

Solutions for production of shale oil and gas

Hydraulic fracturing



Bringing knowledge and solutions to the shale

Technological advances in horizontal drilling and hydraulic fracturing have helped shale plays evolve from out-of-reach resources to vast, economically viable assets.

Dow understands the complexities and challenges involved in developing shale fields, and we offer an evolving portfolio of chemistries, additives and custom solutions – coupled with in-depth technical expertise – to address many of the issues service companies face. As shale and other unconventional resources become an increasingly common and larger slice of the energy pie, Dow is prepared to help address any production and processing challenge that may arise, thanks to an R&D commitment to develop new advances when and where they are needed.

Dow products for shale production

Dow offers a range of chemistries to help shale oil and gas producers drill, stimulate, produce and process their shale assets in ways that protect both their bottom line and the environment.

Clay stabilizers

Dow offers a wide range of **EMBARK™ Shale Inhibitors** that inhibit the swelling and shifting of reactive clays. This functionality helps prevent unwanted formation damage and contributes to increased hydrocarbon productivity through improved permeability in the formation.

Surfactants

Hydrocarbon recovery in hydraulic fracturing has a number of inherent operational challenges, such as hydration of polyacrylamide emulsion used as friction reducers, unfavorable formation wetting characteristics and high interfacial tension between both the fluids and the formation, as well as the commingled phases themselves, resulting in emulsion formation. To address these challenges, surfactants are often included in the fracturing fluid formulation.

Dow offers **EMBARK™ SF and TERGITOL™ Surfactants** to resolve or prevent these problems. These surfactants deliver a combination of economy and performance – increasing surface activity and providing enhanced wettability, as well as improved solubilization or dispersion in the fracturing fluid formulation. Many products also offer favorable handling properties and low odor, and are considered readily biodegradable fluids.

Solvents

Many of Dow's solvents act as carrier fluids for materials and chemical additives used in a variety of downhole applications. Solvents and mutual solvents from Dow include **DOWANOL™, CELLOSOLVE™ and CARBITOL™ glycol ethers, and oxygenated solvents** such as alcohols, acetates, esters and other products for formulation of fluid systems.

Green solvents

A global leader in sustainable chemistry and leading supplier of oilfield solvents for many years, Dow is continually developing new, differentiated products while always maintaining the most current regulatory requirements.

As part of our ongoing commitment to sustainability, Dow openly and constructively collaborates with our customers and local municipalities to assess their products and ensure they are using the most environmentally friendly option.

Iron control

VERSENE™ and VERSENE™ Chelating Agents sequester naturally occurring iron and other metals from surface waters used in fracturing fluids. Keeping iron in solution ensures no iron-related deposits in the fracturing process.

Scale inhibitors

ACCENT™ Traditional and Traceable Scale Inhibitors inhibit the formation of mineral scales such as calcite, barite and gypsum/anhydrite. Added to a fracturing fluid, they can protect the reservoir from scale formation and deposition caused by the mixing of the fracturing fluid with the naturally occurring water. The inhibitors can also be formulated for slow and steady release from the reservoir, thus helping to mitigate scale problems during long-term well production. The traceable nature of the ACCENT™ T line allows easy detection of the active in the produced water over time.

Wax control

ACCENT™ Wax Inhibitors are water-dispersed, oil-soluble actives that can be easily applied to an aqueous stage of a fracturing fluid. These wax inhibitors are high-activity products formulated with environmentally friendly additives, which can be freeze-protected to -40°C.

Providing comprehensive solutions for market needs

Dow has the depth of technical experience – and the breadth of resources – to develop new solutions for customers based on their specific water treatment and process solutions requirements. We evaluate the situation, define the problem and develop viable ways to solve it – applying creative thinking to meet today's, and tomorrow's, challenges.

Dow is committed to the success of our customers through chemistry and continuous innovation. To learn more about our products, innovations, technologies or other Dow services, please speak with your local Dow representative or visit www.dow.com.



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