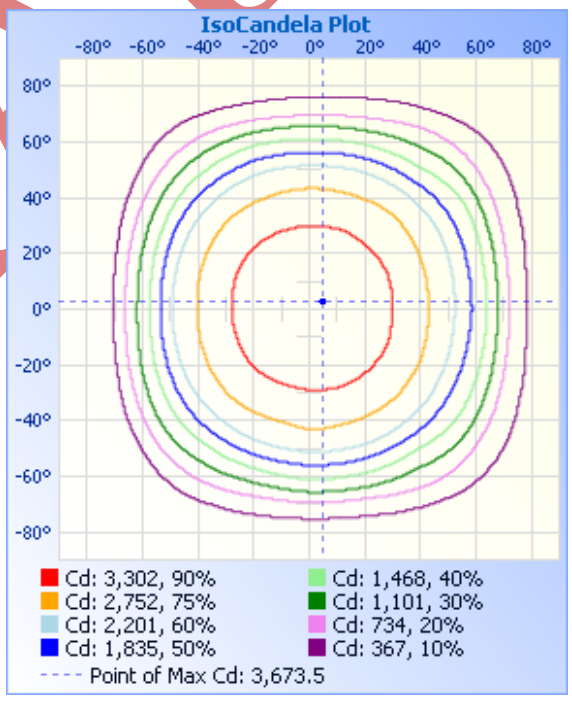
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	348.7	3.4%	90-100	3.1	0%
10-20	1,017.4	10.0%	100-110	1.4	0%
20-30	1,580.7	15.6%	110-120	1.3	0%
30-40	1,934.4	19.0%	120-130	1.4	0%
40-50	2,001.8	19.7%	130-140	1.5	0%
50-60	1,682.2	16.6%	140-150	1.5	0%
60-70	1,087.3	10.7%	150-160	1.2	0%
70-80	410.9	4.0%	160-170	0.8	0%
80-90	80.4	0.8%	170-180	0.3	0%

Photometric Data









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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	3662	3671	3652	3642	3643	3665	3647	3652	3662	3671	3652	3642	3643	3665	3647	3652	3662
1	3663	3671	3654	3643	3643	3666	3647	3650	3661	3670	3654	3641	3645	3664	3647	3655	3663
2	3666	3671	3657	3646	3648	3667	3647	3647	3660	3670	3654	3644	3645	3666	3648	3655	3666
3	3667	3672	3660	3649	3653	3670	3650	3649	3658	3669	3654	3648	3650	3669	3650	3655	3667
4	3665	3670	3662	3653	3655	**3674**	3653	3646	3655	3671	3657	3651	3655	3672	3651	3656	3665
5	3665	3668	3663	3655	3655	3673	3653	3644	3654	3670	3660	3652	3657	3673	3653	3658	3665
6	3663	3666	3664	3655	3653	3668	3652	3644	3651	3668	3663	3653	3657	3672	3656	3659	3663
7	3660	3664	3662	3652	3651	3662	3649	3641	3647	3663	3661	3653	3652	3669	3656	3658	3660
8	3656	3661	3658	3646	3644	3657	3643	3639	3640	3661	3656	3651	3647	3665	3653	3655	3656
9	3653	3656	3650	3639	3638	3647	3634	3633	3635	3655	3651	3643	3639	3655	3649	3651	3653
10	3650	3651	3646	3628	3629	3636	3623	3628	3628	3651	3645	3633	3631	3648	3639	3649	3650
11	3645	3649	3637	3620	3626	3628	3613	3621	3623	3644	3633	3625	3621	3639	3632	3643	3645
12	3638	3640	3629	3612	3616	3617	3606	3610	3615	3635	3624	3615	3611	3632	3622	3637	3638
13	3631	3633	3619	3605	3607	3606	3598	3600	3607	3631	3617	3606	3605	3623	3615	3629	3631
14	3626	3626	3614	3597	3598	3599	3590	3593	3600	3623	3609	3594	3597	3613	3605	3619	3626
15	3617	3618	3605	3589	3591	3590	3574	3583	3594	3615	3599	3587	3592	3605	3594	3612	3617
16	3606	3609	3597	3581	3586	3583	3562	3574	3583	3604	3587	3576	3582	3594	3588	3601	3606
17	3596	3596	3585	3577	3573	3571	3548	3560	3571	3594	3576	3568	3574	3586	3575	3592	3596
18	3584	3582	3573	3565	3559	3559	3538	3549	3553	3583	3562	3557	3565	3573	3564	3581	3584
19	3574	3571	3564	3552	3540	3538	3527	3530	3537	3571	3550	3543	3549	3561	3550	3570	3574
20	3552	3557	3550	3533	3515	3518	3518	3516	3514	3552	3534	3532	3533	3546	3539	3556	3552
21	3536	3544	3537	3516	3495	3491	3506	3491	3492	3533	3524	3514	3511	3533	3526	3542	3536
22	3512	3522	3525	3491	3469	3468	3495	3469	3469	3514	3510	3496	3491	3513	3514	3525	3512
23	3492	3497	3506	3470	3448	3438	3471	3440	3449	3487	3496	3472	3464	3488	3502	3507	3492
24	3464	3468	3490	3442	3422	3414	3447	3417	3422	3462	3476	3453	3444	3468	3485	3483	3464
25	3441	3443	3464	3418	3397	3384	3417	3393	3398	3434	3448	3426	3423	3443	3471	3462	3441
26	3414	3414	3437	3388	3365	3360	3390	3362	3370	3410	3423	3404	3395	3425	3447	3441	3414
27	3393	3391	3404	3366	3336	3337	3358	3337	3347	3384	3390	3383	3373	3399	3423	3412	3393
28	3364	3371	3374	3340	3309	3304	3318	3297	3321	3347	3359	3355	3343	3377	3387	3386	3364
29	3337	3340	3335	3306	3273	3277	3286	3270	3287	3317	3320	3336	3317	3347	3355	3356	3337

