S.T.A.M.P.E.D.

We encourage using the STAMPED process to assist in determining the correct hose, coupling, and attachment method. It is critical in order to realize a safe hydraulic system.

STAMPED is an acronym. It stands for the 7 major information areas required to provide a quality hose assembly for the customer, as follows:

S stands for **Size**; I.D. and length; any O.D. constraints

* Overall length should be specified to include fittings
* **Inside Diameter -** the I.D. of the hose must be adequate to keep pressure loss to a minimum and avoid damage to the hose due to heat generation or excessive turbulence.
* **Flow Rate/Fluid Velocity -** The flow rate of the system in conjuncton with the inside diameter of the hose will dictate the fluid velocity through the hose. Typical fluid velocities can be seen in the nomographic chart on page 409. Please note that suction line recommendations are different than pressure lines.

T stands for **Temperature:** Temperature of both the fluid conveyed and the environmental conditions.

Two areas of temperature must be considered: fluid temperature and ambient temperature. The hose selected must be capable of withstanding the minimum and maximum temperature seen by the system. Care must be taken when routing near hot manifolds, and in extreme cases, a heat shield may be advisable.

* **Maximum Intermittent Ambient Temperature:** Hose constructions which use a rubber inner tube and/or cover, can have significant change in properties when exposed to extreme heat or cold. This may require some hoses to be rated to a lower operating pressure when exposed to such conditions.

* **Fluid Temperature:** The fluid temperature is the temperature of the fluid being conveyed inside the hose during operation.

* **Ambient Temperature:** The ambient temperature is the temperature of the environment to which the hose assembly is exposed.

* **Maximum Temperature:** The maximum temperature is the highest temperature to which the fluid or the environment may reach. The temperature is typically short in duration and occurs under extreme operating conditions. The hose selected for an application should be rated at or above the maximum ambient and maximum fluid temperature.

* **Minimum Temperature:** This is the lowest temperature to which the hose assembly will be exposed. For a hydraulic system, this is based on the minimum ambient temperature. A hose should be rated at or below the minimum ambient temperature to which the assembly may be exposed.

A stands for **Application:** The conditions under which the hose assembly will be used.
The type of application in which a hose assembly will be used is very important in determining what type of hose should be selected. The most common types of applications are listed below:

* **High Impulse:** Hydraulic system is subjected to frequent pressure spikes.

*** Low Impulse:** Hydraulic system is seldom subjected to pressure spikes.
*** Non-Flexing Applications:** Hose assemblies are not subjected to bending or flexing from articulation of the equipment.
*** Flexing Applications:** Hose assemblies are subjected to bending or flexing due to articulation or movement of the equipment.

Static discharge can become an issue when non-polar liquids or mixtures including non-polar liquids are conveyed in non-conductive hose. A static charge will build, and on discharge, perforate the hose tube. To avoid this, use conductive tube products when conveying non-polar, or mixtures of non-polar liquids.

Electrical conductivity of hydraulic hoses or conveyed fluids is an issue with equipment used to work around electrical lines. If hydraulic equipment is to be used around electrical lines, always use hydraulic hoses rated as non-conductive.
Be sure to select products that will meet any regulatory standards required in the application. Examples of these standards would include: SAE, USCG, EN/DIN, ABS, etc.

Never place hoses in a position where they will be pulled on. Hoses are designed to hold pressure and convey fluids, exposing them to axial loads will cause premature failure. Any special or unusual applications should always be approved by the hose manufacturer, otherwise, additional independent testing may be required.

The following questions may need to be answered, such as:

* Where will the hose be used?
* Fluid and/or ambient temperature?
* Hose construction?
* Equipment type?
* Fluid compatibility?
* Thread end connection type?
* Working and surge pressures?
* Environmental conditions?
* Permanent or field attachable (reusable) couplings?
* Suction applications?
* Routing requirements?
* Thread type?
* Government and industry standards being met?
* Unusual mechanical loads?
* Minimum bend radius?
* Non-conductive hose required?
* Excessive abrasion?

M stands for **Material**: Fluid being conveyed, type and concentration.

Some applications require specialized oils or chemicals to be conveyed through the system. Hose selections must assume compatibility of the inner hose tube and cover material. In addition to the hose materials, all other components, which make up the hose assembly (hose ends, o-rings, etc.) must also be compatible with the fluid being used.

Permeation or effusion is the movement of a substance through the hose tube walls which may degrade the hose tube, cause cover blistering, or other undesired effects, and must be considered especially when conveying compressed gases.

Be sure to select a hose that is compatible and approved by the manufacturer for the fluid conveyed. Concentration, pressure, temperature and other factors may impact the compatiblity of the hose and fluid. Depending on the fluid, the maximum temperature and pressure rating of the assembly, may be lowered.

Technical

Additional caution must be exercised in hose selection for gaseous applications such as refrigerants and LP Gas.

NOTE: All block type couplings contain nitrile O-rings which must be compatible with the fluids being used.

P stands for **Pressure**: Pressure to which the assembly will be exposed. The most important step in the hose selection process is knowing the system pressure, including pressure spikes.

* **Maximum Operating Pressure:** This is the maximum pressure that the system should be exposed to in normal operating conditions. This pressure should be dictated by the relief setting of the system. Both the hose and hose end should not be rated to a pressure less than the maximum operating pressure of the system.

* **Pressure Spikes:** When a hydraulic system is subjected to a large load in a short period of time, the system pressure can overshoot the relief setting and exceed the maximum operating pressure. Frequent pressure spikes can reduce the life of hydraulic hose assemblies.

Hose assembly working pressures must be equal to or greater than the system pressure. Pressure spikes greater than the maximum working pressure will shorten hose life and must be taken into consideration.

Any time a hose assembly is to be exposed to external pressures, which may exceed the internal hose pressures, be sure to consult with the hose manufacturer for recommendations.

E stands for **ENDS**: Termination end style, type, orientation, attachment methods, etc. Always use manufacturer approved couplings for hose assemblies. Be sure to select the appropriate end termination for a system working pressure and other requirements, such as, vibration resistance.

D stands for **DELIVERY**: Testing, quality, cleanliness, packaging and delivery requirements. Define any special requirements needed. Always follow manufacturer recommendations for maximum fluid velocity within a hose. Excessive fluid velocity may cause pressure loss, heat generation, hose movement or whipping, system noise and hammer effects.