

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: P601240

Luminaire Tested: **ML408LSAWW95FS1E - TIR4D25AWW - TL45R6G_ TL46S6G_ 3000K**

Issue Date: 7/29/2022

Tested By:

Approved By:



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Test Information

Test Method: LM-79-08
 Report Number: P601240
 Test Lab: COOPER LIGHTING SOLUTIONS
 Issue Date: 7/29/2022
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
 Product Line: HALO
 Catalog Number: ML408LSAWW95FS1E - TIR4D25AWW - TL45R6G_ TL46S6G_ 3000K
 Description: RETROFIT, 25D WW OPTIC, LINEAR SPREAD LENS TRIM
 Light Source: (1) SELECTABLE LUMEN LED 95CRI / 3000K CCT
 Ballast/Driver: -

Summary

Lumens per Lamp: N/A
 Luminaire Lumens: 728.8 lumens
 Efficiency: N/A
 Efficacy: 70.8 lumens/watt
 Spacing Criteria (0/90/45): 1.21 / 0.78 / 1
 Luminous Opening: Circular (Dia: 0.21' x H: 0')
 CIE Type: Direct

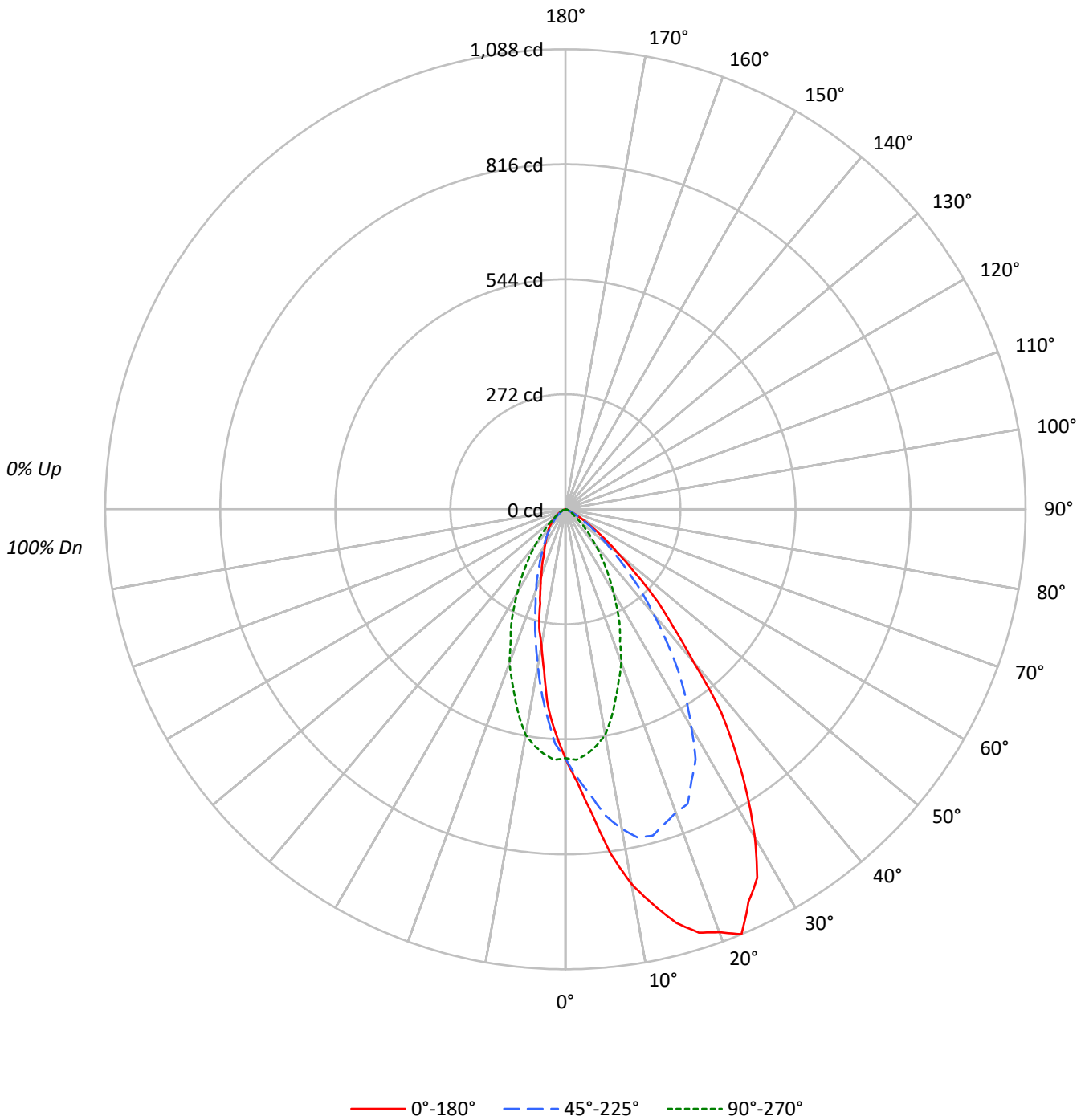
Input Watts (W): 10.3
 Input Voltage (V): NR
 Input Current (Ain): NR
 Voltage Rise (V): NR
 Power Factor: NR
 Total Harmonic Distortion (THDi): NR
 Frequency (hertz): 60
 Stabilization Time: NR
 Operation Time: NR
 Ambient Temperature (°C): NR
 Test Distance: 25 FT



