

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: P601274

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 2700K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601274  
 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\_ 2700K  
 Description: RETROFIT, 25D WW OPTIC, OPEN TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 2700K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 681.4 lumens  
 Efficiency: N/A  
 Efficacy: 56.8 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

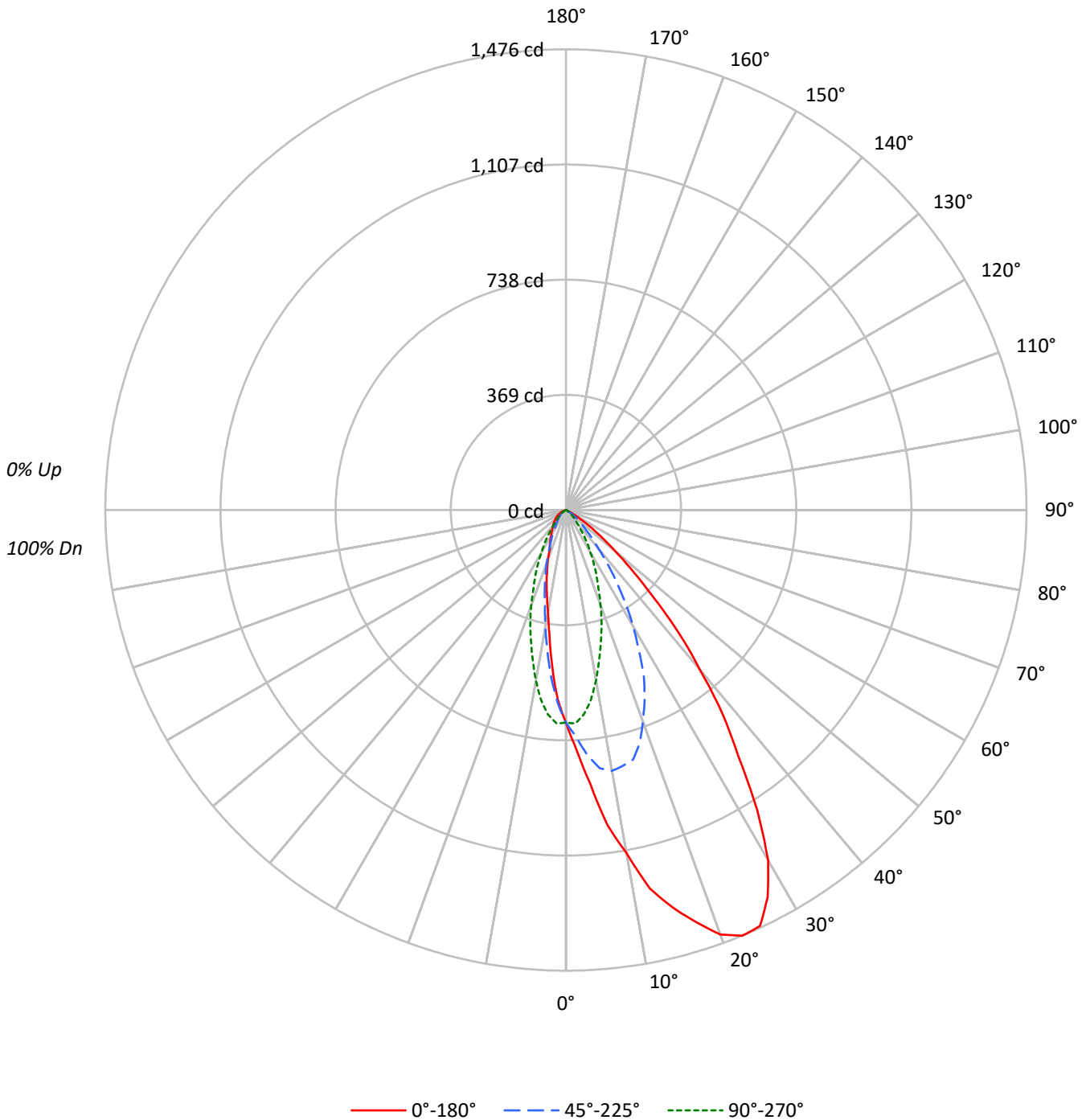
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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

