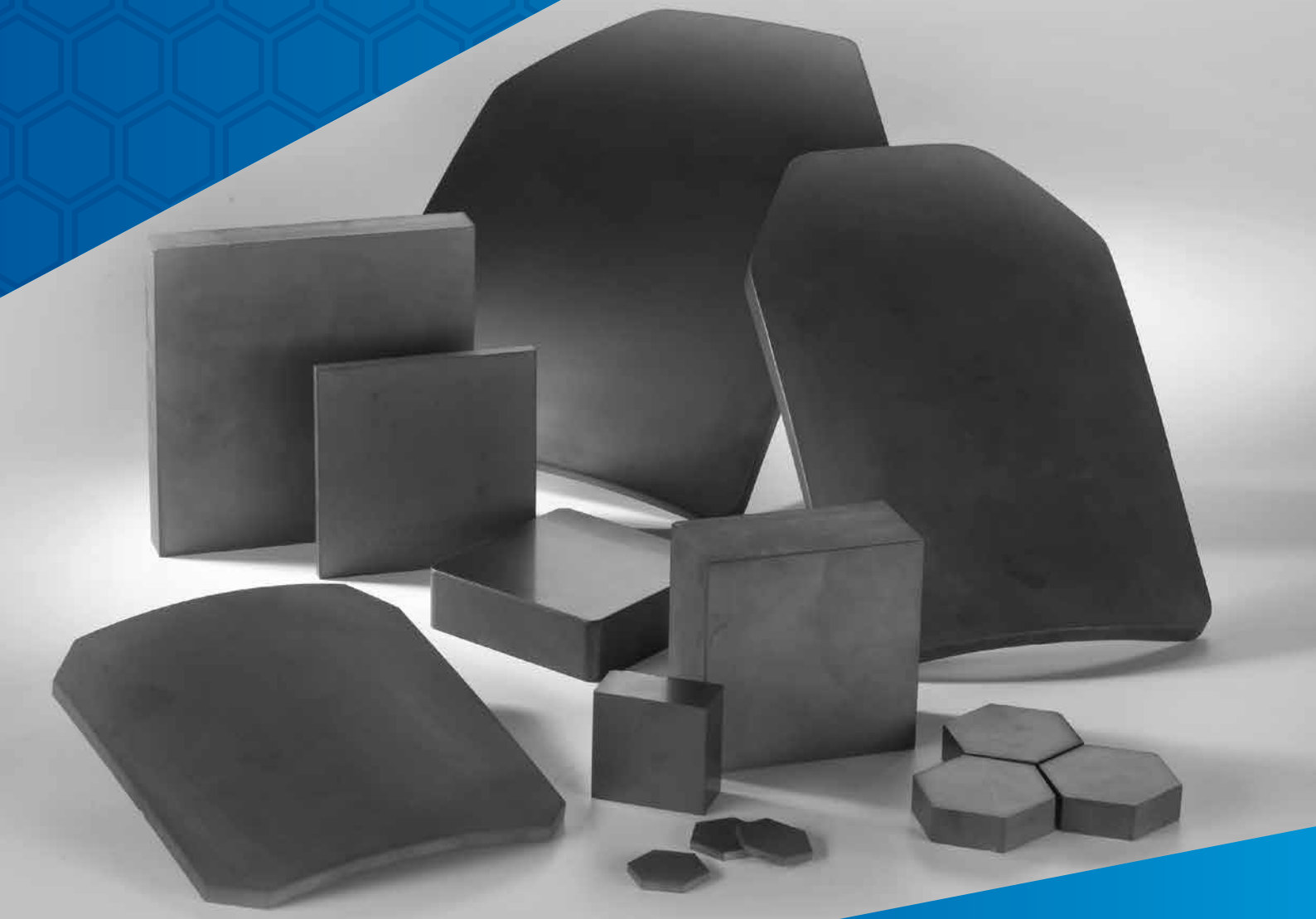
SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

PROTECTIVE CERAMIC MATERIALS

MAXIMUM PROTECTION - MINIMUM WEIGHT



SAINT-GOBAIN

BALLISTIC PROTECTION

TAILOR-MADE MATERIALS & SOLUTIONS

Saint-Gobain Performance Ceramics & Refractories is a global leader in supporting composite armor systems, offering unparalleled design flexibility with the most innovative and consistent ceramics on the market. Our high-performance, lightweight ceramic materials are designed for the utmost performance in modern ballistic protection.

