Henkel Quality for Professionals

Chemical Anchor

Technical Handbook

July 2008

Dear Customer,

In an effort to further meet your needs, we have put together this Pattex Chemical Anchor Technical Handbook. We hope that you will find it to be a helpful resource.

As the world leader in adhesives, sealants and surface treatments for consumer, craftsmen and industrial applications; we are proud of our high-quality products. Professionals around the world rely on our expertise as a chemical leader. Through our extensive research and development processes we offer a well-balanced portfolio of international, regional and local brands.

With over 80 years of experience, we have numerous established products and continually seek innovative ways to further meet customer needs in a changing building industry environment. Henkel is committed to offering you the most advanced, state-of-the-art products.

Pattex Chemical Anchor matches industrial level quality expectations. It provides a secure solution for even the most challenging anchoring situations. This handbook will provide you with helpful technical information, product specifications and general anchoring technology.

The Pattex Team

Brands

Pattex is our worldwide brand. We also offer regional and local brands in the following markets.

Moment is the local brand used in Russia, Romania, the Baltic countries and Bulgaria.

Resistol is the local brand used in Mexico.

Ceresit is the local brand used in the United Kingdom and the Ukraine.

Pattex

Applications
Notice

Notice

Relevant Information

1. All information, instructions and advice found within this technical handbook are based on the knowledge and experience of Henkel and its technical information and data sheets on the date of the creation of this handbook. Due to different materials used as well as to varying working conditions beyond our control, we strictly recommend to carry out intensive trials to test the suitability of our products with regard to the required processes and applications. We do not accept any liability with regard to the above information or with regard to any verbal recommendation, except for cases where we are liable of gross negligence or false intention.

2. Henkel's commitment to innovation means that technical information is always changing and being updated. We maintain the right to alter technical information specifications etc. without notification. For the latest updates always refer to our website www.chemical-anchoring.com.

3. All of the technical data and values are based on tests performed in controlled environments. The user takes full responsibility for the application of the included data for the on-site usage of the product. Henkel can provide general guidance and advice related to chemical anchoring, however, the final responsibility for selecting the right product for a particular application resides with the user.

4. All products must be used and applied strictly in accordance with all current technical information and application instructions published by Henkel (i.e. technical data sheets, brochures as well as application and usage instructions, etc.) as well as technical standards and other principles.

5. As base materials and projects vary, the user is responsible for on-site testing. The ultimate and safety load values provided in this technical handbook are based on specific test results under documented conditions. The user must consider these conditions and results when using chemical anchor on-site.

6. Henkel will not be liable for any misuse of its products. Any damages, injuries, losses or expenses resulting from such misuse shall be the responsibility of the user or customer. It is the user's responsibility to observe and adhere to individual production expiration dates prior to application of the product.

7. The supply of products and all recommendations provided are subject to Henkel's General Terms and Conditions. These General Terms and Conditions are available on the following webpage: www.henkel.com or will be forwarded to you upon request which may be sent to the following address: chemical.anchoring@henkel.com.

Applications
Overview


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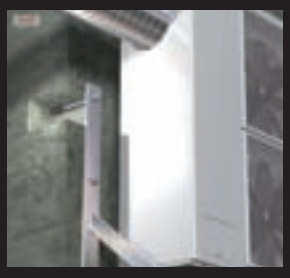
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Pattex Chemical Anchor can be used in a range of light- to heavy-duty applications as well as in specialty and problematic fixing. The product is ideal for use in concrete, solid and hollow bricks. Chemical Anchor is a long-lasting, strong and secure way to fix loads of various weights and problematic anchoring situations.

Light Duty Applications

① ② ③ ④ ⑤

Light duty applications include many fixings for residential use (i.e. bathroom fixings, window shutters, satellite dishes, air conditioners and outside lights). Additional applications can include inside fixings such as televisions, overhead lighting fixtures and hanging cabinets. We recommend CF800 or CF850 (page 3.2 and 3.3) for these types of light duty applications.

Vibration / External Force Heavier Duty Applications

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Chemical Anchor is ideal in settings where external effects must be considered. Vibrations due to wind or machine operation can be overcome through the use of Chemical Anchor, which will securely retain the fixing element. We recommend CF900 or CF920 (page x) for these types of applications.

