

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: P85088

Luminaire Tested: **EL405827-TL409WHWW**

Issue Date: 3/3/2020

Test Information

Test Method: LM-41-14
Report Number: P85088
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: EL405827-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 2700K
(1) 221 14 WATTS
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: 531 (1 lamp)
Luminaire Lumens: 530.8 lumens
Efficiency: 100.0%
Efficacy: 38.7 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

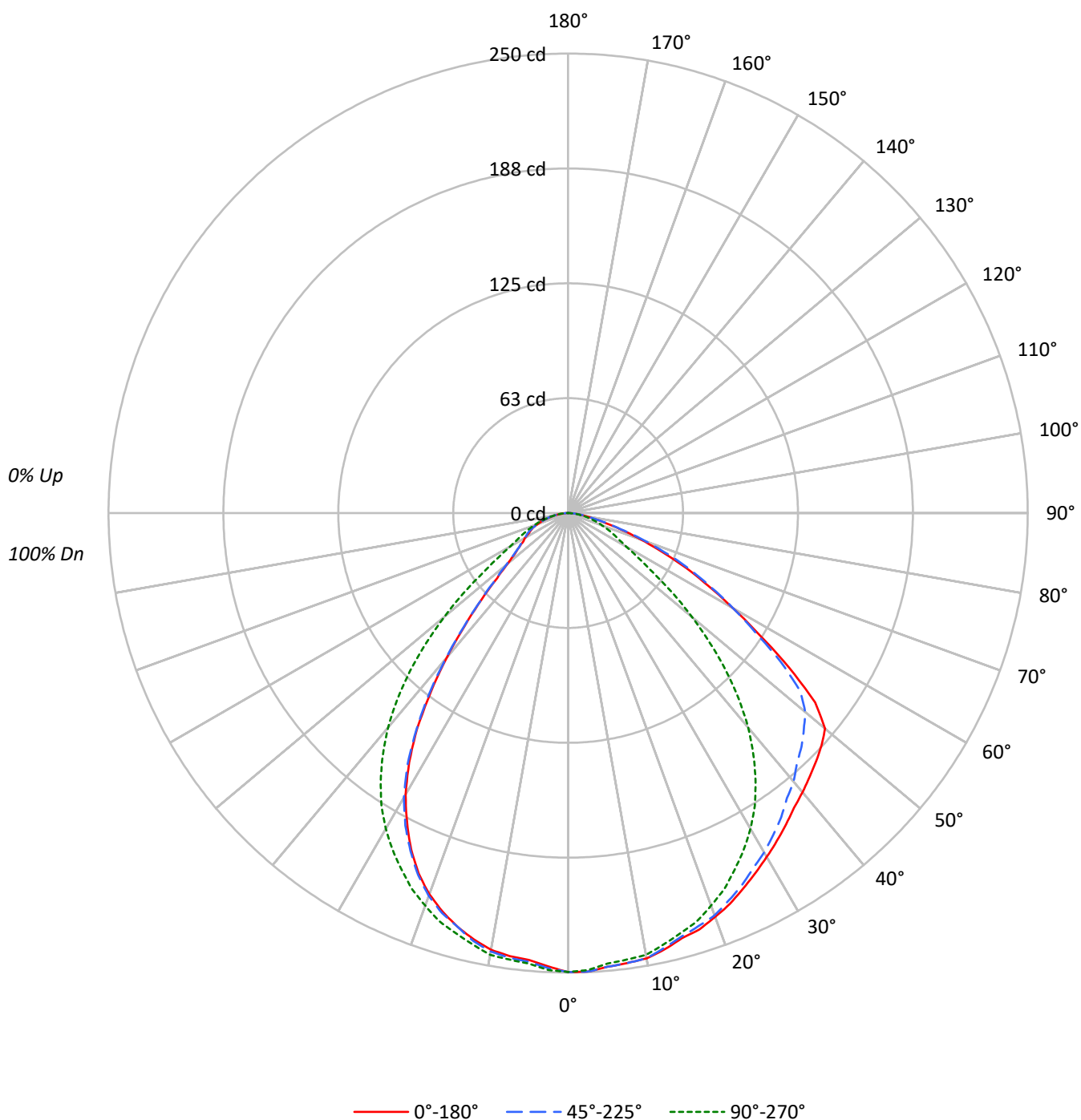
Input Watts (W): 13.7
Input Voltage (V): NR
Input Current (Ain): 0.12012
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 25 FT



