



Laboratory Tubing Catalog



- Saint-Gobain laboratory tubing — engineered to meet the needs of specialized applications
- Tygon® tubing — the benchmark for quality in research and industry
- Custom formulations — solutions for the most demanding specifications

TYGON® Tubing...

...sets the standard for laboratory tubing through high-performance excellence and continuous innovation

Saint-Gobain manufactures a variety of Tygon® flexible tubing options, each engineered to meet our uncompromising standards for consistency and to exceed your expectations for laboratory performance. The Tygon® brand represents a long tradition of excellence and commitment to quality. Our original formulation was launched in the 1940s and remains an integral part of countless fluid transport systems worldwide. Today, we stand committed as ever to continually developing superior new products and improving existing formulations to keep Tygon® the standard by which all flexible tubing is judged. No matter what challenges your laboratory faces, Tygon® has a formulation and size to support your application.

Tygon® — the best quality tubing for your laboratory

- A wide variety of formulations to accommodate every laboratory application provides superior resistance to a range of chemicals and corrosive environments.
- Tight tolerances and lot-to-lot consistency in our manufacturing processes yields reproducible results in your laboratory.
- A wide array of choices in tubing length, inner diameter (I.D.) and outer diameter (O.D.) sizes are available.
- Sets the standard for durability and chemical resistance; long tubing life reduces downtime and saves you money.
- Smooth inner bore provides consistent fluid flow and reduces risk of particle buildup to keep your process running.
- All raw materials — including tubing resin — are traceable for regulatory compliance and to meet quality standards.
- Superior quality and technical support separate Tygon® from the competition.
- New non-DEHP and phthalate-free formulations demonstrate Saint-Gobain's commitment to social responsibility.



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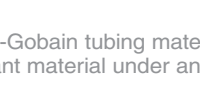
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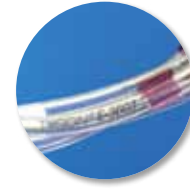
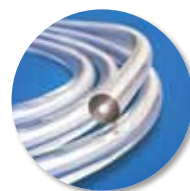
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NEW

Tygon® Laboratory Tubing

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FORMULATION

TYGON S³™ E-3603

DUROMETER HARDNESS Shore A, 56

Non-DEHP and Phthalate-Free Tubing

Most consistently reliable tubing for laboratory applications

- Outstanding chemical resistance
- Lot-to-lot consistency for reproducible results
- Non-oxidizing and non-contaminating
- Smooth, polished inner wall
- Utilizes bio-based plasticizer
- Contains no phthalates or BPA
- Available in vacuum tubing sizes

Tygon S³™ E-3603 handles most inorganic chemicals used in laboratories. It is highly resistant to oxidizing agents, is non-contaminating and is less permeable than rubber tubing. The glassy-smooth inner bore helps prevent buildup. Coils are marked at 1-foot (30.4 cm) intervals for easy measuring.

Engineered to last

Tygon S³™ E-3603 non-DEHP tubing is specially formulated for resistance to flex-fatigue and abrasion. In many peristaltic pump applications it will outlast the original R-3603 by 3 to 1. As a tubing for instrumentation connection, vent, drain and other general laboratory applications, Tygon S³™ E-3603 tubing offers superior life, which minimizes the labor and expense of replacement.

Applications

- General laboratory
- Biopharmaceutical
- Food and beverage
- Peristaltic and vacuum pumps
- Analytical instruments

Regulatory Compliance

- USP Class VI
- FDA criteria
- NSF-51

Sterilization Methods

- Autoclavable — Steam 30 minutes at 15 psi at 250°F (121°C)
- Gas — Ethylene Oxide



Relative Chemical Resistance Properties for Tygon S³™ E-3603 and Tygon S³™ E-3603 Vacuum

Acids			Bases			Salts	Alcohols	Ketones
conc.	med.	weak	conc.	med.	weak			
F	E	E	F	E	E	E	F	U
Aliphatic Hydrocarbons			Aromatic Hydrocarbons			Halogenated Hydrocarbons		
U			U			U		

E = Excellent F = Fair U = Unsatisfactory *All tests conducted at room temperature.

Tygon S3™ E-3603 Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
	In.		mm		In.		mm		In.		psi at 73°F		bars at 23°C	
	mm		mm		mm		Ft.		mm		mm at 73°F		mm at 23°C	
ACF00001	1/32	0.8	3/32	2.4	1/32	0.8	50	15	1/8	3.2	69	4.8	29.9	760
ACF00002	1/16	1.6	1/8	3.2	1/32	0.8	50	15	1/4	6.4	36	2.5	29.9	760
ACF02002	1/16	1.6	1/8	3.2	1/32	0.8	100	30.5	1/8	3.2	36	2.5	29.9	760
ACF04002	1/16	1.6	1/8	3.2	1/32	0.8	500	152	1/8	3.2	36	2.5	29.9	760
ACF00003	1/16	1.6	3/16	4.8	1/16	1.6	50	15	1/8	3.2	69	4.8	29.9	760
ACF00004	3/32	2.4	5/32	4.0	1/32	0.8	50	15	3/8	9.5	25	1.7	29.9	760
ACF02004	3/32	2.4	5/32	4.0	1/32	0.8	100	30.5	3/8	9.5	25	1.7	29.9	760
ACF00005	3/32	2.4	7/32	4.0	1/16	1.6	50	15	1/4	6.4	47	3.2	29.9	760
ACF00006	1/8	3.2	3/16	4.8	1/32	0.8	50	15	1/2	12.7	20	1.4	20	508
ACF04006	1/8	3.2	3/16	4.8	1/32	0.8	500	152	1/2	12.7	20	1.4	20	508
ACF00007	1/8	3.2	1/4	6.4	1/16	1.6	50	15	3/8	9.5	36	2.5	29.9	760
ACF02007	1/8	3.2	1/4	6.4	1/16	1.6	100	30.5	3/8	9.5	36	2.5	29.9	760
ACF04007	1/8	3.2	1/4	6.4	1/16	1.6	500	152	3/8	9.5	36	2.5	29.9	760
ACF00009	5/32	4.0	7/32	5.6	1/32	0.8	50	15	3/8	9.5	17	1.2	12	305
ACF00010	5/32	4.0	9/32	7.1	1/16	1.6	50	15	1/2	12.7	30	2.1	29.9	760
ACF02010	5/32	4.0	9/32	7.1	1/16	1.6	100	30.5	1/2	12.7	30	2.1	29.9	760
ACF00011	3/16	4.8	1/4	6.4	1/32	0.8	50	15	1	25.4	14	1.0	9	229
ACF00012	3/16	4.8	5/16	7.9	1/16	1.6	50	15	5/8	15.9	25	1.7	29.9	760
ACF02012	3/16	4.8	5/16	7.9	1/16	1.6	100	30.5	5/8	15.9	25	1.7	29.9	760
ACF04012	3/16	4.8	5/16	7.9	1/16	1.6	500	152	5/8	15.9	25	1.7	29.9	760
ACF00013	3/16	4.8	3/8	9.5	3/32	2.4	50	15	1/2	12.7	36	2.5	29.9	760
ACF00014	3/16	4.8	7/16	11.1	1/8	3.2	50	15	3/8	9.5	47	3.2	29.9	760
ACF00016	1/4	6.4	5/16	7.9	1/32	0.8	50	15	1-5/8	41.3	12	0.8	5	127
ACF00017	1/4	6.4	3/8	9.5	1/16	1.6	50	15	1	25.4	20	1.4	20	508
ACF02017	1/4	6.4	3/8	9.5	1/16	1.6	100	30.5	1	25.4	20	1.4	20	508
ACF04017	1/4	6.4	3/8	9.5	1/16	1.6	500	152	1	25.4	20	1.4	20	508
ACF00018	1/4	6.4	7/16	11.1	3/32	2.4	50	15	3/4	19.0	28	1.9	29.9	760
ACF00019	1/4	6.4	1/2	12.7	1/8	3.2	50	15	1/2	12.7	36	2.5	29.9	760
ACF02019	1/4	6.4	1/2	12.7	1/8	3.2	100	30.5	1/2	12.7	36	2.5	29.9	760
ACF00022	5/16	7.9	7/16	11.1	1/16	1.6	50	15	1-3/8	34.9	17	1.2	13	330
ACF00023	5/16	7.9	1/2	12.7	3/32	2.4	50	15	1	25.4	23	1.6	29.9	760
ACF00024	5/16	7.9	9/16	14.3	1/8	3.2	50	15	7/8	22.2	30	2.1	29.9	760
ACF00025	5/16	7.9	5/8	15.9	5/32	4.0	50	15	3/4	19.0	36	2.5	29.9	760
ACF00027	3/8	9.5	1/2	12.7	1/16	1.6	50	15	1-1/2	38.1	14	1.0	9	229
ACF00028	3/8	9.5	9/16	14.3	3/32	2.4	50	15	1-3/8	34.9	20	1.4	21	533
ACF00029	3/8	9.5	5/8	15.9	1/8	3.2	50	15	1-1/8	28.6	25	1.7	29.9	760
ACF00032	7/16	11.1	9/16	14.3	1/16	1.6	50	15	2-1/4	57.2	13	0.9	7	178
ACF00033	7/16	11.1	5/8	15.9	3/32	2.4	50	15	1-3/4	44.4	18	1.2	15	381
ACF00034	7/16	11.1	11/16	17.5	1/8	3.2	50	15	1-3/8	34.9	22	1.5	28	711
ACF00036	1/2	12.7	5/8	15.9	1/16	1.6	50	15	2-7/8	73.0	12	0.8	5	127
ACF00037	1/2	12.7	11/16	17.5	3/32	2.4	50	15	2-1/4	57.2	15	1.0	12	305
ACF00038	1/2	12.7	3/4	19.0	1/8	3.2	50	15	1-1/2	38.1	20	1.4	21	533
ACF00039	1/2	12.7	13/16	20.6	5/32	4.0	50	15	1-1/2	38.1	24	1.7	29.9	760
ACF00045	5/8	15.9	13/16	20.6	3/32	2.4	50	15	3	76.2	13	0.9	7	178
ACF00046	5/8	15.9	7/8	22.2	1/8	3.2	50	15	2-3/8	60.3	17	1.2	13	330
ACF00050	11/16	17.5	7/8	22.2	3/32	2.4	50	15	3-1/2	88.9	12	0.8	6	152
ACF00053	3/4	19.0	1	25.4	1/8	3.2	50	15	3-1/4	82.6	14	1.0	9	229
ACF00054	3/4	19.0	1-1/16	27.0	5/32	4.0	50	15	2-3/4	69.8	17	1.2	15	381
ACF00055	3/4	19.0	1-1/8	28.6	3/16	4.8	50	15	2-3/8	60.3	20	1.4	21	533
ACF00057	3/4	19.0	1-1/4	31.8	1/4	6.4	50	15	2	50.8	25	1.7	29.9	760
ACF00059	7/8	22.2	1-1/8	28.6	1/8	3.2	50	15	4-1/8	104.8	13	0.9	7	178
ACF00062	1	25.4	1-1/4	31.8	1/8	3.2	50	15	4-3/4	120.6	12	0.8	5	127
ACF00065	1	25.4	1-1/2	38.1	1/4	6.4	50	15	3	76.2	20	1.4	21	533
ACF00069	1-1/4	31.8	1-1/2	38.1	1/8	3.2	50	15	7-7/8	200	10	0.7	3	76
ACF00074	1-1/2	38.1	2	50.8	1/4	6.4	50	15	5-7/8	149.2	14	1.0	9	229
ACF00078	2	50.8	2-1/2	63.5	1/4	6.4	50	15	9-3/8	238.1	12	0.8	5	127
ACF05078	2	50.8	2-1/2	63.5	1/4	6.4	20	6	9-3/8	238.1	12	0.8	5	127

