

RECYCLING WITH A SYSTEM

of HDD drilling fluids

Economical, sustainable, eco-friendly

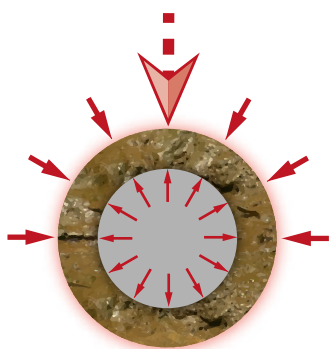
VALUABLE MIXTURE

Drilling fluids in HDD technology

BEARING FUNCTION FUNKTION

The drilling fluid consisting of Bentonite and water for Horizontal Directional Drilling techniques has a number of key functions. It is meant to:

- loosen the soil
- support the free-cut
- decrease coat friction
- cool the drilling tools
- discharge the bore spoil continuously
- stabilise the bore hole
- seal the bore
- prevent fluid loss
- bear the new product pipe

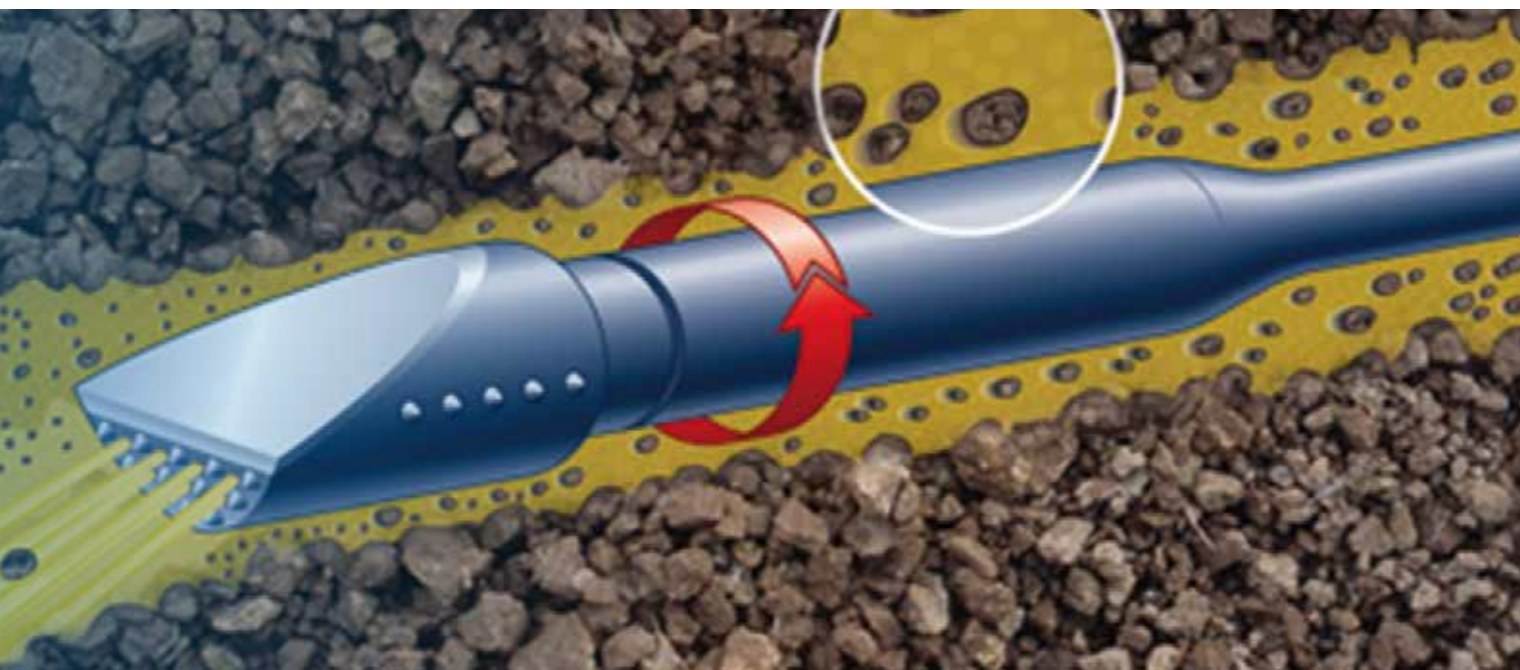


The HDD drilling fluid with Bentonite stabilises the horizontal bore, perpetually protecting the hole from the interfering gravity.

