



Report No.: BLC1806021E-G-R

LM-79-08 Test Report

For

Beyond LED Technology

(Brand Name: Beyond LED)

1939 Packer Ct Suite C, Stone Mountain, GA 30087

Titan Series Linear High Bay

Model name(s): BLT-PHB03-220WRAC1

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

Test & Report By:

Grace Li

Engineer: Grace Li

Date: June 27, 2018

Update: July 13, 2018 (Updating the rated voltage from 100-277V to 120-277V)

Review By:

Tommy Liang

Manager: Tommy Liang



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1.1 Product Information:

Organization Name	Beyond LED Technology	
Brand Name	Beyond LED	
Model Number	BLT-PHB03-220WRAC1	
SKU (if available)	150892	
Type of Luminaire (for integral lamps, list base type and lamp type)	High Bay Luminaires for Commercial and Industrial Buildings	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	220W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K,5700K	
LED Manufacturer	Hongli Zhihui Group Co.,Ltd.	
LED Model	HL-AS-PU2835DW-S1-08-PCT-HR3	
Sample Number	BLC1806021E-G1(4000K),G2(5700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo





1.2 Test Specifications:

Date of Receipt	June 20, 2018
Date of Test	June 25, 2018
Test item	<ol style="list-style-type: none">1. Total Luminous Flux2. Luminous Distribution Intensity3. Luminous Efficacy4. Correlated Color Temperature5. Color Rendering Index6. Chromaticity Coordinate7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none">1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources4. CIE 15-2004 Technical Report Colorimetry5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source6. 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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	2018-06-25	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLT-PHB03-220WRAC1		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180602	120.0	60	1.882	224.55	0.9943	8.09
1E-G1	277.0	60	0.8111	217.54	0.9683	8.58
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

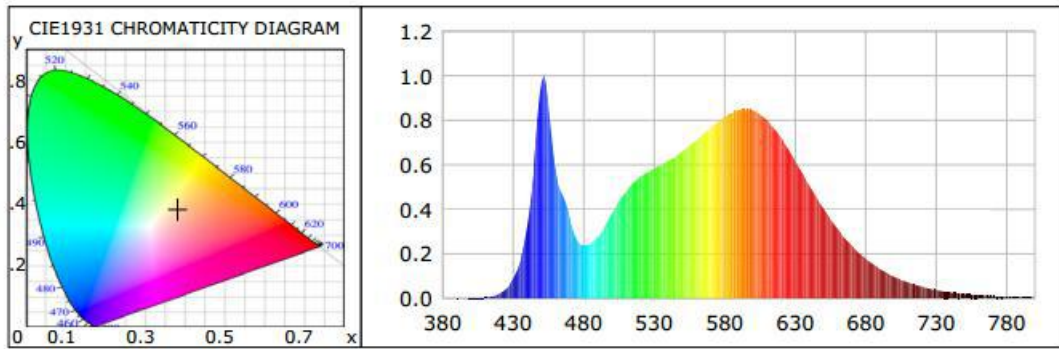
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	2
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	3967	R3	95	R11	79
Duv	0.00024	R4	80	R12	60
Chromaticity (x, y)	x=0.3821 y=0.3783	R5	80	R13	82
Chromaticity (u', v')	u(u')=0.2256 v'(v')=0.5025	R6	85	R14	98
Color Rendering Index (CRI)	82.0	R7	84	R15	74
R9	2	R8	62	--	--

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)	30274.2	30043.0	>=10000(-10%)
Luminous Efficacy (lm/W)	134.82	138.10	Premium: >= 130(-3%)
Most worst Luminous/Highest Watts	133.79		
Zonal lumens in the 20-50° zone (%)	52.6	--	>=30(-10)
Beam Angle (°)	113.7	--	--
Center Beam Candle Power (cd)	10886	--	--



Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary

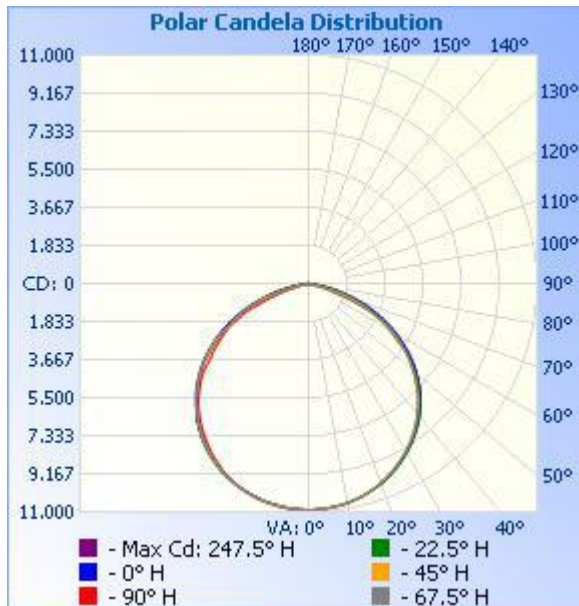
Zone	Lumens	% Lamp	% Luminaire
0-30	8,555.2	28.3%	28.3%
0-40	14,110.0	46.6%	46.6%
0-60	25,098.2	82.9%	82.9%
60-90	5,036.3	16.6%	16.6%
70-100	1,465.2	4.8%	4.8%
90-120	65.2	0.2%	0.2%
0-90	30,134.5	99.5%	99.5%
90-180	136.3	0.5%	0.5%
0-180	30,270.8	100%	100%

Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	1,032.1	3.4%	90-100	24.9	0.1%
10-20	2,973.8	9.8%	100-110	21.0	0.1%
20-30	4,549.3	15.0%	110-120	19.3	0.1%
30-40	5,554.8	18.4%	120-130	17.9	0.1%
40-50	5,817.4	19.2%	130-140	16.7	0.1%
50-60	5,170.8	17.1%	140-150	14.9	0%
60-70	3,596.0	11.9%	150-160	11.5	0%
70-80	1,284.1	4.2%	160-170	7.5	0%
80-90	156.2	0.5%	170-180	2.6	0%



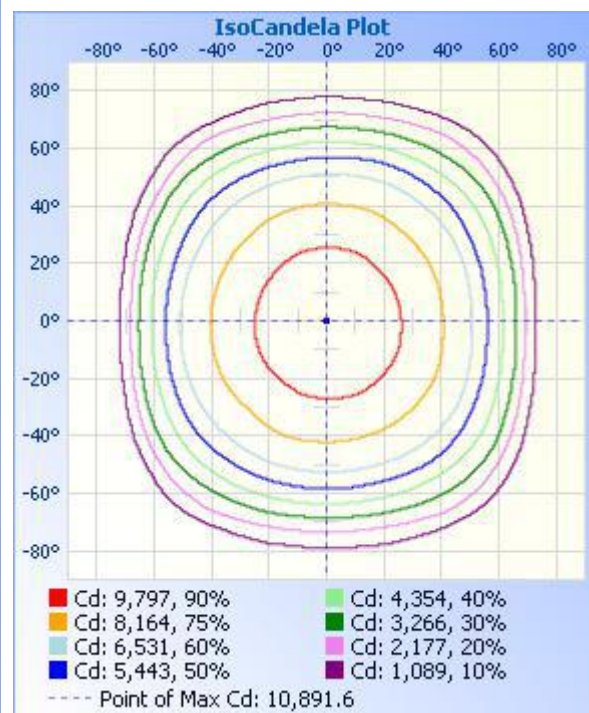
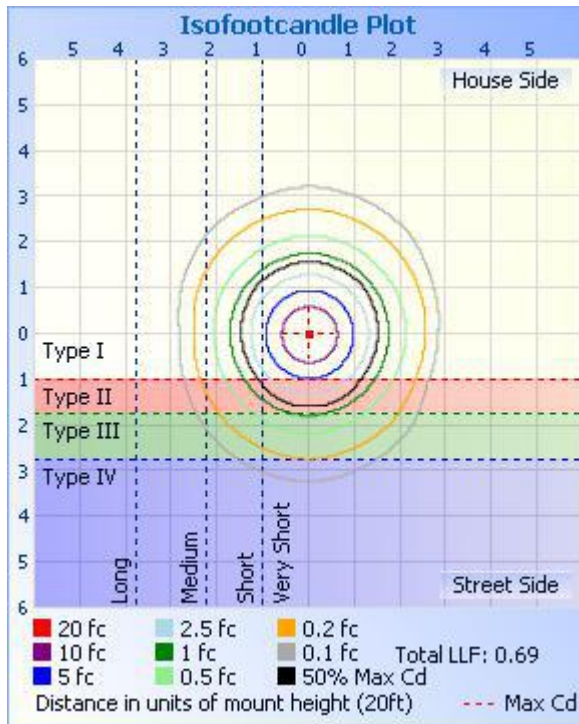
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	37.7 fc	54.0 ft	50.4 ft
34.0ft	9.4 fc	107.9 ft	100.7 ft
51.0ft	4.2 fc	161.9 ft	151.1 ft
68.0ft	2.4 fc	215.8 ft	201.4 ft
85.0ft	1.5 fc	269.8 ft	251.8 ft
102.0ft	1.0 fc	323.7 ft	302.1 ft

