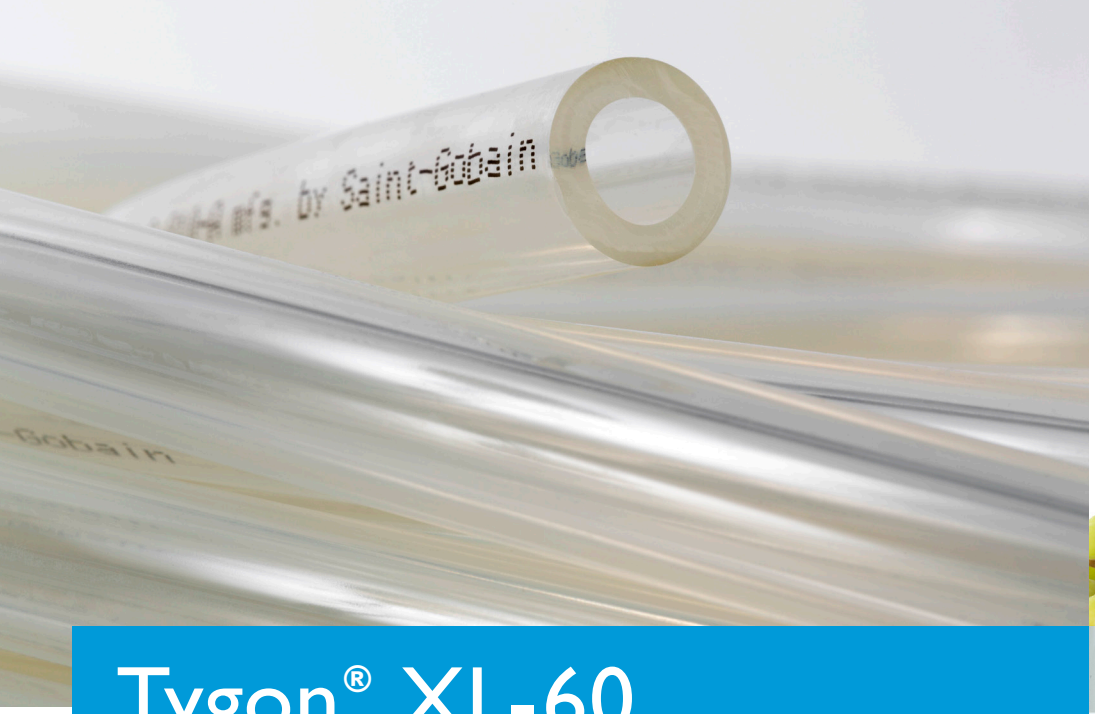

TYGON®
Excellence By Design

Tygon® XL-60

Long Life Pump Tubing for 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 back). Tygon® XL-60 tubing can be considered an alternative to silicones 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°F and is temperature resistant up to 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 250°F
- Low extractables
- Alternative to PVC
- Clear and flexible
- Custom colors available

Regulatory Compliance

- FDA 21 CFR 177.1210
- 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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Tygon® XL-60

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Tygon® XL-60

Part Number	ID	OD	Wall Thickness	Length	Min. Bend Radius	Max. Working Pressure	Vacuum Rating
	(in.)	(in.)	(in.)	(ft.)	(in.)	73°F (psi)*	inHg at 73°F
AN800003	1/16	3/16	1/16	50	1/2	35	29.9
AN800007	1/8	1/4	1/16	50	1/2	20	29.9
AN800012	3/16	5/16	1/16	50	3/4	13	29.9
AN800017	1/4	3/8	1/16	50	1	15	29.9
AN800022	5/16	7/16	1/16	50	1-1/2	11	20.0
AN800027	3/8	1/2	1/16	50	2	11	15.0
AN800038	1/2	3/4	1/8	50	2-1/2	15	29.9
AN800046	5/8	7/8	1/8	50	3	11	20.0
AN800053	3/4	1	1/8	50	4	11	20.0

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

Typical Physical Properties

Property	ASTM Method	Value or Rating
Durometer Hardness, Shore A, 15s	D2240	60
Tensile Strength, psi (MPa)	D412	1,630 (11.2)
Ultimate Elongation, %	D412	770
Tear Resistance, lb-f/in (kN/m)	D1004	190 (33.3)
Specific Gravity	D792	0.90
Water Absorption, % at 73°F (23°C) for 24 hrs.	D570	0.07
Compression Set Constant Deflection, % at 158°F (70°C) for 22 hrs.	D395 Method B	55
Brittleness by Impact Temp., °F (°C)	D746	-87 (-66)
Maximum Recommended Operating Temp.,* °F (°C)	—	250 (121)
Dielectric Strength, v/mil (kV/mm)	D149	550 (21.6)
Tensile Modulus, at 300% Elongation, psi (MPa)	D412	555 (3.83)
Tensile Set, at 75% Elongation	D412	100
Color	—	Clear

Unless otherwise noted, all tests were conducted at room temperature 73°F. Values shown were determined on 0.075" thick extruded strip, 0.075"thick molded ASTM plaques or molded ASTM durometer buttons.

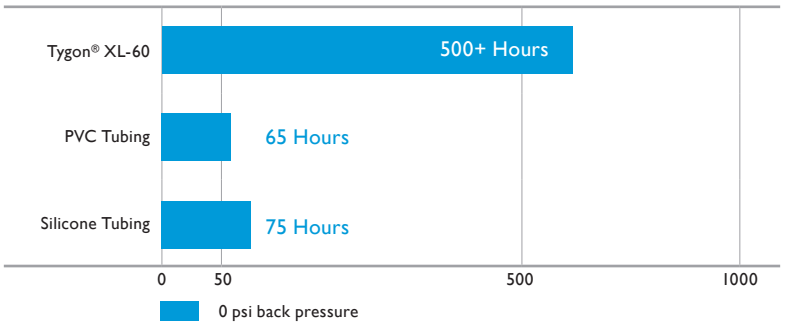
* Values based on static oven test at 0 psi.

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.

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

Comparative Peristaltic Pump Tubing Life

The table below depicts hours until failure of 1/4" ID x 3/8" OD tubing. In each case, a 3-roller pump head operating at 600 rpm under room temperature (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 Tubing	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

Relative Permeability Coefficients

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

Permeability Coefficient ($x10^{-11}$) cc • cm / cm^2 • s • cmHg

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

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