

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: P929020

Luminaire Tested: DFN2DIP-HX4F0-090D100US935-FLLONL

Issue Date: 12/12/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P929020  
REPORT IS A COMBINATION OF REPORTS P900937 AND P896187  
Test Lab: INNOVATION CENTER  
Issue Date: 12/12/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-HX4F0-090D100US935-FLLONL  
Description: 4 foot, Hexagon Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

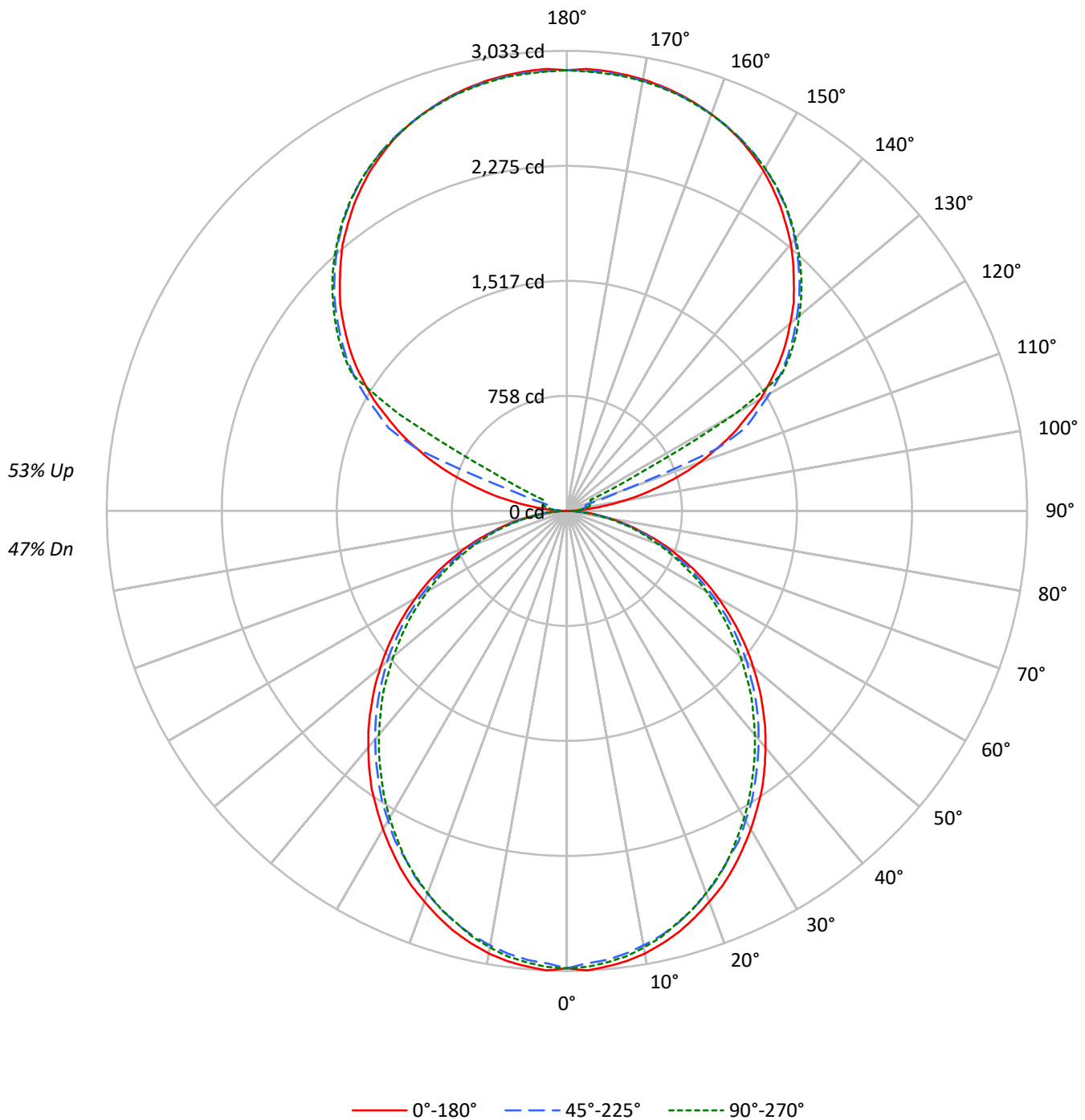
Lumens per Lamp: N/A  
Luminaire Lumens: 16195.5 lumens  
Efficiency: N/A  
Efficacy: 98.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.54' x L: 4.09' x H: 0.1')  
CIE Type: General Diffuse

