Sealing and Consolidation

Waterproofing and Structural Repair of Masonry and Concrete

WEBAC®



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MADE IN GERMANY

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Introduction

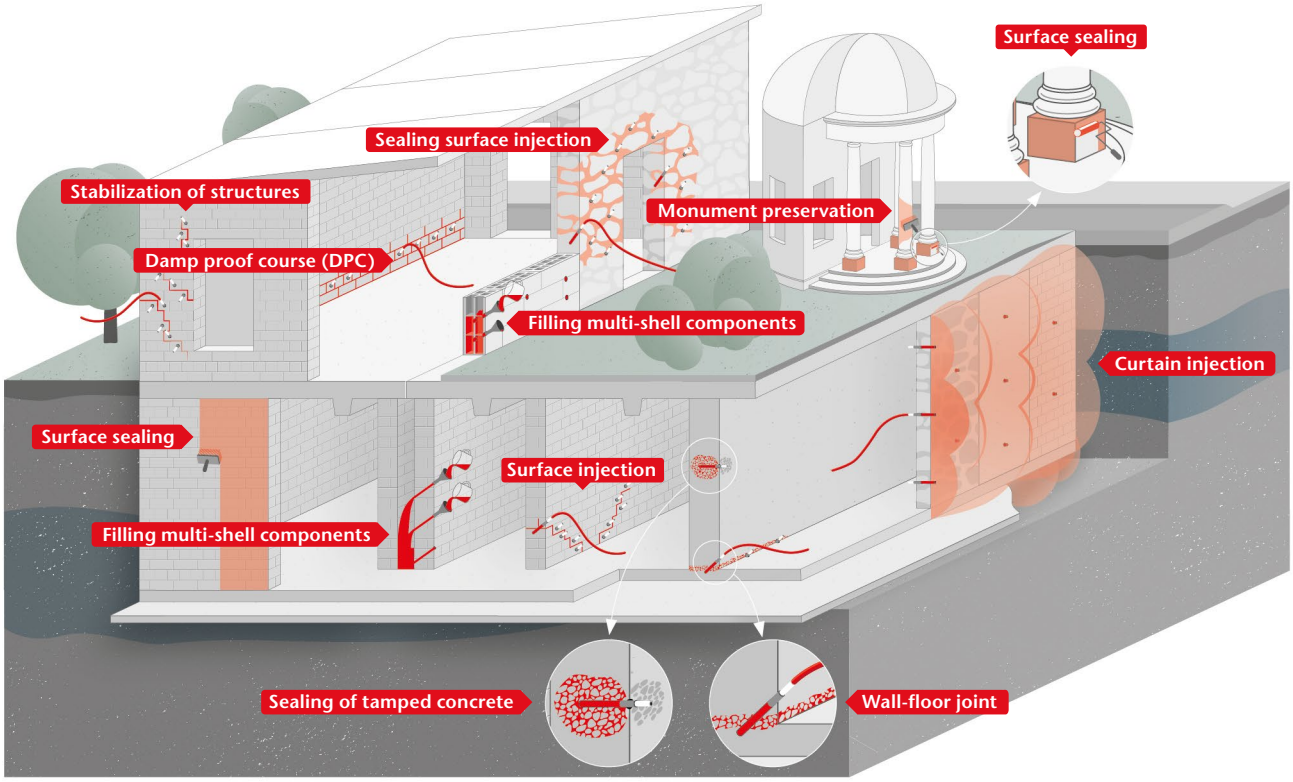
Moisture in Building Components

Undergrade building components such as basement walls and plinth areas are permanently exposed to high moisture loads caused by ground moisture, seepage water, or groundwater. In addition, mechanical and thermal influences affect the base zone of the structure. Waterproofing is particularly demanding in masonry structures composed of different materials or in components made of porous or tamped concrete.

Moisture damage may result from capillary rising damp, leaking joints, defective waterproofing systems, hygroscopic moisture caused by salts, or structural defects in drainage systems and service penetrations. Typical consequences include reduced thermal insulation performance, mold growth, efflorescence, and, in severe cases, impairment of the structural stability of the building component.

Professional waterproofing and repair measures are therefore essential to ensure the long-term protection of the building fabric and the functional reliability of the structure.

