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Photometric Test Report

Relevant Standards
IES LM-79-2008, IES LM-35-2002 (Withdrawn)
ANSI C78.377-2011, ANSI C82.77-2002
CIE 13.3-1995, CIE 15-2004, IES TM-30-15

Prepared For
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Catalog Number
DE-LED-x60-SP-9 SN-DE-LED-x60-SP-9 ST-DE-LED-x60-SP-9 SM-DE-LED-x60-SP-9
UL-DE-LED-x60-SP-9

Order Number
11353040
Test Number
11353040.27

Test Date

2016-09-08

Prepared By

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Approved By

Eric Gaudreau, Senior Engineering Associate

The results contained in this report pertain only to the tested sample.
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Laboratory results may not be representative of field performance
Ballast factors have not been applied

Testing was performed in a 2-meter integrating sphere using the 4π geometry method.
Absorption correction was employed for Sphere measurement



Luminaire Description: Circular black aluminum housing, semi-specular linear reflector and glass lens
Lamp: One (1) White LED
Mounting: VBU
Ballast/Driver: PowerSelect PS60U700C14T

Luminaire



Luminaire Characteristics
Luminous Diameter: 2.75 in.

Summary of Results

Integrating Sphere

Luminous Flux: 871 Lumens
Efficacy: 70.8 lm/w
CCT: 4034 K
CRI (Ra): 79.5

Distribution

Total Luminaire Output: 851.3 Lumens
Luminaire Efficacy: 69.3 lm/w
Maximum Candela: 4561 Candela

Electrical Data at 120 VAC

Test Temperature: 25.6 °C
Voltage: 120.1 VAC
Current: 0.1053 A
Power: 12.30 W
Power Factor: 0.972
Frequency: 60 Hz
Current THD: 14.2 %



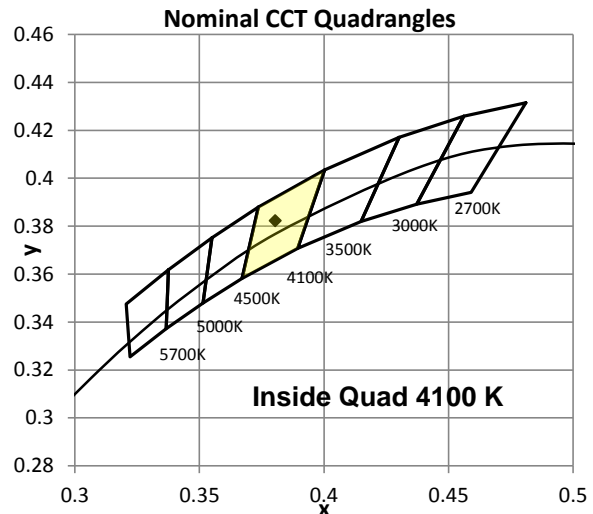
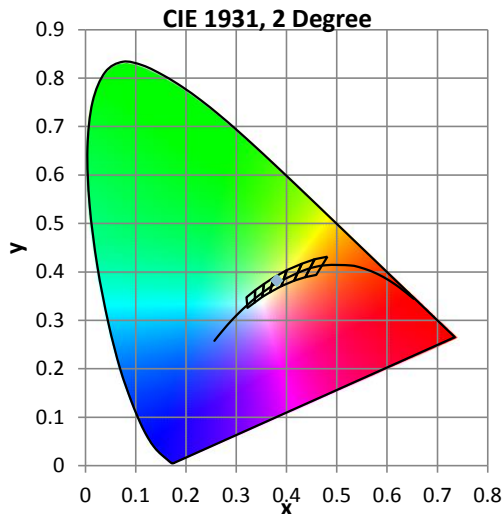
Color Quality - Integrating Sphere

Integrating Sphere Test Conditions

| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 25.6 °C | 120.1 VAC | 0.1053 A | 12.30 W | 0.972 | 60 Hz | 14.2 % |

