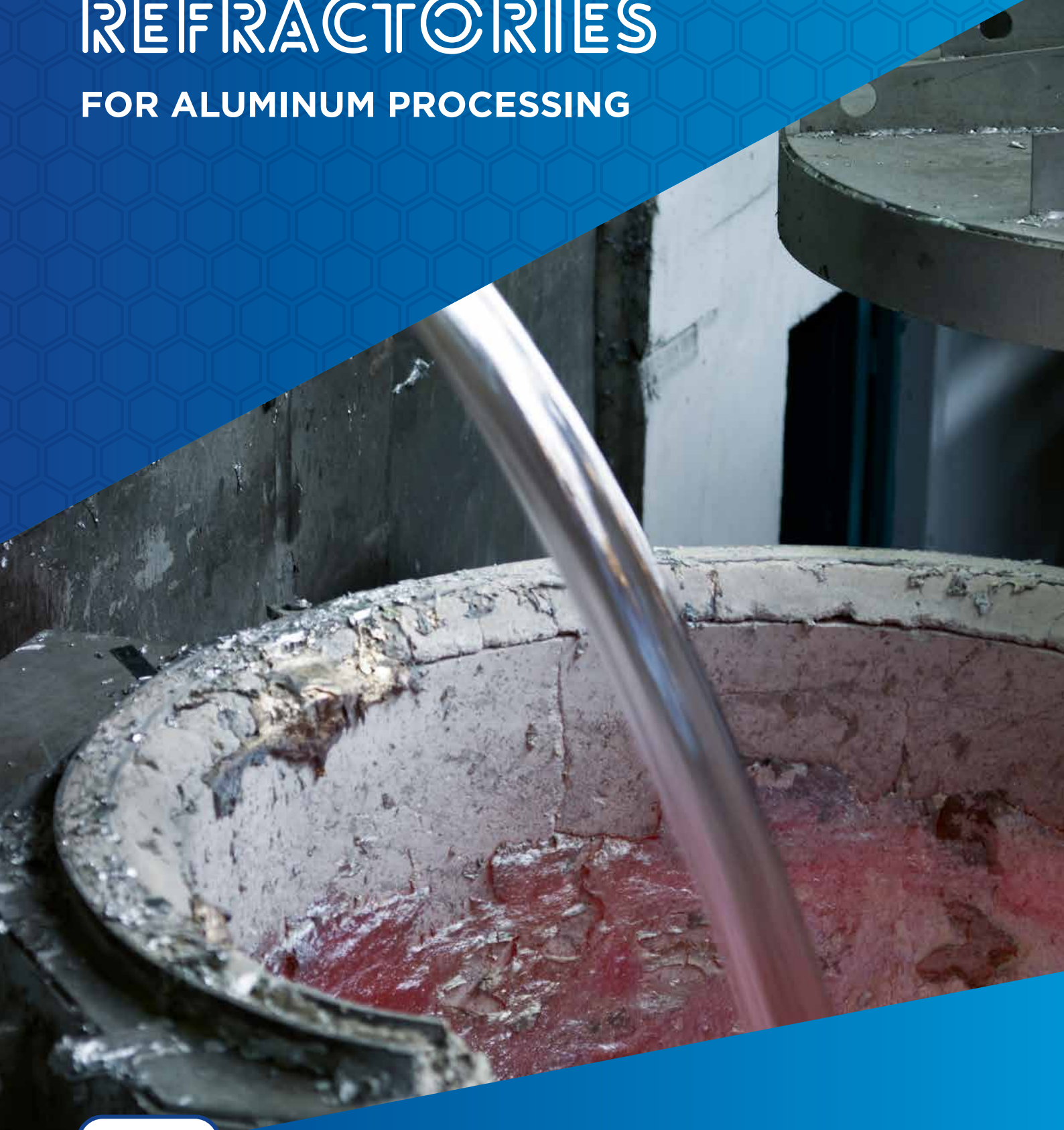


SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

# REFRACTORIES

## FOR ALUMINUM PROCESSING





# SAINT-GOBAIN 2024

Derwent  
Top 100  
Global Innovator  
2024

 Clarivate  
Analytics

 **top**  
EMPLOYER  
Global  
2025  
FOR A BETTER WORLD OF WORK



**46.6**

in euro billion  
2024 sales



**161,000**

employees



Represented in

**80**

countries

## WE ARE COMMITTED TO ACHIEVING NET ZERO CARBON EMISSIONS BY 2050



**1,100**

manufacturing  
facilities



**-34%**

Scope 1 & 2 CO<sub>2</sub> Emissions  
(2024 vs. 2027)



