

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 -1a

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.

This report shall not be reproduced, except in full, without written approval of Deliver Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP.

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		2619
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	145.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		18.0
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	1.60%
		20.00%	277V	19.60%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.796
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4127
		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	≥-40		6
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		0.151
(Goniophotometer - Section 4.2)		Non-Worst Case		0.080
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		18.0
(Goniophotometer - Section 4.2)		Non-Worst Case		17.7

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/10/28	FFLEDS @ 18W / 4000K	A1
2	Goniophotometer Test	2021/10/28	FFLEDS @ 18W / 4000K	A1
3	THD and PF Test	2021/10/28	FFLEDS @ 18W / 4000K	A1

Remark(If any)

- 1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.
- 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 @ 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.	FFLEDS @ 18W / 4000K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.98	60	0.151	18.0	0.995
277.00	60	0.081	17.7	0.796

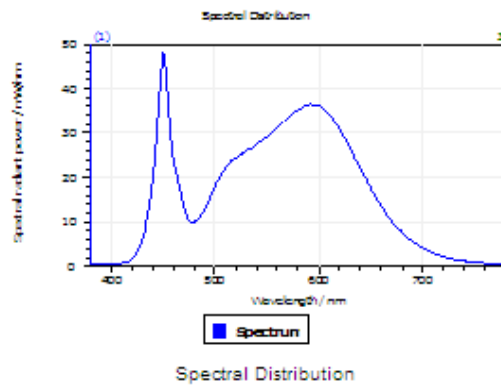
Test Result

CCT (K)	CRI	R9	Duv
4127	83	6	0.00085

Rf	Rg	IES Rcs,h1
83	96	-12%

4.1 Integrating Sphere Test

Results



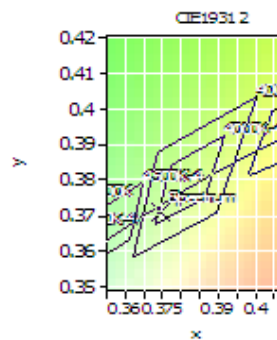
Spectral values

DominantWavelength 579.10 nm
Purity 0.238
PeakWavelength 450.45 nm
Radiant Power 6.392 W
Width50%:

Color Coordinates

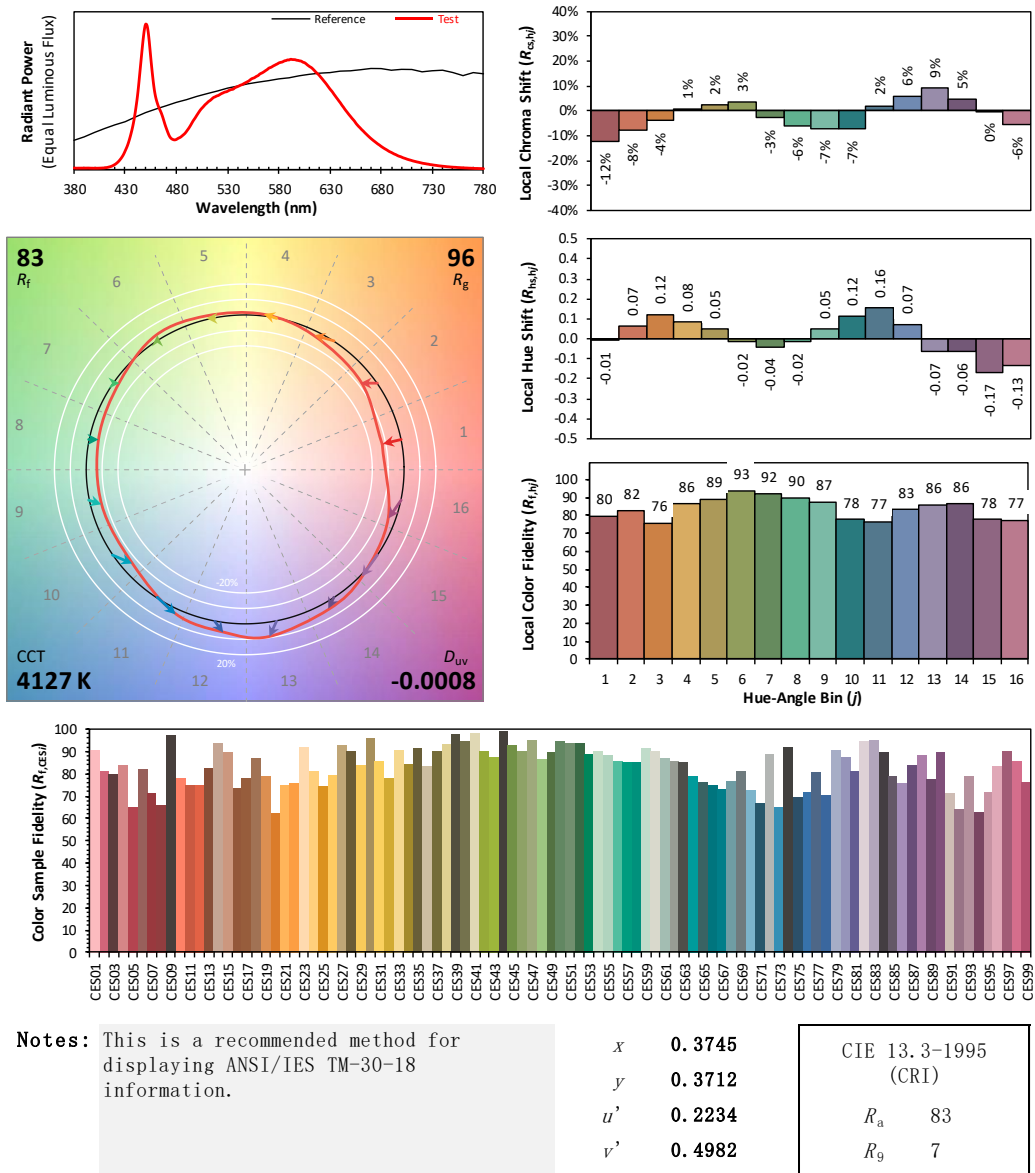
Correlated Color Temperat 4127 K
x: 0.3745 u: 0.2234 u': 0.2234
y: 0.3712 v: 0.3321 v': 0.4982

