

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: P601276

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL41R\_ TL42S\_ 3500K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601276  
 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\_ 3500K  
 Description: RETROFIT, 25D WW OPTIC, OPEN TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 3500K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 723.2 lumens  
 Efficiency: N/A  
 Efficacy: 60.3 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

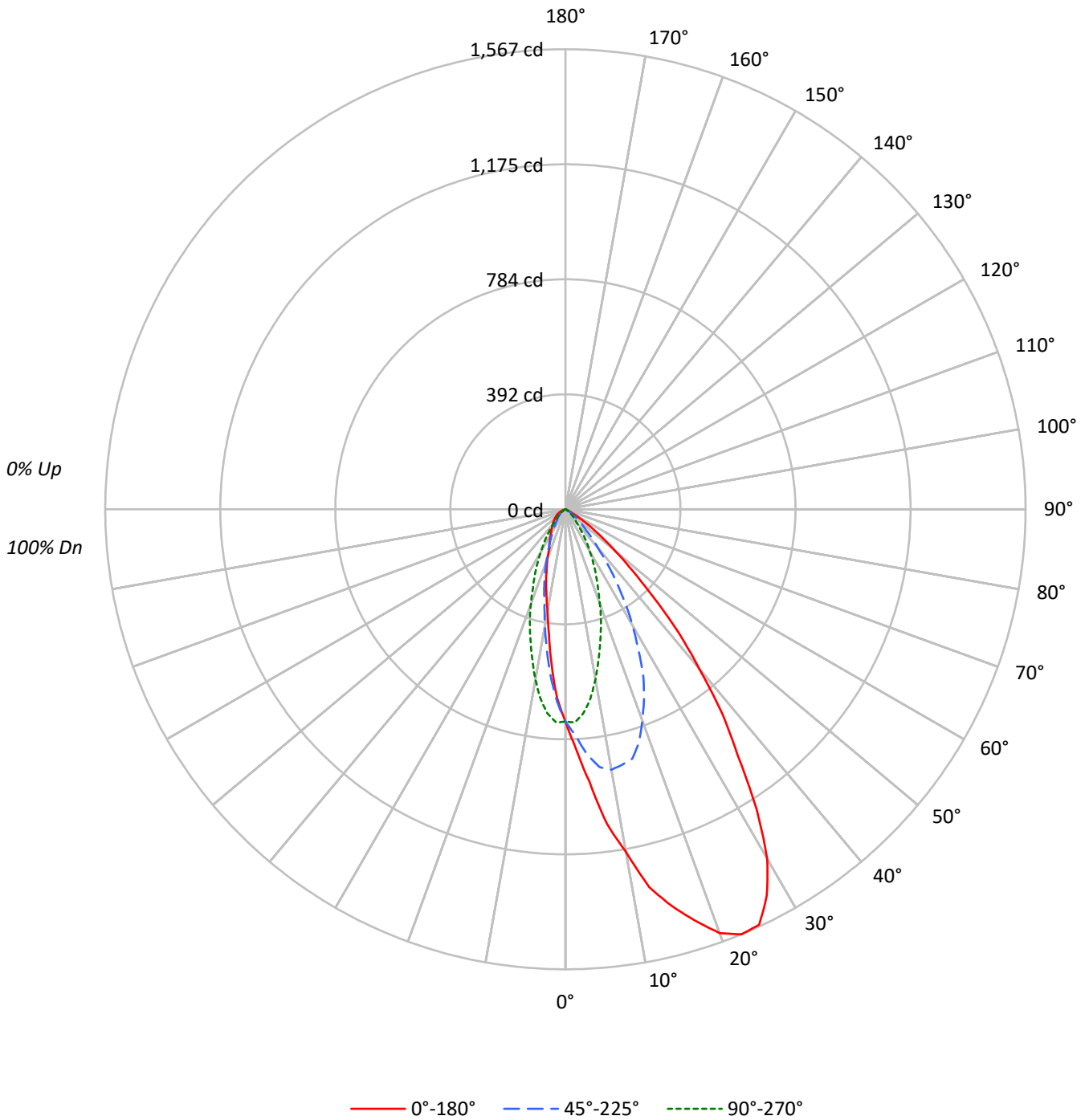
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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°	228298	228298	228298
5°	294942	221309	169833
10°	379666	188502	112511
15°	457241	149951	82936
20°	516210	115494	60149
25°	543900	85499	45014
30°	501345	60927	36316
35°	393882	41131	31532
40°	292664	24938	27865
45°	188984	16925	24873
50°	110628	12232	22106
55°	58740	8478	19599
60°	24693	4484	17241
65°	8891	3512	13300
70°	1108	2216	7663
75°	1464	1464	0
80°	0	0	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	66.7	9.2
10°-20°	172.5	23.9
20°-30°	210.9	29.2
30°-40°	157.8	21.8
40°-50°	78.2	10.8
50°-60°	28.8	4.0
60°-70°	7.2	1.0
70°-80°	1.0	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>450.1</b>	<b>62.2</b>
<b>0°-40°</b>	<b>608.0</b>	<b>84.1</b>
<b>0°-60°</b>	<b>715.0</b>	<b>98.9</b>
<b>0°-90°</b>	<b>723.2</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>723.2</b>	<b>100.0</b>

