SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

CARBON BLACK

SOLUTIONS FOR CARCASS AND TREAD REACTORS

SAINT-GOBAIN

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. 2017 on scope 1+2)

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 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.

SOLUTIONS FOR CARBON BLACK REACTORS

Saint-Gobain Performance Ceramics & Refractories has been supplying complete refractory linings to carbon black reactors for over three decades and is a preferred supplier globally. Our custom engineered solutions for hot face and backup layers in tread and carcass black reactors include:

- Alundum® AH199, AL100, Alfrax® 101 high-purity alumina bricks
- Thermal shock resistant Mullfrax® and AL 102 bricks
- Ziral™ and Zirnorite® zirconia bricks for the highest temperature capability
- Fused-Cast Jargal M shapes for ultimate erosion resistance
- Insulating and dense castables

YOUR BENEFITS

- EXTENDED LIFETIME
- THERMAL SHOCK RESISTANT
- MINIMIZED MAINTENANCE
- INCREASED EFFICIENCY
- RESISTANT TO EROSION AND CORROSION

EXTREME TEMPERATURE & HIGHLY EROSION RESISTANT REFRACTORIES FOR CARCASS AND TREAD REACTORS

Saint Gobain supplies refractory solutions worldwide to all major carbon black processes.

The furnace operator starts the dialogue by defining the operational conditions required to produce the grade of black desired. Reactor temperatures, reactor geometries, fuel source(s), feed source(s) are all significant starting factors. Operating conditions vary by furnace zone. The different zones have unique challenges in regards to their atmosphere (oxidizing or reducing), gas velocities, chemical interactions, and temperature fluctuations. Saint Gobain works closely with furnace operators to provide refractory solutions best suited to meet the performance and cost goals of the operator. Lining solutions are customized by material form and grade:

Material forms: bricks, specialty shapes, precast shapes, fused cast shape, and castables

Material grades: Aluminas and Zirconias.

General experience is noted below.

1 COMBUSTION CHAMBER

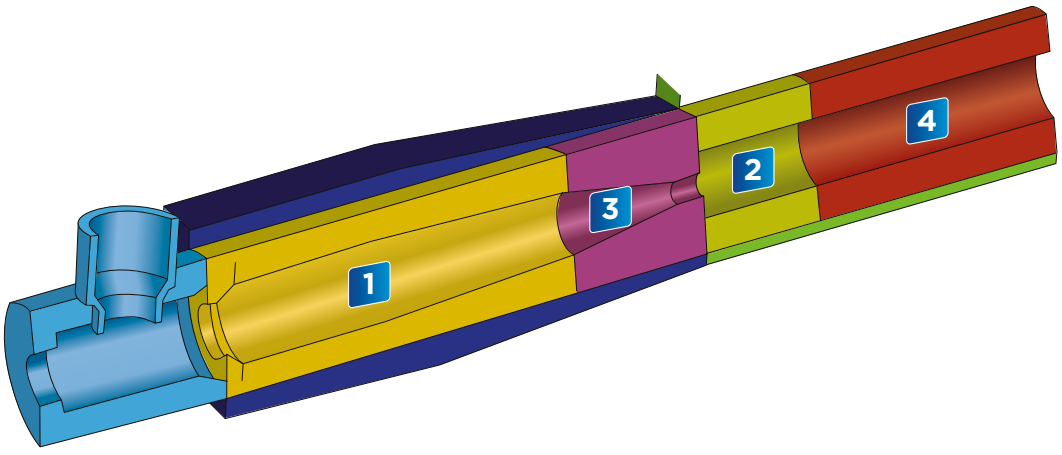
Hot face:
99% alumina bricks: AL 100, AH 199H
Zirconia bricks: ZH192

Backup layer:
Bubble alumina castable: RI34/CA333

2 REACTION ZONE

Hot face:
99% alumina bricks: AL 100, AH 199
90% alumina bricks: Mullfrax® 202 HF

Backup layer:
Bubble alumina castable: RI34/CA333
Dense alumina castable Supcast/CA334



3 CHOKE

Hot face:
Monocriram
High alumina bricks: AL 100, AH 199 H
Fused Cast Alumina: Jargal M

Backup layer:
Bubble alumina casable: RI34HR/CA333

4 QUENCH ZONE

Hot face:
90% Alumina bricks: Mullfrax® 202 HF, MSR2
High Alumina bricks: AL 102 / AL102 V

