

Photometric Test Report

Relevant Standards

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

Prepared For

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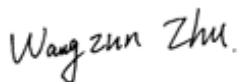
Test Date

2018/4/16

Issue Date

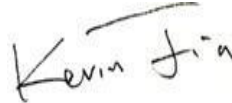
2018/4/16

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	3364	P
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥85%	100.00%	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	110	123.5	P
Allowable CCTs* (K)	IES LM-79-2008	5700	4048	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	65	70.6	P
Power Factor	ANSI C82.77:2014	0.873	0.930	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.68%	P

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/4/16	HBLED26N/480	M1
2	Goniophotometer Test	2018/4/16	HBLED26N/480	M1
3	THD and PF Test	2018/4/16	HBLED26N/480	M1

Remark(If any)

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3.0 Production Description

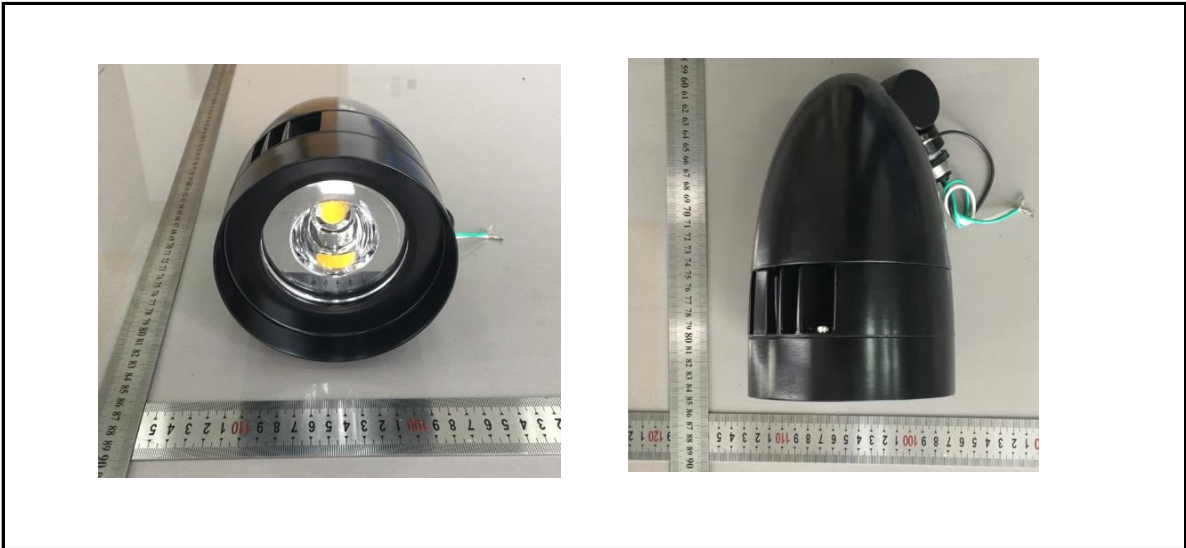
Luminaire Description:

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.	HBLED26N/480	Sample ID.	M1
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	479.97	60	0.061	27.24	0.930

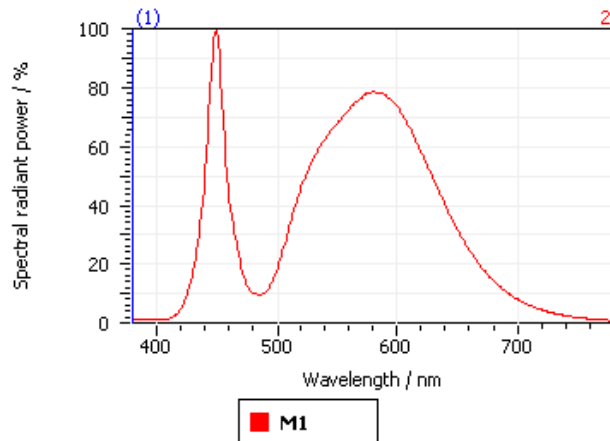
Test Result

CCT (K)	CRI (Ra)	Duv
4048	70.6	1.6E-04

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

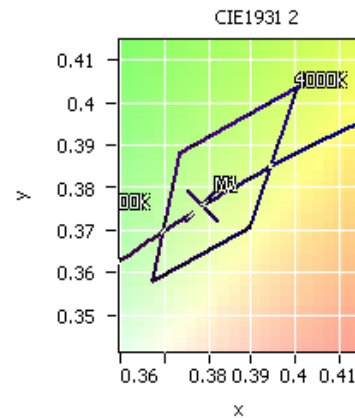
DominantWavelength	578.80 nm
Purity	0.264
PeakWavelength	449.30 nm
Width50%:	18.44 nm

