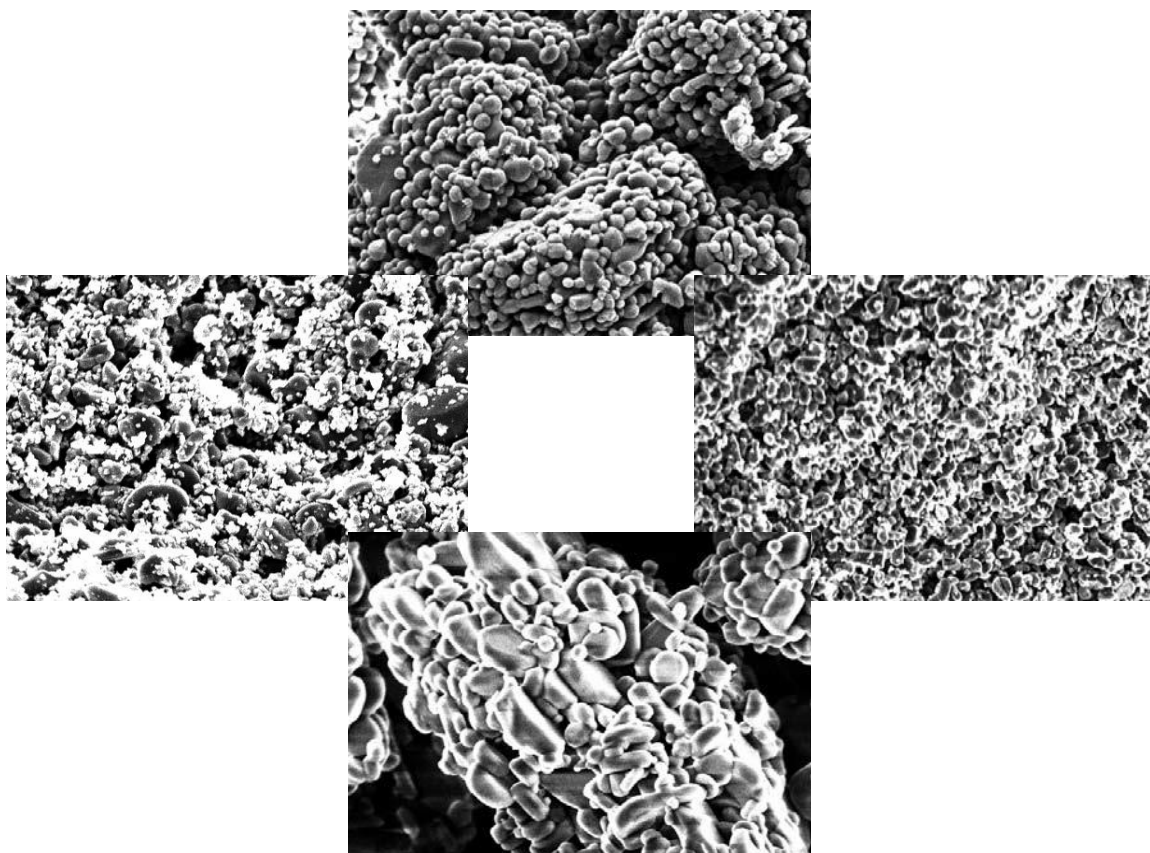


# Calcined and Reactive Aluminas for Refractories





## Ground Calcined Aluminas for Refractories

| Ground                                       |                     | CT 9 G  |      |      |          |      |      |           |      |      |          |      |      |
|--|---------------------|---------|------|------|----------|------|------|-----------|------|------|----------|------|------|
| Properties/Method                            | Unit                | Typical | Min. | Max. | Typical  | Min. | Max. | Typical   | Min. | Max. | Typical  | Min. | Max. |
| Specific Surface Area / BET                  | [m <sup>2</sup> /g] | 0.7     |      |      |          |      |      |           |      |      |          |      |      |
| Particle Size / sieve > 63 µm                | [%]                 | 1.0     |      | 3.0  |          |      |      |           |      |      |          |      |      |
| <b>Chemical Composition</b>                  |                     |         |      |      |          |      |      |           |      |      |          |      |      |
| Al <sub>2</sub> O <sub>3</sub> by difference | [%]                 | 99.5    |      |      |          |      |      |           |      |      |          |      |      |
| Na <sub>2</sub> O                            | [%]                 | 0.15    |      | 0.3  |          |      |      |           |      |      |          |      |      |
| Fe <sub>2</sub> O <sub>3</sub>               | [%]                 | 0.04    |      | 0.06 |          |      |      |           |      |      |          |      |      |
| SiO <sub>2</sub>                             | [%]                 | 0.03    |      | 0.06 |          |      |      |           |      |      |          |      |      |
| Fineground                                   |                     | CT 9 FG |      |      | CT 19 FG |      |      | CT 800 FG |      |      |          |      |      |
| Specific Surface Area / BET                  | [m <sup>2</sup> /g] | 0.80    |      |      | 0.60     | 0.40 | 0.80 | 0.90      | 0.70 | 1.20 |          |      |      |
| Particle Size / D50*                         | [µm]                | 4.0     | 2.0  | 7.0  | 6.0      | 4.0  | 8.0  | 4.0       | 2.7  | 5.3  |          |      |      |
| Particle Size / wet sieve > 45 µm            | [%]                 |         |      |      | 1.0      | 3.0  |      | 0.1       | 3.0  |      |          |      |      |
| Particle Size / > 45 µm*                     | [%]                 | 1.0     |      | 3.0  |          |      |      |           |      |      |          |      |      |
| Water Absorption                             | [%]                 | 20      | 22   |      |          |      |      |           |      |      |          |      |      |
