

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: P601288

Luminaire Tested: **ML410LSAWW9FS1E - TIR4D25AWW - TL45R6G\_ TL46S6G\_ 5000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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**Test Information**

Test Method: LM-79-08  
 Report Number: P601288  
 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\_ 5000K  
 Description: RETROFIT, 25D WW OPTIC, LINEAR SPREAD LENS TRIM  
 Light Source: (1) SELECTABLE LUMEN LED 90CRI / 5000K CCT  
 Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 923.3 lumens  
 Efficiency: N/A  
 Efficacy: 76.9 lumens/watt  
 Spacing Criteria (0/90/45): 1.21 / 0.78 / 1  
 Luminous Opening: Circular (Dia: 0.21' x H: 0')  
 CIE Type: Direct

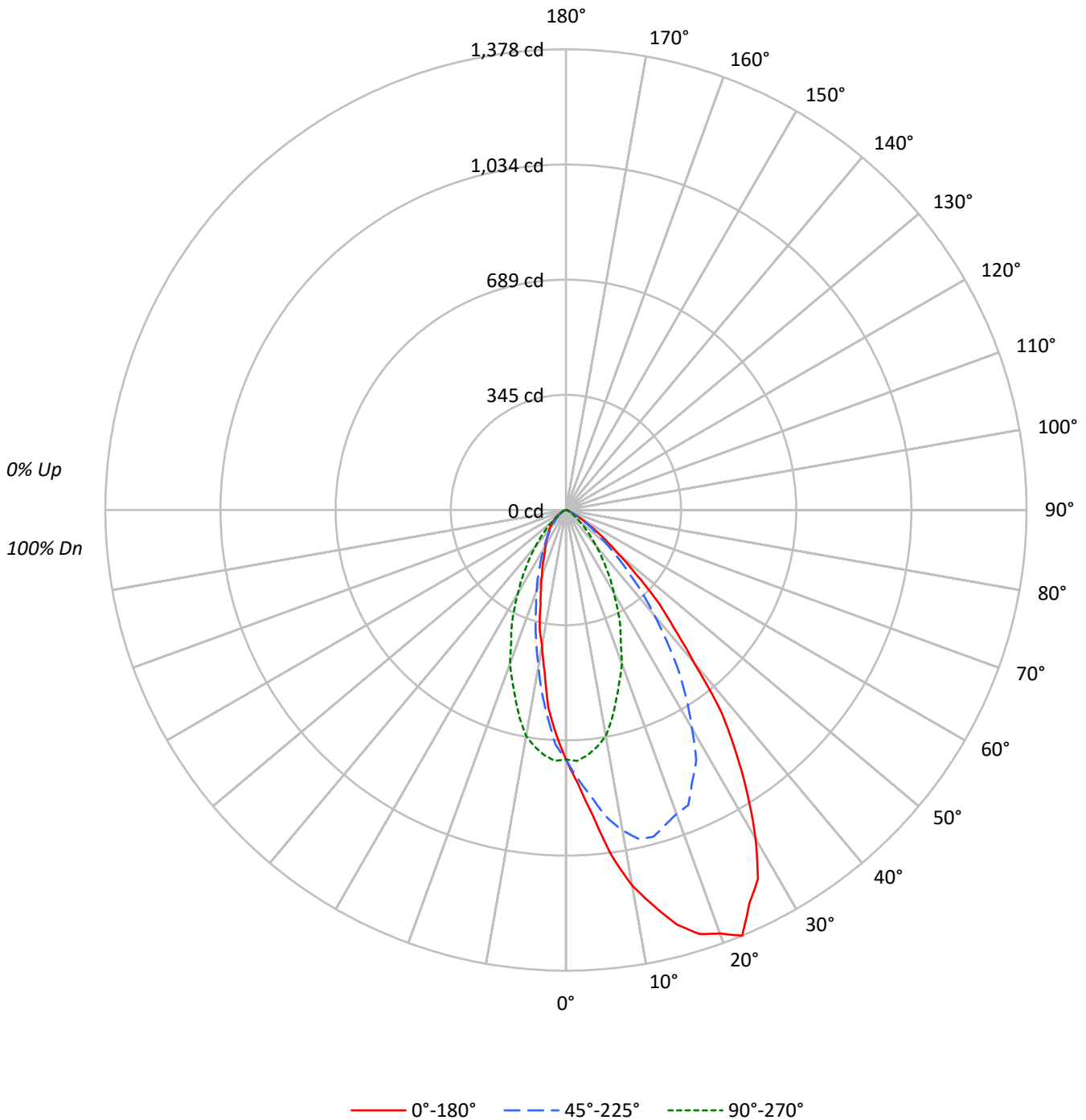
Input Watts (W): 12  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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

