

LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: HALO

Report Number: P601169

Luminaire Tested: **ML406AWW9FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 4000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601169  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML406AWW9FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 4000K  
 Description: RETROFIT, 25D WW OPTIC, OPEN TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 4000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 525.0 lumens  
 Efficiency: N/A  
 Efficacy: 63.3 lumens/watt  
 Spacing Criteria (0/90/45): 1.31 / 0.61 / 0.81  
 Luminous Opening: Circular (Dia: 0.21' x H: 0')  
 CIE Type: Direct

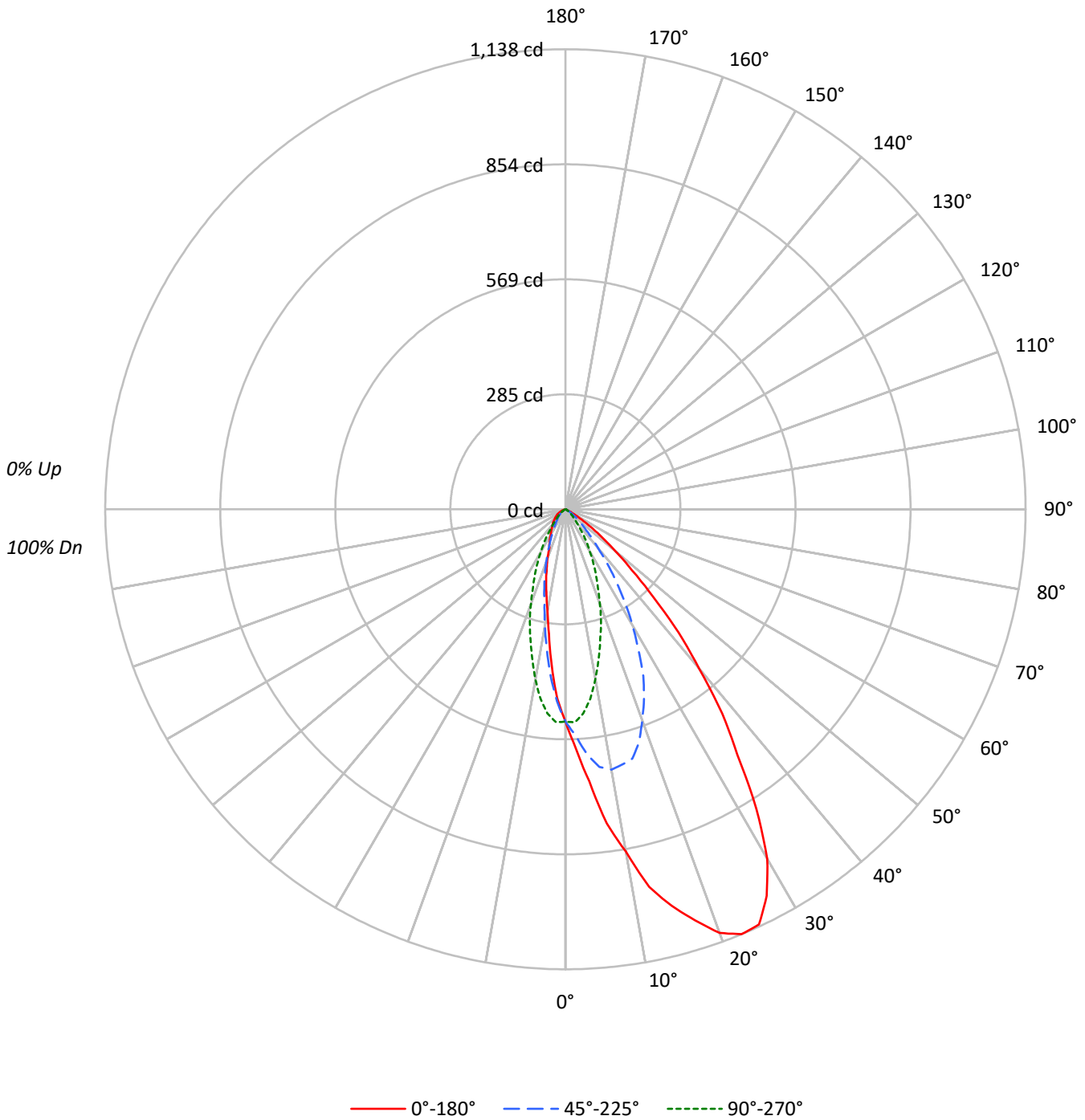
Input Watts (W): 8.3  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



