













Choosing the Right Masterflex® Tubing Formulation

Pump tubing formulation	Advantages	Application suitability†							Meets classifications	Gas permeability	Sterilization
		Acids	Alkalies	Organic solvents	Pressure	Vacuum	Viscous fluids	Sterile fluids			
Silicone (platinum-cured) 96410-, 96510-series 	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.	N/R	N/R	N/R	F	G	F	E	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	CO ₂ : 20,132 H ₂ : 6579 O ₂ : 7961 N ₂ : 2763	Sterilize by EtO, autoclave, or gamma irradiation.
Silicone (peroxide-cured) 96400-, 96406-series 	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.	N/R	N/R	N/R	F	G	F	E	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	CO ₂ : 20,132 H ₂ : 6579 O ₂ : 7961 N ₂ : 2763	Sterilize by EtO or autoclave.
BioPharm Silicone (platinum-cured) 96420-, 96421-series 	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.	N/R	N/R	N/R	F	G	F	E	USP Class VI European Pharmacopoeia (EP 3.1.9) FDA 21 CFR 177.2600 Exceeds 3A sanitary standards REACH (non-DEHP) compliant RoHS compliant	CO ₂ : 25,147 H ₂ : — O ₂ : 4715 N ₂ : 2284	Sterilize by EtO, autoclave, or gamma irradiation.
BioPharm Plus Silicone (platinum-cured) 96440-, 96441-series 	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.	N/R	N/R	N/R	F	G	F	E	USP Class VI European Pharmacopoeia (EP 3.1.9) FDA 21 CFR 177.2600 Exceeds 3A sanitary standards REACH (non-DEHP) compliant RoHS compliant	CO ₂ : 25,147 H ₂ : — O ₂ : 4715 N ₂ : 2284	Sterilize by EtO, autoclave, or gamma irradiation.
Puri-Flex™ 96419-series 	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.	G	G	N/R	G	G	E	E	USP Class VI FDA 21 CFR 177.2600 and 177.1810 REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	Sterilize by EtO, autoclave up to 135°C (275°F), gamma irradiation up to 4.5 Mrad.
C-Flex® 06424-series 	Physical properties similar to silicone with chemical compatibility of Tygon®. Inexpensive. Biocompatible. Heat sealable and weldable. Opaque, white.	G	G	N/R	F	G	F	E	USP Class VI European Pharmacopoeia (EP 3.2.9) REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO ₂ : — H ₂ : — O ₂ : 150 N ₂ : —	Sterilize by EtO, autoclave, or gamma irradiation.
C-Flex® ULTRA 06434-series 	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.	G	G	N/R	F	G	F	E	USP Class VI European Pharmacopoeia (EP 3.2.9) REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO ₂ : 2.1 H ₂ : — O ₂ : 1.1 N ₂ : 3.4	Sterilize by gamma irradiation or one cycle of autoclave at 121°C (250°F), 1 bar (15 psi) for 30 minutes.

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





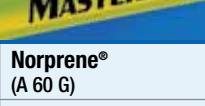

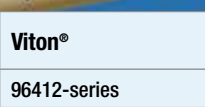
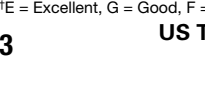
Choosing the Right Masterflex® Tubing Formulation (continued)

Pump tubing formulation	Advantages	Application suitability†							Meets classifications	Gas permeability	Sterilization
		Acids	Alkalies	Organic solvents	Pressure	Vacuum	Viscous fluids	Sterile fluids			
PharMed® BPT 06508-series 	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 ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	Sterilize by EtO, autoclave, or gamma irradiation up to 2.5 Mrad.
Solve-Flex® 96446-series 	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.
GORE® STA-PURE® pump tubing Series PCS (96211-)	Unique composite structure adds strength and flex durability. Greater security against rupture up to 100 psig*. Consistent flow rate over long duration of use. Withstands rigors of CIP/SIP processing.	N/R	N/R	N/R	E	G	G	E	USP Class VI USP <87> USP Physicochemical Tests Compliant with restricted substances per REACH and RoHS No raw materials of animal origin	—	Sterilize by autoclave or SIP (steam in place).
GORE® STA-PURE® pump tubing Series PFL (96212-)	Unique composite structure adds strength and flex durability. Greater chemical resistance than Series PCS. Stable flow rates achievable to 60 psig*. Withstands rigors of CIP/SIP processing.	E	E	E	E	G	G	E	USP Class VI USP <87> USP Physicochemical Tests Compliant with restricted substances per REACH and RoHS No raw materials of animal origin	—	Sterilize by autoclave or SIP (steam in place).
PharmaPure® 06435-series 	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 ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	Sterilize by EtO, autoclave or gamma irradiation up to 2.5 Mrad.
Chem-Durance® Bio 06442-series 	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 ₂ : 745 H ₂ : — O ₂ : 200 N ₂ : 80	Sterilize by EtO, autoclave or gamma irradiation.
PTFE 77390-series 	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 ₂ : 6.8 H ₂ : — O ₂ : — N ₂ : 1.0	Sterilize by EtO or autoclave.

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*Actual performance depends on the specific application conditions.

Choosing the Right Masterflex® Tubing Formulation (continued)

Pump tubing formulation	Advantages	Application suitability†								Meets classifications	Gas permeability	Sterilization
		Acids	Alkalies	Organic solvents	Pressure	Vacuum	Viscous fluids	Sterile fluids				
Tygon® E-LFL 06440-series 	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 Pharmacopia (EP 3.2.9) FDA 21 CFR 175.300 EU Food REACH (non-DEHP) compliant RoHS compliant ADCF compliant	CO ₂ : 563 H ₂ : — O ₂ : 124 N ₂ : 67	Sterilize by EtO or autoclave.
Tygon® E-Food (B-44-X) 06418-series 	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 ₂ : 270 H ₂ : 97 O ₂ : 60 N ₂ : 30	Sterilize by EtO or autoclave.	
Tygon® E-Lab (E-3603) 06509-series 	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 ₂ : 360 H ₂ : 97 O ₂ : 80 N ₂ : 40	Sterilize by EtO or autoclave.	
Tygon® Chemical (2001) 06475-series 	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 ₂ : 114 H ₂ : — O ₂ : 19 N ₂ : 9	Sterilize by EtO, autoclave, or gamma irradiation.	
Tygon® Fuel & Lubricant (F-4040-A) 06401-series 	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 ₂ : 100 H ₂ : 97 O ₂ : 22 N ₂ : 12	Sterilization is not recommended.	
Norprene® (A 60 G) 06404-series 	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 ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	Sterilize by EtO, autoclave, or gamma irradiation.	
Norprene® Food (A 60 F) 06402-series 	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 ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	Sterilize by EtO, autoclave, or gamma irradiation.	
Viton® 96412-series 	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 ₂ : 76 to 79 H ₂ : — O ₂ : 13 to 15 N ₂ : 4.3	Sterilization is not recommended.	

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