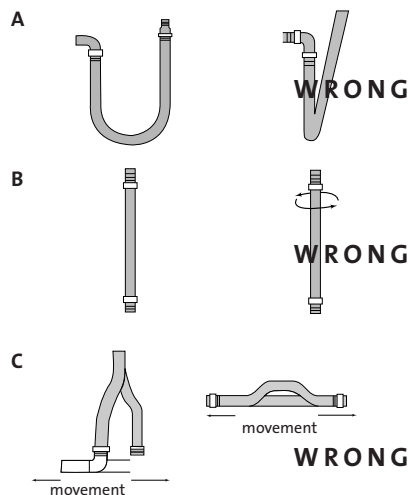


General Hose Installation Precautions

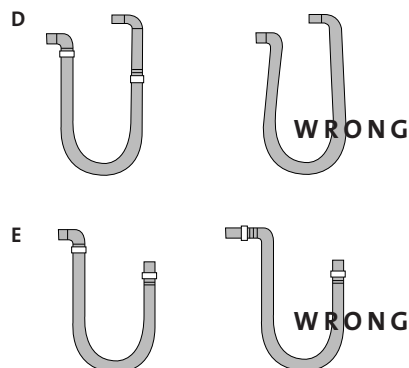
Prior to Installation

1. Examine the hose for any obvious damage. **IF THE HOSE IS DAMAGED, DO NOT USE.** Examples of damage may include slices to the cover, kinks, broken braid, and crushing of the hose (can reduce life and pressure rating).
2. Review application to ensure proper selection of hose has been made by examining materials, pressures, chemical compatibility, temperature and environment.
3. Hose movement should be restricted to a **SINGLE PLANE (Drawing A)** to minimize the resultant twisting (torque). Note: The flexing plane should also be the plane in which the bending occurs. Excessive bending will induce stress fatigue (**Drawing B**).
4. Axial movement should be eliminated. The hose should not be stretched or compressed along its longitudinal axis when installed in-line (**Drawing C**).



Installation

- **Never use hose below minimum bend radius (Drawing D).** Bend radii (measured to inside radius of fluoropolymer-lined hose and centerline for stainless steel metal hose) are given for individual products and sizes (consult factory for specific data). These values represent the minimum bend radius with which the hose can be properly installed. If these values are not maintained, the hose can fail prematurely. Note: In some cases, vacuum and pressure ratings are based on not exceeding 2 times minimum bend radius (consult factory for specific hose ratings).
- **Do not allow severe bends (Drawing E).** Severe bends can cause kinking in a hose or overstress the assembly/material, resulting in damage and ultimate failure. If severe bends cannot be avoided, use elbows designed to accommodate the direction change.
- **Do not twist (torque) assembly along centerline during installation.** The likelihood of leakage/failure increases for hoses that are twisted (torqued) during assembly. The proper use of floating flanges and swivel-type fittings (i.e., J.I.C.) can eliminate improper twisting.



General Hose Installation Precautions (continued)

Hose Assemblies with PTFE, FEP Flare-Thru and PFA Encapsulated Flanged Fittings

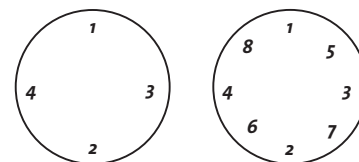
- Flange covers should not be removed until hose is ready to be bolted into position. Flange covers should be replaced immediately after disconnecting hose to protect sealing surfaces.
- Gaskets are not required when hose is connected to a sealing surface made of PTFE, FEP, or PFA. If the hose is connected to any other surface, such as metal, glass, carbon, reinforced plastic, etc., a gasket should be used.
- Bolts should be tightened using proper bolt techniques and torque values. The table below gives torque values for lined hoses using Class 150 flanges. Bolts should be clean and lubricated with flat washers being used to ensure correct torque.
- For accurate tightening a torque wrench is **HIGHLY recommended**. If a flange leak occurs on one side of a properly torqued flange, the bolts should not be over-torqued. Instead, loosen the bolts on the non-leaking side the same amount you tighten the bolts on the leaking side.

Nominal Hose Size

1/2"	1"	1-1/2"	2"	3"	4"	5"	6"
10	10	15	25	40	30	60	75

Torque (ft.-lbs.)

Bolt Torque Sequence



Installation

Flare-Thru Fittings; Clamp Style Sanitary Ends

- For installation of W.S.I.B, open pitch and MTL/MTLSJ Series hose assemblies, SGPPL recommends that solid PTFE gaskets **MUST** be used to ensure a leak-tight seal. Use of other types of gaskets may result in leaks, sealing surface damage, or difficulty in installing the sanitary clamps.

Notes on Hose Assemblies with Fluoropolymer Flare-Thru Fittings

The following precautions should to be taken during removal for storage/cleaning/sterilization:

- Assemblies or components with Flare-Thru ends (including Chemfluor®-lined adapters) **MUST NEVER** be removed from the hose/piping system until they have completely cooled down to at least 70°F.
- Flare-Thru ends in assemblies **MUST ALWAYS** be restrained. Recommended methods include:
 - End caps and solid PTFE gaskets (for clamp style sanitary fittings)
 - Flange covers/blind flanges

- Lap-joint flange with stub end and the appropriate gasketing
- Bolts or clamps to attach the assembly to the hose/piping system

Also recommended is the use of dust plugs/caps for female and male cam and grooves.

- Assemblies or components with Flare-Thru ends that are to be pressure tested or cleaned (autoclaved) **MUST ALWAYS** have the Flare-Thru ends restrained (by end caps, flange covers, dust plugs/caps or a flange with stub end and appropriate gasketing) prior to start of the process. These devices **MUST** remain in place during heat-up and through complete cool-down to at least 70°F before removing for installation.
- Flange covers, end caps, dust plugs/caps or a flange with stub end and appropriate gasketing **MUST** be replaced immediately after disconnecting hose. Flange covers or end caps **MUST NOT** be removed until hose assembly or component is ready to be bolted or clamped into position.

Installation (continued)

Threaded End Connections (MNPT); Metallic and Plastic Pipe Fittings

- Typically, male pipefitting (MNPT) can be effectively sealed using common PTFE sealing tape. Other types of pipe dope or sealing compounds (usually PTFE paste) should be checked to confirm compatibility with service fluids and temperatures of the application.
- Any welding near the hose assembly should be done in a manner that protects the liner and the hose from damage.

MTL/MTLSJ and Chemflur® Fluoropolymer Lined Adapters

- Vent holes (found at each end of each hose fitting or in the stainless steel body of adapters) should be unobstructed to allow trapped gas or product between liner and hose to escape. Steadily escaping gas or product could mean possible liner damage and should be inspected.

Service Life Factors

The actual service life of the hose assembly is strongly affected by its environment. Some of the factors that may influence service life include:

- **Corrosion**
 - General corrosion attack
 - Stress corrosion cracking
 - Intergranular corrosion
 - Pitting corrosion
- **Fatigue (including)**
 - High cyclic
 - Flexure
 - Pulsation
 - Vibration
 - Torsion
- **Vibration**
- **Movement of attached equipment**
 - Proper hose configuration and live length should be used when hose may be exposed to movements from attached piping, tanks or equipment (i.e., thermal growth or mechanically imposed) and/or offset.
- **Wear**