

# Photometric Test Report

## Relevant Standards

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

## Prepared For

**RAB Lighting Inc.**

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

## Prepared By

**Deliver Co., Ltd.**

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

## Project Number

**DLF2110111**

## Report Number

**DLF2110111-4a**

## 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		4464
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	142.9
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		31.2
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	1.93%
		20.00%	277V	10.57%
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	5029±355	5052
		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		3
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%		99.87%
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		0.261
(Goniophotometer - Section 4.2)		Non-Worst Case		0.122
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		31.2
(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 / 5000K	D1
2	Goniophotometer Test	2021/10/28	FFLEDS @ 26W / 5000K	D1
3	THD and PF Test	2021/10/28	FFLEDS @ 26W / 5000K	D1

### 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 / 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.	FFLEDS @ 26W / 5000K	Sample ID.	D1
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
120.06	60	0.262	31.5	0.999
276.99	60	0.123	30.8	0.905

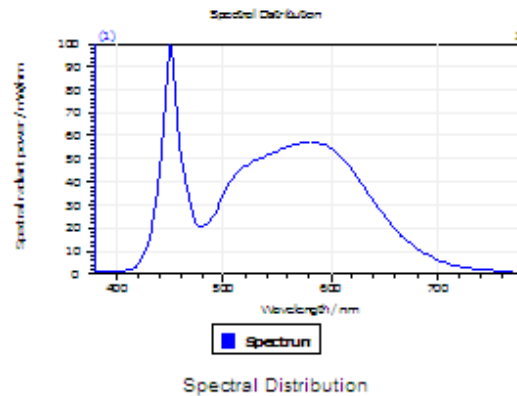
#### Test Result

CCT (K)	CRI	R9	Duv
5052	82	3	0.0026

Rf	Rg	IES Rcs,h1
83	96	-13%

## 4.1 Integrating Sphere Test

### Results



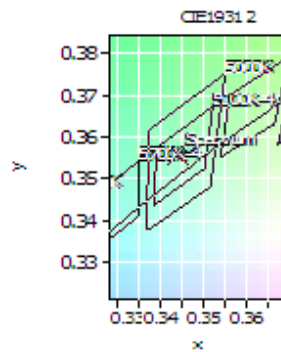
#### Spectral values

DominantWavelength 589.52 nm  
Purity 0.101  
PeakWavelength 450.59 nm  
Radiant Power 11.14 W  
Width50%:

#### Color Coordinates

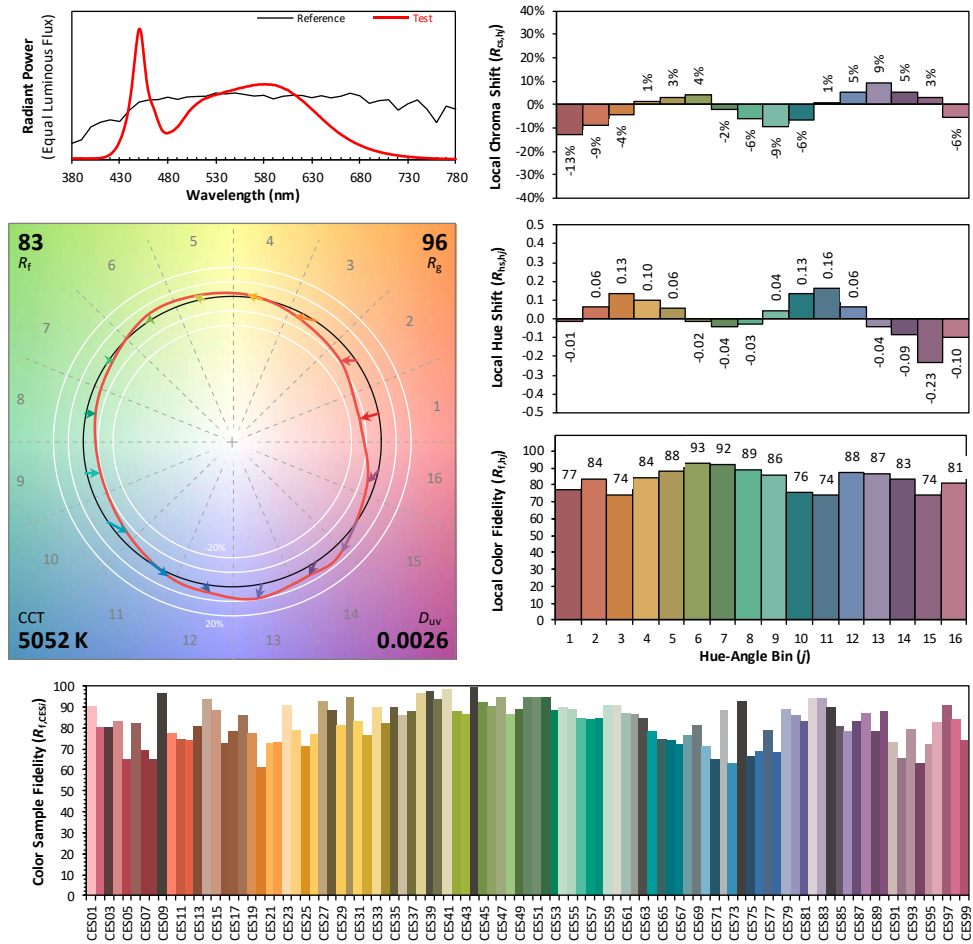
Correlated Color Temperat 5052 K  
x: 0.3441 u: 0.2091 u': 0.2091  
y: 0.3560 v: 0.3244 v': 0.4866

