

Profile SFR- 83

SFCT

INDIA

NAME OF THE FACILITY	SODIUM FACILITY FOR COMPONENT TESTING
ACRONYM	SFCT
COOLANT(S) OF THE FACILITY	Sodium
LOCATION (address)	Fast Reactor Technology Group (FRTG), Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India
OPERATOR	FRTG, IGCAR
CONTACT PERSON	Dr. P. Selvaraj, Director, Fast Reactor Technology Group, Indira Gandhi Centre for Atomic Research, Kalpakkam – 603102, India, +91 44 27480083, pselva@igcar.gov.in
STATUS OF THE FACILITY	Commissioned
Start of operation (Date)	2019

MAIN RESEARCH FIELDS	<input type="checkbox"/> Zero power facility for V&V and licensing purpose
	<input type="checkbox"/> Design Basis Accidents (DBA) and Design Extended Conditions (DEC)
	<input 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

Sodium Facility for Component Testing (SFCT) is a multipurpose loop, which will be used for sodium testing of scaled down components of future FBRs and experiments related to general sodium technology. It is a dynamic sodium loop with three test vessels, heater vessel, heat exchangers and purification circuit with cold trap, plugging indicator and sodium sampler. Two electromagnetic pumps of capacities - 50 m³/hr and 170 m³/hr are provided for sodium circulation in the facility. The facility also consists of a heater vessel of 220 kW capacity and a heat exchanger of 1250 kW capacity. Maximum temperature of loop operation is 600°C and the material of construction of all the components and piping in the facility is SS 316 LN.

ACCEPTANCE OF RADIOACTIVE MATERIALS – No

Scheme / Diagram

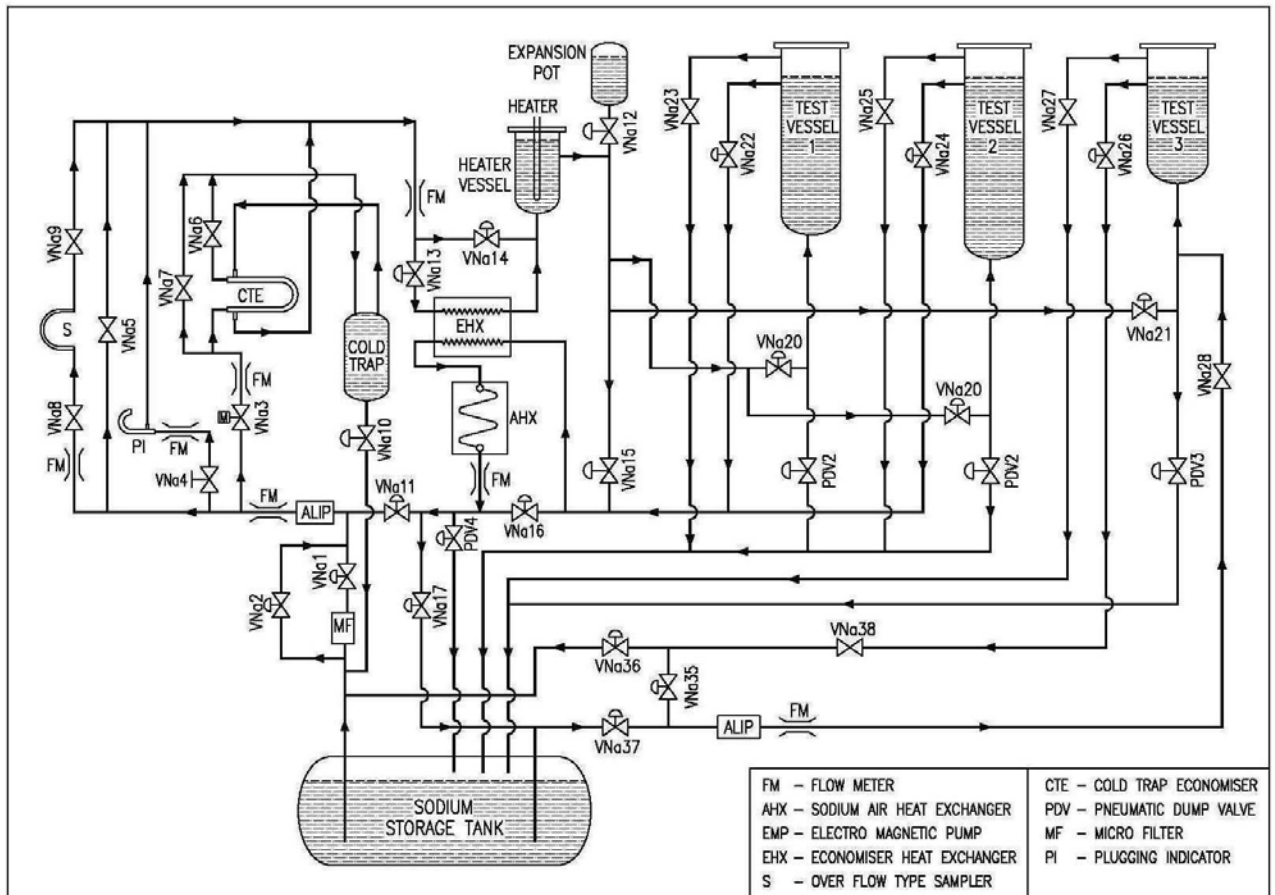


FIG. 1. Scheme of the SFCT

3D Drawing/Photo



FIG. 2. View of the SFCT facility

Parameters table

Coolant inventory	6 tonne
Power	Heater vessel with a total capacity of 220 kW 6 nos. of heaters in TV-3 with a total capacity of 120kW
No. of test sections	3
Test sections	
	<u>Characteristic dimensions</u> <i>Test vessel – 1:</i> Length = 5500 mm, Inner diameter = 600 mm <i>Test vessel – 2:</i> Length = 6500 mm, Inner diameter = 600 mm <i>Test vessel – 3:</i> Length = 3000 mm, Inner diameter = 1300 mm
	<u>Static / Dynamic experiment</u> Dynamic
	<u>Temperature in the test section</u> 200 – 580°C

	<u>Operating pressure and design pressure</u> Operating pressure – 1.5 kg/cm ² (g) Design pressure – 2 kg/cm ² (g)
	<u>Flow range (mass velocity etc)</u> Sodium flow – 120 m ³ /hr
Coolant chemistry measurement and control (active or not, measured parameters)	Coolant is not active Coolant purity is maintained by cold trapping and monitored using online plugging indicator, and periodical sampling and analysis
Instrumentation	Thermocouples for temperature measurement Wire type and spark plug type leak detectors, and sodium ionization detectors for sodium leak detection Mutual inductance type discrete and continuous level probes for monitoring sodium level Permanent magnet flow meters for monitoring flow Bourdon tube gauges for measuring cover gas pressure Smoke detectors for fire detection

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

Nil

PLANNED EXPERIMENTS (including time schedule)

Qualification testing of indigenously developed sodium compatible ultrasonic transducers.

Testing of Bellows sealed Sodium Service valves.

Demonstration of frozen seal formation of SG isolation valve.

Testing of pipes and fittings like elbow, reducer and Tee for erosion and hot/cold thermal shock studies.

Testing of various evolving designs of electromagnetic sodium pumps with different capacities

Endurance testing of components.

Calibration of sodium level probes.

TRAINING ACTIVITIES

Training activities can be considered with IGCAR Kalpakkam for the operation of experimental campaign under the supervision of IGCAR qualified staff.

REFERENCES

Nil