

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: P601173

Luminaire Tested: **ML406AWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K**

Issue Date: 7/29/2022

Tested By:

Approved By:



Cooper Lighting Solutions laboratories have been accredited by National Voluntary Laboratory Accreditation Program (NVLAP) that it adheres to the requirements of ISO/IEC 17025:2005 and appropriate IESNA test methods. This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the Federal Government. Results contained in this report are valid for luminaire sample tested, as supplied by requestor. Information related to the luminaire tested has been supplied by requestor and can affect the validity of the test results. Report shall not be reproduced except in full without approval of Cooper Lighting Solutions Lighting Laboratory. Test performed at address noted above.

**Test Information**

Test Method: LM-79-08  
 Report Number: P601173  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Issue Date: 7/29/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: HALO  
 Catalog Number: ML406AWW9FS1E - 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: 614.6 lumens  
 Efficiency: N/A  
 Efficacy: 74.0 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

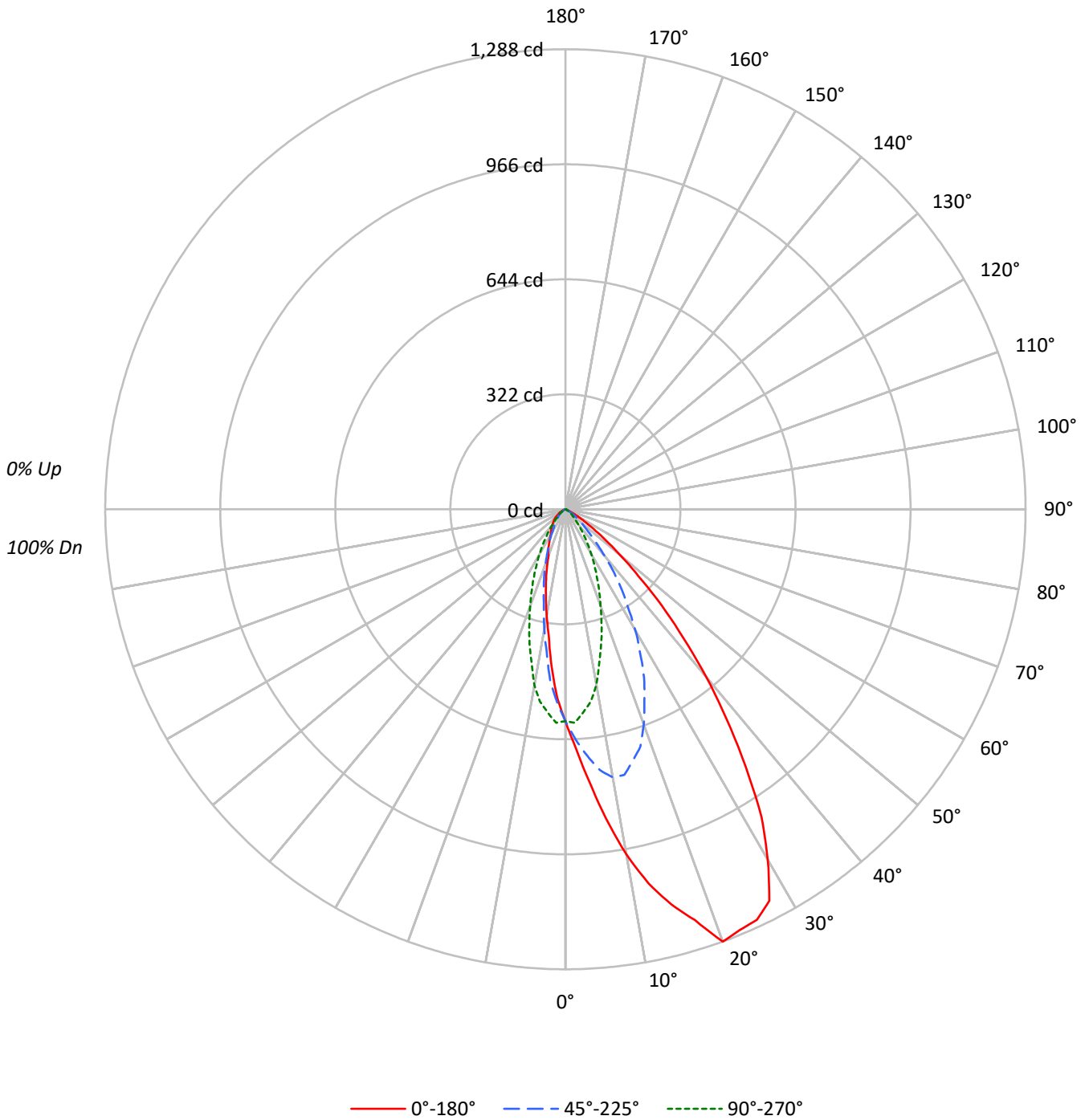
Input Watts (W): 8.3  
 Input Voltage (V): NR  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: NR  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 25 FT



