



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

## Indoor Distribution Test Report

Relevant Standards  
IES LM-79-2008  
ANSI C82.77-2002

Prepared For  
**SONNEMAN - A WAY OF LIGHT**

NICOLAS CARMICHAEL  
106 PIERCES RD  
NEWBURGH, NY 12550-9369  
United States

**Catalog Number**

**7220.98-WL**

Order Number

11281216

Test Number

1253417

Test Date

2016-07-06

Prepared By

Tony Rubio, Technician

Approved By

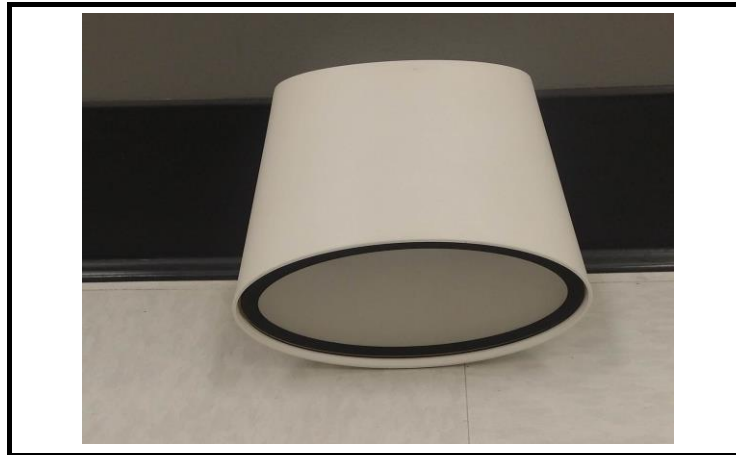
Eric Gaudreau, Senior Engineering Associate

The results contained in this report pertain only to the tested sample.  
This report shall not be reproduced, except in full, without written approval of Underwriters Laboratories.  
This report must not be used by the client to claim product certification, approval, or endorsement by  
NVLAP, NIST, or any agency of the Federal Government.



**Luminaire Description:** Circular white formed aluminum housing with a frosted black bordered glass lens  
**Lamp:** 36 White LEDs  
**Mounting:** Surface/Wall  
**Ballast/Driver:** One (1) ERP EBR015U-0350-32

**Luminaire**



**Luminaire Characteristics**

Luminous Length: 2.50 in.  
Luminous Width: 6.000 in.  
Luminous Height: 1.50 in.

**Summary of Results**

Total Luminaire Output: 586.5 Lumens  
Luminaire Efficacy: 56.3 lm/w  
Maximum Candela: 380 Candela

**Test Conditions**

Test Temperature: 24.6 °C  
Voltage: 120.0 VAC  
Current: 0.08837 A  
Power: 10.42 W  
Power Factor: 0.982  
Frequency: 60 Hz  
Current THD: 17.0 %

Laboratory results may not be representative of field performance  
Ballast factors have not been applied



## Distribution - Goniophotometer

### Distribution Test Conditions

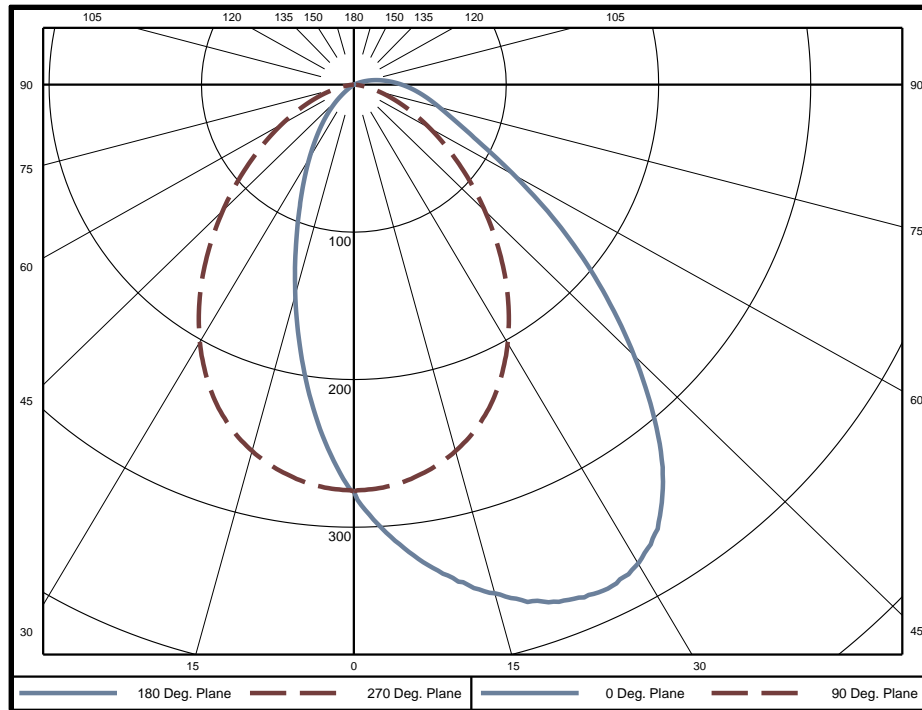
| Temperature | Voltage   | Current   | Power   | Power Factor | Frequency | Current THD |
|-------------|-----------|-----------|---------|--------------|-----------|-------------|
| 24.6 °C     | 120.0 VAC | 0.08837 A | 10.42 W | 0.982        | 60 Hz     | 17.0 %      |

