

## Profile LFR-1

### COMPLIT

### BELGIUM

#### GENERAL INFORMATION

NAME OF THE FACILITY COMPONENT LOOp Tests  
ACRONYM COMPLIT  
COOLANT(S) OF THE FACILITY Lead Bismuth Eutectic (LBE) - Air  
LOCATION (address): SCK•CEN, Boeretang 200, 2400, Mol, Belgium  
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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

COMPLIT is a large scale isothermal loop that is used for component tests and hydraulic experiments. The design goal of COMPLIT was to achieve a full scale mock-up of a hydraulic flow path through the MYRRHA core allowing characterisation of hydraulic and hydrodynamic behaviour of full-scale MYRRHA components in flowing LBE. Typical examples of these components are the fuel assembly, spallation target, control and safety rod systems and in-pile experiments. COMPLIT will also be employed for validation of CFD and system codes.

### Acceptance of radioactive material

No

### Scheme/diagram

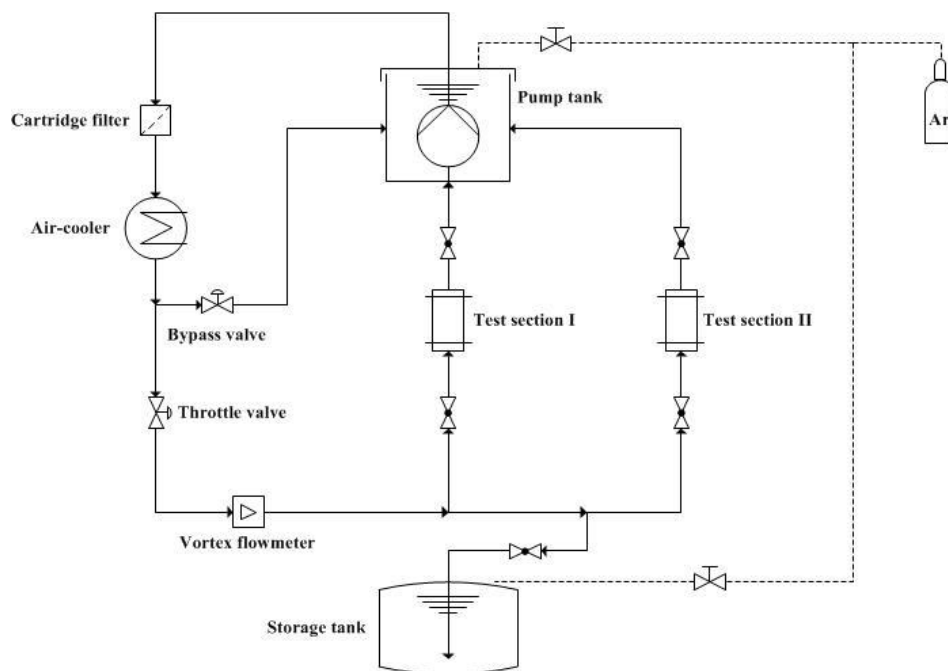


FIG. 1. Scheme of the COMPLIT facility

### 3D drawing/photo

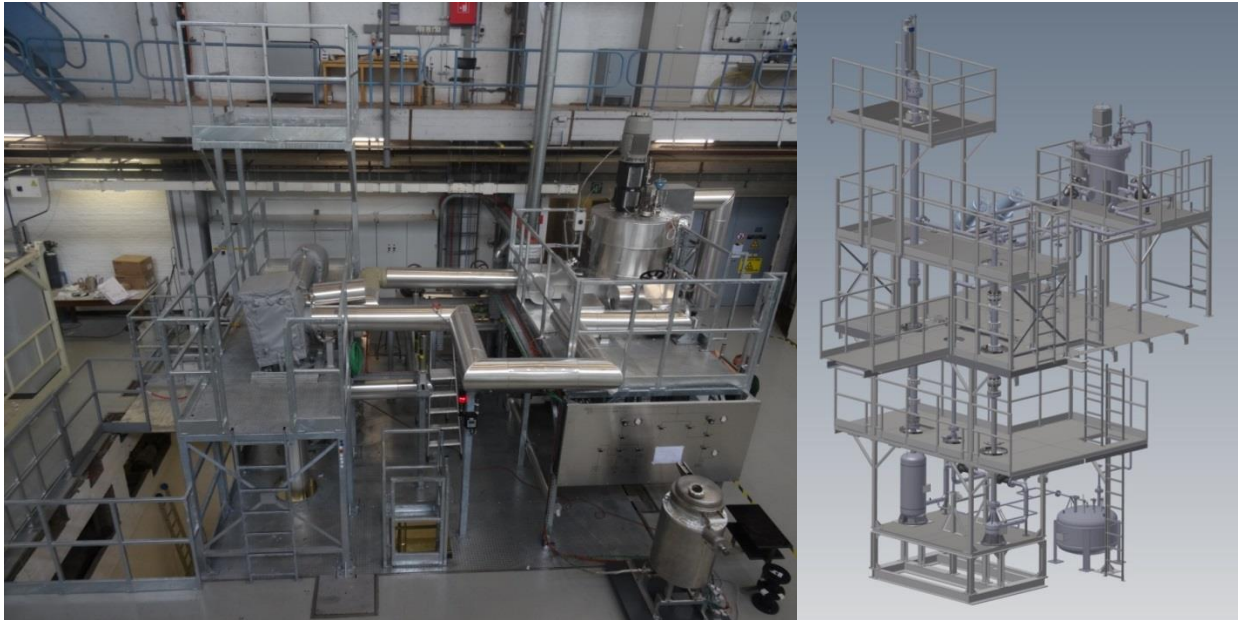


FIG. 2. View of the COMPLIT facility

**Parameters table**

Coolant inventory	9000 kg
Power	75 kW
Test sections	
TS #1 / TS #2	<u>Characteristic dimensions</u> Test Section #1: 4" inlet/outlet; Acceptable lengths of 3 m. Test Section #2: 4" inlet/outlet; Acceptable lengths of 12 m.
	<u>Static/dynamic experiment</u> Dynamic
	<u>Temperature range in the test section (<math>\Delta T</math>)</u> 200°-400°C, isothermal
	<u>Operating pressure and design pressure</u> Operating pressure = 9 bar; Design pressure = 16 bar
	<u>Flow range (mass, velocity, etc.)</u> 3,6-104,7 kg/s
Coolant chemistry measurement and control (active or not, measured parameters)	Coolant chemistry control via gas surface interaction in pump tank and storage tank. However, due to the low efficiency of active oxygen control this feature is only installed on an as-required basis.
