UL Verification Services Inc.
7036 Snowdrift Road
Allentown, PA 18106
610-774-1300

ACCREDITED

NVLAP LAB CODE 201042-0

# Indoor Distribution Test Report

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

**Prepared For**

## Techbrite LLC

Mandy Peck
1000 Kieley Pl
Cincinatti, Oh 45217
United States

**Catalog Number**

**EB2204SS2B5C0000 5K**

Order Number

11186381

Test Number

1238306

Test Date

2016-04-19 - 2016-05-24

Prepared By

Javier Caban, Technician

Approved By

Carissa Samonte-cam, Project Handler

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:** White steel housing / reflector, no enclosure
**Lamp:** 624 white LEDs, four boards with 156 LEDs each
**Mounting:** High Bay
**Ballast/Driver:** Two Everline D23CC90HRVT-F

**Luminaire**

**Luminaire Characteristics**

| | | |
|---|---|---|
| Luminous Length: | 22.00 | in. |
| Luminous Width: | 17.50 | in. |

**Summary of Results**

| | |
|---|---|
| Total Luminaire Output: | 12570 Lumens |
| Luminaire Efficacy: | 154 lm/w |
| Maximum Candela: | 4250 Candela |

**Test Conditions**

| | | |
|---|---|---|
| Test Temperature: | 24.9 | °C |
| Voltage: | 347.0 | VAC |
| Current: | 0.2484 | A |
| Power: | 81.61 | W |
| Power Factor: | 0.947 | |
| Frequency: | 60 | Hz |
| Current THD: | 0.520 | % |

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

# Distribution - Goniophotometer

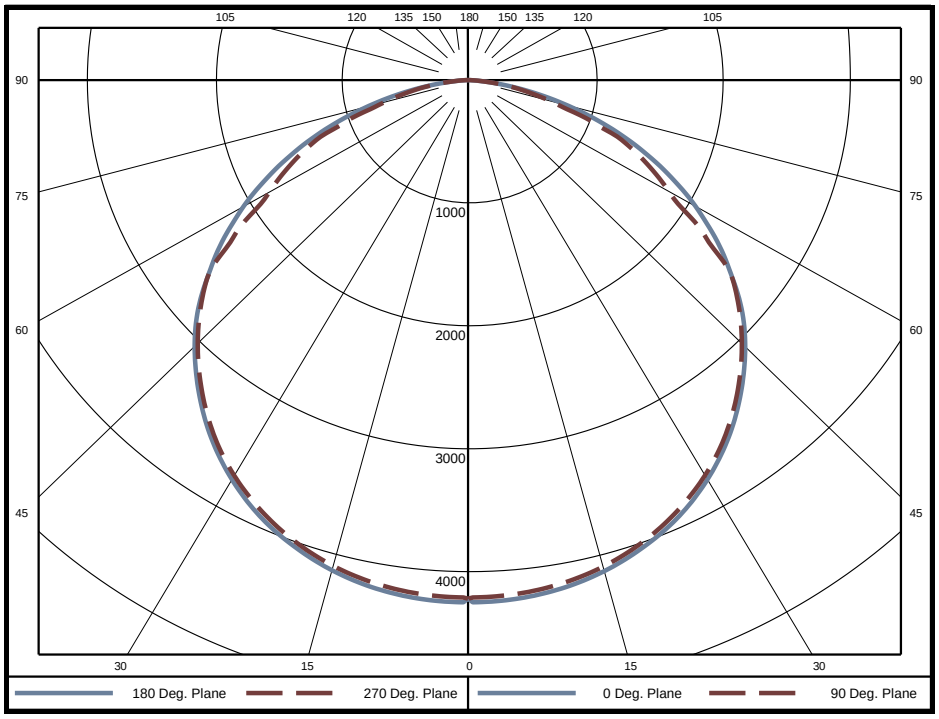
Distribution Test Conditions

| Temperature | Voltage | Current | Power | Power Factor | Frequency | Current THD |
|---|---|---|---|---|---|---|
| 24.9 °C | 347.0 VAC | 0.2484 A | 81.61 W | 0.947 | 60 Hz | 0.520 % |

