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

Replacement Lamps for High Bay Luminaires (UL Type B)

Model name(s): AST-CLW07-100WBCA1-acK

Remark: “a” refers to lamp base, "E" is E39 lamp base, "EX" is EX39 lamp base.
“cK” refers to CCT, can be 30K, 35K, 40K, 50K, 57K.

Representative (Tested) Model: AST-CLW07-100WBCA1-a30K
AST-CLW07-100WBCA1-a57K

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

Test & Report By:

Grace Li

Engineer: Grace Li

Date: September 6, 2018

Review By:

Tommy Liang

Manager: Tommy Liang

1.1 Product Information:

Organization Name	ASMART LIGHT CO., LTD	
Brand Name	ASMART	
Model Number	AST-CLW07-100WBCA1-acK	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Replacement Lamps for High Bay Luminaires (UL Type B)	
Rated Voltage / Frequency	100-277Vac, 50/60 Hz	
Nominal Power	100W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K,5700K	
LED Manufacturer	Samsung Electronics Co., LTD.	
LED Model	SPMWH1228xxxxxxxxx	
Sample Number	BLC1808024E-B1(3000K),B2(5700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo

Certificate#4810.01

1.2 Test Specifications:

Date of Receipt	Aug 29,2018
Date of Test	Aug 31,2018
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.

Certificate#4810.01

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2018-8-31	Test Ambient:	25.2 º C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AST-CLW07-100WBCA1-a30K		

Electrical Measurement in Lithonia THD 400S A15:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180802 4E-B1	120.0	60	0.854	101.86	0.994	6.6
	277.0	60	0.383	97.75	0.922	16.35
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia THD 400S A15:

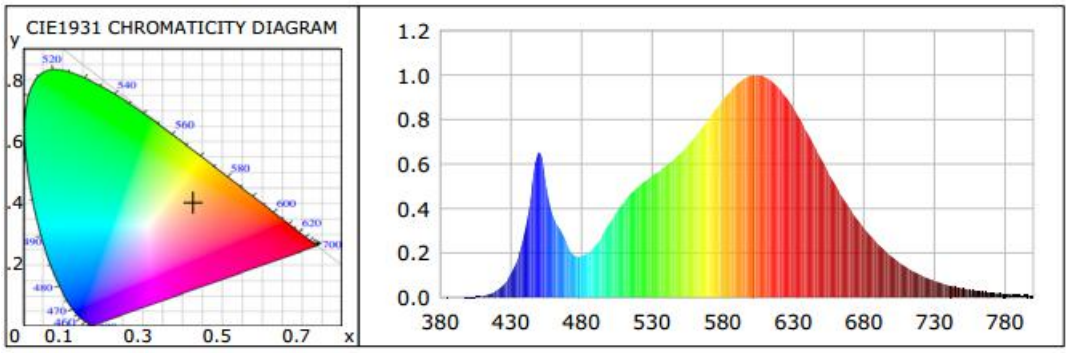
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3112
Duv	-0.00105
Chromaticity (x, y)	x=0.4277 y=0.3982
Chromaticity (u', v')	u(u')=0.2472 v'=0.5177
Color Rendering Index (CRI)	83.6
R9	14

Special Color Rendering Indices			
R1	82	R9	14
R2	90	R10	78
R3	97	R11	82
R4	82	R12	71
R5	82	R13	84
R6	88	R14	98
R7	84	R15	76
R8	63	--	--

Photometric Measurement – Goniophotometer Method in Lithonia THD 400S A15:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	12170.23	11726.09	>=10000(-10%)
Luminous Efficacy (lm/W)	119.48	119.96	>= 100(-3%)
Most worst Luminous/Highest Watts	115.12		
Zonal lumens in the 20-50° zone (%)	48.8	--	>= 30(-10)
Beam Angle (°)	127.8	--	--
Center Beam Candle Power (cd)	2441	--	--