Color Coordinates

Correlated Color Temperature 4048 K

x: 0.3785	u: 0.2242	u': 0.2242
y: 0.3759	v: 0.3339	v': 0.5009

ResultsCRICRI01	67.5	ResultsCRICRI09	-32.7
ResultsCRICRI02	78.0	ResultsCRICRI10	46.9
ResultsCRICRI03	85.1	ResultsCRICRI11	62.6
ResultsCRICRI04	68.5	ResultsCRICRI12	37.7
ResultsCRICRI05	66.7	ResultsCRICRI13	69.3
ResultsCRICRI06	67.9	ResultsCRICRI14	91.5
ResultsCRICRI07	80.2	ResultsCRICRI15	61.3
ResultsCRICRI08	51.0	ResultsCRICRI16	62.4
ResultsCRI	70.6		



Nominal CCT: 4000K

PlanckDistance 1.6E-004

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	HBLED26N/480	Sample ID.	M1
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

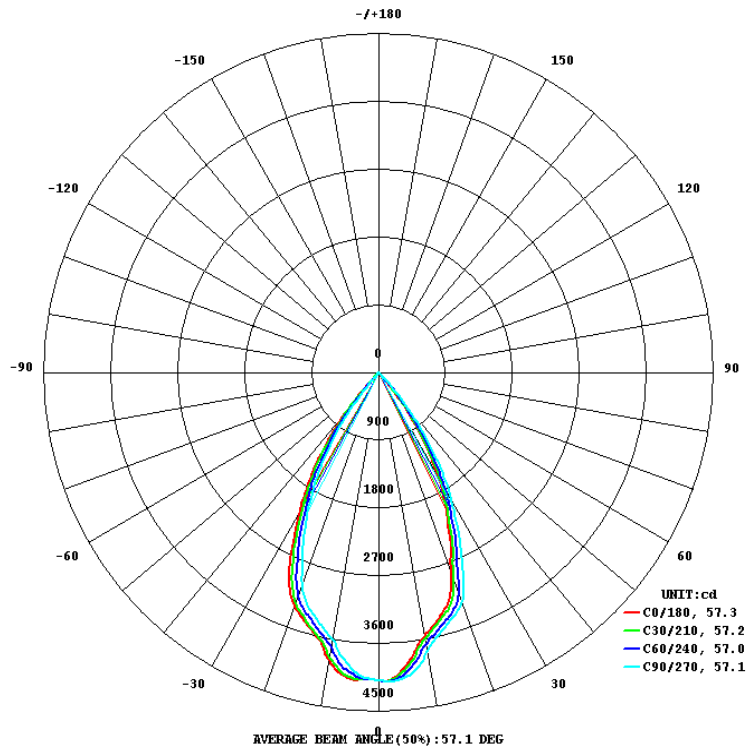
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.02	60	0.061	27.23	0.926	Light Down

Test Result

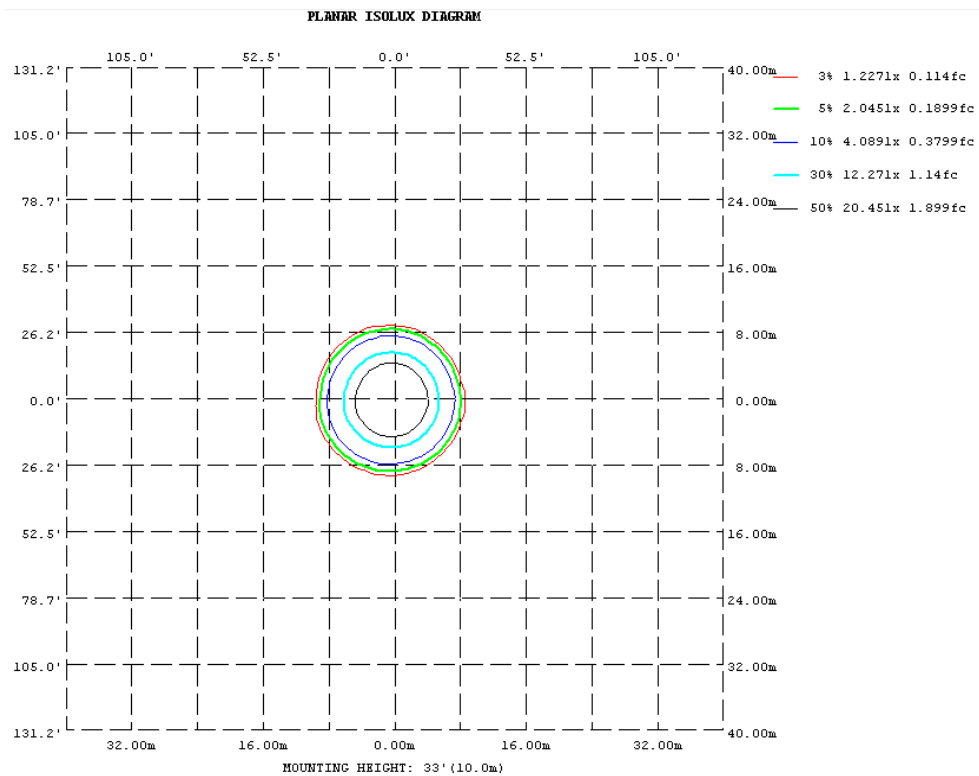
Flux(lm)	Zonal Lumen Requirement (0° - 90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3364	100.00%	81.7	82.0	57.1	57.3	123.5