TEST NUMBER: P85088

CATALOG NUMBER: EL405827-TL409WHWW

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					0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10
RCR																				
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100		
1	110	106	103	99	108	104	101	98	100	97	95	96	94	92	92	91	89	87		
2	102	94	88	83	99	93	87	82	89	85	81	86	82	79	83	80	77	75		
3	94	84	77	71	91	83	76	71	80	74	69	77	72	68	75	71	67	65		
4	86	76	68	62	84	74	67	61	72	65	60	70	64	60	68	63	59	57		
5	80	68	60	54	78	67	59	54	65	58	53	63	57	53	61	56	52	50		
6	74	62	54	48	72	61	53	48	59	52	47	58	52	47	56	51	46	45		
7	69	57	48	43	68	56	48	43	54	47	42	53	47	42	52	46	42	40		
8	65	52	44	39	63	51	44	38	50	43	38	49	43	38	48	42	38	36		
9	61	48	40	35	59	47	40	35	46	39	35	45	39	35	44	39	34	33		
10	57	44	37	32	56	44	37	32	43	36	32	42	36	32	41	36	31	30		

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	30799	30799	30799
5°	29690	29474	29246
10°	28867	28644	28315
15°	27732	27408	26979
20°	26943	26194	25434
25°	26038	24745	23335
30°	25206	23140	20631
35°	24556	21111	17001
40°	24180	18583	12547
45°	24083	15349	8381
50°	24052	11591	5670
55°	20426	7806	4550
60°	15411	5419	4023
65°	11407	4348	3594
70°	7408	3449	3132
75°	4224	2574	2397
80°	2109	1683	1683
85°	976	976	738



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ZONAL LUMENS:

Zone	Lumens	% Fixture	% Lamp
0°-10°	23.5	4.4	4.4
10°-20°	66.7	12.6	12.6
20°-30°	98.1	18.5	18.5
30°-40°	108.5	20.4	20.4
40°-50°	96.0	18.1	18.1
50°-60°	72.4	13.6	13.6
60°-70°	43.4	8.2	8.2
70°-80°	18.3	3.4	3.4
80°-90°	4.0	0.7	0.7
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°	188.3	35.5	35.5
0°-40°	296.8	55.9	55.9
0°-60°	465.2	87.6	87.6
0°-90°	530.8	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°	530.8	100.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	250	250	250	250	250	
5°	248	248	246	245	244	24
15°	239	238	237	233	233	68
25°	225	224	214	203	202	104
35°	207	202	178	144	143	130
45°	191	180	122	67	66	147
55°	147	141	56	33	33	130
65°	71	74	27	23	22	70
75°	22	22	13	12	12	24
85°	4	4	4	3	3	5
90°	0	0	0	0	0	



