

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: P190103

Luminaire Tested: **TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG**

Issue Date: 3/3/2020



Test Information

Test Method: LM-79-08
Report Number: P190103
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-LD4-20W-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 450mA
OT40W/1

Summary

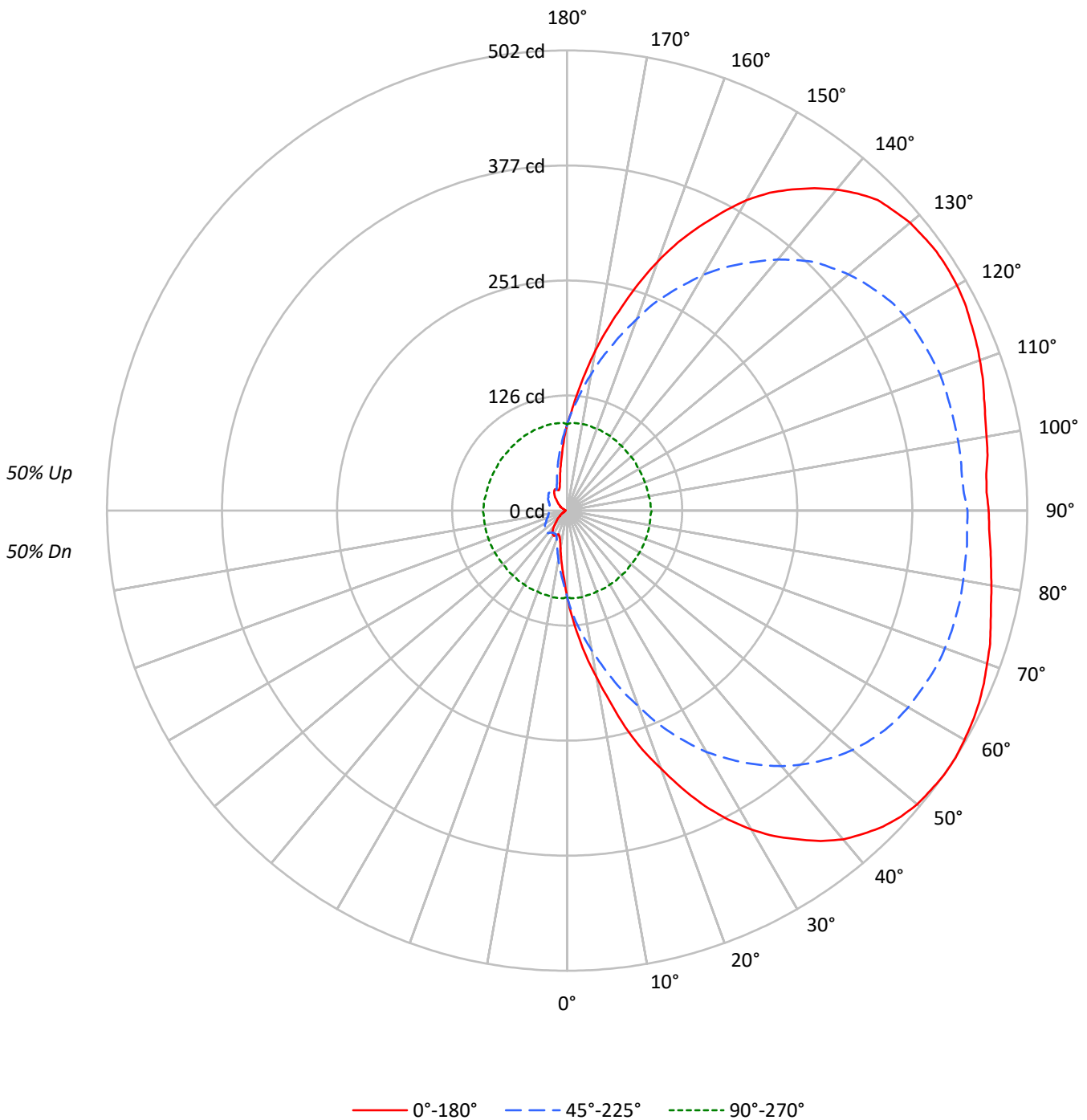
Lumens per Lamp: N/A
Luminaire Lumens: 2322.0 lumens
Efficiency: N/A
Efficacy: 106.0 lumens/watt
Spacing Criteria (0/90/45): 2.89 / 1.51 / 2.68
Luminous Opening: Rectangular w/ Sides (W: 0.92' x L: 0.29' x H: 0.92')
CIE Type: General Diffuse

Input Watts (W): 21.9
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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CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

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°	3784	3784	3784
5°	4324	3560	1956
10°	4848	3329	1092
15°	5525	3120	688
20°	5985	2953	552
25°	6409	2848	532
30°	6637	2744	502
35°	6723	2691	424
40°	6765	2635	319
45°	6700	2625	228
50°	6581	2606	170
55°	6424	2636	118
60°	6253	2688	81
65°	6102	2763	57
70°	5956	2865	34
75°	5845	2998	34
80°	5789	3169	34
85°	5800	3389	35



