Certificate#4810.01

LM-79-08 Test Report

For

ASMART LIGHT CO., LTD

(Brand Name: ASMART)

506 N GARFIELD AVE SUITE#210 ALHAMBRA CA 91801

Architectural Flood and Spot Luminaires

Model name(s): AST-SP01-600WMHT2B1-acd

Remark: "a" can be any two letters to represent lamp colors,
"c" can be "S" for Surge-Protective Device provided or blank for no Surge-Protective Device provided,
"d" can be any two digits to represent CCT

Representative (Tested) Model: AST-SP01-600WMHT2B1-ac40
AST-SP01-600WMHT2B1-ac57

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

Test & Report By:

Grace Li

Engineer: Grace Li

Date: Sept 19, 2018

Review By:

Tommy Liang

Manager: Tommy Liang

1.1 Product Information:

Organization Name	ASMART LIGHT CO., LTD	
Brand Name	ASMART	
Model Number	AST-SP01-600WMHT2B1-acd	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires	
Rated Voltage / Frequency	100-277Vac, 50/60 Hz	
Nominal Power	600W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,4500K,5000K,5700K	
LED Manufacturer	OSRAM	
LED Model	GW PUSTA1.PM	
Sample Number	BLC1809011E-U-A1(4000K),A2(5700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo

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1.2 Test Specifications:

Date of Receipt	Sept 13,2018
Date of Test	Sept 17,2018
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	BL-QP-033

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 25º C ± 1º 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 25º C ± 1º 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 BL-QP-033)

Test date	2018-09-17	Test Ambient:	25.2 º C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AST-SP01-600WMHT2B1-ac40		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180901	120.0	60	5.0989	610.65	0.998	4.02
1E-U-A1	277.0	60	2.1990	585.98	0.962	7.02
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

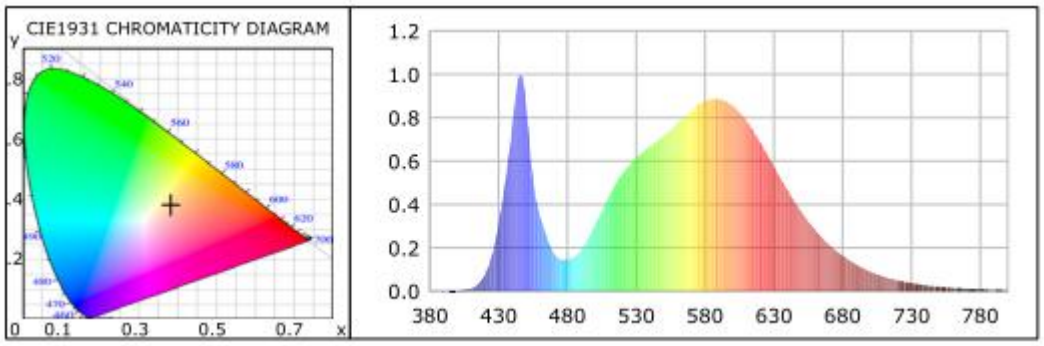
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3970
Duv	0.00005
Chromaticity (x, y)	x=0.3818 y=0.3777
Chromaticity (u', v')	u(u')=0.2256 v'=0.5022
Color Rendering Index (CRI)	74.3
R9	0

Special Color Rendering Indices			
R1	72	R9	0
R2	80	R10	54
R3	88	R11	72
R4	74	R12	51
R5	72	R13	73
R6	7	R14	93
R7	81	R15	65
R8	54	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	87267.99	85594.10	>=30000(-10%)
Luminous Efficacy (lm/W)	142.91	146.07	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	140.17		
Zonal lumens in the 0-90° zone (%)	99.7	--	>=85(-3)
Beam Angle (°)	16.4	--	--
Center Beam Candle Power (cd)	540389	--	--