Meas		Calibration Due Date	
Instrument	Identificatio		
Photometer	GONIO 1 11111111	4/22/2021	10/22/2021
Power Meter	XITRON 2801 IN0197	12/1/2020	12/1/2021
AC Power Source	CHROMA 61505 IN0196	12/1/2020	12/1/2021
DC Power Supply	AGILENT E3634A IN0198	11/30/2020	11/30/2021
Room Thermometer	ONSET IN0143	12/1/2020	12/1/2021

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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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	113	110	107	105	111	108	106	103	104	102	100	100	99	97	97	96	94	93
2	107	102	97	94	105	100	96	93	97	93	91	94	91	89	91	89	87	85
3	101	94	89	84	99	93	88	84	90	86	82	87	84	81	85	82	80	78
4	95	87	81	77	93	86	80	76	84	79	75	82	78	74	80	76	73	72
5	90	81	75	70	88	80	74	70	78	73	69	76	72	68	75	71	68	66
6	85	75	69	64	83	75	68	64	73	68	64	72	67	63	70	66	63	61
7	80	70	64	59	79	70	64	59	68	63	59	67	62	59	66	62	58	57
8	76	66	60	55	75	65	59	55	64	59	55	63	58	55	62	58	54	53
9	72	62	56	51	71	61	55	51	60	55	51	60	54	51	59	54	51	49
10	69	58	52	48	68	58	52	48	57	52	48	56	51	48	55	51	48	46

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

	0°	90°	180°
0°	165745	165745	165745
5°	214114	160673	123302
10°	275651	136848	81666
15°	331938	108859	60216
20°	374775	83873	43650
25°	394851	62052	32681
30°	363958	44228	26362
35°	285948	29836	22897
40°	212490	18096	20239
45°	137183	12280	18041
50°	80318	8892	16064
55°	42610	6166	14203
60°	17935	3284	12504
65°	6426	2540	9638
70°	831	1570	5539
75°	1098	1098	0
80°	0	0	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	48.4	9.2
10°-20°	125.3	23.9
20°-30°	153.1	29.2
30°-40°	114.6	21.8
40°-50°	56.8	10.8
50°-60°	20.9	4.0
60°-70°	5.2	1.0
70°-80°	0.7	0.1
80°-90°	0.0	0.0
90°-100°	0.0	0.0
100°-110°	0.0	0.0
110°-120°	0.0	0.0
120°-130°	0.0	0.0
130°-140°	0.0	0.0
140°-150°	0.0	0.0
150°-160°	0.0	0.0
160°-170°	0.0	0.0
170°-180°	0.0	0.0
<b>0°-30°</b>	<b>326.8</b>	<b>62.2</b>
<b>0°-40°</b>	<b>441.4</b>	<b>84.1</b>
<b>0°-60°</b>	<b>519.1</b>	<b>98.9</b>
<b>0°-90°</b>	<b>525.0</b>	<b>100.0</b>
90°-120°	0.0	0.0
90°-150°	0.0	0.0
<b>90°-180°</b>	<b>0.0</b>	<b>0.0</b>
<b>0°-180°</b>	<b>525.0</b>	<b>100.0</b>

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	525	525	525	525	525	
5°	676	608	507	416	389	71
15°	1015	638	333	202	184	289
25°	1133	455	178	90	94	508
35°	742	219	77	41	59	468
45°	307	71	28	23	40	245
55°	77	20	11	10	26	74
65°	9	3	3	3	13	10
75°	1	1	1	0	0	1
85°	0	0	0	0	0	0
90°	0	0	0	0	0	0

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**CANDELA DISTRIBUTION (FULL):**

