

Ammonium Pentaborate



Ammonium pentaborate tetrahydrate
 Diammonium decaborate octahydrate
 Grade: Technical Powder
 CAS Number 12046-04-7



For stabilization and protection

Ammonium pentaborate results from the controlled reaction of ammonia, water, and boric acid. It is an alkaline salt and consists of white crystalline granules.

Applications

Ammonium pentaborate is used where a readily soluble alkali borate is needed or where alkali metals cannot be used.

Electrolytic capacitors

U.S. Borax special quality grade ammonium pentaborate is used in the preparation of both wet and dry electrolytic capacitors for:

1. Developing a thin oxide film on aluminum foil when an electric current is applied
2. Inserting into an aluminum container during the final assembly of capacitors
3. Purity of the components (boric acid, borax, and ammonium pentaborate) is essential to the production of high-quality capacitors.

Flame retardancy

Borates change oxidation reactions in cellulosic material combustion to cause carbon residue formation. This charring action forms a barrier to combustion and diverts the decomposition products that would alternatively smolder. Ammonium pentaborate is used in a wide variety of flame proofing formulations for cellulosic materials, including insulation and paper. In polymers, it can be used as an effective flame retardant, spumific agent, and char promoter in epoxy, TPU, and urethane foam.

Corrosion inhibition

Incorporated in some proprietary water treatment chemicals for corrosion inhibition. It protects ferrous metals against oxidation.

Welding, soldering, and brazing fluxes

An excellent solvent for metallic oxides at high temperatures. Used in the preparation of special welding, soldering, and brazing fluxes for stainless steel or various non-ferrous metals, where alkali borates cannot be used.

Refractories

Due to its stabilizing effect, it's used in gunning and patching compounds for extending the life of basic refractories in steel furnaces

Theoretical chemical composition

Boric oxide, B ₂ O ₃	63.95%
Ammonium oxide, (NH ₄) ₂ O	9.57%
Water of crystallization, H ₂ O	26.48%

Characteristics

Molecular weight	272.15
Specific gravity	1.58

Ammonium Pentaborate



Solubility

About 10.9% by weight at room temperature

Solubility in water, as $\text{NH}_4\text{B}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$	
0 (32)	5.4
5 (41)	6.3
10 (50)	7.3
15 (59)	8.4
20 (68)	9.6
25 (77)	10.9
30 (86)	12.4
35 (95)	13.4
40 (104)	15.5
45 (113)	17.4
50 (122)	19.6
55 (131)	21.9
60 (140)	24.8
65 (149)	27.6
70 (158)	30.5
75 (167)	33.2
80 (176)	35.9
85 (185)	38.6
90 (194)	41.2

pH

Aqueous solutions show a slight decrease in pH with increasing concentration:

Ammonium pentaborate (wt)	pH @ 25°C (77°F)
0.1%	8.48
0.5%	8.44
1.0%	8.35
2.0%	8.16
5.0%	7.74

Melting point

Stable to about 110°C at which point it loses all but two moles of water. If heated sufficiently, it will release the balance of its hydration water and decompose to boric oxide and ammonia.

Stability

Shows little tendency to cake except after prolonged storage or if it becomes severely wetted by rain or substantial water penetration. It can also absorb moisture if exposed to humid environments.

Containers

May be available in drums or IBCs

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About U.S. Borax

U.S. Borax, part of Rio Tinto, is a global leader in the supply and science of borates—naturally-occurring minerals containing boron and other elements. We are 1,000 people serving 650 customers with more than 1,800 delivery locations globally. We supply around 30% of the world's need for refined borates from our world-class mine in Boron, California, about 100 miles northeast of Los Angeles.

About 20 Mule Team products

U.S. Borax produces the *20 Mule Team*[®] borates family of products from naturally occurring minerals and have an excellent reputation for purity and safety when used as directed. Borates are key ingredients in a number of industrial applications including fiberglass, glass, ceramics, batteries and capacitors, wood preservatives, and flame retardants.

High quality, high reliability, high performance borate products. It's what we're known for.

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