Applications
Overview


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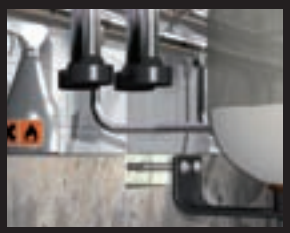
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Heavy Duty Fixing

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Heavy duty fixings can include varied weight loads where life and dead loads must be considered. This includes applications such as I-beams, balconies and railings. We recommend CF900, CF920 and CF1000 (page 3.4, 3.7 and 3.8) for these types of applications.

Problematic Fixing

⑩ ⑪ ⑫ ⑬ ⑭

In certain situations, Chemical Anchor is the only solution for fixing a load. Problematic applications include wet and underwater fixings where corrosion and aggressive environmental effects must be considered. Environments containing aggressive chemicals or which are regularly exposed to salt water are also ideal application areas for Chemical Anchor. It creates a total form closure that protects the anchor rod from corrosion. Cracked concrete is another problematic application. CF1000 is an ideal solution for anchor fixings in cracked concrete.* Another problematic situation involves fixing a load with close axial or edge distance. Chemical Anchor will hold heavy loads that must be fixed close to the edge without creating any internal pressure. For these types of applications we recommend CF920 (page 3.7) or CF1000 (page 3.8).

Post-Installed Rebar

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Post-installed rebar is an application that can only be completed using Chemical Anchor. For this application we recommend CF1000 (page 3.8).

* Certification pending completion

Contents

Base Materials

There are many kinds of base materials. It is important to know their individual properties in order to determine the permitted load and to select suitable anchors. Only in this way is it possible to ensure that anchors are safe and of a high quality. Concrete, light building materials and masonry (including full stone and hollow brick) are the most commonly used building materials.

Concrete

Concrete consisting of a mixture of cement, aggregates, water and possibly other additives, is a synthetic stone. It is produced after the cement paste hardens and cures. Although it has a relatively high compressive strength, it has only a low tensile strength. Because of this, steel reinforcing bars are cast in concrete to take up tensile forces. This is then referred to as reinforced concrete.

The following factors decide on the concrete type:

- Dry gross density (light concrete, normal concrete, heavy concrete)
- Compressive strength
- Place of production, use or ceramic bond condition
- Consistency
- Density of the reinforcing bars

The composition and the processing of the material determine the concrete's properties. A crucial attribute for concrete is compressive strength. Normal concrete without accelerating additives obtains its full minimum compressive strength after 28 days and is ideal for anchoring. After this time has elapsed, the testing procedure defined in EN206-1 is performed to determine the strength class of the concrete. This is generally between C12/12 (≈B15) and C50/60 (≈B55). For special purposes, higher quality concrete is available, but C20/25 is the most commonly used concrete class.

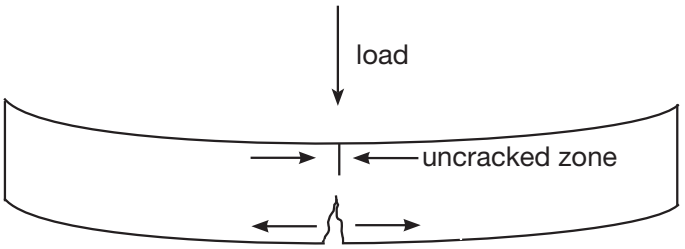
C20/25 stands for the following:

C = Concrete

20 = Compressive strength f_{ck} of the concrete test cylinders (diameter 150 mm, height 300 mm) in N/mm²

25 = Compressive strength $f_{ck,cube}$ of the concrete test cubes (edge length 150 mm) in N/mm²

Concrete



cracked zone, approx. 0,3 mm

Cracks form in concrete if the tensile strength is exceeded. As a rule, they cannot be seen, but experience has shown that the crack width does not exceed the figure regarded as admissible ($w \cong 0.3$ mm) if the concrete is under a constant load. If the forces acting on the concrete are mostly constraining, individual cracks may be wider if no additional reinforcement is provided to prevent this. Subjecting a concrete component to a bending load can cause wedge-shaped cracks across the component cross-section and at the end close to the neutral axis.