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

	0°	90°	180°
0°	235466	235466	235466
5°	289997	233418	188630
10°	365525	220021	132359
15°	419483	190879	95456
20°	453036	164352	70600
25°	452234	134102	53794
30°	413618	104426	44082
35°	342651	79563	36543
40°	246043	58244	32193
45°	174381	39878	26570
50°	102326	25594	21909
55°	61438	17396	17396
60°	32903	12946	12946
65°	18081	9713	8368
70°	10340	6832	5170
75°	4514	4514	0
80°	3455	3455	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	70.6	7.7
10°-20°	192.3	20.8
20°-30°	251.3	27.2
30°-40°	215.5	23.3
40°-50°	123.3	13.4
50°-60°	50.4	5.5
60°-70°	16.1	1.7
70°-80°	3.4	0.4
80°-90°	0.4	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°	514.2	55.7
0°-40°	729.7	79.0
0°-60°	903.4	97.8
0°-90°	923.3	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	923.3	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	746	746	746	746	746	
5°	915	859	736	623	595	95
15°	1283	1012	584	352	292	362
25°	1298	894	385	184	154	594
35°	889	588	206	97	95	549
45°	390	266	89	48	60	297
55°	112	91	32	22	32	105
65°	24	20	13	9	11	26
75°	4	4	4	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°	745.7	745.7	745.7	745.7	745.7	745.7	745.7	745.7	745.7	745.7	745.7
2.5°	818.2	835.0	829.4	838.7	836.8	820.1	803.4	777.3	751.3	736.4	702.9
5°	914.9	935.4	950.3	939.1	933.5	920.5	859.2	801.5	736.4	671.3	623.0
7.5°	1041.4	1035.8	1052.6	1019.1	1020.9	1015.4	926.1	814.5	714.1	619.3	550.5
10°	1140.0	1123.2	1140.0	1128.8	1106.5	1080.5	972.6	808.9	686.2	567.2	474.2
12.5°	1212.5	1234.8	1234.8	1208.8	1186.5	1156.7	1007.9	805.2	637.9	504.0	409.1
15°	1283.2	1290.6	1277.6	1257.1	1234.8	1173.4	1011.7	781.1	583.9	442.6	351.5
17.5°	1329.7	1331.5	1325.9	1307.3	1275.7	1238.5	987.5	758.7	533.7	394.2	295.7
20°	1348.2	1333.4	1331.5	1298.0	1270.1	1236.7	967.0	704.8	489.1	336.6	256.6
22.5°	1378.0	1342.7	1342.7	1309.2	1251.5	1246.0	955.9	643.4	427.7	288.2	219.4
25°	1298.0	1292.5	1303.6	1257.1	1212.5	1203.2	894.5	596.9	384.9	249.2	184.1
27.5°	1244.1	1229.2	1214.4	1184.6	1141.8	1119.5	844.3	537.4	334.7	208.3	156.2
30°	1134.4	1134.4	1115.8	1100.9	1043.3	1026.5	755.0	481.7	286.4	178.5	130.2
32.5°	1013.5	996.8	998.6	981.9	946.6	933.5	671.3	420.3	247.3	145.1	113.4
35°	888.9	870.3	861.0	848.0	842.4	801.5	587.7	362.6	206.4	126.5	96.7
37.5°	766.2	747.6	740.1	719.7	689.9	680.6	496.5	301.3	172.9	104.1	80.0
40°	596.9	596.9	595.1	572.8	563.5	557.9	411.0	251.1	141.3	83.7	68.8
42.5°	476.1	481.7	477.9	468.6	448.2	444.5	342.2	204.6	115.3	70.7	57.6
45°	390.5	373.8	370.1	368.2	357.1	355.2	265.9	161.8	89.3	57.6	48.4
47.5°	286.4	284.5	288.2	278.9	265.9	277.1	210.1	122.7	70.7	46.5	40.9
50°	208.3	212.0	212.0	202.7	199.0	202.7	161.8	93.0	52.1	37.2	35.3
52.5°	156.2	154.4	152.5	154.4	152.5	152.5	120.9	68.8	40.9	29.8	27.9
55°	111.6	111.6	109.7	113.4	115.3	111.6	91.1	50.2	31.6	24.2	22.3
57.5°	78.1	78.1	74.4	78.1	78.1	81.8	65.1	37.2	26.0	18.6	18.6
60°	52.1	52.1	52.1	53.9	55.8	55.8	44.6	26.0	20.5	14.9	14.9
62.5°	35.3	35.3	35.3	37.2	37.2	40.9	31.6	20.5	16.7	13.0	11.2
65°	24.2	24.2	24.2	24.2	26.0	26.0	20.5	14.9	13.0	11.2	9.3
67.5°	14.9	16.7	14.9	16.7	16.7	16.7	13.0	11.2	9.3	7.4	5.6
70°	11.2	11.2	11.2	11.2	11.2	11.2	9.3	9.3	7.4	5.6	3.7
72.5°	7.4	7.4	7.4	7.4	7.4	7.4	5.6	5.6	5.6	3.7	3.7
75°	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	1.9	1.9
77.5°	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	0.0
80°	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	0.0	0.0
82.5°	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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°	745.7	745.7
2.5°	684.4	671.3
5°	580.2	595.1
7.5°	505.8	487.2
10°	424.0	412.8
12.5°	368.2	362.6
15°	305.0	292.0
17.5°	262.2	249.2
20°	219.4	210.1
22.5°	187.8	182.2
25°	161.8	154.4
27.5°	139.5	135.8
30°	120.9	120.9
32.5°	104.1	107.9
35°	93.0	94.8
37.5°	80.0	83.7
40°	74.4	78.1
42.5°	63.2	70.7
45°	53.9	59.5
47.5°	46.5	52.1
50°	39.1	44.6
52.5°	35.3	39.1
55°	29.8	31.6
57.5°	24.2	26.0
60°	18.6	20.5
62.5°	14.9	16.7
65°	11.2	11.2
67.5°	7.4	9.3
70°	3.7	5.6
72.5°	1.9	1.9
75°	1.9	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)