

TD Water Technology

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Drilling Fluid Additives

June 2018

I. Filtrate Reducer

Product Line:

PLY-1 Salt-resistant and Thermally-stable Filtrate Reducer
PSO-1 Nitrile Silicone Polymer Filtrate Reducer
PSP-1 Sulfonate Copolymer Filtrate Reducer
PSP-2 Sulfonate Copolymer Filtrate Reducer
PANS Low Viscosity Polymer Filtrate Reducer
PFL-1 Composite Salt Water Filtrate Reducer
PMP Sulfomethylated Phenolic Resin
PMP-III Sulfomethylated Phenolic Resin
PPNH Lignite Resin for Drilling Fluid
PYS Pre-gelatinization Starch
PMR Carboxymethyl Starch
PHR High-temperature Modified Starch
PGF-1 Lignite Anti-Salt Filtrate Reducer
PNP-1 Natural Polymer Filtrate Reducer

PLY-1 Salt-resistant and Thermally-stable Filtrate Reducer

Product Description

PLY-1 is a water-soluble polymer filtration control agent. PLY-1 has excellent performance filtration control performance and high-temperature resistance. In typical freshwater muds, PLY-1 is capable to perform up to 200°C and has shown good performance in muds. It can increase the viscosity of muds and is compatible with all commonly used materials. The recommended dosage is between 3-7 ppb.

Technical Specification

Items	Specifications
Appearance	Yellow or orange free-flowing powder or granular
Moisture, %	≤10.0
Residue (0.90mm), %	≤10.0
FL _{API} for 4% brine(150°C/16h), mL	≤15.0
FL _{API} for saturated salt water (150°C/16h), mL	≤15.0

Features

- Reduction of filtration loss with minimal dosage
- Highly resistant to salinity; can be applied in brine, saturated brine and seawater muds
- Can be used for deep wells due to its high-temperature resistance
- Should increase mud system viscosity

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PSO-1 Nitrile Silicone Polymer Filtrate Reducer

Product Description

PSO-1 is a nitrile silicone polymer with excellent capabilities in salt-resistance up to saturation and high-temperature resistance up to 220 °C. It can be used in ultra-deep wells and is soluble in fresh water, brine, saturated brine and seawater based drilling fluids. This polymer can be directly added to various water-base drilling fluids. The recommended dosage is 3-7 ppb.

Technical Specification

Items	Specifications
Appearance	White free-flowing powder
Moisture, %	≤10.0
Residue (0.90mm), %	≤10.0
FL _{API} for fresh water mud (180°C/16h), mL	≤12.0
FL _{API} for saturated salt water mud (180°C/16h), mL	≤15.0

Features

- Reduction of filtration loss with minimal dosage
- Highly Resistant to calcium and magnesium; can be applied in brine, saturated brine and seawater based drilling fluids
- Excellent high-temperature resistance (up to 220 °C); can be used in deep, ultra-deep and geothermal wells

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PSP-1 Sulfonate Copolymer Filtrate Reducer

Product Description

PSP-1 is a copolymer with excellent salt and high-temperature resistant product. By adopting the design of molecular structure, PSP-1's steric hindrance and polymer molecular rigidity are enhanced because of reasonable space volume of the monomers. PSP-1 far surpasses other lubricants sheen performance, poor salt resistance, and poor FL_{HTHP} performance of conventional polymer filtration reducers. As a new polymer filtration reducer with excellent performance, PSP-1 can resist high temperature up to 200°C. It is suitable to be used in deep wells, ultra-deep wells and high-salinity brine drilling fluids. The recommended dosage is 3-7 ppb.

Technical Specification

Items		Specifications
Appearance		White or light yellow powder
Moisture, %		≤ 10.0
Residue (0.90mm), %		≤ 10.0
PH		7-9
30% Salt water mud after 200°C/16h aging	FL_{API}	≤ 5.0
	FL_{HTHP}	≤ 20.0

Features

- This product exhibits excellent performance under high temperature up to 200°C can be used for deep and ultra-deep wells
- Strong resistance to salt up to saturation and calcium up to 10,000 ppm; can be applied in freshwater, brine, saturated brine, seawater based drilling, and completion fluids
- Reduces FL_{HTHP} effectively improves mud cake quality
- Effective in inhibiting clay from hydrating

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PDSP-2 Sulfonate Copolymer Filtrate Reducer

Product Description

PSP-2 is a synthesized polymer filtrate reducer that can increase the viscosity effectively in freshwater muds and increase the viscosity slightly in brine muds. It also reduces the filtration loss, improves the quality of mud cake, and inhibits clay dispersion. PSP-2 is suitable for seawater drilling fluids, deep well and ultra-deep well drilling fluids. The recommended dosage is between 3-5 ppb.