Possible Applications for WEBAC Products



Renovation of Existing Buildings

Renovation of Existing Buildings includes all structural measures carried out on existing structures in order to preserve, improve, or adapt them for new uses.

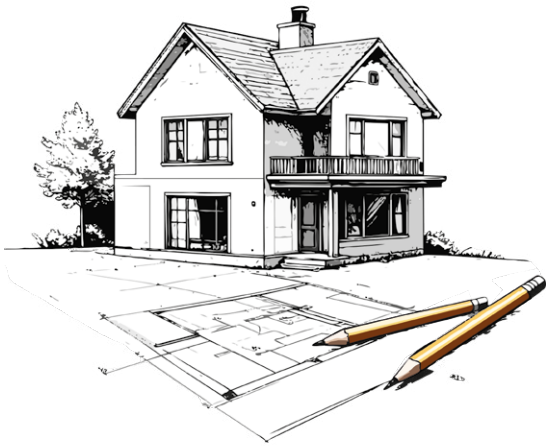
Typical measures include:

- Maintenance and repair
- Restoration and reconstruction
- Modernization (e.g. energy efficiency improvements)
- Conversion or change of use

Such projects often present planners and contractors with specific technical, legal, and economic challenges.

Planning and documentation

- Verification of structural stability, thermal performance, and potential contaminants
- Incomplete or missing construction documentation in older buildings



Regulatory requirements

- Building permits for structural alterations or facade modifications
- Monument protection regulations
- Compliance with the German Building Energy Act (GEG) or country-specific building energy regulations

Technical challenges

- Outdated construction techniques, uncertain load-bearing capacity
- Hidden damage that becomes visible only during demolition
- Upgrading to current standards (sound, thermal and fire protection)

Economic aspects

- Cost risks due to unforeseen conditions
- Possible subsidies (in Germany, e.g. KfW, BAFA)
- Restricted building use during the construction phase

A thorough building condition assessment and careful planning are essential to minimize risks and ensure technically and cost-effective solutions.

Determination of the Current Condition

Building Condition Assessment

An expert building condition assessment is the first and most important step on the path to successful renovation. It creates the basis for an effective repair concept by systematically recording the current condition of building components.

Relevant parameters such as structure, location, material properties, and environmental influences are considered. A thorough analysis is essential to reliably identify the causes of damage and to plan appropriate remedial measures.

Causes of Damp Walls

- Capillary rising damp
- Cracks and leaky joints in the wall structure
- Leaks at wall-floor joint
- Damaged vertical seals
- Salt-related hygroscopic dampness
- Damage to drainage systems, openings such as supply and disposal pipes
- Changed moisture-related stress due to ground water or penetrating surface water

Structural Investigation

- General building information such as age, condition, and use
- Humidity and temperature in the rooms
- Groundwater conditions, pH values and existing salt contamination



Core sampling on the building component



Moisture measurement

Determination of the Current Condition

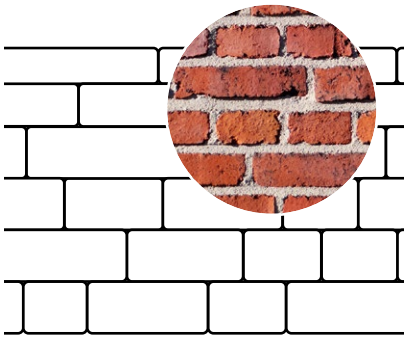
Building Condition Assessment

Analysis of the Building Construction

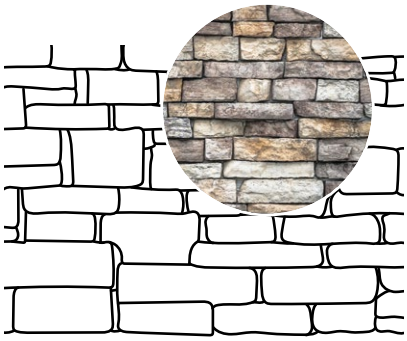
A detailed analysis of the building construction provides fundamental information about:

- Type of masonry (e. g., concrete, mixed masonry, etc.)
- Wall thicknesses
- Structure of masonry (single-shell or multi-shell)
- Homogeneity, strength and porosity of joints
- Supply connections
- Existing dpc courses, location and condition
- Repairs already carried out

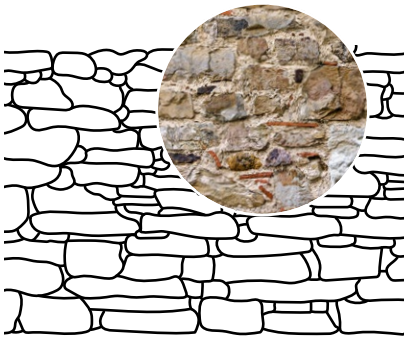
This is crucial for assessing stability and planning suitable repair measures.