| <b>Chemical Composition</b>                  |                     |         |      |      |          |      |      |           |      |      |          |      |      |
| Al <sub>2</sub> O <sub>3</sub>               | [%]                 | 99.5    |      |      | 99.8     |      |      | 99.7      |      |      |          |      |      |
| Na <sub>2</sub> O                            | [%]                 | 0.15    |      | 0.30 | 0.08     |      | 0.10 | 0.12      |      | 0.15 |          |      |      |
| Fe <sub>2</sub> O <sub>3</sub>               | [%]                 | 0.04    |      | 0.06 | 0.02     |      | 0.04 | 0.02      |      | 0.04 |          |      |      |
| SiO <sub>2</sub>                             | [%]                 | 0.03    |      | 0.06 | 0.02     |      | 0.05 | 0.02      |      | 0.04 |          |      |      |
| Superground                                  |                     |         |      |      |          |      |      | CT 800 SG |      |      | CT 10 SG |      |      |
| Specific Surface Area / BET                  | [m <sup>2</sup> /g] |         |      |      |          |      |      | 1         | 0.80 | 1.50 | 13.0     |      |      |
| Particle Size / D50*                         | [µm]                |         |      |      |          |      |      | 3.4       | 2.5  | 4.0  | 3.5      |      |      |
| Particle Size / wet sieve > 20 µm            | [%]                 |         |      |      |          |      |      |           |      |      | 2.0      |      | 5.0  |
| Particle Size / > 20 µm*                     | [%]                 |         |      |      |          |      |      | 1.2       |      | 3.0  |          |      |      |
| <b>Chemical Composition</b>                  |                     |         |      |      |          |      |      |           |      |      |          |      |      |
| Al <sub>2</sub> O <sub>3</sub> by difference | [%]                 |         |      |      |          |      |      | 99.7      |      |      | 99.5     |      |      |
| Na <sub>2</sub> O                            | [%]                 |         |      |      |          |      |      | 0.12      |      | 0.15 | 0.4      |      | 0.5  |
| Fe <sub>2</sub> O <sub>3</sub>               | [%]                 |         |      |      |          |      |      | 0.02      |      | 0.04 | 0.03     |      | 0.04 |
| SiO <sub>2</sub>                             | [%]                 |         |      |      |          |      |      | 0.02      |      | 0.04 | 0.03     |      | 0.05 |

The typical product properties are based upon the actual averages from production data. The min-max data show our standard product specification data for these products.

All data are based upon Almatix standard test methods. All test methods are available upon request.

