SCIENTICO INDIA
Manufacturer & Exporter · Ambala, Haryana, India

PRODUCT DATA SHEET
Catalogue reference for product evaluation

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Saturation Pressure | ThermoFlux – 7069

Category: Thermodynamics Lab Equipment · **Country of Origin:** India

Product Overview

Saturation Pressure ThermoFlux – 7069 is a bench-top laboratory trainer that demonstrates the relationship between saturation pressure and boiling point temperature of water, combining a Marcet Boiler with a throttling calorimeter and a condensate return pipe loop. Pure water is heated by two variable-power cartridge heaters. A sight glass allows observation of boiling patterns and water level. Saturated steam circulates through a pipe loop (0 to 8 bar gauge) fitted with a K-type thermocouple and an electronic pressure sensor before condensing and returning to the boiler. The throttling calorimeter, connected via a vapour offtake with isolating valve, enables determination of the dryness fraction of wet steam at different operating pressures. A second K-type thermocouple records post-expansion temperature. Three independent safety provisions are included: a mechanical relief valve at 10 bar, two digital pressure switches at 8 and 8.5 bar, and a standalone Bourdon gauge. Sensor readings display on a common digital meter with USB output for optional PC data acquisition via LabVIEW-based software. Supplied by SCIENTICO India with hoses, measuring beaker, stopwatch, and instruction manual.

View this product online: https://scienticoindia.com/product/saturation-pressure-thermoflux-7069/



Request a model-specific quotation
Include quantity and delivery country.

Technical Specifications

Saturation Pressure ThermoFlux – 7069: Technical Specifications

Parameter	Value
Operating Pressure Range	0 to 8 bar (gauge)
Digital Pressure Safety Switches	8 bar and 8.5 bar (2 digital switches)
Mechanical Pressure Safety (Relief Valve)	10 bar
Heating Element	Pair of cartridge heaters with variable power control
Temperature Sensors	K-type thermocouples (2 total: loop top limb + post-throttle)
Pressure Sensor	Electronic saturation pressure sensor (top limb of pipe loop)
Pressure Gauge	Bourdon gauge (remains operational when power is disconnected)
Sight Glass	Front-mounted, for observation of boiling patterns and water level
Filling Point	Bottom of loop, for filling with pure water
Vapour Offtake	With isolating valve, connects to throttling calorimeter
Throttling Calorimeter	Included, for dryness fraction determination
Pipe Loop	Condensate return from steam back to base of boiler

Parameter	Value
Data Output	USB port for optional PC connection
Display	Common digital meter for all sensor readings
Electrical Safety	RCD and current protection devices in electrical console
Software	Optional DAQ software (National Instruments LabVIEW environment)
Software Compatibility	Any Windows environment

Technical Data

Parameter	Value
Operating Pressure	0 to 8 bar (gauge)
Digital Safety Switch 1	8 bar
Digital Safety Switch 2	8.5 bar
Mechanical Pressure Relief	10 bar

Key Features

Key Features

- **Apparatus Type:** bench-top saturation pressure and Marcet Boiler equivalent
- **Throttling Calorimeter:** included for dryness fraction determination of wet steam
- **Operating Pressure Range:** 0 to 8 bar gauge
- **Mechanical Safety Relief Valve:** set at 10 bar
- **Digital Pressure Safety:** 8 bar and 8.5 bar (2 independent digital switches)
- **Heating Element:** pair of cartridge heaters with variable power control
- **Temperature Sensors:** 2 x K-type thermocouples: top limb of loop and post-throttle position
- **Saturation Pressure Sensor:** electronic sensor on top limb of pipe loop
- **Bourdon Gauge:** remains operational when electrical power is disconnected
- **Sight Glass:** front-mounted for boiling pattern observation and water level monitoring
- **Pipe Loop:** returns condensate from saturated steam to base of boiler for reheating
- **Filling Point:** at base of loop for filling with pure water
- **Vapour Offtake:** with isolating valve for steam diversion to calorimeter
- **Data Output:** USB port, all sensor signals routed for optional PC connection
- **Display:** common digital meter for all sensor readings
- **Electrical Console:** RCD and current protection devices for operator safety
- **Software:** optional DAQ software in National Instruments LabVIEW environment, Windows compatible

