

# Photometric Test Report

## Relevant Standards

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

## Prepared For RAB Lighting Inc.

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## Project Number

DLF1804109

## Report Number

DLF20180416001-26a

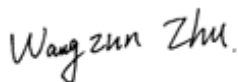
## Test Date

2018/4/16

## Issue Date

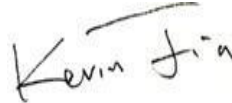
2018/4/16

## Prepared By



Wangzun Zhu

## Approved By



Kevin Jia

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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	2751	P
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥85%	100.00%	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	100.0	P
Allowable CCTs* (K)	IES LM-79-2008	5700	3074	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	65	69.8	P
Power Factor	ANSI C82.77:2014	0.873	0.929	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	3.72%	P

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/4/16	HNLED26Y/480	Z1
2	Goniophotometer Test	2018/4/16	HNLED26Y/480	Z1
3	THD and PF Test	2018/4/16	HNLED26Y/480	Z1

### Remark(If any)

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2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

### 3.0 Production Description

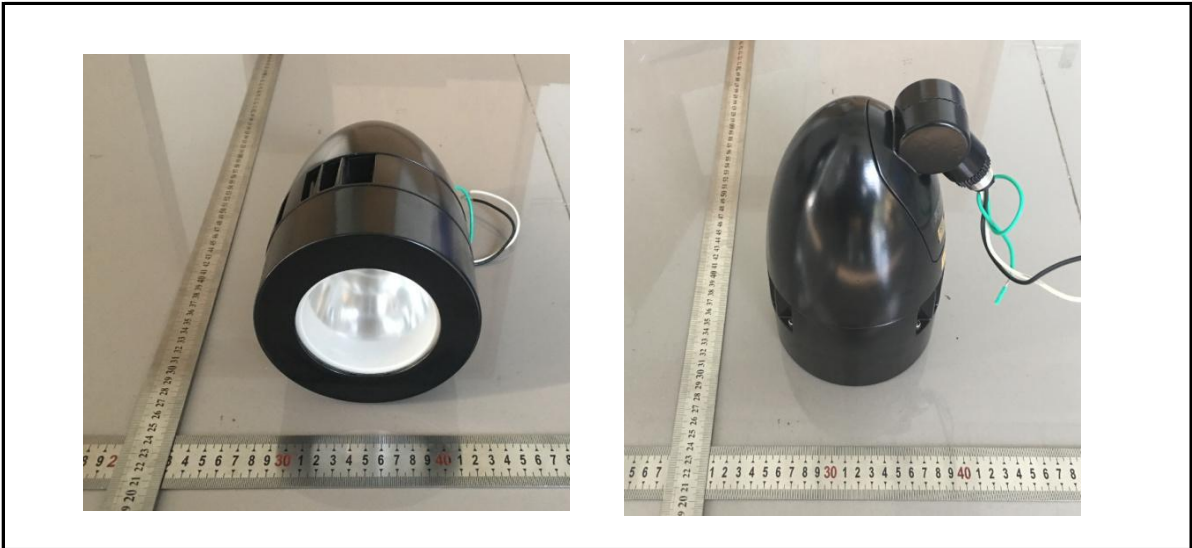
**Luminaire Description:**

**Electrical Specification:** 120V-277V,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.	HNLED26Y/480	Sample ID.	Z1
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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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	480.02	60	0.062	27.52	0.929

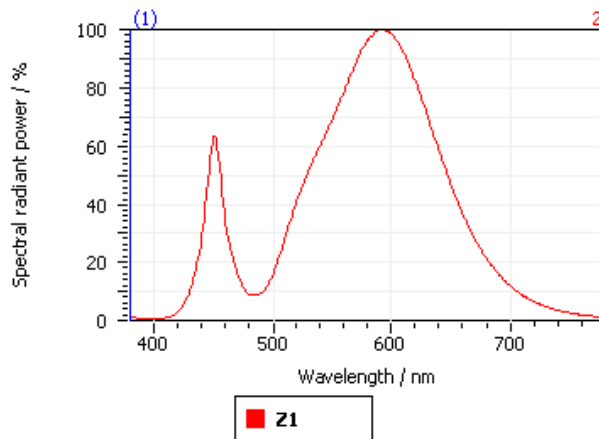
#### Test Result

CCT (K)	CRI (Ra)	Duv
3074	69.8	1.5E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