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	3551	3620	3756	3909	3882	3778	3600	3514
20	2876	3048	3256	3321	3311	3221	3020	2799
30	1617	1728	1977	2213	2153	1987	1749	1574
40	314.2	392.2	580.9	824.4	772.9	640.7	435.8	282.1
50	9.319	10.02	14.75	25.45	22.55	20.50	12.04	10.84
60	1.337	1.447	1.681	1.637	1.632	1.727	1.452	1.393
70	0.5550	0.7515	0.2968	0.9564	0.9917	0.9112	0.2920	0.3150
80	0.0279	0.0355	0.0832	0.0545	0.0399	0.0428	0.0716	0.0305
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	371.38	0 - 10	371.38	11.04%
10 - 20	957.23	0 - 20	1328.61	39.49%
20 - 30	1142.26	0 - 30	2470.87	73.45%
30 - 40	737.58	0 - 40	3208.45	95.37%
40 - 50	147.22	0 - 50	3355.67	99.75%
50 - 60	6.78	0 - 60	3362.45	99.95%
60 - 70	1.30	0 - 70	3363.75	99.99%
70 - 80	0.28	0 - 80	3364.03	100.00%
80 - 90	0.03	0 - 90	3364.06	100.00%
90 - 100	0.00	0 - 100	3364.06	100.00%
100 - 110	0.00	0 - 110	3364.06	100.00%
110 - 120	0.00	0 - 120	3364.06	100.00%
120 - 130	0.00	0 - 130	3364.06	100.00%
130 - 140	0.00	0 - 140	3364.06	100.00%
140 - 150	0.00	0 - 150	3364.06	100.00%
150 - 160	0.00	0 - 160	3364.06	100.00%
160 - 170	0.00	0 - 170	3364.06	100.00%
170 - 180	0.00	0 - 180	3364.06	100.00%

