

Photometric Test Report

Relevant Standards

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

Prepared For

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Prepared By



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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		37983
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	149.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		253.6
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%		4.87%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9		0.961
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4147
		4 step	3985±154	
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		4
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%		-12%
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		480
Input Current (A) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.551

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/11/4	FFLEDL @ 230W / 4000K/480	E1
2	Goniophotometer Test	2021/11/4	FFLEDL @ 230W / 4000K/480	E1
3	THD and PF Test	2021/11/4	FFLEDL @ 230W / 4000K/480	E1

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 @ 230W / 4000K/480

Electrical Specification: 480V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	FFLEDL @ 230W / 4000K/480	Sample ID.	E1
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
479.98	60	0.550	253.6	0.961

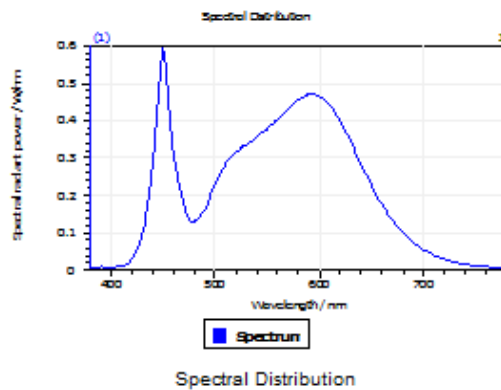
Test Result

CCT (K)	CRI	R9	Duv
4147	82	4	0.0013

Rf	Rg	IES Rcs,h1
83	96	-12%

4.1 Integrating Sphere Test

Results



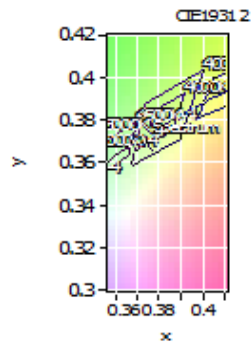
Spectral values

DominantWavelength 579.29 nm
Purity 0.230
PeakWavelength 450.33 nm
Radiant Power 82.77 W
Width50%:

Color Coordinates

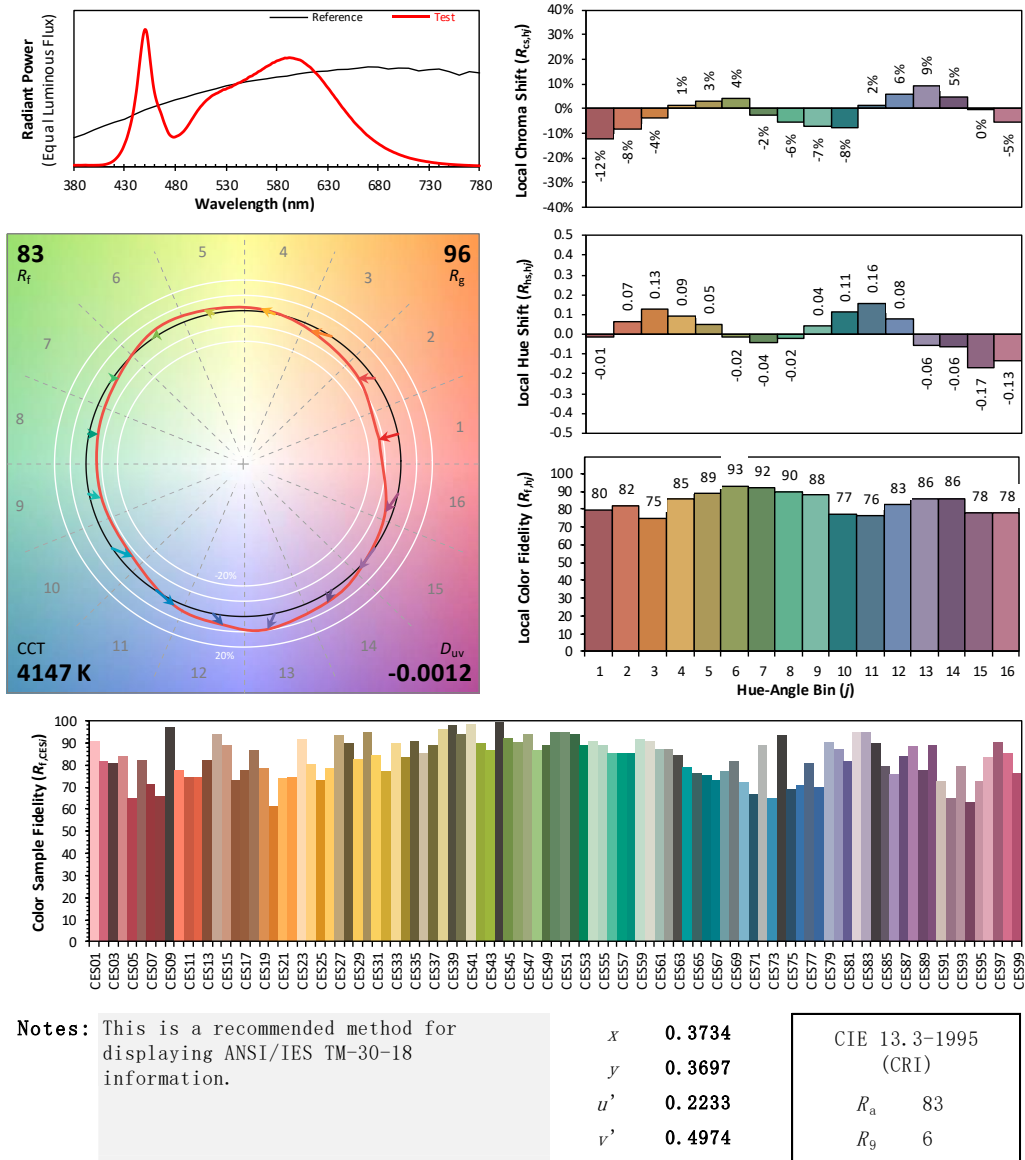
Correlated Color Temperat 4147 K
x: 0.3734 u: 0.2233 u': 0.2233
y: 0.3697 v: 0.3316 v': 0.4974