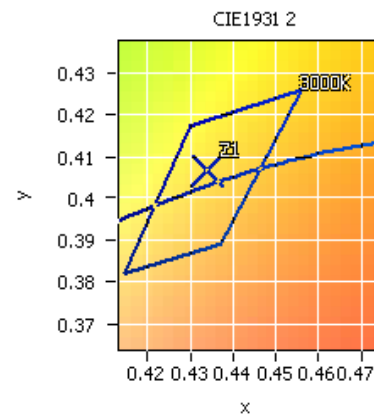
DominantWavelength	581.98 nm
Purity	0.523
PeakWavelength	592.23 nm
Width50%:	118.33 nm

#### Color Coordinates

Correlated Color Temperature 3074 K

x: 0.4339 u: 0.2475 u': 0.2475  
y: 0.4067 v: 0.3480 v': 0.5220

ResultsCRICRI01	66.0	ResultsCRICRI09	-35.5
ResultsCRICRI02	80.0	ResultsCRICRI10	53.0
ResultsCRICRI03	91.4	ResultsCRICRI11	57.5
ResultsCRICRI04	64.8	ResultsCRICRI12	40.1
ResultsCRICRI05	64.0	ResultsCRICRI13	68.4
ResultsCRICRI06	70.7	ResultsCRICRI14	95.0
ResultsCRICRI07	78.2	ResultsCRICRI15	58.7
ResultsCRICRI08	43.4	ResultsCRICRI16	58.4
ResultsCRI	69.8		



Nominal CCT: 3000K

PlanckDistance 1.5E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	HNLED26Y/480	Sample ID.	Z1
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  $\pm 0.2$  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  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

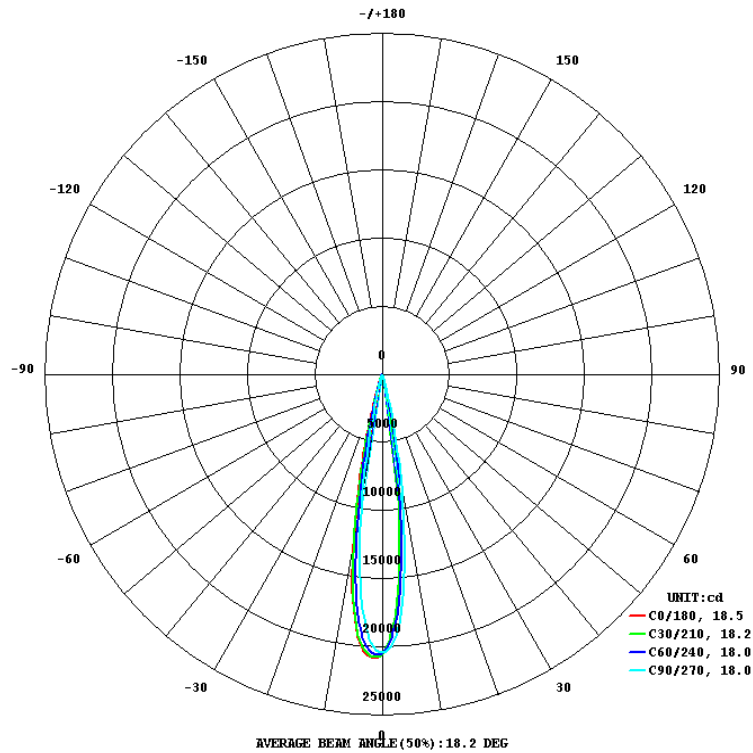
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	479.93	60	0.062	27.52	0.926	Light Down