4.3 Goniophotometer Test

Axial Candela

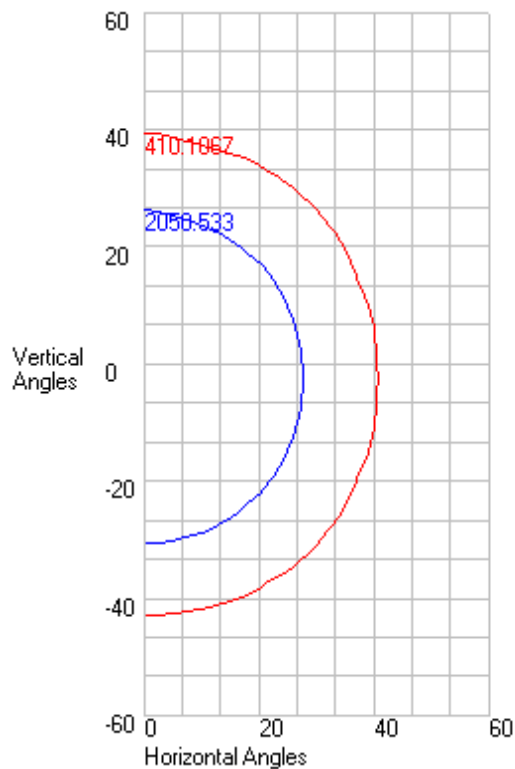
DEG.	HOR.	DEG.	VERT.
90	0	90	0.01
85	0.05	85	0.01
75	0.12	75	0.05
65	1.05	65	1.29
55	3.24	55	1.94
47.5	24.17	47.5	17.08
42.5	214.68	42.5	133.92
37.5	743.23	37.5	599.94
33	1364.95	33	1191.09
29	1872.07	29	1744.63
25.5	2307.95	25.5	2160.57
22.5	2684.91	22.5	2560.41
19.5	3071.99	19.5	2954.51
17	3250.63	17	3197.01
15	3348.11	15	3307.5
13	3447.66	13	3407.02
11	3549.91	11	3499.61
9	3688.59	9	3608.98
7	3836.56	7	3794.29
5	3968.74	5	3942.84
3	4042.52	3	4050.41
1	4079.74	1	4097.53
0	4088.124	0	4088.124
-1	4093.87	-1	4077.4
-3	4099.7	-3	4076.11
-5	4061.12	-5	4092.09
-7	3980.84	-7	4039.49
-9	3862.3	-9	3942.72
-11	3683.99	-11	3812.78
-13	3577.96	-13	3624.72
-15	3479.66	-15	3532.44
-17	3401.34	-17	3441.44
-19.5	3288.69	-19.5	3336.52
-22.5	3017.2	-22.5	3133.55
-25.5	2574.83	-25.5	2767.13
-29	2104.61	-29	2278.01
-33	1573.59	-33	1748.15
-37.5	927.46	-37.5	1115.09
-42.5	307.89	-42.5	454.31
-47.5	43.42	-47.5	63.73
-55	5.32	-55	5.76
-65	1.3	-65	1.49
-75	0.13	-75	0.19
-85	0.06	-85	0.01
-90	0.01	-90	0.01

