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NVLAP LAB CODE 201011-0

Report No.: GZE140319-H3

LM-79-08 Test Report

For

PREMIUM QUALITY LIGHTING (Brand Name: SUPERIOR LIFE®)

2285 WARD AVENUE
SIMI VALLEY, CA 93065

Retrofit Kits for Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model name(s): 83396

Model Different: N/A

Test & Report By:

Sean Zhao

Engineer: Sean Zhuo

Date: April 21, 2014

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 : 8th floor, Block B, No. 11 Caipin Road, Guangzhou Science City, Tianhe, Guangzhou 510663, China

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U.S. Department of Energy

Lighting Facts™ Uniform LM-79 Reporting Template
Laboratory Information:

Name of Test Laboratory	Standard-Tech Co. Ltd
Date of Test Report	April 21, 2014
Test Report No.	GZE140319-H3
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	PREMIUM QUALITY LIGHTING	
Brand Name	SUPERIOR LIFE®	
Model Number	83396	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Retrofit Kits for Outdoor Pole/Arm-Mounted Area and Roadway Luminaires	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Integrating Sphere
Goniophotometer
Electrical Measurements:
Output
Output

	Integrating Sphere	Goniophotometer	
Input Wattage	--	147.2	W
Input Current	--	1.233	A
Input Voltage (ac)	--	120.1	V
Power Factor	--	0.9943	
Off-State Power	--	0	W

Photometric Characteristics

	Integrating Sphere	Goniophotometer	
Total Initial Lumen Output	--	11580	lm
Initial Lumen Efficacy	--	78.64	lm/w
Correlated color temperature / CCT	4500	--	K
Color rendering index / CRI	71.9	--	
R9 Value	0	--	
Duv	0.0025	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----	4380	cd
Beam angle (if applicable)		112.9	°
Zonal lumens in the 0°-60° zone		84.4	%
Zonal lumens in the 60°-90° zone		15.4	%
Zonal lumens in the 90°-120° zone		0.1	%
Zonal lumens in the 120°-180° zone		0.1	%

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Test Specifications:	
Date of Receipt	: April 16. 2014
Date of Test	: April 21.2014
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry IESNA LM-16-93 Practical Guide to Colorimetry of Light Source IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

Test Methods

1. Photometric and Electrical measurements – Light Distribution 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 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. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric 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 Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at least 5 nm intervals over the range of 380 to 780 nm.

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1. Product Information:

Brand Name	SUPERIOR LIFE®
Model Number	83396
Luminaire Type	Retrofit Kits for Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz
Nominal Power	150W
Rated Initial Lamp Lumen	--
Declared CCT	4500K
LED Manufacturer	CREE
LED Model	XB-D
Sample Receipt Date	April 16.2014
Sample Number	140319-16

Photo



2.1 Electrical, Photometric and Chromaticity Measurements (Refer to Work Instruction QD25)	IES LM-79 2008
--	-----------------------

Test date	2014-04-21	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	83396		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
140319-16	120.0	60	1.233	147.2	0.9943	6.4
	277.0	60	0.5737	149.2	0.9389	8.9

Sphere-Spectroradiometer Method in GE M250R2 Roadway Lamp:

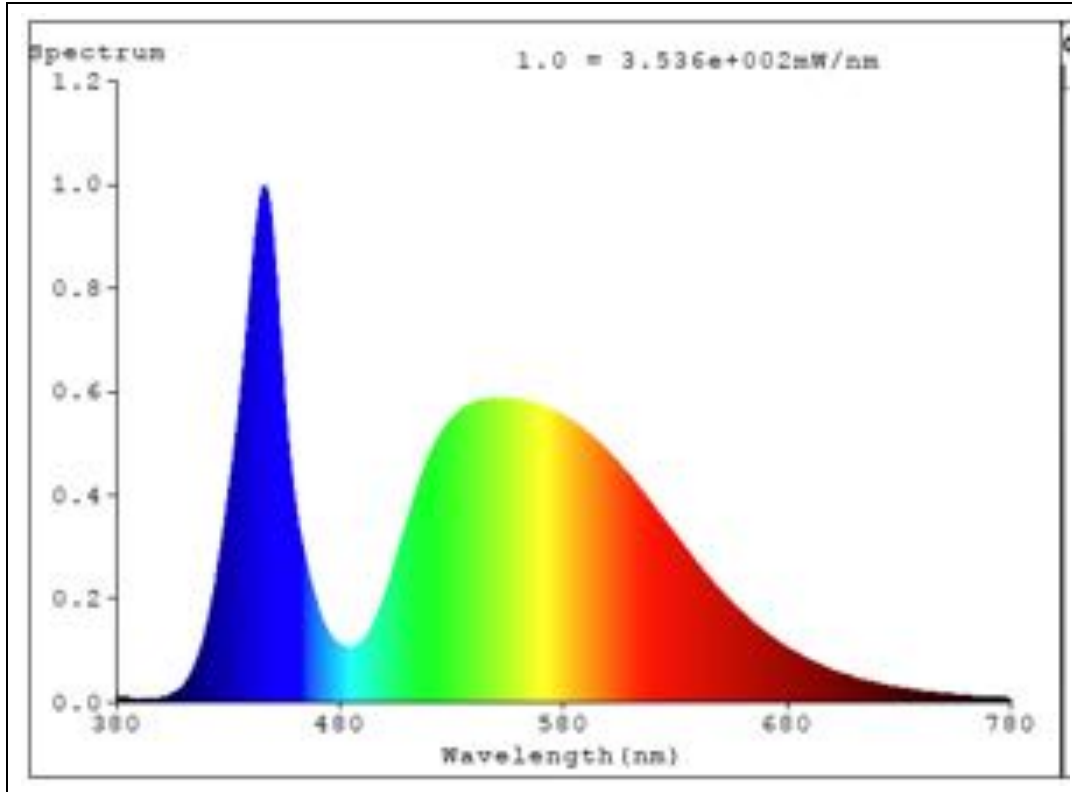
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	71	R9	0
Frequency (Hz)	60	R2	75	R10	39
Color Rendering Index (CRI)	71.9	R3	76	R11	72
R9	0	R4	74	R12	44
CCT (K)	4500	R5	72	R13	70
Chromaticity (x, y)	x=0.3313 y=0.3450	R6	66	R14	86
Chromaticity (u', v')	u'=0.2046 v'=0.4793	R7	79	R15	66
Duv	0.0025	R8	62	--	--

Goniophotometer Method in GE M250R2 Roadway Lamp:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	11580
Luminous Efficacy (lm/W)	78.64
Beam Angle°	112.9
Center Beam Candle Power (cd)	4380
S/MH(C0/180)	1.27
S/MH(C90/270)	1.26

Spectral Power Distribution

Spectral Power Distribution:



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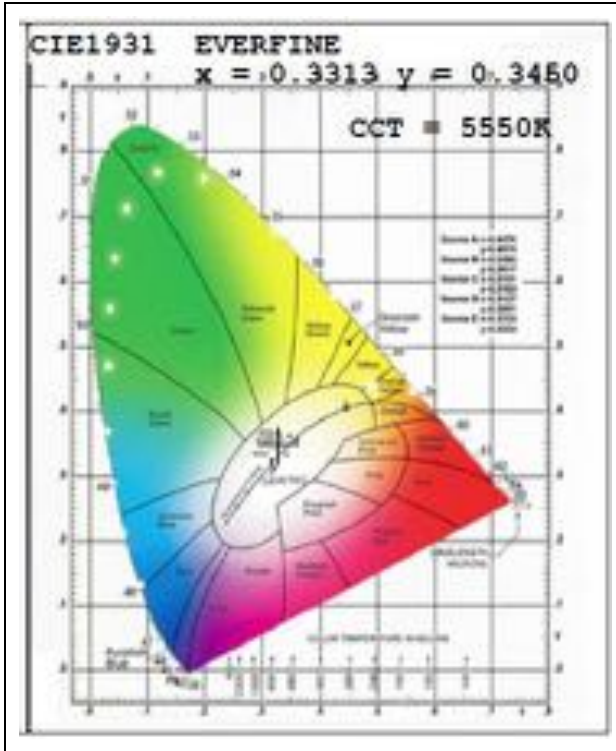
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Chromaticity Diagram



