

LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

MT LED Area Light

Model: MT100406-III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ17080006a

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Test specifications:

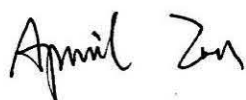
Date of Receipt : Jul. 24, 2017

Date of Test : Jul. 25, 2017

Test item : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters

Reference Standard : IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

Reviewed by:



Engineer: April Zou

Jul. 25, 2017

Approved by



Manager: Jim Zhang

Jul. 25, 2017

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

Test Summary

Sample Tested: MT100406-III

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
99.4	11632.0	117.08	0.9775
CCT (K)	CRI	Stabilization Time (Light & Power)	
4051	73.3	60	
IES Classification		Longitudinal Classification	
Type III		Short	

Table 1: Executive Data Summary

Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: MT LED Area Light
Model	: MT100406-III
Electrical Ratings	: 347~480V, 50/60Hz, 100W
Product Description	: 4000K Manufacturer of light source: SAMSUNG Model of light source: LH351B
Manufacturer	: ABOVE ALL LIGHTING (SHANGHAI) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza, # 1839 Qixin road, Shanghai

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TEST RESULTS

Test ambient temperature was 24.7°C.

Sample orientation was Base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 95 minutes.

Goniophotometer Method

The photometric distance is 2.47m.

Luminous data was taken at 0.5°vertical intervals and 5°horizontal intervals.

Parameter	Result	
Test Voltage (V)	347.0	480.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.345	0.265
Power Factor	0.9775	0.9324
Test Power (W)	117.08	118.63
THD A%	8.21	14.41
Luminous Efficacy (lm/W)	99.4	97.9
Total Luminous Flux (lm)	11632.0	11612.0
Color Rendering Index (CRI)	73.3	
R9	-26	
Correlated Color Temperature (CCT) (K)	4051	
Chromaticity (Chroma x, Chroma y)	(0.3770, 0.3707)	
Chromaticity (Chroma u, Chroma v)	(0.2253, 0.3323)	
Chromaticity (Chroma u', Chroma v')	(0.2253, 0.4984)	
Duv	-0.0018	
Average Beam Angle (°)	105.2	
Center Beam Candle Power (cd)	3347	
Spacing Criteria	0.69 (0°-180°)/ 1.55 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	71.87%	
Zonal Lumens in the 60°-90°Zone	28.13%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Rendering Indices	Color
R1	70
R2	81
R3	89
R4	71
R5	70
R6	72
R7	81
R8	53
R9	-26
R10	54
R11	65
R12	48
R13	72
R14	94

Table 2: Test data per Goniophotometer Method

Note: According to CIE 1976 (u',v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution

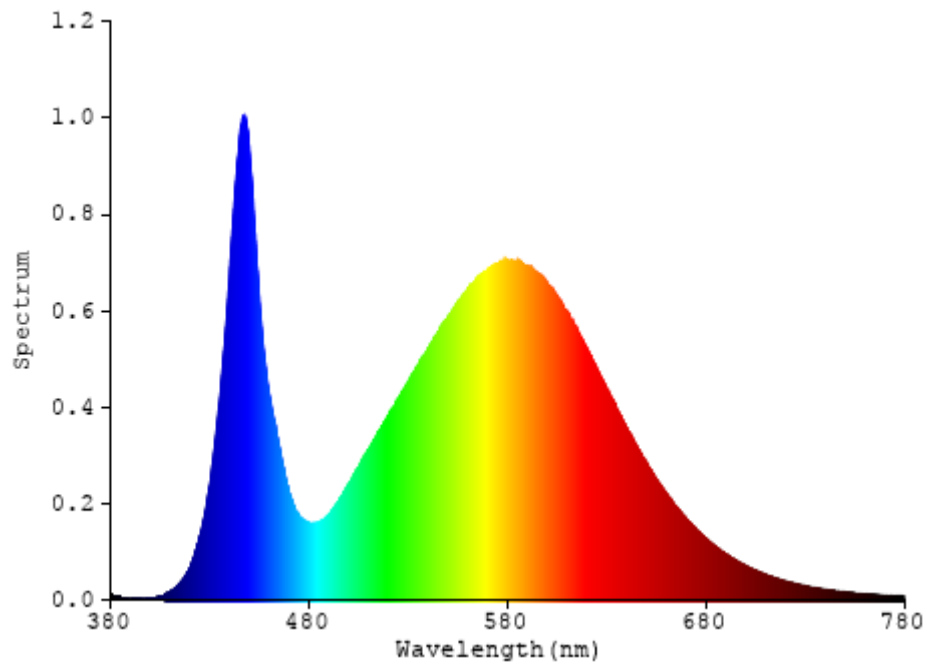


Chart 1: Spectral Power Distribution

IESNA Luminaire Flux Distribution Table

Zone	Lumens	Luminaire %
FL - Front-Low (0-30)	1521.5	13.1
FM - Front-Medium (30-60)	4726.1	40.6
FH - Front-High (60-80)	2748.5	23.6
FVH - Front-Very High (80-90)	38.2	0.3
Total Forward Light	9034.3	77.6

BL - Back-Low (0-30)	943.5	8.1
BM - Back-Medium (30-60)	1169.5	10.1
BH - Back-High (60-80)	466.7	4.0
BVH - Back-Very High (80-90)	18.3	0.2
Total Back Light	2598.0	22.4

UL - Uplight-Low (90-100)	0	0
UH - Uplight-High (100-180)	0	0
Total Up Light	0	0

BUG (Back, Up, Glare) Rating	B2-U0-G2
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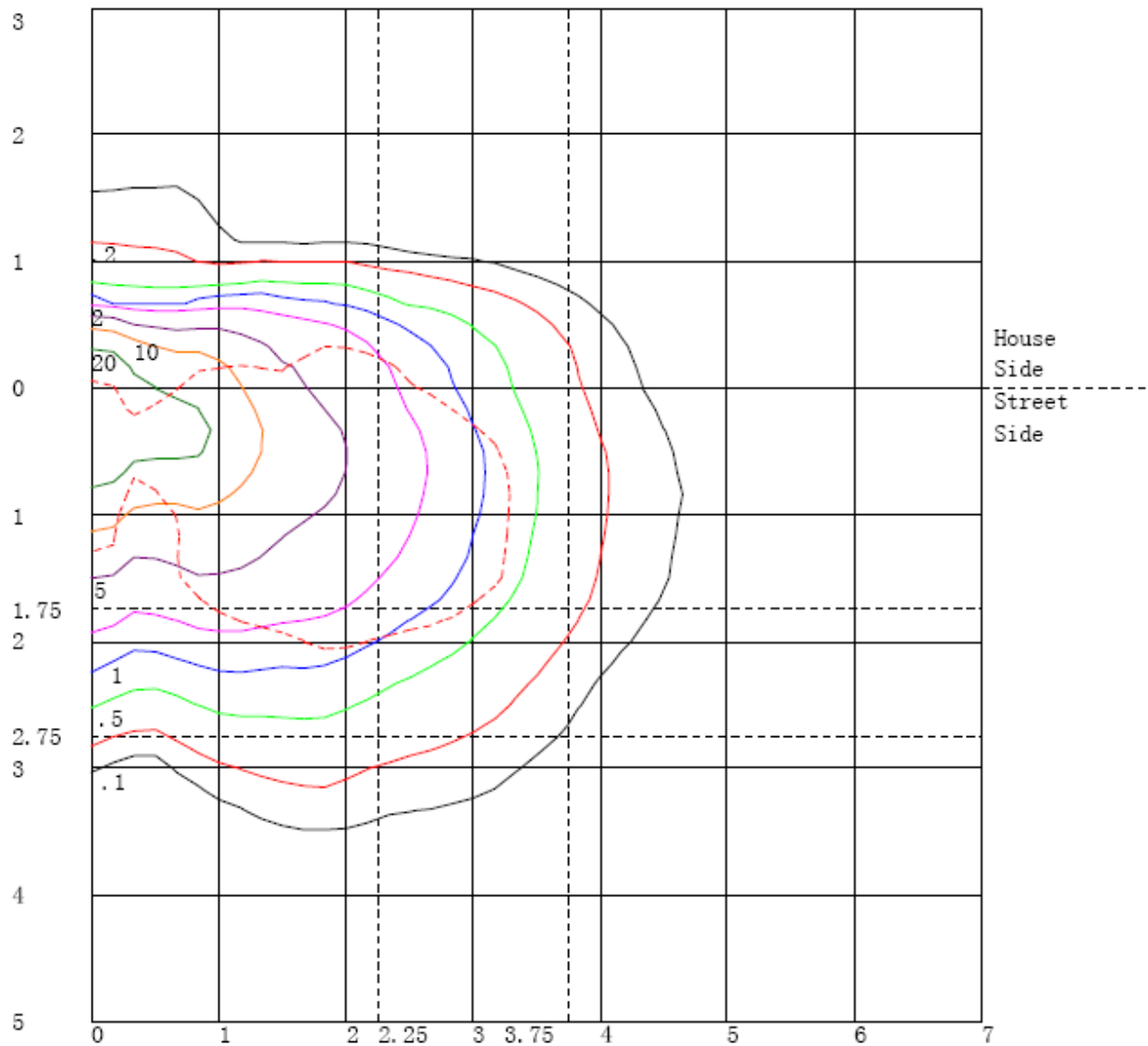
Table 3: Flux Distribution Data

