

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: P190104

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

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P190104  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P27868)  
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-CSTG  
Description: TERRAPIN 11" LED SHALLOW CAST WALL MOUNT WITH OPEN CLEAR LENS  
Light Source: (56) NICHIA 5000  
NF2L757DRT  
Ballast/Driver: OSRAM ELECTRONIC DRIVER PROGRAMMED AT 300mA  
OT25W/1

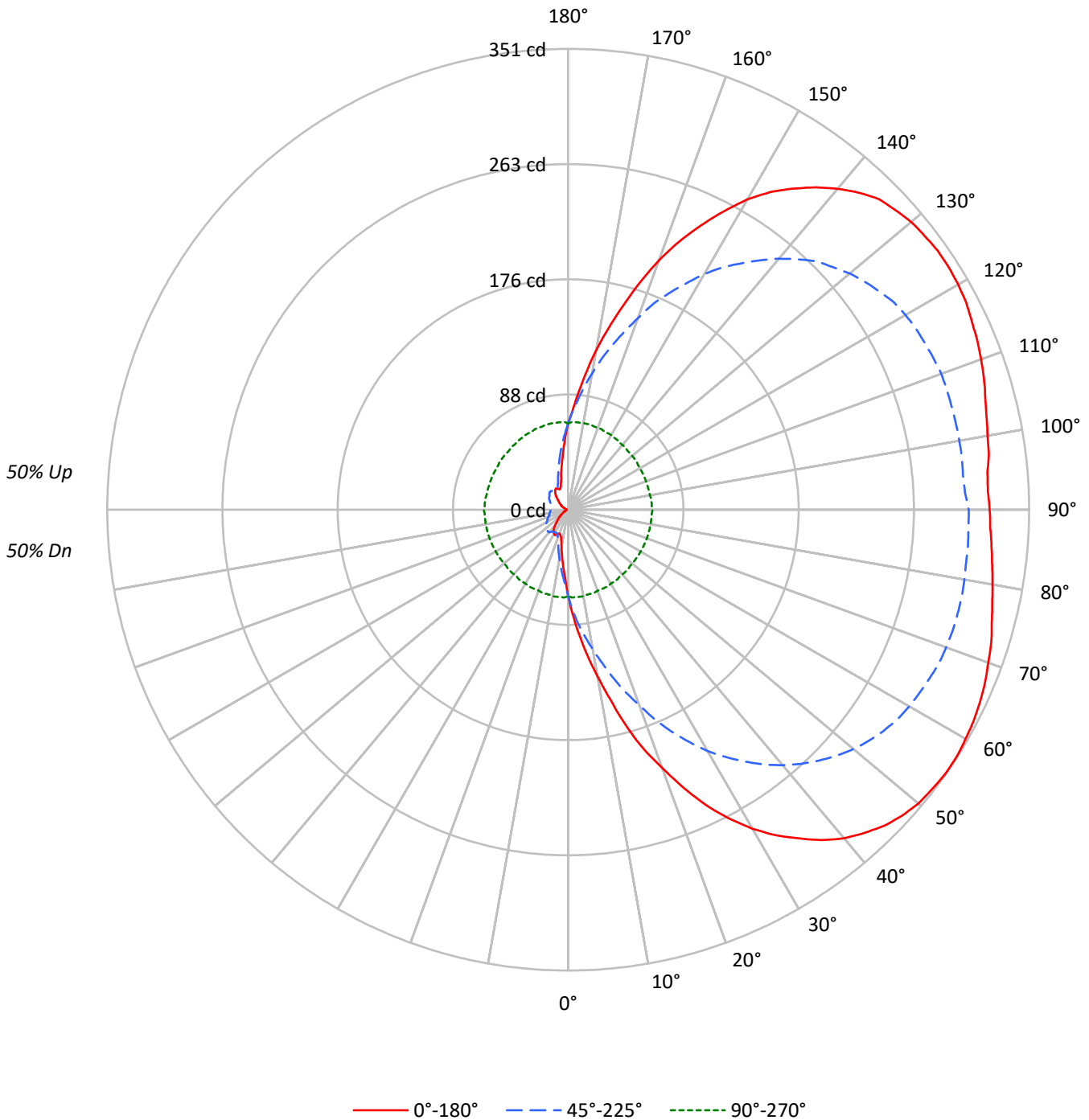
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 1621.0 lumens  
Efficiency: N/A  
Efficacy: 113.4 lumens/watt  
Spacing Criteria (0/90/45): 2.89 / 1.51 / 2.68  
Luminous Opening: Rectangular w/ Sides (W: 0.92' x L: 0.29' x H: 0.92')  
CIE Type: General Diffuse  
  
Input Watts (W): 14.3  
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	107	107	107	107	99	99	99	99	84	84	84	69	69	69	57	57	57	50
1	93	87	81	76	85	80	75	70	66	62	59	54	51	48	43	40	38	33
2	83	73	65	58	76	67	60	54	55	50	45	45	40	37	35	32	29	24
3	75	63	54	47	68	57	49	43	47	41	36	38	33	29	29	26	23	18
4	68	55	45	38	61	50	42	35	41	35	29	33	28	24	25	21	18	14
5	62	48	39	32	56	44	35	29	36	29	24	29	24	20	22	18	15	12
6	56	43	33	27	51	39	31	25	32	26	21	26	21	17	20	16	13	9
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	16	12	9	7
9	44	31	23	17	40	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	9	14	10	7	5

