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Indoor Distribution Test Report

Relevant Standards
IES LM-79-2008, ANSI C82.77-10-2014

Prepared For
H E Williams Inc
831 W Fairview Ave
PO Box 837
Carthage, MO 64836-0837
United States

Catalog Number
2AR-L12/835-DIM-UNV-LW-OF-WH-x-xx (0° TILT)
Order Number
13257190
Test Number
13257190.03

Test Date

2020-03-16

Prepared By

Jesse Litchfield, Technician

Approved By

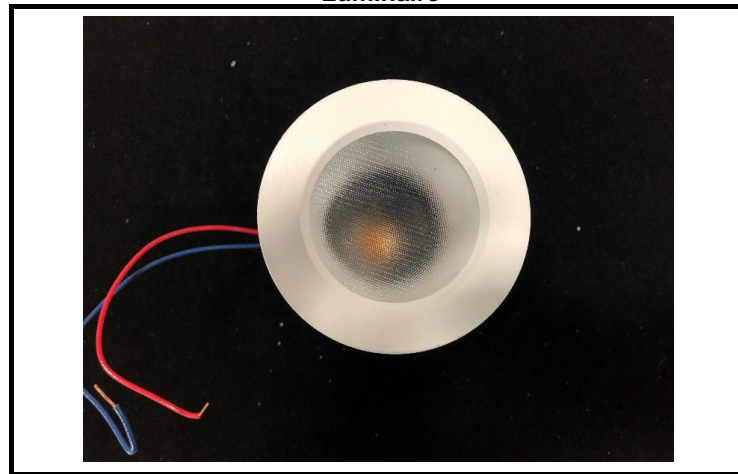
Alexa Lambert, Project Handler

The results contained in this report pertain only to the tested sample.
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Luminaire Description: Aluminum housing, optics, and trim enclosure
Lamp: One white LED
Mounting: Recessed
Ballast/Driver: One Philips Advance XI025C070V054DSM1 Driver

Luminaire



Luminaire Characteristics

Luminous Diameter: 2.50 in.

Summary of Results

| | |
|-------------------------|--------------|
| Total Luminaire Output: | 1063 Lumens |
| Luminaire Efficacy: | 50.8 lm/w |
| Maximum Candela: | 3363 Candela |

Test Conditions

| | |
|-------------------|-----------|
| Test Temperature: | 25.2 °C |
| Voltage: | 120.0 VAC |
| Current: | 0.1755 A |
| Power: | 20.94 W |
| Power Factor: | 0.995 |
| Frequency: | 60 Hz |
| Current THD: | 8.86 % |

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 |
|-------------|-----------|----------|---------|--------------|-----------|-------------|
| 25.2 °C | 120.0 VAC | 0.1755 A | 20.94 W | 0.995 | 60 Hz | 8.86 % |

Summary of Results

Spacing Criteria

0-180: 0.53

90-270: 0.55

Total Lumen Output:

1063 Lumens

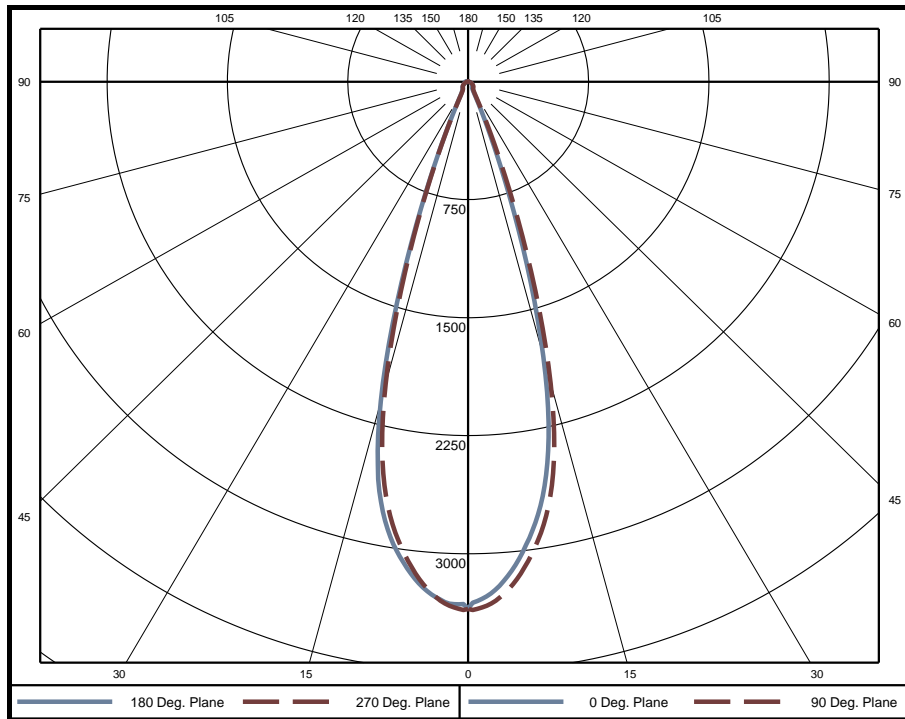
Luminaire Efficacy:

