

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: P601280

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601280  
 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\_ 3000K  
 Description: RETROFIT, 25D WW OPTIC, DIFFUSE CLEAR LENS TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 3000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 795.8 lumens  
 Efficiency: N/A  
 Efficacy: 66.3 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

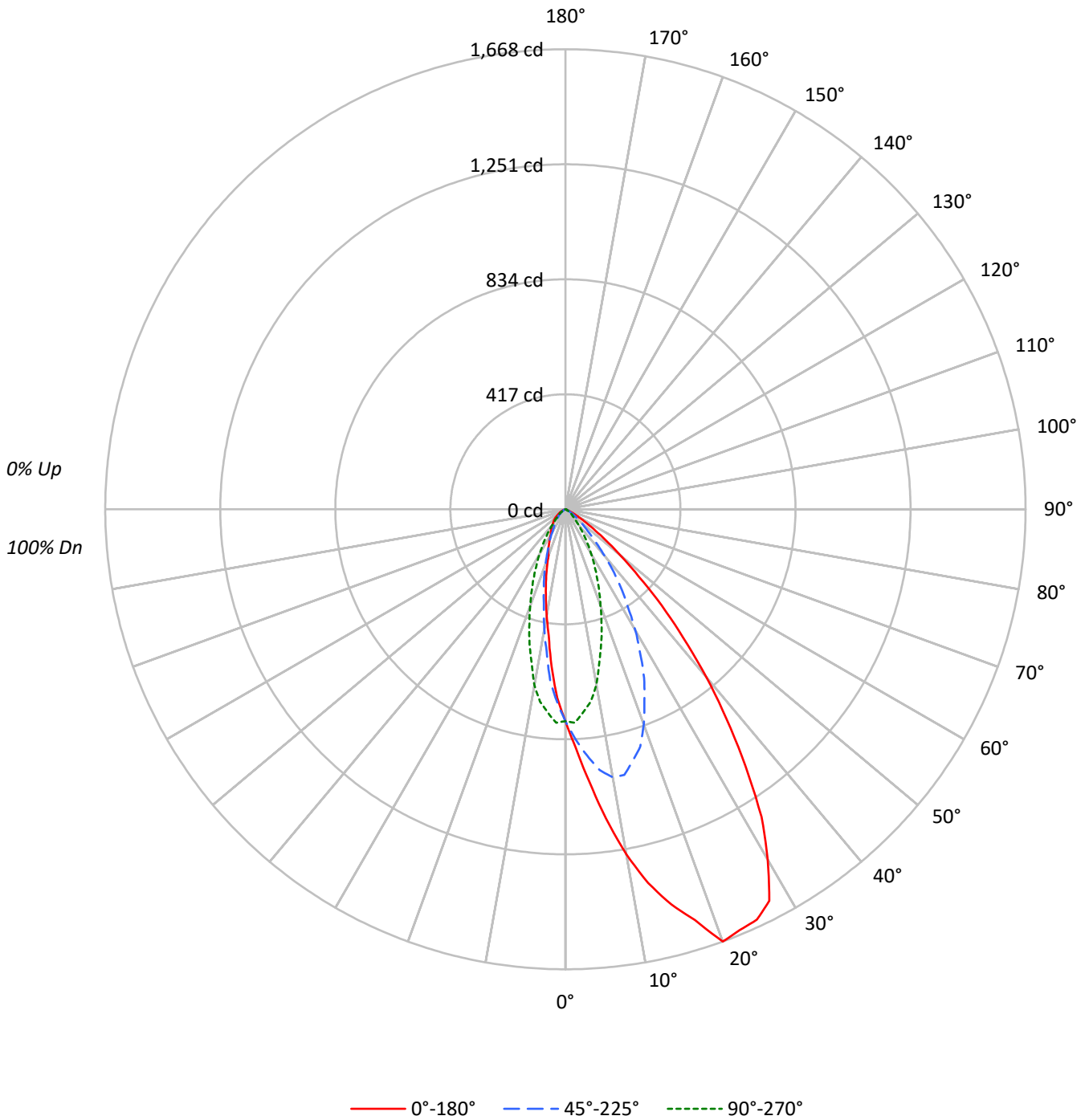
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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	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	98	97	97	95	94	92		
1	113	110	107	105	110	108	105	103	104	102	100	100	98	97	97	95	94	92	91	88	86	85	85	85		
2	107	101	97	93	104	100	96	92	96	93	90	93	91	88	91	88	86	85	85	82	79	78	78	78		
3	101	94	88	84	99	92	87	83	89	85	82	87	83	80	85	82	79	78	85	82	79	78	78	78		
4	95	87	81	76	93	85	80	75	83	78	75	81	77	74	79	76	73	71	79	76	73	71	71	71		
5	89	80	74	69	88	79	73	69	78	72	68	76	71	68	74	70	67	65	74	70	67	65	65	65		
6	84	75	68	64	83	74	68	63	72	67	63	71	66	62	70	65	62	60	70	65	62	60	60	60		
7	80	70	63	59	78	69	63	58	68	62	58	66	62	58	65	61	57	56	66	62	58	56	56	56		
8	76	65	59	54	74	65	58	54	64	58	54	62	57	54	61	57	53	52	62	57	54	52	52	52		
9	72	61	55	51	70	61	55	50	60	54	50	59	54	50	58	53	50	48	59	54	50	48	48	48		
10	68	58	51	47	67	57	51	47	56	51	47	55	50	47	55	50	47	45	55	50	47	45	45	45		

