

Scaled data based on original data using
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State
Lighting Products

Test Report Prepared for
Cooper Lighting Solutions
(formerly Eaton)

Brand: FAIL-SAFE

Report Number: 01288

Luminaire Tested: **TTRC-160**

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-08
Report Number: 01288
Test Lab:
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: FAIL-SAFE
Catalog Number: TTRC-160
Description: FAIL-SAFE FORMED STEEL HOUSING
WHITE ENAMEL REFLECTOR
CLEAR PLASTIC LENS
Light Source: FOUR F40W/30/RS TWIN TUBE RATED 3150 LUMENS EACH
Ballast/Driver: TWO ADVANCE R-2BS40-TP

Summary

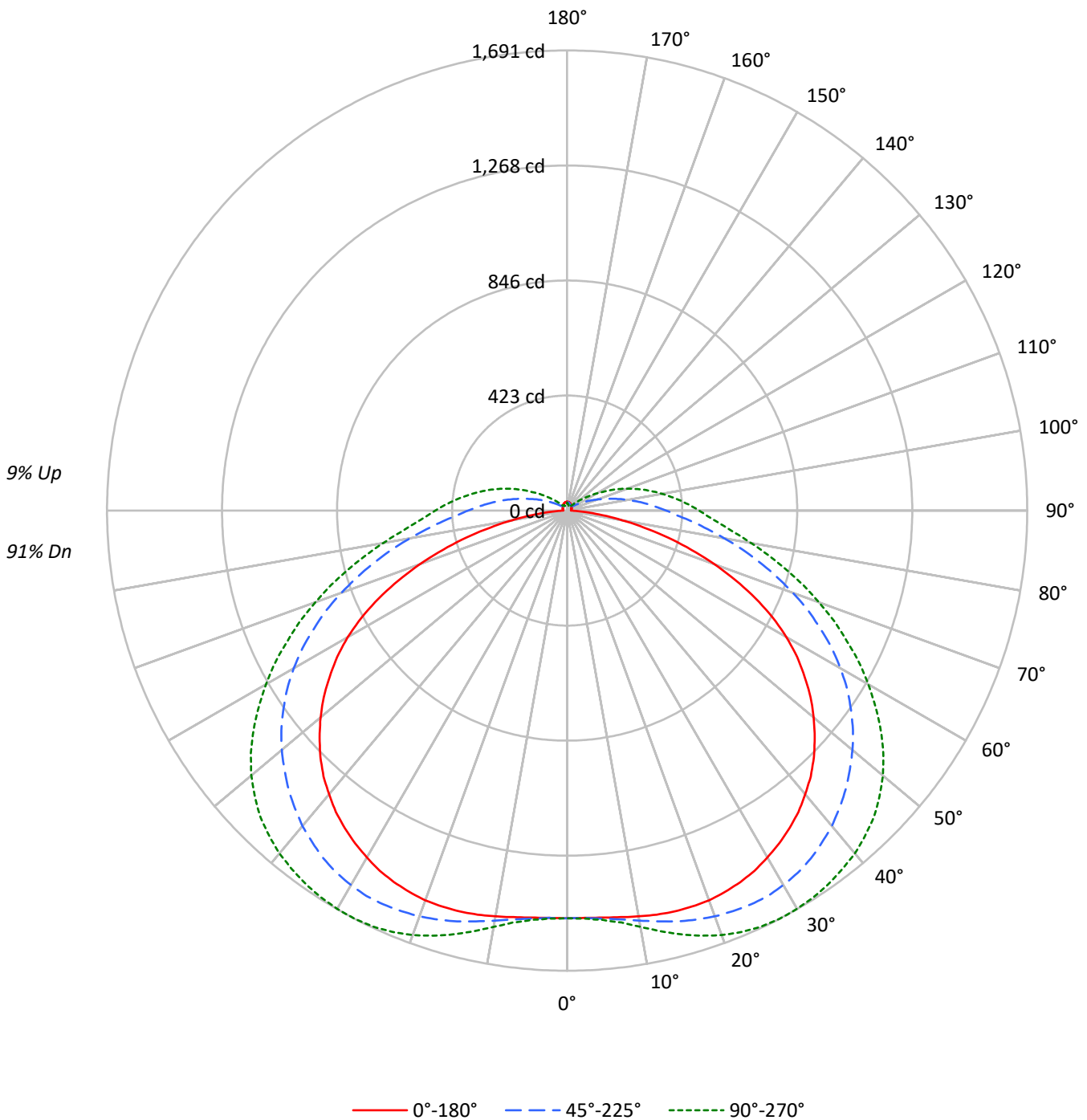
Lumens per Lamp: 3150 (4 lamps)
Luminaire Lumens: 7323.6 lumens
Efficiency: 58.1%
Efficacy: 46.4 lumens/watt
Spacing Criteria (0/90/45): 1.45 / 1.66 / 1.67
Luminous Opening: Rectangular w/ Sides (W: 0.89' x L: 4.42' x H: 0.29')
CIE Type: Direct

