Certificate#4810.01

LM-79-08 Test Report

For

Beyond LED Technology

(Brand Name: Beyond LED Technology)

1939 Parker Ct, Stone Mountain, GA 30087, USA

Architectural Flood and Spot Luminaires

Model name(s): BLT-SP01-750WEHT2H1-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-SP01-750WEHT2H1-ac40
AST-SP01-750WEHT2H1-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-SP01-750WEHT2H1-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	277-480Vac, 50/60 Hz	
Nominal Power	750W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,4500K,5000K,5700K	
LED Manufacturer	OSRAM	
LED Model	GW PUSTA1.PM	
Sample Number	BLC1809011E-U-D1(4000K),D2(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 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AST-SP01-750WEHT2H1-ac40		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180901	277.0	60	2.5325	698.69	0.996	6.22
1E-U-D1	480.0	60	1.4760	685.1	0.967	10.49
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

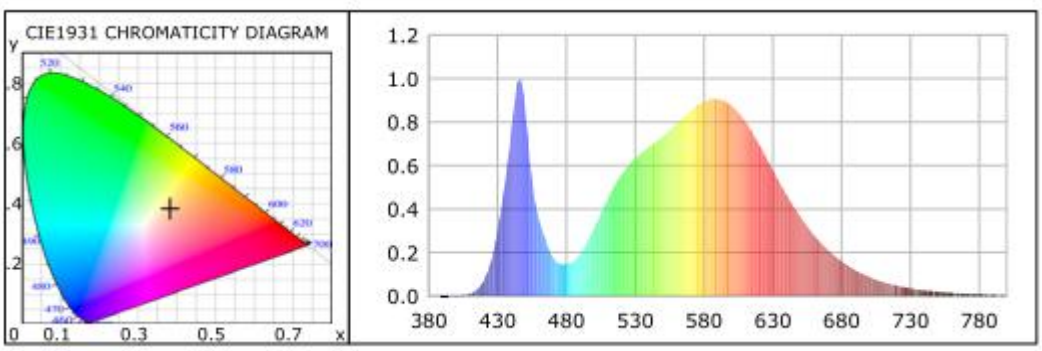
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
CCT (K)	3974
Duv	0.0011
Chromaticity (x, y)	x=0.3824 y=0.3804
Chromaticity (u', v')	u(u')=0.2250 v'=0.5035
Color Rendering Index (CRI)	73.9
R9	0

Special Color Rendering Indices			
R1	71	R9	0
R2	80	R10	53
R3	88	R11	71
R4	74	R12	50
R5	72	R13	72
R6	73	R14	93
R7	81	R15	64
R8	53	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	277.0	480.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	100557.85	99239.1	>=30000(-10%)
Luminous Efficacy (lm/W)	143.92	144.85	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	142.04		
Zonal lumens in the 0-90° zone (%)	99.8	--	>=85(-3)
Beam Angle (°)	17.4	--	--
Center Beam Candle Power (cd)	613039	--	--

