

Tapes-Molded tubes-Extruded tubes-Large Molded tubes-Extruded rods-Compressed sheets



Polytetrafluoroethylene (PTFE) is a tetrafluoroethylene polymer featuring a unique combination of physical-chemical features that make it different from any other plastic material. The main features of PTFE are:

- extreme chemical inertness
- excellent heat resistance
- optimum dielectric properties
- zero hygroscopicity and maximum resistance against solvents
- optimum resistance to ageing
- self-lubricating properties and minimum friction coefficient.

Chemical Properties

PTFE withstands virtually all chemical reactants. It is only attacked by elemental alkali metals, chlorotrifluorides and elemental fluorine at high pressure and high temperature. PTFE is indifferent to all solvents up to 300°C. It can only be swelled and melt by some highly fluorinated oils at temperatures around the crystalline melting point.

Thermal properties

PTFE has a low heat transmission factor and can be therefore considered a thermoinsulating material. It also shows flame-retardant properties and is stable at 260°C for an indefinite length of time.

Electrical properties

PTFE has optimum dielectric properties within a vast range of temperatures and frequencies. As water absorption is virtually inexistent, these properties are maintained even after a prolonged exposure to weather agents. Electric strength is practically not influenced by the operating temperature. The resistance to arcing of PTFE is considerable and the spark does not generate carbon residues but only non-conductive vapours. The other electric properties (dielectric constant, surface resistivity, volume resistivity, power factor, etc.) show very interesting values.

Mechanical properties

The following table displays the mechanical properties of PTFE, measured at the temperature of 23°C. Take note that between 19°C and 21°C, the material shows a transition point determined by a modification of its crystalline structure which provokes a loss of volume of about 1%. Other particular properties of PTFE are its non-adhesivity and its low friction coefficient, above all under high loads.

Dimensional checks

The dimensions of PTFE products can be assessed with suitable techniques according to the nature of the product. The presence of a transition point at about 20°C requires the adoption of particular measures in case of strict tolerance limits; in this case, it will be appropriate to establish standardised control procedures.

Filled PTFE

The above-mentioned properties make of PTFE the material of choice when it is necessary to eliminate a number of complex problems that cannot be solved otherwise. However, there are specific applications which claim for higher product performance. In this case, filled PTFE grades are employed whose standard properties are modified with special additives in powder form, such as glass fibres, carbon, graphite, molybdenum bisulphide, bronze, ceramic powder, and even mixes of two or more fillers. According to the filler type and quantity, it is possible to:

- increase compressive strength
- increase wear resistance
- reduce the thermal expansion coefficient
- vary volume and surface resistivity
- increase hardness.