

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF2110111**

## Report Number

**DLF2110111-3a**

## Test Date

**2021/10/28**

## Issue Date

**2021/11/1**

## 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 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		4461
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	142.4
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		31.3
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	2.41%
		20.00%	277V	10.25%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.999
		0.9	277V	0.905
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4135
		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%		99.87%
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		0.262
(Goniophotometer - Section 4.2)		Non-Worst Case		0.122
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		31.3
(Goniophotometer - Section 4.2)		Non-Worst Case		30.7

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/10/28	FFLEDS @ 26W / 4000K	C1
2	Goniophotometer Test	2021/10/28	FFLEDS @ 26W / 4000K	C1
3	THD and PF Test	2021/10/28	FFLEDS @ 26W / 4000K	C1

### 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:** FFLEDS @ 26W / 4000K

**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.	FFLEDS @ 26W / 4000K	Sample ID.	C1
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  $\pm 0.2$  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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.97	60	0.262	31.4	0.999
276.98	60	0.123	30.8	0.905

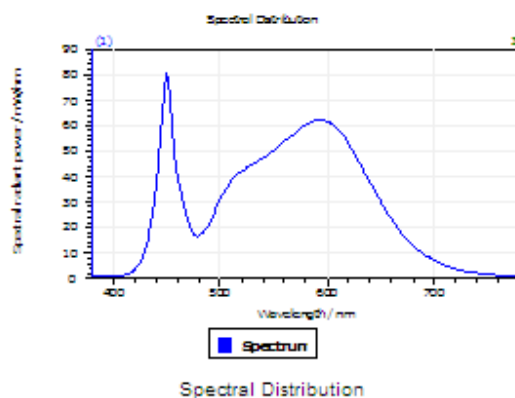
#### Test Result

CCT (K)	CRI	R9	Duv
4135	82	4	0.00073

Rf	Rg	IES Rcs,h1
83	96	-12%

## 4.1 Integrating Sphere Test

### Results

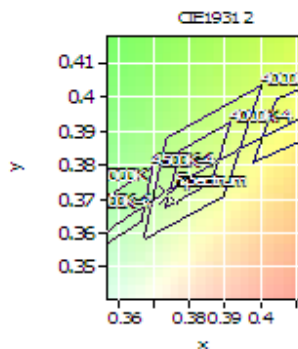


#### Spectral values

DominantWavelength 579.00 nm  
Purity 0.237  
PeakWavelength 450.04 nm  
Radiant Power 10.95 W  
Width50%:

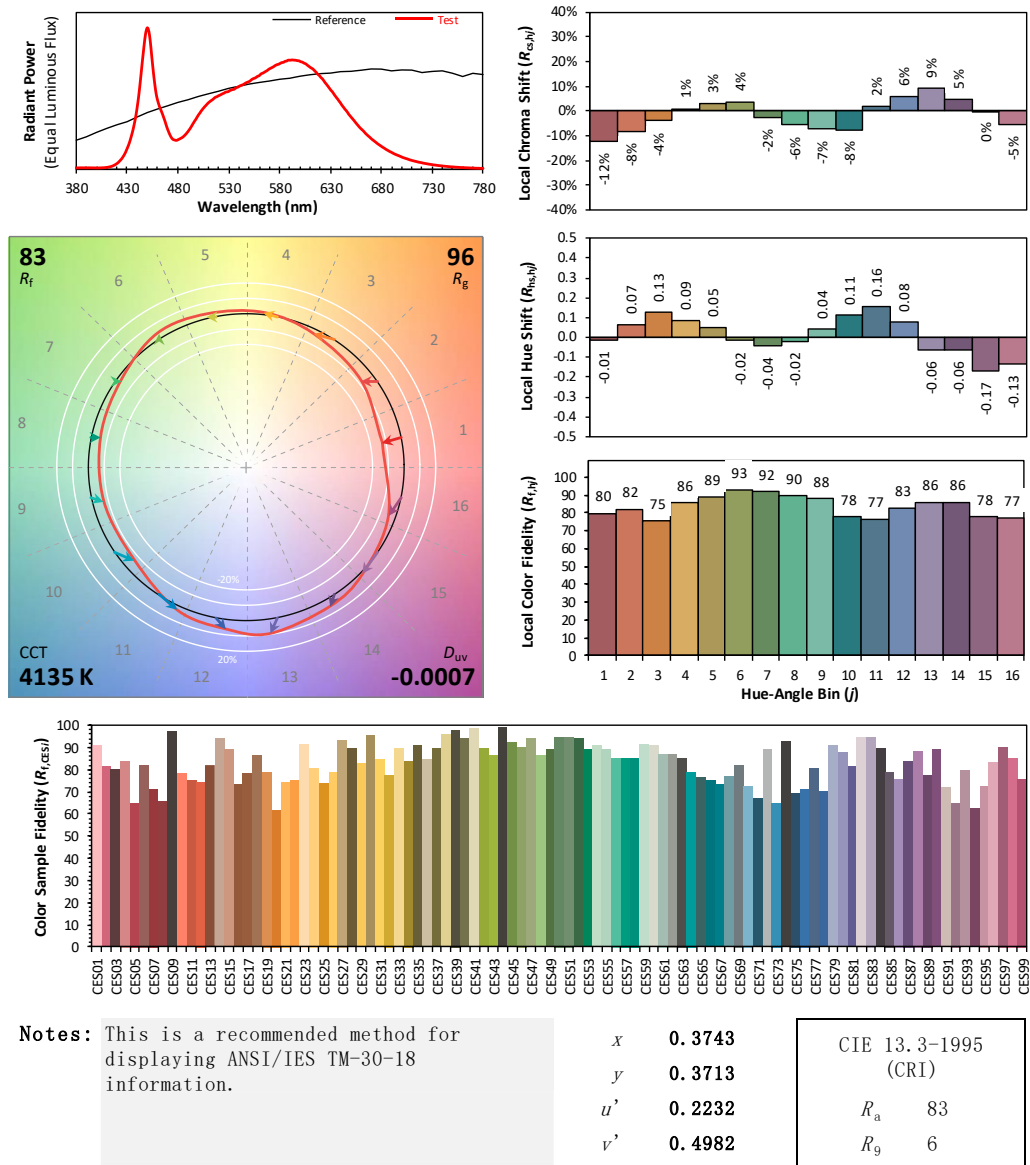
#### Color Coordinates

Correlated Color Temperatur 4135 K  
x: 0.3743 u: 0.2232 u': 0.2232  
y: 0.3713 v: 0.3321 v': 0.4982  
CRI01 80.5 CRI09 4.2  
CRI02 88.5 CRI10 73.0  
CRI03 94.3 CRI11 80.8  
CRI04 81.5 CRI12 62.4  
CRI05 81.0 CRI13 82.4  
CRI06 84.2 CRI14 97.1  
CRI07 84.9 CRI15 73.9  
CRI08 63.1 CRI16 72.0  
ResultsCRI 82.2



PlanckDistance 7.3E-004

## 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.	FFLEDS @ 26W / 4000K	Sample ID.	C1
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  $\pm 0.2$  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

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.02	60	0.262	31.3	0.998
NON-WORST CASE	277.03	60	0.122	30.7	0.905

#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
4461	115.0	149.9	89.8	109.2	142.4

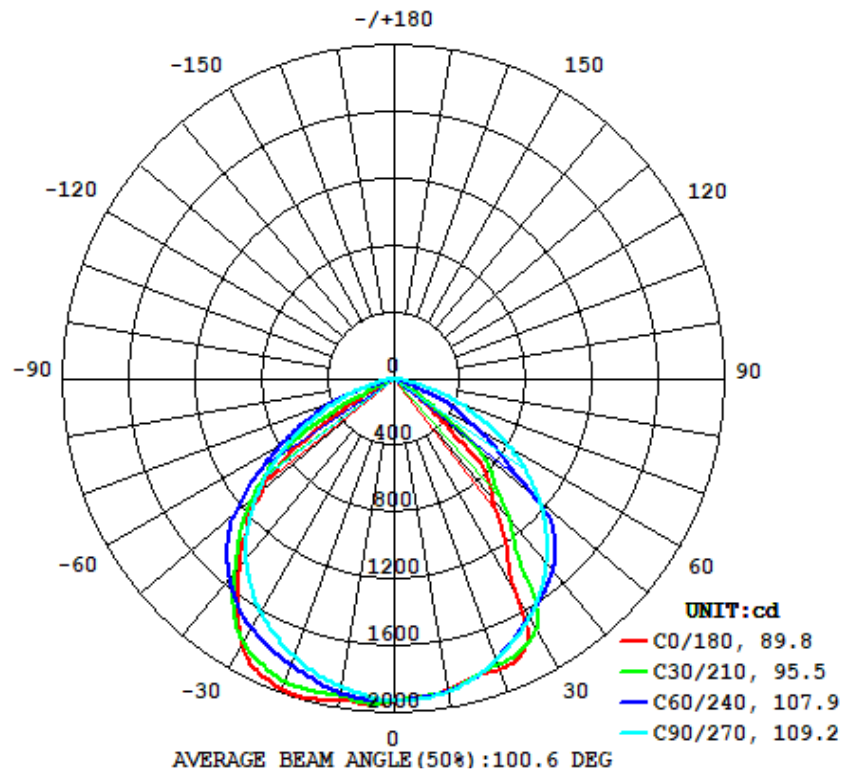
Zonal Lumen Requirement  
( $0^{\circ}$ - $90^{\circ}$ )