TEST NUMBER: P85088

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CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
0°	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7
2.5°	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7
5°	247.8	247.8	247.8	247.8	247.8	247.8	247.8	247.8	247.8	247.8	247.8
7.5°	246.9	246.9	246.9	246.9	246.9	246.9	246.9	246.9	246.9	246.9	246.9
10°	246.0	246.0	246.0	246.0	246.0	246.0	246.0	246.0	246.0	246.0	245.0
12.5°	243.1	243.1	243.1	243.1	243.1	242.2	242.2	242.2	242.2	242.2	242.2
15°	239.4	239.4	239.4	239.4	239.4	239.4	239.4	239.4	239.4	238.5	238.5
17.5°	237.5	236.6	237.5	236.6	236.6	236.6	236.6	236.6	236.6	235.7	235.7
20°	233.8	233.8	233.8	233.8	233.8	233.8	233.8	232.9	232.9	232.9	231.9
22.5°	230.1	230.1	230.1	230.1	230.1	229.1	229.1	229.1	228.2	228.2	228.2
25°	225.4	225.4	225.4	225.4	225.4	224.4	224.4	223.5	223.5	223.5	222.6
27.5°	220.7	220.7	220.7	220.7	220.7	219.8	219.8	218.8	218.8	217.9	217.0
30°	216.0	216.0	216.0	216.0	216.0	216.0	215.1	214.2	214.2	213.2	212.3
32.5°	211.4	211.4	211.4	211.4	211.4	210.4	210.4	209.5	208.5	207.6	206.7
35°	206.7	206.7	206.7	206.7	205.7	205.7	204.8	203.9	202.9	202.0	200.1
37.5°	202.0	202.0	202.0	201.1	201.1	200.1	199.2	198.3	197.3	195.5	194.5
40°	198.3	198.3	197.3	197.3	196.4	195.5	194.5	193.6	191.7	190.8	188.9
42.5°	194.5	194.5	193.6	192.6	191.7	189.8	188.9	188.0	186.1	184.2	182.4
45°	190.8	190.8	189.8	188.9	187.0	186.1	184.2	183.3	181.4	179.6	176.8
47.5°	187.0	187.0	186.1	184.2	183.3	181.4	179.6	177.7	175.8	173.9	171.1
50°	182.4	181.4	180.5	179.6	178.6	176.8	174.9	173.0	171.1	168.3	165.5
52.5°	169.3	168.3	168.3	167.4	167.4	165.5	164.6	163.7	161.8	159.0	156.2
55°	146.8	146.8	146.8	146.8	146.8	146.8	145.9	145.0	143.1	141.2	138.4
57.5°	123.4	122.5	123.4	123.4	123.4	123.4	123.4	122.5	122.5	120.6	119.7
60°	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8
62.5°	86.0	86.0	87.0	87.0	87.0	87.0	87.0	87.9	87.9	87.9	88.8
65°	71.1	71.1	71.1	71.1	72.0	72.0	72.0	72.9	72.9	73.9	74.8
67.5°	55.2	56.1	56.1	56.1	57.0	57.0	57.0	58.0	58.0	58.9	59.9
70°	42.1	42.1	42.1	42.1	43.0	43.0	44.0	44.0	44.0	44.9	44.9
72.5°	30.9	29.9	30.9	30.9	30.9	30.9	31.8	31.8	31.8	31.8	31.8
75°	21.5	20.6	21.5	21.5	21.5	21.5	21.5	22.4	22.4	22.4	22.4
77.5°	14.0	14.0	14.0	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
80°	9.4	9.4	9.4	9.4	9.4	10.3	10.3	10.3	10.3	10.3	10.3
82.5°	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
85°	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
87.5°	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
