Hose Selection Guide – S.T.A.M.P.E.D.

The S.T.A.M.P.E.D. acronym is an industry-wide standard that should begin every conversation when replacing an existing hose, or selecting a hose for a new application. The easy to remember acronym stands for Size, Temperature, Application, Material/Media, Pressure, Ends, Delivery.

Size

In a custom made hose assembly, either hydraulic or industrial, size is one of the most critical pieces of information to gather as hose professionals. Many people might think of one or two dimensions being important, but we'll share a couple of other insights to ensure you get the correct hose assembly for your specific application.

Typically customers are familiar with the following two measurements, the inside diameter (i.d.) and the outside diameter (o.d.). The inside diameter is the size of the interior tube of a hose. This can range from something as small as ⅛" i.d. up to large transfer hoses that could be 10" i.d. or larger.

In many applications, it is critical to have the i.d. match up exactly with the i.d. of the size of hose that came off of a piece of equipment originally. This deals with physics, flow rates, gallons per minute, and ensuring your equipment has the proper amount of fluid it needs to run efficiently (in the case of a hydraulic assembly).

The second measurement would be the outside diameter. The o.d. is the exterior profile measurement, and is critical in applications where hoses are routed through an engine block, bundled together in a hose protection sleeve, or anywhere that space is limited. We make sure to ask walk-in customers if the outside diameter is critical to their job at hand, ensuring they leave with the exact hose they need. A good example of this is the over the sheave hydraulic hose assemblies that go over a pulley on forklifts or aerial lifts. These pulleys are designed to route hoses in a groove and fitting that groove is of utmost importance.

The final dimension is the overall length (o.a.l.). When asking a customer about the length of a hose assembly, it is important to differentiate hose length (h.l.) vs. the

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Temperature



Temperature is extremely important when selecting the correct hose for both industrial and hydraulic applications. Understanding the temperature criteria is critical to ensure the compounds used to manufacture the hose are up to the rigors of the job, and will not cause a failure due to degradation.

The first topic we would address would be your system requirements and manufacturer's specifications stating operating temperatures. These specifications could include the operating temperature of hydraulic fluid for a hydraulic system, the temperature of chemicals in a processing plant, or high-temperature pressure washing, just to name a few.

How Low Temperatures Affect Hose

Most people would think that high heat would be the most common temperature concern in selecting the correct hose, but cold, and the extreme cold can be equally as important. There are styles of hose built specifically to handle low-temperature environments such as construction sites or airport ground support in northern winter climates where temperatures can dip below freezing for several days. The compounds used in these hoses are created to resist stiffening and cracking up to -70 degrees F while maintaining their service life.

Specific rubber compounds that are made to maintain their performance for specialized applications can prevent catastrophic failures. All hoses are not created equally.

How High Temperatures Affect Hose

On the other side of the coin, high temperature can wreak havoc on an incorrect

hose assembly. For example, we've seen general purpose air hose rated for 150°F used coming directly off a large industrial compressor where temperatures can easily reach 200°F. This caused premature failure.

Another factor to consider is the ambient temperature or the temperature of the environment or the surrounding object. If the environmental temperature, both indoors and outdoors, is extremely hot or cold, this would affect the specific hose we would recommend for your application.

So if you need hose assemblies to function in an environment where a human wouldn't be comfortable working without protective gear, for instance near a furnace door or on a forklift in an ice plant, consider changing your hose to one rated for extreme conditions to greatly improve the life of the hose and reduce downtime for failed assemblies.

Application
At first, "application" might seem like a broad term in regards to choosing the correct hose for the job, but it really isn't. "Application" refers to the environment in which the hose will be exposed to. Exposure can mean anything from what is being conveyed through the hose, to external exposure to other chemicals, ozone, or other harsh environments.

How Environment Affects Hose

For instance, in a steel manufacturing plant, you might need to protect the exterior of a hydraulic hose from molten splash caused by the manufacturing processes that occur in a steel mill. Without discussing some of the harsh environmental challenges, a hydraulic hose without the correct external protection is a failure waiting to happen.

Another example of "application" would be a high abrasion area for a hydraulic system. We see this a lot of time in the field with mobile hydraulics, such as small bulldozers, excavation equipment, and sanitation trucks with hydraulic arms that

are constantly extending and contracting. Without a stronger external cover, these hoses will fail quicker than if the correct hose was used for this application.

Sometimes hoses, both hydraulic and industrial, will need to be routed through a tight turn and the bend radius of the hose will be a factor in choosing the right series of hose. This is one of the reasons we will ask customers as many questions as we can – to ensure they get the exact hose they need for their application.

