



UL LLC
1075 W Lambert Rd Suite B
Brea, CA 92821

Photometric Test Report

Relevant Standards
IES LM-79-2008, ANSI C82.77-10-2014, CIE 13.3-1995
CIE 15-2004, ANSI C78.377-2017, IES TM-30-2018

Prepared For
Express Imaging Systems LLC dba Evluma
3600 Lind Ave SW Suite 140
Renton, WA 98057
United States

Catalog Number
OM-70-27-MO
Order Number
12914541
Test Number
12914541.05

Test Date

2019-06-19 - 2019-06-26

Prepared By

Austin Duff, Technician

Approved By

Eric Gaudreau, Engineering Leader

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: White plastic housing with diffuse lens
Lamp: 96 White LEDs
Mounting: VBD
Ballast/Driver: Integrated

Luminaire



Luminaire Characteristics

Luminous Diameter: 3.50 in.
Luminous Height: 1.500 in.

Summary of Results

Integrating Sphere

Luminous Flux: 8582 Lumens
Efficacy: 123.33 lm/w
CCT: 2761 K
CRI (Ra): 81.0

Distribution

Total Luminaire Output: 8560 Lumens
Luminaire Efficacy: 122.9 lm/w
Maximum Candela: 919 Candela

Electrical Data at 120 VAC

Test Temperature: 24.6 °C
Voltage: 120.1 VAC
Current: 0.5821 A
Power: 69.59 W
Power Factor: 0.996
Frequency: 60 Hz
Current THD: 8.84 %



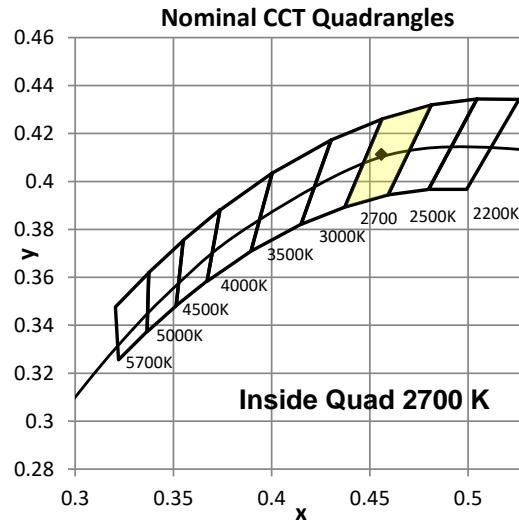
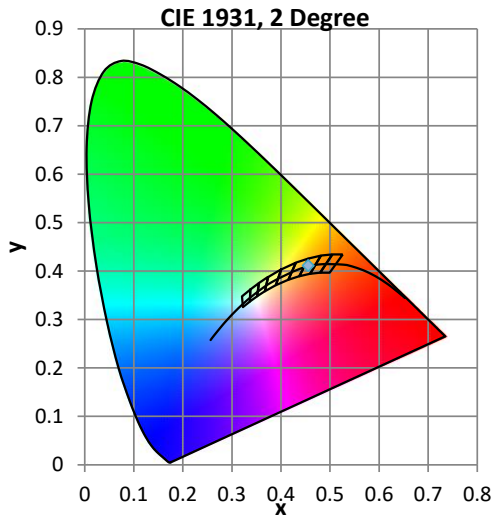
Color Quality - Integrating Sphere

Integrating Sphere Test Conditions

| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 24.6 °C | 120.1 VAC | 0.5821 A | 69.59 W | 0.996 | 60 Hz | 8.84 % |

