

SUPPLY SERVICES

performance engineering products

PTFE

The base characteristics of PTFE are the ones offering a unique combination of:

- low coefficient of friction
- excellent chemical inertness
- non-adhesive surface
- wide temperature range withstanding (-200° C to +260° C), excellent dielectric properties.

The most popular and processed materials of which Guarniflon® stock quite large quantities and owns large production capacity:

- **PTFE - G400**

Extruded tubes and rods
Moulded tubes rods and sheets
Skived sheets
Skived tapes
Finished products.

- **PTFE - G200**

Extruded tubes and rods
Skived sheets
Skived tapes
Finished products.

- **PTFE - G500**

Uded tubes and rods
Skived sheets
Skived tapes
Finished products.

- **PTFE - G300**

Extruded tubes and rods
Finished products.

MECHANICAL PROPERTIES

The compressive strength at a certain predetermined compression value is one of the most significant mechanical characteristics of PTFE, in a wide range of service temperatures. Flexibility strength, plastic memory and hardness, are additional characteristics of PTFE products.

ELECTRICAL PROPERTIES

PTFE products have excellent dielectric performances in a wide range of frequencies and temperatures. The dielectric strength changes according to the thickness and decreases when the frequency increases, with no substantial alterations up to 300°C.

CHEMICAL INERTNESS

PTFE is practically inert to all chemical products, except for some alkaline metals, for example, clorotrifluoruro and for basic fluorine at high temperatures and pressures.

THERMAL PROPERTIES

PTFE is considered one of the most stable materials from the thermal point of view. Up to a service temperature of 260° C PTFE does not change its own physical and molecular properties.

PTFE STANDARD COMPOUND

The more common compounded PTFE grades are filled with glass fibre, bronze, graphite, carbon.

The values from the associated chart are obtained by the analysis of both the moulding and extrusion process. The first column on the left sums-up the basic data of virgin PTFE G400, in order to compare with the values of the different compounds.

"G" COMPOUNDS AVAILABLE - FILLERS AND THEIR FUNCTIONS

In addition to virgin PTFE G400 products, **GUARNIFLON®** offers a wide range of compounded products as well. Among these compounds, processed directly in Guarniflon® compounding unit starting from selected polymers and special high-purity fillers, end users are enabled to find the right answer to their technical requirements. To make their selection easier, the following tables resume:

- the correlation among single fillers, properties and common uses
- properties of standard and special compounds among those most commonly marketed

The following table shows the way each filler affects physical and mechanical properties. Combinations of two or more fillers (not considered in the table) allow a large number of compounds. Thus the resulting combined properties offer a variety of applications.

Filler	Property	Most common applications
Glass	Enhanced wear resistance. Enhanced chemical resistance (except for alkali and hydrofluoric acid).	Valve seats, seals, bearings, requested to resist sliding and chemicals. Suitable for bearings working at low PV values.
Graphite	Extremely low coefficient of friction. Fairly good compressive strength. Good wear resistance.	Bearings for high speed on fairly hard surface.
Carbon	Good thermal conductivity. Good resistance to deformation.	Valve seats. Bearings for high speed and when fast dissipation of electric charges is needed. Elastic bands for unlubricated compressors.
Molibdenum disulphide	Enhanced non-stick properties. Low static coefficient of friction. Fairly good resistance to deformation.	Guide bands. Details needing good resistivity.
Bronze	Enhanced compressive strength. Good wear resistance and high thermal conductivity.	Anti-extrusion rings. Unlubricated bearings for high speed on not hard surface.

TUBES AND RODS

An extensive range of sizes are available to satisfy customers' requirements for both molded and extruded products. In addition to virgin PTFE tubes and rods, standard or special compound products are also available.

According to customers' needs, Guarniflon® can suggest the most suitable solutions concerning available technologies, materials and dimensions. In order to grant a fast and efficient service to its customers, Guarniflon® stocks a wide range of molded and extruded tubes and rods, in virgin PTFE as well as compounded.

TUBES	TUBES	RODS	RODS
EXTRUDES	MOLDED	EXTRUDED	MOLDED

SHEETS

Technologies available at Guarniflon® provide options among a wide range of molded or skived sheets, in **virgin PTFE** as well as compounded PTFE.

According to customers' needs, Guarniflon® can suggest the most suitable solutions concerning available technologies, materials and dimensions.