| 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 |

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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 | 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 | 104 | 110 | 107 | 105 | 103 | 103 | 101 | 99 | 100 | 98 | 96 | 96 | 95 | 94 | 92 |
| 2 | 106 | 100 | 96 | 92 | 104 | 99 | 95 | 91 | 95 | 92 | 89 | 92 | 90 | 87 | 90 | 87 | 85 | 83 |
| 3 | 100 | 92 | 87 | 82 | 98 | 91 | 86 | 81 | 88 | 84 | 80 | 86 | 82 | 79 | 83 | 80 | 78 | 76 |
| 4 | 94 | 85 | 79 | 74 | 92 | 84 | 78 | 73 | 82 | 76 | 72 | 79 | 75 | 72 | 78 | 74 | 71 | 69 |
| 5 | 88 | 78 | 72 | 67 | 86 | 77 | 71 | 67 | 76 | 70 | 66 | 74 | 69 | 65 | 72 | 68 | 65 | 63 |
| 6 | 83 | 73 | 66 | 61 | 81 | 72 | 65 | 61 | 70 | 65 | 60 | 69 | 64 | 60 | 67 | 63 | 59 | 58 |
| 7 | 78 | 68 | 61 | 56 | 77 | 67 | 60 | 56 | 65 | 60 | 55 | 64 | 59 | 55 | 63 | 58 | 55 | 53 |
| 8 | 74 | 63 | 56 | 52 | 72 | 62 | 56 | 51 | 61 | 55 | 51 | 60 | 55 | 51 | 59 | 54 | 51 | 49 |
| 9 | 70 | 59 | 52 | 48 | 68 | 58 | 52 | 48 | 57 | 52 | 47 | 56 | 51 | 47 | 55 | 51 | 47 | 46 |
| 10 | 66 | 55 | 49 | 44 | 65 | 55 | 48 | 44 | 54 | 48 | 44 | 53 | 48 | 44 | 52 | 47 | 44 | 42 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 90° | 180° |
|-----|--------|--------|--------|
| 0° | 185859 | 185859 | 185859 |
| 5° | 228917 | 184255 | 148881 |
| 10° | 288509 | 173689 | 104495 |
| 15° | 331121 | 150670 | 75351 |
| 20° | 357637 | 129741 | 55747 |
| 25° | 356979 | 105881 | 42436 |
| 30° | 326476 | 82439 | 34784 |
| 35° | 270490 | 62794 | 28872 |
| 40° | 194230 | 46002 | 25433 |
| 45° | 137674 | 31482 | 20988 |
| 50° | 80760 | 20190 | 17292 |
| 55° | 48501 | 13763 | 13763 |
| 60° | 25956 | 10168 | 10168 |
| 65° | 14271 | 7696 | 6575 |
| 70° | 8124 | 5447 | 4062 |
| 75° | 3538 | 3538 | 0 |
| 80° | 2728 | 2728 | 0 |
| 85° | 0 | 0 | 0 |