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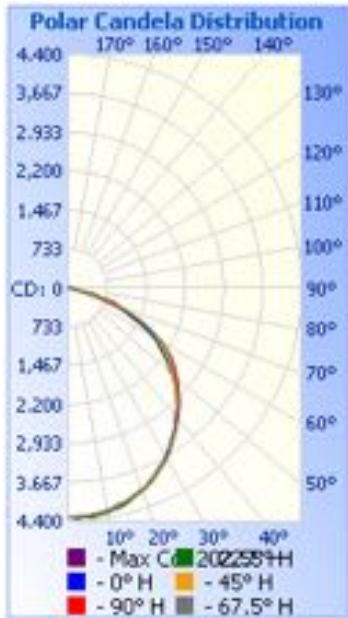
<http://www.standard-tech.com>

Zonal Lumen Tabulation

Zonal Lumen Summary			
Zone	Lumens	% Lamp	% Luminaire
0-30	3,381.3	29.2%	29.2%
0-40	5,530.5	47.8%	47.8%
0-60	9,768.2	84.4%	84.4%
60-90	1,786.3	15.4%	15.4%
70-100	440.2	3.8%	3.8%
90-120	6.2	0.1%	0.1%
0-90	11,554.5	99.8%	99.8%
90-180	24.4	0.2%	0.2%
0-180	11,578.9	100%	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	411.1	3.6%	90-100	1.1	0%
10-20	1,180.2	10.2%	100-110	2.0	0%
20-30	1,789.9	15.5%	110-120	3.1	0%
30-40	2,149.2	18.6%	120-130	3.9	0%
40-50	2,226.0	19.2%	130-140	4.1	0%
50-60	2,011.7	17.4%	140-150	3.9	0%
60-70	1,347.3	11.6%	150-160	3.3	0%
70-80	397.1	3.4%	160-170	2.2	0%
80-90	42.0	0.4%	170-180	0.8	0%