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	9.5	0.4
10°-20°	33.4	1.4
20°-30°	67.6	2.9
30°-40°	108.3	4.7
40°-50°	147.0	6.3
50°-60°	178.2	7.7
60°-70°	199.5	8.6
70°-80°	211.5	9.1
80°-90°	215.7	9.3
90°-100°	213.9	9.2
100°-110°	208.3	9.0
110°-120°	196.2	8.4
120°-130°	175.1	7.5
130°-140°	144.2	6.2
140°-150°	105.6	4.5
150°-160°	65.9	2.8
160°-170°	32.7	1.4
170°-180°	9.4	0.4
0°-30°	110.6	4.8
0°-40°	218.9	9.4
0°-60°	544.1	23.4
0°-90°	1170.8	50.4
90°-120°	618.4	26.6
90°-150°	1043.3	44.9
90°-180°	1151.0	49.6
0°-180°	2322.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	94	94	94	94	94	
5°	136	124	96	71	62	14
15°	244	190	95	42	30	71
25°	356	267	94	29	30	165
35°	438	336	93	30	28	275
45°	488	387	92	32	17	377
55°	502	420	91	30	9	450
65°	496	435	91	25	5	491
75°	478	440	91	21	3	506
85°	464	438	91	19	3	380
90°	460	437	92	19	3	252
95°	459	432	91	19	3	377
105°	471	433	90	19	3	499
115°	486	430	90	22	6	482
125°	492	415	91	25	10	441
135°	479	383	91	28	17	369
145°	428	328	93	25	25	269
155°	342	261	94	27	25	159
165°	230	185	96	42	30	67
175°	128	120	96	72	63	14
180°	94	94	94	94	94	



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CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
2.5°	114.3	113.4	114.3	113.4	113.4	113.4	112.4	112.4	111.5	110.6	109.7
5°	136.4	135.5	135.5	134.6	133.6	132.7	130.9	130.9	129.0	126.3	124.4
7.5°	160.4	158.5	158.5	156.7	154.8	153.9	152.1	150.2	146.5	142.9	139.2
10°	184.3	183.4	183.4	180.6	177.9	177.0	174.2	170.5	165.9	160.4	154.8
12.5°	212.0	212.0	210.1	206.4	202.8	200.0	198.1	193.5	187.1	179.7	171.4
15°	244.2	242.4	240.5	236.9	230.4	226.7	224.9	217.5	209.2	200.9	189.9
17.5°	273.7	271.0	269.1	264.5	259.9	255.3	251.6	243.3	232.2	222.1	209.2
20°	299.5	298.6	296.8	291.2	285.7	281.1	276.5	267.3	255.3	243.3	226.7
22.5°	328.1	326.3	323.5	318.0	311.5	306.0	301.4	291.2	277.4	264.5	247.9
25°	355.7	353.0	350.2	343.8	336.4	331.8	326.3	314.3	299.5	285.7	267.3
27.5°	379.7	377.9	375.1	367.7	359.4	354.8	349.3	337.3	321.6	306.0	285.7
30°	401.8	400.0	397.2	389.8	382.5	376.0	370.5	357.6	341.0	324.4	304.1
32.5°	421.2	419.3	414.7	409.2	400.9	394.5	388.9	376.0	358.5	341.0	319.8
35°	437.8	436.8	433.2	426.7	419.3	412.9	406.4	393.5	376.0	357.6	335.5
37.5°	454.4	453.4	448.8	443.3	434.1	429.5	423.0	409.2	392.6	373.3	350.2
40°	468.2	466.3	461.7	456.2	447.9	443.3	436.8	423.0	406.4	387.1	364.0
42.5°	478.3	477.4	472.8	468.2	459.0	454.4	448.8	435.0	418.4	399.1	376.0
45°	487.5	485.7	482.0	476.5	469.1	464.5	459.0	446.1	429.5	411.0	387.1
47.5°	494.0	492.1	489.4	483.8	476.5	471.9	466.3	454.4	439.6	420.3	397.2
50°	498.6	496.8	494.0	489.4	482.9	478.3	472.8	461.7	447.0	428.6	406.4
52.5°	500.4	499.5	496.8	492.1	485.7	482.0	477.4	466.3	452.5	435.0	413.8
55°	502.3	500.4	498.6	494.0	488.5	484.8	480.2	470.0	457.1	441.5	420.3
57.5°	502.3	500.4	497.7	494.0	488.5	484.8	481.1	472.8	460.8	445.1	425.8
60°	500.4	498.6	496.8	493.1	488.5	484.8	481.1	472.8	462.7	447.9	429.5
62.5°	498.6	496.8	494.0	491.2	486.6	483.8	480.2	473.7	463.6	450.7	432.2
65°	495.8	494.0	492.1	489.4	484.8	482.0	479.2	472.8	463.6	451.6	435.0
67.5°	492.1	491.2	489.4	485.7	482.0	479.2	477.4	470.9	462.7	452.5	437.8
70°	487.5	487.5	485.7	482.9	479.2	476.5	474.6	469.1	461.7	451.6	438.7
72.5°	483.8	482.9	481.1	478.3	475.6	473.7	471.9	466.3	460.8	451.6	439.6
75°	478.3	477.4	476.5	473.7	471.9	470.0	468.2	463.6	458.0	450.7	439.6
77.5°	473.7	472.8	471.9	470.0	468.2	466.3	464.5	461.7	456.2	449.7	439.6
80°	470.0	469.1	468.2	466.3	464.5	462.7	461.7	459.0	454.4	448.8	438.7
82.5°	466.3	465.4	464.5	462.7	460.8	459.0	458.0	457.1	453.4	447.9	437.8
85°	463.6	463.6	461.7	459.9	458.0	457.1	456.2	454.4	451.6	446.1	437.8
87.5°	460.8	460.8	459.9	457.1	456.2	455.3	454.4	452.5	449.7	446.1	436.8
90°	459.9	459.0	458.0	456.2	455.3	454.4	453.4	452.5	449.7	445.1	436.8
92.5°	458.0	457.1	456.2	454.4	452.5	451.6	450.7	448.8	446.1	440.5	433.2
95°	459.0	459.0	458.0	455.3	454.4	452.5	451.6	449.7	447.0	441.5	432.2
97.5°	462.7	461.7	460.8	458.0	456.2	455.3	453.4	451.6	447.9	442.4	433.2
100°	464.5	463.6	462.7	459.9	458.0	457.1	456.2	452.5	448.8	443.3	433.2
102.5°	467.3	467.3	465.4	463.6	460.8	459.9	459.0	454.4	449.7	443.3	433.2
105°	470.9	470.9	469.1	467.3	464.5	463.6	461.7	457.1	451.6	444.2	433.2
107.5°	475.6	475.6	473.7	470.9	468.2	466.3	464.5	459.9	453.4	445.1	433.2
110°	479.2	479.2	477.4	474.6	470.9	470.0	467.3	461.7	455.3	446.1	433.2



