

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

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Test Date

2021/10/28

Issue Date

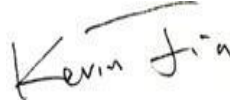
2021/11/1

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		29973
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	154.7
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		193.7
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	3.75%
		20.00%	277V	10.16%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
		0.9	277V	0.944
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	5055
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		82
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		2
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		83
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		96
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-13%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	85%		99.89%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		120
(Goniophotometer - Section 4.2)		Non-Worst Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		1.617
(Goniophotometer - Section 4.2)		Non-Worst Case		0.722
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		193.7
(Goniophotometer - Section 4.2)		Non-Worst Case		189.1

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/10/28	FFLEDL @ 180W / 5000K	N1
2	Goniophotometer Test	2021/10/28	FFLEDL @ 180W / 5000K	N1
3	THD and PF Test	2021/10/28	FFLEDL @ 180W / 5000K	N1

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: FFLEDL @ 180W / 5000K

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	FFLEDL @ 180W / 5000K	Sample ID.	N1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	54.0

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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.98	60	1.618	193.7	0.998
276.99	60	0.723	189.0	0.944

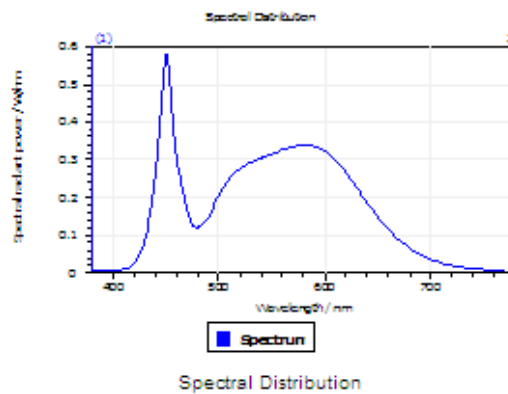
Test Result

CCT (K)	CRI	R9	Duv
5055	82	2	0.0025

Rf	Rg	IES Rcs,h1
83	96	-13%

4.1 Integrating Sphere Test

Results

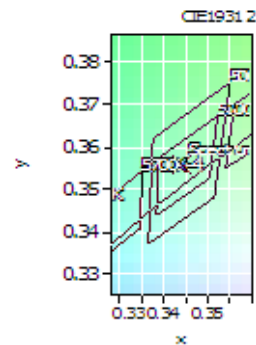


Spectral values

DominantWavelength 569.52 nm
Purity 0.100
PeakWavelength 450.52 nm
Radiant Power 65.66 W
Width50%:

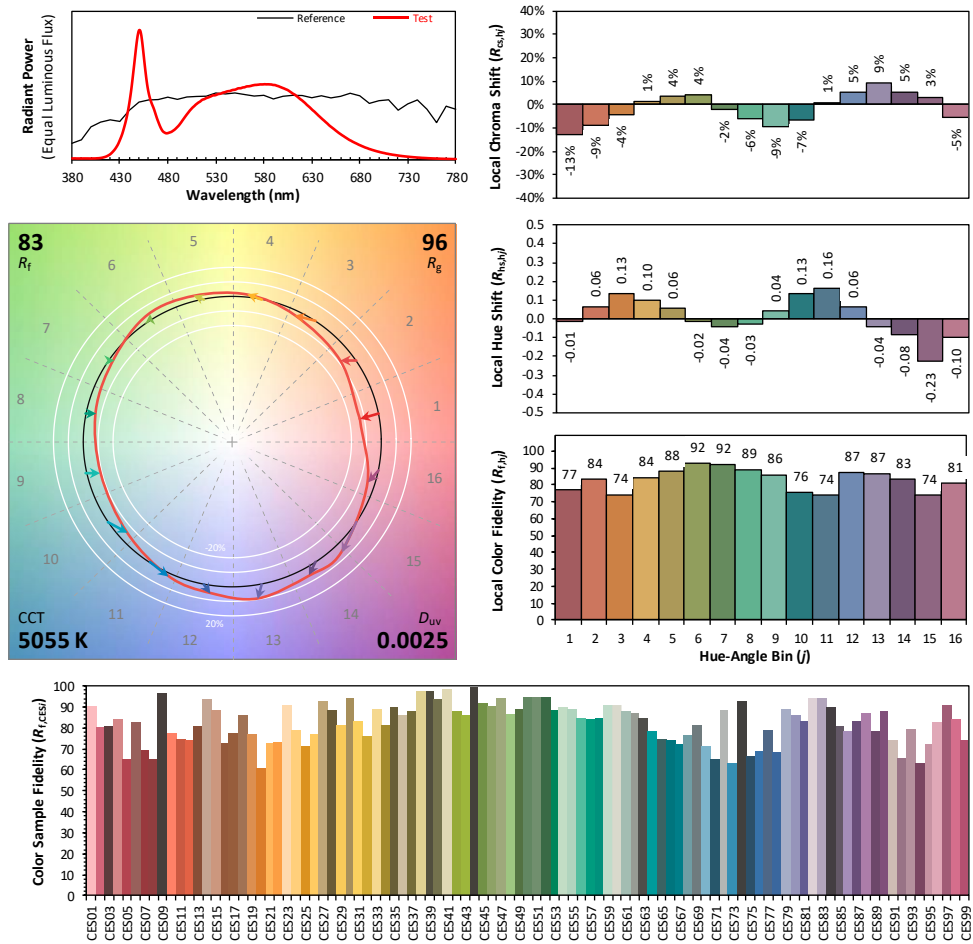
Color Coordinates

Correlated Color Temperat 5055 K
x: 0.3440 u: 0.2091 u': 0.2091
y: 0.3558 v: 0.3243 v': 0.4865
CRI01 80.0 CRI09 2.3
CRI02 86.4 CRI10 67.7
CRI03 91.0 CRI11 81.8
CRI04 82.4 CRI12 59.7
CRI05 80.8 CRI13 81.5
CRI06 81.0 CRI14 95.2
CRI07 86.4 CRI15 74.1
CRI08 66.3 CRI16 73.2
ResultsCRI 81.8