4.3 Goniophotometer Test

Characteristics

NEMA Type	5 H x 5 V
Maximum Candela	4101.067
Maximum Candela Angle	-1 H 1 V
Horizontal Beam Angle (50%)	56.8
Vertical Beam Angle (50%)	57.3
Horizontal Field Angle (10%)	82.3
Vertical Field Angle (10%)	82.7
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	2317
Beam Efficiency	N.A.
Field Lumens	3258
Field Efficiency	N.A.
Spill Lumens	106
Luminaire Lumens	3364
Total Efficiency	N.A.
Total Luminaire Watts	27.2302
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	0	0	0
85	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	0.012	0.017	0.021	0.01	0	0
75	0.05	0.05	0.05	0.05	0.049	0.048	0.046	0.043	0.04	0.042	0.043	0.044	0.04	0.04	0.043	0.039	0.039	0.032	0.027	0.028	0.031	0.014	0
65	1.29	1.277	1.25	1.202	1.156	1.105	1.051	1.007	0.977	0.933	0.868	0.827	0.794	0.739	0.627	0.223	0.21	0.122	0.067	0.047	0.041	0.035	0
55	1.94	1.935	1.925	1.885	1.847	1.802	1.753	1.701	1.645	1.598	1.545	1.462	1.408	1.397	1.334	1.348	1.229	0.852	0.234	0.082	0.044	0.037	0
47.5	17.08	16.912	16.576	15.16	13.906	12.526	10.921	10.486	9.767	8.964	7.172	5.988	4.203	2.363	1.876	1.57	1.383	1.338	0.852	0.107	0.057	0.043	0
42.5	133.92	130.099	122.467	103.938	85.974	66.723	49.818	39.288	32.194	27.894	22.9	17.621	13.635	10.317	5.849	2.363	1.626	1.379	1.075	0.183	0.066	0.045	0
37.5	599.94	589.539	557.021	515.436	469.754	402.956	355.931	307.003	255.796	208.379	158.539	86.135	39.418	25.404	14.817	7.58	2.72	1.571	1.314	0.261	0.078	0.046	0
33	1191.09	1179.62	1140.73	1089.52	1024.38	965.642	905.997	818.778	730.014	633.06	502.071	347.288	214.786	100.903	31.802	15.635	6.144	1.894	1.345	0.291	0.084	0.046	0
29	1744.63	1729.07	1679.99	1618.49	1540.93	1473.99	1400.83	1322.02	1219.36	1112.84	953.421	751.646	517.809	292.458	115.402	27.943	10.818	3.628	1.379	0.327	0.091	0.047	0
25.5	2160.57	2145.06	2096.55	2033.82	1960.54	1896.94	1818.39	1726.73	1622.6	1503.30	1333.15	1114.27	851.516	543.732	241.515	61.224	16.762	5.533	1.448	0.688	0.097	0.047	0
22.5	2560.41	2541.61	2478.10	2390.94	2292.95	2221.49	2144.49	2045.34	1932.03	1807.72	1636.86	1395.11	1137.99	800.181	406.62	132.012	23.086	7.811	1.53	0.863	0.101	0.047	0
19.5	2954.51	2924.99	2832.23	2720.14	2660.79	2599.17	2499.01	2363.53	2234.99	2099.13	1900.00	1658.71	1382.81	1032.24	594.6 *	215.594	30.808	9.707	1.622	0.919	0.103	0.048	0
17	3197.01	3179.03	3121.56	3050.51	2973.00	2859.39	2738.17	2635.92	2511.17	2335.92	2126.41	1851.19	1570.93	1208.26	749.676	288.673	46.721	11.688	1.718	0.951	0.104	0.048	0
15	3307.5	3294.96	3253.57	3208.13	3156.91	3073.51	2962.85	2819.19	2681.92	2535.80	2288.04	2008.36	1701.19	1333.94	866.496	361.47	68.464	13.947	1.806	0.974	0.105	0.048	0
13	3407.02	3392.02	3348.26	3309.42	3259.34	3196.60	3112.77	2997.85	2848.38	2673.35	2460.34	2148.62	1826.13	1455.47	976.551	434.498	92.237	16.05	1.899	0.994	0.107	0.049	0
11	3499.61	3480.58	3425.57	3398.11	3347.12	3285.39	3206.31	3123.63	3003.32	2823.60	2595.58	2267.94	1945.62	1551.55	1084.24	505.887	117.985	17.956	1.975	1.01	0.11	0.049	0
9	3608.98	3584.51	3524.28	3482.53	3437.85	3369.05	3285.63	3203.93	3111.06	2964.28	2700.86	2391.40	2056.61	1637.72	1162.25	571.139	144.715	19.656	2.061	1.022	0.112	0.049	0