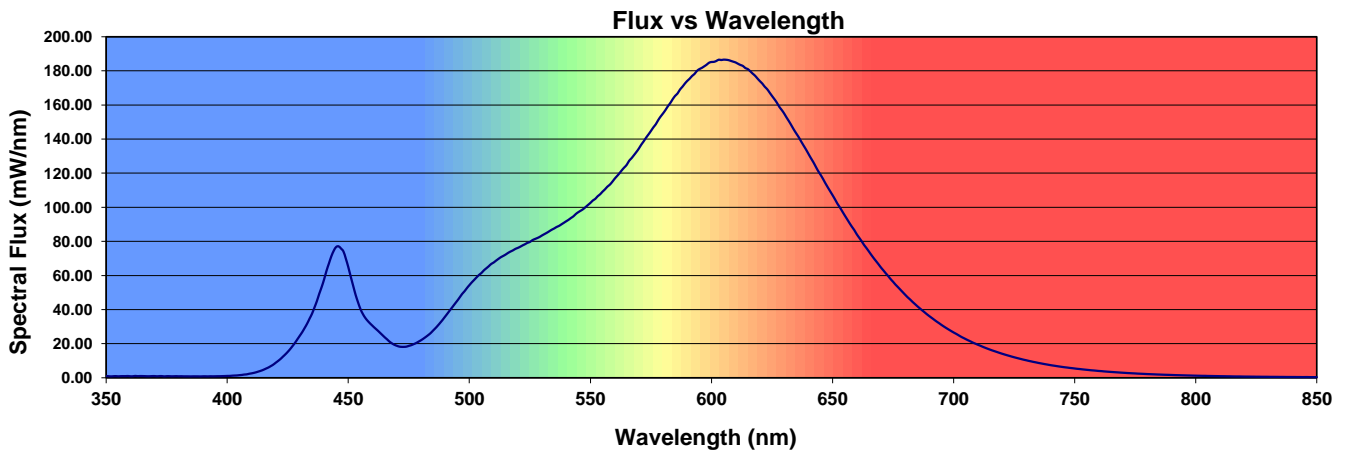
Summary of Results

| | | | |
|-----------------------------|-------------|---------------------------|--------|
| Total Output: | 8582 Lumens | Chromaticity (x): | 0.4558 |
| Efficacy: | 123.3 lm/w | Chromaticity (y): | 0.4113 |
| CCT: | 2761 K | Chromaticity (u'): | 0.2596 |
| CRI (Ra): | 81.0 | Chromaticity (v'): | 0.5270 |
| CRI (R9): | -1.0 | TM-30 Rf: | 82.9 |
| Peak Wavelength: | 604 nm | TM-30 Rg: | 97.5 |
| Dominant Wavelength: | 584 nm | Duv: | 0.0005 |
| S/P Ratio: | 1.21 | | |



Color Rendering Index Detail

| Ra (CRI) | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | R11 | R12 | R13 | R14 | R15 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 81.0 | 78.9 | 89.1 | 96.9 | 80.0 | 79.3 | 87.8 | 81.3 | 54.8 | -1.0 | 76.4 | 80.4 | 74.3 | 81.0 | 98.7 | 70.0 |





Distribution - Goniophotometer

Distribution Test Conditions

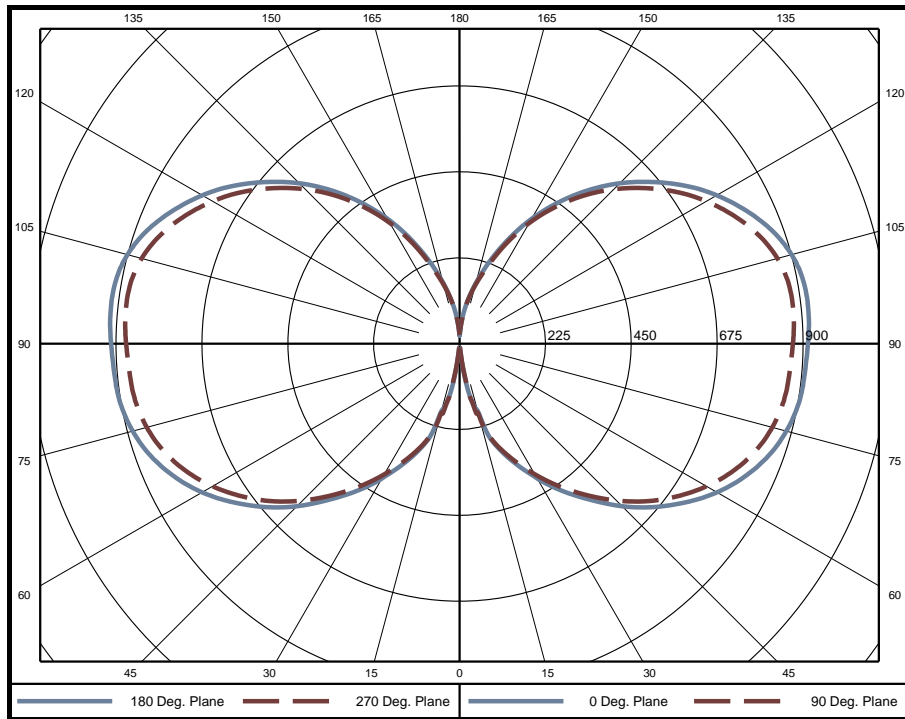
| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 24.4 °C | 120.1 VAC | 0.5825 A | 69.67 W | 0.996 | 60 Hz | 8.83 % |

