

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014
- ☒ UL1598-2008

Prepared For

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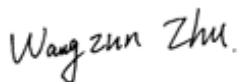
Test Date

2018/4/16

Issue Date

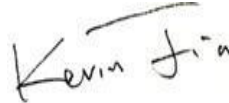
2018/4/16

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

The results contained in this report pertain only to the tested sample.

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1.0 Test Summary

DLC Technical Requirements v4.3

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements	Test value	Results (Fail/Pass)
Lamp Output (lm)	IES LM-79-2008	1000	3340	P
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥85%	100.00%	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	110	121.7	P
Allowable CCTs* (K)	IES LM-79-2008	5700	5110	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	65	71.6	P
Power Factor	ANSI C82.77:2014	0.873	0.929	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.73%	P

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/4/16	HBLED26/480	P1
2	Goniophotometer Test	2018/4/16	HBLED26/480	P1
3	THD and PF Test	2018/4/16	HBLED26/480	P1

Remark(If any)

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3.0 Production Description

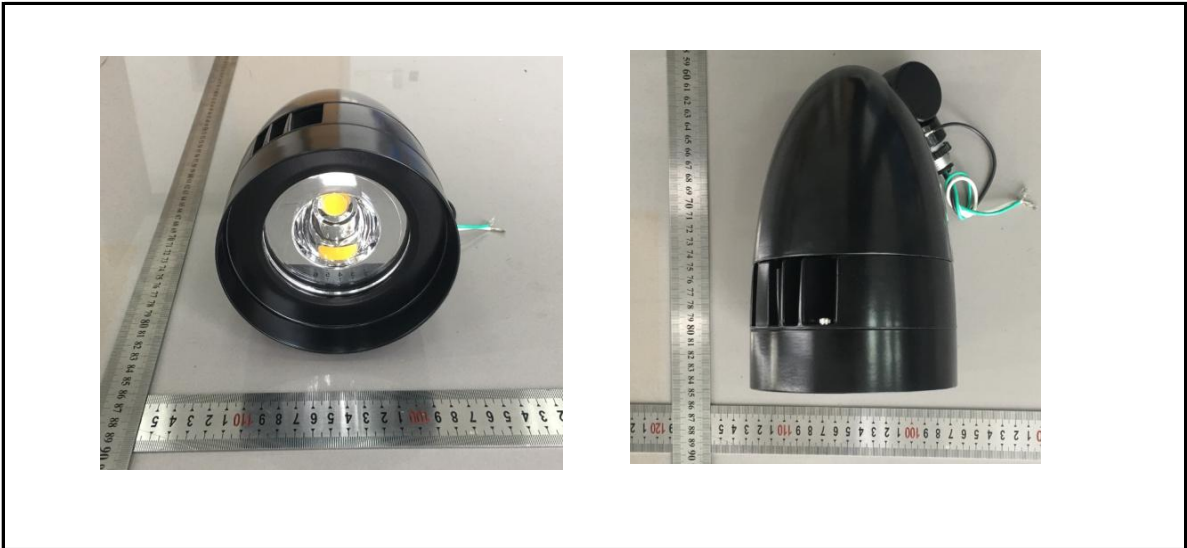
Luminaire Description:

Electrical Specification: 347V-480V,50/60HZ

Light source: LL725F1212-XXC

Manufacturer Of Light Source: Lustrous International Technology Company

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	HBLED26/480	Sample ID.	P1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.1	479.95	60	0.062	27.55	0.929

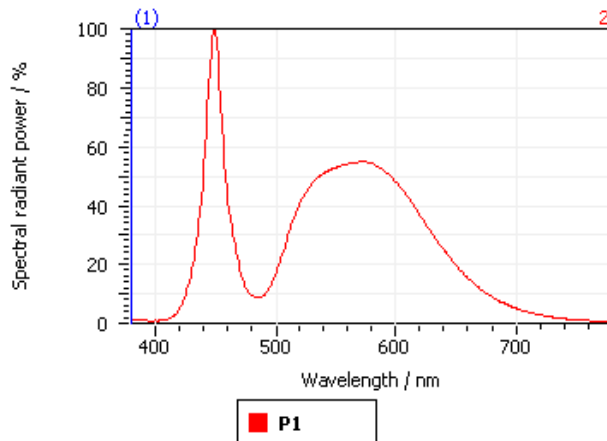
Test Result

CCT (K)	CRI (Ra)	Duv
5110	71.6	1.1E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

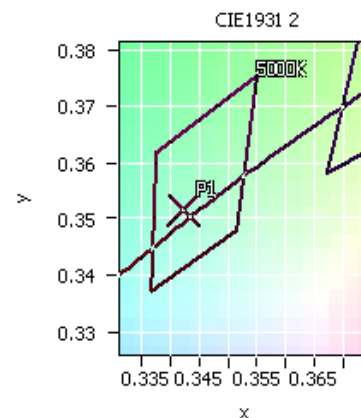
DominantWavelength	569.85 nm
Purity	0.082
PeakWavelength	449.11 nm
Width50%:	18.58 nm

