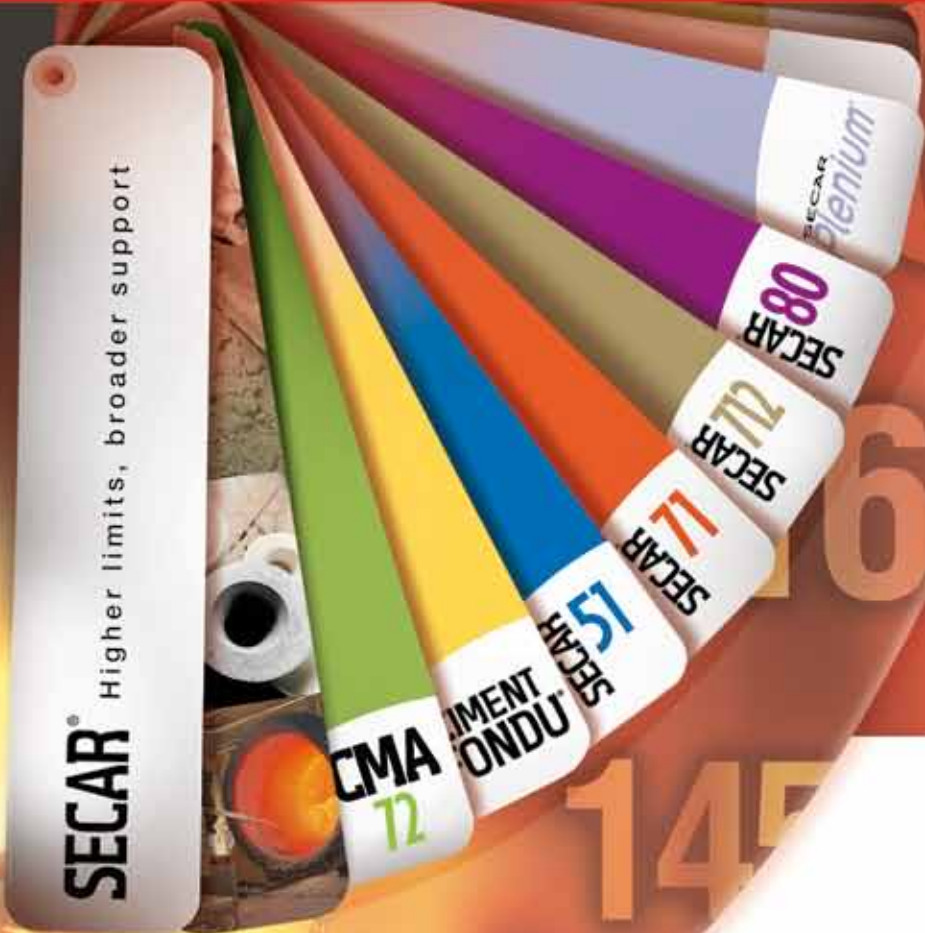


# SECAR® RANGE



Solutions for refractories

# A BROAD PORTFOLIO OF PRODUCTS AND SOLUTIONS

## > The SECAR® range

**CIMENT FONDU®** and **SECAR® 51** are fused products with a mineralogy focused on calcium aluminates (CA) to give strong hydraulic activity and impart excellent mechanical properties **to conventional concretes**.

These cements are recommended when rapid hardening properties are required. They are adapted **to all types of placing methods, particularly casting and gunning**.

The low iron oxide content of **SECAR® 51**, when combined with appropriate aggregates, makes it particularly suitable **for concretes having to withstand carbon monoxide reducing atmospheres**.

**SECAR® 71** is a pure cement with carefully controlled balance of CA and CA<sub>2</sub> phases, allowing refractory producers to create products of excellent stability, optimum workability and high temperature performance. SECAR® 71 shows outstanding additive compatibility allowing a high degree of performance optimisation **in all types of deflocculated systems**.

**SECAR® 712** possesses all the attributes of SECAR® 71 and incorporates a leading edge technology that provides **time stability** not only to cement but also to **low cement castables**.

