F SERIES

Osborne Reynolds Apparatus – F5

The Armfield F5 has been designed to allow the classical experiments conducted by Professor Osborne Reynolds, to be reproduced by students in the laboratory.

Experimental content

- To determine the Reynolds number (Re) at the critical velocities at transitional flow
- To observe the laminar, transitional and turbulent flow in a test pipe and also to observe the velocity profile
- To observe the paraboloid velocity profile

Description

The Armfield Osborne Reynolds Apparatus can be bench or floor mounted and is designed for the vertical flow of a liquid through a precision bore glass tube. The use of a vertical direction for the flow compensates for the effect of any small deviations of the density of dye relative to that of the working fluid.

The operating fluid may be supplied from any small bore supply point by means of the flexible hose provided. Fluid enters a cylindrical constant head tank through a ring diffuser and then through a stilling bed to eliminate any gross variations of fluid velocity in the head tank.

This tank therefore provides uniform, low velocity head conditions upstream of the entry to the vertically mounted pipe test section. Fluid enters this section through a profiled bellmouth, designed to uniformly accelerate the fluid without any spurious inertial effects.

The cylindrical pipe test section is mounted inside a fabricated shroud that provides an uninterrupted background for observations of the dye trace behaviour. Dye solution is admitted to the test section through a fine diameter stainless steel tube and the rate of flow of dye is controlled by a needle valve on the outlet of the dye reservoir. The dye injection system can be readily removed for cleaning and maintenance.

The flow rate of the working fluid through the test section is regulated by a globe valve located in the base of the apparatus. The rate may be measured either volumetrically or by weighing (equipment for this purpose is not supplied). The apparatus is compatible with any means chosen to alter the kinematic viscosity of the fluid, either by using different fluids or by altering the temperature of a given fluid (the external circuit for this is not supplied).

The whole apparatus is mounted on a substantial fabricated steel support and a means is provided for levelling the apparatus to ensure the test section is vertical. The stilling bed, all necessary connecting hoses, an initial supply of dye and an instruction manual are supplied with the apparatus.

Overall dimensions	
Height	1.48m
Diameter	0.61m
Packed and crated shipping specifications	
Volume	1.2m^3
Gross weight	130kg
Ordering Code	
F5	

Ordering specification

- Floor standing apparatus to produce classic Osborne Reynolds experiments
- Fluid enters a vertically mounted test section through a carefully profiled bellmouth from a constant head tank
- An easily cleaned dye injection system is incorporated
- Fluid flow is controlled by a needle point globe valve
- Supply includes stilling bed, hoses and dye

Requirements	Scale
COLD	

Water Supply: Up to 0.5 l/sec maximum

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Issue: 2
URL: http://www.armfield.co.uk/f5
Applications: ChE ME CE IP