

## Water-soluble ammonium polyphosphate (TF-301,302)

Molecular formula : (NH<sub>4</sub>)<sub>n+2</sub>P<sub>n</sub>O<sub>3n+1</sub> n<20

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF-301 , 302

Other name: polyphosphoric acids, ammonium salts

Properties: Ammonium polyphosphate with short chain and low polymerization degree, PH value is neutral.

Appearance : White powder or lumps, easy to absorb water and good solubility. The water solution is clear.

#### Technical Data Sheet / Specification :

Specification	TF-301	TF-302 (Low arsenic)
Appearance	White powder or lumps	White powder or lumps
P₂O₅ content (w/w)	≥45%	≥45%
N content (w/w)	≥24%	≥24%
pH value(10% water solution)	6.5-8.5	6.5-8.5
Solubility (at 25ºC in 100ml water)	≥80g	≥80g
Water insoluble(25°C)	≤0.02%	≤0.02%
Arsenic	/	2ppm max

#### **Characteristics :**

1. Lump solid, stable property, convenient for transportation, storage and use ;

2. pH value is neutral, safe and stable during production and use, good compatibleness, not to react with other flame retardant and auxiliary;

3. High P-N content, appropriate proportion, excellent synergistic effect and reasonable price.

#### Application :

**1.** Aqueous solution is used for the retardant treatment .To prepare 20-25%P-N flame retardant, used solely or together with other materials in the flameproof treatment for textiles, papers, fibers and woods, etc. To apply by autoclave, immersion or by spray both ok. If special treatment, it can be used to prepare high-concentration flameproof liquid to 50% to meet the flameproof requirement of special production.

2. It also can be used as flame retardant in water based fire extinguisher and wood varnish,

3. It is also used as a high concentration of binary compound fertilizer, slow released fertilizer.

Packing: 25kg plastic woven bag with PE liner, 17mt/20'fcl without pallets, 13mt/20'fcl with pallets.



# Water-soluble ammonium polyphosphate ( TF-303, 304)

Molecular formula : (NH<sub>4</sub>)<sub>n+2</sub>P<sub>n</sub>O<sub>3n+1</sub> n<20

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF- 303, 304

Other name: polyphosphoric acids, ammonium salts

**Properties:** Ammonium polyphosphate with short chain and low polymerization degree, PH value is neutral. **Appearance :** White powder or lumps, easy to absorb water and good solubility. The water solution is clear.

Technical Data Sheet / Specification :
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Specification	TF-303(high P content)	TF-304(high P and low arsenic)
Appearance	White crystalline powder	White crystalline powder
P <sub>2</sub> O <sub>5</sub> content (w/w)	≥59.5%	≥59.5%
N content (w/w)	≥17.5%	≥17.5%
pH value(10% water solution)	5.0-7.0	5.0-7.0
Solubility (at 25ºC in 100ml water)	≥150g	≥150g
Water insoluble(25ºC)	≤0.02%	≤0.02%
Arsenic	/	2ppm max

#### **Characteristics :**

1. Lump solid, stable property, convenient for transportation, storage and use ;

2. pH value is neutral, safe and stable during production and use, good compatibleness, not to react with other flame retardant and auxiliary;

3. High P-N content, appropriate proportion, excellent synergistic effect and reasonable price.

#### Application :

**1.** Aqueous solution is used for the retardant treatment .To prepare 15-25%P-N flame retardant, used solely or together with other materials in the flameproof treatment for textiles, papers, fibers and woods, etc. To apply by autoclave, immersion or by spray both ok. If special treatment, it can be used to prepare high-concentration flameproof liquid to 50% to meet the flameproof requirement of special production.

2. It also can be used as flame retardant in water based fire extinguisher and wood varnish.

3. It is also used as a high concentration of binary compound fertilizer, slow released fertilizer.

Packing: 25kg/bag, 24mt/fcl without pallet, 20mt/fcl with pallet.



## Ammonium polyphosphate

(phase-l)

Molecular formula : (NH<sub>4</sub>)<sub>n+2</sub>P<sub>n</sub>O<sub>3n+1 n>50</sub>

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF-101

Ammonium polyphosphate(APP) is an excellent, high-efficiency and nontoxic inorganic flame retardant, used as the necessary flame-proof additive for all kinds of expanding-type flameproof paint and flame retardant products.

