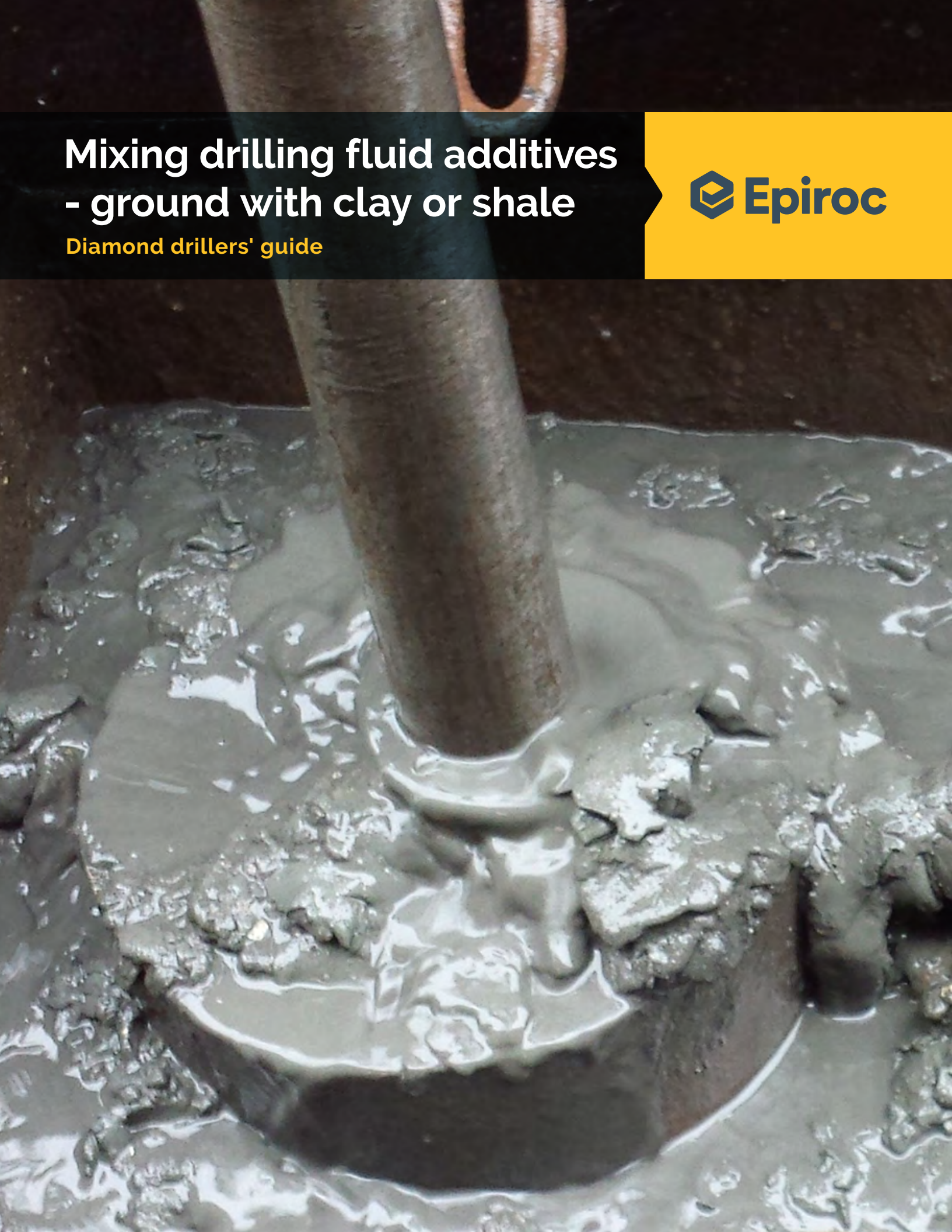
Mixing drilling fluid additives - ground with clay or shale

Diamond drillers' guide

Epiroc



Content

Introduction 4

Check list 5

Matex drilling additives - Torqueless, DD-955, DD-2000 6

Recommended set-up 8

Check your water pH levels 10

Pre-mix additives 11

Add the products to make the drilling mud 12

Testing the viscosity 14

Empty the mix 16

Introduction

Drilling fluid additives have been developed to help improve performance of drilling operations, especially in challenging ground conditions. These additives provide many benefits when used. while drilling in ground with clay conditions. In clay conditions, drill water causes the clay to swell and can result in the ground "squeezing" the drilling equipment leading to the equipment becoming stuck in the hole.