7	3794.29	3724.11	3626.24	3581.40	3520.37	3452.78	3358.21	3267.07	3193.55	3069.71	2817.42	2500.93	2144.56	1713.13	1222.85	635.535	167.603	21.123	2.432	1.032	0.114	0.049	0
5	3942.84	3887.34	3815.67	3707.82	3607.54	3520.30	3438.52	3339.27	3257.09	3148.68	2921.65	2582.56	2210.86	1776.55	1280.24	675.76	186.407	22.338	2.755	1.039	0.117	0.049	0
3	4050.41	3992.69	3942.33	3845.96	3717.28	3593.58	3494.85	3398.22	3306.38	3202.92	2999.76	2633.09	2260.71	1826.24	1324.49	711.555	206	23.626	3.124	1.046	0.118	0.05	0
1	4097.53	4070.62	4024.25	3944.26	3817.79	3667.27	3537.68	3436.76	3338.82	3239.77	3056.08	2673.86	2298.25	1862.7	1356.79	737.149	211.783	23.989	3.201	1.049	0.119	0.05	0
0	4088.12	4079.74	4042.52	3968.74	3836.56	3688.59	3549.91	3447.66	3348.11	3250.63	3071.99	2684.91	2307.95	1872.07	1364.95	743.23	214.68	24.17	3.24	1.05	0.12	0.05	0
-1	4077.4	4076.03	4054.61	3996.00	3863.07	3711.73	3562.84	3461.84	3361.61	3261.18	3085.48	2701.54	2321.55	1882.71	1373.85	750.559	217.27	24.497	3.276	1.052	0.12	0.05	0
-3	4076.11	4082.01	4065.03	3996.56	3882.49	3708.06	3570.32	3475.24	3372.39	3268.89	3090.63	2711.19	2326.71	1885.96	1375.20	751.574	222.44	25.149	3.348	1.056	0.119	0.05	0
-5	4092.09	4087.85	4054.48	3977.66	3865.48	3679.54	3568.40	3471.20	3365.57	3265.61	3080.74	2699.10	2309.38	1875.04	1363.37	741.804	212.285	24.542	3.13	1.053	0.118	0.049	0
-7	4039.49	4042.06	4007.04	3923.40	3787.84	3638.64	3544.88	3445.01	3345.59	3250.35	3049.74	2668.42	2275.75	1848.32	1336.35	726.815	201.757	23.759	2.96	1.048	0.116	0.049	0
-9	3942.72	3943.62	3906.05	3812.59	3677.59	3590.70	3512.81	3410.05	3326.66	3217.94	2997.23	2622.31	2233.33	1805.24	1303.99	688.3 *	188.684	22.587	2.744	1.039	0.114	0.049	0
-11	3812.78	3801.53	3744.06	3672.85	3605.59	3540.32	3463.35	3372.37	3284.89	3162.43	2918.09	2543.59	2171.60	1749.60	1249.12	645.334	172.45	21.2	2.529	1.024	0.112	0.049	0
-13	3624.72	3624.40	3608.97	3574.70	3525.00	3467.74	3396.00	3317.53	3219.61	3079.12	2806.53	2446.62	2088.96	1683.45	1165.92	591.814	157.164	19.402	2.179	1.013	0.109	0.049	0
-15	3532.44	3533.31	3521.29	3491.44	3447.73	3388.63	3327.98	3245.72	3143.28	2964.55	2671.22	2300.65	1988.37	1588.52	1081.32	530.769	135.032	17.187	2.015	1	0.107	0.048	0
-17	3441.44	3439.34	3421.68	3389.86	3353.44	3314.21	3247.55	3143.25	3002.91	2796.14	2531.87	2198.95	1874.49	1485.23	988.326	461.025	105.855	14.547	1.899	0.984	0.106	0.048	0
-19.5	3336.52	3328.04	3300.84	3267.36	3232.39	3170.10	3073.34	2941.20	2758.40	2576.23	2319.45	2028.74	1720.87	1330.41	856.56	377.85	71.86	11.223	1.795	0.96	0.104	0.048	0
-22.5	3133.55	3128.44	3100.88	3061.77	2992.10	2886.06	2753.24	2620.15	2457.06	2277.12	2072.26	1796.23	1502.99	1133.44	682.726	259.043	43.076	9.482	1.68	0.924	0.102	0.047	0
-25.5	2767.13	2762.32	2732.78	2688.52	2617.80	2514.16	2389.93	2264.62	2140.11	1991.23	1793.89	1538.32	1247.61	892.964	498.576	178.833	26.968	8.274	1.604	0.846	0.101	0.047	0
-29	2278.01	2273.28	2246.40	2206.68	2149.99	2069.47	1974.08	1878.07	1753.93	1625.85	1437.89	1205.35	927.506	625.779	293.347	98.881	18.132	5.828	1.505	0.571	0.092	0.047	0
-33	1748.15	1744.64	1721.99	1687.01	1636.90	1579.29	1497.74	1390.21	1281.62	1161.88	990.625	775.503	555.365	315.339	147.528	31.588	9.004	3.988	1.429	0.316	0.089	0.046	0
