

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: P601281

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601281  
 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\_ 3500K  
 Description: RETROFIT, 25D WW OPTIC, DIFFUSE CLEAR LENS TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 3500K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 842.5 lumens  
 Efficiency: N/A  
 Efficacy: 70.2 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

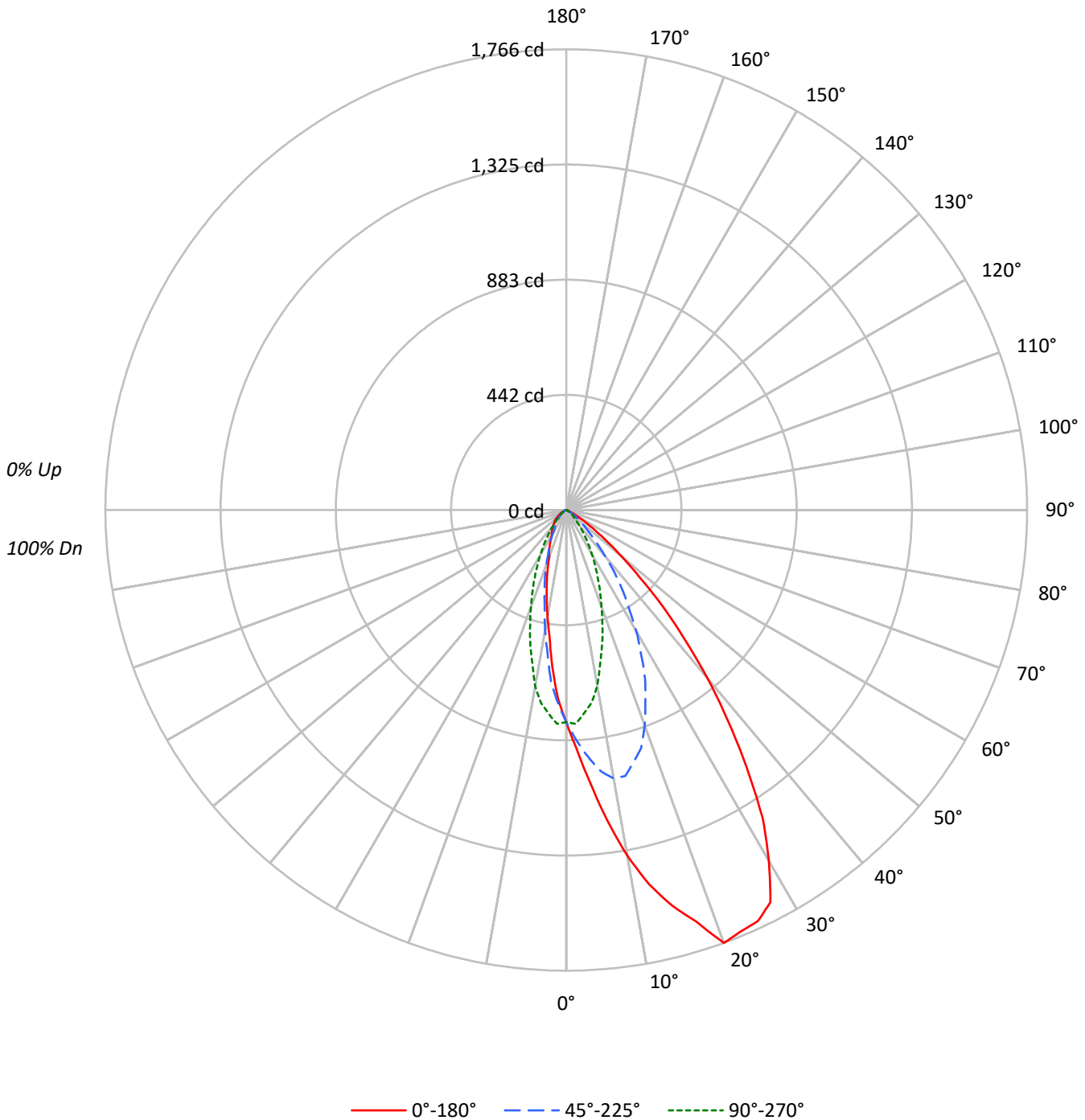
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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	58	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°	256717	256717	256717
5°	332027	247998	191641
10°	431192	219572	132198
15°	513436	173848	94312
20°	593362	132194	63644
25°	605569	99505	52296
30°	566282	72230	40910
35°	464463	48879	36505
40°	346538	31822	31822
45°	233551	21480	27955
50°	136713	15769	24317
55°	72173	11231	19268
60°	34987	6442	14715
65°	14121	4334	9788
70°	6740	2677	5355
75°	3538	1830	0
80°	2728	2728	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	75.5	9.0
10°-20°	195.4	23.2
20°-30°	239.3	28.4
30°-40°	187.6	22.3
40°-50°	96.7	11.5
50°-60°	36.7	4.4
60°-70°	9.4	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°	510.3	60.6
0°-40°	697.8	82.8
0°-60°	831.2	98.6
0°-90°	842.5	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	842.5	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	813	813	813	813	813	
5°	1048	948	782	663	605	109
15°	1571	1000	532	319	288	449
25°	1738	714	286	149	150	789
35°	1205	379	127	70	95	748
45°	523	131	48	38	63	407
55°	131	41	20	18	35	127
65°	19	7	6	6	13	23
75°	3	2	2	2	0	3
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°	813.0	813.0	813.0	813.0	813.0	813.0	813.0	813.0	813.0	813.0	813.0
2.5°	916.4	912.0	935.4	901.8	880.0	909.1	882.9	852.3	820.3	766.4	738.7
5°	1047.5	1050.5	1054.8	1044.6	1040.3	1037.3	948.5	865.4	782.4	700.8	662.9
7.5°	1197.6	1169.9	1187.4	1148.1	1155.4	1135.0	1009.7	852.3	744.5	639.6	550.7
10°	1344.8	1314.2	1328.7	1292.3	1283.6	1266.1	1044.6	817.3	684.8	543.4	467.7
12.5°	1470.1	1456.9	1442.4	1392.8	1375.4	1327.3	1044.6	770.7	600.3	469.1	381.7