30	3309	3310	3301	3279	3240	3239	3242	3241	3258	3278	3287	3305	3281	3321	3312	3332	3309
31	3271	3274	3265	3241	3198	3207	3199	3206	3218	3247	3245	3276	3251	3283	3279	3300	3271
32	3241	3234	3222	3205	3164	3163	3163	3166	3185	3205	3211	3240	3209	3252	3247	3272	3241
33	3200	3197	3187	3162	3120	3117	3118	3136	3139	3170	3177	3208	3173	3220	3209	3234	3200
34	3165	3167	3146	3120	3082	3082	3083	3102	3103	3125	3136	3163	3131	3179	3178	3200	3165
35	3121	3132	3112	3087	3036	3038	3047	3055	3053	3089	3104	3127	3094	3143	3135	3169	3121
36	3082	3082	3079	3052	2996	3003	3002	3013	3010	3039	3059	3091	3059	3098	3101	3125	3082
37	3031	3043	3024	3005	2955	2962	2962	2958	2963	2996	3023	3043	3006	3061	3059	3085	3031
38	2989	2988	2989	2954	2897	2909	2913	2910	2908	2954	2974	3003	2965	3013	3026	3034	2989
39	2933	2941	2941	2910	2838	2863	2874	2846	2866	2899	2934	2948	2913	2973	2980	2990	2933
40	2890	2894	2898	2861	2782	2799	2818	2797	2814	2853	2881	2901	2870	2918	2939	2931	2890
41	2842	2833	2855	2794	2738	2746	2771	2736	2775	2796	2832	2841	2812	2871	2890	2880	2842
42	2829	2785	2794	2739	2682	2681	2708	2689	2764	2764	2769	2792	2769	2810	2851	2819	2829
43	2801	2741	2742	2674	2635	2618	2652	2638	2758	2708	2731	2742	2729	2760	2804	2771	2801
44	2741	2728	2671	2621	2588	2567	2577	2609	2698	2683	2659	2688	2694	2716	2758	2728	2741
45	2684	2667	2610	2555	2519	2505	2513	2561	2625	2672	2598	2621	2638	2675	2704	2703	2684
46	2635	2608	2531	2503	2462	2448	2428	2502	2566	2586	2519	2570	2576	2616	2631	2655	2635
47	2560	2544	2466	2434	2387	2371	2359	2431	2483	2519	2456	2509	2520	2565	2552	2598	2560
48	2502	2482	2382	2357	2312	2304	2272	2347	2415	2434	2379	2439	2452	2497	2487	2535	2502
49	2423	2403	2295	2291	2253	2225	2189	2274	2336	2360	2299	2377	2398	2439	2404	2476	2423
50	2359	2332	2233	2202	2178	2165	2121	2183	2268	2273	2236	2291	2327	2363	2338	2393	2359
51	2281	2248	2160	2134	2118	2091	2040	2112	2190	2204	2179	2220	2274	2303	2260	2301	2281
52	2222	2182	2107	2053	2029	2019	1986	2028	2108	2117	2120	2138	2204	2232	2196	2230	2222
53	2131	2109	2007	1990	1933	1952	1903	1965	2033	2055	2023	2075	2146	2163	2136	2141	2131
54	2054	2051	1929	1908	1808	1836	1827	1883	1948	1978	1956	2000	2072	2107	2052	2073	2054
55	1961	1955	1840	1818	1699	1738	1735	1795	1878	1887	1862	1928	2001	2030	1977	1995	1961
56	1879	1875	1766	1695	1637	1614	1664	1719	1800	1811	1763	1866	1951	1968	1887	1927	1879
57	1810	1783	1674	1573	1544	1554	1570	1622	1743	1717	1685	1786	1892	1894	1813	1828	1810
58	1745	1711	1603	1510	1458	1487	1478	1546	1672	1646	1594	1725	1849	1840	1718	1750	1745
59	1681	1628	1512	1442	1364	1434	1404	1464	1589	1566	1524	1653	1791	1777	1643	1662	1681
60	1593	1573	1445	1382	1301	1360	1318	1398	1522	1509	1435	1603	1740	1714	1556	1569	1593

