

# BIOPHARM TUBING

FOR EVERY PART OF YOUR PROCESS



# THE PERFECT TUBING FOR EVERY PART OF YOUR PROCESS

## The best tubing supplier for biopharm

As the world's leading supplier of peristaltic pumps for the biopharmaceutical industry, we understand that we must provide a pumping package which meets your need for cleanliness, ease of use, control, tube life and reliability. We have brought this understanding to Watson-Marlow tubing.



The tube at the heart of your pump must provide the greatest purity and the most reliable and consistent performance possible - precious qualities we could not purchase. So we made our own tubing.

This development makes us the only pump specialist to manufacture its own tube, and the only tube manufacturer to make its own pumps.

*Only Watson-Marlow offers total peristaltic pumping expertise*

## Validation made easy

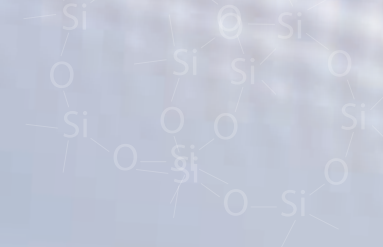
Make the validation process easy:

- *USP Class VI*
- *Laser traceable*
- *Certificate of Conformity*
- *Extensive validation package*
- *Repeatable process*
- *Single-use*

You can count on Watson-Marlow for full validation packs and certificates of analysis for all our tubing materials.

Our validation materials are at your fingertips. Find out at: [www.watson-marlow.com/tubing](http://www.watson-marlow.com/tubing)





## Purity, purity, purity

Biopharmaceutical products are too valuable to take any chances.

- *Low leachables through post curing*
- *Animal-derived content free (ADCF)*
- *Low spallation*

In our ISO 14644-1 Class 7 cleanrooms we manufacture to ISO 9001:2008 standards, following cGMP guidelines. Our manufacturing practice guarantees tubing with no contaminants, which would otherwise harm your critical process fluid and high-value product.



## Precision and process security



- *Rigorous hardness control*
- *Tight dimensional tolerances*
- *Optimised compression setting*

Our tubing delivers accurate, long-term pumping performance. It offers unsurpassed restitutorial resilience, giving you accurate dispensed volumes and long tube life. It is manufactured within very demanding tolerances, which guarantee batch-to-batch uniformity. Our quality assurance system - including closed loop control using a laser micrometer to confirm the dimensions of every millimetre of our tubing - achieves exceptional accuracy allowing you to achieve precise results, too.

## Continuity of supply

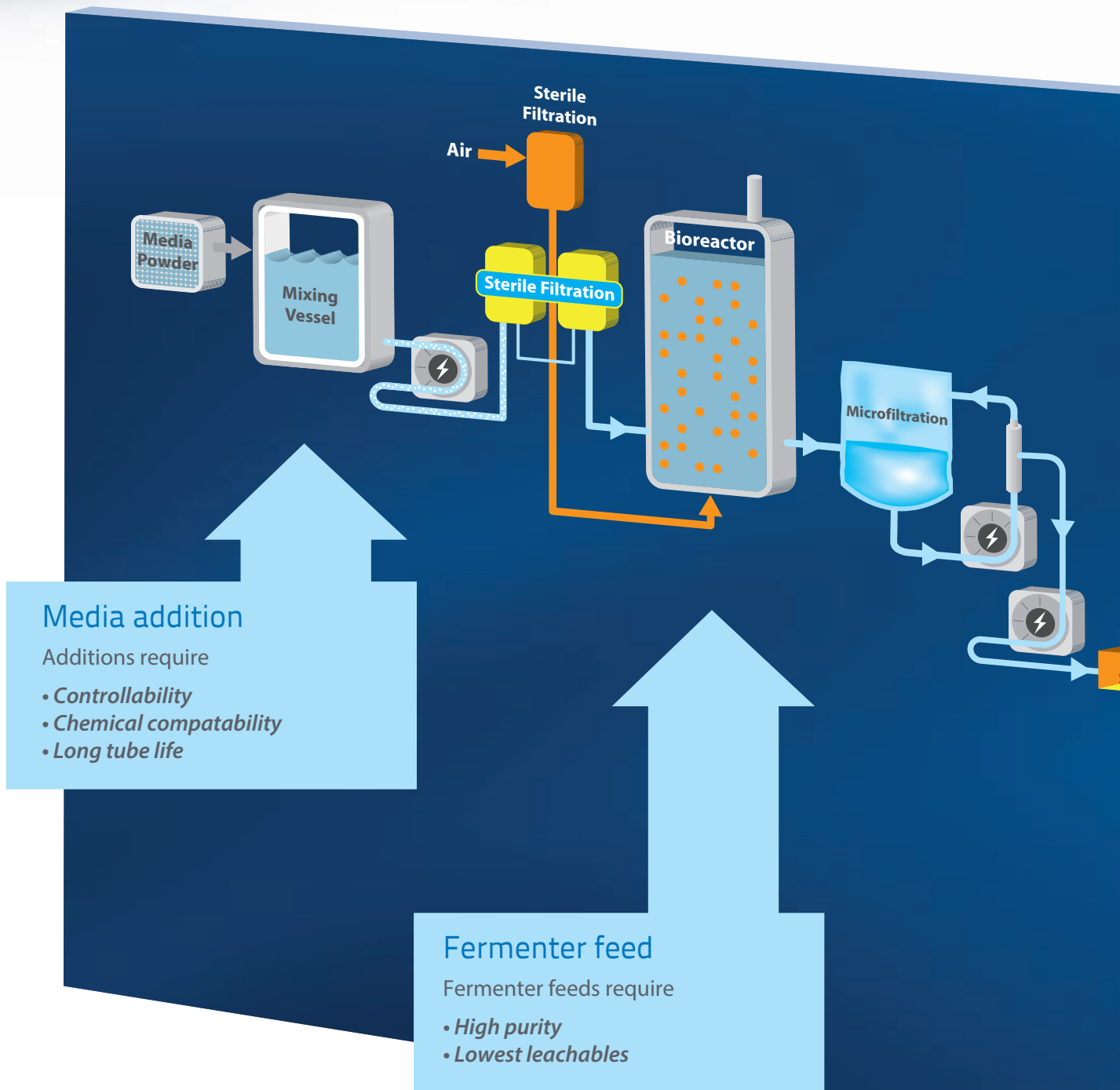
Our production campus has two independent tube manufacturing facilities; precision, state-of-the-art extrusion and curing equipment; and a production capacity which substantially exceeds current demand. You are guaranteed continuity of supply, with maximum attention to service and minimum lead times. Our sales companies around the world carry stocks of our products.