Color Coordinates

Correlated Color Temperature 5110 K

x: 0.3423 u: 0.2095 u': 0.2095
y: 0.3515 v: 0.3228 v': 0.4842

ResultsCRICRI01	69.6	ResultsCRICRI09	-29.2
ResultsCRICRI02	76.7	ResultsCRICRI10	43.1
ResultsCRICRI03	80.3	ResultsCRICRI11	68.4
ResultsCRICRI04	72.1	ResultsCRICRI12	39.8
ResultsCRICRI05	69.9	ResultsCRICRI13	70.5
ResultsCRICRI06	66.8	ResultsCRICRI14	88.8
ResultsCRICRI07	80.5	ResultsCRICRI15	64.1
ResultsCRICRI08	57.0	ResultsCRICRI16	66.4
ResultsCRI	71.6		



Nominal CCT: 5000K

PlanckDistance 1.1E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	HBLED26/480	Sample ID.	P1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

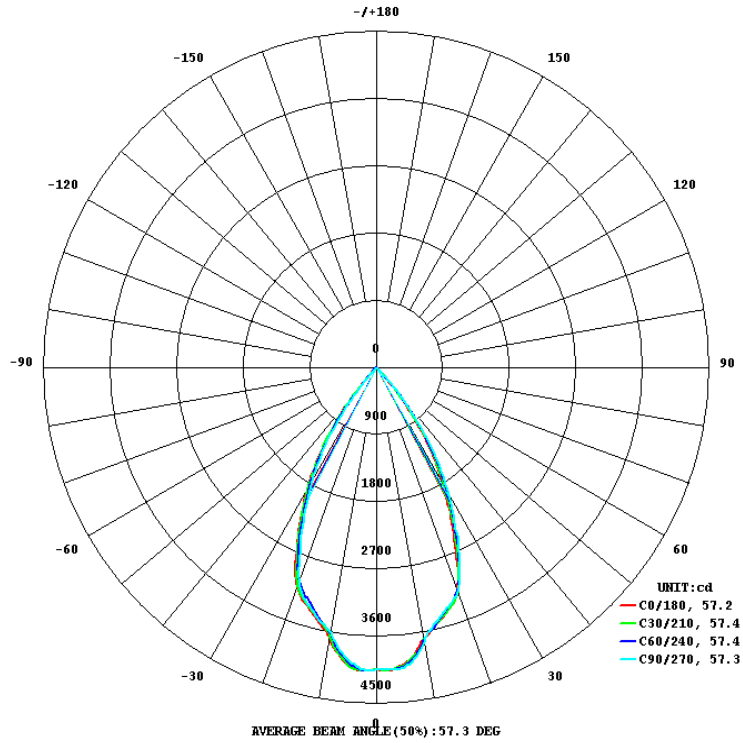
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.21	60	0.062	27.45	0.924	Light Down

Test Result

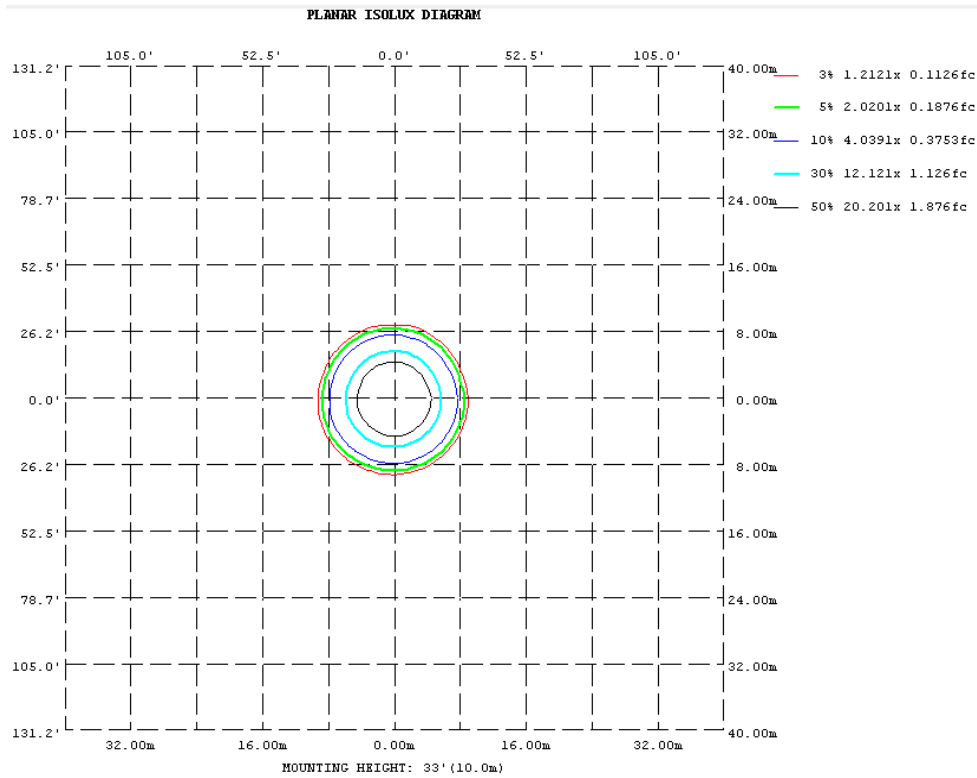
Flux(lm)	Zonal Lumen Requirement (0° - 90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3340	100.00%	81.8	82.1	57.3	57.2	121.7

