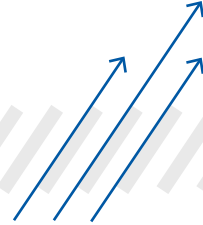


MUD BREAKER

acid-free
chloride-free
non-corrosive



pH NEUTRAL

AIXTRACTOR® 9.0

REMOVER OF MUDCAKE, POLYMER-CONTAINING DRILLING FLUID ADDITIVES

- Crystalline concentrate ready-to-use
- Effective degradation of mudcake from borehole walls
- Dosage and reaction time as per type and volume of drilling fluid
- No corrosive impact, applicable on all well construction and screen materials
- Continuous process control and result verification on site according to latest technical standards of DVGW, German Gas and Water Association e.V.
- Water Hazard Category 1 (0 non-existent)
- Safe and environmentally friendly handling on site
- No neutralization or treatment of waste water required
- Easy disposal by sewage, seepage or irrigation outside water protection zones
- Immediate confirmation of restoring original water quality by simple measurements
- Successful implementation worldwide since 2017

1. DESCRIPTION

AIXTRACTOR® 9.0 is a fast, highly reactive and efficient chemical agent for the degradation of mudcake, drilling muds and process-related drilling fluid additives made of bio and semisynthetic polymers from the borehole and the adjacent geological formation.

Polymeric drilling fluids are often used in connection with the construction of vertical boreholes, horizontal directional drilling (HDD) and deep drilling technology. When applied correctly they increase the viscosity of the drilling fluid decreasing simultaneously the amount of released water and creating a mudcake of low-permeability on the borehole wall. At times remnants of drilling muds adhere in the borehole due to mud losses, insufficient replenishment or inadequate well development preventing the groundwater flow. The chemical process of their natural biological degradation has a very long reaction time and is therefore unacceptable on the job site. AIXTRACTOR® 9.0 decomposes the viscosity of drilling muds within a short reaction time from 48 hours to 8 days subject to the dosage and the type of polymer applied. As the chemical process is pH-neutral, the handling and usage of the mud beaker is simple, safe and hazard-free. AIXTRACTOR® 9.0 is classified in Water Hazard Category 1 (0 does not exist).

2. DOSAGE

AIXTRACTOR® 9.0 is delivered as a ready-to-use crystalline concentrate. The quantity calculation of AIXTRACTOR® 9.0 is based on the total volume of the borehole including the mudpit. The recommended dosage depends on both the type of drilling mud used and on the desired duration of the chemical reaction. An increase of the dosage accelerates the degradation process. When mixing AIXTRACTOR® 9.0 with water, protective clothing, goggles and safety gloves must be worn at all times. It is also imperative to comply with the requirements of the Material Safety Data Sheet.

DOSAGE DRILLING FLUID ADDITIVES:

BIOPOLYMERS	Volume (kg / m ³)	AIXTRACTOR® 9.0 (kg / m ³)	Dosage ratio	Reaction time (days)
Xanthamol	5	30	1 : 6	8 - 9
	5	50	1 : 10	7 - 8
Guamol	5	30	1 : 6	5
	5	10	1 : 2	8
SEMISYNTHETIC POLYMERES	Volume (kg / m ³)	AIXTRACTOR® 9.0 (kg / m ³)	Dosage ratio	Reaction time (days)
Phrikolat CMC HVT	5	15	1 : 3*	2 - 3
	5	5	1 : 1	5 - 6
Modipol 600	5	15	1 : 3*	2
	5	5	1 : 1	5
Antisol FL 30000	5	10	1 : 2	1
	5	5	1 : 1	2

*ATTENTION:

High concentrations of AIXTRACTOR® 9.0 cause heavy foaming which is completed within 1 hour.

WARNING:

AIXTRACTOR® 9.0 is under no circumstances to come in contact with or be dissolved in any kind of acidic agents (e.g. hydrochloric or sulphuric acid) or oxidizing substance (e.g. hypochlorite, hydrogen peroxide). This does not lead to more effectiveness but instead would cause the decomposition of the agent and as consequence develop toxic gas.