The most important function of the HDD drilling fluid is stabilisation, as gravity exerts a permanent pressure on the horizontal bore. The drilling fluid has to protect the bore hole from collapsing, it is also needed to discharge the loosened drill cuttings. This works best with Bentonite, a composite of natural clay minerals with extremely good swelling properties. Bentonite boasts these exceptional swelling properties because the molecular structure of the clay minerals is layered, allowing a satisfying absorption of water. Fortunately, these minerals also develop thixotropic liquids. This means, the drilling fluid adopts a jelly-like, supporting structure when settling down, at the same time flowing and transporting matter when on the move without losing its supporting power.

THE ONE AND ONLY ALTERNATIVE

The specific consistency of the clay minerals makes Bentonite an indispensable medium for drilling fluids in Horizontal Directional Drilling. Due to the special conditions, other drilling fluids are not suitable for horizontal drilling. Deep bore holes, for instance, require drilling fluids made of water mixed with carboxy-methyl cellulose (CMC), most of all to work against the formation pressure and high temperatures. CMC is a cellulose, water-soluble due to chemical treatment, with a chain-like structure which offers no supporting



properties at all. The solution also poses a hazard for the groundwater. Using compressed air as a drilling fluid can only work for HDD operations in certain exceptional cases, i.e. in particularly soft rock formations in lengths up to 80 m. The ability of air to carry out the bore spoils is limited and the bore hole will congest sooner or later. Additionally the walls of the bore hole are not supported at all. The same goes for plain water as drilling fluid. Complete stabilisation of a horizontal bore can only be achieved with a water-Bentonite drilling fluid, irrespective of bore length and diameter. Drilling fluid additives like polymers can boost the supporting effect with a network structure; they are no substitute for the Bentonite, however.

REUSE AND DISPOSAL

Top quality Betonites contain a share of 80 - 90 % montmorillonite, the clay mineral with the strongest swelling properties of all. Its swelling ability amounts to no less than 480 %. Of course the price for this mineral is high accordingly, as are the costs for polymers. Depending on the volume of the HDD drilling fluid, these valuable operating resources can run up quite a bill. Thus HDD drilling fluids are declared as potentially recyclable resources which can be reconditioned for further use. This decreases water and Bentonite consumption and reduces the costs for operating resources, thus making the HDD technique even more economical.

Although the used drilling fluid can be reused after recycling over again, eventually it will have to be disposed of. Then it is declared as waste matter which may not be spread over agricultural surfaces without official permission. In some countries this permission is only granted when sampling has proven that the drilling fluid has a beneficial effect on the soil. Providing a complete chain of evidence takes time and is cost-intensive. The safety data sheets identify Bentonite and polymers as natural materials, but the discharged bore cuttings may contain contaminated soil.

In any case, recycling is a reasonable solution for the economical reuse and cost-saving disposal of the HDD drilling fluid.