#### Test Result

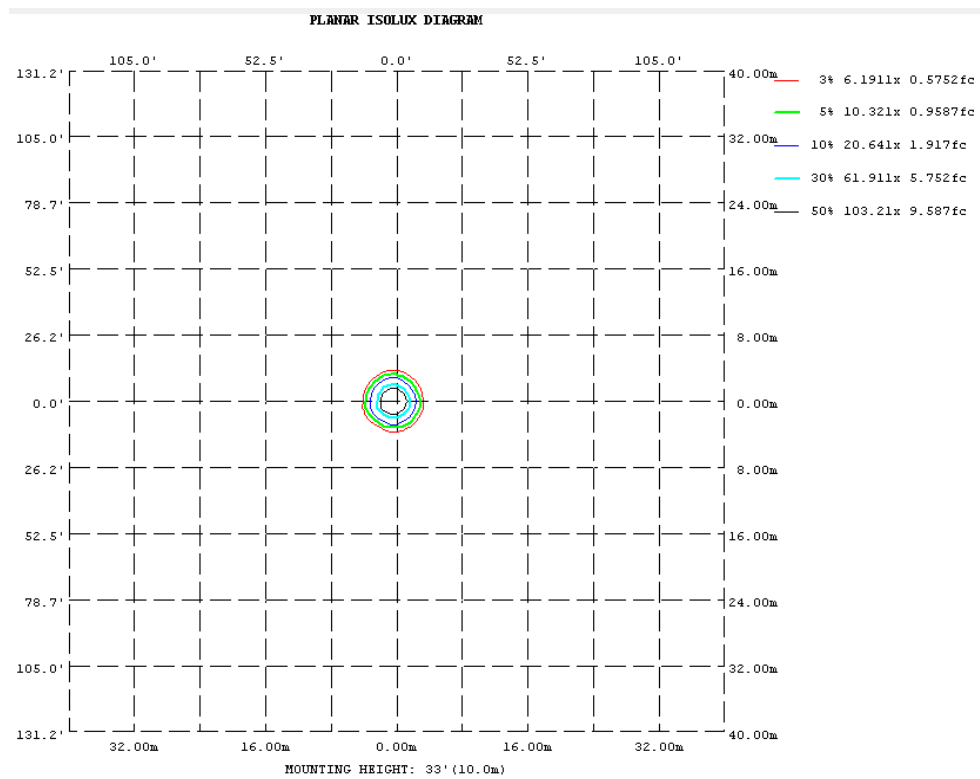
Flux(lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
2751	100.00%	30.5	31.0	18	18.5	100.0

### 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	557.0	574.4	827.3	1195	1267	1169	869.8	532.1
20	51.70	58.36	72.83	96.55	128.1	108.6	75.85	55.23
30	19.20	20.59	22.82	24.76	26.54	26.29	24.02	20.31
40	12.72	12.33	13.17	14.89	14.29	14.63	13.42	12.57
50	9.139	9.083	9.901	10.95	10.35	10.69	9.937	9.264
60	6.263	6.349	6.891	7.462	7.414	7.322	6.982	6.562
70	2.963	3.088	3.618	4.341	4.172	4.009	3.536	2.974
80	0.5334	0.5653	0.7161	1.100	1.020	0.8887	0.5603	0.4414
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: ×10cd Less than 35% Percent = 2.4 %							



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0 - 10	1335.34	0 - 10	1335.34	48.54%
10 - 20	876.89	0 - 20	2212.23	80.41%
20 - 30	191.69	0 - 30	2403.92	87.38%
30 - 40	108.60	0 - 40	2512.52	91.33%
40 - 50	88.54	0 - 50	2601.06	94.55%
50 - 60	73.31	0 - 60	2674.37	97.21%
60 - 70	51.81	0 - 70	2726.18	99.10%
70 - 80	21.89	0 - 80	2748.07	99.89%
80 - 90	3.00	0 - 90	2751.07	100.00%
90 - 100	0.00	0 - 100	2751.07	100.00%
100 - 110	0.00	0 - 110	2751.07	100.00%
110 - 120	0.00	0 - 120	2751.07	100.00%
120 - 130	0.00	0 - 130	2751.07	100.00%
130 - 140	0.00	0 - 140	2751.07	100.00%
140 - 150	0.00	0 - 150	2751.07	100.00%
150 - 160	0.00	0 - 160	2751.07	100.00%
160 - 170	0.00	0 - 170	2751.07	100.00%
170 - 180	0.00	0 - 180	2751.07	100.00%