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

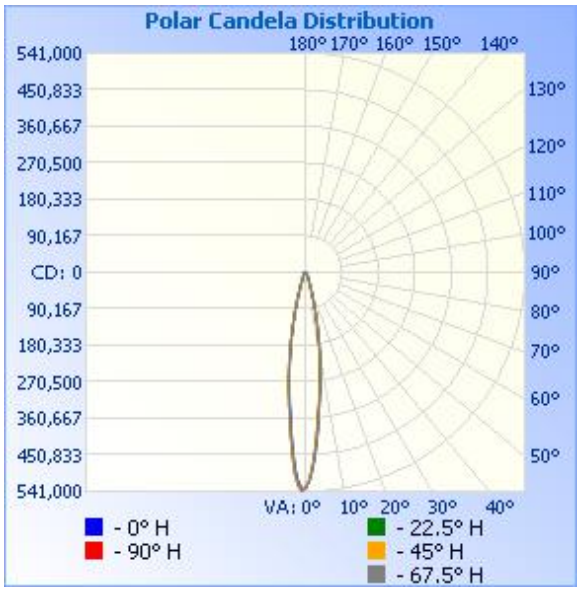
Zonal Lumen Summary

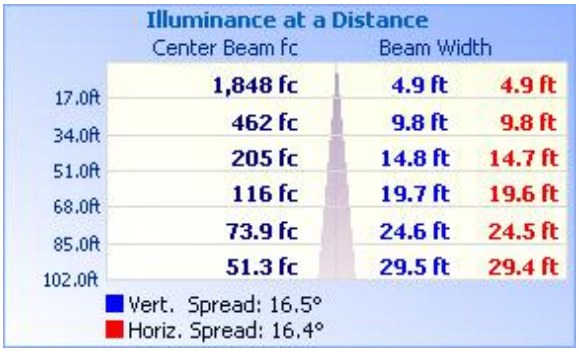
Zone	Lumens	% Lamp	% Luminaire
0-30	64,524.9	73.9%	74%
0-40	69,415.4	79.5%	79.7%
0-60	77,100.6	88.3%	88.5%
60-90	9,924.6	11.4%	11.4%
70-100	6,219.6	7.1%	7.1%
90-120	119.4	0.1%	0.1%
0-90	87,025.1	99.7%	99.9%
90-180	119.4	0.1%	0.1%
0-180	87,144.5	99.9%	100%

