

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: P190078

Luminaire Tested: **TRO11-LD4-10W-50-CL-BK-UNV-EDC1**

Issue Date: 3/3/2020



Test Information

Test Method: LM-79-08
Report Number: P190078
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-LD4-10W-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 200mA
OT25W/1

Summary

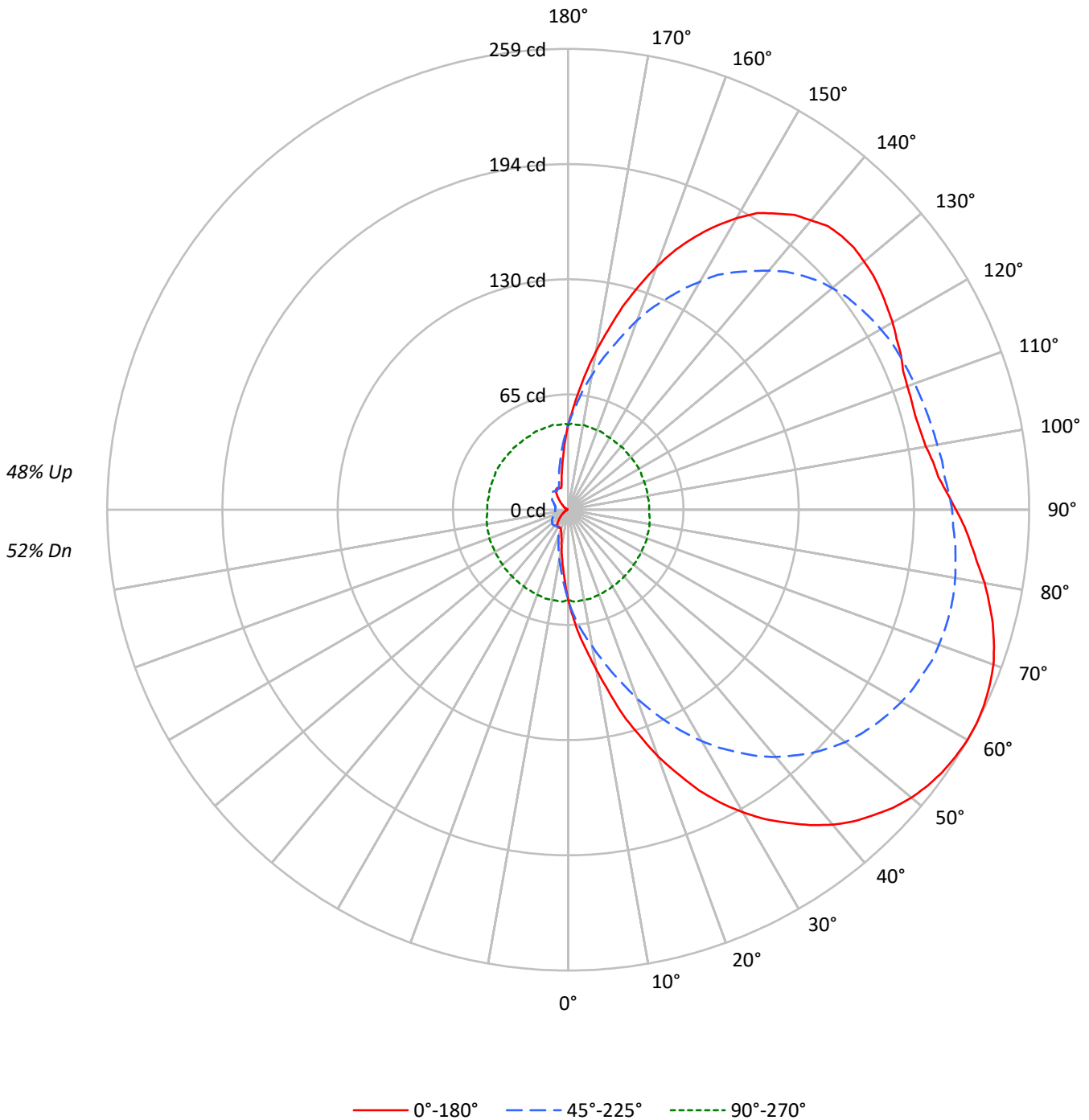
Lumens per Lamp: N/A
Luminaire Lumens: 1129.0 lumens
Efficiency: N/A
Efficacy: 112.9 lumens/watt
Spacing Criteria (0/90/45): 2.81 / 1.5 / 2.58
Luminous Opening: Rectangular w/ Sides (W: 0.92' x L: 0.29' x H: 0.92')
CIE Type: General Diffuse

Input Watts (W): 10
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°	2037	2037	2037
5°	2228	1929	1046
10°	2402	1790	563
15°	2706	1693	330
20°	2948	1602	240
25°	3137	1521	200
30°	3244	1465	192
35°	3298	1425	164
40°	3339	1397	130
45°	3335	1381	95
50°	3322	1372	67
55°	3284	1376	43
60°	3236	1403	32
65°	3177	1430	21
70°	3107	1483	11
75°	3018	1535	11
80°	2926	1609	11
85°	2844	1706	11



