

terra
infrastructure

safety: efficient and sustainable



SOLUTIONS & SERVICES

FOR YOUR INFRASTRUCTURE PROJECTS WORLDWIDE



TERRA INFRASTRUCTURE – LEADING PROVIDER OF INFRASTRUCTURE PROJECTS WORLDWIDE.



With offices in many countries throughout the world we are present wherever our customers need us. Our employees and partners know the local markets and their requirements and can therefore come up with tailored solutions that meet our customers' very specific needs, allowing them to benefit significantly from our knowledge and skills, especially when it comes to after-sales service.

In the course of our work, we focus intensively on what our customers want and how to implement their specific projects, so we can identify very early on what the market needs and can offer tailored solutions more quickly.

We have excellent expertise and decades of experience in implementing large-scale projects.

Our brand claim: „safety: efficient and sustainable“.





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SHEET PILING,
ANCHOR TECHNOLOGY
AND
FLOOD PROTECTION

WE OFFER OUR CUSTOMERS
AROUND THE WORLD AN INTEGRATED
RANGE OF SYSTEM SOLUTIONS.

Central components of our offering are the sale and rental of sheet piling, anchor equipment and flood protection. Here we have a wide range of products from many offering manufacturers, and we round off our offer with a comprehensive service package comprising advice, technical support, and logistics.



HIGH CONSTRUCTION RIGIDITY, VERY GOOD DRIVE PROPERTIES, HIGH SECTION MODULUS: HOT-ROLLED SHEET PILING.

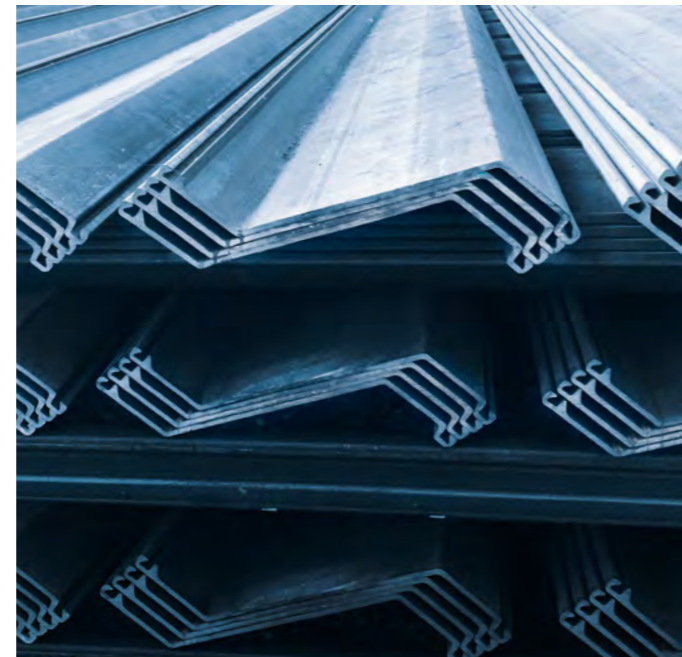
U-sections.

Our U-sections have excellent structural properties. These high-quality pile sections drive in extremely well. The wide range of available sections allows for use in so many different areas, such as marine engineering, embankment protection, and road engineering, and even in trench shoring.



Z-sections.

The continuous web in the sheet piling and the external interlocks are the key features of Z-sections. Both factors have a positive effect on the section modulus in the sheet pile – at relatively low weight. That results in high-cost efficiency.



Due to their excellent properties, our hot-rolled sheet piling is primarily used in water, road, and civil engineering applications. Hot-rolled pile sections are made from a primary material that is heated to over 1,200 degrees. Different section shapes are possible thanks to the high plasticity of the steel.

Combined steel sheet piling.

Our combined steel sheet piling consists of load-bearing and intermediate piles and is used especially in heavy-duty marine engineering projects on the coast, including marine applications such as quay walls, piers, dock structures, and ro-ro vessels. The combined piles are also used in sluices, dams, inland ports, landfills, and abutments.



LARSEN steel piles.

LARSEN steel piles or dolphins are systems for shipping routes and ports.



U-sections

Advantages

- Wide range of sections for various different application areas
- Excellent structural properties
- Optimal reusability
- Excellent quality and drivability
- Easy installation of anchor systems and articulated connections even under water

Z-sections

Advantages

- The interlock connection is positioned in the area with the lowest shear forces
- The external LARSEN lock facilitates an extremely favorable weight–section modulus ratio
- The tall installation heights of the sections lead to high rigidity values, which limit deflection and allow for higher steel products to be selected

Combined steel sheet piling

Advantages

- Modular system, which provides options for combined sheet piling
- Optimum adaptation to suit structural and constructional requirements
- Good driving characteristics thanks to essentially symmetrical arrangement of pile sections

LARSEN steel piles

There are different types depending on their use:

- Impact dolphins used to restrict ship travel routes
- Berthing or mooring dolphins used as mooring points for ships
- Navigation dolphins used to guide floating objects such as pontoons or floating docks