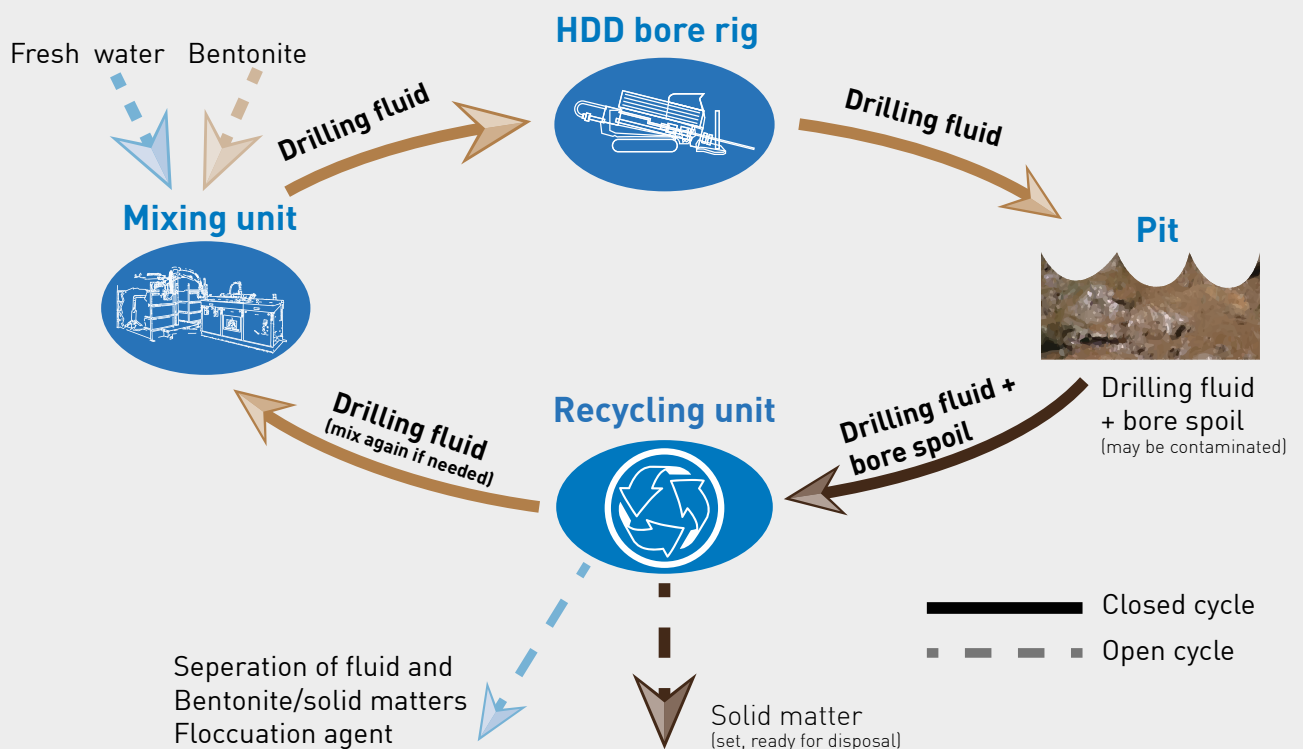


PROFITABLE CIRCULAR FLOW ECONOMY

Maximal exploitation, minimal waste matter due to recycling

CLOSED CIRCUIT RECYCLING

With the help of suitable recycling techniques, solid matter absorbed by the drilling fluid during HDD operations can be completely segregated again. That way, the purified drilling fluid can be reused continuously in a closed circular flow. The solid matter contents in the drilling fluid influence the drilling progress massively. With recycling, the amount of solid matter in the drilling fluid is reduced, accelerating the drilling progress and reducing the wear on drilling tools and pumps significantly. In this way, repeated use of the fluid and separation of the solid matter by means of recycling boosts the economic efficiency of a HDD operation effectively.





DISPOSAL IN AN OPEN CIRCUIT

The nationwide law in Germany rates the used drilling fluid which is not used any more as waste matter which has to be declared and disposed of verifiably and professionally. Further legal guidelines like the Water Resource Law, Soil Protection Act or sewage sludge regulations set strict conditions for disposal. Some German federal states have already enacted decrees in respect thereof - others will follow. The so far common methods of disposal were no longer accepted from that time on or only with considerable additional effort and the costs have also risen enormously. Depending on the region, contractors can be made to pay as much as 110 € for one ton of HDD drilling fluid.

