

Scaled data based on original data using
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State
Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: FAIL-SAFE

Report Number: P190077

Luminaire Tested: **TRO11-LD4-15W-50-CL-BK-UNV-EDC1**

Issue Date: 3/3/2020



Test Information

Test Method: LM-79-08
Report Number: P190077
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P27855)
Test Lab: INNOVATION CENTER(G2)
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: FAIL-SAFE
Catalog Number: TRO11-LD4-15W-50-CL-BK-UNV-EDC1
Description: TERRAPIN 11" LED WALL MOUNT WITH OPEN CLEAR LENS
Light Source: (56) NICHIA 5000
NF2L757DRT
Ballast/Driver: OSRAM ELECTRONIC DRIVER PROGRAMMED AT 300mA
OT25W/1

Summary

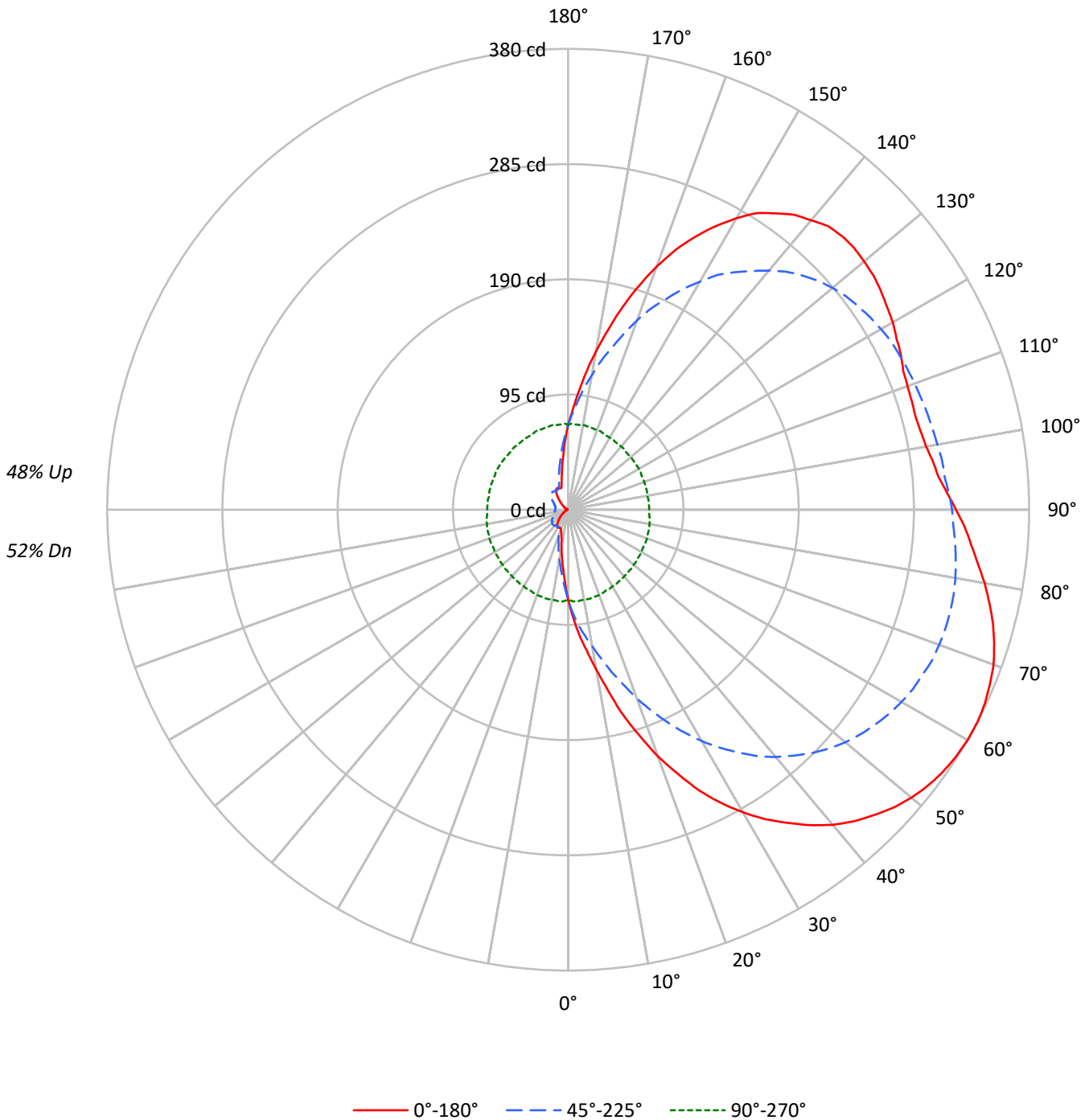
Lumens per Lamp: N/A
Luminaire Lumens: 1657.1 lumens
Efficiency: N/A
Efficacy: 115.1 lumens/watt
Spacing Criteria (0/90/45): 2.81 / 1.5 / 2.58
Luminous Opening: Rectangular w/ Sides (W: 0.92' x L: 0.29' x H: 0.92')
CIE Type: General Diffuse