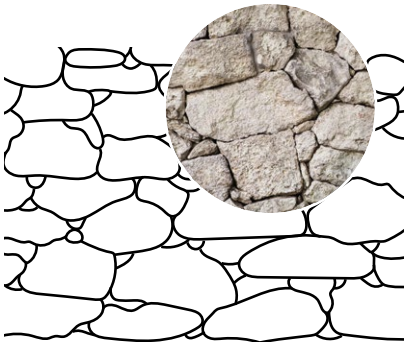
Ashlar masonry



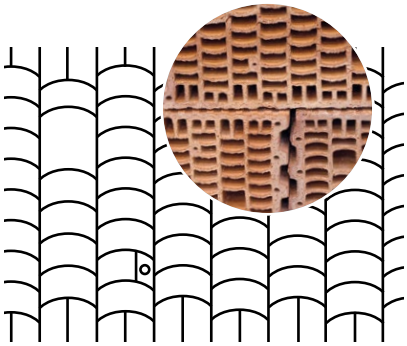
Irregular exposed masonry



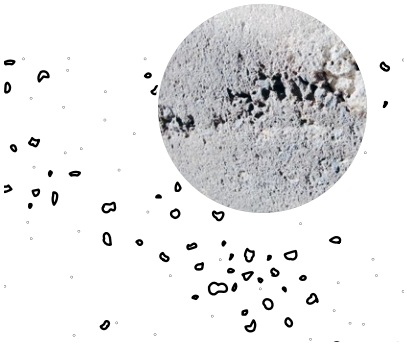
Quarry stone masonry



Cyclopean masonry



Hollow bricks



Tamped concrete

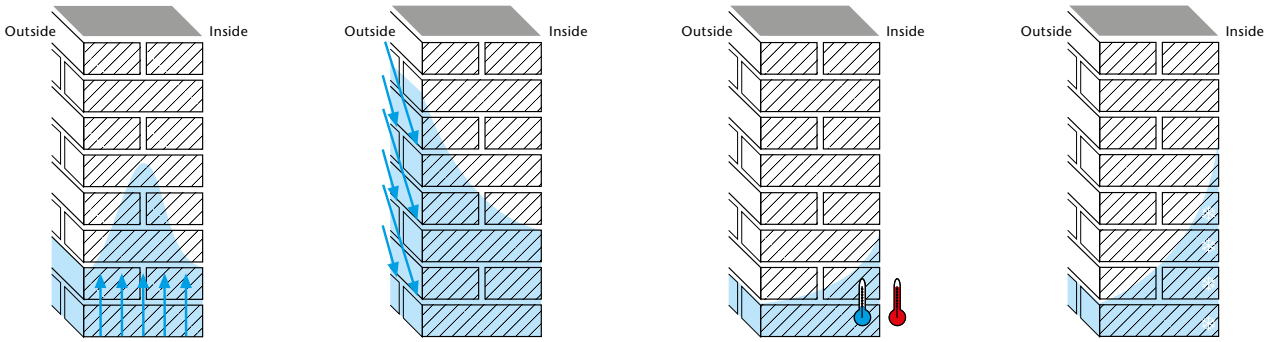
Building Condition Assessment

Moisture Analysis

Investigating the moisture distribution within a building component is an essential step in identifying the causes of damage and forms the basis for the development of a suitable repair concept. Samples of masonry or drill cores can be taken in order to determine the degree of moisture saturation (DMS) and the salt content (e.g. chlorides or nitrates) at different depths within the component. In addition, measurements of pore volume and capillary porosity provide important information for estimating the material requirements for subsequent remediation measures.