Technical Specification

Items		Specifications
Appearance		White or light yellow powder
Moisture, %		≤12.0
Residue (0.90mm), %		≤10.0
PH		9-12
Active matter content, %		≥ 75.0
FL _{API} for compound brine slurry, mL	Room Temp	≤10.0
	160°C/16h	≤15.0

Features

- Reduction of filtration loss with minimal dosage
- Excellent performance under high temperature up to 200°C and it can be used for deep as well as ultra-deep wells
- Strong resistance to salt, calcium and magnesium; can be applied in freshwater, brine, saturated brine, seawater based drilling, and completion fluids
- Increases viscosity slightly

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PANS Low Viscosity Polymer Filtrate Reducer

Product Description

The conventional polymer filtration reducers increase the viscosity of the drilling fluid with high molecular weight. However, they have adverse effects on the rheological property of the high-density drilling fluid systems, and their high liquid phase viscosity can easily lead to concerns.

Besides, the modified starch, such as LV-CMC and LV-PAC, will not resist high temperature, which makes it unsuitable for deep well applications. To solve these problems, we developed the PANS, an advanced filtrate reducer with low molecular weight, small viscosity effect, resistance to high temperature, salinity and excellent filtration control capability. PANS is synthesized polymer filtrate reducer. PANS can reduce the filtration loss, improve the mud cake quality, exhibits high temperature resistance, salinity and calcium contamination resistance. PANS has low viscosity to mud system due to narrow molecular weight scale. It is especially suitable for freshwater, brine, seawater drilling, and completion fluids. The recommended dosage is 3-7 ppb.

Technical Specification

Items		Specifications
Appearance		White or light-yellow powder
Moisture, %		≤ 12.0
AV (1% water solution), mPa.s		≤ 5.0
Effective content, %		≥ 70.0
FL _{API} after 150°C/16h Aging, mL	Fresh water Mud	≤ 15.0
	Composite brine Mud	≤ 15.0
AV after 150°C/16h Aging, mPa.s	Fresh water Mud	≤ 25.0
	Composite brine Mud	≤ 7.5

Features

- Low viscosity; can be used for high-density drilling fluid due to slight impact on rheology
- Reduces filtration effectively with low dosage
- Improves mud cake quality and inhibit clay dispersing
- Performs well under high temperature up to 150°C and is suitable for deep wells
- Strong resistance to salt, calcium and magnesium; can be applied in freshwater, brine, saturated brine, seawater based drilling and completion fluids
- Pilot test is recommended prior to use in KCl, Polyamine and other strong inhibition drilling fluids

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PFL-1 Composite Salt Water Filtrate Reducer

Product Description

PFL-1 is amphoteric multi polymer. PFL-1 illustrates good performance in filtration loss control with the capability of salt, calcium, and magnesium inhibition. It is compatible with conventional chemicals and could be mixed into the drilling fluid through the mixing hopper. Its recommended dosage is 2 -7 ppb.

Technical Specification

Table 1

Items	Specifications
Appearance	Gray free-flowing powder or granules
Moisture, %	≤10.0
AV (1% aqueous solution), mPa.s	≤12.0
Residue (0.90mm), %	≤10.0

Table 2

Drilling Fluid Type		Specifications		
		AV mPa.s	PV mPa.s	mL
Fresh water slurry	Base mud	6-8	3-5	20±3
	Base mud+ 0.5% WFL-1	≤15.0	≤10.0	≤10.0
Composite salt water slurry	Base mud	4-6	2-4	90±10
	Base mud+ 2% WFL-1	≤12.0	≤10.0	≤10.0

Features

- Reduction of filtration loss with minimal dosage
- Strong resistance to salt, calcium and magnesium; can be applied in freshwater, brine, saturated brine, seawater based drilling, and completion fluids.
- This product is non-toxic

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PMP Sulfomethylated Phenolic Resin

Product Description

PMP is a condensed polymer filtrate reducer. PMP is a good filtration loss control agent in ultra-deep wells and it can effectively reduce filtration loss. The recommended dosage is 7 - 18 ppb.

Technical Specification

Items	Specifications	
	PMP-I	PMP-II
Appearance	Black free-flowing powder, its 10% water solution reddish brown.	
Dry basis, %	≥ 90.00	
Water insoluble content, %	≤ 10.0	≤ 8.0
Cloud point salinity (Cl-), g/L	≥ 100.00	≥ 160.00
AV, mPa.s	≤ 25.0	≤ 50.0
FL _{HTHP} , mL	≤ 20.0	≤ 32.0

Features

- High temperature resistance (up to 180°C). Suitable in deep and ultra-deep wells
- Salt resistance, can be applied in freshwater, brine, saturated brine, seawater drilling, and completion fluids
- Low effect on system viscosity, can be applied to high-density drilling and completion fluids
- Compatible with other additives

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PMP-III Sulfomethylated Phenolic Resin

Product Description

PMP-III has high performance in salt-resistance a filtration loss control. Through introducing cationic monomers into the molecular chains, PMO-III is condensation polymer filtrate reducer. It illustrates good capability in inhibiting clay from swelling and hydrating. PMP-III demonstrates better viscosity effect, high- temperature resistance and rheology property compared to normal SMP products. The recommended dosage is 7-18 ppb.