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	2598.0	0	2598.0
Street Side	9034.3	0	9034.3

Table 4: Flux Distribution Table

Note: The Flux in this table might be a little different from the total flux in Table 2 due to software calculation deviation.

Isoilluminance Plots of Horizontal Illuminance



Distance In Units Of Mounting Height
Values Based On 10 Foot Mounting Height
1/2 Maximum Candela Trace Shown As Dashed Curve
(+) = Maximum Candela Point

Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

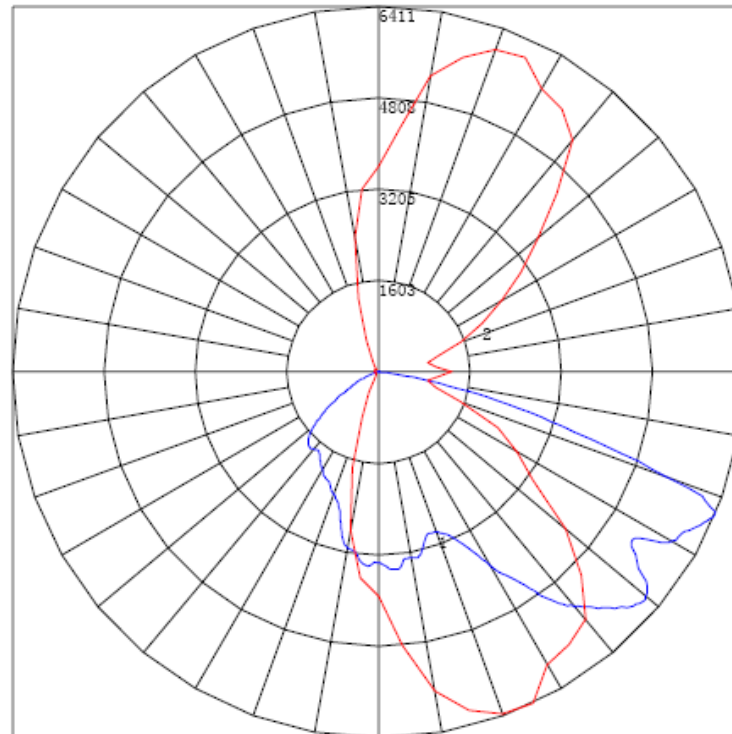


Chart 3: Maximum Plane and Cone Plots of Candela

Maximum Candela = 6410.57 Located At Horizontal Angle = 295, Vertical Angle = 67

1 - Vertical Plane Through Horizontal Angles (295 - 115) (Through Max. Cd.)

2 - Horizontal Cone Through Vertical Angle (67) (Through Max. Cd.)