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: P929020

CATALOG NUMBER: DFN2DIP-HX4F0-090D100US935-FLLONL

### Luminous Intensity Polar Plot



TEST NUMBER: P929020

CATALOG NUMBER: DFN2DIP-HX4F0-090D100US935-FLLONL

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

|     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20 |    |    |    |    | 20 |    |    |    |    | 20 |    |    |    |    | 20 |
| RC  | 80  |     |     |     | 70 |    |    |    |    | 50 |    |    |    |    | 30 |    |    |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 107 | 107 | 107 | 107 | 98 | 98 | 98 | 98 | 82 | 82 | 82 | 67 | 67 | 67 | 54 | 54 | 54 | 47 | 47 | 47 |
| 1   | 97  | 93  | 89  | 86  | 89 | 86 | 82 | 79 | 72 | 69 | 67 | 59 | 57 | 56 | 47 | 46 | 45 | 40 | 40 | 40 |
| 2   | 89  | 81  | 75  | 70  | 81 | 75 | 70 | 65 | 63 | 59 | 56 | 52 | 49 | 47 | 42 | 40 | 38 | 33 | 33 | 33 |
| 3   | 81  | 71  | 64  | 58  | 74 | 66 | 59 | 54 | 55 | 51 | 47 | 46 | 42 | 40 | 37 | 35 | 33 | 28 | 28 | 28 |
| 4   | 74  | 63  | 55  | 49  | 68 | 58 | 51 | 46 | 49 | 44 | 40 | 41 | 37 | 34 | 33 | 30 | 28 | 24 | 24 | 24 |
| 5   | 68  | 56  | 48  | 42  | 62 | 52 | 45 | 40 | 44 | 39 | 34 | 37 | 33 | 29 | 30 | 27 | 24 | 21 | 21 | 21 |
| 6   | 62  | 50  | 42  | 37  | 57 | 47 | 40 | 34 | 40 | 34 | 30 | 33 | 29 | 26 | 27 | 24 | 22 | 19 | 19 | 19 |
| 7   | 58  | 45  | 38  | 32  | 53 | 42 | 35 | 30 | 36 | 30 | 26 | 30 | 26 | 23 | 25 | 22 | 19 | 16 | 16 | 16 |
| 8   | 54  | 41  | 34  | 28  | 49 | 38 | 31 | 27 | 33 | 27 | 23 | 28 | 23 | 20 | 23 | 20 | 17 | 15 | 15 | 15 |
| 9   | 50  | 38  | 30  | 25  | 46 | 35 | 28 | 24 | 30 | 25 | 21 | 25 | 21 | 18 | 21 | 18 | 15 | 13 | 13 | 13 |
| 10  | 47  | 35  | 27  | 23  | 43 | 32 | 26 | 21 | 28 | 22 | 19 | 23 | 19 | 16 | 19 | 16 | 14 | 12 | 12 | 12 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2242 | 2242 | 2242 |
| 5°  | 2246 | 2211 | 2226 |
| 10° | 2228 | 2181 | 2196 |
| 15° | 2195 | 2146 | 2149 |
| 20° | 2151 | 2096 | 2101 |
| 25° | 2107 | 2037 | 2045 |
| 30° | 2052 | 1981 | 1974 |
| 35° | 2000 | 1916 | 1899 |
| 40° | 1936 | 1850 | 1828 |
| 45° | 1872 | 1784 | 1755 |
| 50° | 1802 | 1715 | 1671 |
| 55° | 1729 | 1634 | 1594 |
| 60° | 1646 | 1539 | 1505 |
| 65° | 1556 | 1441 | 1400 |
| 70° | 1441 | 1321 | 1287 |
| 75° | 1282 | 1177 | 1183 |
| 80° | 1091 | 994  | 984  |
| 85° | 791  | 677  | 655  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°  
Vertical Angle: 45°  
Luminance: 1872 cd/sqm