99.87%

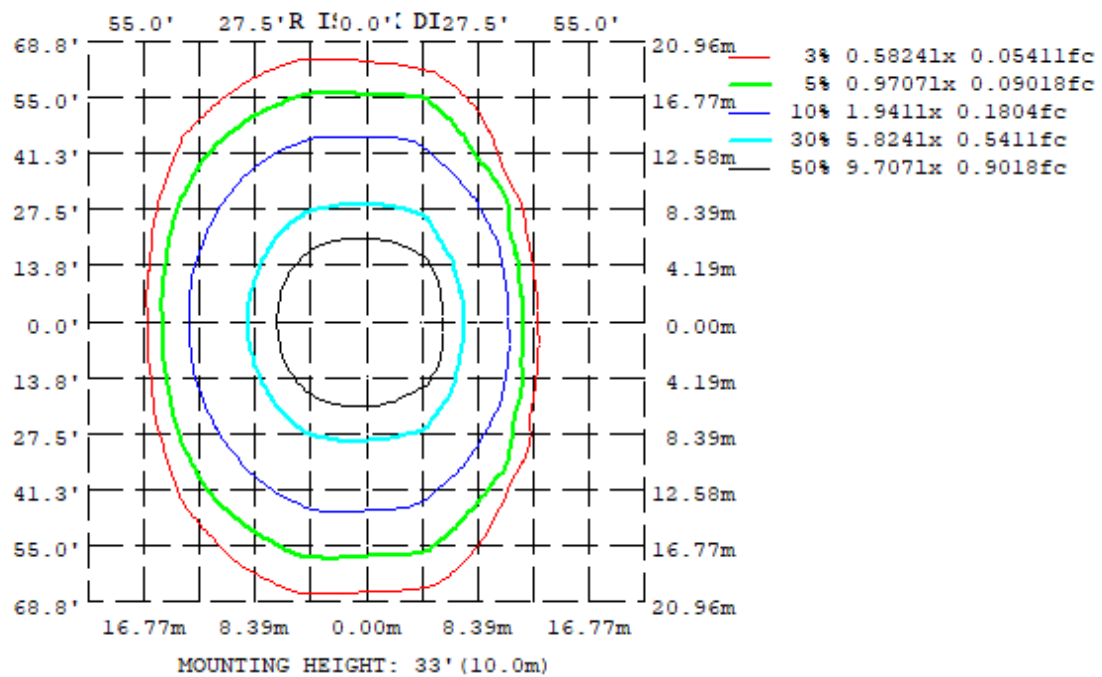


## 4.2 Goniophotometer Test

### Light Distrubtion Curve



### Isolux Plot





## 4.2 Goniophotometer Test

### Zonal Lumen Summary

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315
10	1887	1895	1903	1936	1958	1913	1873	1875
20	1851	1792	1793	1927	1979	1883	1768	1768
30	1471	1700	1646	1818	1838	1786	1613	1694
40	937.2	1311	1438	1576	1455	1566	1392	1173
50	346.8	784.4	1160	1191	1041	1177	1081	750.8
60	18.38	267.8	804.7	774.7	317.1	765.1	707.0	182.2
70	0.3797	10.34	407.5	97.36	35.71	98.72	323.4	7.446
80	0.2408	0.3020	79.48	14.59	10.34	11.96	39.47	0.1232
90	0.2431	0.3706	0.2643	0.2036	0.1473	0.2471	0.1003	0.1271
100	0.3710	0.3601	0.3472	0.9230	3.066	0.7038	0.3572	0.3010
110	0.4218	0.6409	0.6768	0.3418	0.1854	0.3922	0.6611	0.4852
120	0.7113	0.8322	0.7526	0.6486	0.3875	0.6392	0.7000	0.6611
130	1.062	1.030	1.094	0.9019	0.6773	0.8527	1.101	0.9621
140	1.326	1.301	1.280	1.152	1.108	1.201	1.287	1.309
150	1.511	1.557	1.385	1.405	1.335	1.388	1.451	1.548
160	1.636	1.627	1.524	1.533	1.676	1.559	1.467	1.637
170	1.573	1.472	1.485	1.532	1.625	1.507	1.375	1.376
180	1.669	1.558	1.502	1.696	1.627	1.580	1.515	1.552
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	183.49	0 - 10	183.49	4.11%
10-20	532.79	0 - 20	716.28	16.06%
20-30	829.63	0 - 30	1545.91	34.66%
30-40	963.90	0 - 40	2509.80	56.27%
40-50	914.82	0 - 50	3424.62	76.78%
50-60	658.97	0 - 60	4083.59	91.55%
60-70	295.71	0 - 70	4379.30	98.18%
70-80	70.52	0 - 80	4449.82	99.76%
80-90	4.86	0 - 90	4454.68	99.87%
90-100	1.09	0 - 100	4455.77	99.89%
100-110	0.48	0 - 110	4456.25	99.90%
110-120	0.56	0 - 120	4456.81	99.92%
120-130	0.73	0 - 130	4457.54	99.93%
130-140	0.87	0 - 140	4458.42	99.95%
140-150	0.86	0 - 150	4459.28	99.97%
150-160	0.71	0 - 160	4459.99	99.99%
160-170	0.44	0 - 170	4460.43	100.00%
170-180	0.14	0 - 180	4460.57	100.00%

## 4.2 Goniophotometer Test

### Axial Candela

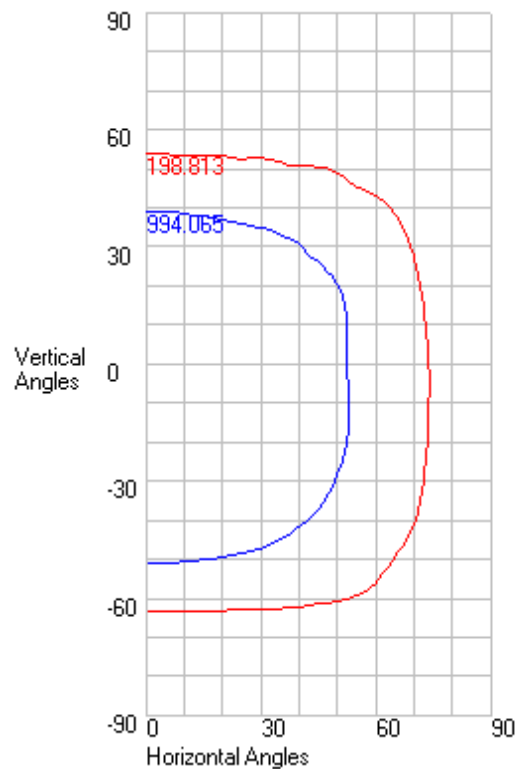
DEG.	HOR.	DEG.	VERT.
90	0.1	90	0.24
85	0.22	85	0.25
75	157.84	75	0.24
65	517.26	65	6.75
55	896.79	55	130.27
47.5	1167.1	47.5	525.915
42.5	1327.92	42.5	868.425
37.5	1454.735	37.5	1041.35
33	1555.6	33	1273.95
29	1630.58	29	1617.22
25.5	1689.555	25.5	1809.765
22.5	1734.375	22.5	1845.885
19.5	1774.135	19.5	1850.98
17	1805.44	17	1846.35
15	1828.37	15	1848.24
13	1848.04	13	1862.65
11	1865.08	11	1879.58
9	1878.78	9	1893.78
7	1893.2	7	1906.19
5	1906.65	5	1910.28
3	1921.86	3	1917.93
1	1926.25	1	1922.95
0	1927.034	0	1927.034
-1	1927.85	-1	1932.5
-3	1925.67	-3	1952.26
-5	1922.64	-5	1956.93
-7	1915.94	-7	1947.45
-9	1907.02	-9	1950.65
-11	1894.71	-11	1961.94
-13	1876.49	-13	1972.9
-15	1854.9	-15	1982.33
-17	1833.11	-17	1988.13
-19.5	1799.61	-19.5	1982.015
-22.5	1758.735	-22.5	1963.01
-25.5	1716.795	-25.5	1935.945
-29	1662.82	-29	1867.28
-33	1592.43	-33	1727.45
-37.5	1496.125	-37.5	1546.72
-42.5	1374.68	-42.5	1363.575
-47.5	1236.95	-47.5	1187.91
-55	990.56	-55	772.04
-65	604.5	-65	68.87
-75	222.34	-75	18.38
-85	6.02	-85	4.95
-90	0.26	-90	0.151

