Profile LFR-19

KYLIN-II TH FC
CHINA

GENERAL INFORMATION

NAME OF THE FACILITY: KYLIN-II Thermal-Hydraulic Forced Circulation Loop
ACRONYM: KYLIN-II TH FC
COOLANT(S) OF THE FACILITY: Lead-bismuth, lead
LOCATION (address): Institute of Nuclear Energy Safety Technology (INES T), Chinese Academy of Sciences (CAS)
OPERATOR: INEST
CONTACT PERSON: Chao Liu, FDS Team, No.350 Shushanhu Road, Hefei, Anhui, China, INEST, CAS. +86 55165593681, Contact@fds.org.cn

STATUS OF THE FACILITY
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
- ☑ Systems and components
- ☑ Instrumentation & ISI&R

TECHNICAL DESCRIPTION

Description of the facility
The KYLIN-II forced circulation loop is a typically rectangle facility. The main piping is made of 316L stainless steel in a standard DN65 size. A sump tank holds the complete LBE inventory (~7tons). The design temperature and pressure is 500°C and 12bar respectively. The maximum flow rate of the loop is 45m³/h. The KYLIN-II forced circulation loop is aimed
at the study of the hydraulic and components test related to reactors cooled by heavy liquid metal.

Acceptance of radioactive material
No

Scheme/diagram

3D drawing/photo
### Parameters table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant inventory</td>
<td>700L</td>
</tr>
<tr>
<td>Power</td>
<td>300kW</td>
</tr>
</tbody>
</table>

### Test sections

<table>
<thead>
<tr>
<th>TS #1</th>
<th>Characteristic dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>7-heated rod bundle test section</td>
</tr>
<tr>
<td></td>
<td>- Diameter of main pipe: 76mm</td>
</tr>
<tr>
<td></td>
<td>- Diameter of heat rods: 15mm</td>
</tr>
<tr>
<td></td>
<td>- Number of rods: 7</td>
</tr>
<tr>
<td></td>
<td>- Pitch of rods: 16.74mm</td>
</tr>
<tr>
<td></td>
<td>- Diameter of helical wire: 1.64mm</td>
</tr>
<tr>
<td></td>
<td>- Pitch of helical wire: 375mm</td>
</tr>
<tr>
<td></td>
<td>- Heating power: 35kw</td>
</tr>
<tr>
<td>(2)</td>
<td>Full scale 61-unheated rod bundle test section</td>
</tr>
<tr>
<td></td>
<td>- Diameter of heated rods: 15mm</td>
</tr>
<tr>
<td></td>
<td>- Number of rods: 61</td>
</tr>
<tr>
<td></td>
<td>- Pitch of rods: 16.74mm</td>
</tr>
<tr>
<td></td>
<td>- Diameter of helical wire: 1.64mm</td>
</tr>
<tr>
<td></td>
<td>- Pitch of helical wire: 375mm</td>
</tr>
<tr>
<td></td>
<td>- Heating power: NA</td>
</tr>
<tr>
<td>(3)</td>
<td>LBE window target test section</td>
</tr>
</tbody>
</table>

### Static/dynamic experiment

- **dynamic experiment**

### Temperature range in the test section (Delta T)

200°C-400°C

### Operating pressure and design pressure

8bar/12bar

### Flow range (mass, velocity, etc.)

0~100kg/s (0~2m/s)

### Coolant chemistry measurement and control (active or not, measured parameters)

- Yes.
- Gas phase control box has been tested in this facility.

### Instrumentation

- Thermocouples, Pressure transducer, Induction flow meters

### COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

✔ Resistance characteristics of 61-rod bundle
Heat transfer of 7-rod bundle
Heat transfer, pressure drop, cladding temperature on fuel pin assembly

PLANNED EXPERIMENTS (including time schedule)
- Experiments: Overall heat transfer coefficients and efficiency of heat exchanger
- Thermal-hydraulics model development and validation

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)