This type of ground includes:

- Clay
- Shale

The use of drilling fluid additives in ground with clay:

• Reduces torque

• Can maintain ideal drill water pressure and reduce the risk of it increasing

• Can reduce damage to drilling equipment

• Can improve core retrieval and increase productivity and profits



We have many online resources to help with similar drilling challenges:
Discover our solutions now

Check list

Make sure you have all the equipment you need before you start mixing.

Use the checklist below:



Marsh cup



Marsh funnel

pH indicator strips





Wooden stick for pre-mixing



Pail



Mud mixer

Matex drilling additives

Epiroc provides drilling additive products from Matex, the leader in drilling fluids and lubricants. Matex products allow you to maximize returns by improving the productivity of your drilling operation and reducing costs.

The Matex product line includes drilling polymers, tool lubricants, thread compounds, and other drilling additive products.

Torqueless



Torqueless is not just another soluble lube, it pays its way. Torqueless increases both bit-life and penetration rates during diamond drilling operations. It is based on a technology that has proven to be effective in lubricating downhole consumables for years.

Recommended use:

The ultimate diamond drilling product for in hole torque reducing, protecting against rod wear, preventing rust, and extending bit life.

Description:

Torqueless is non-sheening when accidentally introduced into a water course. It inhibits swelling of clay like materials such as saprolites, talcs & kimberlites. Torqueless is extremely effective for lubricating and protecting against drill pipe wear during horizontal drilling. Torqueless protects drill rod wear when using wedges in diamond drilling.

Torqueless increases tool joint life by reducing torque in the hole. Torqueless will enhance the effectiveness of powdered mud systems (bentonites, polymers, or pac's). Combined with the appropriate fluids and mixing systems, Torqueless will reduce stuck drill rods and lost casings in squeezing ground conditions.

Suggestion dosage*:

4-6 liters per 1000 liter of water (4-6 quarts per 250 gallons of water) depending upon drilling conditions and depth of hole.

DD-955



A multi-charged liquid formation stabilizer for use with shale and clay to reduce in-hole swelling and instability problems.

Recommended use:

Multicharged viscosifier for shale, clay, saprolite, kimberlite, and talc inhibiting.

Description:

DD-955 is a multicharged liquid viscosifier and formation stabilizer specifically for use in areas plagued with shale and clay instability problems. Due to its ionic charges, DD-955 is absorbed directly onto shales and clays, thereby preventing the water damage that causes loss of core and hole stability. Once absorbed into the formation, the stabilizing effect imparted by DD-955 will remain resistant to any chemical changes in overall mud properties caused by varying geological and drilling conditions. Its effectiveness is enhanced when used with Torqueless.

Suggestion dosage*:

Normal drilling operations : 1 liter DD-955 per 1000 liters of water (1 quart DD-955 per 250 gallons of water). Quantities may be increased for more difficult drilling conditions.

DD-2000



DD-2000 is a very high molecular weight, powdered viscosifier to be used in fresh water. It can be used in diamond rotary drilling. DD 2000 imparts excellent viscosity yield. It is a superior product for stabilization in overburden, sand and gravel areas.

Recommended use:

Powdered viscosifier for use in overburden, sand and gravel areas.

