

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: P190098

Luminaire Tested: **TRF11-LD4-15W-50-OPL-BK-UNV-EDC1**

Issue Date: 3/3/2020



Test Information

Test Method: LM-79-08
Report Number: P190098
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P27862)
Test Lab: INNOVATION CENTER(G2)
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: FAIL-SAFE
Catalog Number: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1
Description: TERRAPIN 11" LED WALL MOUNT WITH OPEN OPAL LENS AND QUAD LENS COVER
Light Source: (56) NICHIA 5000
NF2L757DRT
Ballast/Driver: OSRAM ELECTRONIC DRIVER PROGRAMMED AT 300mA
OT25W/1

Summary

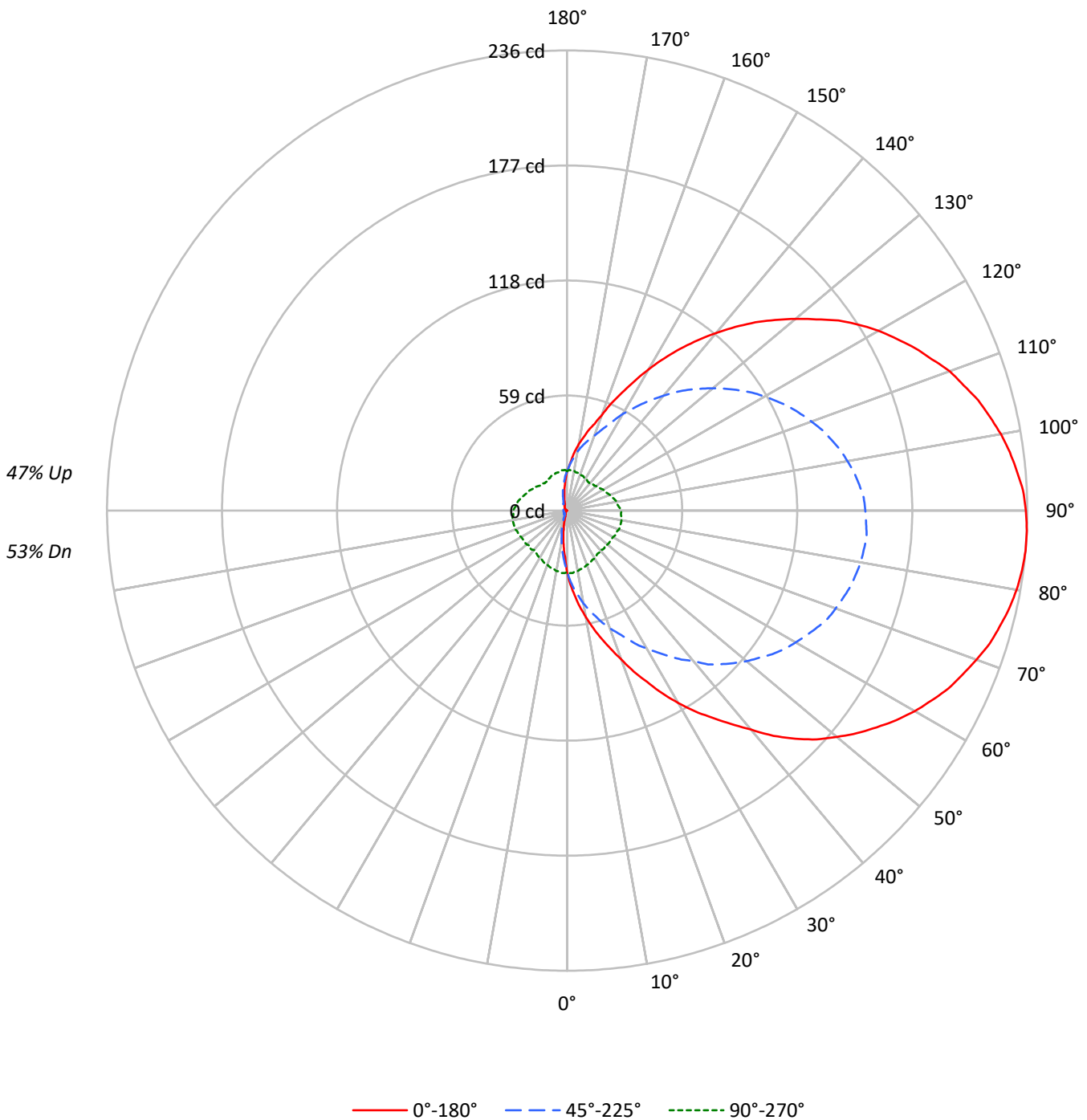
Lumens per Lamp: N/A
Luminaire Lumens: 727.0 lumens
Efficiency: N/A
Efficacy: 50.5 lumens/watt
Spacing Criteria (0/90/45): 3.12 / 1.34 / 2.56
Luminous Opening: Rectangular w/ Sides (W: 0.92' x L: 0.29' x H: 0.92')
CIE Type: General Diffuse

