



P3232
BOUNDARY LAYER
EXPERIMENT

FEATURES

- ◆ Reversible flat plate with blunt and sharp leading edges and smooth and roughened surface
- ◆ Miniature pitot tube on vernier mounting

PRINCIPLE EXPERIMENTS

- ◆ To determine the velocity profile of the boundary layer at specified distances from the 'blunt' leading edge of a 'smooth' test plate (turbulent flow conditions)
- ◆ To determine the velocity profile of the boundary layer at different distances from the 'sharp' leading edge of a 'smooth' test plate (laminar flow conditions).
- ◆ Boundary layer growth on smooth and rough surfaces

DESCRIPTION

When a fluid flows adjacent to a stationary surface, e. g. down a tube, the fluid immediately in contact with the stationary surface will have zero velocity. As a result there will be a comparatively steep velocity gradient associated with the adjacent "boundary layer" of the fluid. The resulting shear forces in this area will be significant and lead to high values of drag forces between the flowing and stationary surface.

Boundary layer studies involve the determination of the thickness of this layer and the velocity profile within it. These parameters will vary with velocity of the fluid flowing over the surface, the distance from the leading edge of the surface and the degree of roughness of the surface. Cussons Boundary Layer Experiment accommodates these studies.

TENDER SPECIFICATION

Comprising a miniature pitot tube held within a vernier carrier. Four different lateral positions of the tube and carrier are catered for by the P3230 Two Dimensional Wind Tunnel, so the velocity profile within the 'boundary layer' can be found at specific distances from the plate leading edge. The plate is smooth on one surface and roughened on the other so the surface effect on the velocity profiles can be determined. The effect of sharp or blunt leading profiles is catered for. The steel test plate is held between two carrier plates, one is fixed to one side of the tunnel and the other is clamped to the opposite wall. Each carrier plate has a horizontal slot of width equal to the test plate thickness.