Technical Description

PyroXide PX6111B

Thermo-Structural Composite

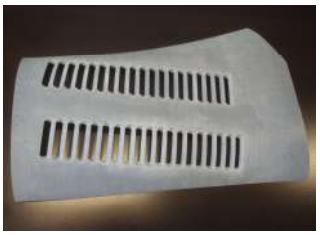
www.high-temperature-composites.com

PyroXide is a new oxide composite technology. Thank to it, we are capable to manufacture easily complex shapes of composite parts resisting to extremely high temperatures. They feature a long-term temperature resistance of up to 1000°C (1800°F). They can also be used at temperatures in excess of 1400°C (2550°F) on a short-term or intermittent basis.

After 2000 hours of exposure at 1000°C, PyroXide retains 100% of its mechanical properties.

This new composite technology is based on proprietary advanced oxide matrix reinforced with alumina fibers.

In addition to its outstanding resistance to heat, a distinctive property of this material is its ability to be initially processed at low temperatures, with techniques similar to those used for carbon fiber reinforced polymers (CFRP). This convenient and unique approach pioneered by Pyromeral Systems not only reduces lead times and complexity for the production of high temperature composite parts, but also improves affordability, from prototype manufacturing to full scale production.



Features:

- Proprietary glass-oxide matrix (patented in 2019)
- Reinforcement based on Al_2O_3 fibres
- Initial cure conducted at temperatures lower than 150°C (300°F)
- Environment-friendly

Advantages:

- Lightweight
- Long-term service temperature up to 1000°C (1800°F)
- Short-term service temperature in excess of 1400°C (2550°F)
- Retention of good mechanical properties at elevated temperatures
- Compatible with large and complex shapes
- Quick implementation

Typical applications for PyroXide include heatshields, thermal protection systems, components of exhaust systems, semi-structural components and other composite parts that simultaneously require low weight, good mechanical properties and resistance to heat or fire. PyroXide composites are typically used for weight reduction purposes as a replacement for steel or Inconel in areas where the temperature resistance requirements would exceed the limits of composites with polymer matrices. PyroXide composites can be combined with other materials (insulating materials, honeycomb, coatings or CFRP) to form hybrid composite parts with tailored thermal and mechanical properties. PyroXide material retains RF (Radio-frequencies) transparency from ambient temperature to elevated temperature, which makes it an useful solution for very high speed vehicles.

Industries Served:

- **Aerospace**
- **Defense**
- **Special Industries**

Updated: 05/02/2025

Material characteristics

Property	Values
Matrix	Alumino-phosphatic matrix
Fibre type	Nextel 610 / 1500 derniers
Chemical composition	α Al_2O_3
Weaving	DF11 / Satin-8 / 370 g/m²

OVERVIEW OF PROPERTIES

Alumina Fabric – 2D – 0/90 Lay-Up

Property	25°C / 77°F	800°C / 1500°F
Density	2.5 g/cm^3	
CTE	8.0 x 10^{-6} m/m.K	
Thermal Conductivity	2 W/m.K	2.4 W/m.K
Specific Heat	1.1 to 1.2 (600°C to 1000°C) (KJ/kg.K)	
Tensile Strength	270 MPa	210 MPa
Tensile Modulus	75 GPa	70 GPa
Compressive Strength	210 MPa	-
Compressive Modulus	80 GPa	-
Flexural Strength	350 MPa	220 Mpa (150 MPa @ 1100°C)
Flexural Modulus	70 GPa	-
Dielectric Constant (ε')	5.0	-
Interlaminar Shear Strength	15-17 MPa	
Porosity	~ 20%	

The data in this table reflects typical properties. Actual properties depend on the grade and processing methods used for sample preparation

Pyromeral Systems
13 rue d'Ognon
60810 Barbery – France
commercial@pyromeral.com

Pyromeral Technology
933 Kifer Road.
Sunnyvale, CA 94086.
HighTempinfo@pyromeraltechnology.com