\* Laser granulometry Bettersizer S3 Almatix global standard



# Reactive Aluminas for High Performance Refractories

| Product                                      |                     | RG 4000    |      |      | CTC 20     |      |      | CTC 22   |      |      | CL 370   |      |      |
|--|---------------------|------------|------|------|------------|------|------|----------|------|------|----------|------|------|
| Properties / method                          | Unit                | Typical    | Min. | Max. | Typical    | Min. | Max. | Typical  | Min. | Max. | Typical  | Min. | Max. |
| Specific Surface Area / BET                  | [m <sup>2</sup> /g] | 7.2        | 6.0  | 9.5  | 2.1        | 1.5  | 3.0  | 2.7      | 2.0  | 3.5  | 3.0      | 2.6  | 3.4  |
| Particle Size / D50*                         | [μm]                | 0.6        | 0.4  | 0.8  | 1.9        | 1.5  | 2.4  | 1.9      | 1.4  | 2.4  | 2.2      | 1.6  | 2.8  |
| Particle Size / D90*                         | [μm]                | 2.0        |      | 3.0  | 5.0        |      | 7.0  | 5.5      | 3.9  | 7.0  | 7.5      | 5.0  | 10.0 |
| Grain Size Distribution                      |                     | Mono-modal |      |      | Mono-modal |      |      | Bi-modal |      |      | Bi-modal |      |      |
| Chemical Composition                         |                     |            |      |      |            |      |      |          |      |      |          |      |      |
| Al <sub>2</sub> O <sub>3</sub> by difference | [%]                 | 99.8       |      |      | 99.7       |      |      | 99.7     |      |      | 99.7     |      |      |
| Na <sub>2</sub> O                            | [%]                 | 0.08       |      | 0.10 | 0.12       |      | 0.20 | 0.12     |      | 0.20 | 0.10     |      | 0.14 |
| Fe <sub>2</sub> O <sub>3</sub>               | [%]                 | 0.02       |      | 0.04 | 0.03       |      | 0.05 | 0.03     |      | 0.05 | 0.03     |      | 0.04 |
| SiO <sub>2</sub>                             | [%]                 | 0.03       |      | 0.08 | 0.03       |      | 0.08 | 0.03     |      | 0.08 | 0.03     |      | 0.07 |
| CaO  | [%]                 | 0.03       |      |      | 0.03       |      |      | 0.03     |      |      | 0.03     |      |      |

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\* Laser granulometry Battersizer S3 Almatis global standard



# Reactive Aluminas for High Performance Refractories

| Product                                      |                     | CTC 30      |      |      | CTC 40   |      |      | CTC 50      |      |      | CTC 55**    |      |      |
|--|---------------------|-------------|------|------|----------|------|------|-------------|------|------|-------------|------|------|
| Properties / method                          | Unit                | Typical     | Min. | Max. | Typical  | Min. | Max. | Typical     | Min. | Max. | Typical     | Min. | Max. |
| Specific Surface Area / BET                  | [m <sup>2</sup> /g] | 3.8         | 3    | 4.5  | 4.8      | 4    | 5.5  | 4.1         | 3.7  | 5.5  | 3.8         | 3.5  | 4.7  |
| Particle Size / D50*                         | [μm]                | 1.5         | 1.2  | 1.8  | 1.2      | 0.8  | 1.5  | 1.6         | 1.2  | 2.0  | 1.6         | 1.2  | 2.0  |
| Particle Size / D90*                         | [μm]                | 4.5         | 3.0  | 6.0  | 4.3      | 3.4  | 5.6  | 7.5         | 5.5  | 9.5  | 7.5         | 6.0  | 9.5  |
| Grain Size Distribution                      |                     | Multi-modal |      |      | Bi-modal |      |      | Multi-modal |      |      | Multi-modal |      |      |
| <b>Chemical Composition</b>                  |                     |             |      |      |          |      |      |             |      |      |             |      |      |
| Al <sub>2</sub> O <sub>3</sub> by difference | [%]                 | 99.8        |      |      | 99.8     |      |      | 99.8        |      |      | 91.0        |      |      |
| Na <sub>2</sub> O                            | [%]                 | 0.08        |      | 0.12 | 0.08     |      | 0.12 | 0.16        |      | 0.20 | 0.10        |      | 0.20 |
| Fe <sub>2</sub> O <sub>3</sub>               | [%]                 | 0.02        |      |      | 0.03     |      |      | 0.03        |      |      | 0.05        |      |      |
| SiO <sub>2</sub>                             | [%]                 | 0.03        |      | 0.07 | 0.03     |      | 0.07 | 0.03        |      | 0.10 | 0.05        |      | 0.10 |
| CaO  | [%]                 | 0.03        |      |      | 0.03     |      |      | 0.03        |      |      | 0.10        |      |      |
| MgO  | [%]                 |             |      |      |          |      |      |             |      |      | 8.00        | 7.30 | 9.30 |

