

# Deep Black XE™

## Graphite Lubricant & Viscosifier

Oil & Gas Drilling Fluids / WBM



The primary function of **Deep Black XE™** is to work as a solid lubricant. DEEP BLACK XE can bring viscosity in fresh water drilling fluids and in salt water drilling completion fluids.

**Deep Black XE™** is part of a family of additives consisting of stabilized dispersion of graphite in an environmentally friendly oily medium (low BTEX).

**Deep Black XE™** provides all functions of graphite lubricants and secondary viscosifier for fresh and salt water drilling fluids.

### BENEFITS AND USE

- **Deep Black XE™** uses the new technology concept which means to treat solid particles with a teflonized derivative.
- **Deep Black XE™** with a slippery surface tension free ability to coat the well bore and drill bit and therefore reduces torque and drag which in turn increases ROP.
- **Deep Black XE™** is non-toxic, non-combustible and contains no heavy metals or environmentally hazardous chemicals.
- **Deep Black XE™** provides for high drilling efficiency and minimization of well costs in vertical, inclined and horizontal wellbores, completion and work-over operations, as well as coiled tubing.
- **Deep Black XE™** does not generate damage formation.

### ADDITIONAL ADVANTAGES

- Optimizes lubrication, especially at higher temperatures
- Inhibits hydration of the clay fraction in shale
- Reduces wellbore damage, especially vibration induced formation damage resulting from the stick-slip phenomenon
- Stabilizes rheological properties, leading to greater borehole efficiency
- Slicks the entire open-hole, casing and drill-string; reducing frictional forces
- Reduction of torque and drag values
- Reduction or elimination of bit and BHA balling
- Significant reductions in tubular and drilling equipment wear.
- Improved tripping, logging and casing run times
- Provides additional viscosity to WBM

### TREATMENT

- **Deep Black XE™** is easily dispersed and may be added via a hopper directly into the active system or through pre-mixing.
- Concentration should vary dependent on mud types, density, well path design (anticipated torque and drag) and anticipated formation.
- Field experience has shown that a treatment of 3.5- 8 ppb to be effective in reducing torque and drag due to brittle formations and pressurized shale.
- Treatment on maintenance of daily addition of between 0.25 and 0.50 ppb should be made.

### PACKAGING

- 55 Gallon Drum
- 275 Gallon Tote
- Bulk

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## PERFORMANCE TESTS

In 4% KCl Base

These test show that additions of **Deep Black XE™** from 2.7 to 5.3 gal/m3 can help to get acceptable rheology parameters.

Sample	1	2	3
Tap Water (ml)	350	350	350
Soda Ash (g)	0.35	0.35	0.35
KCl (g)	14	14	14
<b>Deep Black FR™</b>	<b>3.5</b>	<b>5.0</b>	<b>7.0</b>
Calcium Carbonate Mesh 200 (g)	50	50	50
pH	9.6	9.6	9.6

Sample	1	2	3
Temperature (°F)	120	120	120
PV (cps)	4	5	6
YP (lbf/100ft <sup>2</sup> )	8	13	19
Gels (lbf/100ft <sup>2</sup> )	3/3	6/7	9/12
6/3 rpm Readings (lbf/100ft <sup>2</sup> )	3/2	6/5	9/8

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## PERFORMANCE TESTS

### In Fresh Salt Water Base Fluid

These test show that additions of **Deep Black XE™** from 7.5 gal/m3 can help to get acceptable rheology parameters.

Sample	1	2	3
Saturated 26% NaCl Brine (ml)	350		
KCl 4% Solution (ml)		350	
Potassium Formate Brine (SG=1.57) (ml)			350
Soda Ash (g)	0.35	0.35	0.35
<b>Deep Black XE™ (ml)</b>	<b>10</b>	<b>10</b>	<b>10</b>

Sample	1	2	3
pH	9.5	9.6	9.8
Temperature (°F)	120	120	120
PV (cps)	10	7	26
YP (lbf/100ft2)	32	29	31
Gels (lbf/100ft2)	17/23	16/21	7/9
6/3 rpm Readings (lbf/100ft2)	17/15	16/15	8/7

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