



Contribution ID: 151

Type: **not specified**

The ITER in vessel coils – design finalization and challenges

Monday, 17 September 2018 11:00 (2 hours)

A design update of the ITER In-Vessel Coils (IVCs) has been launched after the prototype coil manufacture in 2014 revealed some major issues in particular related to brazing and joints inside the coils. In parallel a review and update of the plasma operating scenarios and requirements of the IVCs system has been done and a refined set of plasma pulses and corresponding load scenarios of the IVCs has been elaborated in collaboration with the ITER plasma control team. For the fatigue analysis of the vertical stabilisation (VS) coils, the spectrum type electromagnetic loading has been analysed by applying the Rainflow cycle counting method. Furthermore, the maximum currents during transient plasma events have been assessed considering actual operating currents leading to more representative load cases. The main IVC component modifications are the conductor material and the winding pack support structure. In view of risk reduction and cost efficiency, the conductor design has been unified among the IVC system. Cu brazing has been replaced by welding and the conductors are not brazed to the winding pack bracket but clamped. Huge effort has been made in the structural analysis and design integration of the IVC components. With a strong support from the design integration and teams of the other ITER in vessel components, a fully integrated design baseline of the IVC components has been established.

Feasibility studies and mock-ups performed in the frame of the design finalization have identified the main critical activities during manufacture such as the joint assembly, the ELM coil bracket welding and the in-situ winding of the VS coils. The status of the IVC conductor procurement involving two suppliers for the first phase covering process qualification is being shown as well. Key challenges experienced during this first phase along with results on mechanical and electrical tests are presented.

Co-authors: Dr VOSTNER, Alexander (ITER Organization); Dr BONTEMPS, Vincent (ITER Organization); Dr ENCHEVA, Anna (ITER Organization); Dr JIN, Huan (ITER Organization); Dr LAQUIERE, Julien (ITER Organization); Dr MACIOCE, Davide (ITER Organization); Dr MARIANI, Nicola (ITER Organization); Dr MCINTOSH, Simon (ITER Organization); Dr PENG, Xuebing (ITER Organization); Dr SPIGO, Giancarlo (CERN); Dr TRONZA, Vladimir (ITER Organization)

Presenter: Dr VOSTNER, Alexander (ITER Organization)

Session Classification: P1

Track Classification: Magnets and Power Supplies