Input Watts (W): 14.4
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	108	108	108	108	99	99	99	99	84	84	84	70	70	70	58	58	58	52
1	93	87	81	76	86	80	75	70	67	63	59	55	52	49	43	41	39	34
2	83	73	65	58	76	67	60	54	56	50	45	45	41	37	35	32	29	24
3	75	63	54	46	68	58	49	43	48	41	36	38	33	29	30	26	23	19
4	68	55	45	38	61	50	42	35	41	35	29	33	28	24	26	22	18	15
5	62	48	38	31	56	44	35	29	36	30	24	29	24	20	23	19	15	12
6	56	43	33	27	51	39	31	25	32	26	21	26	21	17	20	16	13	10
7	52	38	29	23	47	35	27	21	29	22	18	23	18	14	18	14	11	8
8	48	34	26	20	44	31	24	18	26	20	15	21	16	12	17	13	9	7
9	44	31	23	17	41	29	21	16	24	18	13	19	14	11	15	11	8	6
10	41	28	20	15	38	26	19	14	22	16	12	18	13	10	14	10	7	5

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	2991	2991	2991
5°	3271	2828	1537
10°	3525	2624	829
15°	3973	2482	484
20°	4327	2353	352
25°	4603	2230	295
30°	4760	2151	281
35°	4842	2093	241
40°	4901	2049	191
45°	4895	2024	139
50°	4875	2015	100
55°	4821	2021	64
60°	4750	2060	47
65°	4664	2096	31
70°	4559	2174	16
75°	4430	2255	16
80°	4294	2363	16
85°	4172	2501	16



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	7.3	0.4
10°-20°	24.6	1.5
20°-30°	48.9	2.9
30°-40°	78.1	4.7
40°-50°	106.9	6.5
50°-60°	131.0	7.9
60°-70°	148.0	8.9
70°-80°	156.2	9.4
80°-90°	155.6	9.4
90°-100°	149.7	9.0
100°-110°	142.0	8.6
110°-120°	132.9	8.0
120°-130°	119.9	7.2
130°-140°	100.9	6.1
140°-150°	75.8	4.6
150°-160°	48.1	2.9
160°-170°	24.1	1.5
170°-180°	6.9	0.4
0°-30°	80.8	4.9
0°-40°	158.9	9.6
0°-60°	396.8	23.9
0°-90°	856.7	51.7
90°-120°	424.7	25.6
90°-150°	721.3	43.5
90°-180°	800.0	48.3
0°-180°	1657.1	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	74	74	74	74	74	
5°	103	95	76	55	48	11
15°	176	138	76	31	21	51
25°	256	193	74	19	16	119
35°	315	244	72	16	16	198
45°	356	284	71	18	10	276
55°	377	309	70	16	5	338
65°	379	322	69	14	2	375
75°	362	326	69	13	1	383
85°	334	320	67	11	1	276
90°	320	316	67	11	1	175
95°	306	312	67	11	1	249
105°	296	306	67	11	1	315
115°	303	301	67	13	2	300
125°	315	292	67	16	4	282
135°	319	273	67	20	9	246
145°	298	239	68	19	17	187
155°	249	192	69	20	20	115
165°	173	138	70	29	21	50
175°	97	89	70	53	46	10
180°	70	70	70	70	70	