PlanckDistance 2.5E-003

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3440
 y 0.3558
 u' 0.2091
 v' 0.4865

CIE 13.3-1995
(CRI)

R_a 82
 R_9 0

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	FFLEDL @ 180W / 5000K	Sample ID.	N1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

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

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.04	60	1.617	193.7	0.998
NON-WORST CASE	277.04	60	0.722	189.1	0.945

Test Result

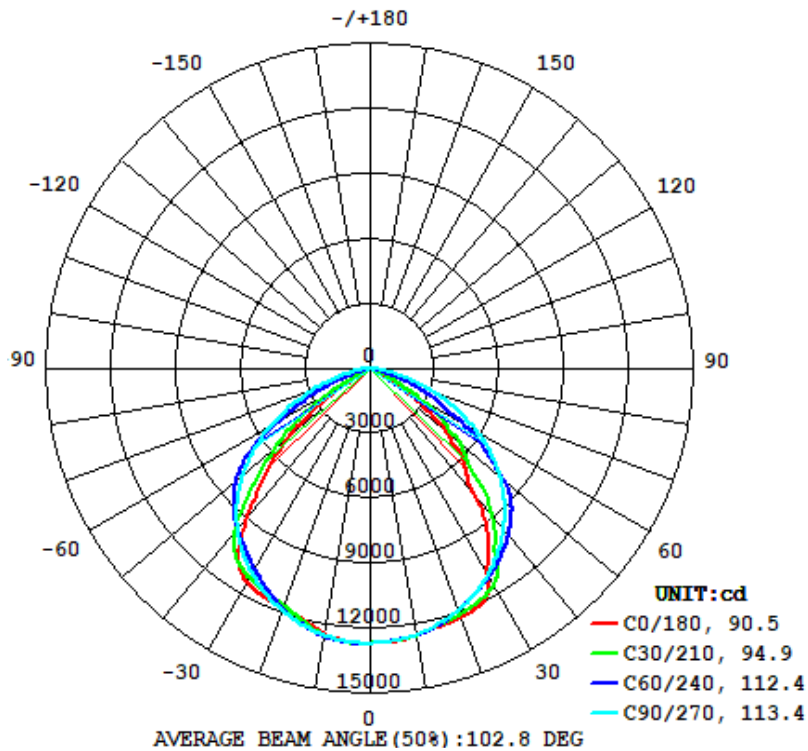
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
29973	119.1	153.0	90.5	113.4	154.7

Zonal Lumen Requirement
(0° - 90°)