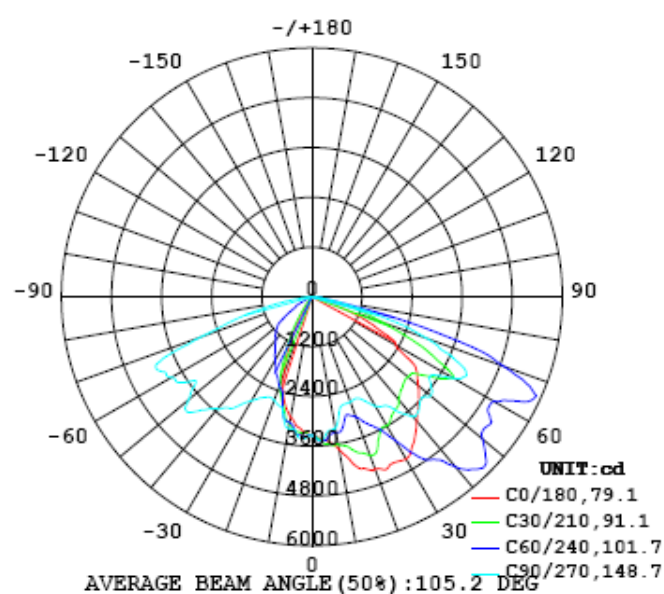


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347
5	3449	3451	3455	3473	3510	3543	3562	3559	3543	3526	3510	3496	3478	3463	3447	3433	3426	3422	3412
10	3729	3716	3746	3801	3761	3688	3611	3514	3453	3417	3376	3342	3324	3310	3293	3273	3253	3229	3221
15	4260	4240	4319	4246	4083	3930	3827	3735	3638	3523	3369	3186	3044	2953	2863	2807	2771	2749	2723
20	4424	4499	4502	4364	4243	4176	4067	3830	3553	3382	3303	3197	3079	2993	2892	2849	2789	2738	2693
25	4454	4542	4574	4400	4285	4080	3779	3622	3639	3653	3609	3526	3429	3277	3123	2950	2850	2766	2706
30	4511	4630	4592	4398	4198	3774	3588	3634	3719	3850	3950	4029	3988	3918	3774	3533	3325	3164	3053
35	4265	4445	4279	4030	3628	3322	3404	3539	3756	4042	4360	4693	4799	4658	4365	3996	3637	3415	3235
40	3903	4179	3730	3542	3042	3098	3230	3479	3753	4187	4698	5052	5334	5464	5288	4868	4362	3981	3762
45	3624	4003	3300	2983	2785	2898	3073	3347	3672	4211	4956	5511	5817	5787	5697	5164	4463	3903	3653
50	3323	3683	2966	2500	2630	2791	3007	3304	3918	4465	4916	5245	5344	5455	5402	5178	4598	4043	3703
55	3049	3196	2649	2385	2666	2950	3310	3855	4279	4630	4766	4983	5246	5271	5215	5096	4536	3850	3426
60	2326	2191	1769	1908	2404	3126	3920	4295	4589	4866	4906	4885	5030	5344	5596	5517	4988	4342	3928
65	1633	1346	1124	1342	1812	2433	3004	3606	4118	4698	5187	5560	5844	6263	6325	6145	5645	4714	3990
70	612	450	455	735	1156	1512	1799	2264	2941	3655	4125	4703	4871	5055	4995	4886	4420	3591	2929
75	38.9	27.2	49.4	137	378	695	993	1073	1267	1605	1919	2172	2491	2772	2565	2407	2203	1787	1419
80	4.48	4.42	4.97	12.2	42.7	56.9	95.5	143	173	249	345	444	503	558	661	701	673	555	453
85	0.56	0.47	0.40	0.42	0.41	0.42	0.45	0.46	1.63	1.47	2.66	7.12	3.39	16.8	0.88	5.17	0.07	0.28	25.9
90	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	0.00	0.00	0.00