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

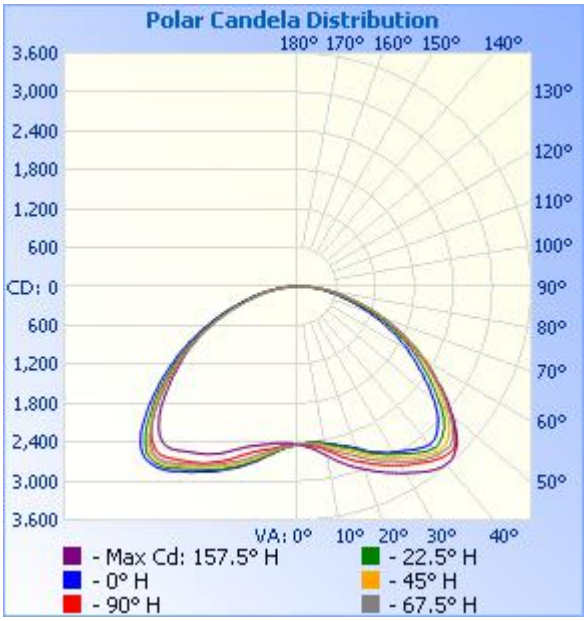
Zonal Lumen Summary

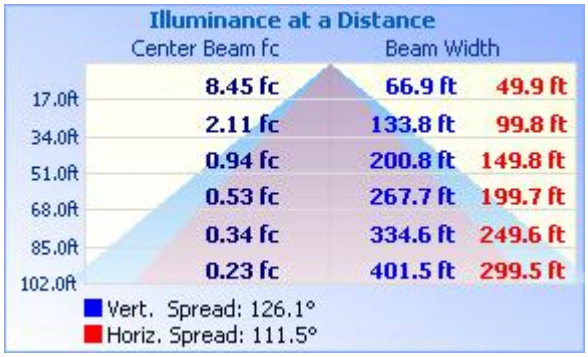
Zone	Lumens	% Lamp	% Luminaire
0-30	2,392.3	19.7%	19.7%
0-40	4,452.2	36.6%	36.6%
0-60	9,187.7	75.5%	75.5%
60-90	2,910.7	23.9%	23.9%
70-100	1,298.4	10.7%	10.7%
90-120	44.9	0.4%	0.4%
0-90	12,098.4	99.4%	99.4%
90-180	71.0	0.6%	0.6%
0-180	12,169.4	100%	100%

