CIRCE - ICE Facility

CIRCE (Circulation Eutectic) is a test facility designed and realized to support the heavy liquid metal technology for nuclear fission plants.

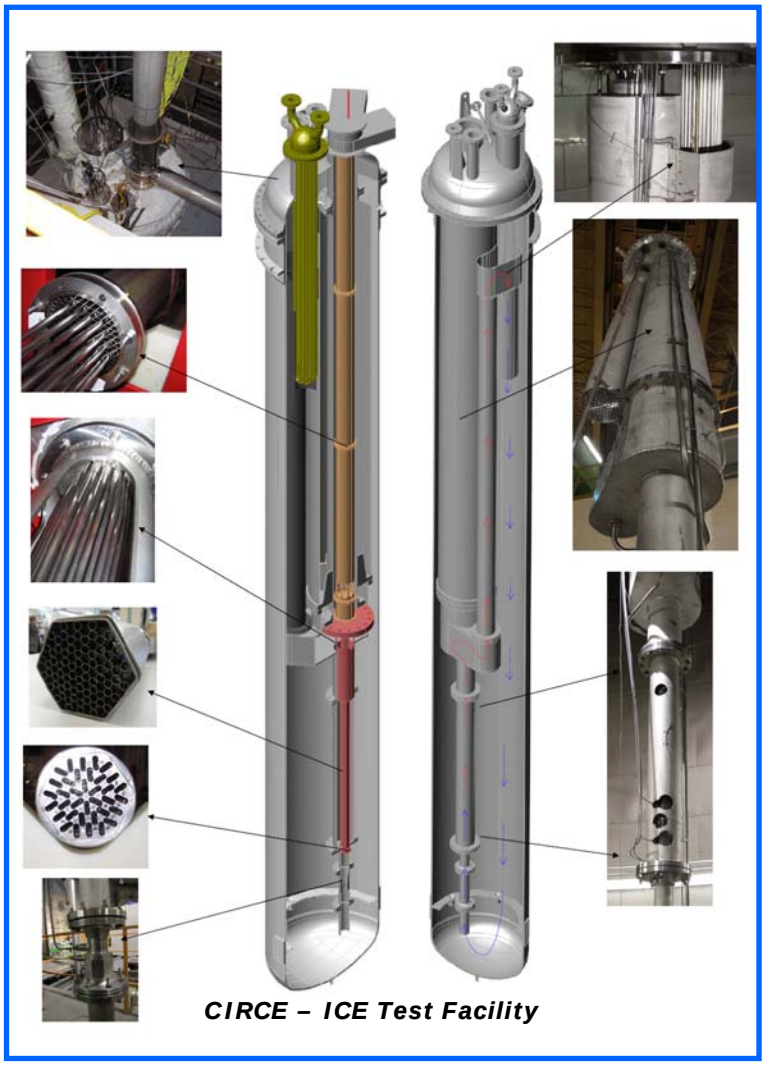
Potential users: universities and nuclear research bodies, manufacturers of nuclear reactors and components.

The facility underwent several EU (FP) and national (Programme Agreement between ENEA and the Italian Ministry for Economic Development) test campaigns by using the Lead-Bismuth Eutectic (LBE) alloy as a working fluid. Specifically, the thermo-fluid dynamic behaviour of some pool-type nuclear reactors cooled by heavy liquid metal has been investigated. Such testing activities allowed to support R&D as related to ADS (Accelerator Driven System) and LFR (Lead cooled Fast Reactor).

The facility is made of 3 main tanks. The test tank, where the test section is contained, has the following characteristics:

- Outside diameter: 1200 mm
- Design temperature: 500 °C
- Design pressure (gas): 450 kPa
- LBE Inventory: 90000 kg.

In the current facility configuration named ICE – Integral Circulation Experiment – a 1 MW thermal source is installed together with a prototypical heat exchanger acting as a decay heat removal system of an LFR.



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Tests allowed to demonstrate the technological feasibility of the LFR primary system on a 1 MW scale by analyzing its thermo-fluid dynamic behaviour and qualifying its auxiliary systems such as the system controlling the oxygen concentration in the alloy.

Heat Exchanger – ICE Test Section

ENEA
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