Vert. Spread: 115.6°
Horiz. Spread: 111.9°





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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	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886	10886
1	10883	10882	10884	10882	10890	10886	10890	10890	10883	10885	10884	10887	10881	10884	10885	10889	10883
2	10876	10874	10875	10880	10889	10881	10888	10878	10876	10891	10882	10892	10879	10883	10886	10887	10876
3	10868	10862	10866	10879	10877	10880	10881	10870	10867	10881	10872	10888	10877	10873	10870	10873	10868
4	10853	10850	10853	10865	10868	10876	10865	10858	10852	10869	10864	10885	10872	10859	10860	10865	10853
5	10838	10839	10838	10849	10850	10868	10850	10844	10841	10868	10852	10875	10859	10851	10844	10856	10838
6	10818	10825	10827	10836	10836	10858	10837	10826	10820	10853	10834	10866	10835	10833	10819	10837	10818
7	10791	10806	10794	10815	10814	10841	10818	10807	10809	10832	10820	10846	10810	10813	10797	10817	10791
8	10770	10786	10774	10785	10791	10818	10793	10790	10783	10809	10804	10821	10783	10784	10771	10782	10770
9	10745	10760	10751	10762	10762	10788	10775	10761	10761	10776	10778	10804	10755	10762	10745	10766	10745
10	10708	10724	10722	10729	10737	10761	10748	10727	10740	10754	10754	10763	10722	10728	10700	10742	10708
11	10672	10693	10690	10694	10702	10733	10718	10690	10704	10729	10715	10728	10694	10693	10667	10703	10672
12	10632	10646	10642	10653	10665	10686	10678	10658	10674	10696	10678	10698	10650	10658	10632	10668	10632
13	10600	10611	10603	10604	10618	10645	10639	10618	10624	10659	10644	10664	10619	10618	10587	10625	10600
14	10551	10563	10555	10546	10575	10604	10597	10579	10578	10624	10600	10617	10581	10571	10530	10589	10551
15	10513	10520	10508	10497	10513	10552	10550	10542	10536	10575	10551	10574	10544	10520	10498	10541	10513
16	10463	10476	10447	10440	10453	10501	10498	10490	10497	10525	10515	10512	10492	10465	10444	10493	10463
17	10393	10423	10387	10382	10399	10435	10442	10428	10441	10481	10456	10462	10443	10416	10371	10436	10393
18	10349	10362	10330	10321	10347	10380	10382	10379	10394	10428	10402	10410	10391	10357	10317	10379	10349
19	10304	10315	10250	10250	10273	10315	10310	10330	10329	10364	10350	10353	10333	10288	10245	10322	10304
20	10231	10256	10184	10182	10206	10240	10246	10275	10271	10311	10282	10288	10256	10214	10168	10260	10231
21	10161	10189	10112	10102	10140	10180	10171	10206	10212	10249	10212	10217	10186	10148	10099	10197	10161
22	10092	10111	10033	10037	10063	10098	10087	10128	10141	10180	10146	10151	10121	10075	10025	10123	10092
23	10017	10044	9957	9960	9983	10016	10007	10064	10077	10113	10060	10081	10044	10000	9956	10048	10017
24	9938	9965	9870	9885	9906	9945	9930	9981	10005	10044	9989	10008	9960	9926	9876	9980	9938
25	9871	9880	9780	9804	9829	9867	9833	9916	9935	9971	9920	9926	9860	9849	9798	9898	9871
26	9778	9795	9694	9714	9744	9779	9738	9834	9850	9893	9823	9836	9757	9762	9707	9820	9778
27	9705	9701	9603	9616	9657	9694	9652	9750	9773	9803	9734	9753	9666	9671	9615	9723	9705
28	9608	9616	9504	9535	9561	9587	9550	9678	9671	9720	9650	9668	9578	9577	9537	9640	9608
29	9515	9520	9419	9448	9457	9489	9447	9579	9585	9627	9574	9568	9478	9478	9437	9543	9515

