

H215

Reynolds Number and Transitional Flow

Free-standing apparatus that gives a visual demonstration of laminar and turbulent flow



- Constant head reservoir and flow-smoothing parts for a smooth flow
- Uses dye injector system to show flow patterns
- Investigates Reynolds number at transition
- Clear tube and light-coloured shroud to help flow visualisation (see flow more clearly)
- Shows turbulent and laminar flow
- Optional heater module available for tests at different viscosities
- Ideal for classroom demonstrations and student experiments

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Description

The apparatus consists of a precision-bore glass pipe (test tube) held vertically in a large shroud. The shroud is open at the front and the inside surface is light coloured. This allows the students to see the flow clearly.

Water enters a constant head tank (reservoir) above the test tube and passes through a diffuser and stilling bed. It then passes through a specially shaped bell-mouth into the test tube. This arrangement ensures a steady, uniform flow at entry to the test tube. A thermometer measures the temperature in the constant head reservoir.

A fixed overflow pipe in the reservoir connects to a suitable drain. At the bottom of the test pipe is a valve which controls the flow rate through the pipe, without disturbing the flow.

Students collect a known quantity of water in a measured time to find the flow rate. Included is a measuring cylinder.

To see the pattern of flow in the pipe, students use a dye injector (included). They use it to inject a fine filament of dye into the top of the tube. The dye injector is a dye reservoir connected to a fine hypodermic tube.

The base of the apparatus has adjustable feet for levelling prior to use (included is a levelling device).

The optional Heater Module (H215a) is a separate free-standing unit. It connects to the water supply line to heat the water, varying its temperature and viscosity. Controls on the module vary the electrical heat input and the flow rate, to give steady conditions over a range of temperatures.

Standard Features

- Supplied with a comprehensive user guide
- Two-year warranty
- Manufactured in accordance with the latest European Union directives

Optional Ancillaries

- Stopwatch (SW1) – To measure flow rates
- Heater Module (H215a) – A free-standing unit to vary and control the water temperature and hence its viscosity.

Experiments

- Demonstration of transition between laminar and turbulent flow.
- Determination of transition Reynolds numbers and comparison with accepted values.
- Investigation of the effect of varying viscosity and demonstration that the Reynolds number at transition is independent of viscosity.

Operating Conditions

Operating environment:
Laboratory environment

Storage temperature range:
–25°C to +55°C (when packed for transport)

Operating temperature range:
+5°C to +40°C

Operating relative humidity range:
80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Essential Services

Water supply:
Mains water supply and drain.

Electrical supply:
For Optional Heater (H215a) – a single-phase electrical supply of 220/240 VAC at 32 A

Space needed:
Approximately 700 mm x 700 mm

Specifications – (H215)

Nett dimensions and weight:
700 mm base width x 400 mm base front to back x 1500 mm high and 21 kg.

Packed dimensions and weight:
1.3 m³ and 92 kg

Specifications – Optional Heater Module (H215a):

Nett dimensions and weight:
360 mm wide x 450 mm high x 330 mm front to back and 10 kg

Other parts:
Controls for temperature and flow. Full earth leakage protection and over-temperature cut-out.