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

NEW

Tygon® Laboratory Tubing for Vacuum Applications

MANUFACTURING PLANTS:

2664 Gilchrist Road
Akron, OH 44305
Tel: (800) 798-1554
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FORMULATION

TYGON S³™ E-3603 Vacuum

DUROMETER HARDNESS Shore A, 56

Non-DEHP and Phthalate-Free Tubing

Thick, non-collapsible wall for laboratory vacuum applications

- Extra-thick walls will not collapse under pressure
- Provides improved bend radius with higher working and vacuum pressure ratings
- Excellent clarity for process monitoring
- Resists cracks and abrasion; less permeable than rubber
- Non-oxidizing and non-contaminating
- Easy-measure coils are marked at 1' intervals
- Resists most inorganic chemicals; can be used in corrosive atmospheres

Flexible and strong

Tygon S³™ E-3603 Vacuum Tubing has all of the same properties as the Tygon S³™ E-3603 formulation, plus extra-thick walls to support laboratory vacuum pump applications. Vacuum tubing features improvements to bend radius as well as higher and more consistent levels of working pressure and vacuum pressure ratings. Flexible and strong, the tubing easily connects to hose barb fittings to form a tight connection and will not collapse under vacuum pressure or kink when manipulated. Tygon S³™ E-3603 Vacuum tubing withstands a full vacuum at room temperature (29.9" [759mm] of mercury at 73°F [23°C] – up to 27" [686mm] of mercury at 140°F [60°C]).

Ideal for laboratory liquid and gas vacuum transfer

Crystal-clear tubing has glass-like clarity for visual inspection and process monitoring, and will not whiten when crimped or bent. It is less permeable than rubber tubing and has superior abrasion and crack resistance. Tygon S³™ E-3603 Vacuum Tubing is non-oxidizing, non-contaminating, resists most inorganic chemicals found in the laboratory, and can be used in corrosive environments. Smooth inner bore prevents buildup and facilitates cleaning. Coils are marked at 1-foot intervals for easy measuring. This formulation is ideal for general laboratory use involving liquid and gas vacuum transfer.

Applications

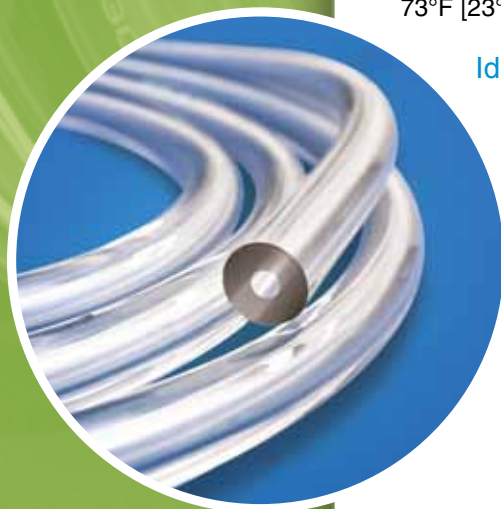
- Vacuum separation and filtration of liquids
- Vacuum transfer of liquids and gasses
- General laboratory use for vacuum applications

Regulatory Compliance

- USP Class VI
- FDA criteria
- NSF-51

Sterilization Methods

- Autoclavable — Steam 30 minutes at 15 psi at 250°F (121°C)
- Gas — Ethylene Oxide





Tygon S3™ E-3603 Vacuum Tubing Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
											psi at 73°F	bars at 23°C	inches at 73°F	mm at 23°C
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm				
ACF00015	3/16	4.8	9/16	14.3	3/16	4.8	50	15	1/4	6.4	69	4.8	29.9	760
ACF00020	1/4	6.4	5/8	15.9	3/16	4.8	50	15	1/2	12.7	53	3.7	29.9	760
ACF00030	3/8	9.5	7/8	22.2	1/4	6.4	50	15	5/8	15.9	47	3.2	29.9	760
ACF00040	1/2	12.7	1-1/8	28.6	5/16	7.9	50	15	7/8	22.2	45	3.1	29.9	760
ACF00049	5/8	15.9	1-3/8	34.9	3/8	9.5	50	15	1	25.4	43	3.0	29.9	760
ACF00058	3/4	19.0	1-1/2	38.1	3/8	9.5	50	15	1-1/2	38.1	36	2.5	29.9	760
ACF00066	1	25.4	2	50.8	1/2	12.7	50	15	1-7/8	47.6	36	2.5	29.9	760
ACF05066	1	25.4	2	50.8	1/2	12.7	20	6	1-7/8	47.6	36	2.5	29.9	760

Vacuum Unipacs (sold in quantities of 10/10' lengths per carton)

ACFUN015	3/16	4.8	9/16	14.3	3/16	4.8	10	3	1/4	6.4	60	4.2	29.9	760
ACFUN020	1/4	6.4	5/8	15.9	3/16	4.8	10	3	1/2	12.7	50	3.5	29.9	760
ACFUN030	3/8	9.5	7/8	22.2	1/4	6.4	10	3	5/8	15.9	50	3.5	29.9	760
ACFUN040	1/2	12.7	1-1/8	28.6	5/16	7.9	10	3	7/8	22.2	45	3.1	29.9	760
ACFUN049	5/8	15.9	1-3/8	34.9	3/8	9.5	10	3	1	25.4	40	2.8	29.9	760

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



NEW

Tygon® Long Flexible Life Tubing

MANUFACTURING PLANT:

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FORMULATION

TYGON S³™ E-LFL

DUROMETER HARDNESS Shore A, 56

Non-DEHP and Phthalate-Free Tubing

Longest flexible life of any clear Tygon® tubing

- Over 1,000 h pump tubing life at 0 psi
- Over 600 h pump tubing life at 10 psi
- Broad chemical resistance
- Extremely low particle spallation
- Contains no BPA or phthalates

The non-aging and broad chemical resistance properties of Tygon S3™ E-LFL enable users to utilize the new tubing for transferring chemicals, cleaning agents and bactericides without danger of corrosion (as with metals) or oxidation (as with rubber). Tygon S3™ E-LFL is safe and non-toxic and can be sterilized through conventional autoclave methods (steam 30 minutes at 15 psi 250°F (121°C), making it an excellent choice for high purity applications. It can be produced in up to a 6" (15.6cm) inside diameter, which is ideal for bulk transfer applications.

Applications

- Peristaltic pumps
- General laboratory liquid transfer
- Surfactant delivery
- Shear-sensitive fluid transfer
- Highly viscous fluid transfer
- Filtration and fermentation
- Food and beverage laboratory liquid transfer

Regulatory Compliance

- USP Class VI
- ISO 10993
- NSF-51
- FDA criteria

Sterilization Methods

- Autoclavable — Steam 30 minutes at 15 psi at 250°F (121°C)
- Gas — Ethylene Oxide

Tygon S3™ E-LFL Tubing provides optimal peristaltic pump performance

Crystal-clear Tygon S3™ E-LFL tubing is formulated specifically for use in peristaltic pump applications.

The new Tygon S3™ E-LFL non-DEHP tubing has even longer pump life—not only at 0 psi—but also at back pressure of up to 25 psi. The peristaltic pump life performance at different back pressures is shown on the next page. With its superior flex life characteristics, Tygon S3™ E-LFL tubing reduces production downtime caused by pump tubing failure. Our tests demonstrated reduced particle spallation, which eliminates the need for frequent downstream filter replacement and diminishes the risk of sensitive-fluid contamination. This is critical in several laboratory applications, such as pharmaceutical, high-purity chemicals, cosmetics and food and beverage.





