Profile LFR-35

MINIPOT

GERMANY

GENERAL INFORMATION

NAME OF THE FACILITY	Modular mini reactor Pool for corrosion, Oxygen Transport and filtering
ACRONYM	MINIPOT
COOLANT(S) OF THE FACILITY	LBE
LOCATION (address):	Karlsruhe Institute of Technology (KIT) Institute for Pulsed Power and Microwave Technology (IHM) Hermann-von-Helmholtz-Platz 1, Bldg 630 76344 Eggenstein-Leopoldshafen Germany
OPERATOR	KIT
CONTACT PERSON (name, address, institute, function, telephone, email):	Dr. Georg Müller Karlsruhe Institute of Technology (KIT) Deputy Institute Director +49 721 608 24669 georg.mueller@kit.edu

STATUS OF THE FACILITY	In operation
Start of operation (date):	2014

MAIN RESEARCH FIELD(S)

- ☐ Zero power facility for V&V and licensing purposes
- ☐ Design Basis Accidents (DBA) and Design Extended Conditions (DEC)
- ☒ Thermal-hydraulics
- ☒ Coolant chemistry
- ☒ Materials
- ☒ Systems and components
- ☒ Instrumentation & ISI&R

TECHNICAL DESCRIPTION

Description of the facility

MINIPOT is a vessel-type experimental device containing about 200kg of molten LBE to investigate mainly absorption of oxygen from the cover gas of the liquid metal and its transport within the flowing LBE. Quantitative experimental investigations include local oxygen concentration measurements as well as Doppler ultrasonic velocimetry of the fluid flow.

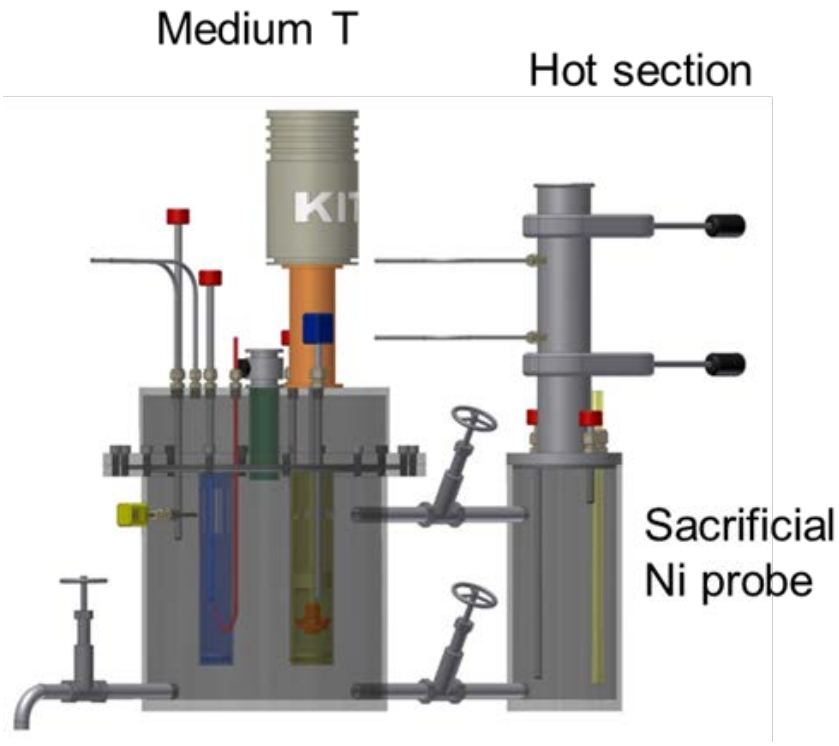
It basically consists of three vessels: a main vessel that contains the pump and the sensor instrumentation, a conditioning vessel and a vessel for sacrificial probes. All vessels are connected by tubes for LBE exchange. MINIPOT is made of austenitic stainless steel. Oxygen sensors and ultrasonic transducers are inserted from the top or the side of the main vessel.

