

Copper Laminated Amperium[®] Wire

Second generation HTS wire for power-dense coil applications. Available in 4.8 mm and 12 mm width

AMSC's copper laminated Amperium wire conducts more than 100 times the electrical current of copper wire of similar dimensions. Used in power dense coils for synchronous motors, generators and magnets among other applications, it can dramatically reduce the size and weight of large-scale electrical equipment. AMSC's copper laminated high temperature superconductor (HTS) wire provides significantly greater power throughput and efficiency as well as high strength and stability with outstanding bend tolerance.

Responding to current demand

Amperium wire has changed the industry with its revolutionary ability to conduct over 100 times the electrical current (amperage) of conventional wire. As an example, just one of these ultra-thin HTS wires can carry enough power to serve the needs of approximately 10,000 US homes.

Reducing the footprint and costs of large-scale equipment

The high power density of Amperium wire dramatically reduces the size, weight and often the overall cost of large-scale electrical equipment while also increasing efficiency for applications such as magnets and wind generators when compared with systems based on traditional copper wire.

Ideal for all coil applications

Coils made utilizing Amperium wire can be effectively applied to ship propulsion motors and generators, wind turbine generators, transformers and SMES and degaussing systems for naval ships.

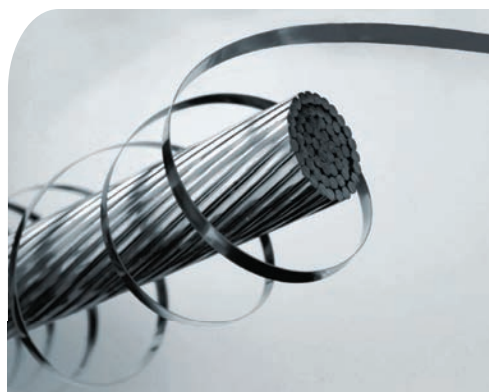
Enhanced strength and electrical stability

The copper laminated wire features solder fillets at the edges, which assure hermeticity, high C-axis strength for epoxy encapsulated coils and enhanced electrical stability – for maximum performance and reliability.

Various widths available

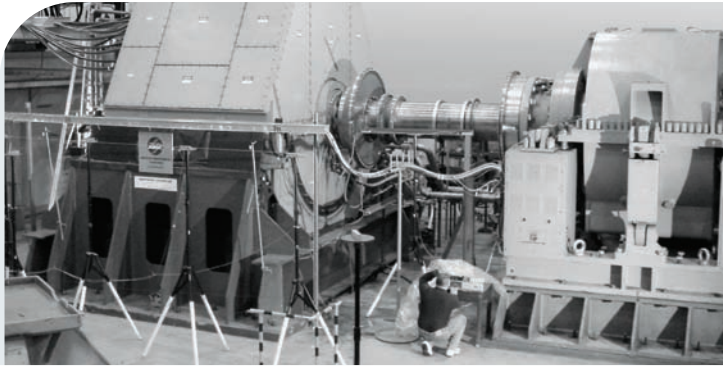
Manufactured utilizing a high-volume and proprietary process, AMSC's copper laminated Amperium wire is available in two different widths: 4.8 mm and 12 mm. The extra wide, high current 12 mm design reduces wire length requirements and coil stack count.

- High strength and stability
- Solder fillets at edges for high c-axis strength and enhanced electrical stability
- Robust product with outstanding bend tolerances



AMSC's Amperium wire wound around a copper bundle with equivalent current carrying capability. Amperium wire conducts more than 100 times the electrical current of equivalent sized copper wire.





Second generation HTS wire for power dense coil applications

AMSC 36.5 MW, 120 rpm ship propulsion motor

MECHANICAL PROPERTIES

| | 4.8 mm | 12 mm |
|---|----------------------|----------------------|
| Average thickness: | 0.18 mm - 0.22 mm | 0.18 mm - 0.22 mm |
| Minimum width: | 4.70 mm | 11.9 mm |
| Maximum width: | 4.95 mm | 12.3 mm |
| Minimum double bend diameter (RT): | 30 mm ⁱ | 30 mm ⁱ |
| Minimum double bend diameter for spliced wire (RT): | 100 mm ⁱ | 100 mm ⁱ |
| Maximum rated tensile stress (RT): | 150 MPa ⁱ | 150 MPa ⁱ |
| Maximum rated wire tension (RT): | 12 kg ⁱ | 30 kg ⁱ |
| Maximum rated tensile strain (77K): | 0.3% ⁱ | 0.3% ⁱ |
| Maximum rated C-Axis stress: | 20 MPa ⁱ | 20 MPa ⁱ |

ELECTRICAL PROPERTIES

| | 4.8 mm | 12 mm |
|--|--|--|
| Minimum amperage (I _c) ⁱⁱ | Average Engineering current density - J _e (A/cm ²) ⁱⁱⁱ | Average Engineering current density - J _e (A/cm ²) ⁱⁱⁱ |
| 70 A | 7,200 A/cm ² | — |
| 80 A | 8,200 A/cm ² | — |
| 90 A | 9,300 A/cm ² | — |
| 100 A | 10,300 A/cm ² | — |
| ≥100 A | Contact factory | — |
| 175 A | — | 7200 A/cm ² |
| 200 A | — | 8200 A/cm ² |
| 225 A | — | 9300 A/cm ² |
| 250 A | — | 10400 A/cm ² |
| ≥250 A | — | Contact factory |

Spliced wire available in long lengths

Insulation options: Contact factory

Certificate of Conformance provided.

Certificate of Analysis optionally available. Contact factory.

Leaders and trailers optionally available. Contact factory.

ⁱ Greater than 95% I_c retention

ⁱⁱ 77K, self-field, 1 μV/cm

ⁱⁱⁱ J_e is based on average thickness and width