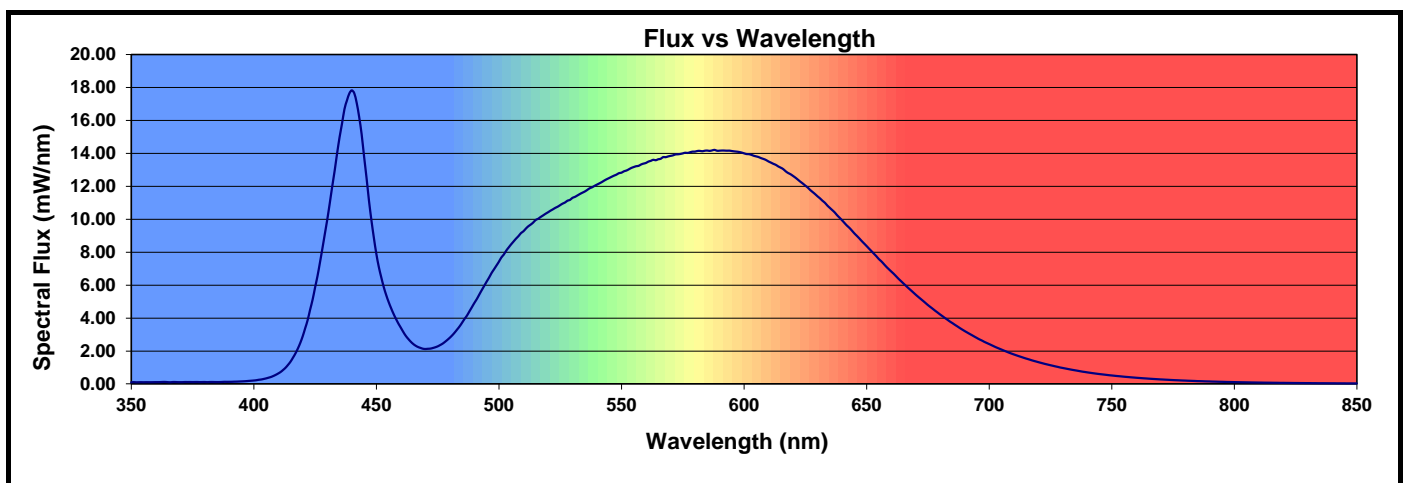
Summary of Results

| | | | |
|----------------------|------------|------------------------|--------|
| Total Output: | 871 Lumens | Chromaticity (x): | 0.3805 |
| Efficacy: | 70.8 lm/w | Chromaticity (y): | 0.3822 |
| CCT: | 4034 K | Chromaticity (u'): | 0.2230 |
| CRI (Ra): | 79.5 | Chromaticity (v'): | 0.5040 |
| CRI (R9): | 11.0 | TM-30 R _f : | 77.6 |
| Peak Wavelength: | 439.9 nm | TM-30 R _g : | 99.9 |
| Dominant Wavelength: | 577.6 nm | Duv: | 0.0018 |
| S/P Ratio: | 1.6 | | |



Color Rendering Index Detail

| Ra (CRI) | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | R11 | R12 | R13 | R14 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 79.5 | 78.6 | 82.4 | 86.6 | 81.2 | 78.9 | 77.3 | 83.8 | 67.4 | 11.0 | 59.9 | 82.1 | 62.5 | 78.3 | 92.3 |