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CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
2.5°	88.1	87.5	88.1	87.5	87.5	86.8	86.8	86.2	86.2	85.6	85.0
5°	103.2	102.0	102.0	101.3	101.3	100.7	100.1	98.8	98.2	96.9	95.0
7.5°	117.1	117.1	116.4	115.8	115.2	113.9	113.3	111.4	110.1	107.0	104.5
10°	134.0	133.4	133.4	130.9	129.6	128.4	127.8	125.2	122.1	118.9	114.5
12.5°	152.9	151.0	150.4	148.5	147.3	145.4	144.1	140.3	135.9	130.3	125.9
15°	175.6	173.7	172.4	170.5	167.4	164.9	163.6	156.7	151.0	144.7	138.5
17.5°	195.1	194.5	193.2	190.1	186.9	184.4	181.2	175.0	168.0	159.8	151.0
20°	216.5	215.2	214.0	210.8	205.8	203.3	200.8	192.6	184.4	175.6	165.5
22.5°	235.4	234.1	232.2	229.7	224.7	221.5	218.4	209.6	200.8	190.7	179.4
25°	255.5	253.6	251.1	247.3	242.9	239.1	235.4	227.2	217.1	205.8	193.2
27.5°	272.5	271.2	269.4	264.9	259.9	256.1	251.7	243.5	233.5	220.9	207.0
30°	288.2	287.6	285.1	280.7	275.0	271.9	267.5	258.7	248.0	235.4	220.3
32.5°	302.7	301.4	299.6	295.2	289.5	285.7	281.9	272.5	261.2	248.0	232.8
35°	315.3	314.7	312.1	308.4	302.1	298.9	294.5	285.1	273.8	259.9	244.2
37.5°	327.9	327.9	325.4	321.0	315.3	311.5	307.1	297.7	285.7	271.9	256.1
40°	339.2	337.9	336.1	331.7	325.4	322.2	317.8	308.4	296.4	281.9	266.2
42.5°	348.6	347.4	345.5	341.1	335.4	331.7	327.2	317.8	305.9	292.0	275.0
45°	356.2	356.2	353.7	349.9	343.6	339.8	336.1	326.6	314.7	300.8	283.8
47.5°	363.7	363.1	360.6	356.8	350.5	347.4	343.6	334.2	322.2	308.4	291.4
50°	369.4	368.2	366.3	361.9	356.8	353.1	349.3	339.8	328.5	314.7	298.3
52.5°	373.8	373.2	370.7	366.9	361.9	358.7	354.3	345.5	334.2	320.3	304.0
55°	377.0	376.3	373.8	370.7	365.0	361.9	358.1	349.3	337.9	325.4	309.0
57.5°	378.9	378.2	376.3	372.6	366.9	363.7	360.6	351.8	341.7	329.1	313.4
60°	380.1	379.5	377.0	373.8	368.8	365.6	362.5	354.3	344.2	332.3	317.2
62.5°	380.1	379.5	377.0	373.2	368.8	365.6	362.5	354.9	346.1	334.8	320.3
65°	378.9	378.2	375.7	371.9	368.2	365.6	362.5	355.6	347.4	336.1	322.2
67.5°	376.3	375.7	373.2	370.0	366.3	364.4	361.9	354.9	347.4	337.3	324.7
70°	373.2	372.6	370.0	366.9	363.7	361.9	359.3	353.7	346.8	337.9	325.4
72.5°	368.2	367.5	365.6	362.5	360.0	358.1	355.6	351.2	344.9	337.3	326.0
75°	362.5	361.9	360.0	357.5	354.9	353.7	351.8	348.0	343.0	336.1	326.0
77.5°	355.6	356.2	354.3	351.8	349.9	349.3	347.4	344.9	340.5	334.2	325.4
80°	348.6	348.6	346.8	345.5	343.6	343.0	342.4	340.5	337.3	332.3	324.1
82.5°	340.5	341.7	339.8	338.6	337.9	337.3	336.7	336.1	333.5	329.8	322.2
85°	333.5	334.2	332.9	332.3	332.3	331.7	331.7	331.0	330.4	326.6	320.3
87.5°	327.2	326.6	325.4	325.4	326.0	326.0	326.0	326.6	326.0	324.1	317.8
90°	319.7	319.7	319.1	319.1	320.3	320.3	321.0	322.2	322.2	321.0	316.5
92.5°	312.8	312.8	312.8	313.4	314.7	315.3	315.9	317.8	318.4	317.8	314.0
95°	306.5	307.1	307.7	308.4	309.6	310.9	312.1	314.7	315.9	315.3	311.5
97.5°	303.3	303.3	304.0	304.6	306.5	307.7	309.0	311.5	313.4	313.4	310.9
100°	299.6	300.2	300.8	302.1	304.0	305.2	306.5	309.6	311.5	312.1	309.0
102.5°	297.7	297.7	298.3	299.6	301.4	303.3	304.6	307.7	309.6	310.3	307.7
105°	296.4	297.0	297.0	298.9	300.8	302.7	304.0	307.1	309.0	309.6	306.5
107.5°	297.0	297.0	297.7	299.6	301.4	302.7	304.0	307.1	308.4	308.4	305.2
110°	297.7	298.3	298.9	300.2	302.1	303.3	304.6	307.1	308.4	307.7	304.0



