CONCEPTUAL DESIGN OF A WELDED ATTACHMENT SYSTEM FOR THE ITER

BLANKET SHIELD MODULES

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Each blanket module (BM) of ITER will be mechanically connected to the vacuum vessel (VV) through four flexible attachments. The flexible supports react the BM loads in the radial direction while being compliant in the other directions. The baseline BM attachment design is bolted.

Moreover, an alternative welded design has been proposed by Europe as a back-up solution. The corresponding conceptual design, as well as the assembly steps, has been developed. In this design, the cartridge is assembled to the BM and to the VV by welding two collars. The sketch of the Figure 1 below illustrates the design for the inboard attachment. Mechanical 3D FE models have been implemented to analyze the electromagnetic design loads, including a non-linear buckling analysis. According to the Structural Design Criteria for In-Vessel Components requirements, both inboard and outboard designs have been verified against immediate plastic collapse, plastic instability, and buckling. A preliminary fatigue analysis has also been carried out.

This paper provides an update on the conceptual welded design and on the analyses status of the EU contribution to the BM attachment design.



Figure 1 – Inboard BM attachment layout