# Swagelok Hose and Flexible Tubing

## Metal Hose & Tubing
- FX Series Metal Hose
- FM Series Metal Hose
- FJ Series Metal Hose
- FL Series Metal Hose
- CT Series Convoluted Metal Tubing

## Teflon Hose & Tubing
- T Series PTFE Hose
- B Series PTFE Hose
- X Series PTFE Hose
- C Series PTFE Hose
- N Series PTFE Hose
- W Series PTFE Hose
- U Series PFA Hose
- F Series PTFE Hose
- S Series PTFE Hose
- PFA Series PFA Tubing

## Thermoplastic Hose
- 7P Series Polyethylene Hose
- 7R and BR Series Nylon Hose
- 7N and BN Series Nylon Hose

## Other Hose & Tubing
- NG Series Nylon Hose
- LT Series Vinyl Tubing
- PB Series Rubber Hose

## End Connections
- Male Pipe Threads, NPT and ISO/BSP Tapered
- Female Pipe Threads, NPT
- Swagelok Tube Adapters
- Swagelok Tube Fittings

## Quick Connects
- QC Series
- QF Series
- QM Series
- QTM Series

*Engineered to perform under pressure*
What Should You Consider When Selecting a Hose?

**Temperature**
Identify the minimum and maximum temperatures the hose assembly will be exposed to with regard to the system media and the environment.

**Pressure**
Identify the minimum and maximum pressures (or vacuum) within and outside the hose assembly.

**Material**
Identify the system media and the environment to which the hose assembly will be exposed. This will help determine the materials of construction best suited to the application demands and whether the hose requires a static dissipative core.

**Movement**
Confirm whether the hose assembly will be installed in dynamic applications as this will require different considerations than a static application.

**Length**
Determine the most likely route for installation of the hose, and use this to identify length requirements.

**Orientation**
Clarify space constraint concerns. Hose assemblies with elbows and union ball joints may help resolve space constraint issues.

**Desired Flow**
Consider desired flow. Hose connection size, core tube construction, and routed installation may impact flow.

**Drainability**
Consider core construction as this will impact drainability.

**Test Reports**
Identify the need for documentation in the form of test reports.

**Special Testing**
Many applications may require testing to requirements different from the production tests listed. For example, metal hose assemblies undergo an inboard helium leak test to a maximum leak rate of $1 \times 10^{-5}$ std cm$^3$/s. If your application uses liquid at a positive pressure, you may request an additional hydrostatic proof test.

**Special Marking**
Discuss special marking requirements; there are different options available to readily identify hose assemblies.

**Documentation and Regulatory Requirements**
Identify the need for special regulatory approvals or documentation.

**Additional Protection and Covers**
Identify whether covers are necessary for additional protection of the hose assemblies or surrounding systems.

**Hose Advisory Services (HAS)**
Operators often overlook hoses even though the consequences of failures are serious. These consequences include downtime, wasted product, environmental damage and human injury.

Our trained specialists will visually inspect the hoses at your facility and help determine the best function and fit for your application. These inspections can assist in reducing the costs and downtime of your systems.

Contact us to get started.

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**Cleanliness**
Identify the need for cleanliness. Ease of cleaning the internal surfaces of the hose, as well as maintaining outside cleanliness may be of concern.

**End Connection**
Identify the type of end connections which are most compatible with the system requirements. End connections differ with regard to materials of construction and pressure ratings.
Hose and Flexible Tubing Nomenclature

Absorption
Absorption occurs when media absorbs into and becomes part of a material. It can lead to contamination, as fluid absorbed into the walls of a core tube may remain there and leach out later.

Annular
A type of convoluted core, typical in metal cores, that features a series of connected rings. Annular metal cores are not well suited to operations in which they move in a repetitive pattern, as the movements can cause metal fatigue and breaking.

Bend Radius
A hose’s minimum bend radius measures how far the hose can bend before kinking. This standard measurement is useful when comparing the flexibility of different hoses.

Conductivity
The ability of a material to transmit or conduct an electrical charge. Swagelok hoses constructed with a metallic braid layer have the potential to be conductive hoses.

Convoluted
With a convoluted core, the tube’s inner wall is ridged, allowing it to bend like a flexible straw. This construction reduces a hose’s kinking potential and is chosen when flexibility is the priority.

Core Tube
A hose’s innermost layer—the one that comes into contact with the system media. Core tube material, which may be metal, silicone, fluoropolymer, thermoplastic, rubber or another material, should be selected based on its chemical, temperature and pressure compatibility with system media and cleaning practices.

Cover
A hose cover is an outer layer that protects underlying layers, personnel, and surrounding equipment. For example, general-purpose silicone covers help prevent fraying of the braids in stainless steel reinforcement layers, provide insulation, and enhance burn protection for operators.