Such questions are:

- How did the previously installed hose perform?
- Did the hose assembly fail because it was incorrectly spec'd?
- Did the outer cover fail prematurely due to environmental stressors?
- Could these have been prevented if the correct hose was used for this application?
- What regulations might dictate what hose we'd recommend? (FDA, USCG, etc)

There are a multitude of situations and conditions that must be considered to correctly and safely spec a hose. In some applications, there might be a need for a static dissipative hose to prevent the buildup of static electricity. It is up to us as hose professionals to ensure the hose we recommend is up for the job and will keep you safe – every time.

Media / Material
The letter "M" is for Media (or material). Media refers to what is actually being conveyed through a section of hose, ducting, pipe, or expansion joint. This is an important piece of information we will need when offering a recommendation for the hose that is suited for the job at hand.

Various media types will require different liner materials, as the media will be in contact with the i.d. (inside diameter) of the hose.. For example, any type of rock or aggregate will require a natural gum or urethane liner to hold up to the demands of an abrasive media that would quickly tear down a less suitably lined hose, quickly

reducing the life of the assembly.

Another example would be a chemical hose assembly. Not only is it important to know the exact chemical that is being used in your process, but knowing the concentration of that chemical is imperative. Depending on the concentration of a chemical, it could require a different liner material to withstand the rigors of constant exposure.

An often overlooked requirement for hose assemblies are what chemicals/media the external surface of a hose might be exposed to. In the case of a petroleum hose that is being used in an environment where the outside cover is constantly exposed to petroleum-based oils or lubricants, you would want to make sure the cover is specifically engineered to withstand external degradation from petrochemical exposure.

Pressure
In the hose world, pressure is typically referred to as PSI (pounds per square inch). Hoses can rated for suction as low as 29.92 in.-Hg (full vacuum) or as high as 20,000 psi for extreme hydraulic applications.

Typically, hoses are engineered to either a 3:1 or 4:1 safety factor. For example, a 4:1 hose that has a working pressure of 2,000 psi, has a burst pressure of 8,000 psi. It is very important that you never exceed the stated working pressure of any hose assembly. The safety factor is built into the assembly to handle sudden system pulses or spikes that could potentially lead to a catastrophic failure.

When recommending a hose for your application, we will always ask what the highest operating pressure is for your specific system or piece of equipment. Much like the weakest link in a chain, a failure could potentially happen if a system component or hose is incorrectly selected.

Equally important is knowing if there are dynamic or static pressure considerations for your application. Dynamic pressure means the operating pressure can fluctuate,

potentially causing shock, vibration, and temperature changes. Static pressure is free from those fluctuations that dynamic pressure sees once the system is completely pressurized. If it's been established that you're working with a dynamic pressure situation, your hose should be rated to withstand the system working and impulse pressure combined, to handle any potential spikes.

Ends
Ends refer to the type, style, thread/connector, material, orientation, and attachment method that you need for a proper connection.

There are various methods for coupling a section of hose with fittings, ranging from permanently attached hydraulic fittings, utilizing a one-piece or two-piece (ferrule and stem) method, to two-piece field-attachable fittings that can be installed in remote areas without the benefits of a powered crimping machine.

Cross Hose & Fittings offers in-house hose crimping technology that can accommodate industrial assemblies up to 4" inside diameter, and vendor partners that can crimp assemblies up to 10" inside diameter.

Some of the materials that fittings are offered in vary from aluminum, plated steel, black iron, stainless steel, brass, PVC, thermoplastic, and even some exotic materials like titanium.

Another important consideration is the orientation of the fittings on your assembly. Specifically, if each of your fittings have a unique angle in which they are oriented. A good example would be if you had both a 45 degree and 90 degree fitting on opposing ends of an assembly, it is extremely important to ensure the fittings are facing the exact direction you need them in, or installation could be impossible.

Delivery
Delivery refers to the specific needs of each individual customer regarding delivery dates. Does the assembly need to be pressure tested? Are there any special packaging/shipping requirements to ensure the assembly arrives intact? Does the

assembly need to be tagged for traceability (utilizing Parker's PTS-Parker Tracking System)?

The S.T.A.M.P.E.D. system of hose requirements is an absolutely critical list when it comes to recommending the correct hose for the correct application. For more information about selecting the right hose, contact a Cross hose and fittings specialist. Our team has years of experience working with a full range of hose and assembly types and can help your team determine the best products for your operation, no matter what the application.