LTL 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: 15657 DATE: 05-13-2009
PREPARED FOR: DIOGEN LIGHTING
CATALOG NUMBER: MT8-1200-93
LAMP: ONE T8 REPLACEMENT LAMP WITH 304 WHITE LEDS.
LAMP CATALOG NUMBER: DIOGEN MT8-1200-13
BALLAST: INTEGRAL
POWER FACTOR: 0.720
ELECTRICAL VALUES: 120.0VAC, 0.1952A, 16.86W
NOTE: THIS TEST WAS PERFORMED USING THE CALIBRATED PHOTODETECTOR METHOD OF ABSOLUTE PHOTOMETRY.*

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 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | |
| 5 | 451 | 453 | 451 | 450 | 449 | 450 | 451 | 453 | 451 | 453 | 451 | 450 | 449 | 450 | 451 | 453 | 43.0 |
| 15 | 441 | 442 | 448 | 453 | 453 | 453 | 448 | 442 | 441 | 442 | 448 | 453 | 453 | 453 | 448 | 442 | 126.3 |
| 25 | 413 | 419 | 427 | 418 | 414 | 418 | 427 | 419 | 413 | 419 | 427 | 418 | 414 | 418 | 427 | 419 | 193.1 |
| 35 | 366 | 379 | 369 | 367 | 366 | 367 | 369 | 379 | 366 | 379 | 369 | 367 | 366 | 367 | 369 | 379 | 231.3 |
| 45 | 309 | 318 | 312 | 290 | 289 | 290 | 312 | 318 | 309 | 318 | 312 | 290 | 289 | 290 | 312 | 318 | 235.0 |
| 55 | 240 | 244 | 231 | 227 | 235 | 227 | 231 | 244 | 240 | 244 | 231 | 227 | 235 | 227 | 231 | 244 | 208.7 |
| 65 | 157 | 160 | 166 | 133 | 128 | 133 | 166 | 160 | 157 | 160 | 166 | 133 | 128 | 133 | 166 | 160 | 147.6 |
| 75 | 48 | 65 | 69 | 64 | 61 | 64 | 69 | 65 | 48 | 65 | 69 | 64 | 61 | 64 | 69 | 65 | 66.9 |
| 85 | 3 | 14 | 15 | 21 | 19 | 21 | 15 | 14 | 3 | 14 | 15 | 21 | 19 | 21 | 15 | 14 | 18.6 |
| 90 | 0 | 7 | 10 | 16 | 14 | 16 | 10 | 7 | 0 | 7 | 10 | 16 | 14 | 16 | 10 | 7 | |
| 95 | 0 | 6 | 9 | 11 | 10 | 11 | 9 | 6 | 0 | 6 | 9 | 11 | 10 | 11 | 9 | 6 | 9.5 |
| 105 | 0 | 1 | 25 | 19 | 7 | 19 | 25 | 1 | 0 | 1 | 25 | 19 | 7 | 19 | 25 | 1 | 11.7 |
| 115 | 0 | 0 | 7 | 12 | 4 | 12 | 7 | 0 | 0 | 0 | 7 | 12 | 4 | 12 | 7 | 0 | 5.4 |
| 125 | 0 | 0 | 1 | 4 | 2 | 4 | 1 | 0 | 0 | 0 | 1 | 4 | 2 | 4 | 1 | 0 | 1.4 |
| 135 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0.3 |
| 145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| 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 | |

Zonal Lumen Summary

| Zone | Lumens | % of Lamp | % of Luminaire |
|---|---|---|---|
| 0-30 | 362.3 | N/A | 27.9% |
| 0-40 | 593.7 | N/A | 45.7% |
| 0-60 | 1037.4 | N/A | 79.9% |
| 0-90 | 1270.5 | N/A | 97.8% |
| 90-180 | 28.4 | N/A | 2.2% |
| 0-180 | 1298.9 | N/A | 100.0% |

