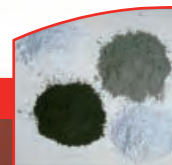


SECAR® RANGE



Solutions for refractories

A BROAD PORTFOLIO OF PRODUCTS AND SOLUTIONS

> The SECAR® range

Ciment Fondu®, SECAR® 41 and SECAR® 51 are fused products with a mineralogy focused on 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 CA₂ 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® 80 and SECAR® 80F are formulated cements with alumina and additive additions to enhance formulation simplicity and performance level **in conventional and medium cement castables**. SECAR® 80F is recommended when long workability and stable flow are required.

> The SECAR® "Plus" range

The SECAR® "Plus" range is a range of **easy-to-formulate binder systems**, which provide new functions **for low cement castables**, the high-tech family of refractory products:

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.

SECAR Xeniom™ is a new binder system designed **for dense castables containing fume silica**. The product has been developed to bring more robustness to these formulations and to allow a wide range of raw materials, to facilitate the task of researchers / production and quality managers. This avoids the need to adjust formulations and ensures the delivery of top class performance.



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 new 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®41

SECAR®51

REFRACTORINESS

Pyrometric cone equivalent on neat cement paste (°C)

1,270 - 1,290

1,315

1,430 - 1,450

CHEMICAL COMPOSITION (%) - EN 196-2

Al₂O₃

CaO

SiO₂

Fe₂O₃

TiO₂

MgO

Na₂O + K₂O

SO₃

37.5 - 41.5

36.5 - 39.5

2.5 - 5.0

14.0 - 18.0

< 4.0

< 1.5

< 0.4

45 - 51

34.8 - 39.9

4.5 - 6.5

4.0 - 9.0

-

-

≤ 0.4

≤ 0.5

50.8 - 54.2

35.9 - 38.9

4.0 - 5.5

1.0 - 2.2

< 4.0

< 1.0

< 0.5

MINERALOGICAL COMPOSITION

Principal phases

Secondary phases

CA

C₁₂A₇, C₂S, C₂AS, C₄AF

CA

C₁₂A₇, C₂S, C₂AS, CT

CA

C₁₂A₇, C₂AS, CT

SPECIFIC GRAVITY (g/cm³)

3.2 - 3.3

3.0 - 3.09

2.95 - 3.05

FINENESS

Blaine specific surface area (cm²/g) - EN 196-6

Laser PSD - d50 (µm)

Laser PSD - d90 (µm)

2,850 - 3,450

18

64

3,000 - 4,000

16 - 25

90 - 100

3,750 - 4,250

14

55

MORTAR PROPERTIES

Sand mortar formulation

Flow after 30 minutes (%) - ASTM C230

Setting time by Vicat needle (minutes)

Initial set

Final set

Compressive strength (MPa) - EN 196-1

After 6 hours (* 8 hours)

After 24 hours

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

> 30 (after 15 minutes)

130 - 210

140 - 230

35 - 50

55 - 70

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

> 50

190 - 270

200 - 280

20 - 30

45 - 65

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

> 30

190 - 270

210 - 300

20 - 55

55 - 85

CASTABLE PROPERTIES

Formulation type:

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

Water addition (%)

Flow (%) - ASTM C230

Initial flow

At 30 minutes

At 60 minutes

Working time (minutes) - after 20 second vibration

Compressive strength (MPa)

