

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: McGRAW-EDISON

Report Number: P437955

Luminaire Tested: **IST-SA1A-722-U-SL4-HSS**

Issue Date: 12/10/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437955  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/10/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: IST-SA1A-722-U-SL4-HSS  
Description: IMPACT ELITE LED TRAPEZOID LUMINAIRE  
(1) 70 CRI, 2200K, 350mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV SPILL LIGHT  
ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

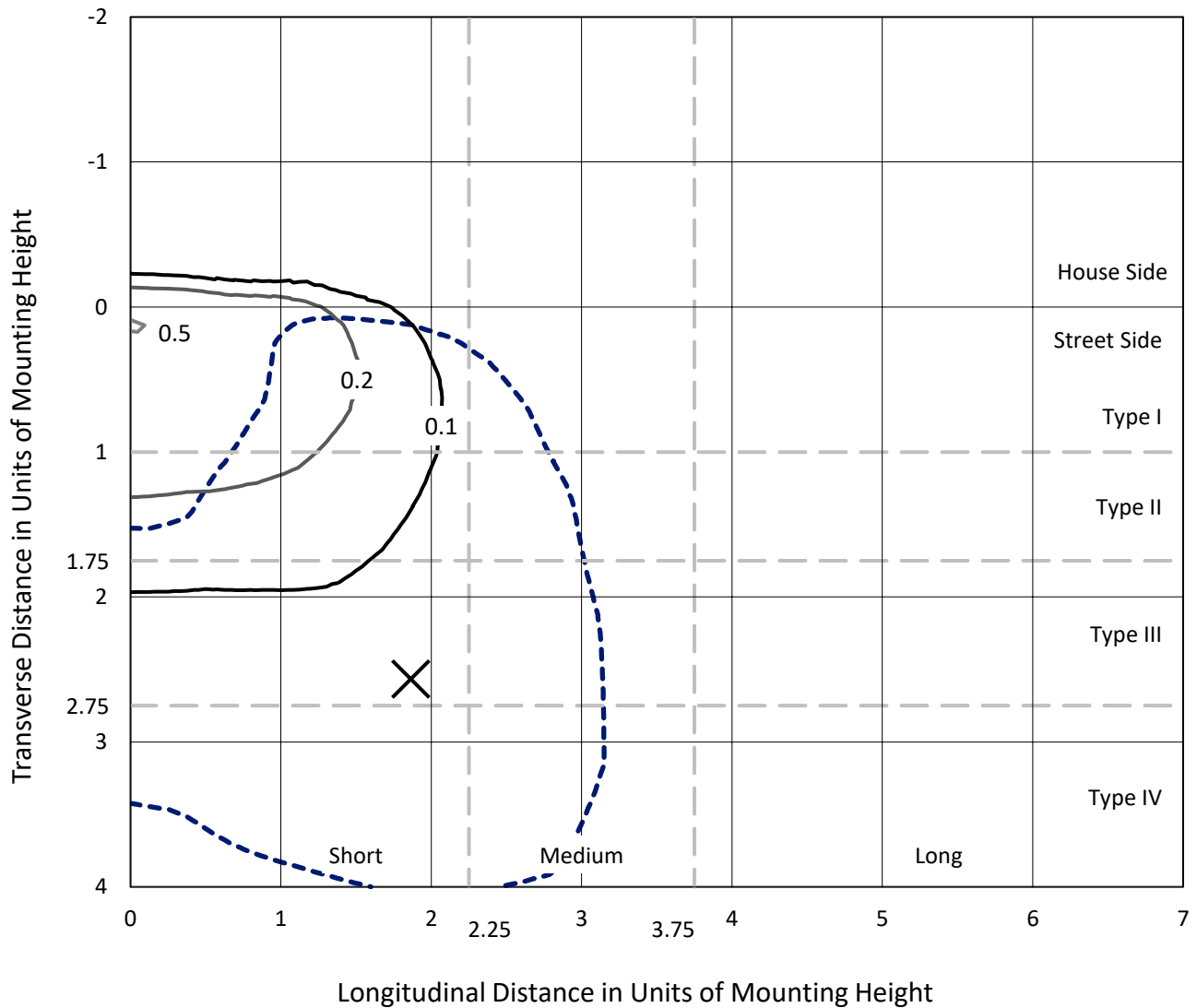
Lumens per Lamp: N/A  
Luminaire Lumens: 1645 lumens  
Efficiency: N/A  
Efficacy: 81.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G1  
  
Input Watts (W): 20.1  
Input Voltage (V): NR  
Input Current (Ain): NR  
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: 28.75 FT



REPORT NUMBER: P437955  
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### Iso-Footcandle Lines of Horizontal Illumination

