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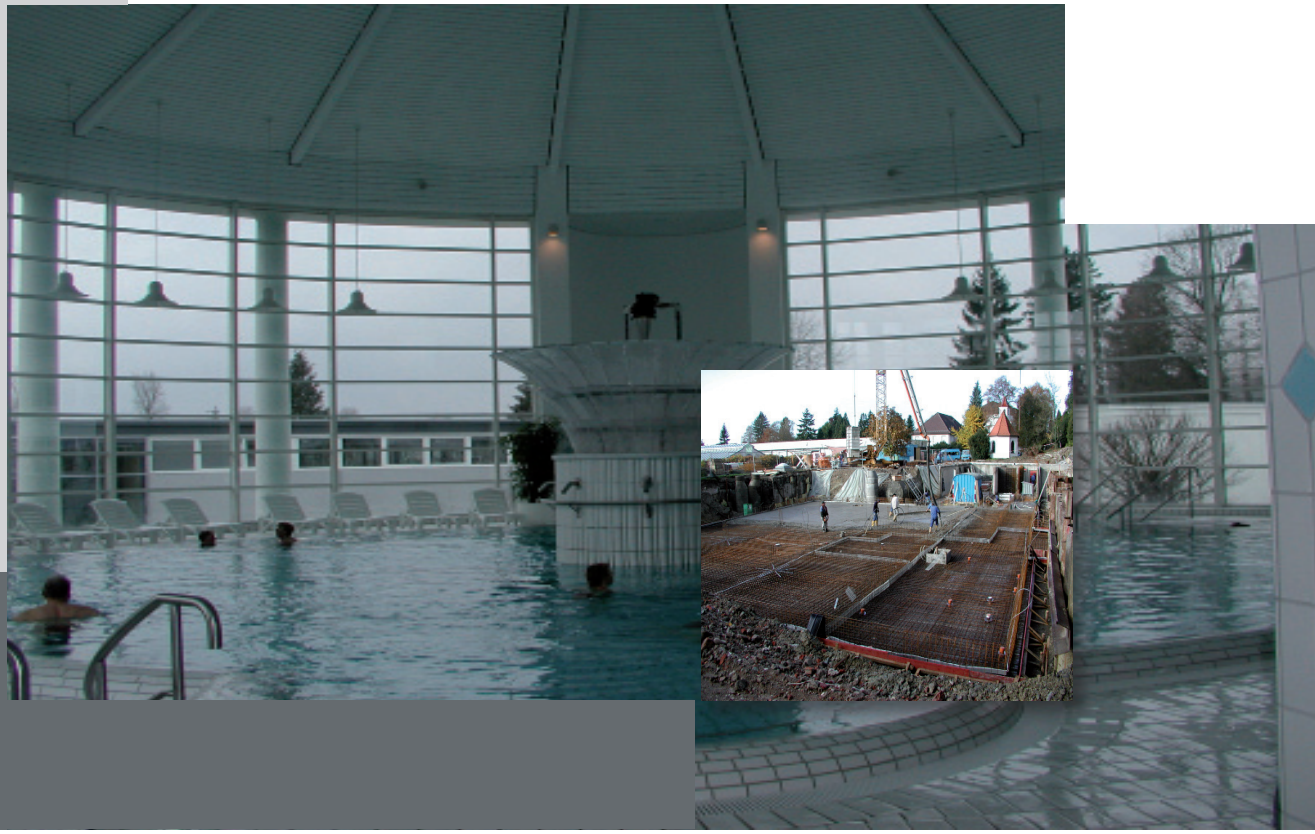
White Tanks



Highest security for highest requirements

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White Tanks | Overview

Although this procedure was examined in the past years in detail and is to be designated as rule in the technology, the White Tanks from Wolf differ nevertheless substantially from other suppliers and distinguish by an unbeatable price performance ratio.

System Description

Construction units made out of impermeable concrete are also called White Tanks. In these constructions the concrete has both the load bearing and the sealing function. Additional sealing is not necessary.

White Tanks of basements, underground car parks and tunnels prevents the penetration of ground water inside the structure and makes leaking of liquids from swimming pools or other containers impossible.

Usually, White Tanks consists of:

- Base plate min d 25 cm
- Outer walls min d 24 cm
- Ceiling slab min d 25 cm

For the waterproofing of these components the following conditions have to be taken:

- Manufacturing of press waterproof concrete
- Manufacturing of press waterproof joints and break through pipes
- Prevention of water leaking cracks

Already in preliminary planning our engineers work closely with architects, structural engineers, building contractors and concrete suppliers in order to achieve these requirements.