Instrumentation	Vortex flowmeter Remote seal diaphragm pressure transmitters Guided radar level transmitters UDV sensors Fibre Bragg Grating

## **COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS**

The mechanical commissioning of the COMPLOT loop was completed in December 2014. The first experimental campaign started in April 2015 (no results to date).

## **PLANNED EXPERIMENTS (including time schedule)**

For the next two years COMPLOT will be used for full scale performance tests and hydraulic characterisation of various components that will enter the MYRRHA core. These are :

Full-scale MYRRHA fuel assembly pressure loss measurements – April 2015

Full-scale MYRRHA control rod insertion measurements – November 2015

Full-scale MYRRHA spallation target pressure loss and flow induced vibration measurements – February 2016

Full-scale MYRRHA fuel assembly flow induced vibration measurements – June 2016

## **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*)**

1. VAN TICHELEN K., GRECO M., KENNEDY G., MIRELLI F., “COMPLOT and E-SCAPE: Facilities for Liquid-Metal, Pool-Type Thermal Hydraulic Investigations and their Associated R&D Program in the Frame of the MYRRHA Project“, The 10<sup>th</sup> International topical Meeting on Nuclear Thermal-hydraulics, Operation and Safety (NUTHOS-10), Okinawa, Japan, December 14-18, 2014.
2. KENNEDY G., VAN TICHELEN K., DOOLAARD H., “Experimental investigation of the pressure loss characteristics of the full-scale MYRRHA fuel bundle in the COMPLOT LBE facility”, The 16<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal-hydraulics, Chicago, USA, August 30 – September 4, 2015.
3. KENNEDY G., “Report on the design of the control rod test section”, Deliverable D3.5 within the EU FP7 MAXSIMA program, grant agreement 323312, October 2013.