After drying at 110°C for 24 hours

After firing at 800°C for 6 hours

After firing at 1,100°C for 6 hours

CC based on
chamotte (40% Al₂O₃),
15% cement

12

110

75

60

120

54

27

21

CC based on
chamotte (40% Al₂O₃),
15% cement

11

120

100

90

180

65

40

31

CC based on
chamotte (40% Al₂O₃),
15% cement

11

125

100

100

170

68

40

32

CEMENTS AND BINDERS

SECAR® 71

SECAR® 80

SECAR® 80F

**SECAR
Plenium®**

**X SECAR
eniom™**

1,590 - 1,620		1,770 - 1,810		1,770 - 1,810		1,770 - 1,810		1,770 - 1,810
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 - 82.5 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		82.0 - 85.0 14.0 - 16.0 < 0.35 < 0.3 < 0.3 < 0.5 < 0.7 < 0.3
CA, CA ₂ , C ₁₂ A ₇ , Aα		CA, CA ₂ , Aα C ₁₂ A ₇		CA, CA ₂ , Aα C ₁₂ A ₇		CA, CA ₂ , Aα C ₁₂ A ₇		CA, CA ₂ , Aα C ₁₂ A ₇
2.90 - 3.05		3.2 - 3.3		3.2 - 3.3		3.2 - 3.3		3.2 - 3.3
3,800 - 4,400 12 50		8,000 - 12,000 6 50		8,000 - 12,000 6 50		9,000 - 13,000 6 50		> 10,000 6 45
Cement 450g, sand 1,350g water 225g (W/C = 0.4) > 60 190 - 240 200 - 250 15 - 30 40 - 55		Cement 500g, sand 1,350g water 180g (W/C = 0.36) > 30 40 - 90 55 - 125 1 - 2 27 - 35		Cement 500g, sand 1,350g water 180g (W/C = 0.36) > 30 (after 60 minutes) 220 - 400 280 - 460 2 - 5* 17 - 25		Cement 500g, sand 1,350g water 160g (W/C = 0.32) > 50 (after 60 minutes) 170 - 230 180 - 260 – 24 - 32		Cement 500g, sand 1,350g water 200g (W/C = 0.36) 90 - 140 35 - 60 45 - 70 8 - 12 14 - 20
CC based on chamotte, 15% cement 9 110 90 80 120 70 43 37	LCC based on tabular alumina, 5% cement 5 120 120 100 90 130 160 160	CC based on tabular alumina, 15% cement 7 120 100 – 60 80 65 60	CC based on tabular alumina, 15% cement 7 120 120 110 120 90 70 64	LCC based on tabular alumina spinel, 10% cement 5 125 90 – 60 108 115 104		ULCC based on andalusite, 10% cement 6 240 240 220 80 140 170 170		