CRI01	80.5	CRI09	4.2
CRI02	88.6	CRI10	73.3
CRI03	94.3	CRI11	80.4
CRI04	81.3	CRI12	63.1
CRI05	81.0	CRI13	82.5
CRI06	84.3	CRI14	97.1
CRI07	84.7	CRI15	74.0
CRI08	62.9	CRI16	72.2
ResultsCRI	82.2		



PlanckDistance 1.3E-003

4.1 Integrating Sphere Test



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 @ 230W / 4000K/480	Sample ID.	E1
Opreate 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 paramters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at 25° C ± 1° 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	479.97	60	0.551	253.6	0.959

Test Result

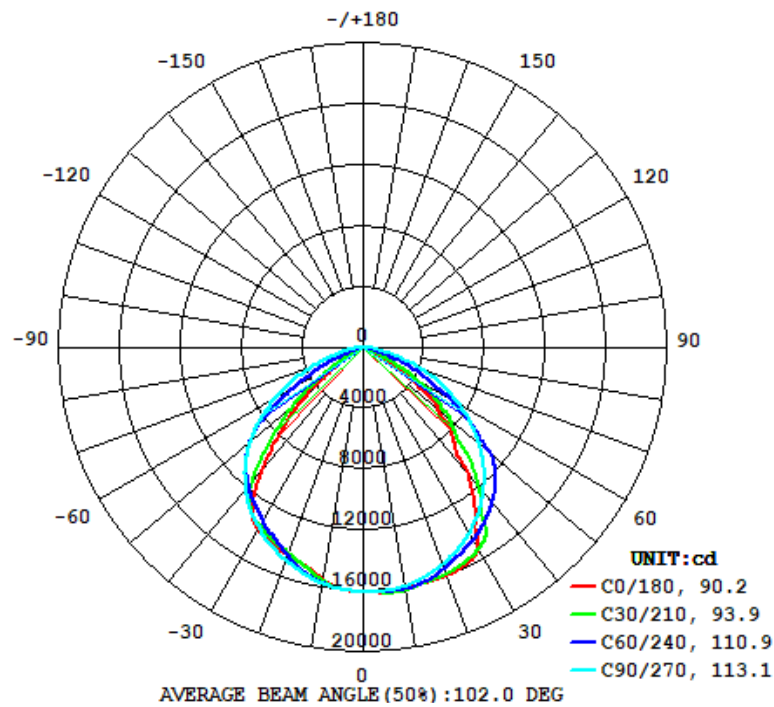
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
37983	119.0	153.4	90.2	113.1	149.8

Zonal Lumen Requirement (0°-90°)