### 4.3 Goniophotometer Test

#### Axial Candela

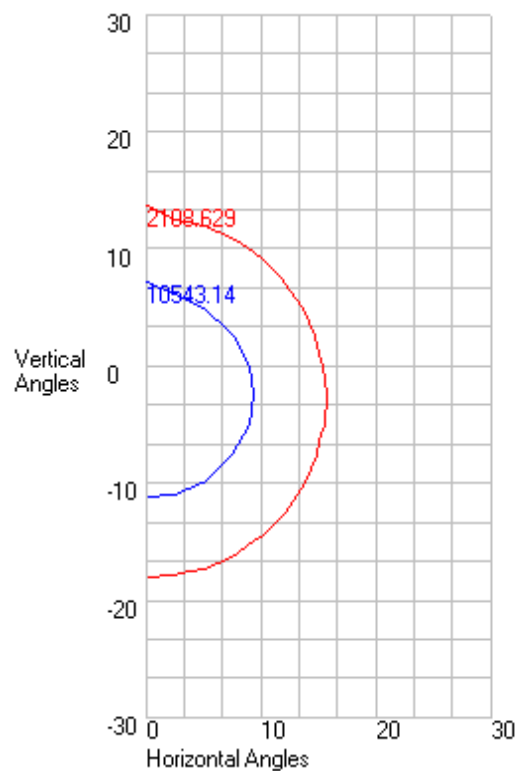
DEG.	HOR.	DEG.	VERT.
90	0.01	90	0.01
85	0.15	85	0.43
75	17.95	75	15.14
65	54.63	65	47.01
55	82.01	55	75.3
47.5	107.47	47.5	100.46
42.5	123.88	42.5	117.96
37.5	147.33	37.5	137.36
33	197.52	33	164.68
29	256.44	29	202.45
25.5	343.36	25.5	251.48
22.5	514.68	22.5	357.06
19.5	826.57	19.5	553.07
17	1434.23	17	849.6
15	2259.74	15	1318.62
13	4109.35	13	2267.37
11	7070.64	11	4333.69
9	10408.76	9	7157.5
7	14070.89	7	10797.55
5	17272.84	5	14716.87
3	19388.17	3	17977.529
1	20300.74	1	19904.561
0	20380.811	0	20380.811
-1	20232.131	-1	20704.631
-3	19256.85	-3	20661.221
-5	17088.461	-5	19751.529
-7	13796.51	-7	17667.641
-9	10024.99	-9	14478.79
-11	6615.94	-11	10859.6
-13	4021.81	-13	7462.14
-15	2126.63	-15	4560.83
-17	1302.64	-17	2563.03
-19.5	792.31	-19.5	1425.54
-22.5	514.1	-22.5	742.92
-25.5	337.66	-25.5	460.04
-29	244.15	-29	291.37
-33	188.57	-33	213.85
-37.5	144.64	-37.5	161.88
-42.5	122.25	-42.5	129.12
-47.5	106.81	-47.5	110.98
-55	81.46	-55	87.66
-65	54.6	-65	60.36
-75	19.65	-75	23.81
-85	0.61	-85	2.14
-90	0.02	-90	0

