

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: P275382

Luminaire Tested: **ML4D09\_935 - TIR50AWW25 - TL41RMW - TL42SMW**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-41-14  
Report Number: P275382  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1808-901-19)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: HALO  
Catalog Number: ML4D09\_935 - TIR50AWW25 - TL41RMW - TL42SMW  
Description: ML4 900LM 2700K, 90CRI, 25° ASYMM WW, WITH ROUND PINHOLE MATTE WHITE FLANGE  
Light Source: (1) HIGH LUMEN LED 90CRI / 3500K CCT  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 802.0 lumens  
Efficiency: N/A  
Efficacy: 71.0 lumens/watt  
Spacing Criteria (0/90/45): 1.4 / 0.6 / 0.88  
Luminous Opening: Circular (Dia: 0.17' x H: 0')  
CIE Type: Direct

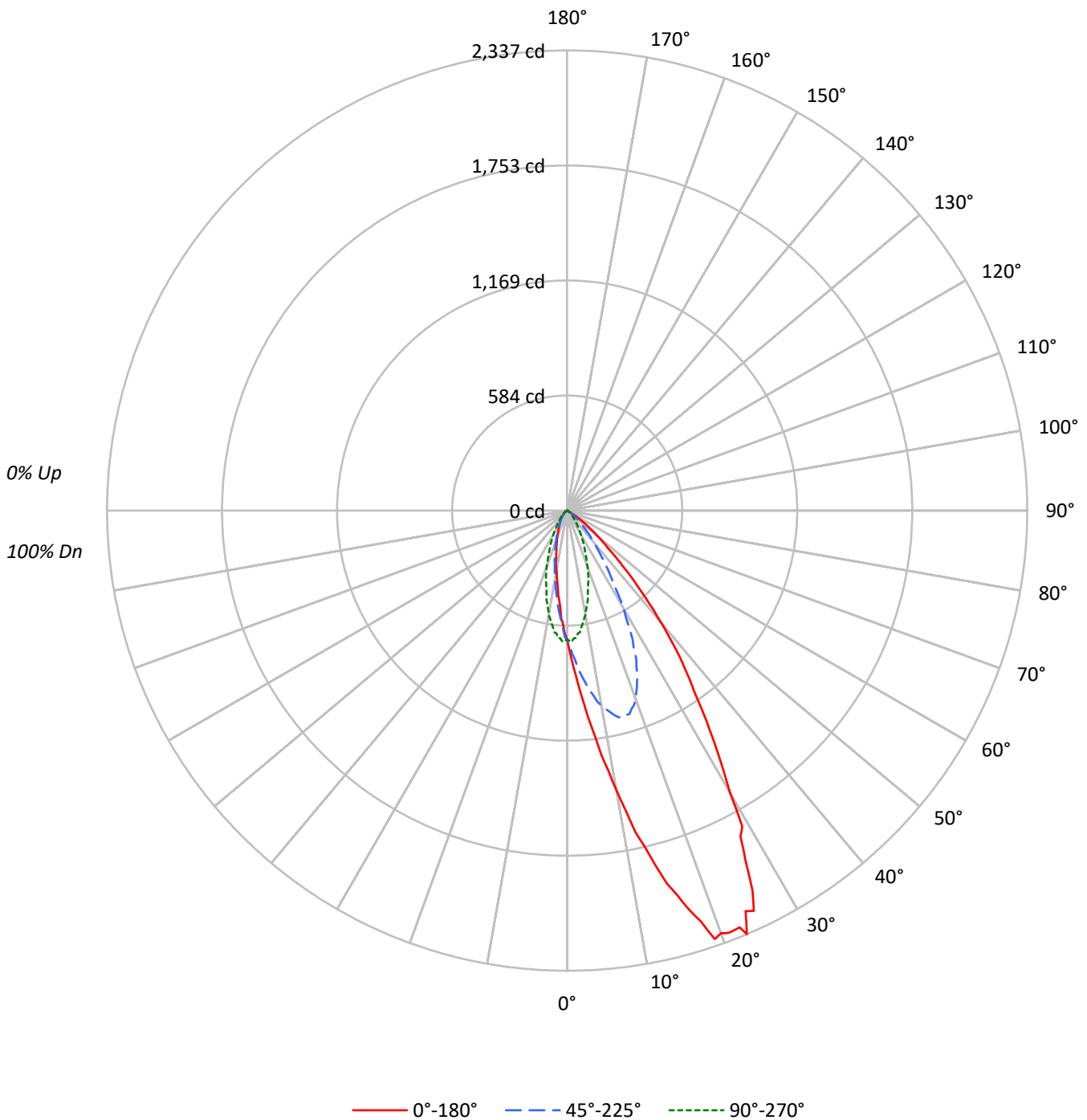
Input Watts (W): 11.3  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT