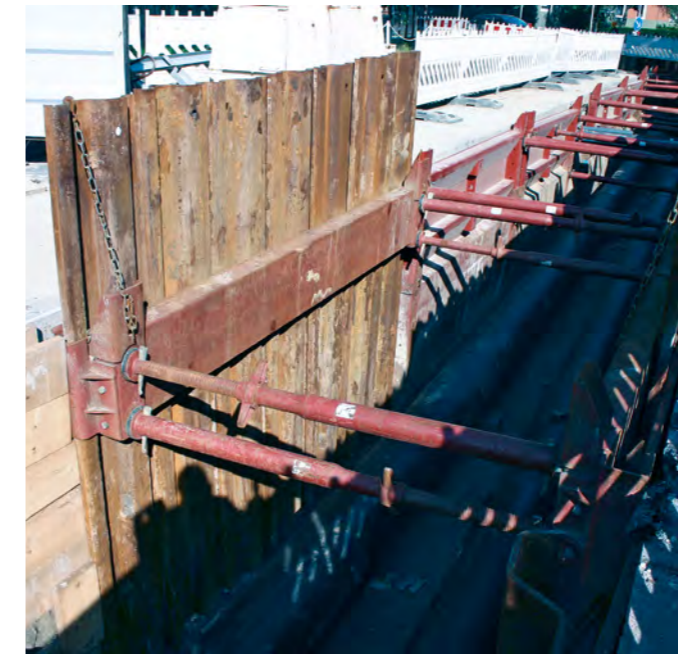
HIGH CONSTRUCTION RIGIDITY AND LOW WEIGHT: COLD-ROLLED SHEET PILING.

Our cold-rolled sections are shaped cold out of steel sheet. A cost-effective and reliable solution, they are primarily used in trench construction and levee protection. We offer a market-based range of channel steel sheet piles and lightweight sections and guarantee this way, that things go smoothly, with fast delivery on time.



Trench sheeting.

Our trench sheets are used for the reliable shoring of trenches, shafts, and excavations. Such sections are used when sealed interlocks are not necessary. To suit the conditions of driving and the typical applications, the form that has become established for trench sheets is one that is highly stable and suitable for repeated use. Their special shape makes them easy to install and stack. We offer trench sheets with different wall thicknesses, which we stock in length of up to eight metres. We can also roll longer sections upon request.



Trench sheeting

Advantages

- Trench sheet piles – tailored for modern driving equipment in terms of shape, material thickness, construction width, and quality of steel – especially suitable for urban channel construction as trench cladding
- Symmetrical rotational shaping optimizes the material behaviour during setup and driving – intensive mutual overlapping guarantees low soil permeability
- High torsional rigidity thanks to the high yield point of the steel ensures resistance to warpage

Lightweight sections.

Lightweight sections are mainly used for trench shoring in inner city applications and for upgrading dikes. The interlock of the lightweight section serves as a reliable hook in such applications. The sections are manufactured in lengths of up to 17 m. For structures requiring greater watertightness, e. g. flood protection, we can supply the sections with an interlock filling made from a durable, pliable bitumen compound.

It is also possible to fit a profiled terra sealing system into the interlocks of the lightweight sections. The sections undergo material testing and quality inspections in accordance with DIN EN 10249 and guarantee safety and reliability combined with optimum drivability.



Lightweight sections

Advantages

- In contrast to channel steel sheet piles, lightweight sections have interlock connections and can be used in applications where the soil is fluid or where there is water encroachment
- Even though interlock connections are not leak-tight, additional sealing can be ensured through the insertion of fine soil particles in the lock mechanism
- Excellent with additional sealing for flood protection structures in levees

SERVICE IN EVERY ASPECT: SPECIAL SERVICES.

The success of a project depends on having the right equipment and the right technical support for that equipment. In addition to our products, which we both sell and rent, we also offer a wide range of different services.



Corrosion protection.

Three forms of corrosion protection are available to enhance the durability of sheet piling – and hence increase the chances of success for your project: coating, hot-dip galvanizing and cathodic corrosion protection.

Coatings.

The choice of coating system depends on the corrosion loads expected and the design life (see also DIN EN ISO 12944). Owing to the high loads to which steel sheet piling is usually exposed, epoxy resin or polyurethane coatings are normally used. Such coatings are also compatible with the terra interlock sealing system.

Hot-dip galvanizing.

Hot-dip galvanizing is another method of corrosion protection and is also compatible with the terra interlock sealing system. It can also be combined with a coating (duplex system) to yield additional benefits. The requirements of DIN EN ISO 1461 must be adhered to.

Cathodic corrosion protection.

Corrosion of steel sheet piling below the waterline can be largely eliminated using cathodic corrosion protection. This is particularly recommended in areas where renewing protective coatings or repairing corrosion damage is technically very difficult. These areas must be considered in planning.

Signal transmitters.

This system helps to prevent declutching in difficult soil conditions. The signal transmitter, fitted securely to the base of the section to be threaded, indicates declutching instantly so that effective measures can be taken in good time.

Knife-edge bearing.

This system, with a German national technical approval, transfers static and dynamic vertical loads directly, i. e. without intermediate fittings, from the reinforced concrete support to the sheet pile cross-section.

Vibration measurement.

The equipment used to install sheet piles can cause vibrations in the ground. The MÜLLER data collection system MS-DATA is available to monitor vibrations in accordance with DIN 4150. Permanent monitoring of the operating parameters of the vibrator automatically prevents set vibration limits for ground or buildings from being exceeded.

Engineering Division.

