

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: P601283

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 5000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601283  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML410LSAWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 5000K  
 Description: RETROFIT, 25D WW OPTIC, DIFFUSE CLEAR LENS TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 5000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 876.3 lumens  
 Efficiency: N/A  
 Efficacy: 73.0 lumens/watt  
 Spacing Criteria (0/90/45): 1.33 / 0.62 / 0.83  
 Luminous Opening: Circular (Dia: 0.21' x H: 0')  
 CIE Type: Direct

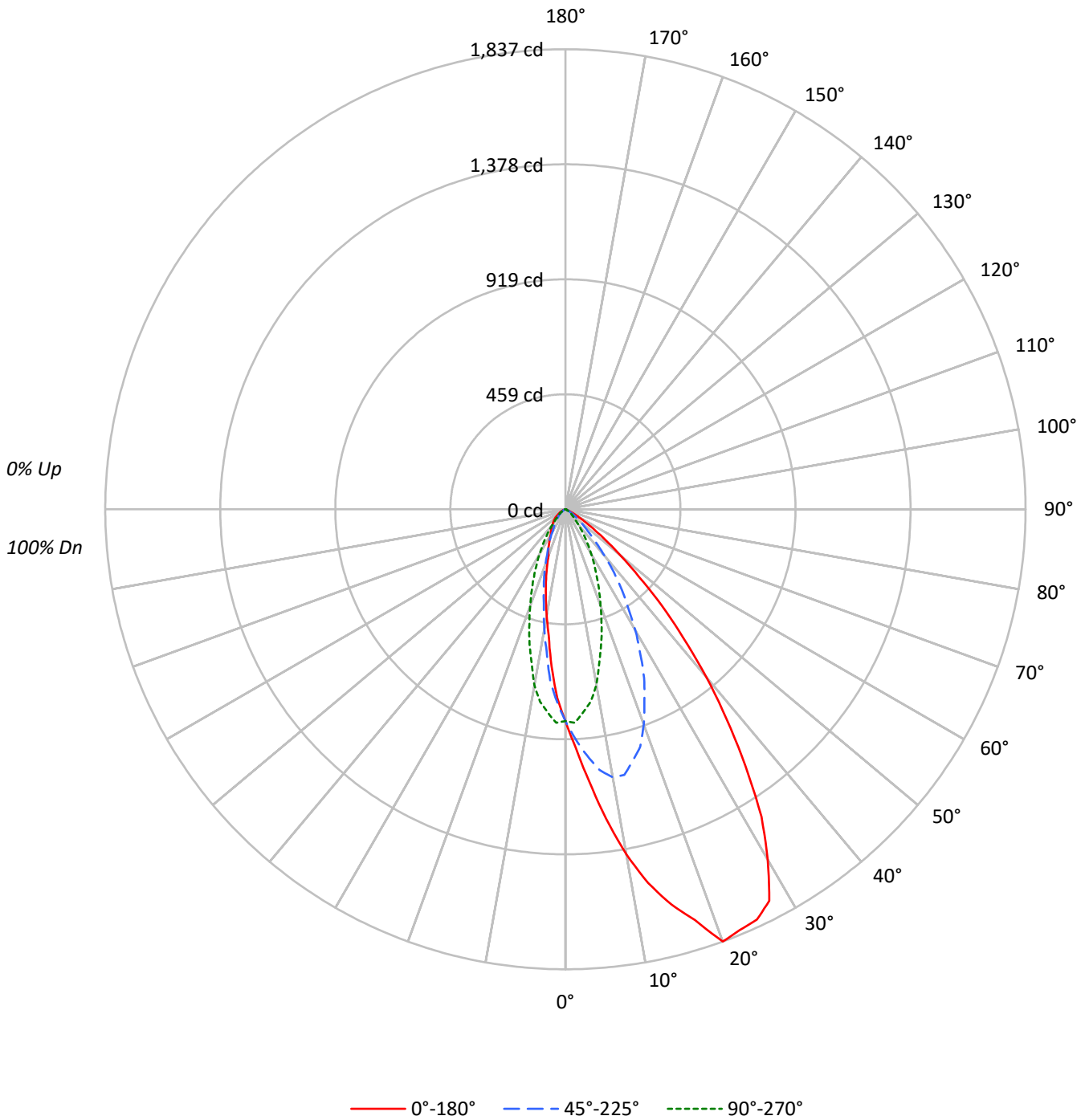
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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	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	110	108	105	103	104	102	100	100	98	97	97	95	94	92
2	107	101	97	93	104	100	96	92	96	93	90	93	91	88	91	88	86	85
3	101	94	88	84	99	92	87	83	89	85	82	87	83	80	85	82	79	78
4	95	87	81	76	93	85	80	75	83	78	75	81	77	74	79	76	73	71
5	89	80	74	69	88	79	73	69	78	72	68	76	71	68	74	70	67	65
6	84	75	68	64	83	74	68	63	72	67	63	71	66	62	70	65	62	60
7	80	70	63	59	78	69	63	58	68	62	58	66	62	58	65	61	57	56
8	76	65	59	54	74	65	59	54	64	58	54	62	57	54	61	57	53	52
9	72	61	55	51	70	61	55	50	60	54	50	59	54	50	58	53	50	48
10	68	58	51	47	67	57	51	47	56	51	47	55	50	47	55	50	47	45

