

SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

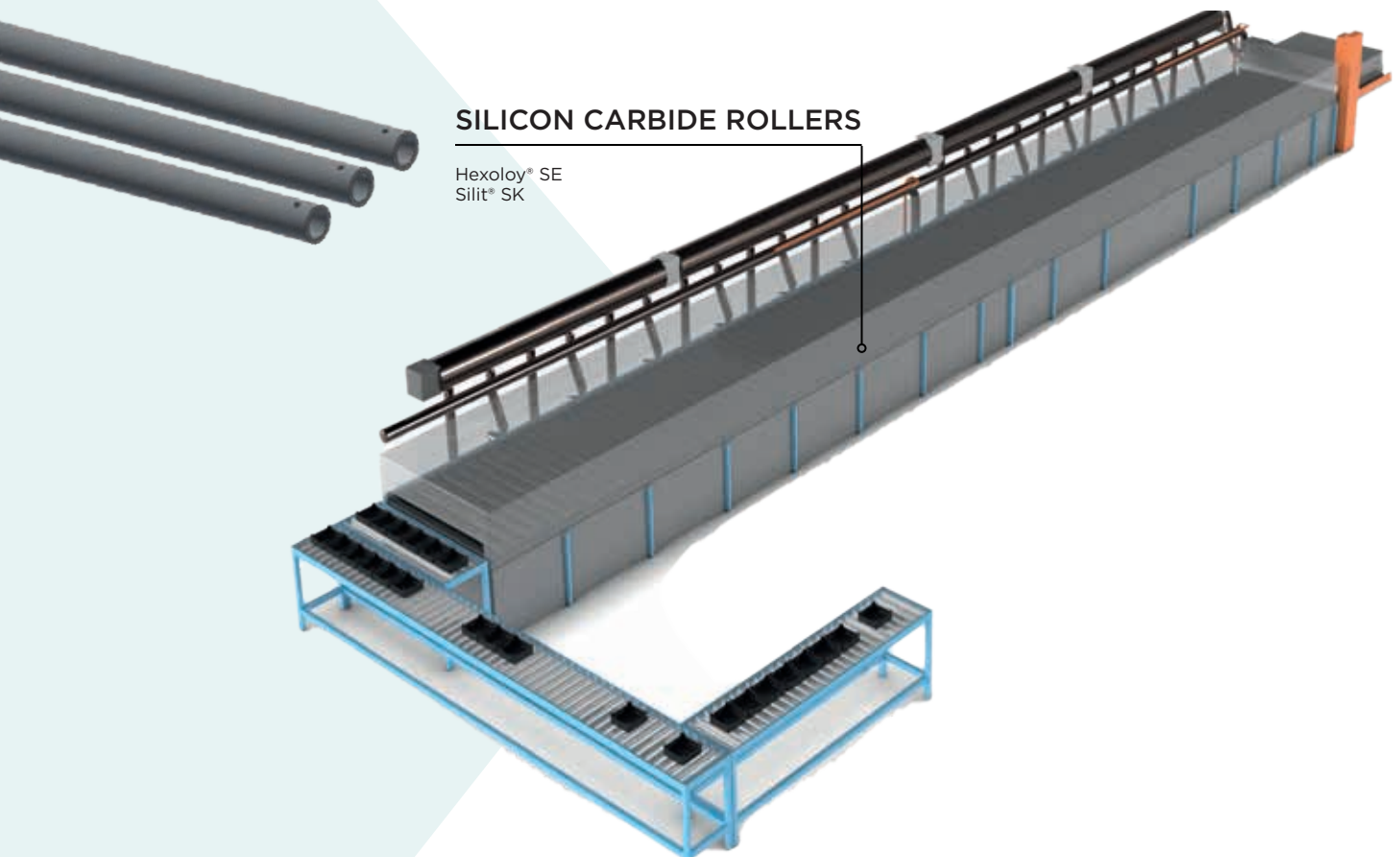
# CERAMIC ROLLERS

FOR LITHIUM-ION BATTERY CATHODE POWDERS



## NEXT GENERATION FOR ROLLER HEARTH KILNS

Lithium-ion batteries are ubiquitous in electric vehicles and storage, handheld electronics, medical equipment, power tools, and many other products. Suppliers must respond to this increasing demand by developing new battery chemistries for greater energy density while boosting recycling efforts and expanding battery production. Roller Hearth Kilns (RHK's) operating at high temperatures and caustic environments (atmosphere, volatilizing compounds, etc.) are critical to manufacturing the cathode powders required in lithium-ion batteries.