Table 5: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347
5	3395	3391	3384	3371	3362	3358	3358	3363	3361	3350	3332	3310	3280	3234	3199	3188	3187	3187	3187
10	3192	3162	3148	3151	3124	3078	3054	3041	3012	2991	3015	3074	3075	3067	3057	2991	2956	2949	2951
15	2661	2647	2619	2575	2591	2589	2613	2683	2724	2709	2672	2637	2645	2713	2718	2676	2593	2574	2596
20	2605	2554	2470	2387	2286	2214	2142	2067	2012	2050	2153	2178	2106	2052	2081	2105	2034	1971	2030
25	2597	2472	2369	2237	2098	1990	1862	1746	1615	1483	1399	1416	1455	1400	1357	1369	1322	1284	1356
30	2904	2685	2409	2193	1964	1774	1574	1371	1202	1057	922	800	736	688	619	599	591	580	623
35	2998	2708	2372	2062	1785	1517	1262	1028	803	588	430	315	234	184	155	153	162	181	188
40	3497	3135	2708	2229	1768	1322	979	655	410	243	143	114	108	104	100	104	108	109	101
45	3404	3168	2814	2322	1742	1227	723	366	183	128	112	101	94.2	88.3	84.5	83.6	83.2	82.7	79.1
50	3407	3169	2708	2051	1476	864	419	205	127	98.7	90.4	81.6	76.6	72.8	68.4	67.1	67.8	68.3	62.9
55	3198	2953	2425	1736	1078	564	258	130	88.5	76.8	75.4	74.6	73.2	70.1	67.6	66.9	62.7	63.1	63.4
60	3653	3162	2222	1268	618	311	161	85.6	61.9	62.6	67.3	76.4	81.3	77.4	72.2	65.6	63.5	63.2	61.8
65	3660	2833	1738	847	396	172	81.2	58.0	52.7	55.8	68.0	73.8	79.8	77.0	72.5	65.6	58.1	57.7	53.2
70	2612	1873	869	363	163	80.9	53.7	47.2	45.5	49.1	60.8	69.1	71.4	68.0	60.7	54.3	52.0	50.5	46.7
75	1254	817	374	187	76.4	45.5	45.1	42.9	42.1	44.6	51.0	58.2	58.3	54.4	50.5	48.2	49.4	47.0	43.9
80	361	184	80.6	46.9	35.7	35.8	35.8	35.5	37.2	39.9	43.2	45.0	47.3	45.1	44.5	44.2	43.7	44.1	43.8
85	27.5	18.5	8.05	8.48	9.91	12.1	16.0	19.0	23.5	28.1	32.3	35.4	37.3	38.9	40.8	41.6	41.0	41.4	43.2
90	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	0.00	0.00	0.00

Table 6: Luminous Intensity Data

Table--3

UNIT: cd

C (DEG) γ (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347
5	3193	3205	3222	3249	3285	3322	3347	3344	3339	3336	3346	3362	3378	3396	3404	3410	3417	3432	3449
10	2962	3021	3066	3085	3109	3127	3083	3042	3050	3065	3081	3126	3160	3172	3189	3202	3218	3259	3280
15	2656	2741	2785	2763	2687	2716	2743	2798	2793	2736	2732	2734	2718	2727	2743	2763	2769	2845	2888
20	2115	2164	2147	2162	2251	2253	2178	2117	2132	2186	2287	2320	2429	2509	2546	2630	2654	2792	2804
25	1432	1411	1418	1492	1502	1492	1569	1682	1783	1892	2038	2141	2236	2406	2503	2621	2672	2833	2867
30	647	669	732	797	874	976	1105	1254	1439	1610	1760	1984	2149	2326	2555	2770	2893	3093	3190
35	194	212	245	284	357	469	645	842	1052	1281	1542	1773	2097	2405	2730	3058	3276	3502	3709
40	96.8	100	106	109	110	169	272	437	709	1009	1349	1760	2162	2641	3041	3301	3523	3730	4117
45	77.7	80.0	79.7	82.5	88.4	101	125	203	399	761	1227	1769	2367	2923	3321	3563	3908	4056	4560
50	61.6	62.3	64.2	65.0	69.6	79.5	93.6	125	245	525	1073	1787	2508	3114	3463	3606	3861	4116	4759
55	63.1	60.3	58.6	57.3	57.2	59.7	66.7	86.3	156	310	696	1220	1866	2604	3082	3305	3544	3889	4554
60	58.9	58.1	56.9	55.6	54.9	54.0	55.6	61.3	81.4	183	431	900	1576	2525	3336	3703	3887	4279	4922
65	51.3	52.4	54.3	55.7	54.1	51.8	51.8	53.2	60.6	94.7	182	449	1029	2019	3084	3783	4114	4683	5503
70	44.8	46.7	50.7	52.7	52.4	50.2	48.3	47.9	49.4	55.8	103	230	506	1061	1947	2528	2850	3534	4319
75	43.5	43.7	46.8	49.2	48.5	46.4	44.6	44.1	45.4	48.2	54.3	105	193	371	845	1344	1561	1876	2332
80	44.6	43.9	45.6	45.6	45.0	43.6	41.0	40.1	40.2	42.1	45.3	47.8	57.8	112	280	537	641	863	1010
85	44.2	43.8	44.0	42.6	38.4	34.2	30.6	28.2	25.8	23.4	21.3	21.1	17.6	20.5	20.6	20.6	21.9	21.2	36.3
90	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	0.00	0.00	0.00

