PRODUCT DATA SHEET

Potassium Tetraborate

$K_2BO_7 \cdot 4H_2O$
Potassium tetraborate tetrahydrate
Dipotassium tetraborate tetrahydrate
Grades: Granular and Powder
CAS Number 12045-78-2

20 MULE TEAM BORAX™

Excellent buffering capabilities

Potassium tetraborate is the result of the controlled reaction of potassium hydroxide, water, and boric acid. The product is an alkaline salt and consists of white crystalline granules.

Applications

With excellent buffering properties, potassium tetraborate replaces borax where an alkali borate is needed but sodium salts cannot be used.

Buffering agent

When dissolved in water, potassium tetraborate hydrolyzes to give a mildly alkaline solution. It is thus capable of neutralizing acids. It also combines with strong alkalis to lower their pH. The relatively constant pH of potassium tetraborate solutions makes them excellent buffering agents, and these are often recommended as primary standards in analytical procedures.

Welding, soldering, and brazing fluxes

An excellent solvent for metallic oxides at high temperatures. It is used in the preparation of special welding, soldering, and brazing fluxes of stainless steel or various non-ferrous metals to avoid the “glare” associated with sodium borate.

Lubricating oil additives

Potassium borates dispersed in a very finely divided state improve the load-carrying, anticorrosion, and anti-wear properties of industrial and automotive gear lubricants. Under extreme conditions, potassium borates interact with metal load-bearing surfaces to form a film of extraordinary resilience. This tenacious film provides outstanding load-carrying capacity and wear protection.

Diazotype developer

A light-sensitive composition can be produced by combining a nonionic aromatic diazo compound and a cationic dye-borate anion complex. Potassium tetraborate can be used as the source of borate anion.

Nuclear

Being a good absorber of thermal neutrons and having a high aqueous solubility, potassium tetraborate is used for emergency shutdowns in nuclear-powered ships.

Theoretical chemical composition

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Boric oxide, B_2O_3	45.58%
Water of crystallization, H_2O	30.83%
Potassium oxide, K_2O	23.59%
Anhydrous equivalent, KB_5O_8	76.41%

Characteristics

Characteristics	
Molecular weight	305.5
Specific gravity	1.92
Onset of water loss	100 °C (212 °F)

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Solubility

Potassium tetraborate is also more soluble in water than borax.

Solubility in water, as $KB_5O_7 4H_2O$	
Temperature °C (°F)	**% by weight**
0 (32)	8.2
5 (41)	10.0
10 (50)	11.8
15 (59)	13.6
20 (68)	15.8
25 (77)	17.8
30 (86)	20.4
35 (95)	22.7
40 (104)	25.4
45 (113)	28.4
50 (122)	31.4
55 (131)	34.3
60 (140)	37.2
65 (149)	40.6
70 (158)	43.6
75 (167)	46.8
80 (176)	50.0
85 (185)	53.6
90 (194)	56.5
95 (203)	60.1
100 (212)	63.3

pH

The pH of a 2% (wt) solution of potassium tetraborate is 9.2. The value increases very slightly with increasing concentration, and diminishes very slightly with increasing temperature. Aqueous solutions of potassium tetraborate show a slight decrease followed by a moderate increase in pH with increasing concentration.

Potassium tetraborate (wt)	pH @20°C (68°F)
0.1%	9.18
0.5%	9.14
1.0%	9.15
2.0%	9.20
5.0%	9.20

Melting point

Heated in a vacuum, the crystalline salt begins to dissolve in its own water at about 100 °C (212 °F), losing two molecules of water. The anhydrous salt is formed at about 400 °C (752 °F), and fuses to a clear glass at 815 °C (1500 °F).

Stability

Potassium tetraborate shows little tendency to cake except after prolonged storage or if it becomes severely wetted by rain or substantial water penetration. It is also capable of absorbing moisture if exposed to a humid environment. When stored under normal conditions of temperature and humidity, potassium tetraborate is unlikely to change chemically or cake. When storing the product, maintain package integrity.

Containers

May be available in bulk, IBCs, or small bags.

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About U.S. Borax

U.S. Borax 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 our customers with more than 1,200 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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