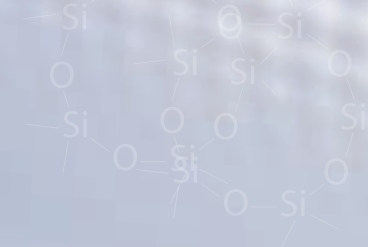
*When you want it, you get it*



# THE PERFECT TUBING

FOR EVERY PART OF YOUR PROCESS





## Filtration

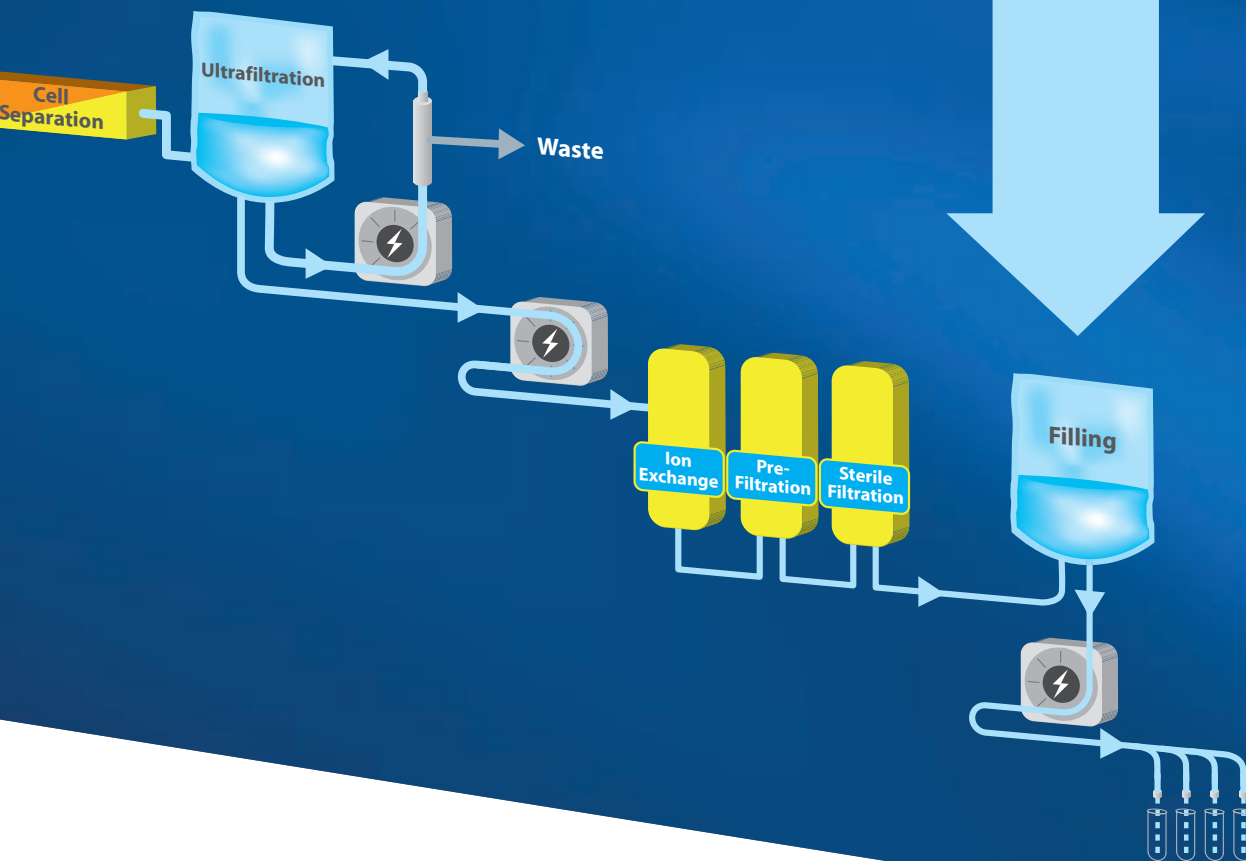
Filtration steps require

- *Wide range of flows*
- *Increased pressures, longer runs*

## Final filling

Final filling requires

- *Highest purity*
- *Consistent, accurate fills*
- *Possible single-use*



# THE PERFECT TUBING FOR EVERY PART OF YOUR PROCESS


## Choose your tube

Our biopharm tubing offers absolute purity and reliability. It has the dimensional and restititional accuracy essential to give long-life, repeatable performance. In addition, the right tubing for you must have the qualities needed for each part of your process.

Watson-Marlow offers tubing in five pharmaceutical grade materials and over 40 sizes, giving an extraordinary range of application capability.


