



Provisional Product Data

Alphabond 500

Chemical Composition [%]	typical
Al ₂ O ₃ *	83.0
CaO	0.6
Na ₂ O	0.3
SiO ₂	0.3
MOI (% loss 25 – 250 °C)	6.5
LOI (% loss 250 – 1100 °C)	9.2

Particle Size Distribution	Min	Max
d90 [µm] ¹⁾		30
d50 [µm] ¹⁾	4	8

* Al₂O₃ by difference = [100 % – (sum of impurities) – (LOI) – (MOI)]

¹⁾ Microtrac SRA 150

Overview:

Almatis' hydratable alumina binder, Alphabond, is an engineered binder for use in no-cement refractory castable formulations. Alphabond has been developed for applications where the chemistry of the refractory matrix is critical to product performance. Alphabond 500 contains high performance additives for dispersion and set control of castables. At a proportion of Alphabond 500 of 3 % or more no additional additives are required for the castable formulation.



Alphabond 500

General:

Although Alphabond behaves similarly to high purity calcium aluminate cement based castables with respect to working time, setting times, water demand and flow properties, it has some unique characteristics that will be further described in this applications brochure.

Alphabond products are hygroscopic and must be handled with care. When not in use, the product should be stored in closed packaging in cool, dry conditions. Under normal circumstances, with Alphabond's special packaging, a shelf life of twelve months should be expected.

Batching, mixing and casting:

Alphabond 500 is only recommended for use in no-cement castables, with binder content in the range 3 - 7 wt%. The new developed Alphabond 500 improves the mixing behaviour of dense castables using Alphabond. It reduces the required mixing time to fully "wet out" to about 120 Seconds, a level that is comparable to usual low cement castables. When placing the castable, take the normal amount of care to avoid laminations by planning appropriate batch sizes and working time. Vibration levels and times used for high purity calcium aluminate cement based castables should be applied to those castables containing Alphabond.

Curing, drying and firing, with particular attention to the avoidance of explosive spalling:

Alphabond has a distinctly different mechanism of hydration when compared to calcium aluminate cement. A castable containing Alphabond does not need surface moisture during strength development; in fact, presence of moisture may inhibit full strength development, particularly at the surface of the castable. A castable containing Alphabond needs only air-drying until sufficient strength has been developed for handling. However, in very dry or dusty environments, placed castable should be covered with plastic to prevent crazing or dusting.

If cast parts require moving to another location before firing, this should be performed before the part has set, in order to minimize internal damage. Some drying in the mold may be required to develop suitable strength prior to demolding.

For optimum strength development and to avoid explosive spalling, it is essential to understand the dewatering associated with cast parts containing Alphabond. This is best accomplished using thermogravimetric (TGA) data for pure Alphabond. Such data show the critical points where water vapor is released.

Relative rates of dewatering are shown in the curve TG' and indicate the relative rate of dewatering as a function of increasing temperature. The most rapid weight loss is apparent around 140 °C and becomes relatively stable at >350 °C. Studies of Alphabond castables containing microsilica indicate that such castables have extremely low levels of permeability in this temperature range. Once the complete part has passed this temperature range, the part can be heated more rapidly. Small amounts of water vapor still evolve at higher temperatures (350 °C to 600 °C) but this should not contribute to an explosive spall.