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

°	C0	C45	C90	C135	C180	C225	C270	C315
10	3689	3710	3737	3761	3677	3639	3605	3604
20	3200	3210	3207	3199	3140	3089	3063	3054
30	1811	1879	1963	2008	1886	1841	1752	1682
40	486.1	535.4	596.0	665.6	570.9	523.5	431.1	388.9
50	10.67	13.27	13.52	17.29	15.60	13.64	8.760	8.244
60	1.454	1.385	1.536	1.562	1.375	1.246	1.176	1.457
70	0.7931	0.8503	0.3966	0.9559	0.8775	0.7538	0.2847	0.6936
80	0.0351	0.0468	0.1549	0.0555	0.0371	0.0429	0.0918	0.0346
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 3.5 %							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0 - 10	370.55	0 - 10	370.55	11.09%
10 - 20	956.27	0 - 20	1326.81	39.73%
20 - 30	1139.57	0 - 30	2466.38	73.84%
30 - 40	727.96	0 - 40	3194.34	95.64%
40 - 50	138.37	0 - 50	3332.71	99.78%
50 - 60	5.75	0 - 60	3338.45	99.95%
60 - 70	1.21	0 - 70	3339.66	99.99%
70 - 80	0.28	0 - 80	3339.94	100.00%
80 - 90	0.04	0 - 90	3339.98	100.00%
90 - 100	0.00	0 - 100	3339.98	100.00%
100 - 110	0.00	0 - 110	3339.98	100.00%
110 - 120	0.00	0 - 120	3339.98	100.00%
120 - 130	0.00	0 - 130	3339.98	100.00%
130 - 140	0.00	0 - 140	3339.98	100.00%
140 - 150	0.00	0 - 150	3339.98	100.00%
150 - 160	0.00	0 - 160	3339.98	100.00%
160 - 170	0.00	0 - 170	3339.98	100.00%
170 - 180	0.00	0 - 180	3339.98	100.00%

4.3 Goniophotometer Test

Axial Candela

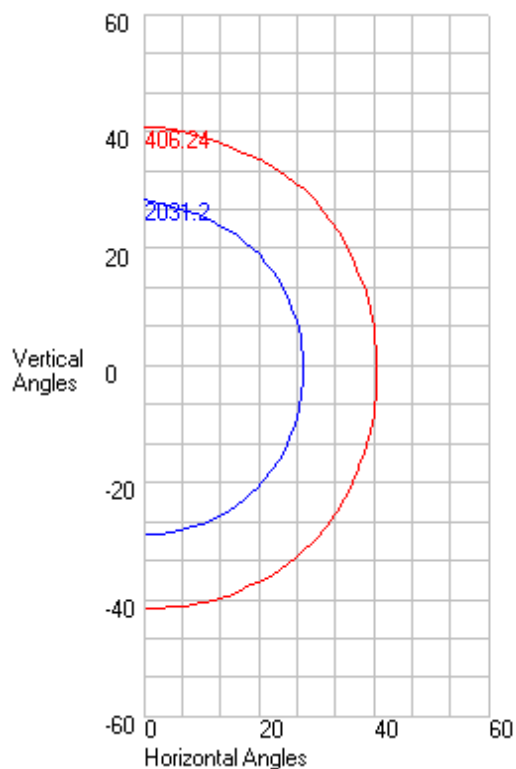
DEG.	HOR.	DEG.	VERT.
90	0.01	90	0.01
85	0.07	85	0.02
75	0.13	75	0.08
65	0.9	65	1.58
55	2.46	55	3.33
47.5	22.24	47.5	33.58
42.5	188.02	42.5	226.62
37.5	728.16	37.5	791.46
33	1350.9	33	1416.23
29	1879.38	29	1943.92
25.5	2316.73	25.5	2422.31
22.5	2712.06	22.5	2883.39
19.5	3111.55	19.5	3240.71
17	3278.96	17	3382.17
15	3361.46	15	3464.49
13	3468.49	13	3546.4
11	3553.85	11	3638.95
9	3693.76	9	3753.85
7	3850.91	7	3919.59
5	3969.3	5	3996.54
3	4040.68	3	4054.53
1	4054.44	1	4055.62
0	4043.609	0	4043.609
-1	4038.8	-1	4045.98
-3	4051.7	-3	4062.4
-5	4036.26	-5	4031.32
-7	3960.3	-7	3931.8
-9	3834.45	-9	3788.78
-11	3636.8	-11	3605.09
-13	3521.64	-13	3497.88
-15	3425.23	-15	3393.15
-17	3345.88	-17	3308.46
-19.5	3239.17	-19.5	3175.63
-22.5	2976.58	-22.5	2880.65
-25.5	2580.65	-25.5	2470.88
-29	2091.14	-29	2013.99
-33	1580.02	-33	1499.14
-37.5	934.3	-37.5	889.01
-42.5	296.68	-42.5	300.06
-47.5	30.48	-47.5	32.74
-55	4.26	-55	4.49
-65	1.18	-65	1.56
-75	0.2	-75	0.16
-85	0.12	-85	0.01
-90	0.01	-90	0.01

