TEST BLANKET MODULE PIPE FOREST INTEGRATION IN ITER EQUATORIAL PORT

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ITER Test Blanket Modules (TBMs) will allow testing Breeding Blanket technologies for a future application in DEMO. IRFM contribution to this test program consists in the integration of the 2 European TBMs (Helium Cooled Lithium Lead and Helium Cooled Pebble Bed) in a dedicated equatorial port. The two Breeding Blanket concepts use Helium gas as a coolant, liquid PbLi as breeder (for HCLL process) and Helium gas for Tritium extraction (for HCPB process). These materials are passing through the cryostat interspace forming a pipe network called the Pipe Forest.
The main structural function of the Pipe Forest is to absorb the thermal expansion due to the Vacuum Vessel and due to the pipe system itself. The Pipe Forest, even though not being a strong technological component, has to cope with several design issues.
In this study, the different key parameters of the Pipe Forest design are identified and their relative influence is analysed.
Several design options have been investigated and compared based on:
- Thermo-mechanical finite element calculations
- Pipe Forest integration within the cryostat interspace
- Interface management
- Assembly and maintenance scenarios
- Complex pipe routing due to the expansion bends

Finally, the requirements of the RCC-MR 2007, which is the reference design & construction code selected for the European TBM, have been studied and applied to the Pipe Forest design.