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
112.5°	482.9	482.9	480.2	477.4	473.7	471.9	469.1	463.6	456.2	445.1	431.3
115°	485.7	485.7	483.8	480.2	476.5	473.7	470.9	464.5	456.2	445.1	429.5
117.5°	489.4	489.4	486.6	482.9	478.3	475.6	472.8	465.4	456.2	444.2	427.6
120°	491.2	490.3	488.5	484.8	479.2	476.5	473.7	465.4	455.3	442.4	424.9
122.5°	492.1	492.1	489.4	485.7	480.2	477.4	473.7	464.5	454.4	439.6	421.2
125°	492.1	491.2	488.5	484.8	479.2	475.6	471.9	462.7	450.7	434.1	414.7
127.5°	490.3	489.4	486.6	482.9	476.5	473.7	469.1	459.0	446.1	428.6	408.3
130°	488.5	486.6	484.8	479.2	473.7	470.0	465.4	454.4	439.6	422.1	400.9
132.5°	483.8	482.9	480.2	475.6	468.2	464.5	459.0	447.9	432.2	413.8	391.7
135°	479.2	477.4	473.7	470.0	462.7	458.0	452.5	440.5	423.9	405.5	383.4
137.5°	469.1	467.3	465.4	459.0	452.5	447.0	441.5	428.6	412.9	393.5	370.5
140°	457.1	455.3	451.6	446.1	439.6	434.1	428.6	415.6	399.1	378.8	357.6
142.5°	443.3	441.5	438.7	433.2	424.9	421.2	413.8	400.9	385.2	365.0	342.8
145°	427.6	427.6	423.9	417.5	410.1	404.6	399.1	386.2	369.6	350.2	328.1
147.5°	411.0	410.1	407.4	400.9	392.6	388.0	381.5	368.6	353.0	333.6	313.3
150°	390.8	389.8	386.2	380.6	372.3	367.7	362.2	349.3	334.5	316.1	296.8
152.5°	366.8	366.8	363.1	357.6	349.3	344.7	340.1	328.1	313.3	296.8	278.3
155°	341.9	341.9	338.2	333.6	326.3	321.6	316.1	306.0	293.1	277.4	260.8
157.5°	317.0	317.0	314.3	309.7	302.3	297.7	293.1	284.8	271.9	258.1	243.3
160°	289.4	289.4	286.6	282.9	276.5	272.8	268.2	260.8	249.8	237.8	222.1
162.5°	259.9	260.8	258.1	255.3	249.8	246.1	242.4	235.9	224.9	214.7	203.7
165°	229.5	229.5	228.6	225.8	221.2	218.4	215.7	209.2	202.8	194.5	185.2
167.5°	202.8	202.8	201.8	200.0	196.3	194.5	191.7	187.1	182.5	175.1	168.7
170°	177.0	176.0	176.0	175.1	172.3	170.5	168.7	166.8	162.2	156.7	151.1
172.5°	151.1	151.1	152.1	150.2	149.3	147.5	146.5	145.6	141.9	139.2	135.5
175°	128.1	128.1	129.0	128.1	127.2	126.3	126.3	125.3	123.5	121.7	119.8
177.5°	107.8	108.8	108.8	108.8	108.8	107.8	107.8	108.8	107.8	106.9	106.9
180°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
0°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
2.5°	108.8	106.9	106.0	104.1	104.1	102.3	101.4	99.5	97.7	95.8	94.0
5°	121.7	118.9	115.2	112.4	111.5	108.8	106.0	103.2	99.5	95.8	93.1
7.5°	135.5	129.9	125.3	120.7	118.9	116.1	110.6	106.0	100.5	95.8	91.2
10°	149.3	141.9	135.5	129.0	125.3	122.6	115.2	108.8	102.3	95.8	89.4
12.5°	164.0	155.8	146.5	138.2	133.6	129.0	119.8	111.5	103.2	94.9	87.6
15°	180.6	169.6	158.5	147.5	141.9	136.4	125.3	114.3	105.1	94.9	86.6
17.5°	197.2	183.4	170.5	156.7	150.2	142.9	129.9	118.0	106.0	94.9	84.8
