



LUMINAIRE TESTING LABORATORY, INC.

SUSTAINING
MEMBER
of the
IESNA

905 Harrison Street · Allentown, PA 18103 · 610-770-1044 · Fax 610-770-8912 · www.LuminaireTesting.com

LTL NUMBER: 17535 DATE: 12-17-2009
 PREPARED FOR: RENOVA LIGHTING SYSTEMS
 CATALOG NUMBER: ECS-ECO4-MN-254-UNV-12H-00W
 LUMINAIRE: FORMED STEEL HOUSING, FORMED SPECULAR ALUMINUM REFLECTOR,
 NO ENCLOSURE.
 LAMP: TWO 54 WATT HIGH OUTPUT T5 LINEAR FLUORESCENT LAMPS RATED AT
 4400 LUMENS EACH.
 LAMP CATALOG NUMBER: PHILIPS F54T5/841/HO
 BALLAST: ONE SYLVANIA "QUICKTRONIC" QTP-2X54T5HO/UNV-PSN-HT
 MOUNTING: PENDANT
 ELECTRICAL VALUES: 120.0VAC, 0.9293A, 111.12W

Candela Distribution

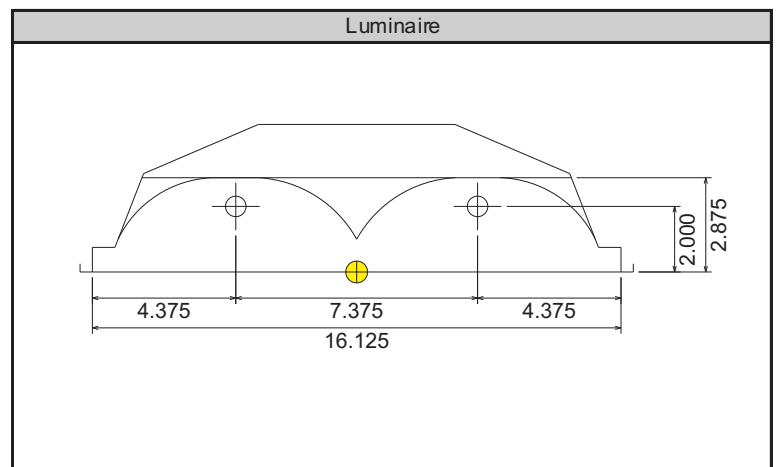
| | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 | Flux |
|-----|------|------|------|------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|--------|
| 0 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | |
| 5 | 2696 | 2735 | 2835 | 2913 | 2942 | 2913 | 2835 | 2735 | 2696 | 2735 | 2835 | 2913 | 2942 | 2913 | 2835 | 2735 | 276.6 |
| 15 | 2597 | 2910 | 3376 | 3681 | 3716 | 3681 | 3376 | 2910 | 2597 | 2910 | 3376 | 3681 | 3716 | 3681 | 3376 | 2910 | 923.1 |
| 25 | 2394 | 3067 | 3482 | 3432 | 3456 | 3432 | 3482 | 3067 | 2394 | 3067 | 3482 | 3432 | 3456 | 3432 | 3482 | 3067 | 1493.5 |
| 35 | 2097 | 3010 | 3081 | 2929 | 2747 | 2929 | 3081 | 3010 | 2097 | 3010 | 3081 | 2929 | 2747 | 2929 | 3081 | 3010 | 1771.0 |
| 45 | 1711 | 2467 | 2264 | 1803 | 1691 | 1803 | 2264 | 2467 | 1711 | 2467 | 2264 | 1803 | 1691 | 1803 | 2264 | 2467 | 1576.5 |
| 55 | 1270 | 1870 | 1287 | 1044 | 1060 | 1044 | 1287 | 1870 | 1270 | 1870 | 1287 | 1044 | 1060 | 1044 | 1287 | 1870 | 1204.3 |
| 65 | 808 | 912 | 743 | 897 | 822 | 897 | 743 | 912 | 808 | 912 | 743 | 897 | 822 | 897 | 743 | 912 | 833.0 |
| 75 | 360 | 342 | 344 | 256 | 207 | 256 | 344 | 342 | 360 | 342 | 344 | 256 | 207 | 256 | 344 | 342 | 337.3 |
| 85 | 41 | 30 | 21 | 23 | 22 | 23 | 21 | 30 | 41 | 30 | 21 | 23 | 22 | 23 | 21 | 30 | 41.3 |
| 90 | 0 | 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 | 0.0 |
| 105 | 0 | 0 | 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 | 0.0 |
| 125 | 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 |
| 145 | 0 | 0 | 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 | 0.0 |
| 165 | 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 |
| 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Zonal Lumen Summary

