

KÖSTER

Waterproofing Systems

Waterproofing Construction Joints



Joints in building construction

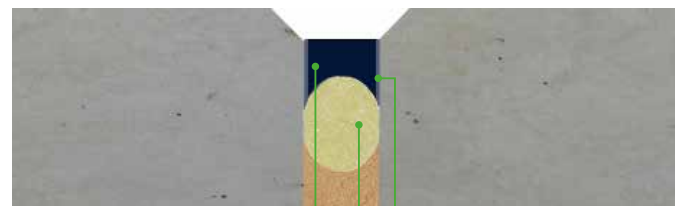


Joints connect building parts and elements that are made from different materials enable movement and settling of the construction and contribute to the acoustic insulation of a building. Construction joints are found in new construction, in precast construction and existing buildings. Joints must be properly planned and installed with respect to thermal transmission and air tightness so that they do not become a weak point in the building.

Joint types

There are different types of joint specifications depending on the exposure and the field of application. Generally there are joints for absorbing movement and connection joints. With “joints for absorbing movement” we mean dilation joints, expansion joints, settlement joints, dummy joints, pressed joints, and contraction joints, (see the table on page 4). These joints are necessary to avoid damage to the construction in the form of deformation and cracking due to differences in the expansion characteristics of the different construction materials in adjacent building elements.

Connection joints are joints between two different types of materials as in the case of between windows and doors and masonry, and sanitary joints that are constantly exposed to water. Movement also occurs due to the different swelling, expansion, and contraction characteristics of a construction material.



KÖSTER Joint Sealant FS-H

Round cord

KÖSTER FS Primer 2C

Construction of a movement joint, sealed with KÖSTER Joint Sealant FS-H

Connection joints between similar or different materials require a dependable and resilient waterproofing that can withstand movements in the structural member as well as heavy operational demands.

Joint Waterproofing

The success of a joint waterproofing not only depends on the external circumstances, but starts at the planning phase of the construction project. The choice of a proper jointing material is decisive for its durability and life cycle expectancy. Another key factor for a durable waterproofing of a joint is the surface preparation. The adhesion of the material to the joint flanks is of equal importance.

Pourable sealing compounds, joint materials in paste form, joint tapes, and injection systems (including injection hoses) are essentially the materials available for successfully waterproofing moving joints.

	Joint type	Depiction	Function	Waterproofing solution
joints for absorbing movement/ Running joints	Cold Joint		boundary between concreting steps, for example the wall / floor joint	KÖSTER Quellband KÖSTER Deuxan 2C KÖSTER NB 4000
	Movement joint		reciprocal movement possibilities for separate construction members in different directions	KÖSTER Joint Sealant FS KÖSTER PU-Flex 25 KÖSTER Joint Tape KÖSTER Injection Gel S4 B+
	Expansion joint		Movement in the perpendicular to the joint flanks	KÖSTER Joint Sealant FS KÖSTER PU-Flex 25 KÖSTER Joint Tape KÖSTER Injection Gel S4 B+
	Settlement Joint		Movement parallel to the joint flanks	KÖSTER Joint Tape KÖSTER Joint Sealant FS KÖSTER PU-Flex 25 KÖSTER Injection Gel S4 B+
joints for absorbing movement/ Specialty joints	Dummy joint		Predetermined breaking point	KÖSTER Joint Sealant FS KÖSTER PU-Flex 25
	Pressed joint		transfer of pressure, transverse displacement can be avoided with an interlocking geometry	A special construction is necessary
	Contraction cracking		shrinkage cracking of building element or cracks after building settlement	After curing of the concrete with KÖSTER C-Coat



KÖSTER Joint Sealant



KÖSTER Joint Tape



KÖSTER Injection Gel S4 B+

Important properties of waterproofing materials

Sealing compounds for joint waterproofing are distinguished by their mechanical properties and according to their type of deformability (plastic or elastic).

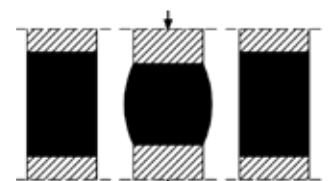
Elastic Waterproofing

Elastic sealing compounds move back into their original shape after being stressed due to their extensibility. Sealing compounds for expansion joints should always be made from elastic materials. The more movement a joint experiences, the higher quality the waterproofing material needs to be.

Plastic Waterproofing

Plastic sealing compounds deform permanently after being stressed and do not return to their original shape. They have the advantage that they create practically no tension on the joint flanks.

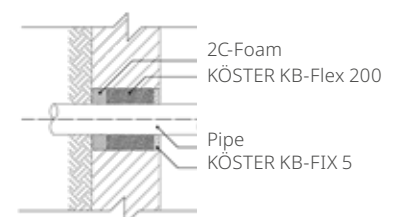
With plastic waterproofing materials it is easy to create a bond to diverse substrates. Plastic sealing compounds can be used in closed joint designs such as in pipe penetrations (see page 7).