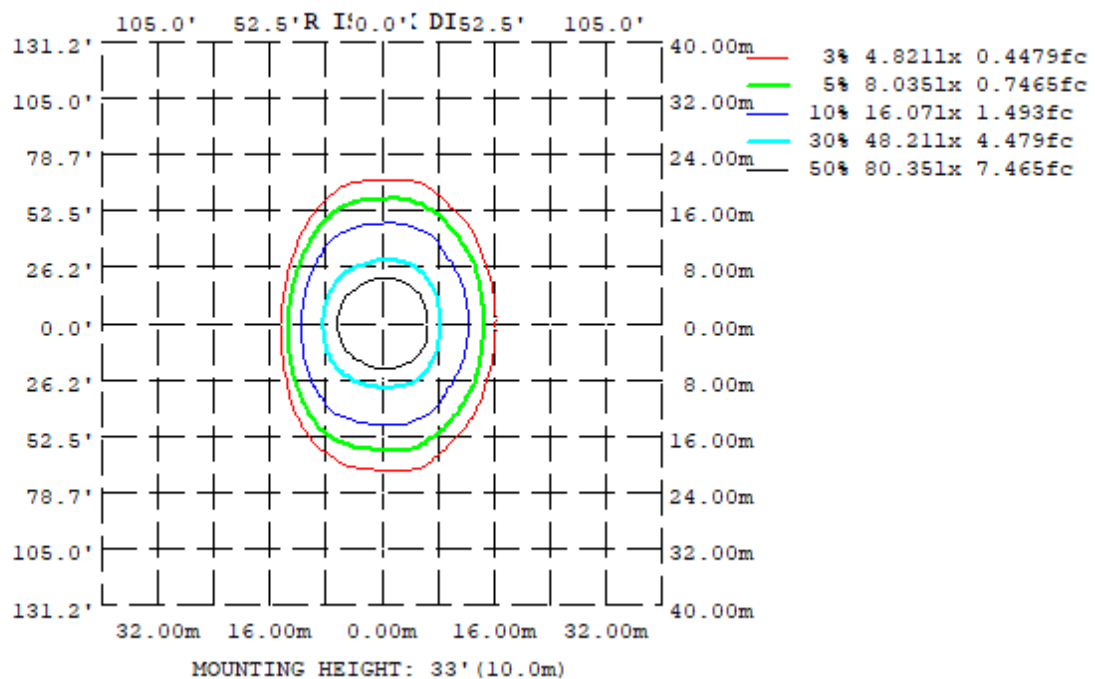
99.89%

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	1612	1619	1590	1577	1551	1566	1575	1605
20	1596	1563	1518	1458	1452	1439	1492	1538
30	1522	1498	1404	1353	1384	1339	1371	1463
40	1074	1330	1239	1229	1020	1202	1202	1320
50	659.6	892.7	1006	883.7	518.6	785.5	972.9	886.7
60	238.0	490.9	714.8	408.6	80.33	313.9	673.8	476.2
70	7.578	87.98	394.5	43.36	18.90	30.38	340.6	88.12
80	0.3097	0.6157	96.65	12.05	3.079	7.470	63.72	0.4150
90	0.2555	0.3108	0.2545	0.6260	0.2636	0.3439	0.2517	0.2438
100	0.1091	0.2354	0.3116	0.4427	0.5446	0.3848	0.3299	0.1597
110	0.2356	0.3687	0.5988	0.4766	0.2826	0.4025	0.5281	0.3030
120	0.4304	0.5178	0.7046	0.6560	0.4385	0.5250	0.6386	0.4297
130	0.6914	0.6862	0.9369	0.8725	0.7340	0.7196	0.8551	0.6473
140	0.9040	0.9027	1.088	1.082	1.092	1.029	1.055	0.9372
150	1.087	1.111	1.163	1.254	1.263	1.206	1.204	1.172
160	1.220	1.197	1.300	1.306	1.410	1.276	1.234	1.277
170	1.280	1.223	1.246	1.256	1.202	1.233	1.130	1.151
180	1.416	1.336	1.247	1.286	1.364	1.360	1.276	1.309
DEG	LUMINOUS INTENSITY: *10cd							

	Zonal (lm)		Total (lm)	Percent
0-10	1527.29	0 - 10	1527.29	4.02%
10-20	4381.99	0 - 20	5909.28	15.56%
20-30	6782.60	0 - 30	12691.87	33.41%
30-40	8237.93	0 - 40	20929.80	55.10%
40-50	7790.11	0 - 50	28719.91	75.61%
50-60	5708.60	0 - 60	34428.52	90.64%
60-70	2732.56	0 - 70	37161.07	97.84%
70-80	727.52	0 - 80	37888.59	99.75%
80-90	51.69	0 - 90	37940.28	99.89%
90-100	4.82	0 - 100	37945.11	99.90%
100-110	3.50	0 - 110	37948.61	99.91%
110-120	4.55	0 - 120	37953.17	99.92%
120-130	5.79	0 - 130	37958.95	99.94%
130-140	6.91	0 - 140	37965.86	99.95%
140-150	6.91	0 - 150	37972.77	99.97%
150-160	5.76	0 - 160	37978.52	99.99%
160-170	3.56	0 - 170	37982.09	100.00%
170-180	1.20	0 - 180	37983.29	100.00%

4.2 Goniophotometer Test

Axial Candela

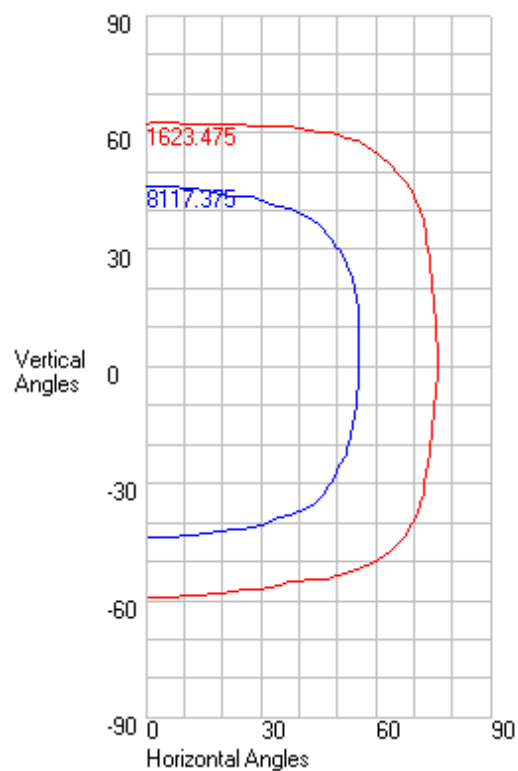
DEG.	HOR.	DEG.	VERT.
90	2.52	90	2.55
85	54.54	85	3.09
75	1834.02	75	9.02
65	5093.21	65	525.14
55	8305.04	55	4589.25
47.5	10366.97	47.5	7757.49
42.5	11504.64	42.5	9091.94
37.5	12507.19	37.5	11888.79
33	13298.97	33	13681.76
29	13845.11	29	15425.72
25.5	14306.86	25.5	15752.99
22.5	14654.89	22.5	15894.47
19.5	14962.83	19.5	15962.42
17	15198.62	17	15992.52
15	15381.48	15	16001.51
13	15538.4	13	16010.53
11	15677.36	11	16067.51
9	15798.29	9	16176.82
7	15891.31	7	16226.09
5	15960.4	5	16182.38
3	16005.98	3	16113.27
1	16037.31	1	16082.15
0	16052.62	0	16052.62
-1	16059.62	-1	16057.47
-3	16066.68	-3	16032.73
-5	16057.9	-5	15949.76
-7	16019.97	-7	15824.57
-9	15948	-9	15641.95
-11	15847.48	-11	15362.2
-13	15721.77	-13	15099
-15	15590.37	-15	14890.77
-17	15439.32	-17	14714.15
-19.5	15228.75	-19.5	14549.83
-22.5	14945.09	-22.5	14400.16
-25.5	14607.44	-25.5	14222.99
-29	14157.67	-29	13949.13
-33	13599.04	-33	13341.3
-37.5	12843.15	-37.5	11631.18
-42.5	11865.26	-42.5	8807.66
-47.5	10702.99	-47.5	6433.76
-55	8685.81	-55	2514.84
-65	5581.13	-65	293.67
-75	2363.17	-75	108.52
-85	78.68	-85	25.8
-90	2.54	-90	2.64