| Zone | Lumens | % of Lamp | % of Luminaire |
|--------|--------|-----------|----------------|
| 0-30 | 2693.1 | 30.6% | 31.8% |
| 0-40 | 4464.1 | 50.7% | 52.8% |
| 0-60 | 7244.9 | 82.3% | 85.7% |
| 0-90 | 8456.5 | 96.1% | 100.0% |
| 90-180 | 0.0 | 0.0% | 0.0% |
| 0-180 | 8456.5 | 96.1% | 100.0% |

Total luminaire efficiency: 96.1%

CIE Type: Direct
 Spacing Criterion: 0 deg: 1.24 90 deg: 1.46
 180 deg: 1.24 270 deg: 1.46



Approved By: _____

THIS REPORT BASED ON LM-41 AND OTHER PERTINENT IESNA PROCEDURES.



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Candela Tabulation (5 degree Vertical Increments)

| | 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 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 | 2703 |
| 5 | 2696 | 2735 | 2835 | 2913 | 2942 | 2913 | 2835 | 2735 | 2696 | 2735 | 2835 | 2913 | 2942 | 2913 | 2835 | 2735 |
| 10 | 2658 | 2819 | 3068 | 3263 | 3343 | 3263 | 3068 | 2819 | 2658 | 2819 | 3068 | 3263 | 3343 | 3263 | 3068 | 2819 |
| 15 | 2597 | 2910 | 3376 | 3681 | 3716 | 3681 | 3376 | 2910 | 2597 | 2910 | 3376 | 3681 | 3716 | 3681 | 3376 | 2910 |
| 20 | 2506 | 2966 | 3584 | 3635 | 3636 | 3635 | 3584 | 2966 | 2506 | 2966 | 3584 | 3635 | 3636 | 3635 | 3584 | 2966 |
| 25 | 2394 | 3067 | 3482 | 3432 | 3456 | 3432 | 3482 | 3067 | 2394 | 3067 | 3482 | 3432 | 3456 | 3432 | 3482 | 3067 |
| 30 | 2258 | 3125 | 3264 | 3343 | 3288 | 3343 | 3264 | 3125 | 2258 | 3125 | 3264 | 3343 | 3288 | 3343 | 3264 | 3125 |
| 35 | 2097 | 3010 | 3081 | 2929 | 2747 | 2929 | 3081 | 3010 | 2097 | 3010 | 3081 | 2929 | 2747 | 2929 | 3081 | 3010 |
| 40 | 1915 | 2762 | 2791 | 2244 | 2097 | 2244 | 2791 | 2762 | 1915 | 2762 | 2791 | 2244 | 2097 | 2244 | 2791 | 2762 |
| 45 | 1711 | 2467 | 2264 | 1803 | 1691 | 1803 | 2264 | 2467 | 1711 | 2467 | 2264 | 1803 | 1691 | 1803 | 2264 | 2467 |
| 50 | 1495 | 2145 | 1676 | 1373 | 1261 | 1373 | 1676 | 2145 | 1495 | 2145 | 1676 | 1373 | 1261 | 1373 | 1676 | 2145 |
| 55 | 1270 | 1870 | 1287 | 1044 | 1060 | 1044 | 1287 | 1870 | 1270 | 1870 | 1287 | 1044 | 1060 | 1044 | 1287 | 1870 |
| 60 | 1040 | 1437 | 906 | 975 | 1066 | 975 | 906 | 1437 | 1040 | 1437 | 906 | 975 | 1066 | 975 | 906 | 1437 |
| 65 | 808 | 912 | 743 | 897 | 822 | 897 | 743 | 912 | 808 | 912 | 743 | 897 | 822 | 897 | 743 | 912 |
| 70 | 566 | 573 | 684 | 513 | 496 | 513 | 684 | 573 | 566 | 573 | 684 | 513 | 496 | 513 | 684 | 573 |
| 75 | 360 | 342 | 344 | 256 | 207 | 256 | 344 | 342 | 360 | 342 | 344 | 256 | 207 | 256 | 344 | 342 |
| 80 | 189 | 225 | 100 | 27 | 23 | 27 | 100 | 225 | 189 | 225 | 100 | 27 | 23 | 27 | 100 | 225 |
| 85 | 41 | 30 | 21 | 23 | 22 | 23 | 21 | 30 | 41 | 30 | 21 | 23 | 22 | 23 | 21 | 30 |
| 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 |