Elastic Waterproofing
Left: original state
Middle: with compression
Right: with renewed stretching



Plastic Waterproofing



KÖSTER Joint waterproofing solutions in practice

Movement joints must be waterproofed durably, elastically, form stable, and UV resistant. A joint waterproofing must allow for movement in the construction without causing damage to the construction itself. Movement joints up to a width of 35 mm can be waterproofed with KÖSTER Joint Sealant FS. For wider joints such as expansion and dilation joints KÖSTER Joint Tapes are used.

Substrate Preparation

All substrates must be prepared before the application of a waterproofing. The preparation of the substrate determines the quality of the system and should not be undervalued. As a general rule the substrate must be cleaned or removed down to a solid and stable base material, then leveled and primed. The substrate must be clean, solid, and dry, and free from adhesion inhibiting materials such as waxes, oils, and old coatings.



Sandblasted surface



Cleaned joint flanks

Joint waterproofing with KÖSTER Joint Sealants

KÖSTER Joint Sealant FS-V

KÖSTER FS Primer 2C

KÖSTER Joint Sealant FS-H



A commonly used method for waterproofing joints is to fill them with an elastic material. KÖSTER Joint Sealant FS-H is a self leveling, rubbery-elastic sealing compound with high chemical resistance and is therefore the ideal material to waterproof horizontal joints in heavy construction, in foundations, waste water treatment plants, garages, tunnels, etc. KÖSTER Joint Sealant FS-V has a putty-like consistency for vertical and horizontal joint waterproofing.

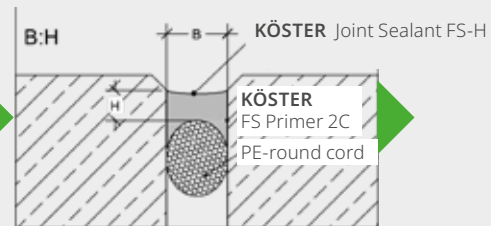
Application



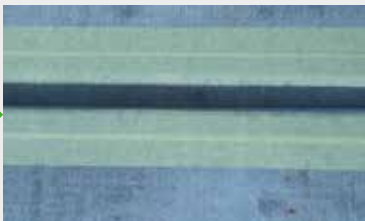
The joint flanks are beveled before the application of the Joint Sealant. The bevel must be at least 10 mm wide and at a 45° angle.



To avoid damage to the Joint Sealant caused by movement in multiple directions, the Joint Sealant should only bond to two joint flanks. For this reason a backing is installed for example with quartz sand or a foam PE backing rod. This eliminates the possibility of adhesion to three flanks.



The Joint Sealant should be installed so that the ratio of joint height: width corresponds to the norm requirement. A detailed table is provided in the Technical Data Sheet.



The sides of the joint are taped to achieve a clean and orderly application.



Absorbent substrates must be primed with KÖSTER FS Primer 2C twice. Non-absorbent substrates are primed once.



The joint is filled approximately 2 hours after applying the KÖSTER FS Primer 2C.



The Joint Sealant is smoothed, for example with a rounded spatula. The tape should be removed before the Joint Sealant has hardened.



KÖSTER Joint Sealant FS-H in its cured state.

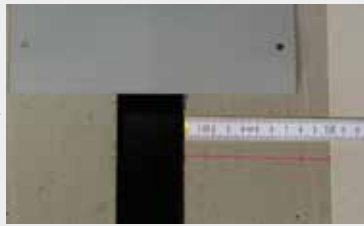
Joint waterproofing with KÖSTER Joint Tapes

KÖSTER Joint Tape is a thermoplastic UV stable tape for waterproofing expansion joints. It comes in widths of 20 cm (for 12 cm wide joints) and 30 cm (for up to 20 cm wide joints), is highly elastic and can resist extreme joint movements. The Joint Tape System consists of the KÖSTER Joint Tape and KÖSTER KB-Pox Adhesive, an epoxy based high performance adhesive.

Application



Initially both sides of the joint are masked with tape.



Embed KÖSTER Joint Tape 20 min. 4 cm (Joint Tape 30 min. 5 cm) into the adhesive on each side. The adhesive is applied 2 cm farther onto the substrate.



Mix the A and B components of KÖSTER KB-Pox Adhesive as stated in the Technical Data Sheet to a homogenous grey color. Apply KÖSTER KB-Pox Adhesive on both sides approx. 2 mm thick.