**AVERAGE LUMINANCE (cd/sqm):**

	0°	90°	180°
0°	2641	2641	2641
5°	3018	2486	1366
10°	3385	2325	763
15°	3858	2179	480
20°	4179	2061	386
25°	4474	1987	371
30°	4633	1916	350
35°	4693	1879	296
40°	4722	1837	223
45°	4678	1830	159
50°	4594	1820	119
55°	4484	1841	82
60°	4366	1877	56
65°	4260	1930	39
70°	4159	2001	23
75°	4080	2094	23
80°	4041	2214	23
85°	4048	2367	24



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	6.7	0.4
10°-20°	23.3	1.4
20°-30°	47.2	2.9
30°-40°	75.6	4.7
40°-50°	102.6	6.3
50°-60°	124.4	7.7
60°-70°	139.3	8.6
70°-80°	147.7	9.1
80°-90°	150.6	9.3
90°-100°	149.3	9.2
100°-110°	145.4	9.0
110°-120°	137.0	8.4
120°-130°	122.2	7.5
130°-140°	100.6	6.2
140°-150°	73.7	4.5
150°-160°	46.0	2.8
160°-170°	22.8	1.4
170°-180°	6.6	0.4
0°-30°	77.2	4.8
0°-40°	152.8	9.4
0°-60°	379.8	23.4
0°-90°	817.3	50.4
90°-120°	431.7	26.6
90°-150°	728.3	44.9
90°-180°	804.0	49.6
0°-180°	1621.0	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	66	66	66	66	66	
5°	95	87	67	50	43	10
15°	170	132	66	29	21	49
25°	248	187	66	20	21	115
35°	306	234	65	21	19	192
45°	340	270	64	22	12	263
55°	351	293	64	21	6	314
65°	346	304	64	17	3	343
75°	334	307	64	15	2	353
85°	324	306	64	14	2	265
90°	321	305	64	14	2	176
95°	320	302	64	14	2	263
105°	329	302	63	14	2	348
115°	339	300	63	15	4	337
125°	344	290	64	17	7	308
135°	335	268	64	19	12	258
145°	298	229	65	17	17	188
155°	239	182	66	19	17	111
165°	160	129	67	29	21	47
175°	89	84	67	50	44	10
180°	66	66	66	66	66	



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**CANDELA DISTRIBUTION (FULL):**