TEST NUMBER: P190077

CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
112.5°	298.9	299.6	300.2	302.1	303.3	304.6	305.9	307.7	308.4	307.1	302.7
115°	302.7	302.1	303.3	304.0	305.9	306.5	307.7	308.4	308.4	306.5	301.4
117.5°	305.2	305.9	306.5	307.1	307.7	308.4	309.6	309.6	309.6	306.5	300.2
120°	309.0	309.0	309.0	309.6	310.3	310.9	310.9	310.3	309.0	305.2	297.7
122.5°	311.5	311.5	312.1	312.8	312.8	312.8	312.8	311.5	309.0	304.0	295.2
125°	314.7	314.7	314.7	314.7	314.0	314.0	314.0	311.5	308.4	302.1	292.0
127.5°	317.2	316.5	316.5	315.9	315.3	314.7	314.0	310.9	306.5	299.6	288.9
130°	318.4	318.4	317.8	317.2	315.3	314.7	312.8	309.6	304.0	295.8	284.5
132.5°	319.7	319.1	318.4	317.2	315.3	314.0	312.1	307.7	300.8	291.4	279.4
135°	319.1	319.1	317.8	315.9	313.4	311.5	309.6	304.0	296.4	286.3	273.1
137.5°	317.2	316.5	315.3	312.8	310.3	307.7	305.9	299.6	290.7	280.0	266.2
140°	311.5	311.5	310.3	307.7	304.0	301.4	298.9	292.0	283.2	271.9	257.4
142.5°	306.5	305.9	304.0	300.8	297.0	293.9	291.4	283.8	274.4	262.4	248.0
145°	298.3	298.3	296.4	293.3	288.9	286.3	283.2	275.0	264.9	253.0	239.1
147.5°	290.1	288.9	287.0	283.8	279.4	276.3	273.1	264.9	254.9	242.9	229.7
150°	277.5	276.9	275.0	271.2	266.8	263.7	260.5	251.7	242.9	230.3	217.1
152.5°	263.7	262.4	260.5	257.4	252.4	249.2	246.7	237.9	228.4	217.1	205.2
155°	248.6	246.7	245.4	241.7	237.3	234.1	231.0	222.8	214.6	204.5	191.9
157.5°	232.2	230.3	229.1	225.3	220.9	218.4	215.2	207.7	199.5	190.7	180.0
160°	213.3	212.1	210.8	207.7	203.3	200.8	198.2	191.9	184.4	176.2	166.1
162.5°	193.2	191.9	191.3	188.2	184.4	181.9	180.0	174.3	168.0	161.1	151.7
165°	173.1	171.8	171.2	168.7	165.5	163.6	161.7	155.4	150.4	144.7	137.8
167.5°	151.7	151.0	150.4	147.9	146.0	144.1	142.9	139.7	134.7	130.9	125.9
170°	132.8	131.5	131.5	129.6	128.4	127.1	125.9	124.0	120.2	117.1	112.6
172.5°	114.5	113.3	113.3	112.0	110.8	110.1	109.5	108.2	105.7	103.2	101.3
175°	96.9	95.7	96.3	94.4	95.0	94.4	94.4	93.8	91.9	91.3	89.4
177.5°	81.8	80.6	81.2	80.6	80.6	80.6	80.6	80.6	79.9	79.9	79.3
180°	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9



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CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
0°	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
2.5°	83.7	83.1	82.4	81.8	81.2	80.6	79.3	78.0	77.4	75.5	74.3
5°	93.1	91.3	90.0	87.5	86.2	85.6	83.1	80.6	78.0	76.1	73.6
7.5°	102.6	99.4	96.9	93.8	91.9	90.0	86.8	83.1	79.3	75.5	72.4
10°	111.4	107.6	103.2	99.4	96.9	95.0	90.0	85.6	80.6	75.5	71.1
12.5°	120.8	115.8	110.1	104.5	102.0	99.4	93.1	87.5	81.2	75.5	69.2
15°	131.5	124.6	117.7	110.8	107.0	103.8	96.9	89.4	82.4	75.5	68.6
17.5°	142.9	134.0	125.2	116.4	112.0	108.2	100.1	91.9	83.7	74.9	67.3
20°	154.2	143.5	132.8	122.7	117.7	112.6	103.2	93.8	84.3	74.9	65.4
22.5°	167.4	152.9	141.0	128.4	122.7	117.1	106.4	95.7	85.0	74.3	64.2
25°	179.4	165.5	149.8	134.7	128.4	121.5	109.5	97.5	85.6	73.6	62.9
27.5°	192.6	176.2	158.6	141.6	134.0	126.5	112.6	99.4	86.8	73.6	61.7
30°	204.5	186.9	168.7	148.5	139.7	131.5	115.8	101.3	87.5	73.0	60.4
32.5°	216.5	197.0	177.5	156.1	145.4	135.9	118.9	103.2	88.1	73.0	59.2
35°	226.6	207.0	185.7	163.0	151.7	141.0	122.1	105.1	88.7	72.4	57.9
37.5°	237.9	217.7	194.5	170.5	158.6	146.0	125.2	107.0	89.4	72.4	56.6
40°	247.3	226.6	202.0	177.5	164.9	151.0	128.4	108.2	90.0	71.7	55.4
42.5°	256.8	234.7	209.6	183.8	170.5	156.7	131.5	110.1	90.6	71.7	54.8
45°	264.9	242.9	217.7	190.7	176.2	161.7	134.7	111.4	91.3	71.1	53.5
47.5°	272.5	249.8	224.0	196.3	181.2	166.8	137.2	113.3	91.9	71.1	52.9
50°	278.8	256.8	230.3	201.4	186.9	170.5	140.3	114.5	92.5	70.5	51.6
52.5°	285.1	262.4	236.6	207.0	191.3	175.6	142.9	115.8	93.1	70.5	51.0
55°	290.1	267.5	241.7	212.1	195.7	179.4	145.4	117.7	93.1	69.9	50.3
57.5°	294.5	271.9	246.1	215.9	199.5	182.5	147.9	118.9	93.8	69.9	49.7
60°	298.9	276.3	250.5	219.6	203.9	186.3	150.4	120.2	94.4	69.9	49.1
62.5°	302.7	280.0	254.2	223.4	207.0	189.4	152.9	120.8	94.4	69.2	48.5
65°	305.2	283.8	258.0	227.2	210.2	192.6	154.8	122.1	95.0	69.2	48.5
67.5°	307.7	287.0	261.2	230.3	214.0	195.7	157.3	123.3	95.7	69.2	47.8
70°	309.6	289.5	263.7	233.5	216.5	198.2	159.2	124.0	95.7	69.2	47.2
72.5°	310.9	291.4	265.6	236.0	218.4	200.1	161.1	125.2	95.7	68.6	47.2
75°	311.5	292.0	267.5	237.3	220.3	202.0	163.0	125.9	96.3	68.6	46.6
77.5°	311.5	293.3	268.7	239.1	222.2	203.9	164.3	126.5	96.3	68.6	46.6
80°	311.5	293.3	269.4	239.8	222.8	204.5	164.9	126.5	96.3	68.0	45.9
82.5°	310.3	293.3	270.0	241.0	223.4	205.2	166.1	127.1	95.7	68.0	45.9
85°	309.6	292.6	270.0	241.0	224.7	205.8	166.8	127.1	95.7	67.3	45.3
87.5°	308.4	292.6	270.0	241.0	224.7	205.8	166.8	127.1	95.0	66.7	45.3
90°	307.1	291.4	269.4	241.0	224.0	206.4	166.8	127.1	95.0	66.7	44.7
92.5°	305.2	290.1	268.7	239.8	224.0	205.8	166.8	127.1	95.0	66.7	44.7
95°	304.0	288.9	267.5	239.1	223.4	205.2	166.1	127.1	94.4	66.7	44.7
97.5°	302.1	287.6	266.2	238.5	222.2	204.5	165.5	127.1	94.4	66.7	44.7
100°	300.8	286.3	264.9	237.3	221.5	203.9	165.5	126.5	94.4	66.1	44.7
102.5°	299.6	285.1	263.7	236.0	219.6	202.0	163.6	125.9	94.4	66.7	44.7
105°	297.7	283.2	261.8	234.1	218.4	200.8	163.0	125.9	93.8	66.7	45.3
107.5°	296.4	281.3	259.9	232.2	216.5	199.5	161.7	124.6	93.8	66.7	45.3
110°	294.5	279.4	258.0	230.3	214.6	197.6	160.5	124.0	93.8	66.7	45.9



