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Fabrication Status of ITER Control Solenoid Modules

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The fabrication of the modules for the ITER Central Solenoid (CS) is in progress at General Atomics (GA) in Poway, California, USA. This purpose built facility has been established with the requisite tools and machines to fabricate the seven 110 tonne CS modules (six required plus one spare). The current schedule has the first module's fabrication completing in 2018 followed by electrical and full current testing. GA has completed the fabrication of a qualification coil, simulating all of the processes and exercising all of the tooling required to fabricate a production module. After being completed, the qualification coil underwent a cool down cycle to 4.5K which served as the final commissioning step of the helium cooling system on the parallel flow paths of a module. In addition, other final test station systems and procedures were simulated to verify their functionality including simulated Critical Current Sharing Temperature measurements, DC switch operation to dump the energy from the coil, and a helium leak test on the coil at <10K. After warming the coil, Paschen tests were repeated prior to the coil being dissected to evaluate the quality of the vacuum pressure impregnation (VPI). Dissection is scheduled for early spring 2018.

GA currently has four production modules in fabrication, all in different stages of production. The first module will be vacuum pressure impregnated in the spring of 2018. The second module is currently in the insulation process with the third module being joined together into a 110 tonne module. Module 4 is wound. The description of the VPI process planned for late spring 2018 will be described. To verify the turn insulation of a module, unique impulse testing methods were developed to test the insulation between the 560 turns of a module and these methods are reported in this paper.

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