Moisture Distribution Under Different Moisture Loads

Causes of moisture load in masonry according to WTA[1]



Capillary rising moisture

Vertically penetrating moisture

Condensate formation due to falling short of dew point temperature

Hygroscopic moisture caused by salts absorbing moisture from ambient air

Moisture spreads within masonry primarily through capillary water transport. Bricks and mortar absorb and transport water in a manner similar to a sponge. The diameter of the capillaries plays a crucial role: the finer the capillaries, the higher the capillary rise of water. However, very small unconnected pores or very large cavities that act as capillary breaks significantly reduce or completely prevent water transport.

Water-soluble salts such as nitrates, ammonium, chlorides, carbonates, and sulfates can significantly increase the moisture content of masonry due to their hygroscopic properties. When these salts crystallize on the surface of the building component, the resulting volume increase may lead to efflorescence and damage to plaster or masonry. The type, concentration and distribution of salts within the building component can be determined by analyzing samples.

CALCULATION OF THE DEGREE OF MOISTURE SATURATION

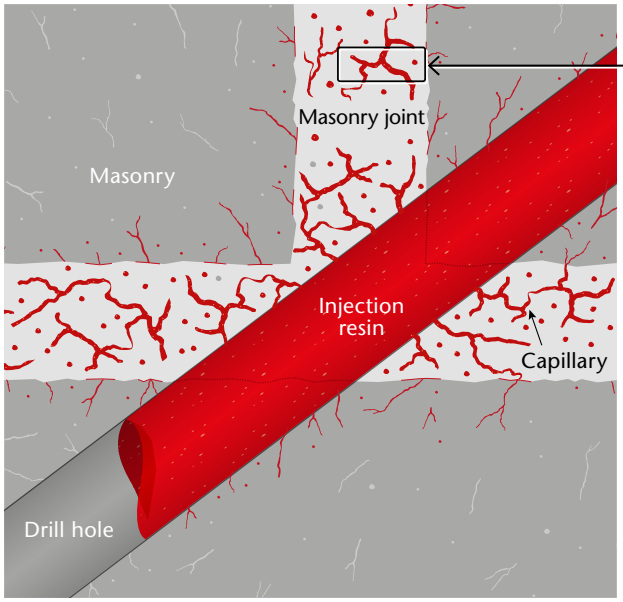
$$DMS = \frac{GF - GT}{GS - GT} \times 100\%$$

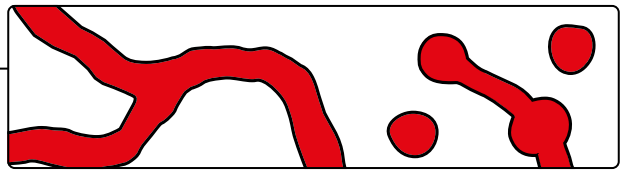
DMS Degree of moisture saturation
GF Mass of the damp sample
GT Mass of the dry sample
GS Mass of the water-saturated sample

[1] WTA International Association for Science and Technology of Building Maintenance and Monuments Preservation

Building Condition Assessment

Effects of Different Injection Materials

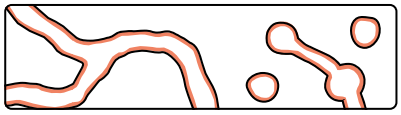




1. Complete Capillary and Pore Blocking

The capillary/pore structure is completely filled, preventing capillary water transport in the long term, regardless of the degree of moisture saturation.

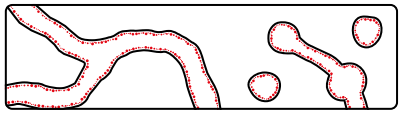
Injection materials:
e. g., polyurethane, acrylate gels



2. Narrowing

Narrowing the capillary and pore structure reduces capillary water absorption.
The drying effect is obtained due to the higher evaporation speed than the capillary transport speed.

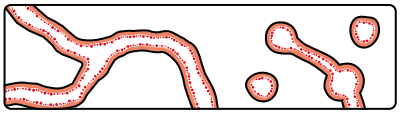
Injection materials:
No material exhibiting only this effect is currently known.



3. Hydrophobization

Water-repellent compounds are deposited on the capillary walls, which means that water rises less high in the capillaries and water transport is impeded. The pore structure remains largely intact.