61	1527	1488	1364	1288	1228	1301	1254	1314	1435	1430	1369	1534	1667	1658	1468	1503	1527
62	1436	1422	1278	1206	1151	1225	1178	1246	1357	1356	1290	1477	1590	1584	1400	1428	1436
63	1355	1338	1212	1103	1021	1142	1118	1150	1268	1286	1228	1399	1521	1521	1317	1362	1355
64	1259	1242	1124	1027	946	997	1043	1070	1204	1184	1149	1316	1426	1435	1259	1281	1259
65	1194	1161	1052	939	866	912	979	977	1118	1107	1070	1244	1349	1356	1185	1211	1194
66	1112	1069	960	869	798	829	893	906	1019	1015	1005	1147	1249	1247	1127	1116	1112
67	1036	996	888	766	701	742	821	825	932	940	939	1064	1166	1156	1052	1019	1036
68	938	893	798	682	615	672	732	757	815	839	882	965	1059	1049	984	946	938
69	854	809	737	596	498	584	664	665	722	725	808	883	951	944	904	859	854
70	748	700	667	518	420	509	589	590	639	639	750	781	877	859	832	788	748
71	673	615	612	443	356	409	523	512	585	553	677	681	790	767	776	696	673
72	622	540	546	373	276	332	468	453	519	500	598	608	723	701	702	622	622
73	555	493	487	331	233	265	394	415	478	444	525	529	644	619	637	543	555
74	509	438	407	284	200	223	335	384	439	407	438	472	587	555	556	482	509
75	464	397	359	254	169	187	282	361	355	377	382	413	523	483	493	444	464
76	427	352	314	228	109	161	254	290	288	309	330	376	476	428	421	402	427
77	344	311	261	202	61	142	224	252	256	254	293	335	418	388	357	384	344
78	295	247	228	168	42	120	200	240	248	221	260	298	370	338	318	337	295
79	269	221	192	128	29	101	147	233	233	212	212	269	346	305	267	287	269
80	264	211	173	101	19	71	117	184	156	195	164	230	280	264	241	256	264
81	205	177	164	77	10	58	112	134	124	135	152	186	246	220	200	235	205
82	122	135	135	61	6	41	92	113	103	106	144	162	213	191	159	198	122
83	107	103	91	45	4	32	67	93	93	93	104	135	172	161	139	136	107
84	92	93	62	34	3	23	54	69	66	75	74	112	146	140	110	109	92
85	68	74	53	28	2	17	46	47	37	60	60	88	119	111	83	92	68
86	60	62	40	20	2	14	37	26	28	27	48	71	101	89	64	66	60
87	42	50	32	16	2	10	22	22	27	27	33	57	82	74	50	53	42
88	32	37	22	12	1	7	9	11	13	16	21	46	67	58	41	37	32
89	15	13	11	6	1	3	2	2	4	6	13	37	57	46	30	17	15
90	7	4	2	1	1	1	2	2	2	4	8	24	43	38	18	12	7
91	2	2	1	1	1	1	1	2	2	3	6	13	28	27	12	6	2

92	2	2	1	1	1	1	1	2	2	3	4	5	15	17	9	5	2
93	1	1	1	1	1	1	1	1	2	2	3	2	4	6	6	4	1
94	1	1	1	1	1	1	1	1	2	2	2	2	2	2	4	3	1
95	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1
96	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1
97	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	1
98	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	1
99	1	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	1
100	1	1	1	1	1	1	1	1	2	2	3	1	1	1	2	1	1
101	1	2	1	1	1	1	1	1	2	2	3	1	1	1	2	2	1
102	2	1	1	1	1	1	1	1	1	2	3	2	1	1	2	2	2
103	1	1	1	1	1	1	1	1	1	2	3	2	1	1	2	2	1
104	1	1	1	1	1	1	1	1	1	2	3	2	1	1	3	2	1
105	1	1	1	1	1	1	1	1	1	2	3	1	1	1	3	2	1
106	1	1	1	1	1	1	1	1	1	2	3	1	1	1	3	2	1
107	1	1	1	1	1	1	1	1	1	2	2	1	1	1	3	2	1
108	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
109	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
110	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
111	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
112	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
113	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
114	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
115	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
116	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
117	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1
118	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1
119	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	2	1
120	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	2	1
121	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	2	1
122	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	2	1

123	1	1	1	1	1	1	2	1	2	2	2	2	2	1	2	2	1
124	1	1	1	1	2	2	1	1	2	2	2	2	2	1	2	2	1
125	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
126	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
127	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
128	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
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152	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	2	3
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154	3	2	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3
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180	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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 ******