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30	9424	9426	9327	9348	9361	9393	9335	9493	9485	9535	9477	9468	9387	9377	9344	9452	9424
31	9327	9316	9216	9244	9280	9306	9242	9386	9401	9437	9388	9364	9266	9275	9233	9354	9327
32	9219	9210	9110	9132	9195	9198	9134	9300	9305	9337	9264	9263	9159	9172	9133	9250	9219
33	9122	9106	9001	9024	9083	9089	9038	9201	9205	9231	9170	9160	9039	9071	9018	9149	9122
34	9015	8992	8894	8903	8980	8975	8921	9098	9102	9122	9062	9048	8922	8961	8906	9019	9015
35	8916	8867	8777	8793	8850	8872	8792	8994	8991	9001	8954	8945	8807	8839	8795	8921	8916
36	8802	8764	8655	8672	8728	8770	8683	8867	8876	8882	8842	8828	8698	8719	8665	8797	8802
37	8680	8644	8527	8538	8615	8643	8564	8758	8766	8762	8707	8698	8578	8594	8541	8672	8680
38	8563	8533	8402	8406	8506	8530	8439	8635	8641	8639	8586	8585	8449	8459	8426	8561	8563
39	8445	8403	8271	8283	8392	8394	8313	8517	8525	8509	8460	8462	8329	8326	8292	8427	8445
40	8313	8272	8130	8137	8276	8261	8174	8385	8392	8363	8327	8337	8196	8189	8147	8296	8313
41	8175	8138	7992	7991	8143	8133	8048	8265	8240	8221	8194	8207	8053	8038	8015	8162	8175
42	8034	8005	7849	7860	8015	7989	7922	8124	8111	8080	8047	8059	7928	7902	7862	7998	8034
43	7889	7854	7713	7715	7895	7836	7776	7996	7972	7940	7916	7931	7771	7747	7719	7869	7889
44	7739	7702	7555	7569	7746	7687	7641	7869	7822	7775	7771	7786	7628	7605	7579	7709	7739
45	7592	7552	7413	7402	7597	7546	7491	7719	7688	7630	7629	7645	7468	7459	7411	7569	7592
46	7452	7391	7236	7240	7451	7395	7341	7556	7549	7484	7483	7486	7311	7313	7261	7410	7452
47	7309	7229	7092	7072	7298	7241	7177	7404	7401	7334	7310	7346	7146	7149	7108	7251	7309
48	7133	7075	6928	6919	7148	7059	7012	7240	7249	7187	7153	7196	6980	6984	6946	7118	7133
49	6977	6894	6764	6748	6968	6902	6829	7077	7077	7019	7000	7036	6824	6808	6787	6960	6977
50	6801	6708	6583	6579	6794	6731	6658	6886	6912	6860	6838	6882	6624	6638	6626	6788	6801
51	6639	6521	6415	6420	6612	6567	6488	6706	6746	6700	6666	6696	6367	6465	6439	6628	6639
52	6468	6329	6221	6229	6431	6374	6314	6520	6577	6528	6488	6514	6105	6296	6255	6457	6468
53	6293	6152	6034	6042	6250	6195	6138	6332	6402	6349	6310	6311	5887	6054	6081	6306	6293
54	6112	5932	5860	5854	6038	6013	5940	6139	6221	6144	6134	6042	5719	5801	5898	6136	6112
55	5927	5755	5670	5660	5788	5817	5758	5924	6047	5959	5956	5761	5546	5550	5718	5948	5927
56	5743	5549	5463	5386	5510	5609	5573	5740	5862	5767	5755	5557	5334	5346	5512	5770	5743
57	5534	5353	5264	5120	5277	5385	5383	5535	5672	5571	5566	5375	5159	5172	5321	5574	5534
58	5322	5153	5049	4893	5074	5108	5179	5344	5473	5354	5373	5191	4973	4979	5102	5368	5322
59	5128	4948	4838	4697	4853	4851	4985	5143	5252	5139	5172	5004	4788	4794	4896	5150	5128
60	4938	4752	4637	4494	4659	4663	4792	4917	5067	4929	4942	4805	4613	4604	4708	4915	4938
61	4744	4531	4411	4317	4472	4454	4581	4724	4871	4723	4635	4617	4420	4401	4445	4707	4744