Backup layer:
Bubble alumina castable RI34HR/CA333
Dense alumina castable Supcast/CA334

ALUMINA | ZIRCONIA REFRACTORIES FOR CARBON BLACK						
	Al_2O_3 [%]	Others (%)	Density g/cm³ (lb/ft³)	Porosity (%)	Shape Design	Benefits
AL100	99.50	< 0.5	3.32 (207)	16	Standard and special design bricks	Excellent erosion resistance
AH199H	99.55	< 0.4	3.30 (206)	16	Standard and special design bricks / blocks	Excellent erosion resistance
AL102	96	3.0 (ZrO_2)	3.25 (203)	16	Standard and special design bricks	High thermal shock resistance
Mullfrax® 202	87	< 10 (SiO_2)	2.80 (175)	18	Standard and special design bricks	High thermal shock resistance
Monocriram	98	< 2.0	3.25 (203)	17	Preshaped block	Choke sections in single block shape
Jargal M	95	<4.0 (Na)	3.54 (221)	4	Fused cast preshaped block	Outstanding erosion and chemical Resistance
ZH 192		92.66 (ZrO_2)	4.43	22	Standard and Special Design	High Temperature Capability

MONOLITHICS FOR CARBON BLACK						
	Basis	Al_2O_3 [%]	Fe_2O_3 (%)	CaO (%)	Density g/cm³	Cold Crushing Strength Mpa (1)
CA333	Bubble alumina	95.68	0.13	3.9	1.6	20.7
CA334	Corundum	94.7	0.2	4.5	2.88	24
RI34	Bubble Alumina	98.5	0.1	-	1.55	10
SUPCAST	Corundum	95	0.2	4	2.95	50

(1) as cast and dried for castables

VALUE PROPOSITION

TAILOR-MADE MATERIALS & SOLUTIONS

HIGH PERFORMANCE REFRACTORIES

Saint-Gobain Performance Ceramics & Refractories (PCR) has been designing and manufacturing high performance refractories for demanding atmosphere furnaces for over 70 years. Our team of application engineers, material scientists and design engineers understand the conditions in atmosphere furnaces and can help you choose the correct material for your application.

BENEFIT FROM THESE ADVANTAGES:

- **Custom engineering to customer specifications**
- **Consistently high-quality manufacturing**
- **Extensive worldwide capacity**
- **Robust export compliance**
- **Manufacturing locations on multiple continents**
- **Global R&D resources**

OUR SERVICES

INNOVATION

Research & development team stationed at our leading-edge R&D centers in Europe, North America and Asia; specialize in ceramic & refractory technology and constantly interact with customers & industry experts while using the most progressive and multidisciplinary technologies.

DESIGN & ENGINEERING

Customized solutions including refractory drawings, adjusted design and modeling capabilities to help minimize maintenance/relining frequency.

PARTNERSHIP

Experienced application teams offer assessments, working in partnership with customers to explore material science and shape capability available from a world leading refractory manufacturer.

CUSTOMER SUPPORT

Experienced, dedicated teams work closely with customers, either in person or remotely via the most advanced digital platforms.

MAKING THE WORLD A BETTER HOME

OUR COMMITMENT

BEING CARBON FREE BY 2050

OUR AMBITION

To provide solutions to our customers that contribute to de-carbonization and reduce environmental footprint.

SUSTAINABILITY AT THE HEART OF OUR BUSINESS STRATEGY

Sustainability is a key tenet of modern environmental, social, and corporate governance (ESG). At Saint-Gobain Performance Ceramics and Refractories, our business model directly contributes to critical ESG outcomes with a dual approach to sustainable development goals: Minimizing our environmental footprint while maximizing our virtuous impact across the entire value chain.