4.3 Goniophotometer Test

Characteristics

NEMA Type	5 H x 5 V
Maximum Candela	4062.4
Maximum Candela Angle	0 H -3 V
Horizontal Beam Angle (50%)	57.1
Vertical Beam Angle (50%)	57.2
Horizontal Field Angle (10%)	82.2
Vertical Field Angle (10%)	82.5
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	2327
Beam Efficiency	N.A.
Field Lumens	3243
Field Efficiency	N.A.
Spill Lumens	97
Luminaire Lumens	3340
Total Efficiency	N.A.
Total Luminaire Watts	27.4435
Ballast Factor	1

ISOCANDELA CURVES



Axial Candela

	0	1	3	5	7	9	11	13	15	17	19.5	22.5	25.5	29	33	37.5	42.5	47.5	55	65	75	85	90
90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.008	0.005	0.002	0	0	0.003	0.01	0.01	0.01
85	0.02	0.019	0.018	0.017	0.015	0.014	0.013	0.011	0.01	0.011	0.011	0.011	0.01	0.01	0.012	0.015	0.018	0.022	0.025	0.028	0.016	0.01	0.01
75	0.08	0.079	0.076	0.073	0.069	0.066	0.063	0.061	0.06	0.057	0.055	0.054	0.05	0.05	0.043	0.044	0.04	0.034	0.031	0.04	0.051	0.016	0.01
65	1.58	1.577	1.571	1.556	1.539	1.519	1.493	1.437	1.375	1.314	1.232	1.124	0.937	0.872	0.789	0.398	0.183	0.131	0.068	0.057	0.057	0.056	0.01
55	3.33	3.275	3.164	2.922	2.729	2.549	2.393	2.251	2.167	2.023	1.782	1.592	1.531	1.469	1.464	1.506	1.497	0.938	0.214	0.088	0.064	0.065	0.01
47.5	33.58	33.066	32.038	28.527	25.539	22.304	19.018	15.583	11.547	8.649	7.28	5.83	4.37	3.855	2.372	1.623	1.397	1.343	0.774	0.113	0.075	0.065	0.01
42.5	226.62	222.044	212.905	189.705	169.503	148.245	127.906	112.683	93.734	70.464	50.978	33.347	20.285	8.48	5.162	3.425	1.578	1.327	0.999	0.154	0.086	0.065	0.01
37.5	791.46	778.481	739.458	690.541	637.386	561.298	504.896	444.55	378.394	312.347	239.897	167.992	105.741	45.648	18.227	6.722	3.331	1.417	1.206	0.25	0.091	0.066	0.01
33	1416.23	1399.21	1347.67	1284.08	1208.23	1140.38	1070.89	975.279	880.188	775.69	637.516	467.986	305.334	172.06	61.063	17.041	5.779	1.816	1.234	0.286	0.099	0.066	0.01
29	1943.92	1924.63	1867.96	1798.96	1715.58	1644.80	1565.82	1478.28	1363.77	1242.97	1075.99	869.155	633.153	392.691	174.195	37.886	8.052	3.654	1.254	0.307	0.105	0.067	0.01
25.5	2422.31	2397.49	2325.65	2245.08	2159.70	2082.58	1985.79	1873.52	1758.42	1633.84	1455.20	1212.61	951.659	641.794	319.144	102.878	16.14	4.891	1.285	0.342	0.107	0.067	0.01
22.5	2883.39	2851.76	2757.55	2648.00	2547.83	2443.77	2325.45	2216.56	2094.56	1944.47	1754.90	1503.05	1223.24	890.315	489.413	174.627	23.68	7.022	1.33	0.528	0.115	0.067	0.01
19.5	3240.71	3221.65	3161.81	3076.98	2988.51	2862.69	2715.21	2570.63	2405.99	2241.55	2034.21	1764.63	1476.56	1102.28	666.439	262.809	34.643	7.594	1.376	0.79	0.12	0.068	0.01