	0°	5°	10°	15°	20°	22.5°	45°	67.5°	90°	112.5°	135°
0°	524.9	524.9	524.9	524.9	524.9	524.9	524.9	524.9	524.9	524.9	524.9
2.5°	591.2	591.2	598.1	586.9	586.9	583.4	558.5	543.9	527.5	503.4	475.0
5°	675.5	692.7	679.0	660.0	671.2	666.1	607.5	554.2	506.9	460.4	415.6
7.5°	783.9	788.2	776.2	752.1	746.9	743.5	642.8	555.0	472.4	402.7	351.1
10°	859.7	865.7	860.5	851.9	822.7	815.8	654.0	522.3	426.8	352.8	290.9
12.5°	956.9	955.2	947.4	922.5	888.9	879.5	647.1	493.1	378.6	296.9	238.4
15°	1015.4	1025.8	1014.6	948.3	932.8	908.7	638.5	453.5	333.0	257.3	202.2
17.5°	1066.2	1061.9	1040.4	998.2	958.6	937.1	605.0	395.8	292.6	214.3	166.9
20°	1115.3	1116.1	1082.6	1030.9	967.2	928.5	555.0	356.3	249.6	176.4	138.5
22.5°	1137.6	1135.9	1092.9	1016.3	942.3	902.7	507.7	311.5	209.1	142.8	111.0
25°	1133.3	1102.3	1073.9	983.6	900.1	851.9	455.2	272.8	178.1	120.5	89.5
27.5°	1078.2	1062.8	1014.6	924.2	827.8	778.8	389.8	233.2	148.9	94.7	73.1
30°	998.2	980.1	922.5	847.6	721.1	682.4	332.2	191.0	121.3	80.9	60.2
32.5°	879.5	865.7	806.3	708.2	609.3	565.4	275.4	152.3	98.1	59.4	49.1
35°	741.8	740.9	688.4	608.4	505.1	460.4	218.6	122.2	77.4	47.3	41.3
37.5°	636.8	614.4	562.8	488.8	401.9	364.9	171.2	95.5	57.7	37.0	34.4
40°	515.5	506.0	451.8	389.0	312.4	284.8	126.5	71.4	43.9	30.1	31.0
42.5°	414.8	401.9	357.1	296.0	241.8	219.4	96.4	55.1	34.4	25.8	27.5
45°	307.2	301.2	275.4	220.3	179.0	163.5	71.4	43.0	27.5	21.5	23.2
47.5°	223.7	216.9	198.8	163.5	129.9	120.5	55.1	33.6	22.4	17.2	18.1
50°	163.5	159.2	147.2	118.8	95.5	87.8	41.3	25.8	18.1	13.8	15.5
52.5°	112.7	114.5	104.1	84.3	68.0	62.8	31.0	18.9	14.6	11.2	12.9
55°	77.4	75.7	71.4	55.1	43.9	40.4	19.8	12.9	11.2	8.6	9.5
57.5°	47.3	47.3	43.9	34.4	27.5	25.8	12.0	8.6	7.7	6.0	7.7
60°	28.4	28.4	24.1	19.8	16.4	14.6	6.9	5.2	5.2	4.3	6.0
62.5°	15.5	15.5	13.8	11.2	8.6	7.7	4.3	4.3	3.4	3.4	5.2
65°	8.6	7.7	6.9	5.2	4.3	4.3	2.6	3.4	3.4	3.4	3.4
67.5°	3.4	3.4	3.4	2.6	2.6	2.6	1.7	2.6	2.6	2.6	2.6
70°	0.9	1.7	1.7	1.7	0.9	0.9	1.7	1.7	1.7	1.7	1.7
72.5°	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
75°	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0
80°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
87.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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**CANDELA DISTRIBUTION (continued):**

	157.5°	180°
0°	524.9	524.9
2.5°	475.9	468.1
5°	398.4	389.0
7.5°	316.7	310.7
10°	259.0	254.7
12.5°	218.6	216.0
15°	185.0	184.2
17.5°	155.8	153.2
20°	127.4	129.9
22.5°	105.0	103.3
25°	88.6	93.8
27.5°	75.7	82.6
30°	66.3	72.3
32.5°	56.8	66.3
35°	49.9	59.4
37.5°	44.7	53.4
40°	41.3	49.1
42.5°	36.1	45.6
45°	31.8	40.4
47.5°	27.5	36.1
50°	25.0	32.7
52.5°	21.5	29.3
55°	18.1	25.8
57.5°	16.4	23.2
60°	13.8	19.8
62.5°	10.3	16.4
65°	7.7	12.9
67.5°	5.2	9.5
70°	2.6	6.0
72.5°	0.9	1.7
75°	0.0	0.0
77.5°	0.0	0.0
80°	0.0	0.0
82.5°	0.0	0.0
85°	0.0	0.0
87.5°	0.0	0.0
90°	0.0	0.0

(END OF REPORT)