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

	0°	90°	180°
0°	267011	267011	267011
5°	345372	257951	199343
10°	448474	228357	137521
15°	534031	180811	98104
20°	617187	137504	66198
25°	629887	103477	54387
30°	588998	75147	42550
35°	483120	50806	37970
40°	360430	33100	33100
45°	242928	22328	29116
50°	142166	16358	25299
55°	75091	11671	20039
60°	36376	6694	15283
65°	14719	4558	10161
70°	7017	2770	5632
75°	3660	1830	0
80°	2728	2728	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	78.6	9.0
10°-20°	203.2	23.2
20°-30°	248.9	28.4
30°-40°	195.1	22.3
40°-50°	100.5	11.5
50°-60°	38.1	4.4
60°-70°	9.7	1.1
70°-80°	1.9	0.2
80°-90°	0.1	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°	530.7	60.6
0°-40°	725.8	82.8
0°-60°	864.5	98.7
0°-90°	876.3	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	876.3	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	846	846	846	846	846	
5°	1090	986	814	690	629	114
15°	1634	1040	553	332	300	467
25°	1808	743	297	155	156	821
35°	1253	394	132	73	98	778
45°	544	136	50	39	65	423
55°	136	42	21	18	36	132
65°	20	8	6	6	14	24
75°	3	2	2	2	0	4
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°	845.6	845.6	845.6	845.6	845.6	845.6	845.6	845.6	845.6	845.6	845.6
2.5°	953.2	948.7	972.9	938.0	915.3	945.6	918.3	886.5	853.2	797.1	768.3
5°	1089.6	1092.6	1097.2	1086.6	1082.0	1079.0	986.5	900.2	813.8	728.9	689.5
7.5°	1245.7	1216.9	1235.1	1194.2	1201.7	1180.5	1050.2	886.5	774.4	665.3	572.8
10°	1398.7	1366.9	1382.1	1344.2	1335.1	1316.9	1086.6	850.2	712.2	565.3	486.5
12.5°	1529.1	1515.4	1500.3	1448.7	1430.6	1380.6	1086.6	801.7	624.4	488.0	397.0
15°	1633.6	1620.0	1603.3	1536.6	1480.6	1436.6	1039.6	733.5	553.1	418.3	331.9
17.5°	1720.0	1667.0	1668.5	1573.0	1524.5	1466.9	994.1	663.8	478.9	350.1	281.9
20°	1836.7	1739.7	1723.0	1621.5	1530.6	1466.9	913.8	588.0	409.2	295.5	231.9
22.5°	1818.5	1732.1	1751.8	1601.8	1504.8	1479.1	824.4	507.7	351.6	248.5	186.4
25°	1807.9	1745.8	1712.4	1551.8	1435.1	1353.3	742.6	444.0	297.0	204.6	154.6
27.5°	1762.4	1668.5	1618.5	1456.3	1327.5	1260.8	645.6	375.8	248.5	162.2	130.3
30°	1615.4	1547.2	1494.2	1324.5	1188.1	1124.4	559.2	312.2	206.1	133.4	103.0
32.5°	1456.3	1397.2	1315.4	1176.0	1019.9	957.7	463.7	266.7	168.2	106.1	86.4
35°	1253.3	1204.8	1127.5	986.5	836.5	809.2	394.0	213.7	131.8	84.9	72.7
37.5°	1056.3	1013.8	935.0	807.7	691.0	651.6	318.2	171.2	106.1	69.7	62.1
40°	874.4	824.4	772.9	648.6	553.1	510.7	244.0	133.4	80.3	56.1	53.0
42.5°	695.6	665.3	609.2	518.3	424.3	397.0	181.9	100.0	63.6	47.0	45.5
45°	544.0	512.2	459.2	398.6	319.8	298.5	136.4	77.3	50.0	37.9	39.4
47.5°	397.0	381.9	347.0	295.5	244.0	219.7	103.0	60.6	39.4	31.8	33.3
50°	289.4	274.3	257.6	210.6	169.7	163.7	77.3	47.0	33.3	25.8	27.3
52.5°	200.0	198.5	180.3	150.0	124.3	113.7	59.1	36.4	27.3	21.2	22.7
55°	136.4	134.9	122.7	104.6	87.9	80.3	42.4	27.3	21.2	16.7	18.2
57.5°	87.9	89.4	81.8	71.2	57.6	53.0	28.8	19.7	15.2	12.1	13.6
60°	57.6	57.6	50.0	45.5	36.4	33.3	19.7	13.6	10.6	9.1	10.6
62.5°	34.9	36.4	31.8	25.8	22.7	19.7	12.1	9.1	7.6	6.1	7.6
65°	19.7	21.2	18.2	15.2	13.6	12.1	7.6	6.1	6.1	4.5	6.1
67.5°	12.1	12.1	10.6	9.1	7.6	7.6	4.5	4.5	4.5	4.5	4.5
70°	7.6	7.6	6.1	6.1	4.5	4.5	3.0	4.5	3.0	3.0	3.0
72.5°	4.5	4.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5
75°	3.0	3.0	3.0	3.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5
77.5°	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.0
80°	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	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°	845.6	845.6
2.5°	750.1	753.2
5°	647.1	628.9
7.5°	538.0	509.2
10°	434.9	428.9
12.5°	366.7	359.2
15°	307.6	300.1
17.5°	257.6	244.0
20°	215.2	197.0
22.5°	178.8	180.3
25°	153.1	156.1
27.5°	131.8	134.9
30°	110.6	116.7
32.5°	100.0	109.1
35°	86.4	98.5
37.5°	77.3	89.4
40°	68.2	80.3
42.5°	60.6	72.7
45°	53.0	65.2
47.5°	47.0	59.1
50°	39.4	51.5
52.5°	33.3	43.9
55°	27.3	36.4
57.5°	22.7	30.3
60°	18.2	24.2
62.5°	13.6	18.2
65°	9.1	13.6
67.5°	6.1	9.1
70°	4.5	6.1
72.5°	1.5	3.0
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)