

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF2208102**

## Report Number

**DLF2208102-8a**

## Test Date

**2022/8/2**

## Issue Date

**2022/8/3**

## 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		2488
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	144.6
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		17.2
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.10%
		20.00%	277V	7.02%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.994
		0.9	277V	0.945
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4028
		4 step	3985±154	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		83
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	-		7
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		94
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%		100.00%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		277
(Goniophotometer - Section 4.2)		Non-Worst Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.066
(Goniophotometer - Section 4.2)		Non-Worst Case		0.141
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		17.2
(Goniophotometer - Section 4.2)		Non-Worst Case		16.8

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2022/8/2	FFLEDXS @ 18W / 4000K	H1
2	Goniophotometer Test	2022/8/2	FFLEDXS @ 18W / 4000K	H1
3	THD and PF Test	2022/8/2	FFLEDXS @ 18W / 4000K	H1

### Remark(If any)

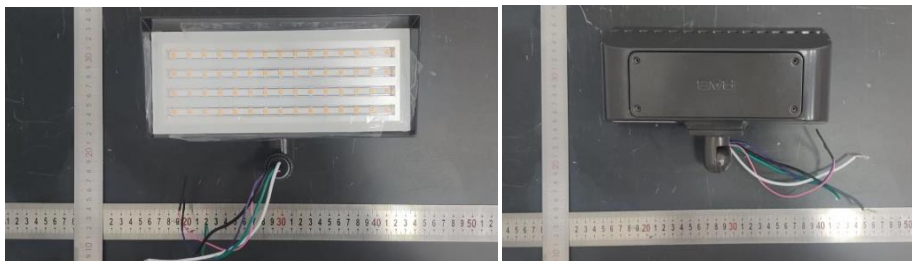
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## 3.0 Production Description

**Luminaire Description:** FFLEDXS @ 18W / 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.	FFLEDXS @ 18W / 4000K	Sample ID.	H1
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
120.01	60	0.140	16.7	0.994
276.98	60	0.065	17.1	0.945

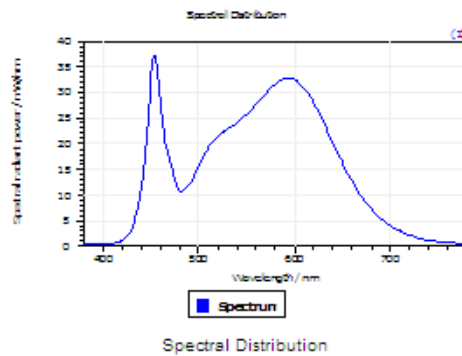
#### Test Result

CCT (K)	CRI	R9	Duv
4028	83	7	0.00062

Rf	Rg	IES Rcs,h1
84	94	-12%

## 4.1 Integrating Sphere Test

### Results



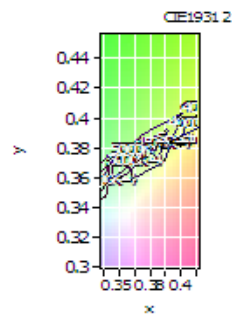
#### Spectral values

DominantWavelength 578.82 nm  
Purity 0.273  
PeakWavelength 453.85 nm  
Radiant Power 5.692 W  
Width50%:

#### Color Coordinates

Correlated Color Temperat 4028 K  
x: 0.3797 u: 0.2243 u': 0.2243  
y: 0.3776 v: 0.3346 v': 0.5018

CRI01	81.4	CRI09	6.5
CRI02	91.1	CRI10	78.5
CRI03	95.7	CRI11	79.1
CRI04	80.1	CRI12	61.6
CRI05	81.3	CRI13	84.2
CRI06	87.1	CRI14	98.2
CRI07	84.6	CRI15	74.7
CRI08	62.6	CRI16	71.2
ResultsCRI	83.0		