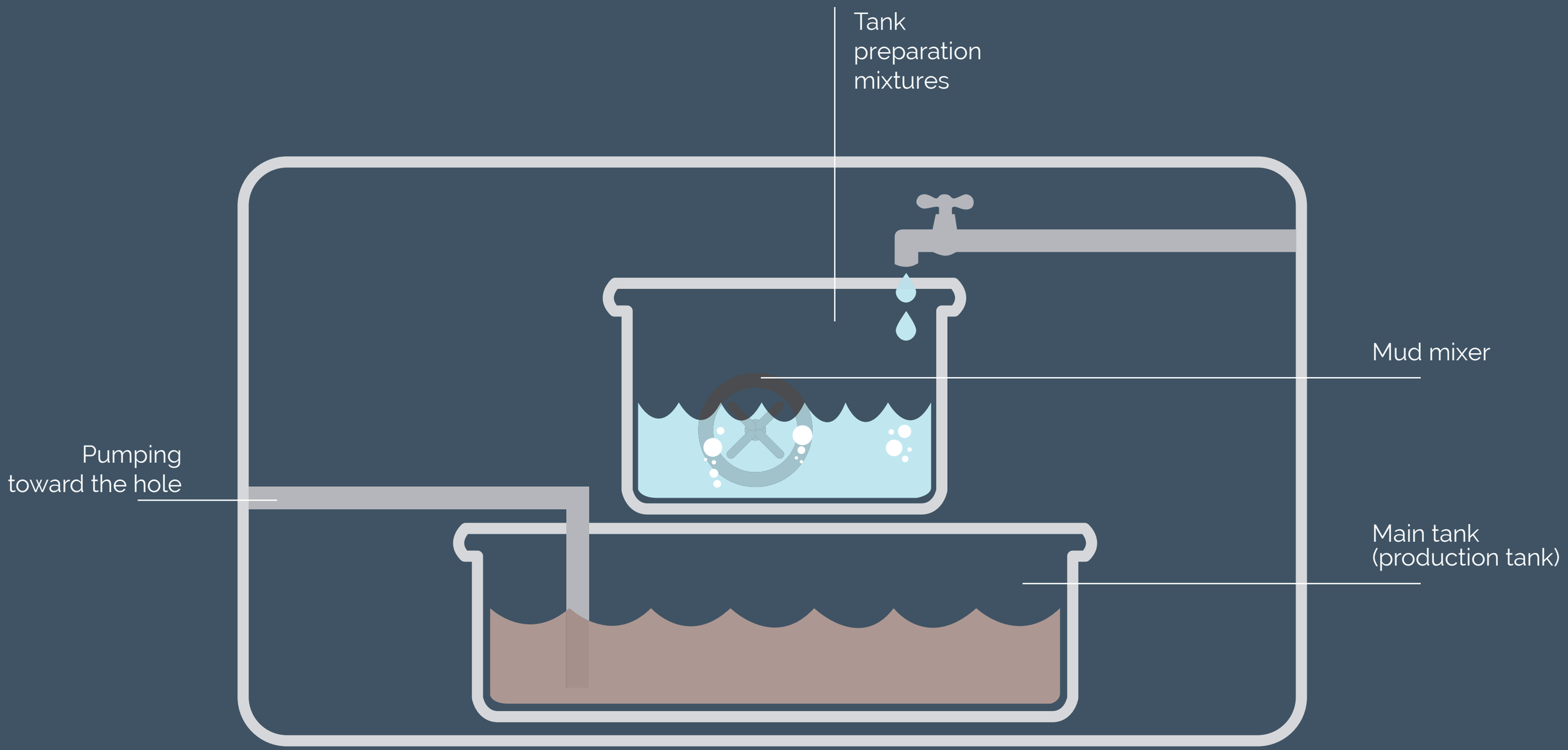
Description:

DD 2000 is effective in drilling conditions where groundwater temperatures exceed 150° F. DD 2000 reduces transportation costs for drilling because of its concentrated nature. DD 2000 combined with Torqueless reduces lost casing.

Suggestion dosage*:

1-2 liters per 1000 liters of water (1-2 quarts per 250 gallons of water).

