

SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

PROTECTIVE CERAMIC MATERIALS

**MAXIMUM PROTECTION -
MINIMUM WEIGHT**




SAINT-GOBAIN

VALUE PROPOSITION

BALLISTIC PROTECTION

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.

**TAILOR-MADE
MATERIALS & SOLUTIONS**

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

Robust export compliance

Co-development options

Rapid prototyping

Consistent high-quality manufacturing

Global R&D resources

Extensive worldwide capacity

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

Bonded SiC

Sintered SiC-B₄C

Hot pressed B₄C

WE PROVIDE PROTECTIVE CERAMIC MATERIALS DESIGNED TO MEET YOUR NEEDS



SAFETY



CUSTOM DESIGN



PERFORMANCE



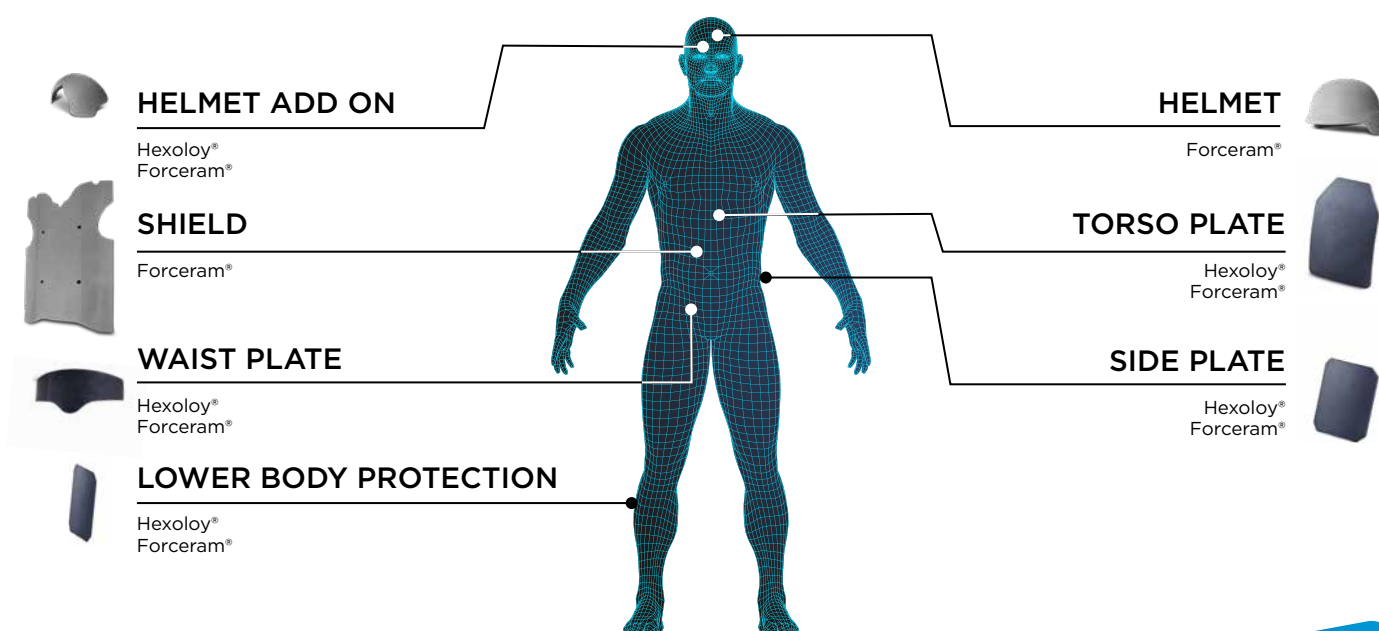
QUALITY

BODY PROTECTION

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.

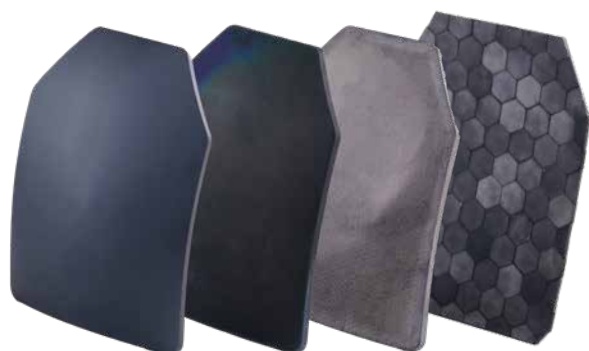
**MULTIPLE SHAPES
AVAILABLE**



TORSO PLATES

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.