| Product                                      |                     | E-SY 1000 |      |      | E-SY 2000** |      |      |
|--|---------------------|-----------|------|------|-------------|------|------|
| Properties / method                          | Unit                | Typical   | Min. | Max. | Typical     | Min. | Max. |
| Specific Surface Area / BET                  | [m <sup>2</sup> /g] | 2.0       | 1.6  | 2.3  | 2.3         |      |      |
| Particle Size / D50*                         | [μm]                | 1.8       | 1.5  | 2.3  | 1.8         | 1.5  | 2.3  |
| Particle Size / D90*                         | [μm]                | 11.0      | 8.0  | 15.0 | 10.0        | 5.0  | 15.0 |
| Grain Size Distribution                      |                     | Bi-modal  |      |      | Bi-modal    |      |      |
| <b>Chemical Composition</b>                  |                     |           |      |      |             |      |      |
| Al <sub>2</sub> O <sub>3</sub> by difference | [%]                 | 99.5      |      |      | 88.0        |      |      |
| Na <sub>2</sub> O                            | [%]                 | 0.20      |      | 0.35 | 0.1         |      | 0.20 |
| Fe <sub>2</sub> O <sub>3</sub>               | [%]                 | 0.03      |      |      | 0.06        |      |      |
| SiO <sub>2</sub>                             | [%]                 | 0.03      |      | 0.06 | 0.04        |      | 0.10 |
| CaO  | [%]                 | 0.03      |      |      |             |      |      |
| MgO  | [%]                 |           |      |      | 11.0        | 8.0  | 13.0 |

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\* Laser granulometry Betsizer S3 Almatiss global standard

\*\* CTC 55 is a Reactive Alumina/Spinel (SDS 1000)

# Calcined Aluminas for Refractories

Due to the excellent high temperature properties of  $\alpha$ -Alumina, Calcined Aluminas are used in many refractory applications, both in monolithic and shaped products.

## Product Performance

Depending on the degree of milling and crystal size, Calcined Aluminas serve a variety of different functions in refractory formulations.

Most important are:

- Upgrade product performance by increasing overall Alumina content of these formulations using natural raw materials in order to improve refractoriness and mechanical properties.
- Improve particle packing by increasing the amount of fine particles resulting in better mechanical strength and abrasion resistance.
- Form a matrix of high refractoriness and good thermal shock resistance by reacting with binder components like Calcium Aluminate Cement and / or clays.

# Reactive Aluminas for High Performance Refractories

## Product Description

The fully ground reactive aluminas are specially designed for the production of high performance refractories, where defined particle packing, rheology and consistent placement characteristics are as important as superior physical properties of the final product.

The highly controlled fine particle size distribution down to the sub-micron range and their excellent sintering reactivity give Reactive Aluminas unique functions in refractory formulations.

Most important are:

- Reduce mixing water of monolithic refractories by helping to optimize particle packing.
- Increase abrasion resistance and mechanical strength by the formation of strong ceramic bonds.
- Increase high temperature mechanical performance by substitution of other superfine materials of lower refractoriness.

## Contact for sales, technical information and application assistance

**Head Office**  
Almatris GmbH  
Lyoner Straße 9  
60528 Frankfurt/Germany

[info@almatris.com](mailto:info@almatris.com)  
[www.almatris.com](http://www.almatris.com)

**SDS 387/1000**