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Mon-Mo-Po1.05-07 [60]: The CFETR CSMC Nb₃Sn coil heat treatment process research

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The CSMC are major components of CFETR to generate the magnetic field for Simulating the Central Solenoid coil manufacturing process. Several trials were performed to qualify and optimize the heat treatment procedure of the Central Solenoid coil. In the trials, gas replacement, temperature controlling, protective gas flow controlling, coil fixture, and assembling procedure were performed to resolve some technical issues and to demonstrate the fabrication procedure. Major requirements are: the radius increase of the conductor must be less than 4.3mm in the reaction heat-treatment when the residual stress relax; the temperature ramp rate limited to 5°C/hr; the temperature uniformity need to be satisfied $\pm 5^\circ\text{C}$ at the same time in whole of the furnace; The gas ,which is exhaust from the furnace and conductor ,its' impurity content must be less than 10ppm;

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