

Essence of Castable

Chemical composition (%)

Al ₂ O ₃	CaO	SiO ₂	Fe ₂ O ₃	MgO	TiO ₂	soluble K ₂ O+Na ₂ O	SO ₃
79.5 - 82.5	16.2 - 17.8	<0.35	<0.2	<0.5	<0.3	<0.7	<0.3

Test method according to BS EN 196-2: Methods of testing cement; Chemical Analysis of Cement.
Soluble K₂O and Na₂O determined by the standard ASTM C114.

Fineness

Blaine specific surface (cm ² /g)	Residue at 90 μm (%)
>8,000	<5

Test method according to EN-196-6: Method of testing cement; Fineness Determination.

Workability (%)

Flow after 60 min.	Flow after 90 min.
60 - 80	50 - 70

Test method according the ASTM C230 flow table using a standard siliceous sand mortar.
Composition of the sand mortar: cement 500g, sand 1,350g, water 160g (W/C=0.32)
prepared according to EN 196-1.

Setting time

Initial set (min.)	Final set (min.)
160 - 230	180 - 260

Composition of the mortar: cement 500g, sand 1,350g, water 160g (W/C=0.32)
prepared according to EN 196-1.

Setting time measurement according to NF P15-431: Vicat apparatus standard EN 196-3
but using a 1,000g test weight; temperature 20°C, 70% relative humidity.

Green strength

Age	Compressive strength (MPa)
24h	18 - 24

Test conditions according to EN 196-1.

Composition of the sand mortar: cement 500g, sand 1,350g, water 160g (W/C=0.32)
prepared according to EN 196-1.

Mineralogical composition

Principal phases*: CA, CA₂, Aα

Secondary phases*: C₁₂A₇,

*C=CaO, A=Al₂O₃

Other physical characteristics

Bulk Density: 700-800 kg/m³

Specific Gravity: 3.2-3.3 g/cm³

P.C.E.: 1,770-1,810°C

This information is given for guidance only.

SECAR Plenium® is an innovative engineered binder with built-in advanced formulation technology developed by Kerneos.

SECAR Plenium® extends the SECAR® range of refractory cements and brings new dimensions to castable formulation and manufacture:

- **SECAR Plenium®** will enable refractory producers to meet the latest challenges presented by increasingly demanding refractory formulation constraints.
- **SECAR Plenium®** is the key to integrating high final performance with ease of use that allows the Refractory Manufacturer to:
 - simplify the development process,
 - optimise formulations with fewer additives,
 - reduce production complexity with fewer components,
 - improve placing properties.



Simplicity and flexibility of castable design

SECAR Plenium® is designed for the formulation of dense castables where a reduced lime content is desirable. Placing can be either by vibration or self-flow techniques. Recommended castable systems include:

- High Purity Alumina,
- Alumina Spinel,
- Alumina Magnesia,
- Low Cement systems containing Fume Silica or Alumina.

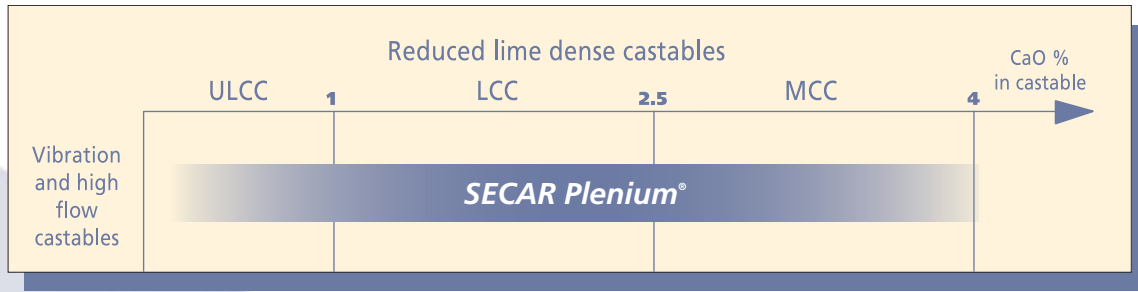
SECAR Plenium® enables the manufacture of low cement castables with normal placing characteristics without the addition of additives:

- **SECAR Plenium®** is completely compatible with all types of refractory fillers,
- **SECAR Plenium®** offers a high degree of compatibility with a wide range of additives.

Choice of additives in recommended systems

ADDITIVES	High Purity Alumina	Alumina-Spinel	LCC Alumina-Alumina	LCC Fume Silica	Alumina-Magnesia
FLUIDIFIERS Phosphates Polycarbonates Polyacrylates Napthalenes Sulphonates	not needed	only for high flow		not needed	only for high flow
SET MODIFIERS Accelerators - lithium salts - sodium aluminates - nitrates Retarders - citrates - borates - carbonates	all types can be used				

