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Vacuum Pressure Impregnation for Central Solenoid of JT-60SA

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The construction of a full-superconducting tokamak referred as JT-60 Super Advanced (JT-60SA) is in progress under the JA-EU broader approach projects. The magnet system of JT-60SA consists of 18 toroidal field (TF) coils, 4 modules of central solenoid (CS) and 6 equilibrium field (EF) coils.
The diameter, the height, the number of layers and the number of turns of CS module are 2.0 m, 1.6 m, 52 layers and 549 turns, respectively. GKG (Glass-Kapton-Glass) tape was wound around conductor as a turn insulation of CS module. Vacuum pressure impregnation (VPI) process was selected to fix the insulation tapes for CS module of JT-60SA.
During VPI process, CS module needs to be pressed in order to increase the bonding strength between turn insulation and conductor. The total insulation thickness of CS module is very thick of about 70 mm because of large number of layers. It was considered that the insulation thickness was shrunk during VPI process under the pressurized condition and traditional rigid jigs could not deal with this large shrinkage.
We conducted the VPI test using stacked insulation tapes to measure the amount of shrinkage. Amount of shrinkage was evaluated as 15mm for JT-60SA CS module. Displacement of 15mm was too large for traditional rigid jigs to be used for VPI process. We developed jigs with moving system and modified procedure of VPI process. VPI process of CS module was successfully performed, even though there was large shrinkage, by using developed jigs and modified procedure.
In this paper, result of VPI test, developed jigs and modified procedure for VPI of CS module will be described.

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