Summary of Results

Spacing Criteria
 0-180: 11.12
 90-270: 10.95

Total Lumen Output: 8560 Lumens
Luminaire Efficacy: 122.9 lm/w
Maximum Candela: 919 Candela

Polar Plot



Zonal Lumen Summary

| Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire |
|-------|--------|----------------|---------|--------|----------------|---------|--------|----------------|
| 0-5 | 0.2 | 0.0% | 60-65 | 381.8 | 4.5% | 120-125 | 339.7 | 4.0% |
| 5-10 | 4.4 | 0.1% | 65-70 | 417.6 | 4.9% | 125-130 | 294.5 | 3.4% |
| 10-15 | 19.5 | 0.2% | 70-75 | 446.5 | 5.2% | 130-135 | 248.5 | 2.9% |
| 15-20 | 41.0 | 0.5% | 75-80 | 467.5 | 5.5% | 135-140 | 203.5 | 2.4% |
| 20-25 | 65.8 | 0.8% | 80-85 | 480.1 | 5.6% | 140-145 | 160.3 | 1.9% |
| 25-30 | 94.1 | 1.1% | 85-90 | 486.3 | 5.7% | 145-150 | 120.3 | 1.4% |
| 30-35 | 127.5 | 1.5% | 90-95 | 489.4 | 5.7% | 150-155 | 84.7 | 1.0% |
| 35-40 | 165.1 | 1.9% | 95-100 | 486.7 | 5.7% | 155-160 | 54.5 | 0.6% |
| 40-45 | 206.8 | 2.4% | 100-105 | 475.2 | 5.6% | 160-165 | 31.8 | 0.4% |
| 45-50 | 251.7 | 2.9% | 105-110 | 452.5 | 5.3% | 165-170 | 16.1 | 0.2% |
| 50-55 | 296.8 | 3.5% | 110-115 | 420.3 | 4.9% | 170-175 | 6.1 | 0.1% |
| 55-60 | 340.8 | 4.0% | 115-120 | 381.9 | 4.5% | 175-180 | 1.0 | 0.0% |

| Zone | Lumens | % of Luminaire |
|--------|--------|----------------|
| 0-40 | 518 | 6.0% |
| 0-60 | 1614 | 18.9% |
| 0-90 | 4294 | 50.2% |
| 90-180 | 4267 | 49.8% |



Candela Tabulation
Horizontal Angle (Degrees)

| | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 5 | 10.5 | 10.1 | 10.2 | 10.4 | 10.4 | 10.4 | 10.2 | 10.1 | 10.5 | 10.1 | 10.2 | 10.4 | 10.4 | 10.4 | 10.2 | 10.1 |
| 10 | 118.7 | 126.1 | 116.9 | 117.4 | 115.3 | 117.4 | 116.9 | 126.1 | 118.7 | 126.1 | 116.9 | 117.4 | 115.3 | 117.4 | 116.9 | 126.1 |
| 15 | 181.8 | 200.2 | 196.3 | 193.1 | 191.0 | 193.1 | 196.3 | 200.2 | 181.8 | 200.2 | 196.3 | 193.1 | 191.0 | 193.1 | 196.3 | 200.2 |
| 20 | 287.2 | 283.9 | 284.0 | 282.4 | 281.5 | 282.4 | 284.0 | 283.9 | 287.2 | 283.9 | 284.0 | 282.4 | 281.5 | 282.4 | 284.0 | 283.9 |
| 25 | 346.2 | 344.1 | 341.5 | 338.5 | 337.1 | 338.5 | 341.5 | 344.1 | 346.2 | 344.1 | 341.5 | 338.5 | 337.1 | 338.5 | 341.5 | 344.1 |
| 30 | 408.4 | 404.3 | 400.9 | 397.2 | 395.4 | 397.2 | 400.9 | 404.3 | 408.4 | 404.3 | 400.9 | 397.2 | 395.4 | 397.2 | 400.9 | 404.3 |
| 35 | 471.4 | 467.5 | 462.7 | 458.5 | 456.4 | 458.5 | 462.7 | 467.5 | 471.4 | 467.5 | 462.7 | 458.5 | 456.4 | 458.5 | 462.7 | 467.5 |
| 40 | 534.1 | 531.0 | 525.3 | 520.4 | 517.8 | 520.4 | 525.3 | 531.0 | 534.1 | 531.0 | 525.3 | 520.4 | 517.8 | 520.4 | 525.3 | 531.0 |
| 45 | 602.3 | 596.7 | 590.2 | 584.2 | 581.0 | 584.2 | 590.2 | 596.7 | 602.3 | 596.7 | 590.2 | 584.2 | 581.0 | 584.2 | 590.2 | 596.7 |
| 50 | 665.8 | 660.4 | 653.1 | 646.0 | 641.9 | 646.0 | 653.1 | 660.4 | 665.8 | 660.4 | 653.1 | 646.0 | 641.9 | 646.0 | 653.1 | 660.4 |
| 55 | 724.2 | 718.5 | 710.1 | 702.0 | 697.0 | 702.0 | 710.1 | 718.5 | 724.2 | 718.5 | 710.1 | 702.0 | 697.0 | 702.0 | 710.1 | 718.5 |
| 60 | 778.9 | 771.7 | 761.6 | 752.8 | 746.9 | 752.8 | 761.6 | 771.7 | 778.9 | 771.7 | 761.6 | 752.8 | 746.9 | 752.8 | 761.6 | 771.7 |
| 65 | 823.9 | 816.5 | 805.7 | 795.5 | 790.3 | 795.5 | 805.7 | 816.5 | 823.9 | 816.5 | 805.7 | 795.5 | 790.3 | 795.5 | 805.7 | 816.5 |
| 70 | 860.4 | 852.0 | 839.9 | 829.7 | 824.8 | 829.7 | 839.9 | 852.0 | 860.4 | 852.0 | 839.9 | 829.7 | 824.8 | 829.7 | 839.9 | 852.0 |
| 75 | 885.9 | 876.8 | 863.7 | 853.5 | 848.2 | 853.5 | 863.7 | 876.8 | 885.9 | 876.8 | 863.7 | 853.5 | 848.2 | 853.5 | 863.7 | 876.8 |
| 80 | 902.2 | 891.6 | 879.1 | 868.0 | 863.2 | 868.0 | 879.1 | 891.6 | 902.2 | 891.6 | 879.1 | 868.0 | 863.2 | 868.0 | 879.1 | 891.6 |
| 85 | 907.8 | 896.9 | 884.3 | 873.6 | 868.2 | 873.6 | 884.3 | 896.9 | 907.8 | 896.9 | 884.3 | 873.6 | 868.2 | 873.6 | 884.3 | 896.9 |
| 90 | 912.8 | 902.1 | 889.2 | 878.7 | 873.6 | 878.7 | 889.2 | 902.1 | 912.8 | 902.1 | 889.2 | 878.7 | 873.6 | 878.7 | 889.2 | 902.1 |
