



PWIE-SP A.1.T-T001-D004: Qualification of W-Heavy Alloys for use in W7-X in conjunction with test on new tungsten mock-ups (WP MAT) and PFUs for WEST

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This work has been carried out within the framework of the EUROfusion Consortium and has received funding from the Euratom research and training programme 2014-2018 and 2019-2020 under grant agreement No 633053. The views and opinions expressed herein do not necessarily reflect those of the European Commission.

Overview of status and planning 2021:

3 Topics, 4 days of GLADIS allocated for SP-A.1 D004

1. **HHF test of W-Heavy Alloys for use in W7-X, in preparation, details next slide**
2. Test of new tungsten mock-ups developed in cooperation WP MAT, → waiting on samples
3. HHF tests and QA of PFUs for WEST → HHF tests completed, minor activities in data processing

Motivation: Transition of W7-X from graphite to W PFM for divertor target and baffle plates. Moderate heat fluxes up to 10 MW/m^2 allow to consider W heavy alloys materials, mainly to reduce manufacturing costs.

Currently under investigation

HPM 1801 or INTERMET 180: about **95 wt% W, Ni 3.4 wt% , Cu 1.4 wt%**

- good mechanical properties, cheap, machining with standard high speed tools,
- Drawback: reduced thermal performance due to Cu/Ni FCC solid solution ($T_{\text{liq}} \sim 1380^\circ\text{C}$)

HHF test programme:

1. Investigation of thermal limits
2. Cyclic fatigue tests
3. Behaviour of overheated and Cu depleted samples (reduced to the sintered W structure)

Status:

- Material available to start
- 3-4 days booked in GLADIS in 2021



W/ Cu composite, adiabatically loaded above Cu melting