PRODUCT DATA SHEET

Polybor® Flow

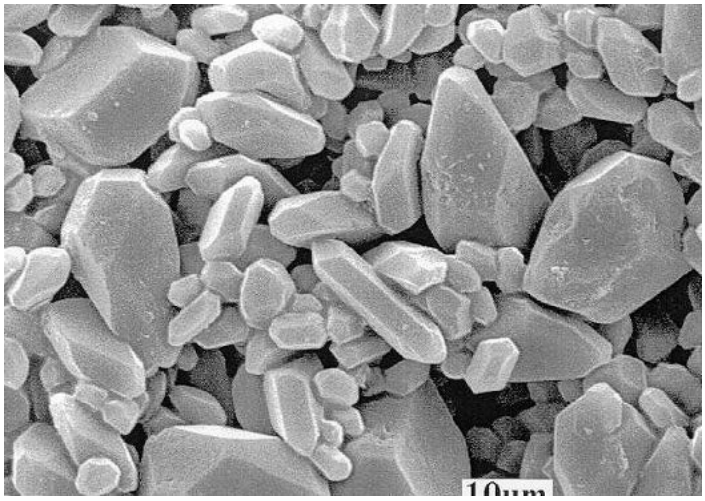
$Na_2O \cdot 5B_2O_3 \cdot 10H_2O$
Sodium pentaborate decahydrate

CAS Number 12007-92-0

Aqueous suspension of sodium borate

Polybor® Flow is a stable, concentrated liquid form of sodium borate. It consists of a white aqueous suspension of fine sodium pentaborate crystals in a saturated sodium pentaborate solution.

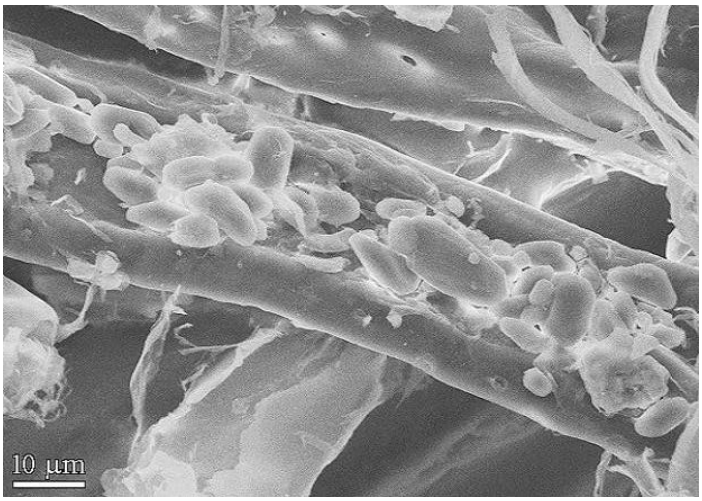
The product is water-based and contains no organic solvents. *Polybor* Flow is easy to pour, pump, meter, or spray. It can easily be mixed with other liquids or powders. On drying, *Polybor* Flow forms a coating of very fine sodium pentaborate crystals, as shown below:



SEM of a dry coating of Polybor *Flow*

Applications

When sprayed, the very fine particles within *Polybor* Flow adhere strongly to substrates—such as cellulosic or synthetic fibers—resulting in an even coating and distribution, as shown below:



SEM of a cellulose fibre sprayed with Polybor *Flow*

Polybor Flow is highly soluble and readily dispersible in water and other solvents. It is particularly useful in applications where a high concentration of sodium borate in solution is required, even at low temperatures. It can also be used as a carrier for other active ingredients.

The product can be used in most borate applications such as flame retardancy (for natural and synthetic fibers), ceramics, adhesives, detergents, wood preservative formulations, anti-corrosion, metallurgical surface treatments, and cement-based applications. The very fine particle size of *Polybor* Flow makes it ideal for use as a binder or a coating agent.

