

Tygon® Microbore Tubing

For Use with AutoAnalyzer Equipment and ICP Instruments

Tygon Microbore Tubing is special application tubing used in AutoAnalyzer instrumentation, ICP peristaltic pumps, and a variety of flow analysis methods (segmented flow, flow injection, continuous flow, and flow batch).

Saint-Gobain has manufactured autoanalysis tubing (TAAT) for over a half century and pioneers the development of unique material formulations. Major equipment and micro pump manufacturers depend on Saint-Gobain's extensive knowledge of this specialized tubing for OEM instruments, while scientists depend on our 2-stop and 3-stop tubing to deliver reproducible results.

Tygon Microbore Tubing from Saint-Gobain is available in a range of application-specific formulations with broad chemical resistance for laboratory, environmental, biopharmaceutical, clinical and industrial automated fluid sample analysis. Tygon Microbore tubing from Saint-Gobain allows optimal flow rate and throughput with accurate, reproducible results.



Features and Benefits

- Available in 2-stop and 3-stop configurations and nominal tubing
- Firm stop adhesion reduces risk of tubing slip within pumps; prevents variable flow rates to improve productivity, accuracy and safety
- Tubing available in a variety of Inner Diameter (ID) sizes to ensure fit
- Precision engineered with tight tolerances for optimal fluid control
- Custom assemblies are available

Available Formulations & Typical Applications

Tygon S3™ E-3603

Phthalate-free laboratory tubing for laboratory analytical instruments, sterile filling and dispensing, and water analysis

Tygon S3™ E-LFL

Phthalate-free long flexible life tubing for micro peristaltic pump dispensing, cell culture feeding and drug testing

Versilon™ F-5500-A

Fluoroelastomer laboratory tubing with excellent chemical resistance to corrosive chemicals, oils, fuel and solvents

Tygon® LMT-55

Non-DEHP laboratory tubing with excellent chemical resistance for autoanalyzer instruments and for reagent dispensing applications

PharMed® BPT

Life science applications tubing for cell culture, reagent dispensing and microbiological testing & dilutions

Tygon® F-4040-A

Hydrocarbon resistant tubing specifically designed for dispensing petroleum-based fluids

Tygon® 3350

Long-life platinum-cured silicone tubing for high-purity liquids and sterile applications

Specifications

Tubing length

- With stops (all formulations) 15 in. (381 mm)
- Nominal tubing (all formulations) 33 ft. (10 m)

Stops are non-DEHP and contain a bio-based plasticizer

Stop distance for Tygon® F-4040-A

- 2-stops: 5.51 in. (140 mm)
- 3-stops: 6.69 in. (170 mm)

Stop distance for all other formulations

- 5.98 in. (152 mm)

Stop colors indicate I.D. tubing sizes

Available options:

- Orange/Red (0.008 in./0.19 mm)
Wall Thickness (0.035 in./0.90 mm)
- Orange/Blue (0.010 in./0.25 mm)
Wall Thickness (0.035 in./0.90 mm)
- Orange/Yellow (0.020 in./0.51 mm)
Wall Thickness (0.035 in./0.90 mm)
- Orange/Orange (0.035 in./0.89 mm)
Wall Thickness (0.033 in./0.85 mm)
- Red/Red (0.045 in./1.14 mm)
Wall Thickness (0.033 in./0.85 mm)
- Yellow/Yellow (0.056 in./1.42 mm)
Wall Thickness (0.033 in./0.85 mm)
- Purple/Purple (0.081 in./2.06 mm)
Wall Thickness (0.033 in./0.85 mm)
- Purple/White (0.110 in./2.79 mm)

Wall Thickness (0.033 in./0.85 mm)

Additional sizes available upon request

Formulations & Features



Tygon E-3603

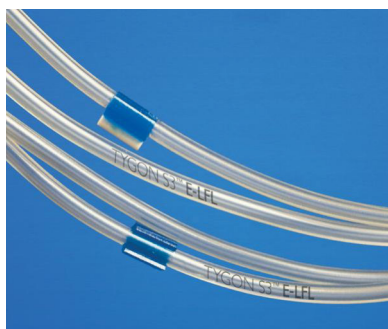
Durometer Hardness Shore A, 56, Phthalate-Free Micro-bore Tubing

The most consistently reliable tubing for laboratory applications

- Flexible clear tubing for laboratory applications features a bio-based plasticizer
- Lot-to-lot consistency for reproducible results
- Non-oxidizing and non-contaminating
- Clear and smooth glass-like inner bore prevents buildup and enables easy monitoring