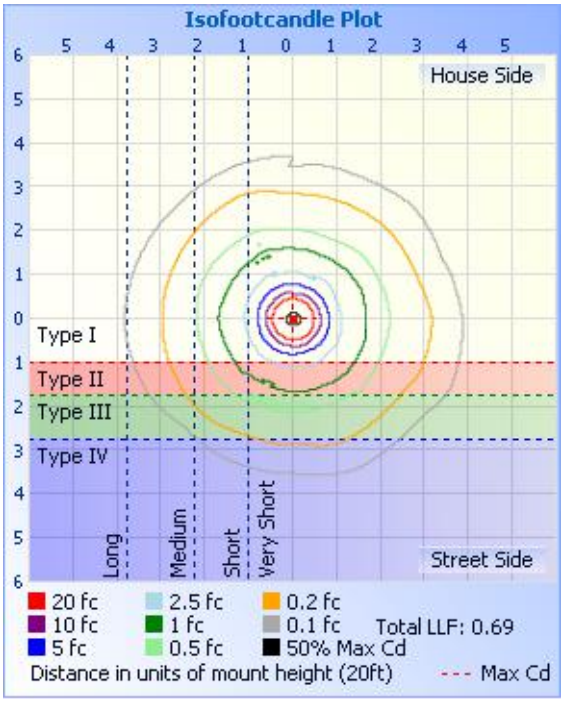
Lumens Per Zone

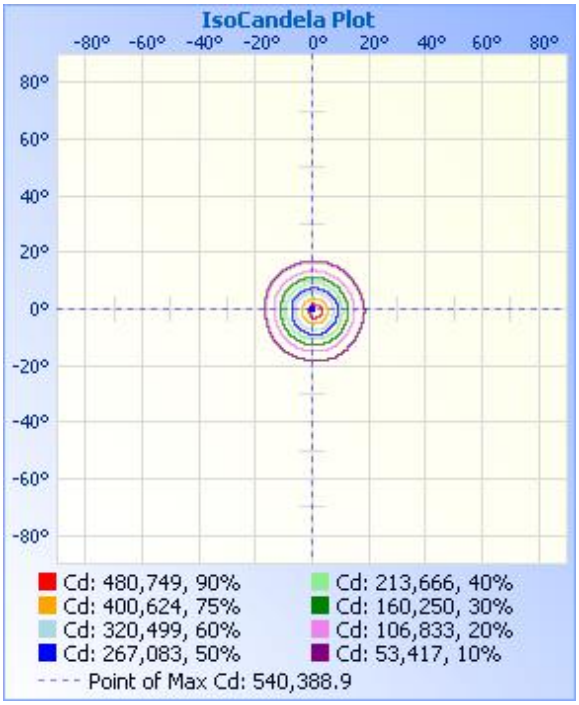
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	31,036.7	35.6%	90-100	119.4	0.1%
10-20	25,777.9	29.6%	100-110	0	0%
20-30	7,710.2	8.8%	110-120	0	0%
30-40	4,890.6	5.6%	120-130	0	0%
40-50	3,859.1	4.4%	130-140	0	0%
50-60	3,826.1	4.4%	140-150	0	0%
60-70	3,824.3	4.4%	150-160	0	0%
70-80	3,466.0	4.0%	160-170	0	0%
80-90	2,634.3	3.0%	170-180	0	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	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165	534165
1	516266	513546	512518	516794	514092	517668	524669	529787	533181	536413	537583	536409	**540389**	533406	528230	520969	516266
2	487973	484044	481599	487073	481722	488959	500502	509060	515605	522243	524098	521737	527128	517471	504748	495267	487973
3	452467	447752	443564	445253	441712	450604	465180	475274	483990	492447	495256	492204	498208	487303	471983	459553	452467
4	411472	406623	402485	404672	395327	406643	416923	431860	442580	451054	455269	448422	455636	444938	429387	417899	411472
5	369939	364192	361344	364940	354563	364125	373687	387834	398294	406127	411241	405080	410683	395554	385071	375541	369939
6	327960	322474	324417	328926	318260	327046	335504	345415	354193	362611	367056	365583	369241	354495	344377	337087	327960
7	293623	289050	288894	296098	285483	290954	302009	311936	318150	326799	330269	329051	328115	317674	304855	298862	293623
8	261501	258292	258740	265576	252148	259966	267920	280294	285304	293608	296635	291547	293033	283723	271663	266164	261501
9	231439	228884	229320	233328	223094	230497	237802	249325	254458	261424	264000	258781	259804	251049	240450	235241	231439
10	202976	200606	201227	205726	194928	201894	208750	216351	224396	230790	229352	227428	228217	220517	210318	205482	202976
11	175913	173446	174132	179065	167155	173670	180033	186730	194580	200358	198683	196075	197460	188222	181464	177346	175913
12	148265	145122	148880	154506	141687	147315	153675	160002	164241	169461	170090	167578	169189	160257	154086	151827	148265
13	125153	121496	122956	130858	117876	121218	129874	135003	138654	144099	143620	140854	141008	134540	126982	125910	125153
14	103441	99947	101776	107021	95513	99921	106590	112592	115650	121852	119912	114616	117575	111375	104078	104724	103441
15	84896	82196	83796	87453	78649	81040	89271	92324	94676	101481	98561	95613	97185	90488	84706	85910	84896
16	6908	6686	6845	7155	6219	6544	7180	7410	7745	8438	8031	7668	79960	7362	6837	7046	6908

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	9	4	4	7	3	0	0	7	4	2	6	8		7	6	4	9
17	55911	54601	56000	58281	50318	52087	57952	59733	60416	67887	64927	61592	65117	57419	54558	57146	55911
18	44716	45067	46182	47469	40915	40649	46888	48527	48499	55764	52909	50184	53829	46087	44331	46721	44716
19	36597	36323	37193	39042	33666	32993	37559	38914	38473	45795	42733	40502	43929	37550	35291	37199	36597
20	30108	30866	31714	31965	27804	27965	30817	31443	31800	37269	34055	32828	35459	31246	28900	31014	30108
21	25649	26060	27063	26881	24112	23545	25841	25718	26418	31192	28952	27352	29929	25899	24699	26284	25649
22	21589	22417	22724	23287	20811	20309	21975	22105	22589	26246	24098	23711	25197	22056	21367	22335	21589
23	18575	19534	20149	20400	18174	18137	19023	18921	19267	21890	21117	20682	21791	19368	18932	19288	18575
24	16792	16836	17590	18078	16441	16269	17273	16686	17422	18975	18791	18642	19033	17621	16923	17023	16792
25	14870	15069	15498	16116	14618	14735	15279	14849	15608	16728	16575	16540	16562	15904	14823	14665	14870
26	13516	13906	14125	14343	13623	13383	14047	13655	14454	14681	14936	14892	14753	14112	13468	13303	13516
27	12686	12077	12736	13009	12433	12122	12586	12614	13055	13317	13407	13558	13081	12729	12494	12155	12686
28	11456	11519	12189	12318	11408	11195	11809	11068	12086	12418	12595	12460	12433	12031	11764	11129	11456
29	10456	11240	10878	11251	10941	10694	10820	10532	10979	11162	11471	11502	11317	11195	11033	10456	10456
30	9995	10790	10160	10530	10187	9889	10090	10302	10026	10681	10800	10890	10579	10512	10059	9935	9995
31	9226	9953	9364	10169	9720	9388	9648	9598	9149	10154	10192	10043	10489	9494	9314	9476	9226
32	9195	9457	9427	9023	9117	8582	8857	8925	8642	10030	9224	9729	9690	8765	8948	8664	9195
33	8181	8527	9162	9274	8605	8476	9146	8649	8396	9116	9037	9337	9313	8157	8461	8573	8181
34	7842	8046	8787	8631	7806	7960	8583	7822	8088	8542	8818	8913	8424	8096	8370	7991	7842
35	7319	7131	8818	8442	7098	8172	8477	7562	7719	7674	8725	9039	8258	7914	8127	7317	7319