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	5.0	0.4
10°-20°	16.8	1.5
20°-30°	33.3	2.9
30°-40°	53.2	4.7
40°-50°	72.8	6.5
50°-60°	89.3	7.9
60°-70°	100.8	8.9
70°-80°	106.4	9.4
80°-90°	106.0	9.4
90°-100°	102.0	9.0
100°-110°	96.8	8.6
110°-120°	90.5	8.0
120°-130°	81.7	7.2
130°-140°	68.7	6.1
140°-150°	51.6	4.6
150°-160°	32.8	2.9
160°-170°	16.4	1.5
170°-180°	4.7	0.4
0°-30°	55.1	4.9
0°-40°	108.2	9.6
0°-60°	270.4	23.9
0°-90°	583.7	51.7
90°-120°	289.3	25.6
90°-150°	491.4	43.5
90°-180°	545.0	48.3
0°-180°	1129.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	51	51	51	51	51	
5°	70	65	52	38	33	7
15°	120	94	52	21	15	35
25°	174	132	50	13	11	81
35°	215	166	49	11	11	135
45°	243	193	48	12	7	188
55°	257	210	48	11	3	230
65°	258	220	47	9	2	256
75°	247	222	47	9	1	261
85°	227	218	46	7	1	188
90°	218	216	46	7	1	119
95°	209	212	46	7	1	170
105°	202	209	46	8	0	214
115°	206	205	46	9	1	205
125°	214	199	46	11	3	192
135°	217	186	46	13	6	168
145°	203	163	46	13	12	128
155°	169	131	47	13	13	79
165°	118	94	48	20	14	34
175°	66	61	48	36	31	7
180°	48	48	48	48	48	



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CANDELA DISTRIBUTION (FULL):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6
2.5°	60.0	59.6	60.0	59.6	59.6	59.2	59.2	58.7	58.7	58.3	57.9
5°	70.3	69.5	69.5	69.0	69.0	68.6	68.2	67.3	66.9	66.0	64.7
7.5°	79.8	79.8	79.3	78.9	78.5	77.6	77.2	75.9	75.0	72.9	71.2
10°	91.3	90.9	90.9	89.2	88.3	87.5	87.0	85.3	83.2	81.0	78.0
12.5°	104.2	102.9	102.5	101.2	100.3	99.1	98.2	95.6	92.6	88.8	85.8
15°	119.6	118.3	117.5	116.2	114.1	112.3	111.5	106.8	102.9	98.6	94.3
17.5°	132.9	132.5	131.6	129.5	127.4	125.6	123.5	119.2	114.5	108.9	102.9
20°	147.5	146.6	145.8	143.6	140.2	138.5	136.8	131.2	125.6	119.6	112.8
22.5°	160.4	159.5	158.2	156.5	153.1	150.9	148.8	142.8	136.8	129.9	122.2
25°	174.1	172.8	171.1	168.5	165.5	162.9	160.4	154.8	147.9	140.2	131.6
27.5°	185.7	184.8	183.5	180.5	177.1	174.5	171.5	165.9	159.1	150.5	141.1
30°	196.4	196.0	194.2	191.2	187.4	185.2	182.2	176.2	168.9	160.4	150.1
32.5°	206.2	205.4	204.1	201.1	197.2	194.7	192.1	185.7	177.9	168.9	158.7
35°	214.8	214.4	212.7	210.1	205.8	203.7	200.7	194.2	186.5	177.1	166.4
37.5°	223.4	223.4	221.7	218.7	214.8	212.3	209.2	202.8	194.7	185.2	174.5
40°	231.1	230.3	229.0	226.0	221.7	219.5	216.5	210.1	202.0	192.1	181.4
42.5°	237.6	236.7	235.4	232.4	228.5	226.0	223.0	216.5	208.4	199.0	187.4
45°	242.7	242.7	241.0	238.4	234.1	231.5	229.0	222.5	214.4	205.0	193.4
47.5°	247.8	247.4	245.7	243.1	238.8	236.7	234.1	227.7	219.5	210.1	198.5
50°	251.7	250.8	249.6	246.6	243.1	240.6	238.0	231.5	223.8	214.4	203.2
52.5°	254.7	254.3	252.6	250.0	246.6	244.4	241.4	235.4	227.7	218.3	207.1
55°	256.8	256.4	254.7	252.6	248.7	246.6	244.0	238.0	230.3	221.7	210.5
57.5°	258.1	257.7	256.4	253.8	250.0	247.8	245.7	239.7	232.8	224.3	213.5
60°	259.0	258.6	256.8	254.7	251.3	249.1	247.0	241.4	234.5	226.4	216.1
62.5°	259.0	258.6	256.8	254.3	251.3	249.1	247.0	241.8	235.8	228.1	218.3
65°	258.1	257.7	256.0	253.4	250.8	249.1	247.0	242.3	236.7	229.0	219.5
67.5°	256.4	256.0	254.3	252.1	249.6	248.3	246.6	241.8	236.7	229.8	221.3
70°	254.3	253.8	252.1	250.0	247.8	246.6	244.8	241.0	236.3	230.3	221.7
72.5°	250.8	250.4	249.1	247.0	245.3	244.0	242.3	239.3	235.0	229.8	222.1
75°	247.0	246.6	245.3	243.6	241.8	241.0	239.7	237.1	233.7	229.0	222.1
77.5°	242.3	242.7	241.4	239.7	238.4	238.0	236.7	235.0	232.0	227.7	221.7
80°	237.6	237.6	236.3	235.4	234.1	233.7	233.3	232.0	229.8	226.4	220.8
82.5°	232.0	232.8	231.5	230.7	230.3	229.8	229.4	229.0	227.3	224.7	219.5
85°	227.3	227.7	226.8	226.4	226.4	226.0	226.0	225.5	225.1	222.5	218.3
87.5°	223.0	222.5	221.7	221.7	222.1	222.1	222.1	222.5	222.1	220.8	216.5
90°	217.8	217.8	217.4	217.4	218.3	218.3	218.7	219.5	219.5	218.7	215.7
92.5°	213.1	213.1	213.1	213.5	214.4	214.8	215.3	216.5	217.0	216.5	214.0
95°	208.8	209.2	209.7	210.1	211.0	211.8	212.7	214.4	215.3	214.8	212.3
97.5°	206.7	206.7	207.1	207.5	208.8	209.7	210.5	212.3	213.5	213.5	211.8
100°	204.1	204.5	205.0	205.8	207.1	208.0	208.8	211.0	212.3	212.7	210.5
102.5°	202.8	202.8	203.2	204.1	205.4	206.7	207.5	209.7	211.0	211.4	209.7
105°	202.0	202.4	202.4	203.7	205.0	206.2	207.1	209.2	210.5	211.0	208.8
107.5°	202.4	202.4	202.8	204.1	205.4	206.2	207.1	209.2	210.1	210.1	208.0
110°	202.8	203.2	203.7	204.5	205.8	206.7	207.5	209.2	210.1	209.7	207.1