OUR 2030 OBJECTIVES

WATER

- 50% Industrial water withdrawal

0 water discharge in area with extremely high water risk

CO2 EMISSIONS

- 33% reduction in scope 1 and scope 2 emissions

- 16% reduction in scope 3 emissions

CIRCULAR ECONOMY

- 80% non valorized production residue

+ 30% avoidance of virgin raw material

100% recyclable packaging with 30% recycled or bio-sourced content

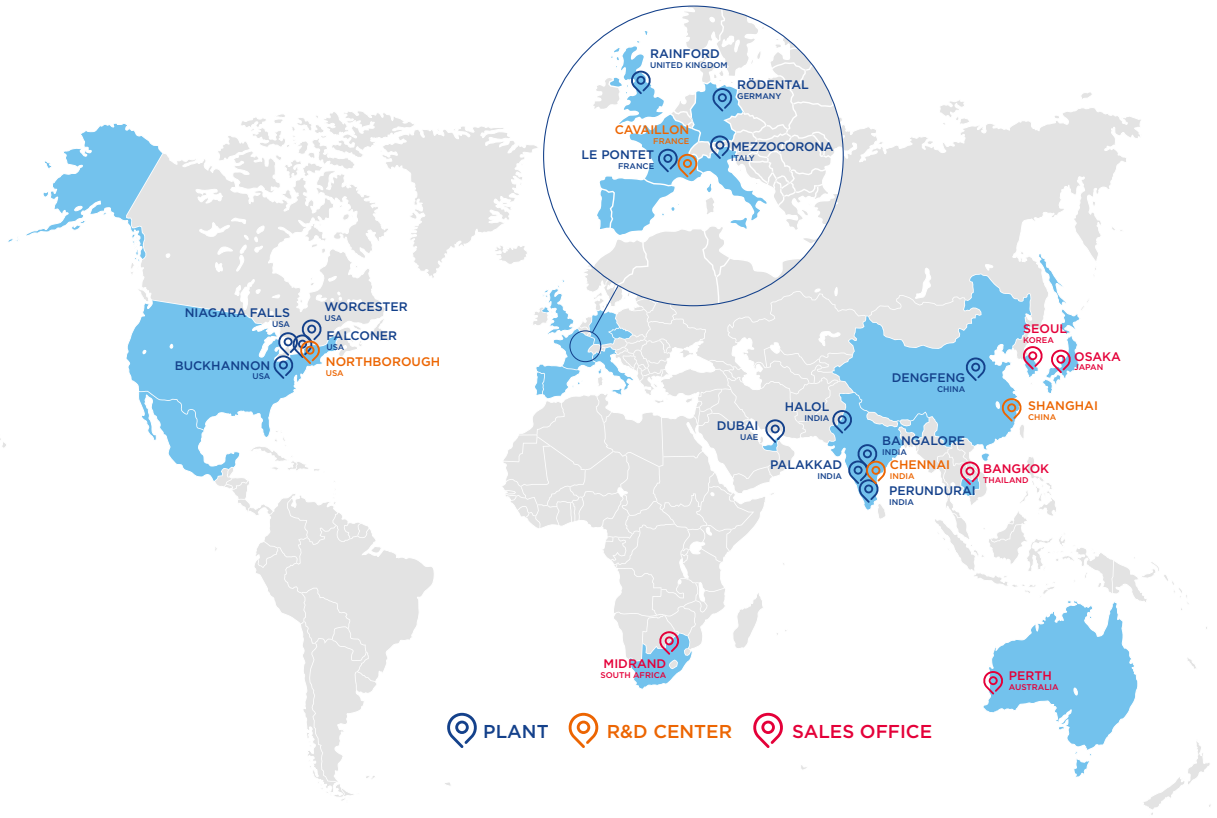
PRODUCT STEWARDSHIP

100% Life Cycle Analysis for all of Group product ranges

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

SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

OUR GLOBAL PRESENCE



CONTACT US

USA

Niagara Falls
+1 716 278 6233
Worcester
+1 508 795 5264
Falconer
+1 716 483 7222

MIDDLE EAST & AFRICA

Dubai (UAE)
+971 4 8011800

EUROPE

Rainford (United Kindom)
+44 1744 882 941
Rödental (Germany)
+49 9563 724 201

INDIA

Bangalore
+ 91 7228 950 887
Halol
+ 91 7228 950 886

PACIFIC

Perth (Australia)
+61 394 745 940

JAPAN

Osaka
+81 6 4707 1700

CHINA

Dengfeng
+86 4008880198
Shanghai
+86 4008880198

ASIA

Seoul (Korea)
+82 2370 693 34
Bangkok (Thailand)
+66 61 415 9204

For more information:
www.ceramicsrefractories.saint-gobain.com
ceramics.refractories@saint-gobain.com

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