

Profile SFR-45
SUBASSEMBLY HYDRAULICS TEST RIG
INDIA

NAME OF THE FACILITY	SUBASSEMBLY HYDRAULIC TEST RIG
ACRONYM	NA
COOLANT(S) OF THE FACILITY	Water
LOCATION (address)	Hall-II, Fast Reactor Technology Group (FRTG), Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India
OPERATOR	FRTG, IGCAR
CONTACT PERSON (name, address, institute, function telephone, email)	Dr. P. Selavaraj, 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	In Operation
Start of operation (Year)	1994

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 type="checkbox"/> Systems and components
	<input type="checkbox"/> Instrumentation & ISI & R

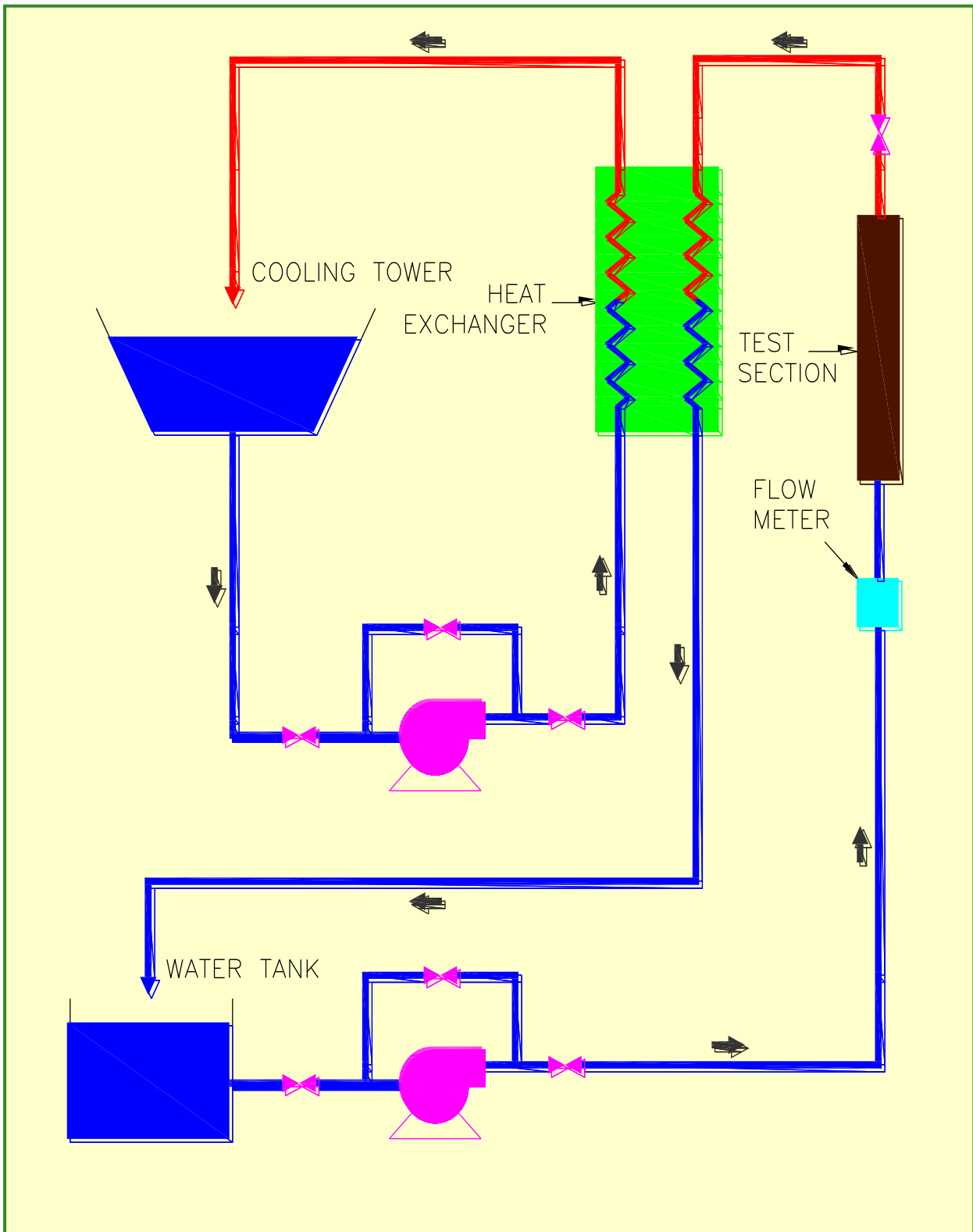
TECHNICAL DESCRIPTION

Description of the facility

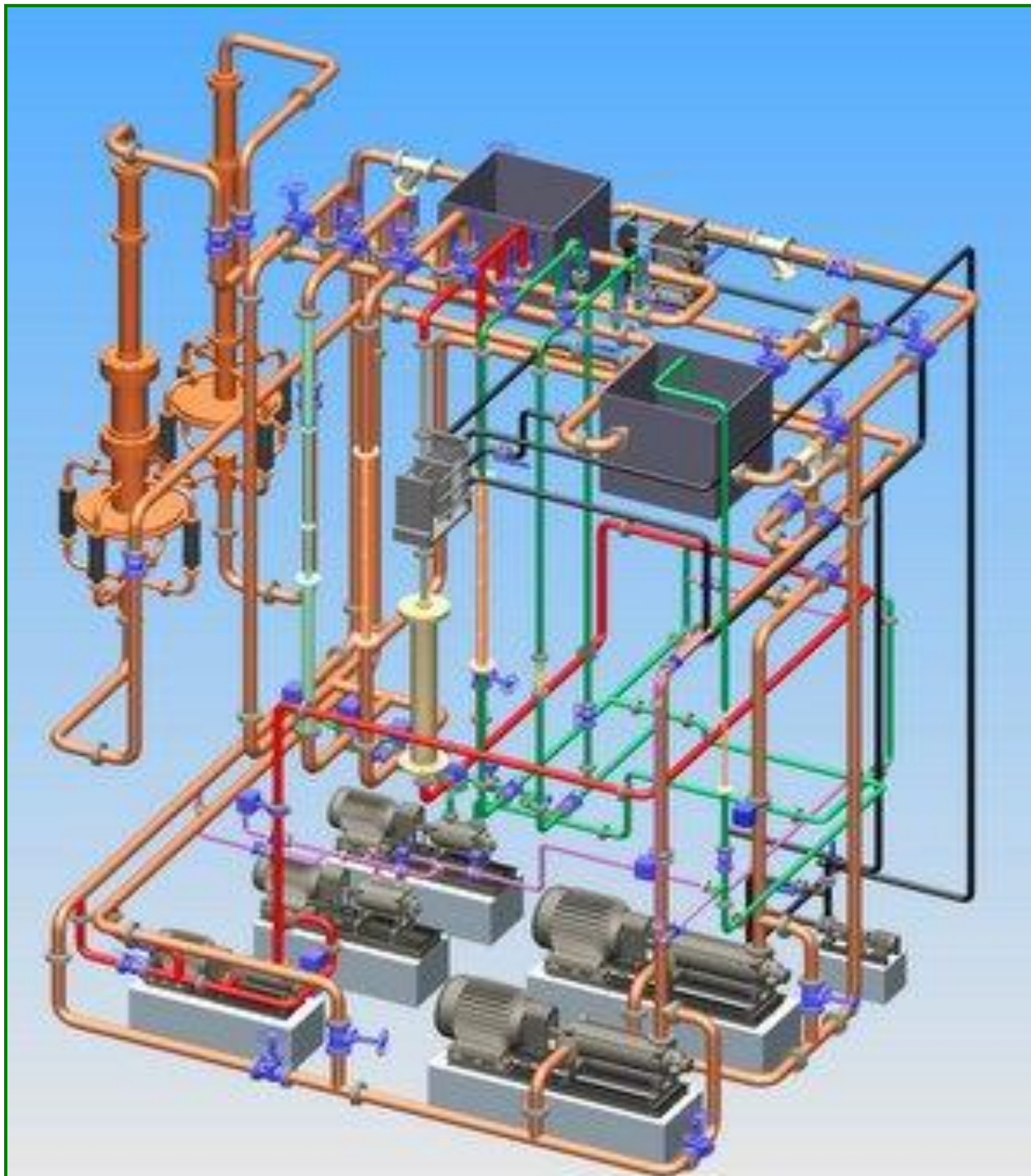
The purpose of this loop is to have separate test sections where dummy subassemblies are tested for design qualification and loops to develop pressure drop devices like orifice plates for flow zoning and labyrinths for reducing flow bypass through grid plate sleeve. Flow induced vibration assessment of the subassemblies are also carried out in one of the rest sections. It has different test sections for testing subassembly, orifices labyrinth and Eddy Current Flow meter (ECFM) separately. This loop also has a Flow Induced Vibration (FIV) test set up specifically meant for testing subassembly component vibration. Water storage tanks of the facility have a total capacity of 10 m³ with provision of heaters inside the tank.

Acceptance of radioactive materials – No.

Scheme/Diagram of the loop