Specification :

Specification	Value
	TF-101
Appearance	White powder
P <sub>2</sub> O <sub>5</sub> (w/w)	≥67.5%
N Content (w/w)	≥13%
Solubility (10% aq., at 25°C)	<1.5 %
pH value ( 10% aq., at 25°C)	6.0-8.0
Moisture (w/w)	<0.3%
Viscosity ( 10% aq., at 25ºC)	≤50
Average Particle size(D50)	15~25µm

#### Use :

1.make into powder extinguishing agent to be used in large-area outfire for forest, oil field and coal field, etc.

2. used to prepare many kinds of high-efficiency expanding-type flameproof coating, adhesive, bond, the flameproof treatment for multistory building, trains, etc.

3. used in the flameproof treatment for woods, plywood, fiberboard, papers, fibers, etc.

Packing: 25kg/bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets. Other packing as request.



# Ammonium polyphosphate (phase-II)

Molecular formula : (NH<sub>4</sub>PO<sub>3</sub>)n n>1000

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF-201, TF-201S

**Ammonium polyphosphate (Phase II)** is a non-halogen flame retardant. It acts as flame retardant by intumescence mechanism. When APP-II is exposed to fire or heat, it decomposes to polymeric phosphate acid and ammonia. The polyphosphoric acid reacts with hydroxyl groups to form a nonstable phosphateester. Following dehydration of the phosphateester, a carbon foam is built up on the surface and acts as an insulation layer.

#### Specification :

Specification	TF-201	TF-201S
Appearance	White powder	White powder
P <sub>2</sub> O <sub>5</sub> (w/w)	≥71%	≥70%
N Content (w/w)	≥14%	≥14%
Decomposition Temperature (TGA, 99%)	> <b>275</b> ℃	> <b>275</b> ℃
Solubility (10% aq. , at 25ºC)	<0.45%	<0.7%
pH value (10% aq. At 25℃)	5.5-7.5	5.5-7.5
Viscosity (10% aq, at 25℃)	<20 mpa.s	<20 mpa.s
Moisture (w/w)	<0.25%	<0.25%
Average Partical size (D50)	15~25µm	<12µm

#### Applications:

1. used to prepare many kinds of high-efficiency intumescent coating, the flameproof treatment for wood, multistory building, ships, trains, cables, etc.

2. used as the main flameproof additive for expanding-type flame retardant used in plastic, resin, rubber, etc.

3. make into powder extinguishing agent to be used in large-area outfire for forest, oil field and coal field, etc.

4. In plastics(PP, PE, etc. ), Polyester, Rubber, and Expandable fireproof coatings.

5. used for textile coatings.

Packing : TF-201 25kg/bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets. Other packing as request.
TF-201S 20kg/bag, 20mt/20'fcl without pallets, 18mt/20'fcl with pallets. Other packing as request.



## Ammonium polyphosphate

(phase-II) treated by silane

Molecular formula :  $(NH_4PO_3)_n$  (n>1000)

CAS No.: 68333-79-9

HS CODE: 2835.3900

Model No.: TF-201W

**TF-201W** is a kind of silane treated APP phase II. Its advantages are **excellent water resistance** and

good compatibility with organic polymers and resins. It is hydrophilic.

Item	TF-201W
Appearance	White powder
P <sub>2</sub> O <sub>5</sub> content	≥70%
N content	≥14%
Solubility (g/100ml water, at $25^{\circ}$ C)	<0.35
pH value (10% aqueous suspension)	5.5-7.5
Viscosity (10% aqueous suspension, at $25^{\circ}$ C)	<20mPas
Moisture (w/w)	<0.25%
Average Particle size (D50)	about 18µm

## Applications:

Used for polyolefin, Epoxy resin(EP) , unsaturated polyester(UP), rigid PU foam, rubber cable ,

intumescent coating, textile backing coating, powder extinguisher etc.

**Packing :** 25kg/bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets. **Storage:** in dry and cool place, keeping out of moisture and sunshine, shelf life two years.



## Ammonium polyphosphate

(phase-II) treated by Organic silicone

Molecular formula :  $(NH_4PO_3)_n$  (n>1000)

CAS No.: 68333-79-9

HS CODE: 2835.3900

Model No.: TF-201G, TF-201SG

201G is a kind of organic silicone treated APP phase II. It is hydrophobic.

#### Characteristics:

## 1. Strong hydrophobicity which can flow on the water surface.

- 2. Good powder flowability
- 3. Good compatibility with organic polymers and resins.

