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## **Tubing Considerations for Food and Beverage Peristaltic Pump Applications**

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Peristaltic pumps are a reliable and vital link in the demanding food and beverage dispensing industry. These pumps can affect productivity by reducing maintenance and operational costs and improving reliability and performance. Since the tubing is the only component that comes into contact with the fluid, it makes it a vital component of the peristaltic pump.

The tubing has to meet today's hygiene standards and be able to handle food substances with care and accuracy.

### **Applications**

Before addressing the benefits of using peristaltic pumps in food and beverage applications, it is important to delineate the many uses of this technology in the industry. On the processing side, peristaltic pumps can be used to control chemical, liquid ingredient and flavoring dosing. This equipment is also critical to the transfer of highly viscous ingredients such as food slurries, fruit skins and other solids. Over on the dispensing side, peristaltic pumps can be used to transfer fruit juice and ice cream, among others.

### **Peristaltic Pump Benefits and Tubing Implications**

Benefits of peristaltic pumps in food and beverage applications include: food hygiene, cleaning, reliability and low shear.

#### **Food Hygiene**

The risks of bacterial growth and product clogging are lowered through the use of a peristaltic pump as the fluid is totally contained within the hose and tube. The pumping action ensures that the tube is fully swept, and the suction and delivery orientation enables the pump to self-drain, which eliminates any risk of dilution or cross contamination.



#### **Cleaning**

Since the fluid's only point of contact is with the tube in a peristaltic pump, there is no dismantling and no parts, such as valves, diaphragms, seals, etc., to clean. Instead it's simply a matter of cleaning or replacing the tubing.

## Reliability

Without the various parts that tend to leak, clog, corrode or need to be replaced, peristaltic pumps are virtually maintenance-free. Because the peristaltic pump is able to transfer a range of products -- from abrasive foodstuffs to highly corrosive chemicals -- through a flexible tube rather than through the pump head itself, corrosion or abrasive wear of the pumping mechanism is eliminated.

## Low Shear

Gentle pumping action, or low shear, makes peristaltic pumps ideal for food processing purposes as the pumping action will not damage or degrade a product's consistency or appearance. Where other pumps might risk damage to the product, the peristaltic pump ensures product quality.

## Peristaltic Pump Tubing

Specific attributes that need to be considered when choosing peristaltic pump tubing, include: sizing and tolerances for consistent flow rates; elasticity for repeatability; and wear resistance, chemical resistance and organoleptics for product quality.

### Tygon® E-65-F: Taste and Odor Free, Long Life Tubing for Peristaltic Pumps

Our new food and beverage dispensing tubing solution has excellent flexural fatigue resistance, making it the best choice for peristaltic pump use. Tygon® E-65-F was also designed to withstand extreme temperatures from -75°F to 275°F and will not crack or deteriorate when used in demanding food and beverage applications.

Further, a sensory analysis conducted by an independent and objective party\* found that Tygon® E-65-F has a taste free and odor free profile for applications with cola syrup and equivalent products. Learn more about this solution [here](#).

Tygon® E-65-F meets NSF 51 and the applicable requirements of FDA Food Additive Regulations and Regulation (EC) No 1935/2004 for its intended use.

\* 03/09/18 Siena Development Saint-Gobain Tubing Testing Certificate. 11/29/17 Corrosion Testing Laboratories Inc. CTL REF#33584

## Accurate Sizing and Tight Tolerances

Because the peristaltic pumps are designed to squeeze the tubing a specific distance (occlusion) and dispense a food or beverage at a specified rate, the tubing needs to be designed to have an inner diameter and wall thickness that meets the design requirements of the dispensing system. IDs that are too large will have a higher flow rate, and IDs that are too small will have flow that is too low. On the extreme end, if the wall is too thin then the pump cannot be primed or generate the vacuum on the back side to pull the media into the pump. Walls that are slightly too thin may not be able to generate the pressure needed to dispense and walls that are too thick will cause excessive compression on the tubing leading to particle shearing (spallation) and early failures.

## Elasticity

Over the life of the pump, peristaltic pump tubing can be squeezed potentially millions of times. Tubes have to withstand these compressions without cracking or having a significant drop in the flow rate of the food or beverage. Elasticity gives the tubing the ability to consistently rebound and push fluid out at a repeatable rate.

## Chemical Resistance

Cleaning chemicals or even the food itself can cause effects on peristaltic pump tubing. These effects can show most often up as either absorption of the media into the tubing or extraction of contents in the tubing to the media. Either way this is bad for the performance of the tubing in the pump. Both lead to a drop in the expected life of the tube.