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°	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7
2.5°	249.7	249.7	249.7	249.7	249.7	249.7	248.8	248.8	248.8	248.8	248.8
5°	246.9	246.9	246.9	246.9	246.9	246.9	246.9	246.0	246.0	246.0	246.0
7.5°	246.0	246.0	246.0	246.0	246.0	246.0	246.0	245.0	245.0	245.0	245.0
10°	245.0	245.0	245.0	245.0	245.0	244.1	244.1	244.1	244.1	243.1	243.1
12.5°	242.2	242.2	241.3	241.3	241.3	241.3	240.3	240.3	240.3	239.4	239.4
15°	238.5	238.5	237.5	237.5	237.5	236.6	236.6	236.6	235.7	235.7	234.7
17.5°	235.7	235.7	234.7	234.7	233.8	233.8	232.9	232.9	231.9	231.0	231.0
20°	231.9	231.9	231.0	230.1	230.1	229.1	228.2	227.3	227.3	226.3	225.4
22.5°	227.3	226.3	226.3	225.4	224.4	223.5	222.6	221.6	219.8	218.8	217.9
25°	221.6	220.7	219.8	218.8	217.9	217.0	215.1	214.2	212.3	210.4	209.5
27.5°	216.0	215.1	214.2	213.2	211.4	210.4	208.5	206.7	203.9	202.0	200.1
30°	211.4	210.4	208.5	206.7	205.7	202.9	201.1	198.3	195.5	192.6	188.9
32.5°	205.7	203.9	202.0	200.1	198.3	195.5	191.7	188.9	185.2	180.5	176.8
35°	199.2	197.3	194.5	192.6	188.9	186.1	182.4	177.7	173.0	167.4	161.8
37.5°	191.7	189.8	187.0	184.2	179.6	175.8	169.3	165.5	159.0	152.4	145.9
40°	186.1	183.3	179.6	174.9	170.2	164.6	159.0	152.4	145.0	136.5	128.1
42.5°	179.6	175.8	171.1	165.5	159.0	152.4	145.0	137.5	129.1	119.7	110.4
45°	173.0	168.3	162.7	155.2	146.8	138.4	130.0	121.6	112.2	102.9	92.6
47.5°	167.4	161.8	154.3	145.0	134.7	124.4	114.1	104.7	95.4	86.0	76.7
50°	160.9	154.3	145.9	134.7	121.6	109.4	98.2	87.9	78.6	70.1	62.7
52.5°	151.5	144.0	133.7	121.6	107.5	93.5	81.4	72.0	63.6	57.0	50.5
55°	133.7	127.2	116.9	104.7	89.8	75.8	64.5	56.1	50.5	45.8	41.1
57.5°	116.9	111.3	101.9	89.8	74.8	61.7	51.4	44.9	39.3	36.5	34.6
60°	101.9	97.3	88.8	77.6	63.6	51.4	42.1	36.5	32.7	30.9	29.0
62.5°	87.9	85.1	77.6	67.3	55.2	44.0	35.5	30.9	28.1	26.2	26.2
65°	74.8	72.9	66.4	58.0	46.8	37.4	30.9	27.1	24.3	23.4	23.4
67.5°	59.9	58.0	54.2	46.8	38.3	30.9	26.2	23.4	21.5	21.5	20.6
70°	44.9	44.9	41.1	36.5	30.9	25.3	21.5	19.6	18.7	18.7	18.7
72.5°	31.8	31.8	29.9	27.1	23.4	20.6	17.8	16.8	15.9	15.9	15.9
75°	22.4	21.5	20.6	19.6	17.8	15.9	14.0	13.1	13.1	13.1	13.1
77.5°	15.0	15.0	14.0	14.0	13.1	12.2	11.2	10.3	10.3	10.3	10.3
80°	10.3	10.3	9.4	9.4	9.4	8.4	8.4	7.5	7.5	7.5	7.5
82.5°	6.5	6.5	6.5	6.5	5.6	5.6	5.6	5.6	5.6	5.6	5.6
85°	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	2.8	2.8
87.5°	1.9	1.9	1.9	1.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
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: P85088