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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	110	108	105	111	108	106	104	104	102	100	100	99	97	97	96	95	93					93			
2	107	102	98	94	105	100	96	93	97	94	91	94	91	89	91	89	87	85					85			
3	101	94	89	85	99	93	88	84	90	86	83	88	84	81	86	83	80	79					79			
4	96	88	82	77	94	86	81	77	84	80	76	82	78	75	80	77	74	72					72			
5	90	81	75	71	89	80	75	70	79	74	70	77	73	69	75	72	68	67					67			
6	85	76	70	65	84	75	69	65	74	68	64	72	67	64	71	67	63	62					62			
7	81	71	65	60	79	70	64	60	69	64	60	68	63	59	67	62	59	57					57			
8	77	66	60	56	75	66	60	56	65	59	55	64	59	55	63	58	55	53					53			
9	73	62	56	52	71	62	56	52	61	55	52	60	55	51	59	55	51	50					50			
10	69	59	53	49	68	58	52	48	57	52	48	57	52	48	56	51	48	47					47			

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

	0°	90°	180°
0°	322572	322572	322572
5°	490113	309986	228218
10°	723280	268832	155407
15°	1001801	209115	107724
20°	1199672	158721	77916
25°	1221380	114157	55255
30°	941951	79474	42557
35°	680725	52401	37644
40°	476412	35939	30206
45°	281819	24142	19467
50°	155815	16272	15428
55°	74836	10580	13419
60°	27531	6611	11052
65°	5253	3853	7822
70°	1587	1587	3174
75°	0	2097	2097
80°	0	3125	3125
85°	0	6227	6227



