



Masterflex® Tubing Formulation Descriptions (Continued)

Tygon® Tubing

Our Tygon® tubing comes in four separate formulations that share common characteristics but differ in tubing life and other specifications. See descriptions below for details about each formulation.

Tygon® LFL Tubing

- Longest tubing life
- Broad chemical compatibility
- Low gas permeability
- USP Class VI and FDA

Tygon® Food Tubing

- Meets various food and sanitary regulations
- Unaffected by all commercial sanitizers
- Non-wetting properties enable flush-cleaning and complete drainage
- Smooth inner surface

Tygon® Lab Tubing





- Ideal for general transfer applications
- Economical
- Nontoxic, nonaging, and nonoxidizing

Tygon® Fuel & Lubricant Tubing

- Ideal for transporting hydrocarbons, gasoline, kerosene, heating oils, cutting compounds, and glycol-based coolants
- Not for use with concentrated strong acids or alkalies

Sterilization Notes

- **Standard gravity autoclave:**
 - Coil loosely in non-linting cloth or sterilizing paper and place in a clean, open tray for 30 minutes at 121°C (250°F) at 1 kg/cm² (15 psi); air dry at max 66°C (150°F) for 2 to 2½ hours until clear.
- **Ethylene oxide (ETO):**
 - Coil loosely in non-linting cloth or sterilizing paper. Follow the sterilization equipment manufacturers directions as to gas type, concentration, times, and temperatures; maintain humidity within the prescribed limits, generally between 30 to 65%.
- **Radiation:**
 - Cap ends of tubing if required. Radiation should be product specific and according to GMP.

Formulation	Tygon® LFL	Tygon® food (B-44-4X)	Tygon® lab (R-3603)	Tygon® fuel & lubricant (F-4040-A)
Series number	06429	06419	06409	06401
Photo				
Advantages	Longest life of all Tygon® peristaltic tubing (1000 hrs) Nonaging, nonoxidizing Clear for easy flow monitoring Broad chemical resistance Low gas permeability Smooth bore Good for viscous fluids High dielectric constant	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 non wetting properties permit flush cleaning and complete drainage. High dielectric constant	Inexpensive tubing for general laboratory applications Non aging, non oxidizing Clear for easy flow monitoring Handles virtually all inorganic chemicals. Low gas permeability Smooth bore Good for viscous fluids High dielectric constant	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
Limitations	Potential leaching of plasticizer	Limited pumping life	Limited pumping life Potential leaching of plasticizer	Don't use with strong acids and alkalies. Potential leaching
Application suitability:	Acids Alkalies Organic solvents Pressure Vacuum Viscous fluids Sterile fluids	Good Good Not recommended Good Good Excellent Good	Good Good Not recommended Good Good Excellent Poor	Good Good Not recommended Good Good Excellent Poor
Physical characteristics and composition	Thermoplastic PVC-based material with plasticizer Firm (stiff) material Transparent, clear	Thermoplastic PVC-based material with plasticizer Firm (stiff) material Transparent, clear	Thermoplastic PVC-based material with plasticizer Firm (stiff) material Transparent, clear	Thermoplastic PVC-based material with plasticizer Firm (stiff) material Transparent, yellow
Temperature range	-50 to 74°C (-58 to 165°F)	-44 to 74°C (-47 to 165°F)	-50 to 74°C (-58 to 165°F)	-37 to 74°C (-35 to 165°F)
Meets classifications	USP Class VI FDA 21 CFR 175.300	FDA 21 CFR 175.300 NSF-listed (Standard 51) All 3A Sanitary Plastics Products Various USDA standards	FDA 21 CFR 175.300	None
Gas permeability $\frac{\text{cc} \times \text{mm}}{\text{cm}^2 \times \text{sec.} \times \text{cm Hg}} \times 10^{-10}$	CO ₂ : 563 H ₂ : — O ₂ : 124 N ₂ : 67	CO ₂ : 270 H ₂ : 97 O ₂ : 60 N ₂ : 30	CO ₂ : 360 H ₂ : 97 O ₂ : 80 N ₂ : 40	CO ₂ : 100 H ₂ : 97 O ₂ : 22 N ₂ : 12
Cleaning/sterilization	Sterilize with ethylene oxide (ETO) or autoclave. To autoclave: Coil loosely in non linting cloth or paper; autoclave at 121°C (250°F), 1 kg/cm ² (15 psi) for 30 mins. (tubing will appear milky); air dry at max 66°C (150°F) for 2 to 2½ hours until clear.	Unaffected by all commercially available sanitizers (when using recommended procedures) Sterilize with ethylene oxide (ETO) or autoclave. To autoclave: Coil loosely in non linting cloth or paper; autoclave at 121°C (250°F), 1 kg/cm ² (15 psi) for 30 minutes (tubing will appear milky); air dry at max 66°C (150°F) for 2 to 2½ hours until clear.	Sterilize with ethylene oxide (ETO) or autoclave. To autoclave: Coil loosely in non linting cloth or paper, autoclave at 121°C (250°F), 1 kg/cm ² (15 psi) for 30 minutes (tubing will appear milky); air dry at max 66°C (150°F) for 2 to 2½ hours until clear.	Sterilization is not recommended.