### 4.3 Goniophotometer Test

#### Characteristics

NEMA Type	3 H x 3 V
Maximum Candela	21086.289
Maximum Candela Angle	-1 H -3 V
Horizontal Beam Angle (50%)	18.3
Vertical Beam Angle (50%)	18.6
Horizontal Field Angle (10%)	31
Vertical Field Angle (10%)	31.5
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	1233
Beam Efficiency	N.A.
Field Lumens	2027
Field Efficiency	N.A.
Spill Lumens	724
Luminaire Lumens	2751
Total Efficiency	N.A.
Total Luminaire Watts	27.5182
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	0.01	0.01	0.01	0.008	0.003	0	0	0.007	0.01
85	0.43	0.409	0.368	0.326	0.285	0.243	0.202	0.139	0.096	0.093	0.087	0.078	0.066	0.059	0.045	0.03	0.024	0.018	0.01	0.013	0.006	0	0.01
75	15.14	15.01	14.749	14.488	13.95	13.509	13.024	12.495	12.062	11.742	11.352	10.82	10.191	9.428	8.481	7.344	6.018	4.578	2.626	0.667	0.034	0.013	0.01
65	47.01	46.866	46.578	45.929	45.287	44.517	43.618	42.588	41.787	41.058	40.077	38.488	36.95	34.364	31.475	27.896	23.674	19.383	13.087	5.333	0.692	0.02	0.01
55	75.3	75.273	75.219	74.77	74.356	73.839	73.186	72.534	71.858	71.153	70.153	68.754	67.085	64.677	61.11	55.953	49.009	41.09	28.718	13.754	2.92	0.02	0.01
47.5	100.46	100.421	100.343	99.54	98.756	97.731	96.476	95.238	93.855	92.29	90.129	87.192	83.881	79.814	75.424	71.356	65.936	58.079	42.401	21.172	5.309	0.026	0.01
42.5	117.96	117.897	117.771	116.831	115.924	114.792	113.479	112.26	110.581	108.351	105.698	102.254	98.026	92.927	86.506	79.109	72.815	66.708	51.35	26.538	7.102	0.032	0.01
37.5	137.36	137.194	136.437	135.392	134.255	132.327	130.543	128.45	126.167	123.69	120.635	115.898	111.117	105.502	98.27	89.423	79.471	72.351	59.262	31.769	8.932	0.04	0.01
33	164.68	164.556	163.283	161.22	158.337	155.355	151.962	147.806	144.276	140.541	135.295	129.012	122.817	115.659	107.438	98.155	86.956	76.741	64.919	36.325	10.626	0.048	0.01
29	202.45	202.728	201.804	199.763	196.591	192.673	187.245	180.812	171.649	162.798	153.197	144.431	134.878	125.6	115.212	105.038	93.661	81.806	68.582	40.096	12.138	0.055	0.01
25.5	251.48	251.115	247.522	242.171	236.578	231.799	224.93	216.672	206.996	196.503	181.825	162.519	148.153	134.96	122.187	110.342	99.061	86.575	70.938	43.401	13.326	0.062	0.01
22.5	357.06	352.704	335.891	315.789	300.305	287.343	273.102	258.251	242.927	227.722	209.372	187.767	165.175	145.846	128.782	115.407	103.407	90.452	72.59	45.524	14.242	0.081	0.01
19.5	553.07	542.46	506.371	461.26	440.269	412.445	375.322	335.485	299.979	271.153	241.527	212.725	187.531	158.079	136.593	120.838	106.99	93.982	74.171	47.68	15.059	0.097	0.01
17	849.6	824.096	740.014	664.203	623.376	570.423	511.388	448.274	385.844	330.306	278.725	235.976	204.843	173.062	144.049	124.702	109.894	96.583	75.497	49.139	15.661	0.109	0.01
15	1318.62	1272.96	1095.16	961.322	873.037	766.64	663.721	564.225	483.283	400.693	320.285	258.323	219.411	185.513	150.009	128.011	112.307	98.519	76.552	50.244	16.152	0.118	0.01
13	2267.37	2117.33	1707.4	1523.32	1338.82	1104.69	887.451	723.908	589.144	483.415	376.263	286.017	235.976	197.421	156.659	131.312	114.462	100.28	77.613	51.223	16.503	0.126	0.01
11	4333.69	3926.62	2810.91	2492.38	1991.92	1596.45	1280.11	950.523	738.966	577.884	441.147	320.386	253.978	207.658	164.697	134.754	116.303	101.862	78.56	52.082	16.87	0.149	0.01