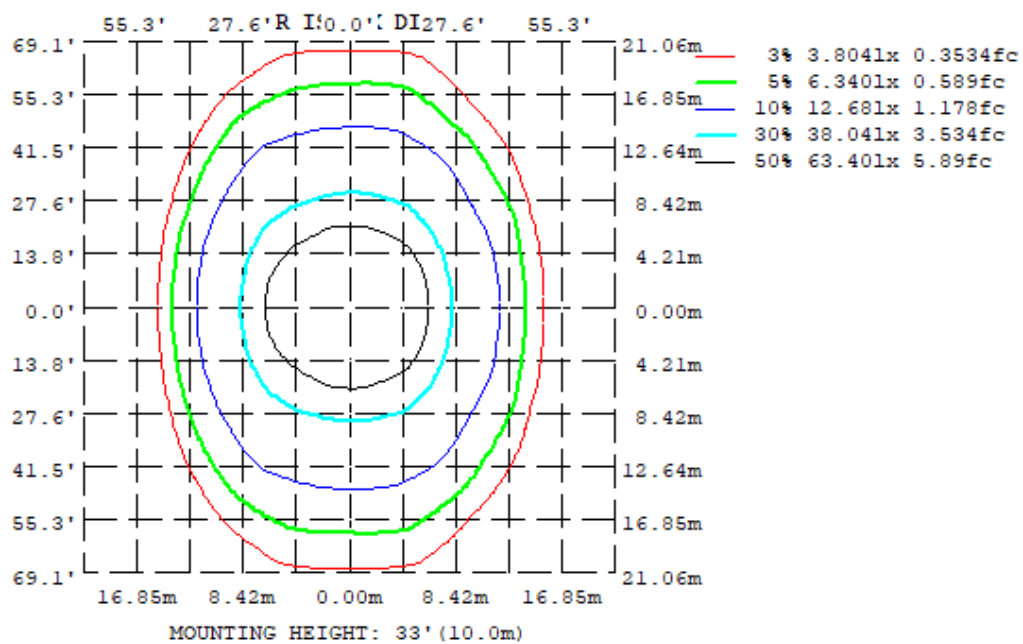
99.89%

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1248	1251	1247	1248	1244	1252	1251	1256
20	1223	1197	1189	1167	1177	1168	1191	1199
30	1094	1134	1098	1095	1140	1090	1094	1136
40	738.8	965.1	968.6	1007	882.4	998.4	958.2	938.7
50	476.0	649.2	796.4	727.9	500.8	721.0	772.1	597.5
60	123.4	353.7	567.8	362.4	102.5	343.5	535.1	338.9
70	4.711	49.35	304.1	39.03	16.22	34.17	275.2	29.75
80	0.1205	0.4633	66.21	8.567	2.285	6.829	44.82	0.1310
90	0.0737	0.1573	0.1790	0.4265	0.0362	0.2756	0.0842	0.0678
100	0.0980	0.1972	0.2376	0.2987	0.5271	0.2593	0.2319	0.1336
110	0.2101	0.3200	0.4115	0.3142	0.1747	0.3012	0.3915	0.2548
120	0.3764	0.4438	0.5247	0.4213	0.2845	0.3909	0.4949	0.3613
130	0.5909	0.5697	0.6650	0.5738	0.4812	0.5315	0.6536	0.5217
140	0.7646	0.7326	0.7668	0.7221	0.7423	0.7776	0.8135	0.7577
150	0.8963	0.8889	0.8044	0.8530	0.8783	0.8953	0.9293	0.9247
160	0.9846	0.9357	0.8647	0.9063	1.053	0.9786	0.9540	1.003
170	0.9946	0.9310	0.8771	0.9186	0.9683	0.9600	0.8918	0.9005
180	1.117	1.032	0.9516	1.046	1.107	1.058	0.9897	1.019
DEG	LUMINOUS INTENSITY: *10cd							

	Zonal (lm)		Total (lm)	Percent
0-10	1204.83	0 - 10	1204.83	4.02%
10-20	3456.72	0 - 20	4661.55	15.55%
20-30	5349.56	0 - 30	10011.11	33.40%
30-40	6480.66	0 - 40	16491.76	55.02%
40-50	6176.96	0 - 50	22668.73	75.63%
50-60	4551.31	0 - 60	27220.04	90.81%
60-70	2126.45	0 - 70	29346.49	97.91%
70-80	559.14	0 - 80	29905.63	99.77%
80-90	35.67	0 - 90	29941.30	99.89%
90-100	3.21	0 - 100	29944.52	99.90%
100-110	2.57	0 - 110	29947.09	99.91%
110-120	3.42	0 - 120	29950.52	99.92%
120-130	4.37	0 - 130	29954.88	99.94%
130-140	5.19	0 - 140	29960.07	99.96%
140-150	5.19	0 - 150	29965.26	99.97%
150-160	4.31	0 - 160	29969.56	99.99%
160-170	2.69	0 - 170	29972.26	100.00%
170-180	0.92	0 - 180	29973.18	100.00%

4.2 Goniophotometer Test

Axial Candela

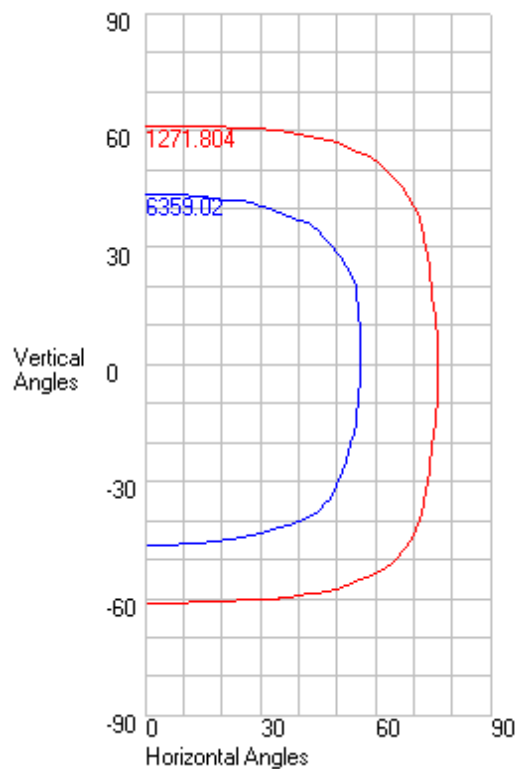
DEG.	HOR.	DEG.	VERT.
90	0.84	90	0.74
85	31.93	85	1.17
75	1481.19	75	4.07
65	4051.29	65	204.25
55	6603.01	55	2969.11
47.5	8228.31	47.5	5325.81
42.5	9166.42	42.5	6686.1
37.5	9965.5	37.5	8798.77
33	10579.59	33	10192.07
29	11058.03	29	11468.62
25.5	11431.18	25.5	11999.37
22.5	11709.24	22.5	12153.86
19.5	11943.74	19.5	12238.23
17	12119.84	17	12298.97
15	12249.29	15	12342.51
13	12364.81	13	12373.41
11	12462.51	11	12424.04
9	12549.17	9	12529.59
7	12616.86	7	12619.64
5	12663.02	5	12648.86
3	12686.91	3	12640.28
1	12695.23	1	12661.08
0	12688.38	0	12688.38
-1	12683.21	-1	12697.27
-3	12655.63	-3	12712.76
-5	12619.9	-5	12676.28
-7	12572	-7	12596.91
-9	12510.94	-9	12503.98
-11	12429.88	-11	12364.47
-13	12327.35	-13	12168.73
-15	12215.89	-15	12017.5
-17	12100.05	-17	11901.02
-19.5	11924.28	-19.5	11783.37
-22.5	11692.77	-22.5	11718.06
-25.5	11426.24	-25.5	11642.4
-29	11086.57	-29	11471.23
-33	10621.74	-33	11051
-37.5	10042.69	-37.5	9843.81
-42.5	9286.94	-42.5	7744.02
-47.5	8426.7	-47.5	5956.07
-55	6888.27	-55	2860.4
-65	4373.77	-65	267.02
-75	1767.8	-75	91.85
-85	52.95	-85	20.29
-90	1.79	-90	0.37