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62	4550	4325	4184	4100	4253	4264	4349	4532	4657	4498	4392	4427	4223	4220	4155	4464	4550
63	4344	4106	3878	3898	4050	4062	4133	4330	4443	4290	4187	4234	3899	4010	3924	4239	4344
64	4124	3887	3631	3674	3837	3869	3900	4101	4234	4087	3993	4037	3652	3798	3707	4026	4124
65	3906	3669	3408	3391	3541	3661	3613	3880	3999	3880	3779	3782	3449	3515	3506	3793	3906
66	3703	3465	3209	3111	3231	3424	3380	3640	3777	3665	3546	3503	3210	3266	3285	3565	3703
67	3480	3231	2987	2779	2843	3127	3150	3409	3573	3431	3340	3305	2729	3076	3093	3326	3480
68	3277	2986	2781	2368	2468	2810	2954	3178	3353	3205	3129	3076	2347	2837	2877	3090	3277
69	3058	2776	2562	2019	2122	2446	2748	2958	3121	2988	2915	2686	2107	2375	2671	2872	3058
70	2827	2557	2345	1618	1649	2106	2547	2727	2901	2772	2676	2253	1804	2058	2467	2669	2827
71	2608	2336	2082	1260	1357	1724	2310	2483	2676	2552	2404	1991	1477	1776	2210	2448	2608
72	2400	2103	1791	1131	1188	1280	2066	2270	2453	2298	2198	1733	1193	1495	2000	2220	2400
73	2184	1905	1441	908	952	1136	1777	2046	2244	2041	1955	1404	914	1223	1810	2005	2184
74	1973	1679	1168	627	653	904	1477	1833	2044	1814	1535	1129	681	946	1471	1770	1973
75	1764	1443	817	352	379	655	1201	1625	1838	1631	1296	843	531	679	1204	1526	1764
76	1561	1257	688	258	254	386	825	1426	1650	1445	1054	643	354	515	1003	1343	1561
77	1367	1082	527	236	222	242	678	1189	1428	1238	805	482	245	378	737	1141	1367
78	1181	926	279	218	203	223	512	1013	1237	1075	581	320	224	238	552	978	1181
79	1005	749	193	192	178	196	330	853	1063	888	413	249	200	214	381	822	1005
80	836	573	164	180	165	176	172	711	877	710	287	214	176	195	272	665	836
81	659	368	150	160	142	159	153	536	720	515	188	197	158	171	174	533	659
82	521	260	135	138	124	133	130	375	578	371	162	169	135	153	150	373	521
83	394	150	117	125	106	117	124	216	439	248	137	154	119	124	128	249	394
84	282	93	83	101	86	101	109	143	325	151	127	145	89	117	110	148	282
85	207	86	88	90	70	88	88	88	217	92	106	122	75	105	95	93	207
86	128	72	73	72	51	79	81	68	139	79	97	105	61	79	73	46	128
87	89	63	51	57	41	62	58	63	81	74	77	85	58	64	68	65	89
88	52	52	44	47	33	37	44	45	61	66	63	66	34	56	61	47	52
89	47	28	31	38	18	40	40	42	49	56	59	59	17	34	36	35	47
90	44	32	29	37	0	20	28	29	38	35	38	42	0	24	32	27	44
91	26	33	30	38	0	20	25	32	36	38	29	31	14	29	29	23	26
92	34	33	26	37	0	21	26	32	29	33	26	27	0	25	33	23	34
93	36	30	26	34	0	19	28	26	29	27	27	30	0	16	28	23	36