Input Watts (W): 158
Input Voltage (V): NR
Input Current (A_{in}): 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 | 0 |
| RCR | | | | | | | | | | | | | | | | | | |
| 0 | 68 | 68 | 68 | 68 | 66 | 66 | 66 | 66 | 62 | 62 | 62 | 58 | 58 | 58 | 55 | 55 | 55 | 53 |
| 1 | 60 | 57 | 54 | 51 | 58 | 55 | 52 | 50 | 52 | 49 | 47 | 49 | 47 | 45 | 46 | 44 | 43 | 41 |
| 2 | 54 | 49 | 44 | 40 | 52 | 47 | 43 | 39 | 44 | 41 | 38 | 41 | 39 | 36 | 39 | 37 | 34 | 33 |
| 3 | 49 | 42 | 37 | 33 | 47 | 41 | 36 | 32 | 38 | 34 | 31 | 36 | 32 | 30 | 34 | 31 | 28 | 27 |
| 4 | 45 | 37 | 31 | 27 | 43 | 36 | 31 | 27 | 34 | 29 | 26 | 32 | 28 | 25 | 30 | 26 | 24 | 22 |
| 5 | 41 | 33 | 27 | 23 | 39 | 32 | 26 | 22 | 30 | 25 | 22 | 28 | 24 | 21 | 26 | 23 | 20 | 19 |
| 6 | 37 | 29 | 24 | 20 | 36 | 28 | 23 | 19 | 27 | 22 | 19 | 25 | 21 | 18 | 24 | 20 | 18 | 16 |
| 7 | 35 | 26 | 21 | 17 | 33 | 26 | 20 | 17 | 24 | 20 | 16 | 23 | 19 | 16 | 22 | 18 | 15 | 14 |
| 8 | 32 | 24 | 19 | 15 | 31 | 23 | 18 | 15 | 22 | 18 | 14 | 21 | 17 | 14 | 20 | 16 | 14 | 12 |
| 9 | 30 | 22 | 17 | 13 | 29 | 21 | 16 | 13 | 20 | 16 | 13 | 19 | 15 | 12 | 18 | 15 | 12 | 11 |
| 10 | 28 | 20 | 15 | 12 | 27 | 19 | 15 | 12 | 18 | 14 | 12 | 18 | 14 | 11 | 17 | 13 | 11 | 10 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 4099 | 4099 | 4099 |
| 5° | 4099 | 4036 | 4033 |
| 10° | 4159 | 4053 | 4081 |
| 15° | 4245 | 4122 | 4200 |
| 20° | 4334 | 4198 | 4321 |
| 25° | 4412 | 4270 | 4421 |
| 30° | 4481 | 4329 | 4494 |
| 35° | 4551 | 4368 | 4556 |
| 40° | 4608 | 4386 | 4614 |
| 45° | 4655 | 4389 | 4652 |
| 50° | 4671 | 4382 | 4645 |
| 55° | 4650 | 4352 | 4581 |
| 60° | 4575 | 4291 | 4471 |
| 65° | 4336 | 4173 | 4322 |
| 70° | 3898 | 4008 | 4154 |
| 75° | 3261 | 3801 | 3960 |
| 80° | 2366 | 3593 | 3796 |
| 85° | 1256 | 3461 | 3755 |



TEST NUMBER: 01288
 CATALOG NUMBER: TTRC-160

ZONAL LUMENS:

CANDELA DISTRIBUTION:

| Zone | Lumens | % Fixture | % Lamp | | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|-----------|--------|-----------|--------|------|------|-------|------|-------|------|------|
| 0°-10° | 144.5 | 2.0 | 1.1 | 0° | 1498 | 1498 | 1498 | 1498 | 1498 | |
| 10°-20° | 444.2 | 6.1 | 3.5 | 5° | 1501 | 1503 | 1505 | 1508 | 1510 | 144 |
| 20°-30° | 737.6 | 10.1 | 5.9 | 15° | 1525 | 1537 | 1563 | 1596 | 1612 | 432 |
| 30°-40° | 973.3 | 13.3 | 7.7 | 25° | 1506 | 1536 | 1597 | 1660 | 1687 | 695 |
| 40°-50° | 1111.4 | 15.2 | 8.8 | 35° | 1425 | 1465 | 1561 | 1642 | 1675 | 892 |
| 50°-60° | 1117.7 | 15.3 | 8.9 | 45° | 1282 | 1328 | 1448 | 1550 | 1594 | 988 |
| 60°-70° | 977.8 | 13.4 | 7.8 | 55° | 1066 | 1126 | 1273 | 1369 | 1407 | 952 |
| 70°-80° | 722.8 | 9.9 | 5.7 | 65° | 764 | 874 | 1027 | 1104 | 1134 | 752 |
| 80°-90° | 451.8 | 6.2 | 3.6 | 75° | 384 | 587 | 731 | 806 | 830 | 407 |
| 90°-100° | 285.5 | 3.9 | 2.3 | 85° | 70 | 305 | 459 | 542 | 565 | 87 |
| 100°-110° | 169.6 | 2.3 | 1.3 | 90° | 16 | 214 | 364 | 457 | 485 | 10 |
| 110°-120° | 88.5 | 1.2 | 0.7 | 95° | 14 | 148 | 291 | 386 | 418 | 12 |
| 120°-130° | 41.3 | 0.6 | 0.3 | 105° | 16 | 54 | 168 | 258 | 294 | 16 |
| 130°-140° | 20.9 | 0.3 | 0.2 | 115° | 18 | 21 | 82 | 150 | 179 | 18 |
| 140°-150° | 14.8 | 0.2 | 0.1 | 125° | 20 | 20 | 34 | 71 | 86 | 18 |
| 150°-160° | 11.4 | 0.2 | 0.1 | 135° | 23 | 20 | 24 | 30 | 35 | 18 |
| 160°-170° | 7.6 | 0.1 | 0.1 | 145° | 25 | 23 | 23 | 24 | 22 | 16 |
| 170°-180° | 2.7 | 0.0 | 0.0 | 155° | 28 | 26 | 25 | 23 | 19 | 13 |
| 0°-30° | 1326.4 | 18.1 | 10.5 | 165° | 31 | 30 | 28 | 26 | 20 | 9 |
| 0°-40° | 2299.7 | 31.4 | 18.3 | 175° | 32 | 32 | 30 | 26 | 25 | 3 |
| 0°-60° | 4528.8 | 61.8 | 35.9 | 180° | 29 | 29 | 29 | 29 | 29 | |
| 0°-90° | 6681.2 | 91.2 | 53.0 | | | | | | | |
| 90°-120° | 543.6 | 7.4 | 4.3 | | | | | | | |
| 90°-150° | 620.7 | 8.5 | 4.9 | | | | | | | |
| 90°-180° | 642.0 | 8.8 | 5.1 | | | | | | | |
| 0°-180° | 7323.6 | 100.0 | 58.1 | | | | | | | |



