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Manufacturer & Exporter · Ambala, Haryana, India

PRODUCT DATA SHEET
Catalogue reference for product evaluation

Phone: +91 7015865225 **Email:** info@scienticoindia.com **Web:** scienticoindia.com **Address:** #71, Industrial Area, Ambala Cantt, Haryana, India

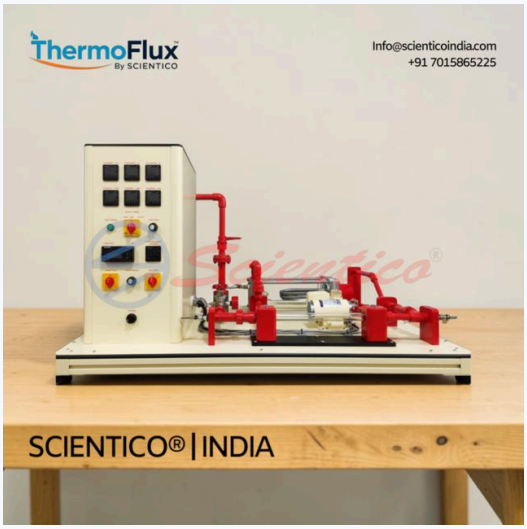
Recycle Loops | ThermoFlux - 7089

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

Product Overview

The Recycle Loops ThermoFlux - 7089 is a bench-top laboratory unit that demonstrates recycle loop principles and enables mass and energy balances under steady state and unsteady state conditions. It features a variable-speed gear circulating pump (12 lpm, 4 bar, 180 W), a 0 to 3000 W electric heater with over-temperature protection, and a quick-disconnect fitting to vary loop volume using a 1 L reservoir or additional tubing lengths. K-type thermocouples measure temperature at inlet, outlet, and within this recycle loops apparatus, while turbine-type flow sensors monitor flow rates at all corresponding locations. The unit connects to a PC via LAN or USB port, with optional LabVIEW-based DAQ software available for Windows.

View this product online: https://scienticoindia.com/product/recycle-loops-thermoflux-7089/



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

Technical Specifications

Recycle Loops ThermoFlux - 7089, Technical Specifications

Parameter	Value
Circulating Pump Type	Gear
Circulating Pump Flow Rate	12 lpm
Circulating Pump Head	4 bar
Circulating Pump Power	180 W
Circulating Pump Speed	Variable
Heater Power	0 to 3000 W
Heater Protection	Over-temperature protection
Additional Volume Tank Capacity	1 L
Loop Flow Rate Range	0 to 7 l/min
Passing Flow Rate Range	0 to 7 l/min
Temperature Measuring Range	-100°C to 400°C
Flow Rate Measuring Range	0 to 15 lpm
Temperature Sensors	K-type thermocouples
Flow Sensors	Turbine type

Parameter	Value
DAQ Connection	LAN or USB port
Power Requirement	110V/230V, 50/60Hz, 1 phase
Mains Cold Water Supply	7 lpm, 2 bar

Technical Data

Circulating Pump

Parameter	Value
Type	Gear
Flow Rate	12 lpm
Head	4 bar
Power	180 W
Speed	Variable

Heater

Parameter	Value
Power	0 to 3000 W
Protection	Over-temperature protection

Additional Volume Tank

Parameter	Value
Capacity	1 L

Measuring Ranges

Parameter	Value
Temperature	-100°C to 400°C
Flow Rate	0 to 15 lpm

Power and Services

Parameter	Value
Power Requirement	110V/230V, 50/60Hz, 1 phase
Mains Cold Water Supply	7 lpm, 2 bar

Key Features

Key Features

- **Recycle Loops Apparatus Type:** Bench-top unit with through pipe and recycle loop
- **Circulating Pump:** Gear type, 12 lpm, 4 bar, 180 W, variable speed