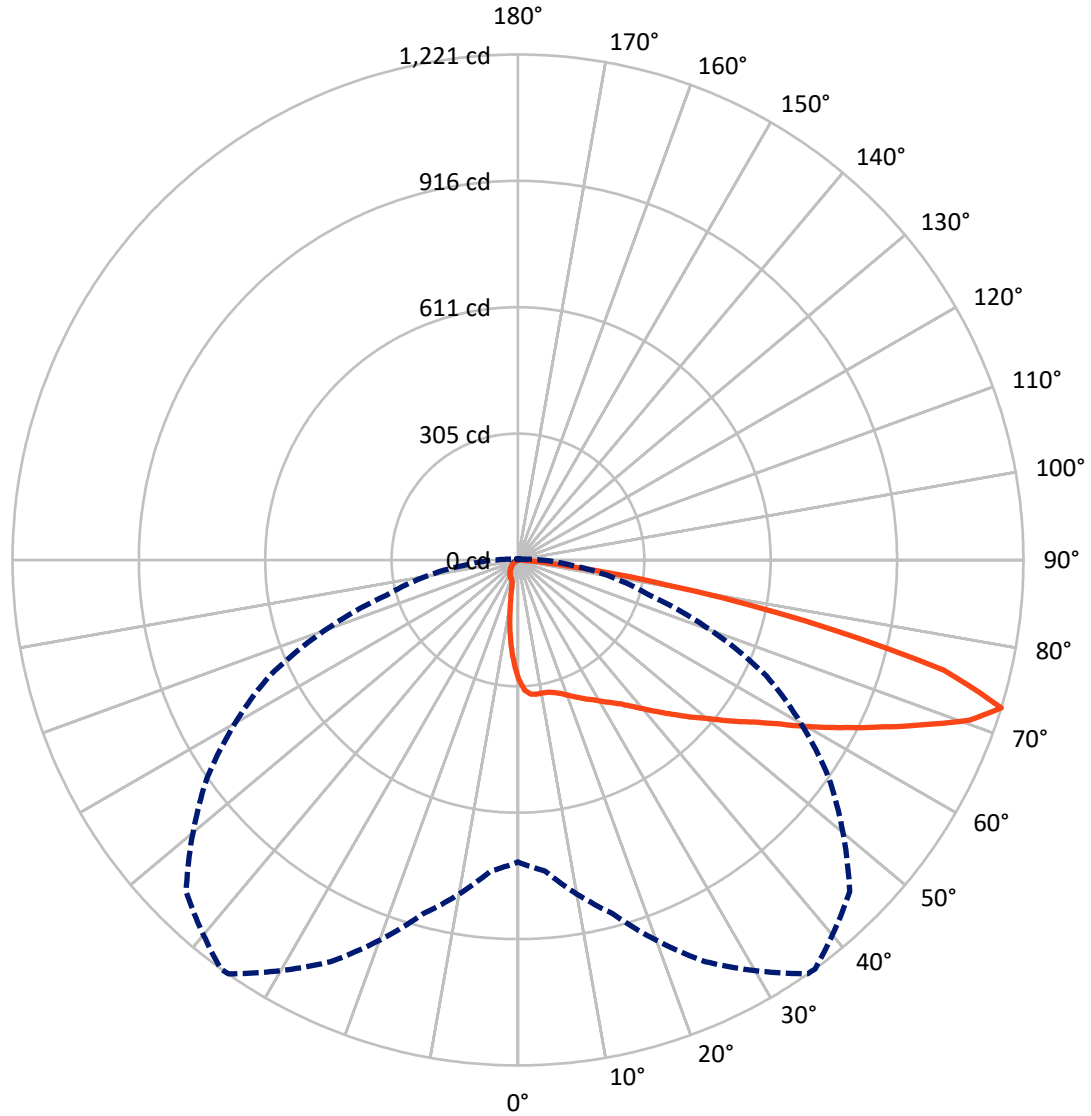
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 0.5 fc  
 Type IV - Short - N/A

REPORT NUMBER: P437955  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 36-Deg Lateral    - - - Horizontal Cone Through 72.5-Deg Vertical

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 CATALOG NUMBER: IST-SA1A-722-U-SL4-HSS

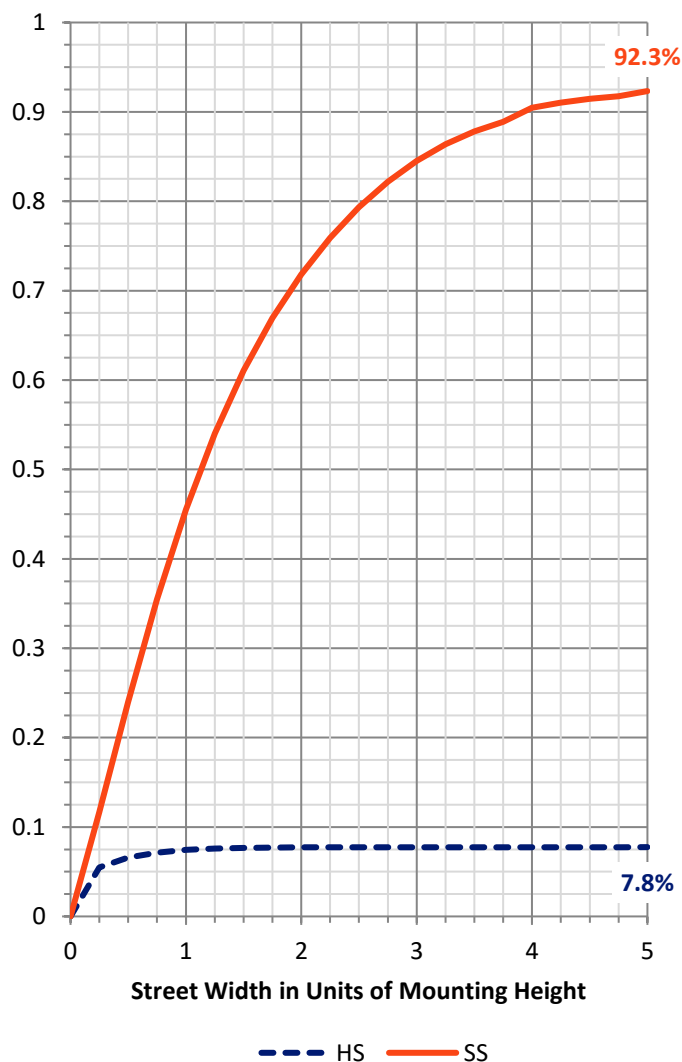
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 128.3    | 0.0    | 128.3  |
|                    | % Fixture | 7.8      | 0.0    | 7.8    |
| <b>Street Side</b> | Lumens    | 1516.6   | 0.0    | 1516.6 |
|                    | % Fixture | 92.2     | 0.0    | 92.2   |
| <b>Total</b>       | Lumens    | 1645.0   | 0.0    | 1645.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 24.7   | 1.5       |
| 10°-20°   | 61.9   | 3.8       |
| 20°-30°   | 101.2  | 6.1       |
| 30°-40°   | 153.8  | 9.3       |
| 40°-50°   | 235.2  | 14.3      |
| 50°-60°   | 334.4  | 20.3      |
| 60°-70°   | 424.1  | 25.8      |
| 70°-80°   | 290.3  | 17.7      |
| 80°-90°   | 19.4   | 1.2       |
| 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°-90°    | 1645.0 | 100.0     |
| 0°-180°   | 1645.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P437955

