

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: P927078

Luminaire Tested: DFN2DIP-HX4F0-090D100US830-RLLONL

Issue Date: 12/12/2024

**Test Information**

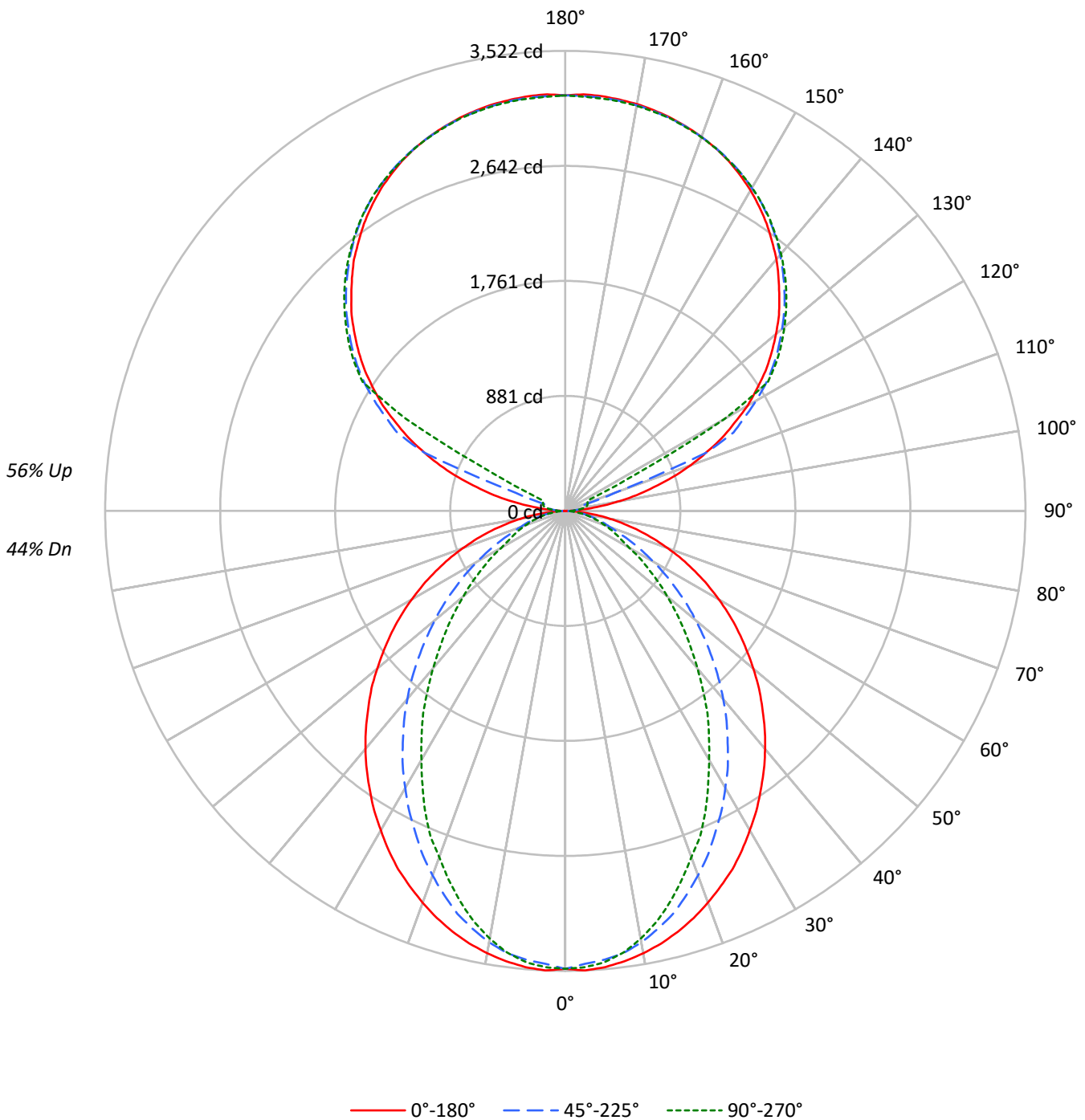
Test Method: LM-79-2019  
Report Number: P927078  
REPORT IS A COMBINATION OF REPORTS P900938 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D100US830-RLONL  
Description: 4 foot, Hexagon Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 16540.9 lumens  
Efficiency: N/A  
Efficacy: 100.4 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse  
  
Input Watts (W): 164.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9821  
Total Harmonic Distortion (THDi): 0.08  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