17	3382.17	3366.24	3320.63	3273.82	3232.28	3154.22	3040.80	2873.95	2684.74	2492.65	2247.97	1960.04	1660.03	1276.06	810.511	344.217	63.025	8.728	1.416	0.826	0.121	0.068	0.01
15	3464.49	3451.23	3413.65	3376.24	3335.81	3281.10	3205.79	3082.90	2920.39	2687.29	2426.75	2110.06	1790.94	1401.74	918.832	415.368	91.837	10.696	1.455	0.85	0.122	0.068	0.01
13	3546.4	3531.40	3487.15	3452.69	3412.19	3356.63	3293.67	3211.49	3082.35	2878.53	2587.46	2237.53	1909.79	1521.62	1017.77	481.2 *	118.135	13.313	1.494	0.863	0.123	0.069	0.01
11	3638.95	3617.68	3564.07	3533.69	3488.29	3419.67	3349.25	3286.54	3194.49	3042.12	2723.72	2368.33	2021.68	1610.63	1116.49	543.052	136.871	15.631	1.557	0.874	0.124	0.069	0.01
9	3753.85	3716.87	3640.65	3601.18	3547.02	3484.09	3410.45	3336.52	3260.41	3138.80	2868.04	2488.52	2112.92	1693.24	1188.98	598.919	155.384	17.611	1.627	0.882	0.125	0.069	0.01
7	3919.59	3872.44	3782.40	3687.54	3610.88	3543.85	3472.57	3382.99	3306.24	3203.27	2981.99	2576.27	2185.34	1761.38	1241.75	651.609	169.645	19.249	1.93	0.889	0.126	0.069	0.01
5	3996.54	3965.58	3910.18	3840.23	3706.47	3591.41	3517.37	3426.1	3338.76	3242.67	3050.10	2636.23	2241.79	1813.6	1290.75	683.052	179.768	20.538	2.171	0.894	0.127	0.069	0.01
3	4054.53	4018.96	3997.55	3920.57	3804.54	3633.88	3538.40	3454.42	3358.81	3266.50	3090.08	2680.02	2284.88	1851.13	1325.70	709.812	189.953	21.87	2.432	0.9	0.128	0.07	0.01
1	4055.62	4056.04	4030.98	3966.78	3846.93	3683.13	3555.01	3468.88	3365.06	3279.28	3111.65	2709.25	2313.23	1875.99	1348.05	726.405	188.665	22.117	2.451	0.9	0.129	0.07	0.01
0	4043.60	4054.44	4040.68	3969.3	3850.91	3693.76	3553.85	3468.49	3361.46	3278.96	3111.55	2712.06	2316.73	1879.38	1350.9	728.16	188.02	22.24	2.46	0.9	0.13	0.07	0.01
-1	4045.98	4051.47	4041.86	3976.45	3855.93	3699.20	3556.48	3465.55	3358.38	3273.90	3109.64	2716.88	2321.16	1882.2	1354.52	731.673	190.079	22.222	2.475	0.9	0.129	0.07	0.01
-3	4062.4	4057.99	4034.07	3951.89	3833.09	3661.91	3538.75	3442.49	3336.45	3251.93	3085.63	2702.24	2306.69	1869.87	1345.13	725.458	194.189	22.187	2.505	0.901	0.128	0.069	0.01
-5	4031.32	4027.53	3992.40	3899.10	3776.53	3600.96	3504.58	3408.92	3302.48	3221.71	3047.89	2671.77	2272.37	1845.22	1323.09	708.662	186.411	21.117	2.295	0.896	0.127	0.069	0.01
-7	3931.8	3932.70	3883.87	3804.53	3649.86	3542.24	3454.74	3356.55	3259.13	3179.33	2992.93	2617.77	2227.89	1806.29	1286.99	686.649	178.376	20.126	2.107	0.891	0.126	0.069	0.01
-9	3788.78	3789.51	3737.42	3631.18	3549.40	3473.85	3396.25	3295.29	3213.38	3119.32	2917.02	2552.50	2167.65	1751.25	1247.00	641.353	165.646	18.853	1.86	0.885	0.125	0.068	0.01