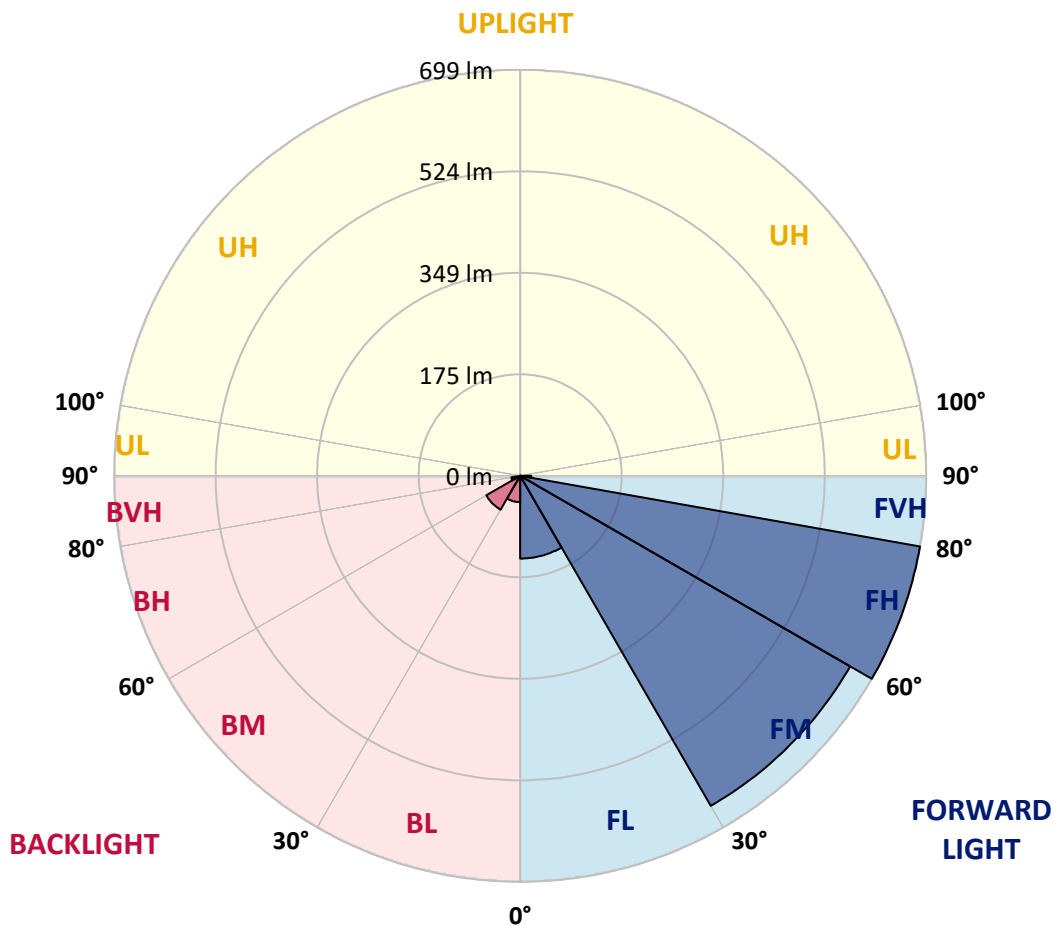
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 142.5  | 8.7       |                         |      |         |
| FM (30°-60°)   | 656.1  | 39.9      |                         |      |         |
| FH (60°-80°)   | 698.9  | 42.5      |                         |      | G1/1800 |
| FVH (80°-90°)  | 19.2   | 1.2       |                         |      | G1/100  |
| BL (0°-30°)    | 45.3   | 2.8       | B0/110                  |      |         |
| BM (30°-60°)   | 67.3   | 4.1       | B0/220                  |      |         |
| BH (60°-80°)   | 15.5   | 0.9       | B0/110                  |      | G0/110  |
| BVH (80°-90°)  | 0.3    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°    | 35°    | 36°    | 45°    | 55°    | 65°   | 75°   | 85°   |
|-------|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|
| 0°    | 288.9 | 288.9 | 288.9 | 288.9  | 288.9  | 288.9  | 288.9  | 288.9  | 288.9 | 288.9 | 288.9 |
| 2.5°  | 323.6 | 321.5 | 320.0 | 318.6  | 314.2  | 315.0  | 310.6  | 306.3  | 299.7 | 296.9 | 292.5 |
| 5°    | 331.6 | 330.9 | 330.2 | 328.0  | 324.4  | 325.8  | 321.5  | 317.1  | 307.7 | 299.0 | 289.6 |
| 7.5°  | 330.2 | 331.6 | 330.9 | 329.4  | 326.5  | 327.3  | 323.6  | 319.3  | 311.3 | 299.7 | 286.7 |
| 10°   | 327.3 | 328.0 | 328.0 | 327.3  | 326.5  | 326.5  | 323.6  | 320.0  | 312.8 | 302.6 | 286.0 |
| 12.5° | 321.5 | 322.9 | 325.1 | 326.5  | 327.3  | 328.0  | 325.8  | 322.9  | 316.4 | 305.5 | 288.2 |
| 15°   | 319.3 | 320.7 | 325.1 | 329.4  | 331.6  | 332.3  | 330.2  | 326.5  | 320.7 | 311.3 | 291.8 |
| 17.5° | 319.3 | 320.7 | 328.0 | 334.5  | 338.8  | 339.6  | 336.7  | 333.1  | 325.8 | 316.4 | 296.1 |
| 20°   | 323.6 | 325.1 | 333.8 | 345.4  | 347.5  | 349.0  | 344.6  | 339.6  | 331.6 | 322.2 | 301.2 |
| 22.5° | 330.9 | 333.1 | 343.9 | 354.8  | 359.1  | 359.8  | 354.8  | 345.4  | 338.1 | 328.7 | 305.5 |
| 25°   | 343.2 | 348.3 | 358.4 | 370.0  | 370.7  | 371.4  | 363.5  | 354.0  | 345.4 | 335.9 | 310.6 |
| 27.5° | 360.6 | 364.9 | 373.6 | 386.6  | 382.3  | 382.3  | 375.8  | 363.5  | 354.8 | 346.1 | 319.3 |
| 30°   | 383.0 | 385.9 | 396.0 | 401.1  | 395.3  | 396.0  | 388.1  | 376.5  | 369.3 | 360.6 | 332.3 |
| 32.5° | 404.0 | 406.2 | 417.0 | 417.8  | 411.2  | 410.5  | 404.7  | 391.0  | 385.2 | 382.3 | 350.4 |
| 35°   | 423.6 | 426.5 | 435.1 | 434.4  | 427.9  | 427.2  | 424.3  | 412.0  | 412.0 | 414.9 | 377.2 |
| 37.5° | 438.0 | 445.3 | 456.1 | 453.2  | 448.9  | 448.9  | 446.7  | 437.3  | 444.6 | 455.4 | 412.7 |
| 40°   | 456.9 | 461.2 | 475.7 | 473.5  | 474.2  | 474.2  | 475.0  | 469.2  | 482.2 | 500.3 | 454.0 |
| 42.5° | 467.0 | 475.7 | 493.1 | 496.0  | 502.5  | 502.5  | 508.3  | 506.8  | 531.4 | 554.6 | 501.8 |
| 45°   | 482.9 | 492.3 | 511.2 | 522.0  | 530.0  | 533.6  | 543.7  | 551.7  | 586.5 | 615.4 | 552.4 |
| 47.5° | 503.2 | 511.2 | 527.1 | 547.4  | 561.8  | 567.6  | 587.9  | 600.9  | 647.3 | 677.0 | 600.2 |
| 50°   | 530.7 | 532.2 | 543.7 | 574.2  | 599.5  | 603.1  | 635.0  | 656.7  | 708.8 | 736.3 | 634.2 |
| 52.5° | 560.4 | 557.5 | 564.0 | 605.3  | 640.8  | 647.3  | 683.5  | 716.8  | 768.9 | 774.7 | 648.0 |
| 55°   | 583.6 | 583.6 | 588.6 | 639.3  | 687.1  | 690.7  | 741.4  | 776.9  | 823.9 | 797.2 | 656.7 |
| 57.5° | 613.3 | 610.4 | 618.3 | 674.1  | 745.0  | 747.9  | 806.6  | 834.1  | 854.4 | 811.6 | 655.2 |
| 60°   | 635.0 | 638.6 | 650.9 | 719.0  | 805.1  | 818.1  | 867.4  | 876.1  | 886.2 | 816.7 | 650.9 |
| 62.5° | 665.4 | 664.7 | 688.5 | 768.9  | 883.3  | 892.0  | 926.0  | 911.5  | 910.8 | 825.4 | 645.1 |
| 65°   | 690.7 | 696.5 | 732.7 | 829.0  | 966.6  | 972.4  | 984.0  | 965.1  | 944.9 | 834.8 | 594.4 |
| 67.5° | 729.8 | 741.4 | 787.0 | 907.9  | 1055.6 | 1062.1 | 1072.3 | 1031.0 | 954.3 | 768.2 | 495.2 |
| 70°   | 774.0 | 789.2 | 863.0 | 1012.9 | 1151.2 | 1158.4 | 1160.6 | 1037.5 | 864.5 | 603.1 | 335.9 |
| 72.5° | 729.8 | 754.4 | 884.8 | 1070.8 | 1220.7 | 1221.4 | 1133.8 | 916.6  | 662.5 | 329.4 | 118.7 |
| 75°   | 469.9 | 501.0 | 732.7 | 949.9  | 1051.3 | 1062.9 | 889.1  | 640.8  | 309.2 | 73.9  | 33.3  |
| 77.5° | 159.3 | 170.1 | 359.8 | 599.5  | 705.2  | 709.5  | 585.0  | 324.4  | 97.7  | 29.7  | 18.1  |