TAILOR-MADE  
MATERIALS & SOLUTIONS

We provide extruded rollers designed to meet your needs:



PRODUCTIVITY



QUALITY



SUSTAINABILITY

100%  
INSPECT

DIMENSIONAL  
LOAD TESTING  
TRACEABILITY  
LASER MARK

## EXTRUDED ROLLERS

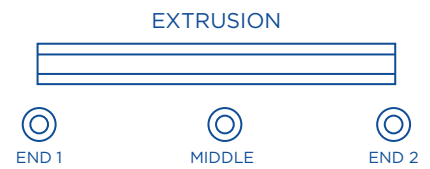
Saint-Gobain Performance Ceramics & Refractories' experienced engineers are on hand to support you in selecting and/or developing the most appropriate product and material for your applications.



### HIGH UNIFORMITY

Utilizing proprietary formulation and extrusion techniques, our rollers for Roller Hearth Kilns are manufactured and sintered creating a product with consistent wall thickness uniformity. What does this mean for the end user?

- Reduced lateral travel of saggars through the kiln
- Reduced impact and brakeage of rollers and saggars while in use
- Longer roller life and reduced kiln downtime due to roller maintenance



### IMPROVED QUALITY CONTROL

#### 4 POINTS ROTATIONAL DYNAMIC LOADING TEST

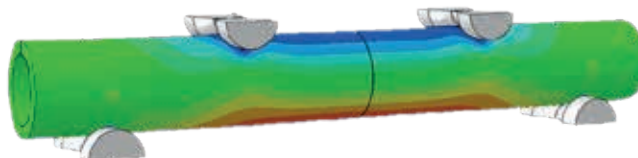
Saint-Gobain PCR has developed a exclusive quality control technique for measuring roller strength. End user benefits include:

- Reduced delivery of sub-standard parts
- Consistently high (and improving) roller strength/capacity
- Reduced frequency of breakages which can lead to kiln idling

#### TIGHTER TIR CONTROL BY LASER SYSTEM

Using a blue light laser measurement system, TIR is measured and controlled across the length for all rollers. This leads to:

- Necessary SPC data for process optimization and control
- Precise measurement data available for each roller shipped
- Low product variation upon delivery



## HEXOLOY® SE SILICON CARBIDE ROLLERS

Best-in-class Hexoloy® rollers offer distinct mechanical, thermal, and corrosion-resistant characteristics, delivering unparalleled performance. Hexoloy® rollers offer the ultimate level of high-temperature capability and mechanical strength when employed in roller hearth kilns operating above 1,500°C. This superior strength and length capability results in the highest kiln capacity and productivity.

up to **4000 mm length**  
and **70 mm diameter\***




\*Other dimensions on request.

## SILIT® SK SILICON CARBIDE ROLLERS

Best-in-class Silit® rollers offer distinct mechanical, thermal, and corrosion-resistant characteristics, delivering unparalleled performance. This trusted, reliable material technology helps reduce energy consumption and increase productivity for DPF/GPF filters, substrate manufacturing, and roller hearth furnaces used for the thermal treatment of lithium-ion powder mixes.




### SINTERED SILICON CARBIDE (SSIC)

#### FEATURES: HEXOLOY®

-  Outstanding chemical resistance
-  High service temperature (up to 1,750°C)
-  Excellent mechanical strength

### SILICONIZED SILICON CARBIDE (SiSiC)

#### FEATURES: SILIT® SK

-  Very good chemical resistance
-  High service temperature (up to 1,380°C)
-  High mechanical strength



50 KM+  
OF ROLLERS  
ALREADY  
SUPPLIED

## YOUR ADVANTAGES

Benefit from these advantages:

### BENEFITS



Excellent service life



Reduced maintenance requirements



Proven material technology



Large shape flexibility



100% inspection



Customized solutions

## OUR MATERIALS WITHSTAND

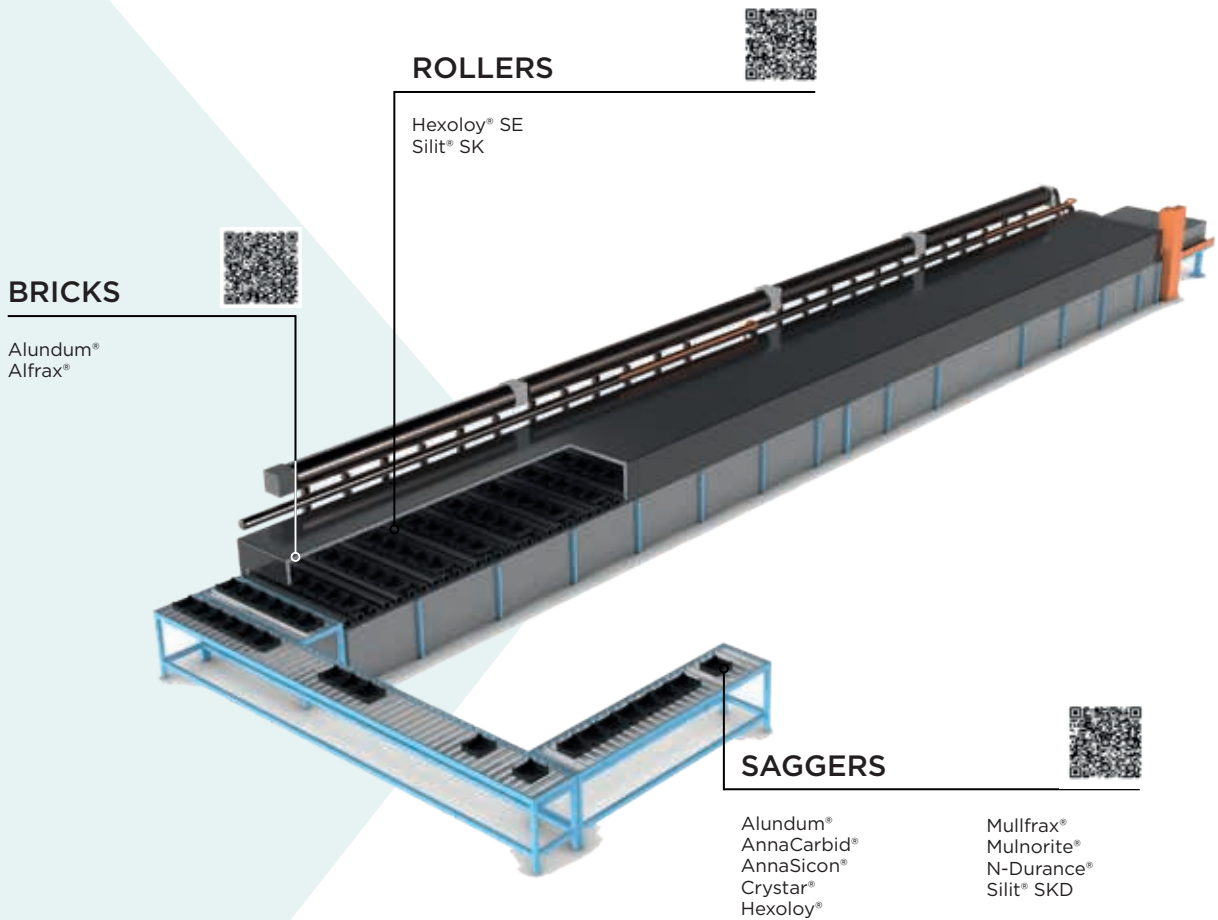
- thermal shock & temperature gradients
- corrosion due to Lithium source (LiOH, Li<sub>2</sub>CO<sub>3</sub>)
- automated handling & vibration

... AND MAINTAIN MECHANICAL STABILITY

Material	Sintered Silicon Carbide	Siliconized Silicon Carbide
Brand	HEXOLOY® SE	SILIT® SK
SiC, %	>98	85
Maximum Use Temperature, °C in air	1750	1380
Density, g/cc	3.05	3.00
Apparent Porosity, %	5.1	0
Modulus of Elasticity, RT°C, GPa	420	340
Flexural Strength, MPa RT 1400°C 1450°C	280 - 270	260 260 -
Thermal Conductivity, 1000°C, W/mK	34.8	35
CTE, /K, 1100°C	4.0x10 <sup>-6</sup>	4.5x10 <sup>-6</sup>

## DISCOVER OUR ENTIRE PRODUCT RANGE

Saint-Gobain Performance Ceramics & Refractories' products and solutions for kilns and furnaces are specifically designed and developed to facilitate consistent and long-term performance at high temperatures (up to 1,800°C) and under severe operating conditions.



## OUR COMPLETE PORTFOLIO OF SERVICES



### DESIGN & ENGINEERING

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



### INNOVATION

Research & development team stationed at our leading-edge R&D centers in Europe, North America and Asia are using the most progressive and multidisciplinary technologies.