Alphabond 500

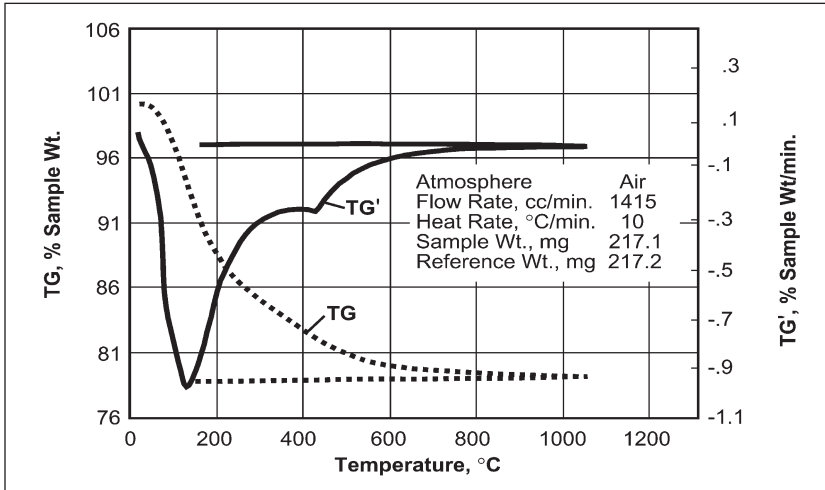


Figure: Thermogravimetric Analysis of Alphabond (neat) hydrated 24 hours before heating

The addition of organic fibers that melt or shrink at or below 150 °C should be used to vent the matrix to reduce the tendency for explosive spalling.

To determine safe rates of heat input during firing, it is recommended that part temperature be used to govern firing schedules by embedding thermocouples in the part and at the surface at the thickest cross section. The ΔT between part and free air should be minimized until the point of maximum vapor release has been passed. For very thick sections, the heating rate should not exceed 1-2 °C/hour until the center of the part has passed 200 °C. In the case of cast-in-place pieces, the cold face of the refractory should be considered equivalent to the center of a precast piece. Such installations should, in all circumstances, be fired at the recommended 1-2 °C/hour until a temperature of > 250 °C is reached at the cold face.



General:

This bulletin is intended to provide guidelines for general use of Alphasbond in refractory castables. It is strongly recommended that an Almatis Applications Manager be consulted regarding proper use of this product.

Alphasbond is packaged in foil-lined 25 kg moisture resistant bags. For price and shipment information, contact your Almatis Regional Account Manager, or Customer Service Representative.

Nothing herein shall be construed as an invitation to use processes covered by patent without proper arrangements with the individuals or companies owning those patents.



Contacts for sales, technical information and application assistance

Almatis GmbH

Giulinistrasse 2
67065 Ludwigshafen
Germany

Phone
49 621 5707 0
Fax
49 621 5707 130

Almatis B.V.

Theemsweg 30
3197KM Botlek RT
The Netherlands

Phone
31 181 2701 00
Fax
31 181 2178 53

Almatis, Inc.

501 West Park Road
Leetsdale, PA 15056, USA

General Phone
800 643 8771
Phone
1 412 630 2800
Fax
1 412 630 2900

Qingdao Almatis Co., Ltd.

F15, Sunshine Tower
61 Hongkong Middle Road
Qingdao, 266071
P.R. China

Phone
86 532 8572 8035
Fax
86 532 8572 8551

Qingdao Almatis Trading Co., Ltd.

Room 1807, Eton Place
69 Dong Fang Road
Shanghai, 200120
P.R. China

Phone
86 21 5879 4987
Fax
86 21 5879 6502

Qingdao Almatis Co., Ltd.

4W-W-# 9 building
Jiming Blocks, Kaifaque
Kaifeng, Henan
P.R. China

Phone
86 378 3850 485
Fax
86 378 3850 485



Headquarters

Almatis GmbH
Lyoner Straße 9
60528 Frankfurt/Germany

Phone **49 69 957 341 0**
Fax **49 69 957 341 13**

info@almatis.com
www.almatis.com

Almatis Alumina Private Limited

Kankaria Estate
2nd Floor
6, Little Russell Street
Calcutta 700-071, India

Phone
91 33 2289 4694
Fax
91 33 2289 4693

Almatis Limited

Morimura Bldg.
1-3-1 Toranomon
Minato-ku, Tokyo 105-8451
Japan

Phone
81 3 3502 2371
Fax
81 3 3502 2375

MSDS 2001