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CANDELA DISTRIBUTION (continued):

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
112.5°	203.7	204.1	204.5	205.8	206.7	207.5	208.4	209.7	210.1	209.2	206.2
115°	206.2	205.8	206.7	207.1	208.4	208.8	209.7	210.1	210.1	208.8	205.4
117.5°	208.0	208.4	208.8	209.2	209.7	210.1	211.0	211.0	211.0	208.8	204.5
120°	210.5	210.5	210.5	211.0	211.4	211.8	211.8	211.4	210.5	208.0	202.8
122.5°	212.3	212.3	212.7	213.1	213.1	213.1	213.1	212.3	210.5	207.1	201.1
125°	214.4	214.4	214.4	214.4	214.0	214.0	214.0	212.3	210.1	205.8	199.0
127.5°	216.1	215.7	215.7	215.3	214.8	214.4	214.0	211.8	208.8	204.1	196.8
130°	217.0	217.0	216.5	216.1	214.8	214.4	213.1	211.0	207.1	201.5	193.8
132.5°	217.8	217.4	217.0	216.1	214.8	214.0	212.7	209.7	205.0	198.5	190.4
135°	217.4	217.4	216.5	215.3	213.5	212.3	211.0	207.1	202.0	195.1	186.1
137.5°	216.1	215.7	214.8	213.1	211.4	209.7	208.4	204.1	198.1	190.8	181.4
140°	212.3	212.3	211.4	209.7	207.1	205.4	203.7	199.0	193.0	185.2	175.4
142.5°	208.8	208.4	207.1	205.0	202.4	200.2	198.5	193.4	187.0	178.8	168.9
145°	203.2	203.2	202.0	199.8	196.8	195.1	193.0	187.4	180.5	172.4	162.9
147.5°	197.7	196.8	195.5	193.4	190.4	188.2	186.1	180.5	173.7	165.5	156.5
150°	189.1	188.7	187.4	184.8	181.8	179.7	177.5	171.5	165.5	156.9	147.9
152.5°	179.7	178.8	177.5	175.4	171.9	169.8	168.1	162.1	155.7	147.9	139.8
155°	169.4	168.1	167.2	164.7	161.7	159.5	157.4	151.8	146.2	139.4	130.8
157.5°	158.2	156.9	156.1	153.5	150.5	148.8	146.6	141.5	135.9	129.9	122.6
160°	145.4	144.5	143.6	141.5	138.5	136.8	135.1	130.8	125.6	120.1	113.2
162.5°	131.6	130.8	130.4	128.2	125.6	123.9	122.6	118.8	114.5	109.8	103.3
165°	117.9	117.1	116.6	114.9	112.8	111.5	110.2	105.9	102.5	98.6	93.9
167.5°	103.3	102.9	102.5	100.8	99.5	98.2	97.3	95.2	91.8	89.2	85.8
170°	90.5	89.6	89.6	88.3	87.5	86.6	85.8	84.5	81.9	79.8	76.8
172.5°	78.0	77.2	77.2	76.3	75.5	75.0	74.6	73.8	72.0	70.3	69.0
175°	66.0	65.2	65.6	64.3	64.7	64.3	64.3	63.9	62.6	62.2	60.9
177.5°	55.7	54.9	55.3	54.9	54.9	54.9	54.9	54.9	54.5	54.5	54.0
180°	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6