Table 7: Luminous Intensity Data

Table--4

UNIT: cd

C (DEG) γ (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347				
5	3458	3465	3469	3475	3479	3483	3494	3506	3512	3508	3497	3480	3461	3451	3450				
10	3287	3302	3310	3327	3353	3370	3390	3471	3578	3637	3658	3686	3724	3724	3728				
15	2921	2995	3093	3203	3315	3453	3574	3631	3680	3743	3898	4091	4205	4241	4252				
20	2852	2921	2989	3128	3215	3327	3516	3702	3931	4110	4177	4245	4374	4479	4468				
25	2971	3069	3255	3366	3524	3616	3726	3698	3726	3969	4277	4391	4497	4633	4584				
30	3408	3693	3923	4005	4134	4062	3885	3793	3692	3683	3941	4348	4427	4562	4653				
35	4088	4409	4628	4750	4616	4387	4080	3840	3658	3527	3517	3838	4223	4373	4552				
40	4591	5039	5372	5292	5090	4727	4193	3800	3522	3311	3166	3231	3640	3974	4225				
45	5223	5807	5860	5638	5317	4822	4259	3765	3358	3048	2904	2840	2997	3589	3839				
50	5504	6027	6118	6017	5739	5096	4537	3894	3273	2929	2767	2623	2622	3183	3425				
55	5080	5219	5444	5523	5561	5512	5152	4416	3739	3211	2925	2656	2462	2632	2975				
60	5663	5913	5932	5686	5313	5017	5035	5215	4721	3954	3151	2486	1947	1734	2101				
65	6081	6336	6268	5969	5756	5774	5359	4493	3833	3510	2747	1845	1290	1090	1332				
70	4699	5123	5412	5374	5435	4790	3991	3242	2659	2006	1620	1324	701	450	473				
75	2518	2683	2773	2481	2192	1915	1745	1498	1332	1164	833	476	240	34.1	33.2				
80	1062	1134	924	718	635	450	343	262	198	152	83.7	47.6	18.7	5.41	4.96				
85	37.7	35.1	40.2	33.9	27.3	15.5	5.93	0.93	0.76	0.56	0.59	0.69	0.82	0.76	0.67				
90	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				

Table 8: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 26, 2016	Jul. 25, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 26, 2016	Jul. 25, 2017
AC Power Supply	DPS1060	HZTE001-06	Dec. 25, 2016	Dec. 24, 2017
DC Power Supply	WY12010	HZTE004-03	Dec. 25, 2016	Dec. 24, 2017
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2016	Aug. 07, 2017
Standard Source	D908	HZTE012-01	Jul. 28, 2016	Jul. 27, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 28, 2016	Jul. 27, 2017

Table 9: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

Goniophotometer Method

Photometric and Electrical Measurements

An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.

Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.

Some graphics were created with Photometric Plus software.

The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.

The uncertainty of goniophotometer system reported in this document is expanded uncertainty is 2.3% with a coverage factor $k=2$.

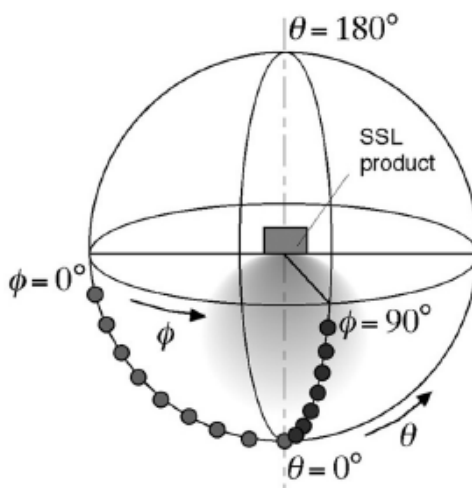
Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes ($C=0^\circ/180^\circ$ and $C=90^\circ/270^\circ$) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for delta color differences of the u' , v' chromaticity coordinates. The spatial non-uniformity of chromaticity, $\Delta u'v'$, is determined as the maximum deviation (distance on the CIE (u' , v') diagram) among all measured points from the spatially averaged chromaticity coordinate.

The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



*** End of Report ***

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