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6
2.5°	79.8	79.1	79.8	79.1	79.1	79.1	78.5	78.5	77.8	77.2	76.6
5°	95.2	94.6	94.6	93.9	93.3	92.6	91.4	91.4	90.1	88.1	86.9
7.5°	111.9	110.7	110.7	109.4	108.1	107.4	106.2	104.9	102.3	99.7	97.2
10°	128.7	128.0	128.0	126.1	124.2	123.5	121.6	119.0	115.8	111.9	108.1
12.5°	148.0	148.0	146.7	144.1	141.5	139.6	138.3	135.1	130.6	125.5	119.7
15°	170.5	169.2	167.9	165.3	160.8	158.3	157.0	151.8	146.0	140.3	132.5
17.5°	191.1	189.2	187.9	184.7	181.4	178.2	175.6	169.9	162.1	155.1	146.0
20°	209.1	208.5	207.2	203.3	199.4	196.2	193.0	186.6	178.2	169.9	158.3
22.5°	229.0	227.8	225.8	222.0	217.5	213.6	210.4	203.3	193.7	184.7	173.1
25°	248.3	246.4	244.5	240.0	234.8	231.6	227.8	219.4	209.1	199.4	186.6
27.5°	265.1	263.8	261.9	256.7	250.9	247.7	243.8	235.5	224.5	213.6	199.4
30°	280.5	279.2	277.3	272.2	267.0	262.5	258.6	249.6	238.1	226.5	212.3
32.5°	294.0	292.7	289.5	285.7	279.9	275.4	271.5	262.5	250.3	238.1	223.3
35°	305.6	305.0	302.4	297.9	292.7	288.2	283.7	274.7	262.5	249.6	234.2
37.5°	317.2	316.5	313.3	309.5	303.0	299.8	295.3	285.7	274.1	260.6	244.5
40°	326.8	325.6	322.3	318.5	312.7	309.5	305.0	295.3	283.7	270.2	254.1
42.5°	333.9	333.3	330.1	326.8	320.4	317.2	313.3	303.7	292.1	278.6	262.5
45°	340.4	339.1	336.5	332.6	327.5	324.3	320.4	311.4	299.8	286.9	270.2
47.5°	344.9	343.6	341.6	337.8	332.6	329.4	325.6	317.2	306.9	293.4	277.3
50°	348.1	346.8	344.9	341.6	337.1	333.9	330.1	322.3	312.0	299.2	283.7
52.5°	349.4	348.7	346.8	343.6	339.1	336.5	333.3	325.6	315.9	303.7	288.9
55°	350.6	349.4	348.1	344.9	341.0	338.4	335.2	328.1	319.1	308.2	293.4
57.5°	350.6	349.4	347.4	344.9	341.0	338.4	335.8	330.1	321.7	310.8	297.2
60°	349.4	348.1	346.8	344.2	341.0	338.4	335.8	330.1	323.0	312.7	299.8
62.5°	348.1	346.8	344.9	342.9	339.7	337.8	335.2	330.7	323.6	314.6	301.7
65°	346.1	344.9	343.6	341.6	338.4	336.5	334.6	330.1	323.6	315.3	303.7
67.5°	343.6	342.9	341.6	339.1	336.5	334.6	333.3	328.8	323.0	315.9	305.6
70°	340.4	340.4	339.1	337.1	334.6	332.6	331.3	327.5	322.3	315.3	306.3
72.5°	337.8	337.1	335.8	333.9	332.0	330.7	329.4	325.6	321.7	315.3	306.9
75°	333.9	333.3	332.6	330.7	329.4	328.1	326.8	323.6	319.8	314.6	306.9
77.5°	330.7	330.1	329.4	328.1	326.8	325.6	324.3	322.3	318.5	314.0	306.9
80°	328.1	327.5	326.8	325.6	324.3	323.0	322.3	320.4	317.2	313.3	306.3
82.5°	325.6	324.9	324.3	323.0	321.7	320.4	319.8	319.1	316.5	312.7	305.6
85°	323.6	323.6	322.3	321.0	319.8	319.1	318.5	317.2	315.3	311.4	305.6
87.5°	321.7	321.7	321.0	319.1	318.5	317.8	317.2	315.9	314.0	311.4	305.0
90°	321.0	320.4	319.8	318.5	317.8	317.2	316.5	315.9	314.0	310.8	305.0
92.5°	319.8	319.1	318.5	317.2	315.9	315.3	314.6	313.3	311.4	307.5	302.4
95°	320.4	320.4	319.8	317.8	317.2	315.9	315.3	314.0	312.0	308.2	301.7
97.5°	323.0	322.3	321.7	319.8	318.5	317.8	316.5	315.3	312.7	308.8	302.4
100°	324.3	323.6	323.0	321.0	319.8	319.1	318.5	315.9	313.3	309.5	302.4
102.5°	326.2	326.2	324.9	323.6	321.7	321.0	320.4	317.2	314.0	309.5	302.4
105°	328.8	328.8	327.5	326.2	324.3	323.6	322.3	319.1	315.3	310.1	302.4
107.5°	332.0	332.0	330.7	328.8	326.8	325.6	324.3	321.0	316.5	310.8	302.4
110°	334.6	334.6	333.3	331.3	328.8	328.1	326.2	322.3	317.8	311.4	302.4



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**CANDELA DISTRIBUTION (continued):**

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
112.5°	337.1	337.1	335.2	333.3	330.7	329.4	327.5	323.6	318.5	310.8	301.1
115°	339.1	339.1	337.8	335.2	332.6	330.7	328.8	324.3	318.5	310.8	299.8
117.5°	341.6	341.6	339.7	337.1	333.9	332.0	330.1	324.9	318.5	310.1	298.5
120°	342.9	342.3	341.0	338.4	334.6	332.6	330.7	324.9	317.8	308.8	296.6
122.5°	343.6	343.6	341.6	339.1	335.2	333.3	330.7	324.3	317.2	306.9	294.0
125°	343.6	342.9	341.0	338.4	334.6	332.0	329.4	323.0	314.6	303.0	289.5
127.5°	342.3	341.6	339.7	337.1	332.6	330.7	327.5	320.4	311.4	299.2	285.0
130°	341.0	339.7	338.4	334.6	330.7	328.1	324.9	317.2	306.9	294.7	279.9
132.5°	337.8	337.1	335.2	332.0	326.8	324.3	320.4	312.7	301.7	288.9	273.4
135°	334.6	333.3	330.7	328.1	323.0	319.8	315.9	307.5	296.0	283.1	267.6
137.5°	327.5	326.2	324.9	320.4	315.9	312.0	308.2	299.2	288.2	274.7	258.6
140°	319.1	317.8	315.3	311.4	306.9	303.0	299.2	290.2	278.6	264.4	249.6
142.5°	309.5	308.2	306.3	302.4	296.6	294.0	288.9	279.9	268.9	254.8	239.3
145°	298.5	298.5	296.0	291.5	286.3	282.4	278.6	269.6	258.0	244.5	229.0
147.5°	286.9	286.3	284.4	279.9	274.1	270.9	266.4	257.4	246.4	232.9	218.8
150°	272.8	272.2	269.6	265.7	259.9	256.7	252.9	243.8	233.5	220.7	207.2
152.5°	256.1	256.1	253.5	249.6	243.8	240.6	237.4	229.0	218.8	207.2	194.3
155°	238.7	238.7	236.1	232.9	227.8	224.5	220.7	213.6	204.6	193.7	182.1
157.5°	221.3	221.3	219.4	216.2	211.0	207.8	204.6	198.8	189.8	180.1	169.9
160°	202.0	202.0	200.1	197.5	193.0	190.4	187.2	182.1	174.4	166.0	155.1
162.5°	181.4	182.1	180.1	178.2	174.4	171.8	169.2	164.7	157.0	149.9	142.2
165°	160.2	160.2	159.6	157.6	154.4	152.5	150.6	146.0	141.5	135.8	129.3
167.5°	141.5	141.5	140.9	139.6	137.0	135.8	133.8	130.6	127.4	122.2	117.7
170°	123.5	122.9	122.9	122.2	120.3	119.0	117.7	116.5	113.2	109.4	105.5
172.5°	105.5	105.5	106.2	104.9	104.2	102.9	102.3	101.7	99.1	97.2	94.6
175°	89.4	89.4	90.1	89.4	88.8	88.1	88.1	87.5	86.2	84.9	83.6
177.5°	75.3	75.9	75.9	75.9	75.9	75.3	75.3	75.9	75.3	74.6	74.6
180°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6