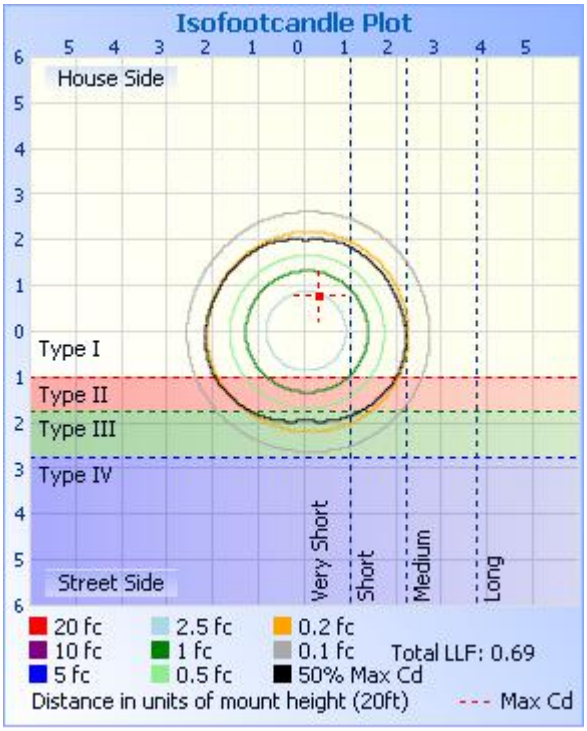
Lumens Per Zone

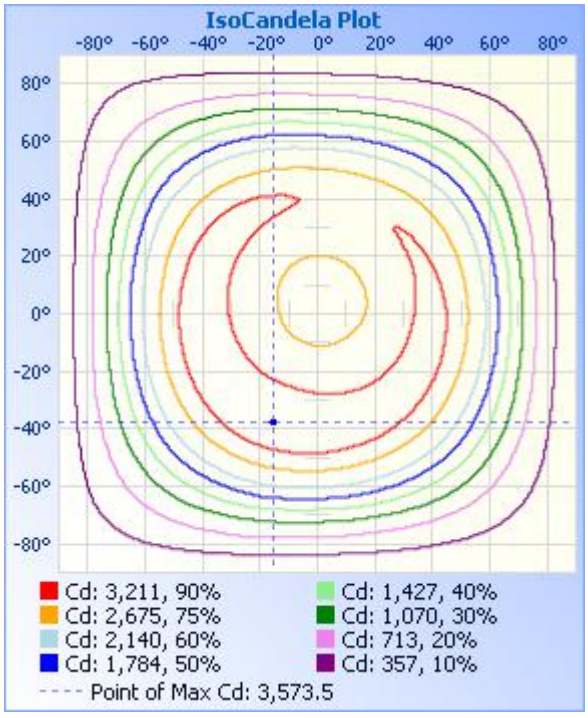
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	238.0	2.0%	90-100	35.7	0.3%
10-20	765.7	6.3%	100-110	4.4	0%
20-30	1,388.6	11.4%	110-120	4.9	0%
30-40	2,059.9	16.9%	120-130	5.3	0%
40-50	2,491.7	20.5%	130-140	5.6	0%
50-60	2,243.7	18.4%	140-150	5.8	0%
60-70	1,648.0	13.5%	150-160	5.1	0%
70-80	923.3	7.6%	160-170	3.2	0%
80-90	339.4	2.8%	170-180	1.0	0%

