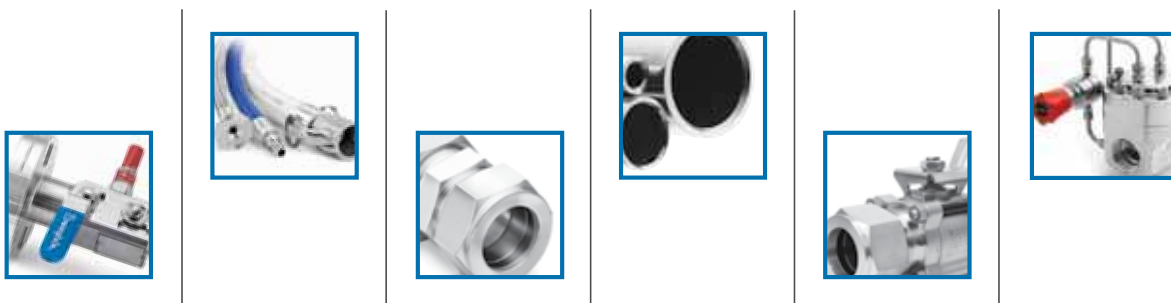
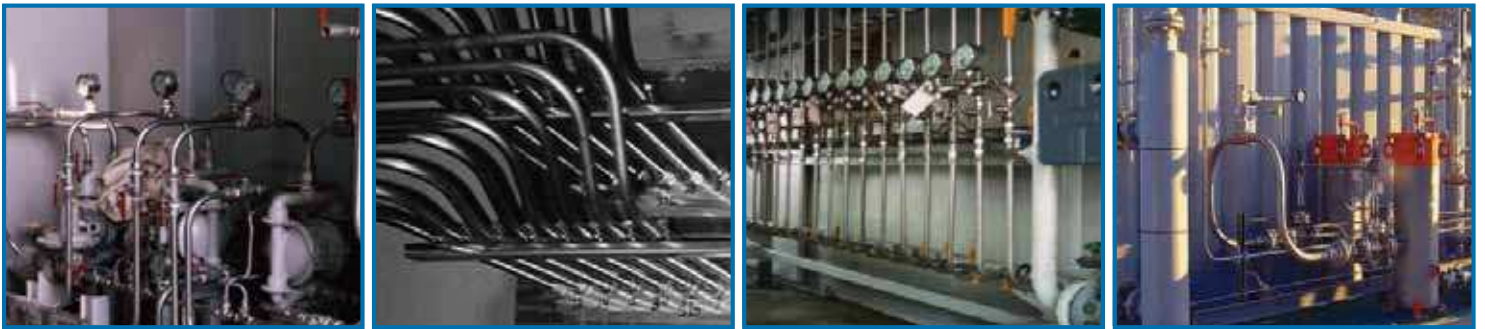


# Small Bore Tubing Solutions

Simpler, Safer, Faster - tubing installations up to 2 inch



## Swagelok® process support solutions

How can a Swagelok small bore tubing solution offer performance benefits along with a lower total installed cost? Your authorized Swagelok sales and service representative has the answer—along with the training, tools, and support needed to make your next small-bore tubing project simpler, safer, faster—and more reliable—than any you have completed before.

### Reduce installation and operating costs.

Consider the requirements for a typical piping project: If it is threaded pipe, there are the pipe stands, dies, cutting oils, sealants, and tapes. Then there is assembly, testing, disassembly, rework, and reassembly.

For a welding job, there is the need to obtain a qualified welder, welding equipment, and consumables. Then depending on the job, there can be the need for weld permits, air tests, firebox, tacking, weld quenching, finish welding, purging, passivation, and inspections.

Either way, planning and managing a fluid system project to be on time and on budget is complicated and time consuming. If you are an engineer, manager, pipe fitter, or contractor who is feeling the squeeze of tight budgets, short staff and increasing workloads. Swagelok has three words for you.

### Simpler

In minutes, anybody in your plant can learn to assemble, and install Swagelok tube fittings correctly the first time. Swagelok small-bore solutions eliminate the oils, sealants, dies, complicated equipment, fire boxes, air tests, and threaded fitting alignment issues. Properly installed Swagelok tube fittings can eliminate leakage. This means rework and clean up are minimized.