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

TECHNICAL CHARACTERISTICS

TYPICAL APPLICATIONS

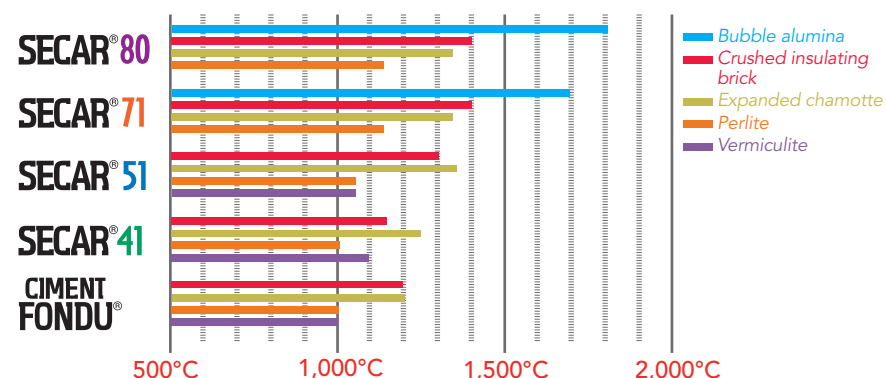
INDICATIVE SERVICE TEMPERATURE LIMITS

> Typical applications

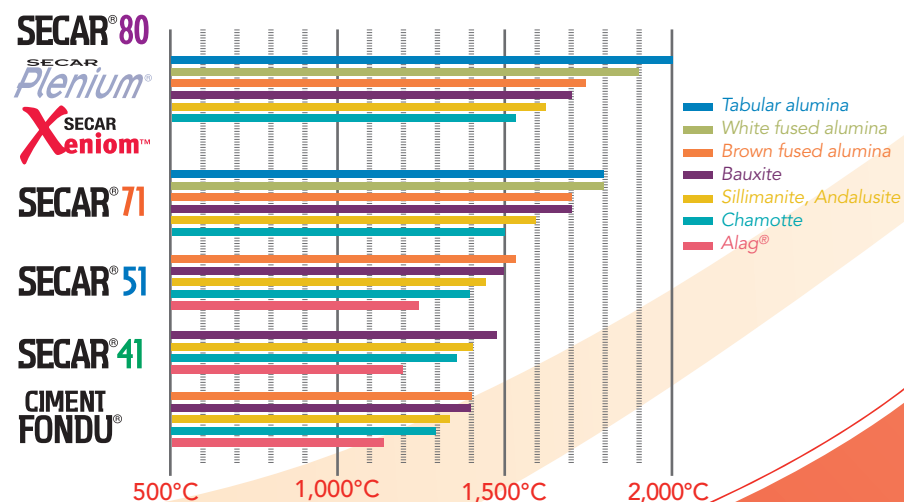
	CIMENT FONDU®	SECAR® 41	SECAR® 51	SECAR® 71	SECAR® 80	SECAR Plenium®	SECAR Xeniom™
INSULATING CASTABLES							
Casting	■	■	■	■	■		
Gunning	■	■	■	■	■		
DENSE CONVENTIONAL CASTABLES							
Casting	■	■	■	■	■	■	
Gunning	■	■	■	■	■		
DEFLOCCULATED CASTABLES (MCC - LCC - ULCC)							
Casting				■		■	■
Gunning				■		■	■
Self flow				■		■	■
Shotcreting				■		■	■

> Indicative service temperature limits

INSULATING CASTABLES



DENSE CASTABLES



ALL YOU NEED IS ON 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



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 on line. 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 on line and can be easily downloaded. More than 50 "technical papers" are now available on line. These papers deal with a wide scope of subjects in the field of calcium aluminates for refractory applications.

> SECAR Xenium™

A presentation of Kerneos' new binder system, SECAR Xenium™, provides an introduction to this product for demanding refractory dense castables, i.e. ULCC (Ultra Low Cement Castable) and LCC (Low Cement Castable). Don't hesitate to contact your local sales representative for further information.

> 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 on line and are available in the News & Events section.



Worldwide network

Local presence

Head office

> France

Kerneos S.A
8, rue des Gravières
92521 Neuilly sur Seine Cedex
France
Tel.: +33 1 46 37 90 00
Fax: +33 1 46 37 92 00

Research centers

> China

Kerneos (China) Aluminate Technologies Co. Ltd
86 Muning Road, Teda
Tianjin, 300457 PR China
Tel.: +86 22 6620 1430
Fax: +86 22 6620 4481

> France

Kerneos Research Center
1 rue Le Chatelier
ZAC Parc Technologique
38090 Vaulx-Milieu
France
Tel.: +33 4 74 95 01 20
Fax: +33 4 74 95 53 39

Plants

> Dunkerque - France

Route du Fortlet
ZIP de Mardyck
59279 Mardyck - France
Tel.: +33 3 28 58 00 00
Fax: +33 3 28 58 00 01

> Fos-sur-Mer - France

BP 20001
13771 Fos-sur-Mer Cedex - France
Tel.: +33 4 42 06 91 00
Fax: +33 4 42 06 91 14

> Le Teil - France

RD 86 - BP 32
07400 Le Teil - France
Tel.: +33 4 75 49 07 92
Fax: +33 4 75 49 09 30

> United Kingdom

Kerneos Limited
Dolphin Way - Purfleet
Essex RM19 1NZ - UK
Tel.: +44 1708 863333
Fax: +44 1708 861033

> USA - Canada

Kerneos Inc
1316 Priority Lane
Chesapeake Virginia 23324 - USA
Tel.: +1 757 284 3200
Fax: +1 757 284 3300

> South America - Brazil

Kerneos do Brasil Produção e Comércio de Aluminosos Ltda
Estrada de Guaxindiba S/Nº
24722030 São Gonçalo RJ - Brazil
Tel.: +55 21 2602 3700
Fax: +55 21 2601 1349

