

NANOSHIELD synthetic polymer

Enhance wellbore stability and seal
off depleted, weak formations

The **NANOSHIELD™ synthetic polymer** from Baker Hughes, a GE company (BHGE), is specially designed to disperse into unique sub-micron-sized particles when added to any mud system. Delivering advanced performance in a variety of drilling conditions, NANOSHIELD has a wide range of synergistic applications and attributes to overcome wellbore instability and weak formation challenges.

NANOSHIELD can be used in high-performance water-based systems to provide enhanced wellbore stability when drilling through shales. The synthetic polymer's small particle size (d50: 200 nanometers) allows the product to enter into micro-fractures in shale, reducing fluid invasion and the associated increase in pore pressure. When used in combination with a high-salinity mud system, NANOSHIELD delivers a significant reduction in shale permeability through osmotic pressure management.

The NANOSHIELD synthetic polymer also functions in all types of invert emulsion mud systems as a polymeric HPHT fluid loss reducer. When used in combination with sized synthetic graphitic products such as the **LC LUBE™ additive**, the NANOSHIELD synthetic polymer is very effective at sealing porous, highly permeable formations. This reduces the potential for induced fractures thereby minimizing the risk of differential sticking and/or downhole losses.

Mixing and recommended treatment

NANOSHIELD polymer should be added through a mixing hopper into the active mud system or through a pre-mixed volume of mud. The product should be added slowly over two to three circulations to ensure an even distribution throughout the mud system. For optimum results, maintain 0.5-5.0 ppb depending on wellbore conditions.

Applications

- Water-based fluids
 - Fresh to saturated brine phase
- Emulsion fluids
 - Diesel, synthetic, and mineral oils
- Offshore rigs
 - 100% active material/small foot print
- Onshore rigs
 - ease of logistics
- Environmentally sensitive areas
- Microfractured and sensitive shales
- Weak and depleted formations

Features and benefits

- Extensive shelf life and compatibility in extreme climates
 - Reduces logistic and storage costs

Features and benefits when used in water-based fluids

- Seals microfractures when drilling through shales
 - Enhances wellbore stability
- Minimizes pore pressure transmission when used in PERFORMAX™ WBM systems
 - Improves osmotic pressure management
- Superior PPA results in LATIDRILL™ system when combined with LATIMAGIC™ additive
 - Seals off depleted and weak formations

Features and benefits when used in emulsion fluids

- Easily dispersed in all types of emulsion systems
 - Improves mixing efficiency
- Polymeric HT/HP fluid loss reducer
 - Reduces filtrate invasion
- As a component of the MAX-BRIDGE™ bridging system allows extreme overbalances to be maintained against porous formations
 - Improves formation integrity

Environmental information

For information concerning environmental regulations applicable to BHGE drilling fluids products, contact the BHGE Health, Safety, and Environment department.

Shipping

Transportation of NANOSHIELD synthetic polymer is not restricted by either US or international regulatory agencies.

Safe handling recommendations

Use normal precautions for employee protection when handling products. Utilize appropriate personal protective equipment (PPE) for employee comfort and protection. See the product's safety data sheet (SDS) prior to use.

Packaging

The NANOSHIELD synthetic polymer is packaged in 25-lb sacks.

Typical physical properties

Appearance	White powder
% Active	100
Bulk density	0.5 – 0.6 SG
Solubility	Dispersible in water and invert emulsion systems
Moisture	<2%
pH	<12.0
Chloride & hardness compatibility	Does not affect performance
Temperature stability	>300°F (149°C)

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