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	12718.04
Maximum Candela Angle	1 H -3 V
Horizontal Beam Angle (50%)	113.1
Vertical Beam Angle (50%)	90.2
Horizontal Field Angle (10%)	154.3
Vertical Field Angle (10%)	122.3
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	23594
Beam Efficiency	N.A.
Field Lumens	29522
Field Efficiency	N.A.
Spill Lumens	451
Luminaire Lumens	29973
Total Efficiency	N.A.
Total Luminaire Watts	193.742
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	0.74	0.73	0.71	0.69	0.66	0.64	0.62	0.59	0.57	0.57	0.58	0.58	0.59	0.59	0.61	0.64	0.67	0.69	0.72	0.73	0.72	0.8	0.84
85	1.17	1.16	1.15	1.13	1.11	1.1	1.08	1.06	1.04	1.04	1.04	1.03	1.03	1.02	1.03	1.05	1.06	1.08	1.12	1.04	0.8	0.83	0.84
75	4.07	4.07	4.07	4.06	3.8	3.65	3.46	3.24	3.29	4.03	4.46	4.53	4.14	2.66	5.41	5.33	2.19	6.56	4.89	8.61	1.09	0.95	0.84
65	204.25	210.25	222.25	227.08	231.95	234.22	233.78	230.54	237.1	242.9	240.64	223.6	208.23	211.79	220.94	201.89	160.46	222.61	128.15	149.43	24.96	1.14	0.84
55	2969.11 *	2985.37 *	3017.86 *	3002.7 *	2989.82 *	2962.27 *	2920.35 *	2905.59 *	2914.46 *	2883.51 *	2801.79 *	2688.97 *	2585.69 *	2547.2 *	2438.4 *	2131.68 *	1887.49 *	1651.13 *	1212.89	653.2	121.11	1.31	0.84
47.5	5325.81 *	5350.71 *	5380.35 *	5380.66 *	5348.84 *	5299.35 *	5224.14 *	5188.2 *	5198.03 *	5220.36 *	5136.7 *	4873.59 *	4732.04 *	4674.09 *	4516.67 *	4034.2 *	3676.6 *	3176.57 *	2486.99 *	1274.95 *	311.1	1.7	0.84
42.5	6686.1 *	6695.24 *	6700.41 *	6687.14 *	6654.39 *	6608.54 *	6579.89 *	6570.89 *	6495.18 *	6400.55 *	6267.67 *	6214.78 *	6206.85 *	5860.52 *	5432.66 *	5339.91 *	4867.74 *	4044.72 *	3327.45 *	1834.42 *	449.67	2	0.84
37.5	8798.77 *	8815.45 *	8825.79 *	8807.1 *	8778.81 *	8674.6 *	8621.32 *	8511.41 *	8395.89 *	8280.41 *	8198.43 *	7907.77 *	7589.73 *	7479.81 *	7087.27 *	6416.17 *	6062.71 *	5295.5 *	4148.88 *	2386.47 *	629.76	2.33	0.84
33	10192.07 *	10202.6 *	10193.23 *	10162.84 *	10110.62 *	10067.01 *	9969.28 *	9868.32 *	9766.04 *	9660.62 *	9577.46 *	9301.22 *	9014.02 *	8738.11 *	8360.82 *	7844.54 *	7058.59 *	6155.14 *	4788.16 *	2825.19 *	776.8	7.07	0.84
29	11468.62 *	11488.15 *	11465.1 *	11417.06 *	11357.91 *	11230.19 *	11096.91 *	11066.67 *	11000.34 *	10729.85 *	10477.91 *	10434.41 *	10246.16 *	9542.98 *	9199.03 *	8839.39 *	7736.74 *	6790.24 *	5354.49 *	3126.07 *	900.9	11.72	0.84
25.5	11999.37 *	11996.52 *	11983.63 *	11961.78 *	11919.04 *	11844.05 *	11755.31 *	11661.32 *	11547.64 *	11408.44 *	11217.57 *	10982.86 *	10719.94 *	10269.56 *	9729.85 *	9346.36 *	8334.67 *	7237.46 *	5838.79 *	3357.43 *	1015.36	15.5	0.84
22.5	12153.86 *	12151.12 *	12141.21 *	12126.41 *	12076.23 *	12004.62 *	11926.69 *	11833.92 *	11716.6 *	11593.31 *	11427.06 *	11191.98 *	10899.07 *	10538.22 *	10084.96 *	9503.93 *	8657.18 *	7547.43 *	6206.49 *	3533.96 *	1104.38	18.51	0.84
19.5	12238.23 *	12236.75 *	12229.9 *	12217.09 *	12162.97 *	12096.04 *	12019.52 *	11924.09 *	11814.28 *	11691.82 *	11528.49 *	11295.5 *	11013.11 *	10652.37 *	10216.84 *	9618.84 *	8804.2 *	7804.39 *	6340.06 *	3700.62 *	1183.47	21.28	0.84
17	12298.97 *	12300.35 *	12296.34 *	12277.76 *	12225.17 *	12162.86 *	12080.66 *	11982.56 *	11874.57 *	11754.62 *	11588.79 *	11357.69 *	11079.95 *	10731.99 *	10285.56 *	9690.19 *	8898.71 *	7983.35 *	6431.8 *	3818.31 *	1241.87	23.39	0.84