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CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
0°	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6
2.5°	57.0	56.6	56.2	55.7	55.3	54.9	54.0	53.2	52.7	51.5	50.6
5°	63.5	62.2	61.3	59.6	58.7	58.3	56.6	54.9	53.2	51.9	50.2
7.5°	69.9	67.7	66.0	63.9	62.6	61.3	59.2	56.6	54.0	51.5	49.3
10°	75.9	73.3	70.3	67.7	66.0	64.7	61.3	58.3	54.9	51.5	48.5
12.5°	82.3	78.9	75.0	71.2	69.5	67.7	63.5	59.6	55.3	51.5	47.2
15°	89.6	84.9	80.2	75.5	72.9	70.8	66.0	60.9	56.2	51.5	46.7
17.5°	97.3	91.3	85.3	79.3	76.3	73.8	68.2	62.6	57.0	51.0	45.9
20°	105.1	97.8	90.5	83.6	80.2	76.8	70.3	63.9	57.5	51.0	44.6
22.5°	114.1	104.2	96.0	87.5	83.6	79.8	72.5	65.2	57.9	50.6	43.7
25°	122.2	112.8	102.1	91.8	87.5	82.8	74.6	66.5	58.3	50.2	42.9
27.5°	131.2	120.1	108.1	96.5	91.3	86.2	76.8	67.7	59.2	50.2	42.0
30°	139.4	127.4	114.9	101.2	95.2	89.6	78.9	69.0	59.6	49.7	41.2
32.5°	147.5	134.2	120.9	106.3	99.1	92.6	81.0	70.3	60.0	49.7	40.3
35°	154.4	141.1	126.5	111.1	103.3	96.0	83.2	71.6	60.5	49.3	39.4
37.5°	162.1	148.4	132.5	116.2	108.1	99.5	85.3	72.9	60.9	49.3	38.6
40°	168.5	154.4	137.6	120.9	112.3	102.9	87.5	73.8	61.3	48.9	37.7
42.5°	174.9	159.9	142.8	125.2	116.2	106.8	89.6	75.0	61.7	48.9	37.3
45°	180.5	165.5	148.4	129.9	120.1	110.2	91.8	75.9	62.2	48.5	36.4
47.5°	185.7	170.2	152.6	133.8	123.5	113.6	93.5	77.2	62.6	48.5	36.0
50°	190.0	174.9	156.9	137.2	127.4	116.2	95.6	78.0	63.0	48.0	35.2
52.5°	194.2	178.8	161.2	141.1	130.4	119.6	97.3	78.9	63.5	48.0	34.7
55°	197.7	182.2	164.7	144.5	133.4	122.2	99.1	80.2	63.5	47.6	34.3
57.5°	200.7	185.2	167.7	147.1	135.9	124.3	100.8	81.0	63.9	47.6	33.9
60°	203.7	188.2	170.7	149.6	138.9	126.9	102.5	81.9	64.3	47.6	33.4
62.5°	206.2	190.8	173.2	152.2	141.1	129.1	104.2	82.3	64.3	47.2	33.0
65°	208.0	193.4	175.8	154.8	143.2	131.2	105.5	83.2	64.7	47.2	33.0
67.5°	209.7	195.5	177.9	156.9	145.8	133.4	107.2	84.0	65.2	47.2	32.6
70°	211.0	197.2	179.7	159.1	147.5	135.1	108.5	84.5	65.2	47.2	32.2
72.5°	211.8	198.5	180.9	160.8	148.8	136.4	109.8	85.3	65.2	46.7	32.2
75°	212.3	199.0	182.2	161.7	150.1	137.6	111.1	85.8	65.6	46.7	31.7
77.5°	212.3	199.8	183.1	162.9	151.4	138.9	111.9	86.2	65.6	46.7	31.7
80°	212.3	199.8	183.5	163.4	151.8	139.4	112.3	86.2	65.6	46.3	31.3
82.5°	211.4	199.8	184.0	164.2	152.2	139.8	113.2	86.6	65.2	46.3	31.3
85°	211.0	199.4	184.0	164.2	153.1	140.2	113.6	86.6	65.2	45.9	30.9
87.5°	210.1	199.4	184.0	164.2	153.1	140.2	113.6	86.6	64.7	45.5	30.9
90°	209.2	198.5	183.5	164.2	152.6	140.6	113.6	86.6	64.7	45.5	30.4
92.5°	208.0	197.7	183.1	163.4	152.6	140.2	113.6	86.6	64.7	45.5	30.4
95°	207.1	196.8	182.2	162.9	152.2	139.8	113.2	86.6	64.3	45.5	30.4
97.5°	205.8	196.0	181.4	162.5	151.4	139.4	112.8	86.6	64.3	45.5	30.4
100°	205.0	195.1	180.5	161.7	150.9	138.9	112.8	86.2	64.3	45.0	30.4
102.5°	204.1	194.2	179.7	160.8	149.6	137.6	111.5	85.8	64.3	45.5	30.4
105°	202.8	193.0	178.4	159.5	148.8	136.8	111.1	85.8	63.9	45.5	30.9
107.5°	202.0	191.7	177.1	158.2	147.5	135.9	110.2	84.9	63.9	45.5	30.9
110°	200.7	190.4	175.8	156.9	146.2	134.6	109.3	84.5	63.9	45.5	31.3



