

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: P601275

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 3000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601275  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML410LSAWW9FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 3000K  
 Description: RETROFIT, 25D WW OPTIC, OPEN TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 3000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 624.7 lumens  
 Efficiency: N/A  
 Efficacy: 48.4 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

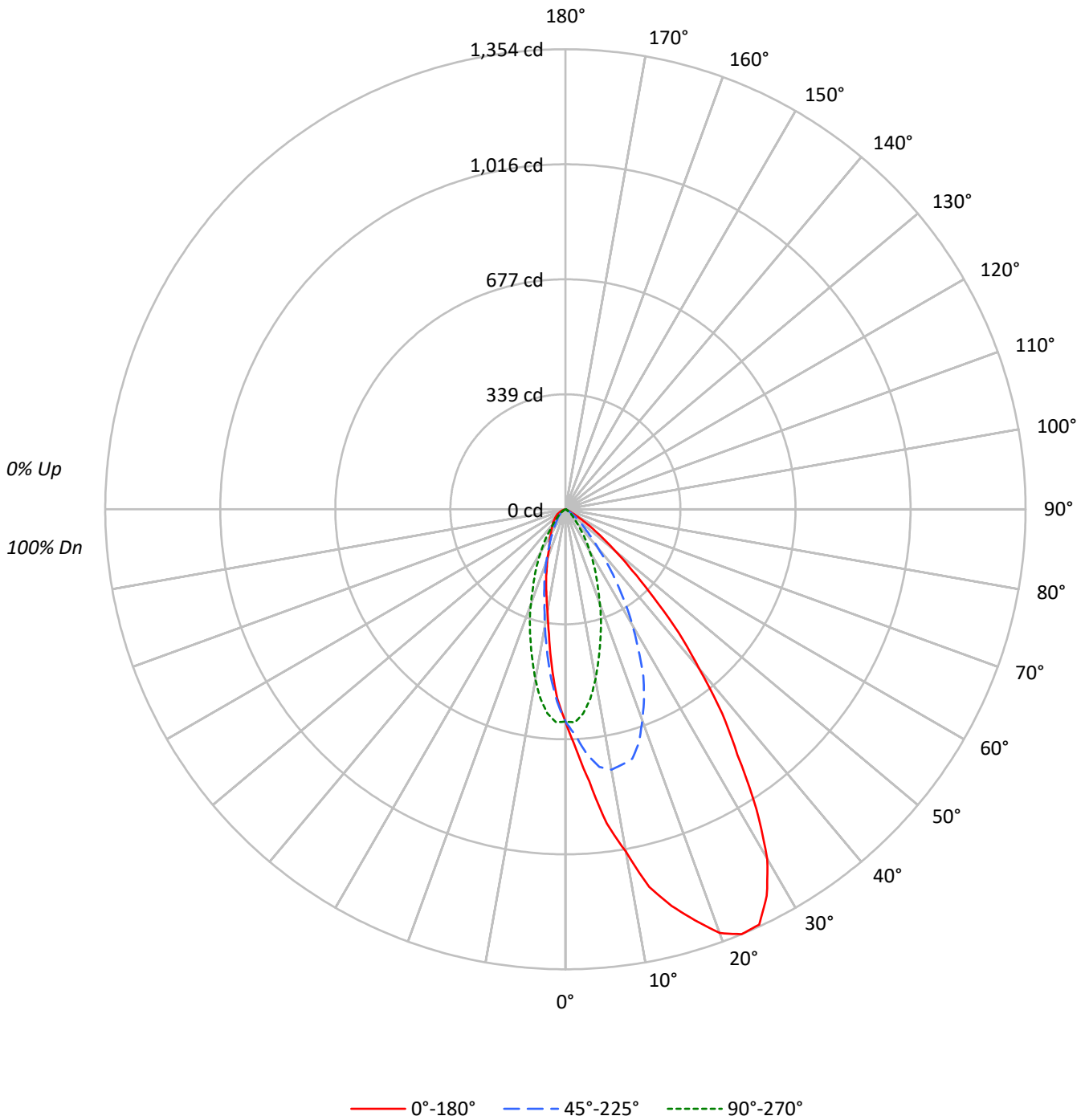
Input Watts (W): 12.9  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



Meas			
Instrument	Identificatio		Calibration Due Date
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	50	30	10	0
RCR																					
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	102	102	102	100
1	113	110	107	105	111	108	106	103	104	102	100	100	99	97	97	96	94	94	94	94	93
2	107	102	97	94	105	100	96	93	97	93	91	94	91	89	91	89	87	87	87	87	85
3	101	94	89	84	99	93	88	84	90	86	82	87	84	81	85	82	80	80	80	80	78
4	95	87	81	77	93	86	80	76	84	79	75	82	78	74	80	76	73	73	73	73	72
5	90	81	75	70	88	80	74	70	78	73	69	76	72	68	75	71	68	68	68	68	66
6	85	75	69	64	83	75	68	64	73	68	64	72	67	63	70	66	63	63	63	63	61
7	80	70	64	59	79	70	64	59	68	63	59	67	62	59	66	62	58	58	58	58	57
8	76	66	60	55	75	65	59	55	64	59	55	63	58	55	62	58	54	54	54	54	53
9	72	62	56	51	71	61	55	51	60	55	51	60	54	51	59	54	51	51	51	51	49
10	69	58	52	48	68	58	52	48	57	52	48	56	51	48	55	51	48	48	48	48	46