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	723	723	723	723	723	
5°	930	837	698	572	536	97
15°	1399	880	459	279	254	398
25°	1561	627	245	123	129	700
35°	1022	301	107	57	82	644
45°	423	98	38	32	56	337
55°	107	27	15	13	36	101
65°	12	4	5	5	18	14
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°	723.0	723.0	723.0	723.0	723.0	723.0	723.0	723.0	723.0	723.0	723.0
2.5°	814.3	814.3	823.8	808.4	808.4	803.7	769.3	749.1	726.6	693.4	654.3
5°	930.5	954.2	935.2	909.1	924.6	917.4	836.8	763.4	698.2	634.2	572.5
7.5°	1079.8	1085.8	1069.2	1036.0	1028.9	1024.1	885.4	764.5	650.7	554.7	483.6
10°	1184.1	1192.4	1185.3	1173.5	1133.2	1123.7	900.8	719.5	587.9	486.0	400.6
12.5°	1318.1	1315.7	1305.0	1270.7	1224.4	1211.4	891.4	679.2	521.5	408.9	328.3
15°	1398.7	1412.9	1397.5	1306.2	1284.9	1251.7	879.5	624.7	458.7	354.4	278.6
17.5°	1468.6	1462.7	1433.1	1375.0	1320.5	1290.8	833.3	545.3	403.0	295.1	230.0
20°	1536.2	1537.4	1491.1	1420.0	1332.3	1279.0	764.5	490.7	343.7	243.0	190.8
22.5°	1567.0	1564.6	1505.4	1399.9	1297.9	1243.4	699.3	429.1	288.0	196.8	152.9
25°	1561.1	1518.4	1479.3	1354.8	1239.9	1173.5	627.0	375.7	245.4	165.9	123.3
27.5°	1485.2	1463.9	1397.5	1273.0	1140.3	1072.7	537.0	321.2	205.1	130.4	100.8
30°	1375.0	1350.1	1270.7	1167.5	993.3	940.0	457.5	263.1	167.1	111.4	83.0
32.5°	1211.4	1192.4	1110.7	975.5	839.2	778.8	379.3	209.8	135.1	81.8	67.6
35°	1021.8	1020.6	948.3	838.0	695.8	634.2	301.1	168.3	106.7	65.2	56.9
37.5°	877.1	846.3	775.2	673.3	553.5	502.6	235.9	131.6	79.4	51.0	47.4
40°	710.0	697.0	622.3	535.8	430.3	392.3	174.2	98.4	60.5	41.5	42.7
42.5°	571.3	553.5	491.9	407.8	333.1	302.3	132.8	75.9	47.4	35.6	37.9
45°	423.2	414.9	379.3	303.4	246.5	225.2	98.4	59.3	37.9	29.6	32.0
47.5°	308.2	298.7	273.8	225.2	179.0	165.9	75.9	46.2	30.8	23.7	24.9
50°	225.2	219.3	202.7	163.6	131.6	120.9	56.9	35.6	24.9	19.0	21.3
52.5°	155.3	157.6	143.4	116.2	93.6	86.5	42.7	26.1	20.2	15.4	17.8
55°	106.7	104.3	98.4	75.9	60.5	55.7	27.3	17.8	15.4	11.9	13.0
57.5°	65.2	65.2	60.5	47.4	37.9	35.6	16.6	11.9	10.7	8.3	10.7
60°	39.1	39.1	33.2	27.3	22.5	20.2	9.5	7.1	7.1	5.9	8.3
62.5°	21.3	21.3	19.0	15.4	11.9	10.7	5.9	5.9	4.7	4.7	7.1
65°	11.9	10.7	9.5	7.1	5.9	5.9	3.6	4.7	4.7	4.7	4.7
67.5°	4.7	4.7	4.7	3.6	3.6	3.6	2.4	3.6	3.6	3.6	3.6
70°	1.2	2.4	2.4	2.4	1.2	1.2	2.4	2.4	2.4	2.4	2.4
72.5°	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
75°	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	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°	723.0	723.0
2.5°	655.5	644.8
5°	548.8	535.8
7.5°	436.2	427.9
10°	356.8	350.9
12.5°	301.1	297.5
15°	254.8	253.7
17.5°	214.5	211.0
20°	175.4	179.0
22.5°	144.6	142.2
25°	122.1	129.2
27.5°	104.3	113.8
30°	91.3	99.6
32.5°	78.2	91.3
35°	68.7	81.8
37.5°	61.6	73.5
40°	56.9	67.6
42.5°	49.8	62.8
45°	43.9	55.7
47.5°	37.9	49.8
50°	34.4	45.0
52.5°	29.6	40.3
55°	24.9	35.6
57.5°	22.5	32.0
60°	19.0	27.3
62.5°	14.2	22.5
65°	10.7	17.8
67.5°	7.1	13.0
70°	3.6	8.3
72.5°	1.2	2.4
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)