



Fusion Blanket Literature Review

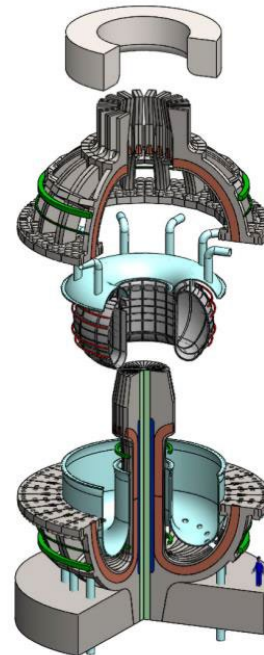
Case study

EASL performed a literature review of fusion blanket designs. This literature review was performed based upon literature identified within a Mendeley group, as well as further papers identified of use.

A literature review on molten salt-based breeder blankets was presented. The aims of the review were to highlight the potential benefits of using molten salts as working fluids in breeder blankets, to describe the molten salt-based concept designs presented in literature, and to identify areas where further research was needed to clarify or resolve known issues with these designs.

Our approach

The review also discussed the relative advantages and disadvantages for each blanket concept. Attention was paid to designs with more developed technical maturity. Blanket concepts are categorised by the coolant (He, H₂O, PbLi, Li, molten salts) and breeder material (ceramic lithium, PbLi, Li, molten salts). Dual-coolant and self-cooled breeders were also identified as additional categories. A summary of the key materials and coolant flow specifications, along with a summary of benefits and drawbacks for each concept was presented. A review of material performance and corrosion threat for implementing molten salts in breeder blankets was carried out.



The results

The work provided an overview of breeder blanket technologies proposed for various fusion reactor designs. It aimed to assist the blanket technology selection for the spherical tokamak for energy production (STEP) at UKAEA. Ten

blanket concept designs were presented including a description of their fundamental design features and proposed materials selection, discussing the relative advantages and disadvantages and assessing the technical maturity for each. A Mendeley database was used for this task and the information was digitised on XML files.

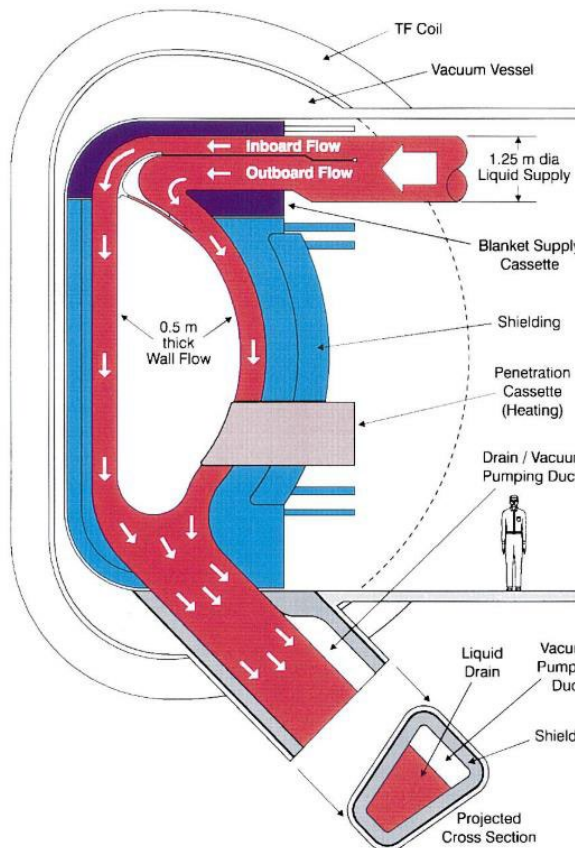


Figure 2 Conceptual design of a free-surface liquid wall for the ARIES-RS reactor.