

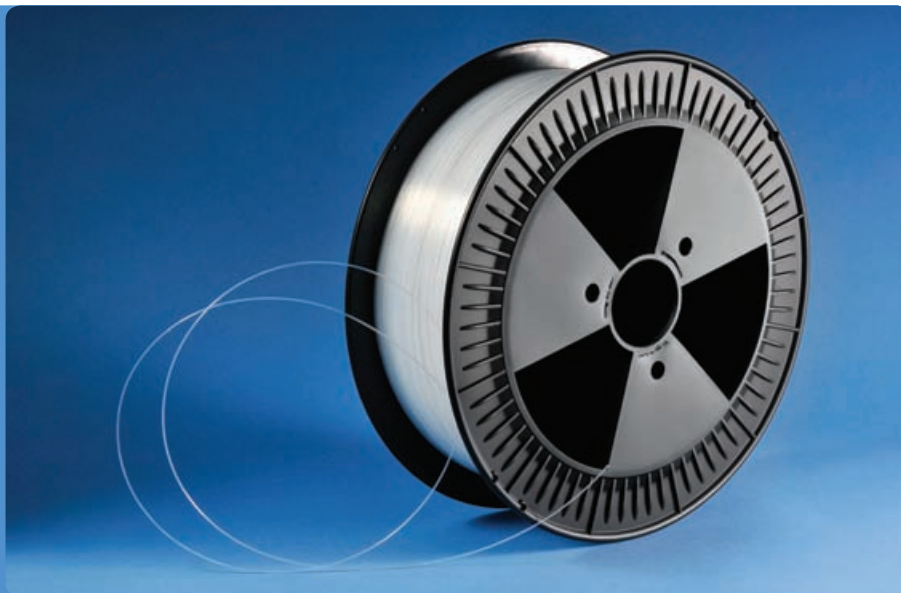
# Fluoropolymer Extrusion

High Quality Tubular FEP, ETFE and PFA



## Key Benefits

- High temperature resistance
- Flexibility
- Glass clear grades available
- Good electrical properties
- Excellent chemical resistance
- Coloured grades available
- Available as layflat sleeve

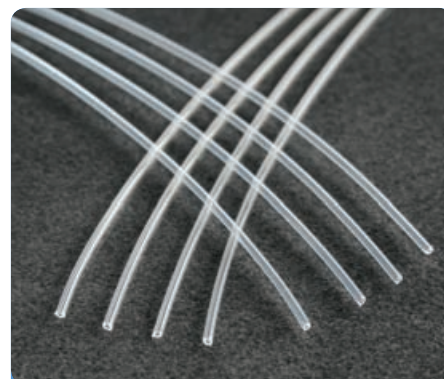


## Specialist fluoropolymer tubing

Lamina specialise in the extrusion of the melt processable fluoropolymer materials, using special high specification extruders and tooling which is designed in house and mainly fabricated in our own tool room.

Lamina produces fluoropolymer tubing products for the electrical, medical, oil and gas and mechanical industries. Our bore sizes range is from 0.125mm to 16.0mm. We excel at producing innovative and close tolerance products to meet special applications.

Products may be supplied on continuous reel or cut to length in both tube and layflat sleeve form.



Fluoropolymer tubing is an ideal solution for chemical resistance and high temperatures

## Applications

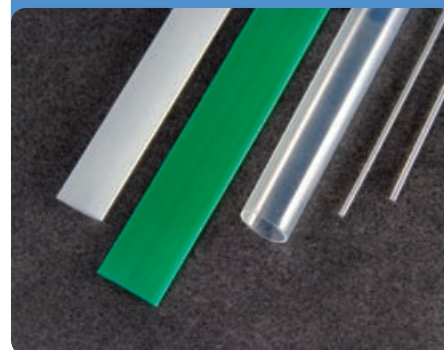
Fluoropolymers are renowned for their excellent chemical resistance and find use where requirements are for high temperature resistance and good electrical properties. The tubes may also be stabilised to maintain tolerances over time and operational conditions.

