

Masterflex® Pump Tubing Formulation Descriptions

Tygon® Tubing

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

Tygon® Lab Tubing

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

Tygon® LFL Tubing

- Longest tubing life of all Tygon tubing formulations
- Broad chemical compatibility
- Low gas permeability

Tygon® Food Tubing

- Meets various food and sanitary regulations
- Unaffected by common commercial sanitizers
- Nonwetting properties allow flush-cleaning and complete drainage
- Smooth inner surface

Tygon® Fuel & Lubricant Tubing

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

Tygon® Chemical Tubing






- Best chemical resistance of Tygon formulations
- Compatible with some organics
- Plasticizer-free

Sterilization

Ethylene oxide (ETO): Coil tubing loosely in nonlinting cloth or sterilization paper. Follow the sterilization equipment manufacturer's directions as to gas type, concentration, times, and temperatures; maintain humidity within the prescribed limits, generally between 30 to 65%.

Standard gravity autoclave: Coil tubing loosely in nonlinting 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.

Gamma radiation: Cap ends of tubing if required. Radiation should be product specific and according to GMP guidelines.

Pump tubing formulation	Tygon® Lab (R-3603)	Tygon® LFL	Tygon® Food (B-44-4X)	Tygon® Fuel & Lubricant (F-4040-A)	Tygon® Chemical (2001)
Series number	06408 and 06409	06429	06419	06401	06475
					
Advantages	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.	Longest life of all Tygon® peristaltic tubing (up to 1000 hrs). Clear for easy flow monitoring. Broad chemical resistance. Nonaging, nonoxidizing. 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 nonwetting properties permit flush cleaning and complete drainage. 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.	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.
Limitations	Limited pumping life. Potential leaching of plasticizer.	Potential leaching of plasticizer.	Limited pumping life.	Don't use with strong acids and alkalis.	Limited pumping life. Some external spallation during use (does not affect tubing ID). Recommended for use with Easy-Load®, Easy-Load® II, and Easy-Load® 3 pump heads only.
Application suitability:					
Acids	Good	Good	Good	Good	Excellent
Alkalis	Good	Good	Good	Good	Excellent
Organic solvents	Not recommended	Not recommended	Not recommended	Not recommended	Good
Pressure	Good	Good	Good	Good	Good
Vacuum	Good	Good	Good	Good	Good
Viscous fluids	Excellent	Excellent	Excellent	Excellent	Excellent
Sterile fluids	Poor	Good	Fair	Poor	Good
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.	Thermoplastic elastomer. PVC- and plasticizer-free material. Firm (stiff) material. Transparent, clear.
Temperature range	Static: -58 to 165°F (-50 to 74°C) Dynamic (pumping): 32 to 104°F (0 to 40°C)	Static: -58 to 165°F (-50 to 74°C) Dynamic (pumping): 32 to 104°F (0 to 40°C)	Static: -47 to 165°F (-44 to 74°C) Dynamic (pumping): 32 to 104°F (0 to 40°C)	Static: -35 to 165°F (-37 to 74°C) Dynamic (pumping): 32 to 104°F (0 to 40°C)	Static: -108 to 135°F (-77 to 57°C) Dynamic (pumping): 32 to 104°F (0 to 40°C)
Meets classifications	FDA 21 CFR 175.300	USP Class VI FDA 21 CFR 175.300	FDA 21 CFR 175.300 NSF-listed (Standard 51)	None	FDA 21 CFR 177.2600
Gas permeability cc x mm (cm ² x sec x cm Hg) x 10 ⁻¹⁰	CO ₂ : 360 H ₂ : 97 O ₂ : 80 N ₂ : 40	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 : 100 H ₂ : 97 O ₂ : 22 N ₂ : 12	CO ₂ : 114 H ₂ : — O ₂ : 19 N ₂ : 9
Cleaning/sterilization	Sterilize with ETO or autoclave. To autoclave: Coil tubing loosely in nonlinting cloth or paper, autoclave at 250°F (121°C), 1 kg/cm ² (15 psi) for 30 minutes (tubing will appear milky); air dry at max 150°F (66°C) for 2 to 2½ hours until clear.	Sterilize with ETO or autoclave. To autoclave: Coil tubing loosely in nonlinting cloth or paper, autoclave at 250°F (121°C), 1 kg/cm ² (15 psi) for 30 minutes (tubing will appear milky); air dry at max 150°F (66°C) for 2 to 2½ hours until clear.	Unaffected by commercial sanitizers (with recommended procedures). Sterilize by ETO or autoclave. To autoclave: Coil tubing loosely in nonlinting cloth or paper; autoclave at 250°F (121°C), 1 kg/cm ² (15 psi) for 30 minutes (tubing will appear milky); air dry at max 150°F (66°C) for 2 to 2½ hours until clear.	Sterilization is not recommended.	Sterilize by ETO, autoclave, or gamma radiation. To autoclave: Coil tubing loosely in nonlinting cloth or paper; autoclave at 250°F (121°C), 1 kg/cm ² (15 psi) for 30 minutes (tubing will appear milky); air dry at max 150°F (66°C) for 2 to 2½ hours until clear.