Amperium® Stainless Steel Laminated Wire

Type 8612 with Double HTS Layers

Unique second generation HTS wire for current limiter and current lead applications with two HTS layers in a single laminated package. Available in 12 mm width.

AMSC's Amperium stainless steel laminated wire is designed for use in current limiting superconductor coils or rods where robustness and current limiting capacity are critical. The use of stainless steel lamination provides a high normal state resistance for current limiter applications. The low thermal conductivity is also ideal for current-lead applications.

Ideal Characteristics for FCL Applications
Type 8612 Amperium wire provides high I_c, superior I_c uniformity, and increased normal state resistivity in a robust, manufacturing process tolerant stainless steel package.

Simplified FCL Manufacture
The unique double HTS-layer construction of Type 8612 Amperium wire reduces FCL manufacture cost by eliminating the need for two-in-hand coil winding and enables the use of fewer coils.

Ideal for current lead applications
Stainless steel laminated Amperium wire is uniquely suited for current lead applications. The combination of low thermal conductivity and high ampacity makes it an ideal wire for low heat leak current leads operating between large temperature differences. The heat leak of Amperium stainless steel wire from 77 K to 4 K is typically ½ or less that of other HTS wires.

High strength with excellent mechanical properties
The stainless steel laminated design with solder fillets at the edges encloses the HTS core in a high strength hermetic package. The unique architecture produces excellent mechanical properties in both axial and through-thickness directions.

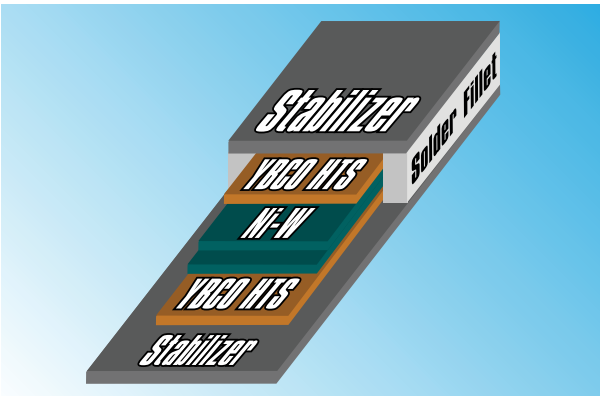
Wide width design
Manufactured using a high-volume and proprietary process, AMSC's stainless steel laminated wire is available in 12 mm width. The wider, higher current wire is designed for high power distribution and transmission level current limiters.

FCL Coil with AMSC's Amperium Stainless Steel Wire.

- High I_c performance
- Eliminates the need for two-in-hand coil winding
- Increased normal state resistance compared to two 3-layer wires
- High strength: robust and reliable with excellent mechanical properties
- Well suited for rapid thermal cycle applications like fault current limiters and high stress coils
- Pre-tinned to enable easy terminations and joining

4-Layer second generation HTS wire for fault current limiter and current lead applications

Type 8612 with Double HTS Layers



4-Layer Construction of Type 8612 Amperium Wire

Uniquely designed for FCL application, Type 8612 stainless steel laminated wire consists of two HTS/substrate insert structures placed back-to-back, with the HTS layers facing outwards. Two layers of 75 µm thick 316L stainless steel laminate are then added, completing the wire. Advantages of this 4-layer construction:

- Twice the I_c of 3-layer wire designs containing only one HTS layer
- Eliminates the need for two-in-hand coil winding
- Outward facing HTS layers providing shielding for the substrates
- Enables systems to use fewer coils
- Higher normal state resistance than two-in-hand 3-layer wires

MECHANICAL PROPERTIES	12 mm
Average thickness:	0.30 mm - 0.36 mm
Minimum width:	11.9 mm
Maximum width:	12.3 mm
Minimum double bend diameter (RT[iv]):	95 mm[i]
Maximum rated tensile stress (RT):	200 MPa[i]
Maximum rated wire tension (RT):	48 kg[i]
Maximum rated tensile strain (77K):	0.3%[i]
Axial Resistance at Room Temperature (RT)	0.07 Ω/m ±20%

ELECTRICAL PROPERTIES	12 mm
Minimum amperage (I_c)[ii]	Average Engineering current density - J_e (A/cm²)[iii]
400 A	10,100 A/cm²
450 A	11,400 A/cm²
500 A	12,700 A/cm²
≥500A	Contact factory

Insulation options: Contact factory

Certificate of Conformance provided.
Certificate of Analysis optionally available. Contact factory.

[i] Greater than 95% I_c retention
[ii] 77K, self-field, 1 µV/cm, 1 m resolution
[iii] J_e is based on average thickness and width
[iv] RT = Room Temperature

amsc.com
sales@amsc.com

smarter, cleaner
...better energy

amsc

SSAMP8612_DS_A4_0614