

TBC-BRINADD

A DIVISION OF TEXAS UNITED CHEMICAL COMPANY, LLC

PBS Plug™ System

DESCRIPTION

PBS Plug is a surface-mixed, pumpable plugging material, formulated to provide a rigid crosslinked gel structure. **PBS Plug 500** and **PBS Plug 2000** contain sized particles of borate-containing minerals and special polymers which provide formulating flexibility to meet various formation requirements in lost circulation applications. **PBS Plug Activator** a salt/magnesia compound, serves as a crosslink catalyst when mixed with **PBS Plug**. Also, calcium chloride may be used as a secondary accelerator in cold-water applications, or to increase rigidity of the plug. The polymers in the base product add viscosity and filtration control and are crosslinked by the borate anion in the sparingly water-soluble borate. The catalysts initiate the crosslink reaction by raising the pH and salinity of the fresh water mixture. This reaction is accelerated by the normally higher temperature in the wellbore. **PBS Plug Retarder** and **PBS Plug Activator-E** are used to delay the set, increase the available pumping time, and broaden the window of possible applications. **PBS Plug Activator-E** is especially useful for mixes where the base water is above 100° F. **PBS Plug** products are packaged in 25 kg sacks.

APPLICATIONS

PBS Plug is a unique system whose main application is the control of lost circulation. The combination of **PBS Plug** and **PBS Plug Activator** satisfies the requirements for the majority of extreme lost circulation situations where anything from induced fractures to total losses are experienced. The final consistency of the **PBS Plug** also allows it to be easily drilled after the chemical setting reaction has been completed. Calcium chloride may also be added as a secondary accelerator to modify the **PBS Plug** shear strength for the following applications:

- Lost circulation pill
- Open hole cement retainer
- Pre-cement pad
- Profile modification
- Formation consolidating gel

The base density for 100 lb/bbl of **PBS Plug** is 10.1 lb/gal but weights up to 17.0 lb/gal can be achieved with the addition of barite or other inert weighting material.

ADVANTAGES

PBS Plug offers the following advantages:

- Provides excellent fluid loss control
- Seals high permeability and fractured formations
- Does not shrink
- Exhibits high shear strength
- Bonds tightly to the formation
- Can be spotted through mud motors and bit nozzles
- Utilizes standard mixing equipment

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PBS Plug™ System Products

PRODUCT	COMPONENTS	FUNCTIONS
PBS Plug 500	Blend of polymers and 500 micron borate mineral	Viscosity, filtration control, bridging
PBS Plug 2000	Blend of polymers and 2000 micron borate mineral	Viscosity, filtration control, bridging
PBS Plug Activator	Blend of salt and magnesia compound	Primary crosslink catalyst
PBS Plug Activator-E	Blend of encapsulated salt and magnesia compound	Delayed crosslink catalyst
PBS Plug Retarder	Magnesium salt	Crosslink retarder, thinner
Calcium Chloride	94-97% CaCl ₂	Secondary crosslink catalyst

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MIXING PROCEDURE:

THE FOLLOWING INSTRUCTIONS ARE FOR MIXING ONLY; PLEASE CONTACT A TBC-BRINADD REPRESENTATIVE FOR THE PROPER RECOMMENDATION.

1. Ensure all lines and tanks are washed and clean of any acid or caustic soda.
2. Add the calculated volume of fresh water and verify a neutral pH.
3. If recommended, add the **PBS Plug Retarder** through a hopper and be sure it dissolves before additional products are added to the mixture.
4. Add the recommended amount of **PBS Plug 500** or **PBS Plug 2000** through a hopper at approximately 3 minutes per sack.
5. Allow the **PBS Plug** slurry to mix for a minimum of 30 minutes.
6. If applicable, add weighting material (barite) through a hopper at 1-2 minutes per sack.
7. Immediately prior to pumping, add the **PBS Plug Activator**.

NOTE: DO NOT ADD THIS PRODUCT UNTIL IT IS KNOWN THE PILL WILL BE NEEDED.

8. If required, add calcium chloride pellets through a hopper at 1-2 minutes per sack.

CAUTION: THIS PILL BEGINS TO SET IMMEDIATELY; IT SHOULD BE HANDLED SIMILARLY TO CEMENT SLURRIES.