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ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------------|--------------|--------------|
| 0°-10° | 55.8 | 7.7 |
| 10°-20° | 151.8 | 20.8 |
| 20°-30° | 198.4 | 27.2 |
| 30°-40° | 170.1 | 23.3 |
| 40°-50° | 97.3 | 13.4 |
| 50°-60° | 39.8 | 5.5 |
| 60°-70° | 12.7 | 1.7 |
| 70°-80° | 2.7 | 0.4 |
| 80°-90° | 0.3 | 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° | 405.9 | 55.7 |
| 0°-40° | 576.0 | 79.0 |
| 0°-60° | 713.1 | 97.8 |
| 0°-90° | 728.8 | 100.0 |
| 90°-120° | 0.0 | 0.0 |
| 90°-150° | 0.0 | 0.0 |
| 90°-180° | 0.0 | 0.0 |
| 0°-180° | 728.8 | 100.0 |

CANDELA DISTRIBUTION:

| | 0° | 45° | 90° | 135° | 180° | Flux |
|-----|------|-----|-----|------|------|------|
| 0° | 589 | 589 | 589 | 589 | 589 | |
| 5° | 722 | 678 | 581 | 492 | 470 | 75 |
| 15° | 1013 | 799 | 461 | 277 | 230 | 286 |
| 25° | 1025 | 706 | 304 | 145 | 122 | 469 |
| 35° | 702 | 464 | 163 | 76 | 75 | 433 |
| 45° | 308 | 210 | 70 | 38 | 47 | 235 |
| 55° | 88 | 72 | 25 | 18 | 25 | 83 |
| 65° | 19 | 16 | 10 | 7 | 9 | 21 |
| 75° | 3 | 3 | 3 | 2 | 0 | 4 |
| 85° | 0 | 0 | 0 | 0 | 0 | 1 |
| 90° | 0 | 0 | 0 | 0 | 0 | |