### PureWeld XL

Weldable biopharmaceutical tubing

- *Weldable and heat sealable*
  - *Animal Derived Component Free*
  - *Sterilisable by gamma radiation, autoclave and ethylene oxide*
- 


### Pumpsil

Platinum-cured silicone tubing

- *Single-use biopharm tubing*
  - *Laser-etched lot traceability*
  - *Excellent flow stability*
- 


### Bioprene

Biopharmaceutical precision TPE tubing

- *Long pump life*
  - *Excellent chemical compatibility*
  - *Fully autoclavable*
- 


### STA-PURE PCS

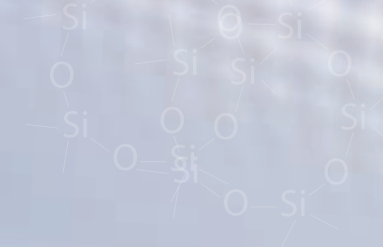
PTFE-reinforced silicone tubing

- *Pressure rated up to 7 bar (100 psi)*
  - *Longest available tube life*
  - *Spallation virtually eliminated*
- 

### STA-PURE PFL

PTFE-reinforced fluoroelastomer tubing

- *High resistance to aggressive chemicals*
  - *Pressure rated up to 4 bar (60 psi)*
  - *50 times longer life than other fluoroelastomers*
- 



## Range of materials for every application

Resistance to chemical attack; long pumping life; economy; transparency: these are some of the factors customers consider when choosing the right validated tubing for their application. Our tubing materials are summarised below to help you make the right choice, with full details on subsequent pages.

	Pumpsil	Bioprene	PureWeld XL	STA-PURE Series PCS	STA-PURE Series PFL
Meets USP Class VI requirements	●	●	●	●	●
European Pharmacopoeia 3.1.9	●	●	●	●	
ISO 10993	●	●	●	●	
FDA regulations 21 CFR 177.2600 PureWeld - CFR 177.1810	●	●	●		
Lot traceable from raw material to finished product	●	●	●	●	●
Low gas permeability		●	●		
Wide chemical resistance		●	●		●
LaserTraceability™	●				
Up to 10,000 hours pumping life		●		●	●
High pressure capability (7 bar 100psi)		●		●	●
High dispensing accuracy	●			●	●
LoadSure® elements	●	●		●	●
Continuous tubing	●	●	●		

(see page 14) (see page 18) (see page 16) (see page 20) (see page 22)

# THE PERFECT TUBING

## FOR EVERY PART OF YOUR PROCESS

### LoadSure for reliability

LoadSure elements with D-connectors allow your pump tubing to be changed in under one minute, without special skills, to achieve perfect tube alignment and tension.

- Total reliability and high-pressure pumping
- Tri-clamp sanitary connectors in PVDF
- Sterilisable by autoclaving and gamma irradiation



### Assured validation

Validating a biopharmaceutical process is easy with validated LoadSure elements. All wetted parts are USP Class VI and ISO 10993 certified with a laser-etched lot number.

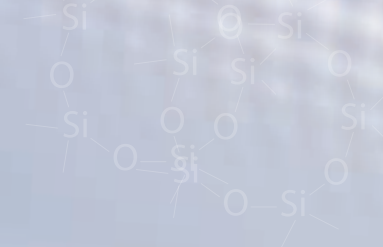
### Pick your configuration

Easy-change Watson-Marlow LoadSure elements make pump maintenance a thing of the past, as detailed above. Double-Y elements which split fluid flow and reunite it after it has passed through the pumphead, reduce pulsation to negligible levels and improve accuracy.

Continuous tubing is available in standard lengths and on bulk reels for huge cost savings. Sizes up to 6.4mm x 1.6mm are supplied in reels of 152 metres; even a tube as large as 9.6mm x 3.2mm can be supplied on 46 metre reels.







## The single-use specialists



Watson-Marlow supply fully customised, single-use solutions to meet our customers' needs. From a single filling line to detailed assemblies for processes such as cell culture and purification, we provide solutions for your process requirements.

Single-use systems achieve operational excellence without compromising product quality. Pre-sterilised, closed

systems eliminate cross-contamination between batches and reduce the need for extensive cleaning operations. The benefits of our flexible, single-use systems include clear cost savings, reduced batch turnaround time and simplified validation.

Assemblies are cleanroom-assembled, fully lot-traceable and accompanied by documentation to confirm compliance with industry standards, including USP Class VI. Available sterile or non-sterile, these systems are ready for integration into your system or to use straight from the bag.

Watson-Marlow manufacture the tubing assemblies and the pumps in which they operate. We are well positioned to understand your fluid transfer needs, helping to develop an effective Value-for-life solution.



# THE PERFECT TUBING FOR EVERY PART OF YOUR PROCESS

## Low extractables

All our Pumpsil platinum-cured silicone tubing is post-cured to remove linear and cyclic siloxanes, which can leach out of other platinum-cured tubing materials and contaminate biopharmaceutical products. Post-curing also tightens the material's molecular bonds, maximising resistance to stress, maintaining dispensing accuracy and increasing tube life.



## Bespoke service

Need a non-standard bore size? Precise cut lengths? An etched definition or message on your silicone tubing? We handle special needs for many of our customers, as well as individual presentation and packaging.

## Product support

Tubing is not a commodity. The right tubing improves pumping performance and productivity, and minimises risk of tube failure and batch loss.

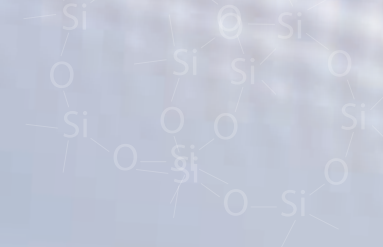
Be confident that your system is performing at its very best, with immediate, personal support before and after purchase. We are happy to arrange free trials of our products to prove what we say.

## Exceeding standards

Pumpsil, Bioprene and PureWeld XL are extruded in our own ISO 14644-1 Class 7 cleanrooms. They surpass the standards laid down by quality-testing authorities worldwide.

They meet USP Class VI and ISO10993 requirements, and follow FDA 21 CFR 177.2600 or 177.1810. Tubing is double-bagged and can be gamma, autoclave or EtO sterilised.





*Cleanrooms  
that surpass the  
standards demanded  
by quality-testing  
authorities worldwide.*

# TRIED AND TESTED

## RESEARCH BASED CREDENTIALS

## Ensuring the purity of platinum-cured silicone

Watson-Marlow tubing is backed by testing and research which underpin its competition-beating qualities and make it totally trustworthy in the biopharmaceutical field. Here we present extracts from papers which demonstrate our research-based credentials.

