

EnersEAL

MMH TECHNOLOGY

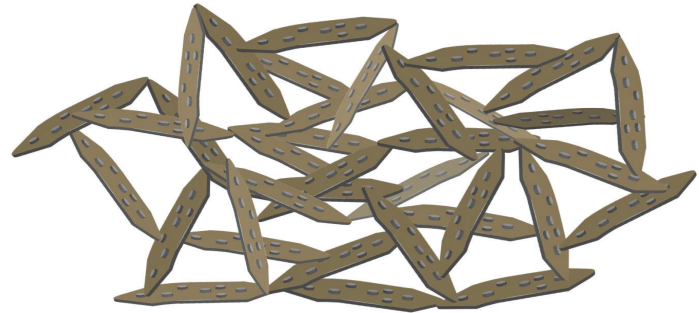
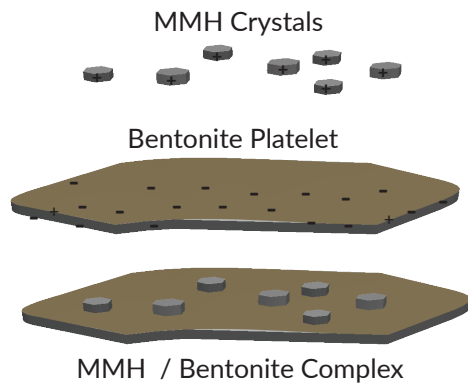


AES DRILLING FLUIDS

DESCRIPTION

EnerSEAL is an advanced mixed metal hydroxide (MMH) water-base drilling fluid with superior stability and performance over previous systems. Using a proprietary chemistry, EnerSEAL delivers challenging wells where MMH technology performs but old systems could not deliver.

EnerSEAL offers excellent flow characteristics for drilling. It suspends cuttings effectively, maintains low surge and pump pressures, and has a special capability to significantly minimize formation losses. It ensures wellbores stay within the desired size range, reduces torque and drag, and enhances solids control efficiency. EnerSEAL also includes an optional package to prevent swelling and dispersion of clays, thereby reducing fluid loss.



The MMH complex entangles a network of clay platelets. The electrostatic charge maintaining the network readily breaks with shear. This is what provides the unique rheological properties of EnerSEAL.

MMH crystals attach to the bentonite platelets by ionic exchange in which the naturally occurring cations on bentonite are exchanged with MMH. This forms a strong association on the face of the clay platelets.

EnerSEAL maintains its unique properties despite encountering contaminants during drilling, including anionic compounds that can disrupt the MMH network and cause a sudden loss of viscosity. It is engineered to withstand common debris, allowing it to outperform other systems, and remains stable at temperatures up to 300°F, making it suitable for diverse drilling applications. Additionally, EnerSEAL achieves these desirable qualities without the use of harsh chemicals, leveraging its distinctive rheology to complement solids control equipment for efficient solids separation and minimal dilution.



DESCRIPTION

E n e r S E A L

Robust mixed metal hydroxide system

Ideal shear thinning properties limit loss rates and improve hole cleaning



BENEFITS

E n e r S E A L

Superior cuttings suspension without impacting pump pressures

Minimal washout

Resistance to losses due to elevated viscosity under low shear conditions in thief zones



APPLICATIONS

E n e r S E A L

Intervals with high risk of losses, such as fractured and unconsolidated formations