According to the costs-by-cause principle, in most countries the contractor is obliged to make sure of a professional disposal of the used drilling fluid. The price level for regular waste disposal depends on the drilling fluid volume. Depending on this volume, the costs for disposal will certainly have a negative influence on the profitability of a HDD operation. The bulk of the waste matter demanding disposal and with this the costs for dumping, are clearly reduced with the help of recycling if the used drilling fluid is divided up into its compounds, turbid water and semi-solid thickened sludge. The water is discharged via sewerage or in a wastewater treatment plant, as the case may be, while the thickened sludge is taken care of in a soil aggregate deposit at a low rate.

RECYCLING IS ALWAYS WORTHWHILE

It applies in any case: the more efficient the recycling system, the lower the costs for operating resources and disposal. Either way, professional recycling plays a leading role in the economical success of every HDD operation.

ADVANTAGES OF HDD FLUID RECYCLING:

- the drilling fluid can be reused
- the consumption of drilling fluid and water is cut back
- the amount of waste matter subject to mandatory disposal is reduced
- costs for disposal are reduced
- the required deposit working face is lessened
- environmental protection is improved



COMPETENCE TO THE POWER OF TWO

System partnership with AMC



TWO POWERFUL PARTNERS

Systematic reasoning comes naturally to us and we strive for providing our customers with holistic solutions in all areas of HDD technology. Recycling the HDD drilling fluid poses a new challenge to customers, disposal companies and the executing drilling contractors, but also to the manufacturers of drill rigs in the performance class up to 300 kN.



In order to provide a proven and functional recycling technique, TRACTO-TECHNIK was bound and determined to cooperate with the leading recycling specialist AMC. Now, with the slogan „everything from one source“, well-tried expertise in HDD machine technology merges with the leading competence in recycling technology.



Centrifuge model with sand contents test



LONG-STANDING EXPERTISE

The Australian Mud Company - abridged AMC - is a leading manufacturer of drilling fluid and recycling technology, represented in Germany by AMC Europe with headquarters in Rastede. The portfolio of the internationally active company comprises drilling fluid additives, project consultancy, job-site service and recycling systems. Comprehensive know-how and many years of practical experience with all drilling methods are incorporated in the products and services of AMC.

Only high-quality, technically mature recycling systems guarantee highest segregation of the bore spoil from the drilling fluid, thus allowing reuse and ecologically sound disposal without qualms. Individual consultancy and project monitoring are essential for their application. Therefore we bank on the recycling technology of AMC and can say with a clear conscience: as professional as it gets!



