

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: P85089

Luminaire Tested: **EL405835-TL409WHWW**

Issue Date: 3/3/2020

Test Information

Test Method: LM-41-14
Report Number: P85089
REPORT IS SCALED FROM IESNA LM-79-08 TEST DATA (P21176)
Test Lab: INNOVATION CENTER P2
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: HALO
Catalog Number: EL405835-TL409WHWW
Description: ****THIS IS A REVISION OF P21160 TO UPDATE CATALOG NUMBER AND AVERAGING DATA****HALO 4 INCH RECESSED FIXTURE WALL WASH WITH WHITE ROUND TRIM, WHITE REFLECTOR, SPECULAR KICKER AND SOFT FOCUS LENS. ---ABSOLUTE PHOTOMETRY IS BASED ON CALIBRATION FACTORS CREATED USING A 500 WATT, NIST TRACEABLE, OMNI-DIRECTIONAL LAB LUMEN STANDARD IN THE GONIOPHOTOMETER WITH TEST DISTANCE OF 28.75 FEET----
Light Source: (1) SMT LED 3500K
(1) 221 14 WATTS
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: 596 (1 lamp)
Luminaire Lumens: 596.2 lumens
Efficiency: 100.0%
Efficacy: 43.5 lumens/watt
Spacing Criteria (0/90/45): 1.17 / 1.18 / 1.22
Luminous Opening: Vertical Cylinder (Dia: 0.33' x H: 0.1')
CIE Type: Direct

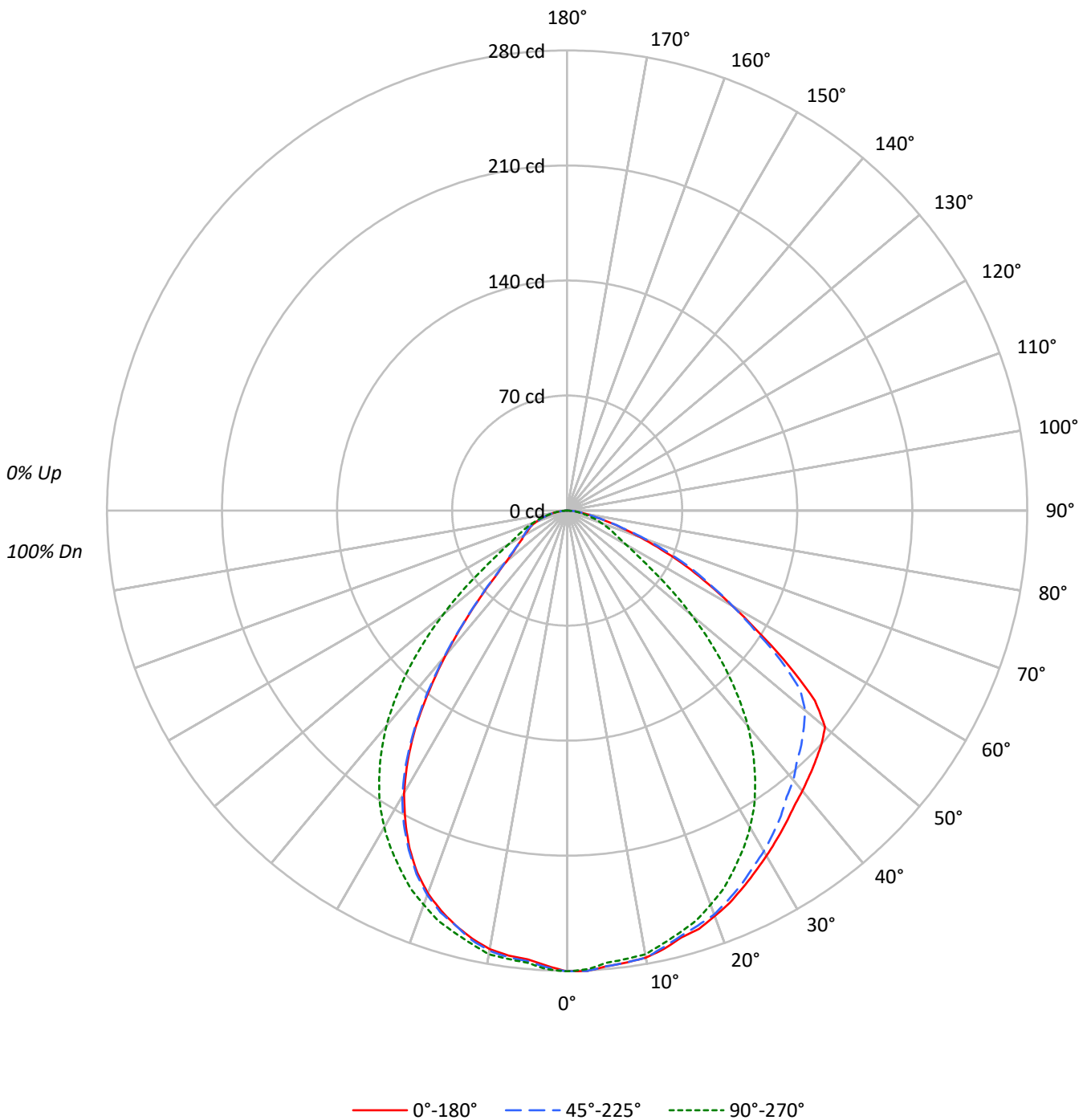
Input Watts (W): 13.7
Input Voltage (V): NR
Input Current (Ain): 0.12012
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 25 FT