50.8 lm/w

Maximum Candela:

3363 Candela

Polar Plot



Zonal Lumen Summary

| Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire | Zone | Lumens | % of Luminaire |
|-------|--------|----------------|---------|--------|----------------|---------|--------|----------------|
| 0-5 | 78.3 | 7.4% | 60-65 | 13.3 | 1.3% | 120-125 | 0 | 0.0% |
| 5-10 | 214.5 | 20.2% | 65-70 | 11.3 | 1.1% | 125-130 | 0 | 0.0% |
| 10-15 | 286.0 | 26.9% | 70-75 | 9.0 | 0.8% | 130-135 | 0 | 0.0% |
| 15-20 | 222.2 | 20.9% | 75-80 | 6.3 | 0.6% | 135-140 | 0 | 0.0% |
| 20-25 | 89.2 | 8.4% | 80-85 | 3.2 | 0.3% | 140-145 | 0 | 0.0% |
| 25-30 | 28.3 | 2.7% | 85-90 | 1.1 | 0.1% | 145-150 | 0 | 0.0% |
| 30-35 | 17.9 | 1.7% | 90-95 | 0 | 0.0% | 150-155 | 0 | 0.0% |
| 35-40 | 16.9 | 1.6% | 95-100 | 0 | 0.0% | 155-160 | 0 | 0.0% |
| 40-45 | 17.1 | 1.6% | 100-105 | 0 | 0.0% | 160-165 | 0 | 0.0% |
| 45-50 | 17.3 | 1.6% | 105-110 | 0 | 0.0% | 165-170 | 0 | 0.0% |
| 50-55 | 16.5 | 1.6% | 110-115 | 0 | 0.0% | 170-175 | 0 | 0.0% |
| 55-60 | 15.1 | 1.4% | 115-120 | 0 | 0.0% | 175-180 | 0 | 0.0% |

| Zone | Lumens | % of Luminaire |
|--------|--------|----------------|
| 0-40 | 953 | 89.7% |
| 0-60 | 1019 | 95.9% |
| 0-90 | 1064 | 100.0% |
| 90-180 | 0 | 0.0% |



