Clay Stabilizer KHF002

1. Introduction

The clay stabilizer KHF002 is used to prepare the salt water for mixing fracturing fluids. The additive can also stabilize the clays in the formation during fracturing and flowback operations.

2. Physical Properties and Hazards

Additives	Form	S.G.	Water Solubility	Health Hazard	Physical Hazard	pH
KHF002	White crystals	1.88-2.08	Soluble	Eyes, skin	None	6.0-8.0 (2 wt.%)

3. Chemical Properties and Application

KHF002 is an inorganic salt. The cations presented in KHF002 aqueous solution will inhibit swelling and dispersing of reactive clays in most sandstone formations.
KHF002 can be used for wide temperature ranges because of its inorganic nature.
KHF002 is compatible with most additives used in guar-based fracturing fluids.

4. Treatment

1-6 wt.% of KHF002 is generally used to prepare the salt water in mixing fracturing fluids.

5. Packaging

KHF002 is supplied in plastic-lined bags with net weight of 25 kg/bag. It should be stored in shaded areas with good ventilation.

Clay Stabilizer KHF002C

1. Introduction

Clay stabilizers are routinely added to aqueous-based fracturing fluids to help prevent damage to the formation caused by clay migration and swelling. These clay stabilizers are either a temporary or permanent type, and they are often used in combination.

The clay stabilizer KHF002C is a KCl substitute and can be used with Guar, HPG, CMHPG and Friction Reducer-based frac fluids. KHF002C is a temporary clay stabilizer that helps to prevent clay particles from swelling and plugging of reactive clays in water-sensitive formations during fracturing and flowback operations.

2. Physical Properties and Hazards

Additives	Form	S.G.	Water Solubility	Health Hazard	Physical Hazard	pH
KHF002C	Colorless liquid	1.02-1.07	Soluble	Moderate-Eyes	None	6.5-8.0

3. Chemical Properties and Application

Temporary Clay Stabilizer KHF002C is an organic liquid clay stabilizer. It is NOT a solution of KCl, but it can be substituted for KCl in most oilfield applications.

KHF002C has been used at temperatures up to 350°F without any adverse effect on fluid rheology.

KHF002C can be batch mixed, or continuously mixed into the fracturing fluid using a liquid-additive system. This eliminates the time-consuming step of batch mixing dry KCl in the base fluid. KHF002C can be used in most aqueous-based fracturing fluids and is compatible with most additives used in the fracturing fluid systems.

KHF002C is highly recommended for systems that are sensitive to high salt concentrations.

4. Treatment

The recommended KHF002C concentration is 0.5 to 2 Gal/1,000 Gal (0.5 to 2 L/m^3). For specific formations such as high reactive clay content, the KHF002C concentration can be further optimized using laboratory core tests.

5. Packaging

KHF002C is supplied in 55 gallons high density polyethylene (HDPE) drums or 265 gallons HDPE totes. Keep it away from extreme conditions such as places near flames or direct sunlight.

Clay Stabilizer KHF002L

1. Introduction

Clay stabilizers are routinely added to aqueous-based fracturing fluids to help prevent damage to the formation caused by clay migration and swelling. These clay stabilizers are either a temporary or permanent type, and they are often used in combination.

The clay stabilizer KHF002L is a KCl substitute for KHF002 which can be used to prepare the salt water for mixing fracturing fluid. The additive can also stabilize the reactive clays in the formation temporarily during fracturing and flowback operations.

2. Physical Properties and Hazards

Additives	Form	S.G.	Water Solubility	Health Hazard	Physical Hazard	pH
KHF002L	Colorless liquid	1.08-1.13	Soluble	Moderate- Eyes	None	7.0-8.0

3. Chemical Properties and Application

Temporary Clay Stabilizer KHF002L is an organic efficient liquid clay stabilizer. It is NOT liquid KCl, but it can be substituted for KCl in most applications.

KHF002L has been used at temperatures up to 350°F without any adverse effect on fluid rheology.