Input Watts (W): 14.4
Input Voltage (V): NR
Input Current (A_{in}): 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

TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

Luminous Intensity Polar Plot





TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

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	100	100	100	100	85	85	85	72	72	72	59	59	59	53
1	93	86	80	74	85	79	74	69	66	62	58	54	51	48	43	41	39	33
2	82	72	64	56	75	66	59	52	55	49	44	44	40	36	35	31	28	23
3	74	62	52	44	67	56	48	41	47	40	34	38	32	28	29	25	22	17
4	67	53	44	36	61	49	40	33	40	33	28	32	27	23	25	21	17	13
5	61	47	37	30	55	43	34	28	35	28	23	29	23	19	22	18	14	11
6	56	41	32	25	51	38	29	23	32	25	19	25	20	16	20	15	12	9
7	51	37	28	22	47	34	26	20	28	21	17	23	17	13	18	13	10	7
8	47	33	25	19	43	31	23	17	26	19	14	21	15	12	16	12	9	6
9	44	30	22	16	40	28	20	15	23	17	13	19	14	10	15	11	8	5
10	41	28	20	14	37	25	18	13	21	15	11	17	12	9	14	10	7	5

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	1268	1268	1268
5°	1376	1193	618
10°	1457	1095	281
15°	1539	1012	113
20°	1623	930	50
25°	1746	876	34
30°	1881	834	31
35°	1990	783	20
40°	2118	754	19
45°	2274	771	8
50°	2384	774	8
55°	2478	783	8
60°	2572	799	7
65°	2656	839	7
70°	2729	889	7
75°	2807	930	7
80°	2883	984	7
85°	2953	1029	8



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	3.0	0.4
10°-20°	9.6	1.3
20°-30°	18.1	2.5
30°-40°	29.4	4.0
40°-50°	43.1	5.9
50°-60°	56.8	7.8
60°-70°	68.7	9.5
70°-80°	77.5	10.7
80°-90°	81.5	11.2
90°-100°	79.7	11.0
100°-110°	72.5	10.0
110°-120°	61.4	8.5
120°-130°	48.2	6.6
130°-140°	34.6	4.8
140°-150°	22.2	3.0
150°-160°	12.5	1.7
160°-170°	6.3	0.9
170°-180°	2.0	0.3
0°-30°	30.7	4.2
0°-40°	60.1	8.3
0°-60°	159.9	22.0
0°-90°	387.7	53.3
90°-120°	213.6	29.4
90°-150°	318.5	43.8
90°-180°	339.0	46.6
0°-180°	727.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	32	32	32	32	32	
5°	43	40	32	23	20	5
15°	68	56	31	11	5	20
25°	97	72	29	4	2	46
35°	130	91	27	2	1	82
45°	166	111	27	2	1	128
55°	194	128	27	2	1	174
65°	216	142	28	2	1	214
75°	230	150	28	2	1	243
85°	236	154	28	2	1	192
90°	235	153	28	2	1	129
95°	232	150	26	2	1	188
105°	218	140	24	2	1	230
115°	197	126	22	2	1	195
125°	170	108	20	2	1	152
135°	136	88	19	3	1	106
145°	101	67	18	3	2	64
155°	67	48	20	4	3	32
165°	43	36	20	8	5	12
175°	26	25	21	16	13	3
180°	20	20	20	20	20	