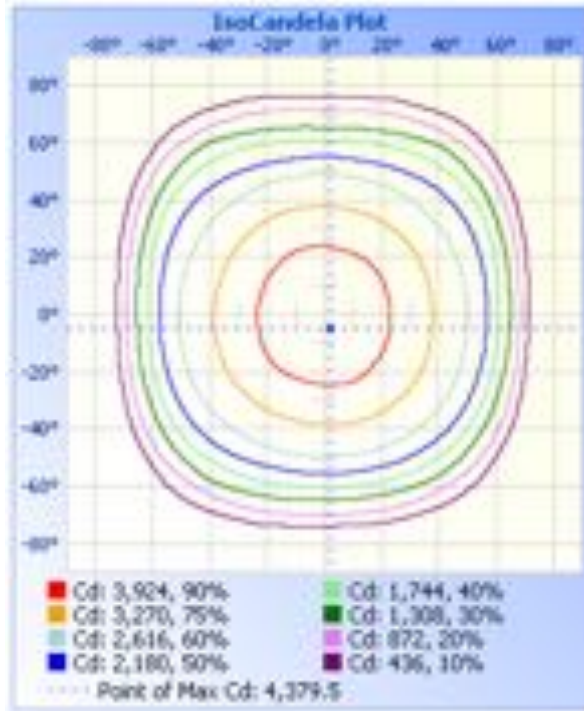
Photometric Data



Illuminance Plots



ISOCANDELA DIAGRAM



ISOLUX DIAGRAM

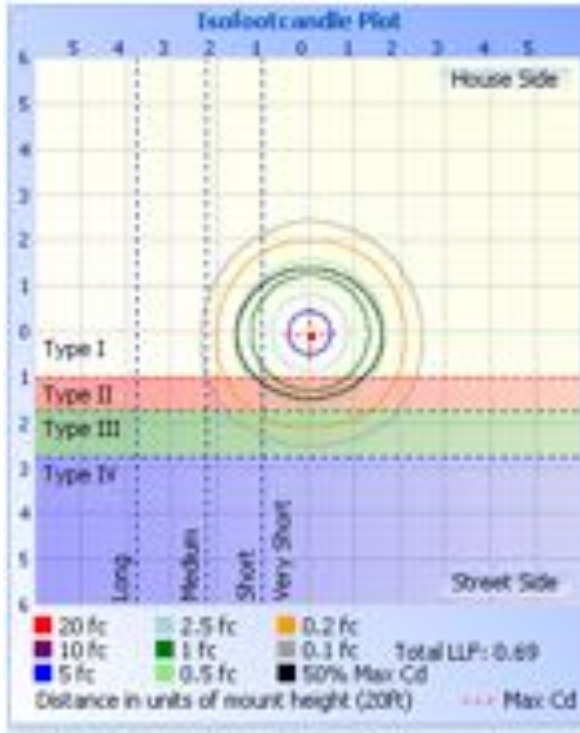
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Candela Table - Type C

	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	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338	4338
1	4344	4341	4338	4336	4331	4332	4343	4347	4336	4352	4342	4343	4334	4334	4334	4333	4344
2	4348	4353	4331	4337	4323	4338	4349	4351	4337	4360	4338	4333	4330	4324	4328	4320	4348
3	4348	4362	4331	4325	4323	4341	4342	4335	4332	4365	4335	4329	4323	4319	4328	4313	4348
4	4327	4351	4329	4323	4321	4327	4334	4320	4328	4379	4334	4316	4318	4322	4320	4307	4327
5	4316	4351	4323	4325	4319	4317	4331	4310	4328	4380	4328	4306	4318	4325	4312	4300	4316
6	4315	4359	4316	4317	4309	4305	4323	4301	4320	4360	4319	4301	4307	4316	4311	4300	4315
7	4320	4348	4309	4304	4296	4294	4312	4288	4314	4332	4306	4296	4290	4300	4311	4295	4320
8	4319	4332	4300	4294	4292	4292	4300	4273	4301	4314	4294	4288	4277	4293	4299	4293	4319
9	4306	4322	4293	4283	4282	4287	4287	4260	4289	4303	4287	4278	4270	4278	4283	4285	4306
10	4286	4306	4265	4270	4268	4268	4278	4247	4283	4290	4267	4254	4263	4262	4271	4277	4286
11	4273	4283	4246	4257	4251	4252	4268	4250	4269	4272	4244	4244	4244	4249	4260	4267	4273
12	4252	4274	4235	4235	4222	4240	4249	4238	4251	4246	4236	4228	4224	4214	4248	4250	4252
13	4227	4267	4219	4213	4200	4230	4228	4222	4238	4232	4221	4204	4201	4188	4234	4233	4227
14	4210	4251	4198	4203	4191	4209	4210	4206	4220	4224	4201	4182	4178	4178	4209	4210	4210
15	4192	4230	4171	4184	4180	4187	4192	4186	4191	4209	4188	4167	4149	4174	4177	4192	4192