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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	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					100			
1	110	106	103	99	108	104	101	98	100	97	95	96	94	92	93	91	89	87					87			
2	102	95	89	84	99	93	87	83	89	85	81	86	82	79	83	80	77	75					75			
3	94	84	77	71	91	83	76	71	80	74	69	77	72	68	75	71	67	65					65			
4	86	76	68	62	84	74	67	61	72	66	60	70	64	60	68	63	59	57					57			
5	80	68	60	54	78	67	60	54	65	58	53	63	57	53	61	56	52	50					50			
6	74	62	54	48	73	61	53	48	59	52	47	58	52	47	56	51	46	45					45			
7	69	57	48	43	68	56	48	43	54	47	42	53	47	42	52	46	42	40					40			
8	65	52	44	39	63	51	44	38	50	43	38	49	43	38	48	42	38	36					36			
9	61	48	40	35	59	47	40	35	46	39	35	45	39	35	44	39	34	33					33			
10	57	44	37	32	56	44	37	32	43	36	32	42	36	32	41	36	32	30					30			

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	34586	34586	34586
5°	33344	33092	32841
10°	32411	32164	31800
15°	31150	30779	30292
20°	30262	29409	28557
25°	29238	27783	26200
30°	28310	25976	23164
35°	27574	23701	19092
40°	27143	20875	14083
45°	27037	17229	9416
50°	27006	13015	6369
55°	22945	8766	5120
60°	17311	6087	4528
65°	12803	4893	4043
70°	8323	3889	3519
75°	4755	2888	2692
80°	2356	1884	1884
85°	1108	1108	844



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ZONAL LUMENS:

Zone	Lumens	% Fixture	% Lamp
0°-10°	26.3	4.4	4.4
10°-20°	74.9	12.6	12.6
20°-30°	110.2	18.5	18.5
30°-40°	121.9	20.4	20.4
40°-50°	107.8	18.1	18.1
50°-60°	81.4	13.7	13.7
60°-70°	48.7	8.2	8.2
70°-80°	20.5	3.4	3.4
80°-90°	4.5	0.8	0.8
90°-100°	0.0	0.0	0.0
100°-110°	0.0	0.0	0.0
110°-120°	0.0	0.0	0.0
120°-130°	0.0	0.0	0.0
130°-140°	0.0	0.0	0.0
140°-150°	0.0	0.0	0.0
150°-160°	0.0	0.0	0.0
160°-170°	0.0	0.0	0.0
170°-180°	0.0	0.0	0.0
0°-30°	211.4	35.5	35.5
0°-40°	333.3	55.9	55.9
0°-60°	522.4	87.6	87.7
0°-90°	596.2	100.0	100.0
90°-120°	0.0	0.0	0.0
90°-150°	0.0	0.0	0.0
90°-180°	0.0	0.0	0.0
0°-180°	596.2	100.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	280	280	280	280	280	
5°	278	278	276	275	274	27
15°	269	268	266	262	262	76
25°	253	251	240	228	227	117
35°	232	227	200	162	161	146
45°	214	202	136	76	75	166
55°	165	159	63	37	37	146
65°	80	83	30	26	25	79
75°	24	25	15	14	14	27
85°	4	4	4	3	3	5
90°	0	0	0	0	0	