CRI01	80.9	CRI09	5.5
CRI02	88.9	CRI10	73.9
CRI03	94.5	CRI11	81.0
CRI04	81.8	CRI12	62.1
CRI05	81.4	CRI13	82.9
CRI06	84.6	CRI14	97.2
CRI07	85.1	CRI15	74.5
CRI08	63.5	CRI16	72.3
ResultsCRI	82.6		



PlanckDistance 8.5E-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 @ 18W / 4000K	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.01	60	0.151	18.0	0.993
NON-WORST CASE	277.04	60	0.080	17.7	0.799

Test Result

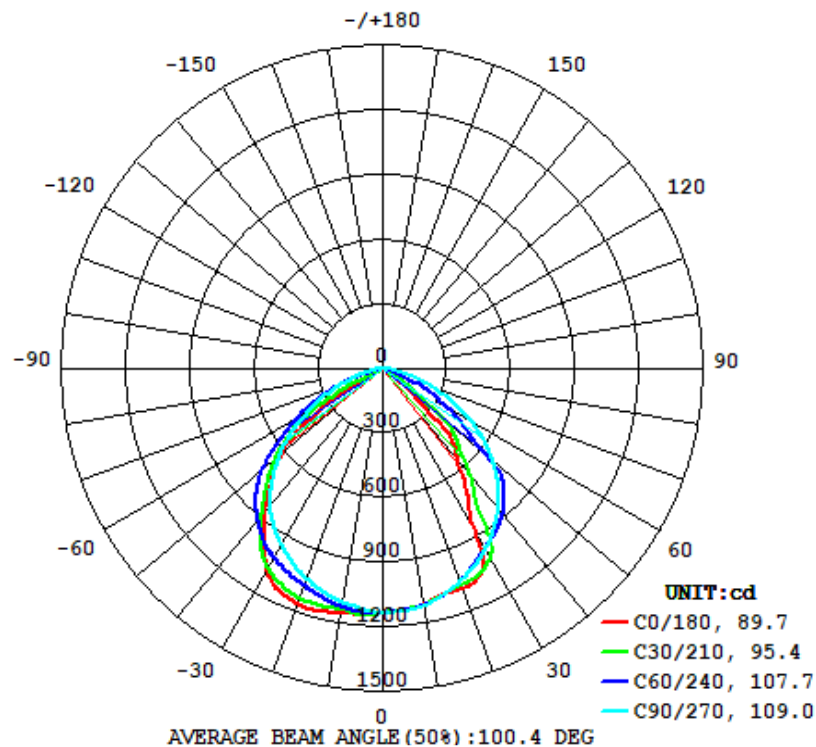
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2619	114.7	149.8	89.7	109.0	145.8

Zonal Lumen Requirement
(0° - 90°)