Zonal Lumen Tabulation (5 degree zones)

| Zone | Lumens | Zone | Lumens | Zone | Lumens | Zone | Lumens |
|-------|--------|-------|--------|---------|--------|---------|--------|
| 0-5 | 66.2 | 45-50 | 741.6 | 90-95 | 0.0 | 135-140 | 0.0 |
| 5-10 | 210.4 | 50-55 | 645.9 | 95-100 | 0.0 | 140-145 | 0.0 |
| 10-15 | 376.8 | 55-60 | 558.4 | 100-105 | 0.0 | 145-150 | 0.0 |
| 15-20 | 546.3 | 60-65 | 473.9 | 105-110 | 0.0 | 150-155 | 0.0 |
| 20-25 | 687.5 | 65-70 | 359.1 | 110-115 | 0.0 | 155-160 | 0.0 |
| 25-30 | 805.9 | 70-75 | 227.1 | 115-120 | 0.0 | 160-165 | 0.0 |
| 30-35 | 882.8 | 75-80 | 110.3 | 120-125 | 0.0 | 165-170 | 0.0 |
| 35-40 | 888.2 | 80-85 | 33.0 | 125-130 | 0.0 | 170-175 | 0.0 |
| 40-45 | 834.9 | 85-90 | 8.3 | 130-135 | 0.0 | 175-180 | 0.0 |



| Coefficients of Utilization - Zonal Cavity Method | | | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Effective Floor Cavity Reflectance 20% | | | | | | | | | | | | |
| Ceiling Cavity Reflectance | 90 | | | | 80 | | | | 70 | | | |
| | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 |
| Room Cavity Ratio (RCR) | | | | | | | | | | | | |
| 0 | 1.172 | 1.172 | 1.172 | 1.172 | 1.144 | 1.144 | 1.144 | 1.144 | 1.117 | 1.117 | 1.117 | 1.117 |
| 1 | 1.085 | 1.04 | 1.001 | 0.965 | 1.058 | 1.018 | 0.982 | 0.949 | 1.033 | 0.996 | 0.964 | 0.934 |
| 2 | 0.997 | 0.918 | 0.853 | 0.799 | 0.971 | 0.899 | 0.84 | 0.79 | 0.946 | 0.881 | 0.827 | 0.781 |
| 3 | 0.915 | 0.813 | 0.735 | 0.674 | 0.891 | 0.797 | 0.725 | 0.668 | 0.868 | 0.782 | 0.716 | 0.662 |
| 4 | 0.842 | 0.725 | 0.64 | 0.577 | 0.819 | 0.712 | 0.633 | 0.573 | 0.798 | 0.699 | 0.626 | 0.569 |
| 5 | 0.777 | 0.65 | 0.563 | 0.5 | 0.756 | 0.639 | 0.558 | 0.498 | 0.736 | 0.629 | 0.552 | 0.495 |
| 6 | 0.718 | 0.587 | 0.5 | 0.439 | 0.7 | 0.578 | 0.496 | 0.437 | 0.682 | 0.569 | 0.492 | 0.435 |
| 7 | 0.667 | 0.533 | 0.448 | 0.389 | 0.65 | 0.525 | 0.445 | 0.388 | 0.633 | 0.518 | 0.441 | 0.387 |
| 8 | 0.621 | 0.487 | 0.404 | 0.348 | 0.605 | 0.48 | 0.401 | 0.347 | 0.591 | 0.474 | 0.399 | 0.346 |
| 9 | 0.58 | 0.447 | 0.367 | 0.314 | 0.566 | 0.441 | 0.365 | 0.313 | 0.552 | 0.435 | 0.362 | 0.312 |
| 10 | 0.543 | 0.412 | 0.335 | 0.285 | 0.53 | 0.407 | 0.333 | 0.284 | 0.518 | 0.402 | 0.331 | 0.284 |