**8**

main  
R&D centers

# PIONEERING CERAMICS FOR A BETTER TOMORROW

# EFFICIENT RESULTS




## MAXIMIZE EQUIPMENT INVESTMENT AND SERVICE LIFE WITH NON-FERROUS REFRACTORY DESIGNS FROM SAINT-GOBAIN

Saint-Gobain non-ferrous metallurgy solutions deliver unparalleled corrosion, oxidation and chemical resistance to improve service life and performance under the harshest operating conditions.

Primary and secondary non-ferrous metallurgy processes require engineered refractory solutions to deliver the cleanest metal while achieving an extended and consistent service life. With years of experience, as well as a strong dedication to R&D to innovate new materials, Saint-Gobain will deliver completely customized solutions for any challenge.



### BENEFITS

-  **Energy efficiency**
-  **Longer service lifetime**
-  **Minimized shutdown**

# OUR MATERIALS

## FOR PRIMARY & SECONDARY APPLICATIONS

Reduce oxide impurities and corrosion while achieving maximum furnace longevity with high-quality oxy-nitride and nitride bonded SiC from Saint-Gobain. Nitride bonded SiC refractories, Advancal® and Refrax® ARC, have become the reference material for the sidewall lining of modern aluminum reduction cells.

Our Advancal® aluminium reduction cell material offers extended service life through improved oxidation and corrosion resistance. All our products and solutions can be manufactured with the material that meets your need to the best.

Product name	Components
Refrax® ARC	Silicon nitride bonded silicon carbide
Advancal®	High oxidation resistant silicon nitride bonded silicon carbide
Cast Refrax®	Silicon nitride bonded silicon carbide with complex shape capability
Carbofrax® 8S	High thermal conductivity silicon carbide mortar
Jargal® M	Fused cast alumina for high purity metal
Cryston® Max	Ultra high oxidation silicon oxynitride silicon carbide
SpyroCor®	Ceramic radiant tube inserts to maximize heat release and reduce the gas consumption
Silit® SKD	Silicon infiltrated Silicon Carbide material
Carbofrax® CC1140	High thermal conductivity silicon carbide castable



# PRIMARY PROCESSING

## FEATURES & BENEFITS


	<b>Larger bath volume</b>		<b>Lower electrical conductivity</b>
	<b>Increased power</b>		<b>Superior oxidation resistance</b>
	<b>Lower thermal conductivity</b>		<b>Excellent erosion &amp; corrosion resistance</b>

## SIC CASTABLES

### CARBOFRAX® • ANNAPLAST®

Our castable protect the top of the sidewall block against oxidation and premature failure.



 **JARGAL® M**  
**Fused cast refractories for Aluminum Linings**  
The good capability of this material allows for the manufacture of many products and many complex-shaped pieces.

## SIDEWALL BLOCKS

### ADVANCAL® • REFRAX®

Our castable protect the top of the sidewall block against oxidation and premature failure.

## SIC MORTARS

### CARBOFRAX® • ANNAPLAST®

Carbofrax® 8S and Annaplast® APL 76 are formulated for our very well-known SiC mortars CBX 8S & APL 76 for cementing SiC sidewall blocks.





