

Technical Characteristics

PU Ether Tubing, USP VI

Goal 1 : Zero Contamination and Extreme Flexibility



- Very high level of cleanliness guaranteed
- Certified Medical grade
- Extremely low migration
- No plasticizer
- Compatibility with medical gases
- Phenomenally flexible material as silicone

Advantages and Benefits

PU Ether Tubing, USP VI

Goal 2 : Trustworthy and Long-Lasting Use



- Excellent mechanical resistance
- Maximum flow
- Sterilisable with the most advantageous processes
- Transparent for full flow visualisation
- Perfect sealing with barb and push-in fittings
- Optimum end-of-life management

Technical Characteristics

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A Unique Solution for the Medical Market

An extremely dependable product

- Ultra flexible material with no technical constraints for the bending radius
- Working pressure: 8 bar
- Cleanliness conforming to ASTM G93-03 : residue 100mg/m² and level 300 for particules
- Compatibility with respiratory applications: ISO 15001

Unprecedented services

- Quick and safe set-up of circuits guaranteed, with no prior cleaning required
- Traceability per part throughout the entire manufacturing process
- 100% tested for sealing and cleanliness for guaranteed longevity
- Airtight, antistatic packaging to guarantee the fitting's cleanliness

Technical Characteristics

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A Unique Range for Parker

PU tubing meeting medical constraints and instant connection

- Material: PU Ether HP 1185A Crystal USP Class VI

Unique material characteristics

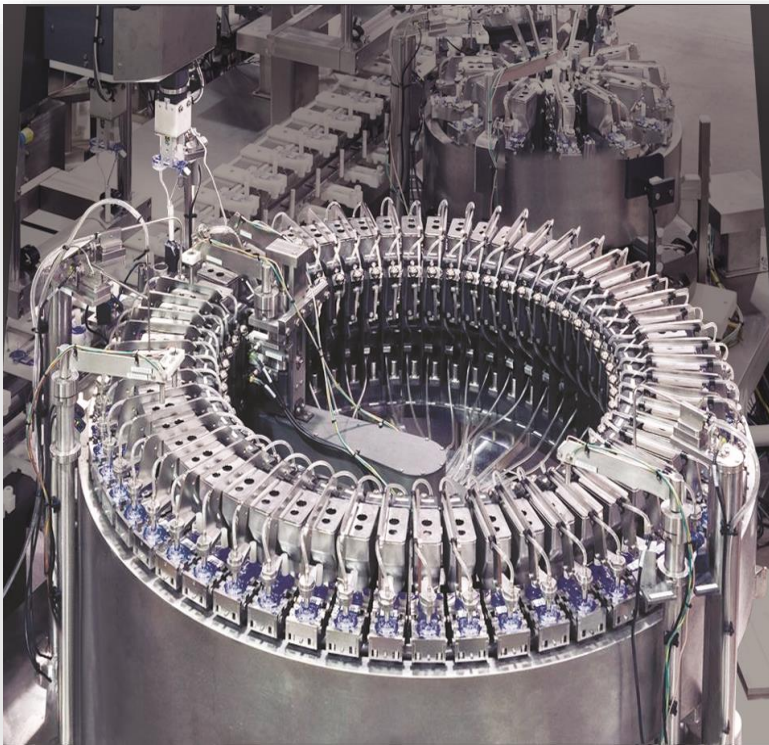
- Memory-sensitive material with no kinking effect, compatible with sterilisation procedures like dry heat, ethylene oxide, gamma radiation, electron beam

Other usages possible

- Excellent cleanliness level and resistance to abrasion

Technical characteristics

PU Ether Tubing, USP VI



Compatible Fluids	Medical air, cater, medical gases, medical fluides, other fluids
Compatible Fittings	Parker Legris polymer fittings
Working Pressure	Vacuum to 8 bar
Working Temperature	-20 °C to + 70 °C
Sterilisation	Dry heat, ethylene oxyde, gamma radiation, electron beam
Regulations	USP class VI
Component Materials	Body: polycarbonate composite Gripping ring: stainless steel Seal: NBR
Tubing Diameters	Ø7 mm to Ø16 mm