Although platinum-cured silicone tubing is industry standard, platinum curing, in itself, does not guarantee a high level of tubing purity with low/safe levels of extractables. Watson-Marlow achieves ultimate purity by driving off cytotoxic extractables through post-curing, a process step many tubing manufacturers ignore. Some producers believe post-curing is not necessary, claiming that the naturally low extractables of platinum-cured tubing (compared with peroxide-cured silicone) is sufficient.

Post-cure is the post-extrusion process of baking tubing for a number of hours in an industrial oven that has a high air throughput to strip away volatiles. Post-cure achieves two key objectives:

1) It drives off volatile cyclic siloxanes (silicone oligomers) that would otherwise remain in the finished tube as leachables. Cyclic siloxanes are cytotoxic and therefore, if left in the tubing, could leach into the product flow and either contaminate the product or affect cell culture.

2) It stabilises the physical properties of the tubing by completing the crosslinking and condensing of any residual functional groups. Full crosslinking ensures a more stable structure resulting in lower hysteresis and more stable flow in a peristaltic pump.

### Which volatiles does post-curing remove?

In production of the silicone polymer - the raw material for the silicone tube - a cyclic siloxane/oligomer mixture is introduced as a process aid. However, it performs no function in the finished polymer and it is vacuum devolatilised at high temperature to remove the oligomer from the polymer. The result is high molecular weight polymer but with a residual 0.5 to 2 percent by weight of residual oligomer. If the tubing is not post-cured, the residue remains in the tubing as an extractable.

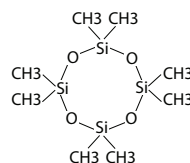
Cyclic siloxanes are cytotoxic. In a test carried out by Toxicon, an independent test laboratory, a mix of three cyclic siloxanes was tested using the MEM Elution test (ISO 10993-5, 1999: (Biological Evaluation of Medical Devices Part 5: Tests for In-Vitro Cytotoxicity) and USP 29 NF 24, 2006 (87) Biological reactivity test, in vitro. The test sample showed a severe reactivity (grade 4) at the 48-hour observation and therefore the mix of cyclic siloxanes was cytotoxic. Grade 4 / severe reactivity means a reduction in viable cell count of approximately 70%.

The cyclic siloxane mix was equal parts of octamethyl cyclotetrasiloxane, decamethyl cyclopentasiloxane and dodecamethyl cyclohexasiloxane. The test was carried out at 25% dilution of this mix.

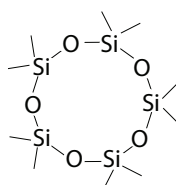
### How does post-curing improve performance?

Post-curing induces chemical changes including the continued crosslinking and condensation of reactive functional groups. The continued crosslinking between vinyl and hydride groups occurs because some of the functional groups are less reactive than others and can only be made accessible with increased heat and time. The final crosslinking increases the Shore A hardness of the tubing by 4 points. All of the physical property changes are the result of a tighter network and an increased crosslink density.

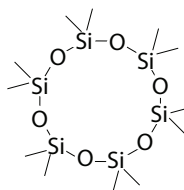
### What are the key cyclic siloxanes also known as?



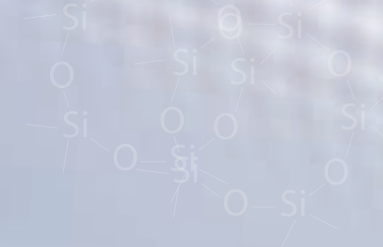
Octamethyl cyclotetrasiloxane  
CAS no 556-67-2  
Chemical formula C<sub>8</sub>H<sub>24</sub>O<sub>4</sub>Si<sub>4</sub>  
Also known as: cyclic dimethylsiloxane tetramer, Cyclodimethicone, D4



Decamethyl cyclopentasiloxane  
CAS no 541-02-6  
Chemical formula C<sub>10</sub>H<sub>30</sub>O<sub>5</sub>Si<sub>5</sub>  
Also known as: Decamethylcyclopentasiloxane; Cyclic dimethylsiloxane pentamer; Cyclomethicone, Polydimethylsiloxane



Dodecamethyl cyclohexasiloxane  
CAS no 540-97-6  
Chemical formula C<sub>12</sub>H<sub>36</sub>O<sub>6</sub>Si<sub>6</sub>  
Also known as: Cyclic VMS



