



Piping System Fundamentals

Spring 2010 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 & Terminology
- Pipe Properties
- Pressure & Head Relationship
- Bernoulli Equation
- Darcy Head Loss Calculation

PIPELINES

- Pipeline Head Loss
- Effect of Fluid Properties on Head Loss
- Pipe Material Impact on Head Loss
- Resistance of Valves & Fittings
- Operating Cost of Head Loss

PUMPS

- Major Pump Parts
- Centrifugal Pump Operation
- Understanding the Pump Curve
- Net Positive Suction Head & Cavitation
- Pump Affinity Laws
- Pump Power & Cost of Operation
- Parallel & Series Pump Operation
- Operating Pumps Properly

DAY 2 – SYSTEM EXAMPLES

CONTROL VALVES

- Types of Control Valves
- Control Valve Operation
- Characteristic Curves
- Control Valve Applications
- Selecting Control Valves
- Control Valve Equations

FLOW METERS

- Types of Flow Meters
- Flow Meters Application
- Flow Meter Accuracy

COMPONENTS

- Heat Exchangers
- Filters & Strainers
- Tanks and Vessels

SYSTEM OPERATION

- Pipelines in Series
- Calculating Flow Between Two Pressure Sources
- Open & Branched Systems
- Parallel Path Piping Networks
- Network Analysis
- Fixed Speed Pump Operating Costs
- Variable Speed Pump Operating Costs
- Multiple Pump Operating Costs
- System Modification & Optimization

CONCLUSION

- Optimization to Reduce Capital, Operating, & Maintenance Costs

Class Registration

To register: Fax (360) 412-0672, call (800) 786-8545, or email register@fluidfundamentals.com

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 Spring 2010 schedule:

Kansas City, MO • Mar 24-25

Halifax, NS • May 25-26

Phoenix, AZ • Jun 2-3

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:

Kansas City, MO - Mar 24-25

Halifax, NS - May 25-26

Phoenix, AZ - Jun 2-3

*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@fluidfundamentals.com
Phone Registration is available from
7am to 3:30pm PDT: (800) 786-8545

* 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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City: _____ State: _____ Zip: _____

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