

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: NEO-RAY

Report Number: P906877

Luminaire Tested: DFN2DIP-SQ4F0-110D160US835-FLLONL

Issue Date: 11/21/2024

**Test Information**

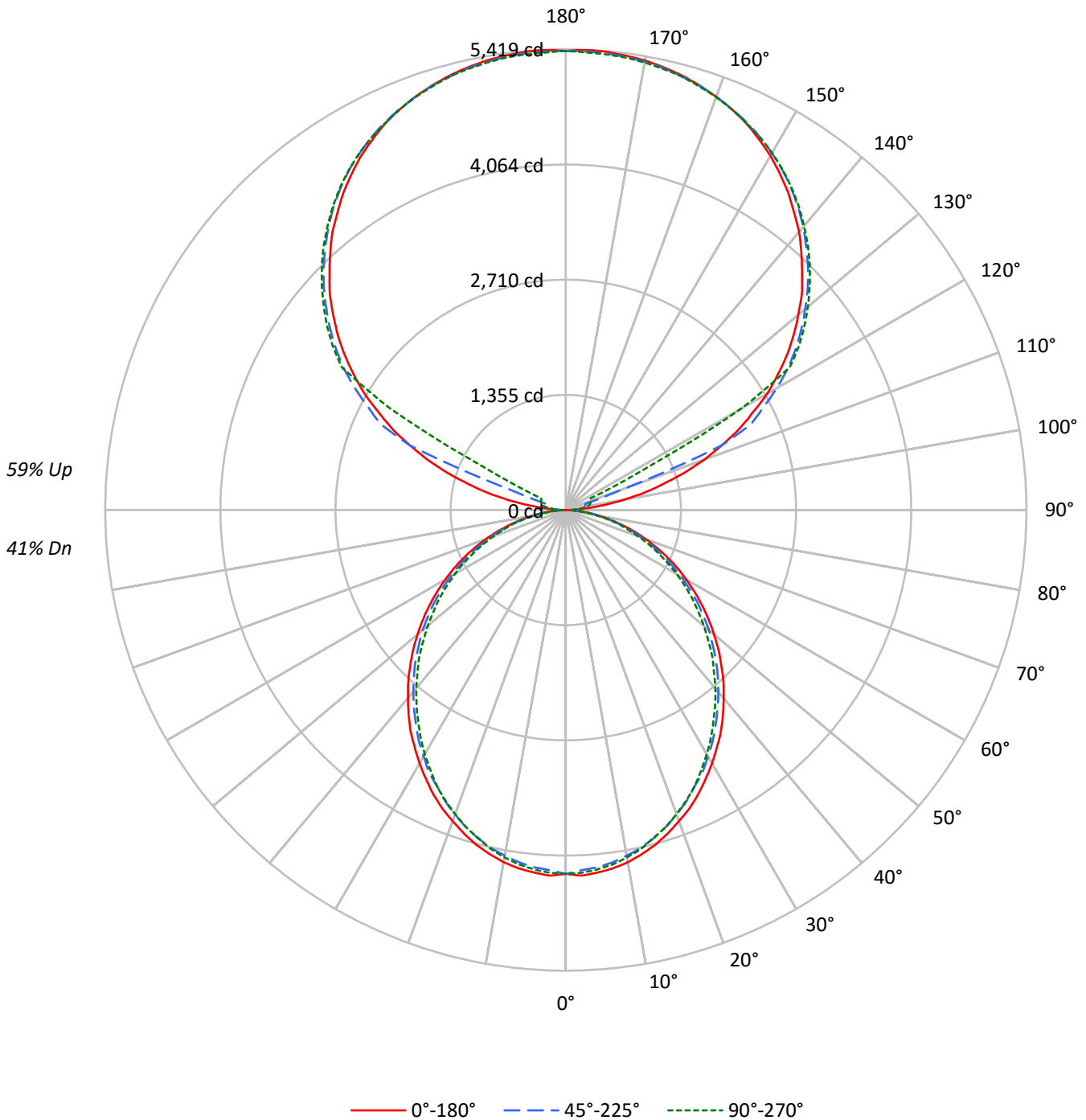
Test Method: LM-79-2019  
Report Number: P906877  
REPORT IS A COMBINATION OF REPORTS P901733 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-110D160US835-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26730.0 lumens  
Efficiency: N/A  
Efficacy: 117.6 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse  
  
Input Watts (W): 227.2  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9951  
Total Harmonic Distortion (THDi): 0.07  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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### Luminous Intensity Polar Plot