9	7157.5	6569.33	5154.54	4351.26	3357.67	2407.21	1734.42	1314.88	928.777	696.745	510.89	360.692	272.84	218.173	172.551	138.122	118.179	103.287	79.465	52.827	17.186	0.149	0.01
7	10797.5	9914.36	8396.99	7349.11	5510.19	3843.57	2514.12	1694.48	1227.21	845.445	584.021	403.46	291.834	228.86	179.53	141.268	119.829	104.541	80.271	53.448	17.45	0.149	0.01
5	14716.8	13489.3	12069.9	10535.1	8370.71	5768.79	3768.31	2273.89	1530.62	1005.12	662.482	444.316	310.152	238.73	186.305	143.404	121.305	105.613	80.946	53.943	17.836	0.149	0.01
3	17977.5	16675.7	15820.2	13705.9	10933.1	7923.67	5121.93	3018.34	1825.12	1208.17	741.775	478.799	326.69	247.203	191.801	145.358	122.841	106.727	81.652	54.455	17.881	0.15	0.01
1	19904.5	19472.9	18552.9	16540.7	13372.1	9830.71	6605.77	3845.68	2150.70	1383.9	807.326	506.773	339.651	254.119	196.15	146.871	123.533	107.222	81.891	54.572	17.927	0.15	0.01
0	20380.8	20300.7	19388.1	17272.8	14070.8	10408.7	7070.64	4109.35	2259.74	1434.23	826.57	514.68	343.36	256.44	197.52	147.33	123.88	107.47	82.01	54.63	17.95	0.15	0.01
-1	20704.6	20675.3	19828.2	17938.2	14716.1	10932.1	7453.05	4396.25	2394.55	1484.63	844.91	520.239	346.111	257.701	198.733	148.009	124.204	107.717	82.117	54.683	17.978	0.15	0.01
-3	20661.2	20622.3	19884.6	17957.9	14753.5	11012.2	7551.84	4507.87	2452.48	1504.46	847.292	517.965	345.306	257.874	199.525	148.719	124.85	108.211	82.33	54.788	18.034	0.151	0.01
-5	19751.5	19777.4	18875.6	16988.9	13948.5	10275.1	7097.84	4192.90	2312.69	1450.41	817.95	506.152	338.938	256.277	199.097	148.837	124.629	108.055	82.053	54.499	18.09	0.152	0.01
-7	17667.6	17715.7	16719.1	14862.6	11884.2	8805.73	5973.44	3560.34	2025.47	1307.18	759.063	478.894	328.287	252.983	197.244	148.589	124.443	107.913	81.79	54.228	17.798	0.153	0.01
-9	14478.7	14524.8	13618.8	11874.3	9483.21	6990.91	4659.66	2792.15	1704.78	1100.11	681.355	441.682	311.307	247.288	194.98	147.137	124.021	107.555	81.363	53.833	17.625	0.154	0.01
-11	10859.6	10897.6	10241.2	8936.49	7041.50	5103.67	3348.31	2075.86	1408.84	910.564	597.935	399.968	292.937	237.93	189.664	145.433	123.324	106.988	80.788	53.315	17.395	0.155	0.01
-13	7462.14	7484.11	6993.12	6001.46	4743.31	3397.54	2286.44	1560.6	1094.53	756.819	522.874	356.964	274.785	228.442	180.882	143.342	122.655	106.171	80.125	52.688	17.108	0.132	0.01
-15	4560.83	4577.01	4262.87	3673.35	2926.00	2182.37	1600.62	1193.42	849.648	628.911	452.658	320.389	257.98	217.171	172.945	140.798	121.454	105.091	79.235	51.944	16.831	0.125	0.01
-17	2563.03	2578.70	2438.04	2165.37	1790.07	1494.82	1169.55	862.961	665.772	518.143	389.143	292.317	244.297	206.01	165.403	137.967	119.66	103.735	78.29	51.068	16.413	0.116	0.01
-19.5	1425.54	1433.55	1384.61	1284.83	1100.58	915.631	766.227	621.796	503.017	409.932	324.701	265.84	229.183	192.259	156.712	134.502	117.444	101.526	76.991	49.886	15.893	0.104	0.01
-22.5	742.92	746.284	729.612	696.37	637.57	568.663	499.96	432.936	369.167	318.497	275.177	240.002	209.553	177.052	147.749	129.413	114.561	98.377	75.28	48.101	15.181	0.087	0.01
-25.5	460.04	461.436	453.711	438.043	413.791	380.812	347.397	316.976	289.467	265.543	240.939	214.725	188.727	159.809	140.042	124.94	110.652	94.738	73.541	46.277	14.379	0.067	0.01
-29	291.37	292.771	291.622	287.412	280.561	269.908	258.564	247.999	235.818	222.31	204.347	184.119	162.71	145.519	131.099	119.484	105.46	90.03	71.31	43.319	13.314	0.059	0.01