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94	30	31	27	26	0	22	26	19	36	32	26	25	0	17	19	14	30
95	27	25	23	35	0	17	25	29	31	34	25	26	0	24	28	14	27
96	20	27	20	36	0	18	26	18	23	30	26	25	0	22	22	18	20
97	34	22	25	32	0	17	19	17	23	32	22	26	0	16	18	21	34
98	20	29	23	34	0	16	19	18	27	28	27	21	0	20	24	24	20
99	32	29	24	35	0	20	22	21	28	28	25	26	0	17	20	20	32
100	24	25	31	31	0	17	25	23	27	27	22	28	0	0	21	21	24
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124	26	25	23	27	0	17	22	15	28	25	24	26	0	20	25	20	26
125	21	28	28	31	0	16	26	18	29	27	23	28	0	23	22	22	21

Laboratory: Shenzhen Belling Test Laboratory A2LA Certificate# 4810.01
Building No3 3rd floor, room 303, No 2-10 south Jinlong avenue, Sand Lake community, Biling street, Pingshan district, Shenzhen, Guangdong,CN. Website: <http://www.blst.com>

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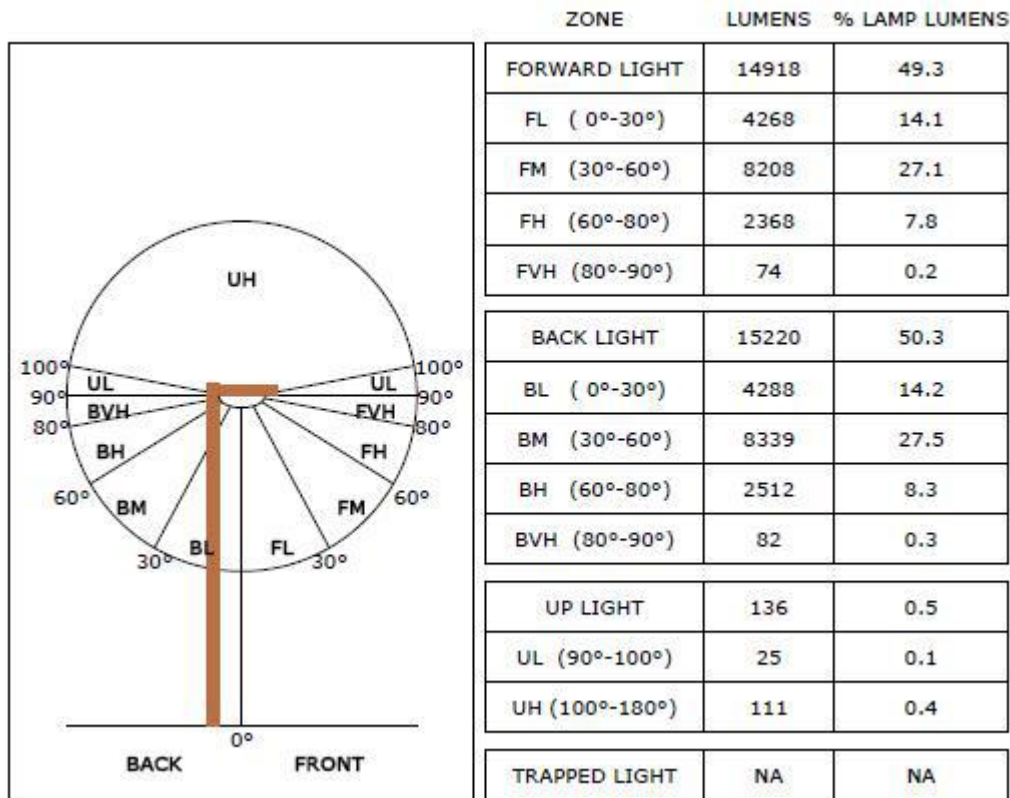