The technological requirements of the concrete are adjusted to the sequence of construction and noted on the working plans.

- Joint design
- Concrete composition
- Crack-sectoring reinforcement
- Press waterproof mounting parts

Our specialists install the joint system and supervise the professional supply and the careful execution of the fresh concrete on site.

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White Tanks | Cast-in-Place Concrete
Special features | Important notice

Special features

White Tanks is a construction that offers a high degree of safety and can be built even under unfavourable weather conditions. Careful planning as well as simple design combined with a concrete composition to match conditions and careful treatment on site result in waterproof components, even against high water pressure.

With the completion of the concrete work, the sealing will also have been completed. The few work steps required during concrete processing make the sealing jobs uncomplicated.

Important notice

By customer's request, Wolf White Tanks System is of course also manufactured after WU-guidelines DIN 1045-1.

- Well-considered construction joint designs must be shown in detail on the working drawings.
- Both in the area of planning as well as the area of execution, the technical concept must be well known.
- Processing and curing of the concrete as well as the installation of the joint system must be executed meticulously.
- An intensive cooperation between the respecti ve special fields is absolutely necessary.

Xinedome cinema in Ulm (Germany) : Application of Pentaflex in 2003

White Tanks | Cast-in-Place Concrete
Guarantee | Accessories

Guarantee

If we are commissioned to perform the complete sealing technique (consulting, planning, as well as assembly of joint safety devices and supervision of concrete processing) Wolf GmbH offers a 10-year guarantee on the unrestricted usability of the waterproof planned and supervised components. This guarantee begins with the completion of the concrete works in the sealing areas without particular written or verbal finishing report.

Damage resulting from deficient consulting, planning or supervision is covered objectrelated by VICTORIA Versicherung Munich, Germany.

2.5 m in case of bodily injury
2.5 m in case of material damage
500 k in case of building damage (1st - 5th year)
125 k in case of building damage (6th – 10th year)
100 k in case of financial damage
100 k in case of procressing damage

Accessories

For work you do by our expert company, be it planning, consulting or the supervision of the construction of impermeable reinforced concrete structures, specially designed products from our own production is used.

Certainly, you can buy our **wolf**seal products for do-it-yourself installation as well.

Warranty

As an option a 10-year warranty can be provided.

Xinedome cinema in Ulm (Germany): Application of Pentaflex in 2003

White Tanks | Base Plate | Assembling after Wolf System

Base Plate

The base plates of our system are at least d = 25 cm thick with a minimum of 3 cm concrete cover above the upper layer of reinforcement. The concrete cover of the upper layer of reinforcement must be respected exactly, since this is a requirement for the installation of the press waterproof joint system. This lies in the responsibility of the contractor.

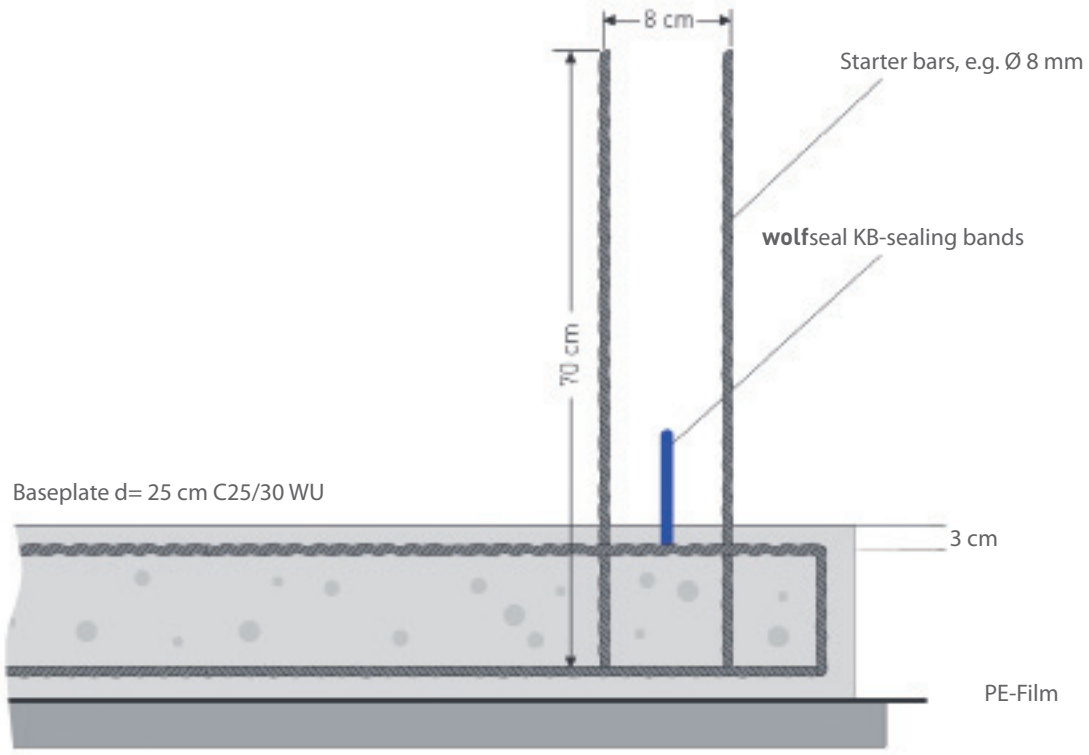
The minimum percentage of reinforcement on both sides is about 0.15% of the concrete cross section, unless stability safety proof prescribes a higher reinforcement volume. This minimum reinforcement has to be placed crosswise.