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

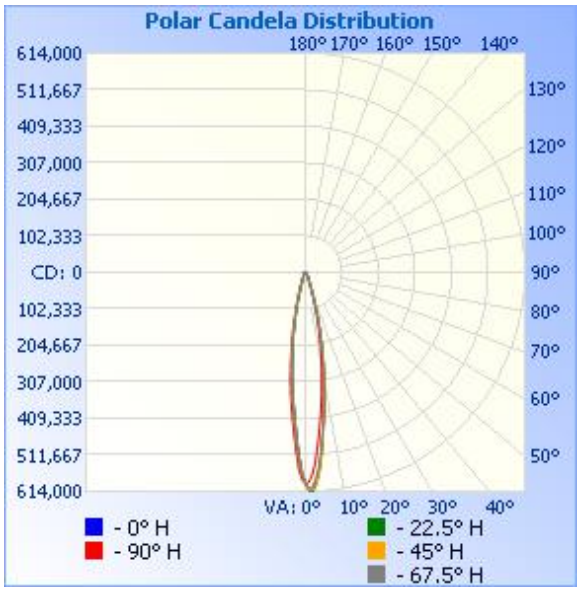
Zonal Lumen Summary

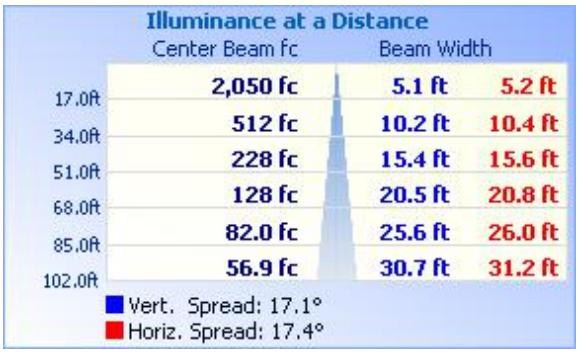
Zone	Lumens	% Lamp	% Luminaire
0-30	75,742.3	75.3%	75.4%
0-40	81,492.3	81%	81.2%
0-60	90,284.4	89.8%	89.9%
60-90	10,026.0	10%	10%
70-100	6,124.9	6.1%	6.1%
90-120	110.7	0.1%	0.1%
0-90	100,310.4	99.8%	99.9%
90-180	110.7	0.1%	0.1%
0-180	100,421.1	99.9%	100%