| 80°   | 92.0  | 91.2  | 126.0 | 262.1  | 351.9  | 365.6  | 294.7  | 129.6  | 45.6  | 15.2  | 12.3  |
| 82.5° | 21.7  | 22.4  | 65.9  | 95.6   | 139.7  | 126.0  | 62.3   | 78.2   | 21.0  | 8.7   | 10.9  |
| 85°   | 0.0   | 0.0   | 10.9  | 23.2   | 16.7   | 19.5   | 5.8    | 23.9   | 3.6   | 3.6   | 7.2   |
| 87.5° | 0.0   | 0.0   | 0.0   | 0.0    | 0.7    | 0.7    | 0.7    | 0.7    | 0.7   | 0.7   | 0.7   |
| 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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 CATALOG NUMBER: IST-SA1A-722-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 | 288.9 |
| 2.5°  | 288.2 | 284.5 | 277.3 | 271.5 | 263.5 | 257.0 | 250.5 | 247.6 | 242.5 | 241.1 | 241.8 |
| 5°    | 283.8 | 278.0 | 264.3 | 250.5 | 235.3 | 220.8 | 205.6 | 196.9 | 193.3 | 186.8 | 185.4 |
| 7.5°  | 278.8 | 270.1 | 250.5 | 228.1 | 202.0 | 181.0 | 160.0 | 145.5 | 132.5 | 127.4 | 125.3 |
| 10°   | 276.6 | 265.7 | 238.2 | 204.2 | 168.7 | 134.7 | 108.6 | 89.8  | 78.2  | 73.9  | 72.4  |
| 12.5° | 276.6 | 263.5 | 226.6 | 181.0 | 133.9 | 94.8  | 71.0  | 60.1  | 56.5  | 55.8  | 55.0  |
| 15°   | 279.5 | 262.8 | 215.8 | 156.4 | 101.4 | 65.9  | 54.3  | 52.9  | 52.1  | 52.1  | 52.9  |
| 17.5° | 280.9 | 261.4 | 204.2 | 132.5 | 74.6  | 52.9  | 50.7  | 50.7  | 50.7  | 50.7  | 50.7  |
| 20°   | 284.5 | 260.6 | 191.1 | 107.2 | 56.5  | 49.2  | 48.5  | 48.5  | 48.5  | 48.5  | 49.2  |
| 22.5° | 285.3 | 260.6 | 175.2 | 82.5  | 50.0  | 47.1  | 46.3  | 46.3  | 46.3  | 47.1  | 47.1  |
| 25°   | 289.6 | 259.2 | 160.0 | 63.0  | 47.1  | 44.2  | 44.2  | 43.4  | 44.2  | 44.2  | 44.2  |
| 27.5° | 295.4 | 259.9 | 141.2 | 52.1  | 44.2  | 42.0  | 41.3  | 41.3  | 41.3  | 41.3  | 41.3  |
| 30°   | 301.9 | 261.4 | 121.6 | 46.3  | 41.3  | 39.8  | 39.1  | 38.4  | 38.4  | 38.4  | 38.4  |
| 32.5° | 314.2 | 262.8 | 100.6 | 42.0  | 38.4  | 36.9  | 36.2  | 35.5  | 35.5  | 35.5  | 35.5  |
| 35°   | 333.1 | 270.8 | 82.5  | 39.1  | 35.5  | 34.0  | 33.3  | 32.6  | 32.6  | 32.6  | 31.9  |
| 37.5° | 358.4 | 283.1 | 65.2  | 36.2  | 32.6  | 31.1  | 30.4  | 29.7  | 29.0  | 29.0  | 29.0  |
| 40°   | 388.8 | 296.1 | 54.3  | 32.6  | 29.7  | 28.2  | 27.5  | 26.8  | 26.1  | 25.3  | 25.3  |
| 42.5° | 425.0 | 312.1 | 43.4  | 29.7  | 26.8  | 25.3  | 24.6  | 23.9  | 22.4  | 21.7  | 22.4  |
| 45°   | 465.5 | 327.3 | 36.9  | 27.5  | 24.6  | 23.2  | 22.4  | 21.0  | 19.5  | 18.8  | 18.8  |
| 47.5° | 501.0 | 330.9 | 32.6  | 24.6  | 22.4  | 21.0  | 20.3  | 18.1  | 16.7  | 15.2  | 15.2  |
| 50°   | 524.9 | 324.4 | 29.0  | 22.4  | 20.3  | 19.5  | 18.1  | 15.2  | 13.0  | 12.3  | 11.6  |
| 52.5° | 527.8 | 307.0 | 25.3  | 20.3  | 18.8  | 17.4  | 15.2  | 13.0  | 10.9  | 9.4   | 9.4   |
| 55°   | 524.9 | 278.0 | 22.4  | 18.8  | 16.7  | 15.2  | 13.0  | 10.1  | 8.0   | 7.2   | 6.5   |
| 57.5° | 515.5 | 247.6 | 20.3  | 16.7  | 15.2  | 13.0  | 10.1  | 8.0   | 5.8   | 5.1   | 4.3   |
| 60°   | 498.1 | 210.7 | 18.1  | 15.2  | 13.0  | 10.9  | 8.0   | 5.8   | 3.6   | 2.9   | 2.9   |
| 62.5° | 465.5 | 170.1 | 15.9  | 13.0  | 10.9  | 8.7   | 6.5   | 3.6   | 2.2   | 1.4   | 1.4   |
| 65°   | 401.1 | 127.4 | 13.8  | 10.9  | 8.7   | 7.2   | 4.3   | 2.2   | 0.7   | 0.0   | 0.0   |
| 67.5° | 312.1 | 86.2  | 10.9  | 8.7   | 7.2   | 5.8   | 3.6   | 0.7   | 0.0   | 0.0   | 0.0   |
| 70°   | 183.9 | 45.6  | 8.7   | 6.5   | 5.8   | 4.3   | 2.2   | 0.7   | 0.0   | 0.0   | 0.0   |
| 72.5° | 52.9  | 18.1  | 6.5   | 5.1   | 4.3   | 2.9   | 1.4   | 0.7   | 0.0   | 0.0   | 0.0   |
| 75°   | 21.7  | 10.9  | 4.3   | 3.6   | 3.6   | 2.2   | 0.7   | 0.7   | 0.0   | 0.0   | 0.0   |
| 77.5° | 14.5  | 8.0   | 2.9   | 2.2   | 2.2   | 1.4   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 11.6  | 4.3   | 1.4   | 1.4   | 1.4   | 0.7   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 10.1  | 2.9   | 0.7   | 0.7   | 0.7   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 5.1   | 1.4   | 0.7   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.7   | 0.7   | 0.7   | 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   |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