## 4.2 Goniophotometer Test

### Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	1988.13
Maximum Candela Angle	0 H -17 V
Horizontal Beam Angle (50%)	108.3
Vertical Beam Angle (50%)	89.9
Horizontal Field Angle (10%)	149.3
Vertical Field Angle (10%)	116.9
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	3463
Beam Efficiency	N.A.
Field Lumens	4395
Field Efficiency	N.A.
Spill Lumens	67
Luminaire Lumens	4461
Total Efficiency	N.A.
Total Luminaire Watts	31.3329
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	0.24	0.234	0.222	0.21	0.198	0.186	0.174	0.162	0.15	0.146	0.141	0.135	0.129	0.122	0.122	0.125	0.128	0.13	0.13	0.127	0.12	0.107	0.1
85	0.25	0.245	0.236	0.227	0.217	0.208	0.198	0.189	0.18	0.175	0.168	0.16	0.152	0.142	0.138	0.135	0.132	0.129	0.13	0.123	0.11	0.102	0.1
75	0.24	0.236	0.228	0.219	0.211	0.203	0.194	0.186	0.179	0.174	0.167	0.158	0.15	0.14	0.136	0.129	0.122	0.118	0.114	0.111	0.102	0.094	0.1
65	6.75	6.847	7.041	6.886	6.679	6.275	5.644	4.755	4.19	4.381	4.899	5.427	4.152	2.984	4.022	4.09	1.857	3.163	0.988	1.827	0.298	0.091	0.1
55	130.27	132.284	136.31	134.989	133.47	129.72	123.562	119.036	121.02	120.855	117.018	105.625	93.986	97.9	86.815	71.759	62.89	64.332	30.186	22.444	4.447	0.105	0.1
47.5	525.915 *	530.243 *	532.398 *	524.101 *	503.281 *	479.547 *	458.041 *	472.264 *	491.652 *	498.993 *	469.714 *	402.874 *	413.307 *	441.068 *	387.811 *	303.861 *	300.754 *	271.543 *	149.218	89.375	12.893	0.122	0.1
42.5	868.425 *	869.509 *	869.989 *	868.297 *	864.532 *	858.123 *	850.744 *	845.875 *	833.291 *	822.144 *	806.502 *	787.627 *	756.243 *	699.047 *	670.824 *	617.125 *	469.536 *	442.037 *	263.771 *	148.57	21.594	0.134	0.1
37.5	1041.35 *	1044.893 *	1047.447 *	1044.922 *	1041.667 *	1024.347 *	1013.897 *	1011.471 *	1006.589 *	990.522 *	954.279 *	944.951 *	931.082 *	891.827 *	825.327 *	786.317 *	687.97 *	586.532 *	440.854 *	209.656 *	35.652	0.148	0.1
33	1273.95 *	1276.971 *	1277.552 *	1274.111 *	1266.294 *	1262.379 *	1249.747 *	1231.564 *	1215.583 *	1195.847 *	1194.595 *	1149.831 *	1104.913 *	1067.029 *	1058.299 *	934.703 *	826.805 *	720.698 *	593.378 *	266.578 *	50.587	0.159	0.1
29	1617.22 *	1624.955 *	1620.506 *	1602.022 *	1568.785 *	1550.058 *	1546.977 *	1538.49 *	1504.973 *	1451.119 *	1430.859 *	1452.711 *	1351.387 *	1250.768 *	1246.623 *	1192.09 *	953.075 *	847.895 *	693.375 *	309.02 *	64.428	0.169	0.1
25.5	1809.765 *	1806.981 *	1799.57 *	1789.766 *	1777.54 *	1765.332 *	1749.666 *	1733.047 *	1715.772 *	1688.176 *	1637.182 *	1612.454 *	1570.944 *	1437.426 *	1383.232 *	1340.901 *	1065.724 *	947.777 *	774.718 *	347.009 *	77.186	0.178	0.1
22.5	1845.885 *	1842.833 *	1836.011 *	1828.431 *	1816.291 *	1803.492 *	1790.061 *	1774.253 *	1750.979 *	1729.809 *	1704.024 *	1662.838 *	1613.093 *	1554.253 *	1486.725 *	1385.548 *	1173.415 *	1022.416 *	842.62 *	379.123 *	87.972	0.185	0.1
19.5	1850.98 *	1848.01 *	1842.103 *	1836.067 *	1822.982 *	1810.552 *	1798.159 *	1780.502 *	1761.484 *	1741.682 *	1715.914 *	1674.194 *	1629.145 *	1579.613 *	1511.402 *	1403.679 *	1246.191 *	1088.37 *	868.816 *	406.946 *	99.212	0.191	0.1
17	1846.35 *	1843.674 *	1838.556 *	1831.22 *	1818.283 *	1804.566 *	1792.321 *	1776.229 *	1757.773 *	1740.276 *	1713.994 *	1673.638 *	1631.501 *	1586.005 *	1517.05 *	1412.092 *	1273.246 *	1137.446 *	883.93 *	428.439 *	108.88	0.196	0.1