## LAUNDER SYSTEM

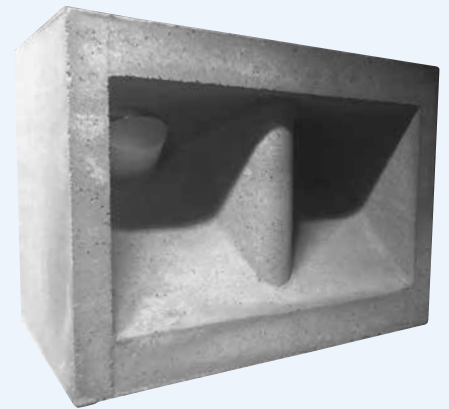
**REFRAX® • CARBOFRAX® • CRYSTON® MAX**

Laundry systems for aluminium transfer and casting.  
Saint-Gobain also provides pouring spouts and baffle plates.

## TAP HOLE BLOCKS

**REFRAX® • CARBOFRAX® • CRYSTON® MAX**

Designed to withstand continuous contact with molten aluminum, our single-piece tap hole blocks offer long-lasting resistance to wear and oxidation. Quick to install and fully compatible with hot face bricks and DryVibe linings, they ensure safe and efficient furnace operation.



## DEGASSING ROTARS

**CAST REFRAX®**

Refrax® rotors provide sustainable, chemical resistance for degassing unit components. High toughness and chemical inertness of our materials enhance your performance.

## IMMERSION HEATER TUBES

**CRYSTON® MAX • CRYSTON® NICARB •  
CRYSTON® CERTS • N-DURANCE®**

High density oxy-nitride silicon carbide tubes and flame diffusers offer superior cost-benefit. Cryston® Max materials offer the optimal thermal conductivity and chemical resistance to keep metal molten in aluminum degassing and holding units.



## SECONDARY PROCESSING

# RADIANT HEATER TUBES

### CRYSTON® NICARB

Our range of heater protection tubes have high mechanical integrity and homogeneity, together with high emissivity and thermal conductivity at elevated operating temperatures. NICARB material remains unchallenged on performance and value for arduous applications.

Our tubes provide an efficient way to electrically heat aluminium holding furnaces without risk of premature element failure due to aluminium splash and corundum growth, or heating by recuperative gas fired systems.



# THERMOCOUPLE TUBES / SHEATHS

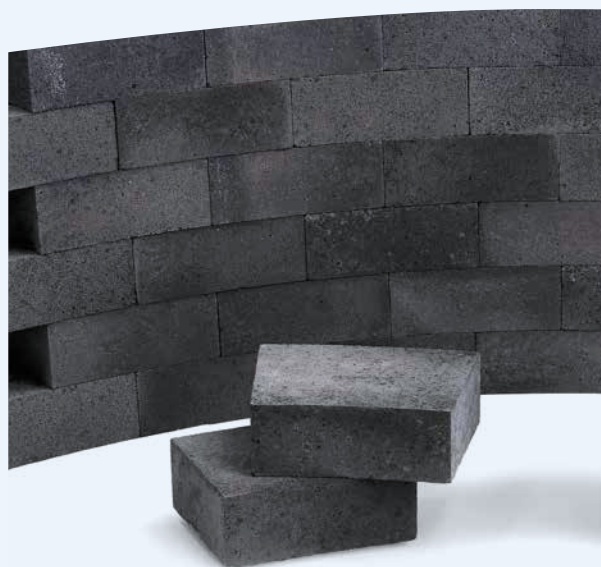
### CRYSTON® CERTS • REFRAOX® 20E CRYSTON® NICARB

Refrax® and Cryston® properties of excellent thermal shock, high thermal conductivity, chemical inertness and hot strength make it the ideal choice of material.

# HEARTH BRICKS

### CRYSTON® MAX

Cryston® Max hearth bricks provide excellent resistance to mechanical shock in loading areas of the furnace. Extend the time between furnace re-lines with our proven material.



# SPYROCOR® RADIANT TUBE INSERTS

These inserts can be easily retrofitted into existing radiant tubes to improve efficiency and bolster the amount of heat that the radiant tube is re-radiating into the furnace chamber. By implementing these inserts, users can experience energy savings of up to 15% or throughput improvements of up to 5%. Available for simple installation in straight, U-type, W-type, and tri-type radiant tubes. Also applicable in P-type and double-P-type radiant tubes.