Recommended set-up



Check your water pH levels

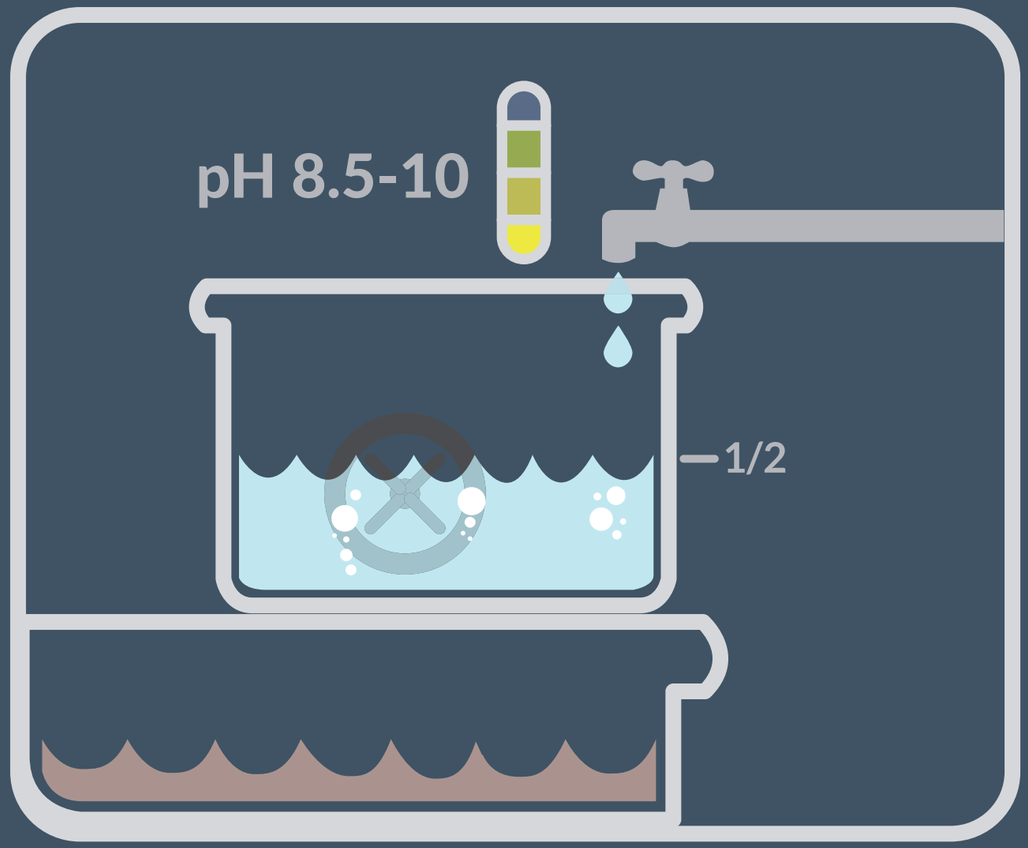
Drilling fluid additives were developed to be mixed with water with a pH level from 8.5 to 10 in order for the required chemical reaction to occur and to provide a proper yield.

A pH of 7.0 is neutral, a pH lower than 7.0 is in the acidic range, and a pH higher than 7.0 is in the alkaline range. Most water sources range from 5.5 to 7.5 which is too low.



The easiest way to check pH level is to use a simple pH testing strip. If you find that the pH level is lower than 7, you will need to add pH10 or soda ash to the water.

If the water quality is poor or if the pH level is too high (between 11 and 14) then you may have to add sodium bicarbonate to lower the pH or find an alternate source of water.