The specialists in our Engineering Division take care of every aspect of project planning, such as tendering, structural analyses and calculations, construction plans, and tailored solutions for individual needs. We are also happy to offer alternative solutions that are optimized for specific budgets.

Welded structures.

Our plants have been fabricating welded structures from steel piles for many decades. All our sheet piling steel grades are suitable for arc welding in compliance with general welding regulations. Foundation piles, dolphins plus fittings, box piles, structural piles such as corner and junction piles, piles with impact strengthening, piles with interlocks sealed by welding, and custom piles to suit special requirements are all fabricated to proven quality standards.

General and specific quality assurance procedures, e. g., non-destructive weld seam testing, are carried out by an independent institute according to German or, if required, international regulations.



SOLUTIONS FOR ANY CHALLENGE: ANCHOR EQUIPMENT.

Our anchor equipment is used for construction projects such as quay structures, onshore and offshore wind turbine foundations, tunnels, trenches, retaining walls, and slope stabilization. We maintain an extensive range of products that can be used to overcome even the toughest challenges.



The solution for sheet pile walls: round steel tie rods.

An anchorage employing round steel tie rods is an economical solution for securing a sheet pile wall, which can be adapted to suit the situation. The forces acting on the wall are transferred via the waling to the round steel tie rods and then to the anchor plates or walls. The selection and design of the anchoring structure is done in accordance with static and structural requirements.

Upon request, we can supply a complete package from one source, consisting of the supply and installation of all the anchorage elements and accessories required for sheet piling structures. Apart from anchors and anchor parts, anchor connection elements, walings and waling fixings, sheet pile wall capping beams, recesses, ladders and mooring lugs plus bollards and special components are also part of our range.

Round steel tie rods

Advantages

- Optimum transfer of tensile forces
- Better dispersion of bending moments thanks to excellent elasticity
- Extendable with the help of couplers or turnbuckles
- Minimal surface for corrosion
- Adjustable to exact length

Applications

- Cofferdams
- Ports and harbours
- Waterways
- Locks

**Maximum loading capacity, minimum diameter:
terra ASF micropile**

Micropiles are being increasingly used as traction elements in water construction and marine projects, gradually replacing driven pile systems. Further development of drilling technology has contributed greatly to this.

terra ASF micropiles are a system that conforms to DIN EN 14199, which terra infrastructure developed in collaboration with special civil engineering companies as a pull/push and interchangeably loaded pile system. This system is a further development of existing pile systems. terra ASF micropiles have high internal load-bearing capacities and reserve capacities as well as being very robust and low warpage. This is achieved by using good quality steel in accordance with DIN EN 10025.

Versatile anchor for every terrain: TITAN soil nail.

Soil nailing is a method of improving the natural stability of the soil. Soil nails in accordance with DIN EN 14490 increase the cohesion that is lacking in loose material. They also enhance the tensile and shear strength of such soils, thus creating a new composite material with a high load-carrying capacity. The soil must exhibit an adequate minimum stability for site operations

The economical system: TITAN micropile.

Micropiles are non-prestressed pile elements with a diameter < 300 mm. Various types are available. They are especially popular for strengthening or underpinning existing foundations and transfer the tensile and compressive forces into the subsoil. Depending on the application, micropiles can be loaded in tension only, but also in tension and compression. We can supply appropriate solutions.

TITAN micropiles are governed by the general technical approval Z-34.14-209 granted by the Deutsches Institut für Bautechnik (DIBt). They are micropiles (compound piles) for which the stipulations of DIN EN 14199 in connection with DIN SPEC 18539 must be observed, unless otherwise specified in the approval.

**Safe anchorage of high tensile forces:
driven anchor piles.**

Our driven piles for anchoring are used in the construction of quay walls.

Additional warpage can essentially increase the load on the piles, so that the maximum load is sometimes not on the head of the pile but rather behind the sheet piling. This must be taken into account when installing the piles and the pile connection.



terra ASF micropile

Advantages

- Maximum strain of up to 4,242 kN
- Can be used as compression and tension piles in accordance with DIN EN 14199
- Low steel strain guarantees rapid activation of forces with low deformation
- Corrosion protection along the entire length
- Length up to 35 m deliverable ex works, unlimited extension possible

Applications

- Foundation piles
- Bracing in marine and special civil engineering
- Bracing in waterway expansion

TITAN soil nail

Advantages

- Stabilizes embankments and prevents settlement
- Ideal for steep slopes because soil nails can be installed in 2 or 3 m lengths with lightweight drilling rigs
- Flexible, environmentally friendly method of construction suitable for any terrain
- Ideal for existing structures such as walls or stocks of trees that are to be incorporated into new construction works
- Minimal vibrations
- Little noise
- Cost-effective method for temporary and permanent applications

TITAN micropile

Advantages

- Can be adapted to any load profile
- Short execution times
- Can be used with any drilling equipment
- Can be used as pull and push piles
- Low settlement when used in foundations with pressed piles

Driven anchor piles

The benefits of slow-action hammers

- Longer effect of driving force
- Particularly suitable for cohesive soils
- Environmentally friendly
- Much less noise, far fewer vibrations

The benefits of fast-action hammers

- Particularly suitable for non-cohesive soils
- "Vibratory effect" increases load-carrying capacity

TEMPORARY FLOOD PROTECTION.