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**CANDELA DISTRIBUTION (continued):**

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
0°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6
2.5°	75.9	74.6	74.0	72.7	72.7	71.4	70.8	69.5	68.2	66.9	65.6
5°	84.9	83.0	80.4	78.5	77.8	75.9	74.0	72.1	69.5	66.9	65.0
7.5°	94.6	90.7	87.5	84.3	83.0	81.1	77.2	74.0	70.1	66.9	63.7
10°	104.2	99.1	94.6	90.1	87.5	85.6	80.4	75.9	71.4	66.9	62.4
12.5°	114.5	108.7	102.3	96.5	93.3	90.1	83.6	77.8	72.1	66.3	61.1
15°	126.1	118.4	110.7	102.9	99.1	95.2	87.5	79.8	73.3	66.3	60.5
17.5°	137.7	128.0	119.0	109.4	104.9	99.7	90.7	82.4	74.0	66.3	59.2
20°	148.6	138.3	126.7	115.8	110.7	104.9	93.9	84.3	74.6	65.6	57.9
22.5°	159.6	148.0	135.1	122.9	115.8	109.4	97.8	86.2	75.3	65.6	56.6
25°	173.1	158.3	143.5	129.3	122.2	114.5	101.0	88.1	76.6	65.6	56.0
27.5°	184.7	169.9	152.5	136.4	128.0	120.3	104.9	90.1	77.2	65.6	54.7
30°	196.2	180.1	161.5	142.8	134.5	124.8	108.1	92.6	77.8	65.0	54.0
32.5°	205.9	189.2	169.9	149.3	139.6	130.0	111.3	93.9	78.5	65.0	52.8
35°	216.8	198.8	178.2	155.7	145.4	135.1	115.2	95.9	79.1	65.0	52.1
37.5°	226.5	207.2	185.9	162.8	151.2	139.6	118.4	97.8	80.4	64.3	51.5
40°	235.5	215.5	193.7	169.9	156.3	144.8	121.6	99.7	81.1	64.3	50.8
42.5°	243.8	223.3	200.1	175.6	162.1	149.3	124.8	101.7	81.7	64.3	49.5
45°	251.6	231.0	207.2	181.4	168.6	153.8	128.0	103.6	82.4	64.3	48.9
47.5°	258.6	237.4	213.0	186.6	173.7	157.6	130.6	105.5	83.0	63.7	48.3
50°	265.1	243.8	219.4	192.4	178.2	162.8	133.8	106.8	83.6	63.7	48.3
52.5°	270.2	249.0	224.5	196.2	182.1	167.3	136.4	108.7	84.3	63.7	47.6
55°	275.4	254.8	229.7	201.4	186.6	171.1	139.0	110.0	84.9	63.7	47.0
57.5°	279.9	258.6	233.5	205.2	190.4	174.4	141.5	111.9	85.6	63.7	46.3
60°	283.1	262.5	237.4	209.1	193.7	177.6	144.1	113.2	86.2	63.7	45.7
62.5°	285.7	265.7	241.3	212.3	196.9	180.8	146.0	114.5	86.9	63.7	45.7
65°	288.9	269.6	244.5	215.5	200.1	184.0	148.6	115.8	87.5	63.7	45.7
67.5°	290.8	271.5	247.7	218.8	203.3	186.6	150.6	117.1	87.5	63.7	45.0
70°	292.7	274.1	250.3	221.3	205.9	188.5	152.5	118.4	88.1	63.7	45.0
72.5°	294.0	276.0	252.2	223.3	207.8	191.1	153.8	119.7	88.8	63.7	44.4
75°	294.7	277.3	254.1	225.2	209.7	192.4	155.7	120.3	89.4	63.7	44.4
77.5°	294.7	277.9	255.4	226.5	211.0	194.3	156.3	121.6	89.4	63.7	44.4
80°	295.3	278.6	256.1	227.8	212.3	194.9	157.6	122.2	90.1	63.7	44.4
82.5°	295.3	279.2	256.7	228.4	213.0	195.6	158.3	122.2	90.1	63.7	44.4
85°	295.3	279.9	257.4	229.0	213.0	196.2	158.9	122.9	90.1	63.7	44.4
87.5°	295.3	279.9	257.4	229.7	213.6	196.9	158.9	123.5	90.7	63.7	44.4
90°	295.3	279.9	258.0	229.7	214.2	196.9	159.6	123.5	90.7	64.3	44.4
92.5°	292.1	277.3	255.4	228.4	212.3	195.6	159.6	122.2	90.1	63.7	43.8
95°	292.1	276.7	254.8	227.8	211.7	194.9	158.9	122.2	90.1	63.7	43.8
97.5°	292.1	276.7	254.8	227.1	211.0	194.3	158.3	121.6	89.4	63.7	43.8
100°	292.1	275.4	253.5	225.8	209.7	193.7	157.0	121.0	89.4	63.1	43.8
102.5°	291.5	274.7	252.9	224.5	209.1	191.7	155.7	120.3	88.8	63.1	43.8
105°	291.5	273.4	250.9	223.3	207.2	190.4	154.4	119.0	88.8	63.1	43.8
107.5°	290.2	272.2	249.6	222.0	205.2	189.2	153.1	118.4	88.1	63.1	43.8
110°	288.9	270.9	247.7	219.4	203.3	187.2	151.2	117.1	87.5	63.1	44.4





