



AGENDA

1) Status of the cold mass construction contract

Summary of 2009 activities and Schedule

P.Fabbricatore

2) Status of FAIR and SIS300 (activities at GSI)

H.Mueller

3) Cold mass final drawings and material procurement

R.Marabotto

4) Standard and norms used for the outer shell

R.Marabotto

5) Construction quality control

S.Parodi

6) Properties of the conductor built at Luvata

G.Volpini

7) Status of the horizontal cryostat construction

U.Gambardella

8) 3D mechanics

S.Farinon

9) Instrumentation of the cold mass

P.Fabbricatore

10) Test of the cold mass in a vertical cryostat

G.Volpini

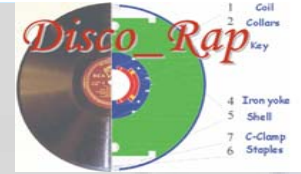
11) Visit to the workshop for inspecting the first pole (just cured)



GENERAL STATUS OF DISCORAP ACTIVITIES

P.Fabbricatore

- 1) Activities performed during last 6 months
- 2) Present status of coil construction
- 3) Planning



Synopsis

Design Phase

Conceptual and Engineering Design, Industrial Developments, Measurements and Tests

Technical Design Report for the Model Dipole

Model
Construction

Tests on the
model

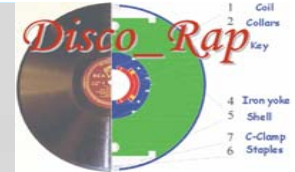
Refinements of some
design aspects

Follow-up
Engineering

Technical Design Report for the
construction of the prototypes for
SIS300

Review in view of
the Model
Construction.
Process to be
ended by Dec.08

Review in
view of the
Prototypes
Construction



Procurement of materials and components

A very critic procurement has been the high strength austenitic steel
 We need 2.5 ton a high strength austenitic steel $YS= 650-700 \text{ MPa @RT}$, $\mu=1.002$
 After several iterations with companies and labs a contract was issued to Buderus
 for a manganese steel which is suitable for our application.

Buderus Edelstahl Band GmbH	Buderus Edelstahl Band		
Company ASG Superconductors SPA Sede Legale e Operativa Corso F.M. Perrone 73r I-18152 GENOVA	Inspection certificate EN 10204/3.1		Stempel des Abnahmebeauftragten Inspectors Stamp
	Certificate No. 110263/2		
	Our Reference No. Pos. 326729 10		

Tensile Test

K3165	test direction	L
	specimen diameter:	2,76 mm
	Temperature:	23 °C
	Rp0,2:	652 MPa
	Rm:	861 MPa
	A:	33,5 %
	Width of the sample:	20,14 mm
	test direction	L
	specimen diameter:	2,81 mm
	Temperature:	23 °C
	Rp0,2:	637 MPa
	Rm:	868 MPa
	Width of the sample:	20,15 mm
	A:	33,9 %

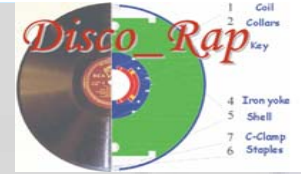
Heat-Analysis (% H ppm)

Mn	Cr	Ni	Mo	N
11,810	19,080	11,190	0,820	0,3380

Rp0,2@4.2 K
1503 – 1541 MPa

Rm@4.2 K
1808 – 1917 MPa

First delivery from
 Buderus not
 acceptable (less
 quantity than needed
 and with low
 mechanical
 properties