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CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
0°	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4
2.5°	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4
5°	278.3	278.3	278.3	278.3	278.3	278.3	278.3	278.3	278.3	278.3	278.3
7.5°	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3
10°	276.2	276.2	276.2	276.2	276.2	276.2	276.2	276.2	276.2	276.2	275.2
12.5°	273.1	273.1	273.1	273.1	273.1	272.0	272.0	272.0	272.0	272.0	272.0
15°	268.9	268.9	268.9	268.9	268.9	268.9	268.9	268.9	268.9	267.8	267.8
17.5°	266.8	265.7	266.8	265.7	265.7	265.7	265.7	265.7	265.7	264.7	264.7
20°	262.6	262.6	262.6	262.6	262.6	262.6	262.6	261.5	261.5	261.5	260.5
22.5°	258.4	258.4	258.4	258.4	258.4	257.3	257.3	257.3	256.3	256.3	256.3
25°	253.1	253.1	253.1	253.1	253.1	252.1	252.1	251.0	251.0	251.0	249.9
27.5°	247.8	247.8	247.8	247.8	247.8	246.8	246.8	245.7	245.7	244.7	243.6
30°	242.6	242.6	242.6	242.6	242.6	242.6	241.5	240.5	240.5	239.4	238.4
32.5°	237.3	237.3	237.3	237.3	237.3	236.3	236.3	235.2	234.2	233.1	232.1
35°	232.1	232.1	232.1	232.1	231.0	231.0	230.0	228.9	227.9	226.8	224.7
37.5°	226.8	226.8	226.8	225.8	225.8	224.7	223.7	222.6	221.6	219.5	218.4
40°	222.6	222.6	221.6	221.6	220.5	219.5	218.4	217.4	215.3	214.2	212.1
42.5°	218.4	218.4	217.4	216.3	215.3	213.2	212.1	211.1	209.0	206.9	204.8
45°	214.2	214.2	213.2	212.1	210.0	209.0	206.9	205.8	203.7	201.6	198.5
47.5°	210.0	210.0	209.0	206.9	205.8	203.7	201.6	199.5	197.4	195.3	192.2
50°	204.8	203.7	202.7	201.6	200.6	198.5	196.4	194.3	192.2	189.0	185.9
52.5°	190.1	189.0	189.0	188.0	188.0	185.9	184.8	183.8	181.7	178.5	175.4
55°	164.9	164.9	164.9	164.9	164.9	164.9	163.8	162.8	160.7	158.6	155.4
57.5°	138.6	137.6	138.6	138.6	138.6	138.6	138.6	137.6	137.6	135.5	134.4
60°	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6	116.6
62.5°	96.6	96.6	97.7	97.7	97.7	97.7	97.7	98.7	98.7	98.7	99.8
65°	79.8	79.8	79.8	79.8	80.9	80.9	80.9	81.9	81.9	83.0	84.0
67.5°	62.0	63.0	63.0	63.0	64.1	64.1	64.1	65.1	65.1	66.2	67.2
70°	47.3	47.3	47.3	47.3	48.3	48.3	49.4	49.4	49.4	50.4	50.4
72.5°	34.7	33.6	34.7	34.7	34.7	34.7	35.7	35.7	35.7	35.7	35.7
75°	24.2	23.1	24.2	24.2	24.2	24.2	24.2	25.2	25.2	25.2	25.2
77.5°	15.8	15.8	15.8	15.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
80°	10.5	10.5	10.5	10.5	10.5	11.6	11.6	11.6	11.6	11.6	11.6
82.5°	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
85°	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
87.5°	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
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):