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16	4161	4196	4148	4151	4160	4169	4170	4168	4157	4181	4174	4150	4129	4150	4153	4172	4161
17	4133	4161	4136	4119	4137	4135	4143	4143	4121	4158	4152	4124	4113	4109	4118	4142	4133
18	4103	4137	4120	4089	4113	4101	4109	4113	4090	4130	4117	4091	4090	4073	4090	4119	4103
19	4083	4117	4093	4070	4094	4080	4079	4084	4071	4099	4084	4061	4062	4046	4067	4087	4083
20	4070	4089	4071	4048	4070	4064	4064	4046	4052	4065	4052	4028	4028	4012	4037	4055	4070
21	4046	4064	4041	4023	4035	4046	4040	4007	4024	4043	4016	3998	3993	3988	4006	4014	4046
22	4012	4028	4009	3991	4002	4013	4014	3974	3996	4018	3984	3962	3961	3960	3976	3976	4012
23	3977	3997	3965	3949	3959	3974	3980	3945	3964	3981	3953	3930	3914	3928	3954	3940	3977
24	3942	3956	3935	3916	3918	3931	3948	3917	3933	3949	3915	3897	3874	3887	3917	3916	3942
25	3907	3919	3900	3882	3877	3884	3905	3892	3900	3927	3886	3861	3835	3851	3881	3875	3907
26	3866	3878	3864	3841	3834	3848	3871	3857	3847	3898	3864	3814	3783	3815	3838	3833	3866
27	3819	3845	3828	3812	3797	3811	3827	3814	3814	3844	3827	3774	3739	3775	3790	3801	3819
28	3771	3808	3788	3780	3759	3776	3781	3770	3768	3791	3779	3733	3700	3728	3747	3762	3771
29	3732	3765	3742	3732	3743	3738	3732	3720	3700	3747	3730	3691	3651	3676	3715	3728	3732
30	3679	3724	3709	3688	3713	3696	3688	3668	3651	3701	3692	3655	3612	3627	3672	3677	3679
31	3621	3677	3662	3647	3670	3647	3646	3623	3618	3664	3630	3617	3570	3593	3634	3629	3621
32	3576	3631	3611	3600	3625	3595	3589	3579	3583	3616	3593	3568	3526	3556	3589	3583	3576
33	3532	3570	3551	3548	3568	3556	3539	3532	3542	3556	3535	3515	3484	3500	3544	3533	3532
34	3475	3509	3497	3502	3514	3511	3491	3482	3487	3505	3492	3465	3434	3451	3486	3484	3475
35	3428	3454	3452	3446	3465	3467	3443	3432	3427	3455	3438	3415	3381	3403	3431	3431	3428
36	3387	3410	3398	3393	3422	3416	3390	3369	3373	3394	3383	3367	3329	3355	3370	3373	3387
37	3332	3360	3344	3346	3368	3368	3340	3311	3325	3345	3333	3319	3290	3298	3307	3313	3332
38	3275	3314	3295	3296	3322	3317	3282	3261	3277	3292	3273	3265	3242	3241	3253	3266	3275
39	3217	3251	3241	3241	3271	3265	3224	3211	3212	3241	3220	3214	3185	3191	3197	3210	3217
40	3164	3193	3180	3187	3224	3208	3164	3150	3156	3179	3160	3160	3135	3142	3134	3149	3164
41	3108	3127	3115	3133	3174	3152	3108	3090	3101	3118	3100	3106	3081	3086	3074	3092	3108
42	3054	3066	3066	3079	3125	3101	3051	3030	3046	3058	3040	3051	3020	3024	3005	3030	3054
43	3003	3013	3005	3033	3075	3049	2995	2961	2990	3008	2987	2996	2965	2965	2943	2971	3003
44	2938	2969	2940	2986	3025	2997	2942	2905	2938	2952	2922	2945	2914	2907	2885	2912	2938
45	2885	2917	2879	2933	2969	2946	2883	2852	2885	2891	2863	2888	2868	2858	2831	2852	2885
46	2838	2852	2820	2875	2908	2886	2824	2797	2834	2834	2810	2828	2811	2804	2766	2791	2838
47	2785	2788	2761	2815	2852	2825	2760	2740	2775	2773	2750	2770	2761	2747	2704	2735	2785