Tygon S3™ E-LFL Inventoried Sizes

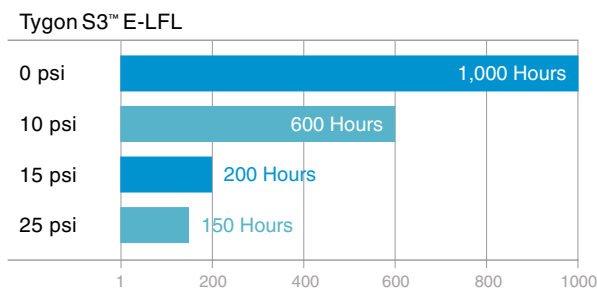
Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
											psi at 73°F	bars at 23°C	inches at 73°F	mm at 23°C
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm				
AVX42003	1/16	1.6	3/16	4.8	1/16	1.6	25	7.62	1/4	6.4	50	3.5	29.9	760
AVX42007	1/8	3.2	1/4	6.4	1/16	1.6	25	7.62	1/2	12.7	34	2.3	29.9	760
AVX42012	3/16	4.8	5/16	7.9	1/16	1.6	25	7.62	3/4	19.0	25	1.7	29.9	760
AVX42017	1/4	6.4	3/8	9.5	1/16	1.6	25	7.62	1	25.4	20	1.4	15.0	381
AVX42019	1/4	6.4	1/2	12.7	1/8	3.2	25	7.62	3/4	19.0	35	2.4	29.9	760
AVX42022	5/16	7.9	7/16	11.1	1/16	1.6	25	7.62	1-1/4	31.75	16	1.1	10.0	254
AVX42029	3/8	9.5	5/8	15.9	1/8	3.2	25	7.62	1	25.4	25	1.7	29.9	760
AVX42038	1/2	12.7	3/4	19.0	1/8	3.2	25	7.62	1-1/2	38.1	20	1.4	20.0	508
AVX06057	3/4	19.0	1-1/4	31.75	1/4	6.4	10	3.04	1-3/4	44.4	24	1.7	29.9	760
AVX06064	1	25.4	1-3/8	34.9	3/16	4.8	10	3.04	3-1/4	82.5	15	1.0	5.0	127

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

- The most advanced choice for phthalate-free tubing
- Non-DEHP, bio-based plasticizer
- Fully biodegradable plasticizer
- Based on sustainable resources
- Safe for the environment; reduced end-user risk

Peristaltic Pump Tubing Life

The table below illustrates hours until failure of 1/4" I.D. x 3/8" O.D. tubing for 0, 10 and 15 psi and 1/4" I.D. x 7/16" O.D. tubing for 25 psi. 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.



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.

NEW

Tygon® Ultra-Soft Tubing

MANUFACTURING PLANT:

2664 Gilchrist Road
Akron, OH 44305
Tel: (800) 798-1554
Tel: (330) 798-9240
Fax: (330) 798-6968

FORMULATION

TYGON® E-1000

DUROMETER HARDNESS Shore A, 40

Non-DEHP Tubing

Soft and flexible tubing for laboratory set-ups

- The best tubing for synthesis – soft and flexible
- Resistant to low temperatures
- Resistant to corrosive chemicals

Ideal selection for complex laboratory set-ups

Tygon® E-1000 tubing is an advanced formulation that is softer than other Tygon® tubing and provides an excellent solution to applications requiring complicated laboratory set-ups with sharp radius curves and multiple directional changes. Tygon® Ultra-Soft Tubing resists twisting and collapse, which are common problems when using other tubing products. Tygon® E-1000 has a maximum operating temperature of 125°C (52°F) and retains its flexibility in low temperatures. The clear tubing provides unobstructed visual monitoring of flow and is ideal for lab use with peristaltic pumps, synthesis and research set-ups, transfer of buffer solutions, cryogenic applications and connection to drain lines.

The preferred tubing in low-torque peristaltic pumps

The extremely low durometer (40) of Tygon® E-1000 provides minimal resistance to compression which is ideal to accommodate the transfer of fluids in low-torque or battery-driven peristaltic pump applications. Tygon® E-1000 resists many corrosive chemicals used in laboratories and provides an excellent alternative to silicone.

Applications

- Synthesis and research set-ups
- Analytical instruments
- Transfer of buffer solutions
- Low torque peristaltic pumps
- Vent and drain line connection

Regulatory Compliance

- FDA criteria
- NSF-51

Sterilization Methods

- Gas — Ethylene Oxide





Tygon® E-1000 Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
											psi at 73°F	bars at 23°C	inches at 73°F	mm at 23°C
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm				
ADK00003	1/16	1.6	3/16	4.8	1/16	1.6	50	15	1/8	3.2	26	1.8	29.9	760
ADK00007	1/8	3.2	1/4	6.4	1/16	1.6	50	15	3/8	9.5	16	1.1	29.9	760
ADK00012	3/16	4.8	5/16	7.9	1/16	1.6	50	15	5/8	15.9	10	0.7	15	381
ADK00017	1/4	6.4	3/8	9.5	1/16	1.6	50	15	1	25.4	8	0.6	7	178
ADK00019	1/4	6.4	1/2	12.7	1/8	3.2	50	15	5/8	15.9	14	0.9	29.9	760
ADK00022	5/16	7.9	7/16	11.1	1/16	1.6	50	15	1 3/8	34.92	7	0.5	5	127
ADK00027	3/8	9.5	1/2	12.7	1/16	1.6	50	15	1 3/4	44.45	7	0.5	3	76
ADK00029	3/8	9.5	5/8	15.9	1/8	3.2	50	15	1 1/8	28.57	11	0.8	15	381
ADK00036	1/2	12.7	5/8	15.9	1/16	1.6	50	15	2 7/8	73.02	6	0.4	2	51
ADK00038	1/2	12.7	3/4	19.0	1/8	3.2	50	15	1 3/4	44.45	8	0.6	7	178

More sizes available upon request.

Relative Chemical Resistance Properties for Tygon® E-1000

Acids			Bases			Salts	Alcohols	Ketones
conc.	med.	weak	conc.	med.	weak			
F	E	E	E	E	E	E	F	U

E = Excellent F = Fair U = Unsatisfactory *All tests conducted at room temperature.



PharMed® Biocompatible Tubing

MANUFACTURING PLANTS:

2664 Gilchrist Road
Akron, OH 44305
Tel: (800) 798-1554
Tel: (330) 798-9240
Fax: (330) 798-6968

La Mothe-aux-Aulnaies
BP14-89120 Charny, France
Tel: (33) 3-86-63-78-78
Fax: (33) 3-86-63-77-77

PharMed® BPT

DUROMETER HARDNESS Shore A, 64

Life Science applications tubing for use with peristaltic pumps

- Outlasts silicone tubing in peristaltic pumps by up to 30 times
- Temperature resistant from -60°F (-51°C) to 275°F (135°C)
- Low particulate spallation
- Withstands repeated sterilization
- Compatible with all commercial cleaners and sanitizers

Transporting biocompatible fluids through a peristaltic pump limits the risk of fluid contact with any portion of the pump itself. PharMed® BPT Biocompatible Tubing has been formulated to withstand the rigors of peristaltic pumping action while providing the biocompatible fluid surface required in sensitive applications. PharMed® BPT Biocompatible Tubing is best for use in peristaltic pumps and cell cultures. As it is less permeable to gases and vapors than silicone tubing, it is ideal for protecting sensitive cell cultures. With its superior flex life characteristics, PharMed® BPT tubing reduces downtime due to pump tubing failure. The excellent wear properties of PharMed® BPT translate to less erosion of interior tubing walls, improving overall efficiency of filtering systems.

Applications

- Cell culture and media dispensing
- Vaccine manufacturing
- Laboratory diagnostic tests
- Bioreactor process lines
- Sterile filling
- Filtration and fermentation
- Shear-sensitive fluid transfer

Regulatory Compliance

- USP Class VI
- ISO 10993 standards
- Master File with the U.S. FDA
- FDA criteria
- NSF criteria

Sterilization Methods

- Autoclavable—Steam 30 minutes at 15 psi at 250°F (121°C)
- Gas — Ethylene Oxide
- Radiation—Gamma and E-beam up to 5 MRad

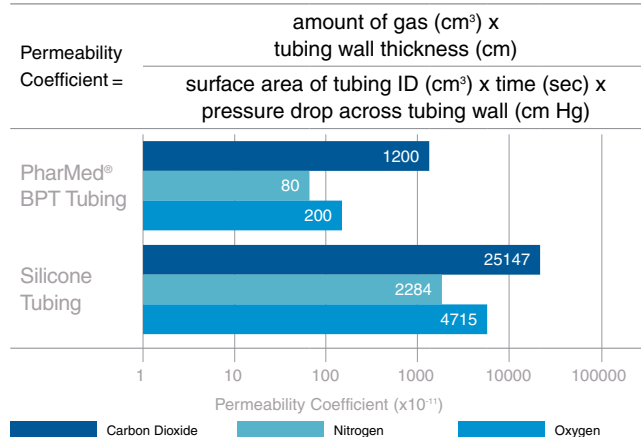
Superior to silicone tubing for many applications

PharMed® BPT tubing is less permeable to gases and vapors than silicone tubing and outlasts silicone tubing in peristaltic pumps by up to 30 times. (see Permeability Coefficient Comparison chart and the Comparative Peristaltic Pump Tubing Life chart at right). PharMed® BPT tubing has very good general chemical resistance and excellent acid, alkali and oxidation resistance. Opaque to visible and UV light, PharMed® BPT tubing helps to protect sensitive fluids. Continuous service temperature range is -60°F (-51°C) to 275°F (135°C).



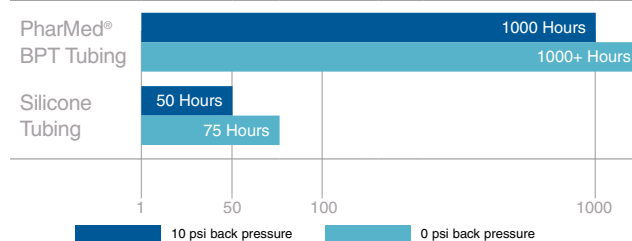


Permeability Coefficient Comparison



Comparative Peristaltic Pump Tubing Life

The table below depicts hours until failure of 1/4" I.D. x 3/8" O.D. tubing. In each case, a 3-roller pump head was utilized operating at 600rpm under room temperature (73°F). 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.

