

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: P275379

Luminaire Tested: **ML4D09\_940 - TIR50AWW25 - TL45R6GMWWB - TL46S6GMWWB**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-41-14  
Report Number: P275379  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1808-901-18)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: HALO  
Catalog Number: ML4D09\_940 - TIR50AWW25 - TL45R6GMWWB - TL46S6GMWWB  
Description: ML4 900LM 2700K, 90CRI, 25° ASYMM WW, WITH ROUND ASYMM WW, LINEAR SPREAD LENS, MATTE WHITE FLANGE, WHITE LENS FRAME  
Light Source: (1) HIGH LUMEN LED 90CRI / 4000K CCT  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 732.9 lumens  
Efficiency: N/A  
Efficacy: 64.9 lumens/watt  
Spacing Criteria (0/90/45): 1.33 / 0.78 / 1.1  
Luminous Opening: Circular (Dia: 0.17' x H: 0')  
CIE Type: Direct

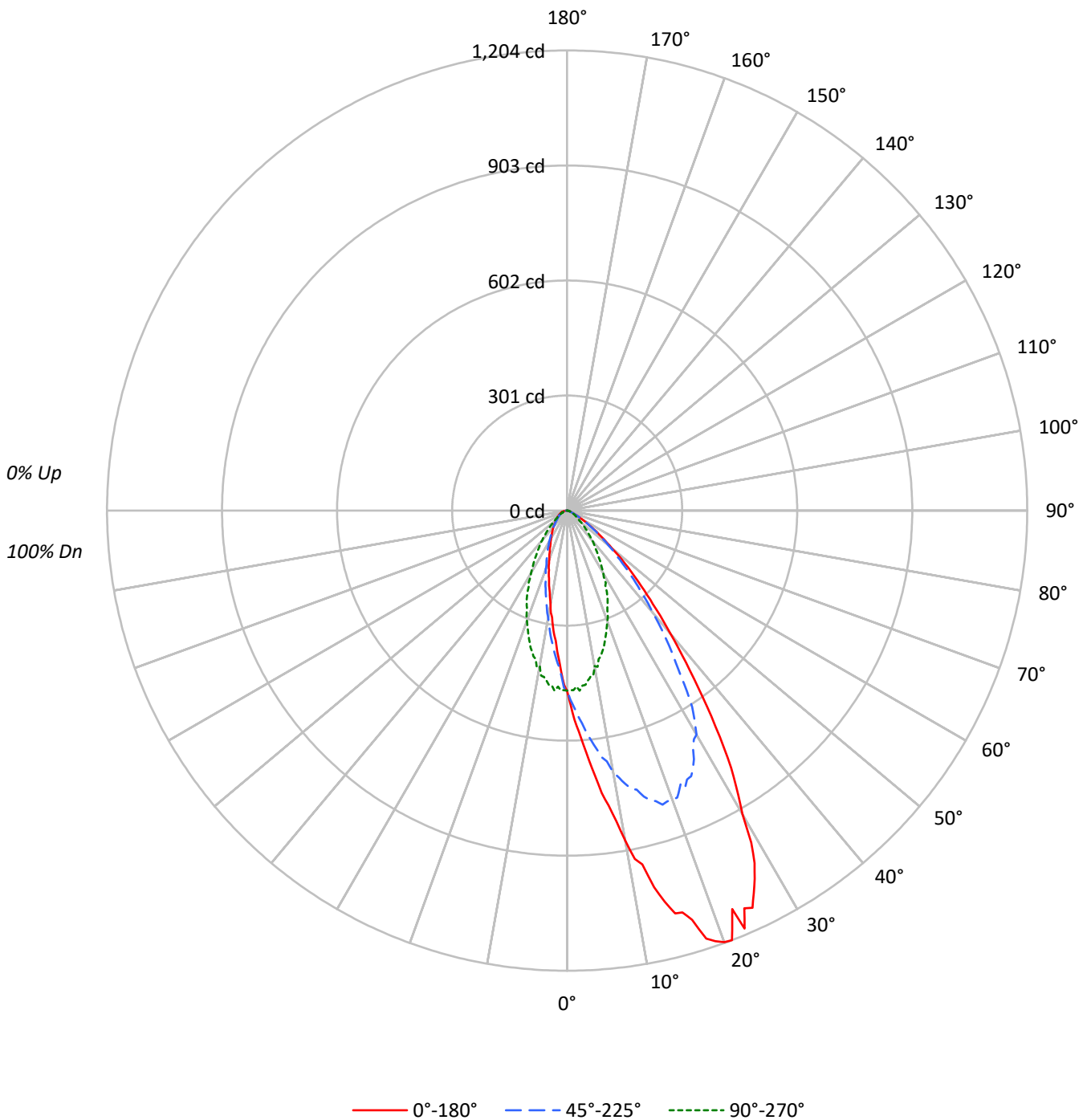
Input Watts (W): 11.3  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT



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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	112	109	106	103	110	107	104	102	103	100	98	99	97	95	95	94	93	91					91			
2	105	99	94	90	103	98	93	89	94	91	87	91	88	85	88	86	84	82					82			
3	99	91	85	80	96	89	84	79	87	82	78	84	80	77	82	78	76	74					74			
4	92	83	77	72	90	82	76	71	80	75	70	78	73	69	76	72	69	67					67			
5	87	77	70	65	85	76	69	64	74	68	64	72	67	63	70	66	63	61					61			
6	81	71	64	59	80	70	63	59	68	62	58	67	62	58	65	61	57	56					56			
7	77	66	59	54	75	65	58	53	64	58	53	62	57	53	61	56	53	51					51			
8	72	61	54	49	71	60	54	49	59	53	49	58	53	49	57	52	48	47					47			
9	68	57	50	45	67	56	50	45	55	49	45	54	49	45	53	48	45	43					43			
10	64	53	47	42	63	53	46	42	52	46	42	51	46	42	50	45	42	40					40			

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

	0°	90°	180°
0°	232431	232431	232431
5°	325190	227673	169083
10°	439519	206959	125398
15°	557419	189501	93576
20°	630892	161293	71668
25°	624409	135661	57596
30°	522534	107617	47969
35°	396136	84323	41137
40°	270441	65952	35939
45°	183437	49261	30980
50°	116132	34924	27939
55°	74406	26408	26408
60°	42628	22498	24669
65°	21247	18562	25217
70°	11540	16445	24668
75°	6481	12963	23828
80°	6535	13070	25855
85°	6227	13020	26040