Distribution - Goniophotometer

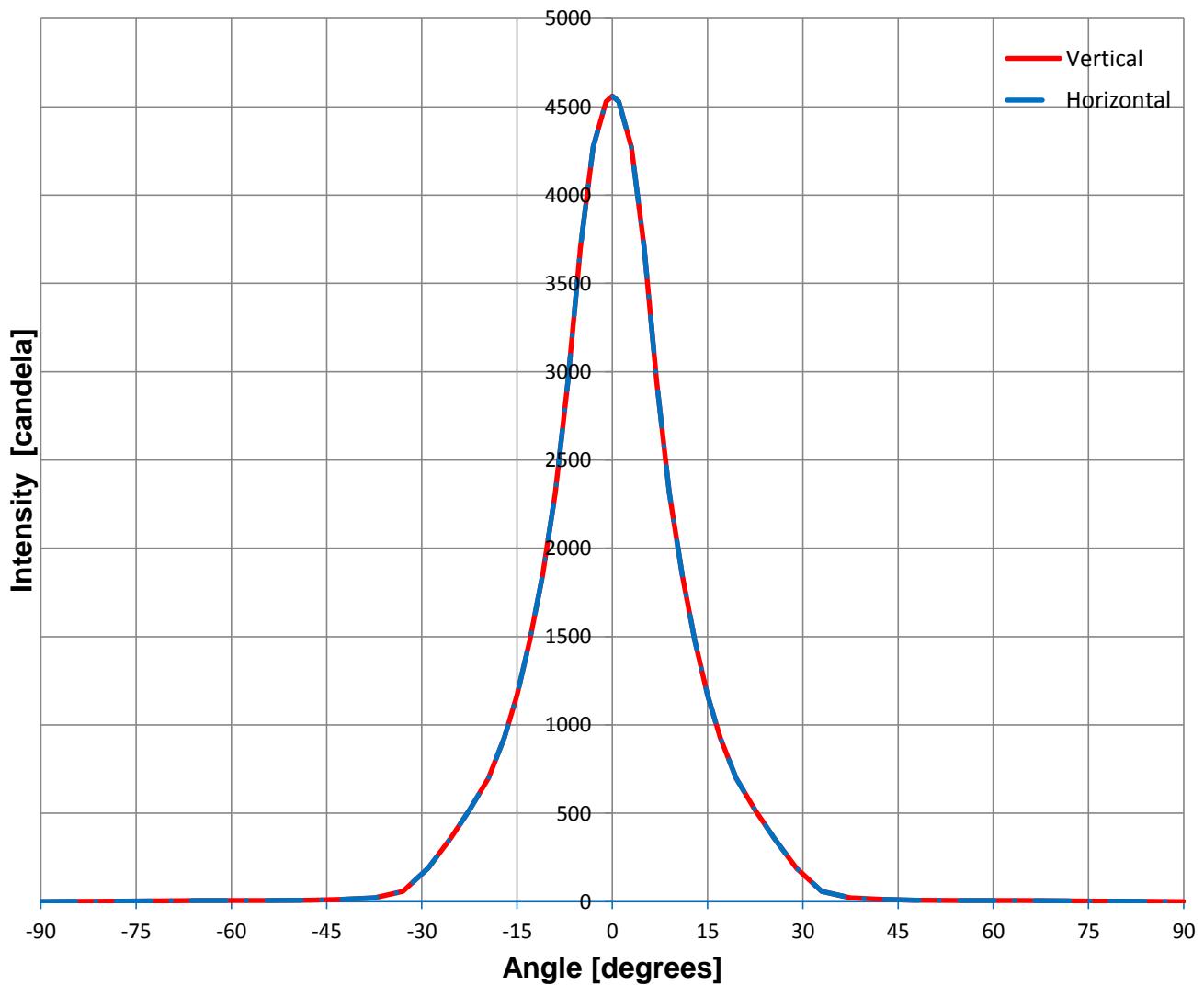
Distribution Test Conditions

| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 25.2 °C | 120.1 VAC | 0.1052 A | 12.28 W | 0.972 | 60 Hz | 14.1 % |

Summary of Results

| | | | |
|---------------------|------------------|------------------|-----------------|
| Total Lumen Output: | 851.3 Lumens | Maximum Candela: | 4560.6 Candela |
| Luminaire Efficacy: | 69.3 Lumens/Watt | Maximum Angle: | 0 H 0 V |
| Field Lumens: | 711.6 Lumens | Field Angle : | 47.3 H X 47.3 V |
| Beam Lumens: | 266.3 Lumens | Beam Angle : | 18.3 H X 18.3 V |
| Spill Light Lumens: | 139.7 Lumens | IESNA Type: | 4 H X 4 V |

Maximum Candlepower Plot





Candela Tabulation

Lateral Angle (Degrees)