CRI01	80.1	CRI09	2.5
CRI02	86.5	CRI10	67.8
CRI03	91.1	CRI11	81.8
CRI04	82.4	CRI12	59.4
CRI05	80.8	CRI13	81.5
CRI06	81.1	CRI14	95.2
CRI07	86.5	CRI15	74.2
CRI08	66.3	CRI16	73.2
ResultsCRI	81.8		



PlanckDistance 2.6E-003

## 4.1 Integrating Sphere Test



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

$x$  0.3441  
 $y$  0.3560  
 $u'$  0.2091  
 $v'$  0.4866

CIE 13.3-1995  
(CRI)

$R_a$  82  
 $R_9$  1

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 / 5000K	Sample ID.	D1
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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , 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	120.01	60	0.261	31.2	0.998
NON-WORST CASE	277.02	60	0.122	30.7	0.906

#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
4464	115.3	149.7	90.1	109.7	142.9

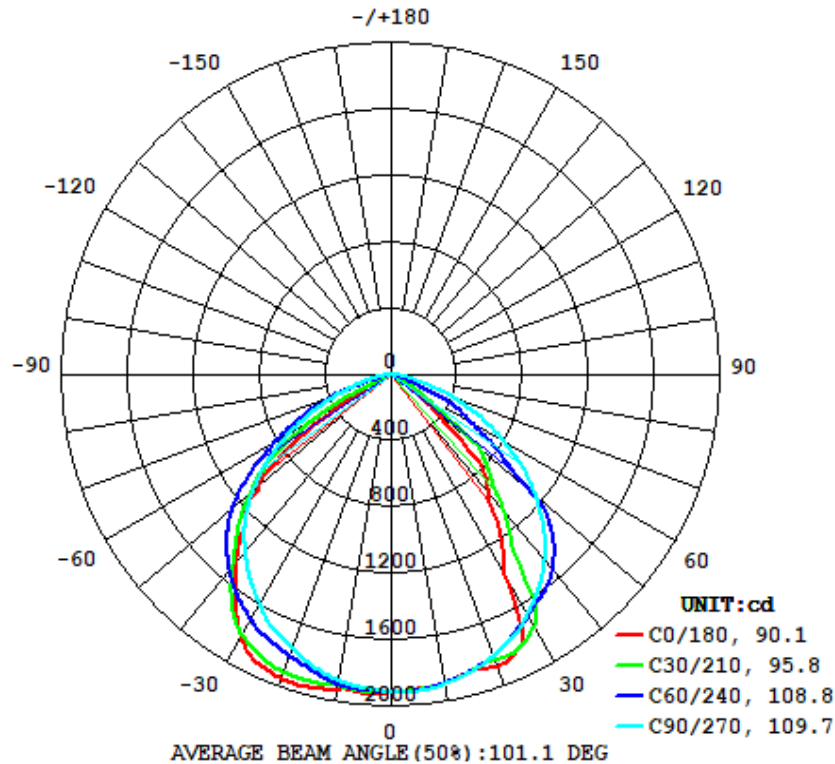
Zonal Lumen Requirement  
( $0^{\circ}$ - $90^{\circ}$ )