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	46.1	6.3
10°-20°	141.1	19.2
20°-30°	200.9	27.4
30°-40°	170.8	23.3
40°-50°	97.9	13.4
50°-60°	45.4	6.2
60°-70°	19.3	2.6
70°-80°	8.5	1.2
80°-90°	2.9	0.4
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°	388.1	52.9
0°-40°	558.9	76.3
0°-60°	702.2	95.8
0°-90°	732.9	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	732.9	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	471	471	471	471	471	
5°	657	584	460	376	341	69
15°	1091	775	371	216	183	307
25°	1147	767	249	122	106	510
35°	658	506	140	71	68	410
45°	263	228	71	42	44	208
55°	86	80	31	27	31	80
65°	18	19	16	18	22	21
75°	3	5	7	11	12	4
85°	1	1	2	3	5	2
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°	471.1	471.1	471.1	471.1	471.1	471.1	471.1	471.1	471.1	471.1	471.1
1°	508.6	513.2	497.3	499.5	497.3	497.3	495.0	493.9	490.4	490.4	495.0
2°	547.3	537.1	531.4	514.3	526.9	529.1	521.2	521.2	518.9	504.1	514.3
3°	579.2	580.3	566.7	565.5	551.9	556.4	557.6	555.3	549.6	534.8	537.1
4°	614.5	612.2	604.2	602.0	597.4	597.4	588.3	589.4	579.2	565.5	557.6
5°	656.6	657.7	642.9	633.8	621.3	623.6	620.2	624.7	603.1	590.6	583.7
6°	697.5	698.7	683.9	677.1	664.5	661.1	656.6	654.3	630.4	613.3	605.4
7°	744.2	738.5	724.8	714.6	705.5	697.5	691.8	690.7	662.3	645.2	627.0
8°	779.5	785.2	779.5	748.7	743.1	747.6	727.1	714.6	691.8	670.2	652.0
9°	822.7	830.7	811.3	814.7	780.6	778.3	769.2	747.6	739.6	688.4	664.5
10°	877.3	871.6	853.4	836.4	828.4	821.6	797.7	793.1	760.1	701.0	695.3
11°	928.5	914.9	898.9	893.3	862.5	856.8	820.4	817.0	780.6	738.5	712.3
12°	946.7	968.4	930.8	920.6	902.4	895.5	870.5	844.3	804.5	756.7	730.5
13°	1011.6	1008.2	996.8	984.3	934.2	928.5	905.8	876.2	832.9	782.9	747.6
14°	1054.8	1056.0	1033.2	1009.3	971.8	962.7	937.6	909.2	856.8	799.9	752.2
15°	1091.3	1100.4	1060.5	1041.2	1005.9	994.5	966.1	938.8	881.9	819.3	774.9
16°	1093.5	1117.4	1090.1	1070.8	1030.9	1024.1	994.5	958.1	897.8	832.9	787.4
17°	1119.7	1151.6	1110.6	1116.3	1056.0	1043.5	1013.9	970.6	927.4	853.4	795.4
18°	1177.7	1168.6	1145.9	1120.8	1077.6	1063.9	1040.0	994.5	928.5	839.8	809.1
19°	1191.4	1189.1	1175.5	1137.9	1092.4	1077.6	1046.9	999.1	936.5	868.2	804.5
20°	1201.6	1198.2	1176.6	1147.0	1093.5	1082.1	1054.8	1012.7	947.9	871.6	804.5
21°	1203.9	1222.1	1175.5	1136.8	1102.6	1089.0	1057.1	1013.9	942.2	870.5	804.5
22.5°	1128.8	1198.2	1182.3	1115.1	1109.5	1090.1	1060.5	1001.4	935.4	856.8	774.9
23°	1188.0	1194.8	1170.9	1141.3	1092.4	1077.6	1044.6	996.8	941.0	859.1	789.7
24°	1139.0	1174.3	1139.0	1124.3	1077.6	1074.2	1026.4	990.0	928.5	846.6	770.4
25°	1147.0	1149.3	1119.7	1102.6	1058.3	1051.4	1033.2	968.4	904.6	832.9	766.9
26°	1114.0	1123.1	1094.7	1077.6	1051.4	1017.3	1002.5	946.7	886.4	809.1	751.0
27°	1081.0	1083.3	1056.0	1042.3	1023.0	988.8	963.8	921.7	873.9	784.0	730.5
28°	1044.6	1044.6	1019.6	1002.5	966.1	954.7	941.0	892.1	835.2	766.9	701.0
29°	993.4	995.7	975.2	967.2	929.7	914.9	895.5	856.8	813.6	738.5	683.9
30°	917.2	949.0	926.3	913.7	886.4	877.3	870.5	840.9	784.0	715.7	677.1
32.5°	798.8	812.5	798.8	788.6	787.4	760.1	739.6	719.2	689.6	636.1	608.8
35°	657.7	672.5	654.3	663.4	647.5	642.9	635.0	607.6	590.6	546.2	506.4
37.5°	525.7	538.2	534.8	532.5	515.5	515.5	515.5	498.4	482.5	454.0	427.9
40°	419.9	427.9	430.1	427.9	423.3	424.4	405.1	406.2	388.0	372.1	349.3
42.5°	332.3	339.1	336.8	330.0	332.3	326.6	338.0	324.3	322.0	299.3	283.3
45°	262.9	261.7	266.3	264.0	262.9	260.6	258.3	258.3	250.3	240.1	227.6
47.5°	206.0	206.0	206.0	207.1	204.8	203.7	203.7	201.4	199.1	186.6	178.7
50°	151.3	157.0	154.8	154.8	160.4	158.2	155.9	158.2	157.0	146.8	141.1
52.5°	113.8	114.9	117.2	114.9	119.5	117.2	118.3	119.5	116.1	112.7	109.2
55°	86.5	84.2	86.5	86.5	89.9	88.8	87.6	87.6	87.6	83.1	79.7
57.5°	61.4	61.4	63.7	62.6	63.7	62.6	63.7	66.0	63.7	61.4	60.3
60°	43.2	43.2	44.4	45.5	46.7	46.7	46.7	46.7	45.5	44.4	43.2
62.5°	29.6	29.6	29.6	30.7	31.9	30.7	33.0	31.9	31.9	31.9	29.6
65°	18.2	18.2	19.3	19.3	20.5	20.5	20.5	21.6	21.6	20.5	19.3



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**CANDELA DISTRIBUTION (continued):**