15	1848.24 *	1846.337 *	1841.158 *	1832.247 *	1819.537 *	1805.496 *	1794.066 *	1777.094 *	1757.754 *	1742.193 *	1714.775 *	1671.509 *	1633.479 *	1590.766 *	1519.708 *	1415.344 *	1285.475 *	1146.32 *	892.162 *	444.022 *	116.239	0.2	0.1
13	1862.65 *	1861.289 *	1855.417 *	1844.928 *	1831.379 *	1819.06 *	1804.891 *	1787.099 *	1770.013 *	1749.82 *	1719.242 *	1677.091 *	1642.15 *	1595.705 *	1521.354 *	1416.303 *	1298.346 *	1154.47 *	899.208 *	458.132 *	123.233	0.204	0.1
11	1879.58 *	1878.573 *	1872.947 *	1862.571 *	1848.2 *	1836.359 *	1821.42 *	1804.019 *	1785.133 *	1763.312 *	1730.368 *	1692.126 *	1652.605 *	1600.733 *	1522.502 *	1421.036 *	1307.151 *	1161.736 *	902.627 *	470.893 *	129.834	0.212	0.1
9	1893.78 *	1893.041 *	1887.205 *	1876.335 *	1864.443 *	1849.862 *	1837.28 *	1820.335 *	1799.136 *	1776.925 *	1744.909 *	1705.942 *	1663.529 *	1605.536 *	1530.097 *	1431.621 *	1316.497 *	1167.218 *	905.302 *	482.309 *	136.014	0.214	0.1
7	1906.19 *	1904.935 *	1898.947 *	1888.257 *	1875.838 *	1861.848 *	1847.963 *	1832.093 *	1809.981 *	1786.821 *	1756.577 *	1717.969 *	1673.716 *	1613.861 *	1538.323 *	1441.695 *	1323.526 *	1170.698 *	906.392 *	492.386 *	141.744	0.215	0.1
5	1910.28 *	1908.158 *	1904.635 *	1892.109 *	1879.612 *	1866.419 *	1854.756 *	1837.668 *	1816.63 *	1794.005 *	1765.021 *	1726.57 *	1681.401 *	1621.384 *	1546.067 *	1447.009 *	1326.853 *	1172.169 *	905.831 *	501.131 *	148.737	0.217	0.1
3	1917.93 *	1916.099 *	1912.25 *	1897.463 *	1884.039 *	1871.634 *	1857.591 *	1841.351 *	1822.333 *	1800.51 *	1770.372 *	1731.103 *	1686.401 *	1626.712 *	1551.632 *	1451.628 *	1328.602 *	1171.698 *	905.607 *	510.009 *	152.373	0.218	0.1
1	1922.95 *	1921.545 *	1916.767 *	1903.416 *	1890.034 *	1877.124 *	1863.626 *	1846.772 *	1827.438 *	1804.837 *	1773.478 *	1733.853 *	1689.078 *	1630.109 *	1555.189 *	1454.227 *	1328.614 *	1169.169 *	899.732 *	514.842 *	156.017	0.22	0.1
0	1927.034 *	1926.25 *	1921.86 *	1906.65 *	1893.2 *	1878.78 *	1865.08 *	1848.04 *	1828.37 *	1805.44 *	1774.135 *	1734.375 *	1689.555 *	1630.58 *	1555.6 *	1454.735 *	1327.92 *	1167.1 *	896.79 *	517.26 *	157.84	0.22	0.1
-1	1932.5 *	1929.54 *	1926.287 *	1912.652 *	1899.78 *	1886.347 *	1873.248 *	1856.182 *	1836.131 *	1812.628 *	1780.344 *	1739.964 *	1694.373 *	1634.749 *	1559.519 *	1458.42 *	1331.879 *	1171.897 *	901.983 *	520.096 *	158.445	0.234	0.1
-3	1952.26 *	1948.3 *	1941.401 *	1928.259 *	1912.948 *	1898.84 *	1886.865 *	1869.393 *	1848.238 *	1823.883 *	1790.736 *	1749.354 *	1702.263 *	1640.603 *	1564.581 *	1464.224 *	1338.341 *	1179.849 *	912.356 *	525.762 *	159.653	0.261	0.1
-5	1956.93 *	1955.073 *	1948.024 *	1932.436 *	1919.246 *	1905.999 *	1891.78 *	1872.625 *	1852.598 *	1831.334 *	1798.413 *	1756.72 *	1707.764 *	1644.428 *	1567.523 *	1468.051 *	1342.896 *	1185.653 *	916.9 *	527.311 *	160.859	0.288	0.1
-7	1947.45 *	1946.722 *	1939.893 *	1926.914 *	1913.386 *	1901.951 *	1890.529 *	1868.561 *	1849.32 *	1830.043 *	1800.937 *	1760.327 *	1710.196 *	1645.901 *	1568.098 *	1471.205 *	1345.594 *	1189.362 *	921.638 *	528.914 *	158.531	0.316	0.1
-9	1950.65 *	1947.989 *	1941.82 *	1926.819 *	1914.242 *	1899.939 *	1889.529 *	1869.432 *	1846.569 *	1828.318 *	1801.547 *	1763.31 *	1714.599 *	1647.487 *	1567.957 *	1469.541 *	1346.065 *	1191.248 *	924.477 *	529.065 *	157.424	0.343	0.1