Dynamic Application
An application in which the hose flexes or changes position.

Flexibility
The relative ease or difficulty of bending a nonpressurized hose or tubing assembly.

Fluoropolymer
Fluoropolymer cores are becoming the material of choice for sanitary applications, due to their chemical inertness, cleanability, and low absorption rates.

Force-to-Bend
The force required to bend an unpressurized hose is just as important as bend radius, but not as easy to measure. The best way to determine if the force-to-bend a hose is too great for an application is to test hose samples with your own hands.

Helical
A type of convoluted core, found primarily in fluoropolymer cores, that features a single convolution that spirals down the length of the hose. Helical cores promote flow maintenance and drainability, enabling better flow downstream than annular convolutions.

Identification
Customized hose identification—whether with tags, text, or cover colors—enables personnel to determine a hose’s function at a glance, which helps with safety and plant efficiency.

Minimum Dynamic Bend Radius
The smallest bend radius that a hose is rated to perform in a dynamic application.

Permeation
The movement of a liquid, gas, or vapor through a solid. All materials are permeable to a degree and should be tested for application compatibility prior to installation.

Reinforcement Layer
Proper reinforcement layers improve pressure containment and flexibility in a hose. In most cases, the core tube is reinforced by a flexible, stainless steel woven braid, which is layered on top of the core tube.

Smooth Bore
In a smooth-bore core, the tube’s inner wall is smooth, allowing for precise flow control and superior drainability because the wall has no irregularities to hinder flow.

Static Application
An application in which the hose is stationary and does not move in any plane.

Static Dissipation
The ability of a material to conduct an electrical charge to ground. Select Swagelok hoses are constructed with carbon black-filled nylon, PTFE, or PFA core material for static dissipation.

Product Catalog Information
Visit swagelok.com or ask your Swagelok representative for the Swagelok Hose and Flexible Tubing product catalog MS-01-180.

Warranty Information
Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

Safe Product Selection
When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and users.

Caution: Do not mix or interchange parts with those of other manufacturers.
### Inspection
Establish an inspection schedule based on system application and replacement history.

### Electrostatic Discharge
Static electricity can be generated by fluid passing through the hose. Select hose with sufficient conductivity to ground the static electric charge and allow static dissipation. If static electricity generation is possible within an application, choose static dissipative hose and properly ground to earth.

### Vibration
Evaluate amount of system vibration when selecting hose. Metal hose may not be appropriate for systems with constant or severe vibration.

### Length
Take into consideration hose movement, system pressurization, and thermal expansion when determining hose length. Installing hose that does not have sufficient length to accommodate these factors may reduce hose life.

### Minimum Bend Radius
Follow minimum bend radius requirements for your hose. Installing hose with smaller bends may kink hose and reduce hose life.

![Minimum Bend Radius Example](image)

- **Recommended**
- **Not recommended**

Hose rupture or leakage may result from bending too close to the hose/fitting connection.

### Hose Strain
Elbows and adapters can be used to relieve hose strain.

### Motion Absorption
Avoid twisting the hose by bending it in one plane only. For a compound bend, use multiple hose pieces or other isolation methods.

<table>
<thead>
<tr>
<th>Bend radius</th>
<th>Minimum straight length (2x Hose O.D.)</th>
<th>Recommended</th>
<th>Not recommended</th>
</tr>
</thead>
</table>

For additional information, see SAE J1273, *Recommended Practices for Hydraulic Hose Assemblies.*
## Hose Selection Guide

<table>
<thead>
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<th>Series</th>
<th>Core</th>
<th>Reinforcement</th>
<th>Cover</th>
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<td>Synthetic fiber braid</td>
<td>Blue Buna N (other colors available)</td>
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</tbody>
</table>

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*Carbon black-filled PTFE core is available for applications that require static dissipation.*

*Carbon black-filled PFA core is available for applications that require static dissipation.*
### Hose Selection Guide

<table>
<thead>
<tr>
<th>Series</th>
<th>Nominal Hose Size, in.</th>
<th>Metal Hose</th>
<th>Temperature Range °F (°C)</th>
<th>Working Pressure at 70°F (20°C), psig (bar)</th>
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</tbody>
</table>

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1. T series hose with alloy 400 braid is rated to 1500 psig (103 bar).
2. C series hose is rated from −20 to 340°F (−28 to 171°C) in the 1 1/2 and 2 in. nominal hose sizes.
3. PB series hose is rated from −20 to 200°F (−28 to 93°C) in the 1 in. nominal hose size.
4. Pressure-temperature ratings may be limited by the end connections.
Swagelok Southwest can provide you with a wide variety of service solutions. Our quality, performance and reliability will reduce your costs in designing, sourcing, installing and maintaining fluid system solutions.

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