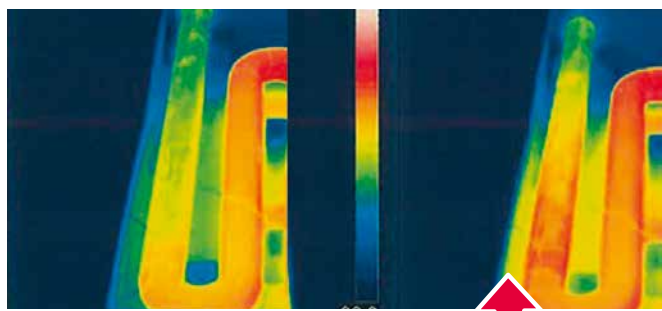
## FEATURES

- Patented twist fin design
- Absorbs heat energy
- Re-radiates heat back into the furnace
- 2 - 6 % throughput improvements

## BENEFITS

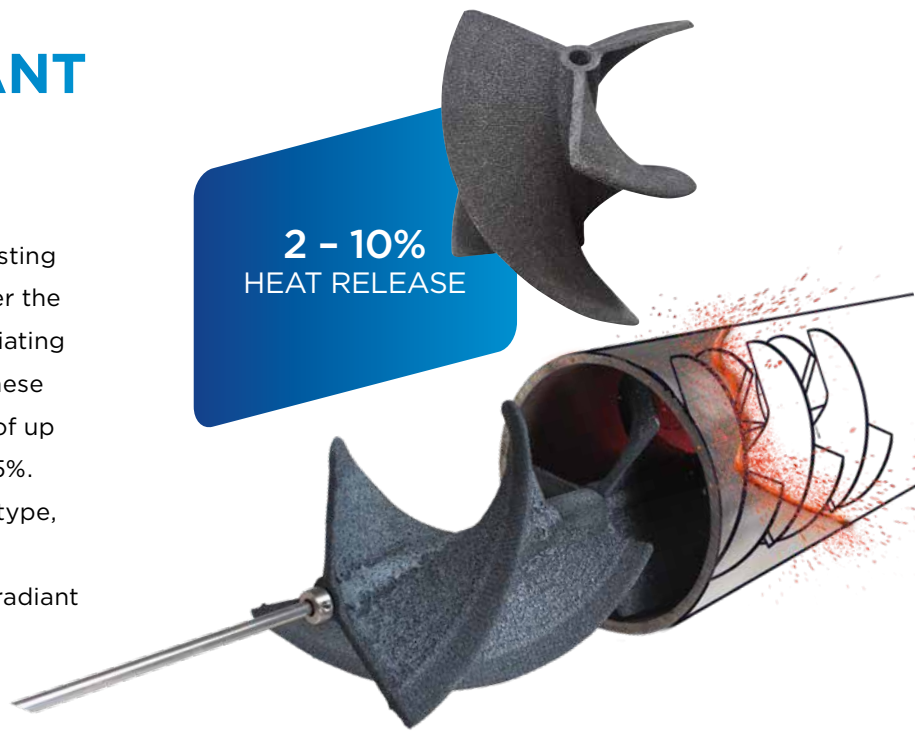


- Reduction of exhaust temperature
- Improved energy efficiency
- Reduction of polluting emissions



More heat into the furnace allows operators to reach YOUR desired temperature faster and boost throughput.

\*Energy savings represents an average at gas cost of \$4.00/MMBZU.