TEST NUMBER: P190104

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

**CANDELA DISTRIBUTION (continued):**

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
112.5°	287.6	268.3	245.1	216.8	200.7	184.0	149.3	115.8	86.9	63.1	44.4
115°	285.7	266.4	242.6	213.6	197.5	182.1	147.3	115.2	86.9	63.1	45.0
117.5°	283.7	263.1	239.3	210.4	194.9	179.5	145.4	113.9	86.2	63.1	45.0
120°	280.5	259.9	235.5	207.2	191.7	176.3	142.8	112.6	85.6	63.1	45.7
122.5°	277.3	256.1	231.6	203.3	187.9	173.1	140.9	110.7	84.9	63.1	46.3
125°	272.8	251.6	226.5	198.8	184.0	168.6	138.3	109.4	84.3	63.7	46.3
127.5°	267.6	245.8	222.0	194.3	179.5	164.7	135.1	108.1	83.6	63.7	47.0
130°	261.9	240.0	216.2	189.8	175.6	160.8	132.5	106.2	83.0	63.7	47.6
132.5°	255.4	234.2	209.7	184.7	170.5	156.3	130.0	104.9	82.4	63.7	48.3
135°	249.0	227.1	204.0	179.5	165.3	151.8	126.7	102.9	81.7	63.7	48.9
137.5°	240.6	219.4	196.9	173.7	160.2	147.3	123.5	101.0	81.1	64.3	49.5
140°	231.0	211.0	189.2	166.0	153.8	142.8	120.3	99.1	80.4	64.3	50.2
142.5°	222.0	202.7	182.1	160.2	148.6	137.7	117.1	97.2	79.8	64.3	51.5
145°	213.0	194.3	175.0	153.8	142.8	133.2	113.9	95.9	79.1	65.0	52.1
147.5°	203.3	185.3	166.6	147.3	137.7	128.7	110.7	93.9	78.5	65.0	53.4
150°	192.4	176.3	157.6	140.9	132.5	124.2	107.4	92.0	77.8	65.6	54.0
152.5°	180.8	165.3	149.3	134.5	126.1	119.0	104.2	89.4	77.2	65.6	54.7
155°	169.9	155.1	141.5	127.4	120.3	113.9	100.4	88.1	76.6	65.6	56.0
157.5°	157.6	145.4	133.8	121.6	115.2	109.4	97.2	86.2	75.9	66.3	57.3
160°	146.0	135.1	125.5	114.5	109.4	104.2	93.9	83.6	74.6	66.3	58.5
162.5°	134.5	125.5	117.1	108.1	103.6	99.1	90.1	81.7	74.0	66.3	59.2
165°	122.9	115.8	108.7	101.7	97.8	93.9	86.9	79.8	72.7	66.9	60.5
167.5°	112.6	106.8	101.7	95.2	92.6	89.4	83.6	77.8	72.1	66.9	61.8
170°	102.3	97.8	93.9	89.4	86.9	84.9	79.8	75.3	70.8	66.9	62.4
172.5°	92.0	88.8	86.2	83.0	81.1	79.8	76.6	73.3	70.1	66.9	63.7
175°	82.4	80.4	79.1	77.2	76.6	75.3	72.7	70.8	68.8	66.9	64.3
177.5°	74.0	73.3	72.7	71.4	71.4	70.8	70.1	68.8	67.6	66.9	65.6
180°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6



