

Scaled data based on original data using

LM-41-14 Approved Method for Photometric Testing Of Indoor Fluorescent Luminaires

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: METALUX

Report Number: 17278

Luminaire Tested: **HBL-432-W-UNV-EB81/PLUS-UPL-U**

Issue Date: 3/3/2020



Test Information

Test Method: LM-41-14
Report Number: 17278
Test Lab: LUMINAIRE TESTING LABORATORY, INC.
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: METALUX
Catalog Number: HBL-432-W-UNV-EB81/PLUS-UPL-U
Description: OPEN HIGH BAY LUMINAIRE WITH WHITE REFLECTOR, WIDE
DISTRIBUTION AND UPLIGHT
Light Source: FOUR 32 WATT T8 - 2850 LUMENS EA
Ballast/Driver: -

Summary

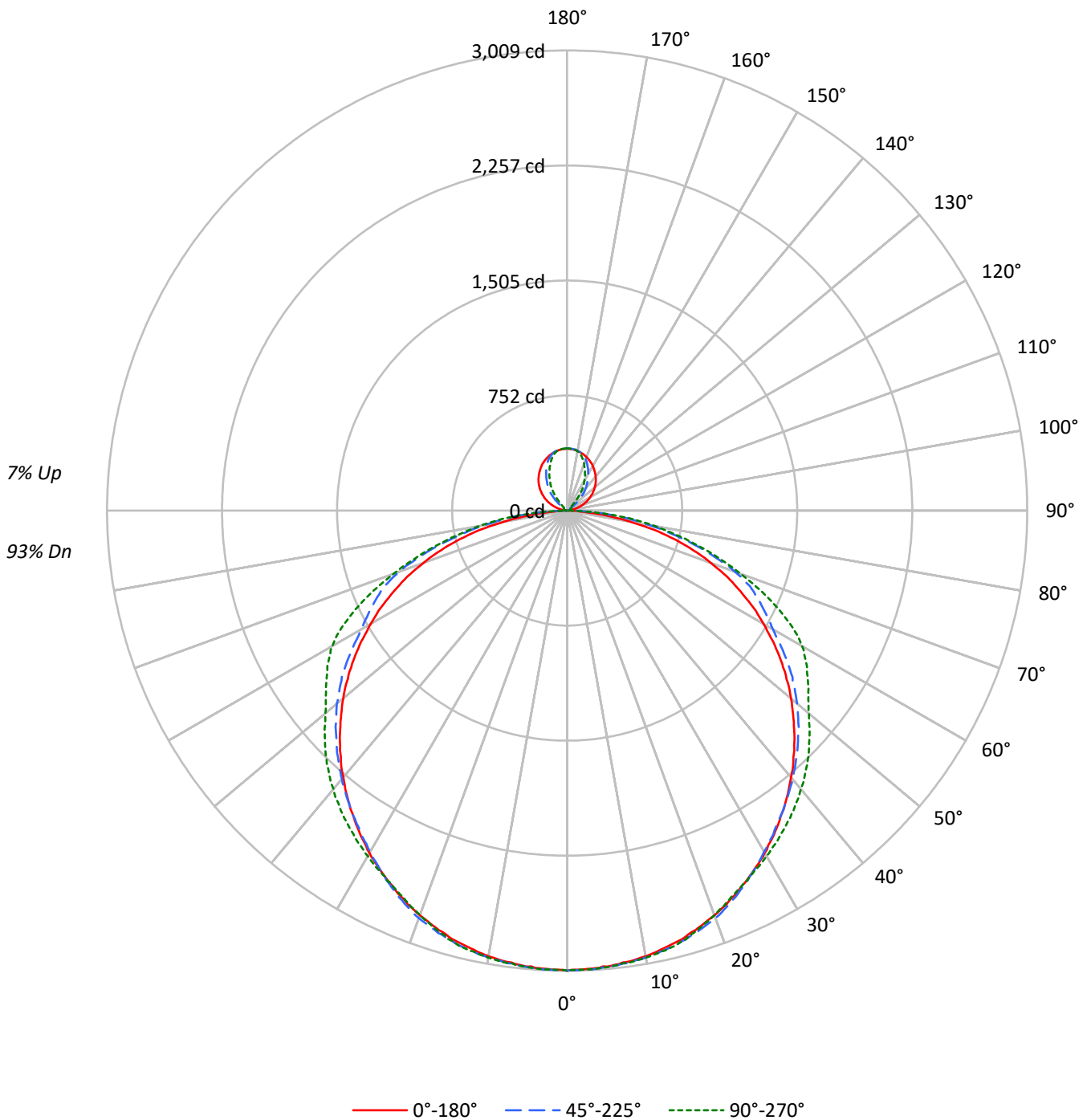
Lumens per Lamp: 2850 (4 lamps)
Luminaire Lumens: 10336.4 lumens
Efficiency: 90.7%
Efficacy: 71.5 lumens/watt
Spacing Criteria (0/90/45): 1.28 / 1.3 / 1.42
Luminous Opening: Rectangular (W 1.59' x L: 4.02' x H: 0')
CIE Type: Direct