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

	0°	90°	180°
0°	215099	215099	215099
5°	277889	208504	160007
10°	357702	177600	106002
15°	430794	141288	78130
20°	486337	108840	56655
25°	512439	80552	42401
30°	472321	57427	34201
35°	371061	38741	29720
40°	275722	23496	26257
45°	178043	15942	23444
50°	104242	11544	20829
55°	55327	7983	18442
60°	23303	4231	16230
65°	8368	3362	12552
70°	1016	2031	7201
75°	1342	1342	0
80°	0	0	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	62.8	9.2
10°-20°	162.6	23.9
20°-30°	198.7	29.2
30°-40°	148.7	21.8
40°-50°	73.7	10.8
50°-60°	27.2	4.0
60°-70°	6.8	1.0
70°-80°	0.9	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
0°-30°	424.1	62.2
0°-40°	572.8	84.1
0°-60°	673.7	98.9
0°-90°	681.4	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	681.4	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	681	681	681	681	681	
5°	877	788	658	539	505	92
15°	1318	829	432	262	239	375
25°	1471	591	231	116	122	660
35°	963	284	100	54	77	607
45°	399	93	36	30	52	318
55°	100	26	14	12	34	96
65°	11	3	4	4	17	13
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°	681.2	681.2	681.2	681.2	681.2	681.2	681.2	681.2	681.2	681.2	681.2
2.5°	767.2	767.2	776.1	761.6	761.6	757.2	724.8	705.8	684.6	653.3	616.4
5°	876.7	899.0	881.1	856.6	871.1	864.4	788.4	719.2	657.8	597.5	539.4
7.5°	1017.4	1022.9	1007.3	976.0	969.3	964.9	834.2	720.3	613.1	522.6	455.6
10°	1115.6	1123.5	1116.8	1105.6	1067.6	1058.7	848.7	677.9	553.9	457.9	377.5
12.5°	1241.8	1239.6	1229.5	1197.2	1153.6	1141.3	839.8	639.9	491.4	385.3	309.3
15°	1317.8	1331.2	1316.7	1230.7	1210.6	1179.3	828.6	588.5	432.2	333.9	262.4
17.5°	1383.7	1378.1	1350.2	1295.4	1244.1	1216.1	785.1	513.7	379.7	278.1	216.7
20°	1447.3	1448.4	1404.9	1337.9	1255.2	1205.0	720.3	462.3	323.9	228.9	179.8
22.5°	1476.4	1474.1	1418.3	1318.9	1222.8	1171.5	658.9	404.3	271.4	185.4	144.1
25°	1470.8	1430.6	1393.7	1276.5	1168.1	1105.6	590.8	354.0	231.2	156.3	116.1
27.5°	1399.3	1379.2	1316.7	1199.4	1074.3	1010.7	505.9	302.6	193.2	122.8	94.9
30°	1295.4	1272.0	1197.2	1100.0	935.8	885.6	431.1	247.9	157.5	105.0	78.2
32.5°	1141.3	1123.5	1046.4	919.1	790.7	733.7	357.4	197.7	127.3	77.1	63.7
35°	962.6	961.5	893.4	789.5	655.5	597.5	283.7	158.6	100.5	61.4	53.6
37.5°	826.4	797.4	730.4	634.3	521.5	473.5	222.2	124.0	74.8	48.0	44.7
40°	668.9	656.7	586.3	504.8	405.4	369.6	164.2	92.7	57.0	39.1	40.2
42.5°	538.3	521.5	463.5	384.2	313.8	284.8	125.1	71.5	44.7	33.5	35.7
45°	398.7	390.9	357.4	285.9	232.3	212.2	92.7	55.8	35.7	27.9	30.2
47.5°	290.4	281.4	258.0	212.2	168.6	156.3	71.5	43.6	29.0	22.3	23.5
50°	212.2	206.6	191.0	154.1	124.0	113.9	53.6	33.5	23.5	17.9	20.1
52.5°	146.3	148.5	135.1	109.4	88.2	81.5	40.2	24.6	19.0	14.5	16.8
55°	100.5	98.3	92.7	71.5	57.0	52.5	25.7	16.8	14.5	11.2	12.3
57.5°	61.4	61.4	57.0	44.7	35.7	33.5	15.6	11.2	10.1	7.8	10.1
60°	36.9	36.9	31.3	25.7	21.2	19.0	8.9	6.7	6.7	5.6	7.8
62.5°	20.1	20.1	17.9	14.5	11.2	10.1	5.6	5.6	4.5	4.5	6.7
65°	11.2	10.1	8.9	6.7	5.6	5.6	3.4	4.5	4.5	4.5	4.5
67.5°	4.5	4.5	4.5	3.4	3.4	3.4	2.2	3.4	3.4	3.4	3.4
70°	1.1	2.2	2.2	2.2	1.1	1.1	2.2	2.2	2.2	2.2	2.2
72.5°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
75°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	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°	681.2	681.2
2.5°	617.6	607.5
5°	517.1	504.8
7.5°	411.0	403.1
10°	336.1	330.6
12.5°	283.7	280.3
15°	240.1	239.0
17.5°	202.1	198.8
20°	165.3	168.6
22.5°	136.2	134.0
25°	115.0	121.7
27.5°	98.3	107.2
30°	86.0	93.8
32.5°	73.7	86.0
35°	64.8	77.1
37.5°	58.1	69.2
40°	53.6	63.7
42.5°	46.9	59.2
45°	41.3	52.5
47.5°	35.7	46.9
50°	32.4	42.4
52.5°	27.9	38.0
55°	23.5	33.5
57.5°	21.2	30.2
60°	17.9	25.7
62.5°	13.4	21.2
65°	10.1	16.8
67.5°	6.7	12.3
70°	3.4	7.8
72.5°	1.1	2.2
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)