EnerTE

DIRECT EMULSION

AES DRILLING FLUIDS

DESCRIPTION

The EnerLITE direct emulsion system provides a simple solution for density control in freshwater or saturated brine environments. Density is controlled through additions of diesel or mineral oil to achieve mud weights well below typical water-continuous systems. NORMUL†, a stabilizing surfactant, maintains the dispersion of the oil phase in the water or brine phase.

No Emulsion:
In a normal state, oil and water do not mix.

Invert Emulsion (typical OBM):
Water droplets are dispersed in an oil-continuous phase.

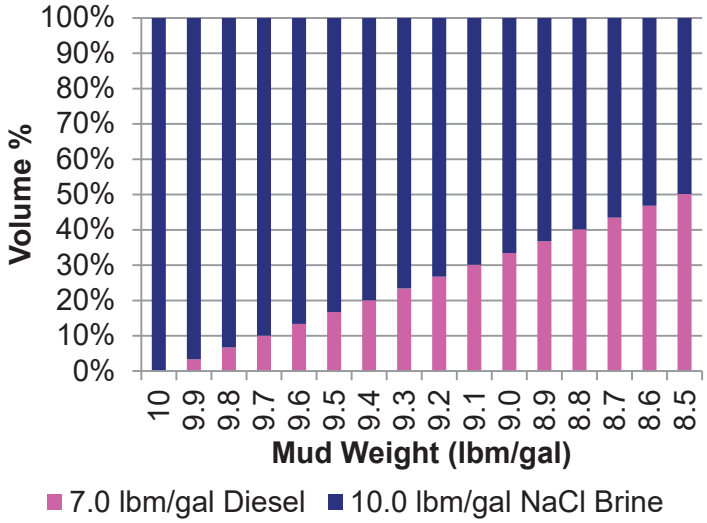
Direct Emulsion:
Oil droplets are dispersed in a water-continuous phase.

APPLICATION

EnerLITE is suitable for depleted formations where low density is desired as well as drilling salt formations where a saturated salt brine phase is necessary to prevent washout but saturated brine density exceeds the target mud weight.

It can handle oil-to-water ratios from 10:90 to 50:50 and bottomhole temperatures up to 225°F. Formulations are optimized by application and engineered beyond these conditions as needed. Test any additional additives, such as lubricants or corrosion inhibitors, before using them.

Mud weight range of saturated brine mixed with diesel at various oil:brine ratios.



DESCRIPTION
EnerLITE

Direct emulsion system

Density control with diesel or mineral oil non-continuous phase

BENEFITS
EnerLITE

Precise density control
Liquid components simplify mixing and maintenance

Simplified logistics through reduced fluid volumes

APPLICATIONS
EnerLITE

Saturated salt systems requiring mud weights below 10.0 lbm/gal

Depleted formations at mud weights below freshwater (8.33 lbm/gal)

Narrow drilling windows

DRILL AHEAD INTO THE LATERAL

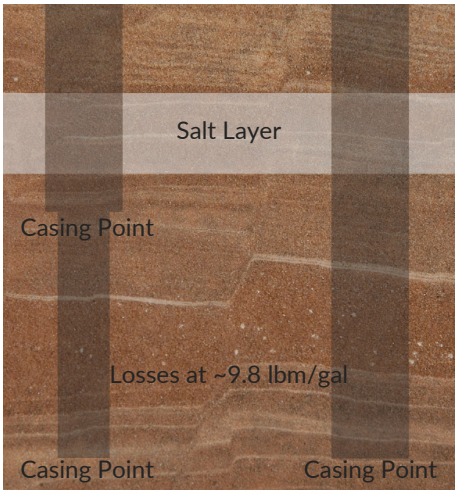
In some areas where EnerLITE is used, operators continue with EnerLITE into the lateral section. To minimize torque and drag, AES Drilling Fluids recommends BRINEX or BRINEX EP. While most lubricants de-stabilize emulsions, BRINEX and BRINEX EP provide superior lubricity while maintaining the direct emulsion critical for a stable fluid. In the picture to the left, note the difference between untreated EnerLITE (left), EnerLITE with a conventional lubricant (middle), and EnerLITE with a compatible lubricant (right). Operators regularly build angle in the intermediate section with EnerLITE and even continue into the lateral when desired.

EnerLITE | EnerLITE with conventional lubricant | EnerLITE with compatible lubricant

Original Method: Two String Design

10.0 lbm/gal Field Brine

9.5 lbm/gal Field Brine

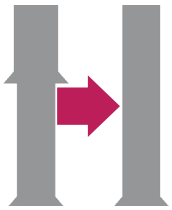


EnerLITE Method: Single String Design

9.6 lbm/gal EnerLITE

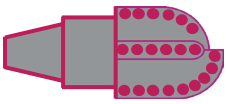
PERFORMANCE

EnerLITE in the Delaware Basin enables the integration of shallow salt layers with the less robust Cherry and Brushy Canyon formations. Previously, saturated 10 lbm/gal brine was necessary to prevent erosion in the middle section. Because the lower formations couldn't withstand 10.0 lbm/gal drilling fluids, this interval required casing and cementing before a second intermediate drilling. EnerLITE's dispersed oil phase now prevents salt section erosion while keeping mud weights below the Cherry/Brushy Canyon formation's fracture gradient. This advancement allows both intervals to be drilled in one go, resulting in more customers observing cement returns to the surface. Additionally, some customers no longer use a differential valve (DV) tool for a second cement stage, streamlining the process.



Eliminate Intermediate Casing with Minimal Salt Washout

- Reduced excess cement volume requirements
- Single stage cement jobs
- Returns to surface
- Removal of DV tool



Overcome Drilling Challenges

- >100 bbl/hr water flows
- >1000 ppm H_2S
- CO_2
- Lost circulation

Support Directional and Horizontal Applications

- ENERLUBELITE minimizes torque
- Build sections to 90°
- Horizontal sections up to 15,000'
- Improved borehole quality

Extended Cost Savings

- Experience to minimize waste through best practices
- Lower/Eliminate dilution with EnerLITE RECOVER

700+
WELLS AND COUNTING

AES DRILLING FLUIDS

www.aesfluids.com

Revision 1.02