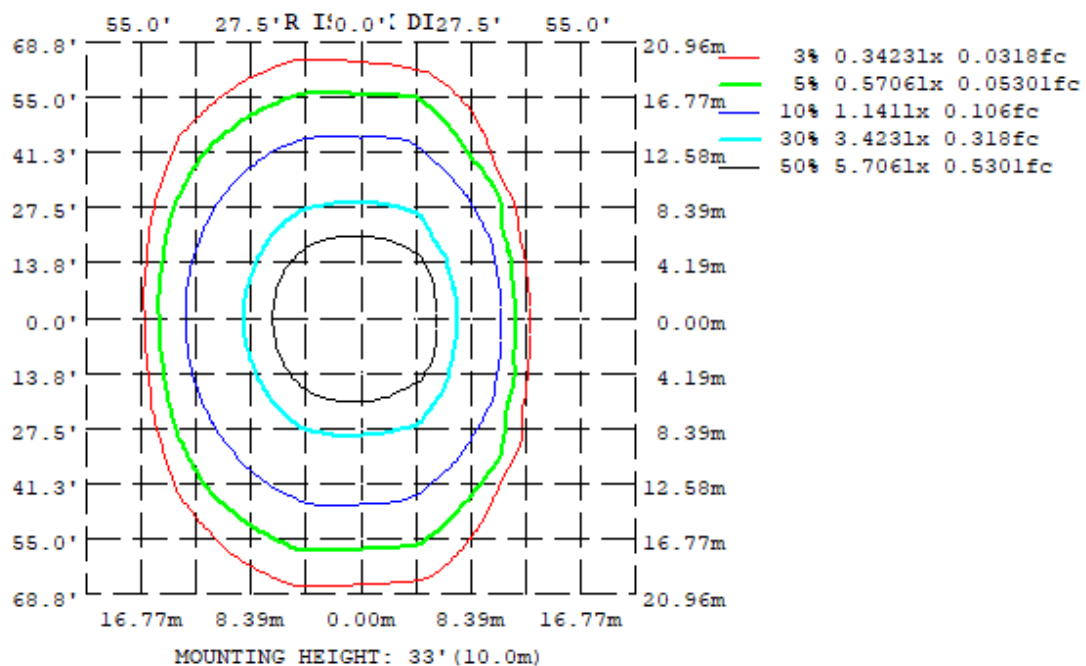
99.87%

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	1109	1115	1119	1140	1152	1127	1102	1104
20	1087	1054	1053	1135	1164	1110	1040	1041
30	858.2	999.3	967.5	1070	1081	1053	949.6	996.8
40	550.9	766.5	845.7	924.4	855.5	922.8	819.8	688.5
50	200.0	461.6	680.9	698.7	609.4	688.9	632.4	440.3
60	10.30	154.3	472.0	453.2	188.9	448.8	414.2	106.6
70	0.2112	6.007	237.6	59.63	20.64	58.84	190.0	4.298
80	0.1384	0.1734	47.11	8.220	5.983	6.702	24.21	0.0699
90	0.1407	0.2137	0.1524	0.1176	0.0807	0.1602	0.0566	0.0724
100	0.2148	0.2079	0.2002	0.5263	1.783	0.4116	0.2044	0.1735
110	0.2452	0.3723	0.3943	0.1980	0.1041	0.2267	0.3822	0.2809
120	0.4160	0.4854	0.4380	0.3792	0.2229	0.3706	0.4085	0.3845
130	0.6187	0.6012	0.6373	0.5263	0.3950	0.4955	0.6388	0.5596
140	0.7741	0.7611	0.7455	0.6736	0.6464	0.6990	0.7488	0.7628
150	0.8813	0.9045	0.8086	0.8213	0.7801	0.8088	0.8452	0.9038
160	0.9326	0.9487	0.8887	0.8941	0.9852	0.9101	0.8553	0.9552
170	0.9178	0.8594	0.8667	0.8961	0.9535	0.8801	0.8014	0.8038
180	0.9732	0.9120	0.8733	0.9839	0.9714	0.9217	0.8834	0.9068
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	107.99	0 - 10	107.99	4.12%
10-20	313.56	0 - 20	421.54	16.10%
20-30	487.99	0 - 30	909.54	34.73%
30-40	566.72	0 - 40	1476.26	56.38%
40-50	536.52	0 - 50	2012.78	76.86%
50-60	385.78	0 - 60	2398.56	91.60%
60-70	172.92	0 - 70	2571.48	98.20%
70-80	40.98	0 - 80	2612.46	99.76%
80-90	2.74	0 - 90	2615.19	99.87%
90-100	0.63	0 - 100	2615.82	99.89%
100-110	0.28	0 - 110	2616.11	99.90%
110-120	0.33	0 - 120	2616.44	99.92%
120-130	0.43	0 - 130	2616.87	99.93%
130-140	0.51	0 - 140	2617.38	99.95%
140-150	0.50	0 - 150	2617.88	99.97%
150-160	0.41	0 - 160	2618.29	99.99%
160-170	0.26	0 - 170	2618.55	100.00%
170-180	0.08	0 - 180	2618.63	100.00%

4.2 Goniophotometer Test

Axial Candela

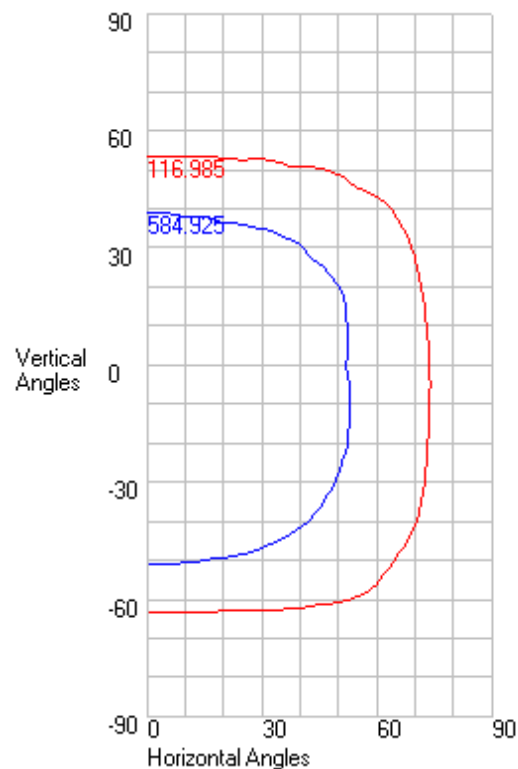
DEG.	HOR.	DEG.	VERT.
90	0.06	90	0.14
85	0.13	85	0.14
75	91.79	75	0.14
65	303.59	65	3.61
55	524.72	55	74.34
47.5	682.885	47.5	282.885
42.5	777.86	42.5	509.635
37.5	856.615	37.5	611.695
33	915.77	33	749.46
29	959.89	29	943.66
25.5	994.325	25.5	1061.44
22.5	1020.945	22.5	1083.705
19.5	1043.825	19.5	1087.45
17	1062.57	17	1085.35
15	1075.59	15	1086.14
13	1087.77	13	1094.84
11	1097.53	11	1105.19
9	1105.1	9	1114.03
7	1113.35	7	1120.39
5	1121.9	5	1122.1
3	1131.08	3	1127.86
1	1133.35	1	1130.59
0	1133.918	0	1133.918
-1	1134.2	-1	1135.75
-3	1132.78	-3	1147.57
-5	1130.81	-5	1151.18
-7	1127.28	-7	1146.33
-9	1122.07	-9	1147.66
-11	1114.23	-11	1154.83
-13	1103.07	-13	1160.95
-15	1090.82	-15	1166.46
-17	1076.74	-17	1169.85
-19.5	1057.745	-19.5	1166
-22.5	1034.13	-22.5	1154.895
-25.5	1008.885	-25.5	1138.8
-29	977.14	-29	1098.71
-33	936.19	-33	1016.58
-37.5	879.565	-37.5	910.04
-42.5	807.965	-42.5	804.47
-47.5	726.565	-47.5	694.31
-55	582.4	-55	452.18
-65	353.52	-65	40.55
-75	129.5	-75	10.57
-85	4.87	-85	2.88
-90	0.15	-90	0.081