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
2.5°	37.8	37.1	37.1	37.1	37.1	37.1	36.5	36.5	36.5	35.9	35.9
5°	43.4	43.4	43.4	42.8	42.8	42.8	42.2	42.2	41.5	40.9	40.3
7.5°	49.7	49.7	49.1	49.1	48.5	47.8	47.8	47.2	45.9	45.3	44.0
10°	55.4	55.4	54.7	54.7	54.1	53.5	52.9	52.2	51.0	49.7	48.5
12.5°	61.7	61.7	61.0	60.4	59.8	59.1	58.5	57.3	55.4	54.1	52.2
15°	68.0	68.0	67.3	66.7	65.4	64.8	64.2	62.3	60.4	58.5	56.0
17.5°	74.3	74.3	73.0	72.4	71.1	70.5	69.2	67.3	65.4	62.9	60.4
20°	81.2	80.5	79.9	78.7	77.4	76.1	74.9	73.0	69.8	67.3	64.2
22.5°	89.4	88.1	87.5	85.6	83.7	83.1	81.2	78.7	75.5	71.7	68.0
25°	96.9	96.9	95.0	93.8	90.6	90.0	88.1	84.9	81.2	76.8	72.4
27.5°	105.7	105.1	103.2	101.3	98.8	96.9	95.6	91.9	86.8	82.4	77.4
30°	113.9	113.3	111.4	109.5	106.3	104.5	102.6	98.2	93.1	88.1	81.8
32.5°	122.1	121.4	119.6	117.0	113.3	111.4	109.5	104.5	98.8	93.1	86.2
35°	129.6	129.6	127.7	124.6	120.8	118.9	116.4	111.4	105.1	98.2	91.2
37.5°	137.8	137.8	135.9	132.8	128.4	125.8	124.0	117.7	111.4	103.8	96.3
40°	146.6	146.0	143.5	140.3	135.9	132.8	130.3	124.0	117.0	108.9	100.7
42.5°	156.7	156.1	153.5	150.4	145.4	142.8	139.7	132.1	124.6	116.4	107.0
45°	165.5	165.5	163.0	157.9	152.3	149.8	146.6	139.1	130.3	121.4	111.4
47.5°	173.7	173.0	169.9	166.1	159.2	156.1	152.9	144.7	135.9	126.5	115.8
50°	180.6	180.0	177.4	173.0	167.4	164.2	158.6	151.0	141.6	131.5	120.2
52.5°	187.5	186.9	184.4	180.0	173.7	170.5	166.1	156.1	146.6	135.9	124.0
55°	193.8	193.2	190.0	185.6	180.0	175.6	171.8	162.3	151.6	140.3	128.4
57.5°	200.1	198.8	196.3	191.3	185.0	181.2	177.4	168.0	156.1	144.1	132.1
60°	205.8	204.5	201.4	197.0	190.0	186.3	181.8	172.4	161.1	148.5	135.3
62.5°	210.8	209.5	206.4	202.0	195.1	190.7	186.9	176.8	165.5	151.6	138.4
65°	215.8	213.9	210.8	206.4	199.5	195.1	190.7	181.2	169.9	155.4	141.6
67.5°	219.6	218.3	215.2	210.2	203.2	198.8	194.4	184.4	173.0	158.6	144.7
70°	223.4	222.8	219.0	214.6	207.0	202.6	198.2	188.1	176.2	161.7	146.6
72.5°	227.2	225.9	222.8	217.7	210.2	205.8	201.4	190.7	178.1	164.9	148.5
75°	229.7	229.0	225.3	220.2	212.7	208.3	203.2	192.5	180.6	166.7	150.4
77.5°	232.2	230.9	227.8	222.1	215.2	210.2	205.8	195.1	182.5	168.6	151.6
80°	234.1	232.8	229.7	224.0	216.5	212.1	207.0	196.3	183.7	169.9	152.9
82.5°	235.3	234.1	230.3	224.6	217.7	213.3	208.3	197.6	185.0	170.5	153.5
85°	236.0	234.7	230.9	225.3	218.3	213.9	208.9	197.6	185.0	171.2	154.2
87.5°	236.0	234.7	230.9	225.3	217.7	213.3	208.3	197.6	185.0	170.5	153.5
90°	235.3	234.1	230.3	224.6	217.1	212.7	207.6	197.0	183.7	169.9	152.9
92.5°	234.1	232.2	229.0	223.4	215.8	211.4	206.4	195.7	183.1	169.3	152.3
95°	231.6	230.9	227.2	221.5	213.9	210.2	205.1	193.8	181.2	167.4	150.4
97.5°	229.0	227.8	224.6	219.0	211.4	207.0	202.6	191.9	179.3	165.5	148.5
100°	225.9	224.6	221.5	215.8	208.3	204.5	199.5	188.8	176.8	161.7	146.0
102.5°	222.1	221.5	217.7	212.7	205.1	201.4	196.3	185.6	173.7	157.9	143.5
105°	218.3	217.1	213.9	208.3	201.4	197.0	192.5	181.8	169.9	154.8	140.3
107.5°	213.3	212.7	209.5	203.9	197.6	193.2	188.1	178.1	166.1	151.6	137.2
110°	208.9	207.0	204.5	199.5	192.5	188.8	183.7	173.7	161.1	147.2	133.4