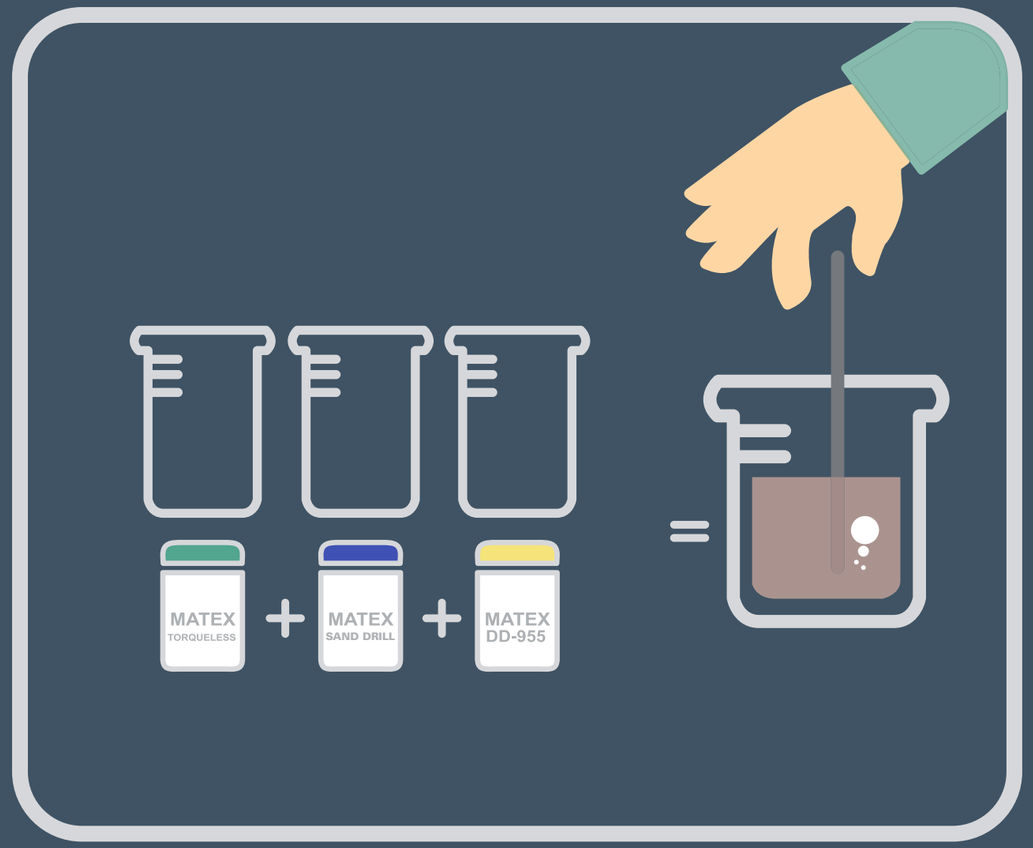
Pre-mix the additives

Always thoroughly mix dry polymers with TORQUELESS before adding to the water. This liquid encapsulates each individual grain of powder and greatly improves mixing.

For a 1,000 liter tank, the following quantities are suggested:

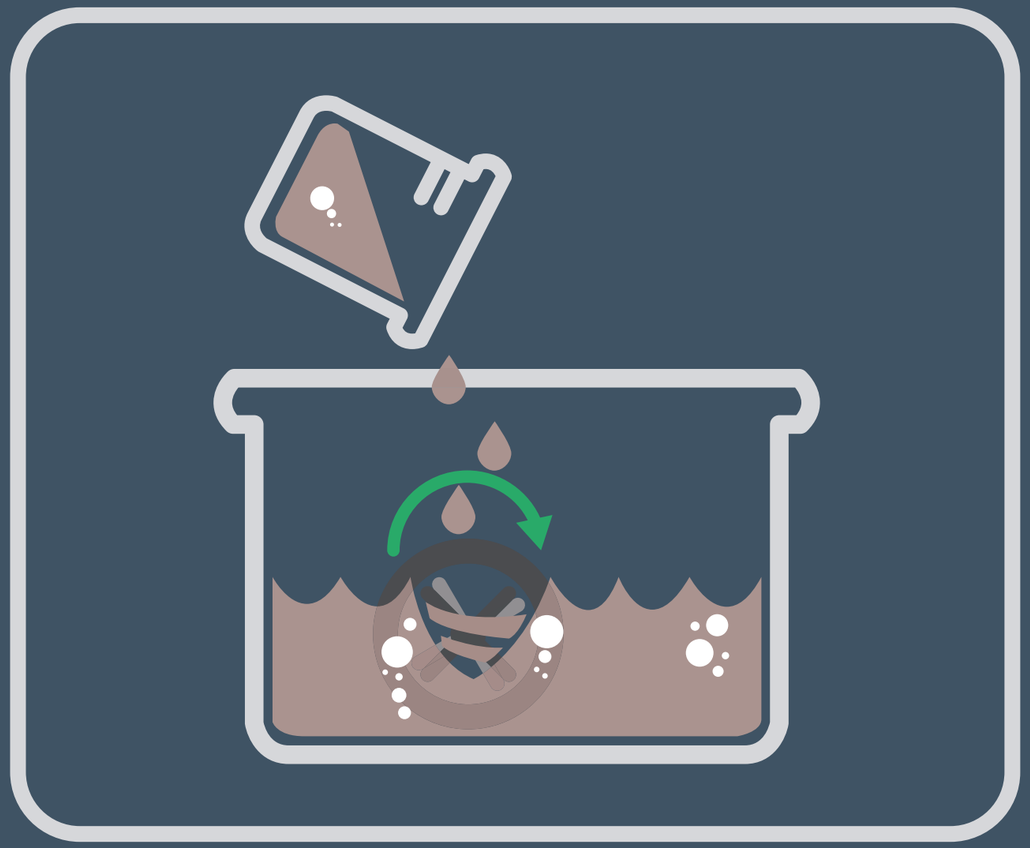
- 2 litres of Torqueless
- ½ litre of DD-955
- 1 litre DD-2000