36	7150	7069	7991	7909	6540	7504	7807	7118	7043	7054	8600	8317	7369	7185	7487	6460	7150
37	6904	6697	7257	7046	6359	6836	7107	5924	6658	6728	7991	7815	6721	6896	7137	6399	6904
38	6412	5504	6430	7234	6570	6243	6803	5955	6305	6403	6930	6920	6450	6501	6544	6368	6412
39	5259	5659	6352	6450	5892	5848	6300	5787	6289	6682	6415	6591	5983	6137	6148	5572	5259
40	5782	4961	6071	5979	5591	5666	5874	5358	6258	6015	6243	6418	5290	5681	4885	5281	5782
41	5551	5659	5790	5524	5757	5544	5524	5159	5566	5783	5385	5790	5335	5560	5524	5021	5551
42	4813	5550	5010	5775	4913	5043	5524	5128	5105	5488	5837	6104	5576	5362	4718	4623	4813
43	4982	5348	5228	5634	5651	5362	4931	4960	5059	5550	5931	4818	4852	5286	4809	4929	4982
44	4782	5069	5353	4849	5516	5013	5266	4899	4936	5069	4948	5178	5079	5134	4931	4807	4782
45	4782	4651	5104	5539	5320	4694	5037	4409	4921	5054	4167	5790	5290	4830	4931	4746	4782
46	5290	4914	5322	5100	4943	4679	4809	4118	4628	5286	4651	5163	4943	4876	5266	4531	5290
47	4413	4573	5010	5492	5485	4436	5189	4485	4705	4728	4791	5524	5033	4891	4718	4684	4413
48	4275	5085	4698	5147	4265	4268	5281	4562	4044	4713	5244	4943	5139	3524	4900	4363	4275
49	4336	4775	4823	4143	4024	3661	4702	4669	4367	5457	4635	4488	4657	3737	4246	4378	4336
50	4552	4976	4027	4158	4461	4603	4474	4577	4259	4837	4511	4551	4491	4466	4581	4133	4552
51	4290	4635	4479	4786	4536	4557	4352	3812	3152	4837	4667	4284	4687	4618	4048	2755	4290
52	3537	4945	4604	5069	3933	4344	4976	3995	4321	4744	4682	4912	4506	4268	4155	4118	3537
53	4367	4465	4495	4551	4310	4147	3896	3873	4552	5054	4682	4614	4747	4360	4657	3659	4367
54	4844	4558	4386	4504	4581	3828	3622	4026	4259	4604	4479	4990	4657	4086	4611	4149	4844
55	4306	4310	3808	4268	4521	3843	4566	4057	3983	4031	4635	4849	4883	4193	4155	3751	4306
56	4275	4573	4651	4457	4461	4223	4200	3597	4490	4573	4526	4645	4235	3266	3805	3766	4275
57	3983	3519	3808	5006	4295	4360	4352	3720	4183	3349	3652	4394	4732	4284	4535	3352	3983
58	4336	4511	3996	4614	4204	4010	4261	3858	4152	4341	4323	4786	4099	4177	4002	3888	4336
59	4167	4124	4573	4629	3994	4375	4033	2679	3629	4449	3917	3954	4687	4056	4292	3506	4167
60	4382	4356	4417	4080	4385	4162	4261	3261	3998	4403	4370	4362	4491	2719	4368	3950	4382
61	4044	4201	3605	4770	4400	3798	4474	3582	4352	3845	4308	4488	3783	4512	4170	3781	4044
62	4029	3922	3886	4551	4491	3904	4200	3904	4106	2635	3917	4457	4084	3737	4109	3796	4029
63	2445	4000	4183	4127	3903	4101	3820	3950	4290	4186	4511	4739	3918	3843	3789	2556	2445
64	4213	3953	3808	4127	3315	4132	4109	2970	3491	3566	3902	4284	3617	3570	4185	3536	4213
65	3706	3457	3933	4237	4370	3843	3805	2419	3521	4000	4042	4598	4129	4071	4139	3628	3706
66	3383	4170	4308	2887	3647	3706	3881	3383	4029	4000	4105	4347	4144	3342	3607	3490	3383
67	3614	3752	3871	4049	4144	3813	4079	2786	2968	4139	3512	4410	4415	3251	3744	3169	3614