Total lumen Output 1298.9 Lumens
Luminaire efficacy: 77.0 Lumens per Watt
CIE Type: Direct
Spacing Criterion: 0 deg: 1.28 90 deg: 1.28
180 deg: 1.28 270 deg: 1.28

Luminaire


Approved By: _____

*DATA WAS ACQUIRED USING THE CALIBRATED PHOTODETECTOR METHOD OF ABSOLUTE PHOTOMETRY. A UDT MODEL #211 PHOTODETECTOR AND UDT MODEL #S370 OPTOMETER COMBINATION WERE USED AS A STANDARD. A SPECTRAL MISMATCH CORRECTION FACTOR WAS EMPLOYED BASED ON THE SPECTRAL RESPONSIVITY OF THE PHOTODETECTOR AND THE SPECTRAL POWER DISTRIBUTION OF THE TEST SUBJECT.

**TESTING WAS PERFORMED IN ACCORDANCE WITH IES LM-79-08.**

TEST ANGULAR INCREMENTS AND REPORT FORMATTING WAS BASED ON IES LM-41-98 AND LM-46-04.

LTL 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

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 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 | 451 |
| 5 | 451 | 453 | 451 | 450 | 449 | 450 | 451 | 453 | 451 | 453 | 451 | 450 | 449 | 450 | 451 | 453 |
| 10 | 447 | 449 | 449 | 451 | 451 | 451 | 449 | 449 | 447 | 449 | 449 | 451 | 451 | 451 | 449 | 449 |
| 15 | 441 | 442 | 448 | 453 | 453 | 453 | 448 | 442 | 441 | 442 | 448 | 453 | 453 | 453 | 448 | 442 |
| 20 | 430 | 431 | 443 | 441 | 438 | 441 | 443 | 431 | 430 | 431 | 443 | 441 | 438 | 441 | 443 | 431 |
| 25 | 413 | 419 | 427 | 418 | 414 | 418 | 427 | 419 | 413 | 419 | 427 | 418 | 414 | 418 | 427 | 419 |
| 30 | 391 | 401 | 400 | 391 | 389 | 391 | 400 | 401 | 391 | 401 | 400 | 391 | 389 | 391 | 400 | 401 |
| 35 | 366 | 379 | 369 | 367 | 366 | 367 | 369 | 379 | 366 | 379 | 369 | 367 | 366 | 367 | 369 | 379 |
| 40 | 338 | 351 | 339 | 338 | 325 | 338 | 339 | 351 | 338 | 351 | 339 | 338 | 325 | 338 | 339 | 351 |
| 45 | 309 | 318 | 312 | 290 | 289 | 290 | 312 | 318 | 309 | 318 | 312 | 290 | 289 | 290 | 312 | 318 |
| 50 | 275 | 280 | 268 | 259 | 252 | 259 | 268 | 280 | 275 | 280 | 268 | 259 | 252 | 259 | 268 | 280 |
| 55 | 240 | 244 | 231 | 227 | 235 | 227 | 231 | 244 | 240 | 244 | 231 | 227 | 235 | 227 | 231 | 244 |
