

White and green on red

Almatis' fine precipitated ATH developed as an environmentally friendly flame retardant

IN SEPTEMBER, ALMATIS, the world's leading speciality aluminas producer, launched its range of Hydral® fine precipitated hydrates (alumina trihydrate or ATH) as "Green and Premium".

The German producer claims that its fine precipitated ATH grade is an environmentally friendly flame retardant that provides a non-toxic alternative to halogen-based products.

Market drivers

For some years, toxic, halogen based flame retardants, such as brominated flame retardants (eg. PBDE – polybrominated diphenyl ethers), have been recognised as a major environmental and health concern.

This has encouraged producers of alternative mineral flame retardants, such as ATH and magnesium hydroxide, to put their case forward for competing with greater strength in the market.

In short, ATH works to retard fire by decomposing endothermically, releasing water vapours rather than toxic gases.

ATH is also safe for disposal in landfills or incinerators, so products containing ATH are not subject to the hazardous materials restrictions of halogen containing compounds.

Virgil Fisher, general manager of Specialty Hydrates, Almatis, said: "Alumina trihydrate is the largest volume flame retardant used globally. With more emphasis being placed on green technology, green products and industrial ecology, ATH will continue to be a significantly important additive. As a company that is proficient in alumina technology, we continue to explore ways that ATH can be used more effectively to benefit the environment."

Interest in non-toxic retardants is driven by government regulations and growing public environmental awareness.

"Almatis is planning a capacity increase to meet the growing need for alumina

trihydrate flame retardants. This investment will allow our customers to grow with the market opportunity for safer, greener flame retardants" said Martin Laudenschach, chief executive officer, Almatis.

Grades & uses

Almatis portfolio includes offers a wide range of speciality aluminas, including a range of ATH grades which are available in several ground and unground grades of varying purity and particle sizes.

On heating, ATH condenses with itself releasing 34% water to form aluminium oxide (alumina). This process is, in part, what makes ATH an effective flamer. Applications include chemicals, catalysts, ceramics, polymers, paper, and coatings.

Almatis' Hydral® products are specially precipitated aluminium trihydroxides: ultra-fine, crystalline, organic-free, pure white powders.

The products can be tailored for specific applications, and display superior flame retardant and smoke suppressant properties.

Almatis state Hydral®'s benefits:

- higher loadings for polymers
- higher temperature processability
- greater efficiency as a flame retardant
- extreme whiteness
- better polymer processability
- improvement of tensile and impact properties in some polymer systems
- more resistant than ground hydrates to higher process temperatures

Almatis considers the grade to be a premium product owing to its ultra-fine, organic-free and very high purity; availability in a range of particle sizes and bulk densities; and surface treatment available. There is also the security of supply in Asia, Europe, and Americas from Almatis' global network of plants and distribution outlets.

Hydral® applications also include: fillers and coating pigments, pigments adhesives and adhesive tapes.

Hydral® grades

Hydral® 710 extra fine, has a median particle diameter of 1 micron with 90% of the powder within 0.5 micron of the median.

Hydral® PGA is Hydral 710 that has been spray dried in the presence of a dispersant. Spray drying increases the bulk density and improves flow characteristics for better handling and bulk shipping.

Hydral® PGA HD is also spray dried 1 micron precipitated ATH. It has a loose bulk density that is 25% higher than regular Hydral PGA. It is designed for applications where flow and bulk density is critical to the compounding process.

Hydral® 9280 is a newly developed 1.8 micron precipitated ATH with reduced surface area. It improves extrusion and injection moulding performance by reducing the formulation viscosity and rheological stresses.

Hydral® 6581 has been modified using a specially selected vinyl silane treatment applied with a proprietary process that provides a uniform coating on the ATH. The selection of various silane treatments can make the material more hydrophilic or hydrophobic, thereby improving polymer compatibility.

Typical specification for Hydral® 9280

Chemical composition (%)

SiO ₂	0.002 - 0.009
Fe ₂ O ₃	0.004-0.013
Na ₂ O (total)	0.17-0.37
Na ₂ O (soluble)	0.016
Al(OH) ₃	99.4-99.6
Moisture	0.13

Physical properties

Loose bulk density (g/cm ³)	22
Packed bulk density (g/cm ³)	42
Surface area (m ² /g)	3
Brightness (% Z)	99+
Refractive index	1.57
Mohs hardness	2.5-3.5
Electrical conductivity (μS/cm)	< 100
Colour L*	91.5
a*	-0.14
b*	1.8

Particle size

% on 325 mesh	0.001
d95 (μ)	3.5
d50 (μ)	1.8
d10 (μ)	1.08

Source: Almatis