# Pumpsil

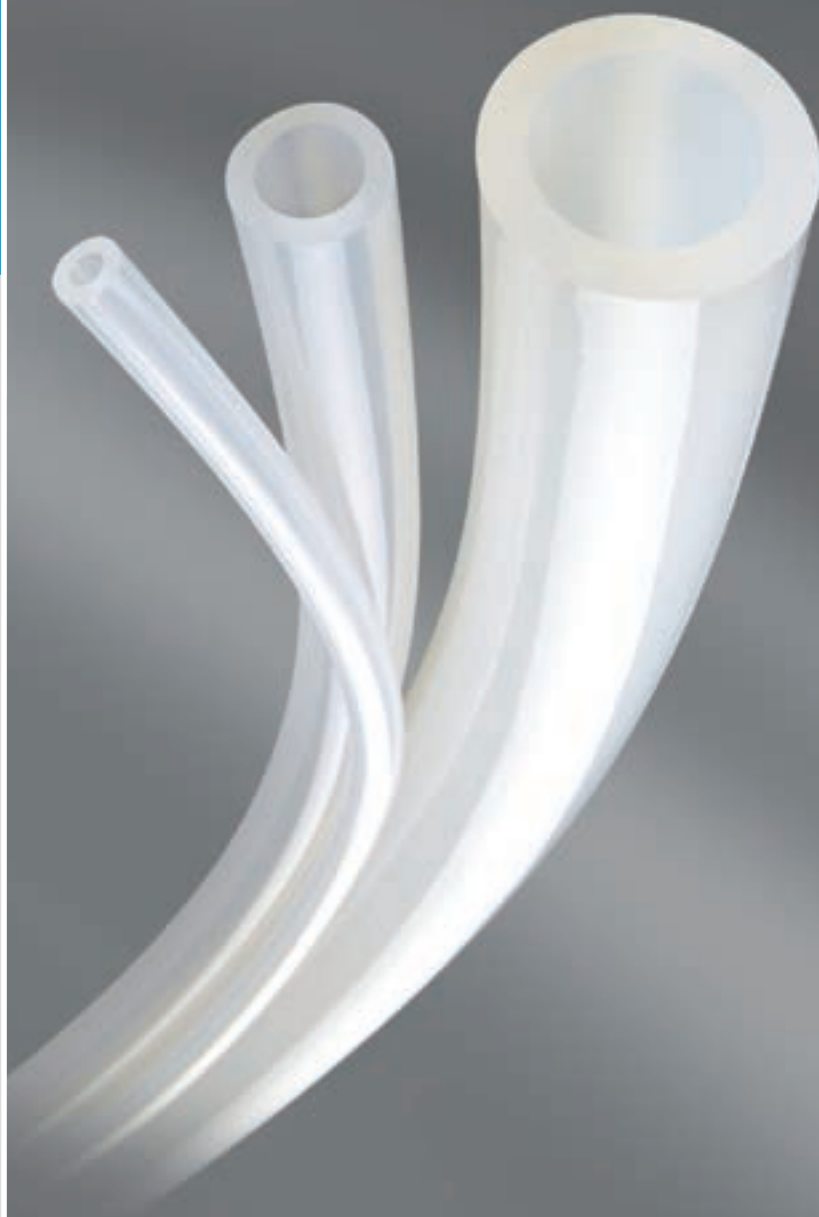
Platinum-cured silicone tubing

Ideal for:

**Single-use biopharm applications. Accurate metering, transfer and filtration**

Developed for the biopharmaceutical industry, Pumpsil is exceptionally pure tubing offering an ultra-smooth bore which helps minimise protein binding and ensure high purity in the finished product.

- Fully documented biocompatibility and comprehensive validation pack
- Absolute traceability with laser-etched part number, lot number and use-by date
- Excellent flow stability for accurate process control
- Comprehensive stock of a wide range of sizes
- Suitable for single-use applications



## Pure platinum-cured silicone tubing

Pumpsil is widely used for single-use biopharm applications, as well as pH control and media feed in fermentation, accurate metering, transfer and filtration.

Pumpsil	Typical Values
Material	Platinum-cured silicone
Colour/transparency	Translucent
Spallation	Low
Life/hours	313/314 pumpheads - 230 hrs 520R pumpheads - 200 hrs 620R pumpheads - 230 hrs
Certification	USP Class VI, FDA regulations 21 CFR 177.2600, ISO10993
Sterilisation methods	Gamma, autoclave, EtO
Operating temperature	-20C to 80C
Hardness, Shore A (5sec)	60
Specific gravity	1.16
Tear B, ppi	279
Ultimate tensile strength psi	1306
Elongation at break, %	861
Tensile stress at 100% wvelongation, psi	118
Compression set, %	18
UV resistance	Excellent
Gas permeability rating	Low
Water absorption	Low

ASTM methods Hardness: ASTM D 2240; Specific gravity: ASTM D 792; Tear B, Ultimate tensile strength, Elongation at break, Tensile stress at 100% elongation; ASTM D 412

Tube ordering codes						
Bore		Wall		Coil size		
mm	inch	mm	inch	15m/50ft	5m/16ft	152m/500ft
0.5	1/50	1.6	1/16	913.A005.016	913.AJ05.016	913.B005.R16
0.8	1/32	1.6	1/16	913.A008.016	913.AJ08.016	913.B008.R16
1.2	3/64	1.6	1/16	913.A012.016	913.AJ12.016	913.B012.R16
1.6	1/16	1.6	1/16	913.A016.016	913.AJ16.016	913.B016.R16
2.4	3/32	1.6	1/16	913.A024.016	913.AJ24.016	913.B024.R16
3.2	1/8	1.6	1/16	913.A032.016	913.AJ32.016	913.B032.R16
4.8	3/16	1.6	1/16	913.A048.016	913.AJ48.016	913.B048.R16
6.4	1/4	1.6	1/16	913.A064.016	913.AJ64.016	913.B064.R16
						122m/400ft
8.0	5/16	1.6	1/16	913.A080.016	913.AJ80.016	913.B080.R16
						152m/500ft
0.5	1/50	2.4	3/32	913.A005.024	913.AJ05.024	913.B005.R24
0.8	1/32	2.4	3/32	913.A008.024	913.AJ08.024	913.B008.R24
1.6	1/16	2.4	3/32	913.A016.024	913.AJ16.024	903.0016.R24
3.2	1/8	2.4	3/32	913.A032.024	913.AJ32.024	903.0032.R24
						122m/400ft
4.8	3/16	2.4	3/32	913.A048.024	913.AJ48.024	903.0048.R24
						91m/300ft
6.4	1/4	2.4	3/32	913.A064.024	913.AJ64.024	913.B064.R24
						61m/200ft
8.0	5/16	2.4	3/32	913.A080.024	913.AJ80.024	913.B080.R24
						46m/150ft
9.6	3/8	2.4	3/32	913.A096.024	913.AJ96.024	913.B096.R24
					3m/10ft	91m/300ft
4.8	3/16	3.2	1/8	913.A048.032	913.A096.I32	913.B048.R32
						61m/200ft
6.4	1/4	3.2	1/8	913.A064.032	913.A048.I32	913.B064.R32
						46m/150ft
9.6	3/8	3.2	1/8	913.A096.032	913.A096.I32	913.B096.R32
						30m/100ft
12.7	1/2	3.2	1/8	913.A127.032	913.A127.I32	913.B127.R32
15.9	5/8	3.2	1/8	913.A159.032	913.A159.I32	-
8.0	5/16	4.0	-	913.A080.040	913.A080.I40	-
12.0	-	4.0	-	913.A120.040	913.A120.I40	-
16.0	-	4.0	-	913.A160.040	913.A160.I40	-
9.6	3/8	4.8	3/16	913.A096.048	913.A096.I48	-
12.7	1/2	4.8	3/16	913.A127.048	913.A127.I48	-
15.9	5/8	4.8	3/16	913.A159.048	913.A159.I48	-
19.0	3/4	4.8	3/16	913.A190.048	913.A190.I48	-
25.4	1	4.8	3/16	913.A254.048	913.A254.I48	-