PharMed® BPT Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm	psi at 73°F	bars at 23°C	inches at 73°F	mm at 23°C
AY242605	.02	0.5	.145	3.7	1/16	1.6	25	7.62	1/8	3.2	115	7.9	29.9	760
AY242606	1/32	0.8	5/32	4.0	1/16	1.6	25	7.62	1/8	3.2	78	5.4	29.9	760
AY242002	1/16	1.6	1/8	3.2	1/32	0.8	25	7.62	1/4	6.4	24	1.7	29.9	760
AY242003	1/16	1.6	3/16	4.8	1/16	1.6	25	7.62	1/8	3.2	43	3.0	29.9	760
AY242005	3/32	2.4	7/32	5.6	1/16	1.6	25	7.62	1/4	6.4	30	2.1	29.9	760
AY242006	1/8	3.2	3/16	4.8	1/32	0.8	25	7.62	1/2	12.7	13	0.9	25	635
AY242007	1/8	3.2	1/4	6.4	1/16	1.6	25	7.62	1/2	12.7	24	1.7	29.9	760
AY242012	3/16	4.8	5/16	7.9	1/16	1.6	25	7.62	5/8	15.9	17	1.2	29.9	760
AY242017	1/4	6.4	3/8	9.5	1/16	1.6	25	7.62	7/8	22.2	13	0.9	25	635
AY242019	1/4	6.4	1/2	12.7	1/8	3.2	25	7.62	3/4	19.0	24	1.7	29.9	760
AY242022	1/3	7.9	7/16	11.1	1/16	1.6	25	7.62	1-1/4	31.8	11	0.8	15	381
AY242027	3/8	9.5	1/2	12.7	1/16	1.6	25	7.62	1-3/8	34.9	9	0.6	10	254
AY242029	3/8	9.5	5/8	15.9	1/8	3.2	25	7.62	1-1/8	26.6	17	1.2	29.9	760
AY242038	1/2	12.7	3/4	19.0	1/8	3.2	25	7.62	1-1/8	28.6	10	0.7	25	635
AY242046	5/8	15.9	7/8	22.2	1/8	3.2	25	7.62	2-3/4	69.9	11	0.8	15	381
AY242053	3/4	19.0	1	25.4	1/8	3.2	25	7.62	3-1/2	88.9	9	0.6	10	254

More sizes available upon request.

Tygon® Extended Life Silicone Tubing

MANUFACTURING PLANT:

3910 Terry-Diane Drive
Beaverton, MI 48612
Tel: (989) 435-9533
Tel: (888) 387-0067
Fax: (989) 435-2355

FORMULATION

TYGON® 3355-L

DUROMETER HARDNESS Shore A, 55

High-performance, platinum-cured silicone tubing for peristaltic pump applications

- Lasts up to five times longer than other platinum-cured silicone tubing in pump applications
- Minimal extractables
- Non-toxic, non-hemolytic, non-pyrogenic
- Ultra-smooth inner bore
- Excellent fluid flow characteristics
- Taste free and odor free
- Temperature resistance -112°F (-80°C) to 400°F (204°C)

Tygon® 3355-L is a high-performance, extended life, platinum-cured silicone tubing formulation specifically designed for demanding peristaltic pump applications. Its superior flex life characteristics reduce potential downtime due to pump tubing failure (see Comparative Peristaltic Pump Tubing Life chart at right). It has an extremely smooth inner surface that helps minimize the risk of particle entrapment and microscopic buildup during sensitive fluid transfer — even in extended use applications.

Limited risk of fluid contamination

Peristaltic pumping transports fluids efficiently, without risking contact with any portion of the pump itself. During this process, the fluid is contained entirely within the flexible tubing, eliminating exposure to any components of the pump and thus the risk of fluid contamination. The excellent fatigue resistance properties of Tygon® 3355-L tubing make it an ideal tubing selection for peristaltic pump systems and perfect for limiting the risk of contamination.

Applications

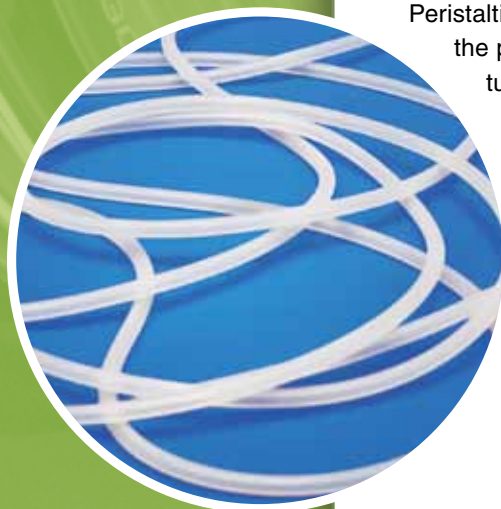
- General biopharm laboratory
- Peristaltic pumps
- Liquid chromatography
- Chemistry and blood analysis
- Media processing and cell culture
- Sterile fill lines
- Filtration and fermentation

Regulatory Compliance

- USP Class VI
- Master File with U.S. FDA
- FDA criteria

Sterilization Methods

- Autoclavable — Steam 30 minutes at 15 psi at 250°F (121°C)
- Gas — Ethylene Oxide
- Radiation — Gamma and E-beam up to 2.5 MRad



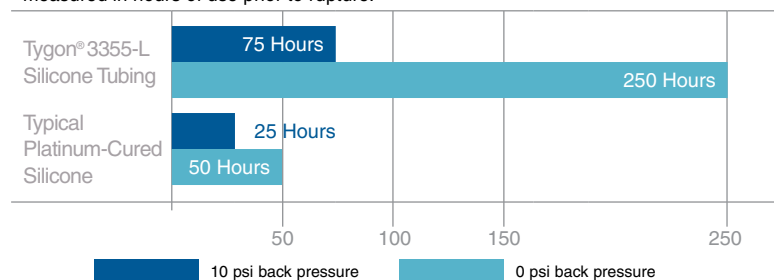


Tygon® 3355-L Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Length		Minimum Bend Radius	
	In.	mm	In.	mm	Ft.	m	In.	mm
F90031	1/8	3.2	3/16	4.8	50	15.2	3/8	9.6
F90032	1/8	3.2	1/4	6.4	50	15.2	1/2	12.8
F90033	5/32	4	7/32	5.6	50	15.2	3/4	19.2
F90034	3/16	4.8	1/4	6.4	50	15.2	1	25.6
F90035	3/16	4.8	5/16	8	50	15.2	1/2	12.8
F90036	3/16	4.8	3/8	9.6	50	15.2	3/8	9.6
F90037	3/16	4.8	7/16	11.2	50	15.2	3/8	9.6
F90038	1/4	6.4	5/16	8	50	15.2	1-1/2	38.1
F90039	1/4	6.4	3/8	9.6	50	15.2	1-1/2	38.1
F90040	1/4	6.4	7/16	11.2	50	15.2	1-5/8	41.6
F90041	1/4	6.4	1/2	12.8	50	15.2	5/8	16
F90042	5/16	8	7/16	11.2	50	15.2	1-1/4	32
F90043	5/16	8	1/2	12.8	50	15.2	5/8	16
F90044	3/8	9.6	1/2	12.8	50	15.2	1-1/2	38.1
F90045	3/8	9.6	9/16	14.4	50	15.2	1	25.6
F90046	3/8	9.6	5/8	16	50	15.2	1	25.6
F90047	7/16	11.2	9/16	14.4	50	15.2	1-1/2	38.1
F90048	7/16	11.2	5/8	16	50	15.2	1-3/4	44.8
F90049	1/2	12.8	5/8	16	50	15.2	3	76.8
F90050	1/2	12.8	11/16	17.6	50	15.2	1-3/4	44.8
F90051	1/2	12.8	3/4	19.2	50	15.2	1-1/2	38.1

Comparative Peristaltic Pump Tubing Life

The table below depicts hours until failure of 1/4" I.D. x 3/8" O.D. tubing. 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.



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.

Versilic® High-Strength Silicone Tubing

MANUFACTURING PLANT:

3910 Terry-Diane Drive
Beaverton, MI 48612
Tel: (989) 435-9533
Tel: (888) 387-0067
Fax: (989) 435-2355

FORMULATION

Versilic® SPX-50

DUROMETER HARDNESS Shore A, 50

Flexible, resilient and durable tubing

- Provides durability and versatility; produces consistent, repeatable results
- Non-pyrogenic, non-toxic and non-hemolytic
- Ultra-smooth inner bore
- Taste free and odor free
- Withstands temperature extremes
-75°F (-59°C) to 350°F (177°C)

Designed for demanding requirements

Peroxide-cured Versilic® SPX-50 Silicone Tubing is designed for use in applications where flexibility, resiliency and durability are required. Produced from a proprietary combination of silicone elastomers, it optimizes critical physical properties such as tensile strength, elongation and compression set, resulting in a more physically durable product. Its smooth inner surface reduces the risk of particulate entrapment and microscopic buildup during fluid transfer, while the translucent color allows visual monitoring of fluid flow. Versilic® SPX-50 is non-pyrogenic, non-toxic, non-hemolytic and withstands temperature extremes from -75°F (-59°C) to 350°F (177°C).

Consistent and reliable performance

Versilic® SPX-50 Silicone Tubing provides versatility in use for a broad range of applications. To ensure that the tubing will provide consistent, reproducible results, every lot of raw material used in the tubing's manufacture undergoes a series of in-house tests to confirm physical properties. This stringent evaluation helps to provide the repeatable quality found in every foot of Versilic® SPX-50 Silicone Tubing.

