

# C-FLEX<sup>®</sup> ULTRA Biopharmaceutical Pump Tubing

**NEW!**



C-Flex<sup>®</sup> ULTRA shown being pumped using a Cole-Parmer MasterFlex L/S<sup>®</sup> Standard pump head.

## Introducing C-Flex<sup>®</sup> ULTRA Thermoplastic Pump Tubing

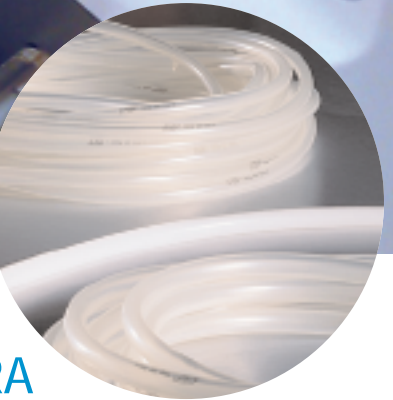
C-Flex<sup>®</sup> — from Saint-Gobain Performance Plastics — a unique, patented thermoplastic elastomer specifically designed to meet the critical demands of the biopharmaceutical world, is now BETTER THEN EVER.

C-Flex<sup>®</sup> ULTRA exceeds the industry's demands for a flexible, clear, sealable, and weldable pump tube for fluid processing applications. This new 60A C-Flex<sup>®</sup> material has been developed to outperform existing C-Flex<sup>®</sup> and every other 'look-alike' on the market. It has been extensively tested by independent organizations and is consistently outperforming every known competitor.

**Feature Rich Formulation.** C-Flex<sup>®</sup> ULTRA complies with USP Class VI standards and is manufactured by Saint-Gobain under strict GMP guidelines. It is non-pyrogenic, non-cytotoxic and has excellent resistance to concentrated acids and alkalis. The ULTRA formula is significantly less permeable than silicone and has low platelet adhesion and low protein binding characteristics.

**Sealable and weldable.** C-Flex<sup>®</sup> ULTRA can be thermally sealed and rewelded making it ideal for the biopharmaceutical filling and sampling processes.

**Significantly extends the life of pump heads.** The lack of surface tackiness typically found with TPE tubing reduces the need to clean gummy pump heads - greatly extending their life.



In a 24-hour pumping trial, competitive tubing failed at less than 12 hours.

### biopharmaceutical products

New C-Flex<sup>®</sup> ULTRA Pump Tubing is perfect for single-use assemblies, pumping, process filling and sampling applications in Bioprocessing.

**C-Flex<sup>®</sup> ULTRA outperforms any TPE on the market today.**

- Very low spallation during the pumping process - lower spallation than any other TPE or silicone formulations.
- Exceptional pump life. At 600 rpm's C-Flex<sup>®</sup> ULTRA is still pumping after 1,400 hours of continuous operation.\*
- The smoother outer surface achieved by the new ULTRA formula does not gum pump heads like other TPE's.
- Excellent clarity – fluid is easily visible through the translucent tubing wall.
- Sealable and weldable either pre or post-gamma irradiation.
- Available **NOW** in 10 standard sizes (ID x OD). Custom sizes, lengths and packaging also available upon request.
- Produced from the same C-Flex<sup>®</sup> materials that have been validated by biopharmaceutical companies for over two decades.
- C-Flex<sup>®</sup> ULTRA has been designed to continue the tradition of providing the biopharmaceutical industry with over 25 years of success with the original C-Flex<sup>®</sup> family of TPE tubing.

\* tests performed by independent lab at 600 rpm/15lbs back pressure.

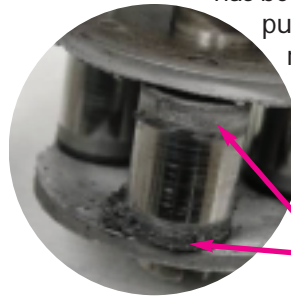
## C-Flex® ULTRA Pump Tubing Inventoried Sizes

Part Number	I.D. (inches)	O.D. (inches)	Wall (inches)	I.D. (mm)	O.D. (mm)	Wall (mm)
700-125-2	1/8	1/4	0.063	3.18	6.35	1.59
700-188-2	3/16	5/16	0.063	4.76	7.94	1.59
700-188-3	3/16	3/8	0.094	4.76	9.52	2.38
700-250-2	1/4	3/8	0.063	6.35	9.52	1.59
700-250-3	1/4	7/16	0.094	6.35	11.11	2.38
700-250-4	1/4	1/2	0.125	6.35	12.70	3.18
700-313-3	5/16	1/2	0.094	7.94	12.70	2.38
700-375-2	3/8	1/2	0.063	9.52	12.70	1.59
700-375-4	3/8	5/8	0.125	9.52	15.88	3.18
700-500-4	1/2	3/4	0.125	12.7	19.05	3.18

C-Flex® ULTRA pump still pumping after 171 hours.