WHERE TO ORDER TUBING

- C/L® tubing 1305
- L/S® tubing 1323-1327
- I/P® tubing 1358-1359
- B/T® tubing 1383

PharMed® Tubing

- Over 10,000 hours of tubing life
- Resists ozone and UV radiation
- Non-cytotoxic and non-hemolytic
- Ideal for tissue and cell culture work
- Heat sealable and bondable

Norprene® Tubing

- Up to 10,000 hours of tubing life
- Best choice for pressure/vacuum applications
- Resists heat, ozone, acids, and alkalies
- Heat sealable and bondable
- Nonaging, nonoxidizing

Norprene® Food Tubing

- Ideal for high-temperature food and beverage applications
- Similar characteristics as Norprene® tubing
- Meets FDA and NSF standards

Viton® Tubing

- Excellent chemical resistance
- Resists corrosives, solvents, and oils at elevated temperatures.
- Low gas permeability
- FDA formulation available



Continuous pressures up to 100 psi!

L/S® High-Pressure Pump System

See page 1339 for details and to order our L/S® high-pressure tubing.

Need FDA Viton® Tubing?

For chemical resistance & FDA approval, we offer FDA Viton® tubing.

See details below.



Formulation	PharMed® (65)	Norprene® (A 60 G)	Norprene® food (A 60 F)	Viton®	FDA Viton®
Series number	06485	06404	06402	06412	96412
Photo					
Advantages	Great for tissue and cell work—nontoxic and non-hemolytic. Long service life minimizes risk of fluid exposure; reduces tubing costs and pump downtime. Opaque to UV and visible light to protect light-sensitive fluids. Heat sealable, bondable, and formable. Extremely low gas permeability.	Best choice for vacuum/pressure applications. Offers longest life with good flow consistency. Heat and ambient ozone resistant. Good resistance to acids/alkalies. Black color hides dirt and dust. Heat sealable, nonaging, and nonoxidizing. High dielectric constant.	Similar to Norprene® (06404) 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.	Our most chemical resistant tubing. Resistant to corrosives, solvents, and oils at elevated temperatures. Low gas permeability.	Perfect for food and lab applications where FDA compliance is required. Good chemical resistance. Resistant to corrosives. High temperature properties.
Limitations	Potential leaching of USP mineral oil or blend material	Potential leaching of USP mineral oil or blend material	Potential leaching of USP mineral oil or blend material	Limited pumping life	Limited pumping life
Application suitability:					
Acids	Good	Good	Good	Excellent	Excellent
Alkalies	Good	Good	Good	Excellent	Excellent
Organic solvents	Not recommended	Not recommended	Not recommended	Variable—test before using	Variable—test before using
Pressure	Good	Good	Good	Good	Good
Vacuum	Excellent	Excellent	Excellent	Good	Good
Viscous fluids	Good	Good	Good	Good	Good
Sterile fluids	Excellent	Not recommended	Good	Fair	Fair
Physical characteristics and composition	Thermoplastic elastomer. Polypropylene-based material with USP mineral oil. Excellent tensile strength. Firm (stiff) material. Opaque, beige.	Thermoplastic elastomer. Polypropylene-based material with USP mineral oil. Excellent tensile strength. Firm (stiff) material. Opaque, black.	Thermoplastic elastomer. Polypropylene-based material with USP mineral oil. Excellent tensile strength. Firm (stiff) material. Opaque, beige.	Thermal set rubber. Viton B (67% fluorine). Firm (stiff) material. Opaque, black.	Thermal set rubber. Viton B (67% fluorine). Firm (stiff) material. Opaque, black.
Temperature range	-59 to 135°C (-60 to 270°F)	-59 to 135°C (-60 to 270°F)	-59 to 135°C (-60 to 270°F)	-32 to 205°C (-25 to 400°F)	-32 to 205°C (-25 to 400°F)
Meets classifications	USP Class VI. FDA 21 CFR 177.2600. NSF-listed (Standard 51)	None	FDA 21 CFR 177.2600. NSF-listed (Standard 51)	None	FDA 21 CFR 177.2600
Gas permeability $\frac{\text{cc} \times \text{mm}}{\text{cm}^2 \times \text{sec.} \times \text{cm Hg}} \times 10^{-10}$	CO ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	CO ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	CO ₂ : 1200 H ₂ : — O ₂ : 200 N ₂ : 80	CO ₂ : 76 to 79 H ₂ : — O ₂ : 13 to 15 N ₂ : 4.3	CO ₂ : 76 to 79 H ₂ : — O ₂ : 13 to 15 N ₂ : 4.3
Cleaning/sterilization	Sterilize with ethylene oxide (ETO), autoclave or gamma irradiation up to 2.5 Mrad. Repeated autoclaving will not affect overall life.	Sterilize by autoclave only.	Sterilize by autoclave. Repeated autoclaving will not affect overall life.	Sterilization is not recommended.	Sterilize with circulating hot air oven at 249°C (480°F) for 16 hours.