TEST NUMBER: P929020

CATALOG NUMBER: DFN2DIP-HX4F0-090D100US935-FLLONL

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 283.8   | 1.8       |
| 10°-20°   | 798.5   | 4.9       |
| 20°-30°   | 1173.4  | 7.2       |
| 30°-40°   | 1362.9  | 8.4       |
| 40°-50°   | 1361.2  | 8.4       |
| 50°-60°   | 1186.9  | 7.3       |
| 60°-70°   | 877.4   | 5.4       |
| 70°-80°   | 496.4   | 3.1       |
| 80°-90°   | 136.1   | 0.8       |
| 90°-100°  | 95.8    | 0.6       |
| 100°-110° | 357.2   | 2.2       |
| 110°-120° | 947.3   | 5.8       |
| 120°-130° | 1571.2  | 9.7       |
| 130°-140° | 1669.0  | 10.3      |
| 140°-150° | 1551.1  | 9.6       |
| 150°-160° | 1247.1  | 7.7       |
| 160°-170° | 803.6   | 5.0       |
| 170°-180° | 276.6   | 1.7       |
| 0°-30°    | 2255.7  | 13.9      |
| 0°-40°    | 3618.6  | 22.3      |
| 0°-60°    | 6166.7  | 38.1      |
| 0°-90°    | 7676.7  | 47.4      |
| 90°-120°  | 1400.3  | 8.6       |
| 90°-150°  | 6191.6  | 38.2      |
| 90°-180°  | 8519.0  | 52.6      |
| 0°-180°   | 16195.5 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3015 | 3015  | 3015 | 3015  | 3015 |      |
| 5°   | 3015 | 3004  | 2972 | 2995  | 2989 | 286  |
| 15°  | 2870 | 2853  | 2815 | 2827  | 2812 | 808  |
| 25°  | 2598 | 2575  | 2526 | 2531  | 2526 | 1195 |
| 35°  | 2241 | 2212  | 2166 | 2148  | 2134 | 1400 |
| 45°  | 1824 | 1804  | 1760 | 1728  | 1716 | 1408 |
| 55°  | 1380 | 1363  | 1328 | 1293  | 1279 | 1234 |
| 65°  | 931  | 913   | 884  | 858   | 844  | 920  |
| 75°  | 487  | 481   | 467  | 449   | 455  | 520  |
| 85°  | 119  | 116   | 113  | 104   | 102  | 132  |
| 90°  | 2    | 25    | 42   | 53    | 57   | 15   |
| 95°  | 137  | 67    | 82   | 93    | 90   | 162  |
| 105° | 639  | 702   | 128  | 151   | 160  | 683  |
| 115° | 1209 | 1245  | 1297 | 324   | 172  | 1190 |
| 125° | 1709 | 1737  | 1777 | 1792  | 1798 | 1525 |
| 135° | 2115 | 2149  | 2168 | 2189  | 2185 | 1634 |
| 145° | 2454 | 2452  | 2487 | 2502  | 2492 | 1535 |
| 155° | 2702 | 2683  | 2708 | 2721  | 2704 | 1245 |
| 165° | 2847 | 2834  | 2841 | 2855  | 2841 | 804  |
| 175° | 2912 | 2897  | 2902 | 2916  | 2895 | 277  |
| 180° | 2906 | 2906  | 2906 | 2906  | 2906 |      |