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	65.0	8.1
10°-20°	199.0	24.8
20°-30°	256.6	32.0
30°-40°	172.0	21.4
40°-50°	78.2	9.8
50°-60°	25.0	3.1
60°-70°	4.5	0.6
70°-80°	1.0	0.1
80°-90°	0.8	0.1
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°	520.6	64.9
0°-40°	692.5	86.3
0°-60°	795.8	99.2
0°-90°	802.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	802.0	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	654	654	654	654	654	
5°	990	842	626	502	461	109
15°	1961	1088	409	244	211	561
25°	2244	828	210	112	102	973
35°	1130	352	87	51	62	719
45°	404	120	35	23	28	326
55°	87	30	12	10	16	86
65°	4	3	3	3	7	8
75°	0	1	1	1	1	0
85°	0	1	1	1	1	0
90°	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°	653.8	653.8	653.8	653.8	653.8	653.8	653.8	653.8	653.8	653.8	653.8
1°	712.9	697.3	708.4	700.6	699.5	708.4	685.0	678.3	700.6	681.7	680.5
2°	773.1	765.3	766.5	759.8	763.1	752.0	752.0	747.5	739.7	744.1	726.3
3°	836.7	833.4	834.5	813.3	821.1	813.3	805.5	791.0	804.4	788.8	757.5
4°	910.4	898.1	897.0	891.4	891.4	864.6	863.5	857.9	843.4	818.9	805.5
5°	989.6	980.7	957.2	962.8	943.8	942.7	924.9	893.6	898.1	868.0	842.3
6°	1071.0	1069.9	1055.4	1038.7	1029.7	1006.3	1001.9	950.5	957.2	913.7	878.0
7°	1151.4	1151.4	1141.3	1122.3	1098.9	1090.0	1071.0	1017.5	1001.9	955.0	913.7
8°	1255.1	1238.4	1203.8	1201.6	1172.6	1153.6	1132.4	1072.1	1053.2	996.3	945.0
9°	1336.6	1333.2	1297.5	1288.6	1259.6	1220.5	1196.0	1127.9	1106.7	1030.9	982.9
10°	1443.7	1434.7	1416.9	1376.7	1345.5	1317.6	1283.0	1217.2	1160.3	1080.0	1005.2
11°	1545.2	1536.3	1497.2	1476.0	1404.6	1366.7	1329.9	1265.2	1194.9	1113.4	1027.5
12°	1669.0	1607.7	1602.1	1563.0	1503.9	1474.9	1415.8	1337.7	1245.1	1134.6	1045.4
13°	1752.7	1730.4	1704.7	1634.4	1585.3	1518.4	1453.7	1362.2	1280.8	1172.6	1065.5
14°	1858.7	1858.7	1798.4	1740.4	1637.8	1608.8	1549.6	1430.3	1316.5	1194.9	1081.1
15°	1961.3	1921.2	1876.5	1807.4	1705.8	1662.3	1578.7	1469.3	1360.0	1211.6	1087.8
16°	2033.8	2032.7	1987.0	1891.0	1775.0	1715.9	1646.7	1507.2	1381.2	1218.3	1080.0
17°	2119.7	2138.7	2055.0	1955.7	1818.5	1765.0	1662.3	1510.6	1395.7	1221.6	1081.1
18°	2192.3	2182.2	2118.6	2004.8	1912.2	1777.2	1713.6	1537.4	1400.1	1207.1	1058.8
19°	2301.6	2253.6	2137.6	2046.1	1887.7	1841.9	1728.1	1549.6	1385.6	1202.7	1044.3
20°	2284.9	2286.0	2177.8	2057.3	1926.7	1801.8	1720.3	1545.2	1370.0	1184.8	1018.6
21°	2297.1	2299.4	2184.5	2058.4	1918.9	1810.7	1692.4	1501.7	1342.1	1173.7	982.9
22.5°	2290.4	2240.2	2167.7	2035.0	1854.2	1790.6	1637.8	1473.8	1288.6	1103.4	929.3
23°	2337.3	2254.7	2113.0	1992.6	1833.0	1752.7	1643.4	1452.6	1302.0	1093.3	909.3
24°	2226.8	2196.7	2080.7	1965.8	1778.4	1677.9	1595.4	1403.5	1257.3	1026.4	865.7
25°	2243.6	2113.0	2021.6	1874.3	1730.4	1614.4	1508.4	1328.7	1200.4	986.2	827.8
26°	2147.6	2068.4	1944.6	1815.2	1638.9	1536.3	1459.3	1271.8	1103.4	931.6	769.8
27°	1997.0	1993.7	1872.1	1700.3	1563.0	1478.2	1380.1	1206.0	1067.7	873.6	733.0
28°	1875.4	1837.5	1733.7	1615.5	1453.7	1351.1	1293.0	1132.4	976.2	811.1	667.2
29°	1834.1	1734.8	1636.7	1500.6	1383.4	1313.1	1210.5	1045.4	898.1	746.4	612.5
30°	1653.4	1609.9	1519.5	1419.1	1262.9	1188.2	1112.3	958.3	836.7	697.3	572.3
32.5°	1382.3	1346.6	1262.9	1178.1	1057.6	981.8	910.4	784.3	662.7	538.9	438.5
35°	1130.2	1126.8	1036.4	952.8	853.5	786.5	725.2	617.0	526.6	419.5	352.5
37.5°	941.6	902.6	832.3	772.0	680.5	630.3	572.3	474.2	407.2	332.5	268.9
40°	739.7	712.9	662.7	593.5	524.4	477.5	439.6	362.6	312.4	254.4	208.6
42.5°	556.7	537.7	495.4	451.8	396.1	368.2	333.6	276.7	237.6	196.4	165.1
45°	403.9	390.5	362.6	328.0	284.5	262.2	242.1	207.5	172.9	147.3	120.5
47.5°	281.1	281.1	255.5	232.1	207.5	187.4	178.5	150.6	129.4	107.1	92.6
50°	203.0	197.5	183.0	166.2	147.3	137.2	125.0	108.2	92.6	79.2	66.9
52.5°	137.2	136.1	125.0	116.0	103.8	97.1	87.0	74.7	64.7	54.7	45.7
55°	87.0	84.8	79.2	71.4	65.8	61.4	56.9	48.0	42.4	35.7	30.1
57.5°	51.3	49.1	45.7	43.5	39.0	36.8	33.5	29.0	25.7	22.3	20.1
60°	27.9	26.8	25.7	23.4	23.4	21.2	19.0	17.9	15.6	13.4	11.2
62.5°	12.3	12.3	11.2	10.0	10.0	10.0	8.9	8.9	7.8	7.8	6.7
65°	4.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3



