

Scaled data based on original data using

LM-41-14 Approved Method for Photometric Testing Of Indoor Fluorescent Luminaires

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: HALO

Report Number: P275386

Luminaire Tested: **ML4D09\_935 - TIR50AWW25 - TL45R6GMWBB - TL46S6GMWBB**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-41-14  
Report Number: P275386  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1808-901-20)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: HALO  
Catalog Number: ML4D09\_935 - TIR50AWW25 - TL45R6GMWBB - TL46S6GMWBB  
Description: ML4 900LM 2700K, 90CRI, 25° ASYMM WW, WITH SQUARE ASYMM WW, LINEAR SPREAD LENS, MATTE WHITE FLANGE, BLACK LENS FRAME  
Light Source: (1) HIGH LUMEN LED 90CRI / 3500K CCT  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 677.9 lumens  
Efficiency: N/A  
Efficacy: 60.0 lumens/watt  
Spacing Criteria (0/90/45): 1.32 / 0.78 / 1.11  
Luminous Opening: Rectangular (W 0.17' x L: 0.17' x H: 0')  
CIE Type: Direct

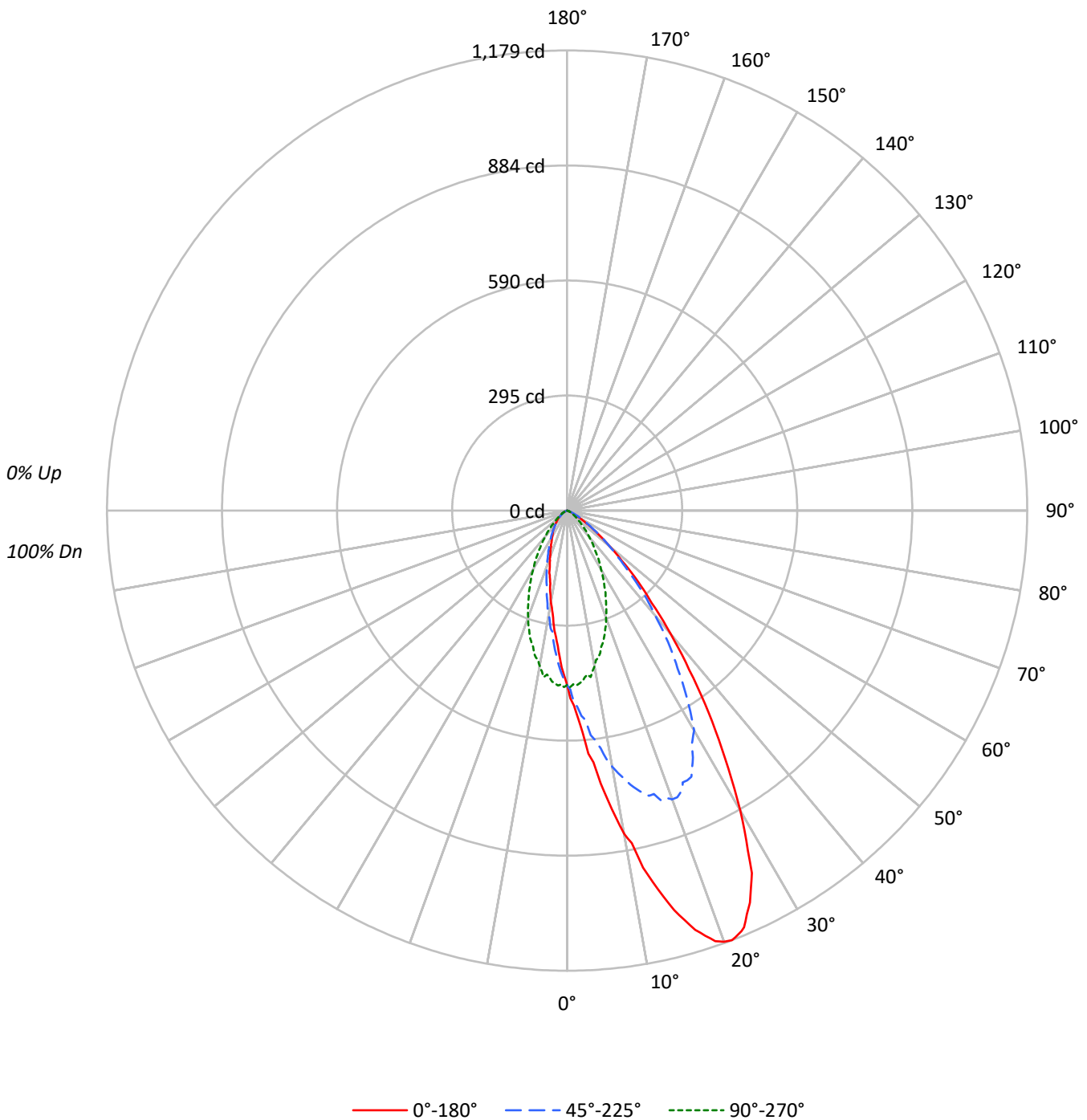
Input Watts (W): 11.3  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT



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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					100			
1	113	109	107	104	110	107	105	102	103	101	99	99	98	96	96	95	94	92					92			
2	106	100	96	92	104	99	94	91	95	92	89	92	89	87	89	87	85	83					83			
3	99	92	86	82	97	91	85	81	88	83	80	85	82	78	83	80	77	75					75			
4	93	85	78	73	91	83	77	73	81	76	72	79	75	71	77	73	70	69					69			
5	88	78	71	66	86	77	71	66	75	70	65	73	69	65	72	68	64	62					62			
6	82	72	65	60	81	71	65	60	70	64	60	68	63	59	67	62	59	57					57			
7	78	67	60	55	76	66	60	55	65	59	55	64	58	54	62	58	54	52					52			
8	73	62	55	51	72	62	55	51	60	55	50	59	54	50	58	54	50	48					48			
9	69	58	51	47	68	58	51	47	57	51	47	56	50	46	55	50	46	45					45			
10	65	54	48	43	64	54	48	43	53	47	43	52	47	43	51	46	43	41					41			

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

	0°	90°	180°
0°	173057	173057	173057
5°	243190	171112	126379
10°	331229	159476	94002
15°	425038	141091	68520
20°	484780	120164	53855
25°	473991	99279	41986
30°	396616	77408	33961
35°	298920	59699	29566
40°	208408	44615	24281
45°	140728	31839	20167
50°	85483	21521	15493
55°	49047	15066	12093
60°	24257	11237	9532
65°	10269	8160	7152
70°	3739	5098	3739
75°	1647	3294	1647
80°	2455	2455	0
85°	0	0	0



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	44.0	6.5
10°-20°	135.7	20.0
20°-30°	193.3	28.5
30°-40°	161.2	23.8
40°-50°	91.3	13.5
50°-60°	38.2	5.6
60°-70°	11.9	1.8
70°-80°	2.2	0.3
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°	373.0	55.0
0°-40°	534.2	78.8
0°-60°	663.7	97.9
0°-90°	677.9	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	677.9	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	447	447	447	447	447	
5°	625	539	440	358	325	66
15°	1060	749	352	201	171	300
25°	1109	752	232	114	98	497
35°	632	494	126	64	62	394
45°	257	228	58	35	37	199
55°	73	79	22	18	18	70
65°	11	19	9	8	8	13
75°	1	2	2	1	1	2
85°	0	0	0	0	0	0
90°	0	0	0	0	0	0



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**CANDELA DISTRIBUTION (FULL):**