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
112.5°	202.6	202.0	198.8	193.8	186.9	183.1	178.7	168.6	156.1	143.5	129.6
115°	197.0	195.7	193.2	188.1	181.8	178.1	173.7	163.0	151.0	139.1	125.8
117.5°	190.7	190.0	186.9	181.8	176.2	172.4	168.0	156.7	146.0	134.0	121.4
120°	184.4	183.1	180.6	175.6	169.9	166.1	160.5	151.0	140.9	129.6	117.0
122.5°	177.4	176.2	173.0	169.3	163.0	157.9	154.2	145.4	135.3	124.0	112.6
125°	169.9	169.3	166.1	160.5	155.4	151.6	147.9	139.1	129.6	118.9	107.6
127.5°	161.1	159.8	157.3	153.5	147.9	144.7	140.9	132.8	124.0	113.3	102.6
130°	152.9	152.3	149.8	146.0	140.9	137.2	134.0	125.8	117.7	107.6	97.5
132.5°	144.7	144.7	141.6	138.4	133.4	130.3	127.1	119.6	111.4	101.9	92.5
135°	136.5	135.9	134.0	130.3	125.8	122.7	119.6	112.6	105.1	96.3	87.5
137.5°	127.7	127.7	125.2	122.1	117.7	115.2	112.0	105.7	98.2	90.0	82.4
140°	118.9	118.3	116.4	113.9	109.5	107.0	104.5	98.2	91.2	84.3	76.8
142.5°	110.1	109.5	107.6	105.1	101.3	98.8	96.3	90.6	84.9	78.7	71.7
145°	101.3	100.7	99.4	96.9	93.1	91.2	88.7	83.7	78.7	72.4	66.7
147.5°	92.5	91.9	90.6	88.7	85.6	83.1	81.2	76.8	72.4	67.3	61.7
150°	83.7	83.7	82.4	80.5	78.0	76.1	74.3	70.5	66.1	61.7	57.3
152.5°	74.9	74.9	74.3	72.4	69.8	68.6	66.7	63.6	59.8	56.0	52.2
155°	66.7	66.7	66.1	64.2	62.3	61.0	59.8	57.3	54.1	51.6	47.8
157.5°	59.8	59.1	58.5	57.3	56.0	54.7	53.5	51.6	49.7	47.2	44.0
160°	52.2	52.2	51.6	51.0	49.7	49.1	48.5	46.6	44.7	42.8	40.9
162.5°	46.6	46.6	45.9	45.3	44.7	44.0	44.0	42.8	41.5	39.6	38.4
165°	42.8	42.2	42.2	41.5	40.9	40.9	40.3	39.6	38.4	37.1	35.9
167.5°	38.4	38.4	38.4	38.4	37.1	37.1	37.1	36.5	35.2	34.6	33.3
170°	34.6	34.6	34.6	34.6	34.0	33.3	33.3	32.7	32.1	31.5	30.8
172.5°	30.8	30.8	30.8	30.2	30.2	30.2	29.6	29.6	28.9	28.3	27.7
175°	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	25.8	25.8	25.2
177.5°	22.7	22.7	22.7	23.3	22.7	22.7	22.7	23.3	22.7	22.7	22.7
180°	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
0°	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
2.5°	35.9	35.2	34.6	34.6	34.0	34.0	33.3	33.3	32.7	32.1	31.5
5°	39.6	38.4	37.8	37.1	36.5	35.9	35.2	34.0	32.7	32.1	30.8
7.5°	42.8	41.5	40.3	39.0	38.4	37.8	36.5	34.6	33.3	31.5	30.2
10°	46.6	44.7	43.4	41.5	40.3	39.6	37.1	35.2	33.3	31.5	29.6
12.5°	50.3	47.8	45.9	43.4	42.2	40.9	38.4	35.9	33.3	30.8	28.3
15°	54.1	51.0	48.5	45.3	44.0	42.8	39.6	36.5	33.3	30.8	27.7
