

Product Name :
Free and Forced Vortex Apparatus

Product Code :
NLAB-MECHANICALAB230016



Description :

Free and Forced Vortex Apparatus

Technical Specification :

The Free and Forced Vortex Apparatus for the study of the shape of 'free and forced vortices' consists of a cylindrical, transparent vessel, having two pairs of diametrically opposed inlet tubes of 9.0 mm and 12.5 mm diameter. The 12.5 mm diameter inlet tubes which are angled at 15° to the diameter, so that a swirling motion is imparted to the liquid entering the vessel, are used as entry tubes for the free vortex experiment.

A smooth outlet is centrally positioned in the base of the vessel and a set of push-in orifices of 24, 16, 12 and 8 mm diameter is supplied to reduce the outlet diameter to a suitable value. A gauge determines the profile of the vortex formed at the top of the vessel, housed on a diametrically mounted bridge piece, which measures the diameter of the vortex at various depths. This gives the co-ordinate points required to plot the vortex profile.

The forced vortex is created in the vessel described above by using as the inlet the 9 mm bore tubes which are angled at 60° to the diameter. The input water from these tubes impinges on a simple two-blade paddle, which acts as a stirrer/flow straightener. The water 'leaves' the vessel via the 12.5 mm diameter angled tubes, which are used as the 'entry' tubes for the free vortex experiment.

Free and Forced Vortex

FEATURES:

Experiment to plot the shape of a free vortex by measurement of the surface profile co-ordinates, and thus verify that $v r = \text{constant}$ where v is the speed and r is the radius of the vortex

Experiment to plot the surface profiles of various forced vortices formed under different speed conditions

Verification of the formula $h = (w^2 r^2) / 2g$ for forced vortices where h is the height of the surface of the water above the datum point; w is the vortex angular velocity and r is the vortex radius.

SPECIFICATIONS:

Cylindrical, transparent vessel 250 mm diameter & 180 mm depth,

Inlet tubes of 9.0 mm and 12.5 mm diameter.

Set of push-in orifices of 24, 16, 12 and 8 mm diameter

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