3D Drawing/Photo



Parameters Table

Coolant inventory	12 m ³
Power	Maximum heater Power: 120 kW
No. of test section	Six [two out of this cater to FIV studies]
Operating temperature range	30 °C to 70 °C
Operating Pressure Design Pressure	Operating Pressure: 16 bar Piping design Pressure: 22 bar
Flow range	25 m ³ /h to 250 m ³ /h
Coolant chemistry measurement and control (active or not measured parameters)	Use of potable water, pH is controlled
Instrumentation	Resistance Temperature Detector, Pressure Gauge, Thermocouples, Pressure transmitters, Averaging pitot tube flow meters, Rotameters, Accelerometers and strain gauges for FIV measurements, Data acquisition system and control system

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

Pressure drop and cavitation performance testing of various types of PFBR dummy subassemblies are completed. Labyrinth type sealing devices for PFBR subassemblies foot are developed. Orifice type flow zoning devices for PFBR core subassemblies are developed. FIV studies are carried out in PFBR dummy subassemblies. Hydraulic studies are carried out in full scale model of ECFM assembly. Hydraulic studies on Failed Fuel Location Module (FFLM) was completed. FIV studies on seven subassembly cluster are completed up to 80% flow.

PLANNED EXPERIMENTS (including time schedule)

Performance testing of flow zoning devices for Source and ICOSA subassemblies of PFBR-December, 2019

Hydraulic testing of FBTR subassembly: December, 2019

TRAINING ACTIVITIES

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

REFERENCE

Nil