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

	0°	90°	180°
0°	197228	197228	197228
5°	254775	191169	146696
10°	327988	162850	97188
15°	395006	129556	71640
20°	445927	99795	51972
25°	469873	73835	38877
30°	433102	52658	31348
35°	340267	35539	27219
40°	252826	21528	24054
45°	163253	14622	21484
50°	95568	10559	19096
55°	50755	7351	16918
60°	21314	3870	14845
65°	7654	3075	11481
70°	929	1858	6586
75°	1227	1227	0
80°	0	0	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	57.6	9.2
10°-20°	149.1	23.9
20°-30°	182.2	29.2
30°-40°	136.3	21.8
40°-50°	67.6	10.8
50°-60°	24.9	4.0
60°-70°	6.2	1.0
70°-80°	0.8	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>388.8</b>	<b>62.2</b>
<b>0°-40°</b>	<b>525.2</b>	<b>84.1</b>
<b>0°-60°</b>	<b>617.7</b>	<b>98.9</b>
<b>0°-90°</b>	<b>624.7</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>624.7</b>	<b>100.0</b>

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	625	625	625	625	625	
5°	804	723	603	495	463	84
15°	1208	760	396	241	219	344
25°	1349	542	212	106	112	605
35°	883	260	92	49	71	556
45°	366	85	33	28	48	292
55°	92	24	13	11	31	88
65°	10	3	4	4	15	12
75°	1	1	1	0	0	1
85°	0	0	0	0	0	0
90°	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°	624.6	624.6	624.6	624.6	624.6	624.6	624.6	624.6	624.6	624.6	624.6
2.5°	703.4	703.4	711.7	698.3	698.3	694.3	664.6	647.2	627.7	599.0	565.2
5°	803.8	824.3	807.9	785.4	798.8	792.5	722.9	659.5	603.1	547.9	494.5
7.5°	932.8	938.0	923.6	895.0	888.8	884.7	764.9	660.5	562.1	479.3	417.8
10°	1022.9	1030.2	1024.0	1013.8	978.9	970.7	778.3	621.6	507.9	419.8	346.1
12.5°	1138.6	1136.6	1127.4	1097.7	1057.8	1046.5	770.0	586.7	450.5	353.2	283.6
15°	1208.3	1220.6	1207.3	1128.4	1110.0	1081.3	759.8	539.6	396.3	306.1	240.6
17.5°	1268.7	1263.6	1238.0	1187.8	1140.7	1115.1	719.8	471.0	348.1	255.0	198.7
20°	1327.0	1328.1	1288.2	1226.7	1151.0	1104.9	660.5	423.9	297.0	209.9	164.8
22.5°	1353.8	1351.6	1300.4	1209.3	1121.3	1074.1	604.1	370.7	248.9	169.9	132.1
25°	1348.6	1311.7	1277.9	1170.5	1071.1	1013.8	541.6	324.6	211.9	143.3	106.5
27.5°	1283.0	1264.6	1207.3	1099.8	985.1	926.7	463.9	277.5	177.2	112.7	87.1
30°	1187.8	1166.3	1097.7	1008.7	858.1	812.0	395.2	227.3	144.4	96.2	71.7
32.5°	1046.5	1030.2	959.5	842.7	724.9	672.7	327.7	181.3	116.7	70.6	58.4
35°	882.7	881.6	819.1	723.9	601.1	547.9	260.1	145.4	92.2	56.3	49.1
37.5°	757.8	731.2	669.7	581.6	478.2	434.2	203.8	113.7	68.6	44.0	41.0
40°	613.4	602.1	537.6	462.8	371.7	339.0	150.5	85.0	52.2	35.9	36.9
42.5°	493.5	478.2	424.9	352.2	287.7	261.1	114.7	65.6	41.0	30.7	32.7
45°	365.6	358.4	327.7	262.1	213.0	194.5	85.0	51.2	32.7	25.6	27.6
47.5°	266.3	258.0	236.5	194.5	154.7	143.3	65.6	40.0	26.6	20.5	21.5
50°	194.5	189.4	175.1	141.3	113.7	104.5	49.1	30.7	21.5	16.4	18.5
52.5°	134.2	136.2	123.9	100.3	80.9	74.7	36.9	22.5	17.4	13.4	15.4
55°	92.2	90.1	85.0	65.6	52.2	48.1	23.5	15.4	13.4	10.2	11.3
57.5°	56.3	56.3	52.2	41.0	32.7	30.7	14.4	10.2	9.2	7.1	9.2
60°	33.8	33.8	28.6	23.5	19.5	17.4	8.2	6.1	6.1	5.1	7.1
62.5°	18.5	18.5	16.4	13.4	10.2	9.2	5.1	5.1	4.1	4.1	6.1
65°	10.2	9.2	8.2	6.1	5.1	5.1	3.1	4.1	4.1	4.1	4.1
67.5°	4.1	4.1	4.1	3.1	3.1	3.1	2.0	3.1	3.1	3.1	3.1
70°	1.0	2.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0
72.5°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
75°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	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°	624.6	624.6
2.5°	566.3	557.0
5°	474.1	462.8
7.5°	376.8	369.7
10°	308.2	303.1
12.5°	260.1	257.0
15°	220.2	219.1
17.5°	185.3	182.3
20°	151.6	154.7
22.5°	124.9	122.8
25°	105.5	111.6
27.5°	90.1	98.3
30°	78.8	86.0
32.5°	67.6	78.8
35°	59.4	70.6
37.5°	53.2	63.5
40°	49.1	58.4
42.5°	43.0	54.2
45°	37.9	48.1
47.5°	32.7	43.0
50°	29.7	38.9
52.5°	25.6	34.8
55°	21.5	30.7
57.5°	19.5	27.6
60°	16.4	23.5
62.5°	12.3	19.5
65°	9.2	15.4
67.5°	6.1	11.3
70°	3.1	7.1
72.5°	1.0	2.0
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)