-33	213.85	214.85	215.299	214.48	212.031	208.511	202.948	194.423	185.994	176.761	164.59	151.836	141.89	131.99	122.522	111.979	98.484	84.278	68.324	39.873	11.938	0.051	0.01
-37.5	161.88	162.353	162.342	161.533	160.294	157.457	153.95	150.073	146.162	142.541	138.586	131.856	126.384	120.511	112.725	102.508	89.784	78.269	63.93	35.648	10.216	0.042	0.01
-42.5	129.12	129.36	129.839	129.228	128.646	127.841	126.718	125.602	124.09	122.07	119.775	116.755	112.626	107.407	100.273	90.732	80.557	71.788	57.403	30.553	8.286	0.035	0.01
-47.5	110.98	111.172	111.555	111.322	111.117	110.731	110.157	109.322	108.238	106.914	104.935	102.079	98.366	93.246	86.833	79.894	72.377	64.993	49.281	25.17	6.411	0.028	0.01
-55	87.66	87.772	87.994	87.739	87.49	87.072	86.48	85.743	84.662	83.519	81.889	79.687	77.321	74.179	70.418	65.585	58.756	50.188	35.734	17.151	3.747	0.02	0.01
-65	60.36	60.348	60.323	59.949	59.592	59.126	58.553	57.85	56.998	56.016	54.714	52.729	50.737	47.522	43.639	38.864	33.193	27.259	18.345	7.705	1.026	0.02	0.01
-75	23.81	23.81	23.81	23.81	23.45	23.216	22.926	22.581	22.235	21.636	20.901	19.95	18.931	17.622	15.922	13.932	11.443	8.759	5.102	1.397	0.043	0.016	0.01
-85	2.14	2.139	2.138	2.137	2.135	2.134	2.133	2.011	1.969	1.866	1.732	1.559	1.375	1.16	0.879	0.587	0.278	0.095	0.025	0.015	0.016	0	0.01
-90	0	0.001	0.002	0.004	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	0.1	0.1	0.1	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	
75		0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0	0	0	
65		0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.2	0.1	0	0	
55		0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.5	0.4	0.5	0.3	0.1	0	0	
47.5		0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.1	0	0	
42.5		0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.1	0	0	
37.5		0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.1	0	0	
33		0.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.1	0	0	
29		0.2	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.4	0.3	0.4	0.3	0.1	0	0	
25.5		0.3	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.1	0	0	
22.5		0.4	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.4	0.3	0.1	0	0	
19.5		0.5	1	1	0.9	0.8	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
17		0.7	1.2	1.1	1	0.9	0.8	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0	0	
15		1.1	2	1.8	1.5	1.3	1.1	0.9	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0	0	
13		1.97 *	3.50 *	2.92 *	2.4	1.9	1.5	1.2	0.9	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0	0	
11		3.42 *	6.08 *	5.03 *	4.06 *	3.04 *	2.2	1.6	1.2	0.9	0.8	0.7	0.5	0.5	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0	0	
9		5.35 *	9.67 *	8.22 *	6.61 *	4.85 *	3.33 *	2.2	1.6	1.1	1	0.8	0.6	0.5	0.4	0.4	0.3	0.2	0.3	0.2	0.1	0	0	
7		7.59 *	13.94 *	12.11 *	9.89 *	7.31 *	4.97 *	3.17 *	2	1.4	1.1	0.9	0.6	0.5	0.4	0.4	0.3	0.2	0.3	0.2	0.1	0	0	
5		9.73 *	18.19 *	16.12 *	13.32 *	10.05 *	6.89 *	4.32 *	2.57 *	1.6	1.3	1	0.7	0.5	0.4	0.4	0.3	0.2	0.3	0.2	0.1	0	0	
3		11.37 *	21.70 *	19.69 *	16.50 *	12.63 *	8.78 *	5.52 *	3.19 *	1.9	1.5	1.1	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
1		6.10 *	11.83 *	10.86 *	9.22 *	7.11 *	4.98 *	3.16 *	1.80 *	1	0.8	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0	0	0	
0																								

