

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: P601285

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL45R6G\_ TL46S6G\_ 3000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601285  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML410LSAWW9FS1E - TIR4D25AWW - TL45R6G\_ TL46S6G\_ 3000K  
 Description: RETROFIT, 25D WW OPTIC, LINEAR SPREAD LENS TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 3000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 838.4 lumens  
 Efficiency: N/A  
 Efficacy: 69.9 lumens/watt  
 Spacing Criteria (0/90/45): 1.21 / 0.78 / 1  
 Luminous Opening: Circular (Dia: 0.21' x H: 0')  
 CIE Type: Direct

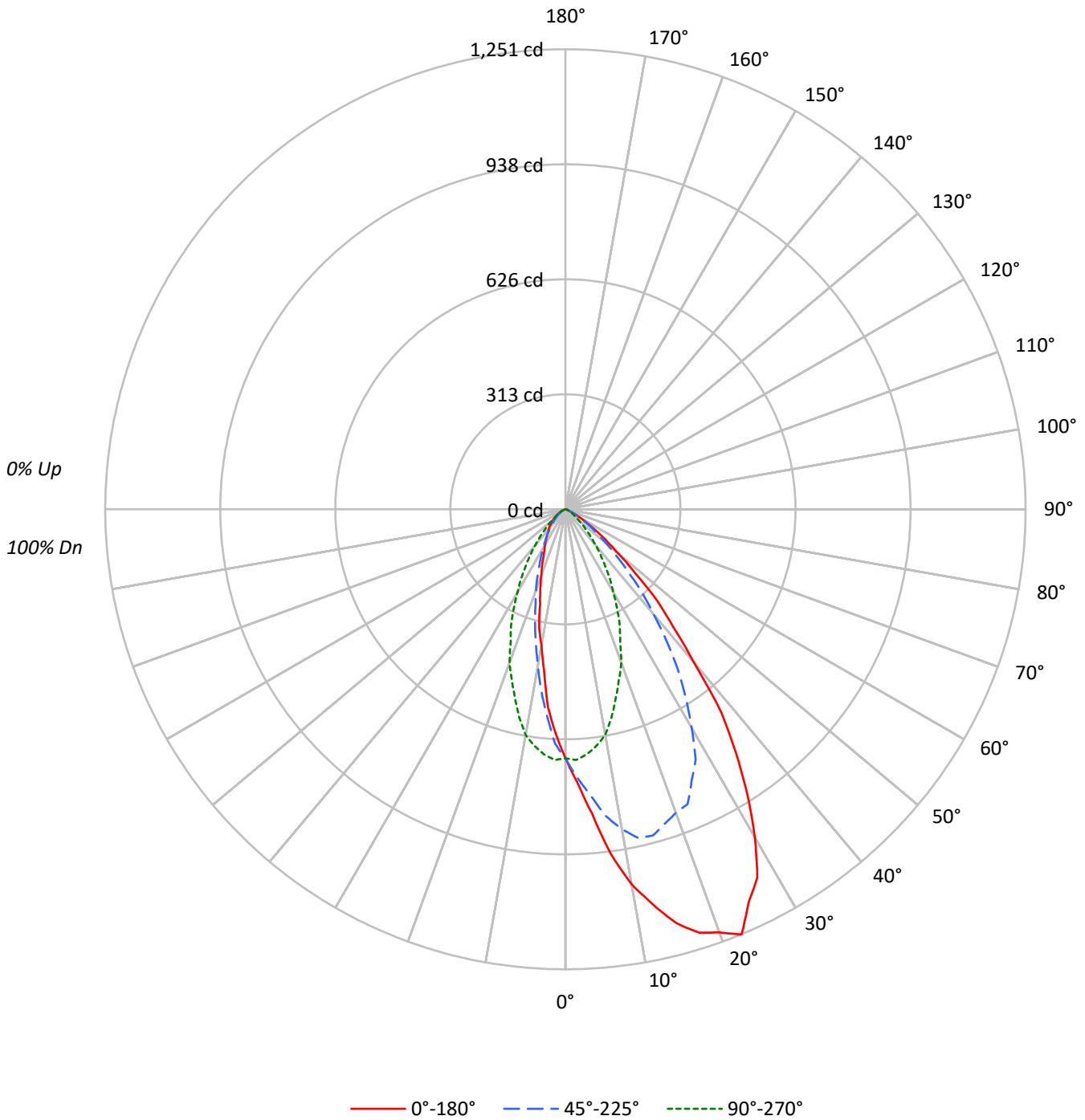
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