Input Watts (W): 144.5
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 25 FT

TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

Luminous Intensity Polar Plot





TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:

| | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|--|----|----|----|--|----|----|----|----|
| RF | 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 | 0 |
| RCR | | | | | | | | | | | | | | | | | | | | |
| 0 | 106 | 106 | 106 | 106 | 103 | 103 | 103 | 103 | 97 | 97 | 97 | | 92 | 92 | 92 | | 87 | 87 | 87 | 84 |
| 1 | 96 | 92 | 88 | 84 | 93 | 89 | 85 | 82 | 84 | 81 | 78 | | 79 | 77 | 75 | | 75 | 73 | 71 | 69 |
| 2 | 87 | 79 | 73 | 67 | 84 | 77 | 71 | 66 | 73 | 68 | 63 | | 69 | 65 | 61 | | 65 | 62 | 59 | 56 |
| 3 | 79 | 69 | 61 | 55 | 76 | 67 | 60 | 54 | 64 | 57 | 53 | | 60 | 55 | 51 | | 57 | 53 | 49 | 47 |
| 4 | 72 | 61 | 53 | 46 | 69 | 59 | 52 | 46 | 56 | 50 | 44 | | 53 | 48 | 43 | | 51 | 46 | 42 | 40 |
| 5 | 66 | 54 | 46 | 40 | 64 | 53 | 45 | 39 | 50 | 43 | 38 | | 48 | 42 | 37 | | 45 | 40 | 36 | 34 |
| 6 | 61 | 49 | 40 | 34 | 59 | 47 | 40 | 34 | 45 | 38 | 33 | | 43 | 37 | 32 | | 41 | 36 | 31 | 29 |
| 7 | 56 | 44 | 36 | 30 | 54 | 43 | 35 | 30 | 41 | 34 | 29 | | 39 | 33 | 28 | | 37 | 32 | 28 | 26 |
| 8 | 52 | 40 | 32 | 27 | 51 | 39 | 32 | 26 | 37 | 31 | 26 | | 36 | 30 | 25 | | 34 | 29 | 25 | 23 |
| 9 | 49 | 37 | 29 | 24 | 47 | 36 | 29 | 24 | 34 | 28 | 23 | | 33 | 27 | 23 | | 31 | 26 | 22 | 21 |
| 10 | 46 | 34 | 26 | 22 | 44 | 33 | 26 | 21 | 32 | 25 | 21 | | 30 | 25 | 21 | | 29 | 24 | 20 | 19 |

AVERAGE LUMINANCE (cd/sqm):

| | 0° | 45° | 90° |
|-----|------|------|------|
| 0° | 5053 | 5053 | 5053 |
| 5° | 5047 | 5052 | 5052 |
| 10° | 5048 | 5060 | 5061 |
| 15° | 5045 | 5066 | 5066 |
| 20° | 5033 | 5068 | 5031 |
| 25° | 5016 | 5036 | 5014 |
| 30° | 5011 | 4997 | 5057 |
| 35° | 4996 | 4996 | 5131 |
| 40° | 4992 | 5022 | 5213 |
| 45° | 4995 | 5071 | 5308 |
| 50° | 4995 | 5134 | 5395 |
| 55° | 4992 | 5177 | 5622 |
| 60° | 4981 | 5223 | 5958 |
| 65° | 4975 | 5492 | 6076 |
| 70° | 4915 | 5715 | 5917 |
| 75° | 4737 | 5593 | 5755 |
| 80° | 4052 | 5319 | 5638 |
| 85° | 2543 | 5068 | 5145 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

ZONAL LUMENS:

CANDELA DISTRIBUTION:

| Zone | Lumens | % Fixture | % Lamp | | 0° | 22.5° | 45° | 67.5° | 90° | Flux |
|-----------|---------|-----------|--------|------|------|-------|------|-------|------|------|
| 0°-10° | 285.2 | 2.8 | 2.5 | 0° | 3009 | 3009 | 3009 | 3009 | 3009 | |
| 10°-20° | 822.1 | 8.0 | 7.2 | 5° | 2994 | 3004 | 2997 | 3002 | 2997 | 285 |
| 20°-30° | 1253.1 | 12.1 | 11.0 | 15° | 2902 | 2913 | 2914 | 2920 | 2914 | 818 |
| 30°-40° | 1541.7 | 14.9 | 13.5 | 25° | 2707 | 2732 | 2718 | 2706 | 2706 | 1249 |
| 40°-50° | 1657.7 | 16.0 | 14.5 | 35° | 2437 | 2456 | 2437 | 2484 | 2503 | 1527 |
| 50°-60° | 1589.7 | 15.4 | 13.9 | 45° | 2103 | 2078 | 2135 | 2210 | 2235 | 1622 |
| 60°-70° | 1349.6 | 13.1 | 11.8 | 55° | 1705 | 1656 | 1768 | 1866 | 1920 | 1524 |
| 70°-80° | 866.8 | 8.4 | 7.6 | 65° | 1252 | 1203 | 1382 | 1510 | 1529 | 1237 |
| 80°-90° | 263.4 | 2.5 | 2.3 | 75° | 730 | 736 | 862 | 882 | 887 | 761 |
| 90°-100° | 10.5 | 0.1 | 0.1 | 85° | 132 | 225 | 263 | 266 | 267 | 169 |
| 100°-110° | 27.4 | 0.3 | 0.2 | 90° | 2 | 8 | 9 | 11 | 11 | 5 |
| 110°-120° | 45.9 | 0.4 | 0.4 | 95° | 14 | 8 | 8 | 7 | 8 | 16 |
| 120°-130° | 71.0 | 0.7 | 0.6 | 105° | 70 | 13 | 20 | 24 | 25 | 75 |
| 130°-140° | 112.1 | 1.1 | 1.0 | 115° | 140 | 51 | 21 | 28 | 30 | 139 |
| 140°-150° | 149.2 | 1.4 | 1.3 | 125° | 205 | 138 | 32 | 24 | 25 | 183 |
| 150°-160° | 146.1 | 1.4 | 1.3 | 135° | 264 | 220 | 140 | 63 | 43 | 203 |
| 160°-170° | 106.5 | 1.0 | 0.9 | 145° | 313 | 295 | 231 | 192 | 175 | 196 |
| 170°-180° | 38.4 | 0.4 | 0.3 | 155° | 355 | 353 | 318 | 287 | 274 | 164 |
| 0°-30° | 2360.4 | 22.8 | 20.7 | 165° | 386 | 390 | 382 | 372 | 366 | 109 |
| 0°-40° | 3902.1 | 37.8 | 34.2 | 175° | 403 | 408 | 405 | 405 | 404 | 38 |
| 0°-60° | 7149.5 | 69.2 | 62.7 | 180° | 407 | 407 | 407 | 407 | 407 | |
| 0°-90° | 9629.3 | 93.2 | 84.5 | | | | | | | |
| 90°-120° | 83.8 | 0.8 | 0.7 | | | | | | | |
| 90°-150° | 416.1 | 4.0 | 3.7 | | | | | | | |
| 90°-180° | 707.0 | 6.8 | 6.2 | | | | | | | |
| 0°-180° | 10336.4 | 100.0 | 90.7 | | | | | | | |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (FULL):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|-------|------|-------|------|-------|------|
| 0° | 3009 | 3009 | 3009 | 3009 | 3009 |
| 0.5° | 3004 | 3014 | 3006 | 3009 | 3004 |
| 1° | 3003 | 3013 | 3006 | 3008 | 3004 |
| 1.5° | 3003 | 3013 | 3006 | 3008 | 3004 |
| 2° | 3002 | 3012 | 3004 | 3006 | 3004 |
| 2.5° | 3000 | 3011 | 3004 | 3007 | 3004 |
| 3° | 2999 | 3010 | 3005 | 3007 | 3003 |
| 3.5° | 2997 | 3008 | 3002 | 3005 | 3002 |
| 4° | 2997 | 3007 | 3001 | 3003 | 2999 |
| 4.5° | 2990 | 3003 | 2997 | 2999 | 2998 |
| 5° | 2994 | 3004 | 2997 | 3002 | 2997 |
| 5.5° | 2991 | 3001 | 2994 | 3000 | 2994 |
| 6° | 2987 | 2999 | 2992 | 2997 | 2991 |
| 6.5° | 2984 | 2996 | 2990 | 2994 | 2990 |
| 7° | 2978 | 2990 | 2985 | 2989 | 2983 |
| 7.5° | 2978 | 2989 | 2985 | 2990 | 2984 |
| 8° | 2975 | 2988 | 2981 | 2986 | 2982 |
| 8.5° | 2971 | 2983 | 2977 | 2984 | 2979 |