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 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 | 3351 |
| 5 | 3121 | 3127 | 3148 | 3177 | 3206 | 3233 | 3260 | 3277 | 3228 | 3277 | 3260 | 3233 | 3206 | 3177 | 3148 | 3127 |
| 10 | 2676 | 2674 | 2707 | 2758 | 2801 | 2844 | 2884 | 2932 | 2889 | 2932 | 2884 | 2844 | 2801 | 2758 | 2707 | 2674 |
| 15 | 1811 | 1797 | 1843 | 1912 | 1986 | 2030 | 2092 | 2164 | 2102 | 2164 | 2092 | 2030 | 1986 | 1912 | 1843 | 1797 |
| 20 | 680 | 657 | 701 | 757 | 830 | 864 | 895 | 927 | 862 | 927 | 895 | 864 | 830 | 757 | 701 | 657 |
| 25 | 150 | 146 | 157 | 176 | 202 | 226 | 236 | 234 | 208 | 234 | 236 | 226 | 202 | 176 | 157 | 146 |
| 30 | 56 | 57 | 60 | 65 | 73 | 81 | 86 | 85 | 80 | 85 | 86 | 81 | 73 | 65 | 60 | 57 |
| 35 | 42 | 44 | 46 | 50 | 55 | 59 | 62 | 63 | 62 | 63 | 62 | 59 | 55 | 50 | 46 | 44 |
| 40 | 38 | 39 | 41 | 45 | 50 | 53 | 55 | 55 | 55 | 55 | 55 | 53 | 50 | 45 | 41 | 39 |
| 45 | 36 | 37 | 39 | 43 | 47 | 49 | 50 | 50 | 49 | 50 | 50 | 49 | 47 | 43 | 39 | 37 |
| 50 | 35 | 36 | 37 | 40 | 42 | 43 | 44 | 44 | 43 | 44 | 44 | 43 | 42 | 40 | 37 | 36 |
| 55 | 33 | 33 | 34 | 35 | 36 | 37 | 36 | 36 | 36 | 36 | 36 | 37 | 36 | 35 | 34 | 33 |
| 60 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| 65 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 24 | 24 | 25 | 25 | 25 | 25 | 25 | 25 |
| 70 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| 75 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 14 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 80 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| 85 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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/m²)

Horizontal Angle (Degrees)

| Vertical Angle (Degrees) | Horizontal Angle (Degrees) | | |
|--------------------------|----------------------------|---------|---------|
| | 0 | 45 | 90 |
| 0 | 1058000 | 1058000 | 1058000 |
| 45 | 16130 | 17440 | 20800 |
| 55 | 18230 | 18800 | 20020 |
| 65 | 19020 | 18700 | 18640 |
| 75 | 18300 | 17730 | 17860 |
| 85 | 4861 | 9497 | 10970 |



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 | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |
| 1 | 114 | 111 | 109 | 107 | 112 | 109 | 107 | 105 | 105 | 104 | 102 | 102 | 100 | 99 | 98 | 97 | 96 | 94 |
| 2 | 109 | 105 | 101 | 98 | 107 | 103 | 100 | 97 | 100 | 97 | 95 | 97 | 95 | 93 | 94 | 93 | 91 | 89 |
| 3 | 105 | 99 | 95 | 92 | 103 | 98 | 94 | 91 | 95 | 92 | 89 | 93 | 90 | 88 | 91 | 89 | 87 | 85 |
| 4 | 101 | 95 | 90 | 86 | 99 | 93 | 89 | 86 | 91 | 88 | 85 | 90 | 86 | 84 | 88 | 85 | 83 | 82 |
| 5 | 97 | 90 | 86 | 82 | 96 | 90 | 85 | 82 | 88 | 84 | 81 | 86 | 83 | 80 | 85 | 82 | 80 | 78 |
| 6 | 94 | 87 | 82 | 78 | 93 | 86 | 82 | 78 | 85 | 81 | 78 | 83 | 80 | 77 | 82 | 79 | 77 | 75 |
| 7 | 91 | 84 | 79 | 75 | 90 | 83 | 78 | 75 | 82 | 78 | 75 | 81 | 77 | 74 | 80 | 76 | 74 | 73 |
| 8 | 88 | 81 | 76 | 73 | 87 | 80 | 76 | 72 | 79 | 75 | 72 | 78 | 75 | 72 | 77 | 74 | 72 | 71 |
| 9 | 86 | 78 | 73 | 70 | 85 | 78 | 73 | 70 | 77 | 73 | 70 | 76 | 72 | 70 | 75 | 72 | 69 | 68 |
| 10 | 83 | 75 | 71 | 68 | 82 | 75 | 71 | 68 | 74 | 70 | 68 | 74 | 70 | 68 | 73 | 70 | 67 | 66 |

