MERCURY

Transport of Solids: Hydraulic & Pneumatic Conveying Course

29 March – 2 April 2027
Lisbon (Portugal)



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Ref: 6045_300850 **Date:** 29 March – 2 April 2027 **Location:** Lisbon (Portugal) **Fees:** 6200 Euro

Introduction

Transport of solids in the form of hydraulic and pneumatic conveying has progressed enormously since its beginning over a century ago. Industries concerned with the processing of particulate solids, such as those involved in catalysts, polymer particles, china clay, pigments, paints, and foodstuffs handling, have employed hydraulic or pneumatic transport of solids in almost all plants.

In the chemical industry alone, the value of the product formed as particles is greater than 30% of the whole. The handling of particles is pivotal, yet often executed inefficiently from an engineering viewpoint. Enhancements in this arena could lead to substantial savings across various industries.

Owing to the complex nature of the interaction between solid particles and the conveying medium, the subject of transporting solids in the form of hydraulic and pneumatic systems is challenging and diverse. The entire system, which includes considerations for pneumatic conveying engineering and hydraulic conveying systems, is challenging to design.

The hydraulic and pneumatic conveying systems course is even more critical to ensure that systems, whether they are positive pressure pneumatic conveying systems or portable pneumatic conveying systems, are operated and maintained correctly. To decide whether hydraulic or pneumatic transport is the optimal solution, one must consider the costs related to the preparation, pumping or compressing, pipeline transport, and post-processing of solids.

This hydraulic and pneumatic conveying systems course is convenient. It provides information on materials, equipment, design, operation, maintenance, and troubleshooting for conveying systems.

Targeted Groups

- Maintenance Engineers.
- Process and Mechanical Technicians.
- Design Engineers.
- Supervisors and Operators.
- Mechanical Engineers.

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Course Objectives

Upon the end of this hydraulic and pneumatic conveying systems course, participants will be able to:

- Gain familiarity with different systems for hydraulic transport and pneumatic conveying—their advantages and disadvantages—as well as the fundamentals of pneumatic conveying definition.
- Understand the methods of hydraulic and mechanical design of systems for the transport of solids according to existing world standards and codes, including those specific to pneumatic conveying systems.
- Make optimal selection and sizing of elements, such as pneumatic conveying equipment, for a given industrial application.
- Predict the efficiency of transport systems and comprehend the ways to enhance the reliability of operations in the hydraulic and pneumatic course.
- Be aware of preferred maintenance and protection strategies to deal with problems in operation, such as corrosion, erosion, abrasion, and wear.

Targeted Competencies

At the end of this hydraulic and pneumatic conveying systems course, the target competencies will be able to:

- Understand knowledge of the principles of selecting the most appropriate means of solid transport for a given application, including the comparison between pneumatic conveying and hydraulic conveying.
- Learn about guidance for optimum performance and trouble-free operation of systems, such as pneumatic conveying of solids and hydraulic systems.
- Understand practical, real-life examples of how to calculate slurry pipeline or pneumatic piping system designs.
- Understand the interplay of various influencing design parameters in systems like a positive pressure pneumatic conveying system or a hydraulic conveying system.
- Economic issues: cost and benefit analysis pertaining to pneumatic conveying engineering.

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Course Content

Unit 1: Main Characteristics of Systems for Transport of Solids

- What is a summary of hydraulic transport of solids: main features, elements, and components, including pneumatic conveying definitions?
- Basics of flow of liquids and solids in pipes: velocity and pressure drop in the conveyance of mixtures.
- Understand the classification and types of pneumatic conveying systems and flow characteristics of standard slurries.
- Overview of main elements of slurry and solid particle preparation equipment.
- Learn additional essential components of hydraulic transport systems.

Unit 2: Pipeline Design Considerations

- Select pipes, material, and diameter based on maximum fluid velocity for systems like pneumatic conveying systems.
- Learn about the comprehensive calculation of pressure losses in the pipeline.
- Select and sizing of pumps for a hydraulic conveying system operation.
- Strategies for handling challenging slurries.
- After-treatment methods for transported material.

Unit 3: Practical Aspects of System Safe Operation

- System design environmental considerations.
- Learn about guidelines for adequate pipeline installation and maintenance.
- Learn about hydraulic system inspection, control, and performance testing.
- Understand what the problems are with the system starting and stopping.
- Methods of pipeline vibration reduction.
- Learn about economic analysis: Capital costs and operating costs.

Unit 4: Characteristics of Different Types of Pneumatic Conveying Systems

- Learn about the exploration of systems for the pneumatic conveying of solids, including the use of portable pneumatic conveying systems.
- Understand the fundamentals of gas flow in pipes and pneumatic conveying system designs.
- Learn about information on sizing blowers and designing piping connections.
- Review the main aspects of material preparation equipment.
- Select pipe materials and design piping systems for optimal pneumatic conveying.

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Unit 5: Survey of Equipment and Methods for After Treatment of Transported Material

- Understand the separate process of material from gas post-transport.
- Inspection and check-up procedures following installation.
- Learn about detailed insights on receiving and unloading material and the start-up of operation in pneumatic conveying.
- Address operational problems and troubleshooting within pneumatic conveying systems.
- Control and monitoring practices for pneumatic conveying.
- Emphasis on optimizing and upgrading existing systems, including changes to the material conveyed.