Photometric Data









Certificate#4810.01

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	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441
1	2433	2429	2431	2431	2440	2444	2445	2444	2450	2451	2447	2446	2446	2437	2435	2434	2433
2	2423	2424	2425	2432	2441	2449	2453	2455	2462	2460	2456	2452	2454	2439	2428	2424	2423
3	2418	2421	2424	2433	2447	2456	2463	2470	2471	2472	2468	2459	2457	2440	2429	2417	2418
4	2414	2420	2421	2432	2455	2468	2479	2485	2485	2487	2480	2468	2463	2445	2430	2420	2414
5	2414	2416	2424	2437	2467	2482	2495	2505	2503	2507	2493	2481	2468	2449	2434	2424	2414
6	2417	2414	2429	2448	2478	2497	2511	2529	2527	2530	2512	2496	2481	2459	2436	2425	2417
7	2419	2421	2440	2466	2493	2516	2535	2553	2557	2554	2530	2508	2496	2469	2446	2428	2419
8	2426	2430	2454	2489	2512	2541	2568	2585	2587	2583	2559	2529	2513	2482	2454	2436	2426
9	2438	2447	2471	2511	2531	2567	2598	2620	2616	2617	2585	2552	2532	2496	2469	2448	2438
10	2453	2465	2493	2531	2560	2595	2629	2652	2645	2643	2619	2579	2546	2514	2483	2464	2453
11	2465	2481	2509	2554	2588	2627	2662	2687	2677	2672	2646	2610	2561	2529	2495	2478	2465
12	2482	2498	2527	2576	2617	2663	2701	2726	2718	2702	2675	2635	2575	2540	2511	2489	2482
13	2495	2513	2553	2605	2653	2705	2739	2765	2756	2742	2708	2659	2595	2557	2521	2505	2495
14	2515	2532	2577	2630	2695	2744	2776	2797	2787	2773	2741	2691	2620	2574	2537	2523	2515
15	2532	2555	2600	2651	2722	2775	2803	2829	2818	2804	2770	2723	2640	2596	2556	2540	2532
16	2550	2571	2618	2681	2754	2805	2840	2867	2854	2838	2801	2755	2669	2618	2577	2559	2550
17	2570	2594	2645	2706	2788	2839	2880	2902	2890	2872	2834	2788	2700	2643	2599	2579	2570
18	2596	2617	2673	2732	2821	2871	2912	2934	2926	2909	2865	2820	2731	2678	2627	2601	2596
19	2621	2644	2700	2762	2849	2904	2939	2964	2956	2939	2896	2850	2767	2713	2659	2633	2621
20	2649	2671	2734	2798	2881	2929	2971	2999	2983	2965	2924	2880	2807	2747	2695	2662	2649
21	2681	2707	2772	2832	2904	2959	3005	3025	3014	2998	2949	2904	2846	2783	2728	2695	2681
22	2718	2749	2806	2865	2933	2996	3040	3062	3046	3032	2980	2936	2881	2828	2768	2731	2718
23	2758	2782	2838	2898	2970	3031	3075	3097	3083	3060	3008	2970	2917	2868	2809	2768	2758
24	2788	2810	2865	2928	2998	3064	3101	3127	3117	3085	3038	2999	2949	2901	2848	2805	2788
25	2816	2838	2894	2958	3030	3098	3133	3159	3149	3112	3063	3028	2978	2932	2877	2837	2816
26	2843	2866	2925	2989	3060	3127	3163	3192	3175	3140	3093	3054	3015	2963	2908	2866	2843
27	2870	2897	2953	3018	3089	3155	3190	3223	3204	3164	3118	3081	3052	2995	2937	2896	2870
28	2901	2931	2982	3041	3118	3181	3220	3255	3237	3190	3146	3106	3083	3025	2967	2926	2901
29	2926	2955	3007	3070	3146	3207	3250	3288	3267	3218	3176	3137	3109	3052	2994	2951	2926