| 9° | 2966 | 2979 | 2974 | 2979 | 2975 |
| 9.5° | 2962 | 2973 | 2972 | 2975 | 2973 |
| 10° | 2960 | 2970 | 2967 | 2971 | 2968 |
| 10.5° | 2955 | 2966 | 2962 | 2968 | 2964 |
| 11° | 2949 | 2963 | 2959 | 2964 | 2959 |
| 11.5° | 2944 | 2955 | 2955 | 2960 | 2956 |
| 12° | 2935 | 2947 | 2947 | 2951 | 2947 |
| 12.5° | 2931 | 2946 | 2944 | 2949 | 2948 |
| 13° | 2925 | 2940 | 2938 | 2944 | 2941 |
| 13.5° | 2918 | 2935 | 2933 | 2938 | 2936 |
| 14° | 2913 | 2928 | 2929 | 2935 | 2931 |
| 14.5° | 2907 | 2920 | 2922 | 2927 | 2921 |
| 15° | 2902 | 2913 | 2914 | 2920 | 2914 |
| 15.5° | 2893 | 2906 | 2909 | 2914 | 2908 |
| 16° | 2882 | 2898 | 2900 | 2903 | 2893 |
| 16.5° | 2874 | 2890 | 2892 | 2894 | 2886 |
| 17° | 2869 | 2885 | 2888 | 2886 | 2878 |
| 17.5° | 2859 | 2876 | 2877 | 2876 | 2867 |
| 18° | 2851 | 2868 | 2869 | 2865 | 2857 |
| 18.5° | 2841 | 2859 | 2860 | 2857 | 2846 |
| 19° | 2832 | 2850 | 2852 | 2847 | 2837 |
| 19.5° | 2824 | 2843 | 2845 | 2835 | 2826 |
| 20° | 2816 | 2832 | 2836 | 2825 | 2815 |
| 20.5° | 2807 | 2825 | 2826 | 2813 | 2804 |
| 21° | 2796 | 2816 | 2816 | 2801 | 2791 |
| 21.5° | 2787 | 2806 | 2803 | 2789 | 2784 |
| 22° | 2779 | 2796 | 2793 | 2777 | 2771 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|-------|------|-------|------|-------|------|
| 22.5° | 2765 | 2786 | 2781 | 2767 | 2760 |
| 23° | 2752 | 2773 | 2767 | 2753 | 2745 |
| 23.5° | 2744 | 2767 | 2757 | 2743 | 2738 |
| 24° | 2734 | 2755 | 2743 | 2733 | 2726 |
| 24.5° | 2720 | 2743 | 2729 | 2717 | 2716 |
| 25° | 2707 | 2732 | 2718 | 2706 | 2706 |
| 25.5° | 2698 | 2720 | 2702 | 2695 | 2693 |
| 26° | 2686 | 2712 | 2691 | 2686 | 2689 |
| 26.5° | 2673 | 2697 | 2675 | 2673 | 2674 |
| 27° | 2661 | 2684 | 2663 | 2661 | 2666 |
| 27.5° | 2648 | 2670 | 2650 | 2650 | 2656 |
| 28° | 2636 | 2662 | 2633 | 2641 | 2648 |
| 28.5° | 2624 | 2648 | 2619 | 2630 | 2640 |
| 29° | 2611 | 2633 | 2607 | 2618 | 2630 |
| 29.5° | 2600 | 2620 | 2593 | 2608 | 2620 |
| 30° | 2584 | 2608 | 2577 | 2598 | 2608 |
| 30.5° | 2573 | 2595 | 2564 | 2588 | 2601 |
| 31° | 2554 | 2580 | 2547 | 2576 | 2587 |
| 31.5° | 2542 | 2564 | 2534 | 2565 | 2577 |
| 32° | 2529 | 2551 | 2521 | 2552 | 2569 |
| 32.5° | 2515 | 2539 | 2510 | 2546 | 2560 |
| 33° | 2499 | 2519 | 2491 | 2530 | 2548 |
| 33.5° | 2484 | 2505 | 2477 | 2521 | 2535 |
| 34° | 2470 | 2489 | 2464 | 2509 | 2525 |
| 34.5° | 2455 | 2472 | 2449 | 2498 | 2515 |
| 35° | 2437 | 2456 | 2437 | 2484 | 2503 |
| 35.5° | 2424 | 2440 | 2423 | 2474 | 2491 |
| 36° | 2411 | 2423 | 2409 | 2460 | 2482 |
| 36.5° | 2393 | 2405 | 2393 | 2450 | 2468 |
| 37° | 2378 | 2388 | 2380 | 2438 | 2459 |
| 37.5° | 2361 | 2372 | 2366 | 2425 | 2444 |
| 38° | 2346 | 2353 | 2352 | 2410 | 2429 |
| 38.5° | 2329 | 2335 | 2337 | 2398 | 2419 |
| 39° | 2311 | 2315 | 2322 | 2387 | 2409 |
| 39.5° | 2295 | 2296 | 2309 | 2375 | 2393 |
| 40° | 2277 | 2279 | 2291 | 2360 | 2378 |
| 40.5° | 2263 | 2261 | 2277 | 2345 | 2366 |