TEST NUMBER: P929020

CATALOG NUMBER: DFN2DIP-HX4F0-090D100US935-FLLONL

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3015.1 | 3015.1 | 3015.1 | 3015.1 | 3015.1 |
| 2.5°   | 3032.7 | 3018.2 | 2986.3 | 3015.1 | 3009.6 |
| 5°     | 3015.1 | 3003.8 | 2971.8 | 2994.9 | 2989.3 |
| 7.5°   | 2994.9 | 2977.7 | 2945.7 | 2969.1 | 2963.2 |
| 10°    | 2963.2 | 2942.9 | 2908.1 | 2931.2 | 2922.6 |
| 12.5°  | 2919.5 | 2902.3 | 2867.6 | 2881.9 | 2876.2 |
| 15°    | 2870.3 | 2853.1 | 2815.2 | 2826.9 | 2812.5 |
| 17.5°  | 2809.4 | 2792.1 | 2754.3 | 2768.8 | 2754.3 |
| 20°    | 2742.6 | 2725.4 | 2684.8 | 2693.4 | 2682.0 |
| 22.5°  | 2676.2 | 2650.1 | 2612.2 | 2612.2 | 2606.3 |
| 25°    | 2597.7 | 2574.6 | 2525.5 | 2531.0 | 2525.5 |
| 27.5°  | 2510.7 | 2490.4 | 2452.9 | 2444.3 | 2429.8 |
| 30°    | 2424.0 | 2400.6 | 2357.2 | 2348.5 | 2336.9 |
| 32.5°  | 2331.1 | 2313.9 | 2267.4 | 2249.9 | 2238.2 |
| 35°    | 2241.3 | 2212.3 | 2165.8 | 2148.4 | 2133.9 |
| 37.5°  | 2139.8 | 2113.6 | 2067.1 | 2046.9 | 2032.4 |
| 40°    | 2035.4 | 2012.1 | 1965.6 | 1939.7 | 1928.1 |
| 42.5°  | 1933.9 | 1910.6 | 1864.4 | 1835.2 | 1818.0 |
| 45°    | 1823.8 | 1803.5 | 1759.8 | 1728.1 | 1716.5 |
| 47.5°  | 1716.5 | 1696.2 | 1649.7 | 1617.7 | 1600.5 |
| 50°    | 1603.3 | 1588.8 | 1548.2 | 1507.6 | 1493.1 |
| 52.5°  | 1493.1 | 1472.8 | 1435.3 | 1403.3 | 1383.0 |
| 55°    | 1380.3 | 1362.7 | 1327.9 | 1293.2 | 1278.8 |
| 57.5°  | 1267.0 | 1252.6 | 1214.8 | 1180.0 | 1168.3 |
| 60°    | 1153.8 | 1142.5 | 1101.8 | 1069.9 | 1061.3 |
| 62.5°  | 1043.7 | 1023.4 | 994.5  | 965.6  | 953.9  |
| 65°    | 930.8  | 913.3  | 884.3  | 858.2  | 843.8  |
| 67.5°  | 814.9  | 800.1  | 774.2  | 754.0  | 742.3  |
| 70°    | 707.5  | 695.8  | 669.7  | 649.4  | 638.0  |
| 72.5°  | 597.4  | 585.7  | 571.2  | 551.0  | 542.3  |
| 75°    | 487.0  | 481.4  | 466.7  | 449.4  | 455.3  |
| 77.5°  | 388.5  | 376.9  | 371.0  | 362.4  | 353.8  |
| 80°    | 290.1  | 287.0  | 281.1  | 272.5  | 266.7  |
| 82.5°  | 197.2  | 197.2  | 194.4  | 182.7  | 182.7  |
| 85°    | 118.7  | 116.0  | 113.2  | 104.3  | 101.5  |
| 87.5°  | 52.3   | 46.4   | 40.6   | 32.0   | 28.9   |
| 90°    | 2.0    | 25.2   | 41.9   | 52.7   | 56.7   |
| 92.5°  | 52.7   | 44.2   | 50.5   | 54.7   | 56.7   |
| 95°    | 136.6  | 67.2   | 81.9   | 92.6   | 90.4   |
| 97.5°  | 245.9  | 73.6   | 107.1  | 113.6  | 115.6  |
| 100°   | 372.3  | 84.1   | 119.9  | 136.6  | 140.9  |
| 102.5° | 510.8  | 506.9  | 124.1  | 147.1  | 153.5  |
| 105°   | 639.2  | 702.3  | 128.4  | 151.3  | 159.8  |
| 107.5° | 788.5  | 840.9  | 132.6  | 155.6  | 164.0  |
| 110°   | 931.5  | 975.5  | 368.0  | 157.8  | 166.0  |

TEST NUMBER: P929020

CATALOG NUMBER: DFN2DIP-HX4F0-090D100US935-FLLONL

**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1066.1 | 1103.8 | 1068.2 | 161.8  | 168.3  |
| 115°   | 1208.9 | 1244.7 | 1297.4 | 323.8  | 172.5  |
| 117.5° | 1333.0 | 1375.0 | 1410.9 | 1110.1 | 559.3  |
| 120°   | 1471.9 | 1503.3 | 1541.3 | 1566.5 | 1282.6 |
| 122.5° | 1589.5 | 1623.2 | 1665.3 | 1677.8 | 1680.1 |
| 125°   | 1709.3 | 1736.8 | 1776.8 | 1791.5 | 1797.7 |
| 127.5° | 1818.7 | 1848.1 | 1879.8 | 1900.8 | 1902.8 |
| 130°   | 1921.8 | 1955.5 | 1978.5 | 2001.7 | 1999.7 |
| 132.5° | 2026.9 | 2054.3 | 2077.3 | 2096.3 | 2094.3 |
| 135°   | 2115.3 | 2149.0 | 2167.7 | 2188.9 | 2184.7 |
| 137.5° | 2207.7 | 2232.9 | 2254.1 | 2275.1 | 2268.8 |
| 140°   | 2298.0 | 2315.1 | 2338.0 | 2357.0 | 2346.5 |
| 142.5° | 2373.9 | 2388.7 | 2415.9 | 2432.6 | 2422.2 |
| 145°   | 2453.8 | 2451.6 | 2487.3 | 2502.1 | 2491.6 |
| 147.5° | 2523.0 | 2516.8 | 2552.4 | 2562.9 | 2554.8 |
| 150°   | 2590.4 | 2575.7 | 2609.4 | 2621.9 | 2611.4 |
| 152.5° | 2647.1 | 2630.4 | 2661.9 | 2674.5 | 2659.8 |
| 155°   | 2701.8 | 2683.0 | 2708.3 | 2720.8 | 2704.1 |
| 157.5° | 2746.0 | 2729.3 | 2748.2 | 2762.9 | 2746.0 |
| 160°   | 2784.0 | 2771.2 | 2784.0 | 2796.4 | 2781.7 |
| 162.5° | 2817.4 | 2804.9 | 2815.4 | 2830.1 | 2811.2 |
| 165°   | 2846.8 | 2834.3 | 2840.6 | 2855.3 | 2840.6 |
| 167.5° | 2870.1 | 2857.3 | 2863.9 | 2878.6 | 2859.6 |
| 170°   | 2889.0 | 2876.3 | 2880.6 | 2895.3 | 2876.3 |
| 172.5° | 2901.5 | 2889.0 | 2893.3 | 2908.0 | 2889.0 |
| 175°   | 2912.0 | 2897.3 | 2901.5 | 2916.3 | 2895.3 |
| 177.5° | 2916.3 | 2901.5 | 2903.8 | 2918.5 | 2899.5 |
| 180°   | 2905.8 | 2905.8 | 2905.8 | 2905.8 | 2905.8 |

