



Piping System Assessment & Optimization

2010 Class Registration

TRAINING OUTLINE

The course length is three 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.

Introduction

Energy flow in piping systems
Why optimize a piping system?
Energy losses in a piping system
Industry and government resources
Developing an optimization method
DOE case studies of successful optimization

Energy Assessments

ASME Energy Assessment for Pumping Systems standard
Assessment levels
How to organize a plant assessment
Prescreening your systems
System walk-through
Data collection
Analyzing plant data
Solutions to excessive energy use
Reporting and documenting

Motors and Drives

Motors as an energy conversion device
Energy loss in a motor
Motor efficiency standards
Motor power equations
Motor and drive calculation worksheet
Variable speed drives
VFD efficiency

Centrifugal Pumps

Theory of operation
NPSH and cavitation
Pump performance curve
Pump power equations
Energy loss in a pump and pump efficiency
Calculating pump operating cost
Pump affinity rules
Options for optimizing pump operation
Cross-validating pump and motor data
Pump calculation worksheet

Energy Losses in Pipelines

Forms of hydraulic energy and energy loss
Bernoulli Equation
Converting pressure to head
Calculating fluid velocity
Head loss calculations for pipes, valves, and fittings
Cost of head loss
Options for reducing head loss
Pipeline calculation worksheet

Control Valves

Types of control valves
Energy profile through a valve
Flow coefficient equation
Control valve characteristics
Calculating the cost of throttling
Control valve calculation worksheet

The Piping System

Types of piping systems
Hydraulic performance of piping system devices
Component calculation worksheet
Use and limitations of the system resistance curve
System static and dynamic head
Understanding system process requirements
Effect of over-sizing equipment in a system
Methods of controlling a system
Cost comparison of control methods

Solutions for Excessive Energy Use

Reducing system static and dynamic head
Reducing system flow rates
Reducing system run times
Modifying system equipment and configuration
Replacing inefficient equipment

Developing an Assessment & Optimization Method

Prioritizing systems by prescreening
Conducting a system walk through
Data collection and analysis
Identifying inefficient operation
Developing options for system optimization
Economically justifying optimization projects
Implementing system optimization
Monitoring and reporting results

Case Studies

Reviewing the system description
Understanding the design case
Detailed equipment descriptions
Maintenance and operational histories
Load profiles
Current operating conditions
Analyzing system operation
Operating cost calculation
Identifying options for optimization
Evaluating options for economic feasibility.



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2010 Class Registration

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 registration fee of \$1295 includes the three-day seminar, course workbook and copy of the ASME standard EA-2-2009, Energy Assessment for Pumping Systems.

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 Assessment & Optimization Training is credited as 2.4 CEU's (24 Professional Development Hours).

Courses are offered on the following 2010 schedule:

Boston, MA - September 21-23, 2010

Chicago, IL – October 12-14

Houston, TX – November 9-11

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:

Boston, MA - September 21-23, 2010

Chicago, IL – October 12-14

Houston, TX – November 9-11

*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 **Mail** this form to:

Engineered Software, Inc. c/o Flow of Fluids
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: _____

Attendee Information

Name: _____ Email: _____
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