99.87%

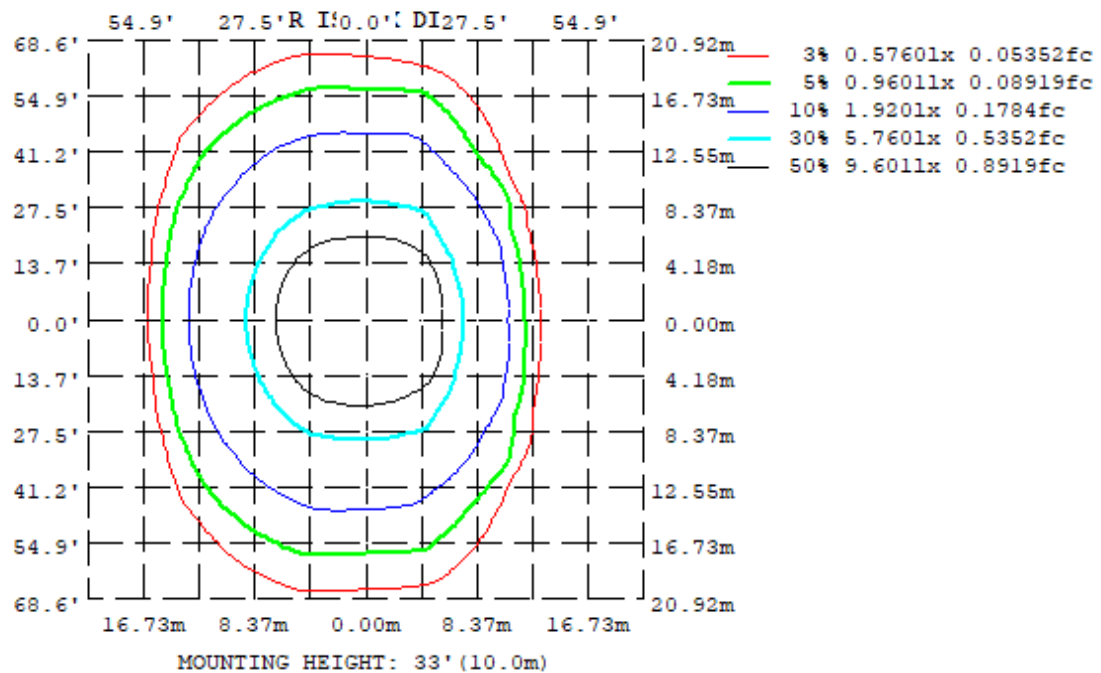


## 4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot





## 4.2 Goniophotometer Test

### Zonal Lumen Summary

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315
10	1887	1891	1891	1909	1927	1896	1871	1877
20	1874	1800	1808	1894	1953	1863	1761	1784
30	1390	1746	1666	1818	1827	1779	1599	1712
40	930.9	1305	1457	1588	1461	1562	1381	1166
50	371.9	783.3	1159	1198	1049	1176	1101	742.3
60	17.58	278.1	791.0	770.0	285.3	776.1	730.9	211.1
70	0.3700	9.630	390.0	89.29	37.36	97.45	340.2	7.136
80	0.2601	0.3161	72.15	14.42	10.97	12.87	42.96	0.1408
90	0.2541	0.3836	0.2804	0.2134	0.1546	0.2995	0.1099	0.1380
100	0.3862	0.3724	0.3720	1.008	3.308	0.7005	0.3629	0.3043
110	0.4223	0.6455	0.7036	0.3535	0.1972	0.3977	0.6737	0.4814
120	0.7119	0.8372	0.7726	0.6687	0.3952	0.6386	0.7068	0.6536
130	1.064	1.044	1.124	0.9195	0.6912	0.8504	1.103	0.9396
140	1.324	1.317	1.305	1.175	1.125	1.202	1.281	1.292
150	1.508	1.569	1.401	1.422	1.355	1.395	1.444	1.539
160	1.671	1.632	1.530	1.537	1.697	1.567	1.463	1.638
170	1.575	1.472	1.489	1.539	1.651	1.506	1.369	1.371
180	1.664	1.556	1.479	1.764	1.664	1.577	1.511	1.547
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	182.16	0 - 10	182.16	4.08%
10-20	530.42	0 - 20	712.58	15.96%
20-30	830.50	0 - 30	1543.07	34.57%
30-40	964.22	0 - 40	2507.29	56.17%
40-50	917.87	0 - 50	3425.16	76.73%
50-60	663.34	0 - 60	4088.50	91.59%
60-70	294.81	0 - 70	4383.31	98.19%
70-80	69.81	0 - 80	4453.12	99.76%
80-90	4.78	0 - 90	4457.90	99.87%
90-100	1.15	0 - 100	4459.06	99.89%
100-110	0.49	0 - 110	4459.55	99.90%
110-120	0.57	0 - 120	4460.12	99.92%
120-130	0.74	0 - 130	4460.86	99.93%
130-140	0.87	0 - 140	4461.73	99.95%
140-150	0.86	0 - 150	4462.60	99.97%
150-160	0.71	0 - 160	4463.31	99.99%
160-170	0.44	0 - 170	4463.75	100.00%
170-180	0.14	0 - 180	4463.89	100.00%

## 4.2 Goniophotometer Test

### Axial Candela

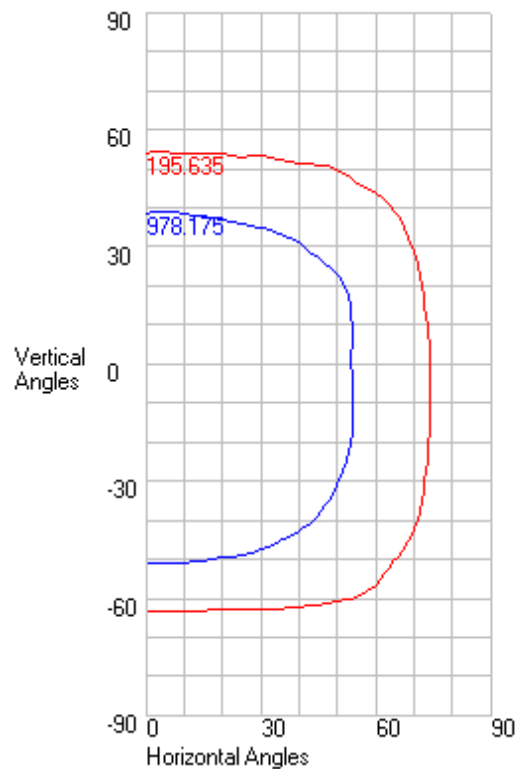
DEG.	HOR.	DEG.	VERT.
90	0.11	90	0.25
85	0.31	85	0.27
75	166.68	75	0.26
65	531.56	65	5.74
55	924.5	55	150.58
47.5	1183.015	47.5	531.07
42.5	1323.4	42.5	865.59
37.5	1440.955	37.5	1008.915
33	1539.79	33	1252.99
29	1619.1	29	1514.34
25.5	1686.845	25.5	1817.815
22.5	1728.03	22.5	1863.365
19.5	1767.225	19.5	1872.33
17	1799.51	17	1854.85
15	1823.76	15	1853.15
13	1845.35	13	1864.67
11	1863.75	11	1881.28
9	1877.97	9	1893.2
7	1889.65	7	1900.26
5	1899.03	5	1898.79
3	1902.95	3	1907.13
1	1911.77	1	1914.56
0	1913.273	0	1913.273
-1	1914.28	-1	1919.75
-3	1916.33	-3	1926.32
-5	1913.42	-5	1928.06
-7	1909.35	-7	1919.62
-9	1898.02	-9	1919.64
-11	1885.42	-11	1933.95
-13	1871.46	-13	1943.49
-15	1855.64	-15	1950.54
-17	1838.13	-17	1956.35
-19.5	1813.25	-19.5	1954.605
-22.5	1778.815	-22.5	1938.05
-25.5	1741.085	-25.5	1913.135
-29	1685.32	-29	1853.47
-33	1609.89	-33	1723.98
-37.5	1517.1	-37.5	1550.065
-42.5	1391.75	-42.5	1367.985
-47.5	1237.815	-47.5	1192.935
-55	981.8	-55	728.72
-65	589.47	-65	70.25
-75	211.1	-75	19.13
-85	5.73	-85	5.36
-90	0.28	-90	0.151

