# NANOSHIELD

## Enhance wellbore stability and seal off depleted, weak formations

### Applications

- Water-based drilling fluids
  - Fresh to saturated brine phase
- Invert emulsion drilling fluids
  - Compatible with diesel, mineral oil, and synthetic base fluids
- Offshore and onshore applications
- Microfractures and sensitive shales
- Weak and depleted formations
- Environmentally sensitive areas

### Features and benefits

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

### Features and benefits when used in water-based drilling fluids

- Seals microfractures when drilling through shales
  - Enhance wellbore stability
- Minimizes pore pressure transmission when used in **PERFORMAX™ high-performance water-based drilling fluid system**
  - Improves osmotic pressure management
- Superior PPA results in **LATIDRILL™ system** when used in combination with **LATIMAGIC™ additive**
  - Seals off depleted and weak formations

The **NANOSHIELD™ wellbore sealing polymer** from Baker Hughes is specially designed nanotechnology capable of dispersing 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 sealing polymer 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 sealing polymer also functions in all types of invert emulsion drilling fluid systems as a polymeric high-pressure, high-temperature (HP/HT) fluid loss reducer. When used in combination with sized synthetic graphitic products such as the **LC-LUBE™ additive**, the NANOSHIELD sealing 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.

### Intelligent Fluids Solutions

The NANOSHIELD wellbore sealing polymer is one of Baker Hughes' *Intelligent Fluids Solutions* designed to address your greatest well construction and production challenges.

### Recommended treatment

NANOSHIELD sealing polymer should be added through a mixing hopper into the active mud system or through a pre-mixed volume of drilling fluid. 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 to 2.0 lb/bbl (1.4 to 5.7 kg/m$^3$) depending on wellbore conditions.

### Environmental information

For information concerning environmental regulations applicable to this product, contact the Health, Safety, and Environmental department of Baker Hughes.

### Shipping

Transportation of the NANOSHIELD polymer is not restricted by either international or United States regulatory agencies.

### Safe handling recommendations

Use normal precautions for employee protection when handling chemical products. See Safety Data Sheet (SDS) prior to use.

## Features and benefits when used in invert emulsion drilling fluids

- Easily dispersed in all types of invert emulsion drilling fluid systems
  - Improves mixing efficiency
- Polymeric high-pressure/high-temperature (HP/HT) fluid loss reducer
  - Reduces filtrate invasion
- Allows extreme overbalances to be maintained against porous formations when used as a component of **MAX-BRIDGE™ advanced bridging solution**
  - Improves formation integrity

## Packaging

The NANOSHIELD sealing polymer is packaged in 25-lb (11.4-kg) multi-walled bags.

| Typical properties | |
|---|---|
| **Appearance** | White powder |
| **Specific gravity** | 1.13 to 1.23 |
| **Solubility** | Insoluble; dispersible in water-based and invert emulsion systems |
| **pH** | Up to 12.0 |
| **Temperature stability** | > 350°F (177°C) |

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