



Contribution ID: 171

Type: **not specified**

Verification of hydraulic performance for the DEMO divertor target cooling

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

This paper presents the design activities and test of a vertical target mock-up, developed under the pre-conceptual design phase for DEMO Work Package DIV-1 “Divertor Cassette Design and Integration” under EUROfusion Power Plant Physics & Technology (PPPT) program.

The activities about the Divertor Outboard Vertical Target cooling mock-up are presented in term of CAD model (CATIA), thermo-hydraulic numerical simulation (ANSYS-CFX), structural analysis (ANSYS Mechanical), structural integrity verification (RCC-MRx) and manufacturing procedure. Moreover, the mechanical dimensions of support systems for plasma facing components (PFCs), manifold and diffuser have been analysed in detail, in order to avoid structural fault during test.

Test procedures are discussed, taking into account design parameters, design code and facility performances. The actual alloy (CuCrZr) selected for PFCs of EU DEMO divertor has been used also for the mock-up, while two options are still under evaluation for manifolds/diffuser, CuCrZr and stainless Steel 316L(N)-IG, depending on the welding technology. Since the mock-up is mainly intended to verify hydraulic performances, it has been simplified by removing the W monoblocks from its PFCs.

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Session Classification: P1

Track Classification: Plasma Facing Components