17.5°	57.3	54.1	51.0	47.2	45.9	44.0	40.3	37.1	33.3	30.2	27.1
20°	60.4	56.6	52.9	49.1	47.2	45.3	41.5	37.1	33.3	29.6	26.4
22.5°	63.6	59.8	55.4	51.0	48.5	46.6	42.2	37.8	33.3	29.6	25.8
25°	67.3	62.9	57.9	52.9	50.3	47.8	42.8	37.8	33.3	28.9	24.5
27.5°	71.7	66.1	60.4	54.7	51.6	49.1	43.4	38.4	33.3	28.3	23.9
30°	75.5	69.8	63.6	56.6	53.5	50.3	44.0	38.4	33.3	28.3	23.9
32.5°	79.9	73.0	66.1	58.5	55.4	51.6	44.7	38.4	32.7	27.7	22.7
35°	83.7	76.1	68.6	61.0	57.3	53.5	45.9	39.0	32.7	27.1	22.7
37.5°	88.1	79.9	71.1	62.9	58.5	54.7	46.6	39.6	32.7	27.1	22.0
40°	91.9	83.1	73.6	64.8	60.4	56.0	47.8	39.6	32.7	26.4	21.4
42.5°	96.9	87.5	77.4	68.0	62.9	58.5	49.1	40.9	33.3	27.1	21.4
45°	101.3	90.6	80.5	69.8	64.8	59.8	49.7	40.9	33.3	27.1	21.4
47.5°	105.1	93.8	82.4	71.7	66.7	61.0	51.0	41.5	33.3	26.4	20.8
50°	108.9	96.9	84.9	73.6	68.0	62.9	51.6	42.2	34.0	27.1	20.8
52.5°	112.0	100.0	87.5	75.5	69.8	64.2	52.9	42.8	34.0	27.1	20.8
55°	115.8	102.6	90.0	77.4	71.1	64.8	53.5	43.4	34.6	27.1	20.8
57.5°	118.9	105.1	91.9	78.7	72.4	66.1	54.1	44.0	34.6	27.1	20.1
60°	121.4	107.6	93.8	79.9	73.6	67.3	54.7	44.0	35.2	27.1	20.1
62.5°	124.6	110.1	95.0	81.2	74.3	68.0	55.4	44.7	35.9	27.7	20.1
65°	127.1	112.0	96.9	82.4	75.5	68.6	56.0	45.3	35.9	27.7	20.1
67.5°	129.6	113.9	98.8	83.7	76.1	69.2	56.6	45.9	36.5	27.7	20.1
70°	131.5	115.8	100.0	84.3	76.8	69.8	57.3	46.6	37.1	28.3	20.1
72.5°	133.4	117.0	100.7	84.9	77.4	70.5	57.3	47.2	37.1	28.3	19.5
75°	134.7	118.3	101.9	85.6	78.0	70.5	57.9	47.2	37.8	28.3	19.5
77.5°	135.9	119.6	102.6	86.2	78.0	70.5	57.9	47.8	37.8	28.3	19.5
80°	136.5	120.2	103.2	86.2	78.7	71.1	57.9	47.8	37.8	28.3	19.5
82.5°	137.2	120.8	103.2	86.2	78.7	70.5	58.5	48.5	38.4	28.3	18.9
85°	137.2	120.8	103.2	86.2	78.0	70.5	58.5	48.5	37.8	27.7	18.9
87.5°	137.2	120.2	103.2	86.2	78.0	70.5	58.5	47.8	37.8	27.7	18.9
90°	136.5	119.6	102.6	85.6	77.4	69.8	57.9	47.8	37.8	27.7	18.2
92.5°	135.9	118.9	101.3	84.3	76.8	69.2	57.3	47.2	37.1	27.1	18.2
95°	134.0	117.0	100.0	83.7	75.5	68.0	56.6	46.6	36.5	26.4	17.6
97.5°	132.1	115.8	98.8	82.4	74.9	67.3	56.0	45.9	35.9	25.8	17.6
100°	130.3	113.9	96.9	81.2	73.6	66.7	54.7	45.3	35.2	25.8	17.0
102.5°	127.7	112.0	95.0	79.3	72.4	65.4	54.1	44.0	34.6	25.2	17.0
105°	124.6	108.9	93.1	78.0	71.1	64.2	52.9	42.8	33.3	24.5	17.0
107.5°	122.1	106.3	91.2	76.1	69.2	62.9	51.6	41.5	32.7	23.9	16.4
110°	118.9	103.8	88.7	74.3	68.0	61.7	50.3	40.3	31.5	23.3	16.4



