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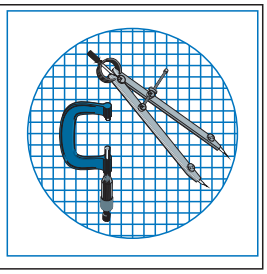
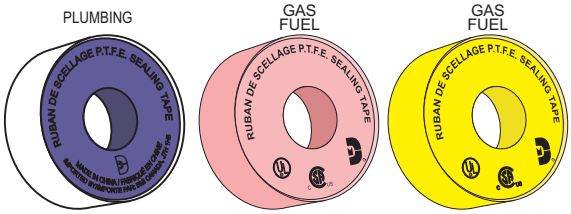


TECHNICAL INFORMATION

Teflon® P.T.F.E. Sealing Tape (PolyTetraFluoroEthylene)



* For use on threaded joints of metal pipe (not exceeding 1 1/2in pipe size) assemblies handling gasoline, petroleum oils, propane, butane, naphtha, benzene, kerosene, natural gas, (pressure not over 100psig) a minimum of three full wraps on the pipe up to 1 in and four full wraps for pipe from 1 in to 1 1/2 in is required.

BMI#	Width	Length	Thickness	Density	
28000	1/2" (12.7mm)	480" (12m)	.003"(.075mm)	0.50g/cm^3	PLUMBING
28001	1/2" (12.7mm)	540" (13.7m)	.004"(.1mm)	1.30g/cm^3	GAS FUEL
28002	3/4" (19mm)	540" (13.7m)	.004"(.1mm)	1.30g/cm^3	
28003	1/2" (12.7mm)	1296" (32.9m)	.004"(.1mm)	1.30g/cm^3	
28008	1" (25.4mm)	520" (13.2m)	.003"(.075mm)	0.35g/cm^3	PLUMBING
28009	1/2" (12.7mm)	540" (13.7m)	.004"(.1mm)	1.30g/cm^3	GAS FUEL
28010	3/4" (19mm)	540" (13.7m)	.004"(.1mm)	1.30g/cm^3	
28011	1" (25.4mm)	540" (13.7m)	.004"(.1mm)	1.30g/cm^3	

The Chemistry of *Teflon*® PTFE

Teflon® PTFE is a linear and fully fluorinated high-molecular weight polymer, made by polymerisation of tetrafluoroethylene at elevated temperature and pressure (Fig. 1). The extremely strong carbon-fluorine bonds in PTFE impart an outstanding combination of properties to PTFE.

The fluorine atoms form a protective sheath around the chain of carbon atoms, shielding the carbon chain from attack by chemicals, for exceptional chemical and thermal stability. The protec-tive sheath of fluorine atoms also reduces surface energy, resulting in a low coefficient of friction and non-stick properties.

Fig. 1 The Manufacturing process for PTFE

$CHCl_3 + 2HF \Rightarrow CHClF_2 + 2HCl$

$2\ CHClF_2 \Rightarrow CF_2 = CF_2 + 2\ HCl$

$n\ CF_2 = CF_2 \Rightarrow (-CF_2 - CF_2-)n$

(Tetrafluoroethylene (PTFE) or TFE)

Properties of PTFE

Temperature Resistance from -200°C to + 260°C

Teflon® PTFE is extremely stable at high temperatures and can be used continuously at 260°C(500°F). At that temperature, at least 50 percent of its mechanical properties are retained after 20,000 hours. Its mechanical properties decrease with increasing temperatures. Above 300°C(570°F), PTFE slowly starts to lose weight. At 300°C, this loss is 0,0003 percent per hour, and at 360°C(680°F) it is 0,003 percent. Above 400°C(750°F), PTFE starts to decompose more rapidly.

Teflon® PTFE is one of the few polymers that retains a measure of toughness and strength at cryogenic temperatures. It has been used successfully in outer space at temperatures approaching absolute zero.

Chemical Resistance

PTFE is vertually inert to all chemicals. The only materials known to react with PTFE are:

- elemental alkali metals, molten or in solution
- finely divided metal powders when heated
- finely divided mixtures of bronze powder and molybdenum disulphide at or above the melting point of PTFE
- fluorine
- chlorine trifluoride
- 80 percent NaOH or KOH solutions above 300°C

It is resistant to fuming sulfuric and nitric acids, aggressive peroxides, amines, antioxidants (as used in high temperature oils), and methanol (as used in fuel).

Solvent Resistance

Organic solvents do not attack or dissolve PTFE, although some permeation may occur as a result of both absorption and diffusion. Obviously, the void content of a finished part will affect permeability significantly. It contains no extractables which can leach out and interact unfavorably with adjacent materials.

Weathering

Teflon® PTFE is extremly hydrophobic and sheds water almost totally. A moisture absorption of 0,01 percent has been reported after 24 hours in water at room temperature. PTFE is also virtually unaffected by oxygen, ozone and visible UV light. Test samples exposed for 20 years to practically all climatic conditions have shown that PTFE is fully weather resistant. No plasticisers anti-oxidants or other additives are used during its processing that could cause ageing.

Flame Rating

Teflon® PTFE is essentially flame resitant. It will sustain combustion only in an environment containing >95 percent oxygen at above 5 psi (ASTM D2863, Limiting Oxygen Index) The flash point is 530°C (985°F) (ASTM D1929). It has a UL rating of 94 V-0. Due to its high melt viscosity, PTFE does not drip when heated over its melting point. This provides an additional safety margin in case of fire. Flame propagation and rate of heat release are very low. Flame rating according to ASTM D635 is ATB<5 s and AEB 5mm.

Friction and Anti-Stick Properties

Teflon® PTFE has an extremly low coefficient of friction. Values of 0,02 have been reported. The lowest values are obtained under conditions of high pressure (>3 N/mm^2) and low velocity (<0,6 m/min). Unfilled PTFE wears relatively rapidly, and is unfit for most dynamic bearing applications. Proprietary fillers can be incorporated to improve wear resistance while maintaining low friction properties. Due to its very low surface energy (18,5 mN/m), PTFE has excellent anti-stick properties.

Electrical Properties

Teflon® PTFE has unique electrical properties: a very low dielectric constant (2,1) and dissipation factor (below 0,0004 up to 10^6Hz) that are constant over a wide range of frequencies, excellent dielectric strength (up to 30kV/mm), and very high volume and surface resistance (>$10^{16}\Omega$). In certain applications, such as fuel hoses, some electrical conductivity is required to dissipate static charges. This can be achieved by blending in 1 to 5 percent by weight of conductive filler.