Advantage: Compared to APP phase II, 201G has better dispersibility and compatibility, higher,

performance on flame retardant. what's more, less affect on mechanic property.

## **Specification:**

Specification	TF-201G	TF-201SG
Appearance	White powder	White powder
P <sub>2</sub> O <sub>5</sub> Content (w/w)	≥70%	≥70%
N Content (w/w)	≥14%	≥14%
Decomposition Temperature (TGA, Onset)	>275 °C	>275 °C
Moisture (w/w)	<0.25%	<0.25%
Average Particle Size D <sub>50</sub>	about 18µm	<12µm
Solubility (g/100ml water, at 25ºC)	floating on the water	floating on the water
	surface, not easy to test	surface, not easy to test

**Application**: Used for polyolefin, Epoxy resin (EP), unsaturated polyester (UP), rigid PU foam, rubber cable, intumescent coating, textile backing coating, powder extinguisher, hot melt felt, fire retardant fiberboard, etc.

**Packing : 201G,** 25kg/bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets.

201SG: 20kg/bag, 20mt/20'fcl without pallets, 18mt/20'fcl with pallets.



# Ammonium Polyphosphate

## (Specially for textile back coatings) TF- 211

IF- Z'

Molecular formula : (NH<sub>4</sub>PO<sub>3</sub>)n, n>1000

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF-211

Product description: TF-211 is a phosphorus containing non-halogen flame retardant dedicated for textile coating.

Technical Data Sheet / Specification :

Specification	TF-211
Appearance	White powder
P₂O₅ content (w/w)	≥70%
N content (w/w)	≥14%
pH value (10% aqueous suspension, at 25°C)	5.5-7.5
Moisture (w/w)	≤0.5%
Decomposition temperature	≥ <b>260</b> °C
Solubility (25°C, g/100ml)	≤0.5
Average particle size ( D <sub>50</sub> )	about 18µm
Bulk density	0.8-1.2 g/cm <sup>3</sup>

#### **Characteristics :**

1. Halogen-free and none heavy metal ions.

2. Stain resistance for hot water. Low water solubility, not easy to precipitate under high temperature and high humidity conditions.

3. Good compatibility with organic polymers and resins, especially acrylic emulsion.

#### Application:

Suitable for all types of flame-retardant textile coatings, especially for hot-water-stain-resistance acrylic emulsion coatings.

Packing: 25kg /bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets. Other packing as request.



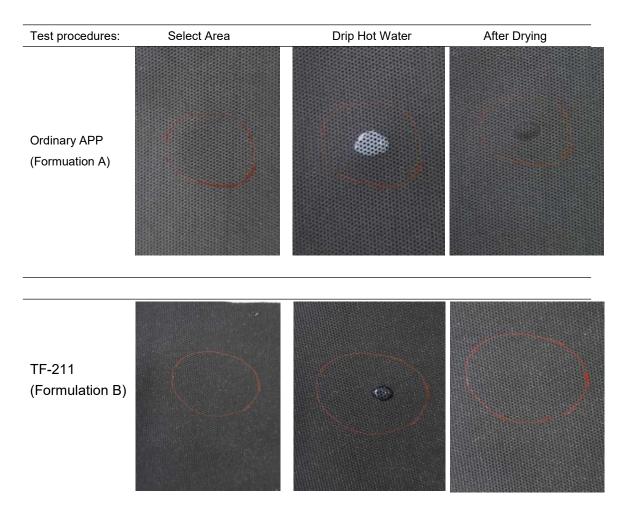
# TF-211 Hot Water Stain Resistance Experiment for FR Textile

#### **Contrast Experimental Operation**

Coating Formulation (%):

	Ordinary APP	TF-211	Acrylic Emulsion	Dispersing Agent	Defoaming Agent	Thickening Agent
А	35	/	63.7	0.25	0.05	1.0
В	1	35	63.7	0.25	0.05	1.0

- 1. Prepare textile backing coating: Prepare the coating according to the formula and scratch it on the surface of black base textile (polyester fiber). The thickness of the coating ≤0.1mm, and heat-treat it in the oven at 120 °C for 3-5min, then the test sample was obtained.
- 2. Hot water stain test: 60-70 °C hot water drip on to the coated side of back coating textile, select 4 to 5 stains and drying them in the oven at 60-70 °C for 10min, the test results are as follows:





## Ammonium Polyphosphate (Epoxy resin coated APP) TF-212

Molecular formula: (NH<sub>4</sub>PO<sub>3</sub>)n, n>1000

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF-212

**Product description:** TF-212 is a phosphorus containing non-halogen flame retardant dedicated based on epoxy resin coated APP for textile coating.