Injection materials:
e. g., silicon micro-emulsions, silanes, siloxanes



4. Hydrophobization and Narrowing

Combination of:
2. Narrowing and
3. Hydrophobization

Injection materials:
Combinations of alkali silicate and siliconate (e. g., modified silica sol)

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Product Range

Products

WEBAC offers a wide range of products for repairing moisture penetration. Especially for injection into mineral components such as masonry or tamped concrete, the products can be flexibly adapted to the respective repair objective – whether by capillary narrowing or by permanent pore blocking. The WEBAC product range offers a wide variety of application-oriented solutions.

Area of Application	Explanation	Product group
Damp proof course (DPC)	• Horizontal sealing layer in the building component • Prevention of capillary rising moisture	• PU injection resins • PU combi injection resins • Acrylate gels • Silicates
Surface sealing/ injection	• Protection against moisture from the ground • Interruption of capillary moisture transport • Options: In the building component structure, from the outside, negative and in front of the building component	• PU injection resins • PU combi injection resins • Acrylate gels • Silicate injection solutions • Bitumen-acrylate dispersion
Stabilization of structures/stabilization	• Improvement of stability • Sealing cracks • Restoration of load-bearing capacity	• Epoxy injection resins • PU injection resins • PU injection foam resins • Silicate injection solutions
Filling of cavities	• Protection against moisture, thermal insulation, reduction in the amount of sealing material required, and enables sealing in the first place	• PU injection resins • PU casting foam resins • PU injection foam resins
Sealing of wall-floor joint	• Waterproofing against rising moisture • Stabilization of the component • Filling cavities/voids	• PU injection resins • PU combi injection resins • Acrylate gels

Products

Product Groups – Properties, Application, and Mode of Action



PU Injection Resins

PU resins are low-viscosity synthetic resins based on polyurethane.

Depending on the formulation, PU resins can be elastic, ductile, or pressure-resistant, offering versatile applications for the permanent sealing of structures.

They are particularly suitable for filling cracks, gaps, and fine pores in building components. Their special reaction forms a uniform, closed structure that provides a permanently stable seal.

PU Combi Injection Resins



PU combi injection resins are polyurethane-based hybrid products that combine polyurethane foam resins and PU resins.

They combine the properties of a fine-celled, waterproof foam when in contact with moisture and a flexible, non-foaming material in dry areas. They are particularly suitable for specialized applications such as crack injection and the installation of damp-proof courses (DPC) in large cavities and areas exposed to water within existing structures. Thanks to the combination of PU foam resin and PU resin, the foam displaces water and seals cavities, while the PU resin ensures a permanent and stable seal.



Epoxy Injection Resins

Epoxy resins are low to high viscosity epoxy-based synthetic resins.

They are characterized by high strength and very good adhesive strength and enable structural connections even in the finest cracks.

Epoxy resins are suitable for load-bearing injections into components and can be used in dry and damp areas. Thanks to their good penetrating ability, epoxy resins fill even the smallest cracks and pores, permanently bond the crack flanks, and prevent the penetration of corrosion-promoting substances.

Product Range

Products

Acrylate Gels



Injection gels are aqueous, very low-viscosity materials based on polyacrylate with high penetration capacity and capillary-clogging properties.

They can reversibly absorb and release moisture, making them particularly suitable for areas in contact with the ground.

Injection gels are used for large-area water proofing against moisture penetration, for post-construction damp proof courses (DPC), or for gel injection behind joints. After injection, the gels spread into the capillaries and pores of the masonry and seal them permanently, thereby reducing moisture transport.



PU Injection Foam Resins

PU foam resins are low-viscosity, polyurethane-based reaction foam resins that foam rapidly on contact with water, forming a fine-celled, open-pored foam structure.

They are therefore particularly suitable for quick, temporary water stops – even with high water pressure – and are used to seal open areas in fissured or hollow masonry.

The rapid foam formation fills free volume areas, displaces water from the building structure, and quickly builds up a barrier that prevents water transport. For a permanently effective seal, a follow-up injection with PU resins is then carried out.

Silicate Injection Solutions



Silicate injection solutions are low-viscosity, diffusion-open silicate formulations.

They are characterized by good penetration and rapid strength development. They are used to consolidate and stabilize soils and masonry, as well as to create post-construction damp proof courses (DPC) against capillary rising moisture. They narrow the capillaries and pores of the masonry, making it water-repellent. In doing so they minimize moisture transport.

Products



Injection Silanes

Injection silanes are low-viscosity, diffusion-open sealing materials based on silane.