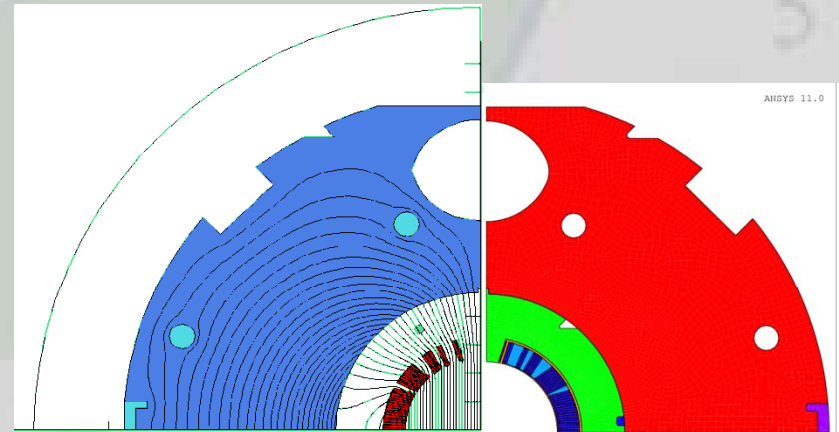
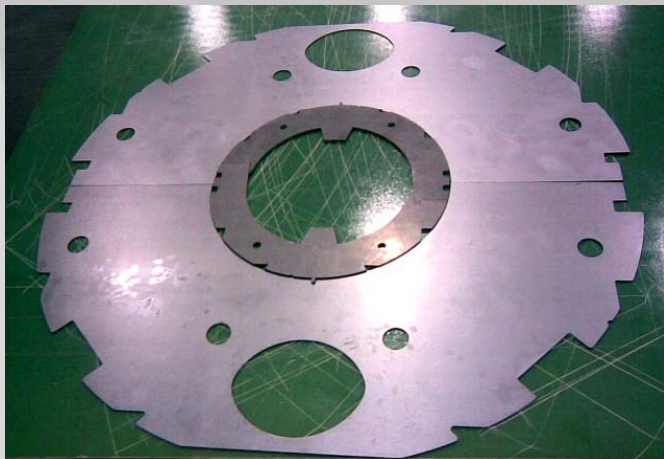


Comparison with other high strength austenitic steel

	C	Si	Mn	P	S	Cr	Ni	Mo	N
YUS130S	0,09	0,39	11,70	0,017	0,001	17,90	6,60	0,06	0,319
Nitronic 40	0,03	0,55	8,81	0,021	0,001	20,20	6,85	0,25	0,295
XM-11 (ASTMA 666)	max 0,04	max 0,75	8,0-10,0	max 0,0	max 0,030	19,0-21,5	5,5-7,5	0,15-0,40	
Böhler P506	0,02	0,25	11,5	0,01	0,002	19,3	11,5	0,9	0,30



Punching devices for iron and collars





External shell in two halves



The horizontal cryostat construction has been awarded to SIMIC (delivery March 2010)



Stato esplosivo: Esplosione Default
Rappr: semplif: 1



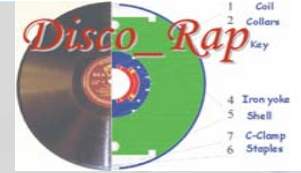
With the delivery of the conductor the construction is started



Two lengths are available of the developed low loss conductor: 717 m (Enough for the coil) + 120 m used for winding tests . $I_c@5T,4.2K= 16740 \text{ A}$ (spec.18540 A)
→ 0.8 K margin (1 K).

ASG re-checked the winding methodology through the complete winding of one pole with new end spacers. Soon after the first pole has been wound and cured.