TEST NUMBER: P190077

CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
112.5°	292.6	276.9	254.9	227.2	212.1	195.1	158.6	123.3	93.1	66.7	45.9
115°	290.7	274.4	252.4	224.7	209.6	192.6	156.1	122.1	93.1	66.7	46.6
117.5°	288.2	271.9	249.2	222.2	206.4	190.1	154.2	121.5	92.5	67.3	47.2
120°	285.7	268.1	246.1	218.4	203.3	186.9	151.7	120.2	92.5	67.3	47.2
122.5°	282.6	264.9	242.3	214.6	199.5	183.8	149.1	118.3	91.3	67.3	47.8
125°	278.2	259.9	237.3	210.2	195.1	179.4	146.6	117.1	90.6	67.3	48.5
127.5°	274.4	255.5	232.8	205.2	190.7	175.6	143.5	115.2	90.0	67.3	49.1
130°	268.7	249.8	227.2	200.8	186.3	171.8	141.0	113.3	89.4	67.3	49.1
132.5°	263.7	244.2	221.5	195.1	181.9	167.4	137.8	112.0	88.7	67.3	49.7
135°	257.4	237.9	215.2	189.4	176.2	162.4	134.7	110.1	87.5	67.3	51.0
137.5°	249.8	230.3	208.3	183.8	171.2	156.7	131.5	108.2	86.8	68.0	51.6
140°	241.7	222.2	200.8	177.5	165.5	151.7	127.8	105.7	86.2	68.0	52.2
142.5°	232.2	214.0	192.6	170.5	158.0	146.0	124.0	103.8	85.0	68.0	52.9
145°	222.8	205.2	185.0	164.3	152.3	141.6	120.8	102.0	84.3	68.0	54.1
147.5°	214.0	196.3	177.5	156.1	146.6	136.6	117.7	100.1	83.7	68.6	55.4
150°	203.3	186.3	168.7	149.1	140.3	131.5	113.9	98.2	83.1	68.6	56.0
152.5°	191.3	176.2	159.2	142.2	134.7	125.9	110.8	95.7	81.8	68.6	57.3
155°	180.0	165.5	149.8	134.7	127.8	120.8	107.0	93.8	81.2	69.2	58.5
157.5°	168.0	154.8	141.6	129.0	122.1	115.8	103.8	91.9	80.6	69.9	59.8
160°	154.8	144.1	132.8	121.5	116.4	110.8	100.1	89.4	79.3	69.9	61.0
162.5°	142.9	134.0	124.0	115.2	110.1	105.7	96.3	87.5	78.7	69.9	62.3
165°	130.9	123.3	115.8	108.2	103.8	100.1	92.5	85.0	77.4	70.5	63.6
167.5°	120.2	113.9	107.6	102.0	98.8	95.0	88.7	82.4	76.8	70.5	64.8
170°	108.9	103.8	100.1	95.0	92.5	90.0	85.0	80.6	75.5	71.1	66.1
172.5°	98.2	94.4	91.9	88.7	86.8	85.0	81.2	77.4	74.3	70.5	67.3
175°	88.1	85.6	83.7	82.4	80.6	79.9	77.4	74.9	73.0	70.5	68.6
177.5°	78.7	77.4	76.8	76.1	75.5	74.9	73.6	73.0	71.7	71.1	69.9
180°	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9