20°	212.9	198.1	181.6	165.9	158.5	150.2	134.6	120.7	106.9	94.0	82.9
22.5°	228.6	212.0	193.5	176.0	165.9	156.7	140.1	123.5	107.8	94.0	81.1
25°	247.9	226.7	205.5	185.2	175.1	164.0	144.7	126.3	109.7	94.0	80.2
27.5°	264.5	243.3	218.4	195.4	183.4	172.3	150.2	129.0	110.6	94.0	78.3
30°	281.1	258.1	231.3	204.6	192.6	178.8	154.8	132.7	111.5	93.1	77.4
32.5°	294.9	271.0	243.3	213.8	200.0	186.2	159.4	134.6	112.4	93.1	75.6
35°	310.6	284.8	255.3	223.0	208.3	193.5	165.0	137.3	113.4	93.1	74.7
37.5°	324.4	296.8	266.3	233.2	216.6	200.0	169.6	140.1	115.2	92.2	73.7
40°	337.3	308.7	277.4	243.3	224.0	207.4	174.2	142.9	116.1	92.2	72.8
42.5°	349.3	319.8	286.6	251.6	232.2	213.8	178.8	145.6	117.0	92.2	71.0
45°	360.4	330.9	296.8	259.9	241.5	220.3	183.4	148.4	118.0	92.2	70.0
47.5°	370.5	340.1	305.1	267.3	248.8	225.8	187.1	151.1	118.9	91.2	69.1
50°	379.7	349.3	314.3	275.6	255.3	233.2	191.7	153.0	119.8	91.2	69.1
52.5°	387.1	356.7	321.6	281.1	260.8	239.6	195.4	155.8	120.7	91.2	68.2
55°	394.5	365.0	329.0	288.5	267.3	245.1	199.1	157.6	121.7	91.2	67.3
57.5°	400.9	370.5	334.5	294.0	272.8	249.8	202.8	160.4	122.6	91.2	66.4
60°	405.5	376.0	340.1	299.5	277.4	254.4	206.4	162.2	123.5	91.2	65.4
62.5°	409.2	380.6	345.6	304.1	282.0	259.0	209.2	164.0	124.4	91.2	65.4
65°	413.8	386.2	350.2	308.7	286.6	263.6	212.9	165.9	125.3	91.2	65.4
67.5°	416.6	388.9	354.8	313.3	291.2	267.3	215.7	167.7	125.3	91.2	64.5
70°	419.3	392.6	358.5	317.0	294.9	270.0	218.4	169.6	126.3	91.2	64.5
72.5°	421.2	395.4	361.3	319.8	297.7	273.7	220.3	171.4	127.2	91.2	63.6
75°	422.1	397.2	364.0	322.6	300.4	275.6	223.0	172.3	128.1	91.2	63.6
77.5°	422.1	398.1	365.9	324.4	302.3	278.3	224.0	174.2	128.1	91.2	63.6
80°	423.0	399.1	366.8	326.3	304.1	279.2	225.8	175.1	129.0	91.2	63.6
82.5°	423.0	400.0	367.7	327.2	305.1	280.2	226.7	175.1	129.0	91.2	63.6
85°	423.0	400.9	368.6	328.1	305.1	281.1	227.6	176.0	129.0	91.2	63.6
87.5°	423.0	400.9	368.6	329.0	306.0	282.0	227.6	177.0	129.9	91.2	63.6
90°	423.0	400.9	369.6	329.0	306.9	282.0	228.6	177.0	129.9	92.2	63.6
92.5°	418.4	397.2	365.9	327.2	304.1	280.2	228.6	175.1	129.0	91.2	62.7
95°	418.4	396.3	365.0	326.3	303.2	279.2	227.6	175.1	129.0	91.2	62.7
97.5°	418.4	396.3	365.0	325.3	302.3	278.3	226.7	174.2	128.1	91.2	62.7
100°	418.4	394.5	363.1	323.5	300.4	277.4	224.9	173.3	128.1	90.3	62.7
102.5°	417.5	393.5	362.2	321.6	299.5	274.6	223.0	172.3	127.2	90.3	62.7
105°	417.5	391.7	359.4	319.8	296.8	272.8	221.2	170.5	127.2	90.3	62.7
107.5°	415.6	389.8	357.6	318.0	294.0	271.0	219.3	169.6	126.3	90.3	62.7
110°	413.8	388.0	354.8	314.3	291.2	268.2	216.6	167.7	125.3	90.3	63.6



