TRANSPORTTION OF THE TOKAMAK REACTOR VACUUM VESSEL COMPONENTS

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Vacuum vessel is one of the most important part of a tokamak reactor providing first nuclear confinement barrier. Vacuum vessel is an essential for removing nuclear heating during plasma operation and shielding of the hard gamma and neutron radiation. Vacuum vessel provides structural support of the in-vessel components and divertor. In order to fulfill the requirements, the ITER tokamak vacuum vessel is designed as a fully welded, double wall structure with in-wall cooling water between the double walls. Access inside the vacuum vessel is provided by ports and penetration inserts [1].

This report includes summary of procedures to be performed for acceptance of the vacuum vessel Upper Ports components at factory, during transportation, and after its delivery to the sites of assembly of the vacuum vessel. The Upper Ports (18 ports in total) constitute an integral part of the ITER Vacuum Vessel. The Upper Ports components are classified as the components important concerning safety, the quality class of the procurement components is Class 1 ITER. Provisions of French Order dated 7th February 2012 are taken into account and applied on all activities concerning SIC/PIC Systems, Structures and Components. Inspections, testing, and acceptance criteria are based on the RCC-MR 2007 requirements [2] and are checked by the Agreed Notified Body (ANB) chosen by the ITER Organization.

The report describes activities performed during acceptance at the factory, during transportation, and after delivery to the assembly sites of the sectors of the vacuum vessel. Preparation of the Transportation Plan and the Monitoring of the state of the equipment at all stages of loading and transportation are described. Various options for load sensors and recorders in accordance with the requirements for transportation of NPE equipment are considered.

The main results of the transportation of the Upper Port PSE12 carried out under implementation of safety standards by French Nuclear Regulator are discussed. The results of the analysis of loads and the state of the technical characteristics of the PSE12 Upper Ports at all stages of loading and transportation are given.

Рассматриваются предварительные требования к транспортировке компонентов вакуумной камеры токамака ТИН.

Preliminary requirements for transportation of the vacuum vessel component of TIN tokamak reactor are considered.

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References

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