**Test Information**

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2237  
 CIE u': 0.2876  
 CIE v': 0.5346  
 Duv: -0.0006  
 CIE x: 0.5005  
 CIE y: 0.4134  
 CIE z: 0.0860  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 587  
 Purity: 74.5  
 Rf: 69.8  
 Rg: 99.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 72.0 |      |       |
| R1:       | 68.9 | R9:  | -17.4 |
| R2:       | 83.0 | R10: | 61.3  |
| R3:       | 95.2 | R11: | 59.8  |
| R4:       | 66.2 | R12: | 50.5  |
| R5:       | 65.9 | R13: | 71.1  |
| R6:       | 76.3 | R14: | 96.9  |
| R7:       | 76.7 |      |       |
| R8:       | 43.8 |      |       |



**Test Conditions**

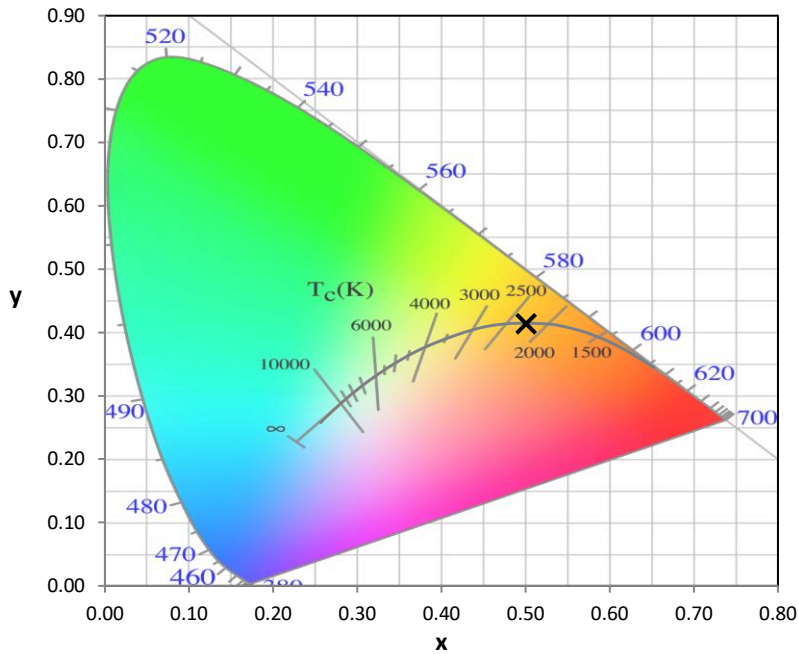
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