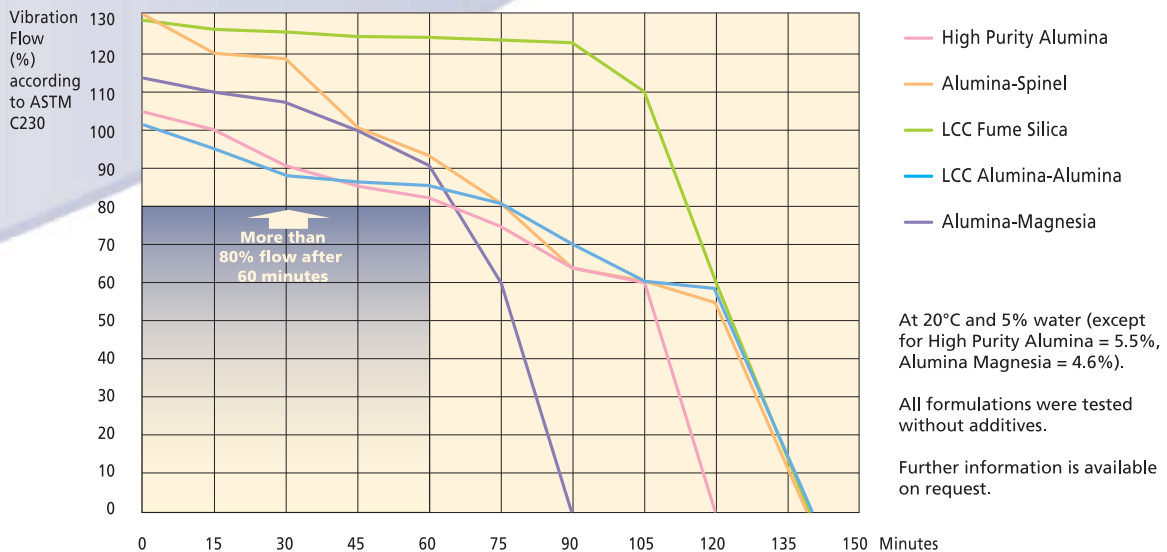
Technical positioning of *SECAR Plenium*[®]



Successful installation is a vital factor in achieving required refractory performance. *SECAR Plenium*[®] is the key to ease of placing in a wide range of environmental conditions:

- **High fluidity with reduced water demand**
Whatever the castable system, *SECAR Plenium*[®] reduces water demand and confers high fluidity, without affecting the safety of de-watering during initial heating.
- **Good workability**
SECAR Plenium[®] provides stable flow and sufficient working time in critical installation conditions such as with the placing of alumina magnesia castables.
- **High reliability in installation**
SECAR Plenium[®] brings high reliability in installation due to its tolerance to a wide range of working temperatures and varying water contents.

Flow profiles for various castables containing *SECAR Plenium*[®]





Competitive advantage in high performing applications

The performance of **SECAR Plenium®** meets the demanding requirements of critical monolithic refractory applications thanks to its powerful combination of attributes:

- rapid hardening,
- consistently predictable demoulding time,
- fast mechanical strength development,
- excellent thermo-mechanical properties,
- volume stability.

The stable and predictable behavior of **SECAR Plenium®** is an additional success factor in critical applications. It is achieved through the inherent design features of the product and the performance of the newly engineered production line, a testament to Kerneos commitment to product quality excellence.

SECAR Plenium® competitive performance with a reference cement in each system

Properties	High Purity Alumina	Alumina-Spinel	Alumina-Magnesia	LCC Alumina-Alumina or Fume Silica	
Hardening					As good
Mechanical Strength Development					Better
Thermo-mechanical Properties					
Volume Stability					Much better

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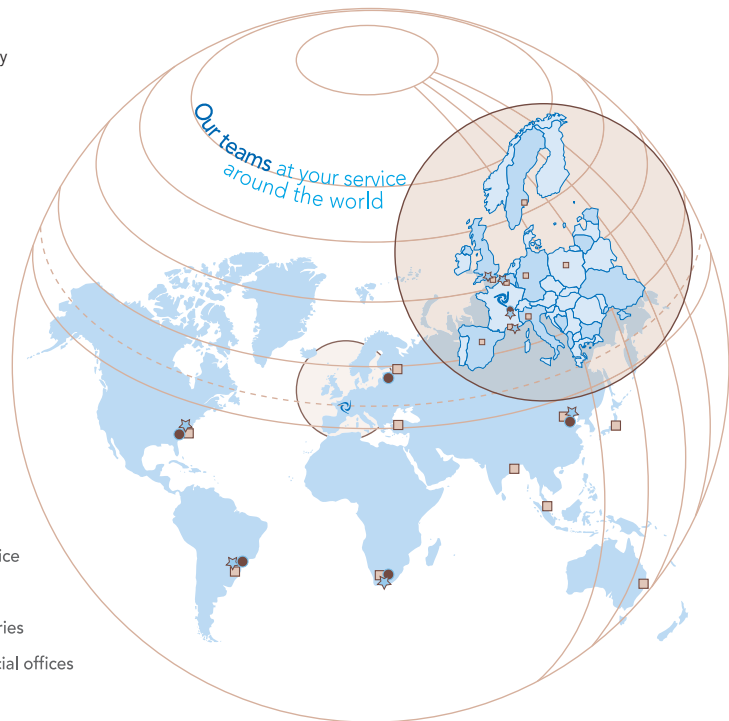
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