## 4.2 Goniophotometer Test

### Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	1956.35
Maximum Candela Angle	0 H -17 V
Horizontal Beam Angle (50%)	109.4
Vertical Beam Angle (50%)	89.5
Horizontal Field Angle (10%)	149.1
Vertical Field Angle (10%)	117.2
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	3483
Beam Efficiency	N.A.
Field Lumens	4396
Field Efficiency	N.A.
Spill Lumens	67
Luminaire Lumens	4464
Total Efficiency	N.A.
Total Luminaire Watts	31.2314
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	0.25	0.245	0.234	0.224	0.213	0.202	0.191	0.181	0.17	0.165	0.158	0.15	0.142	0.133	0.132	0.135	0.138	0.142	0.147	0.143	0.13	0.117	0.11
85	0.27	0.265	0.256	0.247	0.237	0.228	0.218	0.209	0.2	0.195	0.188	0.18	0.172	0.162	0.158	0.155	0.152	0.148	0.143	0.133	0.12	0.112	0.11
75	0.26	0.256	0.248	0.239	0.231	0.223	0.214	0.206	0.199	0.194	0.187	0.178	0.17	0.16	0.155	0.149	0.142	0.138	0.133	0.123	0.115	0.106	0.11
65	5.74	5.853	6.08	5.978	5.843	5.544	5.06	4.37	3.954	4.159	4.629	5.078	3.878	2.842	3.881	3.944	1.956	3.074	1.035	1.804	0.356	0.108	0.11
55	150.58	152.833	157.338	156.188	155.134	152.112	147.076	143.886	144.204	142.455	137.558	127.352	113.728	116.26	103.955	87.235	69.844	74.949	35.467	26.829	4.792	0.124	0.11
47.5	531.07 *	536.832 *	542.356 *	537.828 *	520.86 *	500.028 *	479.973 *	491.147 *	509.2 *	517.562 *	489.145 *	421.992 *	430.735 *	459.158 *	411.25 *	327.07 *	323.968 *	290.533 *	166.702	93.646	13.649	0.152	0.11
42.5	865.59 *	866.385 *	866.403 *	864.415 *	860.534 *	854.366 *	847.01 *	841.303 *	828.505 *	816.922 *	800.797 *	781.608 *	752.956 *	698.804 *	667.771 *	628.374 *	481.833 *	458.7 *	277.974 *	155.656	23.303	0.174	0.11
37.5	1008.915 *	1014.614 *	1022.367 *	1025.037 *	1025.289 *	1009.887 *	999.869 *	998.535 *	994.72 *	976.492 *	938.254 *	931.477 *	918.449 *	879.973 *	816.745 *	783.686 *	695.143 *	595.441 *	458.226 *	216.119 *	39.962	0.198	0.11
33	1252.99 *	1256.283 *	1257.282 *	1254.03 *	1246.04 *	1242.598 *	1232.074 *	1215.171 *	1199.918 *	1180.249 *	1182.058 *	1139.437 *	1093.607 *	1053.686 *	1051.615 *	932.503 *	829.306 *	733.108 *	618.778 *	270.151 *	55.721	0.214	0.11
29	1514.34 *	1537.099 *	1564.072 *	1574.908 *	1566.323 *	1555.951 *	1558.436 *	1544.598 *	1509.173 *	1455.652 *	1430.246 *	1455.735 *	1352.395 *	1247.57 *	1245.82 *	1204.817 *	960.154 *	866.822 *	723.111 *	320.504 *	70.334	0.23	0.11
25.5	1817.815 *	1816.627 *	1812.124 *	1805.091 *	1794.978 *	1782.724 *	1766.07 *	1747.169 *	1729.807 *	1702.258 *	1648.589 *	1623.978 *	1584.564 *	1443.713 *	1386.852 *	1351.035 *	1080.072 *	970.523 *	803.038 *	359.491 *	84.545	0.244	0.11
22.5	1863.365 *	1860.942 *	1855.165 *	1848.884 *	1838.062 *	1825.824 *	1812.747 *	1795.223 *	1772.181 *	1749.118 *	1721.901 *	1678.933 *	1629.6 *	1568.077 *	1495.579 *	1395.535 *	1197.588 *	1049.372 *	872.62 *	389.976 *	96.368	0.254	0.11
19.5	1872.33 *	1869.074 *	1863.309 *	1858.407 *	1847.298 *	1837.085 *	1827.255 *	1805.782 *	1785.481 *	1766.377 *	1738.869 *	1694.449 *	1649.259 *	1599.15 *	1521.482 *	1411.194 *	1271.163 *	1121.168 *	900.102 *	416.652 *	108.127	0.265	0.11
17	1854.85 *	1851.591 *	1846.721 *	1841.842 *	1834.93 *	1826.007 *	1815.373 *	1798.665 *	1778.35 *	1762.004 *	1736.565 *	1695.204 *	1653.945 *	1605.062 *	1526.819 *	1418.626 *	1295.623 *	1176.716 *	916.527 *	437.683 *	117.809	0.273	0.11