Technical Data Sheet / Specification :

Specification	TF-212
Appearance	White powder
P content (w/w)	≥30%
N content (w/w)	≥13%
pH value (10% aqueous suspension, at 25ºC)	5.5 – 7.5
Moisture (w/w)	≤0.5%
Decomposition temperature (TGA, 99%)	≥ <b>260</b> °C
Solubility (25°C, g/100ml)	≤0.5
Average particle size ( D <sub>50</sub> )	about 18µm
Bulk density	0.9-1.1 g/cm <sup>3</sup>

#### Characteristics :

1. Halogen-free and none heavy metal ions.

2. Low water solubility, migration resistance. Good fluidity, not easy to cluster.

3. Good compatibility with acrylic emulsion, 212 is superior to 211 in hot-water-stain-resistance.

#### Application:

Suitable for all types of flame-retardant textile coatings, especially for hot-water-stain-resistance acrylic emulsion coatings. 212 is also suitable for other flame retardant fields that require higher water resistance and higher mechanical properties. Compared with 201, 212 works better in polyurethane emulsion, polyurethane glue, epoxy flame retardant and various resins.

Packing: 25kg/bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets. Other packing as request.



## TF-MF201

Molecular formula : (NH<sub>4</sub>PO<sub>3</sub>)n n>1000

CAS No.: 68333-79-9

EINECS No.: 269-789-9

HS CODE: 2835.3990

Model No.: TF-MF201

**Product description:** Melamine formaldehyde resin modified APP-II is a flame retardant based on phosphorus /nitrogen synergism .

TF-MF201, is different from normal APP II in the following properties:

-Good thermostability

-Better water resistant

#### Technical Data Sheet / Specification :

Specification	TF-MF201
Appearance	White powder
P₂O₅ content (w/w)	≥70%
N content (w/w)	≥14%
Decomposition Temperature	<b>≥270</b> ℃
Moisture (w/w)	≤0.5%
pH value (10% aqueous suspension, at 25°C)	5.5-7.5
Bulk density	0.9 g/cm <sup>3</sup>
Average particle size ( D <sub>50</sub> )	about 18µm
Solubility (25°C, g/100ml)	≤0.05
Solubility(60℃, g/100ml)	≤0.2
Solubility (80°C, g/100ml)	≪0.8

#### Application:

Industry	Flammability rate
Wood, plastic	DIN4102-B1
PU rigid foam	UL94 V-0
Ероху	UL94 V-0
Intumescent coating	DIN4102

Packing: 25kg/bag, 24mt/20'fcl without pallets, 20mt/20'fcl with pallets. Other packing as request.



# TF- 241

#### Model No.: TF-241

**Product description:** TF-241 mainly contains P and N, is a kind of halogen free environmentally friendly flame retardant for polyolefin. It has been developed especially for **various PP**. Containing acid source, gas source and carbon source, TF-241 takes effect by char formation and intumescent mechanism. PP with 22% TF-241 can pass the tests of UL94 V-0(3.0mm) and GWIT 960°C.

#### Technical Data Sheet / Specification:

Specification	TF-241	
Appearance	White powder	
P₂O₅ content (w/w)	≥52%	
N content (w/w)	≥18%	
Moisture (w/w)	≤0.5%	
Bulk density	0.7-0.9 g/cm <sup>3</sup>	
Decomposition Temperature	<b>≥260</b> °C	
Average particle size ( D <sub>50</sub> )	about 18µm	

#### **Characteristics :**

1. White powder, good water resistance.

2. Low density, low smoke generation.

3. Halogen-free and none heavy metal ions.

#### Application:

TF-241 is used in homopolymerization PP-H and copolymerization PP-B . It is widely used in

flame retardant polyolefin like steam air heater and household appliances.