30	2945	2983	3038	3105	3176	3239	3280	3320	3303	3253	3205	3162	3134	3076	3017	2972	2945
31	2969	3010	3069	3138	3208	3265	3309	3349	3331	3284	3238	3196	3156	3097	3039	2997	2969
32	2991	3042	3100	3171	3239	3286	3335	3382	3359	3310	3269	3232	3178	3121	3062	3019	2991
33	3020	3071	3136	3203	3261	3309	3361	3413	3392	3342	3295	3261	3205	3142	3086	3042	3020
34	3046	3104	3170	3235	3285	3338	3397	3447	3431	3377	3327	3288	3233	3164	3110	3066	3046
35	3073	3134	3206	3267	3316	3367	3429	3479	3468	3418	3362	3321	3254	3187	3141	3093	3073
36	3100	3165	3237	3296	3346	3394	3454	3507	3495	3444	3392	3352	3279	3207	3164	3123	3100
37	3123	3197	3258	3318	3376	3416	3478	3531	3513	3468	3417	3383	3306	3233	3184	3146	3123
38	3142	3225	3285	3339	3400	3435	3501	3550	3529	3478	3433	3398	3328	3254	3203	3169	3142
39	3163	3242	3309	3359	3422	3456	3518	3567	3538	3491	3442	3409	3343	3270	3220	3183	3163
40	3179	3257	3325	3378	3445	3471	3528	3570	3544	3490	3439	3412	3346	3258	3217	3180	3179
41	3166	3267	3337	3387	3460	3480	3534	3573	3544	3480	3434	3396	3336	3260	3201	3176	3166
42	3164	3260	3342	3395	3468	3481	3527	3564	3534	3468	3401	3358	3305	3223	3180	3152	3164
43	3132	3232	3338	3400	3473	3471	3509	3540	3506	3432	3365	3324	3283	3190	3134	3126	3132
44	3101	3214	3313	3399	3468	3454	3481	3506	3475	3378	3292	3263	3237	3141	3101	3077	3101
45	3055	3169	3290	3366	3434	3420	3446	3473	3425	3324	3243	3211	3198	3101	3042	3032	3055
46	3013	3149	3245	3339	3387	3368	3398	3420	3364	3260	3159	3123	3133	3032	2987	2968	3013
47	2959	3085	3196	3271	3324	3309	3339	3349	3304	3186	3099	3062	3078	2980	2922	2920	2959
48	2899	3039	3135	3225	3263	3245	3264	3279	3225	3109	3007	2979	2999	2897	2857	2846	2899
49	2821	2956	3079	3144	3193	3161	3190	3201	3137	3018	2944	2905	2938	2840	2789	2784	2821
50	2761	2897	2994	3083	3117	3091	3102	3122	3048	2932	2837	2816	2841	2755	2718	2691	2761
51	2669	2809	2920	2981	3031	3013	3019	3028	2966	2857	2766	2724	2765	2689	2631	2621	2669
52	2595	2727	2834	2920	2950	2939	2935	2951	2873	2768	2672	2640	2678	2601	2551	2535	2595
53	2517	2646	2768	2838	2886	2853	2854	2855	2778	2685	2594	2554	2600	2517	2479	2460	2517
54	2423	2563	2679	2754	2780	2770	2766	2774	2681	2582	2522	2468	2512	2465	2405	2386	2423
55	2362	2494	2602	2680	2711	2668	2665	2674	2599	2507	2406	2383	2421	2355	2333	2302	2362
56	2262	2410	2524	2582	2591	2584	2574	2579	2509	2418	2339	2295	2335	2296	2245	2229	2262
57	2197	2324	2443	2519	2526	2490	2486	2497	2407	2317	2236	2211	2253	2217	2174	2154	2197
58	2130	2251	2368	2418	2440	2409	2389	2388	2323	2248	2159	2134	2173	2125	2103	2089	2130
59	2027	2181	2292	2344	2343	2319	2314	2323	2217	2141	2093	2045	2083	2069	2023	2014	2027
60	1974	2100	2209	2281	2268	2220	2214	2213	2144	2058	1982	1961	2003	1982	1955	1937	1974
61	1904	2024	2140	2175	2162	2147	2118	2124	2049	1978	1903	1877	1918	1892	1865	1857	1904