PlanckDistance 6.2E-004

## 4.1 Integrating Sphere Test

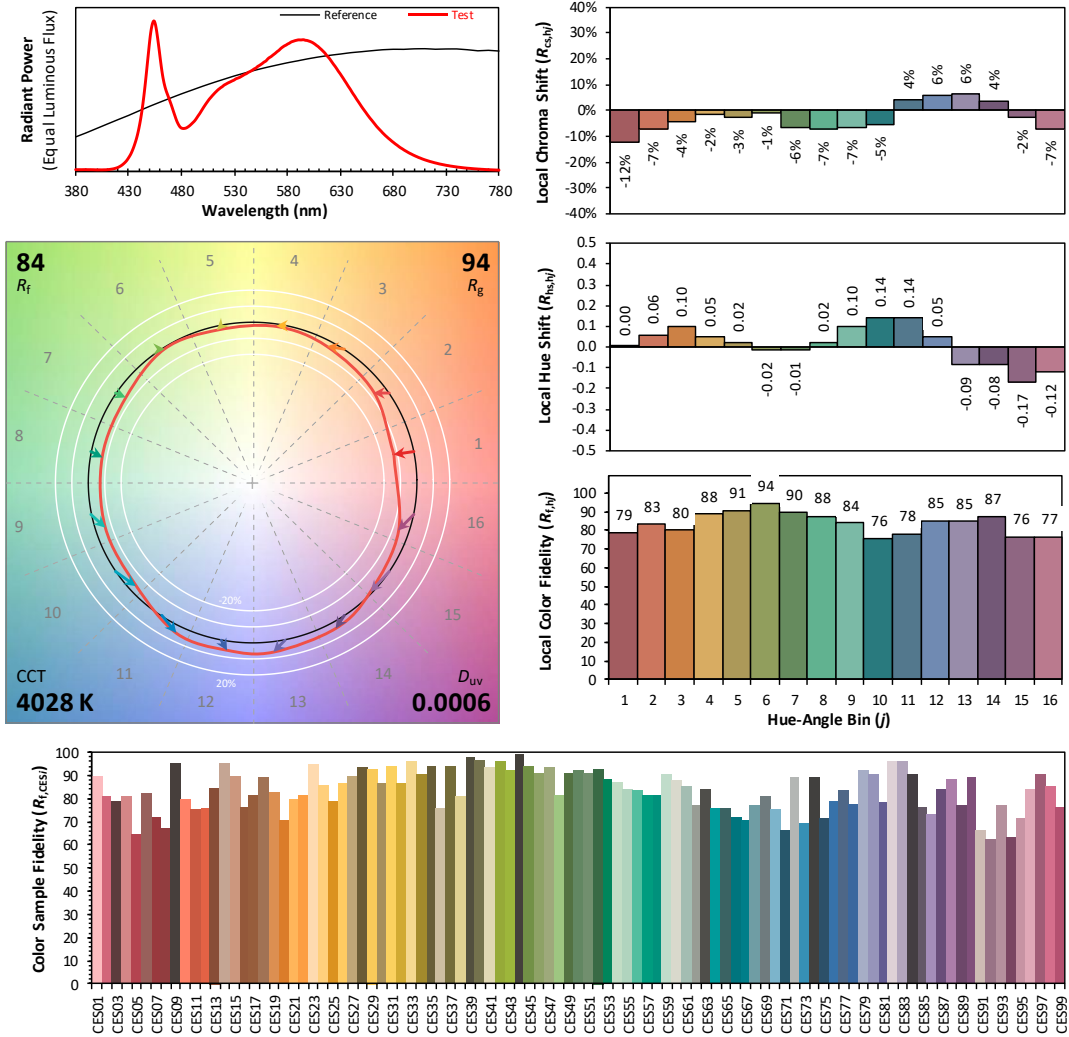
### IES TM-30-18 Color Rendition Report

Source: DLF2208102-8a

Manufacturer: RAB Lighting Inc.

Date: 2022/8/2

Model: FFLEDXS @ 18W / 4000K



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

$x$  0.3796  
 $y$  0.3776  
 $u'$  0.2243  
 $v'$  0.5018

CIE 13.3-1995  
 (CRI)  
 $R_a$  84  
 $R_g$  12

## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	FFLEDXS @ 18W / 4000K	Sample ID.	H1
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	277.04	60	0.066	17.2	0.943
NON-WORST CASE	119.99	60	0.141	16.8	0.992

#### Test Result

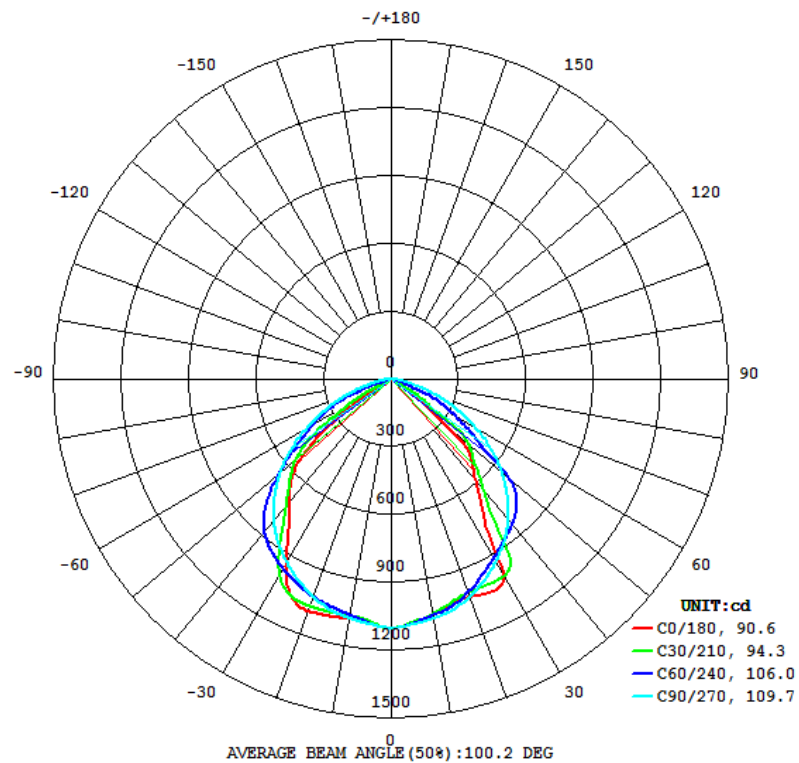
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2488	114.5	150.6	90.6	109.7	144.6