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**CANDELA DISTRIBUTION (continued):**

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
67.5°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
70°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
72.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	1.1
75°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1
77.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
80°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.1
87.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
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°	653.8	653.8	653.8	653.8	653.8	653.8
1°	678.3	660.5	642.6	643.7	630.3	624.8
2°	686.1	667.2	623.7	598.0	588.0	581.3
3°	709.6	649.3	604.7	570.1	542.2	551.1
4°	725.2	648.2	580.1	529.9	490.9	494.2
5°	725.2	625.9	544.4	502.0	464.1	460.8
6°	740.8	622.5	521.0	469.7	429.5	431.8
7°	744.1	595.8	500.9	437.3	397.2	394.9
8°	740.8	575.7	467.5	408.3	374.9	362.6
9°	728.5	554.5	438.5	381.6	343.6	334.7
10°	719.6	536.6	416.1	354.8	318.0	310.2
11°	709.6	507.6	388.2	324.7	293.4	292.3
12°	696.2	484.2	363.7	305.7	268.9	277.8
13°	679.4	467.5	340.3	282.3	254.4	246.6
14°	658.2	432.9	320.2	263.3	228.7	227.6
15°	646.0	409.4	302.3	244.3	216.4	210.9
16°	615.8	387.1	277.8	224.2	195.2	197.5
17°	599.1	368.2	258.8	207.5	184.1	181.9
18°	563.4	347.0	230.9	193.0	170.7	168.5
19°	533.3	326.9	223.1	178.5	160.7	159.5
20°	505.4	302.3	207.5	167.3	148.4	148.4
21°	478.6	278.9	193.0	155.1	139.5	136.1
22.5°	437.3	251.0	174.0	139.5	123.8	122.7
23°	423.9	239.9	165.1	131.6	119.4	119.4
24°	394.9	224.2	151.7	121.6	111.6	109.3
25°	374.9	209.7	139.5	111.6	101.5	101.5
26°	342.5	191.9	127.2	102.6	94.8	95.9
27°	319.1	177.4	117.1	94.8	87.0	89.3
28°	299.0	162.9	108.2	87.0	82.6	83.7
29°	280.0	149.5	97.1	81.4	78.1	79.2
30°	253.3	139.5	89.3	74.7	73.6	74.7
32.5°	201.9	108.2	72.5	61.4	64.7	66.9
35°	155.1	87.0	58.0	51.3	56.9	62.5
37.5°	120.5	69.2	46.9	42.4	49.1	55.8
40°	95.9	55.8	37.9	34.6	40.2	46.9
42.5°	75.9	44.6	32.4	27.9	31.2	35.7
45°	60.2	34.6	25.7	23.4	25.7	27.9
47.5°	44.6	27.9	21.2	19.0	21.2	23.4
50°	33.5	21.2	16.7	15.6	17.9	20.1
52.5°	25.7	15.6	13.4	12.3	15.6	17.9
55°	17.9	12.3	10.0	10.0	13.4	15.6
57.5°	12.3	8.9	8.9	7.8	10.0	13.4
60°	8.9	6.7	6.7	6.7	8.9	11.2
62.5°	5.6	4.5	4.5	4.5	6.7	7.8
65°	3.3	3.3	3.3	3.3	4.5	6.7





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**CANDELA DISTRIBUTION (continued):**

	67.5°	90°	112.5°	135°	157.5°	180°
67.5°	1.1	1.1	2.2	2.2	3.3	4.5
70°	1.1	1.1	1.1	1.1	2.2	2.2
72.5°	1.1	1.1	1.1	1.1	1.1	1.1
75°	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
80°	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
85°	1.1	1.1	1.1	1.1	1.1	1.1
87.5°	1.1	1.1	1.1	1.1	1.1	1.1
90°	0.0	0.0	0.0	0.0	0.0	0.0

(END OF REPORT)