15	1853.15 *	1850.688 *	1845.133 *	1839.631 *	1832.624 *	1823.416 *	1811.6 *	1794.432 *	1775.265 *	1758.7 *	1733.549 *	1691.88 *	1654.063 *	1605.268 *	1528.014 *	1421.319 *	1307.65 *	1184.985 *	925.718 *	453.645 *	125.163	0.279	0.11
13	1864.67 *	1862.647 *	1855.928 *	1850.135 *	1843.531 *	1833.078 *	1819.464 *	1800.973 *	1782.536 *	1763.354 *	1733.097 *	1693.897 *	1658.88 *	1605.712 *	1527.54 *	1421.404 *	1316.141 *	1191.235 *	933.38 *	468.766 *	132.144	0.284	0.11
11	1881.28 *	1878.294 *	1870.169 *	1865.804 *	1858.316 *	1845.933 *	1833.281 *	1814.743 *	1794.296 *	1771.604 *	1740.092 *	1703.897 *	1665.873 *	1606.572 *	1525.481 *	1424.009 *	1319.436 *	1195.086 *	936.108 *	482.361 *	138.725	0.297	0.11
9	1893.2 *	1889.363 *	1881.426 *	1877.145 *	1869.327 *	1857.9 *	1843.206 *	1827.121 *	1805.242 *	1780.825 *	1749.644 *	1713.042 *	1673.467 *	1607.468 *	1529.614 *	1431.276 *	1323.491 *	1197.139 *	937.92 *	494.462 *	144.882	0.3	0.11
7	1900.26 *	1894.875 *	1887.266 *	1882.9 *	1876.864 *	1864.463 *	1850.836 *	1834.091 *	1810.685 *	1785.633 *	1755.508 *	1719.921 *	1680.084 *	1613.153 *	1534.406 *	1438.01 *	1326.352 *	1197.079 *	938.01 *	505.108 *	150.59	0.302	0.11
5	1898.79 *	1894.29 *	1887.134 *	1883.093 *	1877.226 *	1865.621 *	1853.939 *	1836.071 *	1812.684 *	1787.431 *	1759.276 *	1724.948 *	1684.998 *	1618.104 *	1538.562 *	1440.517 *	1327.436 *	1195.139 *	936.357 *	514.341 *	157.517	0.304	0.11
3	1907.13 *	1901.053 *	1894.123 *	1890.607 *	1882.478 *	1870.966 *	1855.527 *	1838.395 *	1817.008 *	1793.137 *	1763.808 *	1727.408 *	1687.222 *	1620.462 *	1540.637 *	1442.256 *	1327.06 *	1191.613 *	934.933 *	523.631 *	161.177	0.307	0.11
1	1914.56 *	1907.629 *	1902.022 *	1897.594 *	1887.892 *	1876.712 *	1862.098 *	1844.14 *	1822.662 *	1798.382 *	1766.628 *	1728.338 *	1687.499 *	1620.529 *	1540.868 *	1441.922 *	1325.06 *	1186.347 *	927.981 *	528.916 *	164.845	0.31	0.11
0	1913.273 *	1911.77 *	1902.95 *	1899.03 *	1889.65 *	1877.97 *	1863.75 *	1845.35 *	1823.76 *	1799.51 *	1767.225 *	1728.03 *	1686.845 *	1619.1 *	1539.79 *	1440.955 *	1323.4 *	1183.015 *	924.5 *	531.56 *	166.68	0.31	0.11
-1	1919.75 *	1915.838 *	1906.786 *	1902.7 *	1893.636 *	1882.464 *	1868.08 *	1849.489 *	1828.08 *	1804.023 *	1771.046 *	1731.174 *	1689.75 *	1622.143 *	1542.467 *	1443.915 *	1326.71 *	1187.142 *	928.984 *	534.633 *	167.299	0.326	0.11
-3	1926.32 *	1923.057 *	1914.525 *	1909.766 *	1899.615 *	1888.321 *	1873.41 *	1854.476 *	1833.445 *	1809.596 *	1776.81 *	1735.73 *	1693.902 *	1625.258 *	1545.486 *	1448.269 *	1331.982 *	1193.946 *	937.942 *	540.773 *	168.538	0.357	0.11
-5	1928.06 *	1924.783 *	1916.765 *	1912.629 *	1901.901 *	1891.212 *	1875.29 *	1855.251 *	1834.498 *	1811.842 *	1780.089 *	1738.24 *	1695.895 *	1625.963 *	1546.789 *	1450.645 *	1335.547 *	1198.857 *	941.475 *	542.907 *	169.773	0.389	0.11
-7	1919.62 *	1916.805 *	1911.269 *	1905.965 *	1897.03 *	1886.307 *	1872.258 *	1851.014 *	1831.162 *	1809.955 *	1781.038 *	1740.014 *	1695.355 *	1623.882 *	1546.226 *	1452.353 *	1337.516 *	1201.929 *	945.309 *	545.071 *	167.58	0.42	0.11
-9	1919.64 *	1915.268 *	1909.453 *	1903.881 *	1896.281 *	1883.606 *	1872.013 *	1852.517 *	1826.941 *	1808.349 *	1782.075 *	1744.493 *	1700.023 *	1622.473 *	1545.207 *	1449.848 *	1337.793 *	1203.1 *	947.531 *	545.793 *	166.565	0.451	0.11
