

Fillers in PTFE

In most situations, PTFE is the perfect fluoroplastic for a wide range of applications. Though when virgin PTFE is not sufficient, you can choose for PTFE with a filler to obtain better properties.

Most applicable fillers

- Glass
- Carbon
- Graphite
- Bronze
- Molybdenum disulfide (MoS₂)

Glass

Fiberglass is the most commonly used filler for PTFE. It makes it more resistant to wear, more resistant to creep, makes it suitable for higher surface pressure and is very chemically resistant. The disadvantage is that it is much more abrasive for the opposite counter material.

Application: piston rings, bushings, threaded connections.

Most commonly used compounds:

PTFE + 25% glass fiber

PTFE + 15% + 5% MoS₂ glass

PTFE + glass spheres

Often, these additional compounds are provided with a pigment, for example, red or blue.

Glass: Type E glass

Milled fibers having a nom. diameter = 13µm

Nominal length: 0.8 mm

CaF₂ - Calcium Fluoride

Calcium fluoride is used when glass is not suitable due to the chemical resistance.

Applications: gaskets, electrical applications.

Carbon

Carbon can be used in the form of powder or fibers. It improves the compressive strength, making it more resistant to wear, increases the thermal conductivity and makes the material electrically conductive. Carbon is less abrasive than glass. Combined with graphite it is perfect for sliding applications and piston rings.

Carbon: Amorphous carbon Petroleum

Purity: > 99%

Particle size: <75µm

Density: 1.8 g/m³

Fillers in PTFE

Graphite

Graphite is a form of carbon. The flake-like crystals provide a perfect lubrication and reducing wear. Graphite is usually combined with other fillers such as glass and carbon.

Graphite: Synthetic

Purity: > 99%

irregular shape

Particle size: <75µm

Density: 2.26 g/m³

MoS₂ (Molybdenum)

MoS₂ has a lubricating effect and, therefore, gives better anti-friction properties to the material. MoS₂ is added in small percentages in conjunction with other fillers such as glass and bronze.

MoS₂: Mineral

Purity: > 98%

Particle size: <65µm

Density: 4.9 g/m³

Bronze

Bronze makes the material more resistant to wear, generates a better heat conductivity, more pressure resistant and more resistant to creep. It has higher friction resistance than other filled PTFE compounds. By the addition of MoS₂, the frictional resistance can be reduced. Chemical resistance is a lot worse. Bronze can oxidize.

Application: ship bushings

Most commonly used compounds:

PTFE + 60% bronze

PTFE + 55% bronze + 5% MoS₂

Bronze: Cu/Sn: 9/1

Irregular or spherical shape

Particle size: <60µm

Density: 8.95 g/m³

SS

Stainless steel (SS) gives a higher resistance to wear and can be loaded much higher. Better chemical resistance than bronze filled material.

Application: parts in steam environments.

Fillers in PTFE

Wollastonite

CaSiO₃ wollastonite (calcium silicate) is a mineral and has similar properties as glass but can be applied in food applications, unlike fiberglass. Moreover, it is somewhat less abrasive.

Ekonol

Ekonol® is an aromatic polyester. Ekonol gives PTFE better properties at higher temperatures, makes it more wear-resistant and does not wear out in the steel counter material. Therefore PTFE with Ekonol is very suitable for rotary applications. It is also suitable for Food applications. Especially suitable for applications with soft counter materials such as aluminum.

Mica

Mica; a mineral which ensures that the material expands and shrinks less. However, it has limited mechanical properties. In particular, applications in compression techniques.

Polyimide (PI)

Polyimide is a high quality synthetic resin that makes the compound super abrasion resistant. This PI-PTFE compound has the lowest coefficient of friction of all PTFE compounds. This makes it extremely suitable for dry running applications. This material will not wear out in the counter surface, not even in soft materials such as copper and plastics. Cost price for this compound is higher than all other PTFE compounds.

More information?

Please contact our sales engineers if you require more information, an inquiry or to evaluate samples. Or download our technical data sheets.