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ITR/2-4: ITER Magnet Systems - from Qualification to Full Scale Construction

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The ITER requires superconducting magnet systems, which consist of 18 Toroidal Field (TF) coils, one Central Solenoid (CS), and 6 Poloidal Field (PF) coils, 18 (9 pairs) Correction Coils (CC), and additional components such as feeders, current leads, and instrumentation feedthroughs, and so on. Six Domestic Agencies (DAs), EURATOM (EU), China (CN), Japan (JA), Korea (KO), Russia Federation (RF), and United States of America (US), are involved in the procurement sharing of the components of the ITER magnet systems and their constructions have been implemented under more than 20 Procurement Arrangements (PAs) signed between the ITER Organization (IO) and 6 DAs.

During recent years, qualification activities have good progress and full scale constructions have been started in TF conductors. Four jacketing lines have been set-up and qualified in EU, CN, JA, and RF, and one jacketing line has been constructed in US. The JA, RF, CN, and KO/EU has already started full scale construction of TF conductors, especially, JA has completed 25 conductors by the end of March 2012. The latest topic is the delivery of the 660-m dummy conductor manufactured by CN to JA. It is the first ITER component completed in CN and also first shipment between DAs under cooperation with the IO, CN, and JA.

The qualification of radial plate manufacture has almost completed in both EU and JA, and both DAs are ready for full scale construction. JA has also qualified full manufacturing processes such as winding, heat treatment, insulation, and impregnation with a 1/3 prototype prior to the qualification by the full scale prototype. Two full scale mock-ups of basic segments of TF coil structure were manufactured in Phase II to optimize and industrialize manufacturing process of TF coil structure. A preparation of the full scale construction of TF coil winding is under way in EU manufacturer, and contracts for full scale construction of TF coil and structure will be placed in JA in July 2012.

A building for PF coil manufacture has been constructed in the ITER site in February 2012. The US and JA have started to manufacture dummy CS conductors with a collaborative work for trial winding in US. The constructions of other components of the ITER magnet systems are also going well toward to the first plasma in 2020.

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