

HM Wire International, Inc.

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Insulated Flat Wire 11 AWG - 32 AWG Half Sizes 1.2 Ratio - 1.4 Ratio

| AWG Sizes | | Ratios - Millimeter Dimensions | | | | | | | | | |
|-----------|------------|--------------------------------|------|-------|------|------|------|-------|------|------|------|
| AWG | Dia. mm | 1:2 | | 1:2.5 | | 1:3 | | 1:3.5 | | 1:4 | |
| | | T | W | T | W | T | W | T | W | T | W |
| 11 | 2.39 | 1.50 | 3.00 | | | | | | | | |
| 12 | 2.14 | 1.34 | 2.68 | | | | | | | | |
| 12.5 | 2.02 | 1.27 | 2.53 | | | | | | | | |
| 13 | 1.92 | 1.20 | 2.40 | 1.07 | 2.68 | | | | | | |
| 13.5 | 1.81 | 1.13 | 2.27 | 1.01 | 2.54 | | | | | | |
| 14 | 1.71 | 1.07 | 2.15 | 0.96 | 2.40 | 0.88 | 2.63 | | | | |
| 14.5 | 1.62 | 1.02 | 2.03 | 0.91 | 2.27 | 0.83 | 2.49 | | | | |
| 15 | 1.53 | 0.96 | 1.92 | 0.86 | 2.15 | 0.78 | 2.35 | | | | |
| 15.5 | 1.45 | 0.91 | 1.82 | 0.81 | 2.03 | 0.74 | 2.23 | | | | |
| 16 | 1.37 | 0.86 | 1.71 | 0.77 | 1.91 | 0.70 | 2.10 | 0.65 | 2.27 | 0.61 | 2.42 |
| 16.5 | 1.30 | 0.81 | 1.62 | 0.73 | 1.82 | 0.66 | 1.99 | 0.61 | 2.15 | 0.57 | 2.30 |
| 17 | 1.22 | 0.77 | 1.53 | 0.69 | 1.72 | 0.63 | 1.88 | 0.58 | 2.03 | 0.54 | 2.17 |
| 17.5 | 1.16 | 0.73 | 1.45 | 0.65 | 1.62 | 0.59 | 1.78 | 0.55 | 1.92 | 0.51 | 2.05 |
| 18 | 1.09 | 0.69 | 1.37 | 0.61 | 1.53 | 0.56 | 1.68 | 0.52 | 1.81 | 0.49 | 1.94 |
| 18.5 | 1.03 | 0.65 | 1.30 | 0.58 | 1.45 | 0.53 | 1.59 | 0.49 | 1.71 | 0.46 | 1.83 |
| 19 | 0.98 | 0.61 | 1.23 | 0.55 | 1.37 | 0.50 | 1.50 | 0.46 | 1.62 | 0.43 | 1.73 |
| 19.5 | 0.93 | 0.58 | 1.17 | 0.52 | 1.30 | 0.48 | 1.43 | 0.44 | 1.54 | 0.41 | 1.65 |
| 20 | 0.88 | 0.55 | 1.10 | 0.49 | 1.23 | 0.45 | 1.35 | 0.42 | 1.46 | 0.39 | 1.56 |
| 20.5 | 0.83 | 0.52 | 1.04 | 0.47 | 1.16 | 0.42 | 1.27 | 0.39 | 1.38 | 0.37 | 1.47 |
| 21 | 0.79 | 0.49 | 0.99 | 0.44 | 1.10 | 0.40 | 1.21 | 0.37 | 1.31 | 0.35 | 1.40 |
| 21.5 | 0.74 | 0.47 | 0.93 | 0.42 | 1.04 | 0.38 | 1.14 | 0.35 | 1.23 | 0.33 | 1.32 |
| 22 | 0.70 | 0.44 | 0.88 | 0.39 | 0.98 | 0.36 | 1.08 | 0.33 | 1.16 | 0.31 | 1.24 |
| 22.5 | 0.68 | 0.42 | 0.85 | 0.38 | 0.95 | 0.35 | 1.04 | 0.32 | 1.12 | 0.30 | 1.20 |
| 23 | 0.63 | 0.40 | 0.79 | 0.35 | 0.89 | 0.32 | 0.97 | 0.30 | 1.05 | 0.28 | 1.12 |
| 23.5 | 0.60 | 0.37 | 0.75 | 0.33 | 0.84 | 0.31 | 0.92 | 0.28 | 0.99 | 0.26 | 1.06 |
| 24 | 0.57 | 0.35 | 0.71 | 0.32 | 0.79 | 0.29 | 0.87 | 0.27 | 0.94 | 0.25 | 1.00 |
| 24.5 | 0.54 | 0.34 | 0.67 | 0.30 | 0.75 | 0.27 | 0.82 | 0.25 | 0.89 | 0.24 | 0.95 |

