ECOTAIN®

CLARIANT

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Exolit® AP 435

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Ammonium Polyphosphate

Product Description

Exolit® AP 435 is a fine-particle ammonium polyphosphate (phase II) optimized for low viscosity in aqueous suspension and intumescent coatings. The product is largely insoluble in water and completely insoluble in organic solvents. It is colourless, non-hygroscopic and non-flammable.

Benefits

- Optimized for low viscosity in aqueous suspension, low water solubility and low acid number
- Non-halogenated flame retardant with favorable environmental and health profile
- 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 435 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 435
- 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

Specification

Characteristics	Unit	Target value	DS[1])	TD[2])	Test method
Chemical Formula		[NH4PO3]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)
Density	g/cm³	1.9	☐	☑	at 25 °C
Bulk Density	g/cm³	approx. 0.7	☐	☑	
Viscosity	mPa*s	max. 40	☐	☑	at 25 °C in 10 % aqueous suspension
pH Value		5-8	☑	☐	Potentiometry in 10 % aqueous suspension; (11/12)
Solubility in Water	% (w/w)	max. 0.5	☑	☐	Gravimetry after filtration of a 10 % aqueous suspension at 25 °C; (11/41)
Acid Number	mg KOH/g	max. 2	☑	☐	Titration using alkali in 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 435 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 435 based intumescent coatings on wood or plastics enables these materials to qualify for Building Material Class B (DIN EN 13501-1).
- Exolit® AP 435 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 435 is a suitable non-halogenated flame retardant for polyurethane foams. If handling of Exolit® AP 435 as a solid is not possible we recommend the dosage of the flame retardant by preparing an Exolit® AP 435 /polyol-suspension. Because of the low acid number of Exolit® AP 435, it is also possible to incorporate this flame retardant in an Exolit® AP 435/isocyanate suspension.
- To prevent the solids from settling, the Exolit® AP 435 suspensions should be stirred or circulated by pump. The stirrers commonly found in service tanks are adequate for this purpose.

Other applications

- Exolit® AP 435 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 435.
- Because of its high heat stability, Exolit® AP 435 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 435. Combinations of AP 435 with ATH show synergistic effects in UL94 and LOI tests.

Packaging and Handling

Delivery form
White powder

Packaging
Exolit® AP 435 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 435 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.

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

- Non hazardous, studies on life cycle data available
- Contributes to saving lives and assets as a flame retardant, supports the global trend towards low-VOC formulations

PLANET

- Phosphorus is on the EU list of critical raw materials, however, recycling is possible and actively investigated
- Increased material efficiency and reduced waste generation in production through recycling of raw material

PERFORMANCE

- Joint developments with customers on formulations
- Improves long-term stability of waterborne solutions. Lower VOC emissions enable the obtainment of e. g. Leadership in Energy and Environmental Design or other certifications according to ISO 16000

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
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