REPORT NUMBER: SP1-1908-441-10-R4

CIE 1931 Chromaticity Diagram



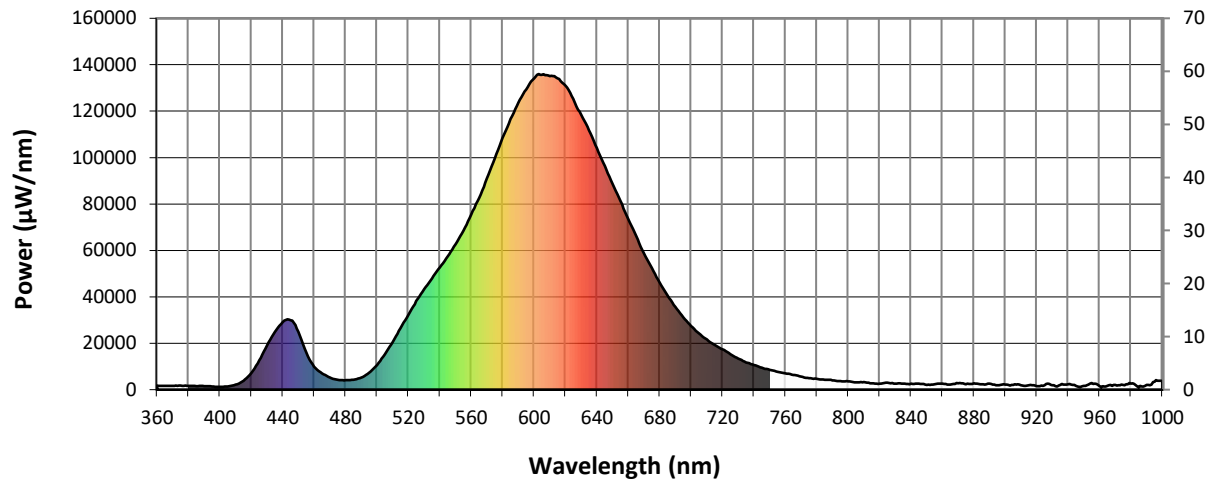
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2200K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-10-R4

**Photopic Flux vs. Wavelength**



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| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 1768                                 | NR                             | 490               | 5206                                 | NR                             | 620               | 130919                               | NR                             | 750               | 8553                                 | NR                             | 880               | 2713                                 | NR                             |
| 365               | 1569                                 | NR                             | 495               | 7286                                 | NR                             | 625               | 125335                               | NR                             | 755               | 7696                                 | NR                             | 885               | 2316                                 | NR                             |
| 370               | 1594                                 | NR                             | 500               | 10654                                | NR                             | 630               | 118388                               | NR                             | 760               | 6978                                 | NR                             | 890               | 2539                                 | NR                             |
| 375               | 1744                                 | NR                             | 505               | 15189                                | NR                             | 635               | 111855                               | NR                             | 765               | 6377                                 | NR                             | 895               | 1933                                 | NR                             |
| 380               | 1659                                 | NR                             | 510               | 20541                                | NR                             | 640               | 104062                               | NR                             | 770               | 5600                                 | NR                             | 900               | 2216                                 | NR                             |
| 385               | 1504                                 | NR                             | 515               | 26492                                | NR                             | 645               | 96365                                | NR                             | 775               | 5000                                 | NR                             | 905               | 2067                                 | NR                             |
| 390               | 1541                                 | NR                             | 520               | 32294                                | NR                             | 650               | 88651                                | NR                             | 780               | 4709                                 | NR                             | 910               | 1959                                 | NR                             |
| 395               | 1355                                 | NR                             | 525               | 38123                                | NR                             | 655               | 81152                                | NR                             | 785               | 4305                                 | NR                             | 915               | 1874                                 | NR                             |
| 400               | 1243                                 | NR                             | 530               | 43232                                | NR                             | 660               | 73523                                | NR                             | 790               | 4040                                 | NR                             | 920               | 1484                                 | NR                             |
| 405               | 1417                                 | NR                             | 535               | 48012                                | NR                             | 665               | 66123                                | NR                             | 795               | 3642                                 | NR                             | 925               | 1914                                 | NR                             |
| 410               | 2147                                 | NR                             | 540               | 52623                                | NR                             | 670               | 58677                                | NR                             | 800               | 3594                                 | NR                             | 930               | 1948                                 | NR                             |
| 415               | 3837                                 | NR                             | 545               | 57516                                | NR                             | 675               | 52349                                | NR                             | 805               | 3190                                 | NR                             | 935               | 2079                                 | NR                             |
| 420               | 7159                                 | NR                             | 550               | 62613                                | NR                             | 680               | 46159                                | NR                             | 810               | 3241                                 | NR                             | 940               | 2263                                 | NR                             |
| 425               | 12599                                | NR                             | 555               | 68554                                | NR                             | 685               | 40525                                | NR                             | 815               | 2732                                 | NR                             | 945               | 1688                                 | NR                             |
| 430               | 19019                                | NR                             | 560               | 75325                                | NR                             | 690               | 35615                                | NR                             | 820               | 2612                                 | NR                             | 950               | 1560                                 | NR                             |
| 435               | 24875                                | NR                             | 565               | 82533                                | NR                             | 695               | 31158                                | NR                             | 825               | 2966                                 | NR                             | 955               | 2826                                 | NR                             |
| 440               | 29103                                | NR                             | 570               | 90909                                | NR                             | 700               | 27409                                | NR                             | 830               | 2574                                 | NR                             | 960               | 1477                                 | NR                             |
| 445               | 29901                                | NR                             | 575               | 99621                                | NR                             | 705               | 24204                                | NR                             | 835               | 2633                                 | NR                             | 965               | 1568                                 | NR                             |
| 450               | 24862                                | NR                             | 580               | 108484                               | NR                             | 710               | 21558                                | NR                             | 840               | 2526                                 | NR                             | 970               | 2030                                 | NR                             |
| 455               | 15942                                | NR                             | 585               | 116679                               | NR                             | 715               | 19222                                | NR                             | 845               | 2631                                 | NR                             | 975               | 1986                                 | NR                             |
| 460               | 9916                                 | NR                             | 590               | 123752                               | NR                             | 720               | 17310                                | NR                             | 850               | 2079                                 | NR                             | 980               | 2540                                 | NR                             |
| 465               | 7051                                 | NR                             | 595               | 129324                               | NR                             | 725               | 15280                                | NR                             | 855               | 2309                                 | NR                             | 985               | 1139                                 | NR                             |
| 470               | 5227                                 | NR                             | 600               | 134082                               | NR                             | 730               | 13282                                | NR                             | 860               | 2528                                 | NR                             | 990               | 2018                                 | NR                             |
| 475               | 4257                                 | NR                             | 605               | 135698                               | NR                             | 735               | 11753                                | NR                             | 865               | 2121                                 | NR                             | 995               | 3445                                 | NR                             |
| 480               | 4052                                 | NR                             | 610               | 135144                               | NR                             | 740               | 10654                                | NR                             | 870               | 2751                                 | NR                             | 1000              | 3704                                 | NR                             |
| 485               | 4298                                 | NR                             | 615               | 134180                               | NR                             | 745               | 9451                                 | NR                             | 875               | 2317                                 | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-1908-441-10-R4