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	1169.85
Maximum Candela Angle	0 H -17 V
Horizontal Beam Angle (50%)	108.2
Vertical Beam Angle (50%)	89.7
Horizontal Field Angle (10%)	149.1
Vertical Field Angle (10%)	116.6
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	2031
Beam Efficiency	N.A.
Field Lumens	2581
Field Efficiency	N.A.
Spill Lumens	39
Luminaire Lumens	2619
Total Efficiency	N.A.
Total Luminaire Watts	17.9589
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	0.14	0.137	0.13	0.123	0.117	0.11	0.103	0.097	0.09	0.087	0.084	0.08	0.076	0.071	0.07	0.07	0.07	0.072	0.077	0.077	0.07	0.063	0.06
85	0.14	0.137	0.132	0.127	0.121	0.116	0.111	0.105	0.1	0.097	0.094	0.09	0.086	0.081	0.078	0.075	0.072	0.07	0.07	0.067	0.06	0.059	0.06
75	0.14	0.137	0.132	0.126	0.121	0.115	0.11	0.104	0.099	0.097	0.093	0.089	0.085	0.08	0.077	0.074	0.071	0.068	0.063	0.062	0.061	0.053	0.06
65	3.61	3.687	3.842	3.748	3.654	3.467	3.183	2.799	2.534	2.617	2.868	3.144	2.432	1.758	2.324	2.386	1.061	1.814	0.587	1.061	0.176	0.054	0.06
55	74.34	75.356	77.386	76.488	75.657	73.829	70.99	69.372	70.128	69.324	66.699	61.44	54.602	57.174	53.751	41.644	40.506	37.086	17.814	14.128	2.475	0.059	0.06
47.5	282.885 *	288 *	294.508 *	294.916 *	287.894 *	278.998 *	269.455 *	276.639 *	287.956 *	293.511 *	276.943 *	236.658 *	241.906 *	258.399 *	229.283 *	178.519 *	176.394 *	156.248 *	87.592	53.542	7.813	0.069	0.06
42.5	509.635 *	510.158 *	510.197 *	508.973 *	506.583 *	502.694 *	498.312 *	495.459 *	488.103 *	481.652 *	472.746 *	461.697 *	443.176 *	411.006 *	392.941 *	362.686 *	275.709 *	259.49 *	154.79 *	88.061	12.793	0.076	0.06
37.5	611.695 *	613.821 *	615.455 *	614.201 *	612.608 *	601.964 *	595.185 *	593.485 *	590.564 *	581.62 *	559.979 *	554.009 *	546.444 *	524.11 *	484.202 *	461.7 *	404.62 *	344.642 *	257.295 *	122.46 *	20.253	0.084	0.06
33	749.46 *	751.025 *	751.021 *	748.695 *	743.829 *	740.56 *	732.487 *	722.774 *	713.526 *	702.223 *	701.997 *	675.213 *	648.879 *	626.907 *	623.471 *	549.225 *	486.616 *	423.352 *	348.418 *	155.919 *	29.496	0.091	0.06
29	943.66 *	949.902 *	950.89 *	944.115 *	929.453 *	915.629 *	908.611 *	905.907 *	886.625 *	847.133 *	837.731 *	856.051 *	794.806 *	735.091 *	733.698 *	700.413 *	559.909 *	497.689 *	406.588 *	181.739 *	38.143	0.098	0.06
25.5	1061.44 *	1060.427 *	1057.329 *	1052.841 *	1046.693 *	1039.576 *	1030.431 *	1020.016 *	1009.509 *	994.169 *	965.409 *	948.286 *	926.062 *	846.268 *	814.838 *	795.069 *	625.625 *	555.861 *	454.049 *	204.344 *	45.882	0.103	0.06
22.5	1083.705 *	1082.313 *	1079.142 *	1075.785 *	1069.011 *	1061.325 *	1053.583 *	1044.025 *	1030.443 *	1017.731 *	1002.584 *	978.659 *	949.558 *	916.054 *	876.196 *	815.117 *	688.929 *	599.082 *	494.02 *	223.229 *	52.339	0.108	0.06
19.5	1087.45 *	1086.06 *	1083.342 *	1080.582 *	1072.447 *	1064.907 *	1057.984 *	1047.486 *	1036.316 *	1024.56 *	1009.369 *	985.411 *	959.055 *	930.28 *	890.505 *	826.159 *	729.977 *	637.138 *	509.182 *	239.532 *	58.801	0.112	0.06
17	1085.35 *	1083.963 *	1081.412 *	1077.82 *	1070.185 *	1061.66 *	1054.723 *	1045.188 *	1034.212 *	1023.817 *	1008.861 *	985.246 *	960.756 *	933.973 *	893.661 *	831.461 *	746.278 *	665.466 *	517.817 *	252.13 *	64.175	0.115	0.06
