Engineering calculations and preparation for manufacturing of ITER equatorial port#11

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An overview of the results of the research and design work on the creation of protective structures for the integration of diagnostic systems of the ITER equatorial port № 11 is presented. The assembly of three diagnostic protective modules (DSM) in the vacuum part of the port contains the most loaded front parts of diagnostic systems, which are exposed to intense radiation, thermal, electromagnetic and mechanical stresses. Neutron, thermohydraulic, electromagnetic and mechanical calculations shows that the DSM design meets all ITER requirements of radiation safety, the absence of overheating and mechanical stability during the most dangerous plasma breakdowns.

Design work on the integration of diagnostic and service elements on the vacuum flange of the equatorial port plug № 11 carried out in the direction of optimization of maintenance of regularly checked components of diagnostic and service systems, that are critical to the safe operation of ITER. A modular model of neutron protection of straight vacuum diagnostics channels and a bioshield plug, which provide maximum protection for service personnel and comply with the principles of step-by-step commissioning of diagnostic systems, is under developing. Preparations of production capacity BINP’s shop to the manufacture and assembly of equipment for the integration of diagnostic systems in accordance with the rules and requirements French code RCC-MR 2007. Prototypes of full-size vacuum structures, with using of deep drilling technologies, welding of large-sized elements, checked by various methods of control of welded joints, have were been manufactured. The first stage of construction of the assembly room has been completed, ensuring the provision of special cleanliness conditions in accordance with the rules of RCC-MR 2007.