-11	1933.95 *	1929.329 *	1922.789 *	1914.947 *	1907.088 *	1893.11 *	1879.04 *	1860.364 *	1836.646 *	1811.403 *	1783.537 *	1747.724 *	1703.454 *	1629.589 *	1546.299 *	1446.853 *	1336.895 *	1202.333 *	948.196 *	545.021 *	164.982	0.482	0.11
-13	1943.49 *	1939.89 *	1933.818 *	1925.853 *	1916.981 *	1903.28 *	1888.024 *	1869.104 *	1845.224 *	1820.96 *	1789.465 *	1750.635 *	1706.634 *	1635.561 *	1552.949 *	1447.994 *	1336.72 *	1199.745 *	948.101 *	542.711 *	162.829	0.491	0.11
-15	1950.54 *	1946.877 *	1940.901 *	1933.712 *	1923.517 *	1911.526 *	1894.882 *	1875.03 *	1853.172 *	1828.773 *	1797.064 *	1756.433 *	1709.29 *	1639.982 *	1556.554 *	1451.393 *	1334.029 *	1195.194 *	943.914 *	538.819 *	160.109	0.513	0.11
-17	1956.35 *	1953.252 *	1947.334 *	1940.425 *	1929.138 *	1917.979 *	1900.453 *	1879.054 *	1857.399 *	1836.008 *	1801.83 *	1759.498 *	1709.07 *	1643.153 *	1558.926 *	1452.151 *	1332.861 *	1189.163 *	938.583 *	533.393 *	156.822	0.532	0.11
-19.5	1954.605 *	1952.024 *	1946.359 *	1940.115 *	1928.486 *	1915.506 *	1901.214 *	1878.588 *	1856.441 *	1834.363 *	1803.116 *	1757.335 *	1704.645 *	1642.368 *	1558.036 *	1449.487 *	1325.961 *	1179.891 *	928.603 *	524.532 *	151.921	0.552	0.11
-22.5	1938.05 *	1935.828 *	1930.535 *	1924.269 *	1913.245 *	1899.154 *	1882.889 *	1864.352 *	1842.231 *	1820.393 *	1791.344 *	1747.49 *	1691.749 *	1629.451 *	1548.08 *	1441.028 *	1314.342 *	1161.82 *	911.83 *	511.545 *	144.986	0.57	0.11
-25.5	1913.135 *	1910.984 *	1905.651 *	1899.124 *	1889.633 *	1874.356 *	1857.211 *	1838.942 *	1818.325 *	1795.216 *	1763.326 *	1720.496 *	1669.409 *	1601.7 *	1516.993 *	1424.925 *	1294.093 *	1134.282 *	880.238 *	492.015 *	136.833	0.581	0.11
-29	1853.47 *	1853.139 *	1848.943 *	1842.494 *	1833.864 *	1818.755 *	1801.567 *	1782.964 *	1764.11 *	1739.192 *	1702.93 *	1665.098 *	1624.348 *	1553.703 *	1462.688 *	1377.238 *	1260.069 *	1090.235 *	838.458 *	467.031 *	125.672	0.584	0.11
-33	1723.98 *	1725.01 *	1722.43 *	1716.454 *	1706.795 *	1697.445 *	1680.362 *	1664.384 *	1646.633 *	1625.9 *	1594.082 *	1556.319 *	1516.848 *	1459.604 *	1376.165 *	1294.797 *	1191.845 *	1026.485 *	779.594 *	434.684 *	112.504	0.574	0.11
-37.5	1550.065 *	1550.217 *	1547.912 *	1542.116 *	1534.876 *	1520.536 *	1510.922 *	1498.975 *	1483.269 *	1464.387 *	1436.194 *	1408.874 *	1374.38 *	1326.932 *	1253.582 *	1177.284 *	1072.978 *	933.862 *	700.885 *	383.309 *	96.052	0.555	0.11
-42.5	1367.985 *	1368.415 *	1366.81 *	1362.687 *	1356.962 *	1350.533 *	1343.535 *	1336.185 *	1315.12 *	1297.391 *	1275.105 *	1251.282 *	1214.956 *	1164.986 *	1101.746 *	1031.912 *	937.611 *	811.741 *	612.749 *	311.391 *	76.646	0.51	0.11
-47.5	1192.935 *	1192.809 *	1191.313 *	1188.057 *	1182.923 *	1173.63 *	1163.185 *	1154.899 *	1136.959 *	1114.512 *	1093.903 *	1071.519 *	1041.104 *	994.286 *	945.956 *	883.865 *	788.882 *	671.625 *	508.528 *	234.836 *	57.254	0.453	0.11
-55	728.72 *	733.436 *	742.862 *	738.851 *	736.947 *	732.799 *	727.169 *	725.004 *	712.737 *	700.457 *	688.719 *	681.112 *	661.697 *	623.582 *	589.819 *	562.475 *	473.9 *	391.038 *	318.464 *	124.637	30.076	0.341	0.11
-65	70.25	71.129	72.887	73.178	73.405	73.005	71.924	70.108	72.069	7													

