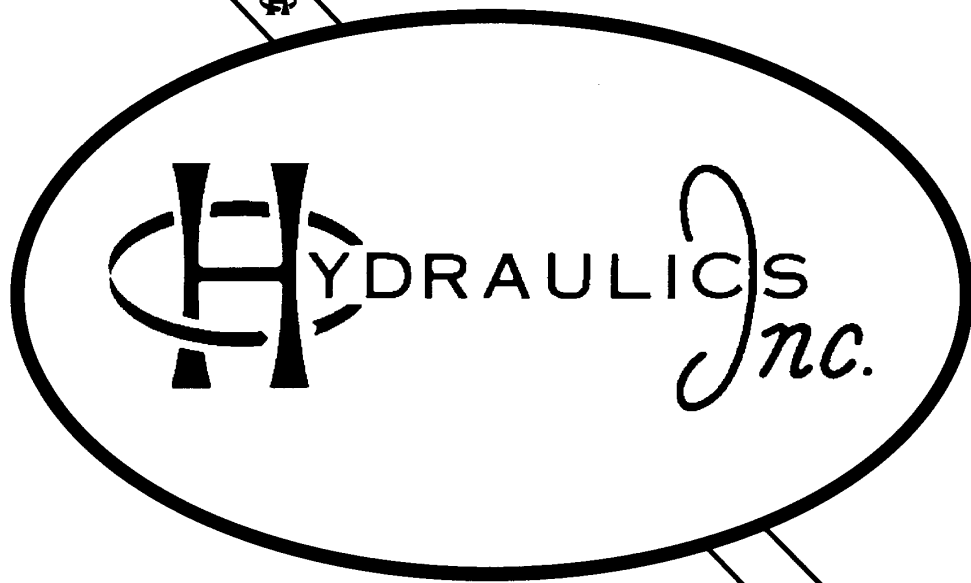


CRITERIA FOR SWIVEL JOINT SELECTION



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Advantages of using Hydraulics Inc. Swivel Joints

Swivel joints needs in fluid powered equipment usually arise because stress is being imparted to flex hose by cyclic movement between system components. Fluid power swivel joint applications are rarely identical due to fluid types, pressure, flow volume, temperature, and due to the endless variety of piping needs. With all these application differences, the system planner's selection criteria for the most correct type and kind of swivel to fill the need, is best served through an extensive line of swivel products.

Simplified System Plumbing

- Swivels connect directly to hose lines and can eliminate adapters.
- Less hose is needed, thus less space is needed.
- Tubing can often be eliminated because swivels offer fluid port rotation on a variety of plains relative to other piping components.

Longer Hose Life

- Hose life is extended by swivel action that eliminates effects of torque and bending stress on hose as created by cyclic movement between fluid system components.

Saves Money

- Simplified plumbing reduces system cost.
- Longer hose life.
- Less down time
- Increased reliability.

Selecting The Most Correct Type and Kind of Swivel Joint

"Because applications are different" and because fluid power swivels is our business, the focus is on continuous advancement of the swivel product lines. This endless goal is supported by technology, manufacturing, and market know how. The desire is to sustain a broad line of products and a high level of service in providing the "most correct type and kind of swivel for the need".

Selection Criteria:

Pressure

The pressure rating for a selected swivel must be equal or greater than the system maximum pressure to which applied. This includes peak or surge pressure, the momentary high pressure encountered in a system that would otherwise shorten swivel life.

Swivel Fluid Port Pressure Rating

There are several swivel fluid port connection options and there are differences in the pressure ratings for these connections. Consider also, that tube and hose female unions for several of these connections have pressure ratings below their male ports. Accordingly, to define a swivel with fluid ports that will qualify for a system's pressure, it is strongly suggested that associated female hose connections and tube connections also be qualified in order to support port compliance.

Temperature Range

Both fluid and ambient temperatures are important in swivel selection. The fluid temperature rating is determined by the swivel's seals. If the fluid temperature exceeds the seal temperature rating, the seals will deteriorate and the swivel will leak. Transient temperatures also have potential for damaging seals, especially during system shut down. High temperatures can precipitate swivel housing corrosion by damaging protective plating.