-11	1961.94 *	1958.731 *	1953.507 *	1938.772 *	1925.616 *	1911.61 *	1895.527 *	1877.829 *	1855.995 *	1831.591 *	1802.23 *	1765.607 *	1718.734 *	1655.402 *	1568.639 *	1467.302 *	1345.459 *	1191.614 *	925.42 *	527.719 *	155.738	0.37	0.1
-13	1972.9 *	1969.253 *	1962.791 *	1950.31 *	1936.413 *	1921.116 *	1905.302 *	1887.432 *	1864.93 *	1840.048 *	1808.269 *	1768.295 *	1722.483 *	1661.736 *	1574.442 *	1468.064 *	1346.023 *	1190.485 *	925.304 *	524.841 *	153.475	0.38	0.1
-15	1982.33 *	1977.721 *	1969.596 *	1958.721 *	1944.768 *	1930.815 *	1913.796 *	1894.334 *	1873.023 *	1848.233 *	1814.735 *	1771.472 *	1726.462 *	1666.605 *	1578.412 *	1470.245 *	1343.601 *	1187.626 *	921.811 *	520.396 *	150.636	0.399	0.1
-17	1988.13 *	1983.7 *	1974.813 *	1964.548 *	1950.412 *	1937.424 *	1919.516 *	1897.929 *	1876.624 *	1853.232 *	1818.257 *	1772.606 *	1728.351 *	1669.467 *	1579.178 *	1470.093 *	1341.428 *	1183 *	916.968 *	514.681 *	147.226	0.416	0.1
-19.5	1982.015 *	1977.908 *	1968.986 *	1959.233 *	1946.461 *	1932.74 *	1917.298 *	1894.88 *	1872.157 *	1849.781 *	1816.638 *	1769.369 *	1723.411 *	1664.544 *	1576.801 *	1466.267 *	1331.367 *	1171.882 *	907.103 *	505.781 *	142.166	0.434	0.1
-22.5	1963.01 *	1959.215 *	1950.667 *	1940.909 *	1928.517 *	1914.175 *	1897.761 *	1878.989 *	1856.76 *	1832.156 *	1800.22 *	1756.343 *	1708.632 *	1646.492 *	1566.016 *	1456.59 *	1317.521 *	1150.129 *	889.36 *	492.982 *	135.372	0.451	0.1
-25.5	1935.945 *	1932.295 *	1923.686 *	1913.521 *	1900.832 *	1885.546 *	1868.168 *	1849.942 *	1829.03 *	1803.49 *	1769.726 *	1730.658 *	1682.621 *	1613.895 *	1531.354 *	1439.492 *	1294.928 *	1119.51 *	856.493 *	476.166 *	127.656	0.462	0.1
-29	1867.28 *	1865.619 *	1858.428 *	1848.746 *	1836.633 *	1821.788 *	1805.723 *	1787.849 *	1769.209 *	1744.485 *	1709.548 *	1672.587 *	1631.041 *	1560.976 *	1472.1 *	1386.592 *	1256.765 *	1073.502 *	814.695 *	452.799 *	117.057	0.466	0.1
-33	1727.45 *	1727.761 *	1723.599 *	1715.994 *	1704.698 *	1694.816 *	1679.28 *	1664.147 *	1646.564 *	1625.053 *	1594.697 *	1558.434 *	1518.483 *	1460.861 *	1380.536 *	1298.198 *	1176.806 *	1003.774 *	756.691 *	418.884 *	104.23	0.459	0.1
-37.5	1546.72 *	1546.957 *	1544.784 *	1539.054 *	1531.833 *	1517.726 *	1508.534 *	1496.741 *	1481.263 *	1462.564 *	1434.879 *	1407.659 *	1373.657 *	1326.798 *	1255.94 *	1173.584 *	1055.708 *	907.771 *	678.359 *	367.873 *	88.247	0.445	0.1
-42.5	1363.575 *	1364.21 *	1363.186 *	1359.587 *	1353.991 *	1346.95 *	1339.026 *	1331.684 *	1309.078 *	1291.996 *	1272.21 *	1249.114 *	1213.905 *	1163.269 *	1102.823 *	1026.89 *	921.968 *	790.212 *	587.827 *	301.035 *	70.758	0.416	0.1
-47.5	1187.91 *	1188.176 *	1187.156 *	1183.966 *	1178.491 *	1169.537 *	1161.338 *	1153.989 *	1136.036 *	1112.649 *	1091.564 *	1072.397 *	1041.243 *	995.355 *	948.087 *	882.243 *	773.637 *	653.742 *	489.61 *	225.625 *	51.814	0.38	0.1
-55	772.04 *	775.059 *	781.094 *	773.291 *	768.616 *	762.867 *	757.274 *	756.12 *	739.991 *	724.651 *	712.203 *	709.82 *	686.342 *	640.672 *	605.402 *	567.725 *	478.394 *	389.518 *	315.243 *	118.089	27.565	0.295	0.1
-65	68.87	69.915	72.005	72.434	72.774	72.384	71.193	69.134	71.905	75.715	76.961	71.762	67.887										