**SECAR® 80** is a formulated cement with alumina and additive additions to enhance formulation simplicity and performance level **in conventional and medium cement castables**.

**SECAR Plenium®** is an innovative engineered binder designed **for dense castables with a reduced lime content**. SECAR Plenium® provides simplicity and flexibility of castable design, high fluidity and a competitive advantage for high performing formulations such as alumina rich castables with or without reactive fillers or magnesia containing systems.



## > The Calcium-Magnesium-Aluminate range

**CMA 72** is the first inroad into **a new generation of binder** that provides highly reactive spinel, develops **unique microstructure** and gives rise to **superior corrosion resistance**. CMA 72 displays similar placing properties to SECAR® 71 and demonstrates synergetic effect with Peramin® AL.

## > The Peramin® additive range for refractory application

**Peramin® AL 200** and **Peramin® AL 300** are two fluidifying agents specifically designed for low cement alumina and alumina-spinel based castables.



# QUALITY, PROXIMITY AND RELIABILITY

*SECAR® solutions from Kerneos have become the global reference for calcium aluminates in the refractory industry.*



## > Ensuring SECAR® quality and reliability

Kerneos maintains an ambitious programme of worldwide quality management systems and this includes an active transfer of best practices around the network of industrial sites. These actions have been supported by major capital investments in new plant and leading edge laboratory equipment and analysis capability such as XRD (X-Ray Diffraction) or XRF (X-Ray Fluorescence).

As a result, measuring capabilities are uniform across all industrial sites and ultimately leads to better product consistency.

As part of an enhanced customer service, a Quality Data Management (QDM) system has been installed which allows personalised information relating to product conformity and quality certificates to be efficiently communicated to our customers.

Different levels of quality data presentation can be offered and customised according to specific customer needs. This quest is driven by the necessity to provide customers with more pertinent information relating to the conformity and characteristics of our products.

## > Guaranting delivery through a high performance supply chain

Kerneos is committed to a high level of excellence with respect to its supply chain. Every day, for each order, Kerneos monitors **the delivered "service level"**, a demanding indicator measuring the combination of service acceptance (delivery date commitment) and service execution (effective timely delivery). Over time, Kerneos achieves at least 95% score for this indicator illustrating reliable logistics systems. Data can be shared with customers and dialogue is encouraged to achieve better forecasting and understanding of order flow as well as the impact of these parameters on business performance.

Other services provide ways to optimise the supply chain with customers. Vendor Managed Inventory (VMI), Service Level Agreement (SLA) and original logistic solutions can be investigated upon request.

## > Sharing and developing expertise

As the pioneer in calcium aluminate technology, Kerneos has developed **strong local and central teams** in order to assist customers with optimised applications, to develop new products, and to participate in problem solving such as managing issues linked to interactions with other raw materials.

This support is provided by:

- **A network of technical development managers** who support customers in the development of new products and in the scientific understanding of their applications,
- **An expertise** in and access to many complex test methods as well as sophisticated diagnostic and analytical techniques through its laboratories and plants worldwide,
- **The availability of products** with well defined and harmonised characteristics **from multiple plants around the world.**



# THE FULL RANGE OF SECAR® CALCIUM ALUMINATE

**CIMENT  
FONDU®**

**SECAR® 51 SECAR® 71**

## REFRACTORINESS

Pyrometric cone equivalent on neat cement paste (°C)

