

OIL AID-WB-11

BREAKER FOR STARCH POLYMERS

DESCRIPTION

OIL AID-WB-11 contains a selected enzyme which effectively hydrolyzes aqueous suspensions or filter cakes of modified starches. The hydrolyzing (breaking) action of OIL AID-WB-11 reduces the viscosity of starch slurries and solutions, and degrades filter cakes of colloidal starch. In both cases, the starch is converted into soluble dextrans and sugars. OIL AID-WB-11 is available in liquid and dry forms. The liquid is less concentrated, having typically 28% of the activity of the dry material.

APPLICATION

OIL AID-WB-11 is useful in breaking drilling and completion fluids prepared with starch products, and in cleaning up filter cakes deposited on formation faces by such fluids.

RECOMMENDED TREATMENT

OIL AID-WB-11 dosage should be based on the amount of starch to be hydrolyzed, and not on the quantity of fluid to be treated.

This requires a determination of the actual concentration of starch in the fluid, which can normally be estimated or known by the fluids engineer on-site based on fluid history and treatment. Chemical tests are also available to assist in starch content estimation.

In the case of treating to degrade starch filter cakes downhole, the judgment of the fluids engineer must be relied upon in estimating total starch content of the filter cake over the hole interval in question, and determining appropriate OIL AID-WB-11 dosage and treatment technique. One option is to prepare an aqueous solution of OIL AID-WB-11 of appropriate concentration, and spot this solution downhole across the interval of interest. This "enzyme soak" should remain in place as long as possible, up to 36 hours, with a minimum of 4 hours. At intervals during soak period, a small amount of the fluid can be squeezed into the formation or circulated in order to expose fresh enzyme solution to the filter cake.

Treatment of aqueous starch suspensions such as drilling or completion fluids is much less time-consuming than filter cake degradation due to optimal exposure of the starch in the slurry to the enzyme.

Break time for a starch fluid can range from 0.5 to 4 hours, depending upon starch concentration, OIL AID-WB-11 dosage, temperature, and pH.

Note: Pilot testing is recommended to assure successful treatment in the aforementioned applications.

EFFECTS OF pH AND TEMPERATURE

At temperatures below 70° C (158° F), optimum pH is 6.0 to 7.0, with good effectiveness available at pH from 5.5 to 7.5. Above 70° C (158° F), optimum pH range is 6.5 to 7.5. OIL AID-WB-11 is stable



in solution at 70° C over a pH range of 5.0 to 10.0, although best starch hydrolysis performance is achieved in the narrow pH ranges given above.

When using OIL AID-WB-11 at temperatures above 60° C (140° F), product stability is enhanced by adding calcium ion (200-400 mg/L) and sodium chloride (NaCl), 2500-5000 mg/L. In many cases these ion concentrations are already available in the fluid being treated.

OIL AID-WB-11 can be used successfully at temperatures up to 90° C (194° F). At temperatures approaching this limit, the rate of starch hydrolysis is accelerated, but enzyme de-activation also proceeds at an increased rate. In this high temperature range, therefore, increased OIL AID-WB-11 loading and decreased exposure/break time may be advised.

DEACTIVATION

OIL AID-WB-11 can be de-activated thermally by exposing the fluid to temperatures above 90° C and holding for approximately

10-20 minutes. Alternatively, de-activation may be accomplished by lowering the pH below the active pH range with hydrochloric or sulfuric acid. At pH 3.5-4.0 and 80-85° C, OIL AID-WB-11 will de-activate in about 15 minutes. Allow more time if temperature is lower. After acid de-activation is complete, the treated fluid can be neutralized with soda ash or calcium carbonate if required, in order to prevent corrosion to tubular goods and tools.

A third means of de-activation is to treat with chlorine in the form of sodium hypochlorite, or with copper sulfate.

DOSAGE

All treatments with OIL AID-WB-11 should be calculated on a dry starch basis. In the case of breaking a starch fluid, this requires knowledge of the concentration of starch in the fluid. In the case of degrading filter cake material, an estimate must be made of the total amount of dry-starch-basis solids in the exposed cake to be treated. This is best accomplished by a trained fluids technician or engineer via a filter cake test: a starch fluid similar to the one which produced the cake is filtered in an API filtration test cell for a period of 1 to 4 hours. The resulting filter cake is dried and weighed to determine starch content. This starch content is used in conjunction with an estimate of the effective surface area and thickness of the downhole filter cake, to arrive at a required dosage figure on a dry starch basis.

Typical treatment is 0.1% OIL AID-WB-11 POWDER on a dry starch basis. When OIL AID-WB-11 LIQUID is used, dosage should be adjusted for the lower active content of the liquid. As the liquid is 28% as active as the powder, this translates into 0.357% OIL AID-WB-11 LIQUID on a dry starch basis. For best results when using the dry product, it should first be dissolved in fresh water with a pH of 6.0-7.0.

PACKAGING

OIL AID-WB-11 Powder is packaged in 500 gram plastic bags, unitized 40 bags inside a lined fiber drum.

OIL AID-WB-11 Liquid is packaged in plastic jugs containing 1 kilogram of liquid (approximately 840 mL), unitized in cartons of 20 jugs each.

OIL AID-WB-11 is a Messina trademark