



Properties of PTFE:

- PTFE is very inert. Even aggressive acids such as aqua regia cannot attack PTFE. The reason is, on the one hand, the particularly strong bond between the carbon and fluorine atoms since fluorine is the element with the strongest electronegativity. Many substances fail to break the bonds and react chemically with PTFE. Furthermore, PTFE is kinetically inhibited by the compact shell made of fluorine atoms, which protects the carbon strand inside. Fine PTFE powder, however, is z. B. used as an oxidizing agent for metal powder in weapon applications.
- It is extremely resistant to all bases, alcohols, ketones, benzines, oils, etc.; it is only unstable to very strong reducing agents such as solutions of alkali metals (e.g. sodium) in liquid ammonia or to very strong oxidizing agents such as elemental fluorine at higher temperatures; Operating temperature up to 260 ° C (at temperatures above 400 ° C highly toxic pyrolysis products such as fluorophosgene (COF₂) are released, frost-resistant down to -270 ° C; can only be glued after pretreatment; welding possible but not common; slightly waxy surface (not as pronounced as with PE); physiologically harmless.
- PTFE has a very low coefficient of friction. PTFE slides on PTFE as well as wet ice on wet ice. In addition, the static friction is just as great as the sliding friction, so that the transition from standstill to movement takes place without jerks.
- There are almost no materials that stick to PTFE because the surface tension is extremely low. PTFE is difficult to wet and hardly sticky. The contact angle with water is 126 °.
- Density: 2.1–2.3 g · cm⁻³, Shore hardness D 50 to 72, ball indentation hardness: 23–32 N / mm², tear strength: 22–40 N / mm²
- High thermal expansion (α in the range 20–100 ° C: $\approx 20 \cdot 10^{-5} \text{ K}^{-1}$), phase transition from triclinic to hexagonal crystal lattice at 19 ° C with a change in volume.
- Firing test: non-flammable. • Refractive index: PTFE has a very low refractive index of around 1.38.
- Specific heat capacity: 0.96 J / (g · K).
- Thermal conductivity: 0.25 W / (K · m). [11] Permittivity: 2.1 (D150 at 103 Hz), dielectric loss factor: $0.3 \cdot 10^{-4}$ at 103 Hz, specific resistance: 1018 $\Omega \cdot \text{cm}$.