-11	3605.09	3605.24	3580.30	3531.44	3473.91	3406.62	3326.62	3252.14	3175.01	3046.59	2800.37	2455.76	2095.79	1680.78	1185.92	591.948	147.972	17.319	1.696	0.877	0.124	0.068	0.01
-13	3497.88	3495.39	3472.60	3437.66	3392.02	3333.91	3272.17	3205.01	3098.33	2944.29	2674.51	2326.33	2002.34	1603.68	1096.18	532.937	129.601	15.546	1.464	0.867	0.123	0.068	0.01
-15	3393.15	3394.16	3384.40	3359.54	3318.02	3270.52	3211.09	3116.78	2986.80	2791.82	2549.91	2203.69	1892.76	1494.47	1006.34	467.38	102.726	13.551	1.406	0.855	0.122	0.067	0.01
-17	3308.46	3307.84	3295.77	3270.78	3233.80	3186.29	3100.99	2976.06	2806.67	2634.05	2372.38	2084.24	1771.10	1379.55	906.688	398.013	74.014	11.386	1.355	0.835	0.12	0.067	0.01
-19.5	3175.63	3175.11	3158.26	3128.33	3073.03	2990.96	2869.18	2716.23	2579.27	2388.88	2168.99	1898.63	1601.38	1221.74	769.61	316.368	45.885	9.729	1.297	0.807	0.117	0.067	0.01
-22.5	2880.65	2876.96	2840.69	2785.78	2704.59	2623.58	2529.31	2391.30	2245.02	2113.11	1914.36	1656.94	1367.96	1021.77	592.808	210.203	28.662	8.732	1.24	0.663	0.112	0.066	0.01
-25.5	2470.88	2468.89	2441.47	2395.00	2326.31	2245.21	2165.16	2068.70	1948.02	1816.39	1632.79	1383.44	1116.69	776.933	408.807	128.254	19.35	6.996	1.199	0.547	0.107	0.066	0.01
-29	2013.99	2012.54	1991.80	1956.71	1908.13	1846.79	1767.21	1680.71	1562.28	1437.93	1267.08	1050.50	790.076	516.186	227.746	48.717	12.784	4.93	1.16	0.313	0.105	0.065	0.01
-33	1499.14	1497.74	1478.29	1446.16	1400.09	1350.08	1279.66	1183.34	1085.61	979.287	823.709	629.704	435.82	239.487	77.823	20.131	8.378	2.751	1.167	0.277	0.094	0.065	0.01
-37.5	889.01	888.146	872.912	847.744	818.581	764.244	701.889	631.922	554.901	471.699	373.161	245.694	150.035	52.51	20.565	9.817	4.847	1.374	1.187	0.244	0.091	0.064	0.01
-42.5	300.06	299.034	296.985	275.149	254.7	229.082	201.41	179.691	148.756	106.329	62.951	33.359	21.724	14.642	8.863	5.305	1.505	1.214	1.063	0.186	0.08	0.063	0.01
-47.5	32.74	32.534	32.122	30.154	28.326	25.691	22.196	19.462	17.526	15.783	13.16	10.131	8.181	6.081	3.594	1.482	1.229	1.236	0.825	0.125	0.069	0.063	0.01
-55	4.49	4.505	4.536	4.39	4.231	3.988	3.637	3.192	2.51	1.936	1.585	1.439	1.312	1.24	1.197	1.286	1.295	0.969	0.228	0.086	0.056	0.062	0.01
-65	1.56	1.548	1.523	1.5	1.476	1.452	1.427	1.398	1.379	1.352	1.312	1.242	1.092	0.983	0.802	0.726	0.33	0.166	0.079	0.057	0.052	0.056	0.01
-75	0.16	0.159	0.158	0.157	0.148	0.142	0.136	0.127	0.12	0.102	0.081	0.07	0.07	0.062	0.06	0.05	0.05	0.043	0.037	0.038	0.041	0.016	0.01
-85	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.013	0.015	0.017	0.019	0.02	0.02	0.02	0.021	0.02	0.027	0.016	0.01	0.01
-90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.007	0	0.007	0.01