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
112.5°	115.2	100.7	86.2	72.4	66.1	60.4	49.1	39.6	30.8	22.7	15.7
115°	112.0	97.5	83.7	70.5	64.2	58.5	47.8	38.4	29.6	22.0	15.7
117.5°	108.2	94.4	81.2	68.6	62.3	57.3	46.6	37.1	28.9	22.0	15.7
120°	103.8	91.2	78.0	66.1	60.4	55.4	45.3	35.9	27.7	21.4	15.7
122.5°	100.0	87.5	75.5	64.2	58.5	53.5	43.4	34.6	27.1	20.8	15.1
125°	95.6	84.3	72.4	61.7	56.6	51.6	42.2	33.3	26.4	20.1	15.1
127.5°	91.2	80.5	69.2	59.1	54.7	49.7	40.9	32.7	25.8	20.1	15.1
130°	86.8	76.8	66.1	56.6	52.2	47.8	39.0	31.5	24.5	19.5	15.1
132.5°	82.4	73.0	63.6	54.7	50.3	45.9	37.8	30.2	23.9	18.9	15.1
135°	78.0	69.2	60.4	52.2	47.8	44.0	36.5	29.6	23.3	18.9	15.1
137.5°	73.6	65.4	57.3	49.7	45.9	42.2	34.6	28.3	23.3	18.9	15.1
140°	69.2	61.7	54.1	47.2	43.4	39.6	33.3	27.7	22.7	18.2	15.1
142.5°	64.8	57.9	51.0	44.7	41.5	38.4	32.1	27.1	22.0	18.2	15.1
145°	60.4	54.1	48.5	42.2	39.0	36.5	30.8	25.8	22.0	18.2	15.7
147.5°	56.0	51.0	45.3	39.6	37.1	34.6	30.2	25.8	22.0	18.9	15.7
150°	52.2	47.2	42.8	37.8	35.2	33.3	28.9	25.2	22.0	18.9	16.4
152.5°	48.5	44.0	39.6	35.9	34.0	32.1	28.3	25.2	22.0	18.9	16.4
155°	44.7	40.9	37.8	34.0	32.7	30.8	27.7	24.5	22.0	19.5	17.0
157.5°	41.5	38.4	35.9	32.7	31.5	30.2	27.1	24.5	22.0	19.5	17.0
160°	38.4	36.5	34.0	31.5	30.2	29.6	27.1	24.5	22.0	19.5	17.6
162.5°	36.5	34.6	32.7	30.2	29.6	28.3	26.4	23.9	22.0	20.1	18.2
165°	34.0	32.7	30.8	28.9	28.3	27.1	25.8	23.9	22.0	20.1	18.2
167.5°	32.1	30.8	29.6	27.7	27.1	26.4	25.2	23.3	22.0	20.1	18.9
170°	29.6	28.9	27.7	26.4	25.8	25.2	24.5	23.3	22.0	20.8	19.5
172.5°	27.1	26.4	25.8	25.2	24.5	24.5	23.3	22.7	21.4	20.8	19.5
175°	24.5	24.5	23.9	23.3	23.3	23.3	22.7	22.0	21.4	20.8	20.1
177.5°	22.7	22.7	22.7	22.0	22.0	22.0	22.0	21.4	21.4	20.8	20.8
180°	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
0°	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
2.5°	30.8	30.2	29.6	29.6	28.9	28.9	28.3	27.7	27.1	26.4	25.8
5°	29.6	28.9	27.7	27.1	27.1	25.8	24.5	23.9	23.3	22.7	21.4
7.5°	28.3	27.1	25.8	25.2	24.5	23.3	21.4	20.8	19.5	18.9	17.6
10°	27.7	25.8	23.9	22.7	22.0	20.1	18.9	17.6	16.4	15.7	14.5
12.5°	26.4	23.9	22.0	20.8	20.1	18.2	16.4	15.1	13.2	12.0	10.7
15°	25.2	22.7	20.1	19.5	18.2	15.7	13.8	12.6	10.7	9.4	8.2
17.5°	23.9	21.4	18.9	17.6	16.4	13.8	12.0	10.1	8.2	6.9	5.7
20°	23.3	20.1	17.0	15.7	14.5	12.0	10.1	8.2	6.3	5.0	4.4
22.5°	22.0	18.9	15.7	14.5	13.2	10.7	8.2	6.3	5.0	3.8	3.1
25°	20.8	17.6	14.5	12.6	11.3	8.8	6.3	5.0	3.8	2.5	2.5
27.5°	20.1	16.4	13.2	11.3	10.1	7.6	5.0	3.8	2.5	2.5	2.5
30°	19.5	15.7	12.0	10.7	8.8	6.3	4.4	3.1	2.5	2.5	2.5
32.5°	18.9	14.5	11.3	9.4	8.2	5.0	3.1	2.5	2.5	2.5	2.5
35°	17.6	13.8	10.1	8.8	6.9	4.4	2.5	2.5	2.5	2.5	1.9
37.5°	17.6	13.2	9.4	7.6	6.3	3.8	2.5	2.5	2.5	2.5	1.9
40°	17.0	12.6	8.8	6.9	5.7	3.1	2.5	2.5	1.9	1.9	1.9
42.5°	16.4	12.0	8.2	6.3	4.4	3.1	2.5	2.5	2.5	1.9	1.9
45°	16.4	12.0	7.6	5.7	3.8	2.5	2.5	2.5	1.9	1.9	1.9
47.5°	15.7	10.7	6.9	5.0	3.1	2.5	2.5	2.5	1.9	1.9	1.9
50°	15.7	10.7	6.3	4.4	3.1	2.5	2.5	2.5	1.9	1.9	1.9
52.5°	15.1	10.1	5.7	3.8	3.1	2.5	2.5	2.5	1.9	1.9	1.9
55°	14.5	9.4	5.0	3.8	3.1	2.5	2.5	2.5	1.9	1.9	1.3
57.5°	14.5	8.8	4.4	3.1	3.1	2.5	2.5	2.5	1.9	1.9	1.3
60°	13.8	8.8	4.4	3.1	3.1	2.5	2.5	1.9	1.9	1.9	1.3
62.5°	13.8	8.2	3.8	3.1	3.1	2.5	2.5	2.5	1.9	1.9	1.3
65°	13.8	7.6	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
67.5°	13.2	7.6	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
70°	13.2	6.9	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
72.5°	12.6	6.9	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
75°	12.6	6.9	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
77.5°	12.0	6.3	3.1	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
80°	12.0	6.3	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
82.5°	12.0	6.3	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
85°	12.0	6.3	3.1	3.1	3.1	3.1	2.5	1.9	1.9	1.3	1.3
87.5°	11.3	5.7	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3	1.3
90°	11.3	5.7	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3	1.3
92.5°	11.3	5.7	3.8	3.1	3.1	3.1	2.5	1.9	1.9	1.3	1.3
95°	10.7	5.7	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3	1.3
97.5°	10.7	5.7	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3	1.3
100°	10.7	5.7	3.1	3.1	3.1	3.1	2.5	1.9	1.9	1.3	1.3
102.5°	10.7	5.7	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.3	1.3
105°	10.7	5.7	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.3	1.3
107.5°	10.7	6.3	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.3	1.3
110°	10.7	6.3	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.3	1.3



