

AQUA-FLEX

Optimized Water-Based Drilling Fluid
for Unconventional Basins

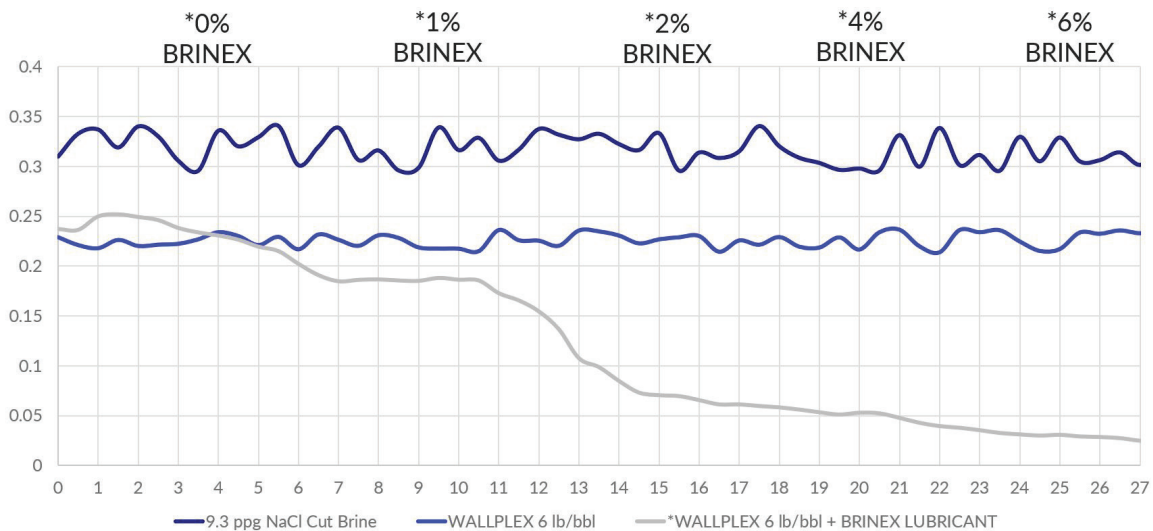


AES DRILLING FLUIDS

DESCRIPTION

AQUA-FLEX is an Optimized Water-Based Drilling Fluid (OWBDF) which utilizes a unique suite of additives to address the primary drilling challenges found throughout the Permian Basin and other Unconventional areas. The system is designed to reduce costs by pairing data and system components with actual well risks. Product selection and concentration promote maximum rate of penetration (ROP) with a lower cost per-barrel. Because AQUA-FLEX excludes unnecessary components, it reduces the cost impact of major downhole losses.

WBM Selection Criteria	Lateral Section Drilling Fluid Needs	AQUA-FLEX Features	HPWBM Features
Lubricity	✓	✓	✓
Corrosion Mitigation	✓	✓	✓
Environmental Sensitivity	✓	✓	✓
Cost Appropriate	✓	✓	✗
Simplicity	✓	✓	✗
Shale Inhibition	✗	✗	✓
Anti-Accretion	✗	✗	✓
Supplemental Polymers	✗	✗	✓
HPHT Performance	✗	✗	✓



APPLICATION

AQUA-FLEX is ideal for unconventional wells where low shale permeability and low-to-no formation reactivity can be addressed with simple, fit-for-purpose additives. Core components include a selection among a family of lubricants, such as BRINEX, to lower torque and drag. WALLPLEX, an optional wall cake additive, enhances lubricity and lowers fluid loss when required. AES FLOC 4003 complements solids control equipment to improve removal of drill solids, effectively lowering environmental impact through water usage reduction and haul-off. A corrosion inhibition package mitigates corrosion rates and extends drill pipe life.

Maximum ROP relies upon high spurt loss and hole cleaning through turbulence to transport cuttings. Because optimal performance relies on maintaining a solids-free fluid, AQUA-FLEX density is limited to the sourced base brine - often ~10.0 lb/gal.

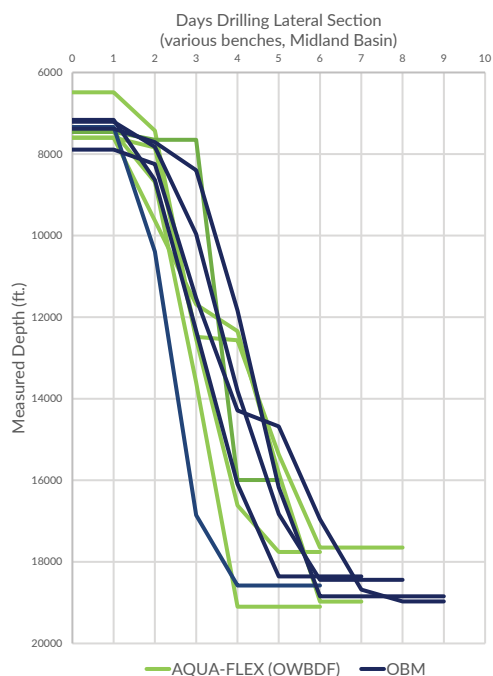
For densities above 10.0 lbm/gal that require specialty brines, consider using EnerCLEAR. If necessary, AQUA-FLEX is convertible to a conventional water-based fluid.



- AQUA-FLEX typical components include a base brine, AES FLOC 4003, BRINEX lubricant, and WALLPLEX for contingency sweeps.

PERFORMANCE

AQUA-FLEX maximizes ROP through efficient drill cuttings transport via turbulent flow, high spurt-loss to clear cuttings from near bit, and minimal torque & drag through proper lubricant selection and application.



- AQUA-FLEX component selection and concentrations are easily modified based on drilling challenges relevant to the drilling location. Performance and cost savings are realized by matching products to specific risks.
- Minimizing torque & drag while extending drill pipe life is achieved through proper selection among a family of lubricants, including BRINEX.
- Drill solids removal is enhanced through the injection of AES FLOC 4003 utilizing existing rig equipment. As drilled solids are removed, drilling performance is improved and water usage for dilution is minimized, lowering environmental impact.

- In certain applications, AQUA-FLEX rivals invert-emulsion fluid performance at significantly reduced cost



FLEXIBLE FEATURES

WALLPLEX, a single-sack wall cake additive and fluid loss reducer, can be deployed to address acute risk of wellbore instability.

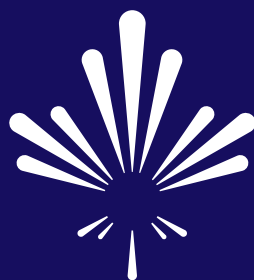


FIELD-PROVEN

AQUA-FLEX components are designed to perform across a wide variety of brine sources, from freshwater to sodium chloride to select produced brines.



- Before (left) and after (right) a solids-laden field brine is treated with AES FLOC 4003



AES DRILLING FLUIDS

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