



KROTOS Facility: the upper element is the furnace, connected with the lower test section

KROTOS

The KROTOS test facility is a relatively small scale experimental installation dedicated to the study of: (a) molten fuel-coolant pre-mixing either with prototypic reactor melts or simulants such as alumina up to 5 kg; (b) progression and energetics of spontaneous and triggered fuel-coolant interactions (vapor explosions).

The test section of the KROTOS facility consists of a stainless steel test section bolted to lugs welded on the inner side walls of a stainless steel pressure vessel. The cylindrical pressure vessel, inner diameter 0.4 m, height, 2.21 m, has a thick flat bottom and a flanged flat upper head and is designed to withstand a static pressure of 2.5 MPa at 493 K. The cylindrical test section, inner diameter 200 mm, outer diameter 240 mm, closed at the bottom by either a flat plate or with a gas trigger device, can contain water up to a height of about 1.27 m (about 40 litres).

Objectives

- The KROTOS main objective is to provide basic experimental information on FCI phenomena relevant to severe accident situations in nuclear reactors.

Experimental Programme

Quenching and steam explosions

Different melt compositions from pro-otypic reactor melts, i.e. corium, to simulants such as alumina can be used. The results give information about the energetics of the interactions and can be used for the validation of other computer models which describe mechanistically the processes of thermal deto-nations, e.g. TEXAS (Univ. of Wisconsin), IDEMO (IKE) and ESPROSE.m (Univ. of California).

The melt penetration and premixing data can also be used to validate in small scale the fuel-coolant mixing models, e.g. IFCI (Sandia Nat. Lab.), TEXAS

(Univ. of Wisconsin),
PM-ALPHA (Univ. of
California) and COMETA
(JRC).