### Summary of Results

**Spacing Criteria**  
 0-180: 1.69  
 90-270: 0.53

**Total Lumen Output:** 586.5 Lumens  
**Luminaire Efficacy:** 56.3 lm/w  
**Maximum Candela:** 380 Candela

### Polar Plot



### Zonal Lumen Summary

| Zone  | Lumens | % of Luminaire | Zone    | Lumens | % of Luminaire | Zone    | Lumens | % of Luminaire |
|-------|--------|----------------|---------|--------|----------------|---------|--------|----------------|
| 0-5   | 6.56   | 1.1%           | 60-65   | 24.85  | 4.2%           | 120-125 | 0.0    | 0.0%           |
| 5-10  | 19.26  | 3.3%           | 65-70   | 18.49  | 3.2%           | 125-130 | 0.0    | 0.0%           |
| 10-15 | 30.82  | 5.3%           | 70-75   | 13.69  | 2.3%           | 130-135 | 0.0    | 0.0%           |
| 15-20 | 40.85  | 7.0%           | 75-80   | 10.21  | 1.7%           | 135-140 | 0.0    | 0.0%           |
| 20-25 | 49.05  | 8.4%           | 80-85   | 7.60   | 1.3%           | 140-145 | 0.0    | 0.0%           |
| 25-30 | 55.08  | 9.4%           | 85-90   | 5.58   | 1.0%           | 145-150 | 0.0    | 0.0%           |
| 30-35 | 58.48  | 10.0%          | 90-95   | 3.93   | 0.7%           | 150-155 | 0.0    | 0.0%           |
| 35-40 | 58.65  | 10.0%          | 95-100  | 2.59   | 0.4%           | 155-160 | 0.0    | 0.0%           |
| 40-45 | 55.35  | 9.4%           | 100-105 | 1.52   | 0.3%           | 160-165 | 0.0    | 0.0%           |
| 45-50 | 49.23  | 8.4%           | 105-110 | 0.72   | 0.1%           | 165-170 | 0.0    | 0.0%           |
| 50-55 | 41.19  | 7.0%           | 110-115 | 0.22   | 0.0%           | 170-175 | 0.0    | 0.0%           |
| 55-60 | 32.62  | 5.6%           | 115-120 | 0.02   | 0.0%           | 175-180 | 0.0    | 0.0%           |

| Zone   | Lumens | % of Luminaire |
|--------|--------|----------------|
| 0-40   | 319    | 54.3%          |
| 0-60   | 497    | 84.8%          |
| 0-90   | 578    | 98.5%          |
| 90-180 | 9      | 1.5%           |