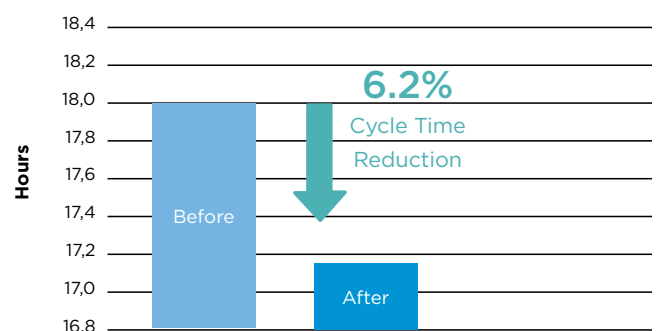
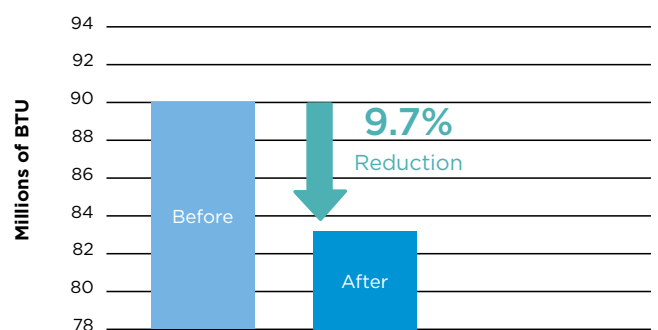


## CASE STUDY

Aluminum slab reheating furnace with W-type Radiant Tube & 567,000BTU/Hr burner

**Energy saving: 9.7%**  
**Additional capacity: +28 cycles / year**  
**ROI\*: 4 months**

### Natural gas consumed per furnace cycle





## SECONDARY PROCESSING

# HEATCOR™ RECUPERATOR

A 3D-printed ceramic recuperator that pre-heats combustion air for high efficiency burner performance.

ACHIEVE **80%+**  
COMBUSTION  
EFFICIENCY

### HEATCOR™

- Thin-wall silicon carbide offers the highest rates of heat transfer and thermal performance
- Variable twist and channel cross-section provides optimized efficiency with controlled pressure drop
- Working temperature up to 1,350°C

### BENEFITS



Excellent thermal conductivity



3x higher rates of heat transfer



Custom designs for optimizing application variability





# NOXBUSTER® RADIANT TUBE INSERT

NOxBuster® patented design permits the recirculation of flue gasses within the radiant tube.

UP TO **50%+**  
REDUCTION  
OF NOx EMISSIONS

## NOXBUSTER®

- Novel technology eliminates NOx at the source
- Safer and less costly than competing downstream solutions
- Low maintenance

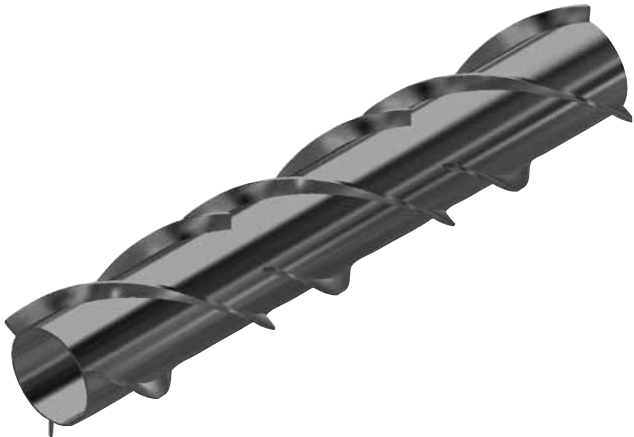
## BENEFITS



Significant energy and maintenance savings via hot-spot elimination



Combined with SpyroCor®, achieve temperature uniformity up to 83°C / 150°F



## PROPERTIES

# DISCOVER OUR ENTIRE PRODUCT RANGE

Saint-Gobain Performance Ceramics & Refractories' extensive portfolio of ceramic materials is available in many shapes and sizes.