Experiments

Saturation Loop

- Observation of the patterns of boiling at the surface of the water
- Measurement of the temperature of saturated steam over the range of saturation pressure 0 to 8 bar and comparison of the saturation curves obtained with those published in steam tables
- The concept of a saturation line
- The describing equation and linearisation
- Gauge and absolute pressures
- Temperature scales
- The characteristic behaviour of a two-phase fluid
- The effect of rate of response on the accuracy of measurement

Throttling Calorimeter

- Determination of the condition of wet steam (quality of the steam) produced by the Saturation Pressure Apparatus at different operating pressures
- Use of the steady flow energy equation
- Use of steam tables
- The difference in enthalpy between phases: enthalpy of vaporisation

Thermodynamics

- Understanding saturation curves and the characteristics of a two-phase fluid
- Understanding the origin and use of steam tables
- Using a throttling calorimeter to determine the quality of wet steam

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Construction and Design

The **Saturation Pressure ThermoFlux – 7069** is a self-contained bench-top unit built around a boiler heated by two cartridge heaters with variable power control.

The boiler incorporates a front-mounted sight glass for direct observation of internal boiling patterns and water level. Saturated steam exits from the top of the boiler and circulates through a closed pipe loop before condensing and returning as condensate to the base of the boiler. The top limb of the loop carries a K-type thermocouple, a temperature sensor, and an electronic **saturation pressure** sensor.

A vapour offtake on the loop, fitted with an isolating valve, diverts steam to the throttling calorimeter. Steam expands to atmospheric pressure through the calorimeter; a second K-type thermocouple records the post-expansion temperature. A filling point at the base of the loop allows the system to be charged with pure water.

Safety is provided by a pressure relief valve set to 10 bar and by two digital pressure switches at 8 bar and 8.5 bar. A Bourdon gauge provides pressure indication independently of the electrical supply. All electrical components are housed in a dedicated console fitted with an RCD and current protection devices. Sensor outputs feed a common digital meter and are simultaneously routed to a USB port for optional data acquisition.

Software (Optional): ThermoFlux – 7069

DAQ software is specially designed in the National Instruments LabVIEW environment to measure and calculate results from the apparatus. The software is optional. When software is used, a set of electronic sensors is included. The software is compatible with any Windows environment.

Scope of Delivery

- 1 experimental unit
- 1 set of hoses
- 1 measuring beaker
- 1 stop watch
- 1 instruction manual

Optional Accessories

- Parallel interface and educational software package (ThermoFlux – 7069 DAQ software, LabVIEW environment, Windows compatible)

Ordering & Delivery

- Send the product name, quantity, delivery country and destination with your enquiry.
- Production schedule, freight, payment terms and export documents are confirmed in the written quotation.

Frequently Asked Questions

Q: What saturation pressure range does the ThermoFlux – 7069 operate over?
A: The unit operates from 0 to 8 bar gauge. A mechanical pressure relief valve is set at 10 bar, and two digital pressure safety switches are set at 8 bar and 8.5 bar.

Q: How is the dryness fraction of wet steam determined using this apparatus?
A: Steam is diverted from the pipe loop through a vapour offtake with an isolating valve into a throttling calorimeter. As steam expands

to atmospheric pressure, a K-type thermocouple measures the post-expansion temperature. This data, combined with steam table values, allows calculation of the dryness fraction.

Q: Can saturation curves from this apparatus be compared with steam tables?
A: Yes. Students measure the temperature of saturated steam across the full saturation pressure range of 0 to 8 bar and plot the results. These curves can be directly compared with published steam tables.

Q: Is data logging to a PC possible with the ThermoFlux – 7069?
A: All sensor signals are routed to a USB port. An optional parallel interface and educational DAQ software package, developed in the National Instruments LabVIEW environment, enables PC-based data acquisition. The software runs on any Windows environment.

Q: What safety features are built into the apparatus?
A: The unit has three independent safety provisions: a mechanical pressure relief valve set at 10 bar, two digital pressure safety switches at 8 bar and 8.5 bar, and a Bourdon gauge that remains operational when electrical power is disconnected. The electrical console includes an RCD and current protection devices.

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