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Optimization and adjustment of impact set-up for testing of insulated pads of ITER blanket module connectors and first wall

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Insulated pads are used on ITER blanket module connectors and the first wall; their main insulating function is to break any current loop between the shield block and vacuum vessel and/or between the first wall and shield block. The design of the pads consists of a cylindrical or prismatic body manufactured from NiAl-bronze, a ceramic insulating coating (Al_2O_3 or MgAl_2O_4) which is applied on interfacing surfaces of the pad body and on the shield block or first wall beam. The pads work in ultra-high vacuum conditions and at elevated temperature 100 – 300 oC. Static and dynamic loads up to 2 MN can act on the insulated pads during various plasma events in ITER.

The qualification program for the insulated pads consist of cyclic and impact tests. The tests are performed for two categories of loading anticipated from plasma events. The number of cycles, force and energy are different for each category and therefore the qualification takes into account the worst case conditions.

The impact tests are performed on a weight drop test bench, which has been designed and manufactured in JSC "NIKIET". A measurement system for the test bench consists of specially designed force sensors and accelerometers.

The description of the pad design and the impact test set-up, the results of analysis for justification of the set-up parameters, and the results of the test bench commissioning are presented in this paper.

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