### Safer

Swagelok tube fittings will provide vibration-tolerant, leak-tight seals to the working pressure of the tubing. Because small-bore tubing systems use no heat or weld gases and are so simple and fast to install, they are well suited for installation in hazardous areas and confined spaces.

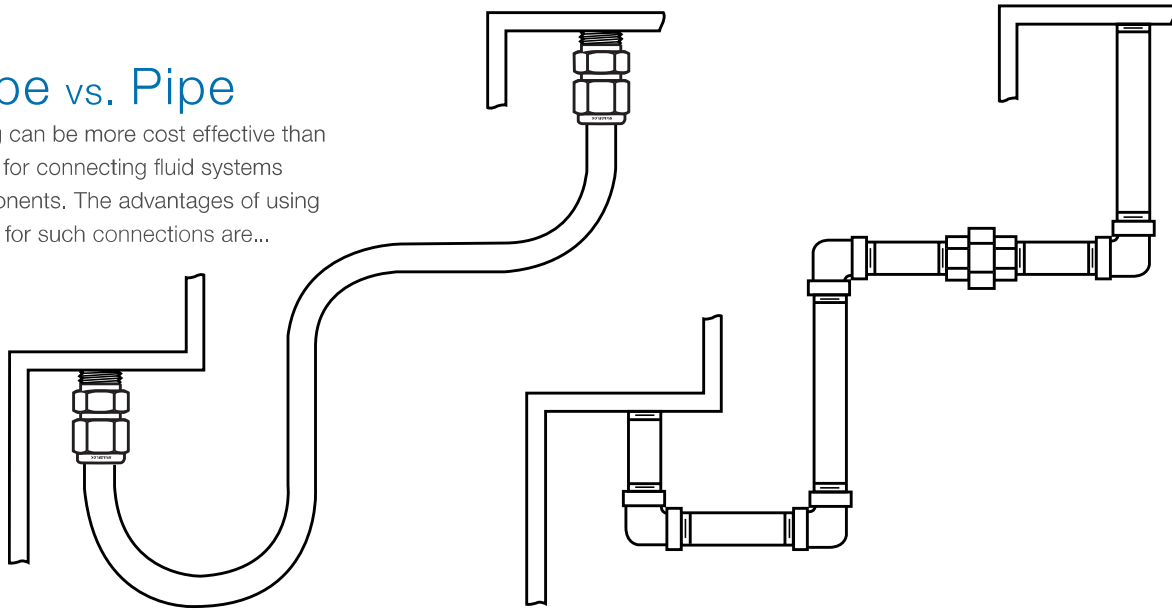
### Faster

Using Swagelok small-bore solutions can dramatically improve productivity. Tube fittings are fast to install. Bending tubing reduces the number of connections in the system. Remakeable Swagelok fittings reduce the time to maintain or modify systems. This means that you can install more system in less time.



## Tube vs. Pipe

Tubing can be more cost effective than piping for connecting fluid systems components. The advantages of using tubing for such connections are...



### Ease of Installation

Only simple tools are needed to install Swagelok tube fittings. No threading, flaring, soldering, or welding is required.

### Lower Pressure Drop

Sharp bends and discontinuities of piping systems are not present in the gradual bends and smooth inside diameter of a tubed system.

### Fewer Connections Needed

Bending reduces the number of necessary connections and potential leak points. Tubing is very adaptable and can be bent around many obstructions.