## 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	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	0.1	0	0	0	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	0.6	0.5	0.6	0.7	0.7	0.6	0.6	0.6	0.5	0.2	0	0	0
47.5	0.76 *	1.54 *	1.56 *	1.55 *	1.52 *	1.47 *	1.44 *	1.45 *	1.46 *	1.80 *	2.03 *	1.85 *	2.07 *	2.28 *	2.22 *	2	1.8	1.9	1.3	0.4	0	0	0	0
42.5	1.07 *	2.15 *	2.15 *	2.14 *	2.11 *	2.07 *	2.04 *	2.02 *	2.00 *	2.44 *	2.80 *	2.63 *	2.88 *	3.06 *	3.05 *	2.80 *	2.28 *	2.45 *	1.7	0.5	0.1	0	0	0
37.5	1.46 *	2.92 *	2.92 *	2.91 *	2.87 *	2.83 *	2.80 *	2.76 *	2.71 *	3.29 *	3.80 *	3.65 *	4.01 *	4.20 *	4.27 *	4.03 *	3.23 *	3.55 *	2.52 *	0.7	0.1	0	0	0
33	1.59 *	3.19 *	3.19 *	3.17 *	3.14 *	3.10 *	3.06 *	3.01 *	2.95 *	3.60 *	4.20 *	4.01 *	4.39 *	4.69 *	4.82 *	4.56 *	3.67 *	4.12 *	2.98 *	0.9	0.1	0	0	0
29	1.77 *	3.54 *	3.53 *	3.50 *	3.46 *	3.41 *	3.37 *	3.31 *	3.22 *	3.90 *	4.57 *	4.39 *	4.72 *	4.98 *	5.19 *	4.90 *	3.87 *	4.33 *	3.18 *	0.9	0.1	0	0	0
25.5	1.83 *	3.66 *	3.65 *	3.61 *	3.56 *	3.51 *	3.46 *	3.41 *	3.32 *	3.99 *	4.64 *	4.47 *	4.82 *	4.99 *	5.18 *	4.92 *	3.84 *	4.27 *	3.15 *	0.93 *	0.1	0	0	0
22.5	1.67 *	3.33 *	3.32 *	3.29 *	3.26 *	3.22 *	3.17 *	3.11 *	3.04 *	3.69 *	4.26 *	4.07 *	4.44 *	4.66 *	4.76 *	4.51 *	3.57 *	3.99 *	2.95 *	0.88 *	0.1	0	0	0
19.5	1.69 *	3.37 *	3.35 *	3.33 *	3.29 *	3.26 *	3.21 *	3.14 *	3.07 *	3.74 *	4.33 *	4.13 *	4.55 *	4.82 *	4.90 *	4.66 *	3.77 *	4.23 *	3.11 *	0.94 *	0.1	0	0	0
17	1.41 *	2.81 *	2.80 *	2.78 *	2.75 *	2.72 *	2.68 *	2.62 *	2.57 *	3.13 *	3.62 *	3.46 *	3.82 *	4.06 *	4.12 *	3.95 *	3.25 *	3.65 *	2.66 *	0.82 *	0.1	0	0	0
15	1.12 *	2.25 *	2.24 *	2.22 *	2.20 *	2.17 *	2.14 *	2.10 *	2.06 *	2.51 *	2.90 *	2.77 *	3.06 *	3.26 *	3.31 *	3.18 *	2.64 *	2.97 *	2.17 *	0.68 *	0.1	0	0	0
13	1.13 *	2.26 *	2.25 *	2.23 *	2.21 *	2.18 *	2.15 *	2.11 *	2.07 *	2.52 *	2.91 *	2.78 *	3.08 *	3.27 *	3.32 *	3.20 *	2.67 *	3.00 *	2.20 *	0.70 *	0.1	0	0	0
11	1.14 *	2.28 *	2.27 *	2.25 *	2.23 *	2.20 *	2.17 *	2.13 *	2.08 *	2.54 *	2.93 *	2.80 *	3.10 *	3.29 *	3.33 *	3.22 *	2.69 *	3.03 *	2.23 *	0.72 *	0.1	0	0	0
9	1.15 *	2.30 *	2.28 *	2.27 *	2.25 *	2.22 *	2.19 *	2.15 *	2.10 *	2.56 *	2.95 *	2.82 *	3.12 *	3.30 *	3.35 *	3.24 *	2.71 *	3.04 *	2.25 *	0.73 *	0.1	0	0	0
7	1.16 *	2.31 *	2.30 *	2.28 *	2.26 *	2.23 *	2.20 *	2.16 *	2.12 *	2.57 *	2.97 *	2.84 *	3.13 *	3.32 *	3.37 *	3.26 *	2.73 *	3.06 *	2.27 *	0.75 *	0.1	0	0	0
5	1.16 *	2.32 *	2.31 *	2.29 *	2.27 *	2.25 *	2.21 *	2.17 *	2.13 *	2.58 *	2.99 *	2.86 *	3.15 *	3.34 *	3.39 *	3.28 *	2.74 *	3.07 *	2.28 *	0.76 *	0.1	0	0	0
3	1.17 *	2.33 *	2.32 *	2.30 *	2.28 *	2.25 *	2.22 *	2.18 *	2.13 *	2.59 *	3.00 *	2.87 *	3.16 *	3.35 *	3.40 *	3.29 *	2.75 *	3.07 *	2.29 *	0.77 *	0.1	0	0	0
1	1.17 *	2.34 *	2.32 *	2.31 *	2.28 *	2.26 *	2.22 *	2.18 *	2.14 *	2.60 *	3.01 *	2.88 *	3.17 *	3.36 *	3.41 *	3.29 *	2.75 *	3.07 *	2.29 *	0.78 *	0.1	0	0	0
0	0.59 *	1.17 *	1.17 *	1.16 *	1.14 *	1.13 *	1.11 *	1.09 *	1.07 *	1.30 *	1.51 *	1.44 *	1.59 *	1.68 *	1.71 *	1.65 *	1.37 *	1.53 *	1.14 *	0.39 *	0.1	0	0	0
	0.59 *	1.17 *	1.17 *	1.16 *	1.15 *	1.13 *	1.12 *	1.10 *	1.07 *	1.31 *	1.51 *	1.44 *	1.59 *	1.68 *	1.71 *	1.65 *	1.38 *	1.54 *	1.15 *	0.39 *	0.1	0	0	0