15°	1570.6	1557.5	1541.4	1477.3	1423.4	1381.2	999.5	705.2	531.8	402.1	319.1
17.5°	1653.6	1602.6	1604.1	1512.3	1465.7	1410.3	955.8	638.1	460.4	336.6	271.0
20°	1765.8	1672.6	1656.5	1558.9	1471.5	1410.3	878.5	565.3	393.4	284.1	222.9
22.5°	1748.3	1665.3	1684.2	1540.0	1446.7	1422.0	792.6	488.1	338.0	238.9	179.2
25°	1738.1	1678.4	1646.3	1491.9	1379.7	1301.0	713.9	426.9	285.6	196.7	148.6
27.5°	1694.4	1604.1	1556.0	1400.1	1276.3	1212.2	620.7	361.3	238.9	155.9	125.3
30°	1553.1	1487.5	1436.5	1273.4	1142.2	1081.0	537.6	300.1	198.1	128.2	99.1
32.5°	1400.1	1343.3	1264.6	1130.6	980.5	920.8	445.8	256.4	161.7	102.0	83.0
35°	1204.9	1158.3	1084.0	948.5	804.2	778.0	378.8	205.4	126.8	81.6	69.9
37.5°	1015.5	974.7	898.9	776.5	664.4	626.5	306.0	164.6	102.0	67.0	59.7
40°	840.7	792.6	743.0	623.6	531.8	491.0	234.6	128.2	77.2	53.9	51.0
42.5°	668.7	639.6	585.7	498.3	407.9	381.7	174.8	96.2	61.2	45.2	43.7
45°	523.0	492.4	441.5	383.2	307.4	287.0	131.1	74.3	48.1	36.4	37.9
47.5°	381.7	367.1	333.6	284.1	234.6	211.3	99.1	58.3	37.9	30.6	32.1
50°	278.3	263.7	247.7	202.5	163.2	157.3	74.3	45.2	32.1	24.8	26.2
52.5°	192.3	190.9	173.4	144.2	119.5	109.3	56.8	35.0	26.2	20.4	21.9
55°	131.1	129.7	118.0	100.5	84.5	77.2	40.8	26.2	20.4	16.0	17.5
57.5°	84.5	86.0	78.7	68.5	55.4	51.0	27.7	18.9	14.6	11.7	13.1
60°	55.4	55.4	48.1	43.7	35.0	32.1	18.9	13.1	10.2	8.7	10.2
62.5°	33.5	35.0	30.6	24.8	21.9	18.9	11.7	8.7	7.3	5.8	7.3
65°	18.9	20.4	17.5	14.6	13.1	11.7	7.3	5.8	5.8	4.4	5.8
67.5°	11.7	11.7	10.2	8.7	7.3	7.3	4.4	4.4	4.4	4.4	4.4
70°	7.3	7.3	5.8	5.8	4.4	4.4	2.9	4.4	2.9	2.9	2.9
72.5°	4.4	4.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	1.5	1.5
75°	2.9	2.9	2.9	2.9	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°	813.0	813.0
2.5°	721.2	724.1
5°	622.1	604.6
7.5°	517.2	489.5
10°	418.1	412.3
12.5°	352.6	345.3
15°	295.8	288.5
17.5°	247.7	234.6
20°	206.9	189.4
22.5°	171.9	173.4
25°	147.2	150.1
27.5°	126.8	129.7
30°	106.4	112.2
32.5°	96.2	104.9
35°	83.0	94.7
37.5°	74.3	86.0
40°	65.6	77.2
42.5°	58.3	69.9
45°	51.0	62.6
47.5°	45.2	56.8
50°	37.9	49.5
52.5°	32.1	42.3
55°	26.2	35.0
57.5°	21.9	29.1
60°	17.5	23.3
62.5°	13.1	17.5
65°	8.7	13.1
67.5°	5.8	8.7
70°	4.4	5.8
72.5°	1.5	2.9
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)