



Food and Beverage Applications



Superior Performance in Peristaltic Pumps

Designed specifically for use in peristaltic pump applications, Tygon® XL-60 tubing maintains a pump life of over 500 hours. With a durometer hardness of Shore A 60°, it is extremely flexible and exhibits superior flex life, reducing downtime due to pump tubing failure (see "Comparative Peristaltic Pump Tubing Life" on the following page). Tygon® XL-60 tubing can be considered an alternative to silicone and PVC when longer pump tubing life is required.

Excellent Physical Properties

Tygon® XL-60 tubing is translucent in color and has excellent chemical resistance to a wide range of fluids, including acids and bases. It also exhibits excellent resistance to ozone, oxygen and sunlight aging. Tygon® XL-60 tubing remains flexible at -40°C (-40°F) and is temperature resistant up to +121°C (250°F).

Low Extractables

Tubing materials used for food and beverage transfer are not totally inert; hence there may be physical and chemical interactions with the food product, which play a decisive role in the selection of the tubing material. The nature of these interactions includes permeation of gases and vapours across the tubing, migration of tubing components into the food, and sorption of food components. These interactions can give rise to odours and degradation reactions in both the food and the tubing. Tygon® XL-60 tubing was subjected to a migration study with food simulants and the Gas Chromatography Mass Spectrometry (GC-MS) analysis showed that under normal use it does not impart an unwanted taste or odour to the food or beverage being transferred.

Features and Benefits

- DEHP free
- Long flex life in peristaltic pumps
- Temperature resistant up to +121°C (250°F)
- Low extractables
- Alternative to PVC
- Clear and flexible
- Custom colors available

Typical Applications

- Food and beverage transfer
- Peristaltic Pumps

Regulatory Compliance

- FDA 21 CFR 177.2600
- NSF 51
- EU Regulation 10/2011*

* For complete compliance information and appropriate use instructions, please refer to the detailed document of compliance.

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OPTUBUS believes that the information in this technical data sheet is an accurate description of the typical uses of the product. OPTUBUS, however, disclaims any liability for incidental or consequent damages, which may result from the use of the product that are beyond its control. Therefore it is the user's responsibility to thoroughly test the product in their particular application to determine its performance, efficiency and safety. Nothing contained herein is to be considered as permission or a recommendation to infringe any patent or any other intellectual property right.

Comparative Peristaltic Pump Tubing Life

The table below depicts hours until failure of 6,35 mm (1/4") ID x 9,53 mm (3/8") OD tubing. In each case, a 3-roller pump head operating at 600 rpm under room temperature 23°C (73°F) conditions were utilized. Tubing failure is measured in hours of use prior to rupture.



The performance of tubing in peristaltic pumping applications is affected by the conditions of use and equipment utilized, along with size and wall thickness of the tubing tested. The data above is presented for information only and should not be utilized for specification purposes.

Relative Chemical Resistance Properties*

Tubing Material	Acids			Bases		
	Conc.	Med.	Weak	Conc.	Med.	Weak
Tygon®XL-60	G	G	E	G	G	E
PVC Tubing	F	E	E	E	E	E
Silicone Tubing	U	U	U	U	F	F

E = Excellent G = Good F = Fair U = Unsatisfactory

*All tests conducted at room temperature

Tygon®XL-60 Standard Sizes

Part Number	ID	OD	Wall	Min. Bend Radius	Max. Working Pressure* 22°C (73°F)	Vacuum Rating at 22°C (73°F)
TY1,59XL4,76	1,59 mm (1/16")	4,76 mm (3/16")	1,59 mm (1/16")	12,7 mm	2,4 bar	760 mmHg
TY3,18XL6,35	3,18 mm (1/8")	6,35 mm (1/4")	1,59 mm (1/16")	12,7 mm	1,3 bar	760 mmHg
TY4,76XL7,94	4,76 mm (3/16")	7,94 mm (5/16")	1,59 mm (1/16")	19,1 mm	0,9 bar	760 mmHg
TY6,35XL9,53	6,35 mm (1/4")	9,53 mm (3/8")	1,59 mm (1/16")	25,4 mm	1,0 bar	760 mmHg
TY7,94XL11,11	7,94 mm (5/16")	11,11 mm (7/16")	1,59 mm (1/16")	38,1 mm	0,7 bar	508 mmHg
TY9,53XL12,7	9,53 mm (3/8")	12,7 mm (1/2")	1,59 mm (1/16")	50,8 mm	0,7 bar	381 mmHg
TY12,7XL19,05	12,7 mm (1/2")	19,05 mm (3/4")	3,18 mm (1/8")	63,5 mm	1,0 bar	760 mmHg
TY15,88XL22,23	15,88 mm (5/8")	22,23 mm (7/8")	3,18 mm (1/8")	76,2 mm	0,7 bar	508 mmHg
TY19,05XK25,4	19,05 mm (3/4")	25,4 mm (1")	3,18 mm (1/8")	101,6 mm	0,7 bar	508 mmHg

*Working pressures are calculated at a 1:5 ratio relative to burst pressure using ASTM D1599

The values listed for working and burst pressures are derived from tests conducted under controlled laboratory conditions. Many factors will reduce the tubing's ability to withstand pressures, including temperature, chemical attack, stress, pulsation and the attachment to fittings. It is imperative that the user conduct tests simulating the conditions of the application prior to specifying the tubing for use.

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Relative Permeability Coefficient

Tubing Material	Carbon Dioxide	Nitrogen	Oxygen
Tygon®XL-60	1,116	62	186
Silicone Tubing	42,800	3,900	8,025

$$\text{Permeability Coefficient} = \frac{\text{amount of gas (cm}^3\text{)} \times \text{tubing wall thickness(cm)}}{\text{Surface area of tubing D (cm}^2\text{)} \times \text{time (seconds)} \times \text{pressure drop across tubing wall (cmHg)}}$$

TYGON® XL-60 TUBING IS NOT INTENDED FOR USE AS AN IMPLANT MATERIAL.

Typical Physical Properties of Tygon[®] XL-60 Tubing

Property	ASTM Method	Value of Rating
Durometer Hardness	D2240	60° Shore A, 15s
Color	-	clear
Tensile Strength	D412	11.2 MPa (1.630 psi)
Ultimate Elongation	D412	770,00%
Tear Resistance	D1004	33.3 kN/m (190 lb-f/in)
Specific Gravity	D792	0.90
Compression set Constant Deflection, 22 hrs. @ 70°C	D395 Method B	55,00%
Tensile Modulus @300% Elongation	D412	3,83 MPa (555 psi)
Tensile Set @75% Elongation	D412	100
Dielectric Strength	D149	21,6 kV/mm (550 v/mil)
Maximum Recommended Operating Temperature	-	121 °C (250°F)
Brittleness by Impact Temperature	D746	-66°C (-87°F)
Water Absorption, 24 hrs. @ 23°C	D570	0,07%