

VICAL® 71

PURE CALCIUM ALUMINATE BINDER FOR REFRACTORY

1 Description

VICAL®71 designed to be used at high temperatures and harsh environments, is a pure calcium aluminate binder with an alumina content of approximately 70%. It has outstanding performance during hydration and after exposure to high temperatures.

Thanks to the new design of mineral phase and special manufacture process, VICAL®71 provides characteristics ideally suited for refractory applications where rapid hardening combined with excellent mechanical strength and high temperature performance are required.

VICAL®71, a binder manufactured by the sintering process, contains only calcium aluminates. Its stable quality, ensured by serious online monitoring and control of its mineral phase, provides and guarantees successful site installation performance and flexible formula design.

As a hydraulic binder without any additives, VICAL®71 shows outstanding compatibility and tolerance to dosage and types of additives and micropowers in the formulations, which provides flexibility during formula optimization. Therefore, it is recommended to be used in high technology refractories, such as low cement, ultra-low cement and pure corundum system.

The rheological properties of VICAL®71 are well adapted to various installation conditions, particularly for the conditions like casting, self-flowing, gunning and shotcreting.

The chemistry of VICAL®71 is particularly suitable for conditions where high purity is essential, especially for strong reduction atmosphere including carbon monoxide or hydrogen.

2 Specification

The specification has an Acceptable Quality Level (AQL) of 2.5%, with the values evaluated according to the sampling standard ISO 3951. The usual range represents the typical values of our products.

Chemical Composition

	Usual Range	Specification
Al ₂ O ₃	68.7-70.5	>68.5
CaO	28.5-30.5	<31.0
SiO ₂	0.2-0.6	<0.8
Fe ₂ O ₃	0.1-0.3	<0.4
MgO	<0.5	-
TiO ₂	<0.4	-
SO ₃	<0.3	-
Soluble K ₂ O+Na ₂ O	<0.4	-

- Chemical composition is determined according to Standard GB/T21114 Chemical analysis of refractory products by CRF-fused cast bead method

Fineness

	Usual Range	Specification
Blaine Specific Surface (m ² /g)	4200-4700	>4000
Reject at 90µm	-	<5

- Fineness determined according to standard EN 196-6, methods for the measurement of the fineness of cement.

Workability:

The workability of VICAL[®]71 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.

	Specification
Flow after 30min (%)	>60

- Sand mortar prepared according to standard EN 196-1 consisting of cement 450g, sand 1350g, water 225g (W/C = 0.5).
- Value of flow tested after 30 minutes with 25 shocks in a conical ASTM mould with d1 (diameter of base) = 100mm. % of flow = d2(mm) - d1 (mm).

Setting Time:

	Usual Range	Specification
Initial Set(min)	190-240	>150
Final Set(min)	200-260	<300

- Sand mortar prepared according to stand EN 196-1 consisting of cement 450g, sand 1350g, water 225g (W/C = 0.5).
- Setting time measured according to NF P15-431: Vicat apparatus standard EN 196-3, but using a 1000 g test weight, temperature at 20°C; samples cured at 20°C with a relative humidity above 90%.
- Final setting time measured in accordance with NF P 15-431, and determined when the Vicat needle no longer penetrates the mortar

Mechanical Resistance:

Compressive Strength (MPa)		
age	Usual Range	Specification
6h	20-40	>20
24h	45-60	>35

- Sand mortar prepared in accordance with standard EN 196-1 consisting of cement 450g, sand 1350g, water 225g (W/C = 0.5).
- Test conditions in accordance with EN 196-1; test prisms 40*40*160 mm; temperature at 20°C; samples cured for 24 hours at a relative humidity above 90%.

3 Additional information

The information given below is just for guidance:

Mineralogical Composition:

- Principal Phase*: CA, CA₂
- Secondary Phase*: C₁₂A₇, αA

* C = CaO, A = Al₂O₃

Other Physical Characteristics:

- Pyrometric cone equivalent: 1590- 1620°C
- Bulk Density : 0.9 g/cm³
- Density : 2.90 - 3.05 g/cm³

4 Storage and Shelf Life

As with all hydraulic binders, VICAL[®]71 must be stored in dry conditions, off the ground. In this case, it will retain its properties for at least 12 months. In many instances, experience has demonstrated that properties are retained for more than one year.