

## SECAR Plenium®

### 1 Description

SECAR Plenium® is a hydraulic binder with an alumina content of approximately 80%. It is suitable for use in a wide range of refractory applications and it simplifies the castable development process by reducing the number of additives required in a formulation. In addition, SECAR Plenium® reduces production complexities with fewer components and improves placing performance.

SECAR Plenium® is an engineered and innovative cement which provides advanced built-in formulation technology. It is optimised for use in conjunction with a wide variety of aggregate types. It is particularly recommended for high purity castable systems, such as alumina rich systems, with and without fume silica and castables containing magnesia and spinel.

SECAR Plenium® is especially recommended for use in reduced lime content systems where the benefits are a very low water demand combined with a high level of fluidity. SECAR Plenium® enables good workability with stable flow and sufficient working time. A tolerance to varying water contents and a wide range of working temperatures brings high reliability in refractory installations.

Refractory castables based upon SECAR Plenium® have excellent thermo mechanical properties throughout the temperature range with high strengths and a high degree of volume stability.

A high level of compatibility with additives and reactive fillers means that it is possible to readily adapt formulations containing SECAR Plenium®. As a result SECAR Plenium® can easily be used in conjunction with a wide range of additives, giving formulation flexibility and simplifying the development process.

SECAR Plenium® is produced and controlled within a quality management system that is certified according to ISO 9001.

### 2 Specifications

The specification limits indicated are determined with an acceptable quality level (AQL) of 2.5% as defined in the sampling standard ISO 3951.

The usual range represents typical values of our production.

#### Chemical composition

	Usual range	Specification
Al <sub>2</sub> O <sub>3</sub> (%)	79.5 - 82.5	> 79.0
CaO (%)	16.2 - 17.8	< 19.5
SiO <sub>2</sub> (%)	< 0.35	< 0.4
Fe <sub>2</sub> O <sub>3</sub> (%)	< 0,2	< 0.3
MgO (%)	< 0,5	-
TiO <sub>2</sub> (%)	< 0,3	-
SO <sub>3</sub> (%)	< 0,3	-
K <sub>2</sub> O+Na <sub>2</sub> O soluble	< 0,7	-

- ♦ The chemical characteristics of SECAR Plenium® have been determined according to the standard: BS EN196-2: Methods of testing cement; Chemical Analysis of Cement.
- ♦ Soluble K<sub>2</sub>O and Na<sub>2</sub>O have been determined according to the standard ASTM C114.

#### Fineness

	Usual range	Specification
Blaine specific surface (cm <sup>2</sup> /g)	-	> 8000
Reject at 90 µm (%)	-	< 5

- ♦ The specific surface area of SECAR Plenium® has been determined according to the standard: EN-196-6: Method of testing cement; Fineness Determination.

## Workability

The workability of SECAR Plenium® has been determined by measuring the flow properties using the ASTM C230 flow table. The test is carried out using a standard siliceous sand mortar.

	Usual Range	Specification limit
Flow after 60 min (%)	60 - 80	> 50
Flow after 90 min (%)	50 - 70	-

- ♦ Composition of the mortar: Cement 500g, sand 1350g, water 160g (W/C = 0.32). Preparation of the mortar according to EN 196-1.
- ♦ Tested after 60 and 90 minutes with 25 shocks using ASTM cone mould d1 (diameter of base) = 100 mm.  
Flow (%) = d2 (mm) - d1 (mm)

## Setting time

	Usual range	Specification limit
Initial set (min)	160 - 230	>140
Final set (min)	180 - 260	<290

- ♦ Composition of the mortar: Cement 500g, sand 1350g, water 160g (W/C = 0.32). Preparation of the mortar according to EN 196-1.
- ♦ Setting time measurement according to NF P15-431: Vicat apparatus standard EN 196-3 but using a 1000 g test weight; temperature 20°C, 70% relative humidity
- ♦ Final setting time measured in accordance with NF 15-330: the Vicat needle no longer penetrates the mortar.

## Mechanical strength

Compressive strength (MPa)		
Age	Usual range	Specification limit
24 h	18 - 24	> 15

- ♦ Composition of the mortar: Cement 500g, sand 1350g, water 160g (W/C = 0.32). Preparation of the mortar according to EN 196-1.
- ♦ Test conditions according to EN 196-1; test prisms 40x40x160 mm; temperature 20°C; prisms cured for 24 hours at > 90% relative humidity.

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## 3 Additional information

This information is given for guidance only.

### Mineralogical composition

• Principal phases\* : CA, CA<sub>2</sub>, A $\alpha$

• Secondary phases\* : C<sub>12</sub>A<sub>7</sub>,

\* C=CaO, A=Al<sub>2</sub>O<sub>3</sub>

### Other physical characteristics

• Pyrometric cone equivalent 1770-1810°C

• Bulk Density 700 - 800 kg/m<sup>3</sup>

• Specific Gravity 3.2 - 3.3 g/cm<sup>3</sup>

• For additional technical information please contact your local Kerneos representative.

## 4 Storage and shelf life

As with all hydraulic binders SECAR Plenium® must be stored in dry conditions, off the ground. In this case it will retain its properties for at least six months.