Technical Specification

Items	Specifications
Appearance	Black free-flowing powder
Dry basis, %	≥ 87.00
Water insoluble content, %	≤ 8.0
Cloud point salinity (Cl-), g/L	≥ 100.00
AV, mPa.s	≤ 40.0
FL _{HTHP} , mL	≤ 28.0
Foaming content,%	≤ 10.0

Features

- High performance in filtration loss control and improved mud cake with low dosage
- Low effect on system viscosity, can be applied to high-density drilling and completion fluids
- Heat resistance up to 180°C; when considered for deep wells and ultra-deep wells
- Strong resistance to salt, calcium, and magnesium
- Compatible with other additives

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PPNH Lignite Resin for Drilling Fluid

Product Description

PPNH is synthetic polymer filtrate reducer. It is capable of reducing viscosity. It is high temperature and salt resistant so that it can be applied in various freshwater and brine drilling fluids. The recommended dosage is 7-14 ppb.

Technical Specification

Items		Specifications
Appearance		Black-brown powder
Moisture, %		≤ 18.0
Water insoluble content, %		≤ 12.0
PH		9.0 – 10.2
FL _{API} , mL	Fresh water slurry	≤ 10.0
	Sodium chloride slurry	≤ 15.0
FL _{HTHP} , mL	Fresh water slurry	≤ 30.0
	Sodium chloride slurry	≤ 35.0
AV, mPa.s	Fresh water slurry	≤ 15.0
	Sodium chloride slurry	≤ 40.0

Features

- High temperature and salt resistance, reduction in filtration loss, exhibits superior lubricating capabilities
- Capable of forming thin and resilient mud caking on the borehole, allowing ample lubricating effects and good rheological property
- Heat resistance up to 200°C; when considered for deep wells and ultra-deep wells

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PYS Pre-gelatinization Starch

Product Description

PYS has a good thermal stability and is capable of stellar calcium and salt resistance, as well as increased system viscosity. It is a good filtration loss control agent in various water-based drilling and completion fluids. This product is non-toxic and environmental-friendly. The recommended dosage is 3-7 ppb.

Technical Specification

Items		Specifications
Appearance		White or light yellow free-flowing powder
Residue (2mm), %		No Residue
Viscometer reading at 600 rpm	40 g/L salt water slurry	≤ 18.00
	Saturated salt water slurry	≤ 20.0
FL _{API} , mL	40 g/L salt water slurry	≤ 10.0
	Saturated salt water slurry	≤ 10.0

Features

- Reduction of filtration loss with minimal dosage
- Increases viscosity slightly
- Resists salt, calcium, and magnesium; it can be applied in various drilling and completion fluids
- Heat resistance up to to 120°C
- Compatible with other chemicals
- Non-toxic and environmental-friendly

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PMR Carboxymethyl Starch

Product Description

PMR is made from anionic starch ethers using a special production treatment. With high content of active ingredients, it can be hydrated in cold water and is mildew resistant. In addition, it can significantly improve performance in fluid loss control, has low effect to system viscosity, and it has strong resistance to high temperature/ salt. As environment-friendly natural material, PMR is suitable for various environmental drilling fluid with a high acid soluble rate it can protect the reservoir. The recommended dosage is 3-7 ppb.

Technical Specification

Items		Specifications
Appearance		White or light yellow free-flowing powder
Moisture, %		≤ 13.0
Residue (2mm), %		No Residue
Acid soluble rate, %		≥ 99.5
Viscometer reading at 600 rpm after 120 °C aging	40 g/L salt water slurry	≤ 18.00
	Saturated salt water slurry	≤ 20.0
FL _{API} after 120 °C aging, mL	40 g/L salt water slurry	≤ 10.0
	Saturated salt water slurry	≤ 10.0

Features

- Reduction of filtration loss with minimal dosage
- Heat resistance up to to 120°C
- Increases viscosity slightly
- Resists salt up to saturation
- Product is bio-degradable and has no harm to environment
- High acid soluble ratio; can protect the reservoir

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PHR High Temperature Modified Starch

Product Description

PHR is a modified starch with improved water solubility and temperature resistance (up to 130°C). It has good fluid loss performance under both low and high temperature. PHR is an environmental-friendly filtrate reducer with low effect on system viscosity and strong resistance to salt. It's recommend dosage is 3-7 ppb.