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
112.5°	412.0	384.3	351.1	310.6	287.5	263.6	213.8	165.9	124.4	90.3	63.6
115°	409.2	381.5	347.4	306.0	282.9	260.8	211.1	165.0	124.4	90.3	64.5
117.5°	406.4	376.9	342.8	301.4	279.2	257.1	208.3	163.1	123.5	90.3	64.5
120°	401.8	372.3	337.3	296.8	274.6	252.5	204.6	161.3	122.6	90.3	65.4
122.5°	397.2	366.8	331.8	291.2	269.1	247.9	201.8	158.5	121.7	90.3	66.4
125°	390.8	360.4	324.4	284.8	263.6	241.5	198.1	156.7	120.7	91.2	66.4
127.5°	383.4	352.1	318.0	278.3	257.1	235.9	193.5	154.8	119.8	91.2	67.3
130°	375.1	343.8	309.7	271.9	251.6	230.4	189.9	152.1	118.9	91.2	68.2
132.5°	365.9	335.5	300.4	264.5	244.2	224.0	186.2	150.2	118.0	91.2	69.1
135°	356.7	325.3	292.2	257.1	236.9	217.5	181.6	147.5	117.0	91.2	70.0
137.5°	344.7	314.3	282.0	248.8	229.5	211.1	177.0	144.7	116.1	92.2	71.0
140°	330.9	302.3	271.0	237.8	220.3	204.6	172.3	141.9	115.2	92.2	71.9
142.5°	318.0	290.3	260.8	229.5	212.9	197.2	167.7	139.2	114.3	92.2	73.7
145°	305.1	278.3	250.7	220.3	204.6	190.8	163.1	137.3	113.4	93.1	74.7
147.5°	291.2	265.4	238.7	211.1	197.2	184.3	158.5	134.6	112.4	93.1	76.5
150°	275.6	252.5	225.8	201.8	189.9	177.9	153.9	131.8	111.5	94.0	77.4
152.5°	259.0	236.9	213.8	192.6	180.6	170.5	149.3	128.1	110.6	94.0	78.3
155°	243.3	222.1	202.8	182.5	172.3	163.1	143.8	126.3	109.7	94.0	80.2
157.5°	225.8	208.3	191.7	174.2	165.0	156.7	139.2	123.5	108.8	94.9	82.0
160°	209.2	193.5	179.7	164.0	156.7	149.3	134.6	119.8	106.9	94.9	83.9
162.5°	192.6	179.7	167.7	154.8	148.4	141.9	129.0	117.0	106.0	94.9	84.8
165°	176.0	165.9	155.8	145.6	140.1	134.6	124.4	114.3	104.1	95.8	86.6
167.5°	161.3	153.0	145.6	136.4	132.7	128.1	119.8	111.5	103.2	95.8	88.5
170°	146.5	140.1	134.6	128.1	124.4	121.7	114.3	107.8	101.4	95.8	89.4
172.5°	131.8	127.2	123.5	118.9	116.1	114.3	109.7	105.1	100.5	95.8	91.2
175°	118.0	115.2	113.4	110.6	109.7	107.8	104.1	101.4	98.6	95.8	92.2
177.5°	106.0	105.1	104.1	102.3	102.3	101.4	100.5	98.6	96.8	95.8	94.0
180°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
0°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
2.5°	92.2	91.2	89.4	88.5	87.6	85.7	83.9	82.9	81.1	80.2	78.3
5°	89.4	86.6	83.9	82.0	81.1	78.3	75.6	73.7	71.0	69.1	67.3
7.5°	86.6	82.9	78.3	76.5	74.7	71.0	68.2	65.4	62.7	59.9	58.1
10°	83.9	78.3	73.7	71.0	69.1	64.5	60.8	57.1	54.4	51.6	49.8
12.5°	81.1	74.7	69.1	66.4	63.6	59.0	54.4	50.7	47.9	44.2	42.4
