

MAINTENANCE AND INSTALLATION OF THE EU TEST BLANKET SYSTEMS INSIDE THE ITER EQUATORIAL PORT

S. Madeleine¹, O. Bede⁴, T. Ilkei⁴, L. Commin¹, D. Keller¹, C. Dechelless¹, JC. Patterlini¹, G. Rampal², J-F. Salavy², F. Cismondi³, J-P Martins¹, L. Doceul¹, T. Baross⁴, G. Grunda⁴, B. Mészáros⁴, D. Nagy⁴, J. Németh⁴, Sz. Tulipán⁴

¹ CEA, IRFM, F-13108 Saint Paul Lez Durance, France

² CEA Saclay, DEN/DM2S, F-91191 Gif sur Yvette, France

³ KIT/Karlsruhe, IRS - Forschungszentrum Karlsruhe GmbH Karlsruhe, Germany

⁴ Euratom-HAS - KFKI-RMKI P.O.Box 49, H-1525, Budapest, Hungary

Corresponding author: sylvain.madeleine@cea.fr

The European Test Blanket Module (EU-TBM), first prototype of the breeding blanket concepts to produce the Tritium inside the future DEMO power plant, will be developed and tested in dedicated equatorial ports n°16 of ITER [1], [2].

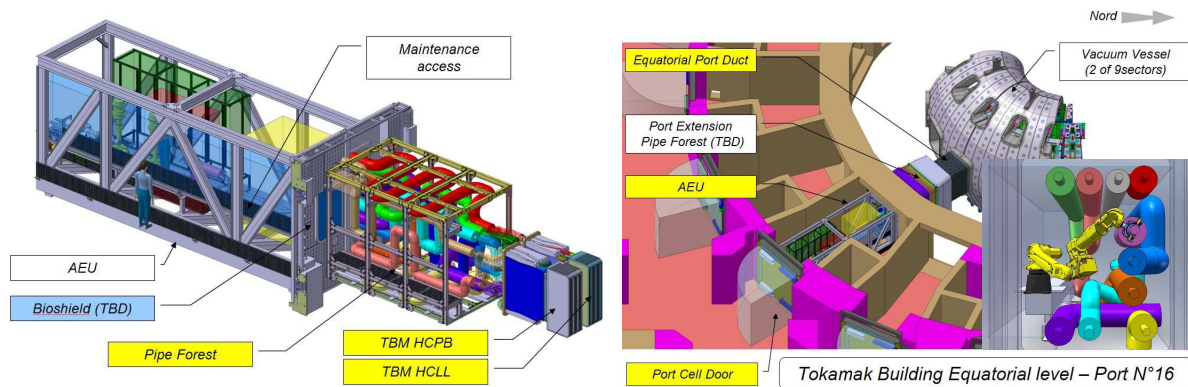


Fig. 1: TBS system and Equatorial Port n°16 in ITER Facilities with RH welding tools

The installation of the EU-TBS into the Equatorial Port n°16 is closely linked to its own maintenance operations [3] and also these dedicated to the ITER installation (Fig.1).

This paper describes some RH operations and does focus about the design of some specific components dedicated to the installation of the TBS in ITER equatorial port. The EU teams develop the Ancillary Equipment Unit (AEU) to transfer TBS equipments between the tokamak building and the Hot cell facilities for maintenance purpose. The AEU have the same size and use the same Air Transfer System (ATS) that the ITER Transfer Cask System (TCS). To accommodate the Vacuum vessel movement and pipes dilatations (50-70mm) between the TBM set and the AEU a Pipe Forest system is installed inside the interspace. A preliminary Shield design for the TBM set inside the ITER Port FRAME is evaluated to protect the TF coils of the Neutronic flux of 2.10^{14} n/cm²/s (500MW power fusion), and support the TBM box (2 tons) during normal operation and disruption event.

The relation between maintenance requirement and the ITER nuclear safety zoning is highlighted to justify the different RH operations identified. A new EU-TBM maintenance scheme with an additional interface at the level of the Bioshield and some industrial RH tools are presented (Fig.1). At the end a first statement of the limit of the present solution is done, with a projection on assessment of other solution of installation under studies today to complete the present work in relation with TBS and ITER development plan.

[1] LV Boccaccini and al., Fusion Engineering and Design, Vol 84, Issues 2-6, Jun 2009, Pages 333-337

[2] S. Madeleine and al., Fusion Engineering and Design, Vol 84, Issues 7-11, June 2009, Pages 1233-1237

[3] O. Bede and al., Fusion Engineering and Design, Vol 83, Issues 10-12, Dec. 2008, Pages 1865-1869