-1	1.18 *	2.36 *	2.35 *	2.33 *	2.31 *	2.28 *	2.25 *	2.21 *	2.16 *	2.63 *	3.03 *	2.89 *	3.19 *	3.38 *	3.43 *	3.32 *	2.77 *	3.09 *	2.31 *	0.79 *	0.1	0	0
-3	1.19 *	2.37 *	2.36 *	2.34 *	2.32 *	2.29 *	2.26 *	2.22 *	2.17 *	2.64 *	3.05 *	2.91 *	3.20 *	3.39 *	3.44 *	3.33 *	2.79 *	3.12 *	2.33 *	0.79 *	0.1	0	0
-5	1.19 *	2.37 *	2.36 *	2.34 *	2.32 *	2.29 *	2.26 *	2.22 *	2.17 *	2.65 *	3.06 *	2.91 *	3.21 *	3.40 *	3.45 *	3.35 *	2.80 *	3.13 *	2.34 *	0.80 *	0.1	0	0
-7	1.19 *	2.37 *	2.36 *	2.34 *	2.32 *	2.29 *	2.26 *	2.22 *	2.17 *	2.65 *	3.06 *	2.92 *	3.21 *	3.40 *	3.46 *	3.35 *	2.81 *	3.14 *	2.35 *	0.79 *	0.1	0	0
-9	1.19 *	2.38 *	2.37 *	2.35 *	2.33 *	2.30 *	2.27 *	2.22 *	2.18 *	2.65 *	3.07 *	2.93 *	3.23 *	3.41 *	3.46 *	3.35 *	2.81 *	3.15 *	2.35 *	0.79 *	0.1	0	0
-11	1.20 *	2.39 *	2.38 *	2.36 *	2.34 *	2.31 *	2.28 *	2.24 *	2.19 *	2.66 *	3.08 *	2.94 *	3.24 *	3.42 *	3.47 *	3.36 *	2.81 *	3.15 *	2.35 *	0.79 *	0.1	0	0
-13	1.20 *	2.40 *	2.39 *	2.37 *	2.35 *	2.32 *	2.29 *	2.25 *	2.20 *	2.67 *	3.09 *	2.95 *	3.25 *	3.43 *	3.47 *	3.36 *	2.81 *	3.15 *	2.34 *	0.78 *	0.1	0	0
-15	1.21 *	2.41 *	2.40 *	2.38 *	2.36 *	2.33 *	2.30 *	2.25 *	2.21 *	2.68 *	3.10 *	2.96 *	3.26 *	3.44 *	3.47 *	3.35 *	2.80 *	3.14 *	2.33 *	0.77 *	0.1	0	0
-17	1.51 *	3.01 *	3.00 *	2.98 *	2.95 *	2.91 *	2.87 *	2.82 *	2.76 *	3.35 *	3.87 *	3.69 *	4.07 *	4.29 *	4.34 *	4.18 *	3.48 *	3.90 *	2.88 *	0.95 *	0.1	0	0
-20	1.80 *	3.59 *	3.58 *	3.55 *	3.52 *	3.48 *	3.42 *	3.36 *	3.29 *	4.00 *	4.61 *	4.40 *	4.85 *	5.12 *	5.18 *	4.97 *	4.13 *	4.61 *	3.40 *	1.11 *	0.1	0	0
-23	1.78 *	3.55 *	3.53 *	3.51 *	3.47 *	3.43 *	3.38 *	3.32 *	3.24 *	3.94 *	4.55 *	4.35 *	4.77 *	5.04 *	5.11 *	4.91 *	4.04 *	4.49 *	3.31 *	1.08 *	0.1	0	0
-26	2.03 *	4.04 *	4.02 *	3.99 *	3.95 *	3.90 *	3.84 *	3.77 *	3.69 *	4.48 *	5.17 *	4.94 *	5.42 *	5.70 *	5.78 *	5.57 *	4.56 *	5.03 *	3.70 *	1.20 *	0.1	0	0
-29	2.19 *	4.37 *	4.35 *	4.32 *	4.27 *	4.22 *	4.15 *	4.08 *	3.99 *	4.84 *	5.60 *	5.35 *	5.87 *	6.17 *	6.25 *	6.03 *	4.94 *	5.42 *	3.97 *	1.28 *	0.2	0	0
-33	2.24 *	4.49 *	4.47 *	4.44 *	4.39 *	4.34 *	4.27 *	4.19 *	4.10 *	4.99 *	5.77 *	5.52 *	6.07 *	6.40 *	6.47 *	6.23 *	5.11 *	5.59 *	4.06 *	1.30 *	0.2	0	0
-38	2.22 *	4.43 *	4.42 *	4.39 *	4.35 *	4.29 *	4.24 *	4.16 *	4.06 *	4.95 *	5.74 *	5.48 *	6.02 *	6.35 *	6.41 *	6.14 *	5.05 *	5.51 *	3.94 *	1.23 *	0.1	0	0
-43	1.94 *	3.88 *	3.87 *	3.84 *	3.81 *	3.76 *	3.71 *	3.64 *	3.54 *	4.31 *	5.01 *	4.78 *	5.22 *	5.50 *	5.56 *	5.31 *	4.32 *	4.69 *	3.28 *	1	0.1	0	0
-48	2.24 *	4.48 *	4.46 *	4.42 *	4.37 *	4.31 *	4.24 *	4.16 *	4.05 *	4.90 *	5.70 *	5.46 *	5.93 *	6.19 *	6.27 *	5.93 *	4.71 *	5.13 *	3.53 *	1	0.1	0	0
-55	1.28 *	2.58 *	2.57 *	2.54 *	2.51 *	2.47 *	2.43 *	2.38 *	2.33 *	2.83 *	3.29 *	3.15 *	3.43 *	3.61 *	3.67 *	3.41 *	2.76 *	3.09 *	2.2	0.6	0.1	0	0
-65	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.5	0.2	0	0	0
-75	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	0.1	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	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	52.8	106	105	104	103	102	100	98.7	96.6	117	136	130	142	151	153	146	120	134	97.8	31.1	3.68	0.01	2230.7

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	FFLEDS @ 26W / 4000K	Sample ID.	C1
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
119.97	60	0.262	31.4	0.999	2.41%
276.98	60	0.123	30.8	0.905	10.25%



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