Flood protection // Range of products

Efficient, individual, economic

ThyssenKrupp Infrastructure

Contents


Betreten auf
eigene Gefahr
Die
Brücke ist
gesperrt.

ThyssenKrupp Infrastructure
Integrated solutions for civil and foundation engineering

Individually, ThyssenKrupp Bautechnik, ThyssenKrupp Tiefbautechnik, and ThyssenKrupp Bauservice have already achieved success in the market in their own right. Now the three are merging to form one single company: ThyssenKrupp Infrastructure. In the future, our combined strength will create even more sustainable value for our customers.

Whether it's about mobility, urbanization, climate change, or resource efficiency: As a leading supplier of civil, marine, and foundation engineering solutions, we cover the full range of services for global infrastructure projects. Our portfolio is organized into four divisions: steel sections, machinery, trench shoring, and scaffolding systems.

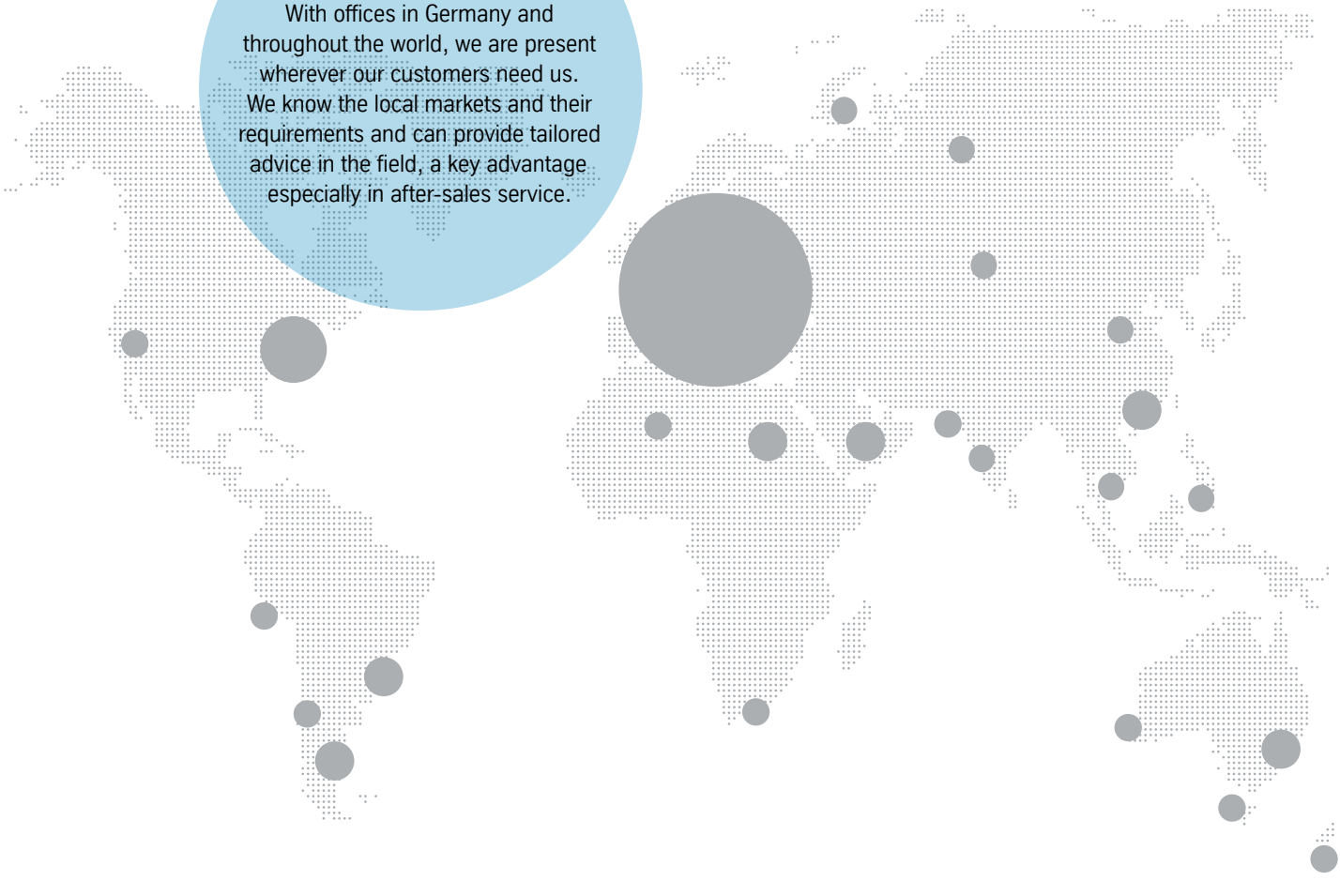
We see ourselves as a full-service supplier to the construction industry. We support and advise our customers all the way, developing solutions precisely tailored to the job in hand. For this we can rely on the expert support of our own consulting engineers.

We provide our customers with all the products they need to execute their projects. Most of these products come from our own production, such as MÜLLER pile driving and extracting equipment and TKL cold-formed sections. We are the exclusive distributors of TK-ASF anchor equipment and Emunds+Staudinger | Krings trench shoring systems.

We place great emphasis on sustainability. Our steel products meet the highest environmental performance standards: They are produced with minimum energy consumption, are eco-friendly in use, straightforward to dismantle, and virtually 100% recyclable. Our driving and extracting equipment is quiet and low on CO_2 emissions.