Assembling after Wolf System

Outstanding corners have to be reinforced with a diagonal armouring (e.g. 4 p. Ø 12 mm above and below).

Starter bars, e.g. Ø 8 mm, running inside the concrete wall formwork, have to be embedded in a given distance in order to avoid displacment of the sealing bands during the placing of the concrete. This lies in the responsibility of the contractor.

Attention!
For the rest, the common reinforcement guidelines DIN 1045-1 have to be complied (particularly mat joints).



5 cm plain concrete as blinding layer

Wall / floor construction joints

To seal wall / floor construction joints against press water WOLF System employs the approved **wolf**seal-Sealing System. For these joints we use the KB joint element.

The KB element is 2 m long und 16.7 cm high, allowing a manageable and unproblematic assembly.

The KB joint element consists of a galvanized, completely coated sheet plate.

Fresh concrete binds 100% watertight with the **wolf**seal coating. General Supervision Construction Certificate Nr.: P-SAC 02/5.1/11-435

Thereby, a 3 cm embedment depth in the floor slab is sufficient.

Costs and time consuming reinforcement guide arrangements or foundation curbs can be saved.

Construction site in Ulm (Germany): Using **wolf**seal products

White Tanks | Base Plate | Assembly guide

Assembly guide

After removing the protective film on both sides, the KB elements are placed with the exposed coating side downwards, centric between starter bars and bound to the upper layer of reinforcement.

On both edges the protective film is also removed about 10 cm and the two elements are pressed together overlapping at least 5-6 cm. Afterwards the bond is secured with the provided stirrups.

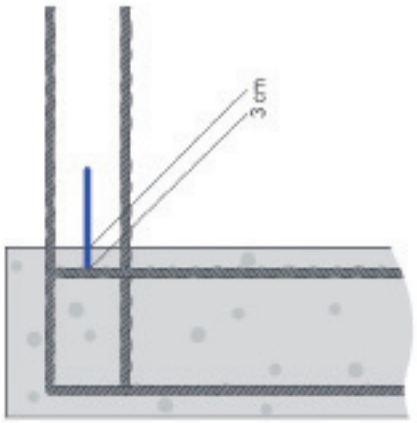
Corners are formed with WOLF System belonging pre-bent corner pieces (wolfseal KB-45°- angle). The connection to the KB elements takes place as afore mentioned.