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48	2702	2729	2698	2760	2803	2769	2698	2685	2715	2709	2688	2710	2712	2691	2640	2683	2702
49	2641	2664	2638	2701	2751	2711	2639	2626	2628	2647	2624	2648	2657	2634	2576	2623	2641
50	2585	2594	2575	2642	2695	2653	2585	2560	2569	2570	2558	2589	2599	2573	2518	2543	2585
51	2487	2511	2522	2581	2635	2598	2530	2489	2466	2520	2498	2528	2545	2517	2459	2481	2487
52	2416	2458	2465	2524	2576	2539	2471	2424	2401	2435	2435	2467	2487	2456	2405	2426	2416
53	2357	2381	2407	2468	2518	2478	2412	2339	2342	2345	2372	2407	2431	2393	2354	2327	2357
54	2281	2286	2347	2414	2463	2422	2354	2262	2262	2283	2311	2327	2371	2337	2297	2254	2281
55	2225	2230	2290	2354	2410	2358	2284	2189	2195	2197	2218	2262	2312	2281	2238	2200	2225
56	2139	2162	2233	2296	2348	2283	2200	2127	2105	2120	2110	2180	2230	2222	2180	2126	2139
57	2065	2109	2177	2237	2278	2199	2105	2052	2041	2026	2030	2089	2138	2165	2122	2071	2065
58	2011	2040	2102	2185	2199	2113	2033	1955	1920	1917	1917	1975	2038	2107	2051	1974	2011
59	1945	1951	2051	2131	2076	2028	1922	1859	1828	1841	1819	1896	1963	2044	1995	1920	1945
60	1849	1903	1996	2071	1995	1928	1826	1796	1728	1752	1735	1756	1820	1944	1905	1854	1849
61	1796	1835	1898	2000	1905	1825	1753	1686	1642	1637	1606	1618	1685	1829	1850	1789	1796
62	1658	1732	1846	1872	1747	1705	1621	1612	1538	1552	1494	1492	1573	1744	1764	1699	1658
63	1580	1675	1762	1771	1658	1565	1518	1507	1424	1437	1419	1394	1461	1610	1678	1611	1580
64	1504	1578	1688	1691	1546	1458	1446	1391	1302	1339	1350	1271	1349	1488	1585	1524	1504
65	1355	1480	1595	1564	1385	1352	1389	1283	1247	1240	1233	1140	1251	1366	1492	1436	1355
66	1251	1389	1502	1435	1304	1215	1283	1200	1175	1133	1125	1063	1154	1244	1399	1310	1251
67	1187	1251	1409	1307	1205	1114	1167	1106	1118	1044	995	946	1026	1144	1310	1208	1187
68	1112	1162	1330	1196	1104	1036	1022	1012	1086	980	879	841	846	1068	1223	1128	1112
69	1057	1101	1233	1114	970	926	924	961	1006	912	742	664	676	946	1086	1063	1057
70	1027	1035	1099	1021	811	813	781	894	829	832	652	520	540	786	978	1013	1027
71	994	991	993	901	660	647	692	784	651	710	568	382	414	629	822	977	994
72	909	951	856	748	527	491	611	667	581	570	481	303	334	489	747	920	909
73	757	890	759	578	411	379	526	539	542	476	332	213	215	382	662	820	757
74	611	749	667	455	340	304	396	469	413	380	206	108	120	286	592	685	611
75	554	633	601	373	227	207	255	362	224	273	114	78	80	174	473	572	554
76	517	544	492	278	129	110	146	236	120	156	68	77	78	82	341	531	517
77	436	516	378	164	86	82	79	124	75	69	65	76	77	68	218	460	436
78	280	418	247	83	84	80	66	63	67	62	63	74	76	67	126	310	280
79	162	266	153	73	83	78	64	61	65	59	60	71	73	67	62	205	162

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80	115	170	84	72	81	75	61	57	60	54	54	66	69	65	55	113	115
81	113	96	59	70	78	71	56	52	54	48	48	61	65	61	52	91	113
82	114	87	55	68	73	66	51	45	48	41	41	55	59	57	48	84	114
83	106	79	51	63	68	60	44	39	39	33	34	49	54	52	44	75	106
84	90	68	47	58	62	55	38	31	28	24	26	41	48	47	39	61	90
85	71	55	42	53	56	48	31	22	16	15	18	31	40	40	34	47	71
86	47	43	36	47	50	42	23	13	6	7	9	19	30	32	28	34	47
87	27	30	30	41	44	33	15	7	1	6	2	6	17	23	21	23	27
88	23	22	24	34	35	22	7	5	1	5	1	0	4	12	15	18	23
89	16	17	17	24	21	9	6	4	1	4	1	0	0	2	7	13	16
90	10	11	10	11	7	7	5	3	1	3	1	0	0	0	1	2	10

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2013-07-08	2014-07-07
ST-R-331	Spectral analysis system HAAS-2000	2013-06-21	2014-06-20
D204	Standard Lamp	2013-06-28	2014-06-27
PF2010	Power Meter for Integrating Sphere	2013-06-20	2014-06-19
EE-09	Goniophotometer system	2013-06-21	2014-06-20
D908S	Standard Lamp	2013-07-05	2014-07-04
PF210	Power Meter for Goniophotometer	2013-06-20	2014-06-19
ST-R-181A	Temperature Tester	2013-08-14	2014-08-13

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