15°	78.3	71.0	64.5	61.7	58.1	53.5	48.8	45.2	41.5	38.7	36.9
17.5°	75.6	67.3	60.8	57.1	54.4	48.8	44.2	39.6	36.9	34.1	32.3
20°	72.8	64.5	56.2	52.5	49.8	44.2	39.6	35.9	33.2	31.3	29.5
22.5°	70.0	60.8	52.5	48.8	46.1	40.6	35.9	32.3	30.4	29.5	28.6
25°	68.2	58.1	49.8	46.1	42.4	36.9	33.2	30.4	28.6	28.6	28.6
27.5°	66.4	55.3	47.0	43.3	39.6	34.1	30.4	28.6	28.6	28.6	28.6
30°	63.6	52.5	44.2	40.6	36.9	32.3	29.5	28.6	28.6	28.6	29.5
32.5°	61.7	50.7	41.5	37.8	35.0	30.4	28.6	28.6	28.6	29.5	30.4
35°	59.9	48.8	39.6	35.9	33.2	29.5	28.6	28.6	29.5	31.3	31.3
37.5°	58.1	46.1	37.8	34.1	32.3	29.5	28.6	29.5	30.4	31.3	31.3
40°	57.1	45.2	35.9	33.2	30.4	28.6	29.5	30.4	32.3	32.3	31.3
42.5°	55.3	43.3	35.0	32.3	30.4	28.6	29.5	31.3	32.3	31.3	29.5
45°	54.4	41.5	33.2	31.3	29.5	29.5	30.4	32.3	32.3	30.4	28.6
47.5°	52.5	40.6	32.3	30.4	29.5	29.5	31.3	33.2	32.3	29.5	26.7
50°	51.6	39.6	32.3	30.4	29.5	29.5	32.3	33.2	31.3	28.6	24.9
52.5°	50.7	38.7	31.3	29.5	29.5	30.4	33.2	33.2	30.4	26.7	23.0
55°	49.8	37.8	31.3	29.5	29.5	31.3	33.2	32.3	29.5	24.9	21.2
57.5°	48.8	36.9	30.4	29.5	29.5	31.3	33.2	32.3	28.6	24.0	19.4
60°	47.9	35.9	30.4	29.5	29.5	32.3	34.1	31.3	26.7	23.0	18.4
62.5°	47.0	35.0	30.4	29.5	30.4	33.2	33.2	30.4	25.8	21.2	17.5
65°	47.0	35.0	30.4	29.5	30.4	33.2	33.2	30.4	24.9	20.3	15.7
67.5°	46.1	34.1	30.4	29.5	30.4	33.2	33.2	29.5	24.0	19.4	14.7
70°	46.1	34.1	30.4	30.4	31.3	34.1	33.2	28.6	23.0	18.4	14.7
72.5°	45.2	34.1	29.5	30.4	31.3	34.1	32.3	27.6	22.1	17.5	13.8
75°	45.2	34.1	30.4	30.4	31.3	34.1	32.3	26.7	21.2	16.6	12.9
77.5°	45.2	33.2	30.4	30.4	31.3	34.1	31.3	26.7	21.2	16.6	12.9
80°	44.2	33.2	30.4	30.4	31.3	34.1	31.3	25.8	20.3	15.7	12.0
82.5°	44.2	33.2	30.4	30.4	32.3	34.1	31.3	25.8	20.3	15.7	11.1
85°	44.2	33.2	29.5	30.4	31.3	34.1	31.3	24.9	19.4	14.7	11.1
87.5°	44.2	33.2	29.5	30.4	31.3	34.1	30.4	24.9	19.4	14.7	11.1
90°	44.2	33.2	29.5	30.4	31.3	33.2	30.4	24.9	19.4	14.7	11.1
92.5°	44.2	33.2	29.5	29.5	31.3	33.2	30.4	24.9	19.4	14.7	11.1
95°	44.2	33.2	29.5	29.5	31.3	33.2	30.4	24.9	19.4	14.7	11.1
97.5°	44.2	33.2	29.5	29.5	30.4	32.3	29.5	24.9	19.4	14.7	11.1
100°	44.2	33.2	28.6	29.5	30.4	32.3	29.5	24.9	19.4	14.7	11.1
102.5°	44.2	33.2	28.6	28.6	29.5	31.3	29.5	24.9	19.4	14.7	11.1
105°	44.2	33.2	28.6	28.6	29.5	31.3	29.5	24.9	19.4	14.7	11.1
107.5°	44.2	33.2	28.6	28.6	29.5	31.3	29.5	24.9	20.3	15.7	12.0
110°	45.2	33.2	28.6	27.6	28.6	30.4	29.5	25.8	20.3	15.7	12.0