| 95 | 917.9 | 907.3 | 894.2 | 883.1 | 878.8 | 883.1 | 894.2 | 907.3 | 917.9 | 907.3 | 894.2 | 883.1 | 878.8 | 883.1 | 894.2 | 907.3 |
| 100 | 916.2 | 905.6 | 892.1 | 880.6 | 877.2 | 880.6 | 892.1 | 905.6 | 916.2 | 905.6 | 892.1 | 880.6 | 877.2 | 880.6 | 892.1 | 905.6 |
| 105 | 900.7 | 891.3 | 877.9 | 865.7 | 862.8 | 865.7 | 877.9 | 891.3 | 900.7 | 891.3 | 877.9 | 865.7 | 862.8 | 865.7 | 877.9 | 891.3 |
| 110 | 870.2 | 861.1 | 848.7 | 836.7 | 833.8 | 836.7 | 848.7 | 861.1 | 870.2 | 861.1 | 848.7 | 836.7 | 833.8 | 836.7 | 848.7 | 861.1 |
| 115 | 827.3 | 819.7 | 807.9 | 796.4 | 793.8 | 796.4 | 807.9 | 819.7 | 827.3 | 819.7 | 807.9 | 796.4 | 793.8 | 796.4 | 807.9 | 819.7 |
| 120 | 778.0 | 771.2 | 760.7 | 750.0 | 746.8 | 750.0 | 760.7 | 771.2 | 778.0 | 771.2 | 760.7 | 750.0 | 746.8 | 750.0 | 760.7 | 771.2 |
| 125 | 721.7 | 716.4 | 706.5 | 696.6 | 693.6 | 696.6 | 706.5 | 716.4 | 721.7 | 716.4 | 706.5 | 696.6 | 693.6 | 696.6 | 706.5 | 716.4 |
| 130 | 659.3 | 654.2 | 645.5 | 637.2 | 634.5 | 637.2 | 645.5 | 654.2 | 659.3 | 654.2 | 645.5 | 637.2 | 634.5 | 637.2 | 645.5 | 654.2 |
| 135 | 594.9 | 590.0 | 581.8 | 574.4 | 572.7 | 574.4 | 581.8 | 590.0 | 594.9 | 590.0 | 581.8 | 574.4 | 572.7 | 574.4 | 581.8 | 590.0 |
| 140 | 525.2 | 521.5 | 514.2 | 507.8 | 507.0 | 507.8 | 514.2 | 521.5 | 525.2 | 521.5 | 514.2 | 507.8 | 507.0 | 507.8 | 514.2 | 521.5 |
| 145 | 452.3 | 450.1 | 443.0 | 438.0 | 437.3 | 438.0 | 443.0 | 450.1 | 452.3 | 450.1 | 443.0 | 438.0 | 437.3 | 438.0 | 443.0 | 450.1 |
| 150 | 378.3 | 375.9 | 371.3 | 365.6 | 365.5 | 365.6 | 371.3 | 375.9 | 378.3 | 375.9 | 371.3 | 365.6 | 365.5 | 365.6 | 371.3 | 375.9 |
| 155 | 301.9 | 299.1 | 296.3 | 290.5 | 290.1 | 290.5 | 296.3 | 299.1 | 301.9 | 299.1 | 296.3 | 290.5 | 290.1 | 290.5 | 296.3 | 299.1 |
| 160 | 228.9 | 227.0 | 223.0 | 218.8 | 217.4 | 218.8 | 223.0 | 227.0 | 228.9 | 227.0 | 223.0 | 218.8 | 217.4 | 218.8 | 223.0 | 227.0 |
| 165 | 164.2 | 162.8 | 161.2 | 159.9 | 159.0 | 159.9 | 161.2 | 162.8 | 164.2 | 162.8 | 161.2 | 159.9 | 159.0 | 159.9 | 161.2 | 162.8 |
| 170 | 108.3 | 108.0 | 107.7 | 107.3 | 107.4 | 107.3 | 107.7 | 108.0 | 108.3 | 108.0 | 107.7 | 107.3 | 107.4 | 107.3 | 107.7 | 108.0 |
| 175 | 57.3 | 57.0 | 56.7 | 56.3 | 56.3 | 56.3 | 56.7 | 57.0 | 57.3 | 57.0 | 56.7 | 56.3 | 56.3 | 56.3 | 56.7 | 57.0 |
| 180 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |

Average Luminance (cd/m²)

Horizontal Angle (Degrees)

| | 0 | 45 | 90 |
|----|--------|--------|--------|
| 0 | 1615 | 1615 | 1615 |
| 45 | 133500 | 130800 | 128800 |
| 55 | 162500 | 159300 | 156400 |
| 65 | 193100 | 188800 | 185200 |
| 75 | 223200 | 217600 | 213700 |
| 85 | 252600 | 246100 | 241600 |

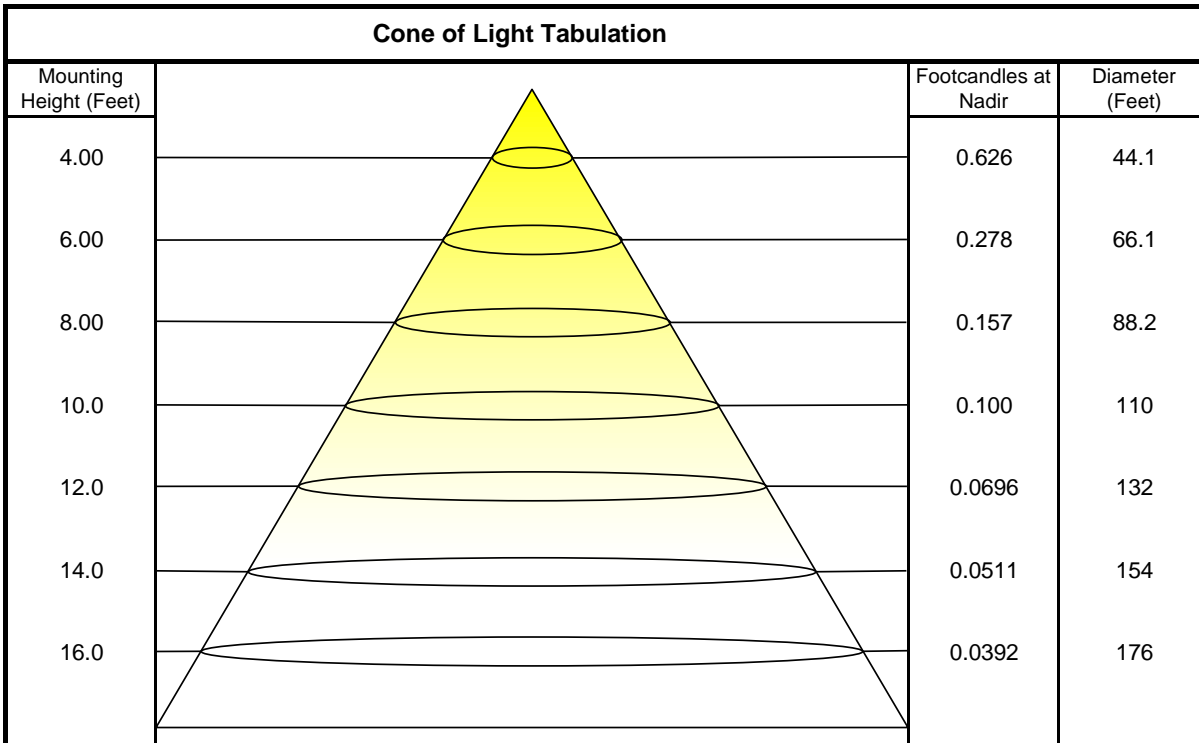


Coefficients of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 20%

| Ceiling Cavity Reflectance | 80 | | | | 70 | | | | 50 | | | 30 | | | 10 | | | 0 |
|----------------------------|---|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Wall Reflectance | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |
| Room Cavity Ratio (RCR) | ** Values are expressed as percent of total lumen output delivered to the task surface ** | | | | | | | | | | | | | | | | | |
| 0 | 107 | 107 | 107 | 107 | 99 | 99 | 99 | 99 | 83 | 83 | 83 | 69 | 69 | 69 | 56 | 56 | 56 | 50 |
| 1 | 92 | 85 | 79 | 74 | 84 | 78 | 73 | 68 | 64 | 60 | 56 | 52 | 49 | 46 | 41 | 38 | 36 | 30 |
| 2 | 81 | 71 | 63 | 55 | 74 | 65 | 57 | 51 | 53 | 47 | 42 | 42 | 38 | 34 | 32 | 29 | 26 | 21 |
| 3 | 73 | 61 | 51 | 44 | 66 | 55 | 47 | 40 | 45 | 38 | 33 | 36 | 30 | 26 | 27 | 23 | 20 | 15 |
| 4 | 66 | 52 | 43 | 35 | 60 | 48 | 39 | 32 | 39 | 32 | 26 | 31 | 25 | 21 | 23 | 19 | 15 | 11 |
| 5 | 60 | 46 | 36 | 29 | 54 | 42 | 33 | 27 | 34 | 27 | 22 | 27 | 21 | 17 | 20 | 16 | 12 | 9 |
| 6 | 55 | 41 | 31 | 24 | 49 | 37 | 28 | 22 | 30 | 23 | 18 | 24 | 18 | 14 | 18 | 13 | 10 | 7 |
| 7 | 50 | 36 | 27 | 21 | 46 | 33 | 25 | 19 | 27 | 20 | 15 | 21 | 16 | 12 | 16 | 12 | 9 | 6 |
| 8 | 46 | 33 | 24 | 18 | 42 | 30 | 22 | 16 | 24 | 18 | 13 | 19 | 14 | 10 | 14 | 10 | 7 | 5 |
| 9 | 43 | 29 | 21 | 15 | 39 | 27 | 19 | 14 | 22 | 16 | 11 | 17 | 12 | 9 | 13 | 9 | 6 | 4 |
| 10 | 40 | 27 | 19 | 14 | 36 | 25 | 17 | 12 | 20 | 14 | 10 | 16 | 11 | 8 | 12 | 8 | 5 | 3 |

