

**FRACTESUS PROJECT: FINAL SELECTION OF RPV MATERIALS FOR UNIRRADIATED AND IRRADIATED ROUND ROBINS**

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Abstract:

The H2020 FRACTESUS project is aimed at the validation of miniaturized compact tension (MCT) specimen. More specifically the usage of the MCT with the Master Curve (MC) oriented fracture toughness testing of reactor pressure vessel (RPV) materials in hot cell conditions will be examined. In the first stage of the project, a general strategy of material selection and testing processes has been established. The choice of the selected RPV materials is based on the widest possible range of mechanical properties expected for baseline materials, but also resulting from their exposure to neutron irradiation, in terms of different MC reference temperature  $T_0$ , and properties determined from Charpy impact testing. Moreover, in order to validate the use of the MCT in a broad application space, it was decided to perform FT tests for both base metals and welds. The largest challenge was related to the availability of those materials. They need to be tested in numerous, planned round robin exercises. They should have already an existing extensive database of fracture toughness results obtained using large specimens. The final version of the test matrix was prepared, keeping all those requirements in mind. An irradiated round robin exercise is planned for one type of weld material, namely 73W, that will be tested by seven partners. Additionally, the FRACTESUS partners were divided into smaller groups with 3–5 participants who will test a sub-selection of unirradiated materials in six round robin exercises. This paper presents the summary of the material selection activities in the FRACTESUS project. The materials are briefly described and rationale for their usage within the project is provided.

Keywords: FRACTESUS, miniature compact tension, master curve, fracture toughness, reactor pressure vessel