## 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	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	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.2	0	0	0	0
55	0.79 *	1.61 *	1.63 *	1.63 *	1.60 *	1.56 *	1.53 *	1.53 *	1.54 *	1.90 *	2.14 *	1.95 *	2.18 *	2.40 *	2.34 *	2.13 *	1.8	1.9	1.3	0.4	0	0	0	0
47.5	1.07 *	2.15 *	2.16 *	2.15 *	2.13 *	2.09 *	2.06 *	2.04 *	2.02 *	2.47 *	2.82 *	2.65 *	2.91 *	3.10 *	3.11 *	2.86 *	2.32 *	2.50 *	1.7	0.5	0	0	0	0
42.5	1.43 *	2.87 *	2.88 *	2.88 *	2.85 *	2.81 *	2.77 *	2.74 *	2.69 *	3.26 *	3.77 *	3.62 *	3.99 *	4.18 *	4.27 *	4.06 *	3.25 *	3.57 *	2.52 *	0.7	0.1	0	0	0
37.5	1.55 *	3.12 *	3.13 *	3.12 *	3.10 *	3.06 *	3.02 *	2.97 *	2.92 *	3.57 *	4.16 *	3.97 *	4.36 *	4.65 *	4.80 *	4.57 *	3.68 *	4.13 *	2.99 *	0.9	0.1	0	0	0
33	1.69 *	3.43 *	3.45 *	3.45 *	3.42 *	3.39 *	3.35 *	3.30 *	3.21 *	3.89 *	4.57 *	4.39 *	4.71 *	4.98 *	5.20 *	4.92 *	3.89 *	4.38 *	3.19 *	0.9	0.1	0	0	0
29	1.78 *	3.59 *	3.61 *	3.60 *	3.57 *	3.53 *	3.48 *	3.43 *	3.34 *	4.02 *	4.68 *	4.51 *	4.85 *	5.02 *	5.22 *	4.96 *	3.87 *	4.33 *	3.16 *	0.92 *	0.1	0	0	0
25.5	1.68 *	3.36 *	3.34 *	3.32 *	3.29 *	3.25 *	3.20 *	3.14 *	3.08 *	3.74 *	4.32 *	4.13 *	4.51 *	4.72 *	4.82 *	4.56 *	3.61 *	4.05 *	2.96 *	0.87 *	0.1	0	0	0
22.5	1.71 *	3.40 *	3.39 *	3.37 *	3.33 *	3.30 *	3.25 *	3.19 *	3.12 *	3.81 *	4.41 *	4.20 *	4.62 *	4.90 *	4.97 *	4.72 *	3.83 *	4.30 *	3.13 *	0.93 *	0.1	0	0	0
19.5	1.42 *	2.83 *	2.82 *	2.80 *	2.77 *	2.74 *	2.71 *	2.66 *	2.61 *	3.18 *	3.69 *	3.52 *	3.88 *	4.12 *	4.17 *	4.00 *	3.31 *	3.71 *	2.68 *	0.82 *	0.1	0	0	0
17	1.13 *	2.25 *	2.24 *	2.23 *	2.21 *	2.19 *	2.16 *	2.12 *	2.08 *	2.54 *	2.95 *	2.82 *	3.11 *	3.30 *	3.35 *	3.22 *	2.69 *	3.03 *	2.19 *	0.68 *	0.1	0	0	0
15	1.13 *	2.26 *	2.25 *	2.24 *	2.22 *	2.19 *	2.16 *	2.12 *	2.09 *	2.55 *	2.95 *	2.82 *	3.12 *	3.31 *	3.35 *	3.24 *	2.72 *	3.05 *	2.22 *	0.70 *	0.1	0	0	0
13	1.14 *	2.28 *	2.27 *	2.25 *	2.23 *	2.21 *	2.18 *	2.14 *	2.10 *	2.56 *	2.96 *	2.84 *	3.13 *	3.32 *	3.36 *	3.25 *	2.73 *	3.07 *	2.24 *	0.71 *	0.1	0	0	0
11	1.15 *	2.29 *	2.28 *	2.27 *	2.25 *	2.22 *	2.19 *	2.15 *	2.11 *	2.57 *	2.98 *	2.85 *	3.15 *	3.33 *	3.37 *	3.27 *	2.75 *	3.09 *	2.27 *	0.73 *	0.1	0	0	0
9	1.15 *	2.30 *	2.29 *	2.28 *	2.26 *	2.23 *	2.20 *	2.16 *	2.12 *	2.58 *	2.99 *	2.87 *	3.16 *	3.34 *	3.39 *	3.28 *	2.76 *	3.10 *	2.28 *	0.74 *	0.1	0	0	0
7	1.16 *	2.31 *	2.30 *	2.29 *	2.27 *	2.24 *	2.21 *	2.17 *	2.13 *	2.59 *	3.00 *	2.88 *	3.17 *	3.35 *	3.40 *	3.30 *	2.77 *	3.11 *	2.29 *	0.76 *	0.1	0	0	0
5	1.16 *	2.31 *	2.30 *	2.29 *	2.27 *	2.25 *	2.21 *	2.18 *	2.13 *	2.60 *	3.01 *	2.89 *	3.18 *	3.36 *	3.41 *	3.30 *	2.77 *	3.11 *	2.30 *	0.77 *	0.1	0	0	0
3	1.16 *	2.32 *	2.31 *	2.30 *	2.28 *	2.25 *	2.22 *	2.18 *	2.14 *	2.60 *	3.02 *	2.89 *	3.19 *	3.37 *	3.42 *	3.31 *	2.77 *	3.10 *	2.31 *	0.77 *	0.1	0	0	0
1	0.58 *	1.16 *	1.16 *	1.15 *	1.14 *	1.13 *	1.11 *	1.09 *	1.07 *	1.30 *	1.51 *	1.45 *	1.60 *	1.69 *	1.71 *	1.65 *	1.38 *	1.55 *	1.15 *	0.39 *	0.1	0	0	0
0																								