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
0°	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6	446.6
1°	481.2	471.1	471.1	474.5	475.6	473.4	471.1	471.1	473.4	468.9	458.9
2°	500.2	512.4	493.5	509.1	502.4	500.2	501.3	500.2	495.7	491.2	489.0
3°	532.5	543.7	539.2	541.5	540.4	532.5	534.8	530.3	523.6	512.4	503.5
4°	570.5	582.8	567.1	578.3	572.7	570.5	563.8	557.1	554.9	534.8	527.0
5°	625.2	610.7	611.8	612.9	607.3	595.1	595.1	588.4	585.0	558.2	539.2
6°	648.6	637.5	655.3	655.3	640.8	635.3	635.3	623.0	605.1	597.3	578.3
7°	704.5	691.1	694.4	679.9	683.3	673.2	672.1	648.6	637.5	623.0	592.8
8°	749.1	748.0	729.0	733.5	729.0	713.4	703.4	691.1	675.4	647.5	615.2
9°	796.0	792.7	774.8	775.9	769.2	746.9	749.1	725.7	693.3	663.2	645.3
10°	841.8	828.4	827.3	821.7	806.1	786.0	791.6	755.8	726.8	697.8	666.5
11°	867.5	873.1	869.7	858.5	841.8	827.3	820.6	786.0	765.9	721.2	685.5
12°	935.6	933.3	912.1	903.2	890.9	860.8	859.7	823.9	782.6	727.9	702.2
13°	976.9	964.6	951.2	933.3	918.8	909.9	892.0	857.4	819.5	743.5	721.2
14°	1019.3	1007.0	994.7	984.7	956.8	941.2	918.8	886.4	837.3	779.3	735.7
15°	1059.5	1024.9	1031.6	997.0	1009.3	959.0	949.0	904.3	858.5	803.8	749.1
16°	1091.9	1078.5	1069.5	1053.9	1030.5	994.7	981.3	924.4	876.4	821.7	760.3
17°	1123.1	1118.7	1097.5	1069.5	1049.4	1019.3	1000.3	950.1	893.1	820.6	759.2
18°	1145.5	1146.6	1123.1	1104.2	1070.7	1042.7	1024.9	964.6	921.1	842.9	781.5
19°	1166.7	1117.6	1139.9	1122.0	1076.2	1058.4	1036.1	991.4	931.1	850.7	779.3
20°	1175.6	1143.2	1143.2	1123.1	1096.3	1066.2	1049.4	990.3	924.4	845.1	787.1
21°	1179.0	1180.1	1156.6	1114.2	1101.9	1078.5	1050.6	992.5	940.0	854.1	787.1
22.5°	1166.7	1168.9	1146.6	1116.4	1104.2	1065.1	1055.0	983.6	923.3	836.2	772.6
23°	1160.0	1149.9	1139.9	1120.9	1085.2	1056.1	1038.3	983.6	916.6	831.7	756.9
24°	1132.1	1139.9	1114.2	1101.9	1064.0	1046.1	1023.8	966.8	906.5	834.0	756.9
25°	1108.6	1101.9	1091.9	1078.5	1047.2	1021.5	1004.8	962.4	899.8	817.2	752.5
26°	1074.0	1080.7	1059.5	1045.0	1021.5	997.0	979.1	932.2	870.8	778.2	731.3
27°	1042.7	1039.4	1026.0	1012.6	983.6	962.4	949.0	914.4	859.7	780.4	710.1
28°	986.9	989.2	979.1	966.8	953.4	930.0	912.1	877.5	817.2	745.8	679.9
29°	937.8	946.7	931.1	908.8	921.1	883.1	870.8	835.1	787.1	720.1	664.3
30°	886.4	888.7	878.6	876.4	857.4	844.0	830.6	794.9	765.9	698.9	650.9
32.5°	752.5	756.9	753.6	749.1	736.8	734.6	721.2	687.7	666.5	614.0	572.7
35°	631.9	624.1	619.6	619.6	620.7	607.3	600.6	581.7	559.3	530.3	493.5
37.5°	513.6	509.1	506.9	502.4	504.6	499.0	497.9	494.6	473.4	447.7	424.2
40°	412.0	407.5	408.6	413.1	405.3	405.3	405.3	403.0	384.1	364.0	350.6
42.5°	320.4	321.5	321.5	326.0	327.1	324.9	320.4	317.1	308.1	295.9	292.5
45°	256.8	250.1	251.2	251.2	249.0	254.5	252.3	252.3	245.6	234.5	227.8
47.5°	189.8	187.6	189.8	194.3	194.3	194.3	196.5	195.4	194.3	185.3	177.5
50°	141.8	140.7	145.1	144.0	146.3	146.3	147.4	149.6	150.7	141.8	140.7
52.5°	106.1	102.7	104.9	109.4	110.5	110.5	112.8	116.1	113.9	110.5	106.1
55°	72.6	73.7	77.0	79.3	80.4	79.3	81.5	84.8	84.8	81.5	79.3
57.5°	50.2	51.4	53.6	53.6	56.9	58.1	56.9	60.3	61.4	61.4	58.1
60°	31.3	32.4	34.6	35.7	38.0	39.1	40.2	43.5	44.7	42.4	41.3
62.5°	19.0	20.1	20.1	22.3	23.4	25.7	26.8	29.0	31.3	30.1	29.0
65°	11.2	11.2	11.2	12.3	14.5	15.6	16.7	17.9	20.1	20.1	19.0