In order to grant a fast and efficient service to its customers, Guarniflon® stocks a wide range of molded and extruded sheets, in different thickness and dimensions.

Etching process available on 1 or 2 sides.

SHEETS	SHEETS
MOLDED	SKIVED

BEARING TAPES

For the heaviest applications in the hydraulic field, motion control and mechanical field, Guarniflon® developed a new family of products, made by special PTFE compounds and devoted technologies, in order to fulfil Guarniflon® customers requirements.

Compounded PTFE materials with bronze, carbon, graphite or other fillers are designed to enhance properties such as:

- wear resistance
- coefficient of friction
- compression strength

Available:

- with sharp edges
- with chamfers on 2 or 4 angles
- knurled on 1 or 2 sides
- etched on 1 or 2 sides



DIMPLED SHEETS AND DISCS

Virgin PTFE or compounded PTFE dimpled sheets. Thanks to the special surface, the above dimpled sheets are generally used in the engineering and construction field. Dimpled sheets are the perfect solution to thermal expansion and load problems usually connected with structural elements.

One of the most common applications for dimpled sheets is the insertion between 2 movable elements (i.e. bridges), working as a self lubricating system exempt from any need of maintenance.

Due to their special and heavy applications, not only the process technology is certified by Guarniflon, but also the type of raw materials used. Guarniflon® dimpled sheets are processed in accordance with the international standard **EN 1337-2**.



HIGH PERFORMANCE FILMS & TAPES

High Performance Films from Guarniflon are skived and melt extruded fluoropolymer films engineered by Guarniflon Spa R&D Department to allow the customers to select the right film for their application requirements. A wide range of grades including PTFE, FEP, ETFE, PFA, PVDF, THV, to match right combination of physical chemical performances in a variety of key market segments including composite molding for the automotive and aerospace industries, chemical processing, electrical/electronics, renewable energies and marine.

	PTFE	FEP	ETFE	PFA	MFA	PVDF	THV
Flexibility	■	■	●	■	■	■	▲
Chemical Resistance	▲	▲	■	▲	▲	■	■
Hig Temperature Resistance	▲	▲	▲	▲	▲	■	■
Fire Resistance	▲	▲	■	▲	▲	■	■
Electrical Insulation	▲	▲	▲	▲	▲	●	●
Mechanical Strength	■	■	▲	■	■	▲	■
Low Temperature Processability	●	●	●	●	●	▲	▲
Optical Properties	●	■	■	■	■	■	▲
Co-processability with Hydrocarbons	●	●	●	●	●	▲	▲

- ▲ Optimum performace - generally recomanded
- Depends on product grade or application
- Generally not recomanded

HPF from Guarniflon Spa are gathered under 3 main product families:



D-TEKBLUE

D-TEKBLUE is a FDA approved blue PTFE detectable using optical scanner, metal detection equipment or X-ray equipment, whatever the type of food has been processed. This ensures that each fragment can be identified rapidly avoiding critical food contamination.

D-TEKBLUE KEY PROPERTIES:

- Blue in color
- FDA and EU 10/2011 approved
- Detectable by X-ray or metal detection equipment
- Easily machined

Whether you are looking at food processing, packaging, or conveying D-TEKBLUE is available in films, sheets, tubes, rods and machined parts.



PTFE G673

PTFE G673 is a new patented stainless steel filled PTFE developed to overcome surface finish problems after CNC and mechanical machining of standard SS filled PTFE.

Composed of a unique blend of PTFE and special SS 316L powder PTFE G673 defines new standard for PTFE compounds in terms of mechanical strength, toughness, elasticity, durability and surface finish.

PTFE G673 KEY PROPERTIES

<ul style="list-style-type: none">• Reduced cost of machining operation	<ul style="list-style-type: none">• Higher compression strength and reduced cold flow providing a leak-free material
<ul style="list-style-type: none">• Smooth surface finish after CNC machining	<ul style="list-style-type: none">• Better wear resistance in comparison to standard SS filled PTFE
<ul style="list-style-type: none">• Low porosity	<ul style="list-style-type: none">• Ideal for extreme temperature and pressure application
<ul style="list-style-type: none">• Higher elasticity in comparison to standard SS filled PTFE	<ul style="list-style-type: none">• FDA and EU 10/2011 approved