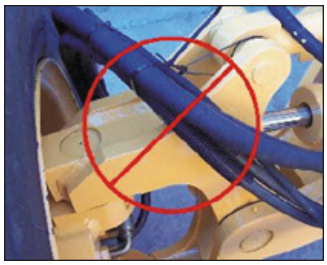
Product Information Report

Hydraulic Hose Routing

PIR



Overview

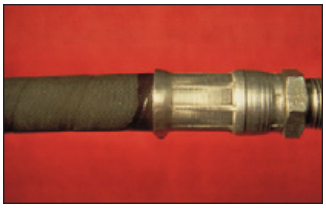
Proper hydraulic hose routing consists of choosing the correct length of hose, the correct adapters (if needed), proper bends and proper clamping to avoid undue stress on the hose and fittings.

Proper hose installation is essential for optimal performance. It reduces hose cost, extends service life, aids in abrasion resistance and is visually appealing.

Hose Failure

Improper hydraulic hose routing can cause system failures and severe injury to machine operators. Hoses can eventually start to leak or could blow apart due to incorrect length or bend radius selections. Listed below are some common failures, their possible causes and a solution to fix each problem.

Weeping at Hose Coupling Interface



Problem: Fluid leaks from the end of the ferrule

Cause: Excessive flexing and tugging

Solution: Replace and check hose length

Hose Blisters

Problem: Blisters under the outer cover of hose caused by fluid leakage

Cause: Excessive bending or twisting of hose

Solution: Use proper fittings and check bend radius

Burst Hose

Problem: Hose burst at body

Cause: Flexing, kinking, crushing, tight bend radius or excessive abrasion

Solution: Check bend radius. Re-route to avoid abrasion and twisting

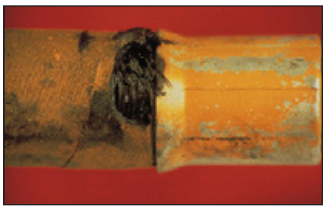
Hose Abrasion

Problem: Part of the hose cover removed, exposing reinforcement

Cause: Excessive rubbing against machinery or other hoses

Solution: Re-route and/or bundle hoses together; use hose guards

Hose Burst at Coupling



Problem: Hose burst at coupling

Cause: Excessive bending

Solution: Use proper fittings or adapters to make bends

Blown Hose

Problem: Hose coupling blown off

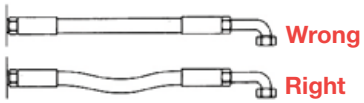
Cause: Insufficient hose slack

Solution: Check hose length

Proper Hose Routing Procedures

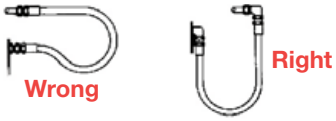
The following diagrams depict incorrect routing, correct routing and an explanation of the correct procedure. These examples are followed by simple ways to prevent common hose failures and machine downtime.

Length Change



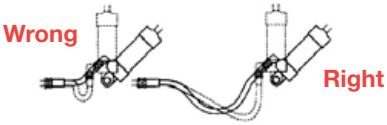
When hose installation is straight, allow enough slack in hose line to provide for length changes which will occur when pressure is applied.

Tight Bend



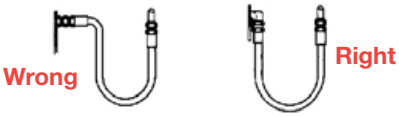
When radius is below the required minimum, use an angle adapter to avoid sharp bends.

Movement/Flexing



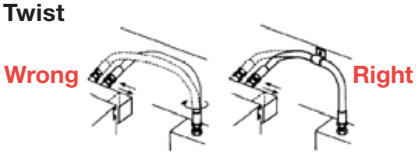
Adequate hose length is necessary to distribute movement on flexing applications and to avoid abrasion.

Tight Bend



Use proper angle adapters to avoid tight bend in hose.

Twist

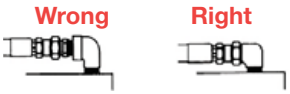


Avoid twisting hose lines which are bent in two places by clamping them at the change of planes.

Twist

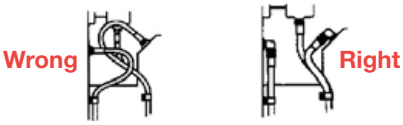
Prevent twisting and distortion by bending hose in same plane as the motion of the port to which hose is connected.