TEST NUMBER: P927078  
CATALOG NUMBER: DFN2DIP-HX4F0-090D100US830-RLLONL

### Luminous Intensity Polar Plot





TEST NUMBER: P927078  
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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 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0 |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |
| 0   | 106 | 106 | 106 | 106 | 97 | 97 | 97 | 97 | 80 | 80 | 80 | 64 | 64 | 64 | 50 | 50 | 50 | 44 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 44 |  |  |  |  |  |  |  |  |    |
| 1   | 97  | 93  | 89  | 86  | 88 | 85 | 82 | 79 | 71 | 68 | 66 | 57 | 56 | 54 | 45 | 44 | 43 | 38 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 38 |  |  |  |  |  |  |  |  |    |
| 2   | 88  | 81  | 76  | 71  | 81 | 75 | 70 | 65 | 62 | 59 | 56 | 51 | 48 | 46 | 40 | 39 | 37 | 32 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 32 |  |  |  |  |  |  |  |  |    |
| 3   | 81  | 72  | 65  | 59  | 74 | 66 | 60 | 55 | 55 | 51 | 47 | 45 | 42 | 39 | 36 | 34 | 32 | 28 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 28 |  |  |  |  |  |  |  |  |    |
| 4   | 74  | 64  | 56  | 50  | 68 | 59 | 52 | 47 | 49 | 44 | 41 | 41 | 37 | 34 | 32 | 30 | 28 | 24 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 24 |  |  |  |  |  |  |  |  |    |
| 5   | 68  | 57  | 49  | 43  | 62 | 53 | 46 | 41 | 44 | 39 | 35 | 37 | 33 | 30 | 29 | 27 | 25 | 21 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 21 |  |  |  |  |  |  |  |  |    |
| 6   | 63  | 51  | 43  | 38  | 58 | 47 | 41 | 36 | 40 | 35 | 31 | 33 | 29 | 26 | 27 | 24 | 22 | 19 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 19 |  |  |  |  |  |  |  |  |    |
| 7   | 58  | 46  | 39  | 33  | 53 | 43 | 36 | 31 | 36 | 31 | 27 | 30 | 26 | 23 | 25 | 22 | 20 | 17 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 17 |  |  |  |  |  |  |  |  |    |
| 8   | 54  | 42  | 35  | 30  | 50 | 39 | 32 | 28 | 33 | 28 | 24 | 28 | 24 | 21 | 23 | 20 | 18 | 15 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 15 |  |  |  |  |  |  |  |  |    |
| 9   | 50  | 39  | 31  | 26  | 46 | 36 | 29 | 25 | 31 | 25 | 22 | 26 | 22 | 19 | 21 | 18 | 16 | 14 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 14 |  |  |  |  |  |  |  |  |    |
| 10  | 47  | 35  | 28  | 24  | 43 | 33 | 27 | 22 | 28 | 23 | 20 | 24 | 20 | 17 | 20 | 17 | 15 | 13 |    |    |    |    |    |    |    |    |    |    |    |   |  |  |  |  |  |  | 13 |  |  |  |  |  |  |  |  |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2607 | 2607 | 2607 |
| 5°  | 2611 | 2566 | 2582 |
| 10° | 2586 | 2516 | 2498 |
| 15° | 2550 | 2433 | 2368 |
| 20° | 2503 | 2318 | 2209 |
| 25° | 2455 | 2190 | 2055 |
| 30° | 2391 | 2059 | 1860 |
| 35° | 2328 | 1917 | 1689 |
| 40° | 2263 | 1771 | 1492 |
| 45° | 2188 | 1608 | 1314 |
| 50° | 2111 | 1444 | 1140 |
| 55° | 2031 | 1269 | 973  |
| 60° | 1937 | 1086 | 801  |
| 65° | 1830 | 899  | 721  |
| 70° | 1700 | 726  | 653  |
| 75° | 1537 | 640  | 594  |
| 80° | 1300 | 538  | 516  |
| 85° | 909  | 360  | 388  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
 Vertical Angle: 45°  
 Luminance: 2188 cd/sqm