15	12342.51 *	12345.25 *	12343.85 *	12320.39 *	12272.84 *	12210.13 *	12125.99 *	12028.32 *	11924.5 *	11800.41 *	11632.55 *	11398.26 *	11138.34 *	10794.81 *	10331.95 *	9733.33 *	8950.89 *	8053.45 *	6492.19 *	3893.53 *	1284.59 *	24.93	0.84
13	12373.41 *	12379.42 *	12384.66 *	12359.96 *	12316.62 *	12253.17 *	12168.13 *	12073.27 *	11972.33 *	11844.51 *	11670.53 *	11452.9 *	11207.17 *	10851.69 *	10374.09 *	9763.37 *	9019.78 *	8112.92 *	6547.61 *	3951.79 *	1323.63 *	26.35	0.84
11	12424.04 *	12436.47 *	12443.34 *	12422.84 *	12374.11 *	12315.62 *	12220.81 *	12141.66 *	12034.17 *	11895.63 *	11721.42 *	11525.86 *	11271.28 *	10900.68 *	10409.11 *	9803 *	9061.81 *	8161.93 *	6581.32 *	3997.53 *	1358.9 *	30.18	0.84
9	12529.59 *	12545.53 *	12545.87 *	12522.25 *	12474.42 *	12406.19 *	12321.53 *	12224.7 *	12104.74 *	11969.93 *	11802.48 *	11595.35 *	11331.48 *	10944.52 *	10465.12 *	9858.59 *	9107.16 *	8200.57 *	6609.87 *	4031.28 *	1390.29 *	30.49	0.84
7	12619.64 *	12632.76 *	12628.86 *	12601.82 *	12559.68 *	12484.43 *	12405.42 *	12298.47 *	12171.2 *	12040.38 *	11873.98 *	11657.13 *	11379.6 *	10993.52 *	10506.82 *	9911.95 *	9142 *	8228.19 *	6627.87 *	4053.63 *	1417.71 *	30.81	0.84
5	12648.86 *	12659.78 *	12655.18 *	12633.1 *	12580.78 *	12519.04 *	12434.62 *	12325.23 *	12209.29 *	12089.14 *	11925.52 *	11696.43 *	11412.86 *	11031.12 *	10544.6 *	9937.49 *	9164.03 *	8243.83 *	6634.96 *	4065.19 *	1454.47 *	31.13	0.84
3	12640.28 *	12657.01 *	12649.49 *	12623.91 *	12582.26 *	12515.36 *	12427.05 *	12336.41 *	12231.57 *	12112.28 *	11943.12 *	11710.67 *	11431.26 *	11053.23 *	10568.92 *	9958.26 *	9174.26 *	8247.09 *	6644.05 *	4076.41 *	1465.14 *	31.45	0.84
1	12661.08 *	12677.99 *	12670.16 *	12648.5 *	12603.27 *	12538.67 *	12456.65 *	12361.07 *	12249.05 *	12122.98 *	11946.94 *	11713.24 *	11434.92 *	11061.93 *	10581.24 *	9966.33 *	9172.2 *	8237.76 *	6616.7 *	4059.67 *	1475.84 *	31.93	0.84
0	12688.38 *	12695.23 *	12686.91 *	12663.02 *	12616.86 *	12549.17 *	12462.51 *	12364.81 *	12249.29 *	12119.84 *	11943.74 *	11709.24 *	11431.18 *	11058.03 *	10579.59 *	9965.5 *	9166.42 *	8228.31 *	6603.01 *	4051.29 *	1481.19 *	31.93	0.84
-1	12697.27 *	12707.56 *	12703.35 *	12677.91 *	12631.63 *	12565.35 *	12477.32 *	12376.94 *	12260.46 *	12128.86 *	11947.59 *	11709.76 *	11429.32 *	11057.22 *	10576.58 *	9958.26 *	9156.64 *	8221.35 *	6603.57 *	4059.63 *	1480.65 *	31.9	0.84
-3	12712.76 *	12718.04 *	12714.75 *	12689.93 *	12636.96 *	12569.61 *	12488.47 *	12382.77 *	12263.07 *	12128.17 *	11943.8 *	11699.49 *	11414.36 *	11039.19 *	10555.02 *	9933.45 *	9127.17 *	8197.82 *	6604.69 *	4076.3 *	1479.56 *	31.84	0.84
-5	12676.28 *	12683.17 *	12675.09 *	12654.05 *	12601.11 *	12534.59 *	12448.51 *	12342.84 *	12230.74 *	12105.89 *	11923.07 *	11675.58 *	11384.34 *	11008.06 *	10521.69 *	9894.21 *	9084.11 *	8161.58 *	6569.77 *	4066.89 *	1478.47 *	31.78	0.84
-7	12596.91 *	12602.91 *	12594.71 *	12570.45 *	12522.91 *	12459.17 *	12373.68 *	12269.22 *	12157.31 *	12030.8 *	11853.3 *	11617.75 *	11339.91 *	10961.93 *	10475.27 *	9848.19 *	9027.13 *	8112.78 *	6537.2 *	4058.51 *	1450.34 *	31.72	0.84
-9	12503.98 *	12512.04 *	12500.83 *	12478 *	12428.32 *	12364.5 *	12271.83 *	12169.43 *	12063.61 *	11935.33 *	11753.2 *	11508.18 *	11238.87 *	10890.09 *	10425.36 *	9772.1 *	8957.39 *	8051.48 *	6494.35 *	4041.82 *	1431.39 *	31.65	0.84