Technical Specification

Items		Specifications
Appearance		White or light yellow free-flowing powder
Moisture, %		≤12.0
600 rpm viscometer reading after aid soluble		≤5.0
AV after 130 °C aging, mPa.s	40 g/L salt water slurry	≤10.00
	Saturated salt water slurry	≤12.0
FL _{API} after 130 °C aging, mL	40 g/L salt water slurry	≤15.0
	Saturated salt water slurry	≤20.0

Features

- Reduces filtration loss effectively
- Increases viscosity slightly
- Product is bio-degradable and has no harm to environment
- Heat resistance up to 130°C
- Strong resistance to salt, calcium, and magnesium; can be applied in various drilling and completion fluids
- Good filtration loss control performance under both low and high temperature and has wide applicable temperature range

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PGF-1 Lignite Anti-Salt Filtrate Reducer

Product Description

WGF-1 is a synthesized filtrate reducer. It can reduce filtration effectively, inhibit shale, and keep thermal stability. It can be applied in various kinds of water-base drilling fluids. The recommended dosage is 3-10 ppb.

Technical Specification

Items		Specifications
Appearance		Black free-flowing powder or granules
Moisture, %		≤ 10.0
PH		7.00-10.00
Relative expansion ratio, %		≤ 60.0
FL _{API} , mL	Room Temp	≤ 10.0
	200 °C / 16h	≤ 12.0
FL _{HTHP} @ 150 °C/3.5 MPa, mL		≤ 28.0

Features

- Reduces filtration loss and viscosity effectively
- Inhibits shale effectively
- Resists temperature up to 200°C and it can be applied in deep or ultra-deep wells
- It has low fluorescence and can be applied in exploration wells
- Compatible with other additives well

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PNP-1 Natural Polymer Filtrate Reducer

Product Description

PNP-1 is a compound derived with vegetable gum and plant fiber through a special process. It has a strong capability to reduce filtration loss but it also has a good thermal stability and strong resistance to salt and calcium. The product reduces yield point or GEL strength without viscosity increasing. The recommended dosage is 3-7 ppb.

Technical Specification

Items		Specifications
Appearance		Black free-flowing powder or granules
Moisture, %		≤ 10.0
PH (1% water solution)		7.00-9.00
Residue (0.9mm), %		≤ 10.0
Decrease ration of AV, %		≥ 70.00
FL _{API} for fresh water slurry, mL	Room Temp	≤ 12.0
	120 °C / 16h aging	≤ 15.0
FL _{API} for 4% salt water slurry, mL	Room Temp	≤ 10.0
	120 °C / 16h aging	≤ 15.0

Features

- Reduces filtration loss effectively
- Increases viscosity slightly in brine slurry and reduce yield point or gel strength
- Strong resistance to salt, calcium, and magnesium; can be applied in freshwater, brine, saturated brine, and seawater based drilling including completion fluids
- Heat resistance up to 120°C
- Compatible with other chemicals well
- Non-toxic and no harm to environment

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

II. Shale Inhibitor

Product Line:

PNOP-1 Nano-polyester for Drilling Fluid
PNS-1 Nano-Silica for Drilling Fluid
PAP-1 Amine Based Shale Inhibitor
PSG Aminated Polysaccharides
PISP-1 Elastic Microsphere for Drilling Fluid
PFF-I Acid Soluble Sulfonated Asphalt
PFF-II Cationic Asphalt Powder
PFF-III Emulsified Asphalt
PYLA Emulsified Paraffin Wax
PDLA-1 Complexing Aluminum Based Shale Inhibitor
POLYOL
PWF-1 Fluorescence-free White Asphalt
PFT-3000 Shale Sealing and Inhibiting Agent

PNOP-1 Nano-polyester for Drilling Fluid

Product Description

PNOP-1 is a multi-polymer. It forms nano-solid sealing material through special technology. The special functional groups on the molecular chain has strong adsorption ability and excellent adhesion properties. PNOP-1 reduces pore-pressure transmission by sealing pore throats and micro-fractures due to reasonable size distribution of NP-1 in muds. It can be used in various water-base drilling fluids. Its recommended dosage is 0.5-3% (v/v).

Technical Specification

Items	Specifications	Measured Value
Appearance	White Emulsion	White Emulsion
Increase ratio of AV, %	≤ 10.0	-38.7
FL _{API} , mL	≤ 15.0	7.6
Water permeability reduction rate, %	≥ 35.0	
Relative expansion ratio, %	≤ 60.0	
Particle size D50, μm	≤ 1.0	0.69
Penetration, mm	≤ 0.5	0.20

Features

- Forms semipermeable membrane at the borehole interface and cutting surface to maintain the stability of borehole and integrity of the cuttings
- Excellent borehole stability; can be applied to all kinds of water-sensitive and other complex formation
- Resists high temperature up to 150°C and reduce HTHP filtration loss
- Compatible with other additives
- Low fluorescence; can be applied to exploration wells

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. Should be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PAP-1 Amine Based Shale Inhibitor

Product Description

PAP-1 is a new type of shale inhibitors used in high-performance water-based drilling fluid. PAP-1 possesses good cationic absorbability, inhibitory capacity and a long duration of action. The introduction of amines compounds provides greater shale inhibition and its anti-collapse mechanism is different from the ordinary polyether products. PAP-1 is designed to be firmly absorbed on the clay to reduce the clay layer spacing and hence prevent water from invading into the formation. The product can be directly added to all kinds of water-base drilling. The recommended dosage is 0.5-1% (v/v).

