



Piping System Fundamentals

2012 Class Registration

The Piping System Fundamentals courses focus on the skills needed to fully understand fluid piping systems and successfully troubleshoot changes or additions to any piping system situation. Our emphasis is on understanding the relationship between the components that make up a piping system and what happens when changes are made to the piping system.

Each attendee is given a course handbook, the *Piping System Fundamentals* book, and a copy of the Crane Technical Paper No. 410 (TP410) in order to maximize the value of your learning experience.

TRAINING OUTLINE

The course length is two days. Class starts at 8:00 AM each day and ends at 5:00 PM with a break for lunch. Example problems are provided so bring a calculator if you want to test out your new skills.

DAY 1 – BASIC TRAINING

INTRODUCTION

- The Value of a Clear Picture
- Minimizing Capital Costs
- Minimizing Operational Costs
- Minimizing Maintenance Costs

PIPING BASICS

- Definitions
- Pipe Details
- Pressure Calculations
- Bernoulli Equations
- Pipeline Headloss Calculations

PIPELINES

- Pipe Material Variations
- Valves & Fittings
- Fluid Properties
- Connecting Pipelines
- Piping System Networks

PUMPS

- Overview
- How Centrifugal Pumps Operate
- Pump Types
- Understanding the Pump Curve
- Net Positive Suction Head
- Pump Affinity Laws
- Pump Power & Cost of Operation
- Operating Pumps Properly

DAY 2 – SYSTEM EXAMPLES

CONTROL VALVES

- Overview
- How Control Valves Operate
- Control Valve Description
- Selecting Control Valves
- Off Normal Control Valve Operation

FLOW METERS

- Types of Flow Meters
- Sizing Flow Meters
- Off Normal Flow Meter Operation

COMPONENTS

- Heat Exchangers
- Filters & Strainers

SYSTEM OPERATION

- Single Pipeline Controlled Flow
- Pipeline Between Two Pressure Sources
- Pipelines & Pumps
- Controlling Flow Rate with a Control Valve
- Controlling Flow Rate with a Pump
- Controlling Flow Rate with a VSD
- Balancing a System with Multiple Destinations
- Balancing a System with Multiple Loads
- Problems with Cavitating Pumps
- Problems with Cavitating Control Valves

CONCLUSION

- Review of First Day Examples
- Value of a Clear Understanding

Class Registration

To register: Fax (360) 412-0672, call (888) 206-2779, or email register@flowoffluids.com This registration form does not guarantee that a seat is held for the registrant(s). Call to confirm seating availability.

Course fee: The early registration fee of \$895 includes the two-day seminar, course workbook and Crane's TP410. The registration fee on the day of the class is \$995.

Cancellation Policy: If notification is received at least two weeks prior to the start of the course, credit may be granted to a later seminar date. No refunds are available for cancellations made less than 30 days prior to the start of the scheduled course. If for any reason we are required to cancel a class, our liability is limited to the return of the registration fee.

Guarantee: Engineered Software offers the highest quality training available. If you are dissatisfied for any reason, notify the instructor prior to the end of the first day and you may withdraw and receive a 100% tuition refund.

Class size: Limited to 40.

Continuing Education Unit (CEU): Completion of the Piping System Fundamentals Training is credited as 1.5 CEU's.

Courses are offered on the following 2012 schedule:

Houston, TX - Feb 28-29, 2012

Portland, OR - Mar 14-15, 2012

Denver, CO - Mar 28-29, 2012

Birmingham, AL - Apr 18-19, 2012

Chicago, IL - Apr 24-25, 2012

Method of Payment (Check one):

Visa MC Amex Purchase Order* Check (Payable to Engineered Software)

Card Number: _____

Exp. Date: _____

Security Code: _____

Name On Card: _____

Signature: _____

Attendee Information **

Requested Class Date (circle one):

Houston, TX - Feb 28-29, 2012

Portland, OR - Mar 14-15, 2012

Denver, CO - Mar 28-29, 2012

Birmingham, AL - Apr 18-19, 2012

Chicago, IL - Apr 24-25, 2012

*In order to notify you of class changes or cancellations, contact information **MUST** be completely filled out.*

Name: _____

Email: _____

Company: _____

Title: _____

Address: _____

City: _____

State: _____

Zip: _____

Phone: _____

Fax: _____

Please select the version of the **CRANE TP410** you would prefer US Edition Metric Edition

Please select the version of **Piping System Fundamentals** you would prefer US Edition Metric Edition

Please **Mail** this form to:

Engineered Software, Inc.
c/o Fluid Fundamentals Training
4529 Intelco Loop SE
Lacey, WA 98503-5941

For your convenience you may also:

Fax to: (360) 412-0672
E-mail to: register@flowoffluids.com
Phone Registration is available from
7am to 3:30pm PDT: (888) 206-2779

* Invoice to be paid prior to beginning of class.

** For additional attendees, a second sheet has been provided. If you need more spaces to register additional people please make a copy of the following attendee registration sheet and use it to include all attendee registrations and return with the Payment Method form.

Additional Attendee(s) Form

Attendee Information

Name: _____ Email: _____

Company: _____ Title: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Plases select the version of the **CRANE TP410** you would prefer US Edition Metric Edition

Plases select the version of **Piping System Fundamentals** you would prefer US Edition Metric Edition

Attendee Information

Name: _____ Email: _____

Company: _____ Title: _____

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