# PureWeld<sup>®</sup> XL

Weldable biopharmaceutical tubing

Ideal for:

## Single-use bioprocessing systems

Designed for secure peristaltic pumping, this pure thermoplastic elastomer can be welded, allowing complete fluid paths to be assembled in minutes without connectors.

- Sterile weldable and heat-sealable
- FDA CFR 177.1810 and USP Class VI certification
- Animal-derived component free (ADCF)
- Sterilisable by gamma radiation, autoclave and ethylene oxide
- Validation and extractables profile available





# The pure weldable pump tube

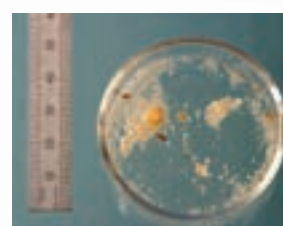
Watson-Marlow PureWeld XL is manufactured by the world's leading peristaltic pump manufacturer. A high quality tubing, PureWeld XL is ideal for use in single-use bioprocessing, has very low internal spallation in peristaltic pumps, as well as long life when compared to other weldable tubes.



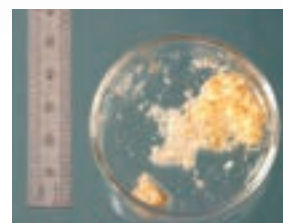
Secure welds, connector free

## Secure - no spallation up to 48 hours running

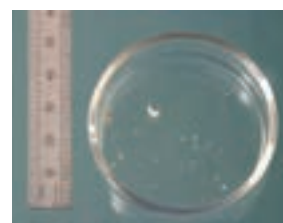
The images opposite show examples of spallation that has occurred after 135 hours pumping water at room temperature and no induced pressure with Competitor A and B, when compared with the results from PureWeld after the same period.



Example A



Example B



PureWeld XL

PureWeld XL	Typical Values
Material	SEBS
Colour/transparency	Opaque
Spallation	Very low
Life/hours	313/314 pumpheads - 500 hrs 520R pumpheads - 1300 hrs 620R pumpheads - 260 hrs 720 pumpheads - 645 hrs
Certification	USP Class V1, FDA regulations 21 CFR 177.1810 USP<85>, USP<661>, USP<788>
Sterilisation methods	Gamma, autoclave, EtO
Operating temperature	-20C to 80C
Hardness, shore A (5sec)	68
Specific gravity	0.90
Tear B,	37.7KN/m
Ultimate tensile strength psi	10.2MPa
Elongation at break, %	621
Tensile stress at 100% elongation	2.8MPa
Compression set, %	74
UV resistance	Good

ISO Hardness: ISO 868; Specific gravity: ISO2781; Tear B, Ultimate tensile strength, Elongation at break, Tensile stress at 100% elongation; ISO37-2005

### PureWeld XL peristaltic pump tubing sizes available

Bore		Wall		Part number
mm	inch	mm	inch	
0.5	1/50	1.6	1/16	941.0005.016
1.6	1/16	1.6	1/16	941.0016.016
3.2	1/8	1.6	1/16	941.0032.016
4.8	3/16	1.6	1/16	941.0048.016
6.4	1/4	1.6	1/16	941.0064.016
8.0	5/16	1.6	1/16	941.0080.016
6.4	1/4	2.4	3/32	941.0064.024
9.6	3/8	3.2	1/8	941.0096.032
12.7	1/2	3.2	1/8	941.0127.032
9.6	3/8	4.8	3/16	941.0096.048
12.7	1/2	4.8	3/16	941.0127.048
19.0	3/4	4.8	3/16	941.0190.048
25.4	1	4.8	3/16	941.0254.048

All sizes of PureWeld XL tubing are available in 50ft (15m) coils. Custom sizes are available to order, as are other specific requirements

# Bioprene<sup>®</sup>

Thermoplastic elastomer tubing

Ideal for:  
**Critical  
biopharmaceutical  
processes requiring  
accurate, reliable  
and repeatable  
performance**

Bioprene peristaltic pump tubing is USP Class VI and FDA compliant and suitable for biopharmaceutical and food applications. Bioprene's long peristaltic life ensures process security, thereby reducing risks in critical cGMP applications.

- USP Class VI and FDA certified and NSF51 listed for biopharmaceutical and food applications
- Fully documented biocompatibility including FDA Drug Master File
- UV opaque and fully weldable
- Sterilisable by gamma irradiation and autoclaving



## For long life and chemical compatibility

Suitable for upstream and downstream biopharmaceutical processes, Bioprene offers exceptionally long peristaltic life, ensuring process security. Bioprene demonstrates a broad chemical compatibility; especially resistance to strong acids, alkalis and oxidising agents.

Bioprene is widely applicable in biopharmaceutical manufacturing operations such as metering, transfer and filtration. It is ideal for media feed and pH control in fermentation and metering tablet coating materials.

Bioprene is also suitable for a variety of applications in the food and beverage industry; especially product transfer and metering.

Operating pressures of 0-2 bar can be achieved with Bioprene continuous tubing. A range of LoadSure tube elements increase the pressure capability up to a maximum of 7 bar.