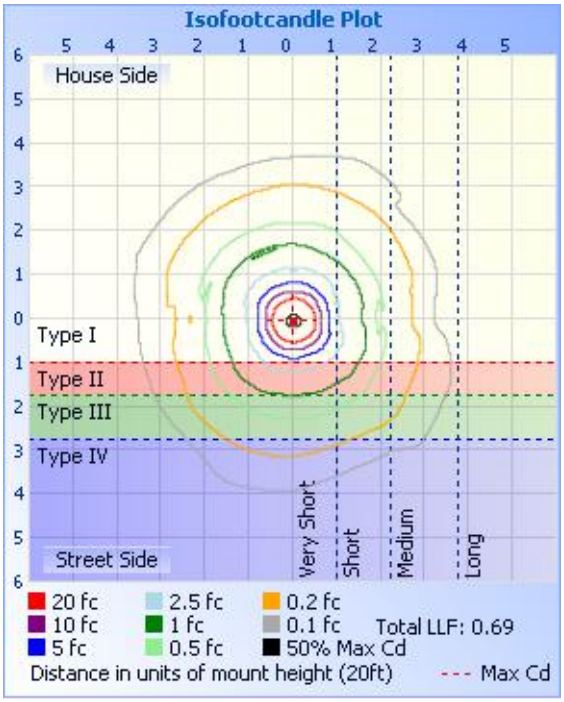
Lumens Per Zone

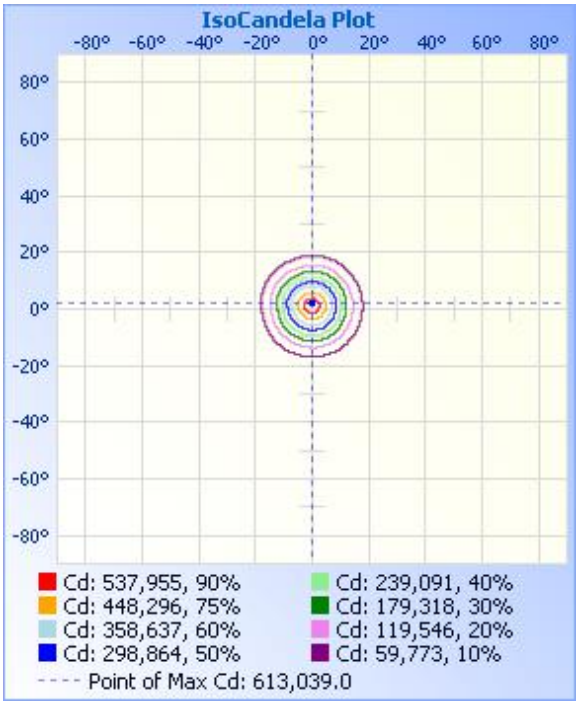
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	35,668.2	35.5%	90-100	110.7	0.1%
10-20	31,033.9	30.9%	100-110	0	0%
20-30	9,040.2	9.0%	110-120	0	0%
30-40	5,750.0	5.7%	120-130	0	0%
40-50	4,504.9	4.5%	130-140	0	0%
50-60	4,287.1	4.3%	140-150	0	0%
60-70	4,011.8	4.0%	150-160	0	0%
70-80	3,493.7	3.5%	160-170	0	0%
80-90	2,520.5	2.5%	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	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310	592310
1	609180	611528	609491	603895	586582	576603	569777	564707	561225	560259	560927	564838	578006	586710	596808	604756	609180
2	608825	613039	608992	597978	564666	543564	525461	521100	512715	517820	519035	524351	547513	563794	583728	597455	608825
3	586630	593151	591842	575382	531747	502422	479707	471485	462337	469369	472373	479019	501103	526779	549876	573502	586630
4	551069	559278	559866	542397	487839	457500	434351	420315	416111	418489	421658	428718	455613	482860	509537	536734	551069
5	507976	514004	516135	501476	444881	413884	392482	380173	375704	378152	381076	387362	413303	440184	466781	494637	507976
6	461781	463809	469037	458147	403837	372772	356411	344807	339942	341335	344594	350618	374776	396280	425050	451630	461781
7	416867	417881	419163	413763	365159	338792	319177	310657	302159	306387	309828	315583	338179	358688	384665	405250	416867
8	375658	377186	377412	371677	325743	305663	285952	273982	268805	269119	272177	277845	302697	322417	346636	364801	375658
9	337920	336258	339013	329032	291000	272715	252757	240987	235822	236507	241698	243773	264532	287148	310030	326923	337920
10	298733	300531	302594	292925	258186	238008	221351	209780	205246	204860	206760	211175	230828	252334	271037	290895	298733
11	263511	265100	266720	259163	225583	209127	190160	179235	175366	174569	176218	179898	199070	218339	236756	256067	263511
12	230420	231352	233669	227373	195603	176954	161738	151848	149297	148155	149777	152845	169798	183753	204142	223628	230420
13	198239	198023	198668	193829	166858	149864	133453	126894	122302	123424	125425	128277	142817	154508	173502	189940	198239
14	168080	166969	169499	165269	138280	126190	110798	102741	100864	99923	102179	104811	116605	127950	144513	163508	168080
15	138091	136584	142730	138915	113786	103987	91065	83225	81478	81078	85295	85477	96256	105186	117162	134365	138091
16	1141	11230	1186	1148	9312	8559	7439	6757	6575	6528	6700	7004	7848	8630	9600	1114	1141

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	68	4	90	44	1	3	1	5	0	6	7	0	5	7	6	13	68
17	92930	91715	97580	93226	74551	67321	60118	53635	51921	52017	53366	56684	64347	70478	77374	90341	92930
18	74919	74817	79651	75367	59689	53784	48584	43361	40685	41894	42702	46186	52454	57715	62459	73505	74919
19	60179	60521	64544	60116	47480	43146	39130	34627	33533	33546	34829	37784	42958	46560	50573	59442	60179
20	48634	48996	51495	48422	37637	34617	32185	29636	27905	27955	28655	31091	35015	38350	40048	47150	48634
21	38756	38904	42016	38141	30809	28986	27306	25539	23923	24327	24882	26090	28985	32219	33379	37169	38756
22	31394	32503	35437	32100	25865	24661	23910	22443	21238	21523	21795	23046	24011	27514	28178	30946	31394
23	26624	27379	30245	26665	22549	21262	20973	19732	19170	18751	19348	20422	21147	24069	24154	26509	26624
24	23059	23844	26005	23357	19309	19061	18846	17791	17487	17147	17726	18092	18389	20336	21386	23090	23059
25	20790	21181	22746	20903	16942	17544	16919	16050	15897	15403	16386	16741	16595	17999	19428	20440	20790
26	18861	18673	20268	18403	15194	15556	15251	14895	14678	14094	15107	15002	14545	16405	17118	18161	18861
27	16546	16695	17742	16865	13732	14281	13813	14033	13196	13627	13922	13961	13460	14038	15389	16143	16546
28	15280	15418	16292	15592	12948	13143	13186	12939	12702	12849	13236	13216	12058	13567	14441	15126	15280
29	14354	14235	15045	14350	11862	11944	12100	12431	11792	12085	12270	12362	11757	12308	13217	13956	14354
30	12872	13472	13688	13495	11049	11170	11427	11707	10820	11307	11786	11368	10777	11412	12559	13355	12872
31	12085	12786	12909	12470	10476	10259	10586	11245	10465	11135	11209	10840	10822	10745	11473	12877	12085
32	11437	11758	12176	11849	10280	9531	10677	10844	10017	10310	11132	10778	10280	10153	10953	11784	11437
33	10279	11618	11646	11259	9149	9121	10219	10028	9523	9765	10633	10654	9044	9667	10249	11229	10279
34	1026	10871	1120	1056	7868	8893	1018	9874	8890	8753	1044	9970	8094	9667	1006	1075	1026