They are suitable for the post-construction installation of damp proof courses, as they penetrate deep into the capillaries and pores of the masonry.

The hydrophobic treatment makes the masonry permanently water-repellent, so that rising moisture is reduced and the building structure is effectively protected against moisture penetration and consequential damage.

PU Casting Foam Resins

PU casting foam resins cure to form a hard, pressure-resistant, closed-cell foam resins based on polyurethane. They have both high dimensional stability and good thermal insulation properties.

Casting foam resins are suitable for filling cavities/ voids in double-shell masonry, wall openings, and similar sealing tasks.



During the reaction process, a dimensionally stable foam body is formed which completely fills the gaps and seals them permanently. In addition, the material forms an ideal abutment for the post-construction installation of a damp proof course (DPC).



Bitumen-acrylate Dispersions

Bitumen-acrylate dispersions are thin-layer, vapor-permeable, and flexible sealing materials that combine the advantages of bitumen and acrylate.

They are suitable for surface sealing against pressing and non-pressing water, for example on balconies and terraces, and are particularly used in the preservation of historical monuments.

When applied, these dispersions form a permanently water-impermeable layer that reliably seals surfaces and masonry and, thanks to the hydrophobic effect of the bitumen content, provides effective protection against leaching by salts that are harmful to buildings.

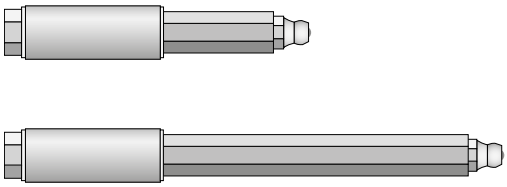
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Product Range

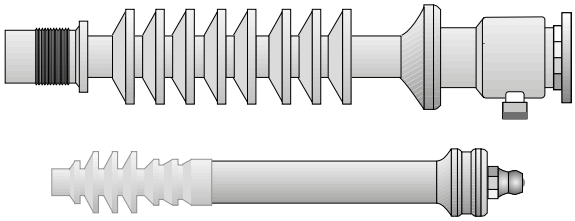
Packers

WEBAC injection packers are the connecting piece between the injection device and the component. They are available in different designs depending on the required pressure, component, and the specific properties of the injection material.

Types of Packers



WEBAC® Mechanical Packers Type S



WEBAC® Hammer-in Packers

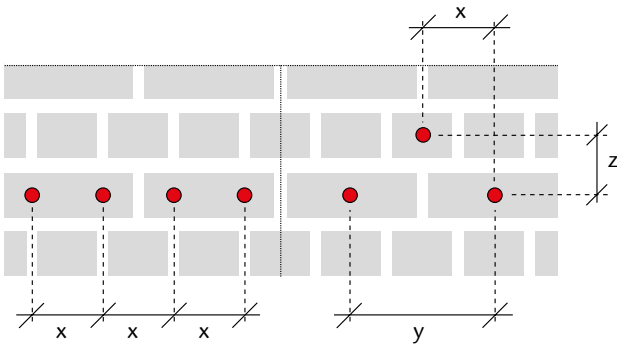
Borehole Spacing/Borehole Diameter

The spacing and size of the drill holes depend on the structural conditions and the packers used. A standard spacing of 10 to 12.5 cm has proven effective – deviations are possible depending on the situation (e.g., in the case of irregular masonry). The drill hole depth should be at least 3/4 of the wall thickness.

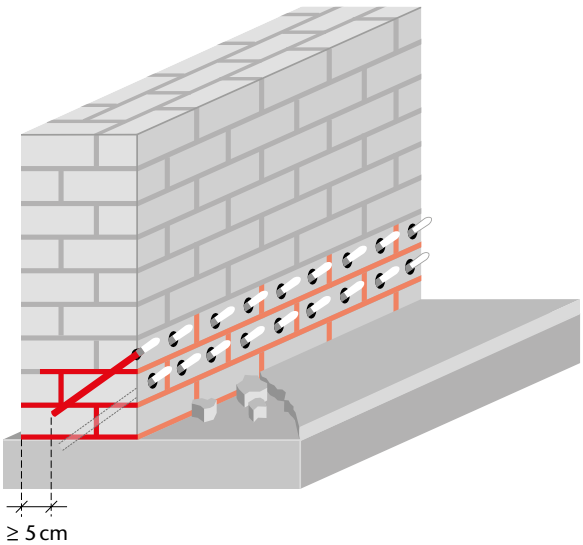
For thicker masonry, a two-row packer arrangement ensures better distribution of the injection material, with the drill holes positioned approx. 8 cm above the first row of drill holes and offset by half the drill hole spacing. The drill channels should cross at least two bed joints to achieve optimum distribution.