	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°	105°
0°	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4
2.5°	280.4	280.4	280.4	280.4	280.4	280.4	279.4	279.4	279.4	279.4	279.4
5°	277.3	277.3	277.3	277.3	277.3	277.3	277.3	276.2	276.2	276.2	276.2
7.5°	276.2	276.2	276.2	276.2	276.2	276.2	276.2	275.2	275.2	275.2	275.2
10°	275.2	275.2	275.2	275.2	275.2	274.1	274.1	274.1	274.1	273.1	273.1
12.5°	272.0	272.0	271.0	271.0	271.0	271.0	269.9	269.9	269.9	268.9	268.9
15°	267.8	267.8	266.8	266.8	266.8	265.7	265.7	265.7	264.7	264.7	263.6
17.5°	264.7	264.7	263.6	263.6	262.6	262.6	261.5	261.5	260.5	259.4	259.4
20°	260.5	260.5	259.4	258.4	258.4	257.3	256.3	255.2	255.2	254.2	253.1
22.5°	255.2	254.2	254.2	253.1	252.1	251.0	249.9	248.9	246.8	245.7	244.7
25°	248.9	247.8	246.8	245.7	244.7	243.6	241.5	240.5	238.4	236.3	235.2
27.5°	242.6	241.5	240.5	239.4	237.3	236.3	234.2	232.1	228.9	226.8	224.7
30°	237.3	236.3	234.2	232.1	231.0	227.9	225.8	222.6	219.5	216.3	212.1
32.5°	231.0	228.9	226.8	224.7	222.6	219.5	215.3	212.1	207.9	202.7	198.5
35°	223.7	221.6	218.4	216.3	212.1	209.0	204.8	199.5	194.3	188.0	181.7
37.5°	215.3	213.2	210.0	206.9	201.6	197.4	190.1	185.9	178.5	171.2	163.8
40°	209.0	205.8	201.6	196.4	191.1	184.8	178.5	171.2	162.8	153.3	143.9
42.5°	201.6	197.4	192.2	185.9	178.5	171.2	162.8	154.4	144.9	134.4	123.9
45°	194.3	189.0	182.7	174.3	164.9	155.4	146.0	136.5	126.0	115.5	104.0
47.5°	188.0	181.7	173.3	162.8	151.2	139.7	128.1	117.6	107.1	96.6	86.1
50°	180.6	173.3	163.8	151.2	136.5	122.9	110.3	98.7	88.2	78.8	70.4
52.5°	170.1	161.7	150.2	136.5	120.8	105.0	91.4	80.9	71.4	64.1	56.7
55°	150.2	142.8	131.3	117.6	100.8	85.1	72.5	63.0	56.7	51.5	46.2
57.5°	131.3	125.0	114.5	100.8	84.0	69.3	57.8	50.4	44.1	41.0	38.9
60°	114.5	109.2	99.8	87.2	71.4	57.8	47.3	41.0	36.8	34.7	32.6
62.5°	98.7	95.6	87.2	75.6	62.0	49.4	39.9	34.7	31.5	29.4	29.4
65°	84.0	81.9	74.6	65.1	52.5	42.0	34.7	30.5	27.3	26.3	26.3
67.5°	67.2	65.1	60.9	52.5	43.1	34.7	29.4	26.3	24.2	24.2	23.1
70°	50.4	50.4	46.2	41.0	34.7	28.4	24.2	22.1	21.0	21.0	21.0
72.5°	35.7	35.7	33.6	30.5	26.3	23.1	20.0	18.9	17.9	17.9	17.9
75°	25.2	24.2	23.1	22.1	20.0	17.9	15.8	14.7	14.7	14.7	14.7
77.5°	16.8	16.8	15.8	15.8	14.7	13.7	12.6	11.6	11.6	11.6	11.6
80°	11.6	11.6	10.5	10.5	10.5	9.5	9.5	8.4	8.4	8.4	8.4
82.5°	7.4	7.4	7.4	7.4	6.3	6.3	6.3	6.3	6.3	6.3	6.3
85°	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	3.2	3.2
87.5°	2.1	2.1	2.1	2.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
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):

