Profile SFR-16

DOLMEN

FRANCE

GENERAL INFORMATION

NAME OF THE FACILITY: DOLMEN (Double Latitude pour Maintenance En sodium (Na))
ACRONYM: DOLMEN
COOLANT(S) OF THE FACILITY: Sodium
LOCATION (address): CEA Cadarache, 13108 Saint Paul Lez Durance, FRANCE
OPERATOR: CEA
CONTACT PERSON: O. GASTALDI
(name, address, institute, function, telephone, email): CEA Cadarache Building 710, 13108 Saint Paul Lez Durance, FRANCE
Sodium Technology and Components Project Manager +33 4 42 25 37 87 Olivier.gastaldi@cea.fr

STATUS OF THE FACILITY: In operation
Start of operation (date): 1980 and refurbished in 2013/2014

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
This facility is used for testing instrumentation, small components and under sodium repair technique, in sodium telemetry, under sodium visualization… and it can achieve preparation
of sample for experiments done on other experimental devices (immersion and wetting in sodium).

It is relatively large facility composed of 2 main tests section made of a large sodium pot (1500 L and 600 L) able to be operated up to 600°C. This facility handles sodium with a high chemical quality obtained through an active purification system. The classical subsystems of such sodium facility are present: storage vessel, cold trap, plugging indicator… The atmosphere above sodium surface is composed of Argon.

Acceptance of radioactive material
No

Scheme/diagram

![Scheme of the DOLMEN facility](image)

FIG. 1. Scheme of the DOLMEN facility

3D drawing/photo
FIG. 2. View of the DOLMEN facility

<table>
<thead>
<tr>
<th>Parameters table</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant inventory</td>
<td>Up to 3 m³</td>
</tr>
<tr>
<td>Power</td>
<td>70 kW</td>
</tr>
<tr>
<td>Test sections</td>
<td>Characteristic dimensions</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Sodium capacity: 1500 L</td>
<td>Diameter: 1080 mm</td>
</tr>
<tr>
<td>And height: 2000 mm</td>
<td></td>
</tr>
</tbody>
</table>

**TS #1**

**Static/dynamic experiment**
Sodium is quasi static in test section during the experiments

**Temperature range in the test section (Delta T)**
250°C to 600°C

**Operating pressure and design pressure**
Operating pressure < 450 mbar

**Flow range (mass, velocity, etc.)**
Mass flow rate: 1500 L/h

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<table>
<thead>
<tr>
<th>Test sections</th>
<th>Characteristic dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium capacity: 600 L</td>
<td>Diameter: 600 mm</td>
</tr>
<tr>
<td>And height: 2500 mm</td>
<td></td>
</tr>
</tbody>
</table>

**TS #2**

**Static/dynamic experiment**
Sodium is quasi static in test section during the experiments

**Temperature range in the test section (Delta T)**
250°C to 600°C

**Operating pressure and design pressure**
Operating pressure < 450 mbar

**Flow range (mass, velocity, etc.)**
Mass flow rate: 1500 L/h

**Coolant chemistry measurement and control (active or not, measured parameters)**
Active coolant quality measurement and control (purification with a cold trap on a by passed flow: 1 m³/h and impurities level < few ppm, and impurities content evaluation by a plugging indicator)

**Instrumentation**
Thermocouples
Argon pressure measurement
Inductive level probes
Electromagnetic flowmeters

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

Since the beginning of the start-up of this facility, there are a lot of experimental campaigns.

Here can be mentioned some of them. DOLMEN has been used:

- to perform under sodium repair techniques
- to prepare many mock-ups for development of carbonation process
- to establish performance of telemetry with ultrasound techniques
- to test high temperature ultrasonic transducers up to 600°C
- to calibrate inductive level probes…

PLANNED EXPERIMENTS (including time schedule)
For the next years the main experimental campaign will be devoted to establish the performance of several sodium instrumentation devices: new high temperature ultrasonic transducers, matrix phased array ultrasonic transducers, electromagnetic transducers, but also some experiments to demonstrate the ability to make under sodium visualization. A specific remotely controlled mechanical harm (xyz movements) is developed and will be coupled to DOLMEN to realise this experimental program.

For longer terms, DOLMEN will be used for under sodium repair techniques testing. Some specific under sodium tools will be tested: cutting, laser ablation, welding…

TRAINING ACTIVITIES
Possible, but no specific program is planned.

REFERENCES (specification of availability and language)

4. BAQUE F., MARTIN L., Emersion of PHENIX Reactor Components from Liquid Sodium .Emersion Testing of PHENIX Reactor Components from Liquid Sodium. ICONE 10 Tenth International Conference on Nuclear Engineering, April 14-18, 2002 Washington USA
Conference on Advancements in Nuclear Instrumentation, Measurement Methods and Their Applications (ANIMMA ’09), Marseille, France, June 2009, Paper 80.