Advanced silicon carbide and boron carbide materials have been instrumental in protecting military, law enforcement and security professionals for over 50 years. We continue to develop and produce industry-leading protective materials today, supplying ceramic armor to governments and agencies for military and law enforcement personnel globally.

BENEFIT FROM THESE ADVANTAGES:

- Custom engineering to customer specifications
- Co-development options
- Consistent high-quality manufacturing
- Extensive worldwide capacity
- Robust export compliance
- Rapid prototyping
- Global R&D resources

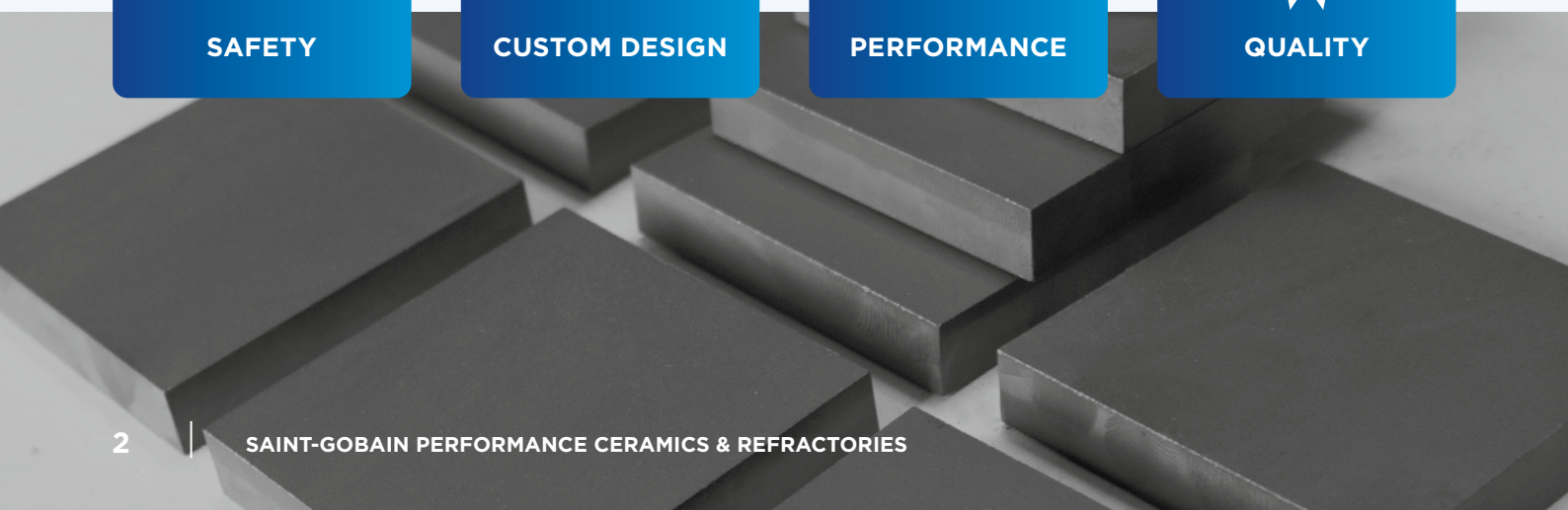
OUR MATERIALS DELIVER VALUE

With over 125 years of experience with silicon carbide (SiC), today we leverage production capability in North America, Europe and Asia to support customers globally. Our material capabilities include:

- Sintered SiC
- Sintered SiC-B_4C
- Bonded SiC
- Hot pressed B_4C

WE PROVIDE PROTECTIVE CERAMIC MATERIALS DESIGNED TO MEET YOUR NEEDS

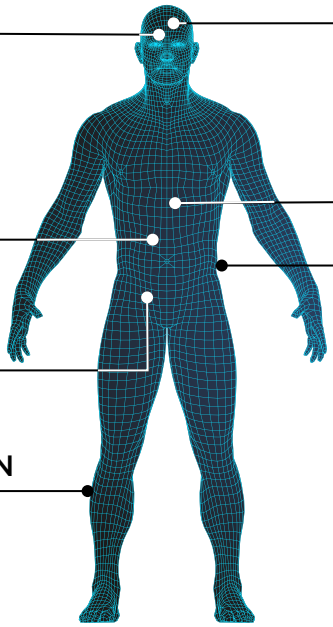
- SAFETY
- CUSTOM DESIGN
- PERFORMANCE
- QUALITY



BODY PROTECTION

MULTIPLE SHAPES
AVAILABLE

The core competence of Saint-Gobain Performance Ceramics & Refractories is the synthesis of expertise and leading production technology that reduce weight and improve reliability, safety & comfort.
Our high performance ceramic solutions increase the ballistic performance for personnel protection. Our leading production technology allows us to flexibly supply both prototype samples and large series-production quantities.



HELMET ADD ON
Hexoloy®
Forceram®

HELMET
Forceram®

SHIELD
Forceram®

TORSO PLATE
Hexoloy®
Forceram®

WAIST PLATE
Hexoloy®
Forceram®

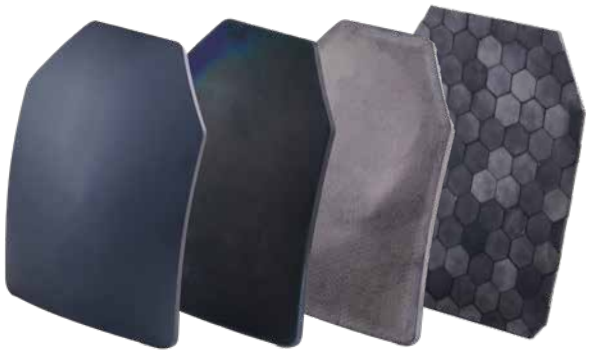
SIDE PLATE
Hexoloy®
Forceram®

LOWER BODY PROTECTION
Hexoloy®
Forceram®

TORSO PLATES

100%
QUALITY ASSURANCE

Saint-Gobain Performance Ceramics & Refractories' torso plates offer superior protection performance in a range of scenarios. Multi and single curve plates are available to accommodate a wide range of current military and law enforcement designs.



BENEFITS

- Superiour single & multi-shot protection
- Net shape components
- High hardness
- Co-development options

Ceramic-based inserts are able to meet the standards of higher safety classes, like Military, NIJ and Special Threat specifications and standards.

VEHICLE ARMOR

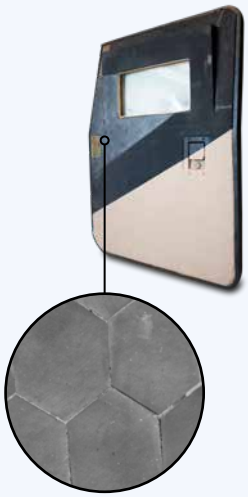
PROTOTYPES & LARGE-VOLUME SERIES AVAILABLE

High-performance, lightweight ceramic materials from Saint-Gobain Performance Ceramics & Refractories are designed to offer protection in extreme scenarios.

Panels are designed from a variety of shapes, including hexagons, squares and rectangles. Our forming capabilities ensure a suitable solution is available for any need, including unique machined tiles that accommodate complex shapes, holes and angles.

BENEFITS

- **Outstanding multi-shot protection**
- **Net shape components**
- **Complex, highly machined parts**



VEHICLE MOSAIC TILES

Hexoloy®

The mosaic-like structure of ceramic tiles for each part of the vehicle made of specialized elements gives protection systems the special ability to stop multiple threats.

FLOOR & SIDE PANELS

Forceram®

Panel kits and large panels available with 20″ x 20″ capacity.