#### Reference Formula (UL94 V0):

Material	Formula S1	Formula S2
Homopolymerization PP (H110MA)	69.3	
Copolymerization PP (EP300M)		69.3
Lubricant(EBS)	0.2	0.2
Antioxidant (B215)	0.3	0.3
Anti-dripping (FA500H)	0.2	0.2
TF-241	30	30

Mechanical properties:

Item	Formula S1	Formula S2
Vertical flammability rate	V0(1.5mm)	UL94 V-0(1.5mm)
Limit oxygen index (%)	30	28
Tensile strength (MPa)	28	23
Elongation at break (%)	53	102
Flammability rate after	V0(3.2mm)	V0(3.2mm)
water-boiled (70°C,48h)	V0(1.5mm)	V0(1.5mm)
Flexural modulus (MPa)	2315	1981
Melt index	G E	2.0
(230℃,2.16KG)	6.5	3.2

**Packing :** 25kg/bag, 22mt/20'fcl without pallets, 17mt/20'fcl with pallets. Other packing as request. **Storage:** in dry and cool place, keeping out of moisture and sunshine, shelf life two years.



# TF-OH01

**Product description:** TF-OH01 is a kind of halogen-free flame retardant used for acrylic adhesives. **Characteristics :** 

1. Halogen free and free of heavy metal ions.

2. Excellent flame retardant performance, with the addition volume 15%, it can stop burning when get away from fire.

3. Small particle size, good compatibility with acrylic adhesive and good dispersion in acrylic adhesive

reclinical Data Sheet / Specification.				
Specification	TF-OH01			
Appearance	White powder			
P₂O₅ content (w/w)	≥58%			
N content (w/w)	≥12%			
Moisture (w/w)	≤0.5%			
Average particle size ( D <sub>50</sub> )	about 10µm			

## Technical Data Sheet / Specification:

Application: Suitable for acrylic adhesive or any other adhesive with similar structure.

## Experimental Operation:

TF-OH01 is used for flame retardant acrylic adhesive

(Blade coating on a tissue paper , coating thickness ≤0.1mm )

## 1. Reference fomulation:

Test	Acrylic adhesive	Thinner	TF-OH01
1	76.5	8.5	15
2	73.8	8.2	18
3	72	8.0	20

## 2. Fire test(Ignition time 10 seconds)

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Test	On fire time	Self-extinguish time
1	2-4s	3-5s
2	4-7s	2-3s
3	7-9s	1-2s

**Packing :** 25kg/bag, 22mt/20'fcl without pallets, 18mt/20'fcl with pallets. Other packing as request. **Storage:** in dry and cool place, keeping out of moisture and sunshine, shelf life two years.



# TF- PU501

Model No.: TF-PU501

**Product description::** TF-PU501 is solid composite halogen-free phosphorus-nitrogen containing intumescent flame retardant, it acts both in the condensed phase and the gas phase.

#### Technical Data Sheet / Specification :

Specification	TF-PU501
Appearance	Gray powder
P₂O₅ content (w/w)	≥47%
N content (w/w)	≥8%
pH value (10% aqueous suspension, at 25ºC)	6.5-7.5
Moisture (w/w)	≤0.5%

#### Characteristics :

1. Gray powder, expands when heated, efficient in smoke suppression.

2. Excellent water resistance, not easy to precipitate, high flame retardant efficiency.

3. Halogen-free and none heavy metal ions. pH value is neutral, safe and stable during production and use, good compatibleness, not to react with other flame retardant and auxiliary.

**Application:** TF-PU501 is used solely in flameproof treatment for rigid polyurethane foam. UL-94 V-0 can be achieved when total loading of 9% is reached, and total loading of 15% to achieve classification for burning behavior of building materials and products GB / T 8624-2012 B2 level.

Packing: 25kg/bag, 22mt/20'fcl without pallets, 18mt/20'fcl with pallets. Other packing as request.



# Fire Retardancy and Mechanical Property Experiment for FR RPUF (TF- PU501, total loading of 15%)

TF-PU501	Sample					
	1	2	3	4	5	6
Average self-extinguish time (s)	4	3	2	4	5	3
Flame height(cm)	15	17	13	12	13	15
SDR	83	74	73	88	81	93
OI	28	27	28	28	29	27
Flammability	B2					

#### Fire Retardancy:

#### Mechanical Property:

Formulation	TF-PU501	Polyether	Rough MDI	Foamer	Foam stabilizer	Catalyzer
Addition (g)	22	50	65	8	1	1
Compression strength(10%)(MPa)	0.15 - 0.25					
Tensile strength (MPa)	8 - 10					
Foam density (Kg/m³)	70 - 100					