Global presence

With offices in Germany and throughout the world, we are present wherever our customers need us. We know the local markets and their requirements and can provide tailored advice in the field, a key advantage especially in after-sales service.



Flood protection
A technological challenge

Flood disasters, once seen as merely once-a-century events, are becoming more and more common. Experts agree that urgent action is required, because flood damage already tops the European loss statistics. Some of the losses are foreseeable and can often be prevented by well-thought-out flood protection schemes tailored to local needs.

A technological challenge

For thousands of years, people have preferred settlements alongside rivers and coasts. River courses have been straightened and constricted, floodplains – the natural routes and holding basins for floodwaters – have been reclaimed and built on, forests have been felled and the air polluted. The consequences of these serious interventions are global climate change and more and more environmental disasters. Flood levels that normally occur only once in every century are becoming more frequent. The exception is almost becoming the rule.

Flood protection is therefore one of the most important preventive measures for the urban and rural communities at risk. This is because alongside the human tragedies and economic losses, flooding often leads to the breakdown of the central services on which the local inhabitants and their helpers rely in just such emergencies.

Flood protection is a matter of trust

ThyssenKrupp Infrastructure is a world-renowned supplier of flood protection technology. We can supply a wide range of high-quality products and diverse technical services for hydraulic engineering and water management projects.

Our engineering services:

- Structural analyses and stability investigations
- Bespoke proposals
- Draft designs
- Calculation of quantities and costs
- Working drawings and detailed solutions
- Consulting and support for designers
- As-built documentation

Made in Germany

ThyssenKrupp Infrastructure is accredited in all areas. Our products are designed and manufactured exclusively by ThyssenKrupp Infrastructure and its German partners. The cooperation with leading hydraulic engineering and water management institutes allows us to offer our customers state-of-the-art products.

Our skills and experience allow us to export our flood protection philosophy to all corners of the globe. We are also involved in international projects, e.g., the MOSE project for saving the City of Venice. Venice, built on timber piles, is in danger of sinking. ThyssenKrupp Infrastructure is playing a major part in the construction of a gigantic flood protection scheme consisting of combined sheet pile walls and three huge water-filled barriers that are filled with air to raise them from the seabed and protect the city when water levels rise.

Flood protection solutions
The right system for every situation

Efficient flood protection considers all the safety and environmental issues. We are constantly developing new, tailored solutions to take into account local needs and economic aspects. Every application involves different priorities. Flood protection must be versatile, must satisfy many demands. We make a fundamental distinction between permanent and temporary flood protection.

Stabilization using steel sheet piling after a dike burst in Fischbeck

TKR aluminum stop log system in Schönebeck

Permanent flood protection

Natural protection against the risks of flooding are seldom adequate. Therefore, diverse permanent civil engineering measures, e.g.,, dikes, reinforced banks, walls, water retention basins, and the raising of dikes and banks, have been implemented over the years. These permanent flood protection systems are fixed parts of the infrastructure. They have a permanent effect on the appearance of landscapes and townscapes. The enormous costs of such major projects call for convincing proof of their reliability, but primarily economically justifiable planning concepts. Owing to their cost-effectiveness and versatility, steel sheet piles from ThyssenKrupp Bautechnik have proved to be an ideal answer in many projects worldwide.

Where visual and aesthetic requirements are important, e.g.,, in holiday resorts or recreational areas, our glass wall systems are a good choice. They are ideal for guaranteeing permanent protection against floods without obscuring the view of the landscape or other attractions. Our permanent systems are:

- Steel sheet piles
- Sheet piling modules
- TKR glass wall system

Temporary flood protection

Inner-city areas, ports and industrial districts, and road and rail crossings are just a few examples of places where permanent structures are often a hindrance because they restrict visibility and the movement of traffic. If flooding occurs only occasionally in such places, our demountable flood protection systems can be used instead of the more elaborate, more costly permanent solutions.

Our TKR aluminum stop log system is a temporary measure for such applications. When floods threaten, the stop logs are built up at the designated points. Once the waters have receded, the stop logs are removed and stored for the next time.

The ThyssenKrupp Bautechnik flood protection portfolio is complemented by floodgates and doors, stop panel systems, and the demountable Aqua-Stop dam system. We can also supply bespoke flood protection equipment for doors, windows, and other openings in buildings. Our temporary systems are:

- TKR aluminum stop log system
- Fold-up flood protection system
- Stop panel system
- Protection for buildings

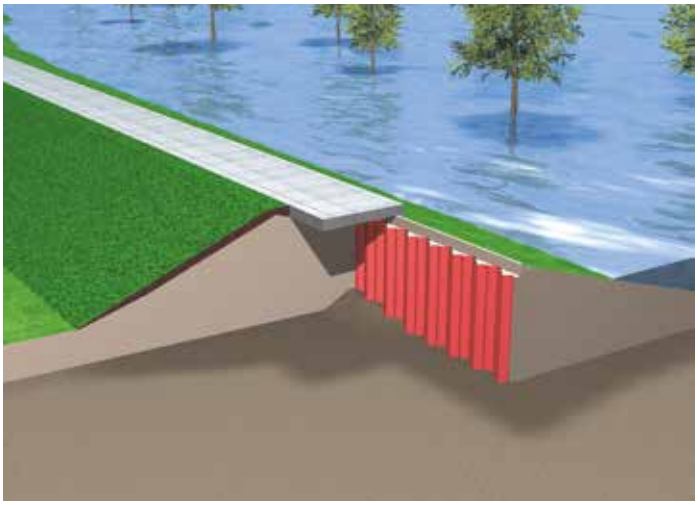
Steel sheet piles in dike building
Permanent safety plus economy

For decades, steel sheet piling has been the classic solution for flood protection. In most cases sheet piles form part of the permanent protection, but they can also be used as temporary systems. Therefore, diverse tailored alternatives are possible answers to flood risks in any situation.