**Candela Tabulation**  
Horizontal Angle (Degrees)

| Vertical Angle (Degrees) | 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                        | 275.8                      | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 | 275.8 |
| 5                        | 310.4                      | 304.8 | 297.3 | 286.0 | 273.1 | 260.2 | 249.0 | 240.2 | 238.8 | 240.2 | 249.0 | 260.2 | 273.1 | 286.0 | 297.3 | 304.8 |
| 10                       | 336.7                      | 328.0 | 314.0 | 292.5 | 267.0 | 240.5 | 216.8 | 199.4 | 193.8 | 199.4 | 216.8 | 240.5 | 267.0 | 292.5 | 314.0 | 328.0 |
| 15                       | 357.0                      | 346.0 | 326.0 | 295.3 | 257.2 | 217.1 | 182.3 | 158.1 | 150.1 | 158.1 | 182.3 | 217.1 | 257.2 | 295.3 | 326.0 | 346.0 |
| 20                       | 373.5                      | 359.2 | 333.6 | 293.7 | 243.4 | 190.5 | 147.5 | 120.8 | 111.5 | 120.8 | 147.5 | 190.5 | 243.4 | 293.7 | 333.6 | 359.2 |
| 25                       | 379.9                      | 365.3 | 335.0 | 286.6 | 224.7 | 162.2 | 115.7 | 90.6  | 82.3  | 90.6  | 115.7 | 162.2 | 224.7 | 286.6 | 335.0 | 365.3 |
| 30                       | 374.1                      | 360.3 | 328.3 | 273.0 | 201.8 | 134.2 | 89.2  | 67.5  | 60.4  | 67.5  | 89.2  | 134.2 | 201.8 | 273.0 | 328.3 | 360.3 |
| 35                       | 351.3                      | 341.7 | 311.3 | 252.6 | 176.1 | 107.9 | 67.7  | 49.1  | 43.2  | 49.1  | 67.7  | 107.9 | 176.1 | 252.6 | 311.3 | 341.7 |
| 40                       | 310.5                      | 309.0 | 283.7 | 225.2 | 148.7 | 84.9  | 50.1  | 34.7  | 29.7  | 34.7  | 50.1  | 84.9  | 148.7 | 225.2 | 283.7 | 309.0 |
| 45                       | 260.2                      | 263.5 | 245.5 | 193.2 | 121.8 | 65.3  | 35.7  | 22.8  | 18.4  | 22.8  | 35.7  | 65.3  | 121.8 | 193.2 | 245.5 | 263.5 |
| 50                       | 209.7                      | 213.9 | 201.5 | 159.0 | 97.0  | 48.6  | 23.8  | 12.6  | 8.1   | 12.6  | 23.8  | 48.6  | 97.0  | 159.0 | 201.5 | 213.9 |
| 55                       | 162.3                      | 165.3 | 157.3 | 125.4 | 74.7  | 34.5  | 13.8  | 4.0   | 1.0   | 4.0   | 13.8  | 34.5  | 74.7  | 125.4 | 157.3 | 165.3 |
| 60                       | 120.1                      | 123.6 | 118.1 | 95.2  | 55.6  | 22.9  | 5.4   | 0.0   | 0.0   | 0.0   | 5.4   | 22.9  | 55.6  | 95.2  | 118.1 | 123.6 |
| 65                       | 89.3                       | 91.2  | 86.2  | 69.5  | 39.3  | 13.0  | 0.7   | 0.0   | 0.0   | 0.0   | 0.7   | 13.0  | 39.3  | 69.5  | 86.2  | 91.2  |
| 70                       | 70.2                       | 68.5  | 62.3  | 48.9  | 26.0  | 5.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 5.1   | 26.0  | 48.9  | 62.3  | 68.5  |
| 75                       | 57.6                       | 53.6  | 45.6  | 33.5  | 15.4  | 1.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.0   | 15.4  | 33.5  | 45.6  | 53.6  |
| 80                       | 48.0                       | 43.1  | 33.8  | 22.3  | 7.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.2   | 22.3  | 33.8  | 43.1  |
| 85                       | 39.5                       | 34.6  | 25.1  | 13.9  | 2.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 2.1   | 13.9  | 25.1  | 34.6  |
| 90                       | 31.6                       | 27.0  | 18.1  | 7.5   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 7.5   | 18.1  | 27.0  |
| 95                       | 24.2                       | 20.2  | 12.0  | 2.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 2.7   | 12.0  | 20.2  |
| 100                      | 17.6                       | 13.9  | 6.7   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.4   | 6.7   | 13.9  |
| 105                      | 11.4                       | 8.2   | 2.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 2.3   | 8.2   |
| 110                      | 5.9                        | 3.4   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2   | 3.4   |
| 115                      | 1.6                        | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.3   |
| 120                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 125                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 130                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 135                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 140                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 145                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 150                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 155                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 160                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 165                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 170                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 175                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 180                      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