-37.5	1115.09	1112.98	1094.74	1065.14	1029.86	966.24	894.999	813.843	723.974	628.453	510.457	343.757	217.502	125.573	35.705	13.801	5.565	2.061	1.392	0.284	0.082	0.046	0
-42.5	454.31	452.602	449.191	419.045	390.144	355.577	313.616	273.207	226.109	185.591	138.503	85.03	37.237	22.281	10.429	5.548	2.709	1.596	1.311	0.234	0.073	0.045	0
-47.5	63.73	63.537	63.15	54.318	45.938	39.238	35.323	32.448	28.492	24.406	20.107	14.206	9.117	6.868	4.475	2.44	1.661	1.473	1.059	0.137	0.063	0.043	0
-55	5.76	5.726	5.658	5.463	5.293	5.108	4.704	4.257	4	3.639	2.867	2.063	1.932	1.766	1.607	1.526	1.51	1.3	0.327	0.086	0.044	0.037	0
-65	1.49	1.492	1.497	1.513	1.529	1.549	1.573	1.59	1.608	1.634	1.675	1.662	1.531	1.28	1.119	0.902	0.728	0.192	0.087	0.055	0.041	0.037	0
-75	0.19	0.19	0.19	0.19	0.185	0.182	0.179	0.174	0.17	0.162	0.154	0.136	0.106	0.075	0.061	0.057	0.05	0.043	0.031	0.028	0.031	0.014	0
-85	0.01	0.011	0.012	0.013	0.015	0.016	0.017	0.016	0.017	0.016	0.014	0.012	0.01	0.01	0.012	0.015	0.013	0.012	0.017	0.023	0.01	0	0
-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	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
47.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
42.5	0.1	0.2	0.2	0.2	0.2	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	
37.5	0.6	1.1	1	1	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.2	0.1	0.1	0.1	0	0	0	0	0	0	0	0	
33	1.22 *	2.41 *	2.33 *	2.22 *	2.08 *	1.93 *	1.75 *	1.55 *	1.34 *	1.4	1.2	0.8	0.5	0.3	0.1	0.1	0	0	0	0	0	0	0	
29	1.79 *	3.53 *	3.44 *	3.31 *	3.17 *	3.00 *	2.80 *	2.57 *	2.31 *	2.49 *	2.39 *	1.72 *	1.3	0.7	0.3	0.1	0	0	0	0	0	0	0	
25.5	2.08 *	4.12 *	4.03 *	3.91 *	3.77 *	3.61 *	3.42 *	3.20 *	2.94 *	3.27 *	3.30 *	2.56 *	2.05 *	1.3	0.6	0.2	0	0	0	0	0	0	0	
22.5	2.15 *	4.27 *	4.18 *	4.07 *	3.93 *	3.77 *	3.59 *	3.39 *	3.15 *	3.58 *	3.69 *	2.99 *	2.57 *	1.78 *	0.9	0.3	0.1	0	0	0	0	0	0	
19.5	2.52 *	4.97 *	4.86 *	4.72 *	4.57 *	4.39 *	4.19 *	3.96 *	3.70 *	4.22 *	4.43 *	3.69 *	3.31 *	2.45 *	1.3	0.4	0.1	0	0	0	0	0	0	
17	2.34 *	4.63 *	4.54 *	4.43 *	4.31 *	4.15 *	3.95 *	3.73 *	3.49 *	3.99 *	4.21 *	3.56 *	3.27 *	2.55 *	1.49 *	0.5	0.1	0	0	0	0	0	0	
15	1.98 *	3.94 *	3.89 *	3.83 *	3.74 *	3.61 *	3.45 *	3.27 *	3.06 *	3.50 *	3.69 *	3.13 *	2.93 *	2.35 *	1.44 *	0.6	0.1	0	0	0	0	0	0	
13	2.04 *	4.06 *	4.02 *	3.97 *	3.90 *	3.81 *	3.68 *	3.50 *	3.28 *	3.75 *	3.97 *	3.37 *	3.18 *	2.60 *	1.66 *	0.7	0.1	0	0	0	0	0	0	
11	2.10 *	4.18 *	4.14 *	4.09 *	4.02 *	3.93 *	3.83 *	3.68 *	3.48 *	3.99 *	4.22 *	3.59 *	3.40 *	2.84 *	1.87 *	0.8	0.2	0	0	0	0	0	0	
9	2.16 *	4.30 *	4.25 *	4.20 *	4.12 *	4.03 *	3.92 *	3.80 *	3.63 *	4.20 *	4.46 *	3.80 *	3.60 *	3.04 *	2.06 *	0.9	0.2	0	0	0	0	0	0	
7	2.25 *	4.45 *	4.38 *	4.31 *	4.22 *	4.12 *	4.01 *	3.89 *	3.74 *	4.38 *	4.67 *	3.98 *	3.77 *	3.21 *	2.21 *	1	0.2	0	0	0	0	0	0	
5	2.35 *	4.64 *	4.55 *	4.45 *	4.33 *	4.21 *	4.08 *	3.96 *	3.82 *	4.50 *	4.85 *	4.13 *	3.92 *	3.35 *	2.34 *	1.12 *	0.3	0.1	0	0	0	0	0	
3	2.43 *	4.81 *	4.72 *	4.60 *	4.44 *	4.29 *	4.15 *	4.02 *	3.88 *	4.60 *	4.98 *	4.26 *	4.04 *	3.47 *	2.45 *	1.19 *	0.3	0.1	0	0	0	0	0	
1	2.48 *	4.92 *	4.84 *	4.72 *	4.55 *	4.37 *	4.21 *	4.07 *	3.92 *	4.66 *	5.08 *	4.36 *	4.14 *	3.55 *	2.53 *	1.25 *	0.3	0.1	0	0	0	0	0	
0	1.25 *	2.48 *	2.45 *	2.39 *	2.31 *	2.21 *	2.12 *	2.04 *	1.97 *	2.35 *	2.57 *	2.20 *	2.09 *	1.80 *	1.29 *	0.64 *	0.2	0	0	0	0	0	0	

