

**Improved solutions for energy industries
with Graphite Technologies**

GRAPHITE HYDROGEN FUEL CELLS PLATES



Materials

**GT-KELITE+
GT-FLON
GT-OXY FLON**



Graphite Technology

www.graphite-technology.com

Welcome to Graphite Technology's world

Graphite Technology is a company specialized in all types of graphite equipment for chemical processes industries including fuel cells. Graphite Technology has developed a comprehensive range of designs to cut plant processing costs and improve reliability thanks to customized materials and major technology improvement in design.

Graphite Technology designs, manufactures and implements tailor-made constructions to solve heat exchangers problems, corrosion issues, and improve process efficiency.

Our Mission

Thanks to our knowhow in engineering, construction, manufacturing and services, our aim is to offer and supply to you perfect process systems, equipment and components made of graphite for the harshest operating conditions. Elevated temperature, high corrosion, pressure,....

We are manufacturing impregnated plain graphite plates for the highest electrical conductivity, highest current density requirement under our brand **GT CELL**

Our products are used for ...

- chemical process industries (chemical, metallurgy)
- fuel cells modules



Graphite Material

The word graphite originated from Ancient Greek "graphein", means "write".

Graphite, a synthetic or a natural form of carbon, is usually produced at temperatures above 3000°C.

Graphite has a high melting temperature of 3500°C and is an excellent conductor of heat and electricity.

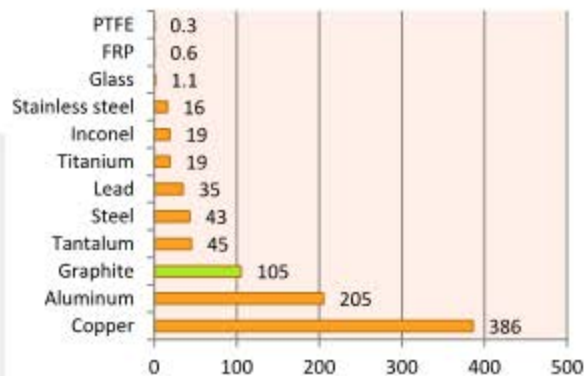
Graphite is usually in the form of a black soft solid bonded in layers.

Graphite is characterized by its high level of corrosion resistance and its thermal conductivity which are much greater than most comparable corrosion resistant materials, metallics or composites.

Manufacturing process, of graphite raw material, requires a lot of energy during compression, baking and graphitization. A very long process which can take several months.



Comparison of thermal conductivity (W/m.°C)



Each producer of raw graphite has its own specifications and formulations which are tailored for final application.

We select and test into pilot equipment the graphite which will give the best balance between electrical conductivity, resistance to corrosion, thermal and mechanical shocks.

Our unique "ultrafine grain" (down to 5µm size) with very high mechanical and thermal strength, high thermal conductivity withstand the harshest operating conditions.

Impregnated Graphite

Impregnation of graphite will give imperviousness property. This process will not degrade the electrical conductivity of the graphite, as air from inner porosity is replaced by resin. On the contrary, some resins may bring improvement in electrical behavior on the long term due to protection from local sparks.

We are using proprietary resin and latest technology to ensure optimized properties. This process is not a coating but a deep penetration of resin into the open porosity of graphite microstructure.

Three grades of impregnated graphite, using two different resin types to cover most fuel cells applications.

Our GT-FLON and GT-OXY FLON show extraordinary corrosion properties outclassing traditional phenolic/epoxy resin impregnated graphite.



* typical values

	GT-KELITE+	GT-FLON	GT-OXYFLON
Applications	PEMFC	PEMFC with oxidative media	PEMFC with Very oxidative media
Graphite grain size (mm)	0.043 - 0.005	0.020- 0.005	0.020- 0.005
Impregnant type	Epoxy Phenolic	Fluoropolymer	Fluoropolymer
Density	1.89	1.92	1.92
Flexural strength (MPa – ASTM C651)	43.0 - 50.0	32.0 - 42.0	32.0 - 42.0
Compression strength (MPa – ASTM C695)	118.0 - 159.0	91.0 - 130.0	91.0 - 130.0
Volume resistivity (Ω.cm) ASTM D257)	9.0-11.0	9.0-11.0	9.0-11.0
Max permissible material temperature (°C)	170	300	300
Recommended for	Traditional fuel cells conditions / MTBF 10-20,000 hours	Frequent thermal cycling, high temperature. Oxidative media/long life time >MTBF 20,000 hours	Frequent thermal cycling, high temperature. Oxidative media/long life time >MTBF 50,000 hours

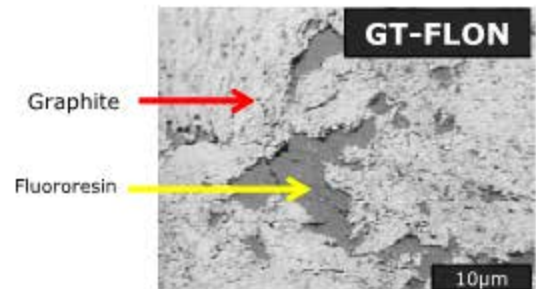
GT-FLON® & GT-KELITE® are registered trademark

GT-FLON & GT-OXY FLON® for oxidative media & high temperature

We developed grades having exceptional corrosion, electrical and surface properties. Unlike competition, our material is impregnated at core and is not a superficial coating.

The penetration of fluororesin around grain of graphite allow a very stable and long-term electrical properties. Our unique process bring exceptional corrosion and thermal resistance compared to traditional epoxy phenolic resin impregnation. We own a unique process of manufacture. It allows to ensure the longest lifetime of bipolar plates of the market.

Micrography of our impregnated graphite



Machining and testing

We machine final product according to your design.

Thickness of plates down to 1.6mm.

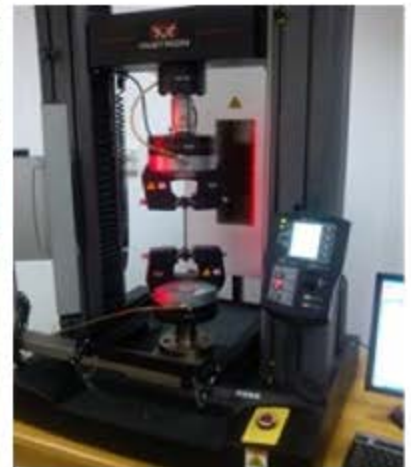
Big dimensions available (up to 600mmx600mm).

High precision machining and dimensional analysis.

Huge stock of raw material.

Tests done according to customer requirement (permeability, corrosion, strength....)

In-house laboratory for quality control and R&D.



Our R&D team can help you to select the right material grade. For specific request we can also proceed to tests in lab or in your plant to define the optimized material for your process.

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