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

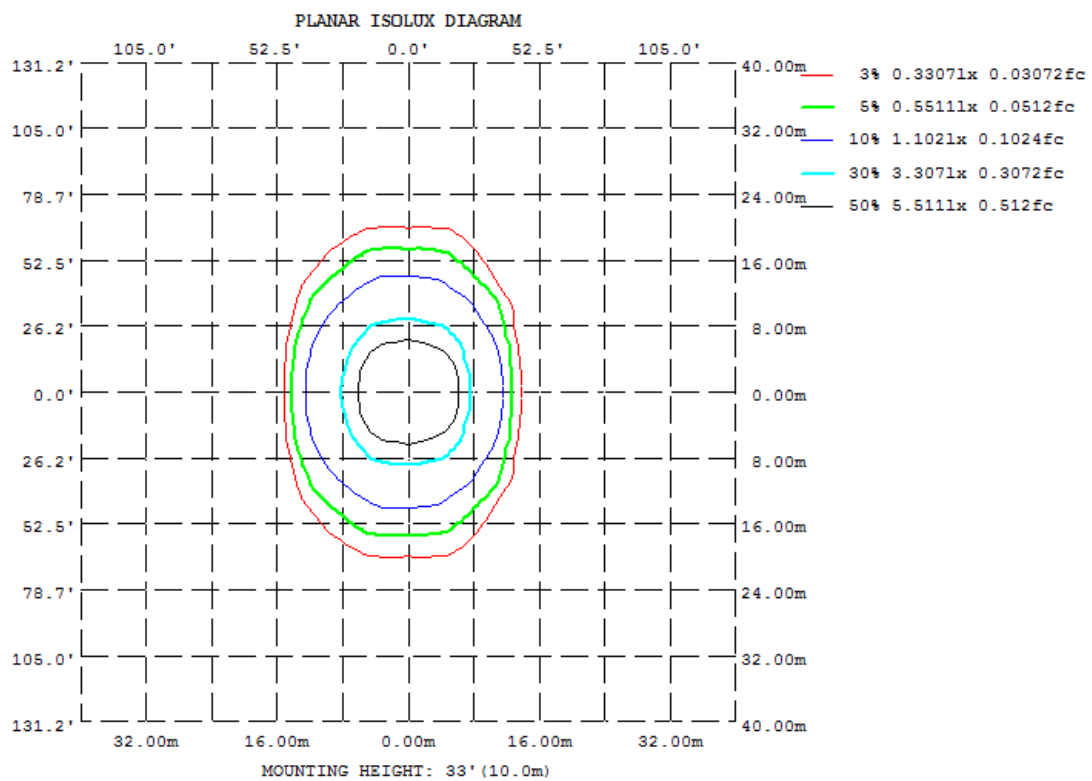
100.00%

## 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	1059	1061	1075	1059	1077	1059	1075	1061
20	1026	998.9	1024	1051	1092	1051	1024	998.9
30	1003	955.2	933.3	1005	936.2	1005	933.3	955.2
40	586.1	846.4	813.0	805.6	701.3	805.6	813.0	846.4
50	288.7	483.8	647.5	574.8	503.3	574.8	647.5	483.8
60	39.52	195.0	438.6	350.8	72.01	350.8	438.6	195.0
70	1.126	10.16	217.2	26.71	16.52	26.71	217.2	10.16
80	0.0335	0.0458	40.73	6.392	5.681	6.392	40.73	0.0458
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	103.27	0 - 10	103.27	4.15%
10-20	297.55	0 - 20	400.81	16.11%
20-30	465.45	0 - 30	866.26	34.82%
30-40	540.66	0 - 40	1406.92	56.56%
40-50	513.41	0 - 50	1920.33	77.20%
50-60	364.94	0 - 60	2285.27	91.87%
60-70	160.12	0 - 70	2445.39	98.31%
70-80	39.12	0 - 80	2484.51	99.88%
80-90	3.02	0 - 90	2487.54	100.00%
90-100	0.00	0 - 100	2487.54	100.00%
100-110	0.00	0 - 110	2487.54	100.00%
110-120	0.00	0 - 120	2487.54	100.00%
120-130	0.00	0 - 130	2487.54	100.00%
130-140	0.00	0 - 140	2487.54	100.00%
140-150	0.00	0 - 150	2487.54	100.00%
150-160	0.00	0 - 160	2487.54	100.00%
160-170	0.00	0 - 170	2487.54	100.00%
170-180	0.00	0 - 180	2487.54	100.00%

## 4.2 Goniophotometer Test

### Axial Candela

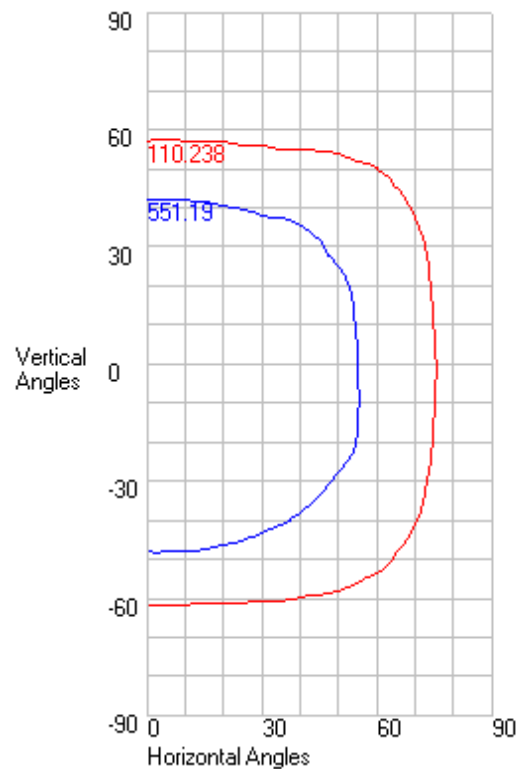
DEG.	HOR.	DEG.	VERT.
90	0	90	0
85	3.64	85	0.03
75	115.26	75	0.05
65	329.63	65	7.6
55	547.74	55	138.25
47.5	690.96	47.5	461.02
42.5	775.5	42.5	546.28
37.5	846.79	37.5	649.62
33	900.83	33	779.61
29	944.31	29	1029.42
25.5	976.65	25.5	1040.54
22.5	1002.23	22.5	1033.37
19.5	1027.71	19.5	1025.28
17	1045.35	17	1024.8
15	1057.1	15	1030.68
13	1065.32	13	1041.38
11	1072.01	11	1052.74
9	1078.66	9	1065.61
7	1084.01	7	1078.94
5	1088.86	5	1081.19
3	1095.26	3	1092.07
1	1100.47	1	1100.51
0	1102.25	0	1102.25
-1	1100.47	-1	1102.38
-3	1095.26	-3	1093.38
-5	1088.86	-5	1080.25
-7	1084.01	-7	1074.59
-9	1078.66	-9	1074.91
-11	1072.01	-11	1078.56
-13	1065.32	-13	1082.52
-15	1057.1	-15	1086.03
-17	1045.35	-17	1088.18
-19.5	1027.71	-19.5	1091.59
-22.5	1002.23	-22.5	1084.09
-25.5	976.65	-25.5	1048.38
-29	944.31	-29	966.61
-33	900.83	-33	844.36
-37.5	846.79	-37.5	743.72
-42.5	775.5	-42.5	666.7
-47.5	690.96	-47.5	576.65
-55	547.74	-55	269.45
-65	329.63	-65	26.77
-75	115.26	-75	9.54
-85	3.64	-85	3.03
-90	0	-90	0