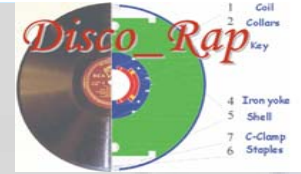




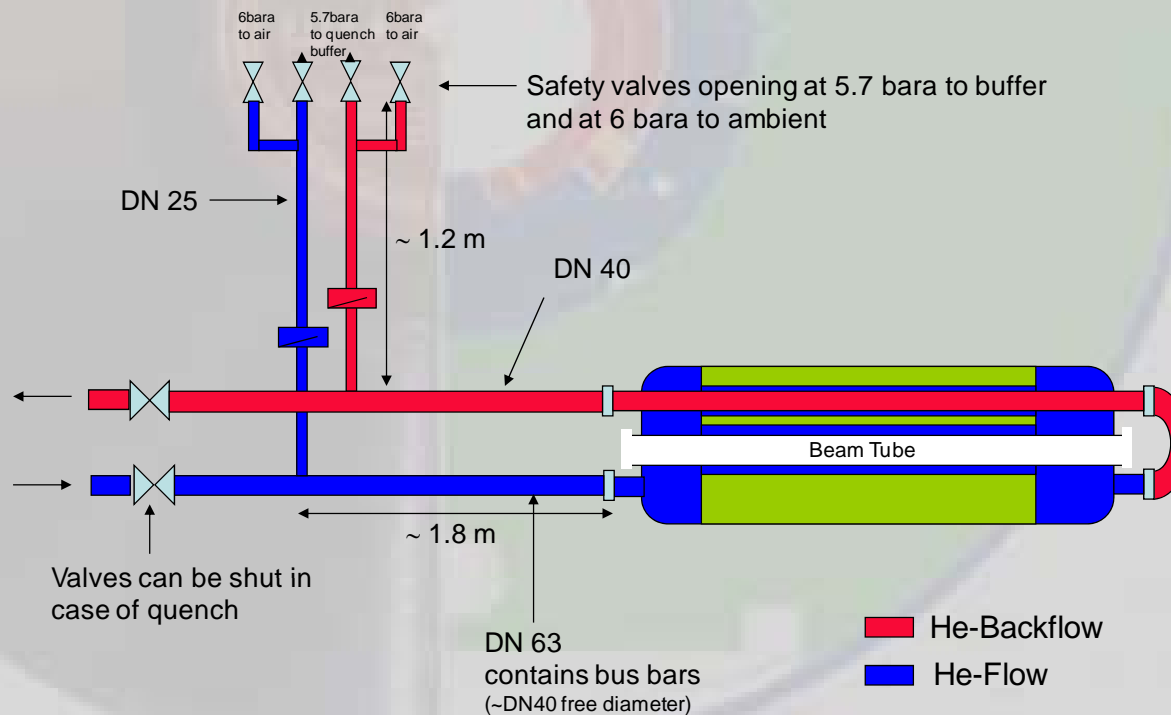
Pressure code for the cold mass shell

Since the cold mass shell can experience high pressure during a quench of the magnet, after some internal discussions and after having a feedback by FAIR (Hans) we decided to apply a standard code for the cold mass construction. The code applied is AD2000.

This decision had implied a cost increase of the order of 20k€ and much more difficult construction operations because any components of the cold mass shell (also not strictly related to the function of containing the pressure) must be approved and certified)

