REPORT

CONCEPTUAL DESIGN REPORT FOR THE 16 T COMMON COIL DIPOLE

Abstract

A 16 T twin aperture common coil dipole magnet based on Nb_3Sn technology has been designed within the EuroCirCol frame, as one of the candidates for the FCC main dipole magnets. In addition, the design has been adapted to fit in the current LHC cryostat, reducing the iron yoke to 650 mm in diameter, to allow the possibility of being the main dipole magnet of a HE-LHC accelerator. This report describes both the electromagnetic and mechanical design of the baseline design version v1h2_helhc650_pre1.

TRACEABILITY

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Verified by:	***Date:*** 2018-MM-DD
Approved by:	***Date:*** 20YY-MM-DD
Distribution: FCC Members	

Rev. No.	***Date***	***Description of Changes*** *(major changes only, minor changes in EDMS)*

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Minimum free aperture		
Integrated field		
Mechanical length		
Working temperature		
Working point		
Nominal current		
Iron geometry		
Field quality		
Fringe field		

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2.2 Cable

2.2.1 Specifications

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Table 2. Strand specifications.

Parameter	Value	Units
Cu/Sc		
Strand diameter		mm
Metal section		mm^2
Nº of filaments		
Filament diameter		µm
I (5T,4.2K)		A
J_c		A/mm^2
RRR		

Table 3. Rutherford cable specifications.

Parameter	Value	Units
No of strands		
Metal area		mm^2
Cable thickness		mm
Cable width		mm
Cable area		mm^2
Metal fraction		
Key-stone angle		deg
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