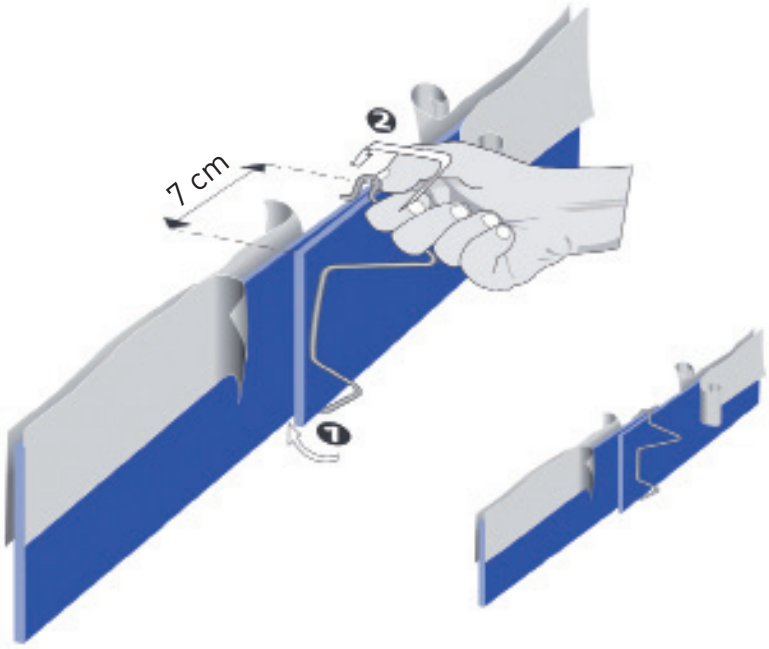
Attention!

During the placing of the concrete of the base plate, the KB element has to be placed at the wall centre and the anchoring depth of at least 3 cm has to be controlled!

The upper protective film has to be completely stuck out of the base plate!

After the concrete hardening of the base plate and before placing the wall elements, theremaining protective film of **wolf**seal KB has to be removed.





White Tanks | Base Plate
Types of concrete | Concrete casting measures | Cast-in-place wall

Types of concrete

Wolf Company determines the type of concrete in coordination with the constructor and the pre-cast concrete factory transport. If the client works under his / her own responsibility, we gladly offer him / her our advice.

Types of concrete after DIN 1045-II / EN 206 have to be adapted to the exposure conditions and the particular requirements of the civil works.

General remarks:
To definitely adjust the consistence for the concrete processing at site, a flux material (FM) has to be added. At the same time, it has to be warranted that the concrete liquefier (BV) and the flux material are compatible. The highest additional amount according to manufacture's directives may not be exceeded.

Water addition at site is only possible after consulting with Wolf Company assistants!

Furthermore, Wolf Company assistants are entitled to refuse a concrete casting if it doesn't meet the specified requirements.

Concrete casting measures

When placing the concrete for the base it has to be minded that the fresh concrete is brought in and compacted wet and wet.

Attention has to be paid to the careful placement of the concrete at the KB element's radius.

For after-treatment, the base plate is covered with a film and protected with water against strong solar radiation or with thermal protection against frost.

Cast-in-place wall

In Wolf System the cross section of the cast in-place wall is at least 24 cm and has a minimal percentage of reinforcement of 0.10%.

Wolf Company specifies supplementary reinforcements according to the structural component. The fulfilment of the joints between the components and the use of the type of concrete are adjusted to the demands of the structural component and the demands of the engineers concerned with the project.

wolfseal KB joint between bottom slap and external wall

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White Tanks | Wall Elements | Prefabricated building

Wall Elements

With the progress in construction, prefabricated building with wall units is becoming more and more popular. The lower costs and the time make pre-fabricated building more attractive and represent a real alternative to the long established cast-in-place concrete building.

In 1997 Roland Wolf GmbH developed a system that, now a days, has become standard in cellar sealing with wall units.

With the Wolf System for "White Tanks with Wall Units" we have discovered an economic solution that we will introduce to you below.

Prefabricated building

The basis of the system development is our engineer's and technician's long time experience in the area of planning, consulting and supervision of impermeable reinforced units in cast-in-place concrete building as well as the restoration experiences of leaky "watertight" pre-fabricated cellars.

Wolf System "White Tanks with Wall Units" is conceived in such a way that beside our specialists also the client can do the work. The approved **wolf**seal Joint System will be used for sealing.

By reviewing our **wolf**seal Joint System description and its corresponding assembly guide you will find out that the processing is very easy.

Technical modifications and improvements are express reserved to Wolf Company.

Construction site White tanks: Application **wolf**seal KB Elements as well as FTS Elements

White Tanks | Wall Elements | Wall Unit

Wall Unit

In the Wolf System wall units have a minimum thickness of d = 24/25 cm.

