

BREAKDOWN

Enzyme and chelant filtercake breaker system

APPLICATIONS

- Oil or gas wells completed as openhole gravel packs, standalone screens, or stand-alone liners
- Water injector openhole completion wells

BENEFITS

- Slowly and uniformly destroys filtercake
- Provides complete placement in horizontal sections
- Prevents reactions with formation fluids and solids by reacting only with specific filtercake components

FEATURES

- Provides a controlled delay in filtercake breakthrough under most conditions
- Demonstrates effectiveness over a wide range of temperature
- Incorporates into the gravel-pack fluid for contact with filtercake
- Compatible with conventional drilling rig equipment for mixing and placement
- Offers moderate pH that is less aggressive to personnel and downhole completion equipment
- Exhibits low corrosivity

The BREAKDOWN* enzyme and chelant filtercake breaker system comprises a group of enzymes and chelants designed to destroy FLO-PRO NT* water-base reservoir drill-in fluid (RDF) filtercakes by removing the fluid-loss-control starch additive and the calcium carbonate bridging material. The BREAKDOWN system and the FLO-PRO NT fluid can be used for both injector and producer wells. The choice of chelant component is based on required breaker fluid performance and application.

The BREAKDOWN system dissolves FLO-PRO NT fluid filtercakes with a slow-acting chemistry that delivers complete placement in the horizontal section. This slow process enables the system to be spotted in the openhole interval without losses, keeping the breaker fluid in contact with the filtercake instead of bypassing it and reacting with formation fluids and solids. It facilitates removal of any washpipe assembly and closure of the downhole fluid-loss-control device before the filtercake is compromised.

The BREAKDOWN system uses an enzyme and a chelant to destroy the fluid-loss-control starch additive and the calcium carbonate bridging material in FLO-PRO NT fluid filtercakes, respectively. By destroying these major RDF components, formation and completion impairment is minimized. To break down the starch component in the filtercake established by an RDF, WELLZYME* starch-specific enzymes are used. The system uses D-SOLVER* brine-soluble chelating agents to assist in the destruction of calcium carbonate in FLO-PRO NT fluid filtercakes.

BREAKDOWN EXTRA system

The BREAKDOWN EXTRA* enzyme and advanced chelant filtercake breaker uses the D-SOLVER EXTRA* advanced brine-soluble chelating agent to clean up water-base filtercakes. The agent is compatible with monovalent and divalent brines (except calcium bromide), and the corrosion rate is low compared with acid or oxidizer treatments. D-SOLVER EXTRA agent has a low pH and can complex many metal ions present in RDF filtercakes and completion fluids, specifically calcium and magnesium.

The BREAKDOWN EXTRA breaker can be incorporated into a gravel pack carrier fluid if required during gravel pack operations with Alternate Path⁺ gravel-pack shunt tube technology.

BREAKDOWN 7 system

In wells planned for long-term suspension, the BREAKDOWN 7* enzyme and neutral-pH chelant filtercake breaker system uses the D-SOLVER 7* neutral chelating agent to achieve a system pH of 7.

The BREAKDOWN 7 system is designed to clean up water-base filtercakes and offers extremely low corrosion rates. The D-SOLVER 7 agent is a water-soluble, nonprotonated chelating agent and is compatible only with monovalent brines.

BREAKDOWN System Component Specifications

Product	Concentration	System Property
Monovalent brine [†]	22%–58% volume	Density
WELLZYME A* enzyme breaker or WELLZYME III* enzyme breaker for North Sea applications [‡]	1%–5% volume	
Ethylene glycol monobutyl ether (EGMBE)	1%–3% volume	
D-SOLVER agent	40%–70% volume	
D-SOLVER EXTRA agent	25%–45% volume	
D-SOLVER 7 agent	30%–45% volume	
D-SPERSE* water-soluble surfactant	0%–0.5% volume	Dispersion, surface tension
Sodium acid pyrophosphate (SAPP) dispersant (optional)	2–4 lbm/bbl [5.7–11.4 kg/m ³]	6–8 pH ^{††}
SAFE-VIS* polymer fluid loss control additive (optional) ^{‡‡}	0.5–1.5 lbm/bbl [1.4–4.3 kg/m ³]	Yield point

[†] Component applied as desired.

[‡] The WELLZYME A and WELLZYME III enzyme breakers begin to denature at temperatures greater than 212 degF [100 degC] but are functional to 275 degF [135 degC], and most chelant components are effective to temperatures up to 350 degF [177 degC].

^{††} SAPP polymer fluid-loss-control dispersant has a pH of approximately 4.0 in a 10% solution.

^{‡‡} SAFE-VIS additive is a nonionic, modified high-molecular-weight natural polymer.

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