In inner cities, ports, and industrial zones, and on road and rail crossings, permanently installed structures are often a hindrance. In these applications our terra stop log system can be used as a temporary measure instead of cost-intensive permanent solutions.



The system comprises just a few aluminium elements that can be installed at different heights. More elements can be fitted later to respond flexibly to changing conditions. The terra stop log system is approved by the Europaverband Hochwasserschutz e. V. and has already proved successful as a temporary flood protection measure in numerous applications. It is a modular system and consisting of the following elements: terra stop logs, posts with or without back stays, clamping devices, anchor plates, and bottom seal.

Applications:

- Installation on existing ground and sheet piling structures
- Protective wall
- Dike opening
- Building protection



Advantages

- Simple design – no special tools required
- Robust construction, high reliability
- Low repair, maintenance and storage requirements
- Resistant EPDM seal
- Optimum storage systems
- Low manpower requirements
- Short, flexible response times
- No obstruction of traffic or views in normal conditions



PERMANENT SAFETY: OUR STEEL SHEET PILING IN DIKE CONSTRUCTION.

Our proven steel sheet piling is the classic solution for flood protection. A flexible and highly cost-effective solution, it has been used for decades all around the world. Mostly used for permanent systems, steel sheet piling can also serve as a base for temporary systems. This opens up a wide range of possibilities for the design of optimum flood defense solutions.



Sheet piling in dikes.

In a flood, dikes are subjected to enormous loads. Often, they are no longer capable of meeting these loads as the increasing regularity of flood disasters was not foreseen by their builders. Here, our steel sheet piling offers an efficient and cost-effective solution because it can be installed quickly and easily in both existing and new dikes to stabilize and seal the dike and increase its load-bearing capacity.

Sheet piling is flexible and can follow the movements of the dike, ensuring long-term stability and watertightness. If necessary, the sheet pile interlocks can be sealed. Various bituminous materials are available for this. These sealants can be installed in the interlocks either at the factory or on-site. One particularly reliable solution is the terra interlock sealing system made from a polymer. This seal is fitted into the interlocks at the factory and is suitable for all methods of sheet pile installation.

If the piling is used for a visible wall, the polymer seal is particularly recommended as it is heat-resistant and does not run out of the interlocks in the heat of the sun. Naturally, all recommended sealing systems are ground-water-neutral and ecologically safe. Ecological reasons also clearly favour the use of sheet pile walls. As 100% steel products they are particularly environment friendly as they can be removed without residues and reused.

Sheet piling applications:

- New dike construction and dike repairs
- Dike raising
- Base for further flood defense structures such as terra glass wall system or demountable flood barriers



Lightweight steel sections.

As well as hot-rolled sheet piling, cold-rolled piling sections are used for flood protection. They are cold-formed from flat material into sheet piling profiles and are mainly used for sealing purposes. They are a long-proven low-cost solution. In general they are used in the same way as hot-rolled sheet piling sections, taking their load-bearing properties into account. Production is cost-effective and service properties are ideal for many flood protection applications. The visible parts of the pile wall can be architecturally enhanced in various ways, including painting, brick facing, facing elements, greening, etc. Sheet piling in dikes is a prerequisite for mobile dike-top systems used to temporarily raise the height of dikes when there is a risk of flooding. It also forms an ideal base for raising the flood protection level of glass systems and protective walls.

Sheet pile wall modules.

When existing dikes or flood defense systems are not high enough for extreme flood situations, steel sheet pile wall modules can be used as permanent or temporary flood defense solutions. They can be used cost-efficiently as dike raising elements and dike openings to protect residential and working areas in densely populated zones.

Applications of sheet pile wall modules:

- Protection of residential and working areas
- Densely populated zones
- Dike raising elements
- Dike openings

Advantages

- Absorb all static and dynamic forces generated by the flood
- Stability of the dike is guaranteed even if most of the water-side section of the dike is already eroded
- Prevents dike seepage and erosion
- Different groundwater levels on either side of the dike can be offset by staggered driving or slitting of the sheet piles
- Sheet pile walls are so flexible that they follow the movements of the ground without being damaged



MACHINERY
AND EQUIPMENT

BALTI
GERMA

OPTIMAL MACHINERY AND EQUIPMENT ARE THE KEY TO COST-EFFECTIVE WORK IN MARINE AND FOUNDATION ENGINEERING PROJECTS.

We supply our customers with all the machinery and equipment they need to drive steel sheet piles, pipe piles, beams, and other pile sections in the course of easy to complex pile driving jobs. We also provide drilling technology for every field of application: from anchor and geothermal drilling rigs, drilling mounts and hammer drills to double-head drilling rigs.



In addition, we also supply the convincing technical concept and ensure that the construction project is implemented economically.

The right technology for every application.

There are many different technologies for driving piles: Pile driving and extracting, pressing, hammering or drilling. Depending on the requirements on site, we offer our customers a wide range of suitable machines in many variants and output sizes. With MÜLLER pile driving and drawing technology, for example, we also offer our own products.

Service.

With a wide range of services, we ensure that our customers' machines deliver optimum performance. The spectrum ranges from inspection and maintenance to spare parts, monitoring to transport and set-up.