RULE OF THUMB

Drill hole packers
approx. 6–7 pieces per meter



x: 10–12.5 cm (single row)
y: 20–25 cm (double row)
z: approx. 8 cm (depending on brick format!)



Product Range

Pumps

WEBAC 1C pumps are universally applicable in a wide range of applications. They are suitable for professional use in crack injections, post-construction damp proof courses (DPC), and injection tube grouting. WEBAC epoxy injection resins, PU injection resins, and fast-foaming PU injection foam resins can be processed. WEBAC 1C pumps, like WEBAC 2C pumps, are optimized for processing WEBAC products.



WEBAC® IP EasyPro (electric 1C high-pressure diaphragm pump)



WEBAC® IP 1K-F4 (electric 1C high-pressure piston pump)



WEBAC® IP 1K-F3 (compressed air-operated 1C high-pressure piston pump)



WEBAC® HP 100



WEBAC® HP 250



WEBAC® HEP 1001



WEBAC® Hand lever injection press

Injection Pressure

Injection is carried out with an injection pressure adjusted to the component. This depends on the strength of the building component, the selected injection material, and the type of packer used. It is advisable to start the injection at the lowest possible pressure.

Safety Measures and First Aid

Personal Protective Equipment



When handling and processing chemical products, risks and hazards can arise for your own health and the health of others.

Through careful and thorough work planning and appropriate precautions and protective measures, risks can be reduced and health hazards can be reliably prevented.

To minimize the hazard potential for the user, knowledge of substance- and product-specific information is essential. Information on the substances used, including hazard and safety information and recommended personal protective equipment, can be found on the container, in the Technical and Safety Data Sheets.

Based on this data, you can assess the risk for yourself and your colleagues. Take into account the typical contact routes such as inhalation, ingestion, as well as skin and eye contact and, if possible, take organizational protective measures in advance to reduce health hazards and thus contribute to safety on your construction site.

For example, ensure adequate ventilation when carrying out injection work in closed spaces. When handling chemical products, please wear suitable protective clothing with long trousers and long sleeves, protective gloves and goggles. Many construction sites also require safety shoes, high-visibility vest and helmet.

Observe general health and safety instructions on the construction site and keep escape and rescue routes clear. As a hygiene measure, be sure to wash your hands before breaks and at the end of work and ensure that the workplace is clean. Do not eat, drink or smoke during work.

Information and operating instructions for the safe handling of our products can be found in the GISCODE information.

First Aid

- After inhalation, if the person feels dizzy or unwell, he/she is advised to get fresh air and contact a doctor or the Poison Control Center.
- After eye contact, remove any contact lenses and gently flush eyes with plenty of water for about 15 minutes and seek medical attention. Use eye wash if available.
- After skin contact, clean the affected area thoroughly with plenty of water. In case of extensive contact, use emergency shower if necessary. Do not use solvents or thinners. Remove contaminated clothing immediately.

Damp Proof Course (DPC)