1,270 - 1,290

1,430 - 1,450

1,590 - 1,620

## CHEMICAL COMPOSITION (%) - EN 196-2

Al<sub>2</sub>O<sub>3</sub>

37.5 - 41.5

50.8 - 54.2

68.7 - 70.5

CaO

36.5 - 39.5

35.9 - 38.9

28.5 - 30.5

SiO<sub>2</sub>

2.5 - 5.0

4.0 - 5.5

0.2 - 0.6

Fe<sub>2</sub>O<sub>3</sub>

14.0 - 18.0

1.0 - 2.2

0.1 - 0.3

TiO<sub>2</sub>

< 4.0

< 4.0

< 0.4

MgO

< 1.5

< 1.0

< 0.5

Na<sub>2</sub>O + K<sub>2</sub>O

< 0.4

< 0.5

< 0.5

SO<sub>3</sub>

< 0.4

< 0.5

< 0.3

## MINERALOGICAL COMPOSITION

Principal phases

CA

CA

CA, CA<sub>2</sub>

Secondary phases

C<sub>12</sub>A<sub>7</sub>, C<sub>2</sub>S, C<sub>2</sub>AS, C<sub>4</sub>AF

C<sub>12</sub>A<sub>7</sub>, C<sub>2</sub>AS, CT

C<sub>12</sub>A<sub>7</sub>, Aα

## SPECIFIC GRAVITY (g/cm<sup>3</sup>)

3.2 - 3.3

2.95 - 3.05

2.90 - 3.05

## FINENESS

Blaine specific surface area (cm<sup>2</sup>/g) - EN 196-6

2,850 - 3,450

3,750 - 4,250

3,800 - 4,400

Laser PSD - d50 (µm)

18

14

12

Laser PSD - d90 (µm)

64

55

50

## MORTAR PROPERTIES

Sand mortar formulation

Cement/sand ratio = 1/2.7  
water/cement ratio = 0.4 (0.45 for flow)

Cement 500g, sand 1,350g  
water 200g (W/C = 0.4)

Cement 450g, sand 1,350g  
water 225g (W/C = 0.4)

Flow after 30 minutes (%) - ASTM C230

> 30 (after 15 minutes)

> 30

> 60

Setting time by Vicat needle (minutes)

Initial set

130 - 210

190 - 270

190 - 240

Final set

140 - 230

210 - 300

200 - 250

Compressive strength (MPa) - EN 196-1

After 6 hours

35 - 50

20 - 55

15 - 30

After 24 hours

55 - 70

55 - 85

40 - 55

## CASTABLE PROPERTIES

Formulation type:

- CC: Conventional Castable
- LCC: Low Cement Castable
- ULCC: Ultra Low Cement Castable

CC based on  
chamotte (40% Al<sub>2</sub>O<sub>3</sub>),  
15% cement

CC based on  
chamotte (40% Al<sub>2</sub>O<sub>3</sub>),  
15% cement

CC based on  
chamotte,  
15% cement

LCC based on  
tabular alumina,  
5% cement

Water addition (%)

12

11

9

5

Flow (%) - ASTM C230

Initial flow

110

125

110

120

At 30 minutes

75

100

90

120

At 60 minutes

60

100

80

100

Working time (minutes) - after 20 second vibration

120

170

120

90

Compressive strength (MPa)