| 41° | 2247 | 2242 | 2261 | 2331 | 2356 |
| 41.5° | 2229 | 2221 | 2247 | 2318 | 2339 |
| 42° | 2210 | 2200 | 2231 | 2306 | 2325 |
| 42.5° | 2190 | 2182 | 2214 | 2289 | 2308 |
| 43° | 2174 | 2161 | 2199 | 2272 | 2295 |
| 43.5° | 2159 | 2142 | 2186 | 2261 | 2283 |
| 44° | 2136 | 2120 | 2168 | 2244 | 2266 |
| 44.5° | 2120 | 2100 | 2152 | 2226 | 2251 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|-------|------|-------|------|-------|------|
| 45° | 2103 | 2078 | 2135 | 2210 | 2235 |
| 45.5° | 2083 | 2058 | 2117 | 2193 | 2217 |
| 46° | 2063 | 2037 | 2101 | 2178 | 2200 |
| 46.5° | 2044 | 2015 | 2086 | 2162 | 2183 |
| 47° | 2028 | 1998 | 2071 | 2148 | 2167 |
| 47.5° | 2007 | 1973 | 2050 | 2127 | 2150 |
| 48° | 1989 | 1956 | 2034 | 2114 | 2135 |
| 48.5° | 1969 | 1934 | 2016 | 2095 | 2115 |
| 49° | 1950 | 1911 | 1999 | 2075 | 2096 |
| 49.5° | 1932 | 1891 | 1982 | 2057 | 2080 |
| 50° | 1912 | 1870 | 1965 | 2043 | 2065 |
| 50.5° | 1892 | 1850 | 1944 | 2022 | 2046 |
| 51° | 1873 | 1829 | 1926 | 2002 | 2032 |
| 51.5° | 1854 | 1809 | 1906 | 1982 | 2016 |
| 52° | 1833 | 1786 | 1887 | 1964 | 2002 |
| 52.5° | 1807 | 1766 | 1868 | 1947 | 1989 |
| 53° | 1791 | 1742 | 1847 | 1929 | 1975 |
| 53.5° | 1772 | 1723 | 1833 | 1914 | 1963 |
| 54° | 1745 | 1702 | 1809 | 1897 | 1948 |
| 54.5° | 1728 | 1680 | 1790 | 1880 | 1934 |
| 55° | 1705 | 1656 | 1768 | 1866 | 1920 |
| 55.5° | 1685 | 1636 | 1747 | 1852 | 1907 |
| 56° | 1662 | 1613 | 1725 | 1837 | 1891 |
| 56.5° | 1639 | 1592 | 1704 | 1821 | 1880 |
| 57° | 1619 | 1573 | 1684 | 1810 | 1870 |
| 57.5° | 1598 | 1549 | 1660 | 1794 | 1853 |
| 58° | 1572 | 1524 | 1639 | 1777 | 1837 |
| 58.5° | 1549 | 1502 | 1614 | 1764 | 1822 |
| 59° | 1526 | 1479 | 1592 | 1749 | 1807 |
| 59.5° | 1509 | 1460 | 1575 | 1737 | 1794 |
| 60° | 1483 | 1436 | 1555 | 1721 | 1774 |
| 60.5° | 1463 | 1414 | 1536 | 1706 | 1754 |
| 61° | 1440 | 1391 | 1521 | 1691 | 1736 |
| 61.5° | 1418 | 1369 | 1503 | 1674 | 1713 |
| 62° | 1397 | 1346 | 1484 | 1653 | 1689 |
| 62.5° | 1373 | 1322 | 1467 | 1633 | 1665 |
| 63° | 1348 | 1299 | 1450 | 1608 | 1637 |
| 63.5° | 1324 | 1275 | 1432 | 1587 | 1610 |
| 64° | 1298 | 1252 | 1414 | 1561 | 1583 |
| 64.5° | 1275 | 1226 | 1398 | 1536 | 1556 |
| 65° | 1252 | 1203 | 1382 | 1510 | 1529 |
| 65.5° | 1227 | 1177 | 1365 | 1481 | 1495 |
| 66° | 1201 | 1151 | 1346 | 1454 | 1464 |
| 66.5° | 1180 | 1131 | 1331 | 1428 | 1435 |
| 67° | 1154 | 1105 | 1311 | 1393 | 1403 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|-------|------|-------|------|-------|------|
| 67.5° | 1133 | 1082 | 1293 | 1364 | 1372 |
| 68° | 1104 | 1055 | 1266 | 1330 | 1337 |
| 68.5° | 1079 | 1032 | 1245 | 1303 | 1306 |
| 69° | 1051 | 1005 | 1221 | 1270 | 1274 |
| 69.5° | 1025 | 978 | 1192 | 1231 | 1238 |
| 70° | 1001 | 955 | 1164 | 1199 | 1205 |
| 70.5° | 976 | 931 | 1139 | 1168 | 1176 |
| 71° | 953 | 909 | 1116 | 1139 | 1146 |
| 71.5° | 922 | 881 | 1077 | 1105 | 1109 |