Technical Specification

Items	Specifications
Appearance	Light yellow viscous liquid
pH (2% water soluble solution)	8-12
Freezing point, °C	≤-45
Fluorescence grade	≤5
The increased ratio of the third-time shale recovery, %	≥90
Note: The ratio of first time shale cuttings recovery in distilled water shall be 20 -40%.	

Features

- Inhibits shale effectively with minimal viscosity and filtration loss increasing, controls the clays dispersing, prevent bit balling. It's especially suitable for soft mud stone formation, salt gypsum formation, water-sensitive formation, and other complex formations
- Adheres to clay interlamination
- Strong inhibition capability, reduces surface tension
- No influence on rheological properties and fluid loss
- Stabilizes borehole by reducing clay spacing and inhibiting water from getting into formation
- Resists salt, calcium, and magnesium. Can be applied to freshwater, brine, seawater drilling, and completion fluids
- Performs well under high temperature up to 200°C and is suitable for deep wells and ultra-deep wells
- Freezing point is low, has cold-resistance, can be used in cold areas
- Protects oil and gas reservoirs
- Good compatibility

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. Should be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PSG Aminated Polysaccharides

Product Description

PSG is a special modified natural polysaccharide polymer. PSG provides low chemical activity of drilling fluid and enhanced stability of shale. It has good properties of forming film, high-temperature resistance, shale inhibition, and salt resistance. It is non-toxic with the benefit of protecting oil and gas reservoirs. PSG is suitable for unconsolidated coal bed gas formations. The recommended dosage is 3-5% (v/v).

Technical Specification

Items	Specifications
Appearance	Clay bank viscous liquid
pH	6.0-8.0
AV, mPa·s	≤20.0
FL _{API} , mL	≤15.0
The relative rate of expansion, %	≤60.0

Features

- Forms semipermeable membrane on the interface to enhance borehole stability. It's especially suitable for water sensitivity formation (mud stone formation, salt rock formation, soft mud stone formation, and other complex formations)
- Good lubricating property with the ability to be applied to horizontal wells, high angle deviated wells, and other complex wells
- Excellent salt contamination resistance
- Good filtration loss control property up to 120°C
- Protects oil and gas reservoirs
- Non-toxic, biodegradable, suitable for building environmental-friendly drilling fluid

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. Should be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PISP-1 Elastic Microsphere for Drilling Fluid

Product Description

PISP-1 can effectively inhibit clay hydration, dispersion, and keep water sensitivity formation from damage. It has good elasticity and can form elastic deformation under the differential pressure to adapt to the pore of different shapes and sizes. It has good sealing effect for the pore throat with wider size. It reduces filtration loss of drilling fluid, and is an anti-sloughing agent, and reservoir protection agent for excellent preparation. Recommended treatment is from 0.5-3% (v/v).

Technical Specification

Items	Specifications
Appearance	Colorless or pale yellow viscous liquid
AV increased value, mPa·s	≤7.0
FL _{API} reduction value (150°C/16h), mL	≥10.0
Relative inhibition	≤1.0
Shale recovery rate, %	≥70.0
Fineness (2.5-300μm), %	≥80.0

Features

- Good sealing and anti-sloughing performance
- Protects oil and gas reservoirs
- Resists temperature to 150 °C suitable for use in deep wells
- Compatible with other additives well
- Non-toxic, no harm to environment

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. Should be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PFF-I Acid Soluble Sulfonated Asphalt

Product Description

PFF-I is a proven drilling fluid additive which has many advantages and can be widely applied. PFF-I contains high water-soluble content. Comparing to normal modified asphalt, FF-I contains more absorbing groups to provide its ability to absorb on the shale interface through electrical absorption. It exhibits good performance in anti-sloughing and filtration loss control with lower temperature influence. PFF-I can be applied in various water-base drilling fluids. The recommend dosage is 3.5-10.5 ppb.

Technical Specification

Items	Specifications
Appearance	Black or brown free-flowing powder
Moisture, %	≤ 10.0
pH	8.0-10.0
Sodium sulfonate group, %	8.0-13.0
Oil soluble content, %	≥ 30.0
Water soluble content, %	≥ 60.0
Acid precipitates content, %	≤ 6.0
FL _{HTHP} , %	≤ 32.0

Features

- Suitable for various water-based drilling fluids
- Ability to inhibit drilling cuts from dispersion and stabilize YP of mud
- Good sealing capacity and ability to improve the mud cake quality and control the filtration loss under high temperature (up to 200°C) and high-pressure condition
- High active content and low impurity compared to other sulfonated asphalt products
- Reduces torque and drag, avoids pipe stuck
- Performs sealing agents in OBM
- No harm to oil and gas reservoir

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PFF-II Cationic Asphalt Powder

Product Description

PFF-II is compounded by natural asphalt and composite surfactant. PFF-II has higher asphalt content than sulfonated asphalt and emulsified asphalt. PFF-II in the drilling fluid can be adsorbed on the surface of shale to form a thin and tough hydrophobic film with small permeability. PFF-II can also block the throat and micro-fracture under differential pressure to provide effective prevention of filtrate invasion into formation. With the excellent inhibiting ability of its cationic group, PFF-II can effectively stabilize the borehole by preventing shale from hydration swelling and peeling off. The recommended dosage is 3.5 -10.5 ppb.