Meas		Calibration Due Date	
Instrument	Identificatio		
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
RCR																				
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100	100	100
1	113	110	107	104	110	107	105	103	103	101	99	100	98	96	96	95	94	92	92	92
2	106	100	96	92	104	99	95	91	95	92	89	92	90	87	90	87	85	83	83	83
3	100	92	87	82	98	91	86	81	88	84	80	86	82	79	83	80	78	76	76	76
4	94	85	79	74	92	84	78	73	82	76	72	79	75	72	78	74	71	69	69	69
5	88	78	72	67	86	77	71	67	76	70	66	74	69	65	72	68	65	63	63	63
6	83	73	66	61	81	72	65	61	70	65	60	69	64	60	67	63	59	58	58	58
7	78	68	61	56	77	67	60	56	65	60	55	64	59	55	63	58	55	53	53	53
8	74	63	56	52	72	62	56	51	61	55	51	60	55	51	59	54	51	49	49	49
9	70	59	52	48	68	58	52	48	57	52	47	56	51	47	55	51	47	46	46	46
10	66	55	49	44	65	55	48	44	54	48	44	53	48	44	52	47	44	42	42	42

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

	0°	90°	180°
0°	213836	213836	213836
5°	263340	211959	171291
10°	331923	199789	120207
15°	380909	173325	86662
20°	411402	149231	64115
25°	410669	121804	48847
30°	375589	94836	40035
35°	311158	72239	33190
40°	223455	52886	29225
45°	158350	36216	24114
50°	92894	23236	19895
55°	55768	15800	15800
60°	29871	11746	11746
65°	16438	8817	7546
70°	9325	6278	4709
75°	4148	4148	0
80°	3091	3091	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	64.1	7.7
10°-20°	174.6	20.8
20°-30°	228.2	27.2
30°-40°	195.7	23.3
40°-50°	111.9	13.4
50°-60°	45.8	5.5
60°-70°	14.6	1.7
70°-80°	3.1	0.4
80°-90°	0.3	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>466.9</b>	<b>55.7</b>
<b>0°-40°</b>	<b>662.6</b>	<b>79.0</b>
<b>0°-60°</b>	<b>820.3</b>	<b>97.8</b>
<b>0°-90°</b>	<b>838.4</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>838.4</b>	<b>100.0</b>