| Vertical Angle (Degrees) | Lateral Angle (Degrees) | | | | | | | | | | |
|--------------------------|-------------------------|------|------|------|------|------|------|------|------|-----|------|
| | 0 | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19.5 |
| 85.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 75.0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 65.0 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 55.0 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 47.5 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 |
| 42.5 | 13 | 13 | 12 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 10 |
| 37.5 | 21 | 21 | 21 | 20 | 20 | 19 | 18 | 17 | 16 | 15 | 13 |
| 33.0 | 57 | 57 | 55 | 51 | 46 | 39 | 33 | 28 | 25 | 23 | 20 |
| 29.0 | 189 | 188 | 183 | 173 | 159 | 141 | 119 | 97 | 74 | 53 | 35 |
| 25.5 | 357 | 356 | 349 | 333 | 311 | 283 | 250 | 214 | 176 | 138 | 92 |
| 22.5 | 517 | 516 | 507 | 489 | 463 | 429 | 388 | 341 | 289 | 236 | 172 |
| 19.5 | 698 | 697 | 682 | 653 | 618 | 576 | 528 | 475 | 414 | 349 | 265 |
| 17.0 | 928 | 925 | 902 | 857 | 796 | 724 | 650 | 582 | 516 | 444 | 349 |
| 15.0 | 1169 | 1165 | 1132 | 1068 | 982 | 884 | 780 | 679 | 593 | 516 | 414 |
| 13.0 | 1474 | 1468 | 1420 | 1327 | 1207 | 1071 | 932 | 799 | 679 | 582 | 475 |
| 11.0 | 1848 | 1839 | 1770 | 1640 | 1472 | 1288 | 1104 | 932 | 780 | 650 | 528 |
| 9.0 | 2311 | 2298 | 2192 | 2003 | 1772 | 1527 | 1288 | 1071 | 884 | 724 | 576 |
| 7.0 | 2943 | 2918 | 2733 | 2428 | 2093 | 1772 | 1472 | 1207 | 982 | 796 | 618 |
| 5.0 | 3709 | 3672 | 3393 | 2920 | 2428 | 2003 | 1640 | 1327 | 1068 | 857 | 653 |
| 3.0 | 4273 | 4234 | 3954 | 3393 | 2733 | 2192 | 1770 | 1420 | 1132 | 902 | 682 |
| 1.0 | 4530 | 4491 | 4234 | 3672 | 2918 | 2298 | 1839 | 1468 | 1165 | 925 | 697 |
| 0.0 | 4561 | 4530 | 4273 | 3709 | 2943 | 2311 | 1848 | 1474 | 1169 | 928 | 698 |
| -1.0 | 4530 | 4491 | 4234 | 3672 | 2918 | 2298 | 1839 | 1468 | 1165 | 925 | 697 |
| -3.0 | 4273 | 4234 | 3954 | 3393 | 2733 | 2192 | 1770 | 1420 | 1132 | 902 | 682 |
| -5.0 | 3709 | 3672 | 3393 | 2920 | 2428 | 2003 | 1640 | 1327 | 1068 | 857 | 653 |
| -7.0 | 2943 | 2918 | 2733 | 2428 | 2093 | 1772 | 1472 | 1207 | 982 | 796 | 618 |
| -9.0 | 2311 | 2298 | 2192 | 2003 | 1772 | 1527 | 1288 | 1071 | 884 | 724 | 576 |
| -11.0 | 1848 | 1839 | 1770 | 1640 | 1472 | 1288 | 1104 | 932 | 780 | 650 | 528 |
| -13.0 | 1474 | 1468 | 1420 | 1327 | 1207 | 1071 | 932 | 799 | 679 | 582 | 475 |
| -15.0 | 1169 | 1165 | 1132 | 1068 | 982 | 884 | 780 | 679 | 593 | 516 | 414 |
| -17.0 | 928 | 925 | 902 | 857 | 796 | 724 | 650 | 582 | 516 | 444 | 349 |
| -19.5 | 698 | 697 | 682 | 653 | 618 | 576 | 528 | 475 | 414 | 349 | 265 |
| -22.5 | 517 | 516 | 507 | 489 | 463 | 429 | 388 | 341 | 289 | 236 | 172 |
| -25.5 | 357 | 356 | 349 | 333 | 311 | 283 | 250 | 214 | 176 | 138 | 92 |
| -29.0 | 189 | 188 | 183 | 173 | 159 | 141 | 119 | 97 | 74 | 53 | 35 |
| -33.0 | 57 | 57 | 55 | 51 | 46 | 39 | 33 | 28 | 25 | 23 | 20 |
| -37.5 | 21 | 21 | 21 | 20 | 20 | 19 | 18 | 17 | 16 | 15 | 13 |
| -42.5 | 13 | 13 | 12 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 10 |
| -47.5 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 |
| -55.0 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| -65.0 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| -75.0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| -85.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |



Candela Tabulation

Lateral Angle (Degrees)

