

Mudzyme water-based drill-in fluid filter cake breaker

Maximize productivity by removing damage caused by drill-in fluid

Applications

- Openhole reservoirs
- Water-based drill-in fluid filter cake removal
- Workover and remediation operations

Features and Benefits

- Enzymatically degrades starch and biopolymer in filter cakes
 - Minimizes possible formation damage caused by drill-in fluid
- Polymer destruction rate can be controlled
 - Allows time to install the lower completion
- Can be put into the completion brine or pumped with the gravel pack
 - Reduces rig time and costs
 - Allows delay of filter cake destruction
- Compatible with Na⁺ and K⁺ brine systems
 - Can achieve densities up to 11.5 lbm/gal (5.21 kg/L)
- Environmentally friendly products
 - Requires no special handling restrictions
- Operates at near neutral pH
 - Is noncorrosive to downhole equipment

The Baker Hughes **Mudzyme™ enzymatic filter cake breaker system** provides a single-step, environmentally friendly approach for removing the starch and xanthan gum in water-based drill-in fluid filter cakes. This enzyme system is synergistic with organic acids and is compatible with gravel pack proppants and downhole equipment.

The Mudzyme system is custom formulated based on the application and is efficient at bottomhole temperatures up to 275°F (135°C). Enzymes are effective in monovalent brines such as seawater, potassium chloride (KCl), sodium chloride (NaCl), and sodium bromide (NaBr), but should not be used with a mutual solvent.

The Mudzyme system provides an efficient and effective alternative to traditional low-pH acid breakers that degrade water-based filter cake damage. This system maintains a relatively constant pH between 4 and 8 when used with acetic or formic acid.

The Mudzyme enzymes provide the most aggressive rate of polymer degradation at a pH between 4 and 5. A standard Mudzyme soak solution will be adjusted to the required pH prior to pumping downhole. If a longer delay in the destruction of the filter cake is required, the breaker's pH can be adjusted higher so the rate at which the enzymes destroy the polymers slows. The polymer degradation rate is at its lowest when the pH of the soak solution is adjusted to above 7, offering the greatest delay.

The Mudzyme system can be blended at the rig or shipped out in tote tanks. The solution must be pumped within 24 hours and the pH is adjusted at the rig site. The system is composed of environmentally friendly products and requires no special handling restrictions.

The Mudzyme system is one of Baker Hughes' Intelligent Fluids Solutions designed to address your greatest well construction and production challenges.

Typical properties

pH of solution	4 to 8
Temperature range	Up to 275°F (135°C)
Compatible brines	Monovalent

Typical components of the Mudzyme breaker system

Product	Function	Treatment levels
Mudzyme S	Starch-specific enzyme	1% vol
Mudzyme X	Xanthan-gum-specific enzyme	Monovalent
Mudzyme SA	pH control and buffer when using organic acid	2% fl wt for acetic acid 4% fl wt for formic acid
Mudzyme FB	pH control and buffer when not using acid	0.4 lbm/bbl (0.18 kg/bbl)