

Description

KAR-PHPA L is a high molecular weight partially hydrolyzed polyacrylamide/polyacrylate emulsion in mineral oil.

Typical Properties

Appearance : Whitish Liquid
Active Content : 35% min.
pH (0.5% soln.) : 7.4 - 7.6
Specific Gravity : 1.05 - 1.07
Solubility : Easily soluble in water.

Features and Benefits

KAR-PHPA L improves wellbore stability by inhibiting the hydratable and dispersible shales.

KAR-PHPA L reduces the disintegration of cuttings through polymer encapsulation and hence leading to effective solids control.

KAR-PHPA L provides excellent hole-cleaning due to the shear thinning rheology imparted to the drilling fluid.

KAR-PHPA L also aids in reducing drag and enhancing rate of penetration.

KAR-PHPA L provides some fluid loss control and improves filter cake quality.

KAR-PHPA L minimizes bit and stabilizer balling.

KAR-PHPA L minimizes the incidence of tight hole and washouts.

Application

KAR-PHPA L can be used as shale stabilizer in weighted and un-weighted water-base drilling fluids made up of fresh-water, seawater, and sodium and potassium chloride brines.

KAR-PHPA L, as a bentonite extender, enhances the yield of bentonite low solids drilling fluids.

KAR-PHPA L can be used as a selective flocculant in clear-water and low solids drilling fluids to flocculate low yield solids.

KAR-PHPA L can also be used to formulate viscous sweeps for periodic hole cleaning.

Limitations

KAR-PHPA L is precipitated by calcium if the hardness level exceeds approximately 400 mg/l at 200°F. KAR-PHPA L becomes more stable to calcium contamination at lower temperatures. Remove the calcium using soda ash. When reducing calcium content with soda ash, it is recommended that 50 to 100 mg/l of calcium be left to prevent over treating with carbonate which can reduce shale protection at low concentrations.

KAR-PHPA L is a pH sensitive polymer. A pH range of 8.5 to 10.5 is preferred for optimum polymer stability. Above pH of 10.5 it is converted into acrylate with hydrolysis and release ammonia (NH₃). This effect becomes more significant pronounced at higher hardness levels.

Effectiveness of KAR-PHPA L is reduced by excessive cement contamination, where high levels of excess lime and high pH occur. In order to prevent the adverse effects of high calcium and pH due to cement contamination, the system is pretreated with sodium bicarbonate along with a pH-reducing product such as citric acid.

KAR-PHPA L is thermally stable to 300°F and can be used successfully in wells with bottom hole temperatures in excess of 350°F. Its temperature stability decreases with increasing hardness.

Soluble iron ion content greater than 40 mg/l cause rapid and severe cross-linking of KAR-PHPA L and excess gelation. Citric acid is used to sequester the iron and to prevent fish eyes.

The effectiveness of KAR-PHPA L is reduced where organic anionic dispersants are used in large quantities.

Treatment

An initial concentration of 1 to 4 lb/bbl (2.8–14.3 kg/m³) is recommended. The concentration will vary depending on the amount of "active" solids being drilled. Since the polymers are continually depleted by adsorption, it is essential to compensate the loss of these polymers. As a rule of thumb, an average concentration of 1 lb/bbl active KAR-PHPA L is maintained in the system to get satisfactory encapsulation. Moreover, on the basis of field experience, 2 to 8 lb supplemental KAR-PHPA L per barrel of formation drilled is recommended to account for PHPA loss and degradation.

Equivalent Concentrations of KAR-PHPA L

lb/100bbl (kg/m ³)	gal/100bbl (l/m ³)
25 (0.7)	2.8 (0.07)
50 (1.4)	5.6 (1.33)
75 (2.1)	8.4 (2.00)
100 (2.8)	11.0 (2.62)
125 (3.5)	14.0 (3.33)
150 (4.2)	17.0 (4.05)

KAR-PHPA L is added to the system uniformly and slowly through the mud hopper, the mud pump suction, or directly into the drill pipe. If KAR-PHPA L is used as selective flocculant, it is added directly to the flow line. Rapid addition may result in "fish eyes" and incomplete solution of the polymer.

Packaging

KAR-PHPA L is available in 20 kg (5 gal) net weight pails.