15	1086.14 *	1085.664 *	1083.853 *	1078.881 *	1071.169 *	1063.102 *	1056.165 *	1046.216 *	1035.042 *	1025.664 *	1009.719 *	984.552 *	962.021 *	936.63 *	895.095 *	833.544 *	752.64 *	670.742 *	522.448 *	261.229 *	68.28	0.118	0.06
13	1094.84 *	1094.784 *	1092.875 *	1086.759 *	1078.106 *	1071.024 *	1062.687 *	1052.461 *	1042.498 *	1030.806 *	1012.803 *	988.215 *	967.142 *	939.652 *	896.061 *	834.047 *	760.074 *	675.543 *	526.433 *	269.412 *	72.193	0.12	0.06
11	1105.19 *	1105.535 *	1103.981 *	1097.489 *	1088.311 *	1081.187 *	1072.724 *	1062.551 *	1051.592 *	1039.001 *	1020.026 *	996.852 *	973.43 *	942.746 *	896.874 *	836.745 *	764.92 *	679.786 *	528.371 *	276.807 *	75.897	0.126	0.06
9	1114.03 *	1114.607 *	1112.158 *	1105.294 *	1098.321 *	1089.149 *	1081.807 *	1072.519 *	1060.126 *	1046.853 *	1028.093 *	1004.81 *	979.962 *	945.223 *	901.581 *	842.956 *	770.137 *	682.992 *	529.873 *	283.417 *	79.377	0.126	0.06
7	1120.39 *	1120.716 *	1118.239 *	1111.637 *	1104.18 *	1096.556 *	1088.554 *	1078.822 *	1066.195 *	1052.078 *	1034.625 *	1011.495 *	985.611 *	950.037 *	906.2 *	848.917 *	774.207 *	685.033 *	530.455 *	289.246 *	82.614	0.127	0.06
5	1122.1 *	1122.87 *	1121.185 *	1113.757 *	1106.605 *	1099.157 *	1091.947 *	1081.395 *	1069.478 *	1055.932 *	1039.042 *	1016.191 *	989.79 *	954.56 *	910.547 *	852.104 *	776.719 *	685.891 *	530.078 *	294.299 *	86.549	0.128	0.06
3	1127.86 *	1127.875 *	1125.938 *	1117.748 *	1108.886 *	1101.669 *	1093.124 *	1083.448 *	1072.3 *	1059.559 *	1041.848 *	1018.948 *	992.612 *	957.708 *	913.644 *	854.819 *	778.093 *	685.601 *	529.894 *	299.429 *	88.642	0.129	0.06
1	1130.59 *	1131.711 *	1128.553 *	1120.306 *	1111.808 *	1104.299 *	1096.634 *	1086.946 *	1075.118 *	1062.18 *	1043.503 *	1020.617 *	994.095 *	959.659 *	915.587 *	856.322 *	778.255 *	684.104 *	526.446 *	302.202 *	90.74	0.13	0.06
0	1133.918 *	1133.35 *	1131.08 *	1121.9 *	1113.35 *	1105.1 *	1097.53 *	1087.77 *	1075.59 *	1062.57 *	1043.825 *	1020.945 *	994.325 *	959.89 *	915.77 *	856.615 *	777.86 *	682.885 *	524.72 *	303.59 *	91.79	0.13	0.06
-1	1135.75 *	1136.368 *	1133.32 *	1125.322 *	1117.621 *	1109.422 *	1102.206 *	1092.473 *	1080.333 *	1066.924 *	1047.606 *	1024.313 *	997.227 *	962.385 *	918.134 *	858.874 *	780.469 *	685.737 *	527.79 *	305.268 *	92.165	0.138	0.06
-3	1147.57 *	1146.027 *	1143.602 *	1134.651 *	1125.857 *	1116.861 *	1109.868 *	1099.943 *	1087.823 *	1073.759 *	1053.942 *	1029.997 *	1001.959 *	965.883 *	921.274 *	862.485 *	784.724 *	690.484 *	533.924 *	308.622 *	92.915	0.154	0.06
-5	1151.18 *	1150.342 *	1147.251 *	1138.838 *	1130.222 *	1122.163 *	1113.775 *	1102.008 *	1090.831 *	1078.473 *	1058.646 *	1034.482 *	1005.205 *	968.175 *	923.231 *	864.922 *	787.737 *	693.971 *	536.693 *	309.575 *	93.664	0.17	0.06
-7	1146.33 *	1146.08 *	1142.553 *	1135.229 *	1127.725 *	1120.935 *	1113.033 *	1100.476 *	1089.193 *	1077.813 *	1060.456 *	1036.705 *	1006.799 *	969.072 *	923.891 *	866.912 *	789.562 *	696.221 *	539.572 *	310.556 *	92.41	0.186	0.06
-9	1147.66 *	1146.484 *	1143.459 *	1135.605 *	1128.407 *	1120.45 *	1113.138 *	1101.259 *	1087.807 *	1076.888 *	1061.052 *	1038.468 *	1009.636 *	969.999 *	924.199 *	865.945 *	790.147 *	697.379 *	541.352 *	310.686 *	91.822	0.202	0.06
