



Technical Training Services

Delivered Locally by Swagelok Pittsburgh | Tri-State Area



- *Fitting Installation Essentials*
- *Fitting Inspection Essentials*
- *Tube Bending Essentials*
- *Installation & Bending Essentials*
- *Hose Essentials*
- *Valve Essentials*
- *Advanced Tube Bending*

Swagelok®

Swagelok Technical Training courses, offered locally at our Training Center in Pittsburgh OR at your facility/jobsite by **Swagelok Pittsburgh | Tri-State Area**, deliver **unmatched content depth** to ensure that your technicians learn how to install and maintain fluid systems safely, properly, and efficiently.

We provide **unparalleled variety of class titles** — and all can be **customized** to enable you to exceed your learning objectives. Our specially equipped Training van gives us **the mobility to bring our instruction to you**, saving you considerable time and money. We have **ample availability to satisfy virtually any timeframe** that's most convenient for you: mornings, afternoons, evenings, over shifts, even weekends.

All graduates receive **valuable take-home materials**, plus a genuine **Swagelok Certificate of Completion** and Continuing Education credits for each class undertaken. And all of our classes are backed by a full **money-back guarantee** should we fail to teach your workers how to better perform their duties.

You will not make a better investment to substantially boost the safety, productivity, and efficiency of your workforce and overall operations.



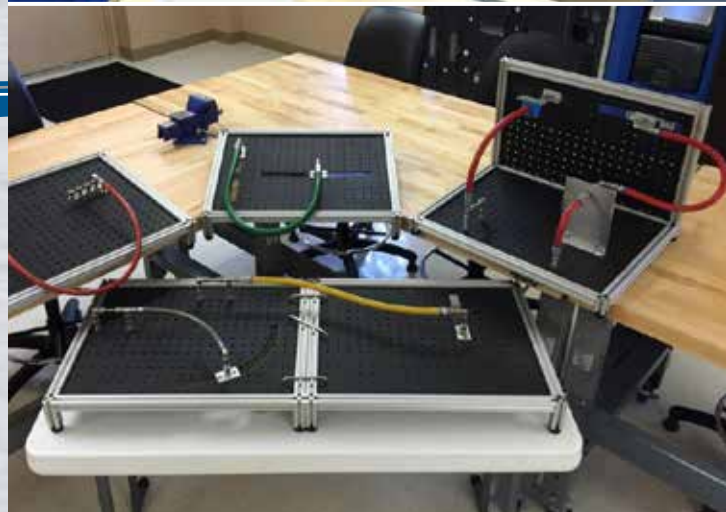
Tube Bending Essentials

Learn:

- the basic theory/practice/concepts of tube bending
- the measure-mark-bend method of tube bending
- how to use the Swagelok hand tube bender
- the tube bending concepts necessary to complete quality 45°, 90°, 180°, and offset bends

Course Content:

- Tube Preparation
- Hand Tube Bender Components
- Hand Tube Bender Operating Instructions
- Long Handle
- Loading the Bender
- Positioning the Tube for Changes in Direction
- Making Bends 90° or Less
- Springback
- Making Bends Greater than 90°
- Reverse Bends
- Bend Terminology
- Tube Bending Variables
- Marks Used in Bend Layout
- Bend Layout Using the Measure-Bend Method
- Bending Exercises
- Tube Bending Defects
- Understanding the Relationship Between 45° and 90° Angles
- Offsets
- Minimum Leg Lengths Between Common Bends — Hand Tube Bender



Hose Essentials

Learn:

- common hose terminology
- how to evaluate hose fit for purpose
- hose selection variables
- hose installation guidelines
- the common issues involved in hose applications

Course Content:

- Why Use Hose
- When Not to Use Hose
- Hose Life
- Hose Assembly Components
- Covers/Tags
- End Connections
- STAMPED: Size/Temperature/Pressure
- STAMPED: End Connections and Accessories
- STAMPED: Delivery
- Hose Inspection (Survey and Frequency)
- STAMPED: Applications
- Hose Length Considerations
- Hose Cleaning
- Hose Storage



