

Scaled data based on original data using

LM-41-14 Approved Method for Photometric Testing Of Indoor Fluorescent Luminaires

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: HALO

Report Number: P300504

Luminaire Tested: **ML4D09_27D2WE - TIR45NFL25 - TL45R6GMWBB - TL46S6GMWBB**

Issue Date: 3/3/2020

Test Information

Test Method: LM-41-14
Report Number: P300504
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G1-1902-156-14)
Test Lab: INNOVATION CENTER(G1)
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: HALO
Catalog Number: ML4D09_27D2WE - TIR45NFL25 - TL45R6GMWBB - TL46S6GMWBB
Description: ML4 2700K, 900LM DIM-TO-WARM, 25 DEG NFL OPTIC, WITH ROUND/SQUARE ASYMM WW, LINEAR SPREAD LENS, MATTE WHITE FLANGE, BLACK LENS FRAME
Light Source: (1) HIGH LUMEN LED 90CRI / 2700K CCT
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 442.0 lumens
Efficiency: N/A
Efficacy: 39.5 lumens/watt
Spacing Criteria (0/90/45): 0.46 / 0.65 / 0.56
Luminous Opening: Circular (Dia: 0.19' x H: 0')
CIE Type: Direct

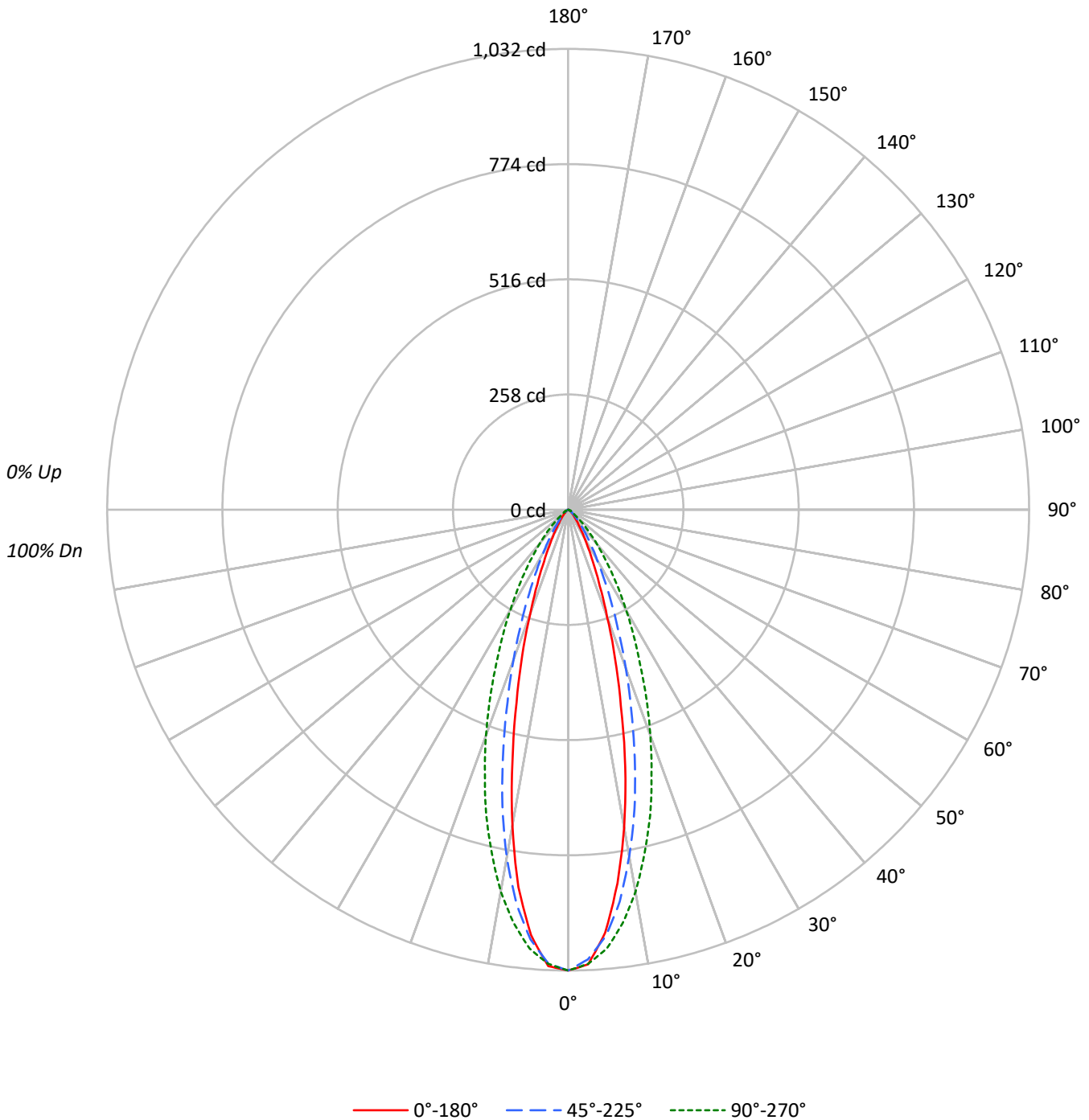
Input Watts (W): 11.2
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 25 FT



