Preliminary Thermo-Mechanical Design of the Once Through Steam Generator and Molten Salt Intermediate Heat Exchanger for EU DEMO

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Abstract:

The European DEMOnstration power plant (DEMO) is considered to be the nearest-term fusion reactor capable of producing several hundred MWs of net electricity, operating with a closed tritium fuel-cycle (achieving the tritium self-sufficiency), and qualifying technological solutions for a fusion power plant with different breeding blanket (BB) concepts that are under investigation. The BB is a key component for the development of the DEMO plant design and, in particular, of those systems having the responsibility to remove the plasma-generated thermal power and its conversion in the electrical energy. This study deals with the preliminary thermo-mechanical design of the heat exchangers and steam generator components. The design criteria and the main design analyses were discussed to achieve a simple but robust design. The proposed preliminary thermo-mechanical designs, both for heat exchangers and for steam generators, are considered feasible.