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 328.6   | 2.0       |
| 10°-20°   | 902.0   | 5.5       |
| 20°-30°   | 1266.4  | 7.7       |
| 30°-40°   | 1380.4  | 8.3       |
| 40°-50°   | 1268.7  | 7.7       |
| 50°-60°   | 996.4   | 6.0       |
| 60°-70°   | 648.6   | 3.9       |
| 70°-80°   | 333.9   | 2.0       |
| 80°-90°   | 90.8    | 0.5       |
| 90°-100°  | 104.9   | 0.6       |
| 100°-110° | 391.0   | 2.4       |
| 110°-120° | 1037.0  | 6.3       |
| 120°-130° | 1719.9  | 10.4      |
| 130°-140° | 1827.0  | 11.0      |
| 140°-150° | 1697.9  | 10.3      |
| 150°-160° | 1365.1  | 8.3       |
| 160°-170° | 879.6   | 5.3       |
| 170°-180° | 302.8   | 1.8       |
| 0°-30°    | 2496.9  | 15.1      |
| 0°-40°    | 3877.3  | 23.4      |
| 0°-60°    | 6142.5  | 37.1      |
| 0°-90°    | 7215.7  | 43.6      |
| 90°-120°  | 1532.9  | 9.3       |
| 90°-150°  | 6777.7  | 41.0      |
| 90°-180°  | 9325.0  | 56.4      |
| 0°-180°   | 16540.9 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3506 | 3506  | 3506 | 3506  | 3506 |      |
| 5°   | 3506 | 3490  | 3449 | 3477  | 3468 | 332  |
| 15°  | 3334 | 3300  | 3192 | 3132  | 3100 | 940  |
| 25°  | 3027 | 2925  | 2716 | 2586  | 2538 | 1392 |
| 35°  | 2608 | 2446  | 2167 | 1967  | 1897 | 1632 |
| 45°  | 2132 | 1919  | 1586 | 1361  | 1285 | 1647 |
| 55°  | 1621 | 1374  | 1031 | 841   | 781  | 1449 |
| 65°  | 1095 | 838   | 552  | 444   | 435  | 1085 |
| 75°  | 584  | 362   | 254  | 232   | 229  | 617  |
| 85°  | 136  | 70    | 60   | 60    | 60   | 156  |
| 90°  | 2    | 28    | 46   | 58    | 62   | 15   |
| 95°  | 150  | 74    | 90   | 101   | 99   | 177  |
| 105° | 700  | 769   | 140  | 166   | 175  | 748  |
| 115° | 1323 | 1362  | 1420 | 354   | 189  | 1303 |
| 125° | 1871 | 1901  | 1945 | 1961  | 1968 | 1669 |
| 135° | 2316 | 2352  | 2373 | 2396  | 2392 | 1789 |
| 145° | 2686 | 2684  | 2723 | 2739  | 2727 | 1680 |
| 155° | 2958 | 2937  | 2965 | 2978  | 2960 | 1363 |
| 165° | 3116 | 3103  | 3110 | 3126  | 3110 | 880  |
| 175° | 3188 | 3172  | 3176 | 3192  | 3169 | 303  |
| 180° | 3181 | 3181  | 3181 | 3181  | 3181 |      |