KHF002L can be batch mixed, or continuously mixed into the fracturing fluid using a liquid-additive system. This eliminates the time-consuming step of batch mixing dry KCl in the base fluid. KHF002L can be used in most aqueous-based fracturing fluids and is compatible with most additives used in the fracturing fluid systems.

4. Treatment

The recommended KHF002L concentration is 2 Gal/1,000 Gal (2 L/m3). For specific formations such as high reactive clay content, the KHF002L concentration can be further optimized using laboratory core tests.

5. Packaging

KHF002L is supplied in 55 gallons high density polyethylene (HDPE) drums or 265 gallons HDPE totes. Keep it away from extreme conditions such as places near flames or direct sunlight.

Mutual Solvent KHF017

1. Introduction

Oil film around formation fines sets a barrier for acids or other stimulation fluids to react with formation rock. Mutual solvent mixed in acids or stimulation fluids will dissolve the oil films and water-wet the formation fines. KHF017 is therefore normally used in most acidizing fluid systems to penetrate sandstone matrix and water-wet formation grains in order to improve acidizing efficiency.

2. Physical Properties and Hazards

Additives	Form	S.G.	Water Solubility	Health Hazard	Physical Hazard	pH
KHF017	Colorless liquid	0.90-0.95	Soluble	Eyes, skin	Moderate-Fire	5.5-6.5

3. Chemical Properties and Application

KHF017 is a multi-functional surfactant which is very effective in facilitating fluid flow, breaking emulsions, and preventing water blocks. It can be used for most applicable stimulation fluid systems at various well conditions.
KHF017 is miscible in acids, oils, water and brines. The functional groups attached to KHF017 molecules provides KHF017 with strong surface-active properties. KHF017 reduces surface tension of water and interfacial tension of water oil interfaces and reverse the wettability of solid surfaces from oil-wet to water-wet. It is especially effective in removing oil films from formation fines leaving surface water-wet for more acids to react.
KHF017 is compatible with most additives in stimulation fluid systems. Lab testing is required when new corrosion inhibitor is considered since KHF017 may have adverse effect on corrosion inhibition.

4. Treatment

5-10% Volume is typically enough for most cleanup and acidizing jobs. 10% Volume is considered the optimum concentration in most fluid designs.

5. Packaging

KHF017 is supplied in 55 gallons steel drums. Keep it away from extreme conditions such as places near flames or direct sunlight.

Surfactant Gelling Agent KHF041

1. Introduction

KHF041 is a surfactant and water-based, polymer-free systems that extends the family of viscoelastic surfactants to 275°F. SurFrac is the fracturing fluid for high-application temperatures ranging between 65 and 275°F. It contains gelling agent KHF041, clay stabilizer and breaker. Unlike polymer-based fluid systems, crosslinkers are not needed since viscosity is developed upon mixing.

2. Physical Properties and Hazards

Additives	Form	S.G.	Water Solubility	Health Hazard	Physical Hazard	pH
KHF041	Amber-yellow liquid	1.00-1.05	Miscible	Eyes, skin	Fire	7.0-8.0 (1% Alcohol solution)

3. Chemical Properties and Application

KHF041 systems are not degraded when exposed to extended periods of shearing and the viscosity is independent of time. The fluid viscosity decreases with increasing shear rate, but the original fluid viscosity is recovered when the shear rate returns to the original value. However, since the fluid viscosity is a function of shear rate, the time that a fluid needs to regain its viscosity after high-shear exposure is an important fluid characteristic. KHF041 does not need any shear recovery additives.

The SurFrac fluids are prepared by mixing gelling agent KHF041, Mutual Solvent when needed, breaker and clay stabilizer in freshwater. KHF041 are designed for use in wells with bottomhole temperatures (BHT) from 65 to 275°F.

4. Treatment

KHF041 is used in a concentration range of 30 to 100 Gal/1,000 Gal. QA/QC tests must ensure that the fluid viscosity at BHT is above 50 cP at 100 s^{-1}.

5. Packaging

KHF041 is supplied in 55 gallons high density polyethylene (HDPE) drums or 265 gallons totes. Keep it away from extreme conditions such as places near flames or direct sunlight.