Applications

- Veterinary pharmaceuticals
- Food and dairy laboratories
- Environmental laboratories
- Sterile filling and dispensing
- Laboratory analytical instruments

Regulatory Compliance

- USP Class VI
- FDA criteria
- NSF-51
- 3-A Sanitary standards

Sterilization Methods

- Autoclavable—Steam 30 minutes at 15 psi at 250°F (121°C)
- Gas — Ethylene Oxide
- Radiation—Gamma and E-beam up to 2.5 MRad





Versilic® SPX-50 Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure	
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm	psi at 73°F	psi at 320°F
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm	psi at 73°F	psi at 320°F
ABX00001	1/32	0.8	3/32	2.4	1/32	0.8	50	15.25	1/8	3.2	22	21
ABX00002	1/16	1.6	1/8	3.2	1/32	0.8	50	15.25	1/4	6.4	14	13
ABX00003	1/16	1.6	3/16	4.8	1/16	1.6	50	15.25	1/4	6.4	22	21
ABX00004	3/32	2.4	5/32	4	1/32	0.8	50	15.25	1/4	6.4	11	10
ABX00005	3/32	2.4	7/32	5.6	1/16	1.6	50	15.25	1/4	6.4	18	16
ABX00006	1/8	3.2	3/16	4.8	1/32	0.8	50	15.25	3/8	9.6	9	8
ABX00007	1/8	3.2	1/4	6.4	1/16	1.6	50	15.25	1/2	12.8	14	13
ABX00009	5/32	4	7/32	5.6	1/32	0.8	50	15.25	3/4	19.2	7	6
ABX00011	3/16	4.8	1/4	6.4	1/32	0.8	50	15.25	1	25.6	7	6
ABX00012	3/16	4.8	5/16	8	1/16	1.6	50	15.25	1/2	12.8	11	10
ABX00013	3/16	4.8	3/8	9.6	3/32	2.4	50	15.25	3/8	9.6	14	13
ABX00014	3/16	4.8	7/16	11.2	1/8	3.2	50	15.25	3/8	9.6	18	16
ABX00016	1/4	6.4	5/16	8	1/32	0.8	50	15.25	1-1/2	38.4	5	4
ABX00017	1/4	6.4	3/8	9.6	1/16	1.6	50	15.25	3/4	19.2	9	8
ABX00018	1/4	6.4	7/16	11.2	3/32	2.4	50	15.25	5/8	16	12	11
ABX00019	1/4	6.4	1/2	12.8	1/8	3.2	50	15.25	5/8	16	14	13
ABX00022	5/16	8	7/16	11.2	1/16	1.6	50	15.25	1-1/4	32	7	6
ABX00023	5/16	8	1/2	12.8	3/32	2.4	50	15.25	5/8	16	10	9
ABX00024	5/16	8	9/16	14.4	1/8	3.2	50	15.25	3/4	19.2	7	6
ABX00027	3/8	9.6	1/2	12.8	1/16	1.6	50	15.25	1-1/2	38.4	9	8
ABX00028	3/8	9.6	9/16	14.4	3/32	2.4	50	15.25	1	25.6	11	10
ABX00029	3/8	9.6	5/8	16	1/8	3.2	50	15.25	1	25.6	6	5
ABX00033	7/16	11.2	5/8	16	3/32	2.4	50	15.25	1-3/4	44.8	8	7
ABX00036	1/2	12.8	5/8	16	1/16	1.6	50	15.25	3	76.8	5	4
ABX00037	1/2	12.8	11/16	17.6	3/32	2.4	50	15.25	1-3/4	44.8	7	6
ABX00038	1/2	12.8	3/4	19.2	1/8	3.2	50	15.25	1-1/2	38.4	9	8
ABX00045	5/8	16	13/16	20.8	3/32	2.4	50	15.25	3	76.8	6	5
ABX00046	5/8	16	7/8	22.4	1/8	3.2	50	15.25	2-1/2	64	7	6
ABX00053	3/4	19.2	1	25.6	1/8	3.2	50	15.25	2-1/2	64	7	6
ABX42062	1	25.6	1-1/4	32	1/8	3.2	25	7.62	5	128	5	4
ABX42069	1-1/4	32	1-1/2	38.4	1/8	3.2	25	7.62	6	153.6	5	4
ABX42074	1-1/2	38.4	2	51.2	1/4	6.4	25	7.62	7	179.2	6	5

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

Tygon® High-Purity Tubing

MANUFACTURING PLANT:

2664 Gilchrist Road
Akron, OH 44305
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FORMULATION

TYGON® 2475

DUROMETER HARDNESS Shore A, 72

Plasticizer-Free Tubing

Clear, flexible tubing with very high level of purity

- Exceptionally low adsorption
- Broad chemical resistance including alcohols and ketones
- Smooth inner surface
- Highly resistant to aggressive cleaners and sanitizers
- Environmentally safe to dispose

Designed for purity

Maintaining fluid integrity during transfer is critical in pharmaceutical and biotechnology applications. Loss of fluid through migration into the tubing walls can cause inconsistencies in final product results. Tygon® 2475 High-Purity Tubing is hydrophobic, resists the absorption/adsorption of aqueous fluids and provides a high level of purity not previously available in any clear, flexible tubing. In addition, it is entirely free of plasticizers and is ideally suited for use in many sensitive cell culture and fermentation applications. Tygon® 2475 has a Master File with the U.S. Food and Drug Administration.

Sanitization and disposal

Analysis has shown that this tubing has smooth inner walls that inhibit particulate entrapment and reduce the potential for bacterial growth and contamination. Tygon® 2475 High-Purity Tubing is virtually unaffected by chemical sanitizers and cleaners, and can be cleaned repeatedly without decreasing its service life. When properly incinerated, Tygon® 2475 High-Purity Tubing releases only carbon dioxide and water into the air, and will not disperse hazardous by-products into the environment.

Applications

- Sterile filling and dispensing
- Laboratory diagnostic equipment
- Laboratory analytical instruments
- Cell and tissue culture transport
- Infusion sets for parenterals and drugs

Regulatory Compliance

- USP Class VI
- Master File with the U.S. FDA
- FDA criteria

Sterilization Methods

- Gas — Ethylene Oxide
- Radiation — Gamma and E-beam up to 2.5 MRad





Tygon® 2475 Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
											psi at 73°F	bars at 23°C	inches at 73°F	mm at 23°C
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm				
ACG00003	1/16	1.6	3/16	4.8	1/16	1.6	50	15.25	1/8	3.2	85	5.9	29.9	760
ACG00007	1/8	3.2	1/4	6.4	1/16	1.6	50	15.25	1/4	6.4	50	3.4	29.9	760
ACG00012	3/16	4.8	5/16	8	1/16	1.6	50	15.25	1/2	12.8	40	2.8	29.9	760
ACG00017	1/4	6.4	3/8	9.6	1/16	1.6	50	15.25	3/4	19.2	30	2.1	29.9	760
ACG00022	5/16	8	7/16	5.6	1/16	1.6	50	15.25	1-3/8	35.2	18	1.2	29.9	760
ACG00027	3/8	9.6	1/2	12.8	1/16	1.6	50	15.25	1-3/4	44.8	20	1.4	25.0	635
ACG00038	1/2	12.8	3/4	19.2	1/8	3.2	50	15.25	1-1/2	38.4	29	2.0	29.9	760
ACG00046	5/8	16	7/8	22.4	1/8	3.2	50	15.25	2-1/4	57.6	25	1.7	29.9	760
ACG00053	3/4	19.2	1	25.6	1/8	3.2	50	15.25	3-1/4	83.2	21	1.4	29.9	760
ACG42064	1	25.6	1-3/8	35.2	3/16	4.8	25	7.62	3	76.8	20	1.4	29.9	760

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

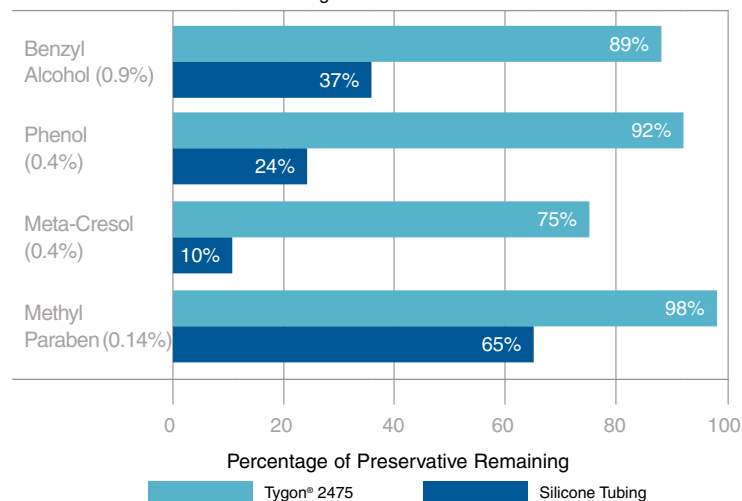
Relative Chemical Resistance Properties for Tygon® 2475

Acids			Bases			Salts	Alcohols	Ketones
conc.	med.	weak	conc.	med.	weak			
F	E	E	E	E	E	E	E	E

E = Excellent F = Fair U = Unsatisfactory *All tests conducted at room temperature.

Tygon® 2475 vs. Silicone Tubing Absorption

Test Methods Used: Drug preservatives were analyzed by gas chromatography after 72 hours of contact with each tubing.



Tygon® High-Purity Pressure Tubing

MANUFACTURING PLANT:

2664 Gilchrist Road
Akron, OH 44305
Tel: (800) 798-1554
Tel: (330) 798-9240
Fax: (330) 798-6968

FORMULATION

TYGON® 2475 I.B.

DUROMETER HARDNESS Shore A, 72

Plasticizer-free, flexible tubing for high-pressure fluid transfer applications

- Plasticizer-free tubing eliminates concern of plasticizer extraction
- Low sorption to aqueous liquids maintains product integrity
- Durable internal braid provides reinforcement
- Excellent chemical resistance to sanitizers and cleaners
- Temperature resistant -94°F (-70°C) to 125°F (52°C)

Maintaining product integrity during fluid transfer is critical in most biotechnology, pharmaceutical and sensitive laboratory applications. Tygon® 2475 I.B. High-Purity Pressure Tubing is entirely plasticizer free. This unique tubing uses advanced polymer technology to provide a flexible, transparent (with white inner braid) tubing for sensitive fluid transfer under elevated working pressure. Tygon® 2475 I.B. High-Purity Pressure Tubing is also formulated to resist the absorption and adsorption of aqueous fluids. This reduction in sorption minimizes the risk of fluid alteration in single- or repeat-use applications, and increases quality through lot-to-lot consistency.

Excellent chemical resistance and versatility in cleaning and sterilization

Tygon® 2475 I.B. High-Purity Pressure Tubing is hydrophobic. Its non-wettable surface facilitates complete drainage of fluid and is unaffected by chemical sanitizers and cleaners. It can be cleaned repeatedly without decreasing its service life. Tygon® 2475 I.B. High-Purity Pressure Tubing can withstand 2,000 psi and is an outstanding choice for applications with elevated working pressures. It also has excellent chemical resistance to bases, salts, alcohols, ketones and medium to weak concentrated acids. This formulation has a wide range of temperature resistance: -94°F (-70°C) to 125°F (52°C).

