

Accuflex Beverage Transfer Products

Frequently Used Terms

- **Barrier** — A special layer applied to hose or tubing that is designed to prevent permeation or contamination. Advantages: Flavor protection, longer service life. Disadvantage: Stiffer.
- **Non-Barrier** — Hose or tubing which does not contain the special barrier layer. Advantages: Costs less. Disadvantages: No flavor protection, shorter service life.
- **Flushable** — The ability to rinse out a previous flavor from a hose or tube. Advantages: Can change flavors without danger of flavor contamination. Disadvantage: Costs more.
- **Non-Flushable** — The inability to rinse out previous flavors from a hose or tube without the danger of flavor contamination. Advantage: Costs less. Disadvantage: May have to replace the hose or tube in order to safely change flavor.
- **Permeation** — The movement of molecules from an area of high concentration to one of low concentration until equilibrium is obtained. Advantage: Rids smoke. Disadvantage: Makes it necessary to use barriers.
- **Tubing** — Cylindrical shape, sometimes called a core tube, no reinforcement. Advantages: Less bulky, lighter weight. Disadvantage: Lower working pressure.
- **Hose** — Multi-layered cylindrical shape; has core tube, reinforcement and cover. Advantage: Higher working pressure. Disadvantages: Bulkier and heavier.
- **Bundle** — Multiple tubes and/or hoses wrapped together closely to form a compact unit. Advantages: Easy to install, saves labor. Disadvantage: Lines need barrier protection.
- **Cabled bundle** — Twisted bundle construction to increase overall flexibility. Advantage: Easier to install. Disadvantage: Costs more to produce.
- **Insulated bundle** — Bundle with insulation, used in recirc and beer installations. Advantage: Helps keep beverages cold. Disadvantages: Costs more, bulkier.
- **Uninsulated bundle** — Bundle with no insulation, used for room temperature runs. Advantages: Less costly, less bulky. Disadvantage: No thermal protection.

Frequently Asked Questions

Q: What is the difference between tubing and hose?

A: Tubing has a simple single wall, and a lower pressure rating. Hose has several layers and is reinforced for higher pressures and, while it is slightly stiffer, it usually has a smaller bend radius.

Q: What does "Barrier" and "Non-Barrier" mean?

A: A "Barrier" is a layer in the hose or tube that prevents flavors from permeating through the wall and contaminating other flavors, for example, root beer flavor penetrating into a tube carrying a lemon-lime beverage and contaminating its flavor. A hose or tube that is a "Non-Barrier" product has no such protection from permeation and flavor contamination.

Q: What does the term "flushable" refer to?

A: The term "flushable" refers to the ability of a hose or tube to have a flavor rinsed out completely and then begin carrying a new flavor with no taste carryover.

Q: What is the difference between cabled bundles and non-cabled bundles?

A: Cabled bundles are twisted during assembly to give them greater flexibility. Non-cabled bundles are simply hoses and/or tubes grouped together in parallel bundles. They are fine for short runs, but are fairly stiff and hard to bend.

Q: What do you mean when you talk about permeation?

A: All plastics permeate. This means that molecules of flavor penetrate into the plastic core tubes and, in many cases, they can get all the way through a hose or tube and even get into an adjacent hose or tube. This causes flavor mixing and flavor contamination. Accuflex's dual barrier hoses and tubes are 500+ times less permeable than most plastic hoses and tubes.

Q: What is flavor ingress or cross-tasting, and what precautions can be taken to prevent it?

A: Organic liquids and vapors can permeate through essentially all plastic and rubber materials to some extent. The rate of permeation is determined by the chemical nature of the organic substance and of the polymeric material. Although polyethylene is a very inert material, containing few extractable components and having excellent resistance to water absorption, it has relatively low resistance to permeation by organic hydrocarbons and oily substances. When a flavor or contaminant permeates from the surrounding environment through the hose or tubing into the contained beverage, flavor ingress or cross-tasting is said to have occurred.

Plastics that display excellent resistance to permeation are considered to be "barrier resins." A layer of these barrier resins can be incorporated into a hose or tube as an overlapping layer or as a seamless co-extrusion. Although very thin when

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Frequently Asked Questions (continued)

compared to the rest of the hose or tubing wall, the barrier layers offer effective protection against flavor ingress.

When hose or tubing is exposed to cleaning fluids or environmental contaminants, or when the lines are confined in close proximity to each other, as in a bundle or conduit, the flavors of beverages inside the hose or tubing can be affected by flavor ingress or cross-tasting. We recommend that barrier-style hoses, tubing, or bundles be used in these situations.