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	16234.75
Maximum Candela Angle	-3 H 7 V
Horizontal Beam Angle (50%)	112.9
Vertical Beam Angle (50%)	90.4
Horizontal Field Angle (10%)	154
Vertical Field Angle (10%)	121.8
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	29770
Beam Efficiency	N.A.
Field Lumens	37165
Field Efficiency	N.A.
Spill Lumens	818
Luminaire Lumens	37983
Total Efficiency	N.A.
Total Luminaire Watts	253.58
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	2.55	2.54	2.52	2.51	2.49	2.47	2.45	2.43	2.41	2.41	2.4	2.39	2.39	2.38	2.39	2.41	2.43	2.46	2.51	2.4	2.11	2.38	2.52
85	3.09	3.09	3.08	3.07	3.06	3.05	3.04	3.03	3.02	3.01	2.99	2.97	2.95	2.93	2.92	2.92	2.91	2.89	2.84	2.57	2.11	2.44	2.52
75	9.02	9.59	10.74	11.88	12.2	12.61	12.68	12.38	12.05	12.71	13.22	14.04	14.11	12.08	15.22	16.18	14.36	15.34	19.21	20.3	4.53	2.58	2.52
65	525.14	536.36	558.8	560.82	562.3	555.5	539.8	514.64	527.05	552.91	564.8	539.58	509.4	507.82	589.76	551.95	387.23	539.36	354.43	295.41	56.64	2.79	2.52
55	4589.25 *	4633.69 *	4722.53 *	4733.52 *	4729.78 *	4678.22 *	4570.76 *	4497.64 *	4536.77 *	4546.81 *	4477.23 *	4102.39 *	3959.56 *	3850.6 *	3684.28 *	3099.01 *	2750.65 *	2148.52 *	1061.09	292.39	3.08	2.52	
47.5	7757.49 *	7769.01 *	7774.62 *	7763.15 *	7742.02 *	7694.46 *	7632.22 *	7543.82 *	7386.5 *	7220.97 *	7152.64 *	7110.89 *	6816.96 *	6412.05 *	6218.29 *	5983.43 *	5348.64 *	4562.57 *	3669.7 *	2015.77 *	550.76	10.48	2.52
42.5	9091.94 *	9120.85 *	9153.25 *	9138.16 *	9059.83 *	8987.31 *	8984.54 *	9119.97 *	9115.62 *	9014.18 *	8607.79 *	8459.96 *	8496.68 *	8403.45 *	7669.18 *	7255.52 *	6959.01 *	6057.53 *	4593.87 *	2735.89 *	757.96	16.86	2.52
37.5	11888.79 *	11912.75 *	11930.84 *	11907.86 *	11866.22 *	11741.86 *	11691.47 *	11625.38 *	11525.22 *	11372.66 *	11155.6 *	10908.38 *	10640.44 *	10238.68 *	9784.17 *	9263.88 *	8295.21 *	7394.92 *	5473.64 *	3528.14 *	947.09	23.71	2.52
33	13681.76 *	13710.06 *	13726.02 *	13706.76 *	13645.02 *	13617.37 *	13564.6 *	13452.22 *	13246.73 *	13014.38 *	12858.5 *	12747.2 *	12500.74 *	11758.88 *	11195.77 *	10615.82 *	9936.93 *	8348.76 *	6395.33 *	4046.97 *	1123.07	28.87	2.52
29	15425.72 *	15413.83 *	15365.58 *	15306.01 *	15239.29 *	15114.13 *	14969.05 *	14779.85 *	14667.74 *	14501.51 *	14130.37 *	13734.8 *	13583.09 *	13108.64 *	12071.66 *	11544.54 *	10684.36 *	9008.33 *	7060.83 *	4351.35 *	1270.38	33.78	2.52
25.5	15752.99 *	15732.07 *	15684.14 *	15629.24 *	15554.37 *	15439.06 *	15306.4 *	15164.9 *	15004.03 *	14819.31 *	14575.79 *	14257.66 *	13893.85 *	13403.68 *	12738.72 *	12036.57 *	10962.15 *	9547.15 *	7531.97 *	4574.61 *	1390.75	37.72	2.52
22.5	15894.47 *	15872.73 *	15825.05 *	15773.18 *	15687.6 *	15579.54 *	15460.71 *	15323.37 *	15152.11 *	14967.8 *	14733.98 *	14408.67 *	14031.88 *	13587.33 *	12982.84 *	12178.63 *	11145.6 *	9863.46 *	7881.65 *	4745.25 *	1481.84	40.82	2.52
19.5	15962.42 *	15941.07 *	15895.75 *	15844.91 *	15755.96 *	15659.29 *	15547.44 *	15395.19 *	15232.56 *	15056.06 *	14819.45 *	14493.75 *	14122.07 *	13660.67 *	13096.68 *	12290.52 *	11243.18 *	10034.77 *	8040.15 *	4867.52 *	1563.84	43.65	2.52
17	15992.52 *	15970.44 *	15923.45 *	15868.3 *	15787.2 *	15697.53 *	15576.16 *	15429.22 *	15269.9 *	15096.91 *	14857.77 *	14534.76 *	14166.01 *	13734.2 *	13175.03 *	12356.3 *	11304.61 *	10122 *	8149.39 *	4955 *	1625.83 *	45.78	2.52