Applications

- Fluid transfer for biotechnology and pharmaceutical applications
- Sensitive fluid transfer under elevated working pressure
- Chemical transfer
- Cell culture and media processing
- Deionized water and sterile fill lines

Regulatory Compliance

- USP Class VI
- Master File with the U.S. FDA
- FDA criteria

Sterilization Methods

- Gas — Ethylene Oxide
- Radiation — Gamma and E-beam up to 2.5 MRad





Tygon® 2475 I.B. Inventoried Sizes

Saint-Gobain Part Number	I.D.		O.D.		Wall Thickness		Length		Minimum Bend Radius		Maximum Working Pressure		Vacuum Rating of Mercury	
											psi at 73°F	bars at 23°C	inches at 73°F	mm at 23°C
	In.	mm	In.	mm	In.	mm	Ft.	m	In.	mm				
ACX00019	1/4	6.4	1/2	12.8	1/8	3.2	50	15.25	3/8	9.6	225	15.5	29.9	760
ACX00029	3/8	9.6	5/8	16	1/8	3.2	50	15.25	1	25.6	210	14.5	29.9	760
ACX00038	1/2	12.8	3/4	19.2	1/8	3.2	50	15.25	1	25.6	230	15.9	29.9	760
ACX00046	5/8	16	7/8	22.4	1/8	3.2	50	15.25	1-3/4	44.8	135	9.3	29.9	760
ACX00054	3/4	19.2	1-1/16	27.2	5/32	4	50	15.25	1-1/4	32	135	9.3	29.9	760
ACX42064	1	25.6	1-3/8	35.2	3/16	4.8	25	7.6	3-1/2	89.6	125	8.6	29.9	760

Working pressures are calculated at a 1:4 ratio relative to burst pressure using ASTM D1599.

Relative Chemical Resistance Properties for Tygon® 2475 I.B.

Acids			Bases			Salts	Alcohols	Ketones
conc.	med.	weak	conc.	med.	weak			
F	E	E	E	E	E	E	E	E

E = Excellent F = Fair U = Unsatisfactory *All tests conducted at room temperature.



Tygon® Autoanalysis Tubing

Tygon® Autoanalysis Tubing (TAAT) is special application, micro-bore diameter tubing used in autoanalyzer instrumentation and microperistaltic pumps. Saint-Gobain has manufactured TAAT tubing for over a half century and pioneers the development of unique material formulations to meet the requirements of autoanalysis applications.

- Available in 2-stop and 3-stop configurations as well as nominal tubing
- Custom assemblies and tubing sets available
- Accurate flow rate for reproducible results; improves productivity and accuracy
- Precision engineered with tight tolerances; provides optimal fluid control
- Conserves use of reagents and materials

FORMULATION

TYGON S³™ E-3603

TYGON S³™ E-LFL

DUROMETER HARDNESS Shore A, 56

Non-DEHP and Phthalate-Free Tubing

- Available in two formulations: Tygon S³™ E-3603 and Tygon S³™ E-LFL
- Non-DEHP plasticizer is fully biodegradable
- Based on sustainable resources; fully traceable materials meet regulatory compliance

Tygon S³™ E-3603 TAAT Laboratory Tubing

- Ideal for general laboratory use
- Unaffected by inorganic chemicals; provides repeated reliable results
- Low spallation

Applications

- Drinking and wastewater analysis
- Sterile filling and dispensing
- Laboratory analytical instruments

FORMULATION

PharMed® BPT

DUROMETER HARDNESS Shore A, 64

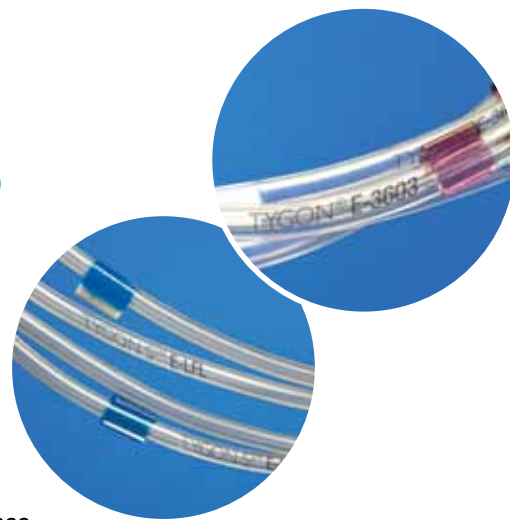
Life Science Applications TAAT Tubing

Life science applications tubing for use with peristaltic pumps

- Low particulate spallation
- Good general chemical resistance; withstands repeated sterilization
- Outlasts silicone tubing in peristaltic pumps by up to 30 times

Applications

- Cell culture and media dispensing
- Discrete reagent dispensing
- Microbiological testing and dilutions



Tygon S³™ E-LFL TAAT Long Flex Life Tubing

- Superior flex characteristics for long life; withstands the rigors of peristaltic pumps
- Low spallation
- Broad chemical resistance

Applications

- Mini peristaltic pump dispensing
- Cell culture feeding
- Drug testing

Regulatory Compliance

- USP Class VI
- FDA criteria
- NSF-51



Regulatory Compliance

- USP Class VI
- Master File with the U.S. FDA
- ISO 10993 standards
- FDA criteria
- NSF criteria

MANUFACTURING PLANT:

2664 Gilchrist Road, Akron, OH 44305 | Tel: (800) 798-1554 Tel: (330) 798-9240 Fax: (330) 798-6968



FORMULATION

TYGON® F-4040-A

DUROMETER HARDNESS Shore A, 57

Hydrocarbon Resistant TAAT Tubing

- Enables safe handling of most petroleum-based fluids
- Low rate of permeation
- Flexible and easy to install
- Resistant to swelling and embrittlement
- Ozone and UV light resistant

Applications

- Hydrocarbon liquids dispensing
- Sterile filling and dispensing
- Laboratory analytical instruments



2-Stop Autoanalysis Configuration

Saint-Gobain Part Number				I.D.		Wall Thickness		Collar
Tygon S3™ E-3603	Tygon S3™ E-LFL	PharMed® BPT	Tygon® F-4040-A	In.	mm	In.	mm	Color Code
A053401-E	A055501-E	n/a	n/a	0.008	0.19	0.035	0.09	Orange/Red
A053402-E	A055502-E	A053903-E	A053303-E	0.010	0.25	0.035	0.09	Orange/Blue
A053405-E	A055505-E	A053905-E	A053305-E	0.020	0.51	0.035	0.09	Orange/Yellow
A053409-E	A055509-E	A053908-E	A053308-E	0.035	0.89	0.033	0.85	Orange/Orange
A053413-E	A055513-E	A053910-E	A053310-E	0.045	1.14	0.033	0.85	Red/Red
A053416-E	A055516-E	A053912-E	A053312-E	0.056	1.42	0.033	0.85	Yellow/Yellow
A053421-E	A055521-E	A053915-E	A053315-E	0.081	2.06	0.033	0.85	Purple/Purple
A053424-E	A055524-E	A053918-E	A053318-E	0.110	2.79	0.033	0.85	Purple/White

3-Stop Autoanalysis Configuration

Saint-Gobain Part Number				I.D.		Wall Thickness		Collar
Tygon S3™ E-3603	Tygon S3™ E-LFL	PharMed® BPT	Tygon® F-4040-A	In.	mm	In.	mm	Color Code
A053501-E	A055601-E	n/a	n/a	0.008	0.19	0.035	0.09	Orange/Red
A053502-E	A055602-E	A054003-E	A054303-E	0.010	0.25	0.035	0.09	Orange/Blue
A053505-E	A055605-E	A054005-E	A054305-E	0.020	0.51	0.035	0.09	Orange/Yellow
A053509-E	A055609-E	A054008-E	A054308-E	0.035	0.89	0.033	0.85	Orange/Orange
A053513-E	A055613-E	A054010-E	A054310-E	0.045	1.14	0.033	0.85	Red/Red
A053516-E	A055616-E	A054012-E	A054312-E	0.056	1.42	0.033	0.85	Yellow/Yellow
A053521-E	A055621-E	A054015-E	A054315-E	0.081	2.06	0.033	0.85	Purple/Purple
A053524-E	A055624-E	A054018-E	A054318-E	0.110	2.79	0.033	0.85	Purple/White

Nominal Tubing is also available through Saint-Gobain. Contact one of our valued distributors for details.

MANUFACTURING PLANT:

2664 Gilchrist Road, Akron, OH 44305 | Tel: (800) 798-1554 Tel: (330) 798-9240 Fax: (330) 798-6968

Chemical Resistance Properties of Tubing

The ratings on this chart are based on the results of laboratory tests. They reflect the relative capabilities of various Saint-Gobain Performance Plastics tubing formulations to withstand specific chemicals. NOTE: The ratings in the charts DO NOT reflect the extent to which extraction may occur, or the extent to which fluids may undergo any physical changes in properties or composition, as a result of coming into contact with the tubing. Saint-Gobain Performance Plastics makes no representation or warranty with respect to the susceptibility of any fluid to become contaminated or undergo changes in properties or composition as a result of possible extraction of tubing ingredients by the fluid to be transmitted. Certain corrosives that would be destructive to tubing with prolonged exposure can be satisfactorily handled for short periods of time if flushed with water after use. All ratings are based on room temperature (73°F). Chemical resistance will be adversely affected by elevated temperatures.

IMPORTANT: It is the user's responsibility to ensure the suitability and safety of Saint-Gobain Performance Plastics tubing for all intended uses, including establishing the compatibility of any fluid with the tubing through which it is transmitted. Laboratory, field or clinical tests must be conducted in accordance with applicable requirements in order to determine the safety and effectiveness for use of tubing in any particular application. If intended for medical use, it is the user's responsibility to ensure that the tubing to be used complies with all applicable medical regulatory requirements.