| AWG Sizes | | Ratios - Inches Dimensions | | | | | | | | | |
|-----------|-------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AWG | Dia. in. | 1:2 | | 1:2.5 | | 1:3 | | 1:3.5 | | 1:4 | |
| | | T | W | T | W | T | W | T | W | T | W |
| 11 | 0.0949 | 0.059 | 0.118 | | | | | | | | |
| 12 | 0.0846 | 0.053 | 0.105 | | | | | | | | |
| 12.5 | 0.080 | 0.050 | 0.100 | | | | | | | | |
| 13 | 0.0756 | 0.047 | 0.094 | 0.042 | 0.106 | | | | | | |
| 13.5 | 0.071 | 0.045 | 0.089 | 0.040 | 0.100 | | | | | | |
| 14 | 0.0669 | 0.042 | 0.085 | 0.038 | 0.095 | 0.035 | 0.104 | | | | |
| 14.5 | 0.064 | 0.040 | 0.080 | 0.036 | 0.089 | 0.033 | 0.098 | | | | |
| 15 | 0.0609 | 0.038 | 0.076 | 0.034 | 0.084 | 0.031 | 0.093 | | | | |
| 15.5 | 0.057 | 0.036 | 0.072 | 0.032 | 0.080 | 0.029 | 0.088 | | | | |
| 16 | 0.054 | 0.034 | 0.067 | 0.030 | 0.075 | 0.028 | 0.083 | 0.025 | 0.089 | 0.024 | 0.095 |
| 16.5 | 0.051 | 0.032 | 0.064 | 0.029 | 0.071 | 0.026 | 0.078 | 0.024 | 0.085 | 0.023 | 0.090 |
| 17 | 0.048 | 0.030 | 0.060 | 0.027 | 0.068 | 0.025 | 0.074 | 0.023 | 0.080 | 0.021 | 0.085 |
| 17.5 | 0.046 | 0.029 | 0.057 | 0.026 | 0.064 | 0.023 | 0.070 | 0.022 | 0.076 | 0.020 | 0.081 |
| 18 | 0.043 | 0.027 | 0.054 | 0.024 | 0.060 | 0.022 | 0.066 | 0.020 | 0.071 | 0.019 | 0.076 |
| 18.5 | 0.041 | 0.026 | 0.051 | 0.023 | 0.057 | 0.021 | 0.062 | 0.019 | 0.067 | 0.018 | 0.072 |
| 19 | 0.039 | 0.024 | 0.048 | 0.022 | 0.054 | 0.020 | 0.059 | 0.018 | 0.064 | 0.017 | 0.068 |
| 19.5 | 0.037 | 0.023 | 0.046 | 0.021 | 0.051 | 0.019 | 0.056 | 0.017 | 0.061 | 0.016 | 0.065 |
| 20 | 0.035 | 0.022 | 0.043 | 0.019 | 0.048 | 0.018 | 0.053 | 0.016 | 0.057 | 0.015 | 0.061 |
| 20.5 | 0.033 | 0.020 | 0.041 | 0.018 | 0.046 | 0.017 | 0.050 | 0.015 | 0.054 | 0.014 | 0.058 |
| 21 | 0.031 | 0.019 | 0.039 | 0.017 | 0.043 | 0.016 | 0.048 | 0.015 | 0.051 | 0.014 | 0.055 |
| 21.5 | 0.029 | 0.018 | 0.037 | 0.016 | 0.041 | 0.015 | 0.045 | 0.014 | 0.049 | 0.013 | 0.052 |
| 22 | 0.028 | 0.017 | 0.035 | 0.015 | 0.039 | 0.014 | 0.042 | 0.013 | 0.046 | 0.012 | 0.049 |
| 22.5 | 0.027 | 0.017 | 0.033 | 0.015 | 0.037 | 0.014 | 0.041 | 0.013 | 0.044 | 0.012 | 0.047 |
| 23 | 0.025 | 0.016 | 0.031 | 0.014 | 0.035 | 0.013 | 0.038 | 0.012 | 0.041 | 0.011 | 0.044 |
| 23.5 | 0.024 | 0.015 | 0.029 | 0.013 | 0.033 | 0.012 | 0.036 | 0.011 | 0.039 | 0.010 | 0.042 |
| 24 | 0.023 | 0.014 | 0.028 | 0.012 | 0.031 | 0.011 | 0.034 | 0.011 | 0.037 | 0.010 | 0.040 |
| 24.5 | 0.021 | 0.013 | 0.026 | 0.012 | 0.030 | 0.011 | 0.032 | 0.010 | 0.035 | 0.009 | 0.037 |