-11	1154.83 *	1153.018 *	1150.029 *	1141.846 *	1134.359 *	1126.43 *	1117.166 *	1106.485 *	1093.584 *	1079.165 *	1061.355 *	1040.116 *	1012.215 *	974.646 *	924.475 *	864.621 *	789.857 *	697.618 *	542.033 *	309.939 *	90.88	0.217	0.06
-13	1160.95 *	1158.936 *	1155.34 *	1148.424 *	1141.205 *	1132.306 *	1122.696 *	1112.434 *	1099.337 *	1084.437 *	1065.083 *	1041.417 *	1014.646 *	978.701 *	927.765 *	865.052 *	790.051 *	696.961 *	542.098 *	308.291 *	89.58	0.223	0.06
-15	1166.46 *	1163.872 *	1159.181 *	1153.047 *	1145.475 *	1137.393 *	1127.701 *	1116.771 *	1104.358 *	1089.316 *	1069.194 *	1043.528 *	1017.06 *	981.639 *	929.927 *	866.324 *	787.63 *	695.369 *	540.203 *	305.722 *	87.914	0.234	0.06
-17	1169.85 *	1167.276 *	1162.103 *	1156.167 *	1148.23 *	1141.129 *	1130.96 *	1118.573 *	1106.239 *	1092.248 *	1071.403 *	1044.571 *	1018.121 *	983.362 *	930.168 *	866.292 *	786.14 *	692.839 *	537.548 *	302.356 *	85.878	0.243	0.06
-19.5	1166 *	1163.569 *	1158.283 *	1152.473 *	1145.434 *	1137.863 *	1129.344 *	1116.285 *	1103.197 *	1090.105 *	1070.368 *	1042.645 *	1015.309 *	980.757 *	928.577 *	863.855 *	781.319 *	686.511 *	531.89 *	297.078 *	82.808	0.254	0.06
-22.5	1154.895 *	1152.575 *	1147.393 *	1141.552 *	1134.629 *	1126.867 *	1117.435 *	1106.831 *	1093.896 *	1079.778 *	1060.885 *	1035.13 *	1006.817 *	969.949 *	922.183 *	857.768 *	773.484 *	673.734 *	521.4 *	289.501 *	78.854	0.263	0.06
-25.5	1138.8 *	1136.638 *	1131.535 *	1125.473 *	1118.181 *	1109.831 *	1100.004 *	1089.482 *	1077.137 *	1062.283 *	1042.632 *	1019.96 *	991.445 *	950.658 *	902.3 *	847.836 *	758.51 *	655.639 *	502.161 *	279.742 *	74.621	0.269	0.06
-29	1098.71 *	1097.753 *	1093.483 *	1087.686 *	1080.39 *	1071.741 *	1062.232 *	1051.963 *	1041.433 *	1027.036 *	1006.739 *	985.086 *	961.078 *	919.904 *	867.344 *	815.972 *	735.446 *	628.451 *	477.598 *	266.115 *	68.9	0.271	0.06
-33	1016.58 *	1016.706 *	1014.122 *	1009.53 *	1002.811 *	997.021 *	988.062 *	979.373 *	969.029 *	956.79 *	939.025 *	917.897 *	894.986 *	861.058 *	811.315 *	760.124 *	688.748 *	587.482 *	443.71 *	246.235 *	61.497	0.266	0.06
-37.5	910.04 *	910.193 *	908.942 *	905.587 *	901.334 *	892.923 *	887.541 *	880.774 *	871.802 *	860.946 *	844.562 *	827.833 *	806.724 *	776.858 *	734.814 *	686.696 *	617.791 *	531.607 *	397.821 *	216.312 *	52.165	0.257	0.06
-42.5	804.47 *	804.534 *	803.494 *	800.905 *	796.781 *	790.661 *	784.928 *	780.166 *	766.37 *	755.669 *	743.677 *	730.513 *	710.181 *	680.703 *	645.634 *	601.373 *	539.898 *	463.242 *	344.699 *	176.847 *	41.864	0.241	0.06
-47.5	694.31 *	694.457 *	693.873 *	692.021 *	688.789 *	683.495 *	678.61 *	674.542 *	664.686 *	651.604 *	638.84 *	627.011 *	609.636 *	582.892 *	555.339 *	517.153 *	453.681 *	383.601 *	287.235 *	133.079 *	30.872	0.219	0.06
-55	452.18 *	453.937 *	457.449 *	453.17 *	450.608 *	447.384 *	444.167 *	443.493 *	434.376 *	425.654 *	418.386 *	417.042 *	403.475 *	376.291 *	355.724 *	334.465 *	281.528 *	229.643 *	185.004 *	68.04 *	16.177	0.172	0.06
-65	40.55	41.173	42.419	42.668	42.87	42.644	41.948	40.746	41.955	43.746	44.456	42.267	39.935	42.002	47.724	42.307	32.914	48.343	28.179	22.86	2.901	0.08	0.06
-75	10.57	10.574	10.582	10.591	10.471	10.396	10.299	10.181	10.088	10.097	10.02	9.852											