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

TEST NUMBER: P601173  
CATALOG NUMBER: ML406AWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K

### Luminous Intensity Polar Plot



TEST NUMBER: P601173

CATALOG NUMBER: ML406AWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K

**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°	187249	187249	187249
5°	242198	180896	139784
10°	314512	160158	96447
15°	374501	126806	68781
20°	432807	96407	46439
25°	441712	72573	38151
30°	413071	52687	29825
35°	338797	35657	26637
40°	252762	23207	23207
45°	170362	15674	20408
50°	99722	11495	17734
55°	52630	8203	14038
60°	25514	4673	10736
65°	10311	3213	7173
70°	4893	1939	3970
75°	2562	1342	0
80°	2000	2000	0
85°	0	0	0

TEST NUMBER: P601173  
 CATALOG NUMBER: ML406AWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K

**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	55.1	9.0
10°-20°	142.5	23.2
20°-30°	174.6	28.4
30°-40°	136.8	22.3
40°-50°	70.5	11.5
50°-60°	26.8	4.4
60°-70°	6.8	1.1
70°-80°	1.4	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°	372.2	60.6
0°-40°	509.0	82.8
0°-60°	606.3	98.6
0°-90°	614.6	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	614.6	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	593	593	593	593	593	
5°	764	692	571	484	441	80
15°	1146	729	388	233	210	327
25°	1268	521	208	108	110	576
35°	879	276	92	51	69	545
45°	382	96	35	28	46	297
55°	96	30	15	13	26	93
65°	14	5	4	4	10	17
75°	2	1	1	1	0	3
85°	0	0	0	0	0	0
90°	0	0	0	0	0	