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Luminous Intensity Polar Plot





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COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:

RF	20				20				20				20				20	
RC	80				70				50				30				10	0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																		
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	114	111	109	107	112	109	107	105	105	104	102	102	100	99	98	97	96	94
2	109	105	101	98	107	103	99	97	100	97	95	97	94	93	94	92	91	89
3	104	98	94	90	102	97	93	89	94	91	88	92	89	87	90	87	85	84
4	100	93	88	84	98	92	87	84	90	86	83	88	84	82	86	83	81	79
5	95	88	83	79	94	87	82	78	85	81	78	84	80	77	82	79	76	75
6	91	83	78	74	90	83	78	74	81	77	73	80	76	73	79	75	73	71
7	88	79	74	70	86	79	74	70	78	73	70	76	72	69	75	72	69	68
8	84	76	70	67	83	75	70	67	74	70	66	73	69	66	72	69	66	65
9	81	72	67	64	80	72	67	63	71	66	63	70	66	63	69	66	63	62
10	78	69	64	61	77	69	64	61	68	64	61	67	63	60	67	63	60	59

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	402307	402307	402307
5°	372108	386195	374064
10°	285682	343911	284890
15°	183792	286020	180160
20°	105455	222982	102966
25°	58541	163622	55100
30°	32905	116676	29754
35°	19036	79094	16656
40°	11704	50431	10178
45°	8270	29826	6616
50°	5458	15768	4245
55°	4078	8835	2719
60°	3119	7017	2339
65°	1845	5535	1845
70°	1140	3419	1140
75°	0	1506	1506
80°	0	0	0
85°	0	0	0



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	86.4	19.5
10°-20°	157.5	35.6
20°-30°	110.2	24.9
30°-40°	54.1	12.3
40°-50°	21.8	4.9
50°-60°	7.8	1.8
60°-70°	3.3	0.7
70°-80°	0.8	0.2
80°-90°	0.0	0.0
90°-100°	0.0	0.0
100°-110°	0.0	0.0
110°-120°	0.0	0.0
120°-130°	0.0	0.0
130°-140°	0.0	0.0
140°-150°	0.0	0.0
150°-160°	0.0	0.0
160°-170°	0.0	0.0
170°-180°	0.0	0.0
0°-30°	354.1	80.1
0°-40°	408.3	92.4
0°-60°	437.9	99.1
0°-90°	442.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	442.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	1032	1032	1032	1032	1032	
5°	951	959	987	966	956	83
15°	455	574	709	562	446	126
25°	136	227	380	205	128	65
35°	40	74	166	60	35	26
45°	15	24	54	18	12	12
55°	6	9	13	6	4	5
65°	2	3	6	2	2	2
75°	0	0	1	1	1	0
85°	0	0	0	0	0	0
90°	0	0	0	0	0	0



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CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0
2.5°	1019.0	1008.9	1010.9	1018.0	998.9	1010.9	1009.9	995.9	1012.9	1015.0	1007.9
5°	950.9	942.9	942.9	955.9	934.9	950.9	948.9	938.9	956.9	961.9	958.9
7.5°	843.8	838.8	840.8	853.8	840.8	852.8	856.8	848.8	874.8	881.8	884.8
10°	721.7	714.7	716.7	729.7	722.7	739.7	742.7	744.7	765.7	780.7	786.7
12.5°	589.6	579.5	586.5	599.6	597.6	609.6	615.6	626.6	646.6	665.6	686.6
15°	455.4	455.4	454.4	477.4	472.4	490.5	489.5	503.5	531.5	552.5	574.5
17.5°	348.3	341.3	346.3	360.3	365.3	372.3	383.4	396.4	420.4	447.4	468.4
20°	254.2	254.2	257.2	267.3	270.3	283.3	288.3	304.3	327.3	352.3	376.4
22.5°	185.2	185.2	187.2	197.2	201.2	211.2	215.2	229.2	248.2	269.3	293.3
25°	136.1	136.1	136.1	142.1	148.1	153.1	159.1	169.2	186.2	204.2	227.2
27.5°	98.1	98.1	100.1	105.1	107.1	113.1	116.1	125.1	138.1	155.1	173.2
30°	73.1	73.1	73.1	76.1	79.1	84.1	86.1	92.1	102.1	116.1	129.1
32.5°	53.0	53.0	54.1	57.1	59.1	62.1	64.1	69.1	76.1	85.1	98.1
35°	40.0	40.0	40.0	43.0	44.0	46.0	47.0	51.0	57.1	64.1	74.1
37.5°	31.0	30.0	31.0	32.0	33.0	35.0	36.0	39.0	43.0	49.0	55.1
40°	23.0	24.0	24.0	25.0	26.0	27.0	27.0	30.0	32.0	36.0	42.0
42.5°	18.0	18.0	18.0	19.0	20.0	21.0	21.0	23.0	25.0	28.0	32.0
45°	15.0	14.0	15.0	15.0	16.0	16.0	17.0	18.0	19.0	22.0	24.0
47.5°	12.0	11.0	12.0	12.0	13.0	13.0	13.0	14.0	15.0	17.0	19.0
50°	9.0	9.0	9.0	10.0	10.0	10.0	11.0	11.0	12.0	13.0	14.0
52.5°	7.0	7.0	8.0	8.0	8.0	8.0	9.0	9.0	9.0	10.0	11.0
55°	6.0	6.0	6.0	6.0	7.0	7.0	7.0	7.0	7.0	8.0	9.0
57.5°	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0	7.0
60°	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0
62.5°	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
65°	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
67.5°	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
70°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
72.5°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
75°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5°	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
87.5°	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