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
112.5°	10.7	6.3	3.8	3.1	3.1	3.1	2.5	2.5	1.9	1.9	1.3
115°	10.7	6.9	3.8	3.8	3.1	3.1	3.1	2.5	1.9	1.9	1.3
117.5°	10.7	6.9	4.4	3.8	3.8	3.1	3.1	2.5	2.5	1.9	1.9
120°	10.7	6.9	4.4	3.8	3.8	3.1	3.1	2.5	2.5	1.9	1.9
122.5°	10.7	7.6	5.0	3.8	3.8	3.1	3.1	2.5	2.5	2.5	1.9
125°	11.3	7.6	5.0	3.8	3.8	3.1	3.1	3.1	2.5	2.5	1.9
127.5°	11.3	8.2	5.7	4.4	3.8	3.8	3.1	3.1	2.5	2.5	1.9
130°	11.3	8.2	5.7	4.4	3.8	3.1	3.1	3.1	2.5	2.5	2.5
132.5°	11.3	8.8	6.3	5.0	3.8	3.8	3.1	3.1	3.1	2.5	2.5
135°	11.3	8.8	6.3	5.0	4.4	3.8	3.1	3.1	3.1	2.5	2.5
137.5°	12.0	9.4	6.9	5.7	4.4	3.8	3.1	3.1	3.1	2.5	2.5
140°	12.0	9.4	7.6	6.3	5.0	3.8	3.8	3.1	3.1	3.1	2.5
142.5°	12.6	10.1	7.6	6.9	5.7	4.4	3.8	3.8	3.1	3.1	3.1
145°	12.6	10.1	8.2	6.9	6.3	4.4	3.8	3.8	3.1	3.1	3.1
147.5°	13.2	10.7	8.8	7.6	6.9	5.0	4.4	3.8	3.8	3.1	3.1
150°	13.8	11.3	9.4	8.2	7.6	5.7	4.4	3.8	3.8	3.1	3.1
152.5°	13.8	12.0	10.1	8.8	8.2	6.3	5.0	4.4	3.8	3.8	3.8
155°	14.5	12.6	10.7	9.4	8.8	6.9	5.7	5.0	4.4	3.8	3.8
157.5°	15.1	13.2	11.3	10.7	9.4	8.2	6.9	5.7	5.0	4.4	3.8
160°	15.7	13.8	12.0	11.3	10.7	9.4	8.2	6.9	5.7	5.0	4.4
162.5°	16.4	14.5	13.2	12.0	11.3	10.1	8.8	8.2	6.9	6.3	5.7
165°	17.0	15.1	13.8	13.2	12.6	11.3	10.1	9.4	8.2	7.6	6.9
167.5°	17.6	16.4	15.1	14.5	13.8	12.6	12.0	10.7	10.1	8.8	8.8
170°	18.2	17.0	16.4	15.7	15.1	13.8	13.2	12.6	11.3	10.7	10.1
172.5°	18.9	18.2	17.0	17.0	16.4	15.7	14.5	13.8	13.2	12.6	12.6
175°	19.5	18.9	18.2	18.2	17.6	17.0	16.4	15.7	15.7	15.1	14.5
177.5°	20.1	20.1	19.5	19.5	19.5	18.9	18.9	18.2	18.2	17.6	17.6
180°	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
0°	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
2.5°	25.8	25.2	25.2	25.2	25.2	24.5	24.5	23.9
5°	20.8	20.8	20.8	20.1	19.5	19.5	19.5	19.5
7.5°	17.0	16.4	16.4	15.7	15.7	15.1	15.1	14.5
10°	13.2	12.6	12.6	12.0	11.3	11.3	11.3	10.7
12.5°	10.1	9.4	8.8	8.8	8.2	7.6	7.6	7.6
15°	6.9	6.3	6.3	5.7	5.7	5.0	5.0	5.0
17.5°	5.0	4.4	3.8	3.8	3.1	3.1	3.1	3.1
20°	3.1	3.1	2.5	2.5	2.5	2.5	2.5	2.5
22.5°	2.5	2.5	2.5	2.5	2.5	2.5	1.9	1.9
25°	2.5	2.5	2.5	1.9	1.9	1.9	1.9	1.9
27.5°	2.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9
30°	2.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9
32.5°	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
35°	1.9	1.9	1.9	1.9	1.9	1.3	1.3	1.3
37.5°	1.9	1.9	1.9	1.9	1.3	1.3	1.3	1.3
40°	1.9	1.3	1.3	1.3	1.3	1.3	1.3	1.3
42.5°	1.9	1.3	1.3	1.3	1.3	1.3	0.6	0.6
45°	1.9	1.3	1.3	1.3	1.3	0.6	0.6	0.6
47.5°	1.3	1.3	1.3	1.3	0.6	0.6	0.6	0.6
50°	1.3	1.3	1.3	1.3	0.6	0.6	0.6	0.6
52.5°	1.3	1.3	1.3	1.3	0.6	0.6	0.6	0.6
55°	1.3	1.3	1.3	0.6	0.6	0.6	0.6	0.6
57.5°	1.3	1.3	0.6	0.6	0.6	0.6	0.6	0.6
60°	1.3	1.3	0.6	0.6	0.6	0.6	0.6	0.6
62.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
65°	1.3	1.3	0.6	0.6	0.6	0.6	0.6	0.6
67.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
70°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
72.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
77.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
80°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
82.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
85°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
87.5°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
90°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
92.5°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
95°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
97.5°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
102.5°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
105°	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
107.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
110°	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0