**Average Luminance (cd/m<sup>2</sup>)**  
Horizontal Angle (Degrees)

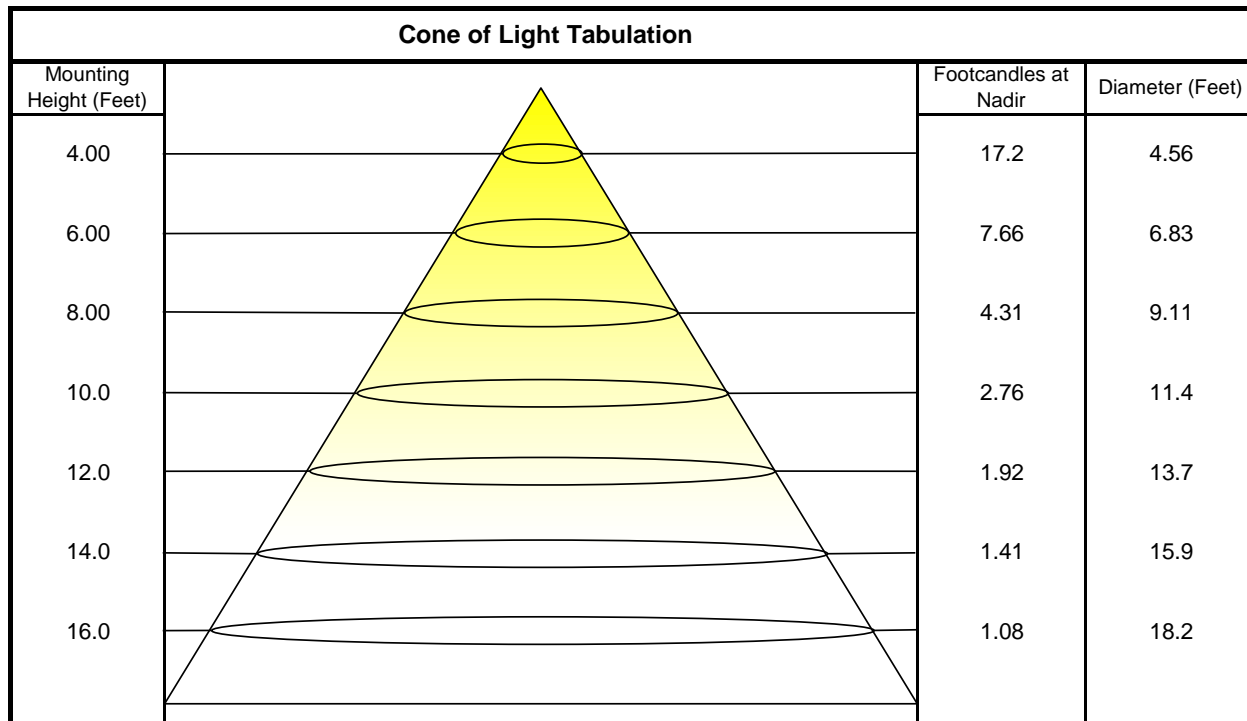
| Vertical Angle (Degrees) | Horizontal Angle (Degrees) |       |       |
|--------------------------|----------------------------|-------|-------|
|                          | 0                          | 45    | 90    |
| 0                        | 28500                      | 28500 | 28500 |
| 45                       | 23770                      | 22400 | 14240 |
| 55                       | 15750                      | 15250 | 9913  |
| 65                       | 9544                       | 9206  | 6261  |
| 75                       | 7104                       | 5611  | 3177  |
| 85                       | 5958                       | 3788  | 630   |



### Utilization of Lumens - 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 Lumens delivered to the task surface ** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0                                      | 696  | 696 | 696 | 696 | 679 | 679 | 679 | 679 | 647 | 647 | 647 | 617 | 617 | 617 | 590 | 590 | 590 | 578 |
| 1                                      | 642  | 616 | 594 | 573 | 625 | 602 | 582 | 563 | 576 | 559 | 544 | 552 | 538 | 525 | 529 | 519 | 508 | 496 |
| 2                                      | 591  | 547 | 511 | 480 | 575 | 535 | 502 | 474 | 513 | 486 | 462 | 493 | 470 | 450 | 475 | 456 | 439 | 426 |
| 3                                      | 544  | 488 | 444 | 410 | 529 | 478 | 438 | 406 | 460 | 426 | 397 | 443 | 414 | 390 | 427 | 403 | 382 | 370 |
| 4                                      | 502  | 438 | 391 | 355 | 489 | 430 | 386 | 352 | 414 | 376 | 346 | 400 | 367 | 341 | 387 | 359 | 335 | 323 |
| 5                                      | 465  | 395 | 347 | 311 | 453 | 389 | 343 | 309 | 376 | 336 | 305 | 363 | 328 | 301 | 352 | 322 | 297 | 285 |
| 6                                      | 432  | 359 | 311 | 276 | 421 | 353 | 307 | 274 | 342 | 301 | 271 | 332 | 296 | 268 | 322 | 290 | 265 | 254 |
| 7                                      | 402  | 328 | 280 | 246 | 392 | 323 | 278 | 245 | 314 | 273 | 243 | 305 | 268 | 241 | 296 | 264 | 239 | 227 |
| 8                                      | 376  | 301 | 254 | 222 | 366 | 297 | 252 | 221 | 289 | 248 | 219 | 281 | 244 | 218 | 274 | 241 | 216 | 205 |
| 9                                      | 352  | 278 | 232 | 202 | 344 | 274 | 231 | 201 | 267 | 227 | 200 | 260 | 224 | 198 | 254 | 221 | 197 | 187 |
| 10                                     | 331  | 257 | 214 | 184 | 323 | 254 | 212 | 184 | 248 | 209 | 183 | 242 | 206 | 181 | 236 | 204 | 180 | 170 |