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

	0°	90°	180°
0°	242476	242476	242476
5°	313611	234242	181022
10°	407240	207388	124856
15°	484930	164204	89081
20°	560431	124835	60116
25°	571982	93966	49369
30°	534853	68219	38649
35°	438674	46142	34462
40°	327289	30050	30050
45°	220600	20274	26436
50°	129099	14885	22990
55°	68154	10625	18167
60°	33029	6063	13894
65°	13374	4109	9265
70°	6370	2585	5078
75°	3416	1708	0
80°	2546	2546	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	71.3	9.0
10°-20°	184.6	23.2
20°-30°	226.1	28.4
30°-40°	177.2	22.3
40°-50°	91.3	11.5
50°-60°	34.6	4.4
60°-70°	8.9	1.1
70°-80°	1.8	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
<b>0°-30°</b>	<b>481.9</b>	<b>60.6</b>
<b>0°-40°</b>	<b>659.1</b>	<b>82.8</b>
<b>0°-60°</b>	<b>785.0</b>	<b>98.6</b>
<b>0°-90°</b>	<b>795.8</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>795.8</b>	<b>100.0</b>

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	768	768	768	768	768	
5°	989	896	739	626	571	103
15°	1483	944	502	301	272	424
25°	1642	674	270	140	142	745
35°	1138	358	120	66	89	706
45°	494	124	45	36	59	384
55°	124	38	19	16	33	120
65°	18	7	6	6	12	22
75°	3	1	1	1	0	3
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°	767.9	767.9	767.9	767.9	767.9	767.9	767.9	767.9	767.9	767.9	767.9
2.5°	865.6	861.4	883.5	851.8	831.2	858.7	833.9	805.0	774.7	723.8	697.7
5°	989.4	992.2	996.3	986.7	982.5	979.8	895.8	817.4	739.0	661.9	626.1
7.5°	1131.1	1105.0	1121.5	1084.4	1091.2	1072.0	953.6	805.0	703.2	604.1	520.2
10°	1270.1	1241.2	1255.0	1220.6	1212.3	1195.8	986.7	772.0	646.8	513.3	441.7
12.5°	1388.5	1376.1	1362.3	1315.5	1299.0	1253.6	986.7	728.0	567.0	443.1	360.5
15°	1483.4	1471.0	1455.9	1395.4	1344.4	1304.5	944.0	666.0	502.3	379.8	301.4
17.5°	1561.9	1513.7	1515.1	1428.4	1384.4	1332.1	902.7	602.7	434.8	317.9	256.0
20°	1667.8	1579.8	1564.6	1472.4	1389.9	1332.1	829.8	533.9	371.5	268.3	210.5
22.5°	1651.3	1572.9	1590.8	1454.5	1366.5	1343.1	748.6	461.0	319.3	225.7	169.3
25°	1641.7	1585.3	1555.0	1409.1	1303.2	1228.9	674.3	403.2	269.7	185.8	140.4
