

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: P601177

Luminaire Tested: **ML406AWW9FS1E - 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: P601177  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML406AWW9FS1E - 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: 611.5 lumens  
 Efficiency: N/A  
 Efficacy: 73.7 lumens/watt  
 Spacing Criteria (0/90/45): 1.21 / 0.78 / 1  
 Luminous Opening: Circular (Dia: 0.21' x H: 0')  
 CIE Type: Direct

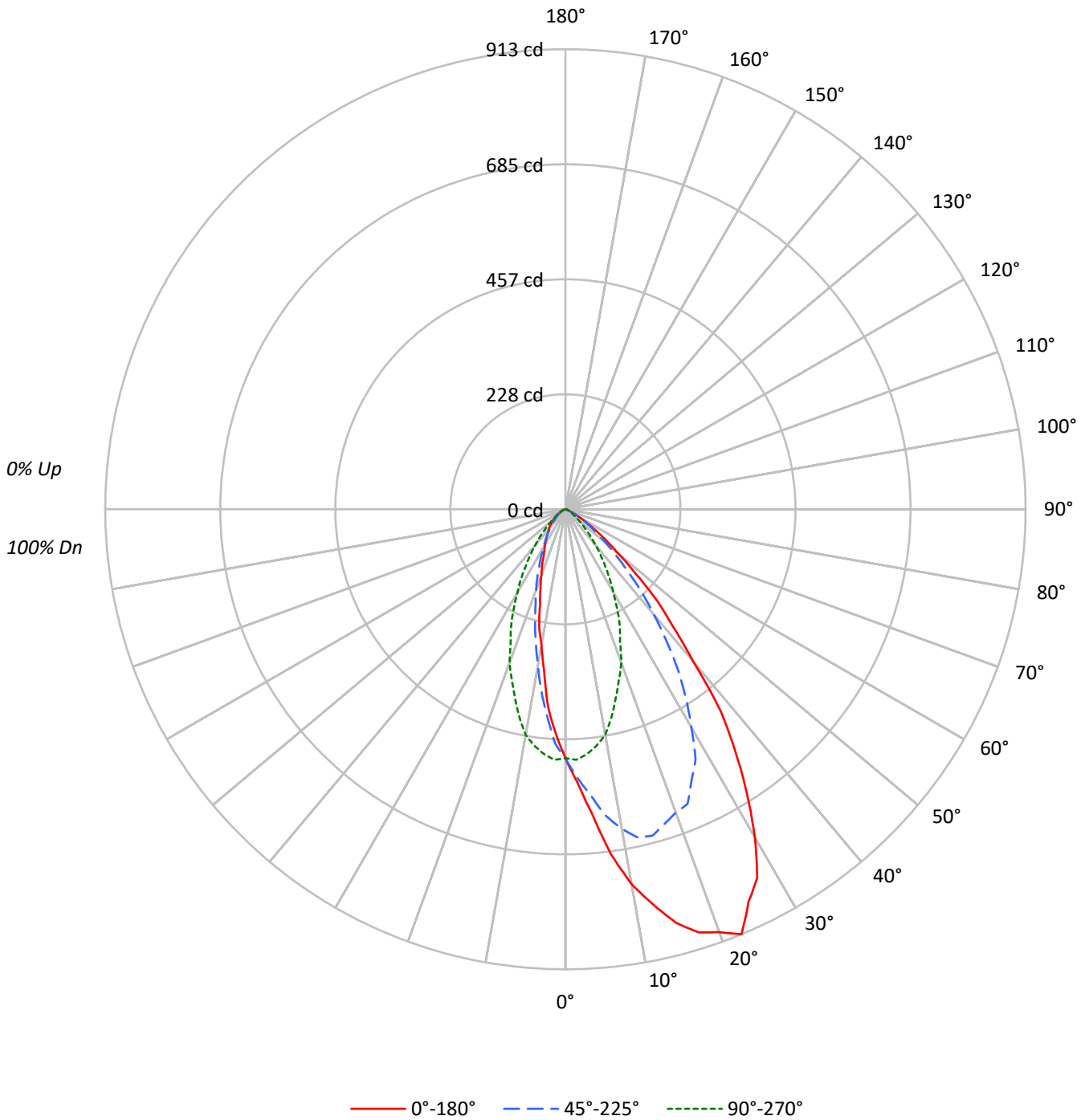
Input Watts (W): 8.3  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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		
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°	155956	155956	155956
5°	192085	154619	124950
10°	242113	145729	87694
15°	277836	126447	63223
20°	300075	108874	46775
25°	299561	88844	35607
30°	273971	69167	29206
35°	226970	52695	24208
40°	162985	38582	21311
45°	115525	26392	17594
50°	67792	16948	14541
55°	40683	11506	11506
60°	21788	8526	8526
65°	11955	6426	5529
70°	6832	4524	3416
75°	3050	3050	0
80°	2182	2182	0
85°	0	0	0

