

Polymer Add (Thailand) Co.,Ltd.

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APPLICATION PROFILE

ALUMINIUM TRIHYDRATE (ATH) MICRONISED

PRODUCT FORM AND PURPOSE

MICRONISED ALUMINIUM TRIHYDRATE (ATH) is a fine white powder of aluminium hydroxide, $\text{Al}(\text{OH})_3$, intended as a functional mineral additive for plastics, polymer compounds, paints and coatings.

Its principal role is halogen-free flame retardancy and smoke suppression. Controlled micronisation reduces coarse particles and supports uniform incorporation into polymer matrices and coating films. Commercial value depends on the combination of particle-size distribution, whiteness, dispersion, surface characteristics and acceptable formulation viscosity. Fine-ground ATH is commercially established in these application areas.

SPECIFIC COMMERCIAL APPLICATION

The principal application is incorporation into flame-retardant polymer compounds and protective coatings where the mineral must disperse uniformly without introducing unacceptable surface roughness or coarse inclusions.

During exposure to fire, ATH absorbs heat as it decomposes, releases chemically bound water and leaves an inorganic aluminium oxide residue. These effects contribute to reduced burning and smoke generation. Dehydration generally becomes significant around 200–220°C; actual processing suitability depends on the grade, temperature and exposure time.

WHY THE MICRONISED FORM IS USED

The micronised form is selected where coarse ATH particles would interfere with surface finish, dispersion or the uniformity of a thin polymer section or coating film.

Reducing the coarse fraction helps distribute ATH throughout the formulation and limits visible mineral particles. This is particularly relevant to cable coverings, moulded surfaces, gel coats and smooth protective coatings.

The finest particle size is not automatically the best choice. Excessive fines and increased surface area can raise resin demand and viscosity. Particle size, particle shape and surface treatment must therefore be balanced against the required loading and processing behaviour. Mechanically micronised ATH and fine precipitated ATH can have different rheological properties even at similar particle sizes.

TARGET APPLICATION AREAS

APPLICATION	SPECIFIC USE OF MICRONISED ATH
EVA and polyethylene cable compounds	Flame-retardant mineral phase in suitable insulation and sheath formulations. Controlled fineness supports uniform dispersion and smooth extrusion surfaces.
Flexible PVC compounds and plastisol coatings	Flame-retardant and smoke-suppressing component where the processing or fusion cycle is compatible with ATH's thermal stability. Fine particles help limit surface grit.

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Glass-fibre reinforced polyester	Functional flame-retardant filler in moulding and pultrusion formulations. Particle-size distribution is selected to balance dispersion, mineral loading and resin flow.
Polyester gel coats	Fine flame-retardant filler where coarse particles could impair the visible surface. Dispersion, viscosity and finish require evaluation together.
Polymer adhesives and sealants	Flame-retardant filler for suitable formulations requiring a fine mineral phase and controlled application consistency.
Fire-protective paints and coatings	Endothermic flame-retardant filler in suitable ablation and other protective coating systems. Micronised particles support uniform distribution through the applied film.
UV-curable coatings	Fine functional extender where low UV absorption is useful. Grade selection must consider cure depth, viscosity, clarity and surface finish.
White and light-coloured paints	High-whiteness functional extender. Selected sufficiently fine grades may support partial TiO ₂ extension where opacity, colour and gloss are retained in trials.

Fine-ground ATH is commercially offered for cables, reinforced polyester, coatings, adhesives and sealants. UV-coating and pigment-extension applications are also established for selected fine ATH grades.

RELEVANCE TO PLASTICS, POLYMER AND COATING FORMULATORS

MICRONISED ATH is relevant when flame retardancy must be combined with controlled surface appearance and consistent mineral distribution.

The reason to select micronised ATH is the finished product's sensitivity to coarse particles. The required fineness should be determined by section thickness, coating-film thickness, processing equipment and acceptable surface texture.

ATH often requires substantial formulation loading to achieve useful fire performance. Qualification must therefore consider viscosity, flexibility, strength and adhesion alongside flame retardancy. Micronisation alone does not establish a fire classification.

CRITICAL PRODUCT REQUIREMENTS

REQUIREMENT	COMMERCIAL RELEVANCE
Particle-size distribution	Report D50, D90 and D100 using an agreed method. Set the maximum size according to the intended application.
Coarse particles and agglomerates	Control both to reduce grit, visible inclusions and uneven mineral distribution.
Whiteness and colour consistency	Important for white, pastel and exposed polymer or coating surfaces.
Free moisture	Control separately from chemically bound water to support consistent processing and storage.

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Surface area and oil absorption	Influence wetting, resin demand, achievable loading and viscosity.
Surface treatment	Where required, select treatment compatible with the polymer, binder and curing system.
Thermal behaviour	Confirm that compounding, extrusion, fusion and curing conditions avoid premature dehydration.
Purity and soluble impurities	Particularly relevant to electrical compounds and moisture-sensitive formulations.
Batch consistency	Maintain reproducible particle size, colour, moisture and formulation behaviour.

FORMULATION AND HANDLING

ATH should be incorporated progressively under adequate mixing to obtain uniform wetting and dispersion. Liquid coatings may require a suitable dispersant; polymer compounds may benefit from compatible coupling agents or surface-treated material.

Loading should be established through trials using the intended formulation and equipment. Evaluate viscosity or melt flow at the required ATH concentration, together with dispersion and finished surface quality.

Store sealed in a dry location and use controlled powder handling. Processing temperatures and curing exotherms must remain compatible with the selected ATH grade.

DISCLAIMER

This Application Profile is provided for general technical and commercial guidance only. Product suitability, dosage, processing conditions and final performance depend on the customer's formulation, equipment and intended application. Customers must conduct their own trials and confirm compatibility, regulatory compliance, safety and finished product performance before commercial use. The information provided does not constitute a product-performance guarantee or specification unless separately agreed in writing by Polymer Add (Thailand) Co., Ltd.

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