	110°	115°	120°	125°	130°	135°	140°	145°	150°	155°	160°
0°	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4
2.5°	279.4	278.3	278.3	278.3	278.3	278.3	278.3	278.3	278.3	277.3	277.3
5°	276.2	276.2	275.2	275.2	275.2	275.2	275.2	275.2	275.2	275.2	275.2
7.5°	275.2	274.1	274.1	274.1	274.1	274.1	274.1	274.1	274.1	273.1	273.1
10°	273.1	273.1	273.1	272.0	272.0	272.0	272.0	272.0	272.0	272.0	271.0
12.5°	268.9	268.9	267.8	267.8	267.8	267.8	267.8	266.8	266.8	266.8	266.8
15°	263.6	263.6	262.6	262.6	262.6	261.5	261.5	261.5	261.5	261.5	261.5
17.5°	258.4	258.4	257.3	257.3	256.3	256.3	256.3	256.3	255.2	255.2	255.2
20°	252.1	251.0	251.0	249.9	249.9	248.9	248.9	248.9	247.8	248.9	247.8
22.5°	243.6	242.6	241.5	240.5	240.5	239.4	239.4	239.4	238.4	238.4	238.4
25°	233.1	232.1	231.0	230.0	228.9	227.9	227.9	227.9	226.8	226.8	226.8
27.5°	221.6	219.5	218.4	217.4	216.3	215.3	214.2	214.2	214.2	213.2	213.2
30°	209.0	206.9	203.7	202.7	201.6	200.6	199.5	199.5	198.5	198.5	198.5
32.5°	194.3	190.1	186.9	184.8	183.8	182.7	181.7	181.7	180.6	180.6	180.6
35°	176.4	171.2	168.0	164.9	162.8	161.7	161.7	160.7	160.7	160.7	160.7
37.5°	156.5	150.2	146.0	142.8	140.7	139.7	138.6	138.6	138.6	137.6	137.6
40°	135.5	128.1	122.9	119.7	117.6	116.6	115.5	115.5	115.5	115.5	115.5
42.5°	114.5	106.1	100.8	97.7	95.6	94.5	93.5	93.5	93.5	93.5	93.5
45°	94.5	86.1	80.9	77.7	75.6	75.6	74.6	74.6	74.6	74.6	74.6
47.5°	76.7	69.3	65.1	62.0	60.9	59.9	59.9	59.9	59.9	59.9	59.9
50°	62.0	56.7	53.6	51.5	50.4	49.4	49.4	49.4	48.3	48.3	48.3
52.5°	51.5	47.3	45.2	43.1	43.1	42.0	42.0	42.0	42.0	42.0	42.0
55°	43.1	41.0	38.9	37.8	37.8	36.8	36.8	36.8	36.8	36.8	36.8
57.5°	36.8	35.7	34.7	33.6	33.6	33.6	33.6	33.6	33.6	33.6	33.6
60°	31.5	31.5	31.5	31.5	31.5	30.5	30.5	30.5	30.5	30.5	30.5
62.5°	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
65°	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	25.2
67.5°	23.1	23.1	24.2	24.2	24.2	23.1	23.1	23.1	23.1	23.1	23.1
70°	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0
72.5°	17.9	17.9	17.9	17.9	17.9	16.8	16.8	16.8	16.8	16.8	16.8
75°	14.7	14.7	14.7	14.7	14.7	13.7	13.7	13.7	13.7	13.7	13.7
77.5°	11.6	11.6	11.6	11.6	11.6	11.6	11.6	10.5	10.5	10.5	10.5
80°	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
82.5°	6.3	6.3	6.3	6.3	6.3	5.3	5.3	5.3	5.3	5.3	5.3
85°	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
87.5°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



TEST NUMBER: P85089

CATALOG NUMBER: EL405835-TL409WHWW

CANDELA DISTRIBUTION (continued):

	165°	170°	175°	180°
0°	280.4	280.4	280.4	280.4
2.5°	277.3	277.3	277.3	277.3
5°	275.2	274.1	274.1	274.1
7.5°	273.1	273.1	273.1	273.1
10°	271.0	271.0	271.0	271.0
12.5°	266.8	266.8	266.8	266.8
15°	261.5	261.5	261.5	261.5
17.5°	255.2	255.2	255.2	255.2
20°	247.8	247.8	247.8	247.8
22.5°	238.4	238.4	238.4	238.4
25°	226.8	226.8	226.8	226.8
27.5°	213.2	213.2	213.2	213.2
30°	198.5	198.5	198.5	198.5
32.5°	180.6	180.6	180.6	180.6
35°	160.7	160.7	160.7	160.7
37.5°	137.6	137.6	137.6	137.6
40°	115.5	115.5	115.5	115.5
42.5°	93.5	93.5	93.5	93.5
45°	74.6	74.6	74.6	74.6
47.5°	59.9	59.9	58.8	58.8
50°	48.3	48.3	48.3	48.3
52.5°	41.0	41.0	41.0	41.0
55°	36.8	36.8	36.8	36.8
57.5°	33.6	32.6	32.6	32.6
60°	30.5	30.5	30.5	30.5
62.5°	28.4	28.4	27.3	27.3
65°	25.2	25.2	25.2	25.2
67.5°	23.1	23.1	23.1	23.1
70°	20.0	20.0	20.0	20.0
72.5°	16.8	16.8	16.8	16.8
75°	13.7	13.7	13.7	13.7
77.5°	10.5	10.5	10.5	10.5
80°	8.4	8.4	8.4	8.4
82.5°	5.3	5.3	5.3	5.3
85°	3.2	3.2	3.2	3.2
87.5°	1.1	1.1	1.1	1.1
90°	0.0	0.0	0.0	0.0

(END OF REPORT)