TEST NUMBER: P190077

CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
0°	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
2.5°	73.0	71.7	70.5	69.2	68.6	68.0	66.7	64.8	64.2	63.6	62.3
5°	70.5	68.0	66.1	64.8	63.6	61.0	59.2	57.3	55.4	54.1	52.9
7.5°	68.6	64.8	61.7	59.8	58.5	55.4	52.9	50.3	47.8	46.6	44.7
10°	66.1	61.7	57.9	55.4	53.5	50.3	47.2	44.1	41.5	39.6	37.8
12.5°	63.6	58.5	53.5	51.0	49.1	45.3	41.5	38.4	35.9	33.4	31.5
15°	61.7	55.4	49.7	47.2	44.7	40.9	36.5	33.4	30.8	28.3	26.4
17.5°	59.2	52.2	46.6	44.1	40.9	36.5	32.7	28.9	26.4	24.5	22.7
20°	57.3	49.7	43.4	40.3	37.8	32.7	28.9	25.8	23.3	21.4	20.1
22.5°	54.8	46.6	40.3	37.1	34.0	29.6	25.8	22.7	20.8	19.5	18.3
25°	52.9	44.1	37.1	34.0	31.5	26.4	23.3	20.8	18.9	18.3	17.6
27.5°	51.0	42.2	34.6	31.5	28.3	23.9	20.8	18.9	17.6	17.0	16.4
30°	49.1	39.6	32.1	28.9	26.4	22.0	19.5	18.3	17.0	16.4	16.4
32.5°	47.2	37.8	30.2	27.1	24.5	20.8	18.3	17.0	16.4	16.4	17.0
35°	45.3	35.9	28.3	25.2	22.7	19.5	17.6	17.0	16.4	17.0	17.0
37.5°	44.1	34.0	26.4	23.9	21.4	18.9	17.6	17.0	17.0	17.0	17.0
40°	42.8	32.7	25.2	22.7	20.8	18.3	17.0	17.0	17.0	17.6	17.0
42.5°	41.5	30.8	23.9	21.4	19.5	17.6	17.0	17.0	17.6	17.6	16.4
45°	39.6	29.6	22.7	20.8	18.9	17.6	17.0	17.6	17.6	17.0	15.7
47.5°	39.0	28.9	22.0	20.1	18.9	17.6	17.0	17.6	17.6	16.4	15.1
50°	37.8	27.7	21.4	19.5	18.3	17.6	17.6	18.3	17.0	15.7	14.5
52.5°	37.1	26.4	20.8	18.9	18.3	17.6	17.6	18.3	17.0	15.1	13.2
55°	35.9	25.8	20.1	18.9	18.3	17.6	18.3	17.6	16.4	14.5	12.0
57.5°	35.2	25.2	19.5	18.9	17.6	17.6	18.3	17.6	15.7	13.8	11.3
60°	34.6	24.5	19.5	18.3	17.6	18.3	18.3	17.6	15.1	13.2	10.7
62.5°	34.0	23.9	19.5	18.3	18.3	18.3	18.9	17.0	14.5	12.0	10.1
65°	33.4	23.3	19.5	18.3	18.3	18.9	18.3	17.0	13.8	11.3	9.4
67.5°	32.7	23.3	18.9	18.3	18.3	18.9	18.3	16.4	13.8	10.7	8.8
70°	32.1	22.7	18.9	18.3	18.3	18.9	18.3	15.7	13.2	10.7	8.2
72.5°	32.1	22.7	18.9	18.3	18.3	18.9	18.3	15.7	12.6	10.1	7.6
75°	31.5	22.7	18.9	18.3	18.3	19.5	18.3	15.1	12.6	9.4	6.9
77.5°	31.5	22.0	18.9	18.3	18.3	19.5	18.3	15.1	12.0	9.4	6.9
80°	30.8	22.0	18.9	18.3	18.9	19.5	17.6	14.5	11.3	8.8	6.3
82.5°	30.8	22.0	18.9	18.3	18.9	19.5	17.6	14.5	11.3	8.2	6.3
85°	30.2	21.4	18.9	18.3	18.3	18.9	17.6	13.8	10.7	8.2	5.7
87.5°	30.2	21.4	18.3	18.3	18.3	18.9	17.0	13.8	10.7	7.6	5.7
90°	30.2	21.4	18.3	18.3	18.3	18.9	17.0	13.8	10.7	7.6	5.0
92.5°	30.2	21.4	18.9	18.3	18.3	18.9	17.0	13.8	10.7	7.6	5.7
95°	30.2	21.4	18.9	18.3	18.3	18.9	17.0	13.8	10.7	7.6	5.7
97.5°	30.2	21.4	18.3	18.3	18.3	18.9	17.0	13.8	10.7	7.6	5.7
100°	30.2	21.4	18.3	18.3	18.3	18.9	17.0	13.8	10.7	8.2	5.7
102.5°	30.2	21.4	18.3	18.3	18.3	18.9	17.6	14.5	10.7	8.2	5.7
105°	30.2	21.4	18.3	18.3	18.3	18.9	17.6	14.5	11.3	8.2	6.3
107.5°	30.8	22.0	18.3	18.3	18.3	18.9	17.6	14.5	11.3	8.8	6.3
110°	30.8	22.0	18.9	18.3	18.3	18.9	18.3	15.1	12.0	8.8	6.9