### 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.

# SAINT-GOBAIN 2021



**1 in 4** products  
did not exist 5 years ago



**166.000+**  
employees



sales of  
**€ 44.2 billion**



represented in  
**75**  
countries



**-23%**  
carbon emissions  
reduction (vs. 2017 on scope 1+2)



**8**  
main R&D centres

## 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.

## OUR PURPOSE

**MAKING THE WORLD A BETTER HOME.**



**WE ARE COMMITTED TO BEING CARBON FREE BY 2050.**

# SAINT-GOBAIN

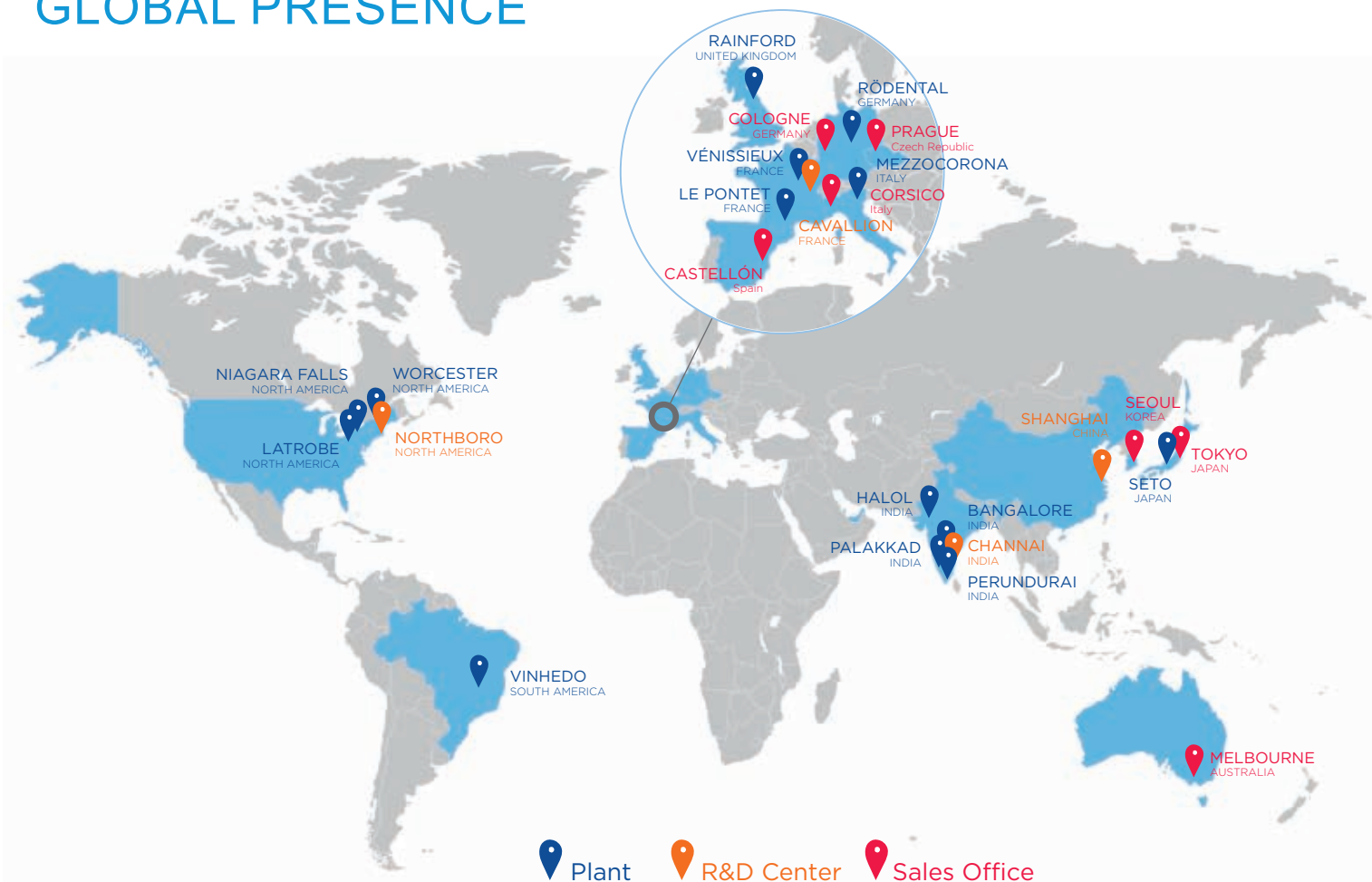
## PERFORMANCE CERAMICS & REFRACTORIES

### 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.**

# GLOBAL PRESENCE



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PERFORMANCE CERAMICS & REFRACTORIES