CLEAN SEPARATION

All-purpose recycling technology

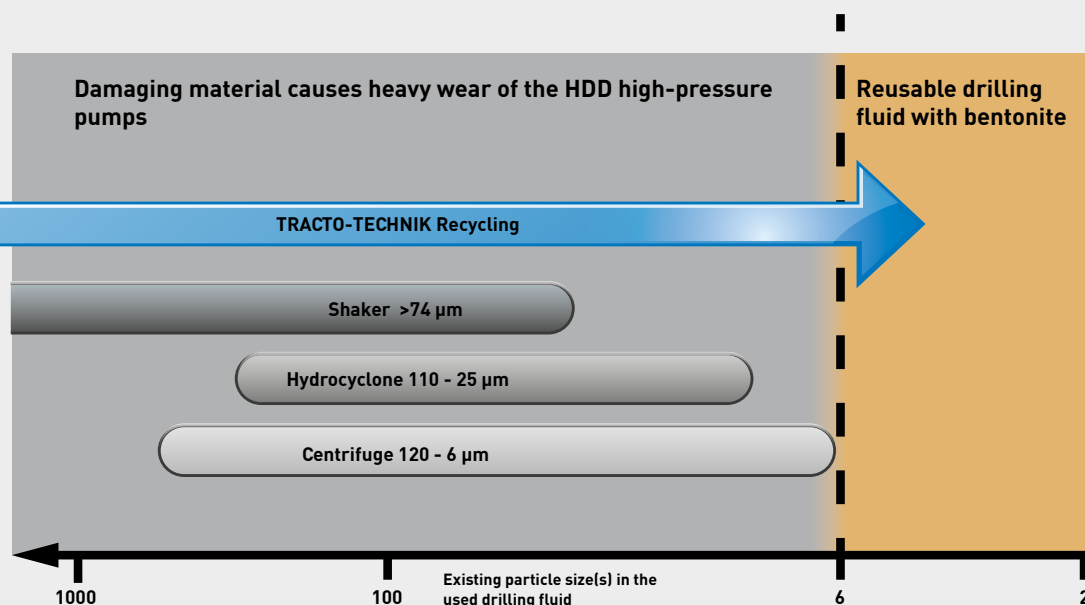
SPECIFIC SOLUTIONS ARE MUCH IN DEMAND

Technical solid matter segregation is imperative for drilling fluid reuse and determines the amount of waste matter necessitating dumping. Type and proportion of the solid matter are variable, they depend on the nature of the soil, the diameter of the pipe which is going to be installed and the bore length. The composition of the drilling fluid is thus very specific and the recycling technology must be just as specific too. On these grounds, no solution is available for all cases! Only if the components of the recycling system suit the drilling fluid perfectly, 100 % of all loosened solid matter, with the exception of the Bentonite itself, can be removed from the drilling fluid - no matter what the composition.

COMPOSITE OF DIFFERENT ELEMENTS

Solid matter separation is effected according to the grain size with the following modules:

- **Shaker:** removal of the coarse solid matter
- **Hydro-cyclones:** removal of the sandy / silty grain share
- **Centrifuges:** removal of the fine grain share





EFFECTIVE INTERPLAY

Depending on the planned application, these elements are perfectly coordinated and combined in the recycling systems by AMC. It demands the application of a centrifuge to achieve a level of purity (separating cut) of 6 - 10 μm . This is extremely important for recycling with HDD systems having a pulling force up to 300 kN to avoid wear of the high-pressure Bentonite pumps. Many years of practical experience proved that it is inevitable to operate a centrifuge in almost every type of geology.



SRU2017

BROAD PRODUCT RANGE

The product spectrum of AMC ranges from small recycling systems for confined spaces and flexible application near launch and target pits to systems for large scale projects. These systems exhibit a cleaning capacity from 150 l/min. to 3,000 l/min. The single modules, i.e. shakers, hydro-cyclones and centrifuges, can also be assembled individually to suit the soil conditions on hand and comply with the required drilling fluid volume.

The AMC recycling systems meet every single relevant safety demand according to CE certification and are technically mature and maintenance-friendly.



500R



1000SC



WE SUPPORT YOU

Trainings and geo-services

Our choice of training

HDD drilling fluid recycling is a highly complicated issue. We offer comprehensive trainings covering all aspects of recycling. In cooperation with the experts of AMC and brain trusts like the „DCA Arbeitskreis Spülungsentsorgung“ (working committee drilling fluid disposal), we guarantee training contents which comply with the latest states of technology.

The training „Recycling HDD fluids with a system“ treats all relevant aspects at full length.

- **Drilling fluids in the HDD technology:**
reasons for, functions, properties and composition of HDD fluids
- **Why recycling?**
Current legal situation and basics, economic efficiency, disposal costs and possibilities
- **Recycling - machine technology & procedures**
Technical basics, geological interrelations, components, AMC product solutions

Timeliness and practice-related, well-founded subject matters go without saying for all trainings on offer for the HDD technology. These start with the basics of horizontal drilling and range from location and drilling fluid technique to rock boring and finally to site management.

Look for information on due training course dates in your vicinity.
www.TRACTO-TECHNIK.com

GEO-SERVICES

Our geo-services comprise the complete range of geological services for the HDD technology.