68	3644	3969	3886	4237	4174	3403	3759	3582	3552	3721	3293	4300	3888	3798	2998	3597	3644
69	3106	3411	3855	4049	3556	3600	3957	3597	3721	4046	3824	4300	4265	3555	3713	3245	3106
70	3398	3411	3855	3970	4099	3205	3698	3735	3798	4031	3871	4143	3541	3023	3439	3383	3398
71	3075	3705	3808	3641	4189	3706	3500	3291	3075	4031	3793	4221	4295	3615	3683	3092	3075
72	3583	3612	2919	4174	4235	3251	3576	3567	3521	3876	3699	2997	3225	3646	3515	3613	3583
73	3106	2822	3231	3688	4114	3327	3485	3414	3598	3845	3418	3594	3526	3266	3713	2954	3106
74	2814	3535	3387	3327	3948	3008	3561	3291	2676	3550	4074	3452	3948	2962	2755	2863	2814
75	2660	3194	2872	3766	3722	3175	3394	2556	3321	3364	3262	3499	3677	3372	3105	2786	2660
76	2998	2620	3543	3782	3556	2294	3089	2541	3475	3395	3434	3421	3662	3418	3135	2618	2998
77	3214	2930	3075	3594	3315	3433	3607	2572	3075	2713	3449	3405	3059	3205	3028	2786	3214
78	3275	2465	3012	3311	2939	3646	2755	2572	3137	3054	3153	2856	3210	3160	3074	2679	3275
79	3075	2589	3278	3091	3014	3220	3028	2740	2906	2728	3293	3013	3150	3099	2191	2771	3075
80	1568	3008	2856	3138	3240	2749	2998	2495	3075	2589	3200	3013	3029	3357	2755	2312	1568
81	2645	2604	3106	3186	2818	2871	2694	1638	2629	2853	2997	3107	2441	2810	2526	1868	2645
82	2752	1690	2435	2762	2863	2522	2298	2250	2583	2558	2981	3013	2893	3129	2435	1653	2752
83	2214	2635	2435	2793	3014	2522	2663	1760	2445	2573	3075	2605	2652	1762	2602	2403	2214
84	2476	2325	2247	3060	2969	2643	2572	1898	2091	2263	2716	2511	2652	2385	2694	2495	2476
85	2722	2372	1920	2621	2667	2673	2115	2067	2691	2635	2669	2495	2637	2749	2252	1852	2722
86	2476	2217	2279	2636	2487	2825	2420	2281	2260	2465	2919	2636	2502	2522	2237	1791	2476
87	2276	1721	2528	2479	2652	2354	2435	1715	1968	2620	2544	2636	2276	2187	2374	1852	2276
88	2553	2015	1826	2668	2065	2643	2115	1760	2184	2062	1935	1585	2230	2142	2389	2021	2553
89	1876	2325	1295	2746	2547	2051	2435	1776	1615	1953	2013	2307	2607	2248	1826	1975	1876
90	2399	2124	2076	2636	2426	1884	2405	2005	2107	2372	1639	2260	2080	2309	2131	1975	2399
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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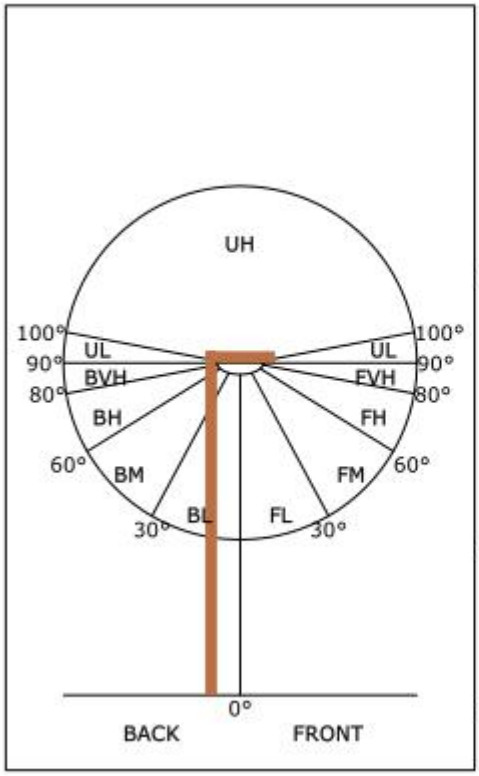
Certificate#4810.01