After drying at 110°C for 24 hours

54

68

70

130

After firing at 800°C for 6 hours

27

40

43

160

After firing at 1,100°C for 6 hours

21

32

37

160

**SECAR® RANGE**



# CEMENTS AND BINDERS

<b>SECAR<sup>®</sup> 712</b>	<b>SECAR<sup>®</sup> 80</b>	<b>SECAR Plenium<sup>®</sup></b>	<b>CMA72</b>
1,590 - 1,620	1,770 - 1,810	1,770 - 1,810	1,750 - 1770
68.7 - 70.5 28.5 - 30.5 0.2 - 0.6 0.1 - 0.3 < 0.4 < 0.5 < 0.5 < 0.3	79.5 - 82.0 16.2 - 17.8 0.35 0.2 < 0.3 < 0.5 < 0.7 < 0.3	79.5 - 82.0 16.2 - 17.8 0.35 0.2 < 0.3 < 0.5 < 0.7 < 0.3	69 - 71 8 - 11 < 1 < 0.5 < 0.4 16 - 22 < 0.5 < 0.3
CA, CA <sub>2</sub> C <sub>12</sub> A <sub>7</sub> , Aα	CA, CA <sub>2</sub> , Aα C <sub>12</sub> A <sub>7</sub>	CA, CA <sub>2</sub> , Aα C <sub>12</sub> A <sub>7</sub>	MA, CA, CA <sub>2</sub> C <sub>12</sub> A <sub>7</sub> , Aα
2.90 - 3.05	3.2 - 3.3	3.2 - 3.3	3.3 - 3.45
2,000 - 4,000 10 - 20 40 - 60	8,000 - 12,000 6 50	9,000 - 13,000 6 50	3,700 - 4,500 18 60
Cement 450g, sand 1,350g water 225g (W/C = 0.5)	Cement 500g, sand 1,350g water 180g (W/C = 0.36)	Cement 500g, sand 1,350g water 160g (W/C = 0.32)	Cement 500g, sand 1,350g water 210g (W/C = 0.42)
90 - 130  200 - 400 250 - 500  - 40 - 55	> 30  40 - 90 55 - 125  1 - 2 27 - 35	> 50 (after 60 minutes)  170 - 230 180 - 260  - 24 - 32	> 60  150 - 400 180 - 500  - 15 - 25
LCC based on tabular alumina, 5% cement	CC based on tabular alumina, 15% cement	LCC based on tabular alumina spinel, 10% cement	LCC based on tabular alumina, 18% cement
5  120 120 110 90  130 160 160	7  120 100 60  80 65 60	5  125 90 60  108 115 104	4  190 170 150 120  120 160 >160

Note: The properties of the cements listed in the above table reflect the typical values of our production and are given for guidance only. For product specifications, please refer to the Product Data Sheets available at your local representative office or consult our website: [www.secar.net](http://www.secar.net)

