

HSM Wire International, Inc.

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Ultra Fine Copper Wire Sizes AWG 42.5 - 58 Chart (Inches)

Technical Details = inches for Copper Magnet Wire. All tolerances based on NEMA MW 1000. Based upon copper conductivity of 100% I.A.C.S. Actual values may be up to 102% I.A.C.S. The following information is intended for a guideline only, actual result may vary; please consider all data before implementing into any project.

| AWG | Bare Copper | | | | | |
|------|-------------------|--------|--------|----------------------------|--------|--------|
| | Diameter (Inches) | | | Resistance* (ohms/1,000ft) | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| 42.5 | .0023 | .0024 | .0025 | 1,659 | 1,800 | 1,960 |
| 43 | .0021 | .0022 | .0024 | 1,960 | 2,142 | 2,351 |
| 43.5 | .0020 | .0021 | .0022 | 2,142 | 2,351 | 2,592 |
| 44 | .0019 | .0020 | .0021 | 2,351 | 2,592 | 2,872 |
| 44.5 | .0018 | .0019 | .0020 | 2,592 | 2,872 | 3,200 |
| 45 | .0017 | .00176 | .00183 | 3,080 | 3,348 | 3,616 |
| 46 | .0015 | .0016 | .00164 | 3,870 | 4,207 | 4,544 |
| 47 | .0014 | .0014 | .00146 | 4,868 | 5,291 | 5,714 |
| 48 | .0012 | .0012 | .00129 | 6,205 | 6,745 | 7,285 |
| 49 | .0011 | .0011 | .00116 | 7,744 | 8,417 | 9,090 |
| 50 | .0010 | .0010 | .00103 | 9,734 | 10,580 | 11,430 |
| 51 | .0009 | .0009 | .00092 | 12,320 | 13,390 | 14,460 |
| 52 | .0008 | .0008 | .00081 | 15,690 | 17,050 | 18,410 |
| 53 | .0007 | .0007 | .00073 | 19,480 | 21,170 | 22,860 |
| 54 | .0006 | .0006 | .00065 | 24,820 | 26,980 | 29,140 |
| 55 | .0005 | .00055 | .00057 | 31,540 | 34,280 | 37,020 |
| 56 | .00047 | .0005 | .00051 | 39,730 | 43,190 | 46,650 |
| 57 | .0004 | .00042 | .00045 | 49,735 | 54,060 | 58,385 |
| 58 | .00036 | .00039 | .00040 | 62,570 | 68,011 | 73,452 |

| AWG | Single Build | | | | Heavy Build | | | |
|------|--------------------|---------------------------|--------|--------|--------------------|---------------------------|--------|--------|
| | Min. Increase (in) | Overall Diameter (inches) | | | Min. Increase (in) | Overall Diameter (inches) | | |
| | | MIN | NOM | MAX | | MIN | NOM | MAX |
| 42.5 | .00020 | .0025 | .0026 | .0028 | .0004 | .0027 | .0029 | .0031 |
| 43 | .00020 | .0023 | .0024 | .0026 | .0004 | .0025 | .0027 | .0029 |
| 43.5 | .00010 | .0021 | .0023 | .0025 | .0004 | .0024 | .0026 | .0028 |
| 44 | .00010 | .0020 | .0022 | .0024 | .0004 | .0023 | .0025 | .0027 |
| 44.5 | .00010 | .0019 | .0021 | .0023 | .0004 | .0022 | .0024 | .0026 |
| 45 | .00010 | .00179 | .00192 | .0021 | .0003 | .00199 | .00215 | .0023 |
| 46 | .00010 | .00161 | .00173 | .0019 | .0003 | .00181 | .00196 | .0021 |
| 47 | .00010 | .00145 | .00158 | .0017 | .0003 | .00165 | .00178 | .0019 |
| 48 | .00010 | .00129 | .00140 | .0015 | .0002 | .00139 | .00155 | .0017 |
| 49 | .00010 | .00117 | .00124 | .0013 | .0002 | .00127 | .00139 | .0015 |
| 50 | .00010 | .00105 | .00113 | .0012 | .0002 | .00115 | .00128 | .0014 |
| 51 | .00010 | .00095 | .00103 | .0011 | .0002 | .00105 | .00117 | .00129 |
| 52 | .00010 | .00085 | .00093 | .0010 | .0001 | .00095 | .00105 | .00115 |
| 53 | .00005 | .00072 | .00079 | .0009 | .0001 | .0008 | .00092 | .00103 |
| 54 | .00005 | .00065 | .00070 | .0008 | .0001 | .00073 | .00084 | .00095 |
| 55 | .00005 | .00058 | .00064 | .0007 | .0001 | .00066 | .00077 | .00087 |
| 56 | .00005 | .00052 | .00059 | .00065 | .0001 | .0006 | .00071 | .00081 |
| 57 | .00004 | .00046 | .00051 | .00056 | - | - | - | - |
| 58 | .00004 | .00041 | .00046 | .00051 | - | - | - | - |

| AWG | Area Sq. mm NOM | Single Build | | | | | Recommended Winding Tensions (grams) | Typical Elongation % |
|------|-----------------------|--------------|-----------|---------|--------------|-------------|---|----------------------------|
| | | Lbs/1000ft | ft/lb | ohms/lb | wires/sq. in | ohms/cu. in | | |
| | | NOM | NOM | NOM | NOM | NOM | | |
| 42.5 | 5.75 | .0180 | 55,635 | 100,172 | 147,928 | 22,195 | 30 | 23 |
| 43 | 4.84 | .0151 | 66,092 | 141,169 | 176,611 | 31,536 | 26 | 22 |
| 43.5 | 4.41 | .0138 | 71,462 | 170,408 | 189,035 | 37,046 | 24 | 21 |
| 44 | 4.00 | .0125 | 79,798 | 206,897 | 206,897 | 44,641 | 22 | 21 |
| 44.5 | 3.61 | .0113 | 88,308 | 253,696 | 253,696 | 54,287 | 19 | 20 |
| 45 | 3.10 | .00965 | 103,608 | - | 271,441 | 75,683 | 17 | 20 |
| 46 | 2.47 | .00768 | 130,200 | - | 334,084 | 117,138 | 14 | 20 |
| 47 | 1.96 | .00604 | 165,200 | - | 400,689 | 176,621 | 11 | 19 |
| 48 | 1.54 | .00487 | 205,300 | - | 509,769 | 286,777 | 9 | 18 |
| 49 | 1.23 | .00385 | 259,700 | - | 649,636 | 456,176 | 7 | 17 |
| 50 | .980 | .00308 | 324,700 | - | 783,225 | 690,474 | 5 | 16 |
| 51 | .775 | .00246 | 406,500 | - | 942,841 | 1,051,779 | 4 | 16 |
| 52 | .608 | .00196 | 510,200 | - | 1,155,625 | 1,642,711 | 3 | 14 |
| 23 | .490 | .00153 | 653,600 | - | 1,602,756 | 2,826,737 | 2.5 | 12 |
| 54 | .384 | .00121 | 826,400 | - | 2,042,041 | 4,588,435 | 2 | 11 |
| 55 | .303 | .00097 | 1,032,000 | - | 2,439,844 | 6,974,283 | 1.5 | 10 |
| 56 | .240 | .00078 | 1,283,700 | - | 2,837,025 | 10,339,461 | 1 | 9 |
| 57 | .192 | .00061 | 1,636,700 | - | 4,000,000 | - | 0.8 | 8 |
| 58 | .152 | .00049 | 2,040,800 | - | 4,726,276 | - | 0.6 | 7 |