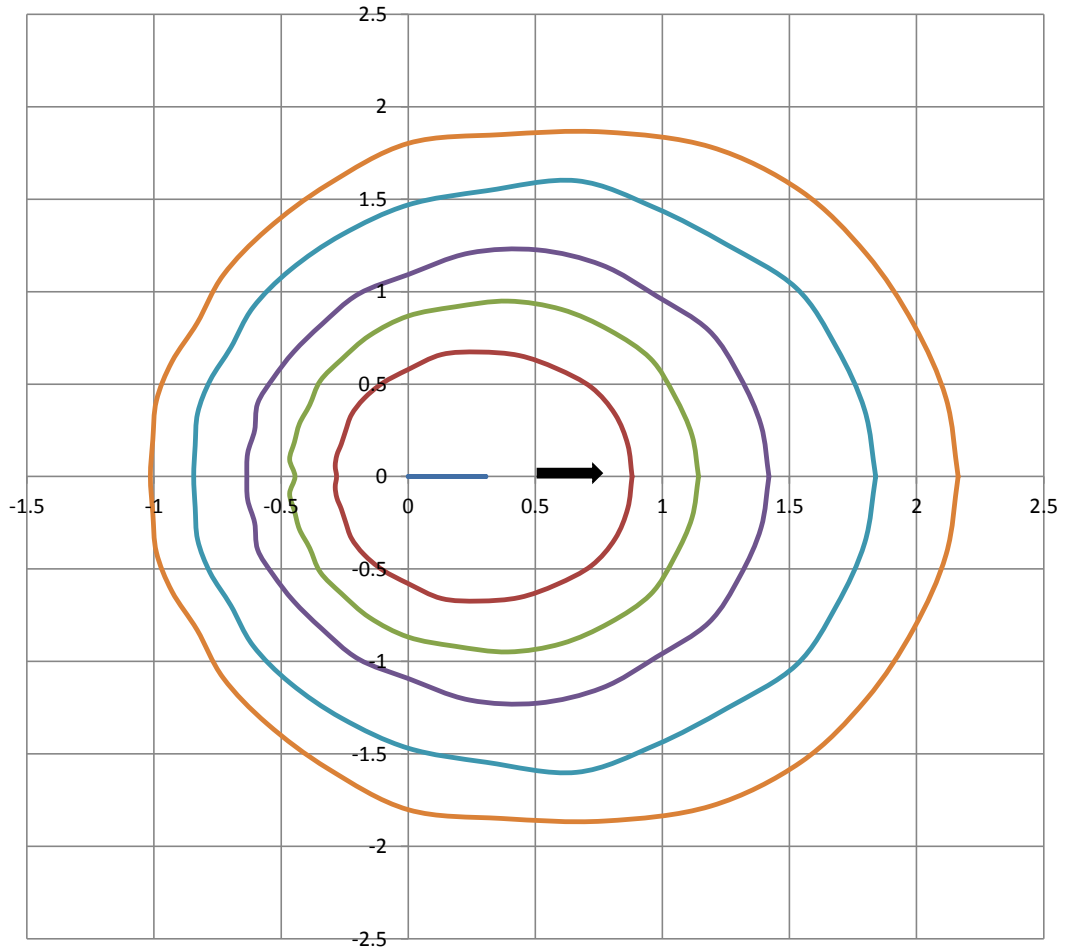
| Beam and Field Information |               |
|----------------------------|---------------|
| CIE Type:                  | Direct        |
| Center Beam Intensity:     | 275.8 Candela |
| Central Cone Intensity:    | 275 Candela   |
| Beam Flux:                 | 407.5 Lumens  |
| Beam Angle (0-180):        | 74.2 Degrees  |
| Beam Angle (90-270):       | 84.0 Degrees  |
| Field Angle (0-180):       | 133.5 Degrees |
| Field Angle (90-270):      | 138.7 Degrees |





### ISOFootcandle Plot

Mounting Height - 8 Feet



Grid Lines in Units of Mounting Height