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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 10° | 15° | 20° | 22.5° | 45° | 67.5° | 90° | 112.5° | 135° |
|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|--------|-------|
| 0° | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 | 588.6 |
| 2.5° | 645.9 | 659.1 | 654.7 | 662.0 | 660.6 | 647.4 | 634.2 | 613.6 | 593.0 | 581.3 | 554.9 |
| 5° | 722.2 | 738.4 | 750.1 | 741.3 | 736.9 | 726.6 | 678.2 | 632.7 | 581.3 | 529.9 | 491.8 |
| 7.5° | 822.0 | 817.6 | 830.9 | 804.4 | 805.9 | 801.5 | 731.0 | 643.0 | 563.7 | 488.8 | 434.5 |
| 10° | 899.8 | 886.6 | 899.8 | 891.0 | 873.4 | 852.9 | 767.7 | 638.6 | 541.7 | 447.7 | 374.3 |
| 12.5° | 957.1 | 974.7 | 974.7 | 954.2 | 936.5 | 913.1 | 795.6 | 635.6 | 503.5 | 397.8 | 322.9 |
| 15° | 1012.9 | 1018.8 | 1008.5 | 992.3 | 974.7 | 926.3 | 798.6 | 616.5 | 460.9 | 349.4 | 277.4 |
| 17.5° | 1049.6 | 1051.0 | 1046.6 | 1032.0 | 1007.0 | 977.7 | 779.5 | 598.9 | 421.3 | 311.2 | 233.4 |
| 20° | 1064.3 | 1052.5 | 1051.0 | 1024.6 | 1002.6 | 976.2 | 763.3 | 556.4 | 386.1 | 265.7 | 202.6 |
| 22.5° | 1087.7 | 1059.9 | 1059.9 | 1033.4 | 987.9 | 983.5 | 754.5 | 507.9 | 337.6 | 227.5 | 173.2 |
| 25° | 1024.6 | 1020.2 | 1029.0 | 992.3 | 957.1 | 949.8 | 706.1 | 471.2 | 303.9 | 196.7 | 145.3 |
| 27.5° | 982.1 | 970.3 | 958.6 | 935.1 | 901.3 | 883.7 | 666.4 | 424.2 | 264.2 | 164.4 | 123.3 |
| 30° | 895.4 | 895.4 | 880.8 | 869.0 | 823.5 | 810.3 | 596.0 | 380.2 | 226.1 | 140.9 | 102.8 |
| 32.5° | 800.0 | 786.8 | 788.3 | 775.1 | 747.2 | 736.9 | 529.9 | 331.8 | 195.2 | 114.5 | 89.5 |
| 35° | 701.7 | 687.0 | 679.7 | 669.4 | 665.0 | 632.7 | 463.9 | 286.2 | 162.9 | 99.8 | 76.3 |
| 37.5° | 604.8 | 590.1 | 584.2 | 568.1 | 544.6 | 537.3 | 391.9 | 237.8 | 136.5 | 82.2 | 63.1 |
| 40° | 471.2 | 471.2 | 469.7 | 452.1 | 444.8 | 440.4 | 324.4 | 198.2 | 111.6 | 66.1 | 54.3 |
| 42.5° | 375.8 | 380.2 | 377.3 | 369.9 | 353.8 | 350.8 | 270.1 | 161.5 | 91.0 | 55.8 | 45.5 |
| 45° | 308.3 | 295.1 | 292.1 | 290.7 | 281.8 | 280.4 | 209.9 | 127.7 | 70.5 | 45.5 | 38.2 |
| 47.5° | 226.1 | 224.6 | 227.5 | 220.2 | 209.9 | 218.7 | 165.9 | 96.9 | 55.8 | 36.7 | 32.3 |
| 50° | 164.4 | 167.3 | 167.3 | 160.0 | 157.1 | 160.0 | 127.7 | 73.4 | 41.1 | 29.4 | 27.9 |
| 52.5° | 123.3 | 121.8 | 120.4 | 121.8 | 120.4 | 120.4 | 95.4 | 54.3 | 32.3 | 23.5 | 22.0 |
| 55° | 88.1 | 88.1 | 86.6 | 89.5 | 91.0 | 88.1 | 71.9 | 39.6 | 25.0 | 19.1 | 17.6 |
| 57.5° | 61.7 | 61.7 | 58.7 | 61.7 | 61.7 | 64.6 | 51.4 | 29.4 | 20.6 | 14.7 | 14.7 |
| 60° | 41.1 | 41.1 | 41.1 | 42.6 | 44.0 | 44.0 | 35.2 | 20.6 | 16.1 | 11.7 | 11.7 |
| 62.5° | 27.9 | 27.9 | 27.9 | 29.4 | 29.4 | 32.3 | 25.0 | 16.1 | 13.2 | 10.3 | 8.8 |
| 65° | 19.1 | 19.1 | 19.1 | 19.1 | 20.6 | 20.6 | 16.1 | 11.7 | 10.3 | 8.8 | 7.3 |
| 67.5° | 11.7 | 13.2 | 11.7 | 13.2 | 13.2 | 13.2 | 10.3 | 8.8 | 7.3 | 5.9 | 4.4 |
| 70° | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 7.3 | 7.3 | 5.9 | 4.4 | 2.9 |
| 72.5° | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 4.4 | 4.4 | 4.4 | 2.9 | 2.9 |
| 75° | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 1.5 | 1.5 |
| 77.5° | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 0.0 |
| 80° | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 0.0 | 0.0 |
| 82.5° | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 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):

| | 157.5° | 180° |
|-------|--------|-------|
| 0° | 588.6 | 588.6 |
| 2.5° | 540.2 | 529.9 |
| 5° | 458.0 | 469.7 |
| 7.5° | 399.3 | 384.6 |
| 10° | 334.7 | 325.9 |
| 12.5° | 290.7 | 286.2 |
| 15° | 240.7 | 230.5 |
| 17.5° | 207.0 | 196.7 |
| 20° | 173.2 | 165.9 |
| 22.5° | 148.3 | 143.9 |
| 25° | 127.7 | 121.8 |
| 27.5° | 110.1 | 107.2 |
| 30° | 95.4 | 95.4 |
| 32.5° | 82.2 | 85.1 |
| 35° | 73.4 | 74.9 |
| 37.5° | 63.1 | 66.1 |
| 40° | 58.7 | 61.7 |
| 42.5° | 49.9 | 55.8 |
| 45° | 42.6 | 47.0 |
| 47.5° | 36.7 | 41.1 |
| 50° | 30.8 | 35.2 |
| 52.5° | 27.9 | 30.8 |
| 55° | 23.5 | 25.0 |
| 57.5° | 19.1 | 20.6 |
| 60° | 14.7 | 16.1 |
| 62.5° | 11.7 | 13.2 |
| 65° | 8.8 | 8.8 |
| 67.5° | 5.9 | 7.3 |
| 70° | 2.9 | 4.4 |
| 72.5° | 1.5 | 1.5 |
| 75° | 1.5 | 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)