> South Africa

Kerneos Southern Africa (Pty) Ltd
20 Carbonode Cell, Alton
P.O. Box 613
Richards Bay 3900 - South Africa
Tel.: +27 35 797 1000
Fax: +27 35 797 1020

> China

Kerneos (China) Aluminate Technologies Co. Ltd
86 Muning Road, Teda
Tianjin, 300457 PR China
Tel.: +86 22 6620 1430
Fax: +86 22 6620 4481

Commercial presence

> France - Benelux

Kerneos S.A
Service Clients France Bénélux
Route du Fortlet - Z.I.P. de Mardyck
59279 Mardyck - France
Tel.: +33 3 28 58 93 73 / 76
Fax: +33 3 28 58 00 02

> United Kingdom

Kerneos Limited
Dolphin Way - Purfleet
Essex RM19 1NZ - UK
Tel.: +44 1708 863333
Fax: +44 1708 861033

> Germany

Kerneos GmbH
Centroallee 275
D-46047 Oberhausen - Germany
Tel.: +49 208 63 59 0
Fax: +49 208 63 59 171

> Nordic Countries

Kerneos Nordic AB / Peramin AB
Johanneslundsvägen 2
SE - 194 81 Upplands Väsby
Sweden
Tel.: +46 8 5908 8020 / 6060
Fax: +46 8 5908 8025

> Eastern Europe

Kerneos Polska Sp. z o.o.
Al. Jerozolimskie 148
02-326 Warszawa - Poland
Tel.: +48 22 458 21 92
Fax: +48 22 458 21 94

> Russia & CIS

LCC Kerneos
Shaumyana str. 4, block 1A,
195027 St. Petersburg
Russia
Tel.: +7 812 4489457
Fax: +7 812 4489456

> Italy

Kerneos Italia S.R.L.
Via G. Silva, 49
Milano 20149 - Italy
Tel.: +39 02 43 00 631
Fax: +39 02 48 16 517

> Spain - Portugal

Kerneos España
C/ Capitán Haya, no 55 - 2º - 8
28020 Madrid - Spain
Tel.: +34 91 571 59 71
Fax: +34 91 571 67 53

> Turkey

Kerneos Alüminat
Dis Ticaret A.Ş.
Sumko Sitesi M 1A
Blok Daire 32
Kozyatagi-Kadikoy
Istanbul 34742 - Turkey
Tel.: +90 216 373 5833/0797
Fax: +90 216 373 5156

> India

Kerneos India
3B - Shristi Bldg. / 3rd floor
12, Ho Chi Minh Sarani
Kolkata 700 071 - India
Tel.: +91 33 3052 2315/16
Fax: +91 33 3052 2681

> Near & Middle East

Kerneos
Usine de Fos-sur-Mer
Cellule Export - RN 568 - BP 1
13771 Fos-sur-Mer Cedex - France
Tel.: +33 4 42 06 91 15
Fax: +33 4 42 06 91 91

> South Africa

Kerneos Southern Africa (Pty) Ltd
21 Dartfield Road, Eastgate Ext 12
P.O. Box 783602
Sandton 2146 - South Africa
Tel.: +27 11 444 3090
Fax: +27 11 444 6575

> USA - Canada

Kerneos Inc
1316 Priority Lane
Chesapeake Virginia 23324 - USA
Tel.: +1 757 284 3200
Fax: +1 757 284 3300

> Central America

Kerneos de México, S.A. de C.V.
Galileo, 20 - 501 - Colonia Polanco
Delegación Miguel Hidalgo
11560 - México - DF - México
Tel.: +52 55 5280 1481
Fax: +52 55 5282 2564

> South America

Kerneos do Brasil Produção e Comércio de Aluminosos Ltda
Estrada de Guaxindiba S/Nº
24722030 São Gonçalo RJ - Brazil
Tel.: +55 21 2602 3700
Fax: +55 21 2601 3737