| Ceiling Cavity Reflectance | 50 | | | | 30 | | | 10 | | | 0 |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |
| Room Cavity Ratio (RCR) | | | | | | | | | | | |
| 0 | 1.068 | 1.068 | 1.068 | 1.068 | 1.022 | 1.022 | 1.022 | 0.981 | 0.981 | 0.981 | 0.961 |
| 1 | 0.986 | 0.956 | 0.929 | 0.904 | 0.919 | 0.897 | 0.877 | 0.885 | 0.867 | 0.851 | 0.832 |
| 2 | 0.901 | 0.848 | 0.802 | 0.763 | 0.817 | 0.779 | 0.745 | 0.788 | 0.757 | 0.729 | 0.709 |
| 3 | 0.825 | 0.754 | 0.697 | 0.65 | 0.729 | 0.68 | 0.639 | 0.705 | 0.663 | 0.628 | 0.608 |
| 4 | 0.759 | 0.676 | 0.612 | 0.561 | 0.654 | 0.598 | 0.554 | 0.633 | 0.586 | 0.546 | 0.527 |
| 5 | 0.7 | 0.609 | 0.541 | 0.49 | 0.59 | 0.531 | 0.484 | 0.573 | 0.521 | 0.479 | 0.46 |
| 6 | 0.649 | 0.552 | 0.483 | 0.432 | 0.536 | 0.475 | 0.428 | 0.521 | 0.467 | 0.424 | 0.405 |
| 7 | 0.604 | 0.503 | 0.434 | 0.384 | 0.489 | 0.427 | 0.381 | 0.477 | 0.421 | 0.379 | 0.36 |
| 8 | 0.564 | 0.461 | 0.393 | 0.344 | 0.449 | 0.387 | 0.342 | 0.438 | 0.382 | 0.34 | 0.323 |
| 9 | 0.528 | 0.425 | 0.358 | 0.311 | 0.414 | 0.353 | 0.309 | 0.405 | 0.349 | 0.308 | 0.291 |
| 10 | 0.496 | 0.393 | 0.328 | 0.282 | 0.384 | 0.324 | 0.281 | 0.376 | 0.32 | 0.28 | 0.264 |

Average Luminance Table (cd/m²)

| | 0 | 45 | 90 |
|----|------|------|------|
| 0 | 5557 | 5557 | 5557 |
| 45 | 4975 | 6583 | 4917 |
| 55 | 4554 | 4614 | 3799 |
| 65 | 3933 | 3617 | 4000 |
| 75 | 2862 | 2729 | 1645 |
| 85 | 960 | 500 | 524 |

THIS TEST WAS CONDUCTED USING RELATIVE PHOTOMETRY TECHNIQUES ACCORDING TO STANDARD IESNA PROCEDURES. THE USER MUST THEREFORE USE CAUTION IN THE FOLLOWING SITUATIONS: 1) THIS TEST WAS PERFORMED USING A SPECIFIC BALLAST/LAMP COMBINATION. EXTRAPOLATION OF THESE DATA FOR OTHER BALLAST/LAMP COMBINATIONS MAY PRODUCE ERRONEOUS RESULTS. 2) ACCORDING TO IESNA PROCEDURES, THE BALLAST(S) AND LAMP(S) ARE PRESUMED TO PRODUCE 100% OF RATED OUTPUT. AN APPROPRIATE BALLAST FACTOR MUST BE APPLIED TO THE LUMEN OUTPUT RATINGS AND LUMINOUS INTENSITY VALUES GIVEN. 3) THIS TEST WAS CONDUCTED IN A CONTROLLED LABORATORY ENVIRONMENT WHERE THE AMBIENT TEMPERATURE WAS HELD AT 25 °C ±1°C. FIELD PERFORMANCE MAY DIFFER PARTICULARLY IN REGARDS TO CHANGE IN LUMINOUS OUTPUT AS A RESULT OF DIFFERENCE IN AMBIENT TEMPERATURE AND METHOD OF MOUNTING THE LUMINAIRE.

