

Profile SFR-18

IRINA

FRANCE

GENERAL INFORMATION

NAME OF THE FACILITY	IRINA - Installation de Recherche pour l'Instrumentation en sodium Na – (Research Facility for in sodium instrumentation)
ACRONYM	IRINA
COOLANT(S) OF THE FACILITY	Sodium
LOCATION (address):	CEA Cadarache, 13108 Saint Paul Lez Durance FRANCE
OPERATOR	CEA
CONTACT PERSON (name, address, institute, function, telephone, email):	O. GASTALDI CEA Cadarache Building 208, 13108 Saint Paul Lez Durance, FRANCE Sodium Technology and Components Project Manager +33 4 42 25 46 40 Olivier.gastaldi@cea.

STATUS OF THE FACILITY	In operation
Start of operation (date):	1995 and refurbished in 2011

MAIN RESEARCH FIELD(S)	<input type="checkbox"/> Zero power facility for V&V and licensing purposes
	<input type="checkbox"/> Design Basis Accidents (DBA) and Design Extended Conditions (DEC)
	<input checked="" type="checkbox"/> Thermal-hydraulics
	<input type="checkbox"/> Coolant chemistry
	<input type="checkbox"/> Materials
	<input checked="" type="checkbox"/> Systems and components
	<input checked="" type="checkbox"/> Instrumentation & ISI&R

TECHNICAL DESCRIPTION

Description of the facility

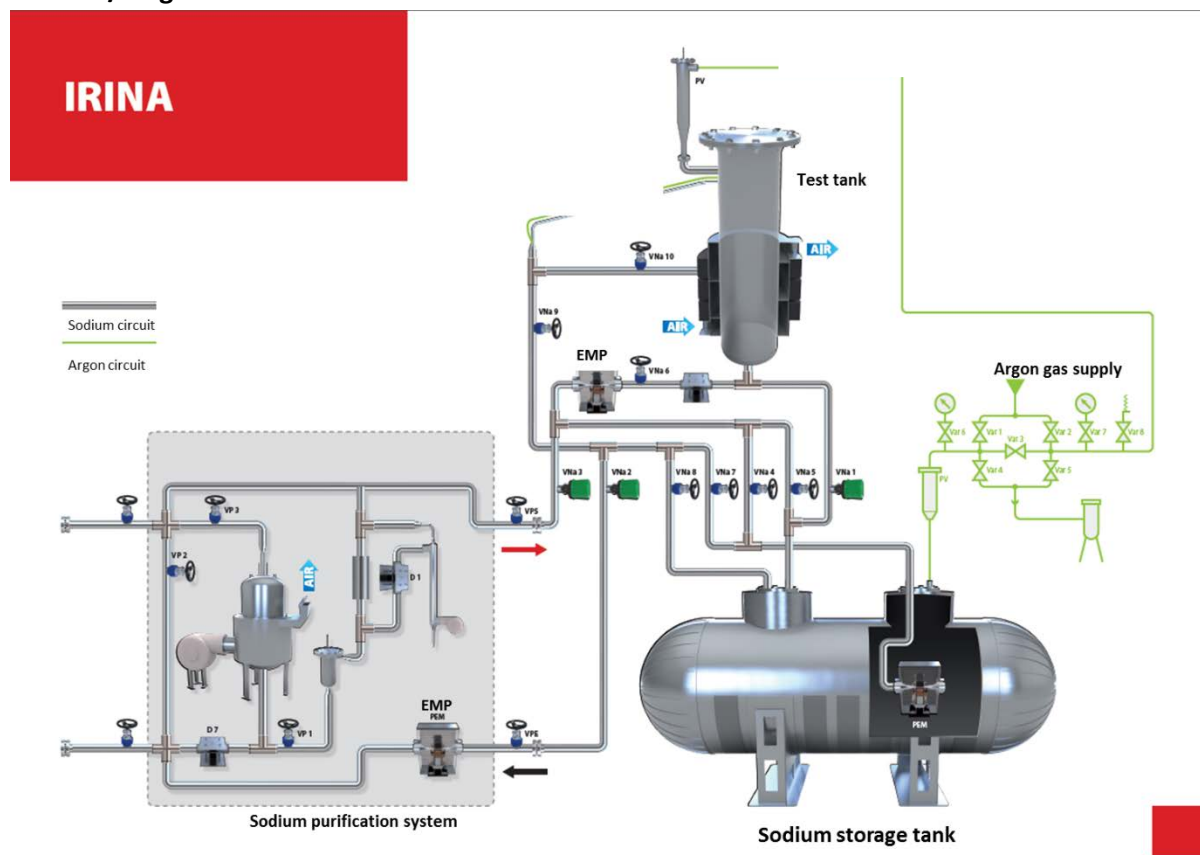
This facility is used for testing instrumentation, small components and was used with a specific arrangement of its main vessel for thermal fatigue tests on mock-ups. As DOLMEN, it can achieve preparation of sample for experiments done on other experimental devices (immersion and wetting in sodium).

It is medium size facility composed of a main test section made of a large sodium pot (1085 L) able to be operated up to 550°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, sodium valves... The atmosphere above sodium free surface is composed of Argon.

Acceptance of radioactive material

No

Scheme/diagram



3D drawing/photo



Parameters table

Coolant inventory	1033 L of sodium
Power	Around 25 kW
Test sections	
TS #1	<u>Characteristic dimensions</u> Test vessel dimensions: <ul style="list-style-type: none"> • Diameter: 750 mm • Height: 2681 mm • Maximum volume of sodium: 800 L
	<u>Static/dynamic experiment</u> Static experiment in the current configuration
	<u>Temperature range in the test section (ΔT)</u> 150°C to 550°C
	<u>Operating pressure and design pressure</u> Maximum operating pressure for the vessels (storage and test section): 0.5 bars
	<u>Flow range (mass, velocity, etc.)</u> Mass flow rate: 2000 L/h
Coolant chemistry measurement and control (active or not, measured parameters)	Active coolant quality measurement and control (purification on a by passed flow: 1 m ³ /h and impurities level < few ppm)
Instrumentation	Thermocouples Argon pressure measurement Inductive level probes Electromagnetic flowmeters

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

Before its refurbishment, the facility previously named TERMINATOR was devoted to study the thermal fatigue of different mock-ups.

After its refurbishment, the facility was aimed at instrumentation testing. The first experimental campaign concerned the validation of operation and calibration of inductive level probes.

PLANNED EXPERIMENTS (including time schedule)

Some other components, such as elements of a robotic device will be tested in representative conditions (immersed in liquid sodium at 200°C): electric motor and mechanical links.

In 2019, tests on ultrasonic sensor are planned for under sodium in service inspection and repair.

Thermomechanical and creep resistance tests are planned in 2020.

TRAINING ACTIVITIES

Possible, but no specific program is planned.

REFERENCES (*specification of availability and language*)

G. RODRIGUEZ., F. BAQUE, J.C. ASTEGIANO, "Evolution of Sodium Technology R&D Actions Supporting French Liquid-Metal Fast Breeder Reactors", Nuclear Technology, Volume 150, Number 1, April 2005, pages 3-15.

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Experimental platforms in support of the ASTRID program: existing and planned facilities, Proceedings of ICAPP 2014, Charlotte, USA, April 6-9, 2014, Paper 14060