-11	12364.47 *	12375.49 *	12362.34 *	12345.18 *	12291.57 *	12219.3 *	12138.8 *	12030.41 *	11920.66 *	11806.88 *	11628.43 *	11372.95 *	11110.04 *	10772.83 *	10325.07 *	9691.55 *	8876.23 *	7978.31 *	6441.7 *	4016.85 *	1407.84 *	31.59	0.84
-13	12168.73 *	12180.03 *	12170.93 *	12147.81 *	12096.37 *	12040.21 *	11965.8 *	11852.15 *	11757.53 *	11654.06 *	11483.44 *	11222.34 *	10972.89 *	10647.38 *	10213.49 *	9604.8 *	8797.89 *	7893.97 *	6384.71 *	3983.69 *	1379.66 *	27.91	0.84
-15	12017.5 *	12022.24 *	12012.15 *	11986.22 *	11938.82 *	11876.31 *	11805.44 *	11703.6 *	11600.31 *	11500.45 *	11341.53 *	11092.61 *	10825.94 *	10511.26 *	10096.97 *	9520.07 *	8698.38 *	7799.31 *	6311.57 *	3942.4 *	1346.82 *	26.69	0.84
-17	11901.02 *	11902.07 *	11889.34 *	11862.4 *	11814.61 *	11748.58 *	11674.08 *	11582.57 *	11472.16 *	11355.99 *	11210.47 *	10987.93 *	10706.2 *	10367.8 *	9980.81 *	9432.56 *	8638.53 *	7694.28 *	6235.93 *	3891.5 *	1309.3 *	25.32	0.84
-19.5	11783.37 *	11778.94 *	11763.66 *	11738.93 *	11690.59 *	11625.55 *	11543.37 *	11462.29 *	11361.48 *	11236.24 *	11075.68 *	10878.59 *	10612.07 *	10224.41 *	9833.9 *	9323.98 *	8551.53 *	7618.8 *	6125.52 *	3815.43 *	1255.81	23.4	0.84
-22.5	11718.06 *	11708.48 *	11686.93 *	11662.18 *	11612.81 *	11540.92 *	11462.2 *	11376.87 *	11272.71 *	11147.96 *	10979.23 *	10769.39 *	10505.76 *	10144.48 *	9690.95 *	9185.61 *	8450.6 *	7502.91 *	5968.46 *	3712.64 *	1183.33	20.8	0.84
-25.5	11642.4 *	11632.46 *	11608.65 *	11579.32 *	11536.04 *	11462.05 *	11380.44 *	11292.44 *	11185.12 *	11058.26 *	10886.02 *	10664.45 *	10396.23 *	10030.84 *	9586.79 *	9043.4 *	8291.12 *	7350.69 *	5753.49 *	3580.78 *	1102.21	17.91	0.84
-29	11471.23 *	11463.1 *	11437.61 *	11405.58 *	11366.58 *	11296.64 *	11213.32 *	11117.91 *	11016.71 *	10895.15 *	10715.89 *	10481.63 *	10228.72 *	9883.58 *	9365.78 *	8786.78 *	8102.34 *	7104.64 *	5437.04 *	3403.61 *	995.79	14.18	0.84
-33	11051 *	11052.74 *	11035.14 *	11003.69 *	10958.43 *	10906.16 *	10800.47 *	10707.38 *	10608.76 *	10504.35 *	10292.89 *	10020.33 *	9772.97 *	9496.48 *	8904.21 *	8239.43 *	7701.99 *	6699.62 *	4963.85 *	3163.93 *	871.87	9.46	0.84
-37.5	9843.81 *	9861.17 *	9871.62 *	9851.68 *	9822.02 *	9713.55 *	9645.48 *	9568.22 *	9485.82 *	9378.37 *	9215.1 *	8935.08 *	8698.85 *	8464.9 *	7954.7 *	7300.38 *	6768.24 *	6019.86 *	4344.94 *	2756.86 *	720.51	4.56	0.84
-42.5	7744.02 *	7766.58 *	7788.11 *	7776.59 *	7730.28 *	7659.93 *	7603.37 *	7621.11 *	7545.31 *	7459.03 *	7287.76 *	7134.1 *	6995.49 *	6779.11 *	6368.53 *	5943.77 *	5524.46 *	4837.57 *	3579.22 *	2165.07 *	541.45	3.97	0.84
-47.5	5956.07 *	5969.93 *	5981.17 *	5970.79 *	5939.32 *	5883.44 *	5803.29 *	5775.59 *	5731.97 *	5664.07 *	5550.3 *	5383.27 *	5265.6 *	5074.6 *	4794.95 *	4470.19 *	4064.1 *	3529.39 *	2712.97 *	1569.79 *	382.59	3.29	0.84
-55	2860.4 *	2885.8 *	2936.57 *	2919.33 *	2903.8 *	2865.33 *	2803.63 *	2759.79 *	2760.3 *	2748.09 *	2707.97 *	2626.55 *	2474.16 *	2425.83 *	2336.05 *	2123.14 *	1907.57 *	1737.89 *	1334.21 *	823.51	201.41	2.31	0.84
-65	267.02	269.55	274.59	275.36	275.8	274.23	270.43	264.17	267.62	274.65	277.25	265.68	254.31	268.12	297.4	271.5	243.44	350.3	244	262.93	49.24	2	0.84
-75																							