15	16001.51 *	15980.69 *	15936.37 *	15879.22 *	15807.28 *	15715.33 *	15590.6 *	15451.2 *	15295.49 *	15128.96 *	14882.23 *	14552.16 *	14218.48 *	13796.86 *	13228.83 *	12395.4 *	11336.63 *	10211.61 *	8221.19 *	5013.12 *	1669.71 *	47.35	2.52
13	16010.53 *	15988.48 *	15943.25 *	15895.47 *	15823.93 *	15743.62 *	15620.13 *	15474.61 *	15344.43 *	15166.82 *	14910.18 *	14593.38 *	14286.69 *	13853.1 *	13271.36 *	12422.98 *	11405.96 *	10284.18 *	8287.37 *	5061.21 *	1708.47 *	48.77	2.52
11	16067.51 *	16050.14 *	15998.29 *	15960.48 *	15889.19 *	15808.88 *	15683.84 *	15554.8 *	15408.94 *	15222.24 *	14955.54 *	14661.49 *	14344.89 *	13901.34 *	13312.96 *	12460.73 *	11449.91 *	10337.55 *	8323.91 *	5097.67 *	1742.06 *	52.39	2.52
9	16176.82 *	16155.54 *	16099.39 *	16055.53 *	15992.48 *	15908.97 *	15777.46 *	15643.91 *	15486.04 *	15278.68 *	15019.95 *	14722.38 *	14396.68 *	13939.56 *	13366.51 *	12511.39 *	11496.16 *	10376.97 *	8352.48 *	5122.55 *	1770.47 *	52.78	2.52
7	16226.09 *	16201.6 *	16155.66 *	16106.16 *	16048.36 *	15939.44 *	15833.65 *	15683.75 *	15495.09 *	15299.77 *	15056.94 *	14768.39 *	14430.55 *	13953.98 *	13367.84 *	12554.51 *	11527.21 *	10401.24 *	8366.77 *	5135.89 *	1793.69 *	53.17	2.52
5	16182.38 *	16151.32 *	16118.72 *	16068.61 *	15996.46 *	15908.62 *	15791.62 *	15636.76 *	15463.59 *	15284.18 *	15060.85 *	14771 *	14418.58 *	13945.77 *	13366.96 *	12555.94 *	11540.81 *	10410.02 *	8366.79 *	5137.79 *	1827.9 *	53.56	2.52
3	16113.27 *	16074.34 *	16046.44 *	15998.82 *	15932.77 *	15836.98 *	15707.81 *	15580.8 *	15429.54 *	15261.99 *	15034.63 *	14734.88 *	14386.84 *	13919.06 *	13351.87 *	12549.29 *	11538.32 *	10404.02 *	8368.23 *	5140.74 *	1830.35 *	53.95	2.52
1	16082.15 *	16041.63 *	16012.92 *	15969.09 *	15902.15 *	15811.78 *	15695.17 *	15560.5 *	15405.18 *	15227.06 *	14991.3 *	14685.76 *	14337.93 *	13876.34 *	13323.15 *	12525.38 *	11519.82 *	10383.08 *	8326.12 *	5109.06 *	1832.79 *	54.54	2.52
0	16052.62 *	16037.31 *	16005.98 *	15960.4 *	15891.31 *	15798.29 *	15677.36 *	15538.4 *	15381.48 *	15198.62 *	14962.83 *	14654.89 *	14306.86 *	13845.11 *	13298.97 *	12507.19 *	11504.64 *	10366.97 *	8305.04 *	5093.21 *	1834.02 *	54.54	2.52
-1	16057.47 *	16035.03 *	16002.75 *	15955.29 *	15889.35 *	15797.37 *	15678.5 *	15537.81 *	15377.37 *	15193.07 *	14951.38 *	14639.37 *	14287.42 *	13823.72 *	13266.9 *	12470.18 *	11472.99 *	10343.95 *	8302.82 *	5099.82 *	1825 *	54.36	2.52
-3	16032.73 *	16015.55 *	15979.46 *	15935.51 *	15859.93 *	15767.82 *	15654.3 *	15509.29 *	15342.47 *	15157.67 *	14913.57 *	14593.44 *	14234.62 *	13761.01 *	13181.77 *	12383.8 *	11398 *	10286.82 *	8298.39 *	5113.04 *	1806.97 *	54	2.52
-5	15949.76 *	15943.67 *	15907.65 *	15862.8 *	15788.42 *	15700.55 *	15584.4 *	15433.35 *	15269.26 *	15092.11 *	14854.34 *	14528.5 *	14162.56 *	13681.96 *	13079.67 *	12280.4 *	11307.52 *	10215.34 *	8251.35 *	5091.57 *	1788.99 *	53.63	2.52
-7	15824.57 *	15825.73 *	15780.94 *	15732.96 *	15666.1 *	15571.16 *	15456.03 *	15315.01 *	15137.12 *	14946.11 *	14706.56 *	14411.55 *	14066.79 *	13583.84 *	12957.83 *	12169.65 *	11201.79 *	10130.06 *	8206.58 *	5071.16 *	1738.77 *	53.27	2.52