## 4.2 Goniophotometer Test

### Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	1102.38
Maximum Candela Angle	0 H -1 V
Horizontal Beam Angle (50%)	109.9
Vertical Beam Angle (50%)	90.4
Horizontal Field Angle (10%)	150.9
Vertical Field Angle (10%)	118.7
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	1954
Beam Efficiency	N.A.
Field Lumens	2439
Field Efficiency	N.A.
Spill Lumens	49
Luminaire Lumens	2488
Total Efficiency	N.A.
Total Luminaire Watts	17.2
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0
75	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.08	0.08	0.06	0.18	0.1	0.57	0.16	0.16	0
65	7.6	7.72	7.97	8.08	8.16	8.15	8.05	7.83	7.88	8.08	8.29	8.23	7.87	8.68	9.31	7.67	7.4	11.75	5.88	9.09	2.11	0.25	0
55	138.25 *	139.91 *	143.22 *	142.18 *	141.45 *	139.51 *	136.43 *	134.82 *	134.71 *	134.11 *	132.65 *	128.52 *	122.04 *	122.03 *	116.35 *	105.09	104	102.85	60.15	48.38	9.78	0.44	0
47.5	461.02 *	461.92 *	462.62 *	461.98 *	460.11 *	455.6 *	451.22 *	447.26 *	435.87 *	423.22 *	410.68 *	414.48 *	394.58 *	346.39 *	342.63 *	337.75 *	249.75 *	235.74 *	184.71 *	94.22	21.9	0.89	0
42.5	546.28 *	546.49 *	546.18 *	544.88 *	542.62 *	539.41 *	536.84 *	535.82 *	528.49 *	520.14 *	511.12 *	504.81 *	495.38 *	474.82 *	445.89 *	429.14 *	385.28 *	316.91 *	275.68 *	131.02 *	35.72	1.25	0
37.5	649.62 *	651.03 *	652.08 *	650.77 *	648.54 *	641.43 *	639.06 *	635.67 *	629.76 *	621.34 *	609.45 *	603.34 *	587.94 *	567.33 *	550.24 *	537.37 *	466.91 *	402.86 *	337.26 *	177.76 *	49.11	1.64	0
33	779.61 *	784.76 *	789.83 *	789.09 *	780.49 *	779.72 *	793.76 *	793.85 *	773.62 *	748.71 *	750.24 *	771.25 *	748.4 *	675.64 *	661.63 *	662.74 *	577.31 *	472.59 *	389.95 *	221.88 *	61.06	1.94	0
29	1029.42 *	1028.48 *	1023.95 *	1019.37 *	1016.19 *	1006.32 *	994.4 *	979.86 *	980.61 *	968.45 *	921.92 *	888.23 *	905.11 *	844.85 *	750.36 *	750.21 *	689.71 *	530.45 *	435.91 *	256.13 *	71.07	2.24	0
25.5	1040.54 *	1038.41 *	1034.32 *	1030.49 *	1026.29 *	1020.77 *	1014.83 *	1008.68 *	998.99 *	985.08 *	966.52 *	944.91 *	922.08 *	884.67 *	823.16 *	797.94 *	717.83 *	580.88 *	473.06 *	280.64 *	79.62	2.48	0
22.5	1033.37 *	1031.17 *	1027.2 *	1023.73 *	1019.29 *	1013.94 *	1009.01 *	1003.52 *	993.21 *	980.93 *	963.87 *	943.61 *	919.4 *	887.52 *	847.18 *	801.1 *	728.25 *	617.47 *	503.5 *	298.11 *	86.28	2.67	0
19.5	1025.28 *	1023.18 *	1019.14 *	1015.3 *	1011.3 *	1006.68 *	1001.55 *	995.29 *	986.75 *	975.79 *	960.64 *	941.15 *	916.65 *	883.14 *	850.43 *	803.82 *	730.78 *	639.09 *	516.57 *	308.83 *	92.22	2.86	0
17	1024.8 *	1022.97 *	1018.93 *	1014.83 *	1011.08 *	1006.23 *	1001.94 *	995.9 *	986.85 *	976.39 *	963.27 *	941.69 *	915.73 *	886.83 *	854.57 *	805.68 *	731.96 *	646.15 *	525.02 *	316.39 *	96.63	3	0
15	1030.68 *	1029.23 *	1024.98 *	1020.86 *	1016.8 *	1011.73 *	1007.61 *	1001.24 *	992.85 *	983.03 *	968.19 *	944.31 *	920.21 *	893.76 *	858.54 *	807 *	732.21 *	655.03 *	530.22 *	321.14 *	99.87	3.1	0