27.5°	1600.4	1515.1	1469.7	1322.4	1205.5	1144.9	586.2	341.3	225.7	147.2	118.3
30°	1466.9	1405.0	1356.8	1202.7	1078.9	1021.1	507.8	283.5	187.1	121.1	93.6
32.5°	1322.4	1268.8	1194.4	1067.8	926.1	869.7	421.1	242.2	152.7	96.3	78.4
35°	1138.0	1094.0	1023.8	895.8	759.6	734.8	357.8	194.0	119.7	77.1	66.1
37.5°	959.1	920.6	849.1	733.5	627.5	591.7	289.0	155.5	96.3	63.3	56.4
40°	794.0	748.6	701.8	589.0	502.3	463.7	221.6	121.1	72.9	50.9	48.2
42.5°	631.6	604.1	553.2	470.6	385.3	360.5	165.1	90.8	57.8	42.7	41.3
45°	494.0	465.1	417.0	361.9	290.4	271.1	123.8	70.2	45.4	34.4	35.8
47.5°	360.5	346.8	315.1	268.3	221.6	199.5	93.6	55.0	35.8	28.9	30.3
50°	262.8	249.1	233.9	191.3	154.1	148.6	70.2	42.7	30.3	23.4	24.8
52.5°	181.6	180.3	163.8	136.2	112.8	103.2	53.7	33.0	24.8	19.3	20.6
55°	123.8	122.5	111.5	95.0	79.8	72.9	38.5	24.8	19.3	15.1	16.5
57.5°	79.8	81.2	74.3	64.7	52.3	48.2	26.1	17.9	13.8	11.0	12.4
60°	52.3	52.3	45.4	41.3	33.0	30.3	17.9	12.4	9.6	8.3	9.6
62.5°	31.7	33.0	28.9	23.4	20.6	17.9	11.0	8.3	6.9	5.5	6.9
65°	17.9	19.3	16.5	13.8	12.4	11.0	6.9	5.5	5.5	4.1	5.5
67.5°	11.0	11.0	9.6	8.3	6.9	6.9	4.1	4.1	4.1	4.1	4.1
70°	6.9	6.9	5.5	5.5	4.1	4.1	2.8	4.1	2.8	2.8	2.8
72.5°	4.1	4.1	2.8	2.8	2.8	2.8	2.8	2.8	2.8	1.4	1.4
75°	2.8	2.8	2.8	2.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4
77.5°	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.0
80°	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	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°	767.9	767.9
2.5°	681.2	683.9
5°	587.6	571.1
7.5°	488.5	462.4
10°	394.9	389.4
12.5°	333.0	326.1
15°	279.3	272.5
17.5°	233.9	221.6
20°	195.4	178.9
22.5°	162.4	163.8
25°	139.0	141.7
27.5°	119.7	122.5
30°	100.5	106.0
32.5°	90.8	99.1
35°	78.4	89.4
37.5°	70.2	81.2
40°	61.9	72.9
42.5°	55.0	66.1
45°	48.2	59.2
47.5°	42.7	53.7
50°	35.8	46.8
52.5°	30.3	39.9
55°	24.8	33.0
57.5°	20.6	27.5
60°	16.5	22.0
62.5°	12.4	16.5
65°	8.3	12.4
67.5°	5.5	8.3
70°	4.1	5.5
72.5°	1.4	2.8
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)