	4		9	0			8				6				6	2	4
35	9708	10076	10882	10203	7793	8999	9438	9196	9060	8519	10103	9613	7597	9546	9806	10213	9708
36	8952	9313	10695	10390	7009	8104	8796	8564	7964	8083	9261	8805	6813	9030	9729	9319	8952
37	8705	8581	10290	9815	6361	7360	8016	7594	7254	7320	7670	8122	6557	7861	9347	8641	8705
38	7748	8208	9307	8805	6105	7315	7373	7240	7470	6619	7608	7905	6225	7345	8429	8056	7748
39	8103	7086	8201	8029	5260	6617	6823	7055	7131	6432	7218	7485	5562	6814	7511	7594	8103
40	7563	6775	7951	7610	5140	6344	6379	6608	6652	6697	6984	7299	5683	6420	6868	6962	7563
41	7254	6666	7483	7144	5019	6389	6272	6500	6452	6152	6891	6740	5260	6253	6838	6793	7254
42	6776	6728	7359	7128	5230	5433	5736	6747	6498	5980	6735	6367	5487	5661	6348	6500	6776
43	6081	6183	7140	7035	4929	5630	5767	6300	6189	5871	6454	6336	4838	5721	6104	6516	6081
44	6513	6385	6423	6585	4778	4689	5691	6346	6035	5794	6299	6181	5245	5221	5951	6778	6513
45	6359	5903	6361	5932	4763	5327	5782	6177	5047	6152	6330	6227	4899	5099	6180	6362	6359
46	5834	6089	6595	5870	4552	4264	5874	6208	5680	5856	5363	6134	5306	4887	6027	5684	5834
47	5850	5856	5831	5995	4085	5008	5721	6131	5325	6183	6189	5948	4190	4947	5094	6285	5850
48	5680	5716	6189	5746	4160	3809	5461	5545	4707	5529	6158	5668	4236	4902	5584	6177	5680
49	5464	5607	6018	5668	3964	4887	5186	5561	5402	5591	5675	5513	4009	4780	4987	6038	5464
50	5402	5451	6408	5513	3859	4629	5431	5561	5340	5217	5784	5560	4688	4720	5079	5853	5402
51	5402	4267	6143	5948	3964	4598	4757	4929	4646	5030	5550	5234	4522	4082	5691	6007	5402
52	4707	5529	5082	5342	4040	4629	5063	5345	4800	5466	5613	4876	4175	4477	5446	5715	4707
53	4939	5186	5706	5668	3949	3824	4589	5206	5186	4968	4973	5203	4356	4173	5063	5576	4939
54	5433	5015	5628	5498	3226	4811	4972	5099	4985	4548	5114	5327	4100	4416	4956	5622	5433
55	4924	5124	5410	5296	3874	4310	4390	4868	4723	5171	5238	4473	4085	3642	4834	5607	4924
56	5248	4968	5301	5839	3542	4098	4100	5360	4908	4376	4880	4985	3407	4295	4895	5607	5248
57	4939	4579	5285	4721	3572	3657	4635	5022	4816	4859	4911	5156	3618	3870	4803	5191	4939
58	5001	4548	5410	5156	3557	4416	4803	4636	4167	4127	4755	4970	3904	4143	5033	5468	5001
59	4954	4875	5223	5094	3648	3885	3855	4113	4723	3909	4521	4426	3633	3961	4696	5237	4954
60	4399	4828	4786	5109	3346	3915	4176	4020	4476	4781	4958	4581	3180	3900	4910	4821	4399
61	4769	4127	5207	4410	2849	3718	4467	5037	4090	3987	4474	4535	3452	4189	4910	4960	4769
62	4630	4594	4958	4550	2909	3764	4314	4698	4183	4112	4662	4892	3437	4128	4421	5206	4630
63	4630	4781	4677	4938	1658	4006	3595	3897	3689	3722	4412	4845	3120	4082	4543	4452	4630

