Profile LFR-14

RHAPTER

BELGIUM

GENERAL INFORMATION

NAME OF THE FACILITY	Remote HAndling Parts TEst Rig
ACRONYM	RHAPTER
COOLANT(S) OF THE FACILITY	Lead-Bismuth Eutectic (LBE)
LOCATION (address):	SCK•CEN, Boeretang 200, 2400, Mol, Belgium
OPERATOR	SCK•CEN
CONTACT PERSON (name, address, institute, function, telephone, email):	Ben Caers SCK•CEN Nuclear Systems Research Research engineer LBE-Components and Experiments Tel. +32 (0) 1433 8008 Email Ben.Caers@sckcen.be Cc to: Katrien Van Tichelen SCK•CEN Nuclear Systems Research Unit head LBE-Components and Experiments Tel. +32 (0) 1433 8006 Email kvtichel@sckcen.be.BE
STATUS OF THE FACILITY	In operation
Start of operation (date):	November 2011

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

RHAPTER is a test facility at SCK•CEN built to validate critical components for remote handling in LBE in MYRRHA. The test rig consists of a vessel containing liquid LBE in which different test modules can be submerged, with external drive and load motors and all accessories and instrumentation required for the tests.

Acceptance of radioactive material

No

Scheme/diagram

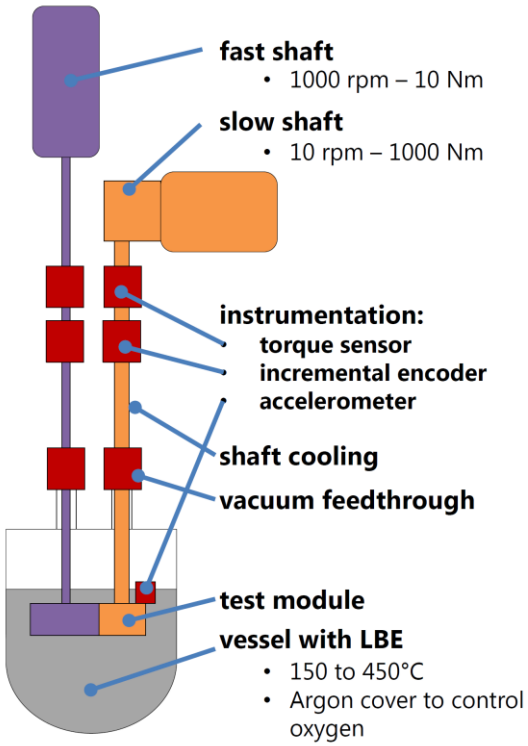

FIG. 1. Scheme of the RHAPTER facility

3D drawing/photo

FIG. 2. View of the RHAPTER facility

Parameters table

Coolant inventory	50l of LBE
Power	4kW mechanical, 3kW heating
Test sections	
TS #1	*Characteristic dimensions* max. size test module: Ø420mm, height 500mm (290mm submerged in LBE, 210mm above LBE)
	Static/dynamic experiment Dynamic (mechanical components are actuated during testing)
	Temperature range in the test section (Delta T) 150 – 450°C
	Operating pressure and design pressure atmospheric (< 1.5bar)
	Flow range (mass, velocity, etc.) not applicable
Coolant chemistry measurement and control	No online coolant chemistry control – possibility to take samples for offline chemical analysis and chemistry control via gas surface interaction in test vessel if required.

(active or not, measured parameters)	
Instrumentation	Incremental and absolute encoders and torque sensors on both shafts Submerged accelerometer Various temperature sensors Pressure gauge Level gauge

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

Ball bearings for remote handling: screening tests near completion – life simulation tests in progress

Electrical cables: tests in progress

PLANNED EXPERIMENTS (including time schedule)

Ball bearings:

- continuation life simulation tests
- new test module for combined radial-axial loading (2017)
- design validation tests (> 2017)

Journal bearings: test module operational 2016

Electrical cables: continuation of tests

Gears: design test module, screening tests, design validation tests > 2017

TRAINING ACTIVITIES

Training activities are possible, availability allowing and after prior agreement under supervision of SCK•CEN qualified staff.

REFERENCES (*specification of availability and language*)

not available