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Product Name :

Emissivity Natural Convection And Radiation

Product Code :

SLE/EA/10



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Description :

Emissivity Natural Convection And Radiation (Product Code: SLE/EA/10) is a heat transfer apparatus used to separate radiant heat loss from natural (free) convection around a heated element in engineering college laboratories. Students run its pressure vessel from 1 bar (gauge) of compressed air down to about 5 Pa (absolute) and extrapolate towards a total vacuum, where convection disappears. This engineering lab equipment in India is made by **Jain Scientific Equipments Pvt Ltd (ScienceLab)**, an OEM manufacturer, at its own factory in Ambala, India.

Specifications

Parameter	Detail
Principle	Compares heat transfer by radiation and by natural (free) convection at different pressures and under vacuum
Test element	Small heated element hanging in the centre of a pressure vessel
Element surface	Matt black, with a thermocouple attached to measure its temperature
Vessel interior	Black, with a thermocouple fitted to the vessel wall
Pressure range	Charged with compressed air up to 1 bar (gauge) or evacuated down to about 5 Pa (absolute)
Pressure measurement	Two pressure transducers – one for pressures aboveatmospheric, one for pressures below atmospheric
Instrumentation	Instruments and a digital display for temperatures, pressures and power to the element
Learning outcomes	Emissivity of a surface; verification of the Stefan-Boltzmann equation; Nusselt, Grashof, Prandtl and Knudsen numbers
Product code	SLE/EA/10
Manufacturer	Jain Scientific Equipments Pvt Ltd (ScienceLab) — OEM
Country of origin	India (made in Ambala, Haryana)

What Is the Natural Convection and Radiation Apparatus Used For?

In a typical practical, students heat the element and log its surface temperature, the vessel wall temperature and the electrical power at several vessel pressures, then plot heat loss against pressure. Because convection weakens as the gas thins out, extending the curve towards zero pressure leaves the radiation component on its own. From that value the emissivity of the matt black surface is calculated and checked against the Stefan-Boltzmann equation.

The same readings let learners work with dimensionless groups such as the Nusselt, Grashof, Prandtl and Knudsen numbers, which makes the unit a strong fit among lab equipments for technical institutes teaching heat transfer. Let the element and vessel settle at each pressure before recording, because steady values give a cleaner extrapolation.

OEM