NOTE: These are recommended quantities but as ground and soil characteristics differ, this recipe may have to be adjusted for optimum performance. Contact our tech team for personalized advice.



Add the products to make the drilling mud

Once the pre-mixing has been done, slowly add the products into the vortex of water created by the mud mixer in mixing tank, which should be half full.

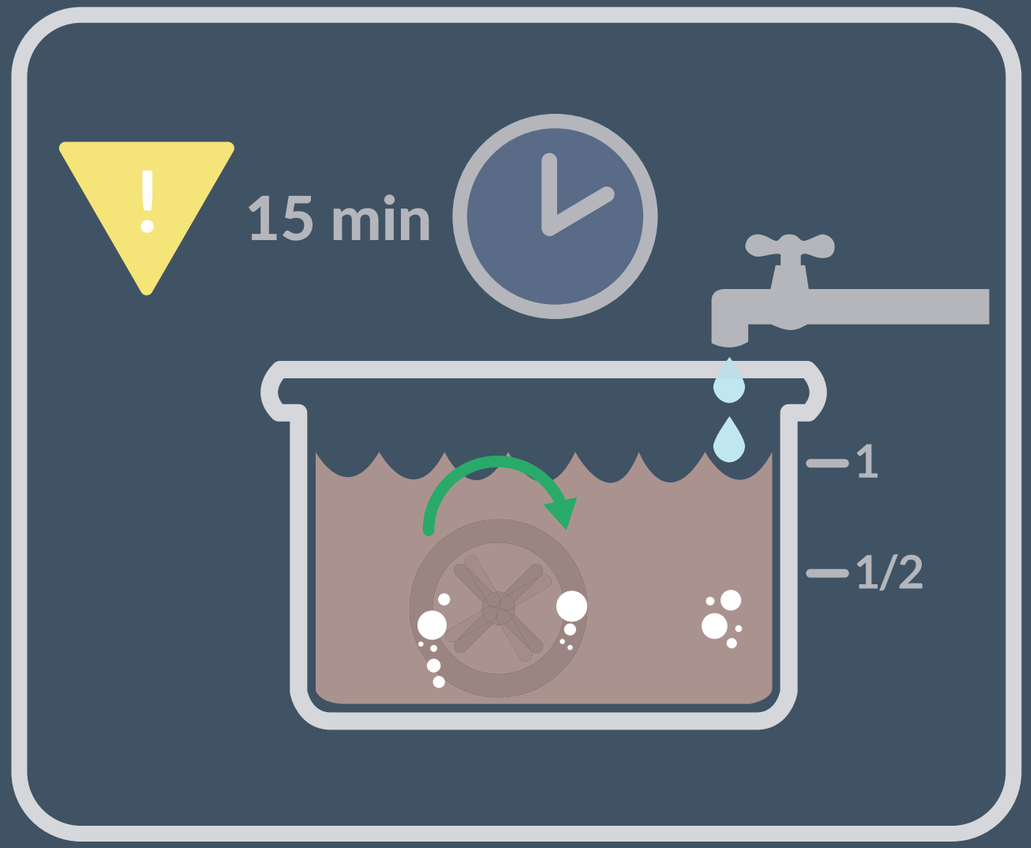


The mixing time will vary according to the temperature of the water. Colder water requires a longer mixing time.