For the planning, the following issues have to be considered:

- The wall unit reinforcement content is determined in accordance with the static requirements (stability). Further reinforcement requirements, like crack width limitation, are not necessary in Wolf System.
- The wall unit shall not exceed the 7 m length.
- Only waterproofed spacers should be used.
- The lower 15 cm of the wall unit in core concrete area have to be free of mounting parts (also open web girder) for assimilation of the KB elements of the base plate.
- The wall unit vertical joints have to be constructed as crack-inducing points therefore no splice reinforcement has to be provided.
- The regulating pieces under the wall-shell are inserted so that they won't reach the core concrete area.
- Pipe break through and other mounting parts that are embedded during production, have to be previously made clear with our assistants.
- During planning and calculation of the ring beam reinforcement in wall/ceiling joints it is important to observe that they do not obstruct the pouring or the concrete compaction while concreting the walls.

Attention! If a stiff cellar construction is necessary for static reasons (e.g. earthquake protection), special-purpose solutions have to be considered to some extent for the described Wolf System.

White Tanks | Wall Elements
Wall / Wall Joint | Crack-inducing elements

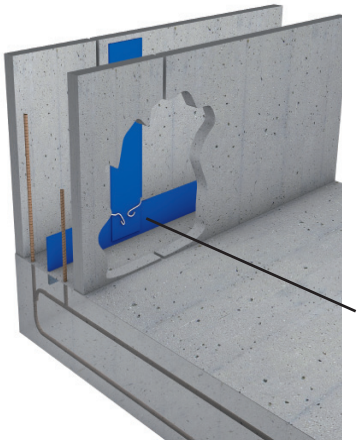
Wall / Wall Joint

Butt joints between prefabricated elements in the Wolf System are treated and sealed like crack-inducing points.

wolfseal crack-inducing elements are applied here.

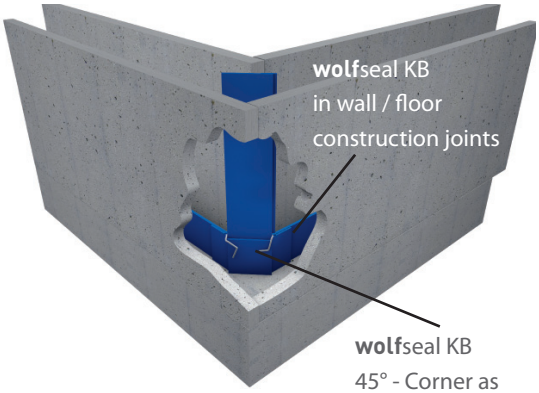
We differentiate two types of crack-inducing elements:

FTS - Straight



wolfseal KB
in wall / floor
construction joints

FTS - Corner



wolfseal KB
in wall / floor
construction joints

wolfseal KB
45° - Corner as
fitting in wall / floor
construction joints

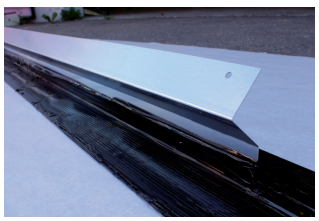
Crack-inducing elements

Assembly procedure:

- Determine the assembly direction of the prefabricated elements.
- While positioning the first wall unit, both front ends of the **wolf**seal crack-inducing elements are affixed to the prefabricated unit and adhered to the base plate **wolf**seal KB-Element.
- According to the assembly directions, a **wolf**seal FTS-Element is affixed on each free end of each next placed pre-cast unit and professionally adhered to the base plate KB-Element.
- The last wall unit is carefully brought in and assembled vertically between the already with crack-inducing element provided wall units.