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**CANDELA DISTRIBUTION (continued):**

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
67.5°	5.6	5.6	5.6	6.7	7.8	7.8	8.9	11.2	11.2	12.3	12.3
70°	3.3	3.3	3.3	3.3	4.5	4.5	4.5	5.6	6.7	6.7	7.8
72.5°	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.3	3.3	3.3	3.3
75°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	2.2	2.2	2.2
77.5°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
80°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
82.5°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	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):**

	67.5°	90°	112.5°	135°	157.5°	180°
0°	446.6	446.6	446.6	446.6	446.6	446.6
1°	462.2	452.2	442.1	435.4	436.5	423.1
2°	461.1	445.5	427.6	416.4	405.3	401.9
3°	475.6	448.8	417.5	398.6	382.9	374.0
4°	491.2	444.3	400.8	377.4	360.6	347.2
5°	499.0	439.9	389.6	358.4	338.3	324.9
6°	500.2	429.8	377.4	336.0	317.1	309.3
7°	508.0	423.1	364.0	312.6	299.2	288.0
8°	503.5	430.9	347.2	304.8	278.0	265.7
9°	522.5	416.4	329.3	285.8	261.2	251.2
10°	518.0	405.3	320.4	269.1	245.6	238.9
11°	527.0	389.6	307.0	260.1	230.0	223.3
12°	524.7	385.2	292.5	243.4	216.6	209.9
13°	525.8	375.1	279.1	230.0	202.1	192.0
14°	523.6	359.5	267.9	216.6	190.9	182.0
15°	520.3	351.7	253.4	201.0	179.7	170.8
16°	500.2	341.6	238.9	192.0	169.7	166.3
17°	506.9	330.5	226.6	180.9	159.7	151.8
18°	502.4	317.1	217.7	170.8	149.6	142.9
19°	484.5	305.9	205.4	159.7	141.8	135.1
20°	482.3	291.4	194.3	151.8	132.9	130.6
21°	475.6	280.2	184.2	142.9	127.3	120.6
22.5°	453.3	261.2	168.6	130.6	116.1	111.6
23°	445.5	254.5	163.0	127.3	112.8	111.6
24°	435.4	242.3	153.0	119.5	109.4	101.6
25°	426.5	232.2	146.3	113.9	101.6	98.2
26°	412.0	218.8	137.3	106.1	96.0	92.7
27°	389.6	207.7	129.5	101.6	91.5	87.1
28°	382.9	196.5	120.6	94.9	86.0	83.7
29°	368.4	186.4	113.9	89.3	80.4	79.3
30°	353.9	173.0	107.2	84.8	77.0	75.9
32.5°	307.0	151.8	90.4	73.7	68.1	68.1
35°	264.6	126.2	77.0	63.6	60.3	62.5
37.5°	235.6	107.2	64.8	54.7	53.6	53.6
40°	199.8	88.2	53.6	46.9	46.9	48.0
42.5°	167.5	72.6	44.7	40.2	41.3	41.3
45°	135.1	58.1	36.8	34.6	35.7	36.8
47.5°	106.1	45.8	30.1	29.0	31.3	31.3
50°	80.4	35.7	24.6	24.6	25.7	25.7
52.5°	60.3	29.0	20.1	21.2	22.3	22.3
55°	43.5	22.3	16.7	17.9	17.9	17.9
57.5°	32.4	17.9	13.4	14.5	15.6	14.5
60°	24.6	14.5	11.2	12.3	12.3	12.3
62.5°	17.9	11.2	8.9	10.0	10.0	8.9
65°	13.4	8.9	7.8	7.8	7.8	7.8





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**CANDELA DISTRIBUTION (continued):**

	67.5°	90°	112.5°	135°	157.5°	180°
67.5°	8.9	6.7	5.6	6.7	5.6	5.6
70°	5.6	4.5	4.5	4.5	4.5	3.3
72.5°	3.3	3.3	2.2	2.2	3.3	2.2
75°	2.2	2.2	2.2	1.1	1.1	1.1
77.5°	1.1	1.1	1.1	1.1	1.1	0.0
80°	1.1	1.1	1.1	0.0	0.0	0.0
82.5°	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
87.5°	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

(END OF REPORT)