64	3936	3364	5067	4457	3331	3946	4146	4636	4028	4423	4771	3168	3105	3749	4253	5299	3936
65	4352	4563	5176	4581	3075	3293	3090	4575	4121	4610	4677	4379	3286	3491	4742	4868	4352
66	4244	4516	4615	3479	2623	3263	3641	4267	4121	4189	4568	4643	3135	3521	4069	4837	4244
67	4553	4065	4459	4519	1990	3506	3870	3420	4198	3940	4428	3914	1794	3749	4421	3512	4553
68	4075	2476	4521	4271	3316	3126	4100	4221	4275	3753	4443	3650	3060	3612	4191	4205	4075
69	3318	4189	4319	4426	3060	3384	3549	3743	4260	3940	4241	4348	2939	3506	3809	4051	3318
70	4322	4034	3586	4178	2562	3096	3243	4190	3998	3847	4272	3898	2472	3551	3442	4544	4322
71	3998	4283	4396	4379	2758	3354	3625	3866	4183	4221	4022	4333	3015	3066	3809	4174	3998
72	4044	3411	4412	3370	2502	3111	3794	3851	3905	3644	3866	3991	2427	3475	3962	4313	4044
73	4106	3613	4256	4240	1990	2808	3702	3697	3442	3722	4022	4007	2984	3248	3381	4036	4106
74	4090	3909	3929	3976	2216	2701	2601	3543	3473	3426	3820	4007	3030	2853	3472	3990	4090
75	3781	2866	3601	3743	2291	2853	3182	3912	3226	3099	3664	3743	2593	3096	2952	3851	3781
76	3766	2803	4209	3572	1990	2747	3564	3851	2701	3146	1918	3603	1764	2489	3059	4097	3766
77	2948	3535	3648	3572	1854	2565	3136	3620	3643	3208	3835	3168	2638	2201	3197	3312	2948
78	3534	3068	3929	3851	1929	1882	3105	2572	3411	2959	3399	3370	1884	2701	3258	2773	3534
79	2963	2071	2837	3494	1929	2899	3212	3004	2902	2476	3508	3448	2186	2413	2952	3450	2963
80	3365	3052	3555	3650	1206	2246	2830	2957	3056	2492	3414	3292	1779	2686	2310	2757	3365
81	3056	2928	3664	3401	1236	2246	2601	3204	2747	2274	3009	3044	1779	2398	3121	2311	3056
82	2979	3068	3321	3230	1206	2201	1866	2865	2639	2554	3009	3354	1929	2185	2983	3034	2979
83	3272	2772	3570	2795	1191	2079	2402	2603	2655	2430	2307	2733	1658	2595	2662	3096	3272
84	2608	2507	3149	2826	859	1867	2417	2388	2037	2461	2479	2795	1266	1760	2646	3327	2608
85	2917	825	2557	3013	799	1472	2279	2665	2099	2196	2884	2625	1326	2519	2570	2819	2917
86	2500	1822	2993	3013	814	1760	2295	2156	1729	2118	2494	2562	1477	2109	2646	2896	2500
87	2253	1931	2791	2267	769	1548	1943	2357	2608	1121	2385	1693	1507	1563	2356	2495	2253
88	2331	2196	2354	2640	739	1032	1698	2634	2145	2321	2417	2531	1236	1943	2478	2511	2331
89	1698	1916	2744	2749	799	1351	1973	2372	2315	1853	2510	1864	1130	1776	2004	2803	1698
90	2161	2212	2541	2671	0	1700	2004	2511	1960	2212	2604	2081	919	1836	2203	2696	2161
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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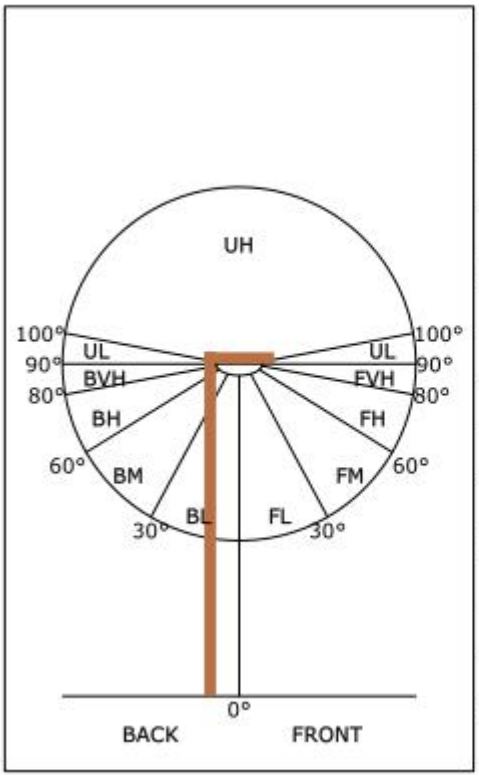
Certificate#4810.01