Lightweight steel sections in Gallin for refurbishing a dike

> **RECENT PROJECTS** Venice, Italy: flood protection in the form of combined sheet piles for the historic old quarter // Cologne-Rodenkirchen, Germany: permanent flood protection with sheet piles // Gallin, Germany: flood protection in the form of lightweight steel sections for dike upgrade and stop logs as temporary measure // Dresden, Germany: permanent and temporary flood protection in the form of sheet piles and stop logs // Mönkebude, Germany: flood protection in the form of sheet piles and stop logs // Wustrow, Germany: flood protection in the form of sheet piles and stop logs

> Further flood protection projects involving steel sheet piles have been erected in Neukalis, Timmendorfer Strand, Ostritz, Leipzig, Chemnitz, Bautzen, Glauchau, and Graal-Müritz.



Steel sheet piling in dikes

Dikes are subjected to enormous loads during flooding. They are often no longer capable of resisting such loads reliably because the increasing regularity of flood disasters was not foreseen by their builders. Steel sheet piling represents an efficient, cost-effective solution in such situations because sheet piles can be quickly and easily installed in both existing and new dikes. They stabilize the dike, seal it, and increase its load-bearing capacity.

Piling is flexible and so can easily move elastically with the dike, which guarantees long-term stability and impermeability. If necessary, the sheet pile interlocks can be sealed. Various bituminous materials can be used as sealants, which are either applied in the factory or on-site. One particularly reliable sealing system is the patented TK HOESCH interlock sealing system, made from a polymer. This system is applied to the interlocks in the factory and is suitable for all methods of sheet pile installation.

Such a synthetic seal is recommended for sheet piling that remains visible because it is heat-resistant and does not run out of the interlocks when exposed to strong sunlight. Of course, all the sealing systems we recommend are not harmful to groundwater or the environment. As 100% steel products, sheet piles are especially environmentally friendly because they can be completely removed without residue and reused.

Applications for steel sheet piling

- New dikes
- Refurbishment of existing dikes
- Raising dikes
- As a foundation for other flood protection measures such as glass walls or demountable systems

The benefits of steel sheet piling

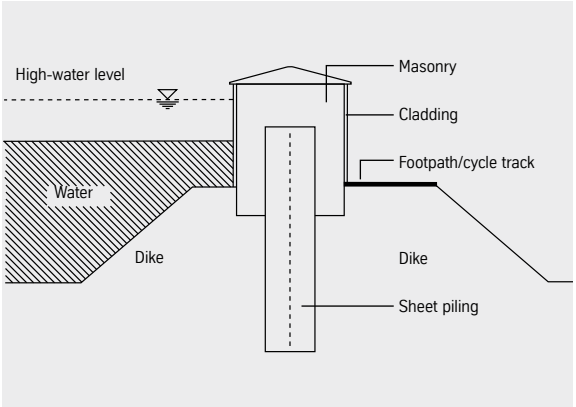
- Accommodates all the static and dynamic forces imposed by floodwaters
- Guarantees the stability of a dike even if most of the dike on the water side is to be removed
- No percolation or undermining
- Staggered embedment depths or slits in the sheet piles guarantee a balanced water table on both sides of the dike.
- Sheet piles are so elastic that they can accommodate the movements of the soil without damage
- Hydraulic engineering works such as dike openings, sluices, pumping stations, and barrages can be integrated seamlessly with sheet piling solutions
- Sheet piling can project above the top of a dike and hence increase the protection offered by an existing dike
- The economic alternative to a new dike
- Can be removed without residue and 100% recycled

Lightweight steel sections

Cold-rolled sheet piling is being increasingly used for flood protection schemes in addition to hot-rolled pile sections. They are formed from sheet material in the cold state and are primarily intended for sealing purposes. They have long since been regarded as a cost-effective solution. In general, they are used in the same way as hot-rolled sheet piling, taking account of their load-bearing characteristics of course. Their production is less costly and their functional properties are ideal for many applications in flood protection schemes. The visible parts of sheet piles can be given numerous architectural treatments, e.g., painting, brick facing, cladding, planting, etc. Sheet piling is a prerequisite for erecting demountable systems intended to raise the level of a dike temporarily during flooding. Sheet piling also represents an ideal foundation for increasing the level of protection with the help of glass wall systems and masonry.

Top left: brick-faced sheet piles, cut-away drawing
Top right: brick-faced sheet piles
Right: increasing dike height using steel sheet piling in Bleckede-Alt Garge

Sheet piles as the basis for flood protection in combination with aluminum stop logs



