

PASS TRAINING BROCHURE

## Process Analyzer Sampling System Training

Learn how to design and build an optimized process analyzer sampling system with hands-on training course from Swagelok



## Expand Your Knowledge With Training by Industry Experts

Swagelok® training programs provide a range of valuable and practical tools for meeting day-to-day challenges related to fluid system and sampling system design, operation, and maintenance. In-depth, hands-on courses taught by experienced instructors to help both new team members and industry veterans. Whether you need to build a foundational understanding of fluid and sampling systems or you want to stay up to date on the latest technologies and best practices, Swagelok offers a robust training.

### Sampling System Training Courses

We are committed to helping you work safer and smarter, providing hands-on training on sampling system design, operate and maintenance for your new and experienced team member and contractor.

Our sampling specialists can also help equip your team with the knowledge to prevent, diagnose, and eliminate costly issues with Swagelok® sampling system training based on the teaching of industry expert, Tony Waters.

### SSM Training - Sample System Problem Solving and Maintenance Training – 2 business days @ 8 hours/day

Learn how to troubleshoot common and complex of sampling system issues from the process line through sample disposal.

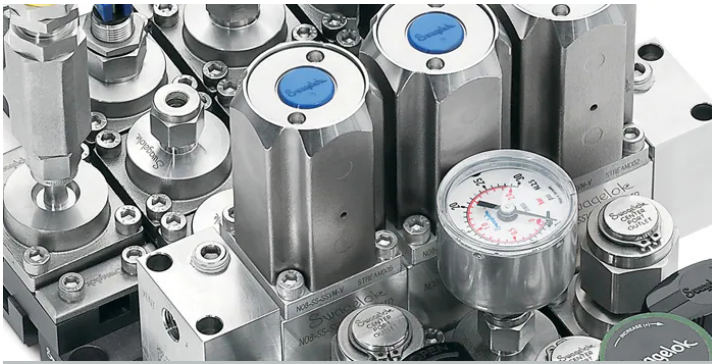
### PASS Basic Training - Process Analyzer Sampling System Training – 5 business days @ 8 hours/day

Learn sampling system fundamentals and improve process accuracy. Design and build an optimized process analyzer sampling system that delivers timely and accurate results.



### PASS Subsystem Training - Process Analyzer Sampling System Training – 5 business days @ 8 hours/day

Once you have understood the basics of a process analyzer sampling system, consider signing up for Swagelok's PASS Subsystem Training. Trainees will learn how to design five common sampling subsystems and will even have the chance to troubleshoot problem design in the field.



# Process Analyzer Sampling System

Gain a high-level understand of sampling system while **designing** and building an **optimized system** that delivers **timely, accurate result**.

## Process Analyzer Sampling System (PASS) – a comprehensive, technical 5-day in-person training

If you design, construct, operate or maintain a sampling systems, you know how important quality data is. Inaccuracy usually results from problems within the sampling system, not the analyzer.

System's differences can post its own challenge in design, operation and maintenance. With our hands-on training and workshop, we help you make better sense of the variables which affect sampling system. You can learn to diagnose and eliminate common sampling system design flaws that result in erroneous data by using engineering principles, formulas, and calculations rather than relying on guess work.

And you don't have to do it alone. You'll design a system in class and apply what you've learned to your own process analyzer sampling system. Swagelok training teaches you in days what it could take years to learn on your own.

### Objectives

PASS training teaches attendees to identify and remedy critical issues with sampling systems, such as poor system design and layout, time delay, and sample transport problems.

- Learn how to prevent costly sampling system errors through sound design principles.
- Design and build an optimized process analyzer sampling system that delivers timely, accurate results.