TEST NUMBER: P190104

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

**CANDELA DISTRIBUTION (continued):**

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
0°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6
2.5°	64.3	63.7	62.4	61.8	61.1	59.8	58.5	57.9	56.6	56.0	54.7
5°	62.4	60.5	58.5	57.3	56.6	54.7	52.8	51.5	49.5	48.3	47.0
7.5°	60.5	57.9	54.7	53.4	52.1	49.5	47.6	45.7	43.8	41.8	40.5
10°	58.5	54.7	51.5	49.5	48.3	45.0	42.5	39.9	38.0	36.0	34.7
12.5°	56.6	52.1	48.3	46.3	44.4	41.2	38.0	35.4	33.5	30.9	29.6
15°	54.7	49.5	45.0	43.1	40.5	37.3	34.1	31.5	29.0	27.0	25.7
17.5°	52.8	47.0	42.5	39.9	38.0	34.1	30.9	27.7	25.7	23.8	22.5
20°	50.8	45.0	39.2	36.7	34.7	30.9	27.7	25.1	23.2	21.9	20.6
22.5°	48.9	42.5	36.7	34.1	32.2	28.3	25.1	22.5	21.2	20.6	19.9
25°	47.6	40.5	34.7	32.2	29.6	25.7	23.2	21.2	19.9	19.9	19.9
27.5°	46.3	38.6	32.8	30.2	27.7	23.8	21.2	19.9	19.9	19.9	19.9
30°	44.4	36.7	30.9	28.3	25.7	22.5	20.6	19.9	19.9	19.9	20.6
32.5°	43.1	35.4	29.0	26.4	24.4	21.2	19.9	19.9	19.9	20.6	21.2
35°	41.8	34.1	27.7	25.1	23.2	20.6	19.9	19.9	20.6	21.9	21.9
37.5°	40.5	32.2	26.4	23.8	22.5	20.6	19.9	20.6	21.2	21.9	21.9
40°	39.9	31.5	25.1	23.2	21.2	19.9	20.6	21.2	22.5	22.5	21.9
42.5°	38.6	30.2	24.4	22.5	21.2	19.9	20.6	21.9	22.5	21.9	20.6
45°	38.0	29.0	23.2	21.9	20.6	20.6	21.2	22.5	22.5	21.2	19.9
47.5°	36.7	28.3	22.5	21.2	20.6	20.6	21.9	23.2	22.5	20.6	18.7
50°	36.0	27.7	22.5	21.2	20.6	20.6	22.5	23.2	21.9	19.9	17.4
52.5°	35.4	27.0	21.9	20.6	20.6	21.2	23.2	23.2	21.2	18.7	16.1
55°	34.7	26.4	21.9	20.6	20.6	21.9	23.2	22.5	20.6	17.4	14.8
57.5°	34.1	25.7	21.2	20.6	20.6	21.9	23.2	22.5	19.9	16.7	13.5
60°	33.5	25.1	21.2	20.6	20.6	22.5	23.8	21.9	18.7	16.1	12.9
62.5°	32.8	24.4	21.2	20.6	21.2	23.2	23.2	21.2	18.0	14.8	12.2
65°	32.8	24.4	21.2	20.6	21.2	23.2	23.2	21.2	17.4	14.2	10.9
67.5°	32.2	23.8	21.2	20.6	21.2	23.2	23.2	20.6	16.7	13.5	10.3
70°	32.2	23.8	21.2	21.2	21.9	23.8	23.2	19.9	16.1	12.9	10.3
72.5°	31.5	23.8	20.6	21.2	21.9	23.8	22.5	19.3	15.4	12.2	9.7
75°	31.5	23.8	21.2	21.2	21.9	23.8	22.5	18.7	14.8	11.6	9.0
77.5°	31.5	23.2	21.2	21.2	21.9	23.8	21.9	18.7	14.8	11.6	9.0
80°	30.9	23.2	21.2	21.2	21.9	23.8	21.9	18.0	14.2	10.9	8.4
82.5°	30.9	23.2	21.2	21.2	22.5	23.8	21.9	18.0	14.2	10.9	7.7
85°	30.9	23.2	20.6	21.2	21.9	23.8	21.9	17.4	13.5	10.3	7.7
87.5°	30.9	23.2	20.6	21.2	21.9	23.8	21.2	17.4	13.5	10.3	7.7
90°	30.9	23.2	20.6	21.2	21.9	23.2	21.2	17.4	13.5	10.3	7.7
92.5°	30.9	23.2	20.6	20.6	21.9	23.2	21.2	17.4	13.5	10.3	7.7
95°	30.9	23.2	20.6	20.6	21.9	23.2	21.2	17.4	13.5	10.3	7.7
97.5°	30.9	23.2	20.6	20.6	21.2	22.5	20.6	17.4	13.5	10.3	7.7
100°	30.9	23.2	19.9	20.6	21.2	22.5	20.6	17.4	13.5	10.3	7.7
102.5°	30.9	23.2	19.9	19.9	20.6	21.9	20.6	17.4	13.5	10.3	7.7
105°	30.9	23.2	19.9	19.9	20.6	21.9	20.6	17.4	13.5	10.3	7.7
107.5°	30.9	23.2	19.9	19.9	20.6	21.9	20.6	17.4	14.2	10.9	8.4
110°	31.5	23.2	19.9	19.3	19.9	21.2	20.6	18.0	14.2	10.9	8.4