Left: section through dike
Right: installing the sheet piles

Left: pocket foundations
Right: brick-faced sheet piles and stop logs

Overall view: sheet piles topped by stop logs

Sheet piling modules
Robust and efficient flood protection

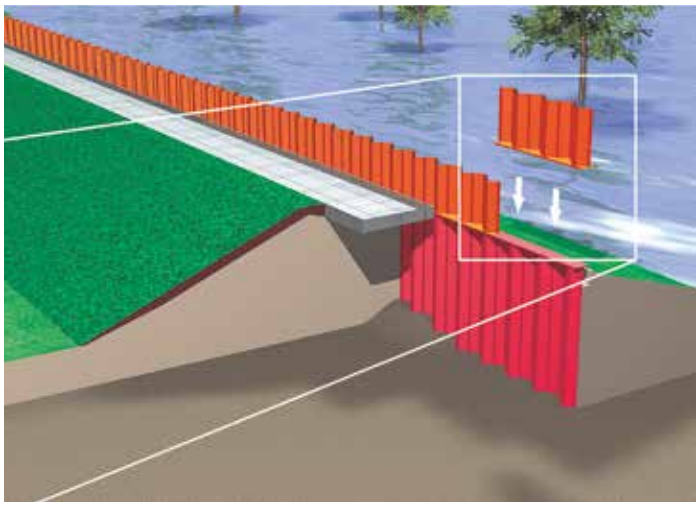
Where existing dikes or flood protection measures are not high enough for extreme flooding situations, then steel sheet piling modules can be added as a temporary measure. By raising dike levels and closing off dike openings, they represent a cost-effective solution for protecting homes and businesses in densely populated areas.

The demountable sheet piling systems for these applications consist of sealed sheet pile sections that are mounted on existing sheet piling or concrete structures via a flange plate or clamping arrangements. These systems are suitable for permanent or temporary installations.

When used as temporary solutions, our flood protection systems can easily raise a dike by approx. 1 m or even more. Installation requires lifting equipment suited to the particular application. All the sheet pile sections available can be used to suit the given loading assumptions and height of protection required. Sections can also be strengthened to suit any particular application.

Applications
- Protection for homes and businesses
- Densely populated districts
- Raising dikes
- Dike openings

The benefits at a glance
- Economic fabrication from sheet piles
- Stable and reliable
- Supplied ready to install
- Fast and safe installation and removal
- Long life and low maintenance requirements
- Low capital costs
- Low maintenance costs



> RECENT PROJECTS Bremen, Germany: sheet piles for permanent protection and modules for temporary protection

TKR glass wall system
Attractive but functional

Unbreakable glass wall systems made from laminated safety glass represent functional and, at the same time, elegant solutions for protecting against floods. Mounted on top of masonry, concrete capping beams, or sheet piling, they are ideal for permanent protection. They provide protection against floods without obstructing the view, e.g., in attractive town centers.

The glass elements are made from laminated safety glass to meet the structural specification. Additional panes of glass can be added on the land or water side to protect the load-bearing panes of toughened or heat-strengthened glass. The additional panes are non-structural, which means that the safety of the protective system is still guaranteed even if they are damaged.

The dimensions of the panes can be varied and are chosen to suit structural and architectural requirements. The perimeter frame is fabricated from stainless steel or aluminum sections with an internal EPDM seal. The laminated safety glass in its frame is fitted between the welded aluminum or stainless steel posts with the help of EPDM gaskets so that no stresses can build up, which might damage the glass. Verified structural analyses form part of the system documentation. The visual effect of such a glass wall can be further enhanced by coloring the metalwork.

Applications
- As an alternative to obtrusive masonry when more daylight is required
- Tourist areas, e.g., along terraces, viewing platforms, etc.
- Areas inaccessible for erecting demountable systems
- Locations with a very short warning time that does not allow the erection of a demountable system or this is deemed too risky
- Public areas with high architectural and urban planning demands

The benefits at a glance
- Aesthetically appealing flood protection, especially in heavily built-up areas
- High level of safety in the event of sudden flooding
- Blends in well with the architecture of the surroundings
- Also forms a barrier to wind and noise
- Does not obstruct the view
- High resistance to corrosion and weathering
- Diverse design options
- Ozone-resistant EPDM seals
- Demountable systems on request

Glass wall systems in Dresden, Kaditzer channel, and Brunsbüttel

Glass wall system in Brake

> **RECENT PROJECTS** **Brake, Germany: glass wall system // Dassow, Germany: glass wall system // Dresden-Kaditz, Germany: combination of stop logs and glass wall system for Kaditzer channel // Guben, Germany: glass wall system with porthole-shaped windows // Neufelderkoog, Germany: glass wall system in storm tide area**

TKR aluminum stop log system
Protection when it's needed

The TKR aluminum stop log system consists of just a few aluminum elements that can be assembled to provide protective walls of various heights. The height can be increased later, meaning that it is possible to react flexibly and at short notice to changing conditions. Erection is completed quickly with a small workforce. The easy handling means that such a wall can even be built by unskilled labor. A consistent design form is used for the individual elements so they cannot be assembled incorrectly.

In terms of economy and ecology, the TKR aluminum stop log system has already proved itself as a temporary flood protection system in many situations. This fact becomes very clear when you consider that a 3 m long, 1 m high stop log panel is equivalent to about 480 sandbags! The TKR aluminum stop log system is based on a modular principle and consists of the following elements: stop logs, posts with or without rear props, tensioning system, anchor plates, and bottom seal if required.

The aluminum sections are currently available in widths of 50, 100, and 150 mm. Specially developed EPDM seals ensure that the wall remains watertight. The EPDM material is weather-resistant, robust, and resistant to aggressive chemicals. All components are designed for a long life.