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 4696.9**

**S/P: 0.85**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 1768          | NR            | 490    | 5206          | NR            | 620    | 130919        | NR            | 750    | 8553          | NR            | 880    | 2713          | NR            |
| 365    | 1569          | NR            | 495    | 7286          | NR            | 625    | 125335        | NR            | 755    | 7696          | NR            | 885    | 2316          | NR            |
| 370    | 1594          | NR            | 500    | 10654         | NR            | 630    | 118388        | NR            | 760    | 6978          | NR            | 890    | 2539          | NR            |
| 375    | 1744          | NR            | 505    | 15189         | NR            | 635    | 111855        | NR            | 765    | 6377          | NR            | 895    | 1933          | NR            |
| 380    | 1659          | NR            | 510    | 20541         | NR            | 640    | 104062        | NR            | 770    | 5600          | NR            | 900    | 2216          | NR            |
| 385    | 1504          | NR            | 515    | 26492         | NR            | 645    | 96365         | NR            | 775    | 5000          | NR            | 905    | 2067          | NR            |
| 390    | 1541          | NR            | 520    | 32294         | NR            | 650    | 88651         | NR            | 780    | 4709          | NR            | 910    | 1959          | NR            |
| 395    | 1355          | NR            | 525    | 38123         | NR            | 655    | 81152         | NR            | 785    | 4305          | NR            | 915    | 1874          | NR            |
| 400    | 1243          | NR            | 530    | 43232         | NR            | 660    | 73523         | NR            | 790    | 4040          | NR            | 920    | 1484          | NR            |
| 405    | 1417          | NR            | 535    | 48012         | NR            | 665    | 66123         | NR            | 795    | 3642          | NR            | 925    | 1914          | NR            |
| 410    | 2147          | NR            | 540    | 52623         | NR            | 670    | 58677         | NR            | 800    | 3594          | NR            | 930    | 1948          | NR            |
| 415    | 3837          | NR            | 545    | 57516         | NR            | 675    | 52349         | NR            | 805    | 3190          | NR            | 935    | 2079          | NR            |
| 420    | 7159          | NR            | 550    | 62613         | NR            | 680    | 46159         | NR            | 810    | 3241          | NR            | 940    | 2263          | NR            |
| 425    | 12599         | NR            | 555    | 68554         | NR            | 685    | 40525         | NR            | 815    | 2732          | NR            | 945    | 1688          | NR            |
| 430    | 19019         | NR            | 560    | 75325         | NR            | 690    | 35615         | NR            | 820    | 2612          | NR            | 950    | 1560          | NR            |
| 435    | 24875         | NR            | 565    | 82533         | NR            | 695    | 31158         | NR            | 825    | 2966          | NR            | 955    | 2826          | NR            |
| 440    | 29103         | NR            | 570    | 90909         | NR            | 700    | 27409         | NR            | 830    | 2574          | NR            | 960    | 1477          | NR            |
| 445    | 29901         | NR            | 575    | 99621         | NR            | 705    | 24204         | NR            | 835    | 2633          | NR            | 965    | 1568          | NR            |
| 450    | 24862         | NR            | 580    | 108484        | NR            | 710    | 21558         | NR            | 840    | 2526          | NR            | 970    | 2030          | NR            |
| 455    | 15942         | NR            | 585    | 116679        | NR            | 715    | 19222         | NR            | 845    | 2631          | NR            | 975    | 1986          | NR            |
| 460    | 9916          | NR            | 590    | 123752        | NR            | 720    | 17310         | NR            | 850    | 2079          | NR            | 980    | 2540          | NR            |
| 465    | 7051          | NR            | 595    | 129324        | NR            | 725    | 15280         | NR            | 855    | 2309          | NR            | 985    | 1139          | NR            |
| 470    | 5227          | NR            | 600    | 134082        | NR            | 730    | 13282         | NR            | 860    | 2528          | NR            | 990    | 2018          | NR            |
| 475    | 4257          | NR            | 605    | 135698        | NR            | 735    | 11753         | NR            | 865    | 2121          | NR            | 995    | 3445          | NR            |
| 480    | 4052          | NR            | 610    | 135144        | NR            | 740    | 10654         | NR            | 870    | 2751          | NR            | 1000   | 3704          | NR            |
| 485    | 4298          | NR            | 615    | 134180        | NR            | 745    | 9451          | NR            | 875    | 2317          | NR            |        |               |               |

