# 3 STEPS TO HOSE SAFETY AND LOWER COSTS

**By Doug Nordstrom,** Senior Product Manager
Hose Product Group, Swagelok Company

Hoses do not get the attention they deserve. Most facilities have specifications and policies concerning tubing, fittings, and valves on pressure-containing systems, but not usually for hose.

This is alarming because hoses do fail – for a number of different reasons. For example, they can be improperly routed, or the hose type may not correctly match the application. Even with the right setup and hose selection, hoses are subject to wear. Like the tires on your car, they will eventually need attention even if treated well, so a maintenance schedule is a must.

Leaks from hoses should be taken seriously. They can put plant personnel in unsafe situations, inflate operating costs, contribute to fugitive emissions, and adversely affect the environment.

You can avoid dangerous situations and downtime, plus improve plant efficiency by following these three steps:

## 1. Properly Match Hose Type to the Application

Today, many companies are trying to get more production from their machines and processes, which can mean greater demands on your hose. In such cases, make sure your hose specifications for pressure, temperature and chemical compatibility are up to date.

When specifying a hose, there are four main areas to consider. Choices in these areas will determine your total cost of ownership, which is more important than the initial purchase price.

| Core Hose Material | Characteristics |
|---|---|
| **Metal** | • Good general purpose hose<br>• Widest temperature range<br>• Resists permeation and absorption<br>• Not compatible with highly caustic or acidic system media<br>• Not well-suited for operations with repetitive movements |
| **Fluoropolymer (PTFE, PFA, FEP)** | • Good chemical compatibility<br>• Advancements have made it very flexible<br>• Good cleanability<br>• Low absorption<br>• Available with static dissipation<br>• Highly permeable |
| **Silicone** | • Very flexible<br>• Limited chemical compatibility<br>• Highly absorptive<br>• Excellent cleanability |
| **Thermoplastic (Nylon)** | • Economical, general purpose hose<br>• Good for hydraulic fluids<br>• Limited temperature range |
| **Rubber** | • Economical, general purpose hose<br>• Durable<br>• Available in large sizes (above 2 inches)<br>• Limited temperature and pressure range |

**Figure 1.** Hose Selection Guide

- Core hose material – Innermost layer, which must be chemically compatible with the system media and tolerate the temperature range, plus provide acceptable levels of permeation and absorption. (See Figure 1 for comparisons.)
- Reinforcement layer – Usually stainless steel or fiber woven braid to improve pressure containment and flexibility. You should consider the hose bend radius, as well as "force to bend."
- Cover – An outer layer (commonly silicone, polyurethane, or rubber) that protects underlying layers, personnel, and surrounding equipment.
- End connections – The performance of your hose depends largely on your manufacturer's ability to attach an appropriate end connection and then test it. Process is important. You can have a good hose and good end connection, but if the process for assembly is not followed, you will have leaks. Look for hose suppliers with certified assemblers and a warranty that covers leakage from the end connection. (When leakage occurs in a hose, it is usually from the end connection.)

## 2. Proper Hose Routing and Storage

It's common to have the right hose for the application, but install it wrong. An error we see frequently is allowing a hose to hang vertically from a horizontal end connection. (See Figure 2. In such situations, you should install 90° elbow fitting first.)

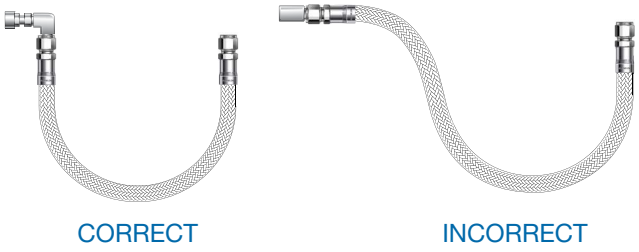


**Figure 2.** Avoid allowing a hose to hang vertically from a horizontal end connection. Instead, install a 90° elbow fitting.

Another set of common installation errors results from improper hose length. Excessive hose length can get in the way, allowing the hose to rub against itself or a machine, accelerating wear. Alternatively, a hose can be too short, tightly stretched between two points. In this case, thermal expansion, system pressure change, or slight movement at the connection points can cause leakage at the end connection. The proper hose length is one that has enough slack to accommodate connection point movement, but not so much as to allow for rubbing, interference, or kinking.

When storing hose, here are a few points to keep in mind:

**Figure 3.** Proper hose storage.

- Store in clean, dry conditions between 50° F and 70° F (10° C to 21° C)
- Protect from UV light/sunlight
- Cap the hose at both ends to prevent contamination and keep dirt, debris, insects, and vermin out of your hose
- Check for hose shelf life
- To prevent kinking, hang so the hose is not bending more than it should (see Figure 3); look up the manufacturer's bend radius for your hose
- Do not stack hoses
- Store coils horizontally on a surface

## 3. Proper Maintenance

Hose failure can be predicted. Based on the hose type and its use, hoses should be checked and replaced at certain regular intervals. You do not need to wait until there is a problem or a dangerous leak.

A proper maintenance schedule should take into account the specific application and hose type. Some hose types wear faster than others. In addition, these variables will lead to faster wear:

- Repetitive movement (not avoidable)
- Vibration (not avoidable)
- Improper routing (avoidable, explained above under #2)

## Conclusion

Hoses are a convenient and quick way to connect two points in your fluid system, but be sure to take the necessary steps to ensure safety and avoid costly downtime.

Would you like to learn more? Visit our Hose Selection Resource Center at https://southwest.swagelok.com/tech-resources/hose-selection.

Swagelok Southwest Co.
(602) 268-4848 | Phoenix, AZ
(505) 842-0213 | Albuquerque, NM
http://southwest.swagelok.com