SCIENTICO INDIA
Manufacturer & Exporter · Ambala, Haryana, India

PRODUCT DATA SHEET
Catalogue reference for product evaluation

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Free and Forced Convection Heat Exchanger | ThermoFlux – 7027

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

Product Overview

A CE-certified heat transfer apparatus for measuring LMTD, overall heat transfer coefficient, and effectiveness under parallel/counter flow conditions, manufactured by Scientico India to ISO 9001:2015 standards. Supplied with calibration certificate, operation manual, and complete export documentation. Designed for Thermodynamics Lab Equipment laboratories in engineering colleges and technical institutions.

View this product online: https://scienticoindia.com/product/free-and-forced-convection-heat-exchanger-thermoflux-7027/



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

Technical Specifications

Free and Forced Convection Heat Exchanger ThermoFlux – 7027, Technical Specifications

Parameter	Detail
Product Name	Free and Forced Convection Heat Exchanger
Model	ThermoFlux – 7027
Duct Flow Cross-Section	120 × 120 mm
Duct Height	1000 mm
Fan Position	Axial fan at top of duct
Heating Element Temperature Limit	90°C
Heating Power Control	Continuously variable, 0–100 W, direct watt readout
Temperature Measurement Resolution	0.1°C
Temperature Sensors	Thermocouple sensors with direct digital readout (°C)
Air Velocity Measurement	Portable anemometer mounted on duct
Fins, Number of Fins	7
Fins, Heating Power	150 W
Fins, Heat Transfer Area	0.14 m²
Pipe Bundle, Number of Tubes	20

Parameter	Detail
Pipe Bundle, Heating Power	150 W
Pipe Bundle, Heat Transfer Area	0.06 m²
Flat Surface, Heating Power	150 W
Flat Surface, Surface Area	0.013 m²
Cylinder with Even Surface Temperature (Optional), Heating Power	150 W
Cylinder with Even Surface Temperature (Optional), Heat Transfer Area	0.0112 m²
Software (Optional)	ThermoFlux – 7027 DAQ software, LabVIEW-based, Windows compatible

Technical Data

Air Duct

Parameter	Value
Flow Cross-Section	120 × 120 mm
Height	1000 mm
Fan	Axial, top-mounted

Heating Elements, Standard (Supplied)

Module	Heating Power	Heat Transfer Area	Additional Data
Finned Surface	150 W	0.14 m²	7 fins
Pipe Bundle	150 W	0.06 m²	20 tubes
Flat Surface	150 W	0.013 m²	-

Heating Elements, Temperature Limitation

Parameter	Value
Maximum Surface Temperature	90°C

Optional Modules

Module	Heating Power	Heat Transfer Area
Cylinder with even surface temperature	150 W	0.0112 m²
Plate surface	150 W	0.01 m²
Cylinder with heating foil (local heat transfer)	150 W	0.0112 m²

Key Features

Key Features

- **Complete Free and Forced Convection Heat Exchanger:** Fully self-contained vertical duct apparatus with three interchangeable 150 W plug-in surface modules and integrated instrumentation
- **Vertical air duct:** 120 × 120 mm flow cross-section, 1000 mm height; axial fan at top for forced convection air stream
- **Finned surface module:** 7 fins, 150 W heating power, 0.14 m² heat transfer area
- **Pipe bundle module:** 20 tubes, 150 W heating power, 0.06 m² heat transfer area
- **Flat surface module:** 150 W heating power, 0.013 m² surface area
- **Temperature limit:** 90°C on all heating elements