Our portfolio

Vibration equipment:

- MÜLLER excavator-mounted vibrators
- MÜLLER free riders & power packs

MÜLLER complementary products:

- drill drives, clamping devices
- accessories & special equipment

Leader masts¹

¹Exclusive distribution in Denmark, Germany, and Austria.

Our services:

- Inspection & maintenance
- Problem solving & repair
- Spare parts
- Spare/rental equipment
- Consulting
- Support hotline
- Transport & setup
- (Remote-)Monitoring

COMPACT ALL-ROUNDERS FOR ANY COMMON EXCAVATOR: MÜLLER EXCAVATOR-MOUNTED VIBRATORS AND DRILL DRIVES.

The compact, lightweight MÜLLER excavator-mounted vibrators can be attached to any standard excavator. The power comes from the on-board hydraulics and the units are controlled by the excavator's control levers. Various models (HFB, HFBV, HFB S, HFB SG, RHA) and useful accessories are available to suit even the most diverse applications.



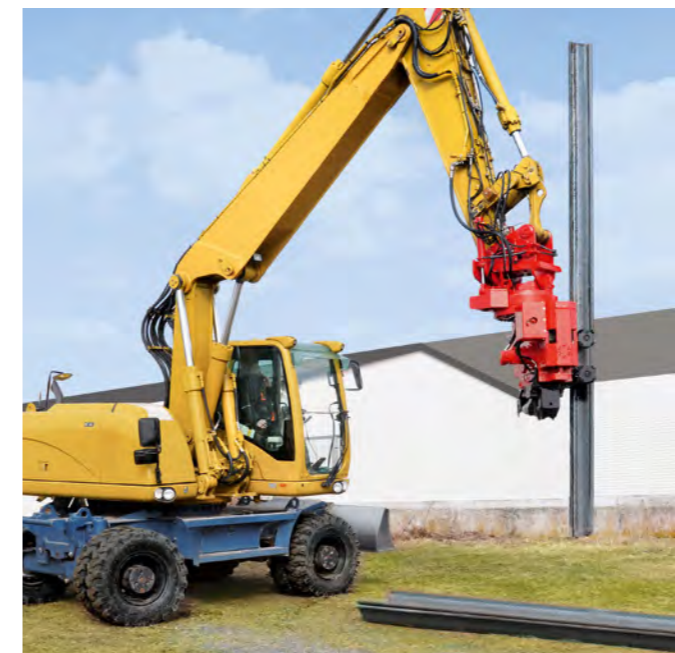
Outstanding maneuverability with maximum durability: MÜLLER excavator-mounted vibrator with side gripper.

Our MÜLLER side grippers are capable of picking up, positioning, and driving a pile with the vibrator in a single operation. This is a key advantage on space or height-restricted job sites especially, as conventional excavator-mounted vibrators have to clamp the pile on the top.

MÜLLER excavator-mounted vibrator with side gripper

Advantages

- With tilt-rotating device and side clamp
- Ideal for applications with restricted space
- Outstanding maneuverability, supreme reliability, and very easy handling
- Side clamp is mounted sturdily
- Can be mounted on almost any standard excavator without interfering with the hydraulics
- Vertical alignment via an inclination measuring and display device
- Made in Germany



Easy clamping of pipe piles: MÜLLER excavator-mounted vibrator also with side grip tube clamp.

Just a few hand movements is enough to replace the standard gripper with the innovative side gripper tubular clamp, which enables tubular piles with a diameter of approx. 200 to 630 millimeters to be clamped. This unique design allows for defined application of force. Standardized MÜLLER MS-U 60/72 or MS-U 80/100 clamping devices can be supported without problems.

MÜLLER excavator-mounted vibrator with side grip tube clamp

Advantages

- Standard gripper can be replaced with side gripper tubular clamp in just a few hand movements
- Like all MÜLLER side grippers, this side gripper is also available in a one and two-cylinder design



MÜLLER HFB and HFBV excavator-mounted vibratory pile drivers – with fixed or variable static moment.

HFB MÜLLER excavator-mounted vibratory pile drivers with a constant amplitude are uncomplicated to operate and robust in use. These are the best prerequisites for good results. The HFBV series offers maximum performance with minimum ground vibration. This makes them ideal for applications in inner-city special civil engineering or for work in vibration-sensitive environments.



HFB series

Applications

- Ideal for sheetpiles, pipes and beams
- Driving and extracting

Advantages

- Small and compact
- Easy operation with a safety circuit
- Quiet and universal in application

HFBV series

Applications

- Urban foundation works
- Areas sensitive to vibration
- Ideal for sandy soils

Advantages

- Minimal ground vibration
- Optimal adaptation to soil conditions
- Technology that's easy on both the equipment and the environment

MÜLLER HFB S excavator-mounted vibratory pile drivers – picking up the pile with a clamp.

HFB S excavator-mounted vibratory pile drivers with a constant amplitude are uncomplicated to operate and robust in use. In addition, they allow the pile to be picked up and deposited directly with a clamp.



HFB S series

Applications

- Sheet pile driving

Advantages

- Direct pick-up and set-down
- Extremely low height allows driving of long piles
- Easy setup through excavator hydraulics
- Control block with safety circuit
- Manual or automatic exciter cell interlocks

MÜLLER RHA add-on drilling drives.

These robust, low-noise drill drives are quickly and easily attached to the stick of an excavator. Optionally, they can be attached to a leader via a guide carried or by fitting in the clamp of a vibrator.