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	0	0	0	0	0
55	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.1	0	0	0	0
47.5	0.41 *	0.85 *	0.87 *	0.87 *	0.85 *	0.83 *	0.81 *	0.82 *	0.84 *	1.05 *	1.17 *	1.06 *	1.19 *	1.33 *	1.29 *	1.2	1	1.1	0.7	0.2	0	0	0	0
42.5	0.61 *	1.23 *	1.23 *	1.23 *	1.21 *	1.19 *	1.17 *	1.16 *	1.16 *	1.43 *	1.64 *	1.53 *	1.68 *	1.80 *	1.79 *	1.64 *	1.33 *	1.43 *	1	0.3	0	0	0	0
37.5	0.86 *	1.71 *	1.71 *	1.71 *	1.69 *	1.66 *	1.64 *	1.62 *	1.59 *	1.93 *	2.23 *	2.14 *	2.36 *	2.47 *	2.50 *	2.37 *	1.90 *	2.08 *	1.47 *	0.4	0	0	0	0
33	0.93 *	1.87 *	1.87 *	1.86 *	1.85 *	1.82 *	1.80 *	1.77 *	1.73 *	2.12 *	2.47 *	2.35 *	2.58 *	2.76 *	2.83 *	2.68 *	2.16 *	2.41 *	1.74 *	0.5	0.1	0	0	0
29	1.03 *	2.08 *	2.07 *	2.06 *	2.03 *	2.00 *	1.98 *	1.94 *	1.89 *	2.29 *	2.69 *	2.58 *	2.77 *	2.93 *	3.05 *	2.88 *	2.27 *	2.54 *	1.86 *	0.5	0.1	0	0	0
25.5	1.07 *	2.15 *	2.14 *	2.12 *	2.09 *	2.06 *	2.03 *	2.00 *	1.95 *	2.34 *	2.73 *	2.63 *	2.83 *	2.93 *	3.05 *	2.89 *	2.25 *	2.51 *	1.84 *	0.55 *	0.1	0	0	0
22.5	0.98 *	1.96 *	1.95 *	1.93 *	1.92 *	1.89 *	1.86 *	1.83 *	1.79 *	2.17 *	2.50 *	2.39 *	2.61 *	2.74 *	2.80 *	2.65 *	2.09 *	2.34 *	1.73 *	0.51 *	0.1	0	0	0
19.5	0.99 *	1.98 *	1.97 *	1.96 *	1.94 *	1.91 *	1.89 *	1.85 *	1.81 *	2.20 *	2.55 *	2.43 *	2.67 *	2.84 *	2.88 *	2.74 *	2.21 *	2.48 *	1.82 *	0.55 *	0.1	0	0	0
17	0.83 *	1.65 *	1.64 *	1.63 *	1.62 *	1.60 *	1.57 *	1.54 *	1.51 *	1.84 *	2.13 *	2.03 *	2.24 *	2.39 *	2.42 *	2.32 *	1.91 *	2.14 *	1.56 *	0.48 *	0.1	0	0	0
15	0.66 *	1.32 *	1.32 *	1.31 *	1.29 *	1.28 *	1.26 *	1.24 *	1.21 *	1.48 *	1.71 *	1.63 *	1.80 *	1.92 *	1.95 *	1.87 *	1.55 *	1.74 *	1.27 *	0.40 *	0.1	0	0	0
13	0.66 *	1.33 *	1.32 *	1.31 *	1.30 *	1.28 *	1.26 *	1.24 *	1.22 *	1.48 *	1.71 *	1.64 *	1.81 *	1.93 *	1.95 *	1.88 *	1.56 *	1.76 *	1.29 *	0.41 *	0.1	0	0	0
11	0.67 *	1.34 *	1.33 *	1.32 *	1.31 *	1.29 *	1.28 *	1.25 *	1.23 *	1.49 *	1.72 *	1.65 *	1.82 *	1.93 *	1.96 *	1.89 *	1.58 *	1.77 *	1.31 *	0.42 *	0.1	0	0	0
9	0.68 *	1.35 *	1.34 *	1.33 *	1.32 *	1.31 *	1.29 *	1.26 *	1.24 *	1.50 *	1.74 *	1.66 *	1.83 *	1.94 *	1.97 *	1.90 *	1.59 *	1.78 *	1.32 *	0.43 *	0.1	0	0	0
7	0.68 *	1.36 *	1.35 *	1.34 *	1.33 *	1.32 *	1.30 *	1.27 *	1.24 *	1.51 *	1.75 *	1.67 *	1.84 *	1.95 *	1.98 *	1.91 *	1.60 *	1.79 *	1.33 *	0.44 *	0.1	0	0	0
5	0.68 *	1.36 *	1.36 *	1.35 *	1.34 *	1.32 *	1.30 *	1.28 *	1.25 *	1.52 *	1.76 *	1.68 *	1.85 *	1.96 *	1.99 *	1.92 *	1.61 *	1.80 *	1.34 *	0.44 *	0.1	0	0	0
3	0.69 *	1.37 *	1.36 *	1.35 *	1.34 *	1.32 *	1.30 *	1.28 *	1.25 *	1.52 *	1.76 *	1.69 *	1.86 *	1.97 *	2.00 *	1.93 *	1.61 *	1.80 *	1.34 *	0.45 *	0.1	0	0	0
1	0.69 *	1.37 *	1.37 *	1.36 *	1.34 *	1.33 *	1.31 *	1.28 *	1.26 *	1.53 *	1.77 *	1.69 *	1.86 *	1.98 *	2.01 *	1.94 *	1.61 *	1.80 *	1.34 *	0.45 *	0.1	0	0	0
0	0.34 *	0.69 *	0.69 *	0.68 *	0.67 *	0.67 *	0.66 *	0.64 *	0.63 *	0.77 *	0.89 *	0.85 *	0.93 *	0.99 *	1.00 *	0.97 *	0.81 *	0.90 *	0.67 *	0.23 *	0	0	0	0
	0.35 *	0.69 *	0.69 *	0.68 *	0.68 *	0.67 *	0.66 *	0.65 *	0.63 *	0.77 *	0.89 *	0.85 *	0.93 *	0.99 *	1.01 *	0.97 *	0.81 *	0.90 *	0.67 *	0.23 *	0	0	0	0