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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	46.8	7.7
10°-20°	127.4	20.8
20°-30°	166.5	27.2
30°-40°	142.7	23.3
40°-50°	81.6	13.4
50°-60°	33.4	5.5
60°-70°	10.7	1.7
70°-80°	2.3	0.4
80°-90°	0.2	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°	340.6	55.7
0°-40°	483.3	79.0
0°-60°	598.4	97.8
0°-90°	611.5	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	611.5	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	494	494	494	494	494	
5°	606	569	488	413	394	63
15°	850	670	387	233	193	240
25°	860	592	255	122	102	394
35°	589	389	137	64	63	363
45°	259	176	59	32	39	197
55°	74	60	21	15	21	70
65°	16	14	9	6	7	17
75°	2	2	2	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°	493.9	493.9	493.9	493.9	493.9	493.9	493.9	493.9	493.9	493.9	493.9
2.5°	542.0	553.1	549.4	555.5	554.3	543.2	532.1	514.9	497.6	487.8	465.6
5°	606.0	619.6	629.4	622.0	618.4	609.7	569.1	530.9	487.8	444.7	412.6
7.5°	689.8	686.1	697.2	675.0	676.2	672.5	613.4	539.5	473.0	410.2	364.6
10°	755.1	744.0	755.1	747.7	732.9	715.7	644.2	535.8	454.5	375.7	314.1
12.5°	803.1	817.9	817.9	800.7	785.9	766.2	667.6	533.4	422.5	333.8	271.0
15°	849.9	854.9	846.2	832.7	817.9	777.3	670.1	517.3	386.8	293.2	232.8
17.5°	880.7	882.0	878.3	865.9	845.0	820.4	654.1	502.6	353.5	261.1	195.9
20°	893.0	883.2	882.0	859.8	841.3	819.1	640.5	466.8	324.0	223.0	170.0
22.5°	912.7	889.3	889.3	867.2	829.0	825.3	633.1	426.2	283.3	190.9	145.3
25°	859.8	856.1	863.5	832.7	803.1	797.0	592.5	395.4	255.0	165.1	121.9
27.5°	824.1	814.2	804.3	784.6	756.3	741.5	559.2	356.0	221.7	138.0	103.5
30°	751.4	751.4	739.1	729.2	691.0	679.9	500.1	319.0	189.7	118.3	86.2
32.5°	671.3	660.2	661.5	650.4	627.0	618.4	444.7	278.4	163.8	96.1	75.1
35°	588.8	576.5	570.3	561.7	558.0	530.9	389.2	240.2	136.7	83.8	64.1
37.5°	507.5	495.2	490.2	476.7	457.0	450.8	328.9	199.5	114.6	69.0	53.0
40°	395.4	395.4	394.2	379.4	373.2	369.5	272.2	166.3	93.6	55.4	45.6
42.5°	315.3	319.0	316.6	310.4	296.9	294.4	226.6	135.5	76.4	46.8	38.2
45°	258.7	247.6	245.1	243.9	236.5	235.3	176.1	107.2	59.1	38.2	32.0
47.5°	189.7	188.5	190.9	184.8	176.1	183.5	139.2	81.3	46.8	30.8	27.1
50°	138.0	140.4	140.4	134.3	131.8	134.3	107.2	61.6	34.5	24.6	23.4
52.5°	103.5	102.2	101.0	102.2	101.0	101.0	80.1	45.6	27.1	19.7	18.5
55°	73.9	73.9	72.7	75.1	76.4	73.9	60.4	33.3	20.9	16.0	14.8
57.5°	51.7	51.7	49.3	51.7	51.7	54.2	43.1	24.6	17.2	12.3	12.3
60°	34.5	34.5	34.5	35.7	37.0	37.0	29.6	17.2	13.5	9.9	9.9
62.5°	23.4	23.4	23.4	24.6	24.6	27.1	20.9	13.5	11.1	8.6	7.4
65°	16.0	16.0	16.0	16.0	17.2	17.2	13.5	9.9	8.6	7.4	6.2
67.5°	9.9	11.1	9.9	11.1	11.1	11.1	8.6	7.4	6.2	4.9	3.7
70°	7.4	7.4	7.4	7.4	7.4	7.4	6.2	6.2	4.9	3.7	2.5
72.5°	4.9	4.9	4.9	4.9	4.9	4.9	3.7	3.7	3.7	2.5	2.5
75°	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.2	1.2
77.5°	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
80°	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	0.0
82.5°	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	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°	493.9	493.9
2.5°	453.3	444.7
5°	384.3	394.2
7.5°	335.0	322.7
10°	280.8	273.5
12.5°	243.9	240.2
15°	202.0	193.4
17.5°	173.7	165.1
20°	145.3	139.2
22.5°	124.4	120.7
25°	107.2	102.2
27.5°	92.4	89.9
30°	80.1	80.1
32.5°	69.0	71.4
35°	61.6	62.8
37.5°	53.0	55.4
40°	49.3	51.7
42.5°	41.9	46.8
45°	35.7	39.4
47.5°	30.8	34.5
50°	25.9	29.6
52.5°	23.4	25.9
55°	19.7	20.9
57.5°	16.0	17.2
60°	12.3	13.5
62.5°	9.9	11.1
65°	7.4	7.4
67.5°	4.9	6.2
70°	2.5	3.7
72.5°	1.2	1.2
75°	1.2	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)