

## A Coil Test Facility for the cryogenic tests of the JT-60SA TF coils

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In the framework of the Broader Approach Activities, the EU will deliver to Japan the 18 superconducting coils which constitute the JT-60SA Toroidal field magnet. These 18 coils will be cold tested before shipping to Japan. Indeed, referring to the experience gained by the cold tests of superconducting coils for fusion devices (Tore Supra, W7-X), it appears that these tests are necessary to detect defects in the manufactured coils and to improve the manufacturing process. In this purpose, the European Joint Undertaking for ITER and the Development of Fusion Energy ("Fusion for Energy") and European Voluntary Contributors, are collaborating for the setup of a Coil Test Facility (CTF) and the performance of tests of the 18 Toroidal Field (TF) coils for JT-60SA, which will be manufactured by France and Italy.

The test facility is designed to measure the insulation resistance (at 3.0 kV) of the coil, the leak tightness, the pressure drop, the total coil resistance and the temperature margin of the coil at the nominal current (25.7 kA) by rising the Helium temperature from 5 K to ~7.5 K referring to the calculated quench temperature. The assessment of the quality of the 5 joint resistances between double pancakes is also part of the tests. The tests of the first coil of each manufacturer include a triggered quench by temperature increase

The test facility will be made of a large cryostat (11 m x 8 m x 5 m) with LN2 cooled thermal shields which can hold one TF coil (15 t) at a time, with a pumping system and leak detection system, a valve box with two HTS current leads, a He refrigeration system, a set of warm and cryogenic transfer lines, an electrical supply and warm bus lines to power the coil, a magnet safety system including quench detection, a control command and data acquisition system, handling equipments and test frames.

The project is presently in the equipment detailed design phase including the preparation of the building which will receive the test facility. The CTF will be built in Cadarache.

The paper will present the main specifications of the test facility, the present detailed design and the schedule for its implementation and for the performance of tests of the 18 TF coils.