Chemical Resistance

Saint-Gobain Tubing Name	Tygon S3™ E-3603 & Tygon S3™ E-LFL all variations	Tygon® E-1000	PharMed® BPT (Regular & TAAT)	Tygon® 3355-L	Versilic® SPX-50	Tygon® 2475	Tygon® 2475 I.B.	Tygon® F-4040-A (TAAT)
Acetaldehyde	U	U	U	F	F	F	F	U
Acetate Solvents (general)	U	U	G	U	U	U	U	U
Acetic Acid, 10% in water	E	E	E	E	E	E	E	E
Acetic Acid, 50-60% in water	E	G	G	E	E	E	E	E
Acetic Acid, Glacial, 100%	F	U	G	U	U	E	E	U
Acetone	U	U	U	F	U	G	G	U
Acetonitrile	U	U	G	U	U	G	G	U
Acetyl Chloride	U	U	F	U	U	U	U	U
Acrylonitrile	U	U	G	U	U	G	G	U
Alcohols General	U	U	E	G	E	E	E	G
Aliphatic Hydrocarbons	U	U	U	U	U	U	U	G
Amines	U	U	F	U	U	U	U	U
Ammonia Gas	E	E	E	U	U	E	E	E
Ammonia, Anhydrous Liquid	G	G	E	U	U	G	G	G
Ammonium Hydroxide, 5-10% in water	E	E	E	U	U	E	E	G
Ammonium Hydroxide, 30% in water	E	E	E	U	U	E	E	F
Ammonium Salts	E	E	E	E	E	E	E	E
Ammonium Sulfate, 30% in water	E	E	E	E	E	E	E	E
Aniline	U	U	F	U	U	U	U	U
Aromatic Hydrocarbons	U	U	U	U	U	U	U	U
Benzaldehyde	U	U	U	F	F	F	F	U
Benzoic Acid	U	U	G	U	U	U	U	F
Benzyl Alcohol	U	U	E	E	E	E	E	U
Bleach Liquor, 22% in water	F	E	E	U	G	E	E	E
Boric Acid, 4% in water	E	E	E	E	G	E	E	E
Butadiene	E	E	E	E	E	G	G	E
Butyl Acetate	U	U	G	U	U	U	U	U
Butyl Alcohol	U	U	U	U	U	E	E	E

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

Chemical Resistance (continued)

Saint-Gobain Tubing Name	Tygon S3™ E-3603 & Tygon S3™ E-LFL all variations	Tygon® E-1000	PharMed® BPT (Regular & TAAT)	Tygon® 3355-L	Versilic® SPX-50	Tygon® 2475	Tygon® 2475 I.B.	Tygon® F-4040-A (TAAT)
Calcium Chloride, 30% in water	E	E	E	E	E	E	E	E
Calcium Salts	E	E	E	E	E	E	E	E
Carbon Tetrachloride	U	U	U	U	U	U	U	U
Castor Oil	U	U	F	E	E	G	G	E
Cellosolve Acetate	U	U	F	U	U	U	U	F
Chlorine, Dry Gas	E	F	F	U	U	F	F	E
Chlorine, Wet Gas	F	U	U	U	U	F	F	E
Chlorobenzene, Mono, Di, Tri	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U
Citric Acid, 10-20% in water	E	E	E	E	E	E	E	E
Cresol (m, o, or p)	F	U	U	G	G	E	E	F
Cyclohexane	U	U	U	U	U	U	U	F
Cyclohexanone	U	U	U	U	U	F	F	U
Detergent Solutions	E	E	G	E	G	E	E	E
Diesel Fuel	U	U	U	U	U	U	U	G
Dimethylformamide	U	U	G	E	G	E	E	U
Dioxane	U	U	U	U	U	U	U	U
Ether	U	U	F	U	U	U	U	F
Ethyl Acetate	U	U	G	U	U	U	U	U
Ethyl Alcohol (Ethanol)	U	U	F	G	F	E	E	G
Ethylene Dichloride	U	U	F	U	U	U	U	U
Ethylene Glycol	E	E	E	E	E	E	E	E
Ethylene Oxide	E	F	E	E	F	E	E	E
Fatty Acids	U	U	F	G	F	F	F	G
Formaldehyde, 37% in water	U	U	U	F	F	F	F	U
Formic Acid, 40-50% in water	G	F	G	E	F	E	E	U
Formic Acid, 98% in water	F	F	G	E	F	E	E	U
Glucose, 50% in water	E	E	E	E	E	E	E	E

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



Chemical Resistance (continued)

Saint-Gobain Tubing Name	Tygon S3™ E-3603 & Tygon S3™ E-LFL all variations	Tygon® E-1000	PharMed® BPT (Regular & TAAT)	Tygon® 3355-L	Versilic® SPX-50	Tygon® 2475	Tygon® 2475 I.B.	Tygon® F-4040-A (TAAT)
Glycerol, (Glycerin)	E	E	E	E	E	E	E	E
Glycolic Acid, 70% in water	E	G	G	E	E	E	E	E
Hexane	U	U	U	U	U	U	U	G
Hydrobromic Acid, 20-50% in water	E	E	U	U	U	E	E	E
Hydrobromic Acid, 100% in water	F	E	U	U	U	E	E	U
Hydrochloric Acid, 10% in water	E	E	E	E	E	E	E	E
Hydrochloric Acid, 37% in water	F	F	G	U	U	E	E	U
Hydrofluoric Acid, 10% in water	E	E	U	U	U	E	E	E
Hydrofluoric Acid, 25% in water	F	E	U	U	U	E	E	U
Hydrofluoric Acid 40-48% in water	U	F	U	U	U	E	E	U
Hydrogen Peroxide, 3% in water	E	E	E	E	E	E	E	E
Hydrogen Peroxide, 10% in water	E	E	E	E	E	E	E	E
Hydrogen Peroxide, 30% in water	E	E	E	E	E	E	E	U
Hydrogen Peroxide, 90% in water	U	U	G	F	F	G	G	U
Hydroquinone, 7% in water	E	E	G	G	F	E	E	E
Iodine, 50 ppm in water	E	E	E	E	E	E	E	E
Isobutyl Alcohol	U	U	F	U	U	E	E	E
Isooctane	U	U	U	U	U	U	U	G
Isopropyl Acetate	U	U	G	U	U	U	U	U
Isopropyl Alcohol	U	U	F	U	U	E	E	E
Isopropyl Ether	U	U	F	U	U	U	U	F
Jet Fuel, JP8	U	U	U	U	U	U	U	G
Kerosene	U	U	U	U	U	U	U	G
Ketones	U	U	U	U	U	F	F	U
Lubricating Oils, Petroleum	U	U	U	G	G	U	U	E
Magnesium Sulfate, 25% in water	E	E	E	E	E	E	E	E
Methyl Ethyl Ketone	U	U	U	U	U	F	F	U
Methyl Isobutyl Ketone	U	U	U	U	U	F	F	U
Methylene Chloride	U	U	F	U	U	U	U	U
Mineral Oil	G	U	U	U	U	U	U	E
Motor Oil	U	U	U	U	U	U	U	E
Naphthalene	U	U	U	U	U	U	U	G
Nitric Acid, 10% in water	E	E	E	F	F	E	E	U
Nitric Acid, 35% in water	G	U	E	U	U	E	E	U
Nitric Acid, 68-71% in water	U	U	U	U	U	E	E	U
Nitrobenzene	U	U	U	U	U	U	U	U
Oxygen	E	E	E	E	E	E	E	E
Ozone, 300pphm	E	E	E	E	U	E	E	E

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

Chemical Resistance (continued)

Saint-Gobain Tubing Name	Tygon S3™ E-3603 & Tygon S3™ E-LFL all variations	Tygon® E-1000	PharMed® BPT (Regular & TAAT)	Tygon® 3355-L	Versilic® SPX-50	Tygon® 2475	Tygon® 2475 I.B.	Tygon® F-4040-A (TAAT)
Paraffins	U	U	U	U	U	U	U	G
Perchloric Acid, 67% in water	U	U	E	U	U	E	E	U
Phenol, 5-10% in water	G	F	E	E	U	E	E	E
Phenol, 91% in water	F	U	E	G	U	E	E	F
Phosphoric Acid, <10% in water	E	E	E	F	U	E	E	E
Phosphoric Acid, 25% in water	E	E	E	U	U	E	E	E
Phosphoric Acid, 85% in water	F	E	E	U	U	E	E	U
Phthalic Acid, 9% in alcohol	U	U	E	G	F	E	E	F
Phthalic Anhydride, 9% in alcohol	U	U	E	E	F	E	E	U
Potassium Dichromate, 5% in water	E	E	E	E	E	E	E	E
Potassium Hydroxide, <10% in water	E	U	E	E	G	E	E	U
Potassium Salts	E	E	E	E	E	E	E	E
Propyl Alcohol (Propanol)	U	U	F	U	U	E	E	E
Pyridine	U	U	F	U	U	F	F	U
Soap Solutions	E	F	G	E	F	E	E	E
Sodium Acetate, 55% in water	E	E	E	U	E	E	E	E
Sodium Bicarbonate, 7% in water	E	E	E	E	E	E	E	E
Sodium Carbonate, 7% in water	E	E	E	E	E	E	E	E
Sodium Chlorate, 45% in water	E	E	E	E	E	E	E	E
Sodium Chloride, 20% in water	E	E	E	E	E	E	E	E
Sodium Hydroxide, 10-15% in water	E	U	E	E	G	E	E	U
Sodium Hydroxide, 30-40% in water	G	U	E	E	G	E	E	U
Sodium Nitrate, 3.5% in water	E	E	E	E	E	E	E	E
Sodium Salts	E	E	E	E	E	E	E	E
Sodium Sulfate, 5% in water	E	E	E	E	E	E	E	E
Sulfuric Acid, 10% in water	E	E	E	E	E	E	E	E
Sulfuric Acid, 30% in water	E	E	E	G	G	E	E	G
Sulfuric Acid, 95-98% in water	U	U	U	U	U	E	E	U
Tetrahydrofuran	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U
Trichloroethane	U	U	F	U	U	U	U	U
Trichloroethylene	U	U	U	U	U	U	U	U
Trichloropropane	U	U	F	U	U	U	U	F
Urea 20% in water	E	E	E	E	G	E	E	E
Vinegar	E	E	E	E	E	E	E	E
Water, Deionized	E	E	E	E	E	E	E	E
Water, Distilled	E	E	E	E	E	E	E	E
Xylene	U	U	U	U	U	U	U	U

