



Masterflex® Tubing Formulation Descriptions

Silicone Tubing

While our silicone tubing formulations share many characteristics, listed are some basic differences.

Platinum-Cured Silicone Tubing

- Slightly greater clarity
- Smooth surface; low protein binding levels
- Ideal for pharmaceutical and biotechnology use
- Fewer potential leachables

Peroxide-Cured Silicone Tubing

- Greater physical compression capability
- Potential outgassing of peroxide products
- Economical
- Longer tubing life

BioPharm Silicone Tubing

- Platinum-cured; ultra-smooth inner surface minimizes particle entrapment
- Fewer extractables
- Lab, biotech, and pharmaceutical applications

BioPharm Plus Silicone Tubing

- Platinum-cured
- Lower spallation than regular silicone
- Enhanced pressure capabilities
- Longest tubing life
- Ultra-smooth inner surface and fewer extractables
- Documented biocompatibility for sensitive applications

C-FLEX® Tubing

- Long tubing life
- Ultra-smooth inner surface; fewer extractables

To Sterilize Silicone Tubing

- **High-speed instrument (flash) autoclave**
- Place tubing on non-linting cloth or sterilizing paper in a clean, open tray for 10 minutes at 132°C (270°F) at 2 kg/cm² (30 psi).
- **Standard gravity autoclave**
- Wrap tubing 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).
- **Pre-vacuum high-temperature autoclave**
- Wrap tubing in non-linting cloth or sterilizing paper and place in a clean, open tray for normal cycle of 30-35 minutes at 121°C (250°F).
- **Gamma radiation**
- 2.5 Mrad.

Formulation	Silicone (platinum-cured)	Silicone (peroxide-cured)	BioPharm Silicone (platinum-cured)	BioPharm Plus Silicone (platinum-cured)	C-FLEX® (50 A)
Series number	96410	96400	96420	96440	06424
Tubing photo					
Advantages	Excellent biocompatibility. No leachable additives, DOP, or plasticizers; phthalate and latex-free; odorless and nontoxic, fungus-resistant. No taste imparted to transported fluids. Extremely good over a wide temperature range. Weather, ozone, corona, and radiation resistant. Minimal tendency to take a set. See information above on the differences between silicone formulations.	Excellent biocompatibility. No additives, plasticizers or DOP; odorless and nontoxic, fungus-resistant. No taste imparted to transported fluids. Extremely good at low temps. Weather, ozone, corona, and radiation resistant. Minimal tendency to take a set. See information above on the differences between silicone formulations.	Shorter life Ultra-smooth inner surface. Minimizes particle entrapment. Lower absorption; excellent biocompatibility; no leachable additive, DOP, or plasticizers. Odorless and nontoxic, fungus-resistant. No taste imparted to transported fluids. Weather, ozone, corona, and radiation resistant. Platinum-cured.	Platinum-cured silicone tubing with long life and ultra-smooth inner surface. Minimizes particle entrapment; lower absorption. Excellent biocompatibility. No leachable additives, DOP, or plasticizers; odorless, nontoxic. Fungus-resistant. No taste imparted to transported fluids. Weather, ozone, corona, and radiation resistant.	Physical properties similar to silicone with chemical compatibility of Tygon®. Inexpensive. Excellent biocompatibility. Smooth bore. Nontoxic, no leachable plasticizers. Lower gas permeability than silicone. Use with many acids and alkalis.
Limitations	Do not use with concentrated acids and bases, organic solvents, or oils.	Do not use with concentrated solvents, oils, acids. Relatively high gas permeability. See additional notes above.	Do not use with concentrated solvents, oils, or acids. Relatively high gas permeability.	Do not use with concentrated solvents, oils, or acids. Relatively high gas permeability.	Not recommended for use with oils. Moderate pumping life.
Application suitability:	Acids Poor Alkalies Poor Organic solvents Not recommended Pressure Fair Vacuum Good Viscous fluids Fair Sterile fluids Excellent	Poor Poor Not recommended Fair Good Fair Excellent	Poor Poor Not recommended Fair Good Fair Excellent	Poor Poor Not recommended Fair Good Fair Excellent	Good Good Not recommended Fair Good Fair Excellent
Physical characteristics and composition	Thermal set rubber. Siloxane polymers and amorphous silica. Excellent compression strength. Soft material; flexible. Translucent, clear to light amber	Thermal set rubber. Siloxane polymers and amorphous silica. Excellent compression strength. Soft material. Translucent, clear to light amber.	Thermal set rubber. Siloxane polymers and amorphous silica. Excellent compression strength. Soft material. Translucent, clear to light amber.	Thermal set rubber. Siloxane polymers and amorphous silica. Excellent compression strength. Soft material. Translucent, clear to light amber.	Thermoplastic elastomer. Styrene-ethylene-butylene modified block copolymer with silicone oil. Excellent tensile and tear strength. Soft material. Opaque, white.
Temperature range	-50 to 230°C (-58 to 446°F)	-50 to 230°C (-58 to 446°F)	-60 to 232°C (-75 to 450°F)	-60 to 232°C (-75 to 450°F)	-73 to 135°C (-100 to 275°F)
Meets classifications	USP Class V Extractables; exceeds Class VI Implant; EP, FDA 21 CFR 177.2600; Exceeds 3A Sanitary Standards; Produced to Bulk Pharm. cGMPs (FDA 21 CFR 210 and 211).	USP Class VI FDA 21 CFR 177.2600	USP Class VI, EP FDA 21 CFR 175.300 Exceeds 3A sanitary standards	USP Class VI, EP, and FDA 21 CFR Part 177.2600 criteria Exceeds 3A sanitary standards	USP Class VI 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 : 20,132 H ₂ : 6579 O ₂ : 7961 N ₂ : 2763	CO ₂ : 20,132 H ₂ : 6579 O ₂ : 7961 N ₂ : 2763	CO ₂ : 25,147 H ₂ : — O ₂ : 4715 N ₂ : 2284	CO ₂ : 25,147 H ₂ : — O ₂ : 4715 N ₂ : 2284	CO ₂ : — H ₂ : — O ₂ : 150 N ₂ : —
Cleaning/sterilization	Clean with hot water/soap solution; use a non-oily soap such as Ivory®. Do not use synthetic detergent or oil-based soap as they may be absorbed by the tubing and may leach into fluid. Rinse well with distilled water. ETO sterilization is not recommended—sufficient data is not available regarding complete outgassing of residual ETO and other ETO products.	Clean with isopropyl alcohol or hot water/soap solution. Use non-oily soap such as Ivory®. Do not use synthetic detergent or oil-based soap as they may be absorbed by the tubing and may leach out into the fluid. Rinse thoroughly with distilled water. May use ethylene oxide (ETO) sterilization. Autoclavable.	To autoclave: coil loosely in non-linting cloth or paper; autoclave at 121°C (250°F), 1 bar (15 psi) for 30 minutes. Sterilize by ethylene oxide (ETO), autoclave, or gamma irradiation up to 2.5 Mrad.	To autoclave: coil loosely in non-linting cloth or paper; autoclave at 121°C (250°F), 1 bar (15 psi) for 30 minutes. Sterilize by ethylene oxide (ETO), autoclave, or gamma irradiation up to 2.5 Mrad	Sterilize by ethylene oxide (ETO) gamma radiation, or autoclave

(Continued on next page)