

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: P275387

Luminaire Tested: **ML4D09_940 - TIR50AWW25 - TL45R6GMWBB - TL46S6GMWBB**

Issue Date: 3/3/2020

Test Information

Test Method: LM-41-14
Report Number: P275387
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_940 - 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 / 4000K CCT
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 691.0 lumens
Efficiency: N/A
Efficacy: 61.1 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

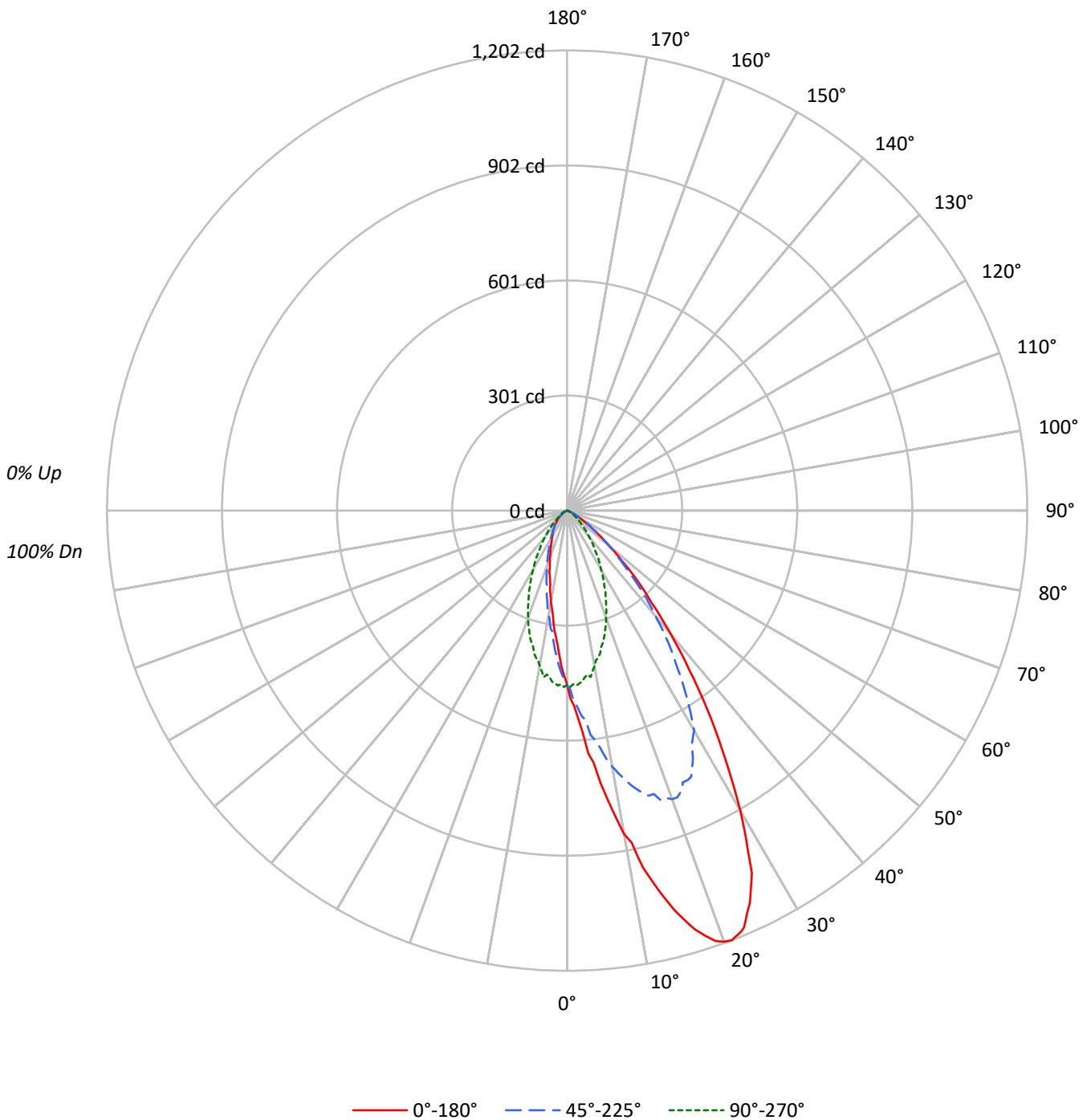
Input Watts (W): 11.3
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 25 FT



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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	53	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°	176390	176390	176390
5°	247897	174418	128830
10°	337643	162545	95812
15°	433262	143819	69844
20°	494141	122473	54886
25°	483141	101203	42799
30°	404312	78929	34632
35°	304691	60834	30133
40°	212404	45475	24736
45°	143413	32442	20605
50°	87111	21943	15794
55°	49993	15403	12296
60°	24722	11470	9687
65°	10453	8344	7335
70°	3852	5212	3852
75°	1647	3444	1647
80°	2455	2455	0
85°	0	0	0



