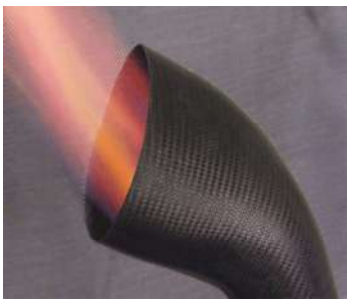
Product Overview

PyroSic

Thermo-Structural Composites
(1000°C / 1832°F)

www.high-temperature-composites.com



PyroSic is a composite material specifically developed for lightweight structural parts exposed to heat or fire. PyroSic composites are based on advanced glass-ceramic matrices (patented) reinforced with silicon carbide fibers. They feature a long-term temperature resistance of up to 650°C (1200°F). They can also be used at temperatures in excess of 1000°C (1800°F) on a short-term or intermittent basis.

In addition to their outstanding resistance to heat, a distinctive property of these materials is their ability to be 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 ceramic matrix based on thermoset inorganic polymers
- Reinforcement based on thermally-stable silicon carbide fibers
- Compatible with cost-effective tooling materials commonly used for CFRP
- Environment-friendly

Advantages:
- Long-term service temprature of up to 650°C (1200°F)
- Short-term service temperature in excess of 1000°C (1800°F)
- Retention of good mechanical properties at elevated temperatures
- Excellent fire, smoke and toxicity (FST) performance
- Compatible with large and complex shapes

Typical applications for Pyrosic include heat shields, fire barriers, thermal protection systems, ducts, tubes, components of exhaust systems and other composite parts that simultaneously require low weight, good mechanical properties and resistance to heat. PyroSic composites are typically used for weight reduction purposes as a replacement for steel, inconel or titanium in areas where temperature resistance requirements would exceed the limits of composites with polymer matrices.

Recent developments in electrified new mobility solutions like e-VTOL require solution to protect the vehicles when batteries burn due to thermal runaway. PyroSic brings a lightweight solution to this kind of issue where lightweight and thin protections to flames are required. As an example, PyroSic material passes the kerosene flame test (FAA AC 20-135 / ISO2685), 15' with only 0.6 mm of thickness. And it retains more than 90% mechanical properties after the test.

Industries Served:

- **Motorsports / Special cars**
- **Aerospace**
- **Defense**
- **eVTOL / UAM / New mobilities**

PyroSic parts are commercially available directly from Pyromeral Systems, which operates three autoclaves, one hydraulic press, and one filament winding machine and several ovens and furnaces at its facilities.

Updated: 05/02/2025

OVERVIEW OF PROPERTIES

Glass-Ceramic Matrix Composite
SiC Fabric – 2D – 0/90 Lay-Up

Property	25°C / 77°F	650°C / 1202°F
Density	1.84 – 2.00 g/cm^3	
CTE	3.0 x 10^{-6} m/m.K	
Thermal Conductivity	0.9 W/m.K	1.2W/m.K
Tensile Strength	320 MPa	300 MPa
Tensile Modulus	55 – 60 GPa	35 – 56 GPa
Compression Strength	290 MPa	-
Compression Modulus	65 GPa	-
Flexural Strength	410 – 430 MPa	350 – 380 MPa
Flexural Modulus	55 – 60 GPa	35 – 48 GPa

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

Fire Resistance

PyroSic composites meet the requirements
Of the FAA AC 20-135 and MIL-STD-2031 for Fire Safety

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