

The Top 20 Tubing & Hose Buying Tips

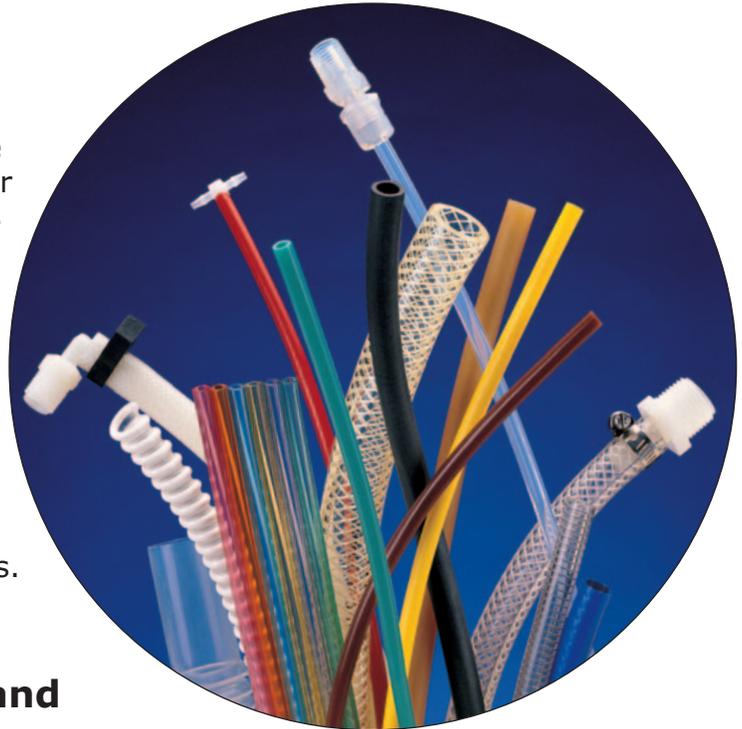
Part 2: Tips 11 through 20

NewAge® Industries, Inc.

Introduction

In Part 2 of the Top 20 Tubing & Hose Buying Tips, further considerations for tubing selection are examined. Topics such as flammability, corrosion resistance and indoor/outdoor use are reviewed.

It's all in an effort to help you choose the right tubing or hose for your application the first time and avoid the hassle, frustration, down-time and costs associated with purchasing errors and product returns.



11. Investigate hardness and softness needs

How soft or hard should your application's tubing or hose be? Tubing hardness is measured as its durometer, and different scales, namely Shore A, Shore D, and Rockwell R, are commonly used for plastic and rubber materials. The lower the scale number, the softer and more flexible the material will be.

For instance, silicone tubing is a very soft, flexible product. A typical hardness rating for it is Shore A50. Polyurethane tubing is not as soft as silicone and can measure between Shore A70 and A95. Harder materials such as nylon and polyethylene are normally measured on the Shore D scale, and actual ratings vary widely due to different material formulations (i.e., high density polyethylene and linear low density polyethylene). Others like polypropylene use the Rockwell R scale.

Flexibility and softness – or hardness – requirements differ greatly between applications, so the needs for your particular job must be carefully considered. In general, softer tubing materials are more flexible, and some may be a bit tacky. Harder products normally offer less friction and can easily glide across the surface of other items. Also, the type of fittings that are needed to make connections changes depending on tubing hardness, as does the necessity for clamps.

12. Check for flammability

Tubing and hose applications can involve high temperatures or electricity, leading to concerns about fire safety and flammability. How about your application?

Do you know what will happen to the tubing or hose if it catches on fire? Might it emit fumes? Self-extinguish? Is it non-flammable? It all depends on the material.

Some tubing and hose, such as that made from particular polypropylene formulas, meets burn ratings established by Underwriters Laboratories (UL). Silicone tubing will self-extinguish, and fluoropolymer is non-flammable. Certain silicone and fluoropolymer formulations can withstand temperatures as high as 500°F (260°C) and are frequently used in electrically-associated applications like computers and appliances. But other tubing can release hazardous chemicals when burned. An example is the high-performance synthetic rubber, Viton™.