- **Continuously variable heating power:** 0–100 W output with direct watt readout from control panel
- **Temperature measurement:** Thermocouple sensors, 0.1°C resolution, direct digital readout in °C
- **Air velocity measurement:** Portable anemometer mounted on duct
- **Dual convection modes:** Fan-on for forced convection; fan-off for free convection, same modules used in both modes
- **Horizontal bench use:** Each module operable independently on the bench in horizontal orientation for free convection coefficient determination
- **Optional surface modules:** Plain cylinder (0.0112 m², 150 W), cylinder with heating foil for local heat transfer study, plate surface
- **Optional DAQ software:** ThermoFlux – 7027 LabVIEW-based software displays temperatures, heating power, and air velocity; calculates results automatically; Windows compatible

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Experiments

- Demonstration of the relationship between input power and surface temperature in free convection
- Demonstration of the relationship between input power and surface temperature in forced convection
- Demonstration of the use of extended surfaces to improve heat transfer
- Determination of the temperature distribution along an extended surface
- Comparison between free and forced convection for finned surface
- Comparison between free and forced convection for pinned surface
- Comparison between free and forced convection for flat surface
- Comparison between vertical and horizontal finned surfaces in free convection
- Comparison of heat transfer surface efficiency
- Comparison between the coefficient of heat transfer and Nusselt number for free and forced convection
- Temperature profile along pinned and finned surfaces

Construction and Design

The Free and Forced Convection Heat Exchanger ThermoFlux – 7027 is constructed as a fully self-contained vertical duct unit with a 120 × 120 mm flow cross-section and 1000 mm height, housing an axial fan at the top to supply the forced convection air stream. Three plug-in heated surface modules of known geometry, finned surface (7 fins, 0.14 m²), pipe bundle (20 tubes, 0.06 m²), and flat surface (0.013 m²), are supplied as standard; each is rated at 150 W and subject to a 90°C surface temperature limit. Modules mount directly into the duct and may also be used independently in horizontal bench orientation for free convection studies. The control panel provides continuously variable heating power from 0 to 100 W with direct watt readout, fan speed control, and thermocouple-based temperature measurement at 0.1°C resolution with direct digital readout in °C. A portable anemometer mounts on the duct for air velocity measurement. This Free and Forced Convection Heat Exchanger supports optional modules, a plain cylinder (0.0112 m², 150 W), a cylinder with heating foil for local heat transfer investigation, and a plate surface, which extend the experimental capability beyond the standard scope of delivery. The optional LabVIEW-based DAQ software integrates with an electronic sensor set to display temperatures, heating power, and air velocity, and to calculate experimental results automatically under Windows environments.

Software

ThermoFlux – 7027 DAQ Software (Optional)

- Developed in National Instruments™ LabVIEW™ environment
- Displays temperatures, heating power, and air velocity; calculates experimental results
- Compatible with all Windows™ operating systems
- When the software option is selected, a set of electronic sensors is included

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Scope of Delivery

- 1 × Experiment unit
- 1 × Pipe bundle surface module
- 1 × Finned surface module
- 1 × Flat surface module
- 1 × Can of thermal paste
- 1 × Instruction manual

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. Which heating surface modules are supplied as standard with the ThermoFlux – 7027?
Three modules are supplied: a finned surface (7 fins, 0.14 m², 150 W), a pipe bundle (20 tubes, 0.06 m², 150 W), and a flat surface (0.013 m², 150 W). Optional modules include a plain cylinder, a cylinder with heating foil, and a plate surface.

Q2. How are free and forced convection modes selected on this apparatus?
Forced convection is achieved by activating the axial fan at the top of the duct; free convection experiments are conducted with the fan inactive. The same plug-in surface modules are used in both modes.

Q3. What is the heating power control range of the Free and Forced Convection Heat Exchanger?
The control panel provides continuously variable electrical output from 0 to 100 W, with a direct readout in watts.

Q4. Can the surface modules be used outside the duct?
Yes. Each module may be used independently on the bench in horizontal orientation to establish free convection coefficients without the duct, extending the experimental versatility of the apparatus.

Q5. What is the maximum surface temperature of the heating elements?
All heating elements on the ThermoFlux – 7027 are subject to a temperature limitation of 90°C.

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