FTS - Straight

FTS - Corner

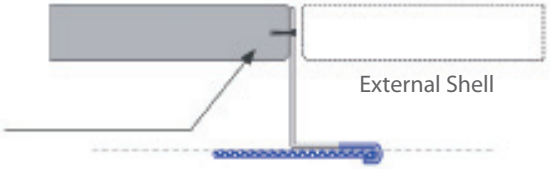


White Tanks | Wall Elements | Assembly of FTS-Elements

Assembly of FTS-Elements

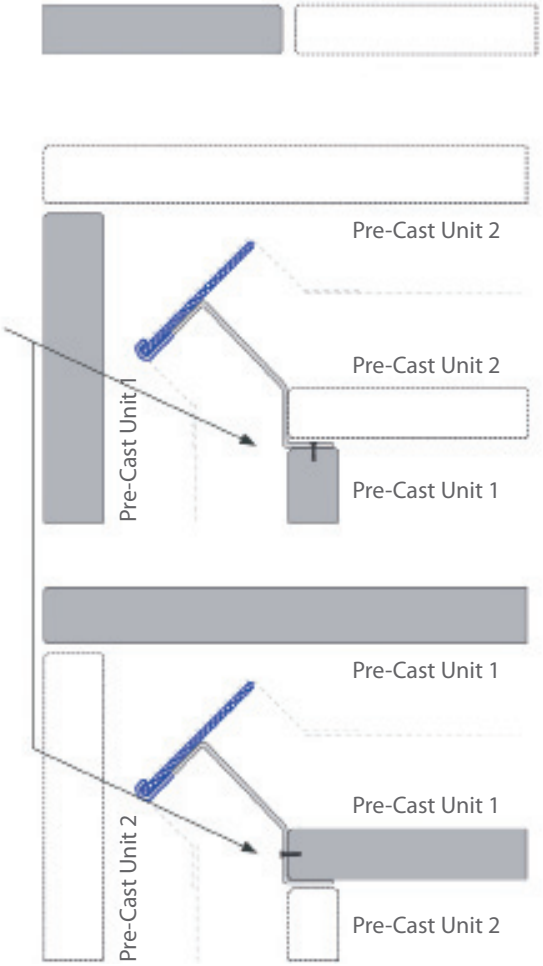
- Detach protection film of the pre-cast crack-inducing elements needed.

- Fix pre-cast crack-inducing element to the front end of the external shell using the impact dowels (6/30.55) in the pilot holes (6 mm).



Assembly of FTS-Corner Elements

- While installing the pre-cast crack-inducing elements FTS-Corner it should be noticed that: the crack-inducing element is affixed differently at the front end of the internal shell of the first placed pre-cast unit (pre-cast unit 1) depending on the assembly direction.



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White Tanks | Wall Elements
Type of Concrete | Measures by concreting

Type of Concrete

Wolf Company determines the type of concrete in coordination with the constructor and the concrete mixing plant transporters. If the client is working under his/her own responsibility, we will willingly offer our advisory capacity.

Concrete sorts after DIN 1045-II / EN 206 have to be adjusted according to the exposition class and the particular requirements of the civil works.

General remarks:
To definitely adjust the consistence for the concrete processing at site, a flux material (FM) has to be added. At the same time, it has to be warranted that the concrete liquefier (BV) and the flux material are compatible. The highest addition amount according to manufacture's directives may not be exceeded.

Water addition at site is only possible after consultation with Wolf Company assistants!

Furthermore, Wolf Company assistants are entitled to refuse a concrete casting if it doesn't meet the specified requirements.

Measures by concreting

Due to the low cross section of the core concrete the wall concreting demands special accuracy. An in advance control of the filling area of the three-layered walls has to be carried out by all means in order to remove, if necessary, every-loose mounting part, impureness or any dirtiness in the joint elements.

Concrete shells have to be wet before concreting.

Concrete has to be poured in maximum 80 cm length at a time and compacted according to the vibrating cylinder diameter formula x 10 = efficiency factor. Pre-cast corner joints and straight joints respectively have to be secured with the stipulated form work safety devices against concrete pressure and supported with slanted props.

For compaction, the vibrating cylinder should be quickly immersed and then afresh be slowly pulled up. Cylinder should be immersed up to the point where the layers attach together. Layers have to be cast wet and wet.
By windows and other recesses concrete should be cast at one side until it emerges smooth at the other side. Larger venting openings have to be planned on the lower horizontal (recessesup about 50cm).

To assure orderly outflow during wall casting an appropriate planning and organization is advisable in advance, especially in larger construction projects.

Reference projects

Business-Park I und II in Ulm-Söflingen (Germany)

We have been involved with our responsible planning and our services in both of these objects as well as all the other buildings shown here.

Joint System:
Phase I (2008) - Pentaflex
Phase II (2012) - **wolf**seal

MTU Friedrichshafen (Germany)
Concrete technology: Wolf

Underground Car Park, Ulm (Germany)
Planning Engineer: Wolf
Joint System: Pentaflex

Doctors house, Ulm (Germany)
Planning Engineer: Wolf
Joint System: Pentaflex

London Park, St. Petersburg (Russia)
Sealing Ceiling
Underground car park:
thepro® DämmDichtSystem

Different Tower, Dubai (VAE)
Planning Engineer: Wolf
Joint System: Pentaflex until 2008
since 2009 **wolf**seal

Townhouses, Wiesbaden (Germany)
Planning Engineer: Wolf
Joint System: **wolf**seal
thepro® DämmDichtSystem

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