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CLARIANT®

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Additives

Exolit® AP 422

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Fine-grained white APP (phase II) powder with low water solubility

Product Description

Exolit AP 422 is a fine-particle ammonium polyphosphate (phase II) produced by a special method. The product is largely insoluble in water and completely insoluble in organic solvents. It is colorless, non-hygroscopic and non-flammable.

Benefits

- Non-halogenated flame retardant with favorable environmental and health profile.
- Greatly reduced water solubility, low viscosity in aqueous suspension, very low acid number.
- Particularly suitable as an "acid donor" for intumescent coatings thanks to its low water solubility. Steel structures coated with intumescent paints can meet the requirements of fire resistance classes specified in EN, DIN, BS, ASTM and others.
- Their application on wood or plastics enables these materials to qualify for Building Material Class B (DIN EN 13501-1).
- Excellent flame-retardant effect in cellulose-containing materials such as paper and wood products. With chipboard products, the DIN EN 13501-1 classification can be achieved by adding 15-20 % Exolit® AP 422.
- Excellent flame-retardant effect in polyolefin based wood plastic composites (WPC) with high wood contents (> 50%) at a dosage of 10-15% Exolit AP 422.
- Imparts a good flame-retardant effect to adhesives and sealants when it is incorporated into the base formulation at the rate of 10-20%.
- Efficient non-halogenated alternative for conventional flame retardants (e.g. TCPP) in various PUR applications, with minimum impact on reaction profiles and material properties.
- An essential component in intumescent formulations for thermoplastics, particularly polypropylene, for which the classification UL 94-V0 is specified for applications in the electrical sector. However, for PP V-o injection molding applications Exolit AP 766 as ready-made intumescent formulation is recommended.
- In the case of thermosets like epoxy resins and unsaturated polyester resins, it paves the way for the production of lightweight components with low solids content.
- Can be used in transport applications to obtain good fire, smoke and toxicity results.
- (Bio-)degradable by breaking down to naturally occurring phosphate and ammonia.

Specifications

Characteristics	Unit	Target value	DS ¹⁾
Appearance		powder	□
Chemical Formula		$[\text{NH}_4\text{PO}_3]_n$ $n > 1000$	☑
Phosphorus	% (w/w)	31.0 - 32.0	☑
Water / Moisture	% (w/w)	max. 0.25	☑
Nitrogen	% (w/w)	14.0 - 15.0	☑
Density	g/cm ³	1.9	☑
Bulk Density	g/cm ³	approx. 0.7	□
Viscosity	mPa*s	max. 100	□
pH Value		5.5 - 7.5	☑
Solubility in Water	% (w/w)	max. 0.5	☑
Acid Number	mg KOH/g	max. 1	☑
Decomposition Temperature	°C	> 275	□
Average Particle Size (D50)	µm	approx. 17	□
Particle Size Distribution	% (w/w)		☑
	> 100 µm	max. 0.2 (DS)	
	< 50 µm	min. 95 (TD)	
Weight Loss	% (w/w)		□
	350 °C	approx. 5	
	450 °C	approx. 10	
	550 °C	approx. 20	

¹⁾ Delivery specification: The product is monitored on a regular basis to ensure that it adheres to the specified values. Test methods: Clariant method numbers 11/xx in brackets.

²⁾ Technical data: The technical data are used solely to describe the product and are not subject to regular monitoring.

Applications

Intumescent coatings On account of its low water solubility, Exolit AP 422 is particularly suitable as an "acid donor" for intumescent coatings. Other essential components of intumescent systems include a binder, a carbon donor (e.g. pentaerythritol) and a blowing agent (e.g. melamine). On exposure to flame, intumescent coatings form a carbonaceous foam which effectively shields the underlying material from temperature increases. Steel structures coated with intumescent paints can meet the requirements of fire resistance classes specified in EN, DIN, BS, ASTM and others. The application of Exolit AP 422 based intumescent coatings on wood or plastics enables these materials to qualify for Building Material Class B (DIN EN 13501-1). Exolit AP 422 imparts a good flame-retardant effect to adhesives and sealants when it is incorporated into the base formulation at the rate of 10-20 %.