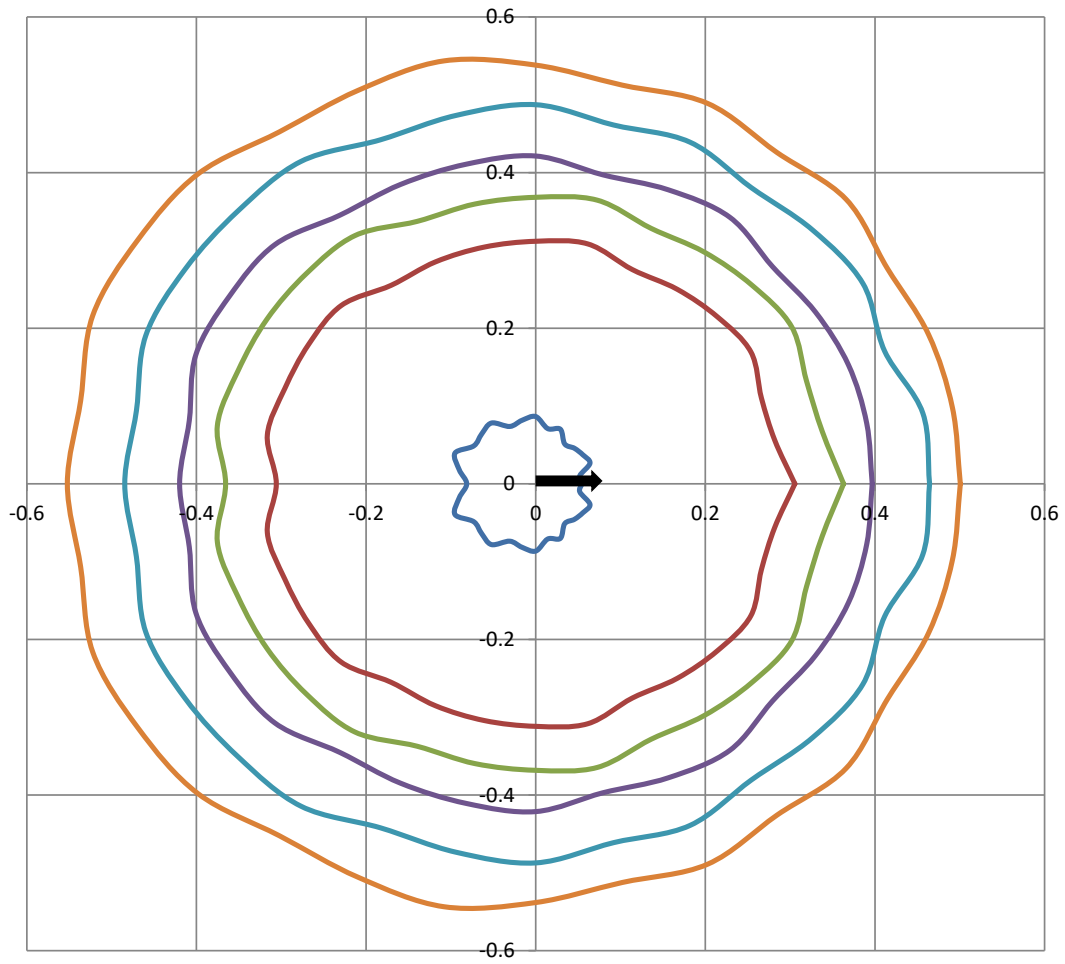
| Beam and Field Information | |
|----------------------------|--------------|
| CIE Type: | Direct |
| Center Beam Intensity: | 3351 Candela |
| Central Cone Intensity: | 3297 Candela |
| Beam Flux: | 647.8 Lumens |
| Beam Angle (0-180): | 32.3 Degrees |
| Beam Angle (90-270): | 32.7 Degrees |
| Field Angle (0-180): | 45.8 Degrees |
| Field Angle (90-270): | 46.6 Degrees |

| Cone of Light Tabulation | | | |
|--------------------------|--|----------------------|-----------------|
| Mounting Height (Feet) | | Footcandles at Nadir | Diameter (Feet) |
| 4.00 | | 209 | 2.21 |
| 6.00 | | 93.1 | 3.31 |
| 8.00 | | 52.4 | 4.42 |
| 10.0 | | 33.5 | 5.52 |
| 12.0 | | 23.3 | 6.63 |
| 14.0 | | 17.1 | 7.73 |
| 16.0 | | 13.1 | 8.84 |



ISOFootcandle Plot

Mounting Height - 8 Feet



Grid Lines in Units of Mounting Height

50 fc 20 fc 10 fc 5 fc 2 fc 1 fc