> Japan

Kerneos Japan
Prime Nihombashi Bldg.5F
Nihombashi Hamacho 3-35-6, Chuo-Ku,
Tokyo 103-0007 - Japan
Tel.: +81 3 3667 7611
Fax: +81 3 3667 3500

> China

Kerneos (China) Aluminate Technologies Co.Ltd - Beijing
Room 03-05, 22nd floor, Silver Tower,
Dong San Huan Bei Lu, Chao Yang
District,
Beijing, 100027, P.R.China
Tel.: +86 10 64 10 8958/59
Fax: +86 10 6410 8966

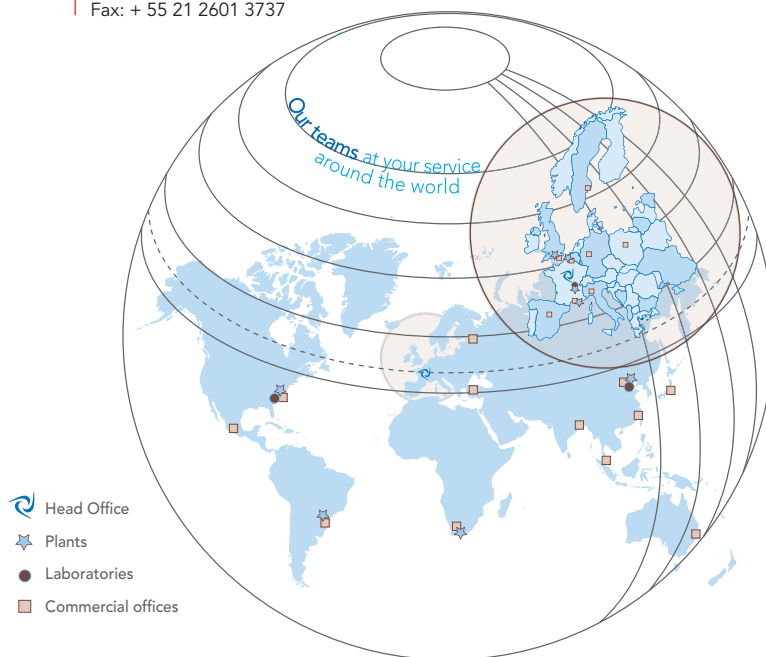
Kerneos (China) Aluminate Technologies Co.Ltd - Shanghai
Room C, 9th Floor, North Gate Plaza
nº99 Tianmu Road West
Shanghai, 200070, P.R.China
Tel.: +86 21 63 80 9132/33
Fax: +86 21 63 80 9148

> Singapore - South East Asia

Kerneos Asia Pacific Pte Ltd
230 Orchard Road
09-236 Faber House
Singapore 238854
Tel.: +65 6737 3379
Fax: +65 6734 8516

> Australia

Kerneos Australia Pty Ltd
Level 4 7-9 Merriwa Street
P.O. Box 38
Gordon NSW 2072 - Australia
Tel.: +61 2 9498 5288
Fax: +61 2 9498 5311



For more information, visit us at:
www.secar.net

All the names mentioned are trademarks of Kerneos and its subsidiaries.

Kerneos warrants that the products comply with the specifications stated in the commercial datasheet to the exclusion of any other warranty, expressed or implied. Kerneos makes no representation or warranty of any kind, either expressed or implied, as to the merchantability or fitness for a particular purpose or use of the products. The warranty shall be limited to the replacement of the non-conforming products or, at Kerneos option, the refund of the purchase price. Any technical advice, recommendations or information are given based on Kerneos current knowledge and experience of the products and are deemed to be accurate. However, Kerneos undertakes no liability or responsibility of any kind in respect thereof. Users are invited to check that they have the latest version of this document.

Head Office: 8, rue des Gravières • 92521 Neuilly-sur-Seine Cedex
Tel.: +33 (0)1 46 37 90 00 • Fax: +33 (0)1 46 37 92 00

 **Kerneos**
ALUMINATE TECHNOLOGIES