TEST NUMBER: P190078

CATALOG NUMBER: TRO11-LD4-10W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	50°	55°	60°	65°	67.5°	70°	75°	80°	85°	90°	95°
112.5°	199.4	188.7	173.7	154.8	144.5	132.9	108.1	84.0	63.5	45.5	31.3
115°	198.1	187.0	171.9	153.1	142.8	131.2	106.3	83.2	63.5	45.5	31.7
117.5°	196.4	185.2	169.8	151.4	140.6	129.5	105.1	82.8	63.0	45.9	32.2
120°	194.7	182.7	167.7	148.8	138.5	127.4	103.3	81.9	63.0	45.9	32.2
122.5°	192.5	180.5	165.1	146.2	135.9	125.2	101.6	80.6	62.2	45.9	32.6
125°	189.5	177.1	161.7	143.2	132.9	122.2	99.9	79.8	61.7	45.9	33.0
127.5°	187.0	174.1	158.7	139.8	129.9	119.6	97.8	78.5	61.3	45.9	33.4
130°	183.1	170.2	154.8	136.8	126.9	117.1	96.0	77.2	60.9	45.9	33.4
132.5°	179.7	166.4	150.9	132.9	123.9	114.1	93.9	76.3	60.5	45.9	33.9
135°	175.4	162.1	146.6	129.1	120.1	110.6	91.8	75.0	59.6	45.9	34.7
137.5°	170.2	156.9	141.9	125.2	116.6	106.8	89.6	73.8	59.2	46.3	35.2
140°	164.7	151.4	136.8	120.9	112.8	103.3	87.0	72.0	58.7	46.3	35.6
142.5°	158.2	145.8	131.2	116.2	107.6	99.5	84.5	70.8	57.9	46.3	36.0
145°	151.8	139.8	126.1	111.9	103.8	96.5	82.3	69.5	57.5	46.3	36.9
147.5°	145.8	133.8	120.9	106.3	99.9	93.0	80.2	68.2	57.0	46.7	37.7
150°	138.5	126.9	114.9	101.6	95.6	89.6	77.6	66.9	56.6	46.7	38.2
152.5°	130.4	120.1	108.5	96.9	91.8	85.8	75.5	65.2	55.7	46.7	39.0
155°	122.6	112.8	102.1	91.8	87.0	82.3	72.9	63.9	55.3	47.2	39.9
157.5°	114.5	105.5	96.5	87.9	83.2	78.9	70.8	62.6	54.9	47.6	40.7
160°	105.5	98.2	90.5	82.8	79.3	75.5	68.2	60.9	54.0	47.6	41.6
162.5°	97.3	91.3	84.5	78.5	75.0	72.0	65.6	59.6	53.6	47.6	42.5
165°	89.2	84.0	78.9	73.8	70.8	68.2	63.0	57.9	52.7	48.0	43.3
167.5°	81.9	77.6	73.3	69.5	67.3	64.7	60.5	56.2	52.3	48.0	44.2
170°	74.2	70.8	68.2	64.7	63.0	61.3	57.9	54.9	51.5	48.5	45.0
172.5°	66.9	64.3	62.6	60.5	59.2	57.9	55.3	52.7	50.6	48.0	45.9
175°	60.0	58.3	57.0	56.2	54.9	54.5	52.7	51.0	49.7	48.0	46.7
177.5°	53.6	52.7	52.3	51.9	51.5	51.0	50.2	49.7	48.9	48.5	47.6
180°	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6