Advantages and Benefits

PU Ether Tubing, USP VI

High Level of Cleanliness



- USP Class VI
- ASTM B93-03
(residue 100mg/m² and particules 300)
- ISO 15001

Advantages and Benefits

PU Ether Tubing, USP VI

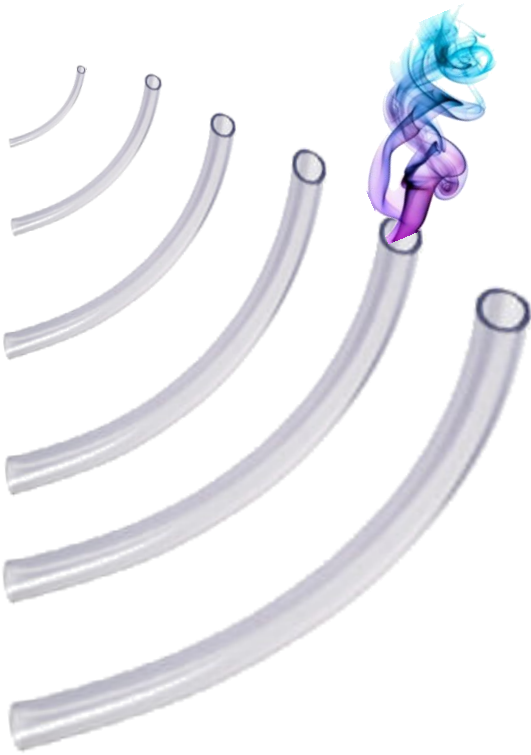
Cleanliness: in Detail

Specification	Residue Density Limit	Particulate and Fiber Limit		
		Test Level	Particulate Size (µm)	Particles/M ²
ASTM G93	Level : 100 mg/m ²	Level 300	X>300 175< X < 300 100< X< 175 X< 100 Fiber	0 5 20 No Limit 25
CGA G4,0	Level 500 mg/m ²		X>1000 50< X < 1000 Fibers > 2000	0 215 0
ISO 15001	50 - 3500 kPa : 550 mg/m ²	Mfg. Specified : idem level 300 ASTM G93		
DMS IN9490 -300 & DMS IN9500 cat. II	220 mg/m ² , residue conform with BAM		X>300 250< X < 300 100< X< 250 50< X< 100 25 < X < 50	0 2 100 997 6950

Advantages and Benefits

PU Ether Tubing, USP VI

Perfect Compatibility with Medical Gases and bio-fluids



- Medical gases (Kinox, etc.)
- Ophthalmological gases
- Nitrogen monoxide- O₂ mixture
- O₂, N₂, CO₂
- NO₂
- Controlled medical air
- He
- Ar

Advantages and Benefits

PU Ether Tubing, USP VI

Perfectly Designed for Installation Constraints



- From 3 mm to 12 mm
- Packaging length 25 m
- Airtight, hermetic packaging guarantees cleanliness until first use



Advantages and Benefits

PU Ether Tubing, USP VI

Phenomenal Flexibility: Guaranteed Ease of Installation



- Memory-sensitive material
- No kinking effect
- Bend radius from 8 mm to 30 mm for tubing diameters from 3 mm to 12 mm

Advantages and Benefits

PU Ether Tubing, USP VI

Comparative Table of Sterilisation Compatibilities



Best trade-off between material stability and mechanical resistance



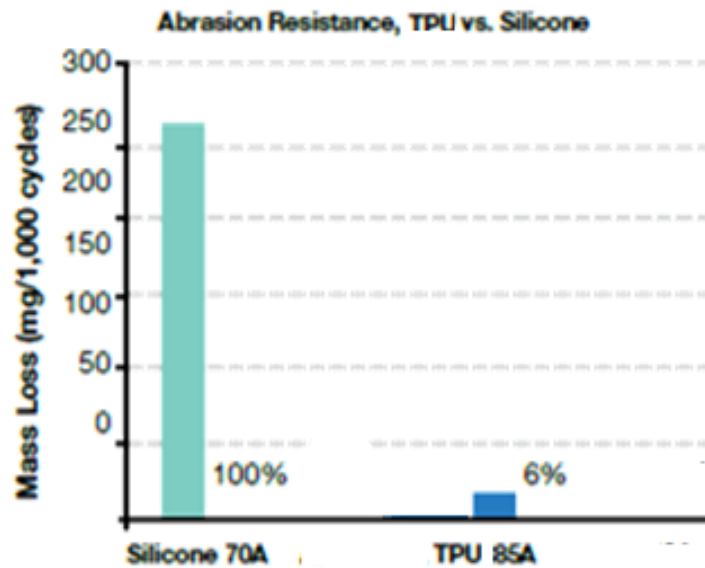
Polymer	Polymer Abbreviation	Steam	Dry Heat	Ethylene Oxide	Gamma Radiation	Electron Beam
Elastomers						
Silicones		Good	Good	Good	Good	Good
Urethane thermoplastic elastomer	TPU	Poor	Fair	Good	Good	Good
Polyolefins						
High-density polyethylene	HDPE	Poor	Poor	Good	Good	Good
Low-density polyethylene	LDPE	Poor	Poor	Good	Good	Good
Ultrahigh molecular weight polyethylene	UHMWPE	Poor	Poor	Good	Good	Good
Polypropylene ^a	PP	Good	Fair	Good	Fair	Fair
Polypropylene copolymers		Good	Fair	Good	Fair	Fair
Cyclo olefin copolymer	COC	Fair	Fair	Good	Good	Good
Polyvinyl chloride plasticized ^{a,b}	PVC	Fair	Fair	Good	Good	Good
Polyvinyl chloride unplasticized ^{a,b}	PVC	Poor	Poor	Good	Fair	Fair