Insulation Type: Polyester / Polyamideimide. Heavy Build. UL recognized, Class 200°C as round wire.
 Polyester / Polyamideimide. Heavy Build. UL recognized, Class 240°C as round wire.
 Polyester / Polyamideimide / Bondcoat. Heavy Build. UL recognized, Class 180°C as round wire.

Product can be shipped: 10 lbs. / 4.5 kgs.
 20 lbs. / 9.1 kgs.
 80 lbs. / 36.3 kgs.

Spool Size: 6" OD x 3.5" (10 lbs.)

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| AWG Sizes | | Ratios - Millimeter Dimensions | | | | | | | | | |
|-----------|------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AWG | Dia. | 1:2 | | 1:2.5 | | 1:3 | | 1:3.5 | | 1:4 | |
| | | T | W | T | W | T | W | T | W | T | W |
| | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| 25 | 0.51 | 0.32 | 0.63 | 0.28 | 0.71 | 0.26 | 0.78 | 0.24 | 0.84 | 0.22 | 0.90 |
| 25.5 | 0.48 | 0.30 | 0.60 | 0.27 | 0.67 | 0.25 | 0.74 | 0.23 | 0.80 | 0.21 | 0.85 |
| 26 | 0.45 | 0.28 | 0.57 | 0.25 | 0.63 | 0.23 | 0.69 | 0.21 | 0.75 | 0.20 | 0.80 |
| 26.5 | 0.43 | 0.27 | 0.54 | 0.24 | 0.61 | 0.22 | 0.66 | 0.20 | 0.72 | 0.19 | 0.77 |
| 27 | 0.41 | 0.26 | 0.51 | 0.23 | 0.57 | 0.21 | 0.63 | 0.19 | 0.68 | 0.18 | 0.72 |
| 27.5 | 0.39 | 0.24 | 0.49 | 0.22 | 0.54 | 0.20 | 0.60 | 0.18 | 0.64 | 0.17 | 0.69 |
| 28 | 0.37 | 0.23 | 0.46 | 0.20 | 0.51 | 0.19 | 0.56 | 0.17 | 0.61 | 0.16 | 0.65 |
| 28.5 | 0.35 | 0.22 | 0.44 | 0.20 | 0.49 | 0.18 | 0.53 | 0.16 | 0.58 | 0.15 | 0.62 |
| 29 | 0.33 | 0.21 | 0.41 | 0.19 | 0.46 | 0.17 | 0.51 | 0.16 | 0.55 | 0.15 | 0.59 |
| 29.5 | 0.31 | 0.20 | 0.39 | 0.18 | 0.44 | 0.16 | 0.48 | 0.15 | 0.52 | 0.14 | 0.55 |
| 30 | 0.29 | 0.18 | 0.37 | 0.17 | 0.41 | 0.15 | 0.45 | 0.14 | 0.49 | 0.13 | 0.52 |
| 30.5 | 0.28 | 0.177 | 0.353 | 0.158 | 0.395 | 0.144 | 0.432 | 0.133 | 0.467 | 0.125 | 0.499 |
| 31 | 0.27 | 0.166 | 0.333 | 0.149 | 0.372 | 0.136 | 0.407 | 0.126 | 0.440 | 0.118 | 0.470 |
| 31.5 | 0.25 | 0.159 | 0.318 | 0.142 | 0.356 | 0.130 | 0.390 | 0.120 | 0.421 | 0.113 | 0.450 |
| 32 | 0.24 | 0.150 | 0.301 | 0.135 | 0.336 | 0.123 | 0.368 | 0.114 | 0.398 | 0.106 | 0.425 |

