

Aluminas for Application in Electric Vehicles





Aluminas for Battery Separators

Ultra Series

Enhance the performance and safety of your Li-Ion batteries with our aluminas of the Ultra series for coating your separators. Alumina, or aluminum oxide (Al_2O_3), is a superior material known for its exceptional thermal stability, mechanical strength, and electrical insulation properties, making it an ideal choice for high-performance battery applications.

Key Benefits:

- **Precise Particle Distribution:** Our alumina features a tightly controlled particle distribution, ensuring consistent and uniform coating. This precision minimizes irregularities, enhancing the separator's ability to maintain a stable barrier between the anode and cathode.
- **Controlled Grain Size:** We rigorously control the maximum grain size of our alumina, optimizing the coating's mechanical properties and preventing the formation of large grains that could compromise the separator's integrity. This control is critical in maintaining the separator's mechanical robustness and flexibility.
- **High Purity:** Our alumina is characterized by its exceptional purity, containing minimal foreign materials. The low levels of metallic impurities, particularly iron, prevent undesirable reactions within the battery, contributing to longer battery life and more reliable performance.
- **Superior Electrochemical Performance:** The pure and precisely controlled alumina coating minimizes the risk of dendrite formation, which can lead to short circuits. This results in higher energy densities, more efficient charge/discharge cycles, and overall superior battery performance.

By integrating our alumina-coated separators into your Li-Ion batteries, you can achieve a remarkable balance of safety, durability, and efficiency.



Aluminas for Battery Separators

Ultra 6000 & 8000

Ultra 6000 and Ultra 8000 are specialized coatings for battery separators. These products feature a fine particle size with a uniform particle size distribution ($d_{90} < 1.5 \mu\text{m}$ for Ultra 6000 and $< 1.0 \mu\text{m}$ for Ultra 8000), ensuring consistent coverage. With minimal soda content and magnetic impurities, along with stable quality, they contribute to the reliability and longevity of battery separators in electric vehicles. Ultra 6000 and Ultra 8000 offer dependable performance for your battery coating needs.

Almatis "Ultra" products are always supplied as slurries (standard water based, / solvent is also an option). If a powder is required, a dried version can be supplied, it will be labeled with a "D" behind the product name.

To further improve the purity, both products are also available as XLS (extra low soda) and ULS (ultra low soda) versions.

		Ultra 6000 GAS	Ultra 6000 XLS	Ultra 6000 ULS
Chemical Composition	Unit	Typical	Typical	Typical
Al_2O_3 by difference	[%]	99.7	99.8	99.9
Na_2O	[%]	0.08	0.02	0.007
Fe. met.	[ppm]	0	0	0
Properties / Method				
Solid content	[%]		65	
Specific Surface Area / BET	$[\text{m}^2/\text{g}]$	8	8	7
Particle Size / D50	$[\mu\text{m}]$		0.4	
Particle Size / D90	$[\mu\text{m}]$		1.3	

		Ultra 8000 GAS	Ultra 8000 XLS*	Ultra 8000 ULS*
Chemical Composition	Unit	Typical	Typical	Typical
Al_2O_3 by difference	[%]	99.7	99.8	99.9
Na_2O	[%]	0.08	0.02	0.007
Fe. met.	[ppm]	0	0	0
Properties / Method				
Solid content	[%]		65	
Specific Surface Area / BET	$[\text{m}^2/\text{g}]$		10	
Particle Size / D50**	$[\mu\text{m}]$		0.4	
Particle Size / D90**	$[\mu\text{m}]$		1.0	

Standard packaging:

- IBC 1000 kg
- 50 kg barrel



Alumina Fillers for applications in Electric Vehicles

ThermaFill-Series

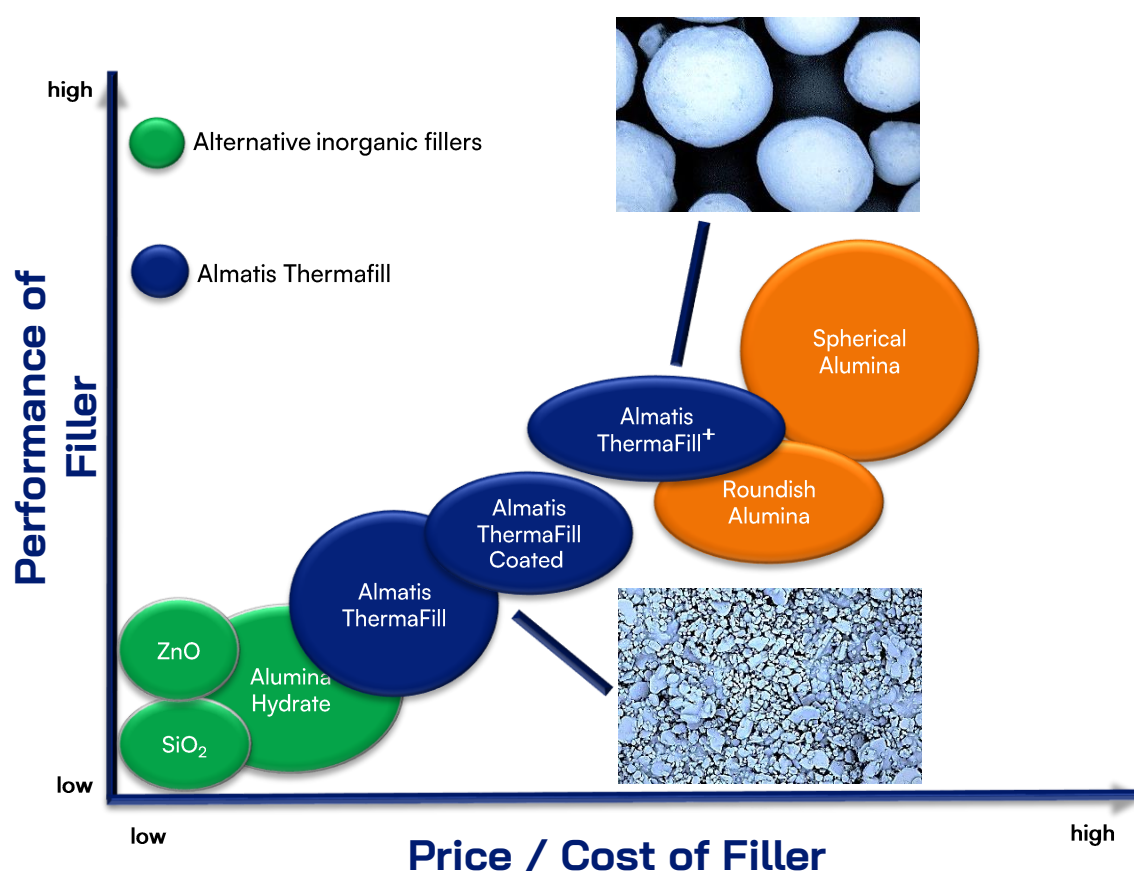
Thermal interface materials play a critical role in various parts of an electric vehicle battery, ensuring efficient heat dissipation to maintain optimal performance and safety. These materials are used between battery cells, between the cells and the housing, and in other critical areas to manage heat effectively.

Alumina is used as a thermal filler to improve the heat dissipation and management in batteries. It offers a high value/cost option to enhance thermal conductivity in polymer systems such as silicone, epoxy, and more.

The ThermaFill product series is designed to meet diverse application needs. With lower viscosity and higher packing efficiency, ThermaFill enables improved thermal conductivity by maximizing the packing density within the compound. Available in various sizes, ThermaFill facilitates higher packing density, further enhancing thermal conductivity performance.

The ThermaFill product series is also available as a surface treated version, empowering users to increase the solids loading in compounds for optimized thermal conductivity. This surface treatment option provides added flexibility and customization to meet specific thermal management requirements.

ThermaFill alumina fillers offer a reliable solution for enhancing thermal conductivity in EV battery systems, ensuring efficient heat dissipation and contributing to overall battery performance and longevity.



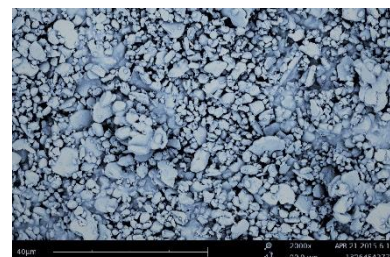


Alumina Fillers for EV Batteries

ThermaFill-Series

ThermaFill products are the economic solution for basic functional filler applications.

The ThermaFill product series is available as a surface treated version, which enables the user to increase the solids loading in compounds for optimized thermal conductivity. There are solutions for Epoxy (E), Silicone (S), Polyol (P) and Urethane (U) available, which are labeled with a suffix accordingly.



SEM Image: ThermaFill 5

ThermaFill								
Chemical Composition	Unit	15	10	8	4	3	2	1
Al ₂ O ₃ Typical	[%]	99.7	99.5	99.5	99.7	99.7	99.7	99.7
Na ₂ O Typical	[%]	0.08	0.4	0.1	0.1	0.1	0.08	0.08
Particle Size Distribution								
		Mono-modal	Mono-modal	Mono-modal	Mono-modal	Bi-modal	Mono-modal	Mono-modal
D50 Typical*	[μm]	15	10	8	3	3	1.2	0.5
Properties / Method								
Specific Surface Area BET Typical	[m ² /g]	0.4	0.8	0.5	2	3	3	7

Standard Packaging

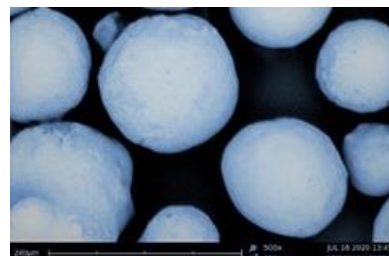
- 25 kg paper bags
- 1000 kg big bags

Aluminas for Thermal Interface Materials

ThermaFill⁺

ThermaFill⁺ is used as an alumina filler designed to yield a higher performance in polymer resin systems, such as silicone, epoxy, etc., for heat dissipation applications. The higher packing efficiency of ThermaFill⁺ compared to standard aluminas allows for a higher filler loading and lower viscosity of the filled resin, offering the potential to significantly increase the thermal conductivity. ThermaFill⁺ provides a cost efficient, high value solution for thermal interface materials.

ThermaFill⁺ is available as a surface treated version, including Epoxy (E), Silicone (S), Polyol (P) and Urethane (U), which are labeled with a suffix accordingly.



SEM image: ThermaFill⁺

ThermaFill ⁺ 80		
Chemical Composition	Unit	Typical
Al ₂ O ₃ Content	[%]	99.7
Na ₂ O	[%]	0.01
Particle Size Distribution		
		Mono-modal
D50 Typical*	[µm]	75
> 200 µm / 74 mesh	[%]	0.1
< 45 µm / 325 mesh	[%]	10
Properties / Method		
Specific Surface Area BET Typical	[m ² /g]	0.25

Standard Packaging

- 25 kg drums
- 1000 kg big bags

Contact for sales, technical information and application assistance

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