In typical conditions, (between 10°C and 25°C), the average mixing time is 15 minutes for dry polymers.

The mixing tank can be filled with the required amount of water during the mixing time.

Once the mix is ready, it will remain in its blended form for several hours, sometimes up to several days, before separating.



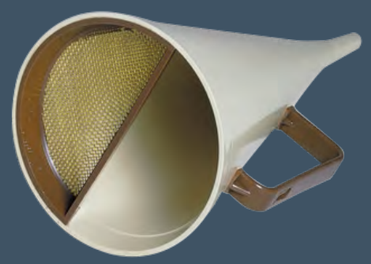
Testing the viscosity

You must test your mix to make sure it has the right viscosity (consistency). We recommend using a Marsh cup and a Marsh funnel, the two best tools for this purpose.



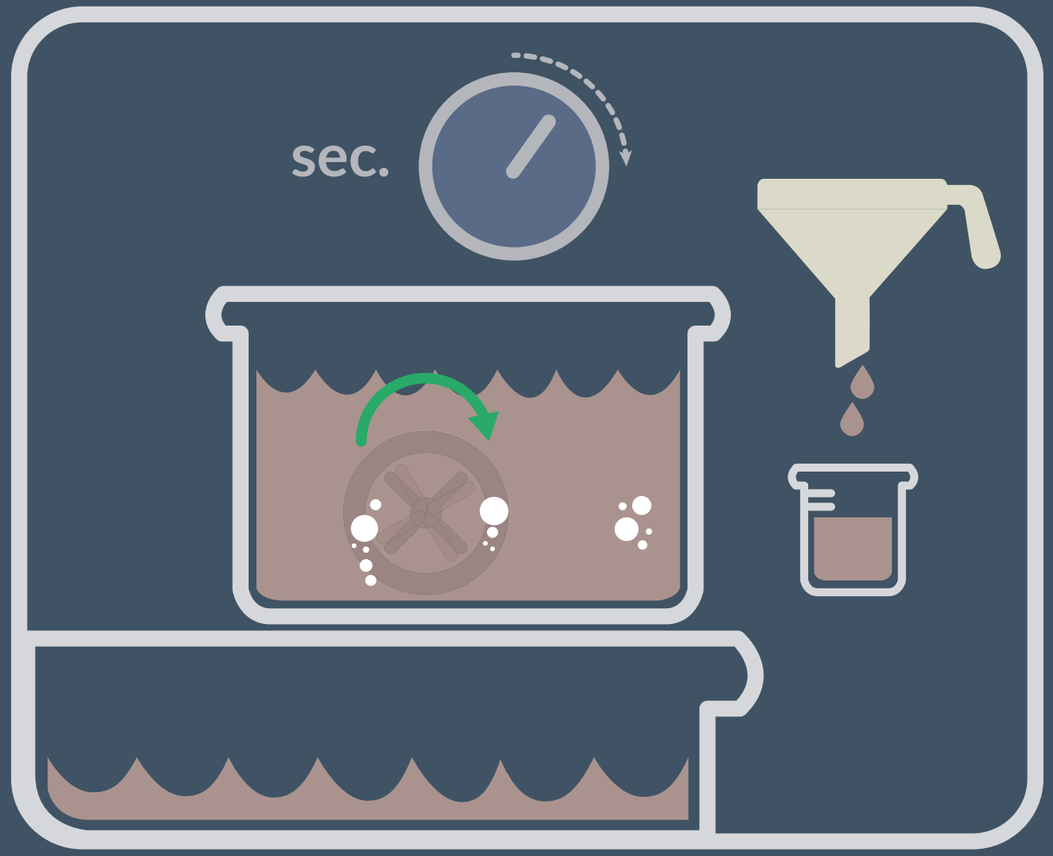
Fill your funnel with mix until it reaches the line at the top of the funnel.