**100%
QUALITY ASSURANCE**



BENEFITS

- Superior 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

VEHICLE ARMOR

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

**PROTOTYPES &
LARGE-VOLUME SERIES
AVAILABLE**

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



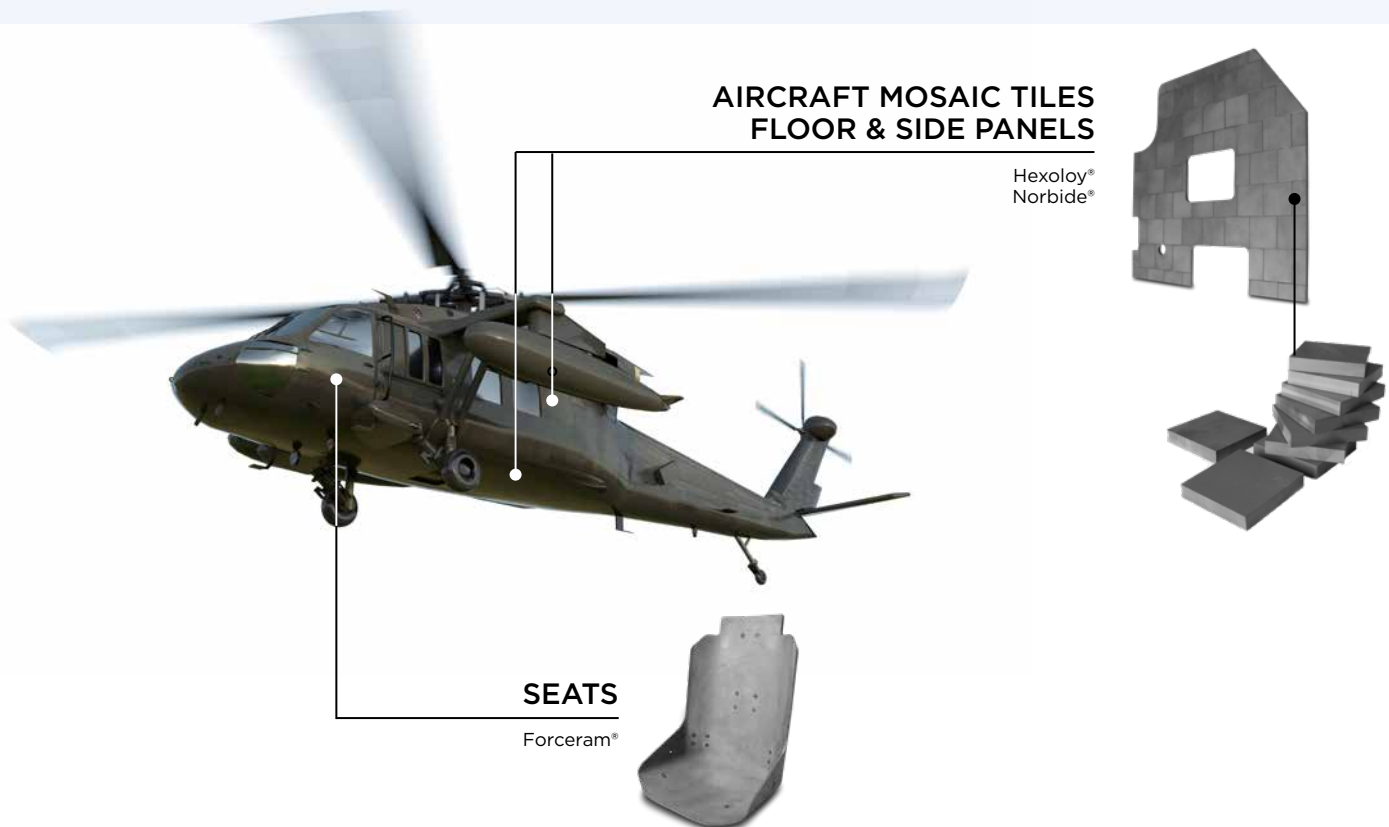
Excellent multi-hit protection



Kitting & assemblies available



Lightweight



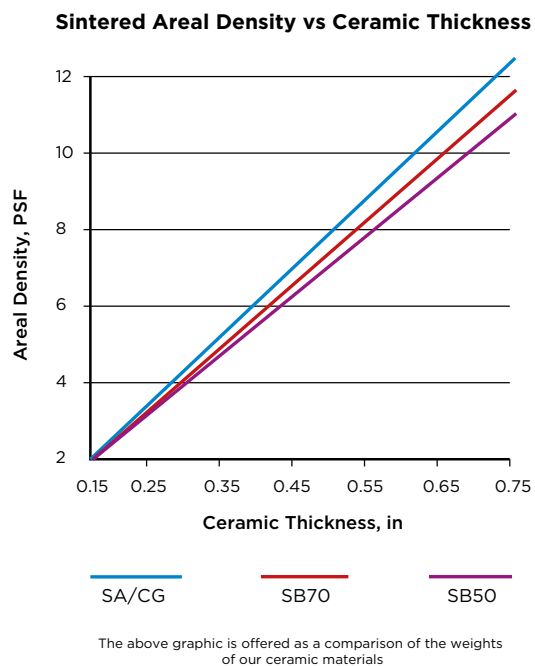
CUSTOM DESIGNED, CO-DEVELOPED
AND MANUFACTURED FOR PROTECTING
GOVERNMENTS AND AGENCIES FOR MILITARY
AND LAW ENFORCEMENT