Be sure to consider the likelihood of fire or burning when selecting tubing or hose for your particular application. If your supplier is unable to provide flammability data, evaluate the choices carefully and consider testing the product.

13. Consider quality

Will your application's tubing or hose transfer critical fluids? Is there reason for you to be concerned with the environmental conditions under which the tubing or hose is manufactured? Or is the application a simple drainage tube that needs to transfer condensation from point A to point B?

Applications vary greatly, and the highest quality product available is not always necessary. When the application involves high purity (vaccine manufacture, for example), standards from organizations such as the FDA (Food and Drug Association) and USP (United States Pharmacopoeia) may dictate which tubing and hose materials can be used. Factors such as leachables (chemicals or additives that can migrate out of the tubing or hose), material and product curing processes, and traceability may be vital. Research the products under consideration and ensure they meet the required standards.



When the application's not so critical, you may be able to save money by using tubing or hose that doesn't meet stringent requirements. Relatively inexpensive products like unreinforced PVC or polyurethane tubing perform well in many applications. Be sure to consider products discontinued by a manufacturer, too. They may be acceptable for your application and available at a reduced cost.

14. Be aware of moisture-related factors

Does your application involve water, condensation, or humidity? Tubing and hose materials react to moisture in different ways.

Some materials absorb water and other liquids, and that may be unacceptable. Absorption (the penetration into the mass of one substance by another) can cause the tubing to swell, so if the application involves dispensing measured amounts of a fluid, you may actually be getting less than the desired amount. Swelling can affect physical properties such as elasticity and tensile strength.

Tubing that absorbs fluids can leach those fluids back into the stream and cause contamination in critical applications. Problems with fitting connections can occur, too, and applications involving a tight fit may be jeopardized.

Materials such as PVC and fluoropolymer have smooth, slick surfaces, leaving less opportunity for fluid adsorption (the process by which molecules of a substance, such as a gas or a liquid, collect on the surface of another substance, such as a solid; the molecules are attracted to the surface but do not enter the solid's minute spaces as in absorption). Other materials like ether-based polyurethane resist attack from moisture and inhibit mold growth.

Be sure to check tubing and hose descriptions for information regarding moisture absorption when you believe it could affect your application's performance.

15. Look for incompatible ingredients or substances

What will travel through the tubing or reinforced hose used in your application? The ingredients of the substance, be it a gas, fluid, powder, or granular material, must be compatible with the tubing or hose you plan to use.

An adverse reaction between tubing and the material flowing within it could be disastrous. You don't want a situation where, for instance, an acidic fluid eats its way through the wall of the tubing. Several tubing materials (PVC, fluoropolymers, Viton™) offer a high degree of chemical resistance and can be used in a wide variety of applications. Others are better suited for simple air transfer or water drains.

Materials like polyurethane are less likely to leach ingredients

The ingredients of the tubing or hose can also have an effect on the materials flowing within. Sometimes chemical compounds used in their manufacture can leach out or react with substances. Certain tubing materials like polyurethane are less likely to leach ingredients.

Don't forget about other fluids and gases with which the tubing or hose may come in contact. Consider cleaning products that may be used on the exterior or gases that may exist in the same room as the tubing or hose. The chemicals may seem harmless enough, but their effects on particular tubing and hose materials should be investigated.

When you're unsure about ingredients being well suited to each other, consult chemical compatibility charts, ask colleagues, and question suppliers to be sure the tubing/hose and the material it will carry will work well together.

16. Check for abrasion and corrosion resistance

If your application involves the movement of tubing or hose against other equipment, you'll need to make sure that both the tubing and the equipment can withstand any abrasion. You'll want to avoid a situation where motion or vibration causes friction between tubing and equipment. But when that's not possible, the tubing material selected must be abrasion resistant.

Certain materials like polyurethane and nylon handle abrasion better than others. The materials' properties allow them to naturally withstand repetitive scraping or rubbing. Other materials – silicone, for example – are better suited to applications that do not involve abrasive environments, although options like jacketing and special formulations can make materials acceptable.