### C-Flex® ULTRA is easy on pump heads

Universally one of the problems with TPE materials has been gummed pump heads. Our new C-Flex® ULTRA formula has been designed to provide a very smooth outer surface. The net result is far less wear and tear on the pump heads.



Gummed pump head using competitive tubing.

## C-Flex® ULTRA Typical Physical Properties

Property	ASTM Method	Unit	Unsterilized	Gamma Irradiated	Autoclaved
Durometer Hardness	D2240	Shore A	62	60	65
Density		g/cc	0.888	0.889	0.887
Tensile Strength	D412	psi MPa	735 5.1	645 4.5	705 4.9
Ultimate Elongation	D412	%	725	885	695
100% Modulus	D412	psi MPa	280 1.9	255 1.8	300 2.1
300% Modulus	D412	psi MPa	390 2.7	350 2.4	415 2.9
Graves Tear Strength	D624	pli kN/m	150 26.3	140 24.5	170 29.8
Tensile Set @ 300% Stretch	D412	%	40	50	35
Compression Set @22 hrs, 70°C	D395	%	30	44	38
Water Absorption	D570	%	0.037	0.020	0.176
Low Temperature Brittleness Point	D746	°C °F	-64 -83	-61 -78	-62 -80
Low Temperature Flexibility @ -50°C/-58°F	D380	Pass/Fail	Pass	Pass	Pass
Oxygen Permeability	D1434	(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.atm)	8.47 x 10 <sup>-8</sup>	3.75 x 10 <sup>-7</sup>	1.49 x 10 <sup>-7</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.Pa)	8.36 x 10 <sup>-13</sup>	3.70 x 10 <sup>-12</sup>	1.47 x 10 <sup>-12</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.cmHg)	1.11 x 10 <sup>-9</sup>	4.93 x 10 <sup>-9</sup>	1.97 x 10 <sup>-9</sup>
		(cm <sup>3</sup> .mil)/(100in <sup>2</sup> .24 hr.atm)	1.86 x 10 <sup>3</sup>	8.23 x 10 <sup>3</sup>	3.28 x 10 <sup>3</sup>
Nitrogen Permeability	D1434	(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.atm)	2.60 x 10 <sup>-7</sup>	4.65x10 <sup>-7</sup>	1.48x10 <sup>-7</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.Pa)	2.57 x 10 <sup>-12</sup>	4.59x10 <sup>-12</sup>	1.46x10 <sup>-12</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.cmHg)	3.42 x 10 <sup>-9</sup>	6.12x10 <sup>-9</sup>	1.95x10 <sup>-9</sup>
		(cm <sup>3</sup> .mil)/(100in <sup>2</sup> .24 hr.atm)	5.71 x 10 <sup>3</sup>	1.02 x 10 <sup>4</sup>	3.25 x 10 <sup>3</sup>
Air Permeability	D1434	(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.atm)	2.11 x 10 <sup>-7</sup>	3.12 x 10 <sup>-7</sup>	6.06 x 10 <sup>-8</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.Pa)	2.08 x 10 <sup>-12</sup>	3.08 x 10 <sup>-12</sup>	5.98 x 10 <sup>-13</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.cmHg)	2.78 x 10 <sup>-9</sup>	4.10 x 10 <sup>-9</sup>	7.97 x 10 <sup>-10</sup>
		(cm <sup>3</sup> .mil)/(100in <sup>2</sup> .24 hr.atm)	4.64 x 10 <sup>3</sup>	6.85 x 10 <sup>3</sup>	1.33 x 10 <sup>3</sup>
Carbon dioxide permeability	D1434	(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.atm)	1.57 x 10 <sup>-7</sup>	1.94 x 10 <sup>-7</sup>	2.93 x 10 <sup>-7</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.Pa)	1.55 x 10 <sup>-12</sup>	1.92 x 10 <sup>-12</sup>	2.89 x 10 <sup>-12</sup>
		(cm <sup>3</sup> .cm)/(cm <sup>2</sup> .sec.cmHg)	2.071 x 10 <sup>-9</sup>	2.56 x 10 <sup>-9</sup>	3.86 x 10 <sup>-9</sup>
		(cm <sup>3</sup> .mil)/(100in <sup>2</sup> .24 hr.atm)	3.45 x 10 <sup>3</sup>	4.27 x 10 <sup>3</sup>	6.44 x 10 <sup>3</sup>

**C-FLEX® TUBING IS NOT INTENDED FOR USE AS AN IMPLANT MATERIAL**

### biopharmaceutical products

Come through clean.™

Saint-Gobain Performance Plastics-Clearwater

4451 110th Avenue North

Clearwater, FL 33762

Tel: (727) 531-4191

Toll-Free: (800) 541-6880

Fax: (727) 299-2569



C-Flex® is a registered trademark of Saint-Gobain Performance Plastics Corporation.



**IMPORTANT:** It is the user's responsibility to ensure the suitability and safety of Saint-Gobain Performance Plastics tubing for all intended uses. Laboratory and clinical tests must be conducted in accordance with applicable regulatory requirements in order to determine the safety and effectiveness for use of tubing in any particular application.

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