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																								
85	0	0	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	0.1	0	0.1	0.1	0.1	0.1	0	0	0	0
65	0.3	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	1.1	1	1.1	1.4	1.5	1.3	1.3	1.8	1.6	0.7	0.1	0	0	0
55	4.85 *	9.81 *	9.85 *	9.81 *	9.72 *	9.58 *	9.43 *	9.38 *	9.35 *	11.47 *	13.09 *	12.25 *	13.58 *	14.79 *	15	14	11	13	9.6	3.1	0.3	0	0	0
47.5	9.50 *	19.12 *	19.17 *	19.07 *	18.88 *	18.57 *	18.24 *	18.06 *	17.95 *	22.07 *	25.30 *	23.73 *	26.25 *	28.33 *	28.50 *	26.95 *	22.10 *	24.36 *	17.75 *	5.5	0.6	0	0	0
42.5	9.16 *	18.38 *	18.37 *	18.28 *	18.10 *	17.86 *	17.63 *	17.42 *	17.15 *	20.96 *	24.27 *	23.30 *	25.86 *	27.24 *	27.61 *	27.04 *	22.27 *	24.58 *	18.29 *	5.8	0.7	0	0	0
37.5	11.80 *	23.63 *	23.59 *	23.45 *	23.20 *	22.93 *	22.67 *	22.29 *	21.80 *	26.55 *	30.80 *	29.54 *	32.74 *	34.48 *	34.69 *	34.01 *	28.46 *	31.47 *	23.60 *	7.74 *	0.9	0	0	0
33	13.03 *	26.06 *	25.99 *	25.84 *	25.59 *	25.27 *	24.88 *	24.41 *	23.91 *	29.25 *	33.94 *	32.18 *	35.44 *	37.78 *	38.17 *	36.80 *	30.68 *	33.91 *	25.45 *	8.56 *	1	0	0	0
29	13.21 *	26.40 *	26.29 *	26.11 *	25.84 *	25.47 *	25.09 *	24.72 *	24.21 *	29.41 *	34.15 *	32.80 *	35.92 *	37.81 *	38.79 *	37.48 *	30.69 *	33.95 *	25.69 *	8.71 *	1	0	0	0
25.5	12.51 *	25.00 *	24.90 *	24.73 *	24.47 *	24.12 *	23.78 *	23.45 *	22.95 *	27.81 *	32.25 *	31.06 *	34.02 *	35.62 *	36.54 *	35.46 *	28.98 *	32.27 *	24.60 *	8.34 *	1	0	0	0
22.5	11.03 *	22.03 *	21.96 *	21.82 *	21.62 *	21.37 *	21.07 *	20.72 *	20.31 *	24.75 *	28.68 *	27.44 *	30.22 *	31.90 *	32.55 *	31.59 *	26.01 *	29.27 *	22.43 *	7.61 *	1	0	0	0
19.5	11.14 *	22.25 *	22.18 *	22.05 *	21.84 *	21.59 *	21.30 *	20.94 *	20.54 *	25.06 *	29.05 *	27.80 *	30.66 *	32.53 *	33.15 *	32.15 *	26.76 *	30.37 *	23.32 *	7.98 *	1	0	0	0
17	9.34 *	18.66 *	18.60 *	18.48 *	18.32 *	18.11 *	17.86 *	17.57 *	17.23 *	21.02 *	24.38 *	23.34 *	25.76 *	27.36 *	27.89 *	27.08 *	22.72 *	25.87 *	19.88 *	6.91 *	0.9	0	0	0
15	7.51 *	14.99 *	14.94 *	14.85 *	14.72 *	14.56 *	14.35 *	14.12 *	13.85 *	16.90 *	19.59 *	18.76 *	20.74 *	22.03 *	22.44 *	21.80 *	18.36 *	20.97 *	16.15 *	5.67 *	0.8	0	0	0
13	7.53 *	15.04 *	14.99 *	14.90 *	14.77 *	14.61 *	14.40 *	14.17 *	13.91 *	16.96 *	19.66 *	18.85 *	20.86 *	22.14 *	22.53 *	21.91 *	18.49 *	21.14 *	16.33 *	5.77 *	0.8	0	0	0
11	7.55 *	15.10 *	15.05 *	14.96 *	14.83 *	14.67 *	14.46 *	14.24 *	13.97 *	17.03 *	19.75 *	18.96 *	20.97 *	22.24 *	22.62 *	22.01 *	18.61 *	21.29 *	16.47 *	5.86 *	0.8	0	0	0
9	7.60 *	15.19 *	15.15 *	15.06 *	14.93 *	14.76 *	14.56 *	14.32 *	14.05 *	17.12 *	19.87 *	19.07 *	21.07 *	22.34 *	22.73 *	22.13 *	18.72 *	21.41 *	16.58 *	5.93 *	0.8	0	0	0
7	7.66 *	15.31 *	15.26 *	15.17 *	15.04 *	14.86 *	14.66 *	14.41 *	14.13 *	17.23 *	20.00 *	19.17 *	21.17 *	22.44 *	22.85 *	22.24 *	18.80 *	21.50 *	16.66 *	5.99 *	0.8	0	0	0
5	7.70 *	15.38 *	15.33 *	15.23 *	15.10 *	14.93 *	14.72 *	14.47 *	14.19 *	17.31 *	20.09 *	19.25 *	21.25 *	22.53 *	22.94 *	22.33 *	18.86 *	21.56 *	16.71 *	6.04 *	0.9	0	0	0
3	7.70 *	15.39 *	15.34 *	15.25 *	15.12 *	14.95 *	14.74 *	14.49 *	14.23 *	17.36 *	20.14 *	19.29 *	21.30 *	22.59 *	23.00 *	22.39 *	18.90 *	21.59 *	16.74 *	6.07 *	0.9	0	0	0
1	7.71 *	15.40 *	15.35 *	15.26 *	15.13 *	14.96 *	14.75 *	14.52 *	14.25 *	17.38 *	20.16 *	19.31 *	21.32 *	22.63 *	23.05 *	22.42 *	18.91 *	21.59 *	16.73 *	6.08 *	0.9	0	0	0
0	3.86 *	7.71 *	7.69 *	7.64 *	7.57 *	7.49 *	7.39 *	7.26 *	7.13 *	8.69 *	10.08 *	9.66 *	10.66 *	11.32 *	11.53 *	11.22 *	9.45 *	10.78 *	8.34 *	3.04 *	0.4	0	0	0
	3.87 *	7.73 *	7.70 *	7.65 *	7.58 *	7.50 *	7.39 *	7.27 *	7.13 *	8.70 *	10.08 *	9.65 *	10.66 *	11.31 *	11.53 *	11.21 *	9.44 *	10.77 *	8.34 *	3.04 *	0.4	0	0	0

