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## Pressure tests supporting the qualification of the ITER EC H&CD upper launcher diamond window

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The Electron Cyclotron diamond window which is located inside the port cell serves, together with an isolation valve, as primary vacuum boundary between the ITER vacuum vessel, the transmission lines and the atmospheric environment and it functions as confinement barrier. The window consists of an ultra-low loss Chemical Vapor Deposition (CVD) diamond disk brazed into a metallic housing and it has to guarantee the compliance with very stringent nuclear safety requirements and an adequate transmission capability for high power mm-waves (1.31 MW at 170 GHz). The design of the window unit is approaching its final phase including design validation analyses, the development of a dedicated qualification program and prototyping activities.

In preparation of the testing of complete window prototypes, pressure tests were performed on a mock-up formed by a diamond disk ( $D = 80$  mm,  $d = 1.11$  mm) brazed to two copper cuffs. The scope of the experiments was to show both the capability of the joining between the disk and the cuffs to keep the required vacuum tightness as well as the integrity of the disk when exposed to pressure loads. Based on the requirements defined for the pressure scenarios during normal operation and off-normal events, a test program was developed accounting for cyclic tests at low pressure differentials and overpressure tests up to 2 bar pressure difference over the disk to simulate severe accident conditions.

This paper gives an outline of the ongoing development of the overall qualification program of the ITER torus window and reports specifically on the experimental set-up and the successful outcome of the pressure tests of the brazed diamond disk mock-up. The test program for the complete window prototype needs discussion and approval by F4E and ITER and will directly determine the final qualification program for the diamond windows during series production.

**Co-authors:** Dr SCHRECK, Sabine (IAM-AWP, KIT); Dr AIELLO, Gaetano (IAM-AWP, KIT); Dr CASAL, Natalia (ITER Organization); Dr GRACIA, Violeta (ITER, Fusion For Energy); Dr HENDERSON, Mark (ITER Organization); Dr MEIER, Andreas (IAM-AWP, KIT); Dr SAIBENE, Gabriella (Fusion for Energy); Dr SCHERER, Theo (IAM-AWP, KIT); Dr STRAUSS, Dirk (AM-AWP, KIT); Dr WOUTERS, Paul (ITER, Fusion For Energy)

**Presenter:** Dr SCHRECK, Sabine (IAM-AWP, KIT)

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