Tube Fitting Installation Essentials

Learn:

- to properly select, handle, prepare, cut, and debur tubing
- to identify thread types
- to correctly and safely assemble a Swagelok tube fitting
- the proper way to prepare threaded installations
- how to gauge a tube fitting assembly
- to virtually eliminate leakage
- why intermixing/interchanging hardware from different manufacturers is NEVER a recommended practice

Course Content:

- Tubing Systems
- Tube Preparation
- Installing the Swagelok Tube Fitting
- Leakage
- Tube Fitting History
- Ferrule-Type Tube Fitting Design Characteristics
- The Swagelok Advantage
- Interchange and Intermix
- Tapered Threads
- Parallel Threads
- Adapter Fittings with Parallel Threads
- Tube Adapter Connections
- Machined Ferrule Connections
- Port Connectors
- Other Products to Make the Job Easier

Tube Fitting Inspection Essentials

Learn:

- to spot common connection errors that result in leakage
- to identify mixed-material tube fittings
- to validate correct pipe thread usage and assembly
- proper tube system design practices
- tube selection variables
- to properly and safely install Swagelok tube fittings
- common tube-bending defects

Course Content:

- Most Common Errors Leading to Tube Fitting Leakage
- Keys to Inspection
- Tubing Selection and Specification
- Tube Marking
- Other Tube Inspection Variables
- Tube System Design
- Tube Handling
- Tube Supports
- Tube Bending Defects
- Interchange and Intermix
- Product Marking
- Manual Tube Fitting Installation up to 1 inch or 25 mm
- Detailed Inspection
- Tube Fitting Inspection without Disassembly
- Tube Fitting Inspection including Disassembly
- Pipe Thread Inspection
- Tapered Thread Installation
- Pipe Thread Inspection without Disassembly
- Practical Examination



Advanced Tube Bending

Learn:

- the three variables that must be considered when bending tube
- the purpose of the straight tube-length mark on the name plate
- how to calculate the tube length used in an offset bend
- about springback — and how it affects the bending process
- last leg minimum length — and how it is used
- how to bend tubing into shape, per a template, using the Swagelok method, data, and Swagelok bender
- the components of a Swagelok tube bender
- the three types of marks used in the Swagelok tube-bending method
- five potential bend defects — and their causes

Course Content:

- Bend Terminology
- Tube Bending Variables
- Marks Used to Bend Tubing
- The Swagelok Method of Tube Bending
- Bend Data
- Swagelok Tube Bender Information
- Hand Tube Bender
- Benchtop Tube Bender
- Electric Tube Bender
- Tube Bending Applications
- Basic Bending Example (Single Bend)
- Understanding the Relationship Between 45° and 90° Angles
- Offsets
- Minimum Leg Lengths
- Custom Offsets
- How to Determine Lengths for Parallel Tubing Runs
- Rolling Offsets
- Locating the Vertex of an Incompletely Dimensioned Drawing
- Segmented Bends
- Tube Bending Defects
- Conversion Charts

Installation & Bending Essentials

Your best Swagelok Training value!
Earn **TWO Swagelok Certificates of Completion** in just **ONE day of training!** Learn all the key tenets of Swagelok Tube Fitting Installation AND Swagelok Tube Bending — **for one low price!**

NOTE: Any TWO of these class titles can be combined into one day of training: Hose Essentials, Fitting Installation Essentials, Fitting Inspection Essentials, and/or Tube Bending Essentials!



Valve Essentials

Call for
complete
details!