MÜLLER RHA add-on drilling drives

Applications

- Pre-drilling to loosen and relieve the ground
- Heavy soils

Advantages

- Various mounting options
- Fast, cost-effective drilling
- Powerful, robust, long life



HHF series with incrementally adjustable eccentric moment – two in one.

These incrementally adjustable vibrators are ideal for use in changeable geological conditions.

The eccentric moment can be increased through removable additional weights, so with one machine, different amplitudes and frequencies adapted to the soil profiles can be achieved with the same centrifugal force.

H series with fixed eccentric moment.

MÜLLER vibrators with constant amplitude – straightforward to use and robust. That is the foundation for good results in moderately difficult driving conditions. These vibrators are fitted with eccentrics that generate a fixed eccentric moment. With forced-feed lubrication and oil cooling, this series is equipped for applications in extreme climatic conditions.

HHF series

Applications

- Soils with moderate to difficult driving conditions
- Suitable for heavy piles

Advantages

- Adjustment to changing soil conditions on site thanks to removable additional weights
- Quick changeover

H series

Applications

- Soils with light to moderately difficult driving conditions
- Driving and extracting tubular piles
- Also in extreme climatic conditions

Advantages

- Extremely robust machine design
- Easy handling and easy adjustment of clamping devices

HFV series – variable and resonance-free.

These vibrators offer maximum performance with minimum ground vibration – ideal for applications in urban foundation works or in areas sensitive to vibration, all thanks to resonance-free starting and stopping. In addition, the amplitude can be infinitely varied during operations. The natural frequency of the soil can therefore be taken into account – driving proceeds effectively and yet with little vibration.

HFV series

Applications

- Urban foundation works
- Areas sensitive to vibration
- Ideal for sandy soils

Advantages

- Minimal ground vibration
- Optimal adaptation to soil conditions
- Technology that's easy on both the equipment and the environment



CONCENTRATED POWER FOR THE VIBRATOR: MÜLLER POWER PACKS.

Power packs are needed to supply the hydraulic vibrators with energy. Inside a noise-insulated housing, diesel motors run hydraulic pumps that supply the necessary flow rate for hydraulic motors via hoses to the vibrators.

The low-noise, fuel-efficient integrated diesel motors comply with the latest exhaust emission regulations. The programmable logic controller can be operated via cable or radio remote control and is used to optimize and monitor the workflows. Optionally, operating parameters and machine data can be called up remotely online via data modem.

Advantages

- Compact, lightweight design thanks to closed oil circuit
- High degree of reliability using components such as diesel motors, pumps, and controllers that have been tried and tested on the building site
- Extensive range of accessories, such as a remote maintenance package, winter package, or fine bypass filters



MÜLLER fine filters.

The bypass oil filter is a filter system that supplements the hydraulic filter already fitted. The bypass oil filter is used for the fine filtering of the hydraulic oil. The lower flow rate via the filter means that a much finer filter can be selected than is the case with standard filter elements. Therefore, much finer particles can be removed from the oil than is the case with full-flow oil filters.



MÜLLER winter package for power packs.

For use in temperatures down to -25°C

The winter package contains:

- Preheaters for hydraulic oil and diesel engine cooling water, with external power supply (220–240 V)
- Option: set of covers for closing off the unit's air intakes and air outlets
- A reduced airflow through the unit to help the unit reach its operating temperature faster
- Operation with some air intakes and air outlets closed depending on the ambient temperature
- Better economy thanks to faster deployment and fuel savings



Mobile measurement, logging, analysis, and archiving of vibrations: MÜLLER data acquisition.

Our data acquisition system enables simple and reliable monitoring of the driving process to ensure that the design requirements are adhered to. The data acquisition equipment is integrated directly into the drive's control unit. The data can then be sent to an internet server, for example.

▶ msdata.terra-infrastructure.com

FOR THE HIGHEST DEMANDS ON PERFORMANCE, PRECISION, QUALITY AND SAFETY: OUR DRILLING TECHNOLOGY.

terra infrastructure GmbH develops, produces and distributes VibroDrills, hammers and rotary drives for foundation engineering and quarries. We manufacture our equipment in-house – it meets the highest quality standards.

In the development and production of our products, we can build on decades of experience and are ideally prepared for the challenges of the future thanks to state-of-the-art calculation and development methods.

With our VibroDrills, rotary hammers and rotary drives, you benefit from state-of-the-art technology, first-class quality and reliable operational readiness.



Rotary heads – the compact lightweights.

terra infrastructure rotary heads score with compact design and low weight combined with high performance. Thanks to a wide range of configuration options you will receive the optimum machine for your application. At the same time, you also benefit from an extremely robust device design.



Drill hammers – the powerful classics.

Our drill hammers deliver optimum drilling performance in different soil conditions. Various configuration options ensure a high degree of variability. They also impress with their compact design.



VibroDrills – the modern all-rounders.

VibroDrills combine the best of both worlds – the drilling and vibration technology. Our vibratory drills reliably deliver high drilling rates in all soil types. Combined with high torque, large drilling diameters and depths can be achieved.