| 72° | 894 | 860 | 1048 | 1074 | 1080 |
| 72.5° | 865 | 834 | 1016 | 1039 | 1043 |
| 73° | 841 | 817 | 985 | 1010 | 1014 |
| 73.5° | 813 | 796 | 955 | 978 | 984 |
| 74° | 782 | 775 | 927 | 947 | 955 |
| 74.5° | 755 | 755 | 894 | 917 | 920 |
| 75° | 730 | 736 | 862 | 882 | 887 |
| 75.5° | 697 | 720 | 828 | 851 | 856 |
| 76° | 672 | 701 | 792 | 820 | 824 |
| 76.5° | 641 | 683 | 763 | 789 | 795 |
| 77° | 615 | 661 | 734 | 757 | 767 |
| 77.5° | 585 | 639 | 703 | 728 | 727 |
| 78° | 544 | 618 | 670 | 696 | 697 |
| 78.5° | 516 | 591 | 644 | 659 | 669 |
| 79° | 481 | 560 | 611 | 634 | 640 |
| 79.5° | 444 | 530 | 579 | 605 | 610 |
| 80° | 419 | 502 | 550 | 576 | 583 |
| 80.5° | 390 | 474 | 519 | 549 | 552 |
| 81° | 360 | 445 | 486 | 514 | 520 |
| 81.5° | 329 | 416 | 459 | 485 | 490 |
| 82° | 299 | 388 | 432 | 455 | 466 |
| 82.5° | 272 | 360 | 404 | 430 | 438 |
| 83° | 241 | 331 | 374 | 401 | 403 |
| 83.5° | 210 | 303 | 349 | 371 | 366 |
| 84° | 182 | 276 | 321 | 335 | 333 |
| 84.5° | 155 | 249 | 292 | 300 | 299 |
| 85° | 132 | 225 | 263 | 266 | 267 |
| 85.5° | 112 | 201 | 234 | 233 | 233 |
| 86° | 89 | 172 | 198 | 199 | 193 |
| 86.5° | 66 | 146 | 166 | 159 | 151 |
| 87° | 49 | 124 | 133 | 124 | 116 |
| 87.5° | 37 | 99 | 97 | 93 | 87 |
| 88° | 25 | 72 | 68 | 64 | 60 |
| 88.5° | 16 | 46 | 42 | 39 | 40 |
| 89° | 8 | 26 | 22 | 21 | 21 |
| 89.5° | 4 | 11 | 9 | 9 | 8 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-----|-------|-----|-------|-----|
| 90° | 2 | 8 | 9 | 11 | 11 |
| 90.5° | 2 | 5 | 8 | 11 | 10 |
| 91° | 2 | 3 | 4 | 5 | 5 |
| 91.5° | 3 | 3 | 4 | 4 | 4 |
| 92° | 4 | 4 | 4 | 4 | 4 |
| 92.5° | 5 | 5 | 5 | 5 | 5 |
| 93° | 7 | 6 | 6 | 6 | 6 |
| 93.5° | 9 | 6 | 6 | 6 | 6 |
| 94° | 10 | 7 | 6 | 7 | 7 |
| 94.5° | 12 | 7 | 6 | 7 | 7 |
| 95° | 14 | 8 | 8 | 7 | 8 |
| 95.5° | 16 | 8 | 9 | 8 | 8 |
| 96° | 18 | 9 | 10 | 8 | 8 |
| 96.5° | 20 | 9 | 11 | 10 | 9 |
| 97° | 22 | 10 | 11 | 11 | 11 |
| 97.5° | 25 | 10 | 13 | 12 | 12 |
| 98° | 27 | 10 | 14 | 13 | 13 |
| 98.5° | 30 | 11 | 15 | 14 | 14 |
| 99° | 33 | 11 | 15 | 16 | 14 |
| 99.5° | 36 | 11 | 15 | 17 | 17 |
| 100° | 39 | 12 | 16 | 18 | 19 |
| 100.5° | 43 | 12 | 16 | 19 | 20 |
| 101° | 46 | 12 | 17 | 19 | 20 |
| 101.5° | 49 | 12 | 17 | 20 | 20 |
| 102° | 52 | 12 | 18 | 21 | 21 |
| 102.5° | 54 | 12 | 18 | 21 | 22 |
| 103° | 57 | 12 | 18 | 21 | 22 |
| 103.5° | 61 | 12 | 19 | 22 | 23 |
| 104° | 64 | 12 | 19 | 23 | 24 |
| 104.5° | 67 | 12 | 20 | 23 | 24 |
| 105° | 70 | 13 | 20 | 24 | 25 |
| 105.5° | 75 | 13 | 20 | 24 | 25 |
| 106° | 78 | 13 | 21 | 24 | 26 |
| 106.5° | 81 | 13 | 21 | 25 | 26 |
| 107° | 84 | 13 | 21 | 25 | 26 |
| 107.5° | 89 | 13 | 21 | 26 | 27 |
| 108° | 92 | 13 | 21 | 26 | 27 |
| 108.5° | 95 | 14 | 22 | 26 | 27 |
| 109° | 99 | 15 | 22 | 26 | 28 |
| 109.5° | 103 | 16 | 22 | 27 | 28 |
| 110° | 106 | 17 | 22 | 27 | 28 |
| 110.5° | 110 | 19 | 22 | 27 | 29 |
| 111° | 113 | 21 | 22 | 28 | 29 |
| 111.5° | 117 | 23 | 22 | 28 | 29 |