Applications
- Mounted on top of sheet piling
- As protective wall
- For closing off dike openings
- For protecting buildings

The benefits at a glance

- Simple design with just a few components
- Robust construction for high reliability
- Easy installation
- No special tools necessary
- Long life
- Low maintenance, care, and storage requirements
- Highly resistant EPDM seal
- Stop logs and posts made from corrosion-resistant aluminum
- Connecting elements made from stainless steel
- Optimum storage systems
- Small workforce
- Fast and flexible response times
- Does not obstruct traffic or impair the appearance of the surroundings when not in use
- Low capital tie-up and minimum maintenance requirement
- Always ready for use

Foundation options

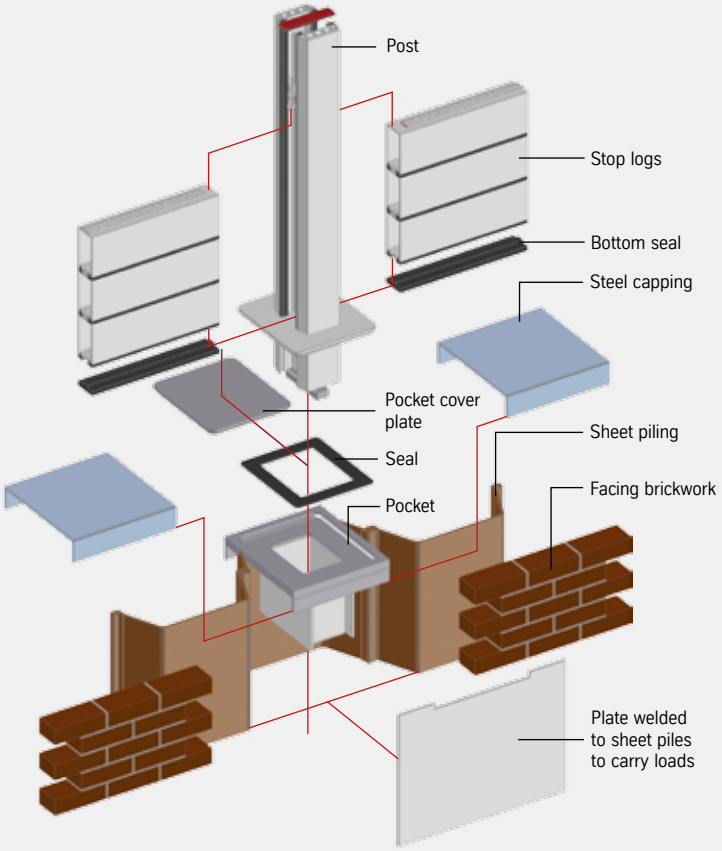
The TKR aluminum stop log system is preferably founded on sheet piling. Such an arrangement ensures that the forces are reliably transferred into the ground; piling prevents percolation and undermining, too. The loads exerted on the stop logs by the floodwaters are transferred into the foundation via the posts. The foundation and the connection with the substructure can be achieved via anchor plates or preformed pockets.

When using anchor plates, the posts are bolted to the load-bearing structure.

When using preformed pockets, a system patented by ThyssenKrupp Bautechnik, each post is simply inserted into a pocket and either turned through 90° to secure it or fixed with a bar. In addition, threaded rods are tightened to fix the post and compress the seal.

Top: test installation of the stop log system to protect the historical city center of Dresden
Bottom: aluminum stop log system with rear support at the Radeberger beer bar in Dresden

Preformed pockets for direct connection to sheet piles



The infinitely adjustable tensioning system pretensions the post and compresses the seal at the base and secures the wall against uplift. A cover suitable for foot and vehicular traffic closes off the pocket when the flood protection is not in use.

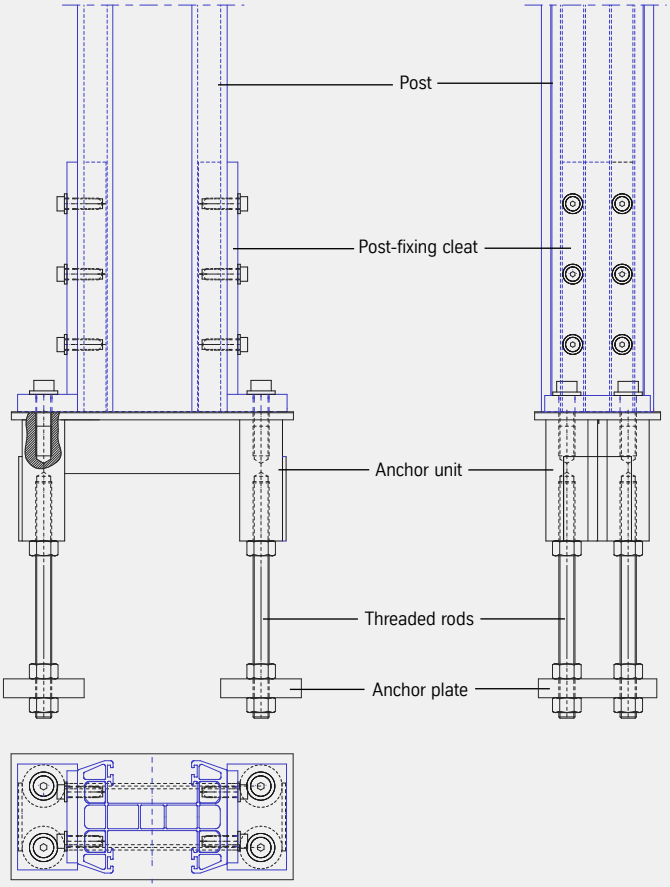
ThyssenKrupp Glasbalken®

Glass stop logs can be combined with the TKR system to provide the right answer for certain applications.

