

AN UPDATE ON MATERIALS PROJECTS AND TEST FACILITIES AT NRG PETTEN

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ABSTRACT

A variety of materials projects is ongoing at NRG Petten, comprising services for current nuclear installations as well as R&D for future power plants and experimental devices. The activities at the NRG group MMI have a thematic focus on nuclear applications with high neutron flux and fluences. The HFR and HCL facilities are the major tools in a range of R&D project. The most important activities concern the investigation of neutron effects on mechanical properties, physical properties and physico-chemical properties. The presentation will cover highlights and recent developments in test methods and hot facilities.

Examples:

A major facility upgrade has been made for the fatigue testing of Ni-base alloys and ferritic-martensitic steels. Presently two facilities are dedicated for isothermal, high cycle and low-cycle fatigue, including hold time.

In the area of irradiation creep testing, NRG has completed two major projects on the determination of stress-relaxation of miniaturized pre-stressed tensile and bend specimens. The in-cell toolings as well as the rig designs have been developed entirely in-house. Typical results of this approach will be shown.

In support of the ongoing trend in miniaturisation of fracture mechanics testing, new test methods using 3-point bend and compact tension have been implemented in-cell.

New facilities are built for handling and testing of irradiated graphites and ceramic composites, mainly for advanced reactor programmes. NRG has re-installed such capacity based on past experience as well as those from the current program partners. It comprises e.g. dilatometry, laser-flash and modulus measurements.