-1	1.24 *	2.48 *	2.46 *	2.41 *	2.33 *	2.22 *	2.13 *	2.05 *	1.98 *	2.36 *	2.58 *	2.22 *	2.11 *	1.81 *	1.29 *	0.64 *	0.2	0	0	0	0	0	
-3	2.48 *	4.96 *	4.93 *	4.83 *	4.67 *	4.46 *	4.27 *	4.11 *	3.96 *	4.72 *	5.17 *	4.45 *	4.23 *	3.64 *	2.60 *	1.30 *	0.3	0.1	0	0	0	0	
-5	2.49 *	4.96 *	4.92 *	4.83 *	4.66 *	4.45 *	4.27 *	4.12 *	3.97 *	4.73 *	5.17 *	4.44 *	4.22 *	3.63 *	2.59 *	1.29 *	0.3	0.1	0	0	0	0	
-7	2.48 *	4.94 *	4.89 *	4.78 *	4.60 *	4.41 *	4.24 *	4.10 *	3.95 *	4.71 *	5.13 *	4.40 *	4.18 *	3.59 *	2.56 *	1.26 *	0.3	0.1	0	0	0	0	
-9	2.43 *	4.86 *	4.80 *	4.67 *	4.51 *	4.35 *	4.20 *	4.07 *	3.93 *	4.66 *	5.06 *	4.33 *	4.10 *	3.52 *	2.50 *	1.22 *	0.3	0.1	0	0	0	0	
-11	2.36 *	4.72 *	4.65 *	4.54 *	4.41 *	4.28 *	4.15 *	4.02 *	3.88 *	4.59 *	4.95 *	4.22 *	4.00 *	3.43 *	2.40 *	1.15 *	0.3	0	0	0	0	0	
-13	2.27 *	4.53 *	4.48 *	4.40 *	4.31 *	4.20 *	4.08 *	3.96 *	3.81 *	4.48 *	4.80 *	4.08 *	3.87 *	3.29 *	2.27 *	1.1	0.2	0	0	0	0	0	
-15	2.18 *	4.37 *	4.34 *	4.29 *	4.21 *	4.12 *	4.01 *	3.88 *	3.72 *	4.33 *	4.60 *	3.91 *	3.70 *	3.12 *	2.11 *	1	0.2	0	0	0	0	0	
-17	2.13 *	4.25 *	4.23 *	4.18 *	4.11 *	4.03 *	3.92 *	3.78 *	3.60 *	4.14 *	4.37 *	3.71 *	3.51 *	2.92 *	1.93 *	0.8	0.2	0	0	0	0	0	
-20	2.58 *	5.16 *	5.13 *	5.07 *	4.99 *	4.88 *	4.72 *	4.51 *	4.24 *	4.85 *	5.10 *	4.33 *	4.08 *	3.33 *	2.14 *	0.9	0.2	0	0	0	0	0	
-23	2.96 *	5.90 *	5.87 *	5.80 *	5.67 *	5.49 *	5.26 *	4.97 *	4.63 *	5.27 *	5.55 *	4.70 *	4.37 *	3.47 *	2.12 *	0.8	0.1	0	0	0	0	0	
-26	2.70 *	5.39 *	5.36 *	5.28 *	5.13 *	4.92 *	4.67 *	4.39 *	4.08 *	4.65 *	4.88 *	4.08 *	3.70 *	2.82 *	1.6	0.6	0.1	0	0	0	0	0	
-29	2.69 *	5.38 *	5.34 *	5.26 *	5.11 *	4.89 *	4.63 *	4.35 *	4.05 *	4.59 *	4.77 *	3.89 *	3.40 *	2.43 *	1.3	0.4	0.1	0	0	0	0	0	
-33	2.46 *	4.91 *	4.87 *	4.79 *	4.67 *	4.48 *	4.23 *	3.94 *	3.62 *	4.05 *	4.09 *	3.20 *	2.62 *	1.7	0.8	0.2	0.1	0	0	0	0	0	
-38	1.97 *	3.93 *	3.90 *	3.83 *	3.72 *	3.54 *	3.30 *	3.02 *	2.72 *	2.95 *	2.83 *	2.05 *	1.5	0.9	0.3	0.1	0	0	0	0	0	0	
-43	1.20 *	2.41 *	2.38 *	2.32 *	2.23 *	2.08 *	1.90 *	1.69 *	1.46 *	1.5	1.3	0.9	0.6	0.3	0.1	0.1	0	0	0	0	0	0	
-48	0.4	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.2	0.1	0.1	0	0	0	0	0	0	0	0	
-55	0.1	0.2	0.2	0.2	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	
-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	133	129	124	119	113	106	123	129	108	99	79	51	23	5.1	1.1	0.2	0.1	0	0	1682

5.0 THD and PF Test

Model No.	HBLED26N/480	Sample ID.	M1
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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	479.97	60	0.061	27.24	0.930	5.15%
25.1	347.30	60	0.078	26.93	0.994	9.68%

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*****