TEST NUMBER: P190078

CATALOG NUMBER: TRO11-LD4-10W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
0°	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6
2.5°	49.7	48.9	48.0	47.2	46.7	46.3	45.5	44.2	43.7	43.3	42.5
5°	48.0	46.3	45.0	44.2	43.3	41.6	40.3	39.0	37.7	36.9	36.0
7.5°	46.7	44.2	42.0	40.7	39.9	37.7	36.0	34.3	32.6	31.7	30.4
10°	45.0	42.0	39.4	37.7	36.4	34.3	32.2	30.0	28.3	27.0	25.7
12.5°	43.3	39.9	36.4	34.7	33.4	30.9	28.3	26.2	24.4	22.7	21.4
15°	42.0	37.7	33.9	32.2	30.4	27.9	24.9	22.7	21.0	19.3	18.0
17.5°	40.3	35.6	31.7	30.0	27.9	24.9	22.3	19.7	18.0	16.7	15.4
20°	39.0	33.9	29.6	27.4	25.7	22.3	19.7	17.6	15.9	14.6	13.7
22.5°	37.3	31.7	27.4	25.3	23.2	20.2	17.6	15.4	14.2	13.3	12.4
25°	36.0	30.0	25.3	23.2	21.4	18.0	15.9	14.2	12.9	12.4	12.0
27.5°	34.7	28.7	23.6	21.4	19.3	16.3	14.2	12.9	12.0	11.6	11.1
30°	33.4	27.0	21.9	19.7	18.0	15.0	13.3	12.4	11.6	11.1	11.1
32.5°	32.2	25.7	20.6	18.4	16.7	14.2	12.4	11.6	11.1	11.1	11.6
35°	30.9	24.4	19.3	17.2	15.4	13.3	12.0	11.6	11.1	11.6	11.6
37.5°	30.0	23.2	18.0	16.3	14.6	12.9	12.0	11.6	11.6	11.6	11.6
40°	29.2	22.3	17.2	15.4	14.2	12.4	11.6	11.6	11.6	12.0	11.6
42.5°	28.3	21.0	16.3	14.6	13.3	12.0	11.6	11.6	12.0	12.0	11.1
45°	27.0	20.2	15.4	14.2	12.9	12.0	11.6	12.0	12.0	11.6	10.7
47.5°	26.6	19.7	15.0	13.7	12.9	12.0	11.6	12.0	12.0	11.1	10.3
50°	25.7	18.9	14.6	13.3	12.4	12.0	12.0	12.4	11.6	10.7	9.9
52.5°	25.3	18.0	14.2	12.9	12.4	12.0	12.0	12.4	11.6	10.3	9.0
55°	24.4	17.6	13.7	12.9	12.4	12.0	12.4	12.0	11.1	9.9	8.1
57.5°	24.0	17.2	13.3	12.9	12.0	12.0	12.4	12.0	10.7	9.4	7.7
60°	23.6	16.7	13.3	12.4	12.0	12.4	12.4	12.0	10.3	9.0	7.3
62.5°	23.2	16.3	13.3	12.4	12.4	12.4	12.9	11.6	9.9	8.1	6.9
65°	22.7	15.9	13.3	12.4	12.4	12.9	12.4	11.6	9.4	7.7	6.4
67.5°	22.3	15.9	12.9	12.4	12.4	12.9	12.4	11.1	9.4	7.3	6.0
70°	21.9	15.4	12.9	12.4	12.4	12.9	12.4	10.7	9.0	7.3	5.6
72.5°	21.9	15.4	12.9	12.4	12.4	12.9	12.4	10.7	8.6	6.9	5.1
75°	21.4	15.4	12.9	12.4	12.4	13.3	12.4	10.3	8.6	6.4	4.7
77.5°	21.4	15.0	12.9	12.4	12.4	13.3	12.4	10.3	8.1	6.4	4.7
80°	21.0	15.0	12.9	12.4	12.9	13.3	12.0	9.9	7.7	6.0	4.3
82.5°	21.0	15.0	12.9	12.4	12.9	13.3	12.0	9.9	7.7	5.6	4.3
85°	20.6	14.6	12.9	12.4	12.4	12.9	12.0	9.4	7.3	5.6	3.9
87.5°	20.6	14.6	12.4	12.4	12.4	12.9	11.6	9.4	7.3	5.1	3.9
90°	20.6	14.6	12.4	12.4	12.4	12.9	11.6	9.4	7.3	5.1	3.4
92.5°	20.6	14.6	12.9	12.4	12.4	12.9	11.6	9.4	7.3	5.1	3.9
95°	20.6	14.6	12.9	12.4	12.4	12.9	11.6	9.4	7.3	5.1	3.9
97.5°	20.6	14.6	12.4	12.4	12.4	12.9	11.6	9.4	7.3	5.1	3.9
100°	20.6	14.6	12.4	12.4	12.4	12.9	11.6	9.4	7.3	5.6	3.9
102.5°	20.6	14.6	12.4	12.4	12.4	12.9	12.0	9.9	7.3	5.6	3.9
105°	20.6	14.6	12.4	12.4	12.4	12.9	12.0	9.9	7.7	5.6	4.3
107.5°	21.0	15.0	12.4	12.4	12.4	12.9	12.0	9.9	7.7	6.0	4.3
110°	21.0	15.0	12.9	12.4	12.4	12.9	12.4	10.3	8.1	6.0	4.7