Rotary units

Applications

- Micropile drilling
- Overburden drilling with DTH hammer
- Auger drilling

Advantages

- Compact design
- Low machine weight
- Robust equipment design

Rotary hammers

Applications

- Micropile drilling
- Overburden drilling
- Self-drilling anchors
- Auger drilling

Advantages

- Compact design
- Variable machine configuration
- Robust equipment design

VibroDrills

Applications

- Micropile drilling
- Overburden drilling
- Self-drilling anchors
- Geothermal drilling
- Geotechnical drilling/core drilling

Advantages

- Can be used in all soil types
- Variable machine configuration
- Easy handling



INDIVIDUAL SERVICE PACKAGE FOR OUR MACHINES AND THIRD-PARTY EQUIPMENT.

With our wide range of services, we make sure that our customers' machines provide optimal performance. Our services range from inspection, maintenance, and repair to the sourcing of spare parts, monitoring, transport, and training.

Instead of just offering standard solutions, we customize our services to suit the specific needs of our customers. We can create individual service packages upon request, optimally tailored to our customers' specific requirements.

With our services we make an important contribution to optimizing our customers' benefits and minimizing their risk by utilizing the unique technical expertise of our service team and our years of global experience.



Especially fast service:

we have installers at all of our local offices and can therefore get them to you quickly to carry out maintenance or repairs. This way we ensure that there's no long downtime on the construction site and the machines are ready to use again in no time. Get more information about the customer service centers near you:

www.terra-infrastructure.com/#service



Overview of services:

Inspection and maintenance

- Regular status checks (report and recommendation)
- Preventative replacement of wear parts

Troubleshooting and repair

- Repair service on site with defined response times – depending on SLA

Spare parts

- Spare parts with defined response and delivery time – depending on SLA

Spare/rental equipment

- Provision of replacement or rental equipment in the event of damage (as part of an SLA)

Advice

- Product advice
- Required infrastructure
- Hire or sale
- Service packages
- Complementary services

Support hotline

- Informational material and documentation
- Technical questions
- Help during setup

Transport and setup

- Machine transport
- Setup and connection
- Commissioning
- Optimization of operation

(Remote-) monitoring

- Monitoring of operating data, status data, errors



TRENCH SHORING

UNIQUE EXPERTISE – FOR OVER 70 YEARS.

Our E+S and KRINGS brand shoring systems have provided cost-effective technical processing solutions with due regard to safety aspects for numerous civil engineering projects, both domestically and on overseas markets. Because each construction site has its own specific challenges, our project-related consulting services are of particular importance.



Unique expertise.

terra Infrastructure is among the world's best-known providers of trench shoring. We offer a wide range of trench shoring equipment and supplementary products. Our portfolio also includes temporary construction site roads made of steel or plastic. For the latter we additionally provide

installation services. For many construction projects, it is more economical to hire the shoring system. Our extensive range of rental equipment means we can always provide our customers with a suitable system, even for large-scale projects.

Our portfolio

- E+S Linear Shoring
- E+S Box Shoring
- KRINGS Box Shoring
- Steel and plastic construction roads
- terra lightweight aluminium shoring
- Supplementary products civil engineering

Services

Technical office

- Individual and cost efficient shoring solutions
- Verifiable and tested structural analyses
- Project-related drawings
- Technical specifications
- New and further developments in design

Site supervision

- Experienced site marshals assist with the installation of the shoring and thus ensure a smooth workflow

Logistics

- Organization of delivery and removal
- Decentralized warehouses and large rental fleets ensure fast delivery and high availability



COST-EFFECTIVE IMPLEMENTATION OF LARGE WIDTHS AND DEPTHS: E+S LINEAR SHORING.

Our E+S linear shoring system is a patented method for trench shoring that is unique worldwide. It offers a large number of possible applications, either as a single-rail or as an overlapping shoring system. Our technical consultation ensures that the most economical product is always used in the most cost-effective combination.

With E+S linear shoring, rigid boogie cars keep the soldiers and thus the shoring panels at an equal distance. Everything stays linearly aligned, always at the same distance from the opposite side, ensuring more effective, faster, and noticeably more cost-effective operations. A major advantage of the system is derived from the special design of the soldiers, as it allows the shoring panels to be pivoted in from the side.

With the overlapping system, the shoring panels are held in vertically installed rails so that they can slide past one another. Once installed, they form an overlapping shoring system.

Our innovative trench end shoring boogie car can handle both the compressive forces exerted from the long sides of the trench shoring and the pressure from the front, which means the sheet piles can now lean directly against the boogie car and the pressure is transferred to the shoring.

The E+S linear shoring system can be used as formwork for in-situ concrete and installed with low vibrations, minimizing the impact on the surrounding soil. Existing buildings and traffic flow thus remain largely unimpaired.

The system is ideally suited for use at depths of 4 to 14 meters and widths of 0.9 to far more than 10 metres.



Advantages

- Low-vibration installation
- Very little impact on the surrounding soil
- No impairment of existing buildings or traffic flow
- Great depths and widths feasible
- Highly suitable for manholes
- Shoring panels can be pivoted in from the outside
- Flexible pipe culvert heights
- Plenty of working space
- Suitable as formwork for in-situ concrete
- Open guidance of the panels prevents jamming in the slide-rail



COST-EFFECTIVE LAYING OF CABLES AND PIPES: E+S TRENCH BOXES.