TEST NUMBER: P601173

CATALOG NUMBER: ML406AWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K

**CANDELA DISTRIBUTION (FULL):**

	0°	5°	10°	15°	20°	22.5°	45°	67.5°	90°	112.5°	135°
0°	593.0	593.0	593.0	593.0	593.0	593.0	593.0	593.0	593.0	593.0	593.0
2.5°	668.5	665.3	682.3	657.8	641.9	663.2	644.0	621.7	598.3	559.0	538.8
5°	764.1	766.2	769.4	762.0	758.8	756.7	691.8	631.3	570.7	511.2	483.5
7.5°	873.6	853.4	866.1	837.4	842.8	827.9	736.5	621.7	543.1	466.5	401.7
10°	980.9	958.6	969.2	942.7	936.3	923.5	762.0	596.2	499.5	396.4	341.1
12.5°	1072.3	1062.7	1052.1	1016.0	1003.2	968.2	762.0	562.2	437.8	342.2	278.4
15°	1145.6	1136.1	1124.4	1077.6	1038.3	1007.5	729.0	514.4	387.9	293.3	232.7
17.5°	1206.2	1169.0	1170.1	1103.1	1069.1	1028.7	697.2	465.5	335.8	245.5	197.7
20°	1288.0	1220.0	1208.3	1137.1	1073.4	1028.7	640.8	412.3	286.9	207.2	162.6
22.5°	1275.3	1214.7	1228.5	1123.3	1055.3	1037.2	578.1	356.0	246.6	174.3	130.7
25°	1267.8	1224.3	1200.9	1088.2	1006.4	949.0	520.7	311.4	208.3	143.5	108.4
27.5°	1236.0	1170.1	1135.0	1021.3	931.0	884.2	452.7	263.6	174.3	113.7	91.4
30°	1132.9	1085.1	1047.9	928.8	833.2	788.6	392.2	218.9	144.5	93.5	72.3
32.5°	1021.3	979.8	922.5	824.7	715.2	671.7	325.2	187.0	118.0	74.4	60.6
35°	878.9	844.9	790.7	691.8	586.6	567.5	276.3	149.8	92.5	59.5	51.0
37.5°	740.7	711.0	655.7	566.4	484.6	457.0	223.2	120.1	74.4	48.9	43.6
40°	613.2	578.1	542.0	454.9	387.9	358.1	171.1	93.5	56.3	39.3	37.2
42.5°	487.8	466.5	427.2	363.5	297.6	278.4	127.5	70.1	44.6	32.9	31.9
45°	381.5	359.2	322.0	279.5	224.2	209.4	95.6	54.2	35.1	26.6	27.6
47.5°	278.4	267.8	243.4	207.2	171.1	154.1	72.3	42.5	27.6	22.3	23.4
50°	203.0	192.4	180.7	147.7	119.0	114.8	54.2	32.9	23.4	18.1	19.1
52.5°	140.3	139.2	126.5	105.2	87.1	79.7	41.4	25.5	19.1	14.9	15.9
55°	95.6	94.6	86.1	73.3	61.6	56.3	29.8	19.1	14.9	11.7	12.8
57.5°	61.6	62.7	57.4	49.9	40.4	37.2	20.2	13.8	10.6	8.5	9.6
60°	40.4	40.4	35.1	31.9	25.5	23.4	13.8	9.6	7.4	6.4	7.4
62.5°	24.4	25.5	22.3	18.1	15.9	13.8	8.5	6.4	5.3	4.3	5.3
65°	13.8	14.9	12.8	10.6	9.6	8.5	5.3	4.3	4.3	3.2	4.3
67.5°	8.5	8.5	7.4	6.4	5.3	5.3	3.2	3.2	3.2	3.2	3.2
70°	5.3	5.3	4.3	4.3	3.2	3.2	2.1	3.2	2.1	2.1	2.1
72.5°	3.2	3.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.1	1.1
75°	2.1	2.1	2.1	2.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
77.5°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0
80°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	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

TEST NUMBER: P601173  
 CATALOG NUMBER: ML406AWW9FS1E - TIR4D25AWW - TL43R2G\_ TL44S2G\_ 3500K

**CANDELA DISTRIBUTION (continued):**

	157.5°	180°
0°	593.0	593.0
2.5°	526.1	528.2
5°	453.8	441.0
7.5°	377.3	357.1
10°	305.0	300.8
12.5°	257.2	251.9
15°	215.7	210.4
17.5°	180.7	171.1
20°	150.9	138.2
22.5°	125.4	126.5
25°	107.3	109.5
27.5°	92.5	94.6
30°	77.6	81.8
32.5°	70.1	76.5
35°	60.6	69.1
37.5°	54.2	62.7
40°	47.8	56.3
42.5°	42.5	51.0
45°	37.2	45.7
47.5°	32.9	41.4
50°	27.6	36.1
52.5°	23.4	30.8
55°	19.1	25.5
57.5°	15.9	21.3
60°	12.8	17.0
62.5°	9.6	12.8
65°	6.4	9.6
67.5°	4.3	6.4
70°	3.2	4.3
72.5°	1.1	2.1
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)