CATALOG NUMBER: EL405827-TL409WHWW

CANDELA DISTRIBUTION (continued):

	110°	115°	120°	125°	130°	135°	140°	145°	150°	155°	160°
0°	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7	249.7
2.5°	248.8	247.8	247.8	247.8	247.8	247.8	247.8	247.8	247.8	246.9	246.9
5°	246.0	246.0	245.0	245.0	245.0	245.0	245.0	245.0	245.0	245.0	245.0
7.5°	245.0	244.1	244.1	244.1	244.1	244.1	244.1	244.1	244.1	243.1	243.1
10°	243.1	243.1	243.1	242.2	242.2	242.2	242.2	242.2	242.2	242.2	241.3
12.5°	239.4	239.4	238.5	238.5	238.5	238.5	238.5	237.5	237.5	237.5	237.5
15°	234.7	234.7	233.8	233.8	233.8	232.9	232.9	232.9	232.9	232.9	232.9
17.5°	230.1	230.1	229.1	229.1	228.2	228.2	228.2	228.2	227.3	227.3	227.3
20°	224.4	223.5	223.5	222.6	222.6	221.6	221.6	221.6	220.7	221.6	220.7
22.5°	217.0	216.0	215.1	214.2	214.2	213.2	213.2	213.2	212.3	212.3	212.3
25°	207.6	206.7	205.7	204.8	203.9	202.9	202.9	202.9	202.0	202.0	202.0
27.5°	197.3	195.5	194.5	193.6	192.6	191.7	190.8	190.8	190.8	189.8	189.8
30°	186.1	184.2	181.4	180.5	179.6	178.6	177.7	177.7	176.8	176.8	176.8
32.5°	173.0	169.3	166.5	164.6	163.7	162.7	161.8	161.8	160.9	160.9	160.9
35°	157.1	152.4	149.6	146.8	145.0	144.0	144.0	143.1	143.1	143.1	143.1
37.5°	139.3	133.7	130.0	127.2	125.3	124.4	123.4	123.4	123.4	122.5	122.5
40°	120.6	114.1	109.4	106.6	104.7	103.8	102.9	102.9	102.9	102.9	102.9
42.5°	101.9	94.5	89.8	87.0	85.1	84.2	83.2	83.2	83.2	83.2	83.2
45°	84.2	76.7	72.0	69.2	67.3	67.3	66.4	66.4	66.4	66.4	66.4
47.5°	68.3	61.7	58.0	55.2	54.2	53.3	53.3	53.3	53.3	53.3	53.3
50°	55.2	50.5	47.7	45.8	44.9	44.0	44.0	44.0	43.0	43.0	43.0
52.5°	45.8	42.1	40.2	38.3	38.3	37.4	37.4	37.4	37.4	37.4	37.4
55°	38.3	36.5	34.6	33.7	33.7	32.7	32.7	32.7	32.7	32.7	32.7
57.5°	32.7	31.8	30.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
60°	28.1	28.1	28.1	28.1	28.1	27.1	27.1	27.1	27.1	27.1	27.1
62.5°	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
65°	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	22.4
67.5°	20.6	20.6	21.5	21.5	21.5	20.6	20.6	20.6	20.6	20.6	20.6
70°	18.7	18.7	18.7	18.7	18.7	17.8	17.8	17.8	17.8	17.8	17.8
72.5°	15.9	15.9	15.9	15.9	15.9	15.0	15.0	15.0	15.0	15.0	15.0
75°	13.1	13.1	13.1	13.1	13.1	12.2	12.2	12.2	12.2	12.2	12.2
77.5°	10.3	10.3	10.3	10.3	10.3	10.3	10.3	9.4	9.4	9.4	9.4
80°	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
82.5°	5.6	5.6	5.6	5.6	5.6	4.7	4.7	4.7	4.7	4.7	4.7
85°	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
87.5°	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
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: P85088

CATALOG NUMBER: EL405827-TL409WHWW

CANDELA DISTRIBUTION (continued):

	165°	170°	175°	180°
0°	249.7	249.7	249.7	249.7
2.5°	246.9	246.9	246.9	246.9
5°	245.0	244.1	244.1	244.1
7.5°	243.1	243.1	243.1	243.1
10°	241.3	241.3	241.3	241.3
12.5°	237.5	237.5	237.5	237.5
15°	232.9	232.9	232.9	232.9
17.5°	227.3	227.3	227.3	227.3
20°	220.7	220.7	220.7	220.7
22.5°	212.3	212.3	212.3	212.3
25°	202.0	202.0	202.0	202.0
27.5°	189.8	189.8	189.8	189.8
30°	176.8	176.8	176.8	176.8
32.5°	160.9	160.9	160.9	160.9
35°	143.1	143.1	143.1	143.1
37.5°	122.5	122.5	122.5	122.5
40°	102.9	102.9	102.9	102.9
42.5°	83.2	83.2	83.2	83.2
45°	66.4	66.4	66.4	66.4
47.5°	53.3	53.3	52.4	52.4
50°	43.0	43.0	43.0	43.0
52.5°	36.5	36.5	36.5	36.5
55°	32.7	32.7	32.7	32.7
57.5°	29.9	29.0	29.0	29.0
60°	27.1	27.1	27.1	27.1
62.5°	25.3	25.3	24.3	24.3
65°	22.4	22.4	22.4	22.4
67.5°	20.6	20.6	20.6	20.6
70°	17.8	17.8	17.8	17.8
72.5°	15.0	15.0	15.0	15.0
75°	12.2	12.2	12.2	12.2
77.5°	9.4	9.4	9.4	9.4
80°	7.5	7.5	7.5	7.5
82.5°	4.7	4.7	4.7	4.7
85°	2.8	2.8	2.8	2.8
87.5°	0.9	0.9	0.9	0.9
90°	0.0	0.0	0.0	0.0

(END OF REPORT)