Learn:

- how to safely choose, install, and maintain valves
- common fluid system terminology
- key differences in valve types, functions, construction, and operation
- how to interpret a flow curve and pressure/temperature table
- how to select the optimum valve for your particular applications
- how to install, repair, maintain, and troubleshoot valves
- the various levels of leakage and how to improve site efficiency

Course Content:

- Fluid System Safety/Overview
- Piping and Instrumentation Diagrams
- Valve Functions
- Ball Valves
- On/Off Valves
- Flow Control
- Needle Valves
- Directional Flow
- Overpressure Protection
- Excess Flow Protection
- Valve Construction Materials
- Valve Components
- Valve Actuation
- End Connections
- Valve Selection Criteria
- Valve Ratings
- Lock Out/Tag Out
- System Considerations
- Filters
- Valve Repair versus Replacement
- Leakage
- Valve Failure Modes
- Preventative Maintenance



The Swagelok Difference

THE SWAGELOK COMPANY GLOBAL DIFFERENCE:

7 TECHNICAL CENTERS	20 MANUFACTURING SITES	225 SALES & SERVICE LOCATIONS
MORE THAN 200 ACTIVE PATENTS	MORE THAN 40,000,000 TUBE FITTINGS MANUFACTURED EACH YEAR	MORE THAN \$10,000,000 INVESTED ANNUALLY IN RESEARCH AND DEVELOPMENT
MORE THAN 6,800 LINE ITEMS SHIPPED DAILY — WITH 99% SHIPPING AND INVENTORY ACCURACY	SWAGELOK TUBE FITTINGS ARE VIRTUALLY LEAK-FREE	MORE THAN 50 APPLICATION AND FIELD ENGINEERS

THE SWAGELOK PITTSBURGH | TRI-STATE AREA LOCAL DIFFERENCE:

1,200 ASSOCIATE TRAINING HOURS PER YEAR	99% SHIPPING ACCURACY	5,000- SQUARE-FOOT FABRICATION CENTER	5 ENGINEERS ON STAFF
3,000 SKUs STOCKED AT ALL TIMES	50+ YEARS OF SUPERIOR SERVICE	STATE-OF-THE-ART TRAINING CENTER	12,000 SHIPMENTS PER YEAR

Trust **Swagelok Pittsburgh | Tri-State Area** for on-time, error-free Swagelok product deliveries, exceptional customer service, unparalleled technical support, and, now, our premier portfolio of

Swagelok Strategic Services:



Comprehensive Technical Training:

- Fitting Installation Essentials
- Fitting Inspection Essentials
- Tube Bending Essentials
- Hose Essentials
- Installation & Bending Essentials
- Valve Essentials
- Advanced Tube Bending

We can bring our instruction to your worksite or facility!

Our Technical Trainer, Mike Gagel, is a 20-year Swagelok Company veteran who authored most of the global Swagelok Training content.



Equipment Rentals:

- Orbital Welders
- Multi-Head Hydraulic Swagers
- Benchtop Tube Benders



Energy Evaluations:

- Gas
- Compressed Air
- Hydraulic Fluid
- Steam

Free Leakage report!



Hose Advisory:

- On-Site Audits of current Hose usage, maintenance, and storage.
- Free comprehensive report — detailing recommended repairs and replacements!



Expert Custom Fabrication:

- Swaging
- Bending
- Kitting
- Coiling
- Orbital Welding
- Simple Assemblies
- Complex Panels
- Design Support

5,000-square-foot Fabrication Shop!



Inventory Management:

- Now available: Swagelok Industrial Vending machines — for complete, automated visibility and accountability around your Swagelok spend.
- We can also perform a routine Vendor-Managed Inventory to ensure that you never run out of critical Swagelok componentry.



We're your one-stop

Swagelok High-Performance Products and Services Resource

for optimal fluid-handling safety, productivity, efficiency, and profitability... no matter how challenging your application or operating conditions!

Our Story and Promise

For more than 50 proud years, we've been your trusted and proven supplier of genuine, premium-quality Swagelok fluid-system Componentry. We now offer a wide array of value-added Strategic Services: **Technical Training** to ensure that your workers properly and safely install and maintain our products; **Industrial Vending** to automate and manage your Swagelok inventory; **Hose and Energy Evaluations** to identify and reduce your overall system inefficiencies; **Fabrication Technologies** to enable your skilled workforce to spend more time on more critical tasks; and **Equipment Rentals** for your special projects and short-term work.

We are 100% dedicated to making you safer, more productive, more efficient, and more profitable!



Swagelok Pittsburgh | Tri-State Area

P: 412.761.9463; X130
or 412.761.3212

M: 412.439.1706

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