LUMEN TABULATION

	0	1	3	5	7	9	11	13	15	17	20	23	26	29	33	38	43	48	55	65	75	85	90	Total
90		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
85		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
75		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
65		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
55		0	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
47.5		0.2	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	
42.5		0.77 *	1.52 *	1.45 *	1.36 *	1.3	1.1	1	0.9	0.7	0.7	0.6	0.4	0.2	0.1	0.1	0	0	0	0	0	0	0	
37.5		1.51 *	2.97 *	2.87 *	2.74 *	2.58 *	2.41 *	2.21 *	1.98 *	1.75 *	1.83 *	1.7	1.2	0.8	0.4	0.2	0.1	0	0	0	0	0	0	
33		2.04 *	4.03 *	3.93 *	3.78 *	3.62 *	3.45 *	3.23 *	2.98 *	2.71 *	2.97 *	2.91 *	2.18 *	1.7	1	0.4	0.1	0	0	0	0	0	0	
29		2.32 *	4.59 *	4.48 *	4.34 *	4.18 *	4.00 *	3.79 *	3.54 *	3.26 *	3.66 *	3.75 *	2.97 *	2.48 *	1.7	0.7	0.2	0	0	0	0	0	0	
25.5		2.42 *	4.77 *	4.65 *	4.51 *	4.35 *	4.16 *	3.94 *	3.70 *	3.44 *	3.90 *	4.05 *	3.32 *	2.93 *	2.12 *	1.1	0.3	0.1	0	0	0	0	0	
22.5		2.79 *	5.53 *	5.41 *	5.26 *	5.08 *	4.86 *	4.60 *	4.32 *	4.02 *	4.57 *	4.78 *	3.99 *	3.64 *	2.78 *	1.6	0.5	0.1	0	0	0	0	0	
19.5		2.52 *	5.00 *	4.94 *	4.85 *	4.72 *	4.55 *	4.33 *	4.07 *	3.78 *	4.30 *	4.51 *	3.80 *	3.52 *	2.80 *	1.70 *	0.6	0.1	0	0	0	0	0	
17		2.08 *	4.14 *	4.10 *	4.05 *	3.98 *	3.87 *	3.73 *	3.54 *	3.30 *	3.75 *	3.94 *	3.32 *	3.11 *	2.53 *	1.60 *	0.7	0.1	0	0	0	0	0	
15		2.13 *	4.24 *	4.20 *	4.15 *	4.08 *	3.99 *	3.88 *	3.72 *	3.50 *	4.00 *	4.21 *	3.55 *	3.35 *	2.77 *	1.81 *	0.8	0.2	0	0	0	0	0	
13		2.19 *	4.34 *	4.30 *	4.24 *	4.16 *	4.07 *	3.97 *	3.84 *	3.66 *	4.22 *	4.45 *	3.77 *	3.55 *	2.98 *	2.00 *	0.9	0.2	0	0	0	0	0	
11		2.25 *	4.46 *	4.40 *	4.33 *	4.24 *	4.14 *	4.04 *	3.91 *	3.76 *	4.39 *	4.67 *	3.95 *	3.73 *	3.16 *	2.17 *	1	0.2	0	0	0	0	0	
9		2.33 *	4.62 *	4.54 *	4.44 *	4.33 *	4.21 *	4.10 *	3.97 *	3.83 *	4.51 *	4.84 *	4.11 *	3.88 *	3.30 *	2.30 *	1.1	0.2	0	0	0	0	0	
7		2.41 *	4.77 *	4.69 *	4.57 *	4.42 *	4.28 *	4.15 *	4.02 *	3.87 *	4.59 *	4.97 *	4.23 *	4.01 *	3.42 *	2.41 *	1.15 *	0.3	0	0	0	0	0	
5		2.45 *	4.86 *	4.80 *	4.69 *	4.52 *	4.34 *	4.19 *	4.05 *	3.91 *	4.65 *	5.06 *	4.33 *	4.10 *	3.51 *	2.49 *	1.21 *	0.3	0	0	0	0	0	
3		2.47 *	4.91 *	4.87 *	4.76 *	4.59 *	4.39 *	4.22 *	4.07 *	3.92 *	4.68 *	5.11 *	4.39 *	4.17 *	3.57 *	2.54 *	1.24 *	0.3	0	0	0	0	0	
1		1.23 *	2.46 *	2.44 *	2.39 *	2.31 *	2.21 *	2.11 *	2.04 *	1.96 *	2.35 *	2.57 *	2.21 *	2.10 *	1.80 *	1.28 *	0.63 *	0.1	0	0	0	0	0	
0																								