| 60 | 201 | 207 | 195 | 189 | 173 | 189 | 195 | 207 | 201 | 207 | 195 | 189 | 173 | 189 | 195 | 207 |
| 65 | 157 | 160 | 166 | 133 | 128 | 133 | 166 | 160 | 157 | 160 | 166 | 133 | 128 | 133 | 166 | 160 |
| 70 | 104 | 109 | 103 | 101 | 96 | 101 | 103 | 109 | 104 | 109 | 103 | 101 | 96 | 101 | 103 | 109 |
| 75 | 48 | 65 | 69 | 64 | 61 | 64 | 69 | 65 | 48 | 65 | 69 | 64 | 61 | 64 | 69 | 65 |
| 80 | 16 | 29 | 33 | 37 | 36 | 37 | 33 | 29 | 16 | 29 | 33 | 37 | 36 | 37 | 33 | 29 |
| 85 | 3 | 14 | 15 | 21 | 19 | 21 | 15 | 14 | 3 | 14 | 15 | 21 | 19 | 21 | 15 | 14 |
| 90 | 0 | 7 | 10 | 16 | 14 | 16 | 10 | 7 | 0 | 7 | 10 | 16 | 14 | 16 | 10 | 7 |
| 95 | 0 | 6 | 9 | 11 | 10 | 11 | 9 | 6 | 0 | 6 | 9 | 11 | 10 | 11 | 9 | 6 |
| 100 | 0 | 6 | 18 | 11 | 9 | 11 | 18 | 6 | 0 | 6 | 18 | 11 | 9 | 11 | 18 | 6 |
| 105 | 0 | 1 | 25 | 19 | 7 | 19 | 25 | 1 | 0 | 1 | 25 | 19 | 7 | 19 | 25 | 1 |
| 110 | 0 | 0 | 11 | 22 | 6 | 22 | 11 | 0 | 0 | 0 | 11 | 22 | 6 | 22 | 11 | 0 |
| 115 | 0 | 0 | 7 | 12 | 4 | 12 | 7 | 0 | 0 | 0 | 7 | 12 | 4 | 12 | 7 | 0 |
| 120 | 0 | 0 | 2 | 8 | 2 | 8 | 2 | 0 | 0 | 0 | 2 | 8 | 2 | 8 | 2 | 0 |
| 125 | 0 | 0 | 1 | 4 | 2 | 4 | 1 | 0 | 0 | 0 | 1 | 4 | 2 | 4 | 1 | 0 |
| 130 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 0 |
| 135 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 140 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 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 | 10.8 | 45-50 | 116.0 | 90-95 | 4.8 | 135-140 | 0.1 |
| 5-10 | 32.2 | 50-55 | 108.4 | 95-100 | 4.7 | 140-145 | 0.0 |
| 10-15 | 53.2 | 55-60 | 100.3 | 100-105 | 6.1 | 145-150 | 0.0 |
| 15-20 | 73.0 | 60-65 | 84.2 | 105-110 | 5.6 | 150-155 | 0.0 |
| 20-25 | 90.0 | 65-70 | 63.4 | 110-115 | 3.6 | 155-160 | 0.0 |
| 25-30 | 103.1 | 70-75 | 42.8 | 115-120 | 1.8 | 160-165 | 0.0 |
| 30-35 | 112.7 | 75-80 | 24.1 | 120-125 | 1.0 | 165-170 | 0.0 |
| 35-40 | 118.7 | 80-85 | 12.2 | 125-130 | 0.4 | 170-175 | 0.0 |
| 40-45 | 119.1 | 85-90 | 6.4 | 130-135 | 0.2 | 175-180 | 0.0 |