Bioprene	Typical Values
Material	Thermoplastic elastomer
Colour/transparency	Beige/opaque
Spallation	Low
Life/hours	313/314, 520R pumpheads -10,000 hrs 620R pumpheads - 6000 hrs
Certification	U SP Class VI, FDA 21CFR 177:2600 for contact with aqueous food. NSF51 listed
Sterilisation methods	Gamma, autoclave, EtO, ask Watson Marlow for more detail
Operating temperature	5C to 80C
Hardness, shore A (5sec)	62 to 68
Specific gravity	0.95 to 0.98
Ultimate tensile strength psi	798 to 9999
Elongation at break, %	340 to 600
UV resistance	Excellent
Permeability rating	Fair
Water absorption	Low

Tube ordering codes						
Bore		Wall		Coil size		
mm	inch	mm	inch	15m/50ft	5m/16ft	152m/500ft
0.5	1/50	1.6	1/16	933.0005.016	933.0005.J16	933.0005.R16
0.8	1/32	1.6	1/16	933.0008.016	933.0008.J16	933.0008.R16
1.6	1/16	1.6	1/16	933.0016.016	933.0016.J16	933.0016.R16
2.4	3/32	1.6	1/16	933.0024.016	933.0024.J16	933.0024.R16
3.2	1/8	1.6	1/16	933.0032.016	933.0032.J16	933.0032.R16
4.8	3/16	1.6	1/16	933.0048.016	933.0048.J16	933.0048.R16
6.4	1/4	1.6	1/16	933.0064.016	933.0064.J16	933.0064.R16
8.0	5/16	1.6	1/16	933.0080.016	933.0080.J16	933.0080.R16
1.6	1/16	2.4	3/32	933.0016.024	933.0016.J24	933.0016.R24
3.2	1/8	2.4	3/32	933.0032.024	933.0032.J24	933.0032.R24
						122m/400ft
4.8	3/16	2.4	3/32	933.0048.024	933.0048.J24	933.0048.R24
						91m/300ft
6.4	1/4	2.4	3/32	933.0064.024	933.0064.J24	933.0064.R24
						61m/200ft
8.0	5/16	2.4	3/32	933.0080.024	933.0080.J24	933.0080.R24
						46m/150ft
9.6	3/8	2.4	3/32	933.0096.024	933.0096.J24	933.0096.R24
4.8	3/16	3.2	1/8	933.0048.032	-	-
					5m/10ft	61m/200ft
6.4	1/4	3.2	1/8	933.0064.032	933.0048.I32	933.0064.R32
						46m/150ft
9.6	3/8	3.2	1/8	933.0096.032	933.0096.I32	933.0096.R32
12.7	1/2	3.2	1/8	933.0127.032	933.0127.I32	-
15.9	5/8	3.2	1/8	933.0159.032	933.0159.I32	-
8.0	-	4.0	-	933.0080.040	933.0080.I40	-
12.0	-	4.0	-	933.0120.040	933.0120.I40	-
16.0	-	4.0	-	933.0160.040	933.0160.I40	-
9.6	3/8	4.8	3/16	933.0096.048	933.0096.I48	-
12.7	1/2	4.8	3/16	933.0127.048	933.0127.I48	-
15.9	5/8	4.8	3/16	933.0159.048	933.0159.I48	-
19.0	3/4	4.8	3/16	933.0190.048	933.0190.I48	-
25.4	1	4.8	3/16	933.0254.048	933.0254.I48	-

ASTM methods Hardness: ASTM D 2240; Specific gravity: ASTM D 792; Tear B, Ultimate tensile strength, Elongation at break, Tensile stress at 100% elongation; ASTM D 412

# GORE® STA-PURE Series PCS

PTFE-reinforced silicone tubing

Ideal for:  
**Demanding applications including tangential flow filtration**

STA-PURE PCS pump tubing provides long term performance with repeatable accuracy, vital in pharmaceuticals and other high technology industries.

- Pressure rated up to 7 bar (100 psi)
- Longest available tube life
- STA-PURE PCS's bore is three times smoother than thermoplastic elastomer tubing, with no grooves or cracking developing as flexing continues
- Spallation virtually eliminated, leaving high-value duty fluids uncontaminated



## Unbeatable value for life

STA-PURE PCS has a unique composite construction of silicone in a PTFE lattice, giving it superior burst resistance up to 7 bar (100psi) and 18 times longer life than silicone tubing. It produces virtually no spallation, is USP Class VI approved and is non-toxic, making it ideal for a wide range of biopharmaceutical applications.

Widely used for ultra-pure applications such as ultra-filtration, live cell transfer, fermentation and bioreactor feed. Also used for aqueous tablet coating.

STA-PURE PCS	Typical Values
Material	ePTFE and platinum-cured silicone composite
Colour/transparency	Off-white/opaque
Spallation	Very low
Life/hours	313/314 pumpheads - 10,000 hrs 520R pumpheads - 10,000 hrs 620R pumpheads - 6000 hrs
Sterilisation methods	Autoclave, CIP, SIP: ask Watson-Marlow
Operating temperature	-20C to 80C
Hardness, shore A (5sec)	85 ± 10
UV resistance	Excellent
Gas permeability	Low
Water absorption	Good