-9	15641.95 *	15640.12 *	15594.02 *	15549.29 *	15474.57 *	15379 *	15248.92 *	15117.6 *	14958.19 *	14761.36 *	14510.93 *	14218.08 *	13902.13 *	13460.19 *	12829.33 *	12021.79 *	11080.2 *	10031.86 *	8148.94 *	5039.28 *	1699.57 *	52.92	2.52
-11	15362.2 *	15365.24 *	15318.09 *	15290.46 *	15204.02 *	15117.3 *	14987.58 *	14869.53 *	14724.13 *	14535.84 *	14286.19 *	14005.53 *	13717.16 *	13301.68 *	12668.49 *	11869.77 *	10945.26 *	9922.49 *	8078.81 *	4995.84 *	1654.95 *	52.56	2.52
-13	15099 *	15098.69 *	15059.05 *	15016.43 *	14946.01 *	14873.91 *	14758.71 *	14612.93 *	14488.56 *	14325.46 *	14079.01 *	13783.48 *	13524.67 *	13124.83 *	12538.31 *	11747.66 *	10814.66 *	9803.06 *	8002.55 *	4940.78 *	1604.88	49.04	2.52
-15	14890.77 *	14888.58 *	14856.67 *	14812.71 *	14750.19 *	14662.15 *	14558.95 *	14422.2 *	14278.25 *	14125.97 *	13910.78 *	13629.82 *	13321.94 *	12944.28 *	12410.47 *	11651.92 *	10671.03 *	9671.58 *	7900.28 *	4874.06 *	1549.36	47.67	2.52
-17	14714.15 *	14709.25 *	14678.78 *	14633.68 *	14573.11 *	14486.96 *	14384.58 *	14261.38 *	14107.29 *	13941.27 *	13759.75 *	13514.91 *	13166.46 *	12769.86 *	12277.91 *	11549.78 *	10590.43 *	9531.23 *	7795.08 *	4795.06 *	1488.36	46.18	2.52
-19.5	14549.83 *	14539.17 *	14509.52 *	14468.49 *	14406.26 *	14322.14 *	14222.77 *	14105.49 *	13955.35 *	13790.9 *	13611.07 *	13373.3 *	13029.87 *	12601.21 *	12105.98 *	11407.7 *	10475.53 *	9415.17 *	7648.7 *	4678.29 *	1404.43	44.15	2.52
-22.5	14400.16 *	14387.53 *	14353.82 *	14309.73 *	14245.83 *	14162.26 *	14057.94 *	13935.65 *	13800.14 *	13656.27 *	13472.28 *	13189.25 *	12870.75 *	12469.99 *	11890.56 *	11218.95 *	10329.76 *	9225.48 *	7453.05 *	4518.34 *	1297.74	41.47	2.52
-25.5	14222.99 *	14210.35 *	14177.81 *	14136.01 *	14075.49 *	13981.13 *	13874.66 *	13755.98 *	13626.94 *	13487.19 *	13281.21 *	13004.51 *	12692.35 *	12264.69 *	11681.88 *	11027.03 *	10106.82 *	8954.5 *	7084.12 *	4296.46 *	1184.28	38.56	2.52
-29	13949.13 *	13937.45 *	13898.69 *	13849.13 *	13788.2 *	13693.46 *	13587.09 *	13480.34 *	13372.71 *	13211.49 *	12975.29 *	12693.06 *	12407.31 *	11953.44 *	11274.09 *	10605.35 *	9774.92 *	8499.41 *	6564.95 *	4008.82 *	1038.79	34.87	2.52
-33	13341.3 *	13336.54 *	13295.24 *	13231.95 *	13145.79 *	13062.95 *	12928.9 *	12808.03 *	12676.45 *	12540.78 *	12275.9 *	11913.22 *	11616.42 *	11258.54 *	10479.97 *	9720.13 *	9106.11 *	7771.38 *	5867.86 *	3616.85 *	864.84	30.31	2.52
-37.5	11631.18 *	11637.2 *	11618.31 *	11560.5 *	11490.12 *	11306.85 *	11218.5 *	11107.02 *	10978.04 *	10822.46 *	10597.66 *	10265.57 *	9954.71 *	9674.35 *	8984.41 *	8283.99 *	7677.88 *	6647.05 *	4960.25 *	2968.53 *	664.69	25.57	2.52
-42.5	8807.66 *	8823.87 *	8828.27 *	8794.53 *	8721.9 *	8603.06 *	8500.82 *	8487.64 *	8351.14 *	8219.59 *	8014.49 *	7809.12 *	7655.78 *	7333.6 *	6839.95 *	6431.24 *	5912.21 *	5053.71 *	3839.79 *	2170.32 *	469.57	18.67	2.52
-47.5	6433.76 *	6442.87 *	6437.96 *	6400.9 *	6330.22 *	6230.74 *	6111.41 *	6082.84 *	6027.83 *	5935.27 *	5783.97 *	5565.68 *	5413.47 *	5162.94 *	4850.69 *	4473.31 *	3999.38 *	3494.87 *	2622.13 *	1474.76	336.05	12.2	2.52
-55	2514.84 *	2536 *	2578.28 *	2549.25 *	2520.17 *	2464.66 *	2381.54 *	2321.86 *	2330.55 *	2318.63 *	2270.71 *	2145.87 *	1991.46 *	2021.97 *	1914.84 *	1671.76 *	1516.69	1456.53	946.29	715.44	167.05	4.59	2.52
-65	293.67	294.65	296.6	296.22	295.74	294.3	291.79	288.16	288.86	290.74	290												

