

EuCARD ColMag WP

Task 2 – HTS Conductor

Pre-kickoff meeting

April 23rd, 2013

Task 2 - objectives

- Design applicable concept, prototype and produce **HTS cables**, in unit length (order of 50 m) and quantity (order of 10 UL) sufficient for coil winding (1 magnet per material option)
- Improve the performance of the two candidate HTS materials (BSCCO-2212 and YBCO), with targets suitable for a 5 T accelerator grade insert in a 15 T background magnet. Produce at least 10 kg of each material at target performance
- Characterize electrical and mechanical properties of the basic materials and cables. Assist material R&D through advanced analytical and imaging techniques

Task 2 – proposed structure

- Sub-task 2.1 – Material development and procurement
- Sub-task 2.2 – Cable concepts, prototyping and production
- Sub-task 2.3 – Characterization

Wires and tapes – targets and metrics

parameter	units	OK...	Yes we can !
J_E (20 T, 4.2 K)	(A/mm²)	600	750
J_E (15 T, 4.2 K)	(A/mm ²)	675	850
J_E (12 T, 4.2 K)	(A/mm ²)	800	1000
σ (I_C) within a unit length	(%)	10	5
σ (I_C) among unit lengths	(%)		10
M(1.5 T, 10 mT/s)	(mT)	300	100
Minimum $\sigma_{\text{transverse}}$	(MPa)		150
Minimum $\varepsilon_{\text{longitudinal}}$	(%)		± 0.5
Unit length	(m)	100	500

Cables – targets and metrics

I_C (20 T, 4.2 K)	(kA)	10
I_C (15 T, 4.2 K)	(kA)	11.5
I_C (12T, 4.2 K)	(kA)	13
<i>width</i>	(mm)	10
<i>thickness</i>	(mm)	1.5
Cabling degradation	(%)	10
Effective contact resistance	($\mu\Omega$)	5

Proposed milestones

- BSCCO

- Q3 2013: cable design proposal
- Q4 2013: delivery of 4 R&D billets (US-CDP)
- Q1 2014: FRESCA sample test
- Q2 2014: cable baseline
- Q2 2014: cable dummy lengths for winding tests (Rutherford)
- Q4 2014: delivery of production wire (optimized composition and doping)
- Q2 2015: production of cable lengths

- YBCO

- Q3 2013: cable design proposal
- Q4 2013: delivery of R&D tapes
- Q2 2014: cable baseline
- Q2 2014: cable prototypes and dummies (Roebel)
- Q4 2014: delivery of production tapes
- Q2 2015: production of cable lengths