

Superconducting cable for CBM magnet

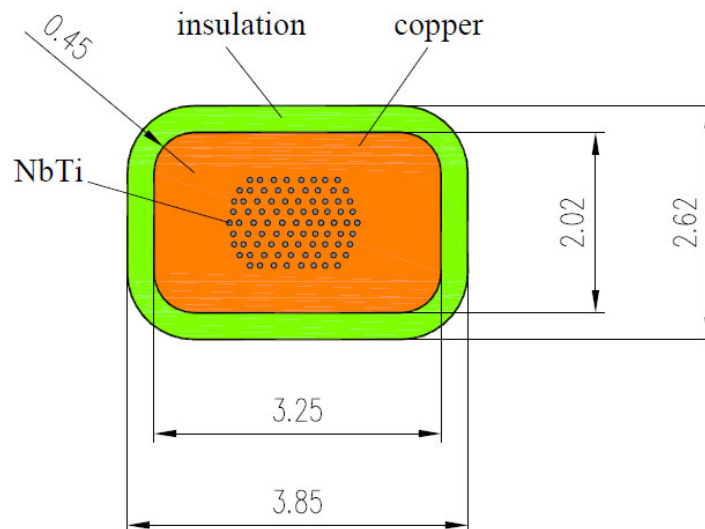
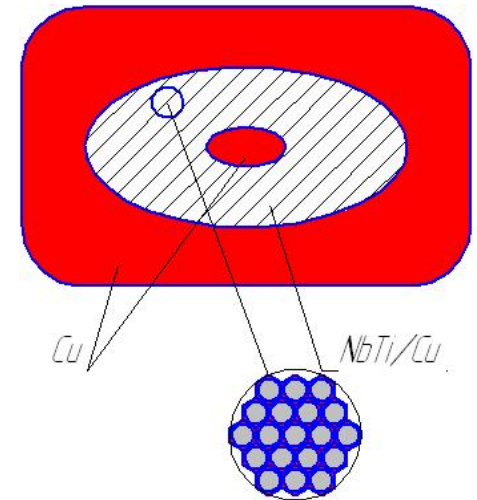
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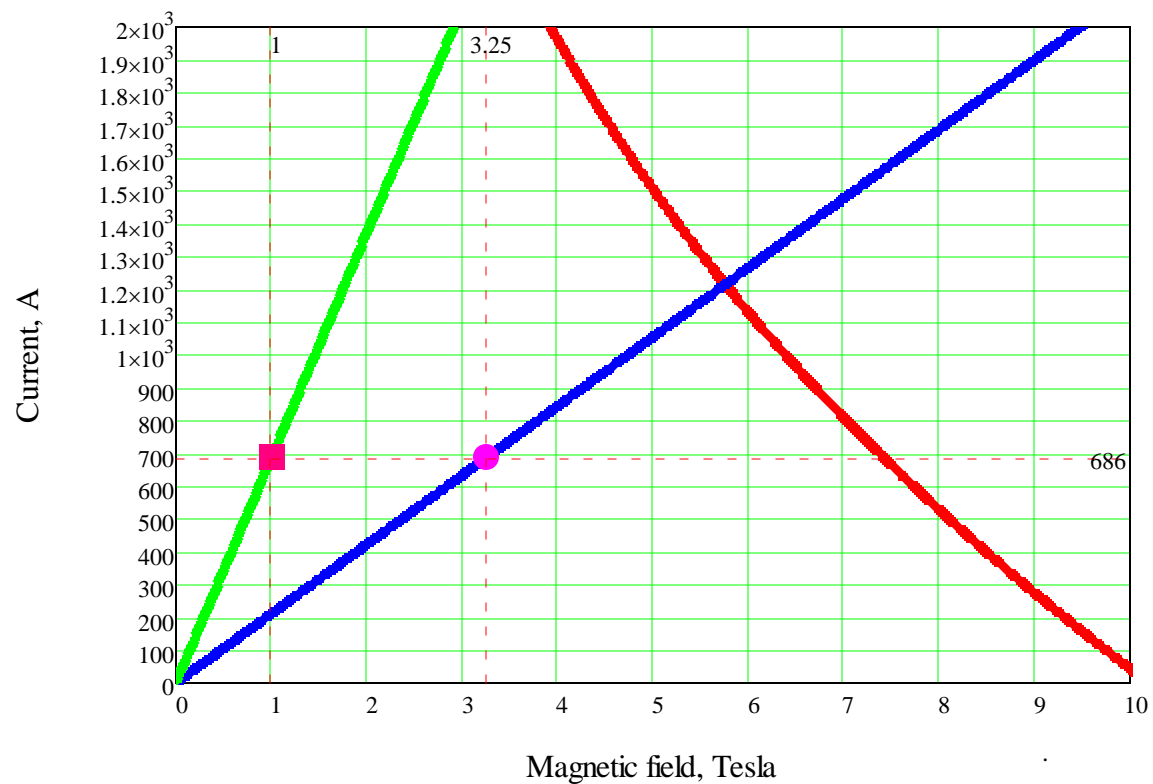
BINP

Superconducting wire parameters for CBM magnet

Table 2 Superconducting cable parameters approved by manufacturers

SC wire parameters	Values
Rectangular bare/insulated sizes:	
a, mm	2.02/2.62
b, mm	3.25/3.85
facets radius, mm	0.45
Cable total length, km	8.6
One piece of the cable length, km	5
Cu/NbTi ratio	>9.1
RRR	>100
Filament diameter, μm	37 ± 1
Number of filaments	620
Filament twist pitch, mm	<45
Cu+NbTi cross section area, mm^2	6.342
NbTi cross section area, mm^2	<0.628
I_c (5 T, 4.2 K), min A/	1754
I_c (4.5 K, 3.3 T), min A	2358





- CBM wire critical curve, 4.5K
- maximum field in the windings
- load line in median plane of magnet center
- field at working point
- working field in median plane of magnet center

Main producers of the SC wire:

- JSC "**VNIINM**" is developing design and manufacturing technology of wire, and study of fabricated wire.
- JSC "**CHMZ**" conducts the purchase and preparation of raw materials and manufactures the wire for the technological support of JSC "VNIINM"
- JSC "**VNIKP**" conducts the purchase of raw materials and makes the insulation on the wires made by JSC "CHMZ"

SC wire insulation

Conductor insulation shall consist of 2 layers with a thickness of 0.05 mm polyimide tape and 2 layers with a thickness of 0.01 mm of glass fibre material (tape or braid). There is no any problem with the application of insulation in two layers of polyimide tape by double coil technology . The found tape allows to provide insulation in two layers.

To date, VNIKP managed to find a fiberglass material with a thickness of 0.1 mm, only a width of 15 mm when the width of the tape is possible only technology single winding with ~ 50 % overlap. The result will also be provided with two layers of fiberglass insulation but with some thin areas in 1 layer on the seams.

At the moment VNIKP has been working with suppliers of insulation in order to buy glass insulation the required width, 0.1 mm in thickness for applying insulation in two layers according to the technology of the double winding