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CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
0°	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0
2.5°	1008.9	1020.0	1023.0	1018.0	1016.0	1001.9	1021.0	1034.0	1026.0	1018.0	1019.0
5°	961.9	975.9	981.9	979.9	979.9	965.9	986.9	998.9	994.9	986.9	986.9
7.5°	891.8	904.8	914.9	919.9	921.9	907.8	932.9	947.9	941.9	933.9	933.9
10°	803.8	818.8	832.8	841.8	848.8	837.8	861.8	875.8	874.8	868.8	868.8
12.5°	699.7	721.7	738.7	755.7	760.7	756.7	780.7	794.7	795.7	788.7	788.7
15°	593.6	616.6	642.6	660.6	670.6	666.6	692.6	709.7	712.7	708.7	705.7
17.5°	489.5	520.5	543.5	570.5	575.5	577.5	607.6	621.6	623.6	620.6	617.6
20°	399.4	429.4	458.4	480.4	493.5	495.5	520.5	532.5	538.5	537.5	531.5
22.5°	317.3	345.3	372.3	399.4	411.4	414.4	437.4	453.4	456.4	456.4	449.4
25°	247.2	271.3	300.3	327.3	340.3	341.3	367.3	381.4	384.4	380.4	377.4
27.5°	189.2	215.2	239.2	261.2	274.3	280.3	300.3	314.3	317.3	316.3	309.3
30°	145.1	166.2	187.2	208.2	221.2	227.2	246.2	255.2	260.2	259.2	251.2
32.5°	111.1	127.1	145.1	166.2	175.2	180.2	195.2	207.2	210.2	209.2	201.2
35°	83.1	97.1	110.1	127.1	136.1	141.1	155.1	162.2	168.2	166.2	160.1
37.5°	62.1	73.1	84.1	98.1	105.1	109.1	121.1	128.1	131.1	128.1	125.1
40°	47.0	55.1	63.1	74.1	80.1	84.1	92.1	97.1	100.1	99.1	95.1
42.5°	36.0	41.0	48.0	56.1	60.1	62.1	69.1	74.1	75.1	74.1	71.1
45°	27.0	31.0	35.0	41.0	43.0	46.0	51.0	53.0	55.1	54.1	52.0
47.5°	20.0	23.0	26.0	30.0	32.0	33.0	36.0	38.0	39.0	39.0	37.0
50°	16.0	17.0	19.0	21.0	22.0	23.0	25.0	26.0	27.0	26.0	25.0
52.5°	12.0	13.0	14.0	16.0	16.0	16.0	18.0	18.0	19.0	18.0	18.0
55°	9.0	10.0	10.0	12.0	12.0	12.0	13.0	14.0	14.0	13.0	13.0
57.5°	7.0	7.0	8.0	9.0	10.0	10.0	11.0	11.0	11.0	10.0	10.0
60°	5.0	6.0	6.0	7.0	8.0	8.0	9.0	9.0	9.0	9.0	8.0
62.5°	4.0	5.0	5.0	6.0	6.0	7.0	7.0	7.0	8.0	7.0	7.0
65°	3.0	4.0	4.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0	5.0
67.5°	2.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0
70°	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
72.5°	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
75°	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5°	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
87.5°	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