## Summary of Results

| Spacing Criteria | | | |
|---|---|---|---|
| 0-180: | 1.32 | **Total Lumen Output:** | 12570 Lumens |
| 90-270: | 1.32 | **Luminaire Efficacy:** | 154.0 lm/w |
| | | **Maximum Candela:** | 4250 Candela |

## Polar Plot




## Zonal Lumen Summary

| Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 101 | 0.8% | 60-65 | 867 | 6.9% | 120-125 | 0 | 0.0% |
| 5-10 | 300 | 2.4% | 65-70 | 697 | 5.5% | 125-130 | 0 | 0.0% |
| 10-15 | 491 | 3.9% | 70-75 | 502 | 4.0% | 130-135 | 0 | 0.0% |
| 15-20 | 669 | 5.3% | 75-80 | 299 | 2.4% | 135-140 | 0 | 0.0% |
| 20-25 | 828 | 6.6% | 80-85 | 134 | 1.1% | 140-145 | 0 | 0.0% |
| 25-30 | 962 | 7.7% | 85-90 | 28 | 0.2% | 145-150 | 0 | 0.0% |
| 30-35 | 1067 | 8.5% | 90-95 | 0 | 0.0% | 150-155 | 0 | 0.0% |
| 35-40 | 1138 | 9.1% | 95-100 | 0 | 0.0% | 155-160 | 0 | 0.0% |
| 40-45 | 1173 | 9.3% | 100-105 | 0 | 0.0% | 160-165 | 0 | 0.0% |
| 45-50 | 1172 | 9.3% | 105-110 | 0 | 0.0% | 165-170 | 0 | 0.0% |
| 50-55 | 1127 | 9.0% | 110-115 | 0 | 0.0% | 170-175 | 0 | 0.0% |
| 55-60 | 1016 | 8.1% | 115-120 | 0 | 0.0% | 175-180 | 0 | 0.0% |

| Zone | Lumens | % of Luminaire |
|---|---|---|
| 0-40 | 5556 | 44.2% |
| 0-60 | 10044 | 79.9% |
| 0-90 | 12571 | 100.0% |
| 90-180 | 0 | 0.0% |

## Candela Tabulation

Horizontal Angle (Degrees)