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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	44.8	6.5
10°-20°	138.3	20.0
20°-30°	197.0	28.5
30°-40°	164.3	23.8
40°-50°	93.0	13.5
50°-60°	39.0	5.6
60°-70°	12.1	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°	380.2	55.0
0°-40°	544.5	78.8
0°-60°	676.5	97.9
0°-90°	691.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	691.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	455	455	455	455	455	
5°	637	550	448	365	331	67
15°	1080	764	358	205	174	306
25°	1130	767	237	116	100	506
35°	644	503	129	65	64	402
45°	262	232	59	35	38	203
55°	74	81	23	18	18	71
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°	455.2	455.2	455.2	455.2	455.2	455.2	455.2	455.2	455.2	455.2	455.2
1°	490.5	480.2	480.2	483.7	484.8	482.5	480.2	480.2	482.5	478.0	467.7
2°	509.8	522.3	503.0	518.9	512.1	509.8	511.0	509.8	505.3	500.7	498.4
3°	542.8	554.2	549.7	551.9	550.8	542.8	545.1	540.6	533.7	522.3	513.2
4°	581.5	594.0	578.1	589.5	583.8	581.5	574.7	567.9	565.6	545.1	537.1
5°	637.3	622.5	623.6	624.8	619.1	606.6	606.6	599.7	596.3	569.0	549.7
6°	661.2	649.8	668.0	668.0	653.2	647.5	647.5	635.0	616.8	608.8	589.5
7°	718.1	704.4	707.8	693.0	696.5	686.2	685.1	661.2	649.8	635.0	604.3
8°	763.6	762.5	743.1	747.7	743.1	727.2	716.9	704.4	688.5	660.0	627.0
9°	811.4	808.0	789.8	790.9	784.1	761.3	763.6	739.7	706.7	676.0	657.8
10°	858.1	844.4	843.3	837.6	821.6	801.2	806.8	770.4	740.8	711.3	679.4
11°	884.2	889.9	886.5	875.1	858.1	843.3	836.4	801.2	780.7	735.2	698.7
12°	953.7	951.4	929.8	920.6	908.1	877.4	876.3	839.8	797.7	742.0	715.8
13°	995.8	983.2	969.6	951.4	936.6	927.5	909.3	874.0	835.3	757.9	735.2
14°	1039.0	1026.5	1014.0	1003.7	975.3	959.3	936.6	903.6	853.5	794.3	749.9
15°	1080.0	1044.7	1051.5	1016.2	1028.8	977.5	967.3	921.8	875.1	819.4	763.6
16°	1113.0	1099.3	1090.2	1074.3	1050.4	1014.0	1000.3	942.3	893.3	837.6	775.0
17°	1144.8	1140.3	1118.7	1090.2	1069.7	1039.0	1019.7	968.4	910.4	836.4	773.8
18°	1167.6	1168.7	1144.8	1125.5	1091.3	1062.9	1044.7	983.2	938.9	859.2	796.6
19°	1189.2	1139.1	1161.9	1143.7	1097.0	1078.8	1056.1	1010.6	949.1	867.2	794.3
20°	1198.3	1165.3	1165.3	1144.8	1117.5	1086.8	1069.7	1009.4	942.3	861.5	802.3
21°	1201.7	1202.9	1179.0	1135.7	1123.2	1099.3	1070.9	1011.7	958.2	870.6	802.3
22.5°	1189.2	1191.5	1168.7	1138.0	1125.5	1085.7	1075.4	1002.6	941.1	852.4	787.5
23°	1182.4	1172.1	1161.9	1142.6	1106.1	1076.6	1058.3	1002.6	934.3	847.8	771.6
24°	1153.9	1161.9	1135.7	1123.2	1084.5	1066.3	1043.6	985.5	924.1	850.1	771.6
25°	1130.0	1123.2	1113.0	1099.3	1067.5	1041.3	1024.2	981.0	917.2	833.0	767.0
26°	1094.8	1101.6	1080.0	1065.2	1041.3	1016.2	998.0	950.2	887.6	793.2	745.4
27°	1062.9	1059.5	1045.8	1032.2	1002.6	981.0	967.3	932.0	876.3	795.5	723.8
28°	1006.0	1008.3	998.0	985.5	971.9	948.0	929.8	894.5	833.0	760.2	693.0
29°	955.9	965.0	949.1	926.3	938.9	900.2	887.6	851.2	802.3	734.0	677.1
30°	903.6	905.9	895.6	893.3	874.0	860.3	846.7	810.3	780.7	712.4	663.5
32.5°	767.0	771.6	768.2	763.6	751.1	748.8	735.2	701.0	679.4	625.9	583.8
35°	644.1	636.1	631.6	631.6	632.7	619.1	612.2	592.9	570.1	540.6	503.0