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CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
0°	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0
2.5°	1025.0	1021.0	1016.0	1000.9	1025.0	1013.9	1006.9	1004.9	1017.0	1000.9	1011.9
5°	992.9	984.9	979.9	964.9	985.9	973.9	961.9	958.9	965.9	947.9	955.9
7.5°	938.9	927.9	921.9	905.8	922.9	907.8	889.8	884.8	888.8	868.8	865.8
10°	869.8	856.8	846.8	829.8	841.8	827.8	802.8	790.7	790.7	765.7	760.7
12.5°	787.7	769.7	757.7	742.7	750.7	729.7	706.7	687.6	680.6	649.6	639.6
15°	699.7	679.6	669.6	649.6	653.6	631.6	601.6	579.5	561.5	533.5	515.5
17.5°	611.6	589.6	573.5	553.5	553.5	528.5	496.5	469.4	451.4	423.4	402.4
20°	521.5	500.5	484.5	460.4	462.4	434.4	401.4	377.4	358.3	327.3	308.3
22.5°	440.4	416.4	396.4	382.4	373.3	349.3	318.3	293.3	273.3	245.2	232.2
25°	364.3	346.3	326.3	304.3	299.3	276.3	244.2	221.2	205.2	183.2	169.2
27.5°	302.3	278.3	260.2	242.2	237.2	211.2	187.2	165.2	152.1	136.1	123.1
30°	241.2	221.2	205.2	189.2	182.2	163.2	140.1	123.1	111.1	98.1	90.1
32.5°	192.2	173.2	160.1	145.1	139.1	121.1	104.1	92.1	82.1	72.1	66.1
35°	151.1	134.1	122.1	110.1	105.1	92.1	78.1	68.1	60.1	53.0	48.0
37.5°	118.1	104.1	92.1	84.1	79.1	68.1	57.1	50.0	44.0	39.0	35.0
40°	89.1	78.1	69.1	62.1	58.1	50.0	42.0	37.0	33.0	29.0	26.0
42.5°	66.1	58.1	51.0	46.0	43.0	37.0	31.0	27.0	24.0	22.0	20.0
45°	48.0	42.0	37.0	34.0	32.0	27.0	23.0	20.0	18.0	16.0	15.0
47.5°	34.0	30.0	27.0	25.0	23.0	20.0	17.0	15.0	13.0	12.0	11.0
50°	24.0	21.0	19.0	18.0	17.0	15.0	13.0	11.0	10.0	9.0	8.0
52.5°	17.0	15.0	14.0	13.0	12.0	11.0	10.0	9.0	8.0	7.0	7.0
55°	12.0	11.0	10.0	9.0	9.0	8.0	7.0	7.0	6.0	6.0	5.0
57.5°	9.0	8.0	8.0	7.0	7.0	6.0	6.0	5.0	5.0	4.0	4.0
60°	7.0	6.0	6.0	5.0	5.0	5.0	4.0	4.0	4.0	3.0	3.0
62.5°	6.0	5.0	5.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
65°	5.0	4.0	4.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
67.5°	4.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
70°	3.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0
72.5°	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
75°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
80°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5°	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
87.5°	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



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CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
0°	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0	1032.0
2.5°	1021.0	998.9	1008.9	1010.9	1011.9	996.9	1020.0	1023.0
5°	961.9	936.9	947.9	947.9	943.9	928.9	951.9	955.9
7.5°	868.8	844.8	850.8	847.8	843.8	827.8	845.8	852.8
10°	756.7	728.7	736.7	722.7	723.7	704.7	722.7	719.7
12.5°	629.6	599.6	599.6	596.6	586.5	575.5	582.5	576.5
15°	501.5	478.4	475.4	467.4	459.4	443.4	453.4	446.4
17.5°	387.4	368.3	363.3	353.3	348.3	335.3	340.3	341.3
20°	295.3	273.3	273.3	268.3	256.2	248.2	249.2	248.2
22.5°	217.2	201.2	198.2	195.2	185.2	179.2	181.2	180.2
25°	157.1	145.1	143.1	138.1	134.1	128.1	129.1	128.1
27.5°	114.1	105.1	103.1	100.1	95.1	92.1	92.1	92.1
30°	82.1	77.1	75.1	73.1	69.1	67.1	67.1	66.1
32.5°	60.1	56.1	54.1	53.0	50.0	49.0	48.0	48.0
35°	45.0	41.0	40.0	39.0	37.0	36.0	36.0	35.0
37.5°	33.0	31.0	30.0	29.0	28.0	27.0	27.0	26.0
40°	24.0	23.0	22.0	22.0	21.0	20.0	20.0	20.0
42.5°	18.0	17.0	17.0	16.0	16.0	15.0	15.0	15.0
45°	14.0	13.0	13.0	12.0	12.0	12.0	12.0	12.0
47.5°	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0
50°	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
52.5°	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0
55°	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
57.5°	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
60°	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
62.5°	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
65°	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
67.5°	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0
70°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
72.5°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
75°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
77.5°	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
80°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5°	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
87.5°	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

(END OF REPORT)