Post sections

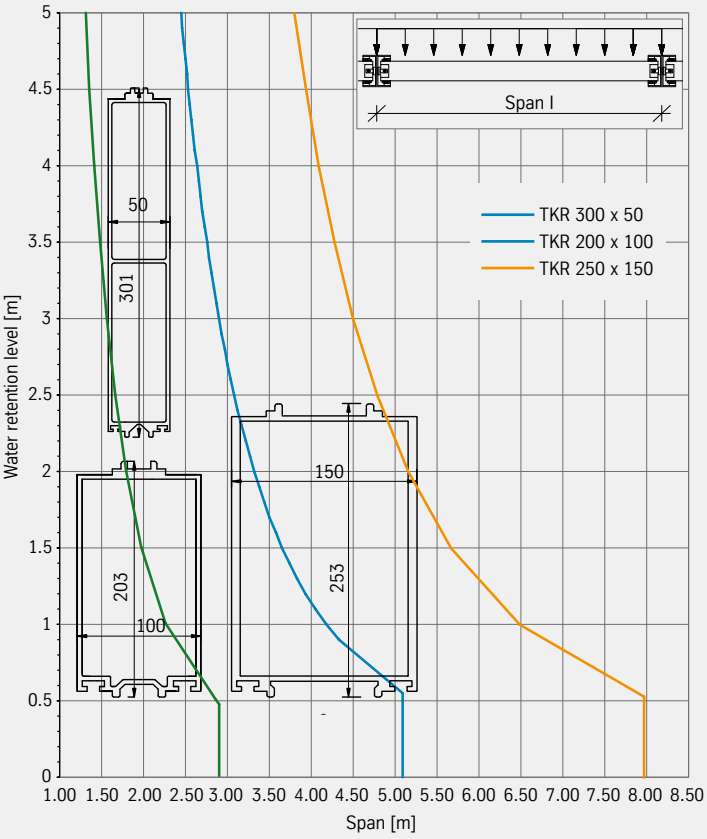
The posts can be made from various aluminum sections, galvanized steel, or stainless steel. Their size depends on the loads anticipated. The newly developed post sections are significantly lighter and more stable, but use only the minimum amount of material. Additional back-propping can be provided if required. Posts can be built into or bolted to the masonry of buildings or walls.

Anchor plate foundation

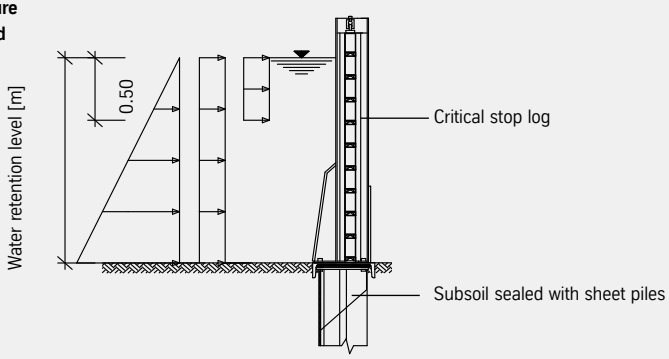


Post sections: stop log loading chart

Flow rate: 1.0 m/s, inflow angle: 15.0°, incl. deformation of l/150, without considering material EN AW-6060 [Al MgSi] T66 (DIN Al MgSi0.5)



Load case hydrostatic pressure + flow pressure + impact load

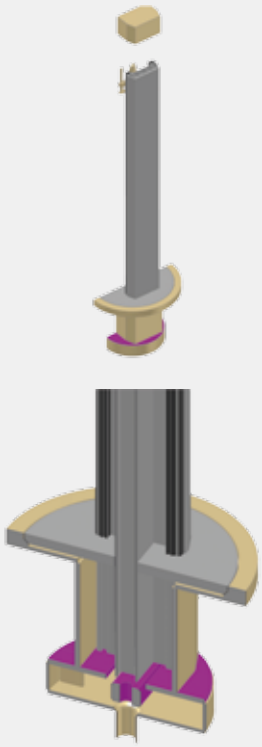


Once the posts have been set up, the stop logs are simply slotted into place between them. The infinitely adjustable tensioning system pretensions the post and compresses the seal at the base and secures the wall against uplift. A custom cap can be supplied as an option to prevent access to the tensioning and locking systems.

> RECENT PROJECTS Dresden, Germany: temporary protection for the historic old quarter // Dresden-Kaditz, Germany: TKR stop log system // Schönebeck, Germany: temporary protection for town center // Lauenburg, Germany: Palm Lock, temporary protection for buildings // Strehla, Germany: combination of sheet piles and stop logs // St. Peter-Ording, Germany: protection against storm tides // Wörlitz, Germany: temporary flood protection // Timmendorf, Germany: temporary protection against storm tides // Bleckede, Germany: temporary protection against storm tides // Bremerhaven, Germany: temporary protection against storm tides

> Further flood protection projects involving the TKR stop log system have been erected in Mühlheim, Iserberka, Grimma, Niederkassel, Bleckede, and Wilkau-Haßlau.

Views of pocket foundation



Rotating post with pocket
The post is embedded in a concrete shaft. All components encased in concrete are made of galvanized steel.
Top left and center: pocket as foundation element
Bottom left: aerial view of pocket
Right: central support with internal locking

Fold-up flood protection system
Simple, functional, safe

Good ideas are amazingly simple – like the fold-up TKR flood protection system. When not in use it is suitable for foot and vehicular traffic; it can even be used as a bench or serve other purposes. And when floods threaten, it is quickly and easily turned into a highly efficient barrier to protect against water and debris.

Temporary solutions made to measure

Our fold-up flood protection system is ideal for devising bespoke, local solutions, which we can develop together with customers. Our extensive experience and the technical options available mean we can offer you a suitable, reliable, and cost-effective answer to your flood protection problem.