TEST NUMBER: P190098

CATALOG NUMBER: TRF11-LD4-15W-50-OPL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
112.5°	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
115°	1.3	1.3	0.6	0.6	0.6	0.6	0.6	0.6
117.5°	1.3	1.3	1.3	1.3	0.6	0.6	0.6	0.6
120°	1.9	1.3	1.3	1.3	0.6	0.6	0.6	0.6
122.5°	1.9	1.3	1.3	1.3	1.3	0.6	0.6	0.6
125°	1.9	1.3	1.3	1.3	1.3	1.3	1.3	1.3
127.5°	1.9	1.9	1.9	1.3	1.3	1.3	1.3	1.3
130°	1.9	1.9	1.9	1.3	1.3	1.3	1.3	1.3
132.5°	1.9	1.9	1.9	1.9	1.9	1.3	1.3	1.3
135°	2.5	1.9	1.9	1.9	1.9	1.9	1.3	1.3
137.5°	2.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9
140°	2.5	2.5	2.5	2.5	1.9	1.9	1.9	1.9
142.5°	2.5	2.5	2.5	2.5	2.5	1.9	1.9	1.9
145°	3.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5
147.5°	3.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5
150°	3.1	3.1	3.1	3.1	2.5	2.5	2.5	2.5
152.5°	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
155°	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
157.5°	3.8	3.1	3.1	3.1	3.1	3.1	3.1	3.1
160°	4.4	3.8	3.8	3.8	3.1	3.1	3.1	3.1
162.5°	5.0	4.4	4.4	4.4	3.8	3.8	3.8	3.8
165°	6.3	5.7	5.7	5.7	5.0	5.0	5.0	5.0
167.5°	7.6	7.6	7.6	6.9	6.9	6.3	6.3	6.3
170°	10.1	9.4	9.4	8.8	8.8	8.2	8.2	8.2
172.5°	12.0	11.3	11.3	11.3	10.7	10.7	10.7	10.7
175°	14.5	13.8	13.8	13.8	13.2	13.2	13.2	13.2
177.5°	17.0	17.0	17.0	17.0	17.0	16.4	17.0	16.4
180°	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1

(END OF REPORT)