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Factory acceptance test and delivery of the first two poloidal field coils to ITER fusion facility

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Fusion for Energy (F4E), the European Domestic Agency for the International Thermonuclear Experimental Reactor (ITER), is responsible for the supply of 5 out of the 6 Poloidal Field (PF) Coils: PF2-PF6. While the 9 meter diameter PF6 was manufactured by the Institute of Plasma Physics Chinese Academy of Sciences (ASIPP) and tested in the cold test facility at Cadarache under a collaboration agreement with F4E; coils PF2-PF5 are currently being manufactured on site, close to the Tokamak building, their size ranging from 17 to 24 meters diameter and weights from 200 to 400 tons.

This article describes the final acceptance tests performed on the coils PF5 and PF6, the testing setup, paying special attention to the tests performed before, after and during the cooldown at 80K. The tests cover a wide range of aspects of the operation at cryogenic temperatures: ranging from the high voltage electrical insulation performance during the potential fault conditions during plasma operation, leak tightness under vacuum and its pressure drop behaviour of its hydraulic system during operation with forced flow helium.

In addition, we will describe the final preparation activities for the delivery to ITER that mainly focus in the metrology measurement of the most important interfaces of the coils inside the tokamak cryostat. From the location of the coil clamps which fix together the PF coils to the toroidal field coils, to the coil electrical and hydraulic interfaces that will connect the coil electrical 55kA joints and cooling supply manifold systems of the machine, to the installation of the protection covers which constitute the most external part of the coil assembly.

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