In normal conditions, i.e., when there is no risk of flooding, the barriers can be folded down to form an unobtrusive surface suitable for foot traffic, for instance. Where the sheet piling projects above ground level, the barriers can be used as seating when folded down, allowing unobstructed views in both directions.

Applications

- Bespoke solutions
- For raising level of protection at short notice
- Can be combined with new sheet piling measures

The benefits at a glance

- No storage or transportation needed
- Zero-maintenance system
- Can be folded up/down by just one person
- Easily retrofitted to existing systems
- Unobstructed views of the landscape
- Robust, vandal-proof design
- Fast deployment is guaranteed

Folded up

Folded down

Stop panel system
Focus on: locks and weirs

Flood protection systems must be versatile. They have to satisfy many demands. Every application has different priorities. We are constantly developing new, tailored solutions to take into account local needs and economic aspects.

Storage of stop panels and needles

Temporary lock closure in Oldersum

One special version of the TKR aluminum stop log system is the stop panel system. Stop panels are fabricated from stop logs and normally fitted into the support structure with lifting equipment as a complete wall, then tensioned to seal the construction. These panels are ideal for closing off locks, weirs, and intakes for inspection purposes.

Stop panels can also take the form of large wall panels of aluminum or steel, which are transferred from their storage to their protective positions with the help of lifting equipment. Flood protection measures can therefore be installed quickly and with little effort. Stop panels are preferably stored in the immediate vicinity of or integrated directly into the flood protection.

Smaller stop panel units, normally set up manually, are available in various forms for closing off doors, windows, and gateways. These panels are custom-fabricated to suit the openings concerned. Stop panel systems help to create fast, dependable, and economic flood protection schemes.

Needles

We can supply steel and aluminum needles for dams and weirs in various forms to regulate water levels and close off watercourses.

> RECENT PROJECTS Oldersum, Germany: temporary lock closure measures // Kossenblatt, Germany: temporary weir closure measures // Schöpffurth, Germany: lock and weir

Protection for buildings, gates, and doors
Keeping property safe and sound

Flooding also causes enormous damage inside buildings. A fully functioning protective system that takes into account the specific requirements of the building exactly is therefore an important preventive measure in all areas at risk of flooding.

Floodgates in Grimma

Johnitzer Mill

We can supply tried-and-tested flood door and gate systems in various styles to ensure that openings in buildings and flood protection systems are closed off watertight:

- Single- and double-leaf doors
- Sliding gates
- Flap, side-hung, and miter gates
- TKR aluminum stop log and stop panel systems for window and door openings

The materials used are steel and aluminum, available in various grades and with different corrosion protection and design options.

Protecting buildings maintains their value

The door leaves are welded, the thicknesses of the plates and sizes of the stiffeners designed according to the hydrostatic pressure. High-quality, extremely weather-resistant EPDM is used for the seals. The fixing, sealing, and closure systems are all proven assemblies from shipbuilding. Our years of experience gained in many areas of marine structures and construction methods prove invaluable here.

Besides conventional manual operation, electric or hydraulic operating systems can be provided as alternatives. The concept, design, and external appearance of gates and doors depend on each individual project. We can comply precisely with the specifications and requests of our customers.

> RECENT PROJECTS Dessau, Germany: protection for the historic Johnitzer Mill // Neufelderkoog, Germany: gates protecting against storm tides // Grimma, Germany: floodgates // Bremerhaven, Germany: floodgates // Tangermünde, Germany: protecting the premises of a water sports club // Cologne, Germany: building protection in the Rheinauhafen district

Aqua-Stop dam system
Safety reserves

The Aqua-Stop dam system is a temporary barrier designed in such a way that it can be set up very quickly when floods threaten. Two people can set up 100 meters of Aqua-Stop dam in 90 minutes without the need for a crane. The logistics are helped by the fact that the dam elements are easy to transport and require little storage space.

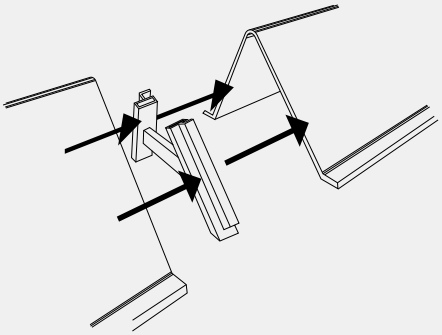
The Aqua-Stop dam system consists of a high-strength frame, especially lightweight sheeting, and the necessary fixings. The frame is made from a special, lightweight and strong plastic material. An aluminum support guarantees stability and also joins the frames together. The individual elements are supplied in easily assembled standard lengths of 2.00 m and heights of up to 1.30 m; standard heights are 1.00 and 0.60 m, other heights are available.

The good stability of the Aqua-Stop dam system is guaranteed by securing it with soil nails. Where available, walls, gutters, or projecting natural features can be used to brace the wall against horizontal forces. To protect buildings, the frames can be placed directly against the external walls. The plastic parts can be sawn and cut to suit the terrain. Angles and special shapes can be produced with the help of adhesives or welding. Watertightness is guaranteed by the sheeting, which is weighted down by sacks of gravel on the water side. As the water rises, it presses the sheeting against the ground and therefore turns the Aqua-Stop dam into an impermeable barrier.