13	1041.38 *	1040.11 *	1035.67 *	1031.48 *	1026.31 *	1021.94 *	1016.32 *	1009.8 *	1002.05 *	991.65 *	975.09 *	951.59 *	929.92 *	901.23 *	862.71 *	808.1 *	739.67 *	662.98 *	535.1 *	324.8 *	102.85	3.2	0
11	1052.74 *	1051.57 *	1047.04 *	1042.77 *	1037.53 *	1032.93 *	1026.82 *	1020.84 *	1012.98 *	1001.15 *	984.49 *	963.15 *	939.74 *	908.76 *	866.88 *	812.76 *	747.01 *	669.92 *	538.74 *	327.67 *	105.56	3.43	0
9	1065.61 *	1064.5 *	1059.74 *	1053.79 *	1049.69 *	1044.48 *	1039.16 *	1032.03 *	1023.64 *	1011.55 *	994.71 *	973.24 *	948.99 *	915.97 *	874.29 *	821.38 *	754.57 *	675.97 *	542.16 *	329.77 *	107.99	3.47	0
7	1078.94 *	1077.72 *	1071.63 *	1065.43 *	1061.76 *	1053.99 *	1050.21 *	1042.43 *	1031.81 *	1020.13 *	1003.43 *	981.82 *	957.36 *	924.18 *	881.67 *	829.66 *	761.11 *	681.02 *	544.89 *	331.09 *	110.13	3.51	0
5	1081.19 *	1079.97 *	1074.81 *	1068.85 *	1065.63 *	1059.48 *	1056.4 *	1049.09 *	1038.77 *	1026.78 *	1011.02 *	989.23 *	964.57 *	931.59 *	888.66 *	835.5 *	766.58 *	685.08 *	546.84 *	331.63 *	112.97 *	3.54	0
3	1092.07 *	1090.51 *	1085.04 *	1079.19 *	1074.4 *	1069.63 *	1062.56 *	1054.72 *	1046.2 *	1035 *	1018.59 *	995.23 *	970.41 *	937.7 *	894.44 *	840.91 *	770.99 *	688.18 *	549.07 *	332.25 *	113.88 *	3.58	0
1	1100.51 *	1098.48 *	1093.54 *	1087.52 *	1082.44 *	1076.74 *	1069.45 *	1062.26 *	1054 *	1042.48 *	1025 *	1000.24 *	974.9 *	942.62 *	899.15 *	845.13 *	774.29 *	690.29 *	548.18 *	330.5 *	114.8 *	3.64	0
0	1102.25 *	1100.47 *	1095.26 *	1088.86 *	1084.01 *	1078.66 *	1072.01 *	1065.32 *	1057.1 *	1045.35 *	1027.71 *	1002.23 *	976.65 *	944.31 *	900.83 *	846.79 *	775.5 *	690.96 *	547.74 *	329.63 *	115.26 *	3.64	0
-1	1102.38 *	1100.36 *	1095.26 *	1089.5 *	1083.38 *	1077.13 *	1070.33 *	1063.01 *	1054.43 *	1042.74 *	1025.12 *	1000.05 *	974.76 *	943.34 *	900.56 *	847.17 *	776.69 *	692.76 *	550.01 *	330.48 *	115.25 *	3.64	0
-3	1093.38 *	1091.54 *	1086.37 *	1081.22 *	1075.8 *	1070.88 *	1065.17 *	1056.78 *	1047.47 *	1035.8 *	1018.85 *	994.6 *	970.06 *	939.94 *	898.76 *	847.06 *	778.21 *	695.58 *	554.53 *	332.17 *	115.22 *	3.64	0
-5	1080.25 *	1079.52 *	1074.06 *	1068.93 *	1065.38 *	1059.7 *	1056.22 *	1049.59 *	1041.15 *	1028.73 *	1011.15 *	987.99 *	964.21 *	935.63 *	896.1 *	845.92 *	778.66 *	697.3 *	555.86 *	331.42 *	115.19 *	3.65	0
-7	1074.59 *	1073.27 *	1068.85 *	1064.08 *	1059.1 *	1055.51 *	1049.4 *	1043.26 *	1037.27 *	1027.03 *	1009.58 *	983.54 *	957.56 *	930.44 *	892.54 *	844.49 *	778.15 *	697.95 *	557.4 *	330.69 *	113.21 *	3.65	0
-9	1074.91 *	1073.05 *	1069.35 *	1064.17 *	1060.09 *	1054.99 *	1050.17 *	1043.38 *	1034.88 *	1025.69 *	1009.85 *	986.06 *	959.62 *	926.78 *	888.89 *	840.96 *	776.7 *	697.5 *	558.05 *	329.09 *	111.91 *	3.65	0
-11	1078.56 *	1076.51 *	1072.73 *	1067.98 *	1063.19 *	1058.6 *	1052.95 *	1046.42 *	1038.25 *	1026.74 *	1010.33 *	988.13 *	962.91 *	930.27 *	887.72 *	837.33 *	774.39 *	695.97 *	557.85 *	326.59 *	110.3 *	3.66	0