-1	0.70 *	1.39 *	1.38 *	1.37 *	1.36 *	1.34 *	1.32 *	1.30 *	1.27 *	1.54 *	1.78 *	1.70 *	1.88 *	1.99 *	2.02 *	1.95 *	1.62 *	1.82 *	1.36 *	0.46 *	0.1	0	0
-3	0.70 *	1.40 *	1.39 *	1.38 *	1.37 *	1.35 *	1.33 *	1.30 *	1.28 *	1.55 *	1.79 *	1.71 *	1.88 *	2.00 *	2.03 *	1.96 *	1.63 *	1.83 *	1.37 *	0.46 *	0.1	0	0
-5	0.70 *	1.40 *	1.39 *	1.38 *	1.37 *	1.35 *	1.33 *	1.31 *	1.28 *	1.56 *	1.80 *	1.71 *	1.89 *	2.00 *	2.03 *	1.97 *	1.64 *	1.84 *	1.37 *	0.47 *	0.1	0	0
-7	0.70 *	1.40 *	1.39 *	1.38 *	1.37 *	1.35 *	1.33 *	1.31 *	1.28 *	1.56 *	1.80 *	1.72 *	1.89 *	2.00 *	2.04 *	1.97 *	1.65 *	1.84 *	1.38 *	0.46 *	0.1	0	0
-9	0.70 *	1.40 *	1.39 *	1.38 *	1.37 *	1.36 *	1.34 *	1.31 *	1.28 *	1.56 *	1.81 *	1.73 *	1.90 *	2.01 *	2.04 *	1.97 *	1.65 *	1.85 *	1.38 *	0.46 *	0.1	0	0
-11	0.71 *	1.41 *	1.40 *	1.39 *	1.38 *	1.36 *	1.34 *	1.32 *	1.29 *	1.57 *	1.81 *	1.73 *	1.91 *	2.02 *	2.04 *	1.97 *	1.65 *	1.85 *	1.38 *	0.46 *	0.1	0	0
-13	0.71 *	1.41 *	1.41 *	1.40 *	1.39 *	1.37 *	1.35 *	1.32 *	1.30 *	1.58 *	1.82 *	1.74 *	1.92 *	2.02 *	2.04 *	1.97 *	1.65 *	1.85 *	1.37 *	0.46 *	0.1	0	0
-15	0.71 *	1.42 *	1.41 *	1.40 *	1.39 *	1.37 *	1.35 *	1.33 *	1.30 *	1.58 *	1.82 *	1.74 *	1.92 *	2.02 *	2.05 *	1.97 *	1.65 *	1.84 *	1.36 *	0.45 *	0.1	0	0
-17	0.89 *	1.77 *	1.77 *	1.75 *	1.74 *	1.72 *	1.69 *	1.66 *	1.62 *	1.97 *	2.28 *	2.17 *	2.40 *	2.53 *	2.55 *	2.46 *	2.05 *	2.29 *	1.69 *	0.56 *	0.1	0	0
-20	1.06 *	2.11 *	2.10 *	2.09 *	2.07 *	2.05 *	2.01 *	1.98 *	1.94 *	2.35 *	2.72 *	2.59 *	2.85 *	3.01 *	3.05 *	2.93 *	2.42 *	2.70 *	2.00 *	0.65 *	0.1	0	0
-23	1.05 *	2.09 *	2.08 *	2.06 *	2.04 *	2.02 *	1.99 *	1.95 *	1.91 *	2.32 *	2.68 *	2.56 *	2.81 *	2.97 *	3.01 *	2.88 *	2.37 *	2.64 *	1.94 *	0.63 *	0.1	0	0
-26	1.19 *	2.38 *	2.37 *	2.35 *	2.32 *	2.29 *	2.26 *	2.22 *	2.17 *	2.63 *	3.04 *	2.91 *	3.19 *	3.35 *	3.40 *	3.27 *	2.68 *	2.95 *	2.17 *	0.70 *	0.1	0	0
-29	1.29 *	2.57 *	2.56 *	2.54 *	2.51 *	2.48 *	2.44 *	2.40 *	2.35 *	2.85 *	3.29 *	3.14 *	3.45 *	3.63 *	3.67 *	3.54 *	2.90 *	3.18 *	2.32 *	0.75 *	0.1	0	0
-33	1.32 *	2.64 *	2.63 *	2.61 *	2.58 *	2.55 *	2.51 *	2.46 *	2.41 *	2.93 *	3.39 *	3.24 *	3.56 *	3.75 *	3.80 *	3.65 *	3.00 *	3.28 *	2.38 *	0.76 *	0.1	0	0
-38	1.31 *	2.61 *	2.60 *	2.58 *	2.55 *	2.52 *	2.49 *	2.44 *	2.38 *	2.90 *	3.37 *	3.21 *	3.53 *	3.72 *	3.75 *	3.60 *	2.96 *	3.23 *	2.31 *	0.72 *	0.1	0	0
-43	1.14 *	2.28 *	2.27 *	2.26 *	2.23 *	2.20 *	2.17 *	2.13 *	2.08 *	2.53 *	2.93 *	2.80 *	3.06 *	3.22 *	3.26 *	3.11 *	2.53 *	2.75 *	1.92 *	0.6	0.1	0	0
-48	1.31 *	2.62 *	2.61 *	2.59 *	2.56 *	2.52 *	2.48 *	2.44 *	2.37 *	2.87 *	3.34 *	3.20 *	3.47 *	3.63 *	3.68 *	3.48 *	2.76 *	3.00 *	2.06 *	0.6	0.1	0	0
-55	0.75 *	1.51 *	1.51 *	1.49 *	1.47 *	1.45 *	1.42 *	1.39 *	1.36 *	1.66 *	1.93 *	1.85 *	2.01 *	2.11 *	2.15 *	2.00 *	1.60 *	1.80 *	1.3	0.4	0	0	0
-65	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0	0	0
-75	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
-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	31	61.9	61.7	61.3	60.7	59.9	59	57.9	56.7	69	79.9	76.2	83.7	88.5	89.8	85.9	70.6	78.4	57.3	18.2	2.14	0.01	1309.6

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDS @ 18W / 4000K	Sample ID.	A1
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
119.98	60	0.151	18.0	0.995	1.60%
277.00	60	0.081	17.7	0.796	19.60%

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*****