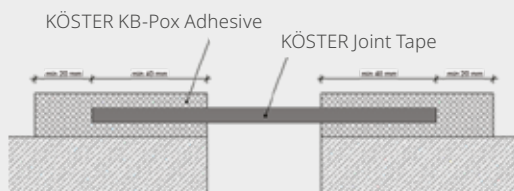
Press the KÖSTER Joint Tape onto fresh adhesive layer.



Immediately apply a second layer of adhesive on top of the tape and overlapping the masking tape on the sides. The center of the tape stays free of adhesive.



Remove the masking tape on both sides before the adhesive cures in order to achieve a clean finish.



After KÖSTER KB-Pox Adhesive has cured for 24 hours, the area waterproofing can be applied overlapping onto the epoxy layer.

Reliable waterproofing for pipe and cable penetrations

While a wall or area waterproofing can be relatively straightforward in its execution, waterproofing pipe and cable penetrations can be challenging. The main problems are movements in the cables and pipes and the fact that the penetrations are often composed of many different types of materials such as plastics, metal, and concrete. The waterproofing must therefore be plastically (not elastically) deformable so that movements can be absorbed and yet the material retains its adhesion to a wide range of materials. KÖSTER KB-Flex 200 offers all of these properties and can even be used under flowing and pressurized water.



KÖSTER KB-Flex 200



1 KÖSTER KB-Flex 200 can even be used under flowing and pressurized water.



2 The material is pressed into place between the cable and the wall with the KÖSTER Special Caulking Gun, immediately and permanently stopping the water flow.



3 To protect the waterproofing the area is smoothed and protected with KÖSTER KB-Fix 5.



4 The pipe penetration is now permanently waterproofed.

Key features at a glance:

KÖSTER KB-Flex 200

- Adhesion to various materials, such as plastic, ceramic, masonry, concrete, wood, metal, and glass.
- Excellent adhesion to dry and wet substrates
- Permanently plastic waterproofing sealant: it never dries out
- Simple application directly from the cartridge gun
- One component product, no mixing is necessary

Waterproofing and Jointing with KÖSTER PU-Flex 25



KÖSTER PU-Flex 25 is a one-component, highly elastic, stable, highly thixotropic sealing compound for waterproofing various building joints. The product is UV stable and can therefore be used indoors and outdoors. The material is commonly used for expansion joints and movement joints in architectural and engineering structures. It develops a high level of adhesion to concrete, mortar, masonry, natural and artificial stone, steel, aluminum and other metals, wood, tiles, non-elastic plastics, etc. No primer is required on porous mineral surfaces. After complete hardening, KÖSTER PU-Flex 25 can be roughened with sandpaper and painted over with an elastomeric paint.

The material has been tested according to EN 15651-1 as a joint sealant for facade elements and according to EN 15651-4 as a joint sealant for pedestrian walkways and is approved for use in the European Union.

Properties of KÖSTER PU-Flex 25

- For expansion, control, and expansion joints in structural and civil engineering joints
- Connection joints made of different materials such as concrete, mortar, masonry, natural stone, artificial stone, metal (i.e. steel and aluminum), wood, ceramic tiles, and even rigid plastics (e.g. PVC)
- large variability in joint width
- Processing in horizontal and vertical joints
- Can be used indoors and outdoors



Joint Waterproofing with KÖSTER Quellband

KÖSTER Quellband is a swell-able sodium bentonite based tape for waterproofing joints. It is alkaline activated so it does not prematurely swell on the jobsite. It is installed in the cold joint between concreting pours and swells on contact with the alkaline water. The joint as well as cracks and cavities are watertight even against pressurized water.



Special waterproofing solutions with KÖSTER Acrylate Gels

Waterproofing joints that are exposed to moisture or even pressurized water from the rear is a special challenge as some joint sealants do not adhere to damp or wet substrates.

Waterproofing dilation joints usually requires great elasticity and is often difficult to access. KÖSTER Acrylate Gels are ideal for subsequent waterproofing of joints that are difficult to access. In many cases, they are the only way to achieve a watertight seal against pressurized water in an expansion joint. KÖSTER Acrylate Gels displace and bind the water in the joint and make it permanently watertight. KÖSTER Injection Gel G4 has a long list of test certificates and approvals, including drinking water testing and harmlessness in groundwater areas, as well as proof that the material is non-corrosive.

In combination with KÖSTER B+, KÖSTER Injection Gel S4 has a shorter and adjustable reaction time. It also shows greater flexibility and better flank adhesion in particularly difficult cases.

With KÖSTER Injection Gel S4, a pressurized injection is carried out directly into the joint, whereby it is not always necessary to remove the existing joint material. KÖSTER Injection Gel S4 combines with the water in the joint to form an elastic, waterproof mass. Even against pressurized water.