-13	1082.52 *	1080.14 *	1076.09 *	1071.77 *	1067.9 *	1063.01 *	1056.8 *	1051.2 *	1042.34 *	1030.38 *	1012.75 *	989.87 *	965.47 *	933.06 *	891.27 *	836.93 *	772.36 *	693.4 *	557.29 *	323.15 *	108.38	3.45	0
-15	1086.03 *	1083.87 *	1079.76 *	1075.53 *	1071.65 *	1067.09 *	1060.85 *	1054.66 *	1046.49 *	1033.69 *	1016.15 *	992.16 *	967.26 *	935.18 *	893.82 *	838.21 *	767.72 *	689.88 *	554.64 *	318.77 *	106.15	3.39	0
-17	1088.18 *	1086 *	1082.05 *	1078.2 *	1074.05 *	1069.43 *	1063.71 *	1056.73 *	1047.87 *	1036.56 *	1018.91 *	994.41 *	968.37 *	936.66 *	895.31 *	837.45 *	763.02 *	685.53 *	551.28 *	313.56 *	103.62	3.32	0
-19.5	1091.59 *	1089.62 *	1085.83 *	1082.25 *	1077 *	1071.88 *	1067.04 *	1058.24 *	1047.91 *	1036.82 *	1020.39 *	993.6 *	965.18 *	934.98 *	895.28 *	833.35 *	753.33 *	670.53 *	544.8 *	305.81 *	100.03	3.21	0
-22.5	1084.09 *	1082.77 *	1079.53 *	1075.87 *	1070.12 *	1064.72 *	1059.53 *	1052.24 *	1038.94 *	1025.27 *	1008.96 *	983.87 *	951.47 *	918.64 *	887 *	822.57 *	736.57 *	647.13 *	533.7 *	294.96 *	95.17	3.07	0
-25.5	1048.38 *	1048.25 *	1046.28 *	1042.43 *	1036.39 *	1031.78 *	1025.82 *	1019.18 *	1007.42 *	991.76 *	973.29 *	954.34 *	923.03 *	884 *	847.09 *	803.38 *	708.1 *	617.26 *	505.28 *	280.33 *	89.69	2.91	0
-29	968.61 *	968.38 *	967.77 *	964.24 *	957.67 *	953.53 *	948.72 *	941.57 *	931.93 *	918.16 *	901.01 *	885.27 *	862.43 *	824.26 *	785.59 *	749.13 *	665.47 *	575.88 *	471.19 *	261.42 *	82.53	2.69	0
-33	844.36 *	846.3 *	846.97 *	844.94 *	839.69 *	836.54 *	833.09 *	827.56 *	818.01 *	805.42 *	797.1 *	785.7 *	764.75 *	730.45 *	706.28 *	670.8 *	601.22 *	524.28 *	428.55 *	237.06 *	73.55	2.42	0
-37.5	743.72 *	744.37 *	744.36 *	742.54 *	739.93 *	733.84 *	730.78 *	726.28 *	719.31 *	710.84 *	697.5 *	688.17 *	672.36 *	647.36 *	618.15 *	588.79 *	528.77 *	460.89 *	378.02 *	203.12 *	62.13	2.13	0
-42.5	666.7 *	666.77 *	666.13 *	664.42 *	661.65 *	657.8 *	653.37 *	649.46 *	641.86 *	634.2 *	623.14 *	611.5 *	594.94 *	571.19 *	542.32 *	511.44 *	457.61 *	397.73 *	318.63 *	160.2 *	47.77	1.73	0
-47.5	576.65 *	577.39 *	577.75 *	576.71 *	574.36 *	570.31 *	564.67 *	559.44 *	553.16 *	546.26 *	536.47 *	523.95 *	505.74 *	482.53 *	457.1 *	428.01 *	370.16 *	317.58 *	249.83 *	117.69 *	35.25	1.34	0
-55	269.45 *	272.79 *	279.47 *	278.17 *	277.11 *	273.42 *	267.08 *	263.04 *	263.89 *	264 *	261.91 *	254.24 *	238.43 *	232.09 *	225.89 *	209.06 *	170.99 *	160.12 *	119.01 *	67.17	16.86	0.82	0
-65	26.77	26.84	26.97	26.94	26.91	26.84	26.72	26.55	26.73	26.76	26.55	25.82	25.29	26.68	27.39	23.75	23.56	28.74	18.56	22.63	6.31	0.57	0
-75	9.54	9.55	9.58	9.61	9.54	9.5	9.44	9.36	9.29	9.26	9.18	9.02	8.82	8.51	8.42	8	7.38	7.29	6.25	4.68	2.34	0.42	0
-85	3.03	3.02	3.01	3	2.99	2.98	2.96	2.94	2.93	2.89	2.85	2.8	2.74	2.67	2.58	2.44	2.25	2.06	1.74	1.35	0.86	0.17	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0	0	0	0

