

Delaying Agent KHF020

1. Introduction

Fast crosslink of linear gel in fracturing fluids will increase the fluid viscosity exponentially and tubing friction will increase dramatically. The crosslink is therefore required to be delayed at most fracturing operations to avoid the above problems.

Crosslink delay time is controlled with delaying agent KHF020. Time to crosslink can be varied from 1 to 4 minutes depending on the mix-water temperature and KHF020 concentration. Delay times longer than 2 minutes may reduce fluid quality at bottomhole conditions. KHF004 can be used to minimize the effect the longer delay times (2 to 4 minutes) have on the fluid stability at bottomhole static temperature.

2. Physical Properties and Hazards

Additive	Form	Specific Gravity	Water Solubility	Melting/Flash Point (°C)	Health Hazard	Physical Hazard	pH
KHF020	White Powder	1.45-1.55	Soluble	93-95	Eyes	Dust	6.0-7.0 (5%)

3. Chemical Properties and Application

OPT fracturing fluid utilizes a split addition for controlling the delay times when changing polymer concentrations. The basic crosslinker solution (one component) consists of KHF008 and KHF009. A side stream of KHF020 is added to the gel prior to adding the crosslinker solution to provide the desired delay time for crosslinking.

KHF020 is deliberately added as a side stream to allow optimization of delay time without changing fundamental fluid stability and performance. Never add KHF020 to the crosslinker solution.

KHF020 is highly soluble in water. It is recommended that the maximum solution be limited to 40 wt.%, which is 3.84 lbs/gal. Additionally, the dissolution is endothermic, that is, the solution temperature drops as the solid dissolves. This could present problems if the initial mix-water temperature is less than 45°F.

4. Treatment

The KHF020 concentration is dependent on the polymer concentration, temperature, mix-water salinity and desired crosslink delay time. Typically 7-25 lbs/Mgal KHF020 are required to cover most applications.

5. Packaging

KHF020 is supplied in plastic-lined bags with net weight of 25 kg/bag.

Keep it away from extreme conditions such as places wet and humid or direct sunlight.