Suitable anchor systems are required if cracks in the tension zone exist. Force-controlled anchor systems with follow-up expansion or undercut anchor systems are recommended for the tension zone of concrete components. Other types of anchors may be used if they are set deep enough so that their anchoring section is positioned within the compression zone.

Anchors are set in both low-strength and high-strength concrete, with the cube compressive strength, $f_{ck,cube,\ 150}$, generally ranging from 25 to 60 N/mm^2. When using expansion anchors, it is important to take the curing of the concrete into account. Expansion anchors should not be set in concrete that has not cured for more than seven days. The loading capacity of anchors can be assumed to be only the actual strength of the concrete at the time the load is applied. If an anchor is set and the load applied later, the loading capacity can be assumed to be the concrete strength determined at that time.

Care must be taken not to cut through reinforcing bars when drilling anchor holes. This can weaken the structure. If this cannot be avoided, consult the responsible design engineer first.

Masonry

There is a tremendous variety of masonry bricks on the market. The different types of bricks (e.g. clay, sand-lime, or concrete bricks) are composed of different materials and are available in various shapes, sizes, bulk densities, and strength classes. They can be either solid or with cavities. As such, this base material is heterogeneous. Performance data often exists only for the shear connector for certain brick styles.

Types of Masonry

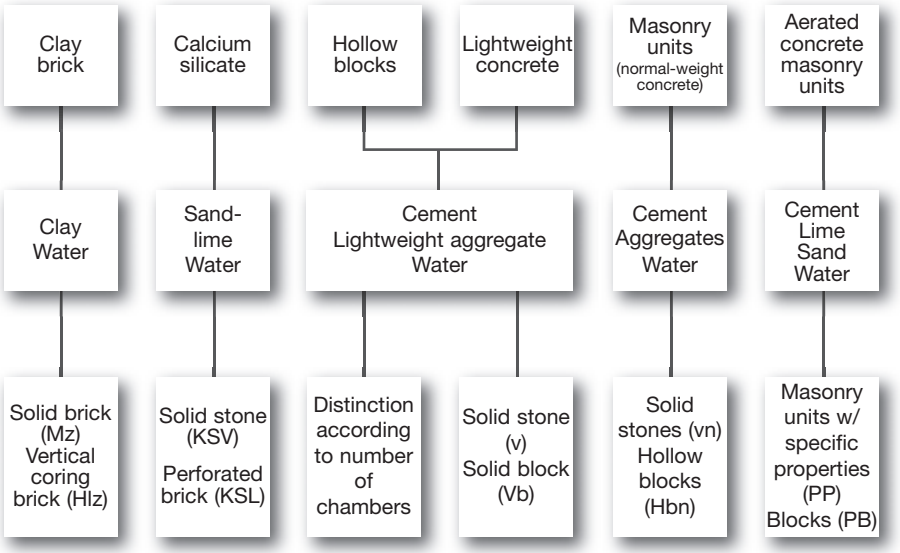


Figure: Shows types of masonry and primary materials included in each type.

Clay Brick

Hollow Clay Brick

Hollow Concrete

Hollow Sand-Lime Stone

Solid Sand-Lime Stone

Criteria and Differentiation of Masonry

- Compressive strength
  This is defined by the pressure class: 2, 4, 6, 8, 12, 20, 28, 36, 48 and 60 N/mm^2. The alternative to the pressure class based on the allowable variation of the compression stress (of the statistic calculation) is not offered for all brick types in all compressive strengths.
- Bulk density
  This is defined by the bulk density class: 0,4, 0,5, 0,6, 0,7, 0,8, 0,9, 1,0, 1,2, 1,4, 1,6, 1,8, 2,0, 2,2 and 2,5 kg/dm^3. Finer grades exist for certain brick types (in multiples of 0,05). While the bulk density designates the weight of the brickwork, it can also be used to evaluate heat and sound protection.

The major designation for all bricks is DF. The scale ranges from 2 DF to 25 DF (length x width x height = 61,5 x 30 x 24 cm).

Due to the relatively low strength of masonry, the loads taken up locally cannot be particularly high. Holes drilled for anchors may run into mortar joints or cavities. Care must be taken to ensure that a layer of insulation or plaster is not used as the base material; the specified anchorage depth (depth of embedment) must be in the actual base material.