TEST NUMBER: P190077

CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
112.5°	31.5	22.0	18.9	18.3	18.3	18.9	18.3	15.7	12.6	9.4	6.9
115°	32.1	22.7	18.9	18.3	18.3	18.9	18.3	16.4	13.2	10.1	8.2
117.5°	32.7	23.3	19.5	18.3	18.3	18.9	18.9	17.0	13.8	11.3	8.8
120°	33.4	23.9	19.5	18.9	18.3	18.9	19.5	17.6	15.1	12.0	9.4
122.5°	34.0	23.9	19.5	18.9	18.3	18.9	19.5	18.3	15.7	12.6	10.7
125°	34.6	25.2	20.1	18.9	18.3	18.9	19.5	18.3	16.4	13.8	11.3
127.5°	35.2	25.8	20.1	18.9	18.9	18.3	19.5	18.9	17.6	15.1	12.6
130°	35.9	26.4	20.8	19.5	18.9	18.3	18.9	19.5	18.3	16.4	13.8
132.5°	37.1	27.1	21.4	19.5	18.9	18.3	18.9	19.5	18.9	17.0	15.1
135°	37.8	28.3	22.0	20.1	18.9	18.3	18.9	19.5	19.5	18.3	16.4
137.5°	39.0	29.6	22.7	20.8	19.5	18.3	18.3	18.9	19.5	18.9	17.6
140°	40.3	30.2	23.9	21.4	20.1	18.9	18.3	18.9	19.5	19.5	18.9
142.5°	40.9	32.1	25.2	22.7	20.8	18.9	18.3	18.3	18.9	19.5	19.5
145°	42.8	33.4	26.4	23.9	22.0	19.5	18.3	18.3	18.9	19.5	19.5
147.5°	44.1	35.2	28.3	25.2	23.3	20.1	18.9	18.3	18.3	18.9	19.5
150°	45.9	37.1	30.2	27.1	24.5	21.4	19.5	18.9	18.3	18.9	18.9
152.5°	47.2	39.0	32.1	28.9	26.4	22.7	20.8	18.9	18.9	18.9	18.9
155°	49.1	40.9	34.6	31.5	28.9	25.2	22.0	20.1	19.5	18.9	18.9
157.5°	51.0	43.4	37.1	34.6	32.1	27.7	24.5	22.0	20.1	19.5	18.9
160°	53.5	45.9	40.3	37.1	34.6	30.8	27.1	23.9	22.0	20.8	20.1
162.5°	55.4	49.1	43.4	40.9	38.4	34.0	30.2	27.7	25.2	23.3	22.0
165°	57.3	51.6	46.6	44.1	42.2	37.8	34.6	31.5	28.9	27.1	25.2
167.5°	59.8	54.8	50.3	47.8	45.9	42.2	39.0	36.5	34.0	31.5	30.2
170°	61.7	57.9	54.1	52.2	50.3	47.2	44.1	41.5	39.0	37.1	35.9
172.5°	63.6	60.4	57.9	56.0	54.8	52.2	49.7	47.2	45.3	44.1	42.2
175°	66.1	64.2	61.7	60.4	59.8	57.9	56.0	54.1	52.9	51.6	50.3
177.5°	68.6	67.3	66.1	65.4	65.4	64.2	62.9	62.3	61.0	60.4	60.4
180°	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9