Electrical - Small bore flexible tubes for insulation in class F motors. Very thin 0.075 to 0.125mm wall layflat tubes for wire jacketing. Clear flexible tubes for lead out mechanical protection.

Oil and Gas - Small bore tubes with tested and guaranteed unrestricted bores over lengths in excess of 1km for pressure relief.

Medical - Advanced 10 way capillary film for medical diagnostic application and continuous flow chemistry. Fine bore tubes for electrical insulation. Close tolerance drug containers and separators capable of sterilisation.

Mechanical - Tubular bearing for specialist applications



For more information or to order contact us:





## Technical Data

Typical Properties	Test Method	Units	Teflon® FEP	Teflon® PFA	Teflon® ETFE
<b>Mechanical</b>					
Specific gravity	ISO 1183		2,15	2,15	1,71
Tensile strength	ISO 12086	MPa			
- 40 °C			43	39	61
23 °C			20 - 34	25 - 35	45 - 51
150 °C			12	23	17
200 °C			6,3	17	6,5
Elongation	ISO 12086	%			
- 40 °C			235	250	180
23 °C			325	350	200 - 375
150 °C			375	515	740
200 °C			395	535	630
Tensile strength at yield	ISO 12086	MPa			
- 40 °C			26,4	26,5	41,7
23 °C			13,1	14,5	22,9
150 °C			5,5	8,3	6,0
200 °C			3,4	5,9	3,8
Tensile modulus	ISO 12086	MPa			
- 40 °C			465	520	880
23 °C			520	435	840
150 °C			34	57	53
200 °C			20	46	30
Flexural modulus 23 °C	ISO 178	MPa	550 - 655	520 - 690	1000 - 1380
Folding endurance <sup>2</sup> M.I.T. (0,2 mm, 270° flex)	ASTM D 2176	cycles	5000 - 1 x 10 <sup>6</sup>	7000 - 2 x 10 <sup>6</sup>	1500 - 60 000
Impact strength	ASTM D 256	J/m			
+ 23 °C			No break	No break	No break
- 54 °C			158	155	> 1100
Hardness	ISO 868	Shore	D-55	D-56	D-67
Coefficient of friction (dyn.) 3 m/min, 0,7 MPa	ASTM D 3702		0,3	0,2	0,4
<b>Thermal</b>					
Peak melting temperature	ASTM D 4591	°C	260	305	265
Service temperature (20 000 h)	ISO 2578	°C	205	260	155
Flame Class <sup>3</sup>	UL94		94V-0	94V-0	94V-0
Oxygen index	ISO 4589	%	> 95	> 95	30 - 32
Temperature index	NES 715	°C	> 400	> 400	ca 290
Heat of combustion	ISO 1716 (NFPA-259)	kJ/g	4,8 - 5,1	4,7 - 4,9	12,4 - 12,6
<b>Electrical</b>					
Dielectric strength	IEC 60243	kV/mm			
film 0,25 mm			78	74	62
film 1,00 mm			35	33	30
Relative permittivity (dielectric constant)	ASTM D 150	1 MHz 1 GHz	2,03 2,02	2,03 2,02	2,47 2,29
Dissipation factor	ASTM D 150	1 MHz 1 GHz	0,00061 0,00094	0,00019 0,00082	0,00550 0,01430
Arc resistance	ASTM D 495	s	> 300	> 180	> 72
Volume resistivity	ASTM D 257	Ω.m	> 10 <sup>16</sup>	> 10 <sup>16</sup>	> 10 <sup>14</sup>
Surface resistivity	ASTM D 257		> 10 <sup>16</sup>	> 10 <sup>17</sup>	> 10 <sup>14</sup>
<b>General</b>					
Weather resistance	"Weather-Ometer" (2000 h)		No effect	No effect	No effect
Solvent resistance	ASTM D 543		Excellent	Excellent	Very good
Chemical resistance	ASTM D 543		Excellent	Excellent	Very good
Water absorption	ASTM D 570	%	0,01	0,03	0,03