Technical Specification

Items	Specifications
Appearance	Black powder
Moisture, %	≤ 10.0
Oil soluble rate, %	≥ 40.0
Reduction rate of FL_{HTHP} (150°C/3.5MPa), mL	≥ 55.0
Permeability of mud cake, μm^2	$\leq 5 \times 10^{-6}$

Features

- Good water dispensability without flocculation and floating issues
- Good shale inhibition and sealing property
- Increases viscosity slightly, suitable for high density drilling fluids
- Resists temperature to 220°C and can be applied to high-temperature deep well drilling fluids
- Resists salt and calcium, can be applied in various freshwater, brine, seawater, saturated salt, and water drilling fluids

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PFF-III Emulsified Asphalt

Product Description

PFF-III is composed of asphalt emulsion and polyacrylate emulsion. This product can inhibit shale hydration expansion, prevent the collapse of unstable formation, improve the quality of mud cake, and improve the lubricating and sealing capability. The recommended dosage is 1-3% (v/v).

Technical Specification

Items	Specifications		
	Type I	Type II	Type III
Appearance	Brown-black jelly		
Water-dispersibility	Dispersed, non-floating solid		
Softening point (evaporation residue), °C	50-70	70-90	90-
Oil-soluble rate, %	≥95	≥75	≥70
Colloidal stability, %	≥95		
Solid content, %	≥55		
Median Diameter, μm	≤60		
Relative inhibition	≤0.60		

Features

- Strong capability of resisting salt, calcium and magnesium; can be applied in freshwater, brine, saturated brine, seawater drilling, and completion fluids
- Good dispensability in water without flocculation and floating issues
- Good colloidal stability and storage stability
- Compatible with other additives

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PYLA Emulsified Paraffin Wax

Product Description

PYLA is refined from the surface-active agents and paraffin. The product has strong performance of lubrication and inhibition. PYLA is non-toxic and has low fluorescence. It can protect oil and gas reservoirs. PYLA can be directly added into all kinds of water-base drilling fluids. The recommended dosage is 1-3% (v/v).

Technical Specification

Items	Specifications
Appearance	Light yellow or milky white viscous liquid
Water dispersing	Uniform dispersion and no floating solids
Colloid stability, %	≥ 95
Fluorescence grade	≤ 4.0
Residue content after evaporation, %	≥ 50.0
The decreased ratio of adhesion coefficient, %	≥ 40.0

Features

- Good sealing and inhibiting property; can effectively seal pore throat and micro-fracture and inhibit drilling cuttings from hydrating and dispersing
- Reduces adhesion coefficient effectively thanks to good lubricant property. It is especially suitable for horizontal wells, directional wells and highly-deviated wells
- High permeability recovery of reservoir; can temporarily plug oil and gas reservoirs
- Compatible with other additives; can be used for various drilling and completion fluids

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PDLA-1 Complexing Aluminum Based Shale Inhibitor

Product Description

PDLA-1 is polymerized by aluminum salt and various complexing. Under low pH condition, PDLA-1 forms precipitates to seal pore throat and micro-fracture, solidifies near borehole and enhance borehole stability. PDLA-1 can inhibit clay from hydrating and swelling with minimal impact on the rheology and filtration control property. The recommended dosage is 1-2 % (v/v).

Technical Specification

Items	Specifications
Appearance	Clear viscous liquid
Aluminum content (weighted by $\text{Al}(\text{OH})_3$), %	≥ 6.0
AV increasing rate, %	≤ 10.0
FL_{API} increasing rate, %	≤ 20.0
Inhibiting rate for mud-making, %	≥ 90.0

Features

- Inhibits clay from hydrating and swelling, inhibits shale from sloughing and caving
- Cleans the borehole, increases borehole stability and reduces risks of bit balling and pipe stuck
- Strong resistance to contamination; can be applied in various brine, saturated brine and seawater drilling fluids
- Protects oil and gas reservoirs
- Non-toxic and biodegradable, has no harm to environment

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

POLYOL

Product Description

Polyol belongs to polyether modified products. It can effectively prevent clays from dispersing and reduce swelling pressure. Besides, providing lubrication/ protection to oil and gas reservoir. The environmental-friendly POLYOL has low fluorescent and low toxicity. Polyol can form hydrophobic film on the surface of metal/ shale, allowing the wettability reversal to happen. With adsorption groups such as COC and hydroxyl, it can effectively avoid drilling cuts from flocculating and adhering, prevent bit balling, and increase ROP. It can be directly added into various water-base drilling fluids. Its recommended dosage is 1-3% (v/v).