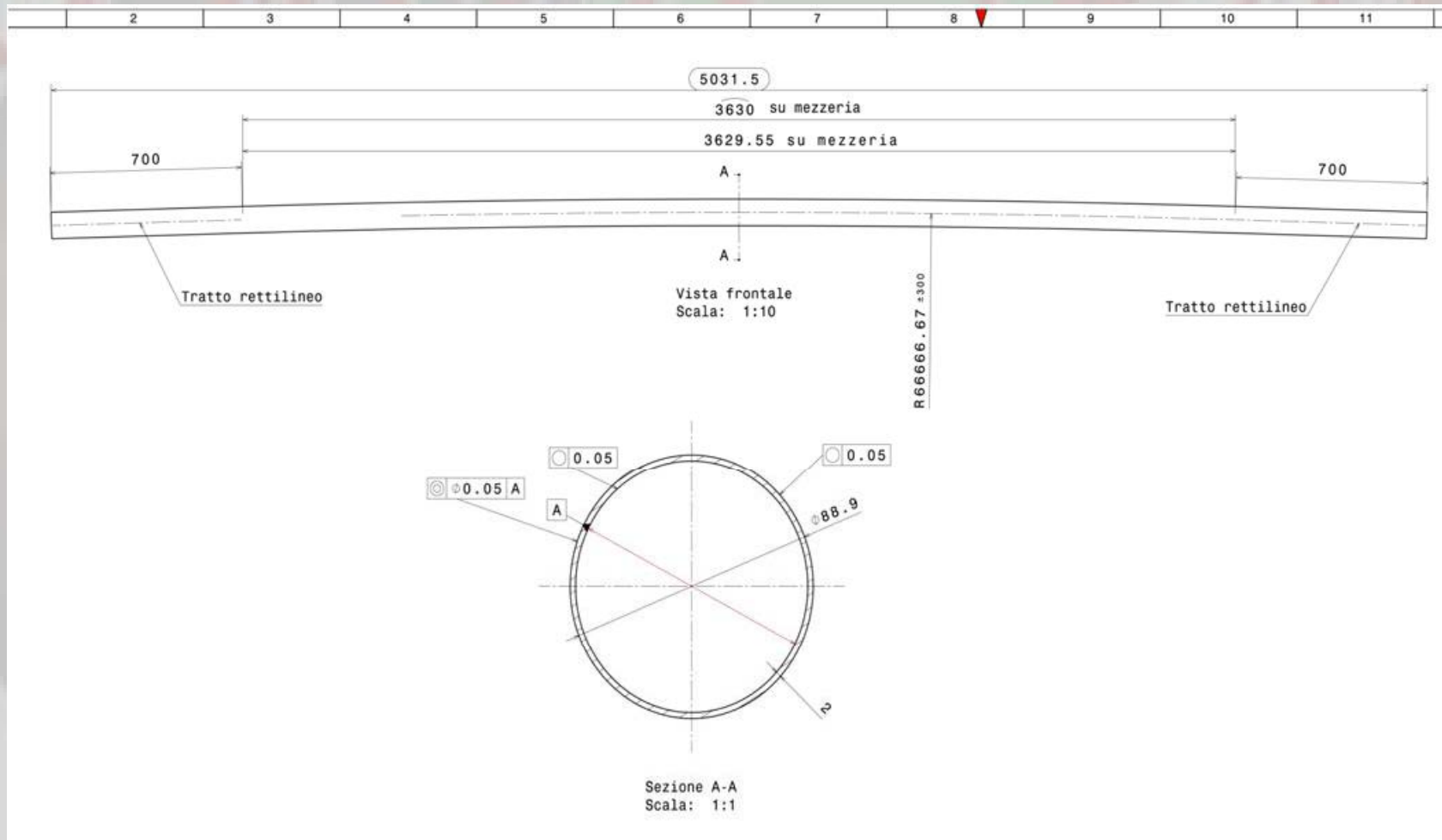


During normal operation at GSI the cryogenic vessel contains supercritical helium (102 l) at 3 bara. The volume enclosed between the cryogenic vessel and the external vessel is under vacuum. The volume inside the inner tube (89 mm diameter) is under vacuum. In case of a quench of the magnet, the pressure rises from 3 to 8 bara maximum. Fig.2 shows a diagram of the cold mass connected to the cooling system of GSI. The blue and red zones of the cold mass (circled in the figure) can get a pressure as high as 8 bara.