| AWG Sizes | | Ratios - Inches Dimensions | | | | | | | | | |
|-----------|-------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AWG | Dia. | 1:2 | | 1:2.5 | | 1:3 | | 1:3.5 | | 1:4 | |
| | | T | W | T | W | T | W | T | W | T | W |
| | in. | in. | in. | in. | in. | in. | in. | in. | in. | in. | in. |
| 25 | 0.020 | 0.012 | 0.025 | 0.011 | 0.028 | 0.010 | 0.031 | 0.009 | 0.033 | 0.009 | 0.035 |
| 25.5 | 0.019 | 0.012 | 0.024 | 0.011 | 0.026 | 0.010 | 0.029 | 0.009 | 0.031 | 0.008 | 0.033 |
| 26 | 0.018 | 0.011 | 0.022 | 0.010 | 0.025 | 0.009 | 0.027 | 0.009 | 0.030 | 0.008 | 0.032 |
| 26.5 | 0.017 | 0.011 | 0.021 | 0.010 | 0.024 | 0.009 | 0.026 | 0.008 | 0.028 | 0.008 | 0.030 |
| 27 | 0.016 | 0.010 | 0.020 | 0.009 | 0.023 | 0.008 | 0.025 | 0.008 | 0.027 | 0.007 | 0.029 |
| 27.5 | 0.015 | 0.010 | 0.019 | 0.009 | 0.021 | 0.008 | 0.023 | 0.007 | 0.025 | 0.007 | 0.027 |
| 28 | 0.014 | 0.009 | 0.018 | 0.008 | 0.020 | 0.007 | 0.022 | 0.007 | 0.024 | 0.006 | 0.026 |
| 28.5 | 0.014 | 0.009 | 0.017 | 0.008 | 0.019 | 0.007 | 0.021 | 0.006 | 0.023 | 0.006 | 0.024 |
| 29 | 0.013 | 0.008 | 0.016 | 0.007 | 0.018 | 0.007 | 0.020 | 0.006 | 0.022 | 0.006 | 0.023 |
| 29.5 | 0.012 | 0.008 | 0.015 | 0.007 | 0.017 | 0.006 | 0.019 | 0.006 | 0.020 | 0.005 | 0.022 |
| 30 | 0.012 | 0.007 | 0.015 | 0.007 | 0.016 | 0.006 | 0.018 | 0.005 | 0.019 | 0.005 | 0.021 |
| 30.5 | 0.011 | 0.007 | 0.014 | 0.006 | 0.016 | 0.006 | 0.017 | 0.005 | 0.018 | 0.005 | 0.020 |
| 31 | 0.01 | 0.007 | 0.013 | 0.006 | 0.015 | 0.005 | 0.016 | 0.005 | 0.017 | 0.005 | 0.019 |
| 31.5 | 0.01 | 0.006 | 0.013 | 0.006 | 0.014 | 0.005 | 0.015 | 0.005 | 0.017 | 0.004 | 0.018 |
| 32 | 0.009 | 0.006 | 0.012 | 0.005 | 0.013 | 0.005 | 0.015 | 0.004 | 0.016 | 0.004 | 0.017 |

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Spool Size: 6" OD x 3.5" (10 lbs.)

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THE PROCESS

The pre-insulated wire or bare wire is flattened utilizing proprietary equipment in a single step deformation between mirror polished work surfaces. It is special for the process that the deformation is performed with negligible elongation. This means the cross sectional area is reduced only marginally. The result is that even at the maximum ratio of deformation 1:4, the insulation is stretched no more than 25% on the flats, and in one direction only (crosswise).

It has shown that the flattening preserves the integrity of practically all types of insulation including solderable polyurethanes and bondcoats as well as high temperature polyimide/imide coatings. Studies of sections of flattened wire show a continuous rather than an angular transition from the flats into semi elliptical edges practically without any stress concentrations. The product also does not exhibit the "dogbone" shape often encountered in post insulated rectangular wire due to surface tension drawing the varnish away from the wire edges.

WORK HARDENING

Depending on the flattening ratio the process normally involves a degree of work hardening, which leaves the wire somewhat harder than post insulated wire. The increased stiffness is perceived as an advantage in certain applications.