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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |    |    |    | 20 |    |    |    | 20 |
| RC  | 80  |     |     |     | 70 |    |    |    | 50 |    |    |    | 30 |    |    |    | 10 |    |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 105 | 105 | 105 | 105 | 96 | 96 | 96 | 96 | 78 | 78 | 78 | 62 | 62 | 62 | 48 | 48 | 48 | 48 | 48 | 48 | 41 |
| 1   | 96  | 91  | 88  | 84  | 87 | 83 | 80 | 77 | 69 | 66 | 64 | 55 | 53 | 52 | 42 | 41 | 40 | 40 | 40 | 40 | 34 |
| 2   | 87  | 80  | 74  | 69  | 79 | 73 | 68 | 63 | 60 | 56 | 53 | 48 | 46 | 43 | 37 | 35 | 34 | 34 | 34 | 34 | 29 |
| 3   | 79  | 70  | 63  | 57  | 72 | 64 | 58 | 53 | 53 | 48 | 45 | 42 | 39 | 37 | 33 | 31 | 29 | 29 | 29 | 29 | 24 |
| 4   | 73  | 62  | 54  | 48  | 66 | 57 | 50 | 45 | 47 | 42 | 38 | 38 | 34 | 31 | 29 | 27 | 25 | 25 | 25 | 25 | 21 |
| 5   | 67  | 55  | 47  | 41  | 60 | 51 | 44 | 38 | 42 | 37 | 33 | 34 | 30 | 27 | 26 | 24 | 22 | 22 | 22 | 22 | 18 |
| 6   | 61  | 49  | 41  | 36  | 56 | 45 | 38 | 33 | 38 | 32 | 28 | 31 | 27 | 24 | 24 | 21 | 19 | 19 | 19 | 19 | 16 |
| 7   | 57  | 45  | 37  | 31  | 52 | 41 | 34 | 29 | 34 | 29 | 25 | 28 | 24 | 21 | 22 | 19 | 17 | 17 | 17 | 17 | 14 |
| 8   | 53  | 40  | 33  | 28  | 48 | 37 | 30 | 26 | 31 | 26 | 22 | 25 | 22 | 19 | 20 | 17 | 15 | 15 | 15 | 15 | 13 |
| 9   | 49  | 37  | 29  | 25  | 45 | 34 | 27 | 23 | 29 | 23 | 20 | 23 | 20 | 17 | 19 | 16 | 14 | 14 | 14 | 14 | 11 |
| 10  | 46  | 34  | 27  | 22  | 42 | 31 | 25 | 21 | 26 | 21 | 18 | 22 | 18 | 15 | 17 | 14 | 12 | 12 | 12 | 12 | 10 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3003 | 3003 | 3003 |
| 5°  | 3008 | 2962 | 2982 |
| 10° | 2984 | 2923 | 2943 |
| 15° | 2940 | 2875 | 2880 |
| 20° | 2880 | 2809 | 2817 |
| 25° | 2821 | 2730 | 2743 |
| 30° | 2747 | 2656 | 2649 |
| 35° | 2677 | 2569 | 2549 |
| 40° | 2591 | 2481 | 2454 |
| 45° | 2505 | 2393 | 2358 |
| 50° | 2411 | 2300 | 2245 |
| 55° | 2313 | 2193 | 2142 |
| 60° | 2201 | 2066 | 2025 |
| 65° | 2080 | 1935 | 1885 |
| 70° | 1925 | 1774 | 1736 |
| 75° | 1711 | 1583 | 1600 |
| 80° | 1454 | 1339 | 1336 |
| 85° | 1051 | 916  | 898  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 90°  
 Vertical Angle: 90°  
 Luminance: 2894 cd/sqm