37.5°	523.5	518.9	516.7	512.1	514.4	508.7	507.6	504.1	482.5	456.3	432.4
40°	419.9	415.4	416.5	421.1	413.1	413.1	413.1	410.8	391.5	371.0	357.3
42.5°	326.6	327.7	327.7	332.3	333.4	331.2	326.6	323.2	314.1	301.6	298.2
45°	261.7	254.9	256.1	256.1	253.8	259.5	257.2	257.2	250.4	239.0	232.2
47.5°	193.5	191.2	193.5	198.0	198.0	198.0	200.3	199.2	198.0	188.9	180.9
50°	144.5	143.4	147.9	146.8	149.1	149.1	150.2	152.5	153.6	144.5	143.4
52.5°	108.1	104.7	107.0	111.5	112.7	112.7	114.9	118.4	116.1	112.7	108.1
55°	74.0	75.1	78.5	80.8	81.9	80.8	83.1	86.5	86.5	83.1	80.8
57.5°	51.2	52.3	54.6	54.6	58.0	59.2	58.0	61.5	62.6	62.6	59.2
60°	31.9	33.0	35.3	36.4	38.7	39.8	41.0	44.4	45.5	43.2	42.1
62.5°	19.3	20.5	20.5	22.8	23.9	26.2	27.3	29.6	31.9	30.7	29.6
65°	11.4	11.4	11.4	12.5	14.8	15.9	17.1	18.2	20.5	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°	5.7	5.7	5.7	6.8	8.0	8.0	9.1	11.4	11.4	12.5	12.5
70°	3.4	3.4	3.4	3.4	4.6	4.6	4.6	5.7	6.8	6.8	8.0
72.5°	2.3	2.3	2.3	2.3	2.3	2.3	2.3	3.4	3.4	3.4	3.4
75°	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	2.3	2.3	2.3
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°	455.2	455.2	455.2	455.2	455.2	455.2
1°	471.1	460.9	450.7	443.8	445.0	431.3
2°	470.0	454.1	435.9	424.5	413.1	409.7
3°	484.8	457.5	425.6	406.3	390.3	381.2
4°	500.7	452.9	408.5	384.6	367.6	353.9
5°	508.7	448.4	397.2	365.3	344.8	331.2
6°	509.8	438.1	384.6	342.5	323.2	315.2
7°	517.8	431.3	371.0	318.6	305.0	293.6
8°	513.2	439.3	353.9	310.7	283.4	270.8
9°	532.6	424.5	335.7	291.3	266.3	256.1
10°	528.0	413.1	326.6	274.3	250.4	243.5
11°	537.1	397.2	313.0	265.2	234.4	227.6
12°	534.9	392.6	298.2	248.1	220.8	213.9
13°	536.0	382.4	284.5	234.4	206.0	195.7
14°	533.7	366.4	273.1	220.8	194.6	185.5
15°	530.3	358.5	258.3	204.8	183.2	174.1
16°	509.8	348.2	243.5	195.7	173.0	169.6
17°	516.7	336.9	231.0	184.4	162.7	154.8
18°	512.1	323.2	221.9	174.1	152.5	145.7
19°	493.9	311.8	209.4	162.7	144.5	137.7
20°	491.6	297.0	198.0	154.8	135.4	133.1
21°	484.8	285.6	187.8	145.7	129.7	122.9
22.5°	462.0	266.3	171.8	133.1	118.4	113.8
23°	454.1	259.5	166.1	129.7	114.9	113.8
24°	443.8	246.9	155.9	121.8	111.5	103.6
25°	434.7	236.7	149.1	116.1	103.6	100.1
26°	419.9	223.0	140.0	108.1	97.9	94.5
27°	397.2	211.7	132.0	103.6	93.3	88.8
28°	390.3	200.3	122.9	96.7	87.6	85.4
29°	375.5	190.0	116.1	91.0	81.9	80.8
30°	360.7	176.4	109.2	86.5	78.5	77.4
32.5°	313.0	154.8	92.2	75.1	69.4	69.4
35°	269.7	128.6	78.5	64.9	61.5	63.7
37.5°	240.1	109.2	66.0	55.8	54.6	54.6
40°	203.7	89.9	54.6	47.8	47.8	48.9
42.5°	170.7	74.0	45.5	41.0	42.1	42.1
45°	137.7	59.2	37.6	35.3	36.4	37.6
47.5°	108.1	46.7	30.7	29.6	31.9	31.9
50°	81.9	36.4	25.0	25.0	26.2	26.2
52.5°	61.5	29.6	20.5	21.6	22.8	22.8
55°	44.4	22.8	17.1	18.2	18.2	18.2
57.5°	33.0	18.2	13.7	14.8	15.9	14.8
60°	25.0	14.8	11.4	12.5	12.5	12.5
62.5°	18.2	11.4	9.1	10.2	10.2	9.1
65°	13.7	9.1	8.0	8.0	8.0	8.0



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CANDELA DISTRIBUTION (continued):

	67.5°	90°	112.5°	135°	157.5°	180°
67.5°	9.1	6.8	5.7	6.8	5.7	5.7
70°	5.7	4.6	4.6	4.6	4.6	3.4
72.5°	3.4	3.4	2.3	2.3	3.4	2.3
75°	2.3	2.3	2.3	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)