The E+S trench boxes of the Lightweight (LBR), Medium, and Magnum classes make it possible to lay pipes with unusually large diameters or lengths particularly cost-effectively. Outstanding performance factors are, for example, shoring heights of up to 6 meters, possible trench widths of over 5 meters, and vertical pipe clearances of up to 2.46 meters. The strong strut systems can handle large widths and are compatible with all three box systems.



LBR Lightweight shoring

Advantages

- Highly cost-effective solution for urban civil engineering projects
- Can be either dropped in or lowered
- Highest safety standard
- Strut system compatible with Medium and Magnum shoring
- Easy handling

Medium shoring

Advantages

- Economical shoring solution for urban civil engineering projects
- Stepless adjustability for optimum adaptation to the trench width
- Strut system compatible with Lightweight and Magnum shoring
- Top panels compatible with Magnum shoring
- Easy handling

Magnum shoring

Advantages

- Cost-effective shoring solution for laying large or long pipes
- Strut system compatible with Lightweight and Medium shoring
- Top panels compatible with Medium shoring

Linear boxes

Advantages

- Combination of slide-rail and box shoring
- Stepless adjustability of the pipe culvert height
- Top panel compatible with Medium and Magnum shorings
- High flexibility due to the vertically displaceable boogie car
- Low-subsidence installation

QUICK AND EASY TO USE: KRINGS TRENCH BOXES.

Our edge-supported shoring systems from KRINGS are particularly versatile. They take up little space during storage and transport and can be very quickly and simply assembled at the construction site.



The little KVL steel box is ideal for inner-city areas, the sturdy KS 60 is recommended for inner-city sewer construction projects, and the KS 100 is designed for use at greater depths.

By means of an adapter, the struts developed for the KS 60 and KS 100 boxes can also be used on the KVL. By using these spindles and connecting pipes, the possible trench width of the KVL can be further increased.



KVL

Advantages

- Suitable for use in urban centers
- Lightweight design
- Ideal for handling with smaller wheel excavators

KS 60

Advantages

- Suitable for open terrain and medium-scale sewer construction in urban centers
- Shoring struts are compatible with KS 100 boxes
- Can be installed and removed using smaller excavators
- Low weight, high strength

KS 100

Advantages

- Most widely used shoring box in the world
- No negative environmental impact from pile-driving and vibration noise
- Shoring struts are compatible with KS 60 boxes

Piling frame element DKU

Advantages

- Ideal for construction measures with crossing lines
- Low-deformation shoring in inner-city areas
- Spindles identical with KRINGS boxes
- Can be used as corner shoring and for linear shoring

GETTING YOU QUICKLY AND EASILY TO THE CONSTRUCTION SITE: SITE ROAD SYSTEMS.



Plastic site road.

Our plastic site road features a combination of low weight and high load-bearing capacity. It is easy to lay, ensures optimal weight distribution, and can be installed on practically any surface. The plastic site road is a genuine lightweight. A single truck can transport up to 75 panels, which keeps transport costs to a minimum. To ensure maximum flexibility, the laying service is carried out by the customer. Thus, it is possible to deliver the sheets at short notice. This makes the plastic construction road a particularly economical solution for many applications. It is not only suitable for construction sites, widening existing roads, or as storage space, but equally for use as a crane or assembly platform for wind power, line construction, or photovoltaic systems. Fitted with a specially designed geotextile underlay, the plastic site road can be used to protect sensitive surfaces such as natural stone or precast concrete paving.



Steel construction roads.

Our E+S steel site road system provides great freedom of mobility as well as a host of technical options and broad scope for cutting costs.

The site road consists of heavy-duty angles laid lengthwise and special profiles laid crosswise. Its simple design and special connectors make installation a very straightforward matter. The speed of laying is relatively high, as an excavator lifts the elements one after another from a reversing truck. The sections are then connected together with straps.

FOR SPECIFIC REQUIREMENTS: SUPPLEMENTARY PRODUCTS FOR CIVIL ENGINEERING.



KRINGS RG2500/RG5000 pipe grabs.

Over many years, our KRINGS pipe grabs have proven to be the ideal devices for the safe and efficient handling and laying of pipes of all kinds. Both types work very simply with automatic grabbing mechanisms. After picking up the load, the jaws lock automatically without manual intervention. An interlocking latch prevents the load from being accidentally released, thus providing greater safety.



Sewer struts.

Particularly in inner-city areas, rapid excavation and pipe-laying are essential. However, problems may arise in deep excavations if tie-back anchoring is not allowed – e. g. if there are adjacent buildings. In this case, sewer struts can be used to support the walers.



KRINGS SZ 10 pipe puller.

The KRINGS SZ 10 pipe puller enables pipe socket seals to be pulled together without damage and also prevents the bed or pipe ends from being damaged by the excavator bucket. Our pipe puller is a very compact unit: All its key working parts, such as the hydraulic cylinders, the control unit, and the double clamp mechanism are accommodated on a smooth-running trolley. Power is provided by a 12-volt battery and vertical anchoring in the socket between two pipes is affected with a socket spindle. The pulling force is 100 kN and the pulling length is not limited.

Benefits

- With an additional adapter, pipes of up to 2,400 millimeters in diameter can be pulled
- Compact design
- No damage to the ends of the pipes



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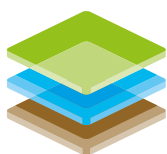
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