## LUMEN TABULATION

	0	1	3	5	7	9	11	13	15	17	20	23	26	29	33	38	43	48	55	65	75	85	90	Total
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0.1	0.1	0	0.1	0.1	0.1	0	0	0	0	0
65	0.2	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.7	0.5	0.2	0	0	0	0
55	0.69 *	1.38 *	1.38 *	1.37 *	1.35 *	1.33 *	1.31 *	1.28 *	1.24 *	1.49 *	1.74 *	1.66 *	1.75 *	1.82 *	1.89 *	1.74 *	1.40 *	1.56 *	1.1	0.3	0	0	0	0
47.5	0.77 *	1.54 *	1.53 *	1.52 *	1.51 *	1.49 *	1.47 *	1.44 *	1.40 *	1.69 *	1.96 *	1.89 *	2.03 *	2.10 *	2.18 *	2.04 *	1.60 *	1.81 *	1.30 *	0.4	0	0	0	0
42.5	0.91 *	1.82 *	1.82 *	1.81 *	1.79 *	1.77 *	1.75 *	1.72 *	1.68 *	2.04 *	2.38 *	2.29 *	2.52 *	2.66 *	2.75 *	2.65 *	2.12 *	2.38 *	1.75 *	0.5	0.1	0	0	0
37.5	0.98 *	1.97 *	1.97 *	1.96 *	1.93 *	1.93 *	1.92 *	1.88 *	1.83 *	2.22 *	2.62 *	2.55 *	2.75 *	2.88 *	3.04 *	2.94 *	2.33 *	2.58 *	1.93 *	0.60 *	0.1	0	0	0
33	1.10 *	2.21 *	2.20 *	2.18 *	2.16 *	2.14 *	2.12 *	2.09 *	2.03 *	2.45 *	2.84 *	2.77 *	3.01 *	3.06 *	3.16 *	3.13 *	2.44 *	2.61 *	1.98 *	0.63 *	0.1	0	0	0
29	1.10 *	2.20 *	2.18 *	2.17 *	2.15 *	2.12 *	2.08 *	2.05 *	2.02 *	2.43 *	2.78 *	2.67 *	2.95 *	3.02 *	3.06 *	3.02 *	2.37 *	2.53 *	1.92 *	0.63 *	0.1	0	0	0
25.5	0.95 *	1.89 *	1.88 *	1.86 *	1.85 *	1.83 *	1.80 *	1.78 *	1.74 *	2.11 *	2.44 *	2.34 *	2.57 *	2.70 *	2.74 *	2.66 *	2.14 *	2.33 *	1.77 *	0.58 *	0.1	0	0	0
22.5	0.94 *	1.87 *	1.86 *	1.85 *	1.83 *	1.81 *	1.79 *	1.76 *	1.73 *	2.11 *	2.44 *	2.33 *	2.56 *	2.72 *	2.77 *	2.68 *	2.19 *	2.44 *	1.86 *	0.61 *	0.1	0	0	0
19.5	0.78 *	1.55 *	1.55 *	1.53 *	1.52 *	1.51 *	1.49 *	1.46 *	1.44 *	1.75 *	2.03 *	1.94 *	2.13 *	2.27 *	2.32 *	2.24 *	1.85 *	2.08 *	1.58 *	0.53 *	0.1	0	0	0
17	0.63 *	1.25 *	1.24 *	1.23 *	1.22 *	1.21 *	1.19 *	1.18 *	1.15 *	1.41 *	1.63 *	1.55 *	1.71 *	1.82 *	1.86 *	1.79 *	1.49 *	1.68 *	1.29 *	0.43 *	0.1	0	0	0
15	0.63 *	1.26 *	1.25 *	1.24 *	1.23 *	1.22 *	1.20 *	1.18 *	1.16 *	1.42 *	1.64 *	1.56 *	1.73 *	1.84 *	1.87 *	1.80 *	1.50 *	1.70 *	1.30 *	0.44 *	0.1	0	0	0
13	0.64 *	1.27 *	1.26 *	1.25 *	1.24 *	1.23 *	1.21 *	1.20 *	1.17 *	1.43 *	1.65 *	1.58 *	1.74 *	1.85 *	1.87 *	1.81 *	1.52 *	1.72 *	1.31 *	0.45 *	0.1	0	0	0
11	0.64 *	1.29 *	1.28 *	1.27 *	1.26 *	1.24 *	1.23 *	1.21 *	1.19 *	1.44 *	1.67 *	1.60 *	1.76 *	1.86 *	1.89 *	1.83 *	1.53 *	1.73 *	1.32 *	0.45 *	0.1	0	0	0
9	0.65 *	1.30 *	1.29 *	1.28 *	1.27 *	1.26 *	1.24 *	1.22 *	1.20 *	1.46 *	1.69 *	1.61 *	1.78 *	1.88 *	1.91 *	1.85 *	1.55 *	1.75 *	1.33 *	0.46 *	0.1	0	0	0
7	0.66 *	1.31 *	1.30 *	1.29 *	1.28 *	1.27 *	1.25 *	1.23 *	1.21 *	1.47 *	1.70 *	1.62 *	1.79 *	1.89 *	1.92 *	1.86 *	1.56 *	1.76 *	1.33 *	0.46 *	0.1	0	0	0
5	0.66 *	1.32 *	1.31 *	1.30 *	1.29 *	1.27 *	1.26 *	1.24 *	1.21 *	1.48 *	1.71 *	1.64 *	1.80 *	1.91 *	1.94 *	1.87 *	1.57 *	1.76 *	1.34 *	0.46 *	0.1	0	0	0
3	0.67 *	1.33 *	1.32 *	1.31 *	1.30 *	1.28 *	1.27 *	1.25 *	1.22 *	1.49 *	1.72 *	1.64 *	1.81 *	1.92 *	1.95 *	1.88 *	1.57 *	1.77 *	1.34 *	0.46 *	0.1	0	0	0
1	0.34 *	0.67 *	0.66 *	0.66 *	0.65 *	0.64 *	0.64 *	0.63 *	0.61 *	0.75 *	0.86 *	0.83 *	0.91 *	0.96 *	0.98 *	0.95 *	0.79 *	0.88 *	0.67 *	0.23 *	0	0	0	0
0	0.34 *	0.67 *	0.66 *	0.66 *	0.65 *	0.64 *	0.64 *	0.63 *	0.61 *	0.75 *	0.86 *	0.83 *	0.91 *	0.96 *	0.98 *	0.95 *	0.79 *	0.89 *	0.67 *	0.23 *	0	0	0	0