OUR MATERIALS

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
Product Type	Bonded SiC	Bonded SiC	Sintered SiC	Sintered SiC	Sintered SiC-B ₄ C	Sintered SiC-B ₄ C	Hot Pressed B ₄ C
Density	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
Flexural Strength, MPa (4 pts bending)	125	160	380	410	320	300	425
Elastic Modulus, GPa	240	250	430	410	320	300	440



GLOSSARY OF TERMS

Ceramics	Inorganic, non-metallic materials
Sintered	Product resulting of high-temperature consolidation of a powder into a solid form without melting
SiC	Silicon Carbide, a ceramic compound of elements silicon (Si) and carbon (C)
B₄C	Boron Carbide, a ceramic compound of elements boron (B) and carbon (C)
Bonded SiC	Product resulting of high temperature consolidation of a SiC powder into a solid form with the assistance of other material additives used to create a bonding phase
Density	Mass of material per unit of volume
Hardness	Resistance of a material to localized plastic deformation
Flexural Strength	Resistance of a material to breaking under a bending stress
Elastic Modulus	Resistance of a material to being deformed elastically (i.e., non-permanently) when a stress is applied

SAINT-GOBAIN 2023

Derwent
Top 100
Global Innovator
2023

Clarivate
Analytics



1 IN 4

PRODUCTS
did not exist 5 years ago



160,000

EMPLOYEES



47.9 BILLION

SALES IN 2023



REPRESENTED IN 76

COUNTRIES



-34 %

**CARBON EMISSIONS
REDUCTION**
(vs. 2017 on scope 1+2)



3

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
ACHIEVING NET ZERO
CARBON EMISSIONS BY 2050**

SAINT-GOBAIN

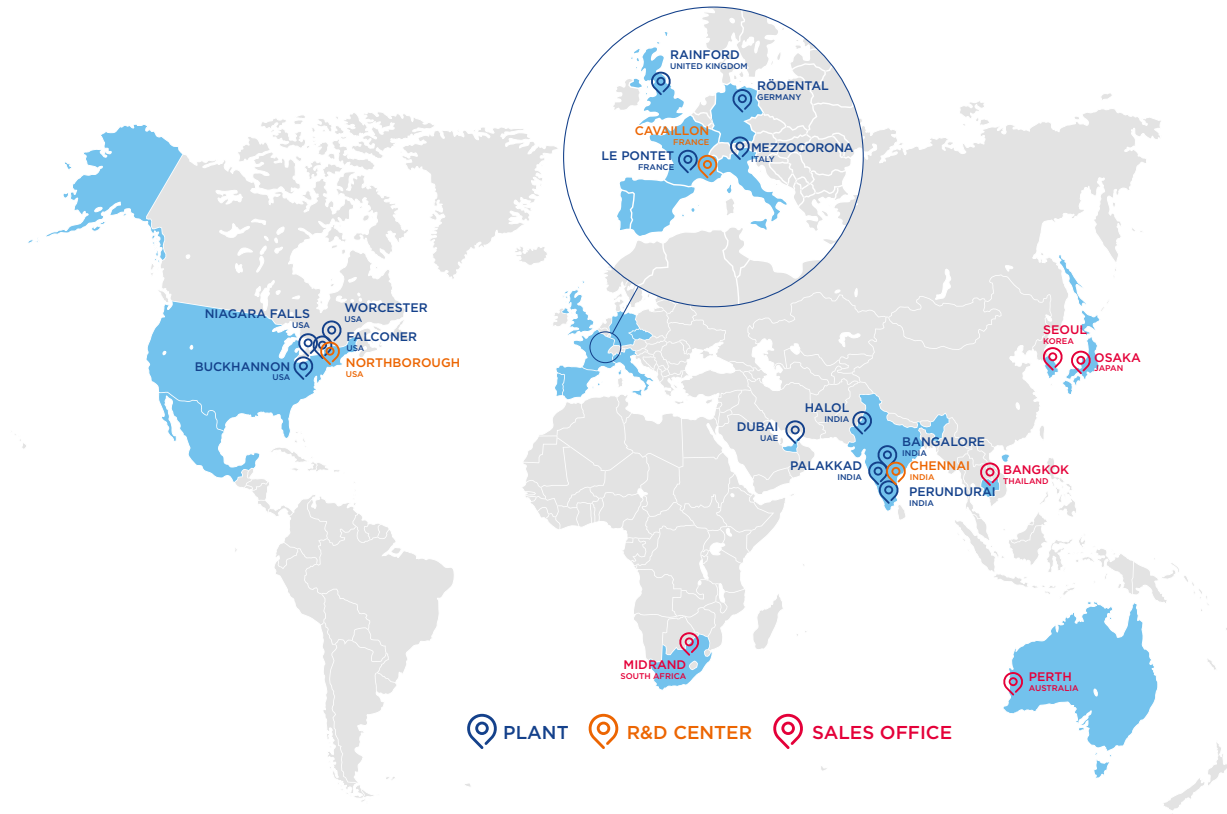
PERFORMANCE CERAMICS & REFRACTORIES

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.

OUR GLOBAL PRESENCE



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