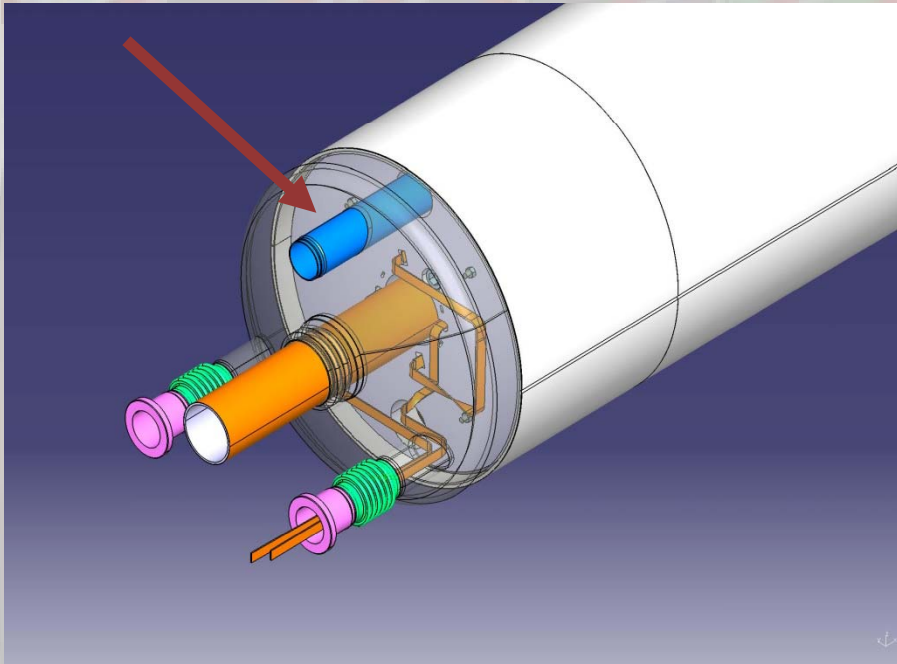
Beam pipe



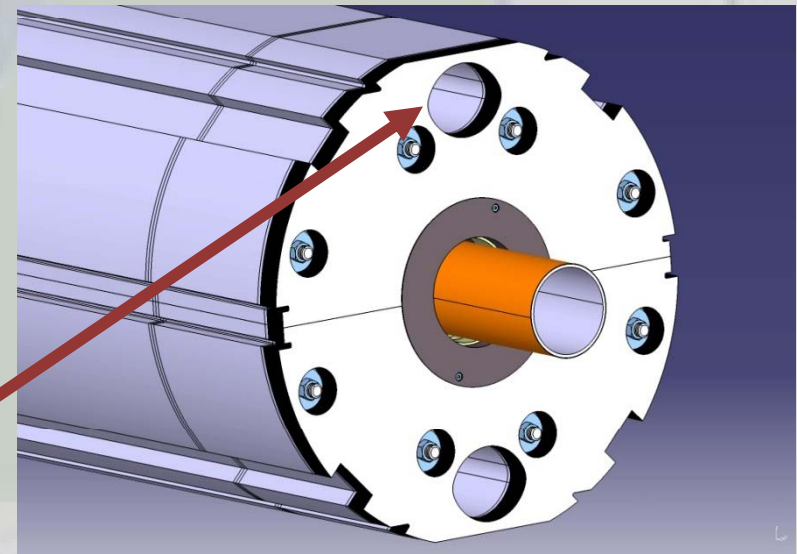
The material is AISI316 L seamless (1.4404 certified AD2000)