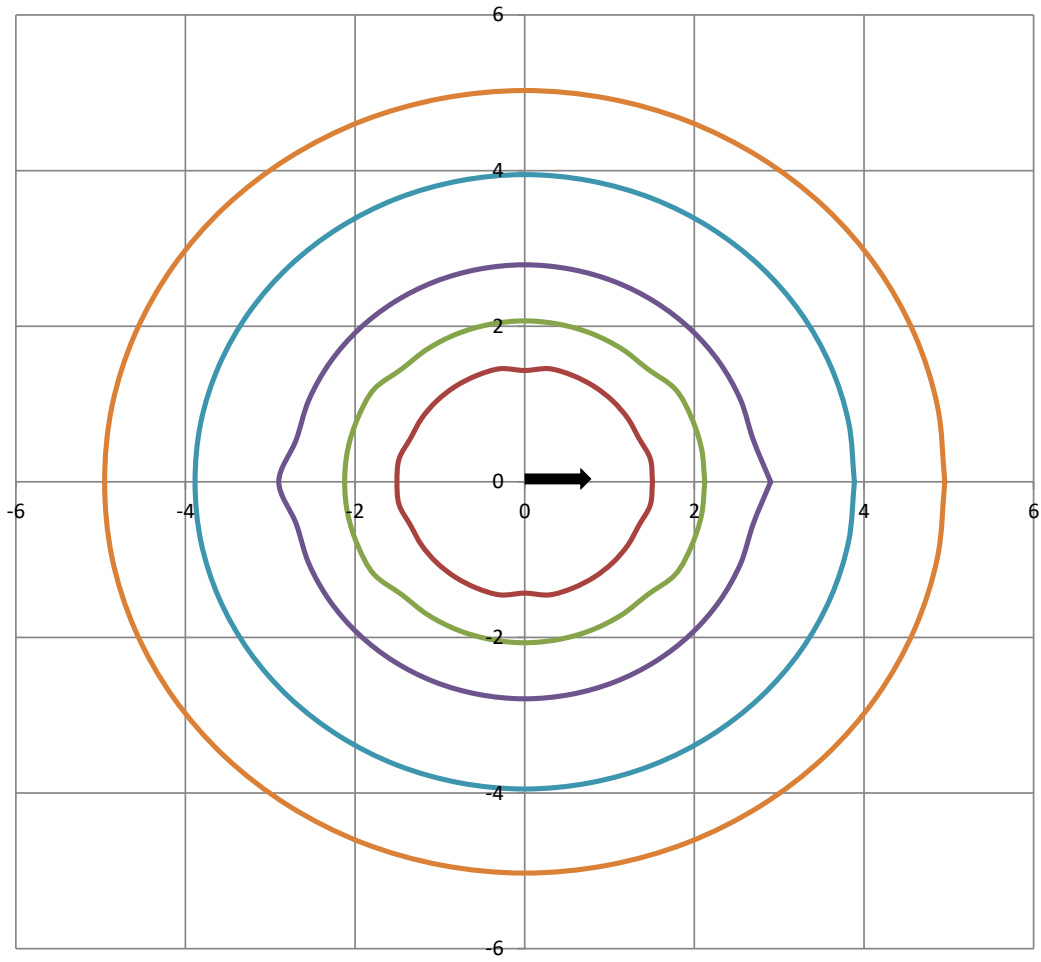
| Beam and Field Information | |
|----------------------------|-----------------|
| CIE Type: | Direct/Indirect |
| Center Beam Intensity: | 10.0 Candela |
| Central Cone Intensity: | N/A Candela |
| Beam Flux: | 8560.4 Lumens |
| Beam Angle (0-180): | N/A Degrees |
| Beam Angle (90-270): | N/A Degrees |
| Field Angle (0-180): | N/A Degrees |
| Field Angle (90-270): | N/A Degrees |





ISOFootcandle Plot

Mounting Height - 8 Feet



Grid Lines in Units of Mounting Height