ZONE	LUMENS	% LAMP LUMENS
FORWARD LIGHT	42683	48.9
FL (0°-30°)	31534	36.1
FM (30°-60°)	6245	7.2
FH (60°-80°)	3598	4.1
FVH (80°-90°)	1306	1.5
BACK LIGHT	44466	51.0
BL (0°-30°)	33112	37.9
BM (30°-60°)	6334	7.3
BH (60°-80°)	3692	4.2
BVH (80°-90°)	1328	1.5
UP LIGHT	119	0.1
UL (90°-100°)	119	0.1
UH (100°-180°)	0	0.0
TRAPPED LIGHT	NA	NA

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2018-09-17	Test Ambient:	25.2 º C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AST-SP01-600WMHT2B1-ac57		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180901 1E-U-A2	120.0	60	5.0945	610.48	0.9986	4.23
	277.0	60	2.2004	586.04	0.9615	7.16
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

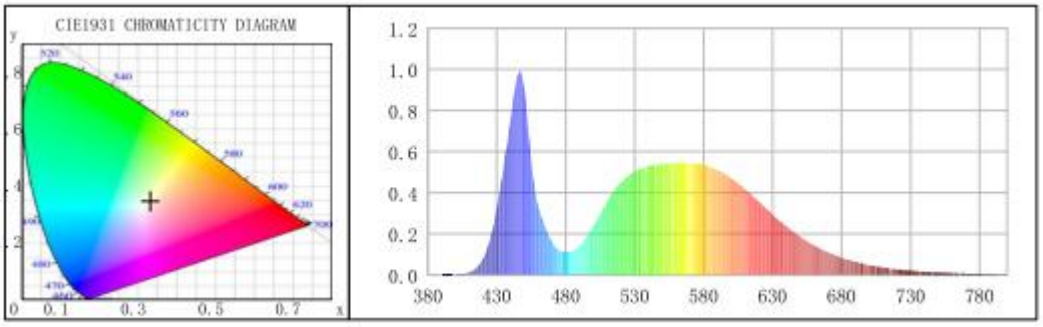
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5534
Duv	0.00337
Chromaticity (x, y)	x=0.3317 y=0.3471
Chromaticity (u', v')	u(u')=0.2041 v'=0.4805
Color Rendering Index (CRI)	72.5
R9	0

Special Color Rendering Indices			
R1	71	R9	0
R2	76	R10	43
R3	80	R11	73
R4	74	R12	47
R5	72	R13	71
R6	68	R14	88
R7	80	R15	65
R8	59	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	89533.00	87536.79	>=30000(-10%)
Luminous Efficacy (lm/W)	146.66	149.37	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	143.39		

Spectral Power Distribution & Chromaticity Diagram



Calculated Efficacy Data for family models (4500K and 5000K):

Model Number	Luminous Flux (lm)	Power (W)	Efficacy (lm/W)
AST-SP01-600WMHT2B1-ac40	87267.99	610.65	142.91
AST-SP01-600WMHT2B1-ac45	87834.24	610.57	143.86
AST-SP01-600WMHT2B1-ac50	88400.49	610.57	144.78
AST-SP01-600WMHT2B1-ac57	89533.00	610.48	146.66

3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometeric System	GPM-3000	DYHXF120001	2019-01-15
AC Power Source	CHP-500C	N/A	2019-01-14
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2019-01-22
Digital Power Meter	WT500	DYDWQ200006	2019-01-14
Integral Sphere (2M)	2M	DYJCE120067	2019-01-15
Digital Power Meter	WT500	DYDWQ200006	2019-01-14
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2019-01-15
Expand Uncertainty: Photometric Measurement (Sphere): 2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.7%, k=2			

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