| 112° | 120 | 26 | 21 | 28 | 30 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-----|-------|-----|-------|-----|
| 112.5° | 123 | 28 | 21 | 28 | 30 |
| 113° | 127 | 32 | 21 | 28 | 30 |
| 113.5° | 130 | 37 | 21 | 28 | 30 |
| 114° | 133 | 41 | 21 | 28 | 30 |
| 114.5° | 137 | 46 | 21 | 28 | 30 |
| 115° | 140 | 51 | 21 | 28 | 30 |
| 115.5° | 144 | 56 | 21 | 27 | 30 |
| 116° | 147 | 61 | 21 | 27 | 30 |
| 116.5° | 150 | 66 | 21 | 27 | 30 |
| 117° | 154 | 71 | 20 | 27 | 30 |
| 117.5° | 157 | 76 | 20 | 27 | 30 |
| 118° | 160 | 80 | 20 | 27 | 29 |
| 118.5° | 163 | 85 | 20 | 26 | 29 |
| 119° | 166 | 90 | 20 | 26 | 28 |
| 119.5° | 170 | 94 | 20 | 26 | 28 |
| 120° | 173 | 99 | 21 | 26 | 28 |
| 120.5° | 176 | 103 | 21 | 26 | 28 |
| 121° | 179 | 107 | 21 | 26 | 28 |
| 121.5° | 182 | 110 | 22 | 25 | 27 |
| 122° | 186 | 115 | 23 | 25 | 28 |
| 122.5° | 189 | 119 | 24 | 25 | 27 |
| 123° | 193 | 123 | 25 | 25 | 27 |
| 123.5° | 196 | 127 | 26 | 24 | 27 |
| 124° | 199 | 131 | 28 | 24 | 26 |
| 124.5° | 202 | 134 | 30 | 24 | 26 |
| 125° | 205 | 138 | 32 | 24 | 25 |
| 125.5° | 208 | 142 | 35 | 24 | 25 |
| 126° | 211 | 146 | 38 | 24 | 25 |
| 126.5° | 214 | 150 | 42 | 24 | 25 |
| 127° | 218 | 154 | 46 | 25 | 25 |
| 127.5° | 221 | 159 | 51 | 25 | 25 |
| 128° | 224 | 163 | 57 | 26 | 25 |
| 128.5° | 227 | 167 | 63 | 27 | 25 |
| 129° | 229 | 171 | 69 | 27 | 25 |
| 129.5° | 233 | 175 | 75 | 29 | 26 |
| 130° | 235 | 179 | 80 | 30 | 26 |
| 130.5° | 238 | 183 | 86 | 31 | 27 |
| 131° | 241 | 187 | 93 | 33 | 28 |
| 131.5° | 244 | 191 | 98 | 34 | 29 |
| 132° | 247 | 195 | 104 | 37 | 30 |
| 132.5° | 250 | 199 | 111 | 39 | 32 |
| 133° | 253 | 203 | 117 | 43 | 33 |
| 133.5° | 256 | 207 | 122 | 47 | 35 |
| 134° | 259 | 212 | 128 | 52 | 38 |
| 134.5° | 261 | 216 | 134 | 57 | 40 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-----|-------|-----|-------|-----|
| 135° | 264 | 220 | 140 | 63 | 43 |
| 135.5° | 267 | 223 | 145 | 70 | 47 |
| 136° | 269 | 227 | 151 | 77 | 52 |
| 136.5° | 272 | 232 | 156 | 83 | 57 |
| 137° | 275 | 236 | 161 | 90 | 64 |
| 137.5° | 277 | 239 | 166 | 97 | 70 |
| 138° | 280 | 244 | 171 | 104 | 78 |
| 138.5° | 283 | 248 | 175 | 111 | 86 |
| 139° | 285 | 251 | 179 | 118 | 93 |
| 139.5° | 287 | 255 | 183 | 124 | 99 |
| 140° | 290 | 258 | 187 | 131 | 105 |
| 140.5° | 292 | 262 | 192 | 137 | 113 |
| 141° | 294 | 266 | 196 | 144 | 119 |
| 141.5° | 297 | 270 | 200 | 151 | 126 |
| 142° | 300 | 273 | 205 | 158 | 134 |
| 142.5° | 302 | 277 | 209 | 164 | 142 |
| 143° | 304 | 280 | 213 | 170 | 149 |
| 143.5° | 307 | 284 | 218 | 176 | 155 |
| 144° | 309 | 288 | 222 | 182 | 161 |
| 144.5° | 311 | 291 | 227 | 187 | 168 |
| 145° | 313 | 295 | 231 | 192 | 175 |
| 145.5° | 316 | 298 | 236 | 197 | 181 |
| 146° | 318 | 302 | 240 | 202 | 186 |
| 146.5° | 320 | 305 | 244 | 206 | 193 |
| 147° | 323 | 309 | 249 | 211 | 198 |
| 147.5° | 325 | 312 | 253 | 216 | 202 |
| 148° | 327 | 315 | 258 | 220 | 207 |
