

SPECIALTY ALUMINAS FOR

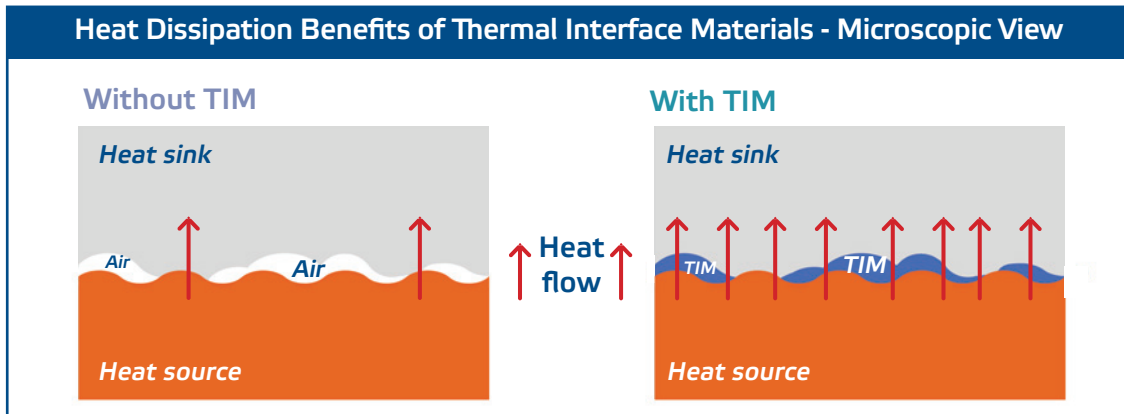
# THERMAL INTERFACE MATERIALS

2022

# ALTEO'S ALUMINAS

## TAKING THE HEAT

Rapid and effective **heat dissipation** is an increasingly important requirement for today's ever more powerful **electronic** components. Similarly, the dramatic rise in demand for new energy vehicles has been made possible largely by **Lithium-ion battery** technology. The sheer number of battery cells required to power vehicles again makes it essential that the substantial heat generated can be conducted away quickly from key working components. **Thermal interface materials** play an important role here and their **thermal conductivity** capabilities arise from fillers such as **TIMal**.

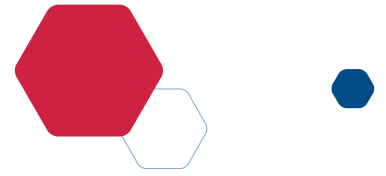


The main forms of thermal interface materials are

- **adhesives** – for bonding and sealing in battery packs and modules
- **potting materials** – to encapsulate or fix electronic or electrical parts
- **gap fillers** – to fill in the gaps between two components.
- **thermal pad** – flexible material with good compression ratio to used for uneven surfaces and for reducing vibration and for shock dampening
- **greases and gel** – when adhesion and rework capabilities are required

| ALUMINA GRADES                                | Unit              | TIMal-G4 | TIMal-G5 | TIMal-J2 | TIMal-J5 | TIMal- 12 | TIMal- 66 | TIMal-16 | TIMal-17 | TIMal-M1 |
|---|-------------------|----------|----------|----------|----------|-----------|-----------|----------|----------|----------|
| <b>Physical Properties</b>                    |                   |          |          |          |          |           |           |          |          | Bi-modal |
| Particle Size Distribution (Cilas)            |                   |          |          |          |          |           |           |          |          |          |
| D10   | µm                | 1.6      | 2.0      | 1.9      | 2.3      | 1.0       | 0.8       | 0.20     | 0.17     | 0.4      |
| D50   | µm                | 4.1      | 5.0      | 5.0      | 5.0      | 2.3       | 1.8       | 0.55     | 0.4      | 2.3      |
| D90   | µm                | 10       | 13       | 12       | 10       | 5.5       | 4.0       | 1.3      | 1.1      | 4.0      |
| Residue wet screen >45µm                      | %                 | 0.1      | 1.5      | 0.5      | 0.01     | 0.2       | 0.05      | 0.1      | 0.1      | 0.2      |
| Specific Surface Area (BET)                   | m <sup>2</sup> /g | 1.0      | 0.8      | 1.0      | 0.75     | 1.8       | 2.5       | 5.5      | 8.0      | 2.5      |
| Oil Absorption (oleic acid)                   | ml/100g           | 18       | 21       | 22       | 18       | 15        | 15        | 17       | 17       | 18       |
| Loss on drying (20-105°C)                     | %                 | 0.1      | 0.05     | 0.05     | 0.1      | 0.05      | 0.1       | 0.2      | 0.3      | 0.15     |
| Loss on ignition (105-1000°C)                 | %                 | 0.2      | 0.15     | 0.1      | 0.2      | 0.15      | 0.3       | 0.4      | 0.5      | 0.3      |
| <b>Chemical Properties</b>                    |                   |          |          |          |          |           |           |          |          |          |
| Al <sub>2</sub> O <sub>3</sub> - on dry basis | %                 | 99.6     | 99.6     | 99.85    | 99.8     | 99.8      | 99.8      | 99.85    | 99.85    | 99.8     |
| Na <sub>2</sub> O soluble                     | ppm               | 700      | 700      | 150      | 700      | 150       | 150       | 400      | 400      | 150      |
| <b>Additional data</b>                        |                   |          |          |          |          |           |           |          |          |          |
| pH  | -                 | 9.0      | 9.0      | 8.8      | 9.0      | 8.8       | 9.3       | 9.2      | 9.7      | 9.0      |
| Electrical conductivity                       | µS/cm             | 80       | 80       | 50       | 90       | 45        | 95        | 140      | 160      | 100      |

*These data are typical data and should not be used as guaranteed limits.*



The TIMal range provides particularly suitable fillers for silicone, **urethane and epoxy** resins.

It can also add heat dissipation properties to

- CCL (copper-clad laminates)
- ceramic **alumina substrates**



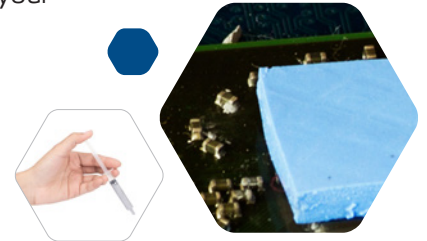
For all these materials TIMal will ensure critical characteristics such as

- **anisotropic thermal conductivity** (W/mK)
- **lowest viscosity with maximum filling**
- **electrical insulation**

This is achieved through strictly controlled

- **particle size distribution**
- **chemistry**

which enables Alteo to offer an extensive range of filler options as indicated in the tables below. Our technical team can help you find the ideal products to meet your material needs.



| ATH GRADES                                    | Unit              | TIMal-H | TIMal-H1 | TIMal-H2 | TIMal-H3 | TIMal-H4 |
|---|-------------------|---------|----------|----------|----------|----------|
| <b>Physical Properties</b>                    |                   |         |          |          |          |          |
| Particle Size Distribution (Cilas)            |                   |         |          |          |          |          |
| D10   | µm                | 35      | 2.2      | 2.5      | 4.9      | 6.0      |
| D50   | µm                | 95      | 8.5      | 11       | 13       | 21       |
| D90   | µm                | 160     | 22       | 26       | 27       | 60       |
| Residue wet screen >45µm                      | %                 | -       | 0.15     | 0.25     | 1        | -        |
| Specific Surface Area (BET)                   | m <sup>2</sup> /g | 0.1     | 4        | 3        | 1.1      | 0.6      |
| Oil Absorption (oleic acid)                   | ml/100g           | 20      | 23       | 21       | 25       | 20       |
| Loss on drying (20-105°C)                     | %                 | 0.05    | 0.4      | 0.3      | 0.15     | 0.05     |
| Loss on ignition (20-1000°C)                  | %                 | 34.6    | 34.6     | 34.6     | 34.6     | 34.6     |
| <b>Chemical Properties</b>                    |                   |         |          |          |          |          |
| Al(OH) <sub>3</sub> - on dry basis            | %                 | 99.8    | 99.8     | 99.8     | 99.8     | 99.8     |
| Al <sub>2</sub> O <sub>3</sub> - on dry basis | %                 | 65      | 65       | 65       | 65       | 65       |
| Na <sub>2</sub> O soluble                     | ppm               | 100     | 100      | 100      | 100      | 100      |
| <b>Additional data</b>                        |                   |         |          |          |          |          |
| pH  | -                 | 9.0     | 9.3      | 9.3      | 9.3      | 9.3      |
| Electrical conductivity                       | µS/cm             | 35      | 60       | 70       | 70       | 50       |

*These data are typical data and should not be used as guaranteed limits.*

## ALTEO R&D

For Alteo, innovation and application R&D are major parts of its growth strategy.

Alteo enhances its R&D capabilities through its application laboratory: the installation of state-of-the-art equipment, the recruitment of technical experts and collaborations with key partners and university laboratories.

Alteo has the know-how and equipment to analyze and evaluate raw materials and finished parts, as well as being able to simulate production processes.

Contact our R&D team now at  
[www.alteo-alumina.com/contact](http://www.alteo-alumina.com/contact)



## CUSTOMER CARE COMMITMENT

To meet your highest expectations, our Customer Care team will always strive to ensure a **first class** service. Our commitment is to provide **full support** from your first call to the delivery of our products; with technical assistance, packing solutions and short lead times.

## ALTEO AT A GLANCE

- A leading integrated supplier of specialty products with the largest production capacity worldwide for calcined, pure and fine alumina.
- A global sales network with 4 regional hubs, 14 offices and more than 35 local warehouses around the world.
- Two development centers in France and China.
- A leading raw material supplier to the following industrial markets: Advanced Ceramics, Performance Refractories, Thermal Management EV-Batteries, Flame retardant, Specialty Glass, Polishing.

Design : Emeline MARTEL - Communication



[www.alteo-alumina.com](http://www.alteo-alumina.com)