### What You Will Learn:

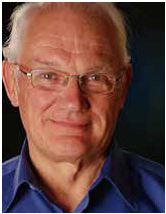
- Introduction and set team goal**
- Basic performance criteria and challenges**
  - Sample compatibility with analyzer
- Diagnosing and fixing time delay problems**
  - Sample transport time calculations for liquids and gases
  - Gas compressibility and time delay
  - Estimating Time delay in sampling
- Velocity in Sample Lines**
  - How to determine fluid velocity in line segments
  - Laminar and turbulent flow (Reynolds Number)
- Pressure Drop– Effect of temperature and pressure**
  - Calculating the pressure drop in each line segment
- Process Tap & Probe**
  - Understand process conditions, analyzer characteristics, and sample requirements
  - Location and design of process nozzle
  - Probe selection and design
- Phase Change: Vaporization**
  - How to condense or vaporize a sample (or avoid it)
  - How to use phase diagrams
  - Design of field stations and fast loops
- Phase Change: Condensation**
  - How to condense or vaporize a sample (or avoid it)
  - How to use phase diagrams
  - Design of field stations and fast loops
- Sample Conditioning Techniques: Particle Filters**
  - Proper use of filters and coalescers
  - Liquid, vapor, and gas separation devices
  - The difference between vapor and liquid concentration
- Sample Conditioning Techniques: Coalescers&Separators**
  - Proper use of filters and coalescers
  - Liquid, vapor, and gas separation devices
  - The difference between vapor and liquid concentration
- Flow Control and Stream Selection**
  - I. Techniques of Stream Switching**
    - Avoiding dead-legs and mixing volumes
    - Modular sample conditioning systems
    - Design and build a modular sampling system
  - II. Group Presentations**

\*please noted that agenda may be changed base on attendee



## Your Instructors:

Course instructors are experts at designing, installing and maintaining sampling systems and included:



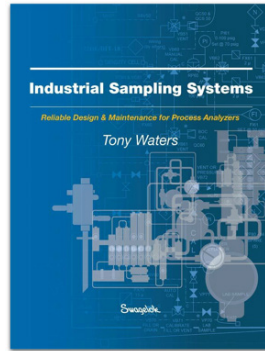
### Tony Waters, Industry Expert and Consultant:

Tony Waters brings over 50 years of experience with process analyzers and sampling systems to his numerous training programs, which have been presented in many countries. He has also founded three

companies and has worked in engineering and marketing roles for an analyzer manufacturer, end-user and a systems integrator. Mr. Waters holds a bachelor's degree in systems engineering from The Open University, Milton Keynes, United Kingdom. He is an ISA Analysis Division Fellow.

Certified Swagelok Field Engineers, Subject Matter Experts in Instrument and Process Analyzer Team are included:

Swagelok field engineers located across the globe are certified to teach our sampling system training courses in languages including English, Spanish, Mandarin Chinese, Cantonese, and Bahasa Malaysian. These field engineers tap into their experience working with customers on sampling system-related matters to inform their teaching of Swagelok PASS and SSM courses.



## Industrial Sampling Systems –

This book is used as the main textbook for Swagelok's Process Analyzer Sampling System training courses. Combining a balance of theory with practical examples, it is standard reference material for experienced engineers and technicians in the industry and for training new analyzer professionals.

All attendees will receive the book as part of registration and participation.

## Needed more information:

### Interesting to join Process Analyzer Sampling System Training Class, filled-in the registration from here!

For further information about the course, live chat with us via [Line \(@Swagelokthailand\)](#) or send an email to [swagelokthailand@mjbangkok.com](mailto:swagelokthailand@mjbangkok.com).



## Related Services – Field Engineering Services

Partnering with our **Field Engineering Team for On-site Evaluation and Advisory Services**, working alongside in customer facilities to understand process and environmental conditions, diagnose problems, recommend solutions and more. This direct assistance leads to more efficient and safer systems.

### Sampling System (Ai Survey)

Improve sample system reliability with our expert, in-depth analysis of every component and subsystem, from tap to analyzer. Increase productivity, reduce operating expenses and maintenance costs and identify unseen opportunities for overall system improvement by:

- Reducing time delay
- Improving compatibility with your analyzer
- Obtaining more representative samples



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