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	677	677	677	677	677	
5°	831	780	669	566	540	86
15°	1165	919	530	319	265	329
25°	1179	812	350	167	140	539
35°	807	534	187	88	86	498
45°	355	242	81	44	54	270
55°	101	83	29	20	29	96
65°	22	19	12	8	10	24
75°	3	3	3	2	0	5
85°	0	0	0	0	0	1
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°	677.2	677.2	677.2	677.2	677.2	677.2	677.2	677.2	677.2	677.2	677.2
2.5°	743.0	758.2	753.1	761.6	759.9	744.7	729.5	705.9	682.2	668.7	638.3
5°	830.8	849.4	862.9	852.8	847.7	835.9	780.2	727.8	668.7	609.6	565.7
7.5°	945.7	940.6	955.8	925.4	927.1	922.0	841.0	739.6	648.5	562.3	499.8
10°	1035.2	1020.0	1035.2	1025.0	1004.8	981.1	883.2	734.6	623.1	515.0	430.6
12.5°	1101.0	1121.3	1121.3	1097.6	1077.4	1050.4	915.3	731.2	579.2	457.6	371.5
15°	1165.2	1171.9	1160.1	1141.5	1121.3	1065.6	918.6	709.2	530.2	401.9	319.2
17.5°	1207.4	1209.1	1204.0	1187.1	1158.4	1124.7	896.7	689.0	484.6	358.0	268.5
20°	1224.3	1210.8	1209.1	1178.7	1153.4	1123.0	878.1	640.0	444.1	305.7	233.0
22.5°	1251.3	1219.2	1219.2	1188.8	1136.5	1131.4	868.0	584.3	388.4	261.7	199.3
25°	1178.7	1173.6	1183.8	1141.5	1101.0	1092.6	812.3	542.1	349.6	226.3	167.2
27.5°	1129.7	1116.2	1102.7	1075.7	1036.8	1016.6	766.7	488.0	304.0	189.1	141.8
30°	1030.1	1030.1	1013.2	999.7	947.3	932.1	685.6	437.4	260.1	162.1	118.2
32.5°	920.3	905.1	906.8	891.6	859.5	847.7	609.6	381.6	224.6	131.7	103.0
35°	807.2	790.3	781.9	770.0	765.0	727.8	533.6	329.3	187.4	114.8	87.8
37.5°	695.7	678.8	672.1	653.5	626.5	618.1	450.9	273.6	157.0	94.6	72.6
40°	542.1	542.1	540.4	520.1	511.7	506.6	373.2	228.0	128.3	76.0	62.5
42.5°	432.3	437.4	434.0	425.5	407.0	403.6	310.7	185.8	104.7	64.2	52.3
45°	354.6	339.4	336.0	334.4	324.2	322.5	241.5	146.9	81.1	52.3	43.9
47.5°	260.1	258.4	261.7	253.3	241.5	251.6	190.8	111.5	64.2	42.2	37.2
50°	189.1	192.5	192.5	184.1	180.7	184.1	146.9	84.4	47.3	33.8	32.1
52.5°	141.8	140.2	138.5	140.2	138.5	138.5	109.8	62.5	37.2	27.0	25.3
55°	101.3	101.3	99.6	103.0	104.7	101.3	82.7	45.6	28.7	22.0	20.3
57.5°	70.9	70.9	67.5	70.9	70.9	74.3	59.1	33.8	23.6	16.9	16.9
60°	47.3	47.3	47.3	49.0	50.7	50.7	40.5	23.6	18.6	13.5	13.5
62.5°	32.1	32.1	32.1	33.8	33.8	37.2	28.7	18.6	15.2	11.8	10.1
65°	22.0	22.0	22.0	22.0	23.6	23.6	18.6	13.5	11.8	10.1	8.4
67.5°	13.5	15.2	13.5	15.2	15.2	15.2	11.8	10.1	8.4	6.8	5.1
70°	10.1	10.1	10.1	10.1	10.1	10.1	8.4	8.4	6.8	5.1	3.4
72.5°	6.8	6.8	6.8	6.8	6.8	6.8	5.1	5.1	5.1	3.4	3.4
75°	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	1.7	1.7
77.5°	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.0
80°	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.0	0.0
82.5°	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	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°	677.2	677.2
2.5°	621.4	609.6
5°	526.9	540.4
7.5°	459.3	442.4
10°	385.0	374.9
12.5°	334.4	329.3
15°	276.9	265.1
17.5°	238.1	226.3
20°	199.3	190.8
22.5°	170.6	165.5
25°	146.9	140.2
27.5°	126.7	123.3
30°	109.8	109.8
32.5°	94.6	97.9
35°	84.4	86.1
37.5°	72.6	76.0
40°	67.5	70.9
42.5°	57.4	64.2
45°	49.0	54.0
47.5°	42.2	47.3
50°	35.5	40.5
52.5°	32.1	35.5
55°	27.0	28.7
57.5°	22.0	23.6
60°	16.9	18.6
62.5°	13.5	15.2
65°	10.1	10.1
67.5°	6.8	8.4
70°	3.4	5.1
72.5°	1.7	1.7
75°	1.7	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)