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CATALOG NUMBER: DFN2DIP-HX4F0-090D100US830-RLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3505.8 | 3505.8 | 3505.8 | 3505.8 | 3505.8 |
| 2.5°   | 3521.7 | 3505.8 | 3470.8 | 3502.8 | 3496.4 |
| 5°     | 3505.8 | 3490.0 | 3448.6 | 3477.2 | 3467.7 |
| 7.5°   | 3477.2 | 3458.3 | 3413.9 | 3426.4 | 3410.5 |
| 10°    | 3439.2 | 3416.9 | 3353.7 | 3343.9 | 3325.0 |
| 12.5°  | 3391.7 | 3363.1 | 3277.3 | 3258.4 | 3223.4 |
| 15°    | 3334.5 | 3299.5 | 3191.8 | 3131.5 | 3099.9 |
| 17.5°  | 3267.8 | 3217.0 | 3083.7 | 3014.0 | 2963.2 |
| 20°    | 3191.8 | 3128.2 | 2969.5 | 2890.5 | 2820.4 |
| 22.5°  | 3109.3 | 3036.3 | 2852.1 | 2744.4 | 2697.0 |
| 25°    | 3026.8 | 2925.1 | 2715.8 | 2585.8 | 2538.1 |
| 27.5°  | 2928.5 | 2820.4 | 2588.9 | 2439.8 | 2366.7 |
| 30°    | 2823.8 | 2703.0 | 2449.2 | 2287.6 | 2201.8 |
| 32.5°  | 2722.1 | 2576.0 | 2316.2 | 2125.7 | 2046.3 |
| 35°    | 2608.1 | 2446.2 | 2167.1 | 1967.2 | 1897.2 |
| 37.5°  | 2497.0 | 2322.3 | 2027.4 | 1808.3 | 1729.2 |
| 40°    | 2379.5 | 2189.3 | 1881.3 | 1656.2 | 1573.7 |
| 42.5°  | 2259.0 | 2056.1 | 1735.5 | 1500.6 | 1421.5 |
| 45°    | 2132.1 | 1919.4 | 1586.4 | 1360.9 | 1284.8 |
| 47.5°  | 2011.6 | 1786.4 | 1443.7 | 1218.2 | 1148.5 |
| 50°    | 1878.3 | 1653.1 | 1304.0 | 1084.9 | 1018.6 |
| 52.5°  | 1748.1 | 1510.1 | 1170.8 | 961.4  | 901.1  |
| 55°    | 1621.1 | 1373.7 | 1031.0 | 840.9  | 780.6  |
| 57.5°  | 1491.2 | 1237.4 | 907.5  | 729.8  | 679.0  |
| 60°    | 1357.9 | 1104.0 | 777.3  | 615.6  | 564.8  |
| 62.5°  | 1228.0 | 974.2  | 666.2  | 514.0  | 488.8  |
| 65°    | 1094.6 | 837.5  | 552.0  | 444.3  | 434.6  |
| 67.5°  | 967.8  | 710.6  | 444.3  | 390.1  | 380.7  |
| 70°    | 834.5  | 587.1  | 368.0  | 336.3  | 323.5  |
| 72.5°  | 707.5  | 472.6  | 307.6  | 282.4  | 276.1  |
| 75°    | 583.7  | 361.5  | 253.8  | 231.6  | 228.6  |
| 77.5°  | 460.1  | 256.8  | 199.9  | 187.2  | 180.8  |
| 80°    | 345.7  | 184.2  | 152.1  | 139.7  | 139.7  |
| 82.5°  | 241.0  | 123.8  | 104.7  | 98.3   | 98.3   |
| 85°    | 136.3  | 69.7   | 60.2   | 60.2   | 60.2   |
| 87.5°  | 50.8   | 25.3   | 25.3   | 22.2   | 22.2   |
| 90°    | 2.2    | 27.6   | 45.9   | 57.7   | 62.0   |
| 92.5°  | 57.7   | 48.4   | 55.2   | 59.8   | 62.0   |
| 95°    | 149.5  | 73.5   | 89.6   | 101.4  | 99.0   |
| 97.5°  | 269.2  | 80.6   | 117.2  | 124.3  | 126.6  |
| 100°   | 407.5  | 92.1   | 131.2  | 149.5  | 154.2  |
| 102.5° | 559.2  | 554.8  | 135.8  | 161.0  | 168.0  |
| 105°   | 699.7  | 768.8  | 140.5  | 165.6  | 174.9  |
| 107.5° | 863.1  | 920.5  | 145.1  | 170.3  | 179.5  |
| 110°   | 1019.7 | 1067.9 | 402.8  | 172.8  | 181.7  |



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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1167.0 | 1208.3 | 1169.3 | 177.1  | 184.3  |
| 115°   | 1323.4 | 1362.5 | 1420.2 | 354.5  | 188.9  |
| 117.5° | 1459.2 | 1505.2 | 1544.5 | 1215.2 | 612.2  |
| 120°   | 1611.2 | 1645.6 | 1687.2 | 1714.8 | 1404.0 |
| 122.5° | 1739.9 | 1776.8 | 1823.0 | 1836.6 | 1839.1 |
| 125°   | 1871.1 | 1901.2 | 1944.9 | 1961.1 | 1967.8 |
| 127.5° | 1990.8 | 2023.1 | 2057.8 | 2080.8 | 2082.9 |
| 130°   | 2103.7 | 2140.6 | 2165.8 | 2191.1 | 2189.0 |
| 132.5° | 2218.7 | 2248.8 | 2274.0 | 2294.7 | 2292.5 |
| 135°   | 2315.5 | 2352.4 | 2372.9 | 2396.1 | 2391.5 |
| 137.5° | 2416.7 | 2444.3 | 2467.5 | 2490.5 | 2483.6 |
| 140°   | 2515.5 | 2534.2 | 2559.3 | 2580.1 | 2568.6 |
| 142.5° | 2598.7 | 2614.8 | 2644.6 | 2662.8 | 2651.4 |
| 145°   | 2686.1 | 2683.7 | 2722.8 | 2738.9 | 2727.4 |
| 147.5° | 2761.8 | 2755.0 | 2794.0 | 2805.5 | 2796.6 |
| 150°   | 2835.6 | 2819.5 | 2856.4 | 2870.1 | 2858.6 |
| 152.5° | 2897.6 | 2879.3 | 2913.8 | 2927.7 | 2911.6 |
| 155°   | 2957.6 | 2937.0 | 2964.6 | 2978.3 | 2960.0 |
| 157.5° | 3005.9 | 2987.6 | 3008.4 | 3024.5 | 3005.9 |
| 160°   | 3047.5 | 3033.5 | 3047.5 | 3061.1 | 3045.0 |
| 162.5° | 3084.0 | 3070.4 | 3081.9 | 3098.0 | 3077.3 |
| 165°   | 3116.3 | 3102.6 | 3109.5 | 3125.6 | 3109.5 |
| 167.5° | 3141.7 | 3127.8 | 3134.9 | 3151.1 | 3130.2 |
| 170°   | 3162.5 | 3148.6 | 3153.2 | 3169.3 | 3148.6 |
| 172.5° | 3176.1 | 3162.5 | 3167.2 | 3183.3 | 3162.5 |
| 175°   | 3187.6 | 3171.5 | 3176.1 | 3192.3 | 3169.3 |
| 177.5° | 3192.3 | 3176.1 | 3178.7 | 3194.8 | 3174.0 |
| 180°   | 3180.8 | 3180.8 | 3180.8 | 3180.8 | 3180.8 |



