



## Ten Routing Tips

Pay particular attention to hydraulic hose routing. Hose must be properly installed to prevent potential hazards and ensure productivity. There are ten routing tips that, if followed, help avoid premature hydraulic hose failure.

### 1. Don't position hose next to heat sources.

An increase of 18 deg F above the maximum operating temperature of a hose may cause cracking and cut its life in half. Cracks are also caused by flexing, especially at excessively low temperatures.

Always select a hose that meets the temperature and flow requirements of the application. Avoid using an undersized hose, which is a source of overheating.

### 2. Avoid routes that result in twisting.

Twisting misaligns hose reinforcement and reduces its ability to withstand pressure. Twisting a high-pressure hose 7 deg can reduce service life by 90%. Pressure applied to a twisted hose can cause loosening of connections. Prevent twisting and distortion by bending in the same plane as the motion of the port to which the hose is connected.

The use of bent tube or block-style couplings and adapters may improve routing.

### 3. Don't position hose next to metal edges or too close to other hoses.

Continuous rubbing against equipment components, other hoses, or objects in the operating environment can result in the hose cover wearing away, exposing the reinforcement. Exposed reinforcement is susceptible to rust and accelerated damage leading to failure.

Prevent abrasion by bundling together hoses that flex in the same direction. Clamps, bent tube couplings, nylon ties, spring guards, and sleeving can be used to keep hose away from abrasive sources. Protective sleeving can be used to protect hose covers from abrasion (Fig. 1).

Manufacturers produce hoses with tough abrasion-resistant covers that last up to 300 times longer than standard rubber-covered versions in hose-to-hose and hose-to-metal testing.

### 4. Avoid straining hose.

Use elbows and adapters to relieve strain on the assembly and provide neat installations accessible for inspection and maintenance. They can be used in the following situations.

- To avoid fitting orientation. Do not use an angle fitting on both ends of a hose assembly. Use a straight fitting and an angle adapter on the other end. This method makes installation easier and eliminates the need for orientation.
- To change size when jump-size fittings are not available. Make the jump with an adapter.
- To ease port connection and hose installation.
- To change to a different thread configuration.
- To promote laminar flow and reduce pressure drop. It is better to use a straight adapter and bent tube coupling than an angled adapter and straight hose end.

### 5. Avoid exceeding the minimum bend radius.

Bending hose tighter than recommended places excessive stress on the reinforcement, can open large gaps between strands of reinforcement, and severely reduces the hose's ability to withstand pressure. The result could be a burst hose.

Reroute hose to eliminate excessive flexing and exceeding the minimum recommended bend radius. Refer to hose specification tables for minimum bend radii.

### 6. Allow for length changes when the hose is pressurized.

Hydraulic hose can elongate up to 2% or contract up to 4%, depending on construction. Routing must take this into account (Fig. 2).

If hose length is excessive, the installation's appearance will be unsatisfactory, and unnecessary equipment costs will be incurred. Service life is reduced if hose assemblies are too short to permit adequate flexing and allow for length changes due to expansion or contraction.

### 7. Don't mix and match.

It is critical that the hose and coupling manufacturer are the same, and that they are assembled using the recommended equipment, components, and procedures.

### 8. Consider mechanical movement when bundling.

Never bundle high-pressure with low-pressure hose, or rubber with thermoplastic or Teflon hose. Under pressure they can work against each other. Bundles, like individual hoses, should only bend in one plane (Fig. 3).

### 9. Route high-pressure hydraulic lines parallel to machine contours whenever possible.

This practice helps save money by reducing line lengths and minimizes the number of hard angle, flow restricting bends. This kind of routing protects lines from external damage and promotes easier servicing.

### 10. Use adapters to make installation and orientation easier.

Adapters are used to ease port connections and hose installation or to change to a different thread configuration (Fig. 4). As a rule, a straight adapter and bent tube coupling are a better choice than an angled adapter and straight hose end. This combination promotes laminar flow and reduces pressure drop.