





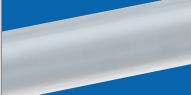









## Masterflex® Tubing Formulations

Pump tubing formulation	Advantages	Application suitability†							Meets classifications	Gas permeability	Sterilization
		Acids	Alkalies	Organic solvents	Pressure	Vacuum	Viscous fluids	Sterile fluids			
 <p><b>Silicone (platinum-cured)</b></p>	<p>Excellent biocompatibility. No leachable additives, DOP, or plasticizers; phthalate and latex-free; odorless and nontoxic, fungus-resistant. No taste imparted to transported fluids. Weather, ozone, corona, and radiation resistant. Minimal tendency to take a set. Translucent, clear to light amber.</p>	N/R	N/R	N/R	F	G	F	E	<p>USP Class V Extractables Exceeds Class VI Implant European Pharmacopoeia (EP 3.1.9) FDA 21 CFR 177.2600; FDA 21 CFR 210 and 211; Exceeds 3A sanitary cGMPs; REACH (non-DEHP) compliant RoHS compliant ADCF compliant</p>	<p>CO<sub>2</sub>: 20,132 H<sub>2</sub>: 6579 O<sub>2</sub>: 7961 N<sub>2</sub>: 2763</p>	<p>Sterilize by EtO, autoclave, or gamma radiation.</p>
 <p><b>Silicone (peroxide-cured)</b></p>	<p>Excellent biocompatibility. No additives, plasticizers or DOP; odorless and nontoxic, fungus-resistant. No taste imparted to transported fluids. Weather, ozone, corona, and radiation resistant. Minimal tendency to take a set. Translucent, clear to light amber.</p>	N/R	N/R	N/R	F	G	F	E	<p>USP Class VI European Pharmacopoeia (EP 3.1.9) FDA 21 CFR 177.2600 Exceeds 3A sanitary standards REACH (non-DEHP) compliant RoHS compliant ADCF compliant</p>	<p>CO<sub>2</sub>: 20,132 H<sub>2</sub>: 6579 O<sub>2</sub>: 7961 N<sub>2</sub>: 2763</p>	<p>Sterilize by EtO or autoclave.</p>
 <p><b>BioPharm Silicone (platinum-cured)</b></p>	<p>Ultra-smooth inner surface minimizes particle entrapment. Lower absorption; excellent biocompatibility; no leachable additive, DOP, or plasticizers. Very low extractables. Odorless and nontoxic, fungus-resistant. No taste imparted to transported fluids. Weather, ozone, corona, and radiation resistant. Translucent, clear to light amber.</p>	N/R	N/R	N/R	F	G	F	E	<p>USP Class VI European Pharmacopoeia (EP 3.1.9) FDA 21 CFR 177.2600 Exceeds 3A sanitary standards REACH (non-DEHP) compliant RoHS compliant</p>	<p>CO<sub>2</sub>: 25,147 H<sub>2</sub>: — O<sub>2</sub>: 4715 N<sub>2</sub>: 2284</p>	<p>Sterilize by EtO, autoclave, or gamma radiation.</p>