Main research interest of MINIPOT is:

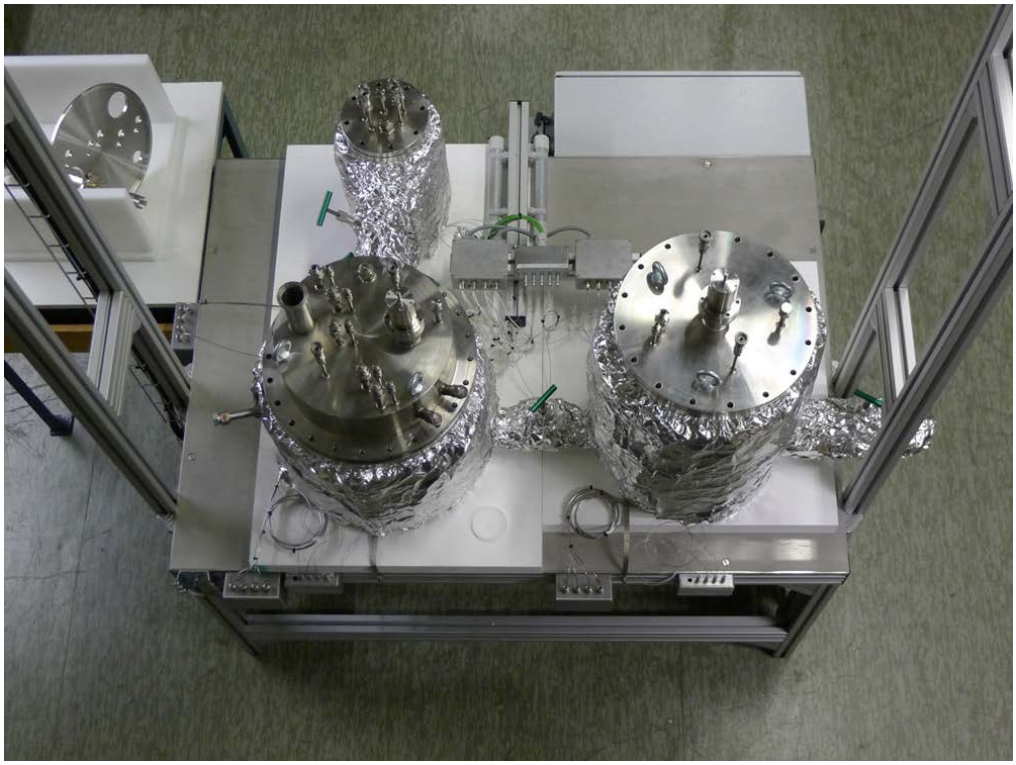
- Oxygen transport in liquid metal using 5 oxygen sensors located at dedicated positions in the flowing Pb alloy
- Influence of water droplets on oxygen content and oxygen transport
- Gas-phase liquid metal interface processes

Acceptance of radioactive material
No

Scheme/diagram



3D drawing/photo



Parameters table

Coolant inventory	20l
Power	n/a
Test sections	
TS #1	*Characteristic dimensions* Main vessel height: 27 cm Main vessel diameter: 30 cm
	Static/dynamic experiment dynamic
	Temperature range in the test section (Delta T) 150°C - 480°C
	Operating pressure and design pressure ambient
	Flow range (mass, velocity, etc.) 0 m/s - 0.05 m/s
Coolant chemistry measurement and control (active or not, measured parameters)	active oxygen control system
Instrumentation	Ultrasonic Doppler Velocimetry (UDV) Thermocouples Oxygen sensors

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

Oxygen transport in flowing PbBi at different temperatures – Gas phase, liquid metal interaction in EU project SEARCH

Influence of small amount of water ingress in liquid PbBi and reaction of oxygen sensors in EU project SEARCH

PLANNED EXPERIMENTS (including time schedule)

TRAINING ACTIVITIES

Training activities are possible, depending on availability and after prior agreement under supervision of KIT.

REFERENCES (*specification of availability and language*)

C. Bruzzese, A. G. Class, A. Weisenburger: Investigation of Flowing LBE with Oxygen Mass Transport in a Small Pool-Type Facility, 45th Annual Meeting on Nuclear Technology, Workshop: Preserving Competence, Frankfurt (D), 6.-8. Mai, 2014.

Alfons Weisenburger, Georg Müller, Christian Bruzzese, Andreas Glass: COOLANT CHEMISTRY CONTROL - OXYGEN MASS TRANSPORT IN LEAD BISMUTH EUTECTIC, 13th Information Exchange Meeting, Seoul, Republic of Korea | 23-26 September 2014