-1	1.23 *	2.46 *	2.45 *	2.40 *	2.31 *	2.21 *	2.11 *	2.04 *	1.96 *	2.34 *	2.57 *	2.21 *	2.10 *	1.80 *	1.29 *	0.63 *	0.2	0	0	0	0	0	
-3	2.47 *	4.93 *	4.89 *	4.78 *	4.61 *	4.40 *	4.21 *	4.06 *	3.91 *	4.67 *	5.12 *	4.41 *	4.19 *	3.59 *	2.56 *	1.26 *	0.3	0	0	0	0	0	
-5	2.46 *	4.91 *	4.85 *	4.73 *	4.55 *	4.35 *	4.18 *	4.03 *	3.88 *	4.63 *	5.07 *	4.36 *	4.15 *	3.55 *	2.53 *	1.23 *	0.3	0	0	0	0	0	
-7	2.43 *	4.84 *	4.76 *	4.63 *	4.45 *	4.28 *	4.13 *	3.99 *	3.85 *	4.58 *	5.00 *	4.28 *	4.07 *	3.49 *	2.47 *	1.19 *	0.3	0	0	0	0	0	
-9	2.35 *	4.69 *	4.62 *	4.49 *	4.33 *	4.20 *	4.07 *	3.93 *	3.80 *	4.51 *	4.89 *	4.17 *	3.96 *	3.39 *	2.38 *	1.13 *	0.3	0	0	0	0	0	
-11	2.25 *	4.50 *	4.44 *	4.34 *	4.22 *	4.11 *	4.00 *	3.87 *	3.74 *	4.41 *	4.74 *	4.03 *	3.83 *	3.27 *	2.26 *	1.1	0.2	0	0	0	0	0	
-13	2.16 *	4.32 *	4.28 *	4.22 *	4.13 *	4.03 *	3.93 *	3.81 *	3.66 *	4.27 *	4.55 *	3.87 *	3.67 *	3.11 *	2.11 *	1	0.2	0	0	0	0	0	
-15	2.10 *	4.20 *	4.17 *	4.12 *	4.04 *	3.96 *	3.86 *	3.73 *	3.55 *	4.09 *	4.33 *	3.68 *	3.49 *	2.91 *	1.93 *	0.9	0.2	0	0	0	0	0	
-17	2.04 *	4.08 *	4.06 *	4.02 *	3.96 *	3.87 *	3.75 *	3.59 *	3.38 *	3.87 *	4.08 *	3.47 *	3.28 *	2.69 *	1.74 *	0.7	0.1	0	0	0	0	0	
-20	2.47 *	4.94 *	4.91 *	4.86 *	4.77 *	4.63 *	4.45 *	4.21 *	3.93 *	4.49 *	4.73 *	4.02 *	3.76 *	3.03 *	1.90 *	0.8	0.1	0	0	0	0	0	
-23	2.77 *	5.54 *	5.50 *	5.42 *	5.27 *	5.07 *	4.83 *	4.55 *	4.24 *	4.84 *	5.11 *	4.31 *	3.96 *	3.09 *	1.83 *	0.7	0.1	0	0	0	0	0	
-26	2.45 *	4.89 *	4.86 *	4.77 *	4.61 *	4.43 *	4.21 *	3.97 *	3.70 *	4.22 *	4.43 *	3.67 *	3.28 *	2.44 *	1.3	0.4	0.1	0	0	0	0	0	
-29	2.39 *	4.79 *	4.75 *	4.67 *	4.54 *	4.35 *	4.14 *	3.89 *	3.61 *	4.09 *	4.22 *	3.40 *	2.91 *	2.01 *	1	0.3	0.1	0	0	0	0	0	
-33	2.14 *	4.29 *	4.26 *	4.18 *	4.07 *	3.90 *	3.68 *	3.42 *	3.13 *	3.47 *	3.47 *	2.67 *	2.13 *	1.3	0.6	0.2	0	0	0	0	0	0	
-38	1.64 *	3.28 *	3.25 *	3.19 *	3.09 *	2.93 *	2.72 *	2.47 *	2.20 *	2.36 *	2.23 *	1.6	1.1	0.6	0.2	0.1	0	0	0	0	0	0	
-43	0.91 *	1.83 *	1.81 *	1.76 *	1.68 *	1.56 *	1.42 *	1.3	1.1	1.1	0.9	0.6	0.4	0.2	0.1	0	0	0	0	0	0	0	
-48	0.3	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0	0	0	0	0	0	0	0	
-55	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	
-65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	69	137	135	132	128	123	118	112	106	121	128	107	98	79	51	22	4.7	0.9	0.2	0.1	0	0	1670

5.0 THD and PF Test

Model No.	HBLED26/480	Sample ID.	P1
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Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.1	479.95	60	0.062	27.55	0.929	5.72%
25.1	346.97	60	0.080	27.51	0.994	9.73%

6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last	Calibration Due
DLF107	Integrating Sphere System	2017/12/28	2018/12/27
DLF108	Auxiliary Lamp	2017/12/28	2018/12/27
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2017/12/28	2018/12/27
DLF116	AC Power Source	2017/12/28	2018/12/27
DLF113	Power Meter	2017/12/28	2018/12/27
DLF112	Temperature Recorder	2017/12/28	2018/12/27
DLF114	Temperature & Humidity Datalogger	2017/12/28	2018/12/27
DLF101	Goniophotometer	2017/12/28	2018/12/27
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2017/12/28	2018/12/27
DLF104	AC Power Source	2017/12/28	2018/12/27
DLF507	DC Power Source	2017/12/28	2018/12/27
DLF102	Power Meter	2017/12/28	2018/12/27
DLF111	Temperature & Humidity Datalogger	2017/12/28	2018/12/27
DLF119	Power Meter	2017/12/28	2018/12/27
DLF031	Temperature data logger	2017/12/28	2018/12/27
DLF022	Digital power meter	2017/12/28	2018/12/27
DLF003	Temperature & Humidity Datalogger	2017/12/28	2018/12/27

***** End of Test Report*****