CLARIANT

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Exolit™ AP 422 A

Edition Date October 24, 2024 **Edition Number**

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

Product Description

Exolit AP 422 A is a fine-particle ammonium polyphosphate (phase II) with less than 0.1% melamine. The product is largely insoluble in water and completely insoluble in organic solvents. It is colorless, non-hygroscopic, non-flammable, and classified as SVHC-free under current regulations.

Benefits

- Non-halogenated flame retardant with favorable environmental and health profile, free of SVHCs *)
- 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 A.
- 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 A.
- 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.

*) according to Article 31 of the REACH Regulation (Regulation (EC) No 1907/2006

Specifications

Characteristics	Unit	Target value	DS[1])	TD[2])	Test method
Appearance		colorless, free-flowing powder	☑	☐	Visual Evaluation
Chemical Formula		$[NH_4PO_3]_n$ n > 1000	☑	☐	
Phosphorus	% (w/w)	31.0 – 32.0	☑	☐	Photometry after oxidizing dissolution; (11/17)
Water / Moisture	% (w/w)	max. 0.25	☑	☐	Thermogravimetry at 130 °C; (11/03)
Nitrogen	% (w/w)	14.0 – 15.0	☑	☐	Elemental analysis; (11/07)
Bulk Density	g/cm^3	approx. 0.7	☐	☑	
Viscosity	mPa*s	max. 100	☐	☑	at 25 °C in 10 % aqueous suspension
pH Value		5.5 – 7.5	☑	☐	Potentiometry in 10 % aqueous suspension; (11/12)
Solubility in Water	% (w/w)	max. 0.8	☑	☐	Gravimetry after filtration of a 10 % aqueous suspension at 25 °C; (11/41)
Acid Number	mg KOH/g	max. 1	☑	☐	ISO 2114 10 % aqueous suspension; (11/11)
Decomposition Temperature	°C	> 275	☐	☑	Initial evolution of ammonia
Average Particle Size (D50)	µm	approx. 17	☐	☑	
Particle Size Distribution	% (w/w)		☑	☐	Air jet sieving; (11/02)
	> 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 A 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 A based intumescent coatings on wood or plastics enables these materials to qualify for Building Material Class B (DIN EN 13501-1). Exolit AP 422 A 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 A 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 A does not show an unwanted plasticizing effect.
Exolit AP 422 A 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 A 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 A 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 A 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 A. Exolit AP 422 A 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 A .Because of its high heat stability, Exolit AP 422 A 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 A . Combinations of AP 422 A with ATH show synergistic effects in UL94 and LOI tests.

Packaging and Handling

Delivery form
White powder

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

Storage
Minimum shelf life is 12 months from the date of shipping when stored according to the said conditions.

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).