 <p><b>BioPharm Plus Silicone (platinum-cured)</b></p>	<p>Similar to BioPharm Silicone, plus: Longest life of any silicone pump tubing. Lower spallation than regular silicone. Enhanced pressure capability. Fungus-resistant. Nontoxic, no leachable plasticizers. Lower gas permeability than other silicones. Translucent, clear to light amber.</p>	N/R	N/R	N/R	F	G	F	E	<p>USP Class VI European Pharmacopoeia (EP 3.1.9) FDA 21 CFR 177.2600 Exceeds 3A sanitary standards REACH (non-DEHP) compliant RoHS compliant</p>	<p>CO<sub>2</sub>: 25,147 H<sub>2</sub>: — O<sub>2</sub>: 4715 N<sub>2</sub>: 2284</p>	<p>Sterilize by EtO, autoclave, or gamma radiation.</p>
 <p><b>Puri-Flex™</b></p>	<p>Biocompatible. Heat sealable and weldable. Long pump life when compared to silicone or other TPE tubings. Low spallation when compared to silicone or some other TPE tubings. Very low protein binding. Cost effective. No halogens or phthalates. Translucent, clear to light white.</p>	G	G	N/R	G	G	E	E	<p>USP Class VI FDA 21 CFR 177.2600 and 177.1810 REACH (non-DEHP) compliant RoHS compliant ADCF compliant</p>	<p>CO<sub>2</sub>: 1200 H<sub>2</sub>: — O<sub>2</sub>: 200 N<sub>2</sub>: 80</p>	<p>Sterilize by EtO, autoclave up to 135°C (275°F), gamma radiation up to 4.5 Mrad.</p>
 <p><b>C-Flex®</b></p>	<p>Physical properties similar to silicone with chemical compatibility of Tygon®. Inexpensive. Biocompatible. Heat sealable and weldable. Opaque, white.</p>	G	G	N/R	F	G	F	E	<p>USP Class VI European Pharmacopoeia (EP 3.2.9) REACH (non-DEHP) compliant RoHS compliant ADCF compliant</p>	<p>CO<sub>2</sub>: — H<sub>2</sub>: — O<sub>2</sub>: 150 N<sub>2</sub>: —</p>	<p>Sterilize by EtO, autoclave, or gamma radiation.</p>
 <p><b>C-Flex® ULTRA</b></p>	<p>Physical properties similar to silicone with chemical compatibility of Tygon®. Biocompatible. Heat sealable and weldable. Longer pump life and lower spallation than C-Flex. Translucent.</p>	G	G	N/R	F	G	F	E	<p>USP Class VI European Pharmacopoeia (EP 3.2.9) REACH (non-DEHP) compliant RoHS compliant ADCF compliant</p>	<p>CO<sub>2</sub>: 2.1 H<sub>2</sub>: — O<sub>2</sub>: 1.1 N<sub>2</sub>: 3.4</p>	<p>Sterilize by gamma radiation or one cycle of autoclave at 121°C (250°F), 1 bar (15 psi) for 30 minutes.</p>







