

Borates in Industrial Fluids

Borates are well established and widely used in the manufacture of industrial fluids such as antifreezes, lubricants, brake fluids, metalworking fluids, water treatment chemicals and fuel additives. Borates' function in these fluids are:

- Corrosion inhibition
- Buffering action
- Freezing point reduction
- Boiling point elevation
- Lubrication
- Stabilization of thermal oxidation
- Prevention of sludge formation
- Reduction in moisture sensitivity

Some of the applications include:

Antifreezes (engine coolant)

Glycol-based antifreezes can oxidize to produce corrosive organic acids in automotive coolant systems. The buffering action of borates keeps the pH above 7 – preventing acid formation and inhibiting corrosion.

Lubricants

Borate polyols and polyamines in lubricants form an extremely resilient film on metal load-bearing surfaces. This film improves load capacity and protects from wear and tear. Potassium borates are used in high pressure lubricants due to their stable dispersion of microspheres.



Brake fluids

Brake fluids are moisture sensitive. Absorption of water by the system reduces the boiling point of the fluid and can cause vapor-lock. Borates in brake fluids act to prevent vapor-lock.

Metalworking fluids

Borates act as bacteriostatic agents in metal cutting emulsions. They are also corrosion inhibitors. Boric acid esters have led to high quality water-miscible cutting fluids with longer emulsion charge life.



Borax Decahydrate

Neobor[®] Borax Pentahydrate

Optibor[®] Boric Acids

Boric Oxide

Potassium Pentaborate

Potassium Tetraborate

Sodium Metaborate 4 Mol

Sodium Metaborate 8 Mol



Water treatment chemicals

In heat exchange devices, any corrosion of metals or alloys can result in diminished heat transfer and, consequently, shorter service life. This is particularly true of central heating systems, cooling towers and circulating water systems. In the presence of oxygen, borates can promote the formation of a passivating layer (ferric oxide film) which prevents further oxidation.

Fuel additives

Borate esters have been used as gasoline additives to prevent pre-ignition, and help to keep carburetors clean. There has also been renewed interest in adding borate esters to gasoline for improving fuel efficiency.

About the formulation

Borax products for industrial fluids are listed on the reverse.

About the company

Rio Tinto Borax supplies nearly half the world's demand for borates from its principal mine in California. The company offers an integrated approach to mining, refining, and distributing borates, as well as:

- Strategic Inventory Placement and long-term contracts with shippers to ensure supply reliability.
- Acknowledged world leadership in borate chemistry and technology development that translates to unparalleled technical support for customers.
- Consistent product quality supported by ISO 9000 registered Quality Management Systems, statistical process control and Certificates of Analysis.

About the products

Borates are naturally-occurring mineral salts, essential for plant life and part of a healthy diet for people. Borate products have an excellent reputation for safety – and a long track-record of being safe when used as directed.

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