62	1804	1945	2033	2108	2086	2043	2033	2040	1947	1869	1819	1783	1816	1823	1779	1777	1804
63	1743	1868	1967	2022	2003	1956	1922	1931	1874	1787	1716	1706	1749	1728	1704	1707	1743
64	1666	1776	1883	1916	1908	1874	1852	1864	1758	1706	1648	1632	1669	1632	1624	1623	1666
65	1565	1702	1779	1856	1828	1763	1756	1754	1676	1606	1554	1531	1565	1565	1533	1536	1565
66	1497	1624	1716	1762	1744	1695	1659	1660	1599	1523	1449	1441	1496	1484	1471	1458	1497
67	1424	1537	1624	1662	1646	1605	1590	1586	1479	1432	1385	1375	1419	1388	1387	1395	1424
68	1335	1452	1529	1590	1565	1496	1492	1484	1421	1341	1300	1283	1321	1313	1296	1303	1335
69	1251	1376	1461	1502	1481	1438	1412	1400	1325	1277	1210	1198	1245	1231	1224	1221	1251
70	1190	1292	1370	1406	1392	1349	1343	1318	1238	1198	1142	1124	1172	1163	1152	1162	1190
71	1116	1198	1298	1338	1311	1259	1241	1215	1171	1091	1059	1051	1074	1068	1064	1079	1116
72	1023	1144	1211	1259	1233	1183	1158	1136	1078	1016	979	955	990	1001	997	1005	1023
73	963	1064	1124	1165	1141	1101	1082	1062	992	943	877	873	924	920	936	942	963
74	895	965	1063	1080	1049	1005	991	970	925	865	817	819	845	847	865	878	895
75	831	906	967	1004	981	937	924	910	864	796	773	738	756	762	774	799	831
76	747	840	884	926	918	881	871	861	783	742	694	674	702	697	713	724	747
77	686	745	822	841	824	794	804	781	735	684	646	639	653	655	666	675	686
78	639	689	759	780	769	740	729	709	680	619	596	583	593	595	614	629	639
79	596	643	687	733	729	698	683	674	603	569	540	516	530	528	544	567	596
80	529	595	632	654	650	624	625	596	551	514	475	471	485	481	499	511	529
81	483	531	593	606	586	557	540	524	507	447	425	428	446	446	459	471	483
82	445	477	525	563	547	516	501	489	429	397	385	368	388	389	420	436	445
83	415	440	471	498	489	463	453	419	369	353	320	313	330	336	350	383	415
84	346	399	424	441	419	384	364	349	331	284	266	272	290	298	307	326	346
85	306	334	379	399	372	346	333	322	276	231	225	231	256	267	281	291	306
86	271	291	323	354	328	309	300	277	219	202	185	165	189	217	248	266	271
87	240	253	269	280	261	237	221	208	192	166	140	129	140	150	174	215	240
88	175	210	222	231	218	207	200	197	164	124	112	115	122	127	140	151	175
89	134	158	185	202	198	189	187	173	118	105	98	93	108	116	123	129	134
90	116	124	149	172	158	141	125	113	102	86	70	51	71	83	110	117	116
91	106	110	116	129	115	110	107	105	81	53	27	26	30	33	43	87	106
92	67	94	103	110	105	101	96	83	40	23	21	22	25	28	31	34	67
93	30	59	81	94	81	67	50	32	22	20	18	18	21	23	26	28	30

94	24	27	42	61	30	24	23	21	18	16	14	15	17	19	22	23	24
95	21	24	25	26	20	20	18	16	15	13	12	12	15	16	18	20	21
96	18	19	22	22	16	16	15	12	12	10	10	10	12	14	15	16	18
97	15	17	18	18	13	13	12	10	9	7	5	6	7	10	13	14	15
98	12	14	15	14	10	10	9	7	5	4	4	4	4	5	8	11	12
99	9	11	12	12	8	6	6	4	3	3	4	4	3	4	5	7	9
100	5	9	10	9	5	4	4	3	3	4	4	4	4	5	4	4	5
101	4	5	6	6	3	4	3	3	3	4	4	4	3	4	5	3	4
102	4	5	5	4	2	3	4	3	3	4	4	4	4	4	5	3	4
103	3	5	5	4	3	4	4	4	3	4	4	4	4	5	5	4	3
104	4	4	5	5	3	3	4	3	3	4	4	5	4	4	5	4	4
105	4	5	5	3	3	4	4	4	4	4	5	5	4	4	4	4	4
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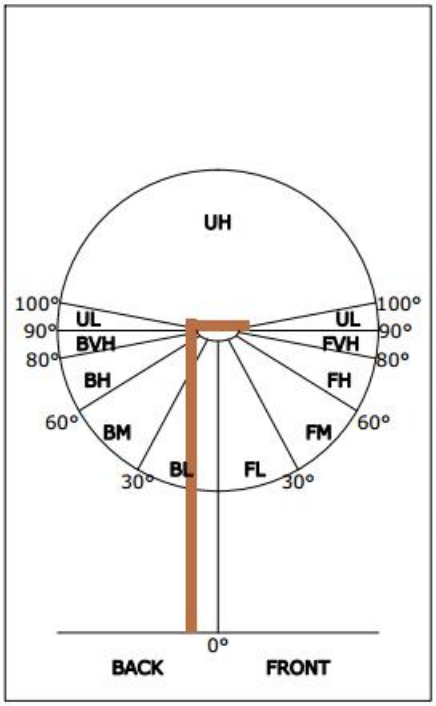
Certificate#4810.01