Vertical Angle (Degrees)

| | 22.5 | 25.5 | 29 | 33 | 37.5 | 42.5 | 47.5 | 55 | 65 | 75 | 85 |
|-------|------|------|-----|----|------|------|------|----|----|----|----|
| 85.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 75.0 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 0 |
| 65.0 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 0 |
| 55.0 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 2 | 1 |
| 47.5 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 3 | 2 | 1 |
| 42.5 | 9 | 8 | 7 | 7 | 6 | 6 | 6 | 6 | 4 | 2 | 1 |
| 37.5 | 12 | 11 | 10 | 8 | 7 | 6 | 6 | 6 | 4 | 2 | 1 |
| 33.0 | 17 | 14 | 12 | 10 | 8 | 7 | 6 | 6 | 4 | 3 | 1 |
| 29.0 | 24 | 20 | 16 | 12 | 10 | 7 | 6 | 6 | 5 | 3 | 1 |
| 25.5 | 48 | 27 | 20 | 14 | 11 | 8 | 7 | 6 | 5 | 3 | 1 |
| 22.5 | 101 | 48 | 24 | 17 | 12 | 9 | 7 | 6 | 5 | 3 | 1 |
| 19.5 | 172 | 92 | 35 | 20 | 13 | 10 | 7 | 6 | 6 | 3 | 1 |
| 17.0 | 236 | 138 | 53 | 23 | 15 | 10 | 7 | 6 | 6 | 3 | 1 |
| 15.0 | 289 | 176 | 74 | 25 | 16 | 11 | 8 | 6 | 6 | 3 | 1 |
| 13.0 | 341 | 214 | 97 | 28 | 17 | 11 | 8 | 6 | 6 | 3 | 1 |
| 11.0 | 388 | 250 | 119 | 33 | 18 | 11 | 8 | 6 | 6 | 3 | 1 |
| 9.0 | 429 | 283 | 141 | 39 | 19 | 12 | 8 | 6 | 6 | 3 | 1 |
| 7.0 | 463 | 311 | 159 | 46 | 20 | 12 | 8 | 6 | 6 | 3 | 1 |
| 5.0 | 489 | 333 | 173 | 51 | 20 | 12 | 8 | 6 | 6 | 3 | 1 |
| 3.0 | 507 | 349 | 183 | 55 | 21 | 12 | 8 | 6 | 6 | 3 | 1 |
| 1.0 | 516 | 356 | 188 | 57 | 21 | 13 | 9 | 6 | 6 | 3 | 1 |
| 0.0 | 517 | 357 | 189 | 57 | 21 | 13 | 9 | 6 | 6 | 3 | 1 |
| -1.0 | 516 | 356 | 188 | 57 | 21 | 13 | 9 | 6 | 6 | 3 | 1 |
| -3.0 | 507 | 349 | 183 | 55 | 21 | 12 | 8 | 6 | 6 | 3 | 1 |
| -5.0 | 489 | 333 | 173 | 51 | 20 | 12 | 8 | 6 | 6 | 3 | 1 |
| -7.0 | 463 | 311 | 159 | 46 | 20 | 12 | 8 | 6 | 6 | 3 | 1 |
| -9.0 | 429 | 283 | 141 | 39 | 19 | 12 | 8 | 6 | 6 | 3 | 1 |
| -11.0 | 388 | 250 | 119 | 33 | 18 | 11 | 8 | 6 | 6 | 3 | 1 |
| -13.0 | 341 | 214 | 97 | 28 | 17 | 11 | 8 | 6 | 6 | 3 | 1 |
| -15.0 | 289 | 176 | 74 | 25 | 16 | 11 | 8 | 6 | 6 | 3 | 1 |
| -17.0 | 236 | 138 | 53 | 23 | 15 | 10 | 7 | 6 | 6 | 3 | 1 |
| -19.5 | 172 | 92 | 35 | 20 | 13 | 10 | 7 | 6 | 6 | 3 | 1 |
| -22.5 | 101 | 48 | 24 | 17 | 12 | 9 | 7 | 6 | 5 | 3 | 1 |
| -25.5 | 48 | 27 | 20 | 14 | 11 | 8 | 7 | 6 | 5 | 3 | 1 |
| -29.0 | 24 | 20 | 16 | 12 | 10 | 7 | 6 | 6 | 5 | 3 | 1 |
| -33.0 | 17 | 14 | 12 | 10 | 8 | 7 | 6 | 6 | 4 | 3 | 1 |
| -37.5 | 12 | 11 | 10 | 8 | 7 | 6 | 6 | 6 | 4 | 2 | 1 |
| -42.5 | 9 | 8 | 7 | 7 | 6 | 6 | 6 | 6 | 4 | 2 | 1 |
| -47.5 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 3 | 2 | 1 |
| -55.0 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 2 | 1 |
| -65.0 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 0 |
| -75.0 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 0 |
| -85.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |



Isocandela Diagram (Percent of Maximum Intensity)