TEST NUMBER: P190104

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

**CANDELA DISTRIBUTION (continued):**

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
112.5°	31.5	23.2	19.9	19.3	19.3	21.2	20.6	18.0	14.8	11.6	9.0
115°	32.2	23.8	19.9	19.3	19.3	20.6	20.6	18.0	15.4	12.2	9.7
117.5°	32.8	24.4	19.9	19.3	19.3	20.6	20.6	18.7	16.1	12.9	10.9
120°	32.8	24.4	19.9	19.3	19.3	19.9	20.6	19.3	16.7	14.2	11.6
122.5°	33.5	25.1	20.6	19.3	18.7	19.3	20.6	19.3	17.4	14.8	12.2
125°	34.1	25.7	20.6	19.3	18.7	19.3	19.9	19.3	17.4	15.4	13.5
127.5°	34.7	26.4	21.2	19.3	18.7	18.7	19.9	19.9	18.0	16.1	14.2
130°	35.4	27.0	21.2	19.9	18.7	18.7	19.3	19.3	18.7	17.4	15.4
132.5°	36.7	27.7	21.9	19.9	19.3	18.0	18.7	19.3	19.3	18.0	16.1
135°	37.3	29.0	22.5	20.6	19.3	18.0	18.0	19.3	19.3	18.7	17.4
137.5°	38.6	29.6	23.8	21.2	19.9	18.0	18.0	18.7	19.3	18.7	18.0
140°	39.2	30.9	24.4	22.5	20.6	18.7	18.0	18.0	18.7	18.7	18.7
142.5°	40.5	32.2	25.7	23.2	21.2	18.7	18.0	17.4	18.0	18.7	18.7
145°	41.8	33.5	27.0	24.4	22.5	19.9	18.0	17.4	17.4	18.0	18.7
147.5°	43.1	35.4	29.0	26.4	23.8	20.6	18.7	18.0	17.4	17.4	18.0
150°	45.0	36.7	30.2	27.7	25.7	21.9	19.3	18.0	17.4	17.4	17.4
152.5°	46.3	38.6	32.2	29.6	27.7	23.8	20.6	19.3	18.0	17.4	17.4
155°	47.6	40.5	34.7	32.2	29.6	25.7	22.5	20.6	18.7	18.0	17.4
157.5°	49.5	43.1	36.7	34.7	32.2	28.3	25.1	21.9	20.6	19.3	18.7
160°	51.5	45.0	39.2	37.3	34.7	30.9	27.7	24.4	22.5	20.6	19.9
162.5°	53.4	47.6	42.5	39.9	38.0	34.1	30.9	27.7	25.7	23.8	22.5
165°	54.7	50.2	45.0	43.1	41.2	38.0	34.7	31.5	29.0	27.0	25.7
167.5°	56.6	52.8	48.3	46.3	45.0	41.8	38.6	36.0	33.5	31.5	30.2
170°	58.5	55.3	52.1	50.2	48.9	45.7	43.1	40.5	38.6	36.7	35.4
172.5°	60.5	57.9	55.3	54.0	52.8	50.8	48.3	46.3	44.4	42.5	41.2
175°	62.4	60.5	58.5	57.9	57.3	55.3	54.0	52.1	50.2	49.5	48.9
177.5°	65.0	63.7	63.1	62.4	62.4	61.1	60.5	59.2	57.9	57.3	57.3
180°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6