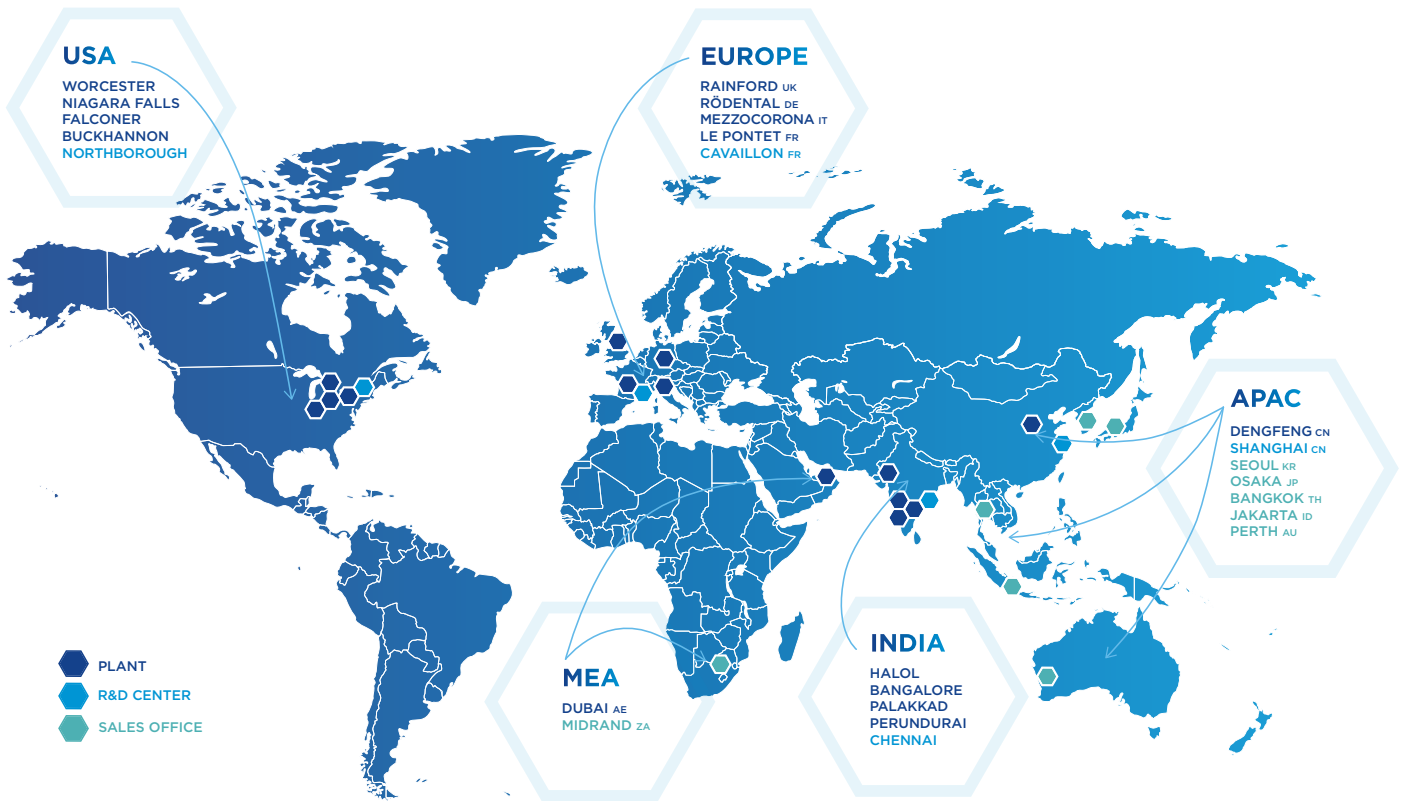
	SILICON CARBIDE (SiC)			
PRODUCT TYPE	SILICON NITRIDE BONDED SiC			OXI-NITRIDE BONDED SiC (patented mixture)
BRAND	REFRAX® ARC	ADVANCAL®	CAST REFRAX®	CRYSTON® MAX
Bulk Density (g/cm <sup>3</sup> )	> 2.58	> 2.6	2.6	2.62
Apparent Porosity (%)	17	< 19	15	16
Max. Service Temperature (°C)	1550	1550	1450	1590
Modulus of rupture at 20°C (MPa)	30	> 30	60	35
Modulus of rupture at 1350°C (MPa)	50	-	50	51 (1250°C) 41 (1450°C)
Thermal conductivity at 1000°C (W/mK)	18.5	-	13.8	-
Thermal expansion 20-1000°C (10 <sup>-6</sup> /K)	0.4	4.9	0.4	5 (up to 1500°C)
Cold crushing strength (MPa)	165	165	-	-
Thermal shock resistance	> 30 cycles	-	-	-
Features & Benefits	<ul style="list-style-type: none"> <li>high strength</li> <li>greater resistance to thermal shock</li> <li>exceptional resistance to abrasion and chemical attack</li> <li>unprecedented dimensional stability</li> </ul>	<ul style="list-style-type: none"> <li>commonly used for sidewall linings of Aluminium Reduction Cells</li> <li>exhibits high strength</li> <li>offers outstanding corrosion, chemical and oxidation resistance</li> </ul>	<ul style="list-style-type: none"> <li>chemically inert to most materials</li> <li>extreme hardness provides outstanding erosion resistance</li> <li>complex geometrical shapes</li> </ul>	<ul style="list-style-type: none"> <li>exceptional resistance to oxidation and chemical attack</li> <li>high strength and exceptional abrasion resistance</li> <li>deal for use in copper shaft and holding furnaces</li> </ul>