TEST NUMBER: 01288
 CATALOG NUMBER: TTRC-160

CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|------|-------|------|-------|------|
| 0° | 1498 | 1498 | 1498 | 1498 | 1498 |
| 2.5° | 1498 | 1498 | 1498 | 1499 | 1501 |
| 5° | 1501 | 1503 | 1505 | 1508 | 1510 |
| 7.5° | 1507 | 1510 | 1515 | 1524 | 1527 |
| 10° | 1514 | 1519 | 1530 | 1545 | 1553 |
| 12.5° | 1521 | 1528 | 1546 | 1570 | 1583 |
| 15° | 1525 | 1537 | 1563 | 1596 | 1612 |
| 17.5° | 1526 | 1543 | 1576 | 1617 | 1638 |
| 20° | 1524 | 1546 | 1587 | 1636 | 1660 |
| 22.5° | 1517 | 1543 | 1593 | 1651 | 1676 |
| 25° | 1506 | 1536 | 1597 | 1660 | 1687 |
| 27.5° | 1492 | 1525 | 1597 | 1664 | 1691 |
| 30° | 1472 | 1509 | 1589 | 1659 | 1690 |
| 32.5° | 1450 | 1489 | 1578 | 1653 | 1685 |
| 35° | 1425 | 1465 | 1561 | 1642 | 1675 |
| 37.5° | 1396 | 1437 | 1538 | 1624 | 1661 |
| 40° | 1361 | 1405 | 1513 | 1605 | 1645 |
| 42.5° | 1325 | 1368 | 1482 | 1580 | 1621 |
| 45° | 1282 | 1328 | 1448 | 1550 | 1594 |
| 47.5° | 1234 | 1282 | 1409 | 1515 | 1557 |
| 50° | 1183 | 1234 | 1369 | 1473 | 1515 |
| 52.5° | 1128 | 1183 | 1324 | 1425 | 1465 |
| 55° | 1066 | 1126 | 1273 | 1369 | 1407 |
| 57.5° | 1002 | 1066 | 1220 | 1308 | 1344 |
| 60° | 931 | 1004 | 1160 | 1243 | 1278 |
| 62.5° | 852 | 942 | 1097 | 1176 | 1210 |
| 65° | 764 | 874 | 1027 | 1104 | 1134 |
| 67.5° | 671 | 804 | 958 | 1031 | 1062 |
| 70° | 575 | 735 | 882 | 956 | 984 |
| 72.5° | 479 | 662 | 806 | 883 | 909 |
| 75° | 384 | 587 | 731 | 806 | 830 |
| 77.5° | 291 | 512 | 659 | 734 | 757 |
| 80° | 206 | 438 | 586 | 666 | 686 |
| 82.5° | 131 | 368 | 520 | 600 | 620 |
| 85° | 70 | 305 | 459 | 542 | 565 |
| 87.5° | 30 | 255 | 405 | 497 | 520 |
| 90° | 16 | 214 | 364 | 457 | 485 |
| 92.5° | 14 | 179 | 326 | 421 | 451 |
| 95° | 14 | 148 | 291 | 386 | 418 |
| 97.5° | 14 | 121 | 258 | 352 | 385 |
| 100° | 15 | 94 | 226 | 318 | 355 |
| 102.5° | 15 | 73 | 196 | 288 | 324 |
| 105° | 16 | 54 | 168 | 258 | 294 |
| 107.5° | 15 | 39 | 141 | 229 | 264 |
| 110° | 17 | 30 | 120 | 202 | 235 |



TEST NUMBER: 01288
 CATALOG NUMBER: TTRC-160

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|----|-------|-----|-------|-----|
| 112.5° | 18 | 23 | 99 | 175 | 206 |
| 115° | 18 | 21 | 82 | 150 | 179 |
| 117.5° | 18 | 20 | 65 | 126 | 150 |
| 120° | 19 | 20 | 53 | 106 | 127 |
| 122.5° | 19 | 20 | 43 | 87 | 105 |
| 125° | 20 | 20 | 34 | 71 | 86 |
| 127.5° | 21 | 20 | 28 | 58 | 69 |
| 130° | 21 | 20 | 26 | 47 | 56 |
| 132.5° | 23 | 21 | 25 | 38 | 45 |
| 135° | 23 | 20 | 24 | 30 | 35 |
| 137.5° | 23 | 21 | 23 | 26 | 27 |
| 140° | 24 | 22 | 23 | 25 | 24 |
| 142.5° | 24 | 23 | 23 | 25 | 23 |
| 145° | 25 | 23 | 23 | 24 | 22 |
| 147.5° | 26 | 25 | 23 | 24 | 22 |
| 150° | 27 | 25 | 23 | 23 | 20 |
| 152.5° | 28 | 26 | 24 | 23 | 20 |
| 155° | 28 | 26 | 25 | 23 | 19 |
| 157.5° | 29 | 27 | 25 | 23 | 19 |
| 160° | 30 | 29 | 27 | 25 | 19 |
| 162.5° | 30 | 29 | 27 | 25 | 18 |
| 165° | 31 | 30 | 28 | 26 | 20 |
| 167.5° | 30 | 30 | 28 | 25 | 21 |
| 170° | 31 | 31 | 29 | 25 | 23 |
| 172.5° | 32 | 32 | 30 | 25 | 25 |
| 175° | 32 | 32 | 30 | 26 | 25 |
| 177.5° | 33 | 32 | 30 | 26 | 25 |
| 180° | 29 | 29 | 29 | 29 | 29 |

(END OF REPORT)