TEST NUMBER: P190078

CATALOG NUMBER: TRO11-LD4-10W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	100°	105°	110°	112.5°	115°	120°	125°	130°	135°	140°	145°
112.5°	21.4	15.0	12.9	12.4	12.4	12.9	12.4	10.7	8.6	6.4	4.7
115°	21.9	15.4	12.9	12.4	12.4	12.9	12.4	11.1	9.0	6.9	5.6
117.5°	22.3	15.9	13.3	12.4	12.4	12.9	12.9	11.6	9.4	7.7	6.0
120°	22.7	16.3	13.3	12.9	12.4	12.9	13.3	12.0	10.3	8.1	6.4
122.5°	23.2	16.3	13.3	12.9	12.4	12.9	13.3	12.4	10.7	8.6	7.3
125°	23.6	17.2	13.7	12.9	12.4	12.9	13.3	12.4	11.1	9.4	7.7
127.5°	24.0	17.6	13.7	12.9	12.9	12.4	13.3	12.9	12.0	10.3	8.6
130°	24.4	18.0	14.2	13.3	12.9	12.4	12.9	13.3	12.4	11.1	9.4
132.5°	25.3	18.4	14.6	13.3	12.9	12.4	12.9	13.3	12.9	11.6	10.3
135°	25.7	19.3	15.0	13.7	12.9	12.4	12.9	13.3	13.3	12.4	11.1
137.5°	26.6	20.2	15.4	14.2	13.3	12.4	12.4	12.9	13.3	12.9	12.0
140°	27.4	20.6	16.3	14.6	13.7	12.9	12.4	12.9	13.3	13.3	12.9
142.5°	27.9	21.9	17.2	15.4	14.2	12.9	12.4	12.4	12.9	13.3	13.3
145°	29.2	22.7	18.0	16.3	15.0	13.3	12.4	12.4	12.9	13.3	13.3
147.5°	30.0	24.0	19.3	17.2	15.9	13.7	12.9	12.4	12.4	12.9	13.3
150°	31.3	25.3	20.6	18.4	16.7	14.6	13.3	12.9	12.4	12.9	12.9
152.5°	32.2	26.6	21.9	19.7	18.0	15.4	14.2	12.9	12.9	12.9	12.9
155°	33.4	27.9	23.6	21.4	19.7	17.2	15.0	13.7	13.3	12.9	12.9
157.5°	34.7	29.6	25.3	23.6	21.9	18.9	16.7	15.0	13.7	13.3	12.9
160°	36.4	31.3	27.4	25.3	23.6	21.0	18.4	16.3	15.0	14.2	13.7
162.5°	37.7	33.4	29.6	27.9	26.2	23.2	20.6	18.9	17.2	15.9	15.0
165°	39.0	35.2	31.7	30.0	28.7	25.7	23.6	21.4	19.7	18.4	17.2
167.5°	40.7	37.3	34.3	32.6	31.3	28.7	26.6	24.9	23.2	21.4	20.6
170°	42.0	39.4	36.9	35.6	34.3	32.2	30.0	28.3	26.6	25.3	24.4
172.5°	43.3	41.2	39.4	38.2	37.3	35.6	33.9	32.2	30.9	30.0	28.7
175°	45.0	43.7	42.0	41.2	40.7	39.4	38.2	36.9	36.0	35.2	34.3
177.5°	46.7	45.9	45.0	44.6	44.6	43.7	42.9	42.5	41.6	41.2	41.2
180°	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6