- **Heater:** Electric, 0 to 3000 W, with over-temperature protection
- **Loop Flow Rate:** Variable, 0 to 7 l/min (including 0 for no-recycle condition)
- **Passing Flow Rate:** Variable, 0 to 7 l/min
- **Loop Volume Adjustment:** Waste-free quick disconnection fitting for reservoir or pipe-in-series connection
- **Additional Volume Tank:** 1 L capacity
- **Residence Time Variation:** Additional flexible tubing lengths connectable in series
- **Temperature Measurement:** K-type thermocouples at inlet, outlet, and within the loop
- **Flow Measurement:** Miniature turbine-type flow sensors at inlet, outlet, and loop locations
- **Inlet Protection:** Pressure regulator with filter to minimize supply pressure fluctuations
- **Operator Safety:** RCD and appropriate current protection devices fitted
- **Display:** Digital meter showing temperatures and flow rates on integral console
- **DAQ Connectivity:** LAN or USB port for PC connection
- **Temperature Measuring Range:** -100°C to 400°C
- **Flow Rate Measuring Range:** 0 to 15 lpm
- **Power Supply:** 110V/230V, 50/60Hz, 1 phase
- **Water Supply Requirement:** 7 lpm, 2 bar mains cold water
- **Software:** Optional LabVIEW-based DAQ software, Windows compatible

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Experiments

Understanding Recycle

- Understanding the meaning of recycle

Steady State Mass Balances

- Demonstrating that whatever the recycle rate, inlet and outlet flow rates remain equal

Steady State Heat Balances

- With the heater switched on and at a fixed input water flow rate, the outlet temperature is independent of the recycle rate
- With the heater switched on, the temperature change between inlet and outlet can be used to determine the combined heat input of the heater and pump at different input water flow rates

Unsteady State Heat Balance

- Determining the response when the heater is switched on at different passing flow rates
- Determining the response when the heater is switched off at different passing flow rates
- Determining the effect of a step change in the input flow
- Determining the effect of recycle with no passing flow

Unsteady State Responses to Step Changes

- In passing flow rate
- In heat input to the loop
- In recycle rate

Use of the Steady Flow Energy Equation

- For the overall system
- For the mixing process

Effects on Response Rates to Parameter Changes

- In heater power
- In through flow
- In recycle flow
- In loop volume

The Effect of Residence Time

- Demonstrated by changing the volume of the loop

Construction and Design

The Recycle Loops ThermoFlux - 7089 is built as a bench-top unit comprising an apparatus assembly and a control panel with an integral electrical console. A through pipe is mounted on the console, with a recycle loop of pipework connected between the supply and drain connections. A variable-speed gear pump (12 lpm, 4 bar, 180 W) circulates water within the recycle loop. A 0 to 3000 W electric heater with over-temperature protection raises the water temperature in the loop. A pressure regulator with filter is fitted at the inlet to minimize cold-water supply pressure fluctuations.

A waste-free quick disconnection fitting allows a 1 L reservoir or a short pipe section to be connected in series with the loop. Different lengths of flexible tubing can also be added in series to further vary residence time. K-type thermocouples measure water temperature at the entry, exit, and inside the recycle loop. Turbine-type flow sensors measure flow rates at corresponding locations, including both inlet and outlet, to demonstrate their equality at all recycle conditions. All power supplies, signal conditioning circuitry, and protection devices, including an RCD, are housed within the control panel. The digital meter on the console displays all temperature and flow rate readings. This recycle loops unit transmits corresponding signals to DAQ via LAN or USB port for connection to a PC.

Software

ThermoFlux - 7089 Software (Optional)

- Developed in the National Instruments LabVIEW environment
- Designed specifically for data acquisition with this apparatus
- Records, stores, and calculates experimental results
- A set of electronic sensors is included when the software option is selected
- Compatible with any Windows operating system
- PC connection via LAN or USB port

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

Q1: What is the purpose of the Recycle Loops ThermoFlux - 7089?
It is designed to demonstrate recycle loop behaviour visually and experimentally, and to enable mass and energy balances under steady state and unsteady state conditions. It models heating arrangements typical of the chemical, food, and pharmaceutical industries.

Q2: How is the volume of the recycle loop changed?
A waste-free quick disconnection fitting allows a 1 L reservoir or a short pipe section to be connected in series with the loop. Different lengths of flexible tubing can also be connected in series to create further changes in residence time.

Q3: How are temperature and flow rate measured in the recycle loops unit?
K-type thermocouples measure water temperature at the inlet, outlet, and within the recycle loop. Miniature turbine-type flow sensors measure flow rates at corresponding locations, including both inlet and outlet.

Q4: Why are flow sensors fitted at both the inlet and outlet?
Flow sensors at both locations demonstrate that inlet and outlet flow rates are always equal, regardless of the recycle rate. This is a fundamental principle that can be counterintuitive when water is flowing through the recycle loop.

Q5: Is the DAQ software included as standard?
No. The ThermoFlux - 7089 DAQ software is optional. When selected, it includes the required electronic sensors, connects via LAN or USB port, and runs in a LabVIEW environment on any Windows operating system.

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