ZONE	LUMENS	% LAMP LUMENS
FORWARD LIGHT	55468	55.2
FL (0°-30°)	42789	42.6
FM (30°-60°)	7516	7.5
FH (60°-80°)	3833	3.8
FVH (80°-90°)	1329	1.3
BACK LIGHT	44980	44.7
BL (0°-30°)	33088	32.9
BM (30°-60°)	7030	7.0
BH (60°-80°)	3671	3.7
BVH (80°-90°)	1191	1.2
UP LIGHT	111	0.1
UL (90°-100°)	111	0.1
UH (100°-180°)	0	0.0
TRAPPED LIGHT	0	0.0

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2018-09-17	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AST-SP01-750WEHT2H1-ac57		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180901 1E-U-D2	277.0	60	2.5325	699.06	0.9965	6.14
	480.0	60	1.4769	685.89	0.9675	10.28
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

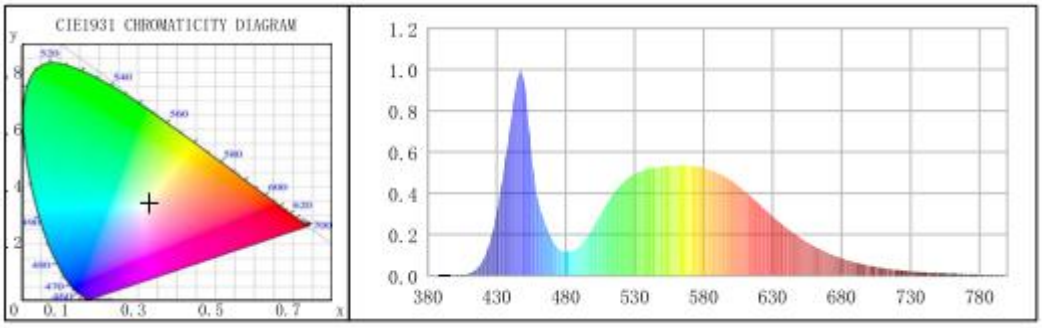
Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
CCT (K)	5648
Duv	0.0026
Chromaticity (x, y)	x=0.3291 y=0.3432
Chromaticity (u', v')	u(u')=0.2038 v'=0.4781
Color Rendering Index (CRI)	73.2
R9	0

Special Color Rendering Indices			
R1	72	R9	0
R2	76	R10	44
R3	80	R11	74
R4	75	R12	48
R5	73	R13	72
R6	69	R14	89
R7	81	R15	66
R8	60	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	277.0	480.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	103272.13	101854.67	>=30000(-10%)
Luminous Efficacy (lm/W)	147.73	148.50	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	145.7		

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-SP01-750WEHT2H1-ac40	100557.85	698.69	143.92
AST-SP01-750WEHT2H1-ac45	101236.42	698.88	144.86
AST-SP01-750WEHT2H1-ac50	101914.99	698.88	145.83
AST-SP01-750WEHT2H1-ac57	103272.13	699.06	147.73

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 ********