Q: Do some flavors cross-taste more than others?

A: Most non-barrier hoses and tubes use polyethylene as the primary material. Polyethylene allows most organic hydrocarbons to permeate relatively quickly without causing any physical change in the polyethylene itself. The rate of permeation is approximately the same for each flavor, but the level at which a given flavor can be detected may vary greatly. Pungent flavors such as root beer, cherry, or strawberry are very strong, and can be detected at very low levels, as compared to non-pungent flavors. Therefore, a pungent flavor will be detected as a contaminant in a non-pungent flavor relatively easily. Furthermore, fruit flavors based on limonene are readily absorbed and held by polyethylene, which releases it slowly to the atmosphere or the beverage contained inside the tube. The high absorption level and slow release are the reasons why fruit flavors are so difficult to flush out of polyethylene hose or tubing.

Q: Water, syrup or CO₂ . . . which hose or tube is best for what?

A: The main criteria in choosing the proper hose or tube are the physical conditions such as pressure, temperature, and environment. Particular attention must be paid to pressurized lines such as CO₂ transfer lines in which higher pressures may require the use of hose instead of tubing, keeping in mind that pressure ratings are reduced at higher temperatures.

Secondly, the environment must be considered to determine if there is a need for barrier protection, such as installations in a floor chase or individual lines in a bundle carrying pungent flavors. Water lines in particular must be protected from contamination, whether run inside a bundle or alongside it.

Q: What size and type of clamp should be used?

A: To obtain uniform compression around the tube or hose, we recommend the use of a stepless ear-type clamp. The clamp must be sized so that it will still slide over the tube after the barbed fitting is inserted, and exert sufficient compression on the materials before the clamp is fully closed. When soft materials are involved, it must be recognized that the clamp will sink into the materials somewhat, perhaps necessitating a smaller sized clamp. When properly sized, the sides of the ear should not be touching each other when the clamp is installed.

Q: How tightly can beverage lines be bent in a permanent installation?

A: The minimum bend radius values shown in this catalog represent the smallest curvature to which a product should be exposed in a positive pressure installation at room temperature, as measured in the inside of the curve. Minimum bend radius depends upon diameter, wall thickness, material hardness and elasticity, and application conditions. If negative pressures or elevated temperatures are involved, larger values should be considered. As a general rule of thumb, a minimum bend radius for a hose or tube is 10 times the OD of the product. This is a conservative value and should apply to most products, unless very thin walled hoses or tubes are involved.

Q: What fire regulations must be considered when installing beverage lines?

A: All beverage lines must be installed in accordance with all applicable regulations and building codes. The most common questions involve the use of lines in ceilings, and, in particular, in plenums. A plenum is an area from which air can be drawn into the living space in a building through the heating or air conditioning systems. A plenum may be a specific air duct, or could be an entire attic area. In the event of a fire, it is important that the materials inside a plenum not generate any significant level of toxic smoke. Halogenated materials such as PVC are of concern in such areas, and should be enclosed in a fire resistant chase.

All materials used in a plenum must be "non-combustible" as defined by standards such as ASTM E-84 in the USA or CAN/ULC S102.2 in Canada. In both of these standards, the maximum values for flame spread and smoke generation are 25 and 50 respectively. Since the primary concerns in the design of beverage hose and tubing are taste integrity and health safety, flame retardant additives cannot be added directly to any components that may be exposed to the beverage. Therefore, the products must contain barrier layers to ensure that no flame retardants migrate to the contact surface. Accuflex's **Bev-Seal Ultra**® Series 235FR, 175FR, and 974FR Fire Resistant tubing, hose and bundles satisfy these requirements with a 0/0 rating.

Q: What is the difference between standards NSF-51 and NSF-61?

A: The National Sanitation Foundation has issued two standards that can relate directly to beverage applications. Standard NSF-51 covers Food Equipment and Related Products, Components and Materials, and includes dispensers and other equipment involved in the preparation, storage or transfer of foods and beverages (including alcoholic beverages). The criteria relate somewhat to FDA regulations. Standard NSF-61 covers Drinking Water System Component – Health Effects, and includes all equipment that comes in contact with drinking water. These criteria are based on EPA guidelines. Many of our hose and tubing products carry both NSF-51 and NSF-61 listings, so that they can be used with both drinking water and prepared beverages.

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