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
112.5°	45.2	33.2	28.6	27.6	27.6	30.4	29.5	25.8	21.2	16.6	12.9
115°	46.1	34.1	28.6	27.6	27.6	29.5	29.5	25.8	22.1	17.5	13.8
117.5°	47.0	35.0	28.6	27.6	27.6	29.5	29.5	26.7	23.0	18.4	15.7
120°	47.0	35.0	28.6	27.6	27.6	28.6	29.5	27.6	24.0	20.3	16.6
122.5°	47.9	35.9	29.5	27.6	26.7	27.6	29.5	27.6	24.9	21.2	17.5
125°	48.8	36.9	29.5	27.6	26.7	27.6	28.6	27.6	24.9	22.1	19.4
127.5°	49.8	37.8	30.4	27.6	26.7	26.7	28.6	28.6	25.8	23.0	20.3
130°	50.7	38.7	30.4	28.6	26.7	26.7	27.6	27.6	26.7	24.9	22.1
132.5°	52.5	39.6	31.3	28.6	27.6	25.8	26.7	27.6	27.6	25.8	23.0
135°	53.5	41.5	32.3	29.5	27.6	25.8	25.8	27.6	27.6	26.7	24.9
137.5°	55.3	42.4	34.1	30.4	28.6	25.8	25.8	26.7	27.6	26.7	25.8
140°	56.2	44.2	35.0	32.3	29.5	26.7	25.8	25.8	26.7	26.7	26.7
142.5°	58.1	46.1	36.9	33.2	30.4	26.7	25.8	24.9	25.8	26.7	26.7
145°	59.9	47.9	38.7	35.0	32.3	28.6	25.8	24.9	24.9	25.8	26.7
147.5°	61.7	50.7	41.5	37.8	34.1	29.5	26.7	25.8	24.9	24.9	25.8
150°	64.5	52.5	43.3	39.6	36.9	31.3	27.6	25.8	24.9	24.9	24.9
152.5°	66.4	55.3	46.1	42.4	39.6	34.1	29.5	27.6	25.8	24.9	24.9
155°	68.2	58.1	49.8	46.1	42.4	36.9	32.3	29.5	26.7	25.8	24.9
157.5°	71.0	61.7	52.5	49.8	46.1	40.6	35.9	31.3	29.5	27.6	26.7
160°	73.7	64.5	56.2	53.5	49.8	44.2	39.6	35.0	32.3	29.5	28.6
162.5°	76.5	68.2	60.8	57.1	54.4	48.8	44.2	39.6	36.9	34.1	32.3
165°	78.3	71.9	64.5	61.7	59.0	54.4	49.8	45.2	41.5	38.7	36.9
167.5°	81.1	75.6	69.1	66.4	64.5	59.9	55.3	51.6	47.9	45.2	43.3
170°	83.9	79.3	74.7	71.9	70.0	65.4	61.7	58.1	55.3	52.5	50.7
172.5°	86.6	82.9	79.3	77.4	75.6	72.8	69.1	66.4	63.6	60.8	59.0
175°	89.4	86.6	83.9	82.9	82.0	79.3	77.4	74.7	71.9	71.0	70.0
177.5°	93.1	91.2	90.3	89.4	89.4	87.6	86.6	84.8	82.9	82.0	82.0
180°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
0°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
2.5°	77.4	76.5	75.6	75.6	74.7	74.7	74.7	74.7
5°	65.4	64.5	63.6	63.6	62.7	61.7	61.7	61.7
7.5°	56.2	54.4	53.5	53.5	51.6	51.6	51.6	50.7
10°	47.0	46.1	44.2	44.2	43.3	42.4	42.4	41.5
12.5°	40.6	38.7	37.8	37.8	35.9	35.9	35.0	35.0
15°	35.0	33.2	33.2	32.3	31.3	31.3	31.3	30.4
17.5°	31.3	30.4	29.5	29.5	29.5	28.6	28.6	28.6
20°	29.5	28.6	28.6	28.6	27.6	27.6	27.6	27.6
22.5°	28.6	28.6	28.6	27.6	28.6	28.6	28.6	28.6
25°	28.6	28.6	28.6	28.6	29.5	29.5	29.5	29.5
27.5°	28.6	29.5	30.4	30.4	30.4	30.4	31.3	31.3
30°	30.4	31.3	31.3	31.3	31.3	31.3	31.3	30.4
32.5°	31.3	31.3	31.3	31.3	30.4	30.4	29.5	29.5
35°	31.3	30.4	30.4	29.5	28.6	28.6	27.6	27.6
37.5°	30.4	29.5	28.6	27.6	26.7	25.8	24.9	24.9
40°	29.5	27.6	26.7	25.8	24.0	23.0	22.1	22.1
42.5°	27.6	25.8	24.0	23.0	21.2	20.3	19.4	19.4
45°	25.8	23.0	22.1	21.2	19.4	17.5	16.6	16.6
47.5°	23.0	21.2	19.4	18.4	16.6	15.7	14.7	14.7
50°	21.2	18.4	17.5	16.6	14.7	13.8	12.9	12.9
52.5°	19.4	16.6	15.7	14.7	12.9	11.1	11.1	10.1
55°	17.5	14.7	13.8	12.9	11.1	10.1	9.2	9.2
57.5°	16.6	13.8	12.0	11.1	9.2	8.3	7.4	7.4
60°	14.7	12.0	11.1	10.1	8.3	7.4	6.5	6.5
62.5°	13.8	11.1	10.1	9.2	7.4	6.5	5.5	5.5
65°	12.9	10.1	9.2	8.3	6.5	5.5	4.6	4.6
67.5°	12.0	9.2	8.3	7.4	5.5	4.6	3.7	3.7
70°	11.1	8.3	7.4	6.5	5.5	3.7	3.7	2.8
72.5°	10.1	8.3	7.4	6.5	4.6	3.7	2.8	2.8
75°	10.1	7.4	6.5	5.5	4.6	3.7	2.8	2.8
77.5°	9.2	7.4	6.5	5.5	3.7	2.8	2.8	2.8
80°	9.2	6.5	5.5	4.6	3.7	2.8	2.8	2.8
82.5°	8.3	6.5	5.5	4.6	3.7	2.8	2.8	2.8
85°	8.3	5.5	4.6	4.6	3.7	2.8	2.8	2.8
87.5°	8.3	5.5	4.6	3.7	2.8	2.8	2.8	2.8
90°	8.3	5.5	4.6	3.7	2.8	2.8	2.8	2.8
92.5°	8.3	5.5	4.6	3.7	2.8	2.8	2.8	1.8
95°	8.3	5.5	4.6	4.6	2.8	2.8	2.8	2.8
97.5°	8.3	5.5	4.6	4.6	3.7	2.8	2.8	2.8
100°	8.3	5.5	5.5	4.6	3.7	2.8	2.8	1.8
102.5°	8.3	6.5	5.5	4.6	3.7	2.8	2.8	2.8
105°	9.2	6.5	5.5	5.5	3.7	3.7	2.8	2.8
107.5°	9.2	7.4	6.5	5.5	4.6	3.7	3.7	2.8
110°	9.2	7.4	6.5	6.5	4.6	4.6	3.7	3.7