TEST NUMBER: P190078

CATALOG NUMBER: TRO11-LD4-10W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
0°	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6
2.5°	41.6	41.2	41.6	41.2	40.7	40.3	39.9	40.3
5°	35.2	34.3	34.3	33.9	33.4	33.0	32.6	33.0
7.5°	29.6	28.3	28.3	27.9	27.0	27.0	26.2	26.6
10°	24.4	23.6	23.2	22.7	22.3	21.9	21.4	21.4
12.5°	20.2	19.3	18.9	18.4	18.0	17.6	17.2	17.2
15°	17.2	16.3	15.9	15.9	15.0	15.0	14.6	14.6
17.5°	14.6	14.2	13.7	13.7	13.3	12.9	12.9	12.9
20°	13.3	12.9	12.4	12.4	12.0	12.0	12.0	12.0
22.5°	12.0	11.6	11.6	11.6	11.6	11.1	11.1	11.1
25°	11.6	11.1	11.1	11.1	11.1	11.1	11.1	11.1
27.5°	11.1	11.1	11.1	11.1	11.1	11.6	11.6	11.1
30°	11.1	11.6	11.6	11.6	11.6	11.6	11.6	11.6
32.5°	11.6	11.6	11.6	11.6	11.6	11.1	11.1	11.1
35°	11.6	11.6	11.6	11.1	11.1	10.7	10.7	10.7
37.5°	11.6	11.1	11.1	10.7	10.3	9.9	9.9	9.9
40°	11.1	10.7	10.3	9.9	9.4	9.0	9.0	9.0
42.5°	10.7	9.9	9.4	9.4	8.6	8.1	7.7	7.7
45°	9.9	9.0	8.6	8.1	7.7	7.3	6.9	6.9
47.5°	9.4	8.6	8.1	7.7	6.9	6.4	6.0	6.0
50°	8.6	7.7	6.9	6.9	6.0	5.6	5.1	5.1
52.5°	7.7	6.9	6.4	6.0	5.1	4.7	4.3	4.3
55°	7.3	6.0	5.6	5.1	4.7	3.9	3.9	3.4
57.5°	6.4	5.6	4.7	4.3	3.9	3.4	3.0	3.0
60°	6.0	4.7	4.3	3.9	3.4	3.0	2.6	2.6
62.5°	5.6	4.3	3.9	3.4	3.0	2.1	2.1	2.1
65°	5.1	3.9	3.4	3.0	2.6	1.7	1.7	1.7
67.5°	4.7	3.4	3.0	2.6	2.1	1.7	1.3	1.3
70°	4.3	3.0	2.6	2.1	1.7	1.3	0.9	0.9
72.5°	3.9	3.0	2.6	2.1	1.3	0.9	0.9	0.9
75°	3.4	2.6	2.1	1.7	1.3	0.9	0.9	0.9
77.5°	3.4	2.1	2.1	1.7	1.3	0.9	1.3	0.9
80°	3.0	2.1	1.7	1.3	1.3	0.9	0.9	0.9
82.5°	3.0	2.1	1.7	1.3	0.9	0.9	0.9	0.9
85°	2.6	1.7	1.3	1.3	0.9	0.9	0.9	0.9
87.5°	2.6	1.3	1.3	0.9	0.9	0.9	0.9	0.9
90°	2.6	1.3	1.3	0.9	0.9	0.9	0.9	0.9
92.5°	2.6	1.7	1.3	0.9	0.9	0.9	0.9	0.9
95°	2.6	1.7	1.3	0.9	0.9	0.9	0.9	0.9
97.5°	2.6	1.7	1.3	0.9	0.9	0.9	0.9	0.9
100°	2.6	1.7	1.3	0.9	0.9	0.9	0.9	0.4
102.5°	2.6	1.7	1.3	0.9	0.9	0.4	0.4	0.4
105°	3.0	2.1	1.7	1.3	0.9	0.4	0.4	0.4
107.5°	3.0	2.1	1.7	1.3	0.9	0.4	0.4	0.4
110°	3.4	2.6	2.1	1.7	1.3	0.9	0.4	0.4



TEST NUMBER: P190078

CATALOG NUMBER: TRO11-LD4-10W-50-CL-BK-UNV-EDC1

CANDELA DISTRIBUTION (continued):

	150°	155°	157.5°	160°	165°	170°	175°	180°
112.5°	3.9	2.6	2.1	1.7	1.3	0.9	0.9	0.9
115°	4.3	3.0	2.6	2.6	1.7	1.3	1.3	1.3
117.5°	4.7	3.9	3.4	3.0	2.1	2.1	1.7	1.7
120°	5.1	4.3	3.9	3.4	3.0	2.6	2.1	2.1
122.5°	5.6	4.7	4.3	3.9	3.4	3.0	2.6	2.6
125°	6.4	5.1	4.7	4.3	3.9	3.4	3.0	3.0
127.5°	7.3	6.0	5.6	5.1	4.7	3.9	3.9	3.9
130°	8.1	6.9	6.4	6.0	5.1	4.7	4.3	4.3
132.5°	9.0	7.7	7.3	6.9	6.0	5.6	5.1	5.1
135°	10.3	9.0	8.6	8.1	7.3	6.4	6.4	6.4
137.5°	11.1	9.9	9.4	9.0	8.6	7.7	7.7	7.3
140°	12.0	11.1	10.7	10.3	9.9	9.0	9.0	9.0
142.5°	12.9	12.0	12.0	11.6	11.1	10.7	10.3	10.3
145°	13.3	13.3	12.9	12.9	12.4	12.0	11.6	11.6
147.5°	13.3	13.7	13.3	13.3	13.3	12.9	12.9	12.9
150°	13.3	13.3	13.7	13.7	13.7	13.7	13.3	13.3
152.5°	12.9	12.9	13.3	13.3	13.3	13.7	13.7	13.7
155°	12.9	12.9	12.9	12.9	12.9	12.9	12.9	13.3
157.5°	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
160°	13.3	12.9	12.9	12.9	12.9	12.9	12.9	12.9
162.5°	14.2	13.7	13.7	13.3	13.3	13.3	12.9	12.9
165°	16.3	15.4	15.4	15.0	14.6	14.6	14.2	14.2
167.5°	19.3	18.4	18.0	17.6	17.2	17.2	16.7	16.7
170°	23.2	22.3	21.9	21.4	21.0	21.0	20.6	20.6
172.5°	27.9	27.0	26.6	26.2	25.7	25.7	25.3	25.3
175°	33.4	32.6	32.6	32.6	31.7	31.7	31.3	31.3
177.5°	40.3	39.9	39.9	39.4	39.4	39.4	39.0	39.0
180°	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6

(END OF REPORT)