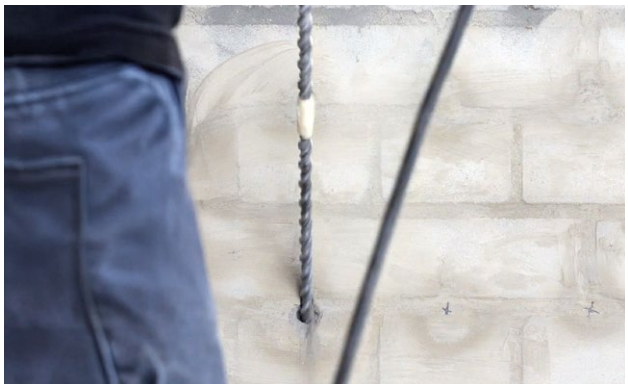


Fig. 1: Drilling holes



Fig. 2: Extraction of drill dust



Fig. 3: Screwing in packers



Fig. 4: Injection and follow-up injection

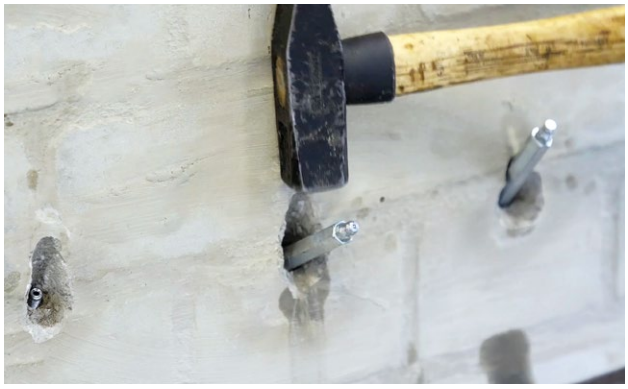


Fig. 5: Knocking out packers



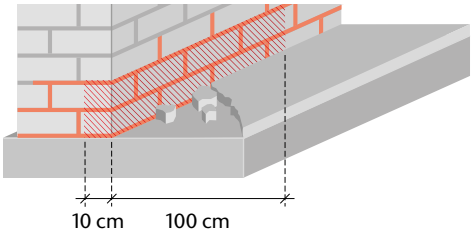
Fig. 6: Closing drill holes

CALCULATION OF MATERIAL CONSUMPTION

Material consumption depends on the pore and cavity volume of the masonry.

Rule of thumb: approx. 1 kg/100 cm per 10 cm wall thickness

For masonry with a wall thickness > 60 cm:
approx. 1.2 kg/100 cm per 10 cm wall thickness



WEBAC®

Filling of Cavities/Voids



Fig. 1: Drilling holes



Fig. 2: Injection



Fig. 3: Material filling (cross-section)



Fig. 4: Hollow-core block



Fig. 5: Filled hollow block

Surface Injection



Fig. 1: Drilling and cleaning holes



Fig. 2: Setting packers

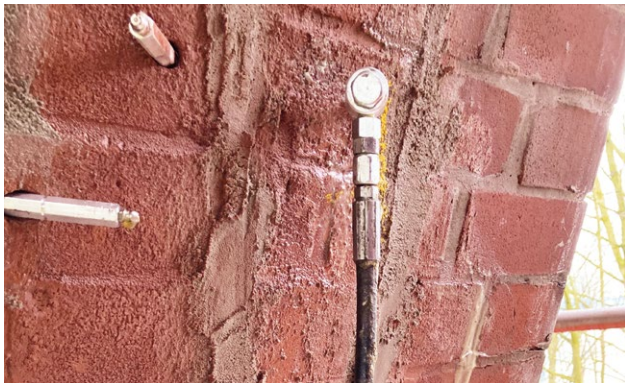


Fig. 3: Injection



Fig. 4: Injection material emerging at the surface



Fig. 5: Injected and filled crack

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Execution/Application

Surface Sealing



Fig. 1: Raw masonry



Fig. 2: Prepared substrate



Fig. 3: Primed surface



Fig. 5: Material application



Fig. 6: Final state

RULE OF THUMB FOR MATERIAL CONSUMPTION WEBAC® 5611

Approx. 1 kg/m² per 1 mm layer thickness **WEBAC® 5611** and 0.8 kg/m² cement

Sealing Wall-Floor Joint



Fig. 1: Initial situation



Fig. 2: Drilling holes



Fig. 3: Setting the packers



Fig. 4: Injection of wall-floor joint



Fig. 5: After injection

Disposal

Disposal of Product Residues

Product residues (liquid or paste-like) of construction products are special waste and must therefore be disposed by an approved waste management company, in accordance with the legal regulations and the requirements of the local/regional authorities.

Information on suitable waste disposal facilities and disposal routes can be obtained by the waste owner from the competent authority or from the regional offices.

Recycling of Empty Containers in Germany

In accordance with the acceptance conditions, completely emptied packaging can be disposed of through Interzero Circular Solutions Germany GmbH. Collection points are available nationwide for this purpose. Our customers can thus return the packaging free of charge for material recycling into the raw material cycle.

For detailed information, please refer to the information sheet “Guidelines for the Disposal and Return of WEBAC Packaging” in the WEBAC product catalog or at www.webac.de, as well as the safety data sheets.



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