TEST NUMBER: P190103

CATALOG NUMBER: TRO11-LD4-20W-50-CL-BK-UNV-EDC1-CSTG

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
112.5°	10.1	8.3	7.4	6.5	5.5	4.6	4.6	4.6
115°	11.1	9.2	8.3	8.3	6.5	6.5	5.5	5.5
117.5°	12.0	10.1	9.2	9.2	8.3	7.4	7.4	7.4
120°	13.8	11.1	11.1	10.1	9.2	8.3	8.3	8.3
122.5°	14.7	12.9	12.0	11.1	10.1	9.2	9.2	9.2
125°	15.7	13.8	12.9	12.9	11.1	11.1	10.1	10.1
127.5°	17.5	15.7	14.7	13.8	12.9	12.0	12.0	12.0
130°	19.4	17.5	16.6	15.7	14.7	13.8	13.8	12.9
132.5°	21.2	18.4	18.4	17.5	16.6	15.7	15.7	14.7
135°	22.1	20.3	19.4	19.4	18.4	17.5	17.5	16.6
137.5°	24.0	22.1	21.2	21.2	20.3	19.4	19.4	19.4
140°	24.9	24.0	23.0	23.0	22.1	21.2	21.2	21.2
142.5°	25.8	24.9	24.9	24.9	24.0	23.0	23.0	23.0
145°	26.7	25.8	25.8	25.8	25.8	24.9	24.9	24.9
147.5°	26.7	26.7	26.7	26.7	26.7	25.8	25.8	25.8
150°	25.8	25.8	25.8	25.8	26.7	26.7	26.7	26.7
152.5°	24.9	24.9	24.9	24.9	25.8	25.8	25.8	25.8
155°	24.9	24.9	24.9	24.0	24.9	24.9	24.9	24.9
157.5°	25.8	24.9	24.9	24.9	24.9	24.9	24.0	24.0
160°	26.7	25.8	25.8	25.8	24.9	24.9	24.9	24.9
162.5°	30.4	28.6	28.6	27.6	27.6	26.7	26.7	26.7
165°	35.0	33.2	32.3	32.3	31.3	30.4	30.4	30.4
167.5°	41.5	38.7	38.7	37.8	36.9	35.9	35.9	35.0
170°	48.8	46.1	46.1	45.2	44.2	43.3	43.3	43.3
172.5°	58.1	55.3	55.3	54.4	53.5	52.5	52.5	51.6
175°	67.3	66.4	66.4	65.4	64.5	63.6	63.6	62.7
177.5°	80.2	79.3	79.3	79.3	78.3	78.3	78.3	77.4
180°	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0

(END OF REPORT)