ZONE	LUMENS	% LAMP LUMENS
FORWARD LIGHT	5928	48.7
FL (0°-30°)	1158	9.5
FM (30°-60°)	3309	27.2
FH (60°-80°)	1284	10.6
FVH (80°-90°)	177	1.5
BACK LIGHT	6171	50.7
BL (0°-30°)	1234	10.1
BM (30°-60°)	3488	28.7
BH (60°-80°)	1287	10.6
BVH (80°-90°)	163	1.3
UP LIGHT	71	0.6
UL (90°-100°)	36	0.3
UH (100°-180°)	35	0.3
TRAPPED LIGHT	NA	NA

Certificate#4810.01

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2018-8-31	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	AST-CLW07-100WBCA1-a57K		

Electrical Measurement in Lithonia THD 400S A15:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180802 4E-B2	120.0	60	0.853	101.93	0.9953	6.93
	277.0	60	0.384	98.12	0.9213	16.28
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia THD 400S A15:

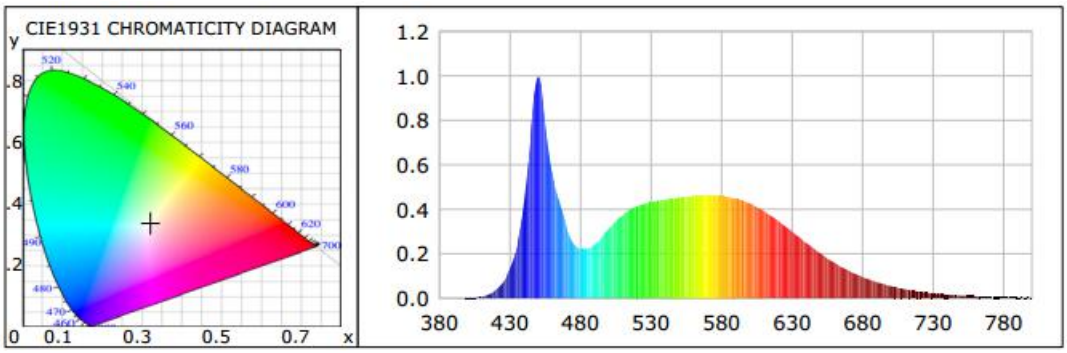
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	6012
Duv	0.00099
Chromaticity (x, y)	x=0.3218 y=0.3334
Chromaticity (u', v')	u(u')=0.2025 v'=0.4720
Color Rendering Index (CRI)	84.3
R9	16

Special Color Rendering Indices			
R1	8	R9	16
R2	88	R10	71
R3	91	R11	84
R4	85	R12	61
R5	84	R13	85
R6	83	R14	95
R7	88	R15	80
R8	72	--	--

Photometric Measurement – Sphere-Spectroradiometer Method in Lithonia THD 400S A15:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	12836.04	12409.24	>=10000(-10%)
Luminous Efficacy (lm/W)	125.93	126.47	>= 100(-3%)
Most worst Luminous/Highest Watts	121.74		

Spectral Power Distribution & Chromaticity Diagram



Calculated Efficacy Data for family models (3500K, 4000K and 5000K):

Model Number	Luminous Flux (lm)	Power (W)	Efficacy (lm/W)
AST-CLW07-100WBCA1-a30K	12170.23	101.86	119.48
AST-CLW07-100WBCA1-a35K	12303.39	101.90	120.75
AST-CLW07-100WBCA1-a40K	12436.55	101.90	122.05
AST-CLW07-100WBCA1-a50K	12569.72	101.90	123.36
AST-CLW07-100WBCA1-a57K	12836.04	101.93	125.93

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 ******