TEST NUMBER: P929020

CATALOG NUMBER: DFN2DIP-HX4F0-090D100US935-FLLONL

**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 | 9.83             | 10.67 | 10.81 | 11.66 | 12.97 | 9.40           | 10.24 | 10.38 | 11.23 | 12.54 |
|                 | 3H   | 11.49            | 12.24 | 12.48 | 13.25 | 14.57 | 11.02          | 11.77 | 12.01 | 12.77 | 14.10 |
|                 | 4H   | 12.08            | 12.79 | 13.08 | 13.80 | 15.13 | 11.61          | 12.32 | 12.61 | 13.32 | 14.66 |
|                 | 6H   | 12.48            | 13.13 | 13.49 | 14.14 | 15.49 | 12.00          | 12.66 | 13.02 | 13.67 | 15.02 |
|                 | 8H   | 12.58            | 13.21 | 13.60 | 14.23 | 15.58 | 12.11          | 12.73 | 13.13 | 13.76 | 15.10 |
|                 | 12H  | 12.63            | 13.22 | 13.66 | 14.24 | 15.62 | 12.15          | 12.74 | 13.17 | 13.76 | 15.13 |
| 4H              | 2H   | 10.29            | 11.00 | 11.30 | 12.01 | 13.35 | 9.95           | 10.66 | 10.96 | 11.66 | 13.00 |
|                 | 3H   | 12.16            | 12.75 | 13.18 | 13.78 | 15.14 | 11.76          | 12.36 | 12.78 | 13.39 | 14.74 |
|                 | 4H   | 12.87            | 13.42 | 13.90 | 14.44 | 15.81 | 12.47          | 13.01 | 13.49 | 14.03 | 15.41 |
|                 | 6H   | 13.39            | 13.85 | 14.42 | 14.90 | 16.27 | 12.98          | 13.44 | 14.01 | 14.49 | 15.86 |
|                 | 8H   | 13.54            | 13.97 | 14.57 | 15.01 | 16.40 | 13.12          | 13.56 | 14.16 | 14.60 | 15.99 |
|                 | 12H  | 13.61            | 14.00 | 14.66 | 15.06 | 16.45 | 13.19          | 13.58 | 14.24 | 14.64 | 16.03 |
| 8H              | 4H   | 13.07            | 13.50 | 14.10 | 14.55 | 15.93 | 12.71          | 13.14 | 13.74 | 14.19 | 15.57 |
|                 | 6H   | 13.70            | 14.06 | 14.76 | 15.14 | 16.53 | 13.34          | 13.70 | 14.40 | 14.78 | 16.16 |
|                 | 8H   | 13.92            | 14.24 | 14.99 | 15.31 | 16.71 | 13.55          | 13.87 | 14.62 | 14.94 | 16.34 |
|                 | 12H  | 14.05            | 14.33 | 15.12 | 15.39 | 16.84 | 13.67          | 13.95 | 14.74 | 15.01 | 16.45 |
| 12H             | 4H   | 13.05            | 13.45 | 14.11 | 14.50 | 15.89 | 12.70          | 13.09 | 13.75 | 14.15 | 15.54 |
|                 | 6H   | 13.73            | 14.05 | 14.80 | 15.11 | 16.52 | 13.38          | 13.69 | 14.45 | 14.76 | 16.16 |
|                 | 8H   | 13.97            | 14.25 | 15.04 | 15.31 | 16.76 | 13.61          | 13.89 | 14.69 | 14.96 | 16.40 |

END OF REPORT