	0°	5°	10°	15°	20°	22.5°	25°	30°	35°	40°	45°
67.5°	11.4	11.4	11.4	12.5	13.7	12.5	13.7	13.7	13.7	12.5	13.7
70°	8.0	6.8	8.0	8.0	8.0	8.0	8.0	8.0	9.1	9.1	9.1
72.5°	4.6	4.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
75°	3.4	3.4	3.4	3.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6
77.5°	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
80°	2.3	2.3	2.3	2.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4
82.5°	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
85°	1.1	1.1	1.1	1.1	1.1	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	1.1	1.1	1.1	1.1	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°	471.1	471.1	471.1	471.1	471.1	471.1
1°	481.3	470.0	464.3	463.1	452.9	456.3
2°	495.0	470.0	451.7	432.4	426.7	424.4
3°	500.7	460.9	437.0	408.5	404.0	394.9
4°	510.9	472.2	425.6	393.7	375.5	369.8
5°	518.9	459.7	413.1	375.5	353.9	341.4
6°	533.7	458.6	394.9	355.0	325.4	326.6
7°	532.5	447.2	382.3	339.1	308.4	303.8
8°	538.2	439.2	365.3	322.0	291.3	283.3
9°	536.0	437.0	352.8	302.7	277.6	270.8
10°	549.6	413.1	338.0	284.5	261.7	250.3
11°	551.9	416.5	325.4	273.1	245.8	234.4
12°	547.3	397.1	311.8	256.0	231.0	219.6
13°	553.0	391.4	297.0	244.6	217.3	207.1
14°	548.5	380.1	284.5	229.9	203.7	196.9
15°	539.4	371.0	272.0	216.2	194.6	183.2
16°	533.7	356.2	258.3	206.0	184.3	174.1
17°	528.0	344.8	243.5	192.3	171.8	162.7
18°	526.9	331.1	234.4	179.8	161.6	155.9
19°	512.1	319.8	219.6	173.0	153.6	145.7
20°	506.4	307.2	209.4	163.9	145.7	136.5
21°	488.2	297.0	200.3	150.2	137.7	130.9
22.5°	482.5	274.2	183.2	142.2	124.0	120.6
23°	464.3	270.8	178.7	136.5	125.2	116.1
24°	457.4	260.6	170.7	129.7	117.2	111.5
25°	448.3	249.2	159.3	121.8	109.2	105.8
26°	434.7	236.7	149.1	116.1	103.5	100.1
27°	415.3	219.6	141.1	110.4	99.0	95.6
28°	400.5	215.1	135.4	103.5	94.4	92.2
29°	389.2	198.0	124.0	99.0	89.9	87.6
30°	368.7	188.9	119.5	93.3	86.5	84.2
32.5°	327.7	162.7	102.4	80.8	75.1	75.1
35°	290.2	140.0	86.5	70.6	68.3	68.3
37.5°	254.9	119.5	75.1	62.6	60.3	61.4
40°	213.9	102.4	66.0	54.6	54.6	55.8
42.5°	173.0	85.3	55.8	47.8	48.9	50.1
45°	140.0	70.6	48.9	42.1	44.4	44.4
47.5°	111.5	56.9	41.0	37.6	41.0	39.8
50°	84.2	45.5	35.3	34.1	36.4	36.4
52.5°	64.9	37.6	30.7	30.7	33.0	33.0
55°	47.8	30.7	27.3	27.3	29.6	30.7
57.5°	35.3	26.2	23.9	23.9	27.3	28.4
60°	27.3	22.8	20.5	22.8	25.0	25.0
62.5°	21.6	19.3	19.3	20.5	22.8	23.9
65°	15.9	15.9	17.1	18.2	20.5	21.6





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**CANDELA DISTRIBUTION (continued):**

	67.5°	90°	112.5°	135°	157.5°	180°
67.5°	12.5	13.7	14.8	15.9	18.2	18.2
70°	9.1	11.4	12.5	14.8	15.9	17.1
72.5°	6.8	9.1	10.2	12.5	14.8	14.8
75°	5.7	6.8	9.1	11.4	12.5	12.5
77.5°	4.6	5.7	8.0	9.1	11.4	11.4
80°	3.4	4.6	5.7	8.0	9.1	9.1
82.5°	3.4	3.4	4.6	5.7	6.8	6.8
85°	2.3	2.3	2.3	3.4	4.6	4.6
87.5°	1.1	1.1	1.1	1.1	2.3	2.3
90°	0.0	0.0	0.0	0.0	0.0	0.0

(END OF REPORT)