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P3.0706 Qualification of ITER Poloidal-Field coil cryogenic components

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The ITER Poloidal-Field (PF) magnet system is composed of six circular coils consisting of superconducting winding packs made up from a stack of Double Pancakes. Due to the large coil sizes the coils PF2, PF3, PF4 and PF5 are to be fabricated adjacent to the ITER site in a dedicated PF Coil fabrication building. The cold testing of the full coils PF2 – PF6 will be carried out in the same facility.
The manufacturing design of the PF Coils has been started and the qualification of special processes and sub-assemblies is now completed.
To qualify the performance of PF Coil key components, several tests at room- and cryogenic temperature were performed at the dedicated test facility CryoMaK of the Karlsruhe Institute of Technology. Components under test were PF Helium Inlet, PF Joint and PF Tail full-scale mock-ups. Mechanical fatigue testing and Helium-leak test were performed to demonstrate the soundness of the welded joints of the mock-ups after the foreseen number of operating cycles. Small size specimens of the insulation material were investigated under different mechanical test modes to study the structural integrity. Finally, PF 3X3 conductors coil section mock-ups were also provided by F4E to investigate the mechanical and electrical integrity of a winding pack. The work summarizes the significant results demonstrating the sound performance of the provided components.

The views and opinions expressed herein do not necessarily reflect those of the ITER and F4E Organizations.

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