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 402.8   | 1.5       |
| 10°-20°   | 1133.5  | 4.2       |
| 20°-30°   | 1665.7  | 6.2       |
| 30°-40°   | 1934.7  | 7.2       |
| 40°-50°   | 1932.3  | 7.2       |
| 50°-60°   | 1684.9  | 6.3       |
| 60°-70°   | 1245.5  | 4.7       |
| 70°-80°   | 704.7   | 2.6       |
| 80°-90°   | 195.5   | 0.7       |
| 90°-100°  | 178.0   | 0.7       |
| 100°-110° | 663.8   | 2.5       |
| 110°-120° | 1760.4  | 6.6       |
| 120°-130° | 2919.7  | 10.9      |
| 130°-140° | 3101.5  | 11.6      |
| 140°-150° | 2882.5  | 10.8      |
| 150°-160° | 2317.4  | 8.7       |
| 160°-170° | 1493.3  | 5.6       |
| 170°-180° | 514.0   | 1.9       |
| 0°-30°    | 3202.1  | 12.0      |
| 0°-40°    | 5136.7  | 19.2      |
| 0°-60°    | 8753.8  | 32.7      |
| 0°-90°    | 10899.5 | 40.8      |
| 90°-120°  | 2602.2  | 9.7       |
| 90°-150°  | 11505.9 | 43.0      |
| 90°-180°  | 15831.0 | 59.2      |
| 0°-180°   | 26730.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 4280 | 4280  | 4280 | 4280  | 4280 |      |
| 5°   | 4280 | 4264  | 4219 | 4251  | 4244 | 406  |
| 15°  | 4074 | 4050  | 3996 | 4013  | 3992 | 1148 |
| 25°  | 3688 | 3655  | 3585 | 3593  | 3585 | 1697 |
| 35°  | 3182 | 3140  | 3074 | 3050  | 3029 | 1987 |
| 45°  | 2589 | 2560  | 2498 | 2453  | 2437 | 1998 |
| 55°  | 1959 | 1934  | 1885 | 1836  | 1815 | 1752 |
| 65°  | 1321 | 1296  | 1255 | 1218  | 1198 | 1306 |
| 75°  | 691  | 683   | 662  | 638   | 646  | 738  |
| 85°  | 169  | 165   | 161  | 148   | 144  | 188  |
| 90°  | 4    | 47    | 78   | 98    | 105  | 25   |
| 95°  | 254  | 125   | 152  | 172   | 168  | 301  |
| 105° | 1188 | 1305  | 238  | 281   | 297  | 1269 |
| 115° | 2247 | 2313  | 2411 | 602   | 321  | 2212 |
| 125° | 3176 | 3227  | 3302 | 3329  | 3341 | 2833 |
| 135° | 3931 | 3994  | 4028 | 4068  | 4060 | 3036 |
| 145° | 4560 | 4556  | 4622 | 4650  | 4630 | 2852 |
| 155° | 5021 | 4986  | 5033 | 5056  | 5025 | 2314 |
| 165° | 5290 | 5267  | 5279 | 5306  | 5279 | 1495 |
| 175° | 5411 | 5384  | 5392 | 5419  | 5380 | 515  |
| 180° | 5400 | 5400  | 5400 | 5400  | 5400 |      |