- Before anchoring in masonry, you should obtain accurate information regarding which brick (designation, dimensions, allowance, boring, and material and compressive strength) and mortar (mortar technology) are present.
- To ensure that anchors in unfamiliar or old masonry are safe, on-site load tests can be performed after consultation with the planner or structural engineer.
- The extra load on the masonry must be considered for anchors near edges (e.g. roof truss). Consult the anchor approval specifications for more information.
- Holes may also be present in solid brick (e.g. clay brick or lime-sand brick). There are often large grip holes in the middle of the brick.
- When drilling into perforated or hollow bricks do not use the hammer function.
- Non-load bearing surfaces such as plaster may not be considered as a load-bearing base material.
- Avoid anchoring in masonry joints as the joints are not homogeneous. The approval documents from the approval body regulate anchoring in joints (butt or horizontal joint).

Other Base Materials

Aerated concrete is manufactured using fine-grained sand as the aggregate, lime and/or cement as the binding agent, and water and aluminum as the gas-forming agent. Its density is between 0,4 and 0,8 kg/dm^3 and its compressive strength is between 2 and 6 N/mm^2.

Lightweight concrete is concrete with a low density (less than 1800 kg/m^3) and a porosity that reduces the strength of the concrete and, consequentially, the loading capacity of an anchor.

Drywall (plasterboard/gypsum) panels are mostly building components without a supporting function to which less important, secondary fastenings are made. This includes wall and ceiling panels.

A large variety of other materials (e.g. natural stone) may be encountered in practice. The previously mentioned materials may also be combined to produce special building components. Due to the manufacturing method and configuration, these components produce base materials with peculiarities that must be given careful attention (e.g. hollow ceiling floor components). Although fastenings can be made to these types of materials, this manual will not explore those specific detailed situations.

Theory Section
Types of Drilling Methods

Drilling Holes

There are many ways of drilling holes. Rotary drilling does not use the hammer function and is especially suited for perforated bricks or base materials with low rigidity. Hammer drilling makes use of the hammer function of professional hammer drills and is suited for hard base materials such as concrete. Diamond core drilling is a vibration-free method of drilling that requires special equipment with diamond drill bits. It is mostly used with wet drilling, but dry drilling is also possible.

More Information

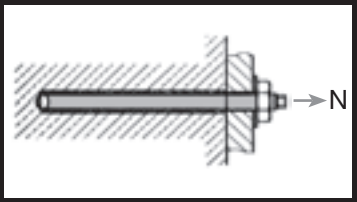
- The approvals of almost all approved anchors specify rotary or hammer drilling.
- Drill bits with excessively worn cutting edges should not be used (see approval stipulations).
- The respective approval must be observed with regards to the cleaning of drill holes (brushed and blown out).
- Also included in the anchor approval is the drilling depth, which refers to a specific base material thickness. Without an approval, the following can be used as a rule of thumb for general applications: required base material thickness = drilling depth + 50 mm.
- The location of new holes to be drilled after misdrills (such as if iron is struck or if the hole was in the wrong location) is regulated in the approvals. The distance from a misdrill must usually be two times the drilling depth of the misdrill. A misdrill hole must be sealed.
- Due to the following, diamond bits are only allowed in exceptional cases:
  – The wall of the drill hole may be too smooth for the anchor.
  – Standing moisture or dampness may drastically reduce the load bearing capacity of the anchor (especially with injection methods).
  – There is a risk of drilling through supporting reinforcing iron.
- Unless the stipulations of the respective approval state otherwise, standing water must be removed from the drill hole of shear anchors or injection systems. Below freezing temperatures, the anchor should be set immediately after the hole is drilled to avoid the formation of ice crystals in the drill hole.

Theory Section

How Anchors Hold in Base Materials

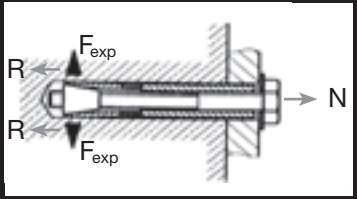
There are three basic working principles that make an anchor hold in a building material.

Form Closure