Vertical 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 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 | 4220 |
| 5 | 4239 | 4210 | 4205 | 4204 | 4199 | 4204 | 4205 | 4210 | 4239 | 4210 | 4205 | 4204 | 4199 | 4204 | 4205 | 4210 |
| 10 | 4201 | 4173 | 4168 | 4167 | 4162 | 4167 | 4168 | 4173 | 4201 | 4173 | 4168 | 4167 | 4162 | 4167 | 4168 | 4173 |
| 15 | 4134 | 4106 | 4102 | 4101 | 4097 | 4101 | 4102 | 4106 | 4134 | 4106 | 4102 | 4101 | 4097 | 4101 | 4102 | 4106 |
| 20 | 4036 | 4008 | 4005 | 4003 | 3999 | 4003 | 4005 | 4008 | 4036 | 4008 | 4005 | 4003 | 3999 | 4003 | 4005 | 4008 |
| 25 | 3912 | 3880 | 3877 | 3873 | 3871 | 3873 | 3877 | 3880 | 3912 | 3880 | 3877 | 3873 | 3871 | 3873 | 3877 | 3880 |
| 30 | 3748 | 3722 | 3720 | 3714 | 3712 | 3714 | 3720 | 3722 | 3748 | 3722 | 3720 | 3714 | 3712 | 3714 | 3720 | 3722 |
| 35 | 3550 | 3525 | 3522 | 3520 | 3517 | 3520 | 3522 | 3525 | 3550 | 3525 | 3522 | 3520 | 3517 | 3520 | 3522 | 3525 |
| 40 | 3319 | 3296 | 3296 | 3290 | 3286 | 3290 | 3296 | 3296 | 3319 | 3296 | 3296 | 3290 | 3286 | 3290 | 3296 | 3296 |
| 45 | 3064 | 3043 | 3042 | 3033 | 3030 | 3033 | 3042 | 3043 | 3064 | 3043 | 3042 | 3033 | 3030 | 3033 | 3042 | 3043 |
| 50 | 2766 | 2759 | 2761 | 2753 | 2748 | 2753 | 2761 | 2759 | 2766 | 2759 | 2761 | 2753 | 2748 | 2753 | 2761 | 2759 |
| 55 | 2421 | 2414 | 2443 | 2419 | 2301 | 2419 | 2443 | 2414 | 2421 | 2414 | 2443 | 2419 | 2301 | 2419 | 2443 | 2414 |
| 60 | 2053 | 2054 | 2088 | 1869 | 1818 | 1869 | 2088 | 2054 | 2053 | 2054 | 2088 | 1869 | 1818 | 1869 | 2088 | 2054 |
| 65 | 1656 | 1662 | 1600 | 1502 | 1497 | 1502 | 1600 | 1662 | 1656 | 1662 | 1600 | 1502 | 1497 | 1502 | 1600 | 1662 |
| 70 | 1240 | 1252 | 1134 | 1148 | 1083 | 1148 | 1134 | 1252 | 1240 | 1252 | 1134 | 1148 | 1083 | 1148 | 1134 | 1252 |
| 75 | 816 | 822 | 749 | 679 | 674 | 679 | 749 | 822 | 816 | 822 | 749 | 679 | 674 | 679 | 749 | 822 |
| 80 | 426 | 402 | 365 | 381 | 387 | 381 | 365 | 402 | 426 | 402 | 365 | 381 | 387 | 381 | 365 | 402 |
| 85 | 120 | 113 | 124 | 125 | 124 | 125 | 124 | 113 | 120 | 113 | 124 | 125 | 124 | 125 | 124 | 113 |
| 90 | 5 | 7 | 10 | 14 | 16 | 14 | 10 | 7 | 5 | 7 | 10 | 14 | 16 | 14 | 10 | 7 |
| 95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | 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 |
| 130 | 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 |
| 140 | 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 |
| 150 | 0 | 0 | 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 |
| 160 | 0 | 0 | 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 |
| 170 | 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 |
| 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Average Luminance (cd/m$^2$)

Horizontal Angle (Degrees)

Vertical Angle (Degrees)

| | 0 | 45 | 90 |
|---|---|---|---|
| 0 | 16990 | 16990 | 16990 |
| 45 | 17440 | 17320 | 17250 |
| 55 | 17000 | 17150 | 16150 |
| 65 | 15780 | 15240 | 14260 |
| 75 | 12700 | 11660 | 10490 |
| 85 | 5533 | 5722 | 5737 |

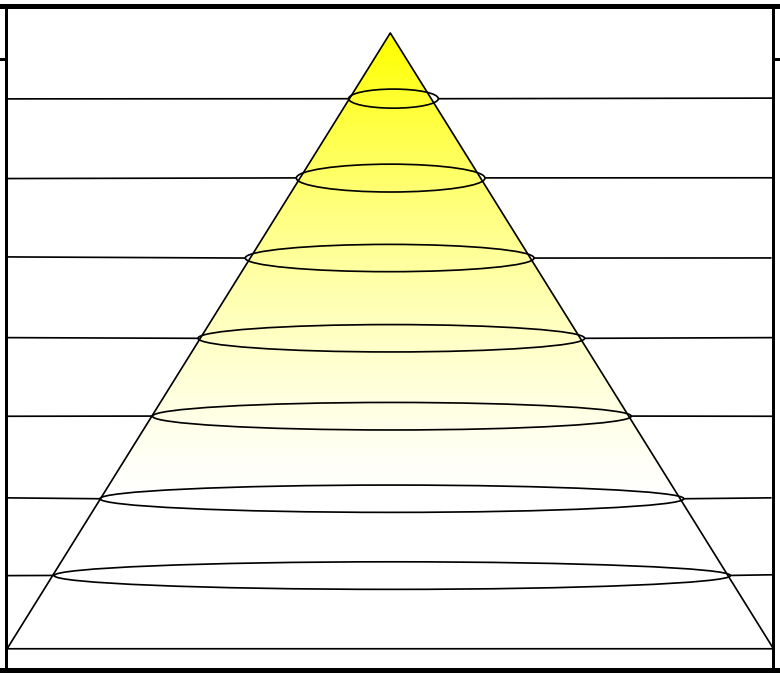
## Utilization of Lumens - Zonal Cavity Method