Technical Specification

Items	Specifications	
	I	II
Appearance	Viscous liquid	
Non-volatile matter content, %	≥96	
Water solubility	Not tiered	
Cloud point, □	<50.0	≥50.0
Hydroxyl value, mg/g (as KOH)	≥30.0	≥150.0

Features

- It can effectively inhibit shale, can be applied in various water-sensitive formations and other complex formations
- High lubricity, can be applied in directional wells and horizontal wells
- Strong resistance to salt, calcium and magnesium; can be applied in freshwater, brine, saturated brine, seawater based drilling, and completion fluids
- Resists temperature to 180°C and it can be applied in deep well or ultra-deep well
- It is non-toxic and biodegradable, has no harm to the environment
- Protects oil and gas reservoir effectively
- Compatible with other chemicals

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PDWF-1 Fluorescence-free White Asphalt

Product Description

PDWF-1 is made from oil soluble chemicals and surfactant through special refining process. PDWF-1 has the desired properties of asphalt products, is non-toxic, has minimal fluorescence and has no harm to environment/ formations. It can be directly added to all kinds of water-base drilling fluids, and the recommended dosage is 3.5 -10.5 ppb.

Technical Specification

Items	Specifications
Appearance	Light yellow or brown powder
pH	6.0-10.0
Water soluble ratio, %	≥ 35
Oil soluble ratio, %	≥ 35
Fluorescence grade	≤ 4
FLHHP, mL	≤ 35

Features

- Excellent sealing and inhibiting property, can be applied in various water-sensitive fragile shale formations and other complex formations
- Good filtration control property, effectively reduces FL_{HHP}
- Provides excellent lubricating property
- Protects oil and gas reservoir
- Compatible with other chemicals and has low fluorescence; can be applied in exploration wells

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

PFT-3000 Shale Sealing and Inhibiting Agent

Product Description

PFT-3000 is an oil soluble sealing and inhibiting chemical that will resist high temperature. Moreover, it has low fluorescence and toxicity. PFT-3000 is suitable for exploration wells and other complex exploration wells. It can be directly added in various water-based drilling fluids, and its recommend dosage is 3.5 -10.5 ppb.

Technical Specification

Items	Specifications
Appearance	Black free-flowing powder
Volatile content, %	≤ 15.0
Fluorescence grade	≤ 5.0
Residue (0.9mm), %	≤ 10.0
Oil soluble ratio, %	≥ 15.0
Relative inhibition	≤ 0.6
FLHTHP(120°C/3.5MPa), mL	≤ 30.0

Features

- Good capability to seal and prevent shale collapsing
- Resists temperature to 200°C can be applied in deep or ultra-deep wells
- Reduces viscosity and filtration loss effectively
- Low fluorescence, so it can be applied in exploration well

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

III. Lubricant

Product Line:

LB-PP2 Polyether Polyol

LB-PP3 Water Base Lubricant for Drilling Fluid

LB-HD1 High Density EP Lubricant

LUBE-102 EP Lubricant for Drilling Fluid

LB-GR Solid Lubricant

LB-PB Plastic Beads

LB-PP2 Polyether Polyol

Product Description

LB-PP2, is polyether polyol lubricant which can provide excellent lubricating property. LB-PP2 is fluorescence-free, toxic-free and pollution-free. It can be directly added into various water-base drilling fluids and its recommended dosage is 1-3% (v/v).

Technical Specification

Items	Specifications
Appearance	Milky viscous liquid
Water soluble	Not tiered
Density, g/cm ³	0.95±0.10
Fluorescence grade	≤5.0
Reduced rate of friction factor, %	≥85.0

Features

- Good lubricating property, suitable in directional and horizontal wells
- Resists salt, calcium and magnesium; can be applied in freshwater, brine, saturated brine, and seawater drilling fluids
- Resists temperature to 150°C can be applied in deep wells
- Non-toxic and biodegradable, no harm to environment

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

LB-PP3 Water Base Lubricant for Drilling Fluid

Product Description

LB-PP3 is a water-emulsified lubricant. LB-PP3 absorbs on the surface of wellbore and drill pipe; changes the interfacial property of the wellbore and drill pipe to improve the extreme pressure lubricating property of drilling fluids. LB-PP3 has excellent surface activity and ability to clean the drill pipe/ prevent bit-balling. Furthermore, it can be directly added into various water-base drilling fluids and its recommend dosage is 1-3% (v/v).