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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 | 9.85             | 10.63 | 10.87 | 11.65 | 13.01 | 5.82           | 6.61 | 6.84  | 7.63  | 8.99  |
|                 | 3H   | 11.53            | 12.22 | 12.55 | 13.25 | 14.64 | 7.01           | 7.71 | 8.04  | 8.74  | 10.12 |
|                 | 4H   | 12.13            | 12.79 | 13.17 | 13.83 | 15.22 | 7.46           | 8.12 | 8.50  | 9.15  | 10.54 |
|                 | 6H   | 12.55            | 13.16 | 13.60 | 14.20 | 15.60 | 7.78           | 8.39 | 8.83  | 9.43  | 10.83 |
|                 | 8H   | 12.68            | 13.26 | 13.73 | 14.31 | 15.71 | 7.87           | 8.45 | 8.92  | 9.50  | 10.90 |
|                 | 12H  | 12.74            | 13.29 | 13.80 | 14.33 | 15.75 | 7.91           | 8.46 | 8.97  | 9.51  | 10.93 |
| 4H              | 2H   | 9.86             | 10.52 | 10.91 | 11.56 | 12.95 | 6.41           | 7.07 | 7.46  | 8.11  | 9.50  |
|                 | 3H   | 11.69            | 12.24 | 12.74 | 13.30 | 14.70 | 7.76           | 8.31 | 8.81  | 9.37  | 10.77 |
|                 | 4H   | 12.38            | 12.88 | 13.44 | 13.94 | 15.36 | 8.31           | 8.81 | 9.37  | 9.86  | 11.29 |
|                 | 6H   | 12.89            | 13.33 | 13.96 | 14.40 | 15.82 | 8.73           | 9.16 | 9.80  | 10.23 | 11.65 |
|                 | 8H   | 13.07            | 13.47 | 14.14 | 14.54 | 15.97 | 8.86           | 9.26 | 9.93  | 10.33 | 11.76 |
|                 | 12H  | 13.16            | 13.53 | 14.25 | 14.61 | 16.05 | 8.92           | 9.28 | 10.01 | 10.37 | 11.81 |
| 8H              | 4H   | 12.34            | 12.75 | 13.41 | 13.82 | 15.25 | 8.59           | 8.99 | 9.66  | 10.06 | 11.49 |
|                 | 6H   | 12.91            | 13.24 | 14.00 | 14.35 | 15.78 | 9.11           | 9.44 | 10.20 | 10.55 | 11.98 |
|                 | 8H   | 13.13            | 13.42 | 14.23 | 14.51 | 15.96 | 9.30           | 9.59 | 10.40 | 10.68 | 12.13 |
|                 | 12H  | 13.26            | 13.52 | 14.37 | 14.61 | 16.10 | 9.42           | 9.67 | 10.52 | 10.76 | 12.25 |
| 12H             | 4H   | 12.29            | 12.66 | 13.38 | 13.74 | 15.18 | 8.59           | 8.95 | 9.68  | 10.03 | 11.47 |
|                 | 6H   | 12.89            | 13.18 | 13.98 | 14.27 | 15.72 | 9.15           | 9.45 | 10.25 | 10.54 | 11.99 |
|                 | 8H   | 13.11            | 13.36 | 14.21 | 14.45 | 15.94 | 9.36           | 9.62 | 10.47 | 10.71 | 12.20 |