Critical hole cleaning applications where pump pressures are limited

Milling operations

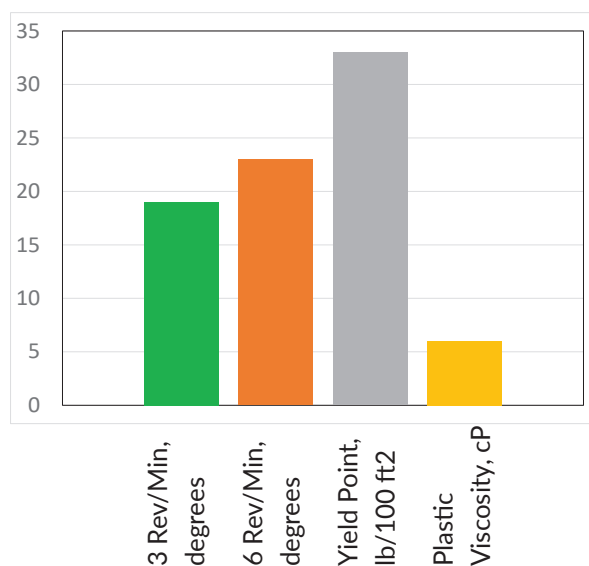
APPLICATION

EnerSEAL is effective in both vertical and horizontal wells, particularly in areas prone to loss such as unconsolidated or fractured formations. As it moves away from the wellbore into these loss zones, it thickens in low-shear regions, minimizing or eliminating losses.

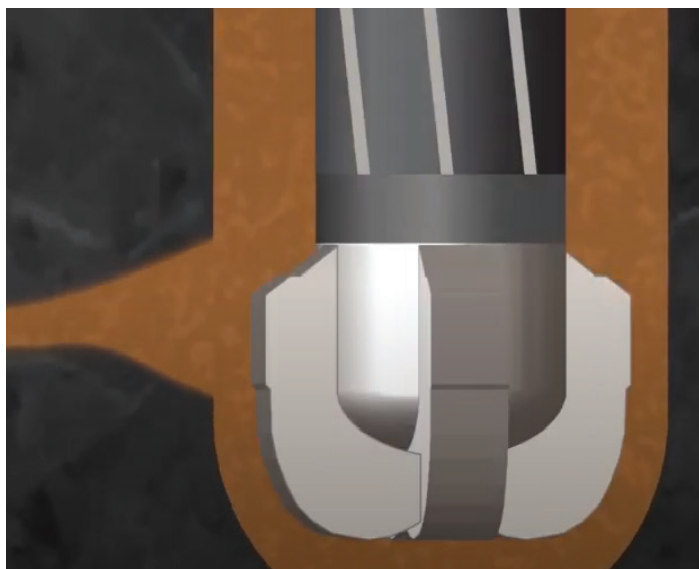
For situations requiring thorough cleaning of the wellbore, EnerSEAL offers a unique solution. This is especially valuable during milling operations and in challenging laterals with restricted pump rates due to rig equipment or equivalent circulating density. Efficient removal of cuttings also reduces torque and drag, while keeping cuttings suspended even when pumps are not in operation, lowering the risk of packoff.

Furthermore, EnerSEAL assists in reducing washout by maintaining a laminar flow in the fluid-wellbore interface, where shear is reduced. This prevents the erosive effects typically associated with turbulent flow, safeguarding unconsolidated or salt formations from erosion.

Typical Rheology at 120°F
(Oilfield Units)



Note the elevated 6 and 3 rev/min readings versus yield point and plastic viscosity in a typical EnerSEAL system rheology (above).



Pictured (above): The shear-thinning nature of EnerSEAL allows low pump pressures in the wellbore in high shear areas. In low shear areas, such as fractures, the fluid thickens, mitigating losses.

PERFORMANCE

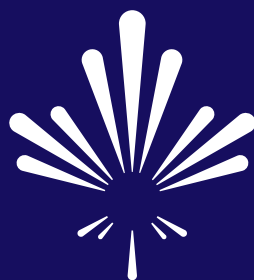
EnerSEAL has shown its effectiveness in various applications. For instance, in the Permian basin alone, it has been utilized in over 200 wells, helping clients mitigate losses in heavily depleted formations like the Brushy Canyon. This successful implementation has enabled clients to eliminate the need for an additional casing string, resulting in a notable savings of 5 rig days.

In a different situation involving lost circulation, a client was able to successfully install surface pipe without any losses, ensuring complete returns while cementing in a riverbed. This achievement was made possible by leveraging the benefits of EnerSEAL.

“Our casing runs have been much smoother, and torque has dropped allowing us to drill faster.”

“We’ve reduced exposure to dangerous chemicals and improved waste management with this system.”

“It [EnerSEAL] is much more stable than the MMH system from years past.”



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