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Chemical composition (typical)	
Boric oxide (B_2O_3)	32.2%
Sodium oxide (Na_2O)	5.8%
Equiv $Na_2O \cdot 5B_2O_3 \cdot 10H_2O$	54.6%
Stabilizing agents	up to 2%

Characteristics	
Density	1300 kg/m³ (10.85 lb/U.S. gal)
Freezing point	-3 °C (27 °F)*

Polybor *Flow will freeze at -3 °C but reverts to its normal state when thawed.*

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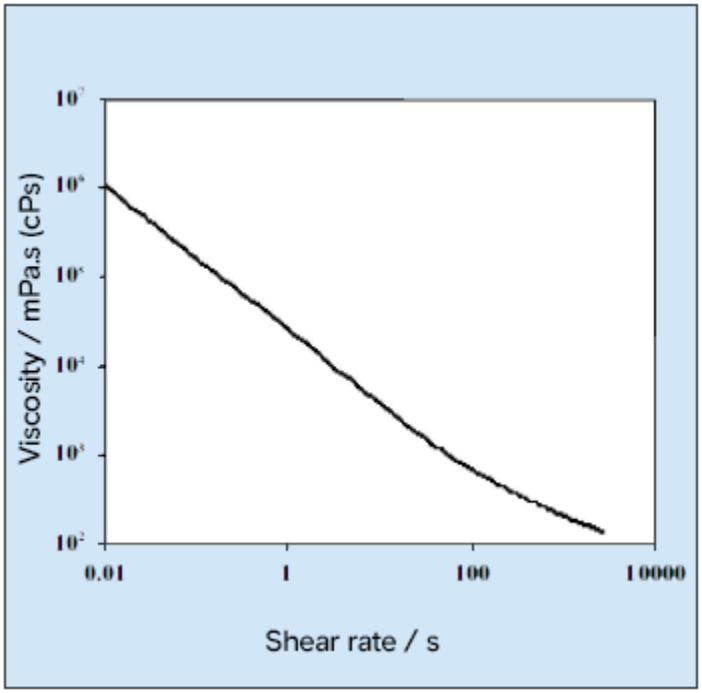
Rheology

Polybor Flow is shear thinning. It is designed to have high viscosity at low shear rates during storage—giving increased stability—and low viscosity at high shear rates during stirring, pumping, and spraying.



Ford cup (No 4), ~40 seconds at 20 °C

Solubility

Polybor Flow is readily soluble in water. It can be diluted to the required concentration and applied as a dilute suspension or solution.

Polybor Flow can be diluted to obtain a saturated solution at different temperatures containing the following B_2O_3 concentrations:

Temp / °C	% weight B_2O_3	% weight *Polybor* Flow
10	7	22
20	9	28

Polybor Flow is also miscible with other solvents such as glycerol, glycol, methanol, and acetone.

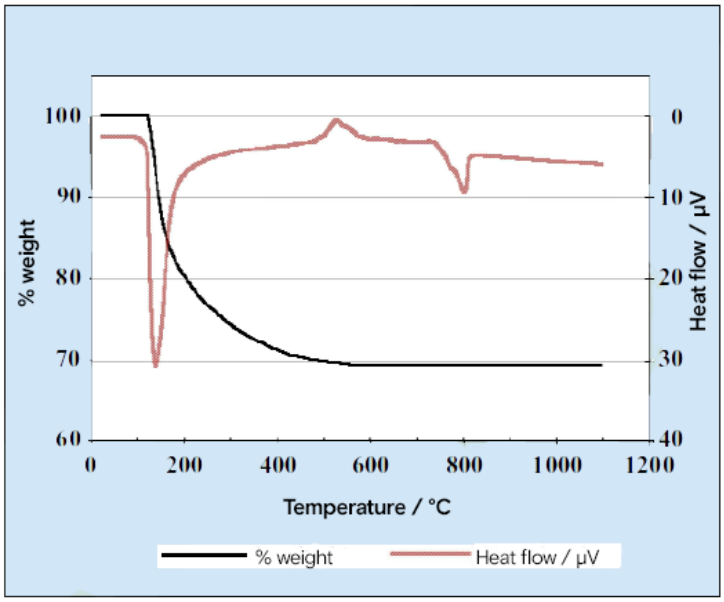
pH

The pH of *Polybor* Flow ranges from mildly alkaline at low concentrations to near neutral at higher concentrations.

% weight *Polybor* Flow	pH @ 20 °C
1.0	8.5
5.0	8.1
10.0	7.7

Melting point

For vitreous applications where the product is to be melted, thermal analysis of *Polybor* Flow (on a dry basis) shows data that is typical of sodium pentaborate.



The weight loss is 30% over the temperature range of 160–500 °C and melting occurs at ~800 °C.

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Polybor® Flow

Stability

Store *Polybor* Flow indoors between 5 °C and 35 °C.

The product has a shelf life of 9 months from the production date. After 9 months, *Polybor* Flow can still be used (it is chemically stable), but we recommend mixing it to re-homogenize the suspension which may have started to settle.

Containers

Available in 1,000 liters (275 gallons) polypropylene containers (dimensions 100x120x116cm), containing 1,300 kg of product

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 Day 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.