TEST NUMBER: P906877

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 4280.2 | 4280.2 | 4280.2 | 4280.2 | 4280.2 |
| 2.5°   | 4305.0 | 4284.5 | 4239.1 | 4280.2 | 4272.3 |
| 5°     | 4280.2 | 4264.0 | 4218.6 | 4251.3 | 4243.5 |
| 7.5°   | 4251.3 | 4226.9 | 4181.5 | 4214.7 | 4206.4 |
| 10°    | 4206.4 | 4177.5 | 4128.2 | 4160.9 | 4148.7 |
| 12.5°  | 4144.4 | 4119.9 | 4070.6 | 4091.1 | 4082.8 |
| 15°    | 4074.5 | 4050.0 | 3996.3 | 4012.9 | 3992.4 |
| 17.5°  | 3988.0 | 3963.6 | 3909.9 | 3930.4 | 3909.9 |
| 20°    | 3893.3 | 3868.8 | 3811.2 | 3823.4 | 3807.3 |
| 22.5°  | 3799.0 | 3761.8 | 3708.1 | 3708.1 | 3699.8 |
| 25°    | 3687.6 | 3654.9 | 3585.0 | 3592.9 | 3585.0 |
| 27.5°  | 3564.0 | 3535.2 | 3481.9 | 3469.7 | 3449.2 |
| 30°    | 3440.9 | 3407.7 | 3346.1 | 3333.9 | 3317.3 |
| 32.5°  | 3309.0 | 3284.6 | 3218.6 | 3193.7 | 3177.1 |
| 35°    | 3181.5 | 3140.5 | 3074.5 | 3049.6 | 3029.1 |
| 37.5°  | 3037.4 | 3000.3 | 2934.4 | 2905.5 | 2885.0 |
| 40°    | 2889.4 | 2856.2 | 2790.3 | 2753.6 | 2737.0 |
| 42.5°  | 2745.3 | 2712.1 | 2646.6 | 2605.1 | 2580.7 |
| 45°    | 2589.0 | 2560.1 | 2498.1 | 2453.2 | 2436.6 |
| 47.5°  | 2436.6 | 2407.8 | 2341.8 | 2296.4 | 2271.9 |
| 50°    | 2275.9 | 2255.4 | 2197.7 | 2140.1 | 2119.6 |
| 52.5°  | 2119.6 | 2090.7 | 2037.5 | 1992.0 | 1963.2 |
| 55°    | 1959.3 | 1934.4 | 1885.1 | 1835.7 | 1815.2 |
| 57.5°  | 1798.6 | 1778.1 | 1724.4 | 1675.0 | 1658.4 |
| 60°    | 1637.9 | 1621.8 | 1564.1 | 1518.7 | 1506.5 |
| 62.5°  | 1481.6 | 1452.8 | 1411.7 | 1370.7 | 1354.1 |
| 65°    | 1321.3 | 1296.4 | 1255.4 | 1218.3 | 1197.8 |
| 67.5°  | 1156.7 | 1135.8 | 1099.1 | 1070.3 | 1053.7 |
| 70°    | 1004.3 | 987.7  | 950.6  | 921.8  | 905.6  |
| 72.5°  | 848.0  | 831.4  | 810.9  | 782.1  | 769.8  |
| 75°    | 691.2  | 683.4  | 662.4  | 638.0  | 646.3  |
| 77.5°  | 551.5  | 534.9  | 526.6  | 514.4  | 502.2  |
| 80°    | 411.8  | 407.4  | 399.1  | 386.9  | 378.6  |
| 82.5°  | 279.9  | 279.9  | 276.0  | 259.4  | 259.4  |
| 85°    | 168.6  | 164.6  | 160.7  | 148.0  | 144.1  |
| 87.5°  | 74.2   | 65.9   | 57.6   | 45.4   | 41.0   |
| 90°    | 3.7    | 46.9   | 77.9   | 97.9   | 105.3  |
| 92.5°  | 97.9   | 82.1   | 93.7   | 101.6  | 105.3  |
| 95°    | 253.8  | 124.8  | 152.2  | 172.1  | 168.0  |
| 97.5°  | 457.0  | 136.9  | 199.0  | 211.1  | 214.8  |
| 100°   | 691.8  | 156.4  | 222.7  | 253.8  | 261.7  |
| 102.5° | 949.3  | 941.9  | 230.6  | 273.3  | 285.3  |
| 105°   | 1187.8 | 1305.2 | 238.5  | 281.2  | 296.9  |
| 107.5° | 1465.2 | 1562.7 | 246.4  | 289.1  | 304.8  |
| 110°   | 1731.1 | 1812.8 | 683.9  | 293.2  | 308.5  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1981.2 | 2051.3 | 1984.9 | 300.7  | 312.7  |
| 115°   | 2246.6 | 2312.9 | 2410.8 | 601.8  | 320.6  |
| 117.5° | 2477.2 | 2555.1 | 2622.0 | 2062.9 | 1039.3 |
| 120°   | 2735.2 | 2793.6 | 2864.1 | 2911.0 | 2383.5 |
| 122.5° | 2953.7 | 3016.3 | 3094.7 | 3117.9 | 3122.1 |
| 125°   | 3176.4 | 3227.4 | 3301.7 | 3329.1 | 3340.7 |
| 127.5° | 3379.6 | 3434.4 | 3493.3 | 3532.3 | 3536.0 |
| 130°   | 3571.3 | 3633.9 | 3676.6 | 3719.7 | 3716.0 |
| 132.5° | 3766.6 | 3817.6 | 3860.3 | 3895.6 | 3891.9 |
| 135°   | 3930.8 | 3993.5 | 4028.3 | 4067.7 | 4059.8 |
| 137.5° | 4102.5 | 4149.4 | 4188.8 | 4227.8 | 4216.2 |
| 140°   | 4270.5 | 4302.0 | 4344.7 | 4380.0 | 4360.5 |
| 142.5° | 4411.5 | 4438.9 | 4489.5 | 4520.6 | 4501.1 |
| 145°   | 4560.0 | 4555.8 | 4622.2 | 4649.5 | 4630.1 |
| 147.5° | 4688.5 | 4676.9 | 4743.3 | 4762.8 | 4747.4 |
| 150°   | 4813.8 | 4786.4 | 4849.1 | 4872.3 | 4852.8 |
| 152.5° | 4919.1 | 4888.0 | 4946.5 | 4970.2 | 4942.8 |
| 155°   | 5020.7 | 4985.9 | 5032.8 | 5056.0 | 5024.9 |
| 157.5° | 5102.9 | 5071.8 | 5107.0 | 5134.4 | 5102.9 |
| 160°   | 5173.4 | 5149.7 | 5173.4 | 5196.6 | 5169.2 |
| 162.5° | 5235.6 | 5212.4 | 5231.8 | 5259.2 | 5224.0 |
| 165°   | 5290.3 | 5267.1 | 5278.7 | 5306.1 | 5278.7 |
| 167.5° | 5333.5 | 5309.8 | 5321.9 | 5349.2 | 5314.0 |
| 170°   | 5368.7 | 5345.1 | 5352.9 | 5380.3 | 5345.1 |
| 172.5° | 5391.9 | 5368.7 | 5376.6 | 5404.0 | 5368.7 |
| 175°   | 5411.4 | 5384.0 | 5391.9 | 5419.3 | 5380.3 |
| 177.5° | 5419.3 | 5391.9 | 5396.1 | 5423.5 | 5388.2 |
| 180°   | 5399.8 | 5399.8 | 5399.8 | 5399.8 | 5399.8 |