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178	37	30	25	35	13	26	32	21	30	27	35	34	20	31	23	30	37
179	24	35	30	38	0	17	29	28	28	25	30	32	16	29	31	27	24
180	20	30	39	29	0	22	25	22	32	30	34	32	16	26	27	21	20



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**2.2 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction BL-QP-033)*

Test date	2018-06-25	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLT-PHB03-220WRAC1		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC180602	120.0	60	1.873	223.61	0.9949	7.74
1E-G2	277.0	60	0.8120	218.07	0.9695	8.23
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	4
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	5644	R3	92	R11	81
Duv	0.00016	R4	82	R12	59
Chromaticity (x, y)	x=0.3292 y=0.3386	R5	82	R13	84
Chromaticity (u', v')	u(u')=0.2056 v'(v')=0.4758	R6	83	R14	96
Color Rendering Index (CRI)	82.8	R7	86	R15	77
R9	4	R8	67	--	--

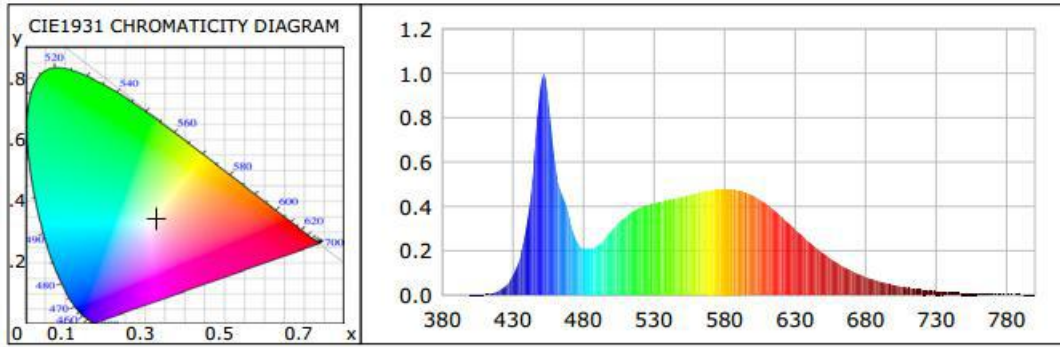
Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	30766.5	30566.9	>=10000(-10%)
Luminous Efficacy (lm/W)	137.59	140.17	Premium: >= 130(-3%)
Most worst Luminous/Highest Watts	136.70		



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Spectral Power Distribution & Chromaticity Diagram





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Calculated Efficacy Data for family models (5000K):

Model Number	Luminous Flux (lm)	Power (W)	Efficacy (lm/W)
BLT-PHB03-220WRAC1	30274.2	224.55	134.82
BLT-PHB03-220WRAC1	30407.7	224.08	135.70
BLT-PHB03-220WRAC1	30766.5	223.61	137.59



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3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometric 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 *****