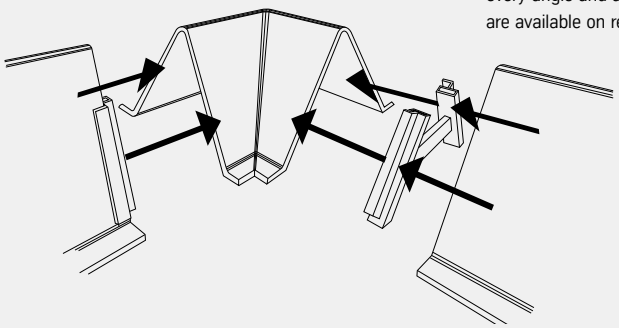
Applications
- Fast protection for buildings
- Barriers
- Protection for building sites
- Readily combined with sandbags

The benefits at a glance
- Fast and easy to use, no equipment needed
- No need to prepare the line of the barrier first
- Flexible, reusable
- Resists UV radiation and impacts, vandal-proof, does not rot
- Easy to clean
- Space-saving storage
- Easy to transport

> RECENT PROJECTS **Dresden, Germany: flood protection for the regional parliament // Dresden, Germany: flood protection for Pillnitz Palace // Rostock, Germany: flood protection for a shopping arcade**



Aluminum supports join together the elements and guarantee stability.



In addition to the standard sizes, corner sections for every angle and any form are available on request.

Dresden: Pillnitz Palace

Storage and logistics
Systems for demountable flood protection

A well-thought-out storage and logistics concept is essential for fast and reliable provision of demountable flood protection when danger threatens.

Most of the time, demountable flood protection elements are kept in storage. Only when floods threaten are the elements transported to their designated place of use. To guarantee rapid deployment in emergency situations, three aspects need to be considered:

- Good storage conditions as a prerequisite for permanent availability and a long life for all the elements
- Properly conceived storage and transport strategies as a prerequisite for fast and reliable installation of the elements
- Storage and transport strategies are part of the emergency plans and must function reliably in the given local conditions, also in unforeseeable situations

We offer the following storage systems:

Roll-off containers
Roll-off container vehicles are widely used in the municipal and construction sectors owing to their economic advantages and flexibility. For ThyssenKrupp Bautechnik, this is the preferred transport and logistics system for flood protection. The internal layout and fittings of the containers depend on the elements to be stored plus specific customer requirements. Shelving systems, lockable doors, interior lighting, and other accessories can be installed on request.

Mesh box pallets
We can supply mesh box pallets in various sizes. They can be stacked two or three high, include removable sidewalls, and are separately lockable on request.

Special storage systems
We can provide other solutions to meet special requirements, e.g., trailers, roll containers, standard sea containers, post pallets, and storage systems are available locally. Other storage systems can be agreed with the customer.

Logistics examples: roll containers and lightweight trailers

Our service plus

If required, our specialists can work together with the customer to develop and supply storage and logistics solutions optimized for the local situation. Storage and logistics systems must be matched to the flood protection emergency plans plus the storage and transport options available locally. We can assist in developing a structured storage strategy as well as an inspection, maintenance, and training program to create the organizational framework that ensures constant availability and rapid installation of demountable flood protection. Custom designs are also possible. Just contact us.

We look after everything

Transport and storage must be properly coordinated. Our specialists will be pleased to advise you. Every community has its own specific emergency plans. We can help to make sure that everything runs smoothly.

The benefits of our storage systems

- Orderly, structured packaging for all flood protection equipment
- Minimum space requirements
- Space-saving stacking and shelving systems
- Optimum protection against weather, loss, and damage
- Efficient loading and transport arrangements

The additional advantages of roll containers:

- Fast loading and unloading without additional equipment or personnel
- No need for an enclosed storage room
- Minimum capital tied up in storage
- Easy relocation when the storage concept changes
- Storing flood protection equipment close to where it will be needed limits the risk factors

Spare parts service

An efficient service system guarantees delivery of spare parts at short notice. Where agreed, we can keep stocks of spare parts for you.

The benefits at a glance

- Orderly, structured storage systems
- Cost-effective storage with optimum protection against the weather
- Efficient, flexible loading and transport arrangements

Machinery
One-stop sourcing

In addition to the materials and equipment needed for flood protection, we can also provide special installation equipment for the pile sections. Different site conditions call for different machinery, different equipment. If the customer does not have the necessary machinery available, we can provide equipment suitable for the project from our own hire fleet.

Many different techniques can be used to install pile sections. Vibratory driving and pressing are among the most important methods. We can supply a wide range of suitable machinery in many variations and power categories to suit the requirements of the site.

Vibratory driving
This is one of the most important methods used in specialist civil engineering. It is based on the principle of turning the soil into a liquid state to a certain extent. This is done by vibrating the pile section. The vibrations reduce the skin friction of the pile section being installed, which achieves rapid driving progress. Vibrators can be leader-guided, suspended from a crane, or mounted on an excavator.

Impact driving
Impact driving methods can be used in almost every type of soil. However, these methods are particularly suitable for driving the final few meters or for embedding piles in a load-bearing stratum when vibratory or pressing methods are ineffective. Impact driving allows the load-bearing capacity of the pile section to be verified.

Drilling
Drilling is mostly used for concrete piles. It can also be used in conjunction with soil improvement measures.

Pressing
This method involves exerting exclusively static pressure on the pile section without any vibration. The noise associated with driving piles and the negative effects of vibration for neighboring buildings and the ground are therefore avoided. Pressing equipment can be leader-guided or mounted directly on top of the sheet piles.

Pressing and leader-guided vibratory driving

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TKIF.069.e.1.1.10.15.MA · Subject to change without notice