Technical Specification

Items	Specifications
Appearance	Milky viscous liquid
Water soluble (2% solution)	Not tiered
Increasing rate of AV (2% dosage), %	≤ 15.0
Decreasing rate of lubricating coefficient after 80°C/16h aging (1% dosage), %	≥ 75.0
Decreasing rate of adhesion coefficient after 80°C/16h aging (1% dosage), %	≥ 45.0

Features

- Good lubricating property, reduces torque effectively
- Good surface activity, prevents bit-balling
- Resists temperature to 150°C and it can be applied in deep wells
- Cost-effective products
- Non-toxic and biodegradable, no harm to environment

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

LB-HD1 High Density EP Lubricant

Product Description

LB-HD1 is made from mineral oil, vegetable oil, extreme pressure additive and surface-active agent. It could improve the lubricating property of drilling fluids under high temperature and high salinity situations. It is an excellent EP lubricant, and recommended dosage is 2-3% (v/v).

Technical Specification

Items		Specifications
Appearance		Brown viscous liquid
Density, g/cm ³		0.9±0.10
Decreasing rate of lubricating coefficient in freshwater mud, %	Room temp.	≥85.0
	150°C/16h	≥85.0
Decreasing rate of lubricating coefficient in high density freshwater mud, %	Room temp.	≥70.0
	150°C/16h	≥75.0

Features

- Good lubricating property to be used in directional, horizontal and other complex wells
- Resists temperature up to 180°C can be applied in deep wells or ultra-deep wells
- Strong salt resistance; can be applied in freshwater, brine, saturated brine and sea water drilling fluids
- Good lubricating property under high-density and high solid content condition; applicable to maintain lubricity of high density drilling fluids

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

LUBE-102 EP Lubricant for Drilling Fluid

Product Description

LUBE-102 is refined from vegetable oil through special sulfonating, neutralizing and emulsifying reaction process. The extreme pressure lubricating property is enhanced. LUBE-102 disperses in various water base drilling fluid uniformly, providing excellent lubricating and friction reduction properties. It can be directly added into the various water-based drilling fluids and the recommended dosage is 0.5 - 2% (v/v).

Technical Specification

Items	Specifications
Appearance	Light yellow viscous fluid
Density, g/cm ³	0.90±0.10
Flash point, °C	> 95.0
Fluorescence grade	≤ 4.0
Reduced rate of friction factor, %	≥ 85.0

Features

- Excellent lubricating property to be used in directional wells and horizontal wells
- Resistant to salt, calcium and magnesium; can be applied to various types of based fluids including fresh water, seawater, brine, and saturated brine
- Perform well up to 180°C and it can be applied in deep wells
- Non-toxic and biodegradable, no harm to environment
- Low fluorescence; can be used with well explorations
- Compatible with other drilling fluid additives

Package and Storage

It is a liquid packaged in 25 L, 50 L cans and 200 L drums. International packaging may vary. And they shall be stored in a shady and dry place with good ventilation.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

LB-GR Solid Lubricant

Product Description

LB-GR, black powder, can be fully dispersed in drilling fluids and quickly adhere to borehole and drilling device to reduce friction coefficient. It can be directly added into water based drilling fluids and its recommend dosage is 3.5-7 ppb.

Technical Specification

Items	Specifications
Appearance	Black powder
Moisture, %	≤ 12.0
pH	6.0-8.0
Fluorescence grade	≤ 5.0
Reduced rate of friction factor, %	≥ 50.0

Features

- Good lubricating capability to be applied in complicated wells such as horizontal and directional wells
- Resists salt, calcium and magnesium; can be applied in freshwater, brine; saturated brine and seawater drilling fluids
- Resists temperature up to 200°C and it can be applied in deep wells or ultra-deep wells
- Non-toxic and has no harm to environment
- Compatible with other additives
- Low fluorescence to be applied in exploration wells

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

LB-PB Plastic Beads

Product Description

LB-PB is made from styrene, acrylic acid and alkadienes cross-linking agent. It has a suitable hardness, strength and specific gravity. Its size can be adjusted, and it can provide excellent lubricating property and is regarded as an ideal solid lubricant.

Technical Specification

Item		Specifications
Appearance		White translucent balls
Density, g/cm ³		1.03-1.05
Thermal resistance, °C		≥200
Moisture, %		≤5
Ball rate, %		≥95.0
Size, %	Median diameter (2.0-0.66) mm, %	≥45.0
	Median diameter (0.66-0.125) mm, %	≤55.0
	Median diameter ≤0.125 mm, %	≤0.5

Features

- Good lubricating effect. It is suitable to be applied in extended reach directional wells, complex wells, deep wells and exploration wells
- LB-PB has strength; can resist higher pressure
- It is suitable to be applied in different direction wells thanks to its adjustable bulk density
- It can be easily applied onsite and can be directly added into the drilling fluids, it is also easy to maintain and operate

Package and Storage

Packaged in 25kg multi-wall paper sacks. It is recommended that the product be stored in a shady, dry, and ventilated place.

Safety

Avoid contact with eyes, skins and clothes; please refer to SDS for more information.

