

Fluid Mechanics 3(2-1)

Theory

Properties of fluids: density, viscosity, surface tension, specific gravity, specific weight, compressibility, fluid energy. Fluid pressure: definition, units, measuring devices, vacuum. Fluid static: derivations and problems. Fluid dynamics: mass and energy balance, steady flow head, Bernoulli's equation, Reynolds number and their practical applications. Energy losses in fluid flow. Newtonian and non-newtonian liquids: flow measurements and characteristics, examples in food. Venturi effect. Pumps: types, working principles, total dynamic head, hydraulic and energy gradelines, power consideration. Darcy-Weisbach equation: loss of head, types of impellers, solutions of flow problems. Diagnostic analysis and remedies. Handling systems.

Practical

Verification of Bernoulli's Theorem. Measurement of flow through venturimeter, orifice meter. Pipe flow and head loss relationship. Pipe head loss and pipe diameter relationship. Characteristic curves for pumps in parallel and series

Books Recommended

1. Hui, Y.H. 2006. Handbook of food science, technology and engineering, Vol-1. CRC Press, Taylor & Francis Group, Boca Raton, Florida, USA.
2. McCabe, W.L., Smith, J.C. and Harriott, P. 2005. Unit operations of chemical engineering. McGraw Hill Inc., New York, USA.
3. Franzini, J.B. and Finnemore, E.J. 2001. Fluid mechanics with engineering applications. McGraw Hill Inc., New York, USA.
4. Streeter, V.L. 1988. Fluid mechanics. McGraw Hill Inc., New York, USA.

Website: www.foodscienceuniverse.com