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	0	0
85	0	0	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	0.2	0.2	0.1	0	0	0	0
75	0.8	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.7	2.1	2.4	2.3	2.5	3	3.3	2.9	2.7	3.5	2.9	1.1	0.1	0	0	0
65	7.83 *	15.90 *	16.05 *	16.02 *	15.87 *	15.54 *	15.08 *	14.86 *	14.90 *	18.52 *	21.58 *	20.06 *	21.63 *	23.47 *	24.44 *	22.78 *	18.49 *	21	15	4.9	0.6	0	0	0
55	14.14 *	28.43 *	28.49 *	28.38 *	28.13 *	27.66 *	27.05 *	26.50 *	26.02 *	31.93 *	37.34 *	35.30 *	38.10 *	40.46 *	41.74 *	39.95 *	32.25 *	35.76 *	26.19 *	8.3	1	0	0	0
47.5	12.85 *	25.74 *	25.71 *	25.55 *	25.29 *	25.01 *	24.81 *	24.50 *	23.93 *	28.95 *	33.56 *	32.40 *	35.95 *	37.71 *	38.21 *	37.60 *	31.19 *	34.41 *	25.60 *	8.4	1	0	0	0
42.5	16.00 *	32.06 *	32.01 *	31.81 *	31.46 *	31.11 *	30.92 *	30.61 *	30.01 *	36.30 *	41.87 *	40.37 *	44.96 *	47.29 *	47.64 *	46.61 *	39.00 *	42.88 *	32.13 *	10.94 *	1.3	0	0	0
37.5	17.54 *	35.12 *	35.05 *	34.85 *	34.55 *	34.21 *	33.80 *	33.19 *	32.45 *	39.52 *	45.99 *	44.08 *	48.28 *	50.87 *	51.81 *	50.22 *	41.46 *	45.31 *	34.27 *	11.90 *	1.5	0	0	0
33	17.74 *	35.46 *	35.34 *	35.13 *	34.84 *	34.47 *	33.95 *	33.33 *	32.64 *	39.68 *	45.96 *	44.19 *	48.60 *	50.76 *	51.58 *	50.50 *	41.36 *	45.02 *	34.34 *	11.93 *	1.5	0	0	0
29	16.62 *	33.18 *	33.04 *	32.84 *	32.53 *	32.11 *	31.61 *	31.08 *	30.50 *	37.06 *	42.75 *	41.01 *	45.31 *	47.44 *	48.14 *	47.04 *	38.57 *	42.43 *	32.53 *	11.30 *	1.4	0	0	0
25.5	14.46 *	28.86 *	28.75 *	28.58 *	28.32 *	27.98 *	27.58 *	27.12 *	26.58 *	32.39 *	37.53 *	35.89 *	39.58 *	41.86 *	42.60 *	41.35 *	34.18 *	38.25 *	29.39 *	10.21 *	1.3	0	0	0
22.5	14.55 *	29.05 *	28.95 *	28.78 *	28.51 *	28.19 *	27.79 *	27.32 *	26.78 *	32.65 *	37.84 *	36.19 *	39.93 *	42.39 *	43.14 *	41.81 *	34.88 *	39.42 *	30.35 *	10.60 *	1.4	0	0	0
19.5	12.16 *	24.29 *	24.20 *	24.06 *	23.84 *	23.58 *	23.24 *	22.85 *	22.41 *	27.32 *	31.66 *	30.29 *	33.45 *	35.53 *	36.18 *	35.07 *	29.40 *	33.36 *	25.74 *	9.09 *	1.2	0	0	0
17	9.74 *	19.45 *	19.38 *	19.27 *	19.11 *	18.89 *	18.62 *	18.31 *	17.96 *	21.90 *	25.38 *	24.29 *	26.86 *	28.55 *	29.06 *	28.16 *	23.67 *	26.94 *	20.84 *	7.42 *	1	0	0	0
15	9.75 *	19.47 *	19.40 *	19.29 *	19.13 *	18.91 *	18.64 *	18.34 *	18.00 *	21.94 *	25.42 *	24.36 *	26.95 *	28.64 *	29.13 *	28.24 *	23.78 *	27.13 *	21.02 *	7.52 *	1	0	0	0
13	9.77 *	19.51 *	19.44 *	19.33 *	19.18 *	18.96 *	18.69 *	18.40 *	18.05 *	21.99 *	25.48 *	24.45 *	27.05 *	28.72 *	29.19 *	28.32 *	23.89 *	27.27 *	21.14 *	7.60 *	1.1	0	0	0
11	9.82 *	19.61 *	19.54 *	19.43 *	19.27 *	19.05 *	18.78 *	18.48 *	18.11 *	22.06 *	25.58 *	24.54 *	27.13 *	28.80 *	29.27 *	28.41 *	23.97 *	27.36 *	21.22 *	7.67 *	1.1	0	0	0
9	9.87 *	19.70 *	19.63 *	19.52 *	19.36 *	19.14 *	18.87 *	18.54 *	18.16 *	22.13 *	25.67 *	24.62 *	27.19 *	28.85 *	29.34 *	28.50 *	24.03 *	27.41 *	21.25 *	7.71 *	1.1	0	0	0
7	9.87 *	19.71 *	19.64 *	19.53 *	19.37 *	19.15 *	18.87 *	18.54 *	18.17 *	22.16 *	25.71 *	24.64 *	27.20 *	28.85 *	29.37 *	28.54 *	24.06 *	27.42 *	21.26 *	7.75 *	1.1	0	0	0
5	9.83 *	19.64 *	19.58 *	19.47 *	19.30 *	19.08 *	18.81 *	18.49 *	18.14 *	22.14 *	25.68 *	24.60 *	27.15 *	28.82 *	29.36 *	28.53 *	24.04 *	27.39 *	21.24 *	7.77 *	1.1	0	0	0
3	9.80 *	19.57 *	19.51 *	19.41 *	19.24 *	19.02 *	18.75 *	18.45 *	18.10 *	22.08 *	25.60 *	24.52 *	27.08 *	28.76 *	29.32 *	28.49 *	24.00 *	27.32 *	21.17 *	7.76 *	1.1	0	0	0
1	4.89 *	9.77 *	9.74 *	9.69 *	9.61 *	9.50 *	9.36 *	9.20 *	9.03 *	11.01 *	12.77 *	12.23 *	13.50 *	14.35 *	14.63 *	14.22 *	11.97 *	13.61 *	10.54 *	3.87 *	0.6	0	0	0
0	4.89 *	9.76 *	9.73 *	9.68 *	9.60 *	9.49 *	9.35 *	9.19 *	9.02 *	10.99 *	12.74 *	12.20 *	13.48 *	14.32 *	14.60 *	14.19 *	11.95 *	13.59 *	10.52 *	3.87 *	0.6	0	0	0