Product Characteristics

Opacity	Clear
FDA Approved for Food Contact	Yes
NSF 51 Standard	Yes
USP Class VI	Yes



Tygon E-LFL

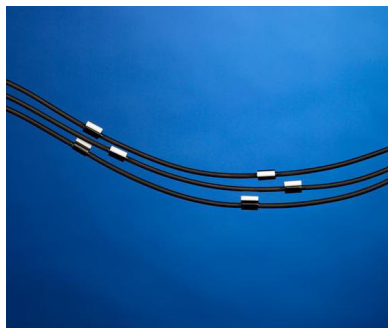
Durometer Hardness Shore A, 56, Phthalate-Free Micro-bore Tubing

Flexible, clear tubing formulated for optimal peristaltic pump performance and long pump life

- Flexible bio-based plasticizer withstands the rigors of peristaltic pumps
- Superior flex life characteristics significantly decreases risk of pump tubing failure; reduces maintenance
- Low particle spallation; diminished risk of sensitive fluid contamination
- Performs well in high-purity biopharmaceutical applications
- Clear and smooth glass-like inner bore prevents buildup and enables easy monitoring

Product Characteristics

Opacity	Clear
FDA Approved for Food Contact	Yes
NSF 51 Standard	Yes
USP Class VI	Yes



Versilon F-5500-A

Durometer Hardness Shore A, 60 Chemically Resistant Micro-bore Tubing

The preferred tubing for harsh chemicals

- Excellent resistance to corrosive chemicals, oils, fuels and solvents
- Ideal for peristaltic pump use
- High degree of flexibility
- Low gas permeability

Product Characteristics

Opacity	Black
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Tygon LMT-55

Durometer Hardness Shore A, 55 non-DEHP Micro-bore Tubing

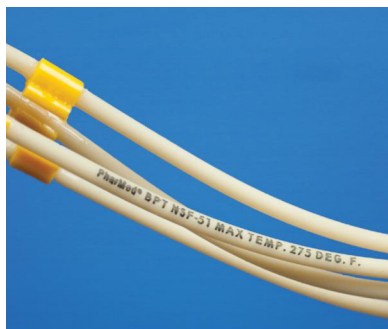
Crystal clear tubing for laboratory applications with excellent chemical resistance

- Long lasting and crack resistant this tubing is engineered to last
- Resistance to flex-fatigue and abrasion
- Smooth, polished inner wall prevents buildup
- Sterilizable by autoclaving and by gas (ethylene oxide)

Product Characteristics

Opacity	Clear
USP Class VI	Yes

Formulations & Features



PharMed BPT

Durometer Hardness Shore A, 64 Biocompatible Micro-bore Tubing

Life science applications tubing for use with peristaltic pumps

- Low particulate spallation
- Excellent alkali and oxidation resistance
- Low gas permeability
- Non-toxic and non-hemolytic
- Opaque to UV and visible light to protect fluids

Product Characteristics

Opacity	Cream
FDA Approved for Food Contact	No
NSF 51 Standard	No
USP Class VI	Yes
ISO 10993	Yes
Masterfile with the FDA	Yes



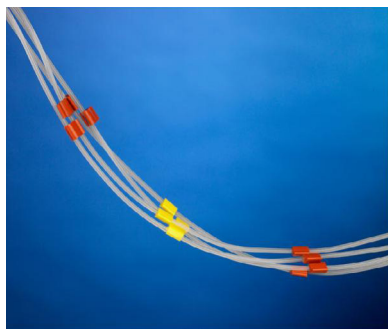
Tygon F-4040-A

Hydrocarbon Resistant Micro-bore Tubing

- High-performance tubing specifically formulated for fuels and lubricants
- Enables safe handling of hydrocarbon and petroleum-based fluids
- Low rate of permeation
- Resists swelling and embrittlement caused by hydrocarbons
- Ozone and UV light resistant
- Translucent yellow color for easy identification

Product Characteristics

Opacity	Translucent Yellow
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Tygon 3350

Durometer Hardness Shore A, 50 Platinum-Cured Silicone Micro-bore Tubing

Long-life, silicone tubing for high-purity liquids

- Smooth inner surface inhibits protein binding and bacterial growth; minimal extractables
- Excellent flexibility and bend radius; ideal for peristaltic pumps
- Highly consistent dispensing volumes
- Stable over a broad temperature range

Product Characteristics

Opacity	Translucent
FDA Approved for Food Contact	Yes
NSF 51 Standard	No
USP Class VI	Yes