LTL 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

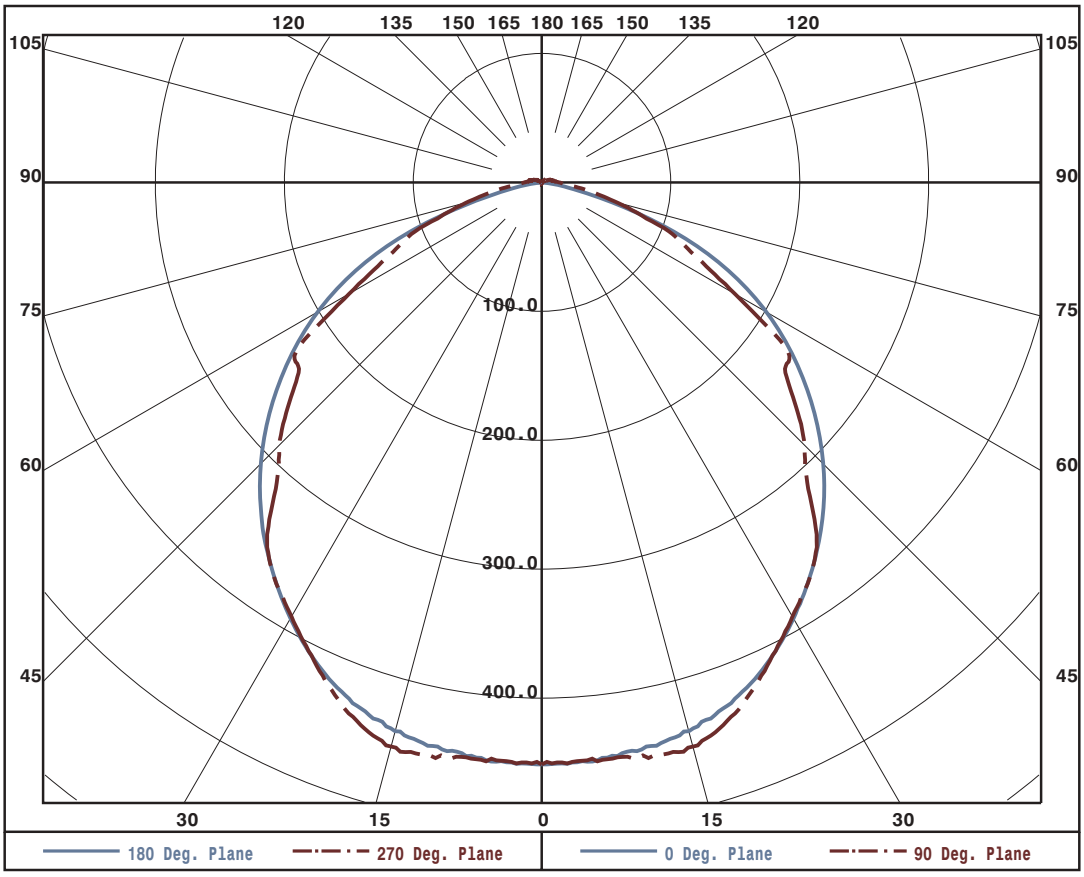
| Utilization of Lumens - Zonal Cavity Method | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effective Floor Cavity Reflectance 20% | | | | | | | | | | | | |
| Ceiling Cavity Reflectance | 90 | | | | 80 | | | | 70 | | | |
| Wall Reflectance | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 | 70 | 50 | 30 | 10 |
| Room Cavity Ratio (RCR) | ** Values are expressed as Lumens delivered to the task surface ** | | | | | | | | | | | |
| 0 | 1581 | 1581 | 1581 | 1581 | 1540 | 1540 | 1540 | 1540 | 1500 | 1500 | 1500 | 1500 |
| 1 | 1453 | 1387 | 1328 | 1276 | 1413 | 1353 | 1300 | 1252 | 1375 | 1321 | 1273 | 1229 |
| 2 | 1327 | 1213 | 1119 | 1042 | 1288 | 1184 | 1099 | 1027 | 1252 | 1158 | 1079 | 1012 |
| 3 | 1212 | 1066 | 954.8 | 867.1 | 1176 | 1043 | 939.6 | 857.4 | 1142 | 1020 | 924.7 | 847.8 |
| 4 | 1111 | 944.8 | 825.1 | 734.8 | 1077 | 925 | 813.4 | 728.1 | 1046 | 905.9 | 801.9 | 721.5 |
| 5 | 1022 | 843.7 | 721.5 | 632.4 | 991.1 | 827 | 712.3 | 627.6 | 962 | 810.8 | 703.2 | 622.8 |
| 6 | 943.4 | 759 | 637.6 | 551.6 | 915.3 | 744.7 | 630.2 | 548 | 888.7 | 730.9 | 622.9 | 544.4 |
| 7 | 874.1 | 687.3 | 568.7 | 486.7 | 848.5 | 675.1 | 562.7 | 483.9 | 824.4 | 663.3 | 556.8 | 481.2 |
| 8 | 812.8 | 626.4 | 511.6 | 433.7 | 789.7 | 615.9 | 506.6 | 431.5 | 767.8 | 605.7 | 501.7 | 429.3 |
| 9 | 758.6 | 574.2 | 463.6 | 389.8 | 737.6 | 565.1 | 459.4 | 388.1 | 717.8 | 556.2 | 455.3 | 386.3 |
| 10 | 710.3 | 529.2 | 422.9 | 353.1 | 691.3 | 521.2 | 419.4 | 351.6 | 673.4 | 513.5 | 415.9 | 350.2 |