-1	9.77 *	19.51 *	19.45 *	19.34 *	19.17 *	18.95 *	18.68 *	18.36 *	18.00 *	21.95 *	25.44 *	24.35 *	26.88 *	28.55 *	29.09 *	28.26 *	23.80 *	27.11 *	21.04 *	7.74 *	1.1	0	0
-3	9.74 *	19.45 *	19.39 *	19.28 *	19.11 *	18.89 *	18.61 *	18.29 *	17.94 *	21.87 *	25.34 *	24.25 *	26.76 *	28.39 *	28.90 *	28.07 *	23.66 *	26.98 *	20.99 *	7.72 *	1.1	0	0
-5	9.68 *	19.33 *	19.27 *	19.16 *	18.99 *	18.77 *	18.50 *	18.18 *	17.82 *	21.72 *	25.18 *	24.11 *	26.60 *	28.20 *	28.68 *	27.86 *	23.48 *	26.81 *	20.89 *	7.67 *	1.1	0	0
-7	9.59 *	19.14 *	19.08 *	18.97 *	18.80 *	18.58 *	18.31 *	18.01 *	17.65 *	21.49 *	24.92 *	23.88 *	26.38 *	27.97 *	28.42 *	27.59 *	23.26 *	26.60 *	20.77 *	7.60 *	1.1	0	0
-9	9.45 *	18.86 *	18.80 *	18.69 *	18.53 *	18.31 *	18.05 *	17.76 *	17.42 *	21.21 *	24.58 *	23.57 *	26.07 *	27.67 *	28.11 *	27.27 *	23.01 *	26.36 *	20.62 *	7.53 *	1.1	0	0
-11	9.28 *	18.54 *	18.47 *	18.37 *	18.21 *	18.01 *	17.75 *	17.47 *	17.15 *	20.90 *	24.21 *	23.22 *	25.72 *	27.33 *	27.79 *	26.95 *	22.74 *	26.08 *	20.44 *	7.44 *	1.1	0	0
-13	9.14 *	18.25 *	18.19 *	18.08 *	17.93 *	17.73 *	17.48 *	17.20 *	16.88 *	20.60 *	23.87 *	22.88 *	25.35 *	26.98 *	27.49 *	26.66 *	22.45 *	25.76 *	20.21 *	7.33 *	1	0	0
-15	9.02 *	18.02 *	17.95 *	17.85 *	17.69 *	17.50 *	17.25 *	16.97 *	16.65 *	20.32 *	23.59 *	22.59 *	24.99 *	26.63 *	27.20 *	26.39 *	22.18 *	25.40 *	19.94 *	7.21 *	1	0	0
-17	11.14 *	22.25 *	22.17 *	22.04 *	21.85 *	21.60 *	21.31 *	20.96 *	20.55 *	25.08 *	29.14 *	27.92 *	30.82 *	32.82 *	33.57 *	32.63 *	27.40 *	31.27 *	24.48 *	8.80 *	1.2	0	0
-20	13.22 *	26.41 *	26.31 *	26.15 *	25.91 *	25.62 *	25.26 *	24.85 *	24.37 *	29.74 *	34.53 *	33.08 *	36.52 *	38.80 *	39.62 *	38.57 *	32.40 *	36.84 *	28.67 *	10.20 *	1.4	0	0
-23	13.07 *	26.10 *	26.00 *	25.84 *	25.61 *	25.31 *	24.95 *	24.53 *	24.08 *	29.37 *	34.06 *	32.62 *	36.03 *	38.20 *	38.92 *	37.87 *	31.74 *	35.81 *	27.67 *	9.76 *	1.3	0	0
-26	15.01 *	29.97 *	29.85 *	29.66 *	29.38 *	29.03 *	28.61 *	28.15 *	27.63 *	33.67 *	39.01 *	37.36 *	41.26 *	43.60 *	44.25 *	43.04 *	35.94 *	39.97 *	30.60 *	10.74 *	1.4	0	0
-29	16.62 *	33.18 *	33.03 *	32.79 *	32.48 *	32.07 *	31.60 *	31.08 *	30.51 *	37.15 *	42.91 *	41.01 *	45.34 *	47.75 *	48.05 *	46.75 *	39.01 *	42.65 *	32.37 *	11.32 *	1.4	0	0
-33	17.12 *	34.21 *	34.07 *	33.82 *	33.44 *	32.99 *	32.50 *	31.95 *	31.34 *	38.16 *	44.00 *	41.92 *	46.37 *	48.86 *	48.82 *	47.32 *	39.64 *	43.00 *	32.27 *	11.18 *	1.3	0	0
-38	15.58 *	31.20 *	31.14 *	30.93 *	30.54 *	30.09 *	29.74 *	29.30 *	28.70 *	34.90 *	40.28 *	38.50 *	42.63 *	44.92 *	45.01 *	43.66 *	36.61 *	39.78 *	29.57 *	10	1.2	0	0
-43	11.63 *	23.32 *	23.30 *	23.15 *	22.86 *	22.49 *	22.23 *	21.96 *	21.53 *	26.17 *	30.18 *	28.93 *	32.03 *	33.70 *	34.00 *	33.06 *	27.53 *	30.09 *	22.43 *	7.6	0.9	0	0
-48	10.25 *	20.66 *	20.70 *	20.57 *	20.32 *	19.92 *	19.56 *	19.34 *	19.09 *	23.32 *	26.86 *	25.47 *	28.18 *	30.05 *	30.38 *	29.15 *	24.45 *	27.22 *	21	7.3	0.9	0	0
-55	4.3	8.8	8.8	8.8	8.7	8.5	8.3	8.2	8.2	10	12	11	12	14	14	13	12	14	11	4.5	0.5	0	0
-65	0.6	1.2	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.5	1.8	1.7	1.9	2.2	2.4	2.4	2.4	3.3	3.1	1.4	0.2	0	0
-75	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.8	1	0.8	0.3	0.1	0	0
-85	0	0	0	0	0	0	0	0	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
-90	0	0	0	0	0	0	0	0	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
Total	437	875	873	868	860	849	837	823	808	985	1141	1091	1205	1277	1298	1259	1053	1183	908	321	42.5	0.18	

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDL @ 230W / 4000K/480	Sample ID.	E1
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
479.98	60	0.550	253.6	0.961	4.87%

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*****