

ABSTRACT

The objective of the poster is to present the assembly of the FRESCA2 magnet with particular emphasis on procedure, tooling developed and important quality control steps. 2 magnets have been assembled and cold tested in 2016/2017.

## I. TAILORED SHIM







- Compensate coil geometrical defects.
- Impregnated using MY750 resin charged with 53% of Dolomie Micropol 100.
- Insulation of the post-to-post contact with polyimide validated by electrical test to accommodate with bad insulation coil-tocentral post.
- Disassembly possible.

# **ASSEMBLY OF THE Nb<sub>3</sub>Sn DIPOLE MAGNET FRESCA2**

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- Assembly of the pads, wedges and mid-plane insulation.
- Dedicated wheels and lifting beam designed to rotate, lift and bring together the two poles.
- Lateral alignment done with expansible mandrel inserted on both side of the aperture.



- Lateral shimming of the coils with polyimide for uniform pre-loading.
- Verification with pressure sensitive film (FUJI paper).
- Good agreement with the finite element model.

# **IV. CONNECTION BOX**









#### Wed-Af-Po3.01-10

**MT-25** 

## V. PRE-LOADING



	PRE-LOADING SEQUENCE AND TARGETS			
Step	Pre-load	Shell εθ [μstr]	Pole εx [μstr]	Rods εz [μstr]
0		100	0	0
1	azimuthal	165	-457	0
2	axial	165	-457	400
3	azimuthal	263	-728	400
4	axial	263	-728	700
5	azimuthal	375	-1039	700
6	axial	375	-1039	1000
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Central post of the coils 1-2, shell and axial rods instrumented with strain gauges. Azimuthal and axial pre-loading done simultaneously (see table) to compensate Lorentz forces at 13T.

I. EL		KII.		
				ES I
				- 002
VOLTAGE LE	EVELS ANI	) RESISTANCI	E FRESCAZA A	AT 293K
	V		$R[G\Omega]$	
	[kV]	ACPA	AL	FINAL
1201 to ground	1	130	21.8	
1201 to ground	2.5	Brd	Brd	
1202 to ground	1	35.4	71.6	
	2.5	Brd	Brd	18.4
2401 to ground	1	X	X	(1kV)
5401 to ground	2.5	33	16.2	_
3402 to ground	1	X	X	
	25	57	10.0	

The final test is done after interconnections. All the coils are in series.

## **VII. CONCLUSION**

- Two magnets have been assembled.
- Feasibility of the tailored shim demonstrated.
- Procedures and tooling validated.
- Ground insulation scheme to be improved to pass the coil-to-ground test at 2.5 kV.