| 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 | 14965 | 14965 | 14965 | 14965 | 14617 | 14617 | 14617 | 14617 | 13968 | 13968 | 13968 | 13373 | 13373 | 13373 | 12827 | 12827 | 12827 | 12571 |
| 1 | 13698 | 13108 | 12579 | 12102 | 13356 | 12822 | 12341 | 11905 | 12288 | 11892 | 11529 | 11798 | 11475 | 11175 | 11345 | 11086 | 10843 | 10581 |
| 2 | 12452 | 11420 | 10566 | 9848 | 12121 | 11182 | 10397 | 9730 | 10735 | 10074 | 9503 | 10323 | 9771 | 9286 | 9943 | 9486 | 9079 | 8806 |
| 3 | 11339 | 10013 | 8986 | 8168 | 11026 | 9813 | 8861 | 8094 | 9438 | 8621 | 7949 | 9090 | 8394 | 7810 | 8768 | 8179 | 7675 | 7399 |
| 4 | 10368 | 8855 | 7746 | 6899 | 10078 | 8687 | 7651 | 6850 | 8370 | 7468 | 6755 | 8076 | 7294 | 6661 | 7802 | 7128 | 6571 | 6296 |
| 5 | 9523 | 7896 | 6760 | 5921 | 9256 | 7755 | 6686 | 5887 | 7486 | 6544 | 5822 | 7237 | 6408 | 5757 | 7003 | 6277 | 5694 | 5425 |
| 6 | 8783 | 7096 | 5964 | 5152 | 8541 | 6976 | 5906 | 5128 | 6748 | 5793 | 5081 | 6534 | 5684 | 5035 | 6335 | 5580 | 4990 | 4728 |
| 7 | 8134 | 6422 | 5313 | 4535 | 7915 | 6320 | 5266 | 4518 | 6125 | 5175 | 4483 | 5942 | 5087 | 4450 | 5770 | 5002 | 4416 | 4164 |
| 8 | 7565 | 5851 | 4774 | 4034 | 7366 | 5763 | 4736 | 4021 | 5596 | 4661 | 3995 | 5438 | 4589 | 3969 | 5290 | 4520 | 3944 | 3702 |
| 9 | 7061 | 5363 | 4323 | 3620 | 6882 | 5287 | 4291 | 3610 | 5142 | 4229 | 3590 | 5005 | 4170 | 3570 | 4876 | 4112 | 3551 | 3319 |
| 10 | 6616 | 4942 | 3941 | 3274 | 6453 | 4876 | 3914 | 3266 | 4750 | 3863 | 3251 | 4631 | 3813 | 3235 | 4519 | 3765 | 3220 | 2998 |