†E = Excellent, G = Good, F = Fair, P = Poor, N/R = not recommended

# Masterflex® Tubing Formulations (continued)

Pump tubing formulation	Advantages	Application suitability†							Meets classifications	Gas permeability	Sterilization
		Acids	Alkalies	Organic solvents	Pressure	Vacuum	Viscous fluids	Sterile fluids			
 <b>PharMed® BPT</b>	Great for tissue and cell work—nontoxic and nonhemolytic. Long service life (up to 10,000 hrs); reduces tubing costs and pump downtime. Opaque to UV and visible light to protect light-sensitive fluids. Low gas permeability. High-pressure 10.3 bar (150 psi) version available. Opaque, beige	G	G	N/R	G	G	E	E	USP Class VI European Pharmacopoeia (EP 3.2.9) FDA 21 CFR 177.2600 NSF-51 REACH (non-DEHP) compliant RoHS compliant	CO <sub>2</sub> : 1200 H <sub>2</sub> : — O <sub>2</sub> : 200 N <sub>2</sub> : 80	Sterilize by EtO, autoclave, or gamma radiation up to 2.5 Mrad.
 <b>Solve-Flex®</b>	Excellent chemical resistance, especially with solvents. Chemically inert. Low spallation. Nontoxic. Low coefficient of friction. Fluoropolymer-lined tubing. Opaque, white.	E	E	E	F	G	E	E	USP Class VI	—	Sterilize by EtO.
 <b>PharmaPure®</b>	Nontoxic and nonhemolytic (similar to PharMed® BPT); biocompatible. Long life even under pressure; up to 1000 hours at 2.7 bar (40 psi). Very low spallation—protects fluid purity. Low extractables. Low gas permeability. Opaque, off-white.	G	G	N/R	G	G	E	E	USP Class VI FDA 21 CFR 177.2600 European Pharmacopoeia (EP 3.2.9) REACH (non-DEHP) compliant RoHS Compliant	CO <sub>2</sub> : 1200 H <sub>2</sub> : — O <sub>2</sub> : 200 N <sub>2</sub> : 80	Sterilize by EtO, autoclave or gamma radiation up to 2.5 Mrad.
 <b>Chem-Durance® Bio</b>	Excellent chemical resistance. Excellent life and durability under pressure. Low spallation. Plasticizer-free inner liner. High dielectric constant. Excellent biocompatibility. Opaque, beige.	E	E	G	E	E	E	E	USP Class VI FDA 21 CFR 177.2600 REACH (non-DEHP) compliant RoHS Compliant	CO <sub>2</sub> : 745 H <sub>2</sub> : — O <sub>2</sub> : 200 N <sub>2</sub> : 80	Sterilize with ethylene oxide (EtO) radiation or autoclave.
 <b>PTFE</b>	Chemically inert. Excellent chemical resistance. Will not leach into or absorb out of fluid being pumped. Extremely low gas permeability. Nontoxic. Virtually nonporous. Low coefficient of friction. Translucent, white.	E	E	E	G	G	E	G	USP Class VI REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO <sub>2</sub> : 6.8 H <sub>2</sub> : — O <sub>2</sub> : — N <sub>2</sub> : 1.0	Sterilize by EtO, autoclave, or gamma irradiation.
 <b>Tygon® E-LFL</b>	Longest life of all Tygon® peristaltic tubing. Clear for easy flow monitoring. Broad chemical resistance. Nonaging, nonoxidizing. Low gas permeability. Smooth bore. Good for viscous fluids. High dielectric constant. Transparent, clear.	G	G	N/R	G	G	E	G	USP Class VI European Pharmacopoeia (EP 3.2.9) FDA 21 CFR 175.300 EU Food REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO <sub>2</sub> : 563 H <sub>2</sub> : — O <sub>2</sub> : 124 N <sub>2</sub> : 67	Sterilize by EtO or autoclave.
 <b>Tygon® E-Food (B-44-4X)</b>	Designed especially for handling food products. Bore is extremely smooth (better than most stainless steels) Nontoxic, will not affect taste or odor, and clear for CIP and flow verification. Excellent nonwetting properties permit flush cleaning and complete drainage. High dielectric constant. Transparent, clear.	G	G	N/R	G	G	E	F	FDA 21 CFR 175.300 EU Food NSF-51 REACH (non-DEHP) compliant RoHS compliant ADCF compliant Meets 3A sanitary standards	CO <sub>2</sub> : 270 H <sub>2</sub> : 97 O <sub>2</sub> : 60 N <sub>2</sub> : 30	Sterilize by EtO or autoclave.

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# Choosing the Right MASTERFLEX® Tubing