Make sure you pour the mix through the mesh part of the funnel so that larger bits of unmixed product do not clog up the bottom of the funnel. This would result in an inaccurate measure of the viscosity.



Place your finger over the narrow bottom of the funnel to keep the mix from coming out. Get your timer ready and remove your finger from the spout. You will be measuring how long it takes for the mix to come out of the Marsh funnel and fill the Marsh cup.

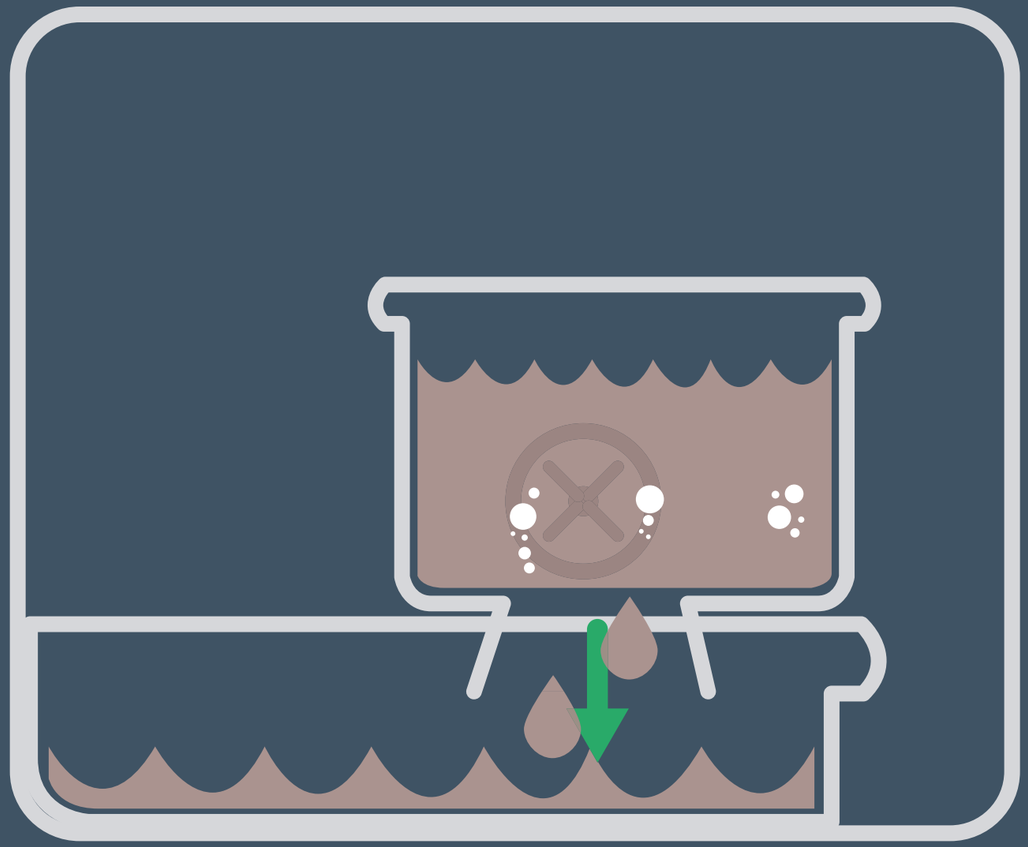
Each second counts as one unit of measure of viscosity. The level of viscosity is equal to the number of seconds it takes to fill the Marsh cup up to the line at the top.



Empty the mix

Empty the mixing tank into the main tank (production tank) so you can pump the mix down the hole.

Start preparing the mud mix for the next shift.



To learn more about how to properly mix drilling mud for sandy conditions, contact our technical support team. They can answer questions or arrange an onsite visit.

Subjected to alterations without prior notice. © Epiroc Drilling Tools. All rights reserved. 2026-07-07

Epiroc

Exploration and geoscience
Phone: +1 800 768-7274
epiroc.com