Corrosion resistance is another item to consider. Is the liquid in your application acidic? It will need to flow through tubing or hose that can withstand such a chemical formula. PVC is known for its corrosion resistance, as are fluoropolymers like PTFE, FEP, and PFA.

Consider, too, the environment the tubing or hose will be in and whether corrosive fluids will come into contact with the tubing or hose. Will anything drip down onto the tubing? Splash up? Might a lubricant used on other parts of the equipment (i.e. metal) affect the tubing?

17. Research alternate materials

Do not assume you're aware of every tubing and hose material available. Research each need individually to make sure you're not over- or under-engineering your application. Advances in plastic and rubber development occur frequently, and you should keep yourself informed. Today's scientists and chemists are working on plastic materials that will harden and soften in response to electrical impulses, break down in seawater, transmit electricity, and are transparent yet nearly as strong as steel.

Some plastic materials have similar properties and can be substituted for each other, depending on the application. For instance, polypropylene and fluoropolymer tubing often have comparable performance characteristics such as their tensile strength, excellent chemical resistance, and outstanding electrical properties. Polypropylene doesn't have fluoropolymer's wide temperature range, but it can often serve as a less-costly replacement.

Coextrusions – tubing with one material on the interior that's permanently bonded to another on the exterior during the manufacturing process – are another option. When an application requires different performance characteristics for the inside and outside of tubing, coextrusions can often save costs. Hytrel®-lined PVC is one example of a coextrusion. Oil-resistant Hytrel makes up the interior while durable PVC protects the outside. It can be used in a harsh

environment application involving the transfer of oil where the durability of PVC is needed for the exterior, and the oil resistance properties of Hytrel come into play on the interior contact surface.

Another example of coextruded tubing is polyethylene-lined EVA (ethylene vinyl acetate). Polyethylene tubing is typically a semi-rigid product. The addition of EVA enhances its flexibility and allows its use with economical barb-style fittings. Like Hytrel-lined PVC, this tubing offers different performance characteristics for the inside and outside of the tube – cleanliness inside, flexibility outside.

Keeping alternate tubing materials in mind or researching them for a project, whether it's a new one or a retrofit situation, can help hold down costs. Using a material that does more than you need isn't always the best choice.

18. Consider indoor or outdoor use

Does your application involve the use of tubing or hose inside a facility or out of doors? Conditions can vary greatly in either environment, but indoor usage normally offers more predictable surroundings. Temperature and humidity can be monitored and maintained indoors. Ventilation, whether it's automatically operated or controlled by fans that are turned on manually, can be regulated. Lighting is manageable.

Consider the whole environment in which your tubing or hose will operate

Outdoor usage can have particular requirements. The tubing or hose may need to resist temperatures that vary from well below freezing to over 100°F or higher. It may need to handle the effects of rain, wind, and gases like ozone. And regardless of the effects of weather, the tubing's flexibility should remain predictable.

Sun exposure is another important consideration. Sunlight and its heat can alter some tubing and hose materials by hardening or discoloring them. Certain materials (polyurethane, for example) and/or colors (black) handle the effects of sunlight and ultraviolet rays better than others.

Consider the whole environment in which your tubing or hose will operate when choosing the best product for each application, whether it's indoors or outdoors.

19. Explore custom options

Don't settle for stock products if they don't fulfill your requirement – ask about customization. Can the tubing be made in a different size? Can it be tinted to match your company's identifying colors? Can it be made in a different hardness (durometer)? Can it be molded to fit around a particular design element? Can you get it with fittings and clamps already attached? Can you get 8,000 pieces, each a foot long, with a 4" slit at one end?

Some companies are able (or willing) to sell only full coils of tubing or reinforced hose and offer no alternatives. But you may not know if you don't ask.

Customization can be as simple as a different I.D. (inner diameter) or as complex as color-matched tubing with a static dissipative additive that's printed with temperature limitations and formed into 10 foot retractable coils with a diameter of 5". Be sure to explore your options when an application calls for a non-stock item.

