

# SMALL MODULAR REACTORS EXPERIMENTAL LOOPS FOR MATERIAL RESEARCH

## COLONRI I

Natural convection loop for the study of interaction of materials with flowing PbBi

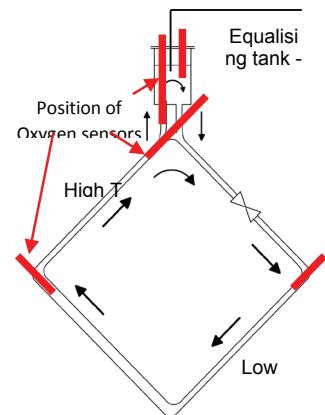
### Parameters

<b>MaxT:</b>	500 °C
<b>Max Flow velocity:</b>	2 cm/s
<b>Material:</b>	AISI321
<b>On-line monitoring:</b>	temperature, oxygen potential

The liquid metal flow is ensured by the  $\Delta T$  (max. 150 °C) between the two experimental tubes.

The oxygen content of the liquid metal is controlled with oxygen sensors especially designed for this application. The level of oxygen is adjusted by bubbling gases in the upper tank.

<b>Irradiated</b>	For non-irradiated materials only
<b>Availability</b>	Available on request



### Examples of Projects

(EUROpean Research Programme for the TRANSmutation of High Level Nuclear Waste in an Accellerator Driven System ) EUROTRANS – DEMETRA, Improvement and assessment of the Heavy Liquid Metal (HLM) technologies and thermal-hydraulics for application in ADS, and in particular to EFIT and XT-ADS, where the HLM could act both as spallation material and primary coolant, FP6 Euroatom. Corrosion and mechanical properties of steels T91 and 316 in PbBi. GETMAT (Gen IV and transmutation materials), FP7 EURATOM. Development of FeCrAlY coatings and corrosion test in PbBi.

MATTER (MATERIAL TESTING and Rules), FP7 EURATOM. Mechanical testing of T91 in LBE.

# SMALL MODULAR REACTORS EXPERIMENTAL LOOPS FOR MATERIAL RESEARCH

## COLONRI II

Natural convection loop for the study of interaction of materials with flowing Pb

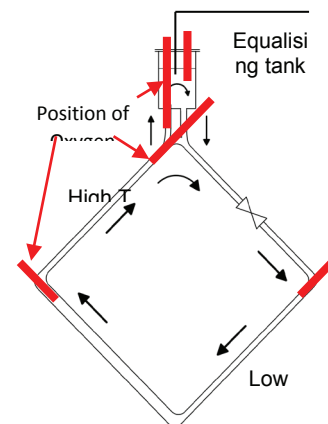
### Parameters

<b>MaxT:</b>	500 °C
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<b>Material:</b>	AISI321
<b>On-line monitoring:</b>	temperature, oxygen potential

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<b>Availability</b>	Available on request



### Examples of Projects

VELLA (Virtual European Lead Laboratory), FP6 EURATOM. Corrosion tests of various steels in flowing Pb.

LEADER (Lead-cooled European Advanced DEMonstration Reactor), FP7 EURATOM. Corrosion and mechanical testing of steel T91 in Pb.

# SMALL MODULAR REACTORS

## EXPERIMENTAL LOOPS FOR MATERIAL RESEARCH

### MAT23 - Heavy Liquid Metal Loop

Heavy Liquid Metal Loop - Purpose of the facility

**Description:**

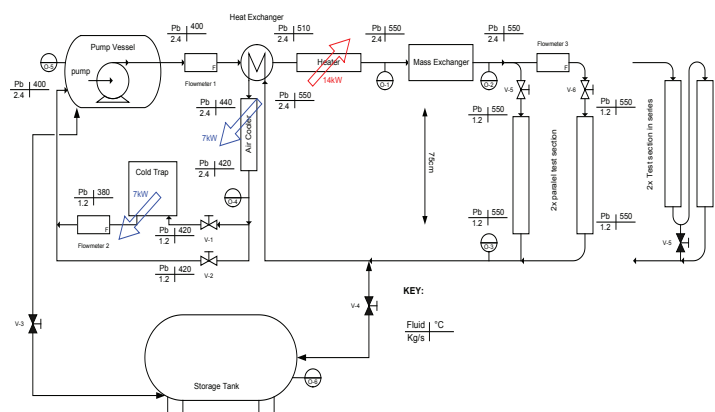
The objective of this experimental facility is testing of materials in flowing liquid metals.

The loop will have 2 parallel experimental chambers to allow testing of materials at different flow velocities.

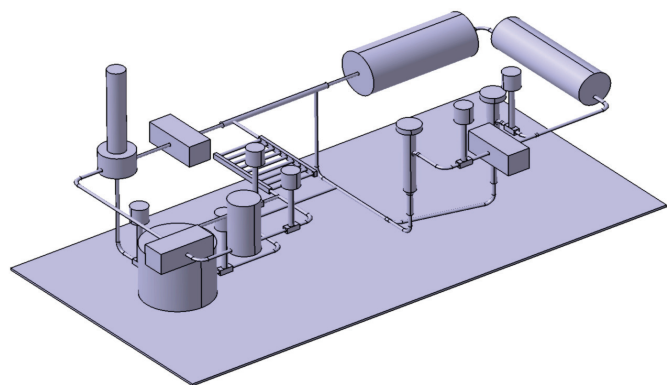
**Basic requirements for the corrosion tests:**

- Maximum temperature in the experimental session, 550 °C
- Maximum flow velocity of the liquid metal in the experimental, 1.5 m/s
- Oxygen concentration 10<sup>-6</sup> – 10<sup>-8</sup> wt%

The secondary objective of the facility is the study of the chemistry of the liquid metal, which is the effect of the oxygen content on the corrosion process and the removal of corrosion products. On this aim, the experimental facility will be equipped with a system for dosing oxygen and with a system for removal of corrosion products.



Flow chart of the loop MAT23



Preliminary design