Fluid Compatibility

Swivel selection must assure body and seal materials are compatible with the system's fluid media. Seal materials other than standard may be required.

Side Loading

Swivel bearings can be subjected to stress from angular deflection in piping systems. Swivel life is predominantly dependent on bearing life. Care should be taken to arrange system plumbing to maximize swivel life. Selection of swivel type and kind, as explained herein, is important to application adaptability. The goal is to permit unrestricted freedom of swivel rotation.



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Selection Criteria: (continued)

Rotation Torque

As fluid system pressure increases, so does swivel rotation torque drag. Torque values are presented in swivel catalogs. Rarely is torque drag an application problem in that fluid pressure also increases rigidity of attached flex hose in a manner to counteract torque drag.

Rate of Rotation

Swivel seal and bearing life is relative to the factors of angular deflection, fluid pressure, temperature, and speed of rotation. The slower the rotation, the longer the seals and bearings survive. Given the potential for extremes in any one factor, applications should probably be qualified by prototype or laboratory tests.

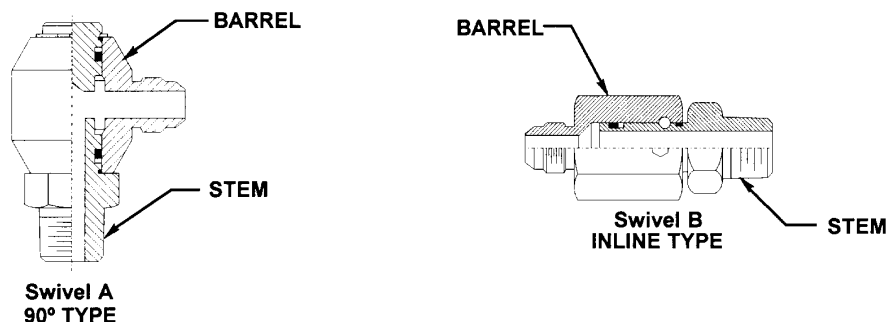
Pressure Drop

Pressure drop, or differential pressure, is the loss of pressure between any two points in a fluid system or component. Measured as a loss in pounds per square inch, it is the resistance to flow of fluid through a swivel. The swivels are designed to be flow efficient and respective values are presented in swivel catalogs.

Corrosion Resistance

Standard swivels receive an exterior coating of zinc, with an overlay of yellow dichromate seal. Both the fluid media, and the fluid system operating environment, should be considered for compatibility of carbon steel products. If corrosion is an issue, then alternate swivel materials should be considered.

How to Distinguish Types of Swivel Joints



The two types of swivel joints discussed here are distinguished by their load bearing mechanisms. Both types require at least two components, commonly referred to as the stem and the barrel.

The first type swivel (Swivel A), is comprised of a barrel fluid port positioned to rotate on a plane 90° to the stem axis. This swivel includes two load bearing mechanisms classed as journal bearings. The swivel's barrel bore includes two load bearing lands separated by a fluid passage. The stem's outer diameter includes bearing lands, complementing the barrel and with space to allow the stem fluid passage to communicate fluid to the barrel port. The two stem bearing lands further include equal size seals for containing the fluid. By nature of equal seal size, the effect of fluid pressure on the stem and barrel creates no load on the bearings. This desirable feature leaves bearing life relative to stress from angular deflection induced through the piping system.

The second type swivel (Swivel B), is distinguished by opposed barrel and stem fluid ports on a common axis. This in-line port relation depends on a single load bearing mechanism, classed as a combination radial-thrust bearing. The swivel's barrel bore provides an axial ball bearing raceway that is distanced from the barrel's seal gland area. The swivel's stem provides an axial ball raceway and a seal groove to coincide with the barrel bore. In assembly, the balls retain the barrel to the stem while permitting axial rotation between the two components. These features require the bearing to withstand both thrust and stress from angular deflection of piping. With absence of deflection, bearing life is related to thrust from fluid pressure.

See back cover for applications

WHY SO MANY TYPE SWIVELS?
BECAUSE APPLICATIONS ARE DIFFERENT!