Pump tubing formulation	Advantages	Application suitability†							Meets classifications	Gas permeability	Sterilization
		Acids	Alkalies	Organic solvents	Pressure	Vacuum	Viscous fluids	Sterile fluids			
<b>Tygon® E-Lab (E-3603)</b> 	Inexpensive tubing for general laboratory applications. Clear for easy flow monitoring. Handles virtually all inorganic chemicals. Nonaging, nonoxidizing. Low gas permeability. Good for viscous fluids. High dielectric constant. Transparent, clear.	G	G	N/R	G	G	E	P	USP Class VI FDA 21 CFR 175.300 EU Food NSF-51 REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO <sub>2</sub> : 360 H <sub>2</sub> : 97 O <sub>2</sub> : 80 N <sub>2</sub> : 40	Sterilize by EtO or autoclave.
Temperature range: Static: -46 to 74°C (-51 to 165°F) Dynamic (pumping): 0 to 40°C (32 to 104°F)											
<b>Tygon® Chemical (2001)</b> 	Best chemical resistance of any Tygon® formulation. Compatible with many polar solvents. Plasticizer-free. Clear for easy flow monitoring. Low extractability. Low gas permeability. High dielectric constant. Transparent, clear.	E	E	G	G	G	E	G	FDA 21 CFR 175.300 REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO <sub>2</sub> : 114 H <sub>2</sub> : — O <sub>2</sub> : 19 N <sub>2</sub> : 9	Sterilize by EtO, autoclave, or gamma radiation.
Temperature range: Static: -77 to 57°C (-108 to 135°F) Dynamic (pumping): 0 to 40°C (32 to 104°F)											
<b>Tygon® Fuel &amp; Lubricant (F-4040-A)</b> 	Specially formulated to transport hydrocarbons, petroleum products, and distillates. Suitable for gasoline, kerosene, heating oils, cutting fluids, and glycol-based coolants. Minimum extractability. Low gas permeability. High dielectric constant. Transparent, yellow.	G	G	N/R	G	G	E	P	REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO <sub>2</sub> : 100 H <sub>2</sub> : 97 O <sub>2</sub> : 22 N <sub>2</sub> : 12	Sterilization is not recommended.
Temperature range: Static: -37 to 74°C (-35 to 165°F) Dynamic (pumping): 0 to 40°C (32 to 104°F)											
<b>Norprene® (A 60 G)</b> 	Best choice for vacuum/pressure applications. Offers longest pump tubing life. Heat, ambient ozone resistant. Good resistance to acids/alkalies. Black color hides dirt and dust. Heat sealable, nonaging, and nonoxidizing. High dielectric constant. High-pressure version available. Opaque, black.	G	G	N/R	E	E	E	N/R	NSF-51 REACH (non-DEHP) compliant RoHS compliant	CO <sub>2</sub> : 1200 H <sub>2</sub> : — O <sub>2</sub> : 200 N <sub>2</sub> : 80	Sterilize by EtO, autoclave, or gamma irradiation.
Temperature range: Static: -59 to 132°C (-60 to 270°F) Dynamic (pumping): -20 to 100°C (-4 to 212°F)											
<b>Norprene® Food (A 60 F)</b> 	Similar to Norprene® but with FDA approval. Excellent for food/dairy applications. Longest life, good flow consistency. Heat and ozone resistant. Good resistance to acids/alkalies. Heat sealable, nonaging, and nonoxidizing. High dielectric constant. Opaque, beige.	G	G	N/R	E	E	E	G	FDA 21 CFR 177.2600 NSF-51 REACH (non-DEHP) compliant RoHS compliant	CO <sub>2</sub> : 1200 H <sub>2</sub> : — O <sub>2</sub> : 200 N <sub>2</sub> : 80	Sterilize by EtO, autoclave, or gamma irradiation.
Temperature range: Static: -59 to 132°C (-60 to 270°F) Dynamic (pumping): -20 to 100°C (-4 to 212°F)											
<b>Viton®</b> 	Perfect for food and lab applications where FDA compliance is required. Excellent chemical resistance. Resistant to corrosives, solvents, and oils at elevated temperatures. Low gas permeability. Opaque, black.	E	E	Variable—test before using	G	G	G	F	FDA 21 CFR 177.2600 ADCF compliant	CO <sub>2</sub> : 76 to 79 H <sub>2</sub> : — O <sub>2</sub> : 13 to 15 N <sub>2</sub> : 4.3	Sterilization is not recommended.
Temperature range: Static: -32 to 205°C (-25 to 400°F) Dynamic (pumping): 0 to 150°C (32 to 302°F)											

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## Masterflex® Tubing Test Kit

Our FREE Tubing Test Kit is a simple way to test your chemicals against different tubing formulations. Kit contains samples of 19 different pump tubing formulations, formulation descriptions, a selection guide, instructions on how to test your tubing, and complete ordering information. Call today! Request item 00101-10.

**Request your FREE test kit today!**