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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |       |       |       |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7   | 0.5   | 0.5   | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3   | 0.5   | 0.3   | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2   | 0.2   | 0.2   | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X=2H            | Y=2H | 10.19            | 10.97 | 11.22 | 12.01 | 13.41 | 9.74           | 10.53 | 10.78 | 11.57 | 12.96 |
|                 | 3H   | 11.85            | 12.55 | 12.89 | 13.60 | 15.01 | 11.36          | 12.06 | 12.40 | 13.11 | 14.52 |
|                 | 4H   | 12.43            | 13.10 | 13.49 | 14.15 | 15.57 | 11.94          | 12.61 | 12.99 | 13.66 | 15.08 |
|                 | 6H   | 12.83            | 13.45 | 13.90 | 14.50 | 15.94 | 12.33          | 12.95 | 13.40 | 14.00 | 15.44 |
|                 | 8H   | 12.94            | 13.52 | 14.01 | 14.59 | 16.02 | 12.44          | 13.02 | 13.50 | 14.09 | 15.52 |
|                 | 12H  | 12.99            | 13.54 | 14.06 | 14.60 | 16.06 | 12.48          | 13.03 | 13.55 | 14.09 | 15.55 |
| 4H              | 2H   | 10.64            | 11.31 | 11.70 | 12.36 | 13.78 | 10.29          | 10.95 | 11.35 | 12.00 | 13.43 |
|                 | 3H   | 12.50            | 13.06 | 13.57 | 14.14 | 15.57 | 12.10          | 12.65 | 13.16 | 13.73 | 15.17 |
|                 | 4H   | 13.22            | 13.73 | 14.29 | 14.80 | 16.26 | 12.79          | 13.30 | 13.87 | 14.37 | 15.83 |
|                 | 6H   | 13.73            | 14.17 | 14.82 | 15.26 | 16.72 | 13.30          | 13.74 | 14.38 | 14.83 | 16.28 |
|                 | 8H   | 13.88            | 14.29 | 14.97 | 15.38 | 16.84 | 13.45          | 13.85 | 14.53 | 14.94 | 16.41 |
|                 | 12H  | 13.95            | 14.32 | 15.06 | 15.42 | 16.90 | 13.51          | 13.88 | 14.61 | 14.97 | 16.45 |
| 8H              | 4H   | 13.41            | 13.82 | 14.49 | 14.90 | 16.37 | 13.03          | 13.44 | 14.12 | 14.53 | 15.99 |
|                 | 6H   | 14.04            | 14.38 | 15.15 | 15.51 | 16.97 | 13.66          | 14.00 | 14.76 | 15.12 | 16.59 |
|                 | 8H   | 14.26            | 14.56 | 15.38 | 15.67 | 17.15 | 13.87          | 14.17 | 14.99 | 15.28 | 16.76 |
|                 | 12H  | 14.40            | 14.66 | 15.51 | 15.76 | 17.28 | 13.98          | 14.25 | 15.10 | 15.35 | 16.87 |
| 12H             | 4H   | 13.39            | 13.76 | 14.49 | 14.86 | 16.33 | 13.02          | 13.39 | 14.12 | 14.49 | 15.96 |
|                 | 6H   | 14.07            | 14.37 | 15.18 | 15.48 | 16.96 | 13.70          | 14.00 | 14.81 | 15.10 | 16.59 |
|                 | 8H   | 14.31            | 14.57 | 15.43 | 15.68 | 17.20 | 13.93          | 14.19 | 15.05 | 15.30 | 16.82 |