| 148.5° | 329 | 318 | 262 | 225 | 212 |
| 149° | 332 | 322 | 267 | 230 | 217 |
| 149.5° | 334 | 324 | 271 | 235 | 221 |
| 150° | 336 | 328 | 275 | 239 | 226 |
| 150.5° | 338 | 330 | 280 | 244 | 231 |
| 151° | 340 | 333 | 284 | 249 | 236 |
| 151.5° | 342 | 335 | 288 | 254 | 241 |
| 152° | 344 | 338 | 293 | 258 | 246 |
| 152.5° | 346 | 341 | 297 | 263 | 251 |
| 153° | 348 | 344 | 302 | 268 | 256 |
| 153.5° | 350 | 346 | 306 | 273 | 261 |
| 154° | 352 | 348 | 310 | 277 | 266 |
| 154.5° | 354 | 351 | 314 | 283 | 270 |
| 155° | 355 | 353 | 318 | 287 | 274 |
| 155.5° | 357 | 356 | 321 | 292 | 280 |
| 156° | 359 | 358 | 325 | 296 | 285 |
| 156.5° | 361 | 360 | 330 | 301 | 290 |
| 157° | 362 | 362 | 333 | 305 | 295 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | 0° | 22.5° | 45° | 67.5° | 90° |
|--------|-----|-------|-----|-------|-----|
| 157.5° | 364 | 364 | 337 | 310 | 300 |
| 158° | 366 | 367 | 342 | 316 | 305 |
| 158.5° | 367 | 369 | 344 | 320 | 309 |
| 159° | 369 | 371 | 348 | 324 | 313 |
| 159.5° | 370 | 372 | 352 | 329 | 318 |
| 160° | 372 | 374 | 355 | 334 | 325 |
| 160.5° | 373 | 376 | 358 | 338 | 329 |
| 161° | 375 | 377 | 361 | 342 | 332 |
| 161.5° | 376 | 379 | 365 | 346 | 337 |
| 162° | 378 | 381 | 367 | 350 | 342 |
| 162.5° | 379 | 382 | 370 | 354 | 346 |
| 163° | 381 | 384 | 372 | 358 | 351 |
| 163.5° | 382 | 386 | 375 | 362 | 354 |
| 164° | 383 | 387 | 377 | 366 | 359 |
| 164.5° | 384 | 388 | 379 | 369 | 363 |
| 165° | 386 | 390 | 382 | 372 | 366 |
| 165.5° | 387 | 391 | 384 | 376 | 370 |
| 166° | 388 | 392 | 386 | 378 | 374 |
| 166.5° | 389 | 394 | 388 | 381 | 377 |
| 167° | 390 | 395 | 389 | 383 | 380 |
| 167.5° | 391 | 396 | 391 | 385 | 382 |
| 168° | 393 | 397 | 393 | 388 | 384 |
| 168.5° | 393 | 398 | 394 | 390 | 387 |
| 169° | 394 | 399 | 395 | 392 | 389 |
| 169.5° | 395 | 400 | 396 | 394 | 392 |
| 170° | 396 | 401 | 397 | 396 | 394 |
| 170.5° | 397 | 402 | 398 | 397 | 395 |
| 171° | 398 | 403 | 399 | 398 | 397 |
| 171.5° | 398 | 403 | 400 | 399 | 398 |
| 172° | 399 | 404 | 401 | 400 | 399 |
| 172.5° | 400 | 405 | 402 | 401 | 401 |
| 173° | 400 | 405 | 402 | 402 | 402 |
| 173.5° | 401 | 406 | 403 | 403 | 402 |
| 174° | 401 | 406 | 404 | 403 | 403 |
| 174.5° | 402 | 407 | 404 | 404 | 404 |
| 175° | 403 | 408 | 405 | 405 | 404 |
| 175.5° | 403 | 408 | 405 | 405 | 405 |
| 176° | 403 | 408 | 406 | 406 | 405 |
| 176.5° | 403 | 408 | 406 | 406 | 406 |
| 177° | 403 | 409 | 406 | 407 | 406 |
| 177.5° | 404 | 409 | 406 | 407 | 406 |
| 178° | 404 | 409 | 407 | 407 | 407 |
| 178.5° | 404 | 409 | 407 | 407 | 406 |
| 179° | 404 | 409 | 407 | 408 | 407 |
| 179.5° | 404 | 409 | 407 | 408 | 407 |



TEST NUMBER: 17278

CATALOG NUMBER: HBL-432-W-UNV-EB81/PLUS-UPL-U

CANDELA DISTRIBUTION (continued):

| | | | | | |
|------|-----|-------|-----|-------|-----|
| | 0° | 22.5° | 45° | 67.5° | 90° |
| 180° | 407 | 407 | 407 | 407 | 407 |

(END OF REPORT)