TEST NUMBER: P190077

CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
0°	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
2.5°	61.0	60.4	61.0	60.4	59.8	59.2	58.5	59.2
5°	51.6	50.3	50.3	49.7	49.1	48.5	47.8	48.5
7.5°	43.4	41.5	41.5	40.9	39.6	39.6	38.4	39.0
10°	35.9	34.6	34.0	33.4	32.7	32.1	31.5	31.5
12.5°	29.6	28.3	27.7	27.1	26.4	25.8	25.2	25.2
15°	25.2	23.9	23.3	23.3	22.0	22.0	21.4	21.4
17.5°	21.4	20.8	20.1	20.1	19.5	18.9	18.9	18.9
20°	19.5	18.9	18.3	18.3	17.6	17.6	17.6	17.6
22.5°	17.6	17.0	17.0	17.0	17.0	16.4	16.4	16.4
25°	17.0	16.4	16.4	16.4	16.4	16.4	16.4	16.4
27.5°	16.4	16.4	16.4	16.4	16.4	17.0	17.0	16.4
30°	16.4	17.0	17.0	17.0	17.0	17.0	17.0	17.0
32.5°	17.0	17.0	17.0	17.0	17.0	16.4	16.4	16.4
35°	17.0	17.0	17.0	16.4	16.4	15.7	15.7	15.7
37.5°	17.0	16.4	16.4	15.7	15.1	14.5	14.5	14.5
40°	16.4	15.7	15.1	14.5	13.8	13.2	13.2	13.2
42.5°	15.7	14.5	13.8	13.8	12.6	12.0	11.3	11.3
45°	14.5	13.2	12.6	12.0	11.3	10.7	10.1	10.1
47.5°	13.8	12.6	12.0	11.3	10.1	9.4	8.8	8.8
50°	12.6	11.3	10.1	10.1	8.8	8.2	7.6	7.6
52.5°	11.3	10.1	9.4	8.8	7.6	6.9	6.3	6.3
55°	10.7	8.8	8.2	7.6	6.9	5.7	5.7	5.0
57.5°	9.4	8.2	6.9	6.3	5.7	5.0	4.4	4.4
60°	8.8	6.9	6.3	5.7	5.0	4.4	3.8	3.8
62.5°	8.2	6.3	5.7	5.0	4.4	3.1	3.1	3.1
65°	7.6	5.7	5.0	4.4	3.8	2.5	2.5	2.5
67.5°	6.9	5.0	4.4	3.8	3.1	2.5	1.9	1.9
70°	6.3	4.4	3.8	3.1	2.5	1.9	1.3	1.3
72.5°	5.7	4.4	3.8	3.1	1.9	1.3	1.3	1.3
75°	5.0	3.8	3.1	2.5	1.9	1.3	1.3	1.3
77.5°	5.0	3.1	3.1	2.5	1.9	1.3	1.9	1.3
80°	4.4	3.1	2.5	1.9	1.9	1.3	1.3	1.3
82.5°	4.4	3.1	2.5	1.9	1.3	1.3	1.3	1.3
85°	3.8	2.5	1.9	1.9	1.3	1.3	1.3	1.3
87.5°	3.8	1.9	1.9	1.3	1.3	1.3	1.3	1.3
90°	3.8	1.9	1.9	1.3	1.3	1.3	1.3	1.3
92.5°	3.8	2.5	1.9	1.3	1.3	1.3	1.3	1.3
95°	3.8	2.5	1.9	1.3	1.3	1.3	1.3	1.3
97.5°	3.8	2.5	1.9	1.3	1.3	1.3	1.3	1.3
100°	3.8	2.5	1.9	1.3	1.3	1.3	1.3	0.6
102.5°	3.8	2.5	1.9	1.3	1.3	0.6	0.6	0.6
105°	4.4	3.1	2.5	1.9	1.3	0.6	0.6	0.6
107.5°	4.4	3.1	2.5	1.9	1.3	0.6	0.6	0.6
110°	5.0	3.8	3.1	2.5	1.9	1.3	0.6	0.6



TEST NUMBER: P190077

CATALOG NUMBER: TRO11-LD4-15W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
112.5°	5.7	3.8	3.1	2.5	1.9	1.3	1.3	1.3
115°	6.3	4.4	3.8	3.8	2.5	1.9	1.9	1.9
117.5°	6.9	5.7	5.0	4.4	3.1	3.1	2.5	2.5
120°	7.6	6.3	5.7	5.0	4.4	3.8	3.1	3.1
122.5°	8.2	6.9	6.3	5.7	5.0	4.4	3.8	3.8
125°	9.4	7.6	6.9	6.3	5.7	5.0	4.4	4.4
127.5°	10.7	8.8	8.2	7.6	6.9	5.7	5.7	5.7
130°	12.0	10.1	9.4	8.8	7.6	6.9	6.3	6.3
132.5°	13.2	11.3	10.7	10.1	8.8	8.2	7.6	7.6
135°	15.1	13.2	12.6	12.0	10.7	9.4	9.4	9.4
137.5°	16.4	14.5	13.8	13.2	12.6	11.3	11.3	10.7
140°	17.6	16.4	15.7	15.1	14.5	13.2	13.2	13.2
142.5°	18.9	17.6	17.6	17.0	16.4	15.7	15.1	15.1
145°	19.5	19.5	18.9	18.9	18.3	17.6	17.0	17.0
147.5°	19.5	20.1	19.5	19.5	19.5	18.9	18.9	18.9
150°	19.5	19.5	20.1	20.1	20.1	20.1	19.5	19.5
152.5°	18.9	18.9	19.5	19.5	19.5	20.1	20.1	20.1
155°	18.9	18.9	18.9	18.9	18.9	18.9	18.9	19.5
157.5°	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
160°	19.5	18.9	18.9	18.9	18.9	18.9	18.9	18.9
162.5°	20.8	20.1	20.1	19.5	19.5	19.5	18.9	18.9
165°	23.9	22.7	22.7	22.0	21.4	21.4	20.8	20.8
167.5°	28.3	27.1	26.4	25.8	25.2	25.2	24.5	24.5
170°	34.0	32.7	32.1	31.5	30.8	30.8	30.2	30.2
172.5°	40.9	39.6	39.0	38.4	37.8	37.8	37.1	37.1
175°	49.1	47.8	47.8	47.8	46.6	46.6	45.9	45.9
177.5°	59.2	58.5	58.5	57.9	57.9	57.9	57.3	57.3
180°	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9

(END OF REPORT)