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Manufacturing of the first ITER Torus Cryopump

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The first of nine ITER Torus and Cryostat Cryopumps has been successfully manufactured and delivered to ITER in summer 2017. This Pre- Production Cryopump is the first of the ITER cryopumps and may be used for the first pump down of the vacuum vessel or the cryostat.

The pump has a 1.8 m diameter and a length of about 3 m and contains cryogenic pressure equipment with a charcoal coated adsorption stage integrated in a casing with a vacuum vessel plug combined with the largest all-metal vacuum valve ever built resulting in an overall weight of 8 tons. The design of the cryopump is the result of more than ten years of research and development finalized to the ITER built to print design to comply with the demanding requirements to be fulfilled during its operation starting from first plasma.

The paper will outline the experience gained with the cryopumps manufacture and assembly. We discuss the components with confinement function as ITER style vacuum flanges, double bellows for the valve assembly and electrical feedthroughs. Many different requirements had to be addressed for the manufacture of these components and their integration in the cryopump.

ITER is a Nuclear Facility, INB-174, and requirements for the operation in the primary vacuum and the nuclear confinement function demand a high level of quality control and inspection needs during all manufacturing stages. The Pre-Production Cryopump has been built in close and successful cooperation with F4E reflected in the adequate surveillance of the 27 suppliers required to fabricate the cryopump. The successfully built and delivered Pre-Production Cryopump will give a reliable basis for the F4E procurement of the eight Torus and Cryostat Cryopumps which are required for first plasma.

The views and opinions expressed herein do not necessarily reflect those of the ITER Organization

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