TEST NUMBER: P190104

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

**CANDELA DISTRIBUTION (continued):**

	150°	155°	157.5°	160°	165°	170°	175°	180°
0°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6
2.5°	54.0	53.4	52.8	52.8	52.1	52.1	52.1	52.1
5°	45.7	45.0	44.4	44.4	43.8	43.1	43.1	43.1
7.5°	39.2	38.0	37.3	37.3	36.0	36.0	36.0	35.4
10°	32.8	32.2	30.9	30.9	30.2	29.6	29.6	29.0
12.5°	28.3	27.0	26.4	26.4	25.1	25.1	24.4	24.4
15°	24.4	23.2	23.2	22.5	21.9	21.9	21.9	21.2
17.5°	21.9	21.2	20.6	20.6	20.6	19.9	19.9	19.9
20°	20.6	19.9	19.9	19.9	19.3	19.3	19.3	19.3
22.5°	19.9	19.9	19.9	19.3	19.9	19.9	19.9	19.9
25°	19.9	19.9	19.9	19.9	20.6	20.6	20.6	20.6
27.5°	19.9	20.6	21.2	21.2	21.2	21.2	21.9	21.9
30°	21.2	21.9	21.9	21.9	21.9	21.9	21.9	21.2
32.5°	21.9	21.9	21.9	21.9	21.2	21.2	20.6	20.6
35°	21.9	21.2	21.2	20.6	19.9	19.9	19.3	19.3
37.5°	21.2	20.6	19.9	19.3	18.7	18.0	17.4	17.4
40°	20.6	19.3	18.7	18.0	16.7	16.1	15.4	15.4
42.5°	19.3	18.0	16.7	16.1	14.8	14.2	13.5	13.5
45°	18.0	16.1	15.4	14.8	13.5	12.2	11.6	11.6
47.5°	16.1	14.8	13.5	12.9	11.6	10.9	10.3	10.3
50°	14.8	12.9	12.2	11.6	10.3	9.7	9.0	9.0
52.5°	13.5	11.6	10.9	10.3	9.0	7.7	7.7	7.1
55°	12.2	10.3	9.7	9.0	7.7	7.1	6.4	6.4
57.5°	11.6	9.7	8.4	7.7	6.4	5.8	5.1	5.1
60°	10.3	8.4	7.7	7.1	5.8	5.1	4.5	4.5
62.5°	9.7	7.7	7.1	6.4	5.1	4.5	3.9	3.9
65°	9.0	7.1	6.4	5.8	4.5	3.9	3.2	3.2
67.5°	8.4	6.4	5.8	5.1	3.9	3.2	2.6	2.6
70°	7.7	5.8	5.1	4.5	3.9	2.6	2.6	1.9
72.5°	7.1	5.8	5.1	4.5	3.2	2.6	1.9	1.9
75°	7.1	5.1	4.5	3.9	3.2	2.6	1.9	1.9
77.5°	6.4	5.1	4.5	3.9	2.6	1.9	1.9	1.9
80°	6.4	4.5	3.9	3.2	2.6	1.9	1.9	1.9
82.5°	5.8	4.5	3.9	3.2	2.6	1.9	1.9	1.9
85°	5.8	3.9	3.2	3.2	2.6	1.9	1.9	1.9
87.5°	5.8	3.9	3.2	2.6	1.9	1.9	1.9	1.9
90°	5.8	3.9	3.2	2.6	1.9	1.9	1.9	1.9
92.5°	5.8	3.9	3.2	2.6	1.9	1.9	1.9	1.3
95°	5.8	3.9	3.2	3.2	1.9	1.9	1.9	1.9
97.5°	5.8	3.9	3.2	3.2	2.6	1.9	1.9	1.9
100°	5.8	3.9	3.9	3.2	2.6	1.9	1.9	1.3
102.5°	5.8	4.5	3.9	3.2	2.6	1.9	1.9	1.9
105°	6.4	4.5	3.9	3.9	2.6	2.6	1.9	1.9
107.5°	6.4	5.1	4.5	3.9	3.2	2.6	2.6	1.9
110°	6.4	5.1	4.5	4.5	3.2	3.2	2.6	2.6



TEST NUMBER: P190104

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

**CANDELA DISTRIBUTION (continued):**

	150°	155°	157.5°	160°	165°	170°	175°	180°
112.5°	7.1	5.8	5.1	4.5	3.9	3.2	3.2	3.2
115°	7.7	6.4	5.8	5.8	4.5	4.5	3.9	3.9
117.5°	8.4	7.1	6.4	6.4	5.8	5.1	5.1	5.1
120°	9.7	7.7	7.7	7.1	6.4	5.8	5.8	5.8
122.5°	10.3	9.0	8.4	7.7	7.1	6.4	6.4	6.4
125°	10.9	9.7	9.0	9.0	7.7	7.7	7.1	7.1
127.5°	12.2	10.9	10.3	9.7	9.0	8.4	8.4	8.4
130°	13.5	12.2	11.6	10.9	10.3	9.7	9.7	9.0
132.5°	14.8	12.9	12.9	12.2	11.6	10.9	10.9	10.3
135°	15.4	14.2	13.5	13.5	12.9	12.2	12.2	11.6
137.5°	16.7	15.4	14.8	14.8	14.2	13.5	13.5	13.5
140°	17.4	16.7	16.1	16.1	15.4	14.8	14.8	14.8
142.5°	18.0	17.4	17.4	17.4	16.7	16.1	16.1	16.1
145°	18.7	18.0	18.0	18.0	18.0	17.4	17.4	17.4
147.5°	18.7	18.7	18.7	18.7	18.7	18.0	18.0	18.0
150°	18.0	18.0	18.0	18.0	18.7	18.7	18.7	18.7
152.5°	17.4	17.4	17.4	17.4	18.0	18.0	18.0	18.0
155°	17.4	17.4	17.4	16.7	17.4	17.4	17.4	17.4
157.5°	18.0	17.4	17.4	17.4	17.4	17.4	16.7	16.7
160°	18.7	18.0	18.0	18.0	17.4	17.4	17.4	17.4
162.5°	21.2	19.9	19.9	19.3	19.3	18.7	18.7	18.7
165°	24.4	23.2	22.5	22.5	21.9	21.2	21.2	21.2
167.5°	29.0	27.0	27.0	26.4	25.7	25.1	25.1	24.4
170°	34.1	32.2	32.2	31.5	30.9	30.2	30.2	30.2
172.5°	40.5	38.6	38.6	38.0	37.3	36.7	36.7	36.0
175°	47.0	46.3	46.3	45.7	45.0	44.4	44.4	43.8
177.5°	56.0	55.3	55.3	55.3	54.7	54.7	54.7	54.0
180°	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6

(END OF REPORT)