-1	0.67 *	1.33 *	1.32 *	1.31 *	1.30 *	1.28 *	1.27 *	1.25 *	1.22 *	1.49 *	1.72 *	1.64 *	1.81 *	1.92 *	1.95 *	1.89 *	1.58 *	1.78 *	1.34 *	0.46 *	0.1	0	0
-3	0.66 *	1.32 *	1.31 *	1.30 *	1.29 *	1.28 *	1.26 *	1.24 *	1.22 *	1.48 *	1.71 *	1.63 *	1.81 *	1.92 *	1.95 *	1.90 *	1.59 *	1.79 *	1.35 *	0.47 *	0.1	0	0
-5	0.66 *	1.31 *	1.30 *	1.29 *	1.28 *	1.27 *	1.25 *	1.23 *	1.21 *	1.47 *	1.70 *	1.62 *	1.79 *	1.91 *	1.95 *	1.89 *	1.59 *	1.79 *	1.35 *	0.46 *	0.1	0	0
-7	0.65 *	1.30 *	1.30 *	1.29 *	1.28 *	1.26 *	1.25 *	1.23 *	1.21 *	1.47 *	1.70 *	1.62 *	1.79 *	1.90 *	1.94 *	1.89 *	1.59 *	1.79 *	1.35 *	0.46 *	0.1	0	0
-9	0.66 *	1.31 *	1.30 *	1.29 *	1.28 *	1.26 *	1.25 *	1.23 *	1.21 *	1.47 *	1.70 *	1.63 *	1.79 *	1.90 *	1.93 *	1.88 *	1.59 *	1.79 *	1.35 *	0.46 *	0.1	0	0
-11	0.66 *	1.31 *	1.30 *	1.29 *	1.28 *	1.27 *	1.25 *	1.23 *	1.21 *	1.48 *	1.71 *	1.63 *	1.80 *	1.90 *	1.93 *	1.88 *	1.58 *	1.79 *	1.34 *	0.45 *	0.1	0	0
-13	0.66 *	1.32 *	1.31 *	1.30 *	1.29 *	1.27 *	1.26 *	1.24 *	1.22 *	1.48 *	1.71 *	1.63 *	1.80 *	1.91 *	1.94 *	1.88 *	1.57 *	1.78 *	1.33 *	0.45 *	0.1	0	0
-15	0.66 *	1.32 *	1.31 *	1.30 *	1.29 *	1.28 *	1.26 *	1.24 *	1.22 *	1.48 *	1.72 *	1.64 *	1.80 *	1.91 *	1.94 *	1.87 *	1.56 *	1.77 *	1.32 *	0.44 *	0.1	0	0
-17	0.83 *	1.65 *	1.64 *	1.63 *	1.62 *	1.60 *	1.58 *	1.56 *	1.53 *	1.86 *	2.15 *	2.05 *	2.25 *	2.39 *	2.42 *	2.32 *	1.93 *	2.19 *	1.63 *	0.54 *	0.1	0	0
-20	0.99 *	1.98 *	1.97 *	1.96 *	1.94 *	1.92 *	1.89 *	1.86 *	1.82 *	2.22 *	2.56 *	2.44 *	2.68 *	2.85 *	2.89 *	2.75 *	2.27 *	2.57 *	1.92 *	0.62 *	0.1	0	0
-23	0.97 *	1.94 *	1.93 *	1.92 *	1.90 *	1.88 *	1.86 *	1.83 *	1.78 *	2.17 *	2.51 *	2.39 *	2.61 *	2.77 *	2.82 *	2.69 *	2.19 *	2.47 *	1.84 *	0.59 *	0.1	0	0
-26	1.07 *	2.15 *	2.14 *	2.12 *	2.10 *	2.08 *	2.05 *	2.02 *	1.97 *	2.39 *	2.77 *	2.65 *	2.90 *	3.05 *	3.12 *	2.99 *	2.42 *	2.71 *	2.02 *	0.65 *	0.1	0	0
-29	1.10 *	2.21 *	2.20 *	2.19 *	2.16 *	2.14 *	2.12 *	2.08 *	2.03 *	2.47 *	2.87 *	2.75 *	3.02 *	3.18 *	3.26 *	3.13 *	2.55 *	2.86 *	2.13 *	0.68 *	0.1	0	0
-33	1.09 *	2.18 *	2.17 *	2.16 *	2.14 *	2.12 *	2.09 *	2.06 *	2.01 *	2.45 *	2.85 *	2.73 *	3.00 *	3.17 *	3.25 *	3.14 *	2.56 *	2.88 *	2.13 *	0.67 *	0.1	0	0
-38	1.07 *	2.15 *	2.14 *	2.13 *	2.11 *	2.08 *	2.06 *	2.02 *	1.98 *	2.41 *	2.79 *	2.68 *	2.94 *	3.11 *	3.16 *	3.04 *	2.48 *	2.78 *	2.02 *	0.62 *	0.1	0	0
-43	0.95 *	1.89 *	1.89 *	1.88 *	1.86 *	1.83 *	1.81 *	1.78 *	1.74 *	2.12 *	2.45 *	2.33 *	2.55 *	2.68 *	2.71 *	2.58 *	2.08 *	2.29 *	1.61 *	0.5	0.1	0	0
-48	0.97 *	1.95 *	1.95 *	1.94 *	1.92 *	1.88 *	1.85 *	1.82 *	1.79 *	2.18 *	2.52 *	2.38 *	2.59 *	2.74 *	2.77 *	2.58 *	2.06 *	2.27 *	1.58 *	0.5	0.1	0	0
-55	0.45 *	0.92 *	0.93 *	0.92 *	0.91 *	0.89 *	0.87 *	0.86 *	0.85 *	1.05 *	1.21 *	1.13 *	1.24 *	1.34 *	1.36 *	1.3	1	1.2	0.9	0.3	0	0	0
-65	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0	0	0
-75	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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	29.2	58.3	58	57.6	57	56.4	55.7	54.8	53.7	65.3	75.6	72.3	79.3	83.6	85.3	82.2	67.4	75.4	56.4	18.5	2.3	0.01	1244.1

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	FFLEDXS @ 18W / 4000K	Sample ID.	H1
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
120.01	60	0.140	16.7	0.994	5.10%
276.98	60	0.065	17.1	0.945	7.02%

## 5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2021/12/26	2022/12/25
DLF108	Auxiliary Lamp	2021/12/26	2022/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF116	AC Power Source	2021/12/26	2022/12/25
DLF113	Power Meter	2021/12/26	2022/12/25
DLF112	Temperature Recorder	2021/12/26	2022/12/25
DLF114	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF101	Goniophotometer	2021/12/26	2022/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF104	AC Power Source	2021/12/26	2022/12/25
DLF507	DC Power Source	2021/12/26	2022/12/25
DLF102	Power Meter	2021/12/26	2022/12/25
DLF111	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF119	Power Meter	2021/12/26	2022/12/25
DLF031	Temperature data logger	2021/12/26	2022/12/25
DLF022	Digital power meter	2021/12/26	2022/12/25
DLF003	Temperature & Humidity Datalogger	2021/12/26	2022/12/25

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