Experienced specialists are placed at your disposal for the following topics:

- Building ground questions
- Consultation pertaining to planning and drilling techniques
- HDD path planning with planning software
- Provision of expert opinions



JUST ASK US

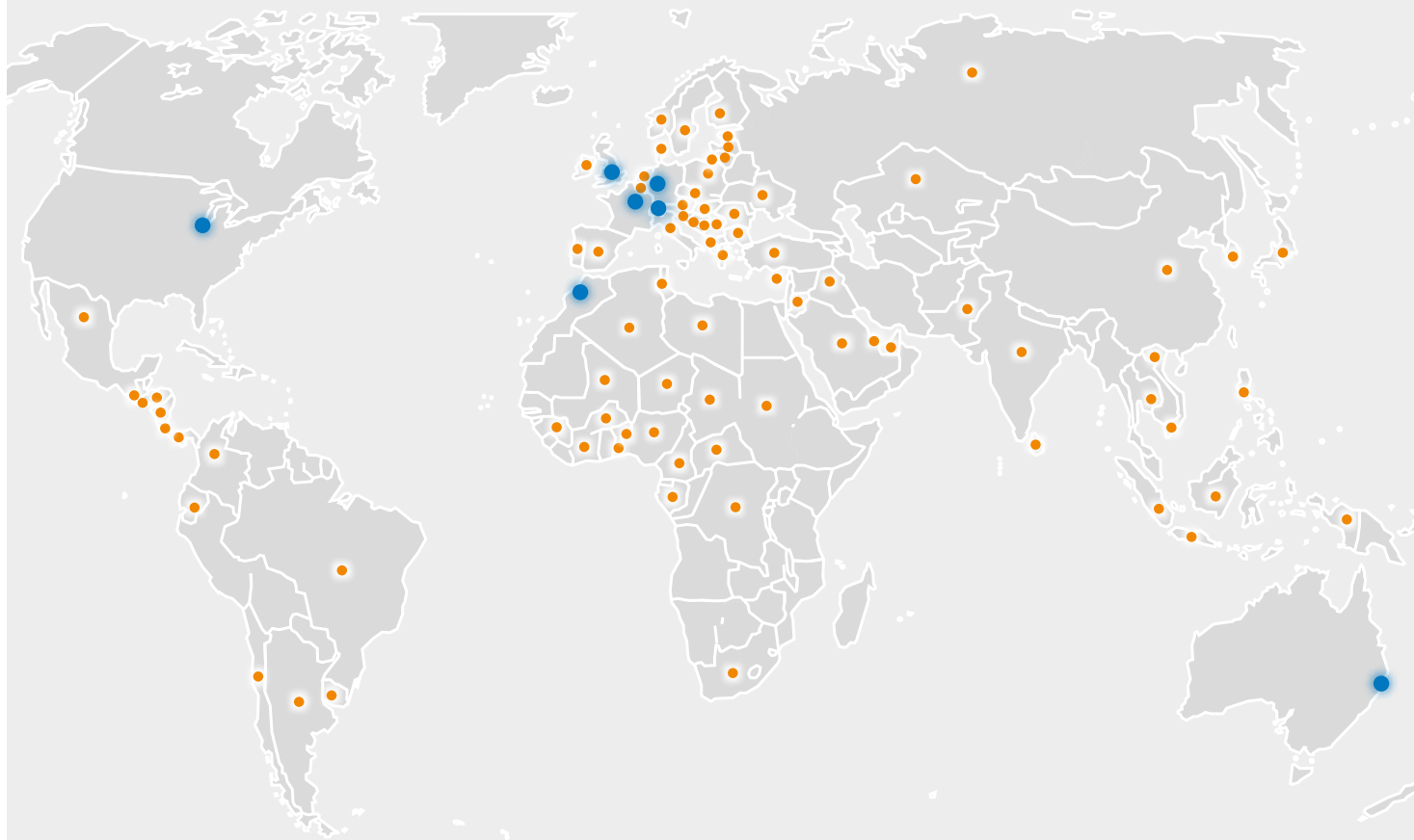
Consultation, offers and more

Our objective is to support you as profound and individually as possible. Our made-to-measure customer service comprises consultation on HDD and recycling systems, drilling fluid technology, live demonstrations of the machine technique as part of a presentation and the chance to rent re-cycling systems.

Whatever you need, our sales team provides help and advice.

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