-1	7.74 *	15.47 *	15.41 *	15.32 *	15.18 *	15.01 *	14.80 *	14.55 *	14.27 *	17.39 *	20.16 *	19.29 *	21.30 *	22.60 *	23.02 *	22.37 *	18.85 *	21.51 *	16.70 *	6.09 *	0.9	0	0
-3	7.73 *	15.45 *	15.40 *	15.30 *	15.16 *	14.99 *	14.78 *	14.53 *	14.25 *	17.37 *	20.13 *	19.26 *	21.26 *	22.54 *	22.94 *	22.28 *	18.77 *	21.44 *	16.68 *	6.09 *	0.9	0	0
-5	7.70 *	15.38 *	15.32 *	15.23 *	15.10 *	14.92 *	14.71 *	14.47 *	14.19 *	17.31 *	20.05 *	19.19 *	21.18 *	22.46 *	22.84 *	22.17 *	18.67 *	21.33 *	16.62 *	6.07 *	0.9	0	0
-7	7.65 *	15.27 *	15.22 *	15.13 *	14.99 *	14.82 *	14.61 *	14.37 *	14.10 *	17.18 *	19.91 *	19.06 *	21.06 *	22.34 *	22.72 *	22.02 *	18.54 *	21.20 *	16.54 *	6.03 *	0.9	0	0
-9	7.58 *	15.13 *	15.08 *	14.99 *	14.85 *	14.68 *	14.47 *	14.23 *	13.96 *	17.02 *	19.71 *	18.87 *	20.86 *	22.17 *	22.54 *	21.84 *	18.39 *	21.04 *	16.44 *	5.98 *	0.9	0	0
-11	7.47 *	14.93 *	14.88 *	14.79 *	14.66 *	14.49 *	14.29 *	14.05 *	13.79 *	16.83 *	19.48 *	18.64 *	20.63 *	21.94 *	22.33 *	21.65 *	18.22 *	20.85 *	16.31 *	5.93 *	0.8	0	0
-13	7.37 *	14.72 *	14.67 *	14.58 *	14.45 *	14.30 *	14.09 *	13.86 *	13.62 *	16.62 *	19.24 *	18.42 *	20.38 *	21.70 *	22.13 *	21.46 *	18.03 *	20.63 *	16.16 *	5.86 *	0.8	0	0
-15	7.29 *	14.55 *	14.50 *	14.41 *	14.29 *	14.13 *	13.93 *	13.70 *	13.45 *	16.42 *	19.04 *	18.22 *	20.14 *	21.45 *	21.92 *	21.28 *	17.85 *	20.39 *	15.98 *	5.77 *	0.8	0	0
-17	9.02 *	18.01 *	17.94 *	17.84 *	17.68 *	17.48 *	17.24 *	16.96 *	16.64 *	20.30 *	23.57 *	22.57 *	24.89 *	26.48 *	27.11 *	26.37 *	22.10 *	25.17 *	19.68 *	7.07 *	1	0	0
-20	10.73 *	21.43 *	21.36 *	21.23 *	21.04 *	20.80 *	20.51 *	20.19 *	19.80 *	24.14 *	28.02 *	26.84 *	29.59 *	31.40 *	32.11 *	31.29 *	26.23 *	29.74 *	23.12 *	8.24 *	1.1	0	0
-23	10.67 *	21.30 *	21.22 *	21.09 *	20.90 *	20.65 *	20.37 *	20.04 *	19.65 *	23.95 *	27.77 *	26.59 *	29.32 *	31.07 *	31.69 *	30.85 *	25.82 *	29.06 *	22.43 *	7.93 *	1	0	0
-26	12.32 *	24.59 *	24.49 *	24.34 *	24.12 *	23.83 *	23.50 *	23.11 *	22.67 *	27.62 *	32.00 *	30.62 *	33.77 *	35.71 *	36.27 *	35.25 *	29.43 *	32.72 *	25.04 *	8.79 *	1.1	0	0
-29	13.72 *	27.39 *	27.28 *	27.11 *	26.87 *	26.54 *	26.14 *	25.71 *	25.23 *	30.72 *	35.49 *	33.92 *	37.48 *	39.52 *	39.77 *	38.65 *	32.28 *	35.32 *	26.76 *	9.35 *	1.1	0	0
-33	14.33 *	28.64 *	28.54 *	28.37 *	28.08 *	27.70 *	27.29 *	26.84 *	26.35 *	32.07 *	36.97 *	35.24 *	38.98 *	41.10 *	41.06 *	39.75 *	33.36 *	36.20 *	27.07 *	9.40 *	1.1	0	0
-38	13.41 *	26.85 *	26.79 *	26.63 *	26.31 *	25.94 *	25.63 *	25.28 *	24.79 *	30.17 *	34.80 *	33.25 *	36.80 *	38.80 *	38.86 *	37.64 *	31.62 *	34.38 *	25.44 *	8.63 *	1	0	0
-43	10.45 *	20.93 *	20.90 *	20.77 *	20.52 *	20.22 *	19.98 *	19.73 *	19.36 *	23.54 *	27.18 *	26.02 *	28.78 *	30.31 *	30.55 *	29.64 *	24.67 *	26.99 *	19.96 *	6.6	0.7	0	0
-48	10.09 *	20.29 *	20.30 *	20.16 *	19.91 *	19.55 *	19.19 *	18.93 *	18.64 *	22.74 *	26.24 *	24.92 *	27.43 *	29.08 *	29.38 *	28.15 *	23.34 *	25.90 *	19.38 *	6.4	0.7	0	0
-55	4.78 *	9.69 *	9.73 *	9.65 *	9.53 *	9.32 *	9.10 *	8.98 *	8.91 *	10.95 *	12.67 *	11.90 *	13.08 *	14.23 *	14	14	12	14	11	4	0.4	0	0
-65	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.4	1.6	1.5	1.7	2	2.2	2.1	2.2	2.9	2.7	1.2	0.1	0	0
-75	0.2	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.6	0.8	0.7	0.2	0	0	0
-85	0	0	0	0	0	0	0	0	0	0	0	0	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0
Total	345	691	689	685	678	670	660	650	638	778	901	861	951	1008	1024	993	831	935	716	250	32.3	0.1	1498

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDL @ 180W / 5000K	Sample ID.	N1
Temperature (°C)	25.4	Humidity (%RH)	54.0

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

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
119.98	60	1.618	193.7	0.998	3.75%
276.99	60	0.723	189.0	0.944	10.16%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

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