Advantages and Benefits

PU Ether Tubing, USP VI

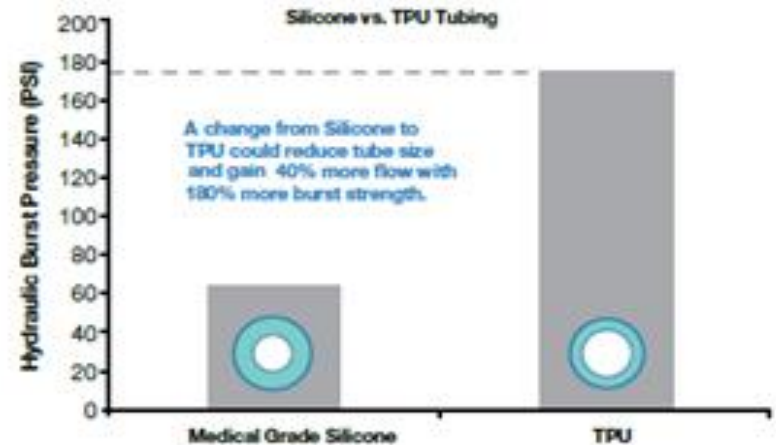
Benefits of TPU vs Silicone

- Low abrasion
- Better resistance to pressure: thinner walls = better flow



Taber Abrasion Resistance

Chart 1: Comparative taber abrasion study according to ASTM 03389, H-18 wheel, 1,000 cycles between medical-grade silicone and selected LSP TPU alternatives.



Burst Strength

Chart 2: In comparative testing of TPU and silicone, TPU demonstrates a significant increase in burst strength and flow rate.

Advantages and Benefits

PU Ether Tubing, USP VI

Benefits of TPU vs Silicone

- Better functional characteristics

	Silicone	Medical-Grade TPU
Processing	Thermoset	Thermoplastic
Property	Hydrophobic	Hydrophobic or Hydrophilic
Size: Flow Ratio	Fair	Excellent
Strength: Burst/Tensile	Poor-Fair	Good-Excellent
In-Body Softening	No	Yes
Kink Resistance	Fair-Good	Excellent
Bond Compatability	Adhesives	Welding, Adhesives, Etc.

Advantages and Benefits

PU Ether Tubing, USP VI

Benefits of TPU vs PVC

- More trustworthy
- A high-quality alternative to PVC
- No phthalates
- No pollution at end-of-life through incineration

The Problem with PVC-Based Medical Device Disposal

Beyond leaching-related issues, there is also a disposal problem created by the use of PVC for medical device manufacturing. Due to the nature of the fluids they transport and their usage, medical devices such as tubes and fluid storage bags must be incinerated after use to avoid the improper disposal of biologically contaminated waste. There are a number of issues with incinerating PVC materials, however, that make disposal as significant an issue as any usage risks.

Phthalates: Driving the Decline of PVC Use in Medical Devices

Unique Selling Proposition

PU Ether Tubing, USP VI

TPU offers the medical industry an environmentally-friendly replacement to PVC and better material characteristics.

An alternative to silicone without sacrificing flexibility and flow with a higher level of mechanical resistance .

- Optimises management of part numbers
- Improves compatibility
- Increase equipment lifespan
- Reduce TCO

Technical Data Sheet

PU Ether Tubing, USP VI

Elastollan® 1185A

Polyether-based Grade

Elastollan® 1185A is specifically formulated for extruded profile, sheet and film applications. It exhibits excellent abrasion resistance, toughness, transparency, very good low temperature flexibility, hydrolytic stability and fungus resistance. It has excellent damping characteristics and outstanding resistance to tear propagation. Elastollan® 1185A10 is rated UL-94 HB in vertical flame test for wall thickness of 1.5 mm. Elastollan® 1185A also conforms to the FDA food contact section, book 21, section 177.2600. Elastollan® 1185A also has NSF Standard 61 "Water Contact Material" certification. Elastollan® 1185A is supplied uncolored in diced or pelletized form.

Typical Properties of Elastollan®	ASTM Test Method	Units	Typical Values
All the physical properties reported here are measured on Injection molded samples. Properties of sheet or film samples of this product are also available upon request.			
Specific Gravity	ASTM D 792	g/cm ³	1.12
Shore Hardness	ASTM D 2240	Shore A or D	85A
Taber Abrasion	ASTM D 1044	mg loss	30
DIN Abrasion	DIN 53516	mm ³ loss	25
E-Modulus	ASTM D 412	psi	3000
Flexural Modulus	ASTM D 790	psi	4200
Tensile Strength	ASTM D 412	psi	5200
Tensile Stress at 100% Elongation	ASTM D 412	psi	1400
Tensile Stress at 300% Elongation	ASTM D 412	psi	3100
Ultimate Elongation	ASTM D 412	%	530
Tear Strength	ASTM D 624, Die C	lb/in	630
Compression Set 22h at 70°C 22h at 23 °C	ASTM D 395 "B"	% of original deflection	45 25
Glass Transition temperature*	BASF Analytical Method	°C	-38
Vicat Softening Temperature	ASTM D 1525	°C	100
DMA Softening Temperature	BASF Analytical Method	°C	66

*Measured with Dynamic Mechanical Analysis (DMA). DMA profile is available upon request.
Above values are shown as typical values and should not be used as specifications.