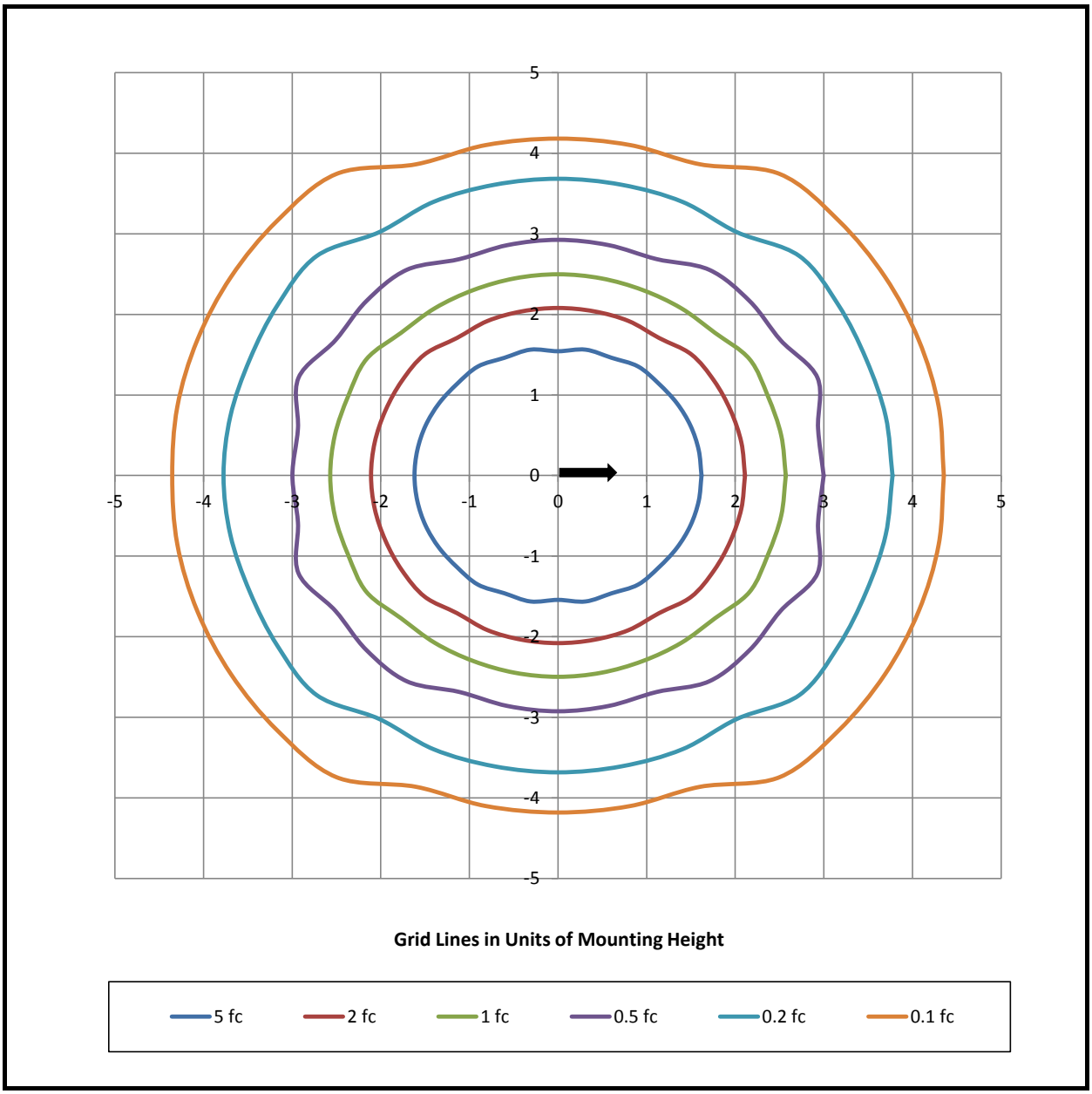
### Beam and Field Information

| | |
|---|---|
| CIE Type: | Direct |
| Center Beam Intenisty: | 4220 Candela |
| Central Cone Intensity: | 4216 Candela |
| Beam Flux: | 9808.2 Lumens |
| Beam Angle (0-180): | 118.4 Degrees |
| Beam Angle (90-270): | 114.1 Degrees |
| Field Angle (0-180): | 160.1 Degrees |
| Field Angle (90-270): | 158.6 Degrees |

### Cone of Light Tabulation



| Mounting Height (Feet) | Footcandles at Nadir | Diameter (Feet) |
|---|---|---|
| 4.00 | 264 | 5.23 |
| 6.00 | 117 | 7.85 |
| 8.00 | 65.9 | 10.5 |
| 10.0 | 42.2 | 13.1 |
| 12.0 | 29.3 | 15.7 |
| 14.0 | 21.5 | 18.3 |
| 16.0 | 16.5 | 20.9 |

## ISOFootcandle Plot

**Mounting Height - 8 Feet**