Case study: Secure waterproofing against pressurized water

The following case study shows step by step how a reliable joint waterproofing is carried out using KÖSTER Systems. It shows a swimming pool used in the muscular rehabilitation for race horses at the Veli Efendi Racetrack in Istanbul, Turkey. The expansion joints were waterproofed using KÖSTER Joint Tapes and KÖSTER FS Joint Sealants. The area waterproofing was completed with the mineral based, crystallizing waterproofing slurry KÖSTER NB 1 Grey.



The debris and remnants of the concreting work are removed.



The surface is cleaned down to a solid and stable base material. The substrate must be clean, solid, and free from adhesion inhibiting materials.



To give the KÖSTER Joint Tape more tolerance, it is pressed slightly into the joint.



Connections are made with a hot air welding gun; seams should overlap at least 2 cm.



The area waterproofing is done with KÖSTER NB 1 Grey. KÖSTER NB 1 Grey is a mineral based waterproofing against ground moisture, non-pressurized and pressurized water. KÖSTER NB 1 Grey is resistant to positive and negative side water pressure.



The tiles are applied on top of the waterproofing with common tile adhesive.



The joints also have to be implemented in the tiles.



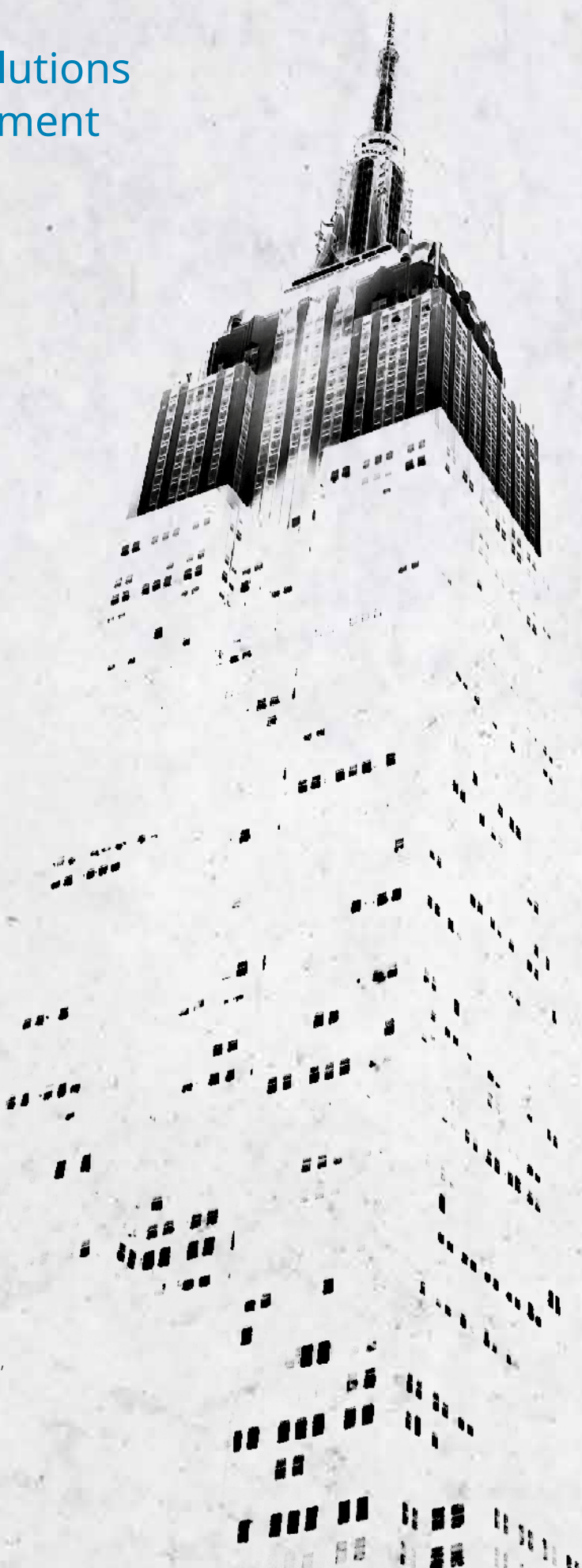
The horizontal joints are waterproofed with KÖSTER Joint Sealant FS-H. The vertical joints were waterproofed with the putty-like KÖSTER Joint Sealant FS-V. KÖSTER FS Joint Sealants have a high chemical and mechanical resistance and high resiliency.



The KÖSTER joint and area waterproofing system has proved itself for years at the Veli Efendi Racetrack and still reliably serves the basin as an unfailing waterproofing.

Waterproofing solutions from roof to basement

We have been developing and producing waterproofing systems since 1982 that protect and preserve valuable building structures, meeting with the highest standards all along the way. In short, where water is a problem, we are there with a solution for the owners, engineers, architects, and all our clients.





We are there for you – worldwide.

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Always adhere to the specifications in the respective Technical Data Sheets.