



Product Data Sheet - Flame Retardants

Additives

Exolit® AP 422

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 colourless, 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)
- Imparts a good flame-retardant effect to adhesives and sealants when it is incorporated into the base formulation at the rate of 10 - 20%
- Suitable non-halogenated flame retardant for polyurethane foams. PUR Foams with Exolit® AP 422 can be recycled
- 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
- 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
- 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
- (Bio-)degradable by breaking down to naturally occurring phosphate and ammonia

Specifications

Characteristics	Unit	Target value	DS ¹⁾	TD ²⁾	Test method
Chemical Formula		[NH ₄ PO ₃] _n n > 1000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Phosphorus	% (w/w)	31.0 - 32.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Photometry after oxidizing dissolution; (11/17)
Water / Moisture	% (w/w)	max. 0.25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Thermogravimetry at 130 °C; (11/03)
Nitrogen	% (w/w)	14.0 - 15.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Elemental analysis; (11/07)
Density	g/cm ³	1.9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	at 25 °C
Bulk Density	g/cm ³	approx. 0.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Viscosity	mPa*s	max. 100	<input type="checkbox"/>	<input checked="" type="checkbox"/>	at 25 °C in 10 % aqueous suspension
pH Value		5.5 - 7.5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potentiometry in 10 % aqueous suspension; (11/12)
Solubility in Water	% (w/w)	max. 0.5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gravimetry after filtration of a 10 % aqueous suspension at 25 °C; (11/41)
Acid Number	mg KOH/g	max. 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Titration using alkali in 10 % aqueous suspension; (11/11)
Decomposition Temperature	°C	> 275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Initial evolution of ammonia
Average Particle Size (D50)	µm	approx. 17	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Particle Size Distribution	% (w/w)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air jet sieving; (11/02)
	> 100 µm	max. 0.2 (DS)			
	< 50 µm	min. 95 (TD)			
Weight Loss	% (w/w)		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	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 suitable non-halogenated flame retardant for polyurethane foams. If handling of Exolit AP 422 as a solid is not possible we recommend the dosage of the flame retardant by preparing an Exolit AP 422/polyol-suspension. Because of the low acid number of Exolit AP 422, it is also possible to incorporate this flame retardant in an Exolit AP 422/isocyanate suspension.

To prevent the solids from settling, the Exolit AP 422 suspensions should be stirred or circulated by pump. The stirrers commonly found in service tanks are adequate for this purpose.

Other applications

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.

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.

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.

Packaging and Handling

Delivery form

White powder

Packaging

Exolit AP 422 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 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.