Saint-Gobain Microbore Tubing

The highest quality tubing for your auto analysis and micro pump applications

- A variety of formulations supporting a range of auto analysis and micro pump applications
- Tight tolerances and lot-to-lot consistency in our manufacturing processes yield reproducible results in your laboratory
- Ideal for use in sample and reagent dispensing, water and soil analysis, and biological and chemical assays
- 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 lower quality competitive products

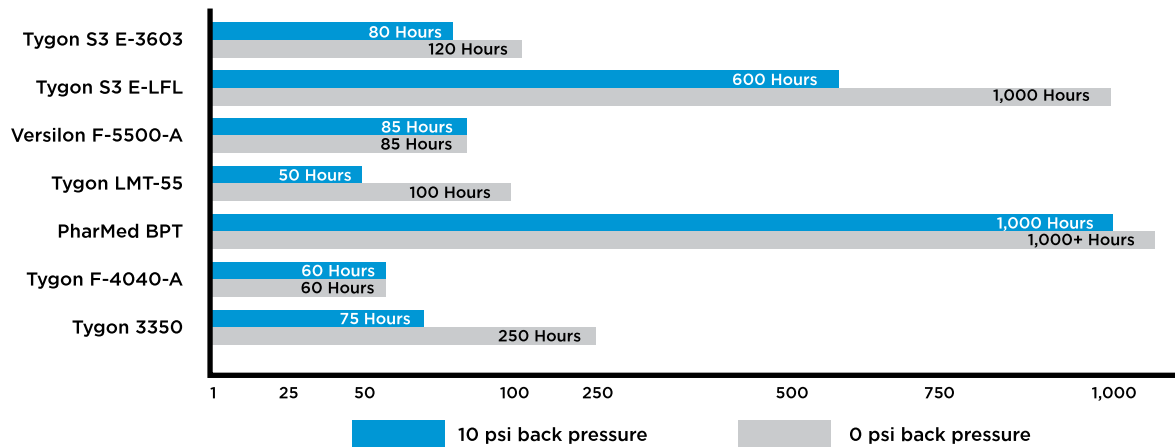
Typical Physical Properties

ASTM Method	Durometer Hardness (Shore A) 15 sec	Tensile Strength psi (Mpa)	Ultimate Elongation %	Tear Resistance ib-f/in (kN/m)	Specific Gravity	Water Absorption % 24 hrs. 73°F (23°C)	Compression Set Constant Deflection% @ 158°F (70°C) 22 hrs	Brittleness Temperature °F (°C)	Max. Recommended Operating Temperature °F (°C)	Tensile Stress @ 100% Elongation psi (MPa)	Tensile Set %	Color
	D2240	D412	D412	D1004	D792	D570	D395 (Method B)	D746	-	D412	D412	-
Tygon E-3603	56	1,750 (12.1)	425	173 (31)	1.21	0.21	64	-51 (-46)	165 (74)	582 (4.0)	95	Clear
Tygon S3 E-LFL	56	1,800 (12.4)	400	184 (32.2)	1.17	0.20	68	-51 (-46)	165 (74)	550 (3.5)	54	Clear
Versilon F-5500-A	60	1400 (9.3)	300	100 (17.5)	1.90	0.23	37	-60 (-51)	350 (2.4)	350 (2.4)	13	Black
Tygon LMT-55	55	1,650 (11.4)	450	125 (22)	1.18	0.24	61	-58 (-50)	165 (74)	650 (4.5)	107	Clear
PharMed BPT	64	1,000 (6.9)	375	120 (21)	0.98	0.30	27	-75 (-60)	275 (135)	410 (2.8)	47	Clear
Tygon F-4040-A	57	1,820 (12.5)	310	167 (29)	1.26	0.49	65	-35 (-37)	165 (74)	910 (6.3)	50	Translucent Yellow
Tygon 3350	50	1450 (10.0)	770	200 (35)	1.14	0.11	35	-112 (80)	400 (204)	462 (3.2)	-	Translucent

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 pressure, 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.

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 corresponding formulation. In each case, a 3-roller pump head was utilized operating at 600 rpm under room temperature of 73°F (23°C). Tubing failure is measured in hours of use prior to rupture.



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NOTE: The data and details given in this document are correct and up to date. This document is intended to provide information about the product and possible applications. This document is not the product specification and does not provide specific features, nor does it guarantee product performance in specific applications. Saint-Gobain cannot anticipate or control the conditions of the field and for this reason strongly recommends that practical tests are conducted to ensure that the product meets the requirements of a specific application.

Tygon® is a registered trademark and Versilon™ is a trademark of Saint-Gobain Performance Plastics.