Re-cooling pipe



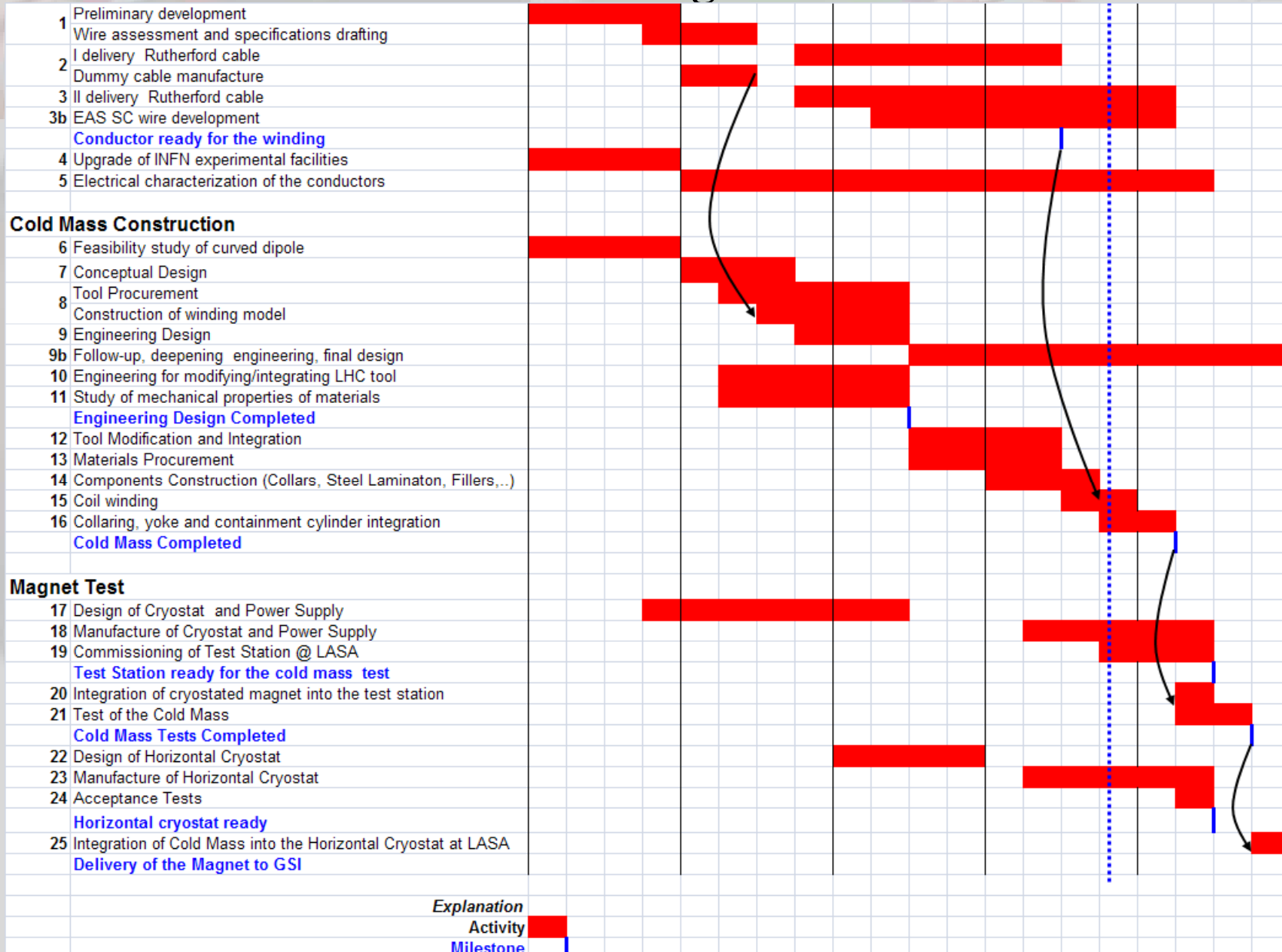
The material is AISI316 L
OD 70 mm. Fully curved.
Modification required for the
non-magnetic steel
lamination at coil ends

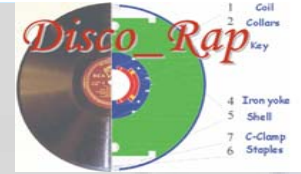


Larger hole



Planning





NEXT MILESTONES

Activity	Date
First pole finished (winding, curing, finishing, elastic modulus measurement)	Nov. 4 th
Second pole finished (winding, curing, finishing, elastic modulus measurement)	Nov. 23
Collaring	Jan 18 th
Integration into the iron yoke	Feb 9 th
Integration into the external shell	Feb 25 th
Exits and completion	April 1 st
Final tests.	April 5 th
Delivery to Milano LASA	April 30 th