

Profile LFR-18

KYLIN-II S

CHINA

GENERAL INFORMATION

NAME OF THE FACILITY KYLIN-II Safety Test Loop
ACRONYM KYLIN-II S
COOLANT(S) OF THE FACILITY Lead bismuth, Lead, Lead lithium
LOCATION (address): Institute of Nuclear Energy Safety Technology (INEST), Chinese Academy of Sciences (CAS)
OPERATOR INEST
CONTACT PERSON Liu Chao, FDS Team, No.350 Shushanhu Road, Hefei, Anhui, China, INEST, CAS . +86 55165593681, Contact@fds.org.cn
(name, address, institute, function, telephone, email):

STATUS OF THE FACILITY In operation

Start of operation (date): 2015

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

The KYLIN-II Safety Test loop will allow performing experimental campaigns in the field of the Design Basis Accidents (DBA)- steam generator tube rupture accident. It basically consists of three tanks, one LBE storage tank, one high pressure water tank and one LBE/water interaction tank. One tube placed on the bottom of water tank is penetrated into the interaction tank and sealed with a special rupture disk. The experimental campaigns shall pursue the following main objectives:

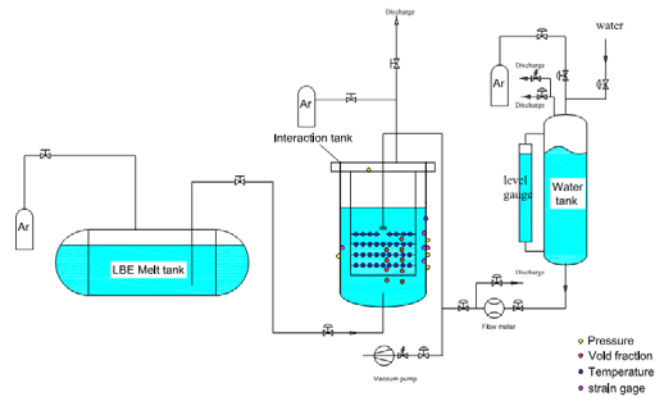
- Physical behavior of water injected in LBE
- Mechanical impact of the SGTR on the vessel structure
- Unstable transient heat conduction phenomenon near the injector
- Two phase flow detection techniques

The total facility is decided to work with 500°C and 25MPa.

Acceptance of radioactive material

No

Scheme/diagram



3D drawing/photo



Parameters table

Coolant inventory	3 tons
Power	200kW
Test sections	
TS #1	<u>Characteristic dimensions</u> <ul style="list-style-type: none"> ✓ The interaction tank diameter $D=500\text{mm}$, height $H=1500\text{mm}$; ✓ The water tank volume=20L; ✓ Max. Pressure of interaction tank and water tank $P=25\text{MPa}$ ✓ Temperature of interaction tank and water tank $T=500^{\circ}\text{C}$
	<u>Static/dynamic experiment</u> <u>SGTR experiment</u>
	<u>Temperature range in the test section (ΔT)</u> $100\text{-}500^{\circ}\text{C}$
	<u>Operating pressure and design pressure</u>

	0.1-25MPa
	<i>Flow range (mass, velocity, etc.)</i> Water injection flow rate: 100t/h
Coolant chemistry measurement and control (active or not, measured parameters)	No
Instrumentation	<ul style="list-style-type: none"> ✓ High pressure dynamic pressure transducers; ✓ Transient temperature thermocouple; ✓ High temperature strain gauge; ✓ Mass flow meter; ✓ High pressure level gauge;

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

NO

PLANNED EXPERIMENTS (including time schedule)

Experiments :

- ✓ LBE-water interaction:
A pressure wave generation and propagation, due to flashing of the water in LBE;
Temperature transient phenomena due to the LBE/water interaction;
- ✓ PbLi-helium interaction
A pressure wave generation and propagation due to “helium” hammer effect.

TRAINING ACTIVITIES

Training activities can be agreed with INEST for the operation of the experimental campaign under the supervision of INEST qualified staff.

REFERENCES (*specification of availability and language*)

NO