## Organoleptics

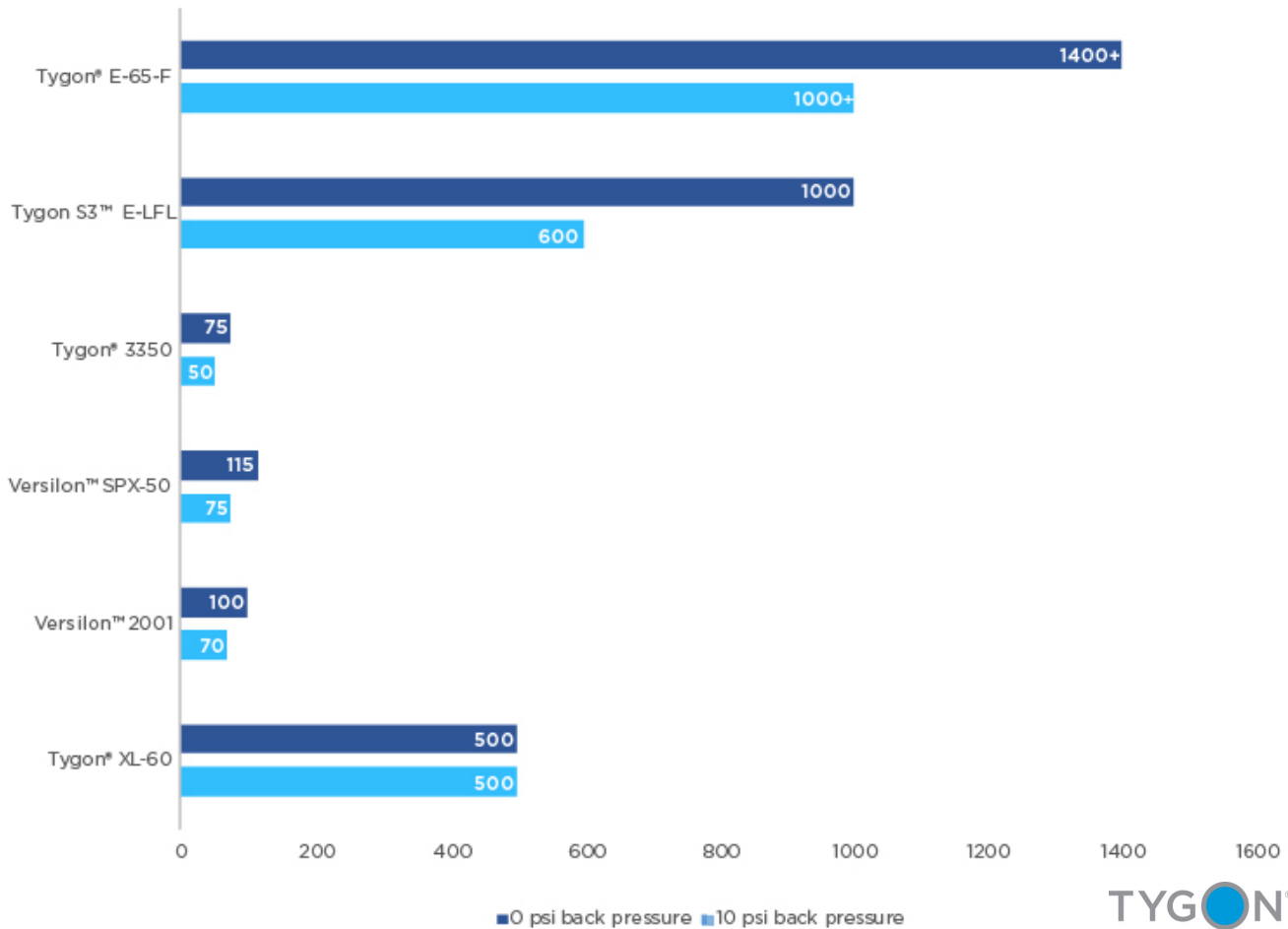
Peristaltic pump tubing should not impart negative taste or odor into the food or beverage it is pumping.

## Wear Resistance

The pumping action on the tubing can cause the inner surface of the tubing to erode over time. This erosion can cause spallation i.e., particulate shedding, from the tubing ID. It is important that the tubing minimizes these particulates to keep the food or beverage pure.

### Comparative Peristaltic Pump Tubing Life

The chart below depicts hours until failure of ¼" I.D. x 3/8" O.D. tubing in each corresponding formulation. In each case, a 3-roller pump head was utilized operating at 600 RPM under room temperature (73°F). Tubing failure is measured in hours of use prior to rupture.



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Both peristaltic pumps and peristaltic pump tubing offer essential benefits to food and beverage processing industry through hygienic performance standards, repeatability, greater accuracy, reduced downtime and lower maintenance costs. Additionally, compared to other tubing technologies, Saint-Gobain offers critical benefits through superior performance and improved finished product quality.

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***Saint-Gobain's Performance Plastics** business is headquartered in Solon, Ohio, and employs 6,000 people in 22 countries. It is a world leader in high-performance plastics, including flexible tubing, seals, coated fabrics, foams, window film, barrier/release films, tapes, medical components, fluid handling systems and bearings.*

***Saint-Gobain's Process Systems** business unit helps customers achieve safety, performance and brand assurance through a broad range of capabilities that rely on superior engineering and customer support. Our product applications include those in the food, beverage, habitat, aerospace, chemical and electronics sectors. We've helped customers in all of these industries achieve goals in innovation, efficiency, sustainability and product integrity through customized solutions such as flexible tubing, gaskets, seals, hoses, fittings, pumps, valves and manifolds.*

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