

What is PTFE Bronze 40 EN

PTFE + 40 % Bronze

PTFE + 40 % bronze – bronze-filled PTFE, very high wear/compressive strength, thermally conductive, dissipative

PTFE Bronze 40 is a PTFE (polytetrafluoroethylene) filled with 40 % bronze. The high metal content makes the material very wear- and compression-resistant, increases load capacity (PV value) and conducts the frictional heat well. This makes bronze PTFE the classic material for heavily loaded plain bearings, piston rings and sealing elements. Note: bronze PTFE is electrically dissipative (not an insulator), brown, and chemically less resistant than virgin PTFE because the bronze is attacked by many media.

Classification and basic character

PTFE Bronze 40 consists of a PTFE matrix with 40 % by weight of bronze (copper-tin alloy). PTFE is a semi-crystalline fluoropolymer that is not melt-flowable and is therefore only machined and not welded. The bronze particles considerably stiffen the soft PTFE base material, increase compressive and wear resistance, improve thermal conductivity and make the material electrically dissipative. The colour is brown.

Wear, load capacity and heat dissipation

The 40 % bronze content gives the PTFE very high wear and compressive strength and a high load capacity (PV value) at a low coefficient of friction – ideal for dry-running and mixed-friction plain bearings. At the same time the bronze conducts frictional heat out of the sliding zone, allowing higher sliding speeds. Cold flow (creep) is markedly lower than with virgin PTFE. With 40 % bronze the result is a very good all-round compromise of load capacity, toughness and price.

How PTFE Bronze 40 is processed

PTFE Bronze 40 is machined from pressed and sintered semi-finished products (sheet, rod, bush) – turning, milling, drilling and sawing work well, whereby sharp, wear-resistant tools and dust/chip extraction are important because of the bronze content. Like all PTFE materials, the compound is not melt-processable/weldable; overheating must be avoided during machining (decomposition from approx. 260 °C).

Mechanical, thermal and chemical properties

PTFE Bronze 40 reaches a tensile strength of around 20 MPa with an elongation at break over 220 % and a hardness of 60–65 Shore D; the density is around 3.10 g/cm³. The material can be used from -200 to +260 °C, is non-flammable (UL 94 V-0) and electrically dissipative. Chemically the PTFE portion is universally resistant, but the embedded bronze is attacked by acids, strong alkalis, oxidising media, ammonia and hot steam – chemical resistance is therefore reduced compared with virgin PTFE.

When PTFE Bronze 40 is the right choice

Bronze PTFE is worthwhile when high mechanical load, wear resistance and heat dissipation are required – for example:

- Heavily loaded plain bearings and bushes (incl. dry running)
- Piston rings and guides in compressors and pumps
- Sealing elements and guide bands in hydraulics/pneumatics
- Wear plates and parts under high surface pressure
- Applications requiring dissipative (antistatic) behaviour

When PTFE Bronze 40 is NOT the right choice

Equally important are the limits of the material:

- Aggressive chemistry (acids, strong alkalis, oxidising media, ammonia) – bronze is attacked
- Electrical insulation required – bronze PTFE is dissipative (then virgin PTFE or GF)
- Food/drinking-water contact (metallic filler)
- Ultra-clean applications without metal abrasion
- Joining by welding – not possible for PTFE (machining only)

What does PTFE Bronze 40 cost?

PTFE materials are among the higher-priced engineering plastics; the bronze content increases the weight and thus the material cost per part. The price is mainly determined by semi-finished shape and dimension, material utilisation (offcut), machining effort and lot size. We are happy to quote binding prices on request based on your drawing.

Processing at Liedtke

PTFE Bronze 40 machines well – turning, milling, drilling and sawing give clean results; because of the bronze content we use sharp, wear-resistant tools and ensure dust/chip extraction. We consistently avoid overheating. This is how we reliably produce heavily loadable sliding, bearing and sealing parts – from single pieces to series production.

Advantages and disadvantages at a glance

An honest assessment – and how the disadvantages can be mitigated in practice:

Advantages

- Very high wear and compressive strength, high load capacity (PV)
- Good heat dissipation (higher sliding speeds possible)
- Low creep (cold flow)
- Low friction, -200 ... +260 °C, non-flammable
- Electrically dissipative/antistatic

Disadvantages

- Reduced chemical resistance (bronze is attacked)
- Not an electrical insulator (dissipative)
- Not for food/drinking-water contact (metal filler)
- Higher weight than virgin/GF PTFE
- Not melt-processable/weldable (machining only)

Practical tip: PTFE Bronze 40 is the right choice for heavily loaded, heat-conducting sliding and bearing applications in neutral to mild media. If electrical insulation, maximum chemical resistance or food contact is required, virgin PTFE or glass-fibre-filled PTFE (GF) is the better choice. For highest load capacity and heat dissipation, PTFE Bronze 60 is the step up.

Typical properties

- Very high wear and compressive strength
- Good heat dissipation, high load capacity (PV)
- Low creep (cold flow)
- -200 ... +260 °C, non-flammable (UL 94 V-0)
- Low friction, self-lubricating
- Electrically dissipative / antistatic
- Colour brown
- Machining only (not weldable)

Product examples

- Heavily loaded plain bearings and bushes
- Piston rings for compressors
- Sealing elements and guide bands
- Wear plates and parts
- Hydraulic/pneumatic guides
- Antistatic sliding parts

Typical industries

- Plain bearing and bearing technology
- Compressor and pump technology
- Hydraulics and pneumatics
- Sealing technology
- Mechanical and plant engineering
- Drive technology

	Test method	Unit	Value
Mechanics / Tribology			
Tensile strength	ASTM D 4894	MPa	≥ 20
Elongation at break	ASTM D 4894	%	≥ 220
Hardness	ISO 868	Shore D	60–65
Coefficient of friction	ASTM D 1894		~ 0.15
Thermal			
Service temperature		°C	-200 ... +260
Thermal conductivity	DIN 52612	W / (m·K)	≈ 0.5
Flammability	UL 94		V-0
General			
Density	ISO 1183	g / cm ³	3.10
Electrical behaviour			dissipative
Colour			brown

PTFE + 40 % bronze is a bronze-filled PTFE compound for heavily loaded sliding and sealing applications. The values stated are typical characteristic values; they serve as an aid to material selection and are not a legally binding warranty of specific properties and may vary between manufacturers. The bronze content markedly increases wear and compressive strength as well as thermal conductivity, makes the material electrically dissipative and brown. Important: chemical resistance is reduced compared with virgin PTFE – acids, strong alkalis, oxidising media, ammonia and hot steam attack the bronze. Bronze PTFE is not intended for food contact. PTFE must not be overheated (decomposition from approx. 260 °C releasing harmful gases).