TYPICAL VALUES

			FUSED CAST MATERIAL
REACTION BONDED SILICON INFILTRATED SiC	MONOLITHIC CASTABLES		ELECTROFUSED ALUMINA
SILIT® SKD	CARBOFRAX® 8S	CARBOFRAX® CC1140	JARGAL® M
3.0	1900	2600	3.17
0	-	-	-
1380	1400	1450	> 1750
260	-	-	-
260 (1200°C)	18 (1400°C)	-	-
35	> 5 (800°C)	7	-
4.5	-	-	-
-	-	30 (110°C) 25 (3 hrs MST)	> 200
-	-	-	-
<ul style="list-style-type: none"> <li>high thermal conductivity, little to no apparent porosity, high mechanical strength, oxidation resistance</li> <li>products can be made in large sizes and complex shapes</li> <li>excellent as-fired dimensional accuracy</li> </ul>	<ul style="list-style-type: none"> <li>high purity, air setting monolithic bedding mortar</li> <li>used for the jointing of silicon carbide</li> <li>excellent strength and has the ability to operate over a range of temperatures</li> </ul>	<ul style="list-style-type: none"> <li>high purity silicon carbide based mortar</li> <li>excellent strength with increased temperature</li> <li>excellent choice as a general purpose castable where heat dissipation is required</li> <li>initially developed for non-ferrous applications</li> </ul>	<ul style="list-style-type: none"> <li>regular cast, electrofused 95% Al<sub>2</sub>O<sub>3</sub> (alpha-beta alumina)</li> <li>extremely low defect potential</li> <li>High resistant to alkali vapor and creep for superstructure application</li> <li>available in various shape and size</li> </ul>

# 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

### MEA (MIDDLE EAST & AFRICA)

**UAE**  
Dubai  
+971 4 8011800

### EUROPE

**Germany**  
Rödental  
+49 9563 724 201  
**United Kingdom**  
Rainford  
+44 1744 882 941

### INDIA

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

### APAC (ASIA-PACIFIC)

<b>Australia</b> Perth +61 409 288 901	<b>Japan</b> Osaka +81 6 4707 1700
<b>China</b> Dengfeng +86 4008880198 Shanghai +86 4008880198	<b>Korea</b> Seoul +82 2370 693 34
<b>Indonesia</b> Jakarta +62 811 1701 2480	<b>Thailand</b> Bangkok +66 2 700 9311

For more information:  
[www.ceramicsrefractories.saint-gobain.com](http://www.ceramicsrefractories.saint-gobain.com)  
[ceramics.refractories@saint-gobain.com](mailto:ceramics.refractories@saint-gobain.com)

Follow us on 



The information contained in this document is believed to be accurate and reliable but is provided without guarantee or warranty on the part of Saint-Gobain Performance Ceramics & Refractories. Process parameters and requirements can impact typical values and test methods. Further, nothing present herein should be interpreted as an authorization or inducement to practice any patented invention without an appropriate license. Saint-Gobain Performance Ceramics & Refractories Terms and Conditions apply to all purchases.

Copyright © 2025, Saint-Gobain Performance Ceramics & Refractories. All rights reserved.