-1	6.25 *	12.19 *	11.27 *	9.63 *	7.46 *	5.25 *	3.34 *	1.90 *	1.1	0.8	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0	0	0	
-3	12.63 *	24.77 *	23.01 *	19.74 *	15.31 *	10.78 *	6.90 *	3.95 *	2.2	1.6	1.1	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
-5	12.40 *	24.44 *	22.66 *	19.37 *	14.94 *	10.49 *	6.72 *	3.85 *	2.2	1.6	1.1	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
-7	11.52 *	22.78 *	21.03 *	17.75 *	13.53 *	9.45 *	6.02 *	3.45 *	2	1.5	1.1	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
-9	9.92 *	19.72 *	18.08 *	14.96 *	11.25 *	7.80 *	4.93 *	2.88 *	1.7	1.3	1	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
-11	7.83 *	15.68 *	14.35 *	11.69 *	8.70 *	5.96 *	3.77 *	2.3	1.4	1.1	0.9	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
-13	5.66 *	11.40 *	10.45 *	8.46 *	6.25 *	4.26 *	2.73 *	1.8	1.2	1	0.8	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.1	0	0	
-15	3.72 *	7.50 *	6.91 *	5.62 *	4.14 *	2.87 *	1.9	1.3	0.9	0.8	0.7	0.5	0.5	0.4	0.4	0.3	0.2	0.3	0.2	0.1	0	0	
-17	2.21 *	4.47 *	4.18 *	3.46 *	2.6	1.9	1.4	1	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0	0	
-20	1.5	3.1	3	2.6	2.1	1.6	1.3	1	0.8	0.7	0.7	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0	0	
-23	1	2	1.9	1.8	1.5	1.3	1.1	0.9	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.1	0	0	
-26	0.6	1.1	1.1	1.1	1	0.8	0.7	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.3	0.4	0.3	0.1	0	0	
-29	0.4	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.1	0	0	
-33	0.3	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.3	0.1	0	0	
-38	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.4	0.1	0	0	
-43	0.2	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.4	0.1	0	0	
-48	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.1	0	0	
-55	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.6	0.6	0.5	0.6	0.4	0.1	0	0	
-65	0.2	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.3	0.1	0	0	
-75	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0	0	0	
-85	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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	127	247	225	190	147	106	72	47	32	29	26	20	19	18	17	15	12	13	9.8	3.3	0.4	0	1375

## 5.0 THD and PF Test

Model No.	HNLED26Y/480	Sample ID.	Z1
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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	480.02	60	0.062	27.52	0.929	3.72%
25.1	346.98	60	0.080	27.45	0.995	9.51%

## 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\*\*\*\*\*