REPORT NUMBER: SP1-1908-441-10-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 1768          | NR            | 490    | 5206          | NR            | 620    | 130919        | NR            | 750    | 8553          | NR            | 880    | 2713          | NR            |
| 365    | 1569          | NR            | 495    | 7286          | NR            | 625    | 125335        | NR            | 755    | 7696          | NR            | 885    | 2316          | NR            |
| 370    | 1594          | NR            | 500    | 10654         | NR            | 630    | 118388        | NR            | 760    | 6978          | NR            | 890    | 2539          | NR            |
| 375    | 1744          | NR            | 505    | 15189         | NR            | 635    | 111855        | NR            | 765    | 6377          | NR            | 895    | 1933          | NR            |
| 380    | 1659          | NR            | 510    | 20541         | NR            | 640    | 104062        | NR            | 770    | 5600          | NR            | 900    | 2216          | NR            |
| 385    | 1504          | NR            | 515    | 26492         | NR            | 645    | 96365         | NR            | 775    | 5000          | NR            | 905    | 2067          | NR            |
| 390    | 1541          | NR            | 520    | 32294         | NR            | 650    | 88651         | NR            | 780    | 4709          | NR            | 910    | 1959          | NR            |
| 395    | 1355          | NR            | 525    | 38123         | NR            | 655    | 81152         | NR            | 785    | 4305          | NR            | 915    | 1874          | NR            |
| 400    | 1243          | NR            | 530    | 43232         | NR            | 660    | 73523         | NR            | 790    | 4040          | NR            | 920    | 1484          | NR            |
| 405    | 1417          | NR            | 535    | 48012         | NR            | 665    | 66123         | NR            | 795    | 3642          | NR            | 925    | 1914          | NR            |
| 410    | 2147          | NR            | 540    | 52623         | NR            | 670    | 58677         | NR            | 800    | 3594          | NR            | 930    | 1948          | NR            |
| 415    | 3837          | NR            | 545    | 57516         | NR            | 675    | 52349         | NR            | 805    | 3190          | NR            | 935    | 2079          | NR            |
| 420    | 7159          | NR            | 550    | 62613         | NR            | 680    | 46159         | NR            | 810    | 3241          | NR            | 940    | 2263          | NR            |
| 425    | 12599         | NR            | 555    | 68554         | NR            | 685    | 40525         | NR            | 815    | 2732          | NR            | 945    | 1688          | NR            |
| 430    | 19019         | NR            | 560    | 75325         | NR            | 690    | 35615         | NR            | 820    | 2612          | NR            | 950    | 1560          | NR            |
| 435    | 24875         | NR            | 565    | 82533         | NR            | 695    | 31158         | NR            | 825    | 2966          | NR            | 955    | 2826          | NR            |
| 440    | 29103         | NR            | 570    | 90909         | NR            | 700    | 27409         | NR            | 830    | 2574          | NR            | 960    | 1477          | NR            |
| 445    | 29901         | NR            | 575    | 99621         | NR            | 705    | 24204         | NR            | 835    | 2633          | NR            | 965    | 1568          | NR            |
| 450    | 24862         | NR            | 580    | 108484        | NR            | 710    | 21558         | NR            | 840    | 2526          | NR            | 970    | 2030          | NR            |
| 455    | 15942         | NR            | 585    | 116679        | NR            | 715    | 19222         | NR            | 845    | 2631          | NR            | 975    | 1986          | NR            |
| 460    | 9916          | NR            | 590    | 123752        | NR            | 720    | 17310         | NR            | 850    | 2079          | NR            | 980    | 2540          | NR            |
| 465    | 7051          | NR            | 595    | 129324        | NR            | 725    | 15280         | NR            | 855    | 2309          | NR            | 985    | 1139          | NR            |
| 470    | 5227          | NR            | 600    | 134082        | NR            | 730    | 13282         | NR            | 860    | 2528          | NR            | 990    | 2018          | NR            |
| 475    | 4257          | NR            | 605    | 135698        | NR            | 735    | 11753         | NR            | 865    | 2121          | NR            | 995    | 3445          | NR            |
| 480    | 4052          | NR            | 610    | 135144        | NR            | 740    | 10654         | NR            | 870    | 2751          | NR            | 1000   | 3704          | NR            |
| 485    | 4298          | NR            | 615    | 134180        | NR            | 745    | 9451          | NR            | 875    | 2317          | NR            |        |               |               |

REPORT NUMBER: SP1-1908-441-10-R4

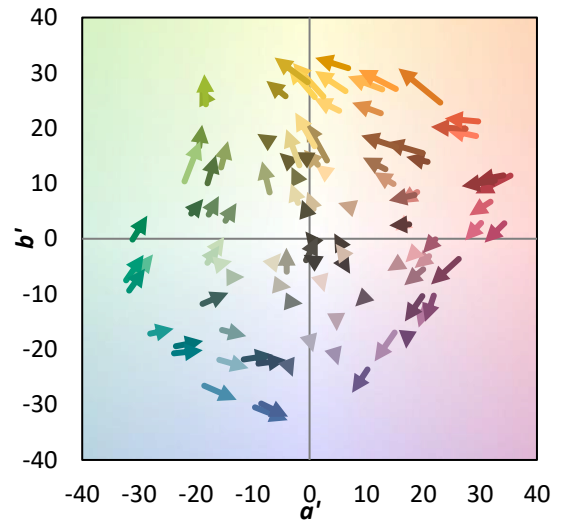
TM-30-18

**Summary**

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_9 = -17.4$



**Color Vector Graphics**





REPORT NUMBER: SP1-1908-441-10-R4

TM-30-18

**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



REPORT NUMBER: SP1-1908-441-10-R4

TM-30-18

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-10-R4

TM-30-18

Measure Comparisons



(END OF REPORT)