Examples of customized tubing and hose include performance additives, different colors and sizes, in-line cutting, thermal bonding, heat-formed shapes, coiling, printing, overbraiding, and hose assemblies. Keep in mind that minimum quantities and lead times are likely with custom products.

20. Don't forget about fittings and clamps

In most cases you'll need to attach your tubing or hose to other equipment. Fittings and clamps come in many different materials – from nylon to PVDF, fluoropolymer to brass – so you can select the best match for your application. You can even build an entire system from one material (polypropylene, nylon, polyethylene, fluoropolymer), which can greatly simplify the upfront work of checking for chemical compatibility.

When using different tubing and fitting materials, remember that the two materials must be suited to each other and must both work well in your application. Pressure and temperature also need to be considered.

In general, softer tubing like PVC, polyurethane, and silicone work best with barb style fittings. Barbed fittings are inserted into the tubing, which stretches to grip the barbs and form a seal. They are available in plastic or metal in a variety of styles and may be used repeatedly or for single uses.



Clamps are typically needed when barbed fittings are used, and they, too, come in various styles and materials. Some can be applied by hand, while others require the use of screw drivers or hand tools.

Harder tubing materials such as polyethylene, polypropylene, and nylon are better suited to push-to-connect and compression fittings. Unlike barbed fittings, these types grip the exterior of the tubing. O-rings and/or the fitting's surfaces seal the tubing ends for leak-free connections.

In the case of a hose assembly with a permanently-attached, stainless steel barbed fitting, a collar is typically used. The collar acts like a clamp by putting pressure on the hose, sealing it to the fitting on the hose's interior. The attachment is done by trained personnel using special equipment.

Your fitting and clamp choices will be determined primarily by your application, but be sure to do the research needed to determine which material and style will work best.

Bonus Tip

Contact the Fluid Transfer Specialists® at NewAge® Industries for your tubing, hose, and fitting needs.

Take advantage of our sales team's knowledge and experience to help you select the best products for your application. Our Sales Team Members have been working in the industry for decades, and they know plastic tubing.

Once you're sure of what you need, benefit from millions of feet of tubing and hose in inventory. Twenty-eight product lines in sizes from

1/64" I.D. through 4" I.D. are stocked, along with ten styles of fittings and clamps. Most orders for in-stock products are shipped the same day the order is placed, *and* we offer a high degree of order accuracy, meaning you get what you need the first time . . . and that makes your job (and ours) easier.

Download part 1 of *The Top 20 Tubing & Hose Buying Tips* (Tips 1 through 10)

About NewAge Industries

In business since 1954, NewAge Industries manufactures thermo-plastic and thermoset tubing in reinforced and unreinforced styles. The company services customers worldwide, and in 2006 initiated an ESOP (Employee Stock Ownership Plan) for the benefit of both its employees and customers.

Its AdvantaPure® division (www.advantapure.com) is ISO 9001:2015 certified and specializes in high purity tubing, hose, Single-Use systems, manifolds, and other molded components for the biopharm and pharmaceutical industries. NewAge's Verigenics® division (www.verigenics.com) focuses on automated identification solutions that enable medical device, pharmaceutical and other regulated companies to track and authenticate consumables, assets and equipment.



Fluid Transfer Specialists®

ESOP Employee Owned
for Your Benefit



A Solar Powered,
Zero Landfill Company

145 James Way • Southampton, Pennsylvania 18966 USA
888-506-3924 • 215-526-2300
www.newageindustries.com • info@newageindustries.com

NewAge®, Fluid Transfer Specialists®, NewAge Industries AdvantaPure® and Verigenics® are registered trademarks of NewAge® Industries, Inc. Viton™ TM The Chemours Company • Hytrel® reg. TM E. I. du Pont de Nemours and Company

© Copyright 2022 All Rights Reserved. 3/7/22

Reproduction of this document or any part thereof, in any form whatsoever, is prohibited without express written permission of NewAge® Industries, Inc.