### Better Strength to Weight Ratio (see below)

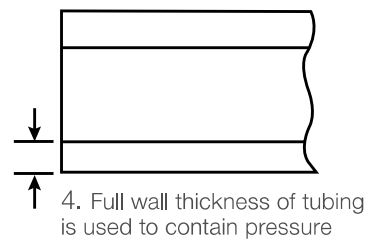
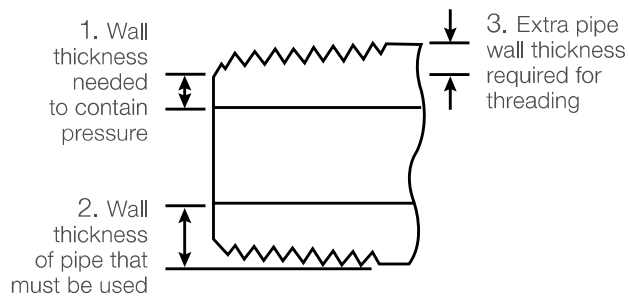
Full wall thickness of tubing is used in containing pressure since no threading is necessary. Threading reduces effective wall thickness in piping. The lighter weight of the tubing provides many benefits. Tubing is less expensive to transport, is easier to assemble, requires less support, and occupies less space.

### Leak Tight

At high pressures, pipe connections often leak! Tubing systems connected with Swagelok tube fittings are leak-tight without using sealing compounds. Compressed air, steam, hydrogen, helium, or hydraulic oil are very expensive services in a plant or refinery. A cheap fitting that leaks can cost more money than a Swagelok tube fitting that provides positive performance.

### Easy Maintenance

Every Swagelok tube fitting acts as a union. When disassembly is necessary, it is simple. This, coupled with leak tightness, means easy maintenance. There is no need to disconnect a series of pipe lengths and fittings to remove a particular component from the system.



## Fluid system components



### Tube Fittings

*Patented Case Hardening Process:*

Excellent gas-tight sealing and tube-gripping action, easily achieved proper installation, consistent remakes, excellent vibration fatigue resistance.



### Process Valves and Manifolds

*Types:* Ball, Needle, Single Block, Single Block and Bleed, Double Block and Bleed, Manifold



### Regulators

*Types:* Diaphragm Sensing, Piston Sensing, Pressure Reducing, Back Pressure, Vaporizing, Ultrahigh-Purity, Modular



### Flange Adapters

*Benefits:* Flange adapter products offer a one piece transition from flanged piping connection to tubing. We offer a variety of flange connections. We keep stock of ANSI/ASME raised flange adapters, and can make to order a variety of flange connections including ring type joints and 4 bolt SAE flanges.



### Measurement Devices

*Gauge Types:* Clean, Dry Air, ECE R110-Approved, Industrial, Process, Panel-Builder, Positionable, Ultrahigh-Purity

*Transducer Types:* Industrial, Explosion-Proof, Intrinsically Safe, Ultrahigh-Purity



### Tubing, Tools, Accessories

*Types:* Tubing, Tube Cutting Preparation, Manual and Electric Tube Benders, Hydraulic Swaging Units, Tubing Support Systems



### Hose and Flexible Tubing

*Types:* Metal, PTFE, PFA, Vinyl, Nylon, Polyethylene, and Rubber Core Materials; General-Purpose, High-Purity, and Vacuum Hose and Flexible Tubing

## A small-bore solution from Swagelok can provide:

Simple three-step installation—



- 1 Preswage the Swagelok nut and ferrules onto the tube using the multihead hydraulic swaging unit;



- 2 align and insert the tube into the Swagelok fitting;



- 3 turn the nut hand-tight, then tighten one half turn with a wrench.

*For complete installation instructions see, Gaugeable Tube Fittings and Adapter Fittings catalog. MS-01-140*



Swagelok tube benders make routing easier. They bend tubing to any angle up to 180 degrees. 45 and 90 degree fittings are replaced by tubing bent exactly as you need it. Routing can be more precise. Offsets and odd angles are no longer a problem. The flow improves and space is conserved.



Compared to a piping system of comparable strength, tubing systems are substantially lighter. This means that tube systems are easier to install and to support.



Headquartered in Solon, Ohio, U.S.A., Swagelok Company is a major developer and provider of fluid system solutions, including products, assemblies, and services for the research, instrumentation, pharmaceutical, oil and gas, power, petrochemical, alternative fuels, and semiconductor industries. Its manufacturing, research, technical support, and distribution facilities support a global network of more than 200 authorized sales and service centers in 57 countries. For more information about Swagelok, visit the company's Web site at [www.swagelok.com](http://www.swagelok.com).