

Fluid Mechanics Fundamentals (Instructor-Led Training)

Course Description

This course presents concepts and theories to help you better comprehend the kinematic and dynamic elements of fluid flow as they relate to flow measurement.

Course Prerequisites

- GTA Web-Based Training
 - Core WBT
 - Flow Measurement Fundamentals
 - Gas Properties 1
- GTA Instructor-Led Training
 - Drawing Sets and Print Reading
 - Basic Measurement

Course Objectives

Upon completion of this course, the student will have received instruction designed to assist him/her in the following:

- Describe differential pressure and why it is the driving force for flow.
- Explain the law of Conservation of Mass.
- Explain the law of Conservation of Momentum.
- Explain the law of Conservation of Energy.
- Explain the Bernoulli Principal in theory and how it applies to gas measurement.
- Explain the physical property of viscosity and how it affects fluid flow.
- Explain and give examples of fluid types.
- Explain and give examples of flow types and components.
- Explain the phenomena of swirl and flow separation.
- Explain the operation of flow conditioners and describe their impact on flow.

Course Outline

1. Fluid Mechanics History and Applications
 - a. Fluid Mechanics Overview
 - b. Influential Figures
 - c. Applications of the Science
 - d. Assumptions
2. Pressure Differential
 - a. The Driving Force
 - b. Fluid Tendencies
 - c. Delta
 - d. Calculating Δp
 - e. Pipeline Transfer
3. The Conservation Laws
 - a. Mass
 - b. Momentum
 - c. Energy
 - d. Conservation
 - i. Conservation of Mass
 - ii. Conservation of Momentum
 - iii. Conservation of Energy
4. The Bernoulli Principle
 - a. Units of Pressure
5. Concepts of Fluid and Flow
 - a. Fluids
 - b. Flow
 - i. Laminar Flow
 - ii. Turbulent Flow
 - c. Reynolds Number
 - d. The Influence of Roughness
 - e. Non-Ideal Velocity Profiles

- f. Swirl
- g. Flow Separation
- h. Flow Conditioners

Recommended Resources

- GTA Fluid Mechanics Fundamentals Participant Guide
- GTA Fluid Mechanics Fundamentals Instructor Presentation.
- Internet sites related to basic fluid mechanics.
- Textbooks or other publications related to fluid mechanics.