STA-PURE PCS pump tubing sizes available						
Bore		Wall		No	Element length mm	Part number
mm	inch	mm	inch			
1.6	1/16	1.6	1/16	14	305	960.0016.016
3.2	1/8	1.6	1/16	16	305	960.0032.016
4.8	3/16	1.6	1/16	25	305	960.0048.016
6.4	1/4	1.6	1/16	17	305	960.0064.016
8.0	5/16	1.6	1/16	18	305	960.0080.016
1.6	1/16	1.6	1/16	14	355	960.0016.L16
3.2	1/8	1.6	1/16	16	355	960.0032.L16
4.8	3/16	1.6	1/16	25	355	960.0048.L16
6.4	1/4	1.6	1/16	17	355	960.0064.L16
8.0	5/16	1.6	1/16	18	355	960.0080.L16
1.6	1/16	2.4	3/32	119	355	960.0016.024
3.2	1/8	2.4	3/32	120	355	960.0032.024
4.8	3/16	2.4	3/32	15	355	960.0048.024
6.4	1/4	2.4	3/32	24	355	960.0064.024
8.0	5/16	2.4	3/32	121	355	960.0080.024
9.6	3/8	2.4	3/32	122	610	960.0096.024
6.4	1/4	3.2	1/8	26	610	960.0064.032
9.6	3/8	3.2	1/8	73	610	960.0096.032
12.7	1/2	3.2	1/8	82	610	960.0127.032
15.9	5/8	3.2	1/8	184	610	960.0159.032
9.6	3/8	4.8	3/16	193	610	960.0096.048
12.7	1/2	4.8	3/16	88	610	960.0127.048
15.9	5/8	4.8	3/16	189	610	960.0158.048
19.0	3/4	4.8	3/16	191	610	960.0190.048
25.4	1	4.8	3/16	92	610	960.0254.048

ASTM methods: Hardness: ASTM D 2240; Specific gravity: ASTM D 792; Tear B, Ultimate tensile strength, Elongation at break, Tensile stress at 100% elongation; ASTM D 412

# Gore® STA-PURE Series PFL

PTFE-reinforced fluoroelastomer tubing

Ideal for:

**Pharmaceutical,  
chemical and solvent-  
based processing  
applications**

STA-PURE PFL handles nearly all aggressive chemicals, including organic solvents such as methyl ethyl ketone, toluene and acetone.

- Highly resistant to aggressive chemicals, including organic solvents
- 50 times longer life than other fluoroelastomers
- Stable flow rate over time
- Pressures up to 4 bar
- Suitable for CIP/SIP



## Unbeatable compatibility

STA-PURE PFL is a high-performance composite of PTFE and a high-grade fluoroelastomer, giving extraordinary chemical resistance, extremely long life and very high burst pressures. It is free from plasticisers, acid acceptors and other processing aids, making it one of the purest tubings available.

Leachability tests using ethyl acetate yielded over 100 times less total extractables than other fluoroelastomer tubing materials. In addition, STA-PURE PFL has Class VI tests for pharmaceutical applications.

STA-PURE PFL	Typical Values
Material	ePTFE and fluoroelastomer composite
Colour/transparency	Off-white/opaque
Spallation	Very low
Life/hours	313/314 pumpheads - 6000 hrs 520R pumpheads - 6000 hrs 620R pumpheads - 6000 hrs
Certification	USP Class VI, ISO 10993-1, USDA and 3A approved
Sterilisation methods	Autoclave, CIP,SIP: ask Watson Marlow
Operating temperature	-20C to 80C
Hardness, shore A (5sec)	85 ± 10
UV resistance	Excellent
Water absorption	Low

STA-PURE PFL pump tubing sizes available						
Bore		Wall		No	Element length	Part number
mm	inch	mm	inch		mm	
1.6	1/16	1.6	1/16	14	305	965.0016.016
3.2	1/8	1.6	1/16	16	305	965.0032.016
4.8	3/16	1.6	1/16	25	305	965.0048.016
6.4	1/4	1.6	1/16	17	305	965.0064.016
8.0	5/16	1.6	1/16	18	305	965.0080.016
1.6	1/16	1.6	1/16	14	355	965.0016.L16
3.2	1/8	1.6	1/16	16	355	965.0032.L16
4.8	3/16	1.6	1/16	25	355	965.0048.L16
6.4	1/4	1.6	1/16	17	355	965.0064.L16
8.0	5/16	1.6	1/16	18	355	965.0080.L16
1.6	1/16	2.4	3/32	119	355	965.0016.024
3.2	1/8	2.4	3/32	120	355	965.0032.024
4.8	3/16	2.4	3/32	15	355	965.0048.024
6.4	1/4	2.4	3/32	24	355	965.0064.024
8.0	5/16	2.4	3/32	121	355	965.0080.024
9.6	3/8	2.4	3/32	122	610	965.0096.024
6.4	1/4	3.2	1/8	26	610	965.0064.032
9.6	3/8	3.2	1/8	73	610	965.0096.032
12.7	1/2	3.2	1/8	82	610	965.0127.032
15.9	5/8	3.2	1/8	184	610	965.0159.032

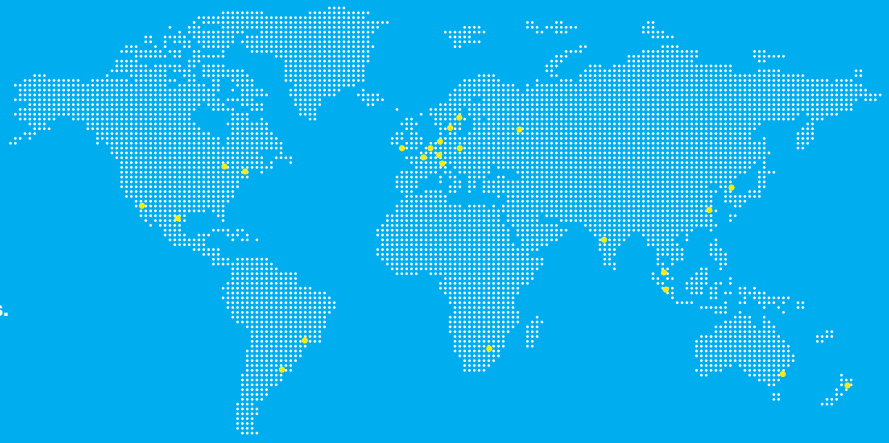
ASTM methods Hardness: ASTM D 2240; Specific gravity: ASTM D 792; Tear B, Ultimate tensile strength, Elongation at break, Tensile stress at 100% elongation; ASTM D 412



Watson-Marlow Pumps Group

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