-1	0.58 *	1.16 *	1.16 *	1.15 *	1.14 *	1.13 *	1.11 *	1.09 *	1.07 *	1.31 *	1.51 *	1.45 *	1.60 *	1.69 *	1.71 *	1.66 *	1.38 *	1.55 *	1.15 *	0.39 *	0.1	0	0
-3	1.17 *	2.33 *	2.33 *	2.31 *	2.29 *	2.27 *	2.23 *	2.19 *	2.15 *	2.62 *	3.03 *	2.90 *	3.20 *	3.38 *	3.43 *	3.32 *	2.78 *	3.12 *	2.33 *	0.79 *	0.1	0	0
-5	1.17 *	2.34 *	2.33 *	2.32 *	2.30 *	2.27 *	2.24 *	2.20 *	2.15 *	2.62 *	3.04 *	2.90 *	3.20 *	3.38 *	3.44 *	3.33 *	2.80 *	3.14 *	2.34 *	0.79 *	0.1	0	0
-7	1.17 *	2.34 *	2.33 *	2.31 *	2.29 *	2.27 *	2.23 *	2.19 *	2.15 *	2.63 *	3.04 *	2.91 *	3.20 *	3.38 *	3.44 *	3.34 *	2.81 *	3.15 *	2.35 *	0.79 *	0.1	0	0
-9	1.17 *	2.33 *	2.32 *	2.31 *	2.29 *	2.26 *	2.23 *	2.19 *	2.15 *	2.63 *	3.04 *	2.91 *	3.20 *	3.38 *	3.44 *	3.34 *	2.81 *	3.16 *	2.36 *	0.79 *	0.1	0	0
-11	1.17 *	2.34 *	2.33 *	2.32 *	2.30 *	2.27 *	2.24 *	2.20 *	2.15 *	2.63 *	3.05 *	2.92 *	3.21 *	3.39 *	3.44 *	3.34 *	2.81 *	3.17 *	2.36 *	0.79 *	0.1	0	0
-13	1.18 *	2.35 *	2.34 *	2.33 *	2.31 *	2.28 *	2.25 *	2.21 *	2.16 *	2.64 *	3.06 *	2.93 *	3.22 *	3.40 *	3.44 *	3.34 *	2.81 *	3.17 *	2.36 *	0.79 *	0.1	0	0
-15	1.19 *	2.37 *	2.36 *	2.34 *	2.32 *	2.29 *	2.26 *	2.22 *	2.17 *	2.65 *	3.07 *	2.94 *	3.23 *	3.41 *	3.45 *	3.34 *	2.81 *	3.16 *	2.35 *	0.78 *	0.1	0	0
-17	1.19 *	2.37 *	2.36 *	2.35 *	2.33 *	2.30 *	2.26 *	2.23 *	2.18 *	2.66 *	3.08 *	2.94 *	3.24 *	3.42 *	3.45 *	3.34 *	2.80 *	3.15 *	2.34 *	0.77 *	0.1	0	0
-20	1.49 *	2.97 *	2.96 *	2.94 *	2.91 *	2.88 *	2.83 *	2.78 *	2.73 *	3.32 *	3.85 *	3.67 *	4.05 *	4.27 *	4.31 *	4.16 *	3.48 *	3.91 *	2.90 *	0.95 *	0.1	0	0
-23	1.78 *	3.55 *	3.53 *	3.51 *	3.48 *	3.44 *	3.38 *	3.32 *	3.26 *	3.97 *	4.60 *	4.39 *	4.83 *	5.10 *	5.15 *	4.96 *	4.13 *	4.62 *	3.42 *	1.12 *	0.1	0	0
-26	1.76 *	3.51 *	3.50 *	3.47 *	3.44 *	3.40 *	3.35 *	3.29 *	3.22 *	3.92 *	4.54 *	4.34 *	4.76 *	5.02 *	5.09 *	4.90 *	4.05 *	4.51 *	3.33 *	1.08 *	0.1	0	0
-29	2.01 *	4.01 *	3.99 *	3.96 *	3.93 *	3.87 *	3.81 *	3.75 *	3.67 *	4.46 *	5.17 *	4.94 *	5.42 *	5.69 *	5.77 *	5.57 *	4.59 *	5.07 *	3.72 *	1.20 *	0.1	0	0
-33	2.18 *	4.35 *	4.34 *	4.30 *	4.26 *	4.21 *	4.14 *	4.07 *	3.99 *	4.85 *	5.60 *	5.36 *	5.89 *	6.18 *	6.26 *	6.06 *	4.99 *	5.46 *	3.99 *	1.28 *	0.2	0	0
-38	2.24 *	4.48 *	4.47 *	4.43 *	4.39 *	4.33 *	4.27 *	4.20 *	4.11 *	5.00 *	5.79 *	5.53 *	6.09 *	6.42 *	6.49 *	6.28 *	5.17 *	5.65 *	4.09 *	1.30 *	0.2	0	0
-43	2.22 *	4.44 *	4.42 *	4.40 *	4.35 *	4.30 *	4.25 *	4.17 *	4.08 *	4.96 *	5.75 *	5.49 *	6.04 *	6.37 *	6.43 *	6.19 *	5.11 *	5.58 *	3.97 *	1.22 *	0.1	0	0
-48	1.95 *	3.90 *	3.88 *	3.85 *	3.82 *	3.77 *	3.72 *	3.65 *	3.55 *	4.32 *	5.01 *	4.78 *	5.23 *	5.51 *	5.57 *	5.34 *	4.36 *	4.75 *	3.31 *	1	0.1	0	0
-55	2.20 *	4.40 *	4.39 *	4.35 *	4.31 *	4.24 *	4.18 *	4.10 *	3.99 *	4.84 *	5.61 *	5.36 *	5.84 *	6.11 *	6.22 *	5.89 *	4.69 *	5.13 *	3.51 *	1	0.1	0	0
-65	1.22 *	2.46 *	2.46 *	2.44 *	2.41 *	2.37 *	2.33 *	2.29 *	2.25 *	2.74 *	3.18 *	3.02 *	3.29 *	3.50 *	3.58 *	3.33 *	2.68 *	3.01 *	2.1	0.6	0.1	0	0
-75	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
-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	0.1	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	0
Total	52.4	105	105	104	103	102	100	98.5	96.5	118	136	130	143	151	153	147	121	135	98.3	30.9	3.61	0.01	2231.9

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	FFLEDS @ 26W / 5000K	Sample ID.	D1
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
120.06	60	0.262	31.5	0.999	1.93%
276.99	60	0.123	30.8	0.905	10.57%



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