

## MH Techtalk #8: Hydraulic Pipes & Fittings

In the previous tech talks, **MH Hydraulics FZC**, a leading hydraulic solutions provider in the Middle East, discussed on hydraulic oil contamination, ways of preventing oil contamination by means of effective filtration, use of desiccant breather, use of hoses and fittings etc. In this techtalk, we will discuss on various points to remember while choosing hydraulic pipes and clamps for hydraulic systems.

Most of the hydraulic systems uses seamless pipes using both carbon steel and stainless-steel materials. Seamless pipes are used because of their high strength, low price, and easy leak-free connection. The seamless pipes will be oiled and pickled or pickled only. The pipes come with a finish of lacquer coating to protect the metal especially during shipping and storage. **The galvanized pipe should not be used in hydraulic systems because of zinc flakes will mess up O-rings and seals.**

The selection of hydraulic tubes is to be done based on the design hydraulic pressure, flow rate, and application. The inner and outer wall of pipes should not be rusted, should not be uneven, and elliptical. It has to be smooth, against corrosion, without oxidation, and free from other defects.

Nominal Pipe Size (NPS) is used to size the hydraulic pipes. For pipes up to 12" NPS refers to its inside diameter and for sizes above 12" NPS refers to outside diameter.

There are schedule number for hydraulic pipes depending on the wall thickness. for example, schedule #10 is a light wall, schedule #40 will have standard thickness, schedule #80 will be extra strong, and schedule #160 is extra-extra strong. The most common pipe schedule used in the industry is schedule 40 because it has the minimum wall thickness used for hydraulic systems and is easily available in the market.

The reason for using cold drawn low carbon steel tubes in hydraulic systems is that It can be easily welded to various standard pipe fittings. But where corrosion resistance is required stainless-steel seamless pipes are widely used.

Selection of pipe clamps is equally important to design a safe and reliable hydraulic system. Factors to be considered are the hydraulic line pressure, and the weight to be supported and the dynamic load apart from the size and application. The clamps limit the vibration in the system by securing the pipes in place. There are some guidelines to be followed for clamp spacing in hydraulic piping. A table as an example is given below.

<b>TUBE DIAMETER (mm)</b>	6-14	15-22	23-28	30-38	40-48.3	50-57	60.3-70
<b>Clamp to Clamp distance (m)</b>	0.9	1.2	1.5	2.0	2.5	3.0	3.4

**Clamp material selection is of utmost importance.**

Complete clamps will consist of the following parts: Weld plates, Body, Cover plate, and a set of screws.



The weld plates, cover plates and screws are available in mild carbon steel for normal application, 304 stainless steel and 316 stainless steel are used for corrosive environment.

Mostly the clamp body is made up of polypropylene, polyamide, and aluminum. Polypropylene material is used for normal temperature applications which is from -30 °C to 90 °C. Installation which demands higher temperature polyamide is used as a clamp material and temperature range is from -30 °C to 120 °C. For highest temperature of 300 °C or even higher aluminum clamps are used.

**Various categories available for tube clamps are:**

1. Light Construction Clamps: These are mostly made of plastic and is used to clamp hydraulic tubes under normal or light mechanical vibration applications. Recommended pipe sizes are 6mm to 102mm.



2. Heavy duty pipe clamps: These are mostly used for clamping hydraulic tubes and pipes under higher mechanical vibration applications. Recommended pipe sizes are 6mm to 508mm.

3. Double clamps: These clamps are used to hold two parallel pipes in one clamp and only suitable for pipe sizes from 6mm to 42mm diameter.



4. Tube clamps made of fire-retardant materials - ideal solution for transport and railway market because of improved safety and efficiency.



5. Steel clamps - These clamps are commonly used for mobile hydraulic because it enables a vibration-free laying of tubes and hoses.



6. Sensor clamps - Fixing clamp for proximity switch according to EN 50025 and 50037. Metal parts of the standard program of series A according to DIN 3105 must be used. The sensors can be adjusted axially and laterally when mounted on mounting rails.