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

Physical Properties and Sterilization Guidelines for Saint-Gobain Tubing

Typical Physical Properties of Tygon® and Other Saint-Gobain Performance Plastics Tubing

Saint-Gobain Tubing Name	Durometer Hardness Shore A, 15	Color	Max. Recommended Operating Temperature °F (°C)	Low Temperature Flexibility °F (°C)	Tensile Strength psi (M Pa)
Tygon S3™ E-3603	56	Clear	165 (74)	-67 (-55)	1,750 (12.1)
Tygon S3™ E-3603 Vacuum	56	Clear	165 (74)	-67 (-55)	1,750 (12.1)
Tygon S3™ E-LFL	56	Clear	165 (74)	-67 (-55)	1,800 (12.4)
Tygon® E-1000	40	Clear	125 (52)	not tested	1,075 (7.4)
PharMed® BPT	64	Cream	275 (135)	-40 (-40)	1,000 (6.9)
Tygon® 3355-L	55	Translucent	400 (204)	not tested	900 (6.2)
Versilic® SPX-50	50	Translucent	350 (177)	not tested	1,500 (10.3)
Tygon® 2475	72	Clear	125 (52)	-94 (-70)	2,000 (13.8)
Tygon® 2475 I.B.	72	Clear (with inner braid)	125 (52)	-94 (-70)	2,000 (13.8)
Tygon S3™ E-3603 TAAT	56	Clear	165 (74)	-67 (-55)	1,750 (12.1)
Tygon® F-4040-A TAAT	57	Translucent Yellow	165 (74)	not tested	1,820 (12.5)
Tygon S3™ E-LFL TAAT	56	Clear	165 (74)	-67 (-55)	1,800 (12.4)
PharMed® BPT TAAT	64	Cream	275 (135)	-40 (-40)	1,000 (6.9)

Sterilization Chart

Saint-Gobain Tubing Name	Sterilization Method Supported		
	Autoclave ¹	Gas ²	Radiation ³
Tygon S3™ E-3603	yes	yes	no
Tygon S3™ E-3603 Vacuum	yes	yes	no
Tygon S3™ E-LFL	yes	yes	no
Tygon® E-1000	no	yes	no
PharMed® BPT	yes	yes	yes (up to 5 MRad)
Tygon® 3355-L	yes	yes	gamma only
Versilic® SPX-50	yes	yes	yes
Tygon® 2475	no	yes	yes
Tygon® 2475 I.B.	no	yes	yes
Tygon S3™ E-3603 TAAT	not tested	not tested	not tested
Tygon® F-4040-A TAAT	not tested	not tested	not tested
Tygon S3™ E-LFL TAAT	not tested	not tested	not tested
PharMed® BPT TAAT	not tested	not tested	not tested

¹ Steam 30 minutes at 15 psi at 250°F (121°C)

² Ethylene Oxide

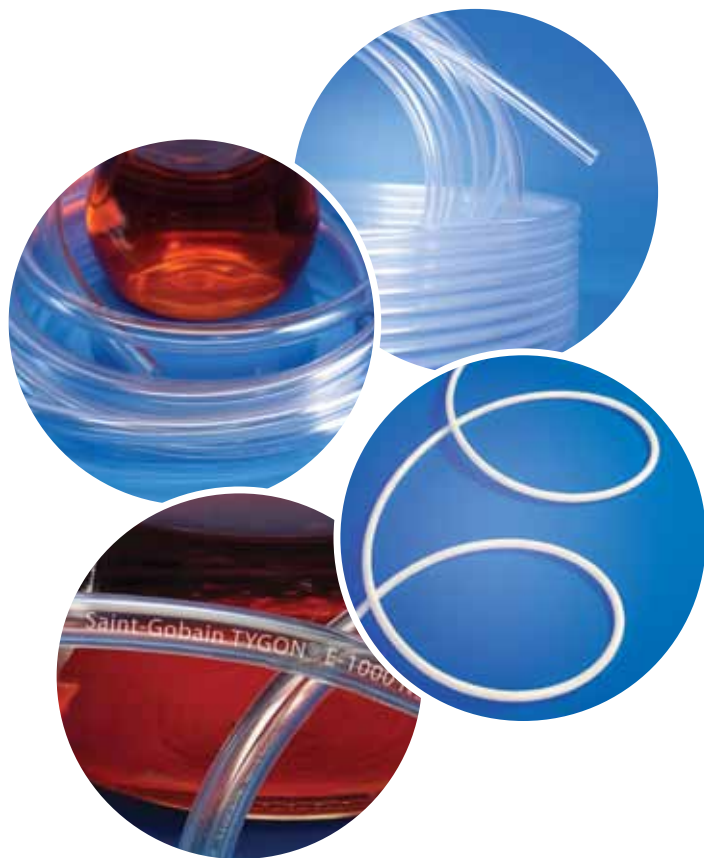
³ Gamma and E-Beam up to 2.5 MRad

Tubing Selection Guide

The information presented in this brochure is intended to serve as a guide for selection and specification of flexible tubing. Proper use of this information will lead to the design of systems which provide both optimized tubing performance and overall increased productivity.

In choosing the right tubing for your application there are several factors to consider. Listed to the right are questions that will help direct you in the selection of the proper tubing from Saint-Gobain Performance Plastics for your specific application. It is required to test tubing under the actual service conditions prior to specifying a particular tubing formulation. If field testing is not practical, laboratory tests that simulate field conditions must be employed.

Assistance in tubing selection is available from our worldwide network of authorized Tygon® tubing distributors. For the name of the distributor nearest you, contact Customer Service at 1-800-798-1554, or you may contact the nearest sales office listed on the back of this catalog.



Frequently Asked Questions

- 1 What fluid will be transported?
- 2 What range of temperatures will the tubing be subjected to?
- 3 What is the maximum line pressure or vacuum pressure?
- 4 Are specific dimensional tolerances required?
- 5 What degree of tubing flexibility is desired?
- 6 What are the conditions of the ambient environment?
- 7 Is there a minimum bend radius required?
- 8 Is clarity of tubing important?
- 9 What regulatory documentation is needed? (e.g., FDA, NSF, ISO 10993, USP, etc.)
- 10 What method(s) of cleaning and/or sterilization are to be employed?
- 11 Is resistance to flexural fatigue or abrasion important?
- 12 Is particle spallation of tubing a concern while used in a peristaltic pump?
- 13 Will the level of extractability affect the transported fluid?
- 14 Will any fluid loss or alteration through sorption (adsorption/absorption) affect your final results?
- 15 Is disposal of contaminated tubing an issue?
- 16 Will particle entrapment resulting in increased risk of bacterial growth be a concern?

Custom Tubing Formulations

MANUFACTURING PLANTS:

Saint-Gobain
Performance Plastics
2664 Gilchrist Road
Akron, OH 44305
Tel: (800) 798-1554
Tel: (330) 798-9240
Fax: (330) 798-6968

Saint-Gobain
Performance Plastics
3910 Terry-Diane Drive
Beaverton, MI 48612
Tel: (989) 435-9533
Tel: (888) 387-0067
Fax: (989) 435-2355

Saint-Gobain
Performance Plastics
La Mothe-aux-Aulnaies
BP14-89120 Charny, France
Tel: (33) 3-86-63-78-78
Fax: (33) 3-86-63-77-77

Saint-Gobain
Performance Plastics
10801-5, Hara-mura, Suwa-gun
Nagano 391-0106, Japan
Tel: (81) 266-79-6400
Fax: (81) 266-70-1001

Saint-Gobain
Performance Plastics
1468 KunYang Road
Minghang Economic & Technological
Development Zone
Shanghai, China 200245
Tel: (86) 21-5472-1568
Fax: (86) 21-5472-5993

- Over 1,000 formulations currently available
- Custom compounds can be formulated to match user requirements; compounding capability is available up to Shore A, 90
- Custom extrusions can be developed or prototyped up through Shore D, 79

Saint-Gobain Performance Plastics is committed to materials research and development, and continually provides innovative solutions to the challenges faced in laboratory and production applications. We compound our own materials to specific formulation requirements using select ingredients that are carefully qualified and specified. We have over 1,000 formulations currently available to solve your application challenges.

Additionally, we have a staff of talented engineers and on-site laboratories that can work with you to develop a custom formulation to meet your most advanced requirements. We can also help with final product inspection, including burst testing, flow rate testing and measurement of other key performance characteristics.



Saint-Gobain tubing material is not intended for use as an implant material under any circumstances.

WARNING: The content of Saint-Gobain Plastics tubing materials is not certified by the FDA for implant devices and is neither designed nor intended to be used in medical applications involving permanent implantation in the human body or permanent contact with body fluids or tissues. Failure to comply with this warning may lead to serious bodily injury or death.

IMPORTANT: It is the user's responsibility to ensure the suitability and safety of Saint-Gobain Performance Plastics materials for all intended uses. Laboratory, field and clinical tests must be conducted in accordance with applicable regulatory requirements in order to determine the safety and effectiveness for use of materials in any particular application. If intended for healthcare use, it is the user's responsibility to ensure that the materials to be used comply with all applicable medical regulatory requirements. SAINT-GOBAIN PERFORMANCE PLASTICS CORPORATION SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND RESULTING FROM THE USE OF PRODUCTS CONTAINED HEREIN.

LIMITATION OF LIABILITY: Except for products for which Saint-Gobain Performance Plastics (SGPPL) has established a specific written warranty, the products described herein are sold by SGPPL without any guarantee and/or warranty, oral or written. User assumes all risk, if any, including the risk of injury, loss or damage, whether direct, consequential or incidental, arising out of the use, misuse or inability to use these products. SAINT-GOBAIN PERFORMANCE PLASTICS DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

NOTE: Saint-Gobain Performance Plastics Corporation does not assume any responsibility or liability for any advice furnished by it, or for the performance or results of any installation or use of the product or of any final product into which the product may be incorporated by the purchaser and/or user. All such advice is given and accepted at the buyer's risk.