# TECHNICAL CHARACTERISTICS

## TYPICAL APPLICATIONS

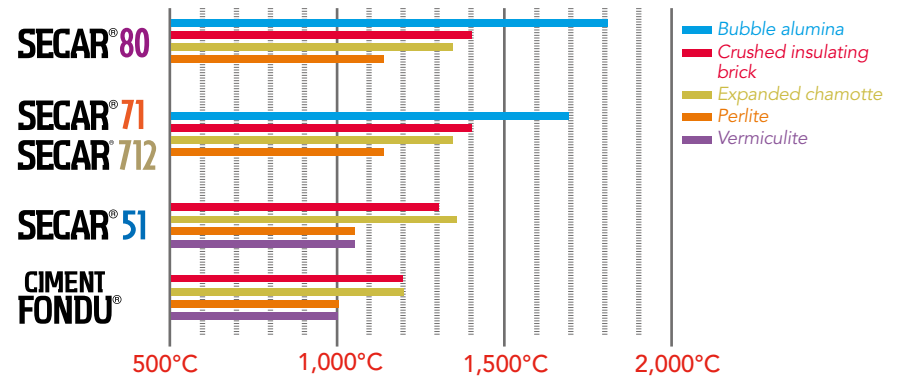
## INDICATIVE SERVICE TEMPERATURE LIMITS

### > Typical applications

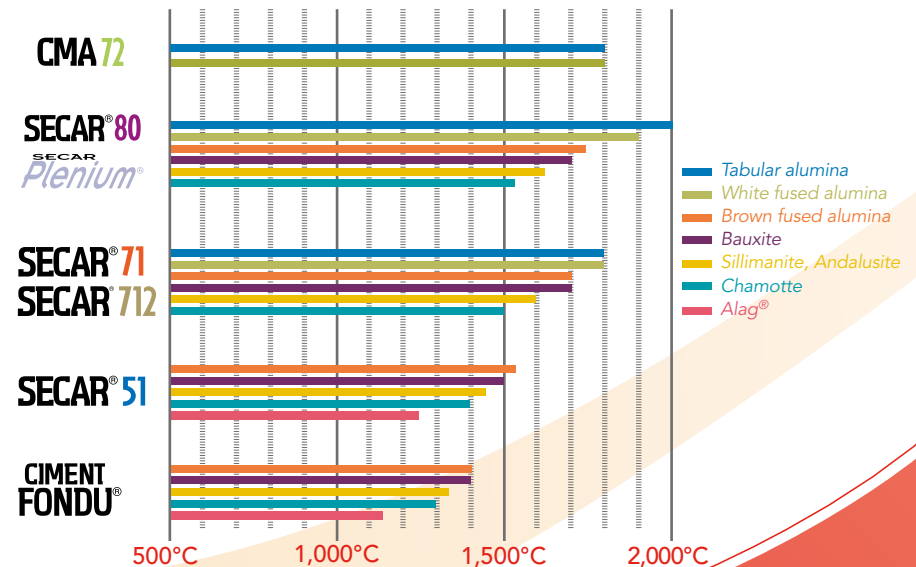
	CIMENT FONDU®	SECAR® 71 SECAR® 51	SECAR® 712	SECAR® 80	SECAR Plenium®	CMA 72
<b>INSULATING CASTABLES</b>						
Casting	■	■	■	■		
Gunning	■	■	■	■		
<b>DENSE CONVENTIONAL CASTABLES</b>						
Casting	■	■	■	■	■	
Gunning	■	■	■	■		
<b>DEFLOCCULATED CASTABLES (MCC - LCC - ULCC)</b>						
Casting			■		■	■
Gunning			■		■	■
Self flow			■		■	■
Shotcreting			■		■	■

### > Indicative service temperature limits

#### INSULATING CASTABLES



#### DENSE CASTABLES



ALL YOU NEED IS ON [www.secar.net](http://www.secar.net)

The SECAR® website has been especially designed for calcium aluminate users within industrial and scientific communities of the refractory industry.

[www.secar.net](http://www.secar.net)



*This interactive tool is devoted to provide global access to state of the art technical information.*

### > **Product Data Sheets**

The latest version of Product Data Sheets of each product in the range is available online. In addition to the Product Data Sheets, Material Safety Data Sheets (MSDS) provide information as to ensure the safe handling of Kerneos' products.

### > **Technical papers**

Kerneos has made significant investments in R&D over many years in the areas of fundamental scientific and application studies. These scientific data are used to generate state of the art technical papers which are made available and can be easily downloaded. Nearly 100 "technical papers" are now available online. These papers deal with a wide scope of subjects in the field of calcium aluminates for refractory applications.

### > **News and Events**

In addition, useful information concerning Kerneos news and recent developments as well as a list of conference and exhibition participation are regularly updated and are available in the News & Events section of [www.secar.net](http://www.secar.net).



# Worldwide network

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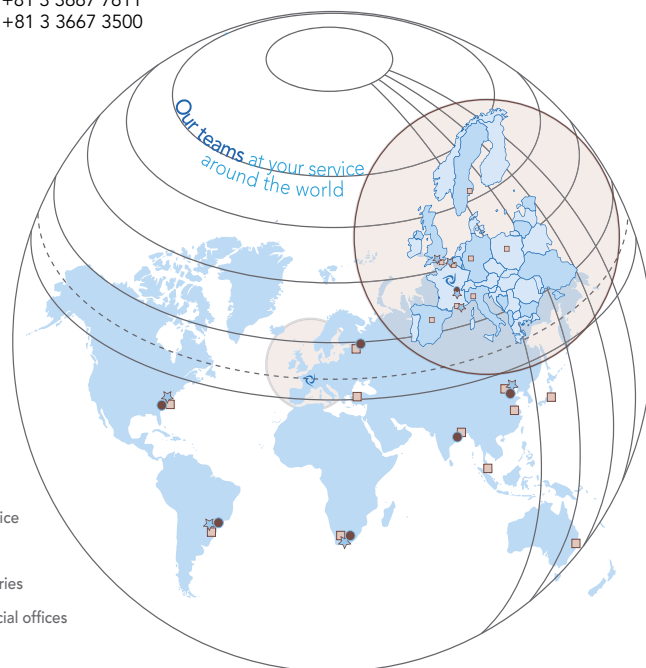
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-  Plants
-  Laboratories
-  Commercial offices



For more information, visit us at:  
[www.secar.net](http://www.secar.net)

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