PTFE HOSE NATURAL

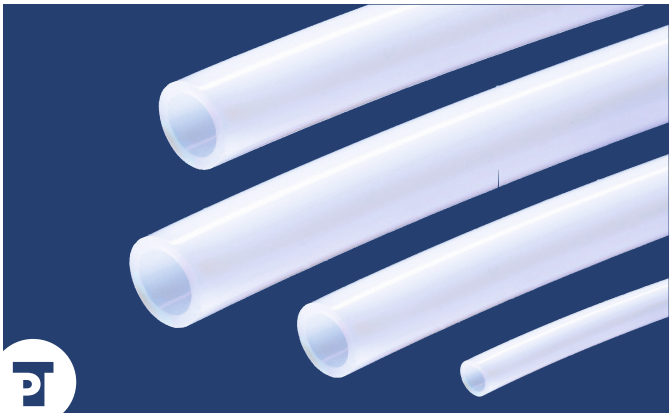
Description and Construction

Among fluoroplastics, PTFE holds a prominent position due to its exceptional chemical, thermal and dielectric properties. These properties enable versatile solutions in the chemical and medical sectors, as well as in the food industry.

Due to the stable bond between fluorine and carbon atoms and the almost complete shielding of the carbon chain by the fluorine atoms, PTFE possesses almost universal chemical resistance. Chemical reactions between PTFE and other substances are limited to a few exceptions: alkali metals, in molten or dissolved form, attack the polymer, causing it to turn brown. Furthermore, elemental fluorine and chlorine trifluoride affect PTFE at higher temperatures and pressures.

Their many beneficial properties (see table below) play a key role in their increasing use across virtually all sectors of industry, including the medical, pharmaceutical and biotechnology sectors, as well as the food industry.

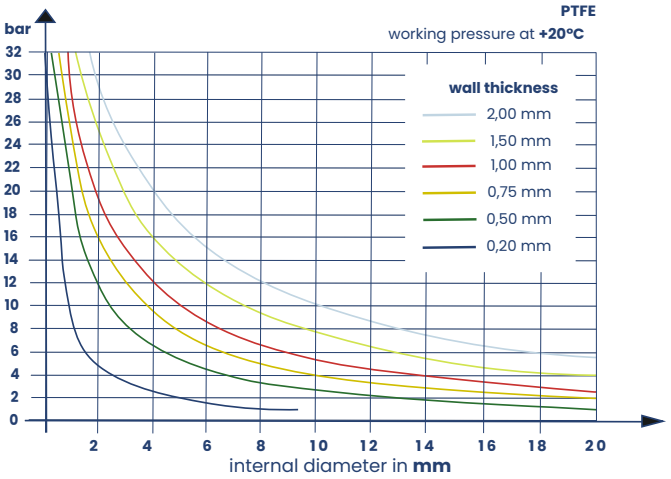
Standart hose properties	Standards	Units	PTFE
Mechanical			
Density	ASTM D792	g/cm³	2,14-2,19
Tensil strength at 23 °C	ASTM D1708-D638	% N/mm²	200-250 29-39
Tensile elongation at break	ASTM D1708-D638	%	200-500
Tensile moduls at 23°C	ASTM D790	N/mm²	620
Hardness Shore D	ASTM D2240		55-72
Coefficient of friction			0,02-0,2
Melting point	ASTM D2116	°C	327
Upper operating temperature		°C	260
Lower operating temperature		°C	-190
Fire resistance	UL 94		V-0
Electric			
Surface resistance	DIN EN 62631	Ω	10^{17}
Volumne resistivity	DIN EN 62631	Ω cm	10^{18}
Dielectric strength, 100 µm film	DIN EN 60243-1	KV/mm	40-80
In general			
Water adsorption	ASTM 0570	%	< 0,01
Flammability			non-flammable



Technical speficications

Natural PTFE hoses are suitable for temperatures ranging from -190 °C to +260 °C.

Working pressure



At temperatures above 20 °C, the pressures shown in the diagram must be multiplied by the following reduction factors.

Temperature °C	Reduction factor F
50	0,87
75	0,77
100	0,68
150	0,53
200	0,2
250	0,12

The safety factor for the working and operating pressure relative to the burst pressure is 1:4.

Please note

Due to the wide range of possible applications and the resulting influencing factors, the usage restrictions listed should always be regarded as guidelines only.

Conductive version

For industrial applications where there is a risk of static build-up, a black, antistatic version is available on request.

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Standard dimensions

Metric hose dimensions range from 1 x 2 to 40 x 43 mm (inner x outer diameter). Standard dimensions are metric – special dimensions are avail-able on request.

internal diameter	wall thicknesses		
mm	mm	mm	mm
2,0	0,50	0,75	1,00
3,0	0,50	0,75	1,00
3,5	0,50	0,75	1,00
4,0	0,50	0,75	1,00
4,5	0,50	0,75	1,00
5,0	0,50	0,75	1,00
5,5	0,50	0,75	1,00
6,0	0,50	0,75	1,00
6,5	0,50	0,75	1,00
7,0	0,50	0,75	1,00
7,5	0,50	0,75	1,00
8,0	0,50	0,75	1,00
8,5	0,50		1,00
9,0	0,50	0,75	1,00
9,5		0,75	1,00
10,0	0,5		1,00
11,0			1,0
12,0			1,0
13,0			1,0
14,0			1,0
15,0			1,50
16,0		1,00	1,50
18,0			1,50
19,0			1,50
20,0			1,50

Validation / Qualification

PTFE HOSE (natural) has undergone extensive testing with the most stringest test conditions applied in accordance with the following requirements:

Food and contact requirements

- European Framework Regulation (EC) No 1935/2004 / German Food, Consumer Goods and Feed Code (German Food and Feed Code – LFGB) Regulation (EU) Nr. 10/2011,
- Regulation (EU) No 10/2011
- FDA 21 CFR 177.1550

Biological reactivity, in vitro and in vivo

- In vitro biological reactivity, USP General Chapter <87> / ISO 10993-5: Testing for cytotoxicity, elution,
- In vivo biological reactivity, USP General Chapter <88>, Class VI.

Extractables

All All tests were carried out at external accredited and independent laboratories.

Metallic impurities

The testing was conducted in accordance with all currently valid guidelines and pharmacopoeias:

- ICH Q3D Guideline for Elemental Impurities
- Ph.Eur. 5.20 Metal Catalysts or Metal Reagent Residues
- USP <232> Elemental Impurities – Limits
- USP <661.1> Plastic Materials of Construction
- USP <665> Plastic Components and Systems used in the manifacturing

PFAS-Analysis

A comprehensive analysis was carried out in accordance with EPA Method 1633A.

A validation package can be requested from TECNO PLAST and is available in German and English.

Tolerances for standard dimensions	
Internal diameter (mm) ± tolerance (mm)	wall thickness (mm) ± tolerance (mm)
2 bis 4 ± 0,1	0,5 ± 0,15
higher than 4 bis 8 ± 0,15	0,75 ± 0,15
higher than 8 bis 12 ± 0,2	1,0 ± 0,2
higher than 12 bis 20 ± 0,25	1,5 ± 0,2
higher than 20 bis 30 ± 0,3	2,0 ± 0,25
higher than 30 bis 40 ± 0,35	

Tighter tolerances are available on request (e.g. when the natural PTFE hose is fitted with compressed air fittings).