Fluid Mechanics

University Mechanical Engineering · Vocabulary in context

Word	Example
fluid mechanics	Use **fluid mechanics** to find forces and losses in moving liquids and gases.
hydrostatics	In **hydrostatics**, pressure grows with depth as $\rho g h$.
pressure prism	The **pressure prism** shows how pressure grows down a submerged wall.
centre of pressure	The resultant force acts at the **centre of pressure**, below the centroid.
viscosity /vɪˈskɒsɪti/	Oil has a higher **viscosity** than water.
kinematic viscosity	Divide viscosity by density to get the **kinematic viscosity**.
control volume	Choose a **control volume** around the turbine.
continuity /kɒntɪˈnjuːɪti/	By **continuity**, a narrower pipe carries the same flow at a higher speed.
Bernoulli	Apply **Bernoulli** only along a streamline in steady, frictionless flow.
streamline	A **streamline** is everywhere tangent to the local velocity.
discharge coefficient	The **discharge coefficient** corrects the ideal meter flow for real losses.

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dimensional analysis /daɪˈmenʃənl əˈnæləsɪs/	**Dimensional analysis** reduces five variables to two groups.
Buckingham Pi theorem	The **Buckingham Pi theorem** counts the dimensionless groups a problem needs.
Reynolds number /ˈrenəldz ˈnʌmbə/	A high **Reynolds number** means inertia dominates viscous forces.
dynamic similarity	A model test needs **dynamic similarity**, not only the same shape.
head loss	Friction in the pipe causes a **head loss** the pump must supply.
major loss	The **major loss** grows with pipe length and the square of speed.
minor loss	Each elbow and valve adds a **minor loss** of K times the velocity head.
friction factor	Read the **friction factor** from the Moody chart or the Colebrook equation.
boundary layer	The **boundary layer** grows thicker downstream of the leading edge.
skin friction	**Skin friction** is the shear drag on the wetted surface.
pressure drag	Blunt bodies have large **pressure drag** behind them.
flow separation	**Flow separation** leaves a low-pressure wake behind a cylinder.
specific gravity	Oil with a **specific gravity** of 0.9 is 90% as dense as water.