3. INJECTION

When removing mud cake or polymers AIXTRACTOR® 9.0 is added to the drilling mud before or during the drilling depending on the duration of the works, s. reaction times. Mixing over a rinsing hopper or a venturi nozzle is useful to prevent clumping of the crystalline powder mixture. Turbidity and foaming of the solution can occur. When mixing AIXTRACTOR® 9.0 in drilling muds protective clothing, goggles and safety gloves must be worn at all times. It is also imperative to comply with the requirements of the Material Safety Data Sheet.

Please not that the chemical reaction starts as soon as AIXTRACTOR® 9.0 is injected in the borehole or mudpit. A constant circulation of the solution during the entire reaction time accelerates the degradation process. At the same time a possible drifting off in the aquifer is prevented.

AIXTRACTOR® 9.0 is not to be used to dissolve fully synthetic polymers.

4. PROCESS CONTROL

The degradation process of viscosity and water-binding capacity are monitored and recorded continuously by measuring the process parameters. Water output and the flow behaviour are the most suitable instruments for the control of the chemical reaction.

The ring apparatus is used to measure the water release time of the drilling mud which allows to determine its water-binding capacity, i.e. the time up to a total wetting, whereby > 8 minutes is considered good and > 15 minutes optimal.

Measurements by means of a Marsh funnel allow an evaluation of other important properties such as viscosity and load bearing capacity, i.e. the funnel flow-time (FFT) of 1 litre drilling mud in seconds or the remaining flow-time (RFT). The evaluation is based on the zero values of water, i.e. FFT [s] 28 or RFT [s] 20. Furthermore, all changes of viscosity (PV, plastic viscosity) of drilling muds during the degradation process can be verified precisely by using a viscometer.

5. DISPOSAL OF THE EXHAUSTED APPLICATION SOLUTION

There is no formation of chemically or microbiologically critical secondary substances or reaction products during the dissolution process. The depleted solution contains only sodium citrate (Na₃C₆H₅O₇) and sodium acetate (C₂H₃NaO₂) in addition to remains of disintegrated components of drilling muds in water. Sodium citrate is a sodium salt of citric acid. It is a colorless salt used in the food industry as an acid regulator and complexing agent E33. It consists of three sodium ions (Na⁺) with one citrate ion (C₆H₅O₇³⁻) and has a weak acid taste. Sodium acetate is a sodium salt of acetic acid, referred to as vinegar in a diluted watery solution. It is a colorless salt also used in the food industry as a preserving agent and acid regulator E262. Watery mixtures of sodium acetate and acetic acid form a buffer solution that keeps the pH level almost constant even after adding smaller amounts of acid or leach. Sodium citrate and sodium acetate do not pose any hygienic or toxicological concerns.

The initial dissolving substance is completely depleted within the reaction time due to its chemical characteristics. Therefore the discharged water is free of any remnants. As the discharged water is neutral with a pH value of around 7, it does not require any neutralisation. The depleted rehab solution to be disposed shows high concentrations of sodium citrate and sodium acetate depending on the dosage applied and the delivery rate (dilution). These substances are harmless as they are used in many food stuffs (dry or condensed milk, jam, jelly, jelly, cheese, tinned fruit and vegetable, confectionery, desserts, meat products, bread, fish in all variations, mayonnaise, salad sauces etc.)

All discharged clear water is disposed untreated either by seepage, irrigation, sprinkling or sewage outside the Source Protection Zones I and II. It is recommended to comply with the FAO limit value of 3000 µS/cm or with the German Drinking Water Ordinance limit of 2790 µS/cm which is considered unproblematic.

The solution may have a certain turbidity due to sand, gravel and cuttings. Although AIXTRACTOR® 9.0 contains eutrophic active substances, the hydrogen peroxide (H₂O₂) created during the chemical reaction together with peracetic acid (C₂H₄O₃) prevents potential microbiological contamination. No colony forming units (CFU) were documented after an incubation of 72 hours as per the German Drinking Water Ordinance §15 1c2.

Prior to any rehabilitation measure and irrespective of the technique and agent it is imperative to clarify with the local water authority whether the exhausted application solution can be disposed via seepage, irrigation, sprinkling or sewage.