Reduce Connections



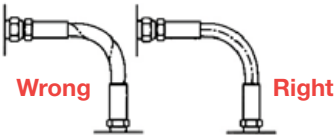
Reduce number of pipe thread joints by using hydraulic adapters instead of pipe fittings.

Appearance



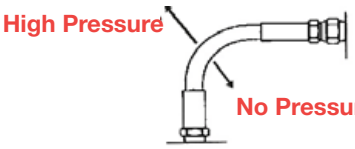
Route hose directly by using 45° and/or 90° adapters and fittings. Avoid excessive hose length to improve appearance.

Twist



When installing hose, make sure it is not twisted. Pressure applied to a twisted hose can result in hose failure or loosening of connections.

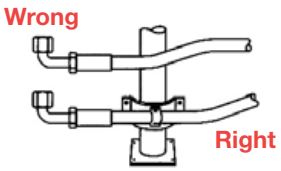
Length Change



Hoses expand under pressure. To allow for length changes when hose is pressurized, do not clamp at bends. Allow the curves to absorb changes. Do not clamp high- and low-pressure lines together.

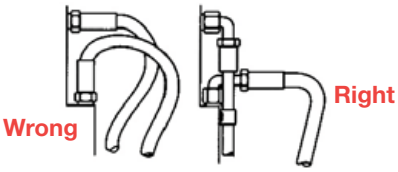
Proper Hose Routing Procedures (cont.)

High Heat



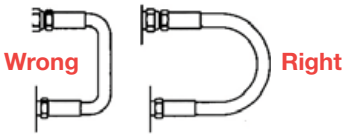
High ambient temperatures shorten hose life, so make sure hose is kept away from hot parts. If this is not possible, insulate the hose.

Strain



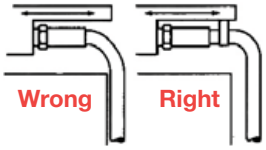
Elbows and adapters should be used to relieve strain on the assembly and to provide neater installations which will be more accessible for inspection and maintenance.

Collapse



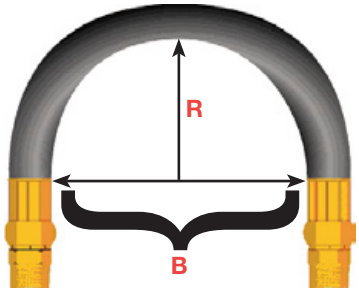
To avoid hose collapse and flow restriction, keep hose bend radii as large as possible. Refer to hose specification tables for minimum bend radii.

Abrasion



Run hose in the installation so that it avoids rubbing and abrasion. Often, clamps are required to support long hose runs or to keep hose away from moving parts. Use clamps of the correct size. A clamp which is too large allows hose to move inside the clamp and cause abrasion.

Determining Bend Radius

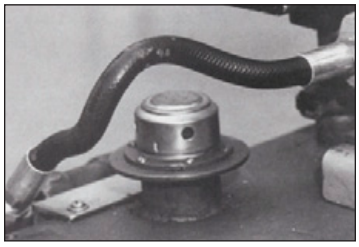


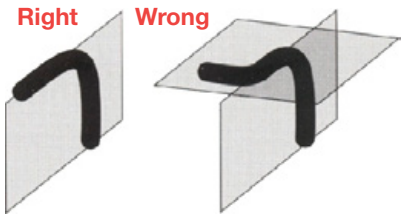
Bend Radius (R) = B ÷ 2

When determining the proper length of hose, it is important to make sure that the minimum bend radius is not exceeded. If the bend radius is smaller than the minimum, the hose could kink and burst. For example, if a hose has a minimum bend radius of 6", anything less than 6" would exceed this.

Measuring the bend radius from the correct spot is critical. Bend radius is determined by dividing the distance between the hose ends by two.

Fitting Selection and Orientation





Proper fitting selection and orientation is an important part of hose routing. Using two rigid fittings on a hose will cause the hose to twist during installation. If a rigid fitting is used on one end of the hose, that end should be the first end installed. The other end should have a swivel fitting. This will enable the hose to stay straight without twisting. A hose twisted as little as 7° can have a 90% reduction in service life.

If the hose must bend, it should do so in only one plane. This can be achieved through the use of angle fittings and/or adapters. Before making final crimps, the fitting orientation should be checked to make sure that there is no twisting in the hose.