| Ceiling Cavity Reflectance | 50 | | | | 30 | | | 10 | | | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wall Reflectance | 70 | 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 | 1427 | 1427 | 1427 | 1427 | 1361 | 1361 | 1361 | 1299 | 1299 | 1299 | 1271 |
| 1 | 1304 | 1261 | 1221 | 1185 | 1206 | 1174 | 1144 | 1155 | 1129 | 1105 | 1077 |
| 2 | 1184 | 1107 | 1041 | 984.7 | 1061 | 1006 | 958.1 | 1018 | 972.9 | 932.8 | 903.7 |
| 3 | 1079 | 977.6 | 896.3 | 829.3 | 938.3 | 869.3 | 811.3 | 901.8 | 843.8 | 794.1 | 765 |
| 4 | 987.3 | 869.9 | 779.9 | 708.5 | 836.5 | 758.8 | 695.9 | 805.4 | 738.8 | 683.7 | 655 |
| 5 | 908.5 | 780.2 | 685.8 | 613.4 | 751.7 | 669.1 | 604.2 | 725.1 | 653.1 | 595.3 | 567.3 |
| 6 | 840 | 704.7 | 608.8 | 537.4 | 680.3 | 595.3 | 530.5 | 657.4 | 582.3 | 523.7 | 496.6 |
| 7 | 780.1 | 640.7 | 545.2 | 475.7 | 619.7 | 534.1 | 470.3 | 599.9 | 523.4 | 465 | 439 |
| 8 | 727.6 | 586.2 | 492.1 | 425 | 567.9 | 482.9 | 420.7 | 550.7 | 473.9 | 416.5 | 391.6 |
| 9 | 681.3 | 539.3 | 447.3 | 382.8 | 523.3 | 439.5 | 379.3 | 508.3 | 431.9 | 375.9 | 352.1 |
| 10 | 640.2 | 498.7 | 409.1 | 347.3 | 484.7 | 402.5 | 344.4 | 471.5 | 396.1 | 341.6 | 318.8 |

Average Luminance Table (cd/m²)

| | 0 | 45 | 90 |
|---|---|---|---|
| 0 | 13523 | 13523 | 13523 |
| 45 | 13074 | 10056 | 8463 |
| 55 | 12512 | 8315 | 7494 |
| 65 | 11129 | 7045 | 4630 |
| 75 | 5545 | 3674 | 2667 |
| 85 | 880 | 1124 | 1098 |

THIS TEST WAS CONDUCTED USING PHOTOMETRY TECHNIQUES ACCORDING TO STANDARD IES 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) 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.


120 135 150 165 180 165 150 135 120
105
90
75
60
45
100.0
200.0
300.0
400.0
30 15 0 15 30
180 Deg. Plane
270 Deg. Plane
0 Deg. Plane
90 Deg. Plane

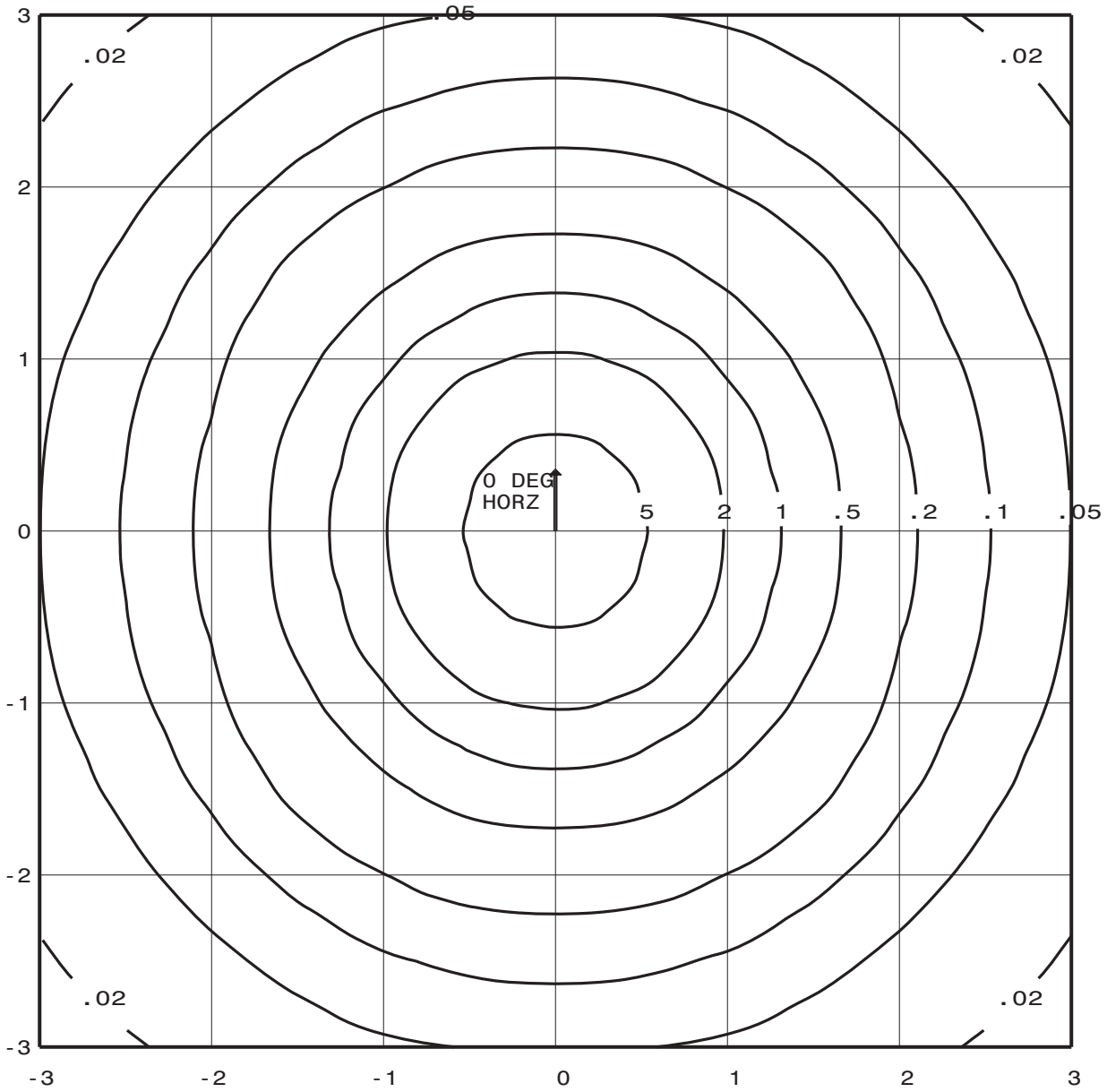
LTL LUMINAIRE TESTING LABORATORY, INC.

SUSTAINING MEMBER of the IESNA

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

ISOFOOTCANDLE CONVERSION FACTORS FOR SELECTED MOUNTING HEIGHTS

| MOUNTING HEIGHT | 6' | 7' | 8' | 9' | 10' |
|---|---|---|---|---|---|
| MULTIPLIER | 1.78 | 1.31 | 1.00 | 0.79 | 0.64 |




LTL REPORT NUMBER 15657-ISOFOOTCANDLE VALUES ARE BASED ON A MOUNTING HEIGHT OF 8', WITH THE LUMINAIRE LOCATED AT 0,0. ISOFOOTCANDLE VALUES ARE CALCULATED FROM THE DIRECT CONTRIBUTION FROM THE LUMINAIRE ONLY. WALL, CEILING, AND FLOOR CONTRIBUTION IS NOT INCLUDED.