Polyurethane foams

Exolit AP 422 is a highly suitable replacement for TCPP in pentane-blown rigid PIR/PUR foams. B2 ratings according to DIN 4102 can be safely achieved with dosages in the range of 10-15 php, depending on the target density.

In rigid integral skin foam, e.g. for E&E applications, Exolit AP 422 can be used to achieve UL 94 (V0) ratings. Unlike many liquid additive flame retardants, Exolit AP 422 does not show an unwanted plasticizing effect.

Exolit AP 422 can also be used in flexible polyester-based PUR foams. Owing to the extremely low vapour pressure and water-solubility, it is an excellent flame retardant for low-emission foams, e.g. in automotive or consumer applications.

Exolit AP 422 can be easily dispersed in most common polyols and circulated in standard production setups. It shows significantly lower abrasiveness than other filler-type additives.

Compared to many other APP grades with higher acid number and solubility, Exolit AP 422 shows minimum impact on amine catalysts.

Other applications In composites for transport applications it can be used to control fire, smoke and toxicity. Especially in railway (EN 45545-2) and aviation (FAR 25.853) applications low smoke density and toxicity is a key requirement. Exolit AP 422 has an excellent flame-retardant effect in cellulose-containing materials such as paper and wood products. With chipboard products, the DIN EN 13501-1 classification can be achieved by adding 15-20 % Exolit AP 422. Exolit AP 422 shows an excellent flame retardant effect in polyolefin based wood plastic composites (WPC) with high wood contents (> 50%) at a dosage of 10-15% Exolit AP 422. Because of its high heat stability, Exolit AP 422 is an essential component in intumescent formulations for thermoplastics, particularly polypropylene, for which the classification UL 94-V0 is specified for applications in the electrical sector. However, for PP V-o injection molding applications Exolit AP 766 as ready-made intumescent formulation is recommended. Casting resins and composites based on epoxy resins or unsaturated polyester resins achieve the classification UL 94-V0 with Exolit AP 422. Combinations of AP 422 with ATH show synergistic effects in UL94 and LOI tests.

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Packaging and Handling

Delivery form
White powder

Packaging

Exolit AP 422 is packed in 25 kg 4-ply paper bags with polyethylene liner. The standard supply unit is a shrink-wrapped pallet with 40 bags weighing 1000 kg net. Exolit AP 422 can also be supplied in a variety of big bags, shrink-wrapped.

EcoTain®

Products that offer outstanding sustainability advantages are awarded Clariant's EcoTain® label. EcoTain® products significantly exceed sustainability market standards, have best-in-class performance and contribute overall to sustainability efforts of the company and our customers. Find out more about: [EcoTain®](#).



PEOPLE



SAFE USE, TRANSPARENCY AND INFORMATION

- Non hazardous, studies on life cycle data available



ADDRESSING MEGATRENDS AND SOCIETAL NEEDS

- Saves lives and assets as a (halogen free) flame retardant



PLANET



RAW MATERIALS AND SUSTAINABLE SOURCING

- Phosphorus is on the EU list of critical raw materials, however, recycling is possible and actively investigated



RESOURCE EFFICIENCY AND ENVIRONMENTAL PROTECTION

- High material efficiency and minimized waste in production through recycling of raw materials



PERFORMANCE



INTEGRATED SUSTAINABLE BUSINESS

- Joint developments with customers on formulations



PERFORMANCE ADVANTAGES

- Constant high quality and hydrolytic stability
- Supports the attainability of eco-labels for customer products

Safety

For regulatory details such as the classification and labeling as dangerous substances or goods please refer to our corresponding Material Safety Data Sheet.

Contact Us;

Please contact us for safety and regulatory details or the Material Safety Data Sheet (MSDS).

www.clariant.com



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