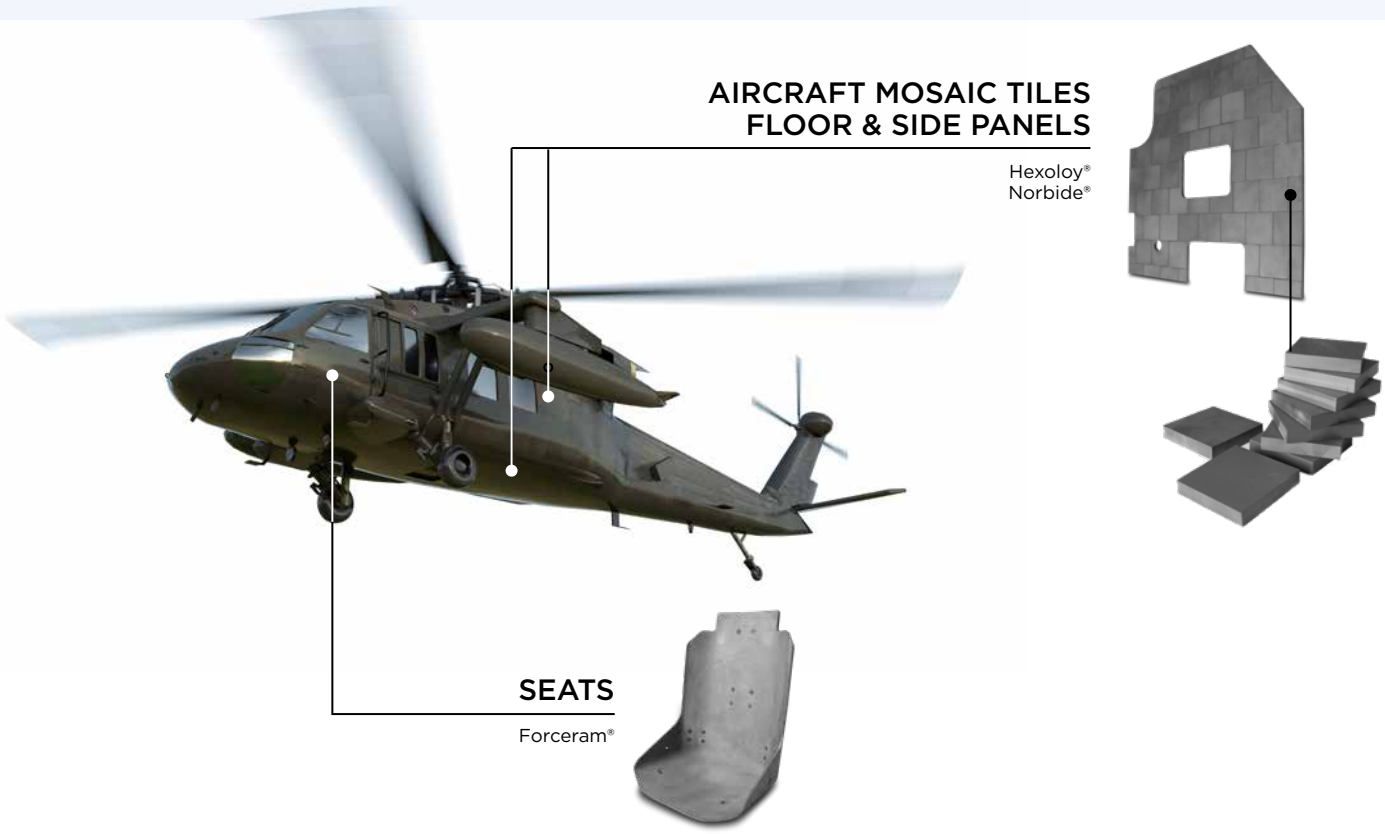
AIRCRAFT ARMOR

Saint-Gobain Performance Ceramics & Refractories' silicon carbide and boron carbide ceramic tile armor assemblies protect fixed-wing and rotary-wing aircraft. All AC-130U gunships incorporate Hexoloy® SA sintered silicon carbide tiles.

Our application engineers are available to assist you with your technical project in designing cost effective high performing products that will meet your need now and in the future.

HEXOLOY® & NORBIDE® BENEFITS

- Excellent multi-hit protection
- Kitting & assemblies available
- Lightweight

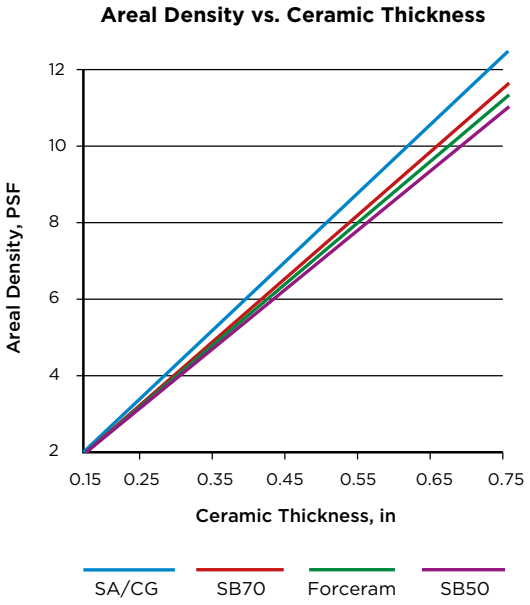


CUSTOM DESIGNED, CO-DEVELOPED AND MANUFACTURED FOR PROTECTING GOVERNMENTS AND AGENCIES FOR MILITARY AND LAW ENFORCEMENT

DISCOVER OUR ENTIRE PRODUCT RANGE

Saint-Gobain Performance Ceramics & Refractories' extensive portfolio of ceramic materials is available in all shapes and sizes, which meet or exceed Military NIJ and Special Threat specifications.

Family	FORCERAM®		HEXOLOY®				NORBIDE®
Brand	FORCERAM® O-SiC	FORCERAM® N-SiC	HEXOLOY® SA	HEXOLOY® CG	HEXOLOY® SB70	HEXOLOY® SB50	
Features	Diverse size & shape capability Multi-Hit	Diverse size & shape capability Multi-Hit	Industry-leading performance	Multi-Hit	Light Weight Multi-Hit	Light Weight Multi-Hit	Lightest Weight
Composition (Phases)	Bonded SiC	Bonded SiC	Sintered SiC	Sintered SiC	Sintered SiC-B_4C	Sintered SiC-B_4C	Hot Pressed B_4C
Density, g/cc	2.85	2.80	3.15	3.15	2.89	2.75	2.50
Hardness, kg/mm^2(Knoop)	1,100	1,200	2,500	2,500	2,300	2,300	2,800
Flexual Strength, MPa(4 pts bending)	125	160	380	410	320	300	425
Elastic Modulus, GPa	240	250	430	410	320	300	440
Fracture Toughness, MPam$^{1/2}$	2.7	3.6	3.0	3.5	3.5	3.7	3.1



The above graphic is offered as a comparison of the weights of our ceramic materials

GLOSSARY OF TERMS

Ceramics	Inorganic, non-metallic materials
Sintered	High-temperature (usually >2500°F/1400°C) bonding of powder into a solid form without melting
SiC	Silicon Carbide, a ceramic compound of elements silicon (Si) and carbon (C)
B_4C	Boron Carbide, a ceramic compound of elements boron (B) and carbon (C)
Bonded SiC	Method of sintering silicon carbide with the assistance of other material additives
Density	Mass of material divided by volume
Hardness	Ability to withstand wear before permanent damage is done
Flexual Strength	Resistance to deformation and breaking when a bending force is applied
Elastic Modulus	Measure of non-permanent deformation when force is applied
Fracture Toughness	Amount of energy (not force) that can be absorbed before breaking

SAINT-GOBAIN 2023

Derwent Top 100 Global Innovator 2023
Clarivate Analytics

top EMPLOYER GLOBAL 2024

1 IN 4
PRODUCTS
did not exist 5 years ago

160,000
EMPLOYEES

47.9 BILLION
SALES IN 2023

REPRESENTED IN **76**
COUNTRIES

CO_2
-34 %
CARBON EMISSIONS REDUCTION
(vs. 2027)

8
MAIN R&D CENTRES

OUR PURPOSE

MAKING THE WORLD A BETTER HOME.

OUR MISSION

Saint-Gobain designs, manufactures and distributes materials and solutions which are key ingredients in the well-being of each of us and the future of all.

WE ARE COMMITTED TO BEING CARBON FREE BY 2050

SAINT-GOBAIN

PERFORMANCE CERAMICS & REFRACTORIES

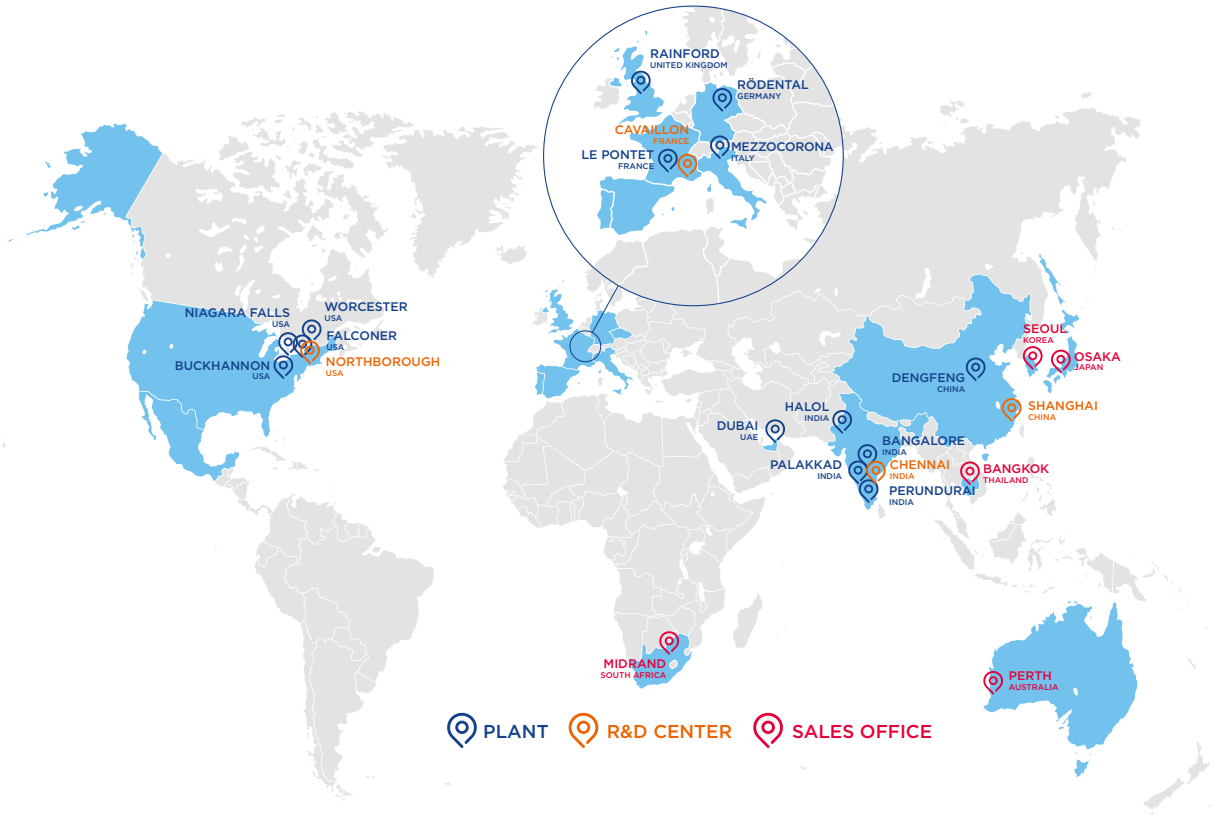
OUR MISSION

To design, develop and **supply solutions** and **services** for **extreme operating industrial conditions.** Our **engineered ceramics** and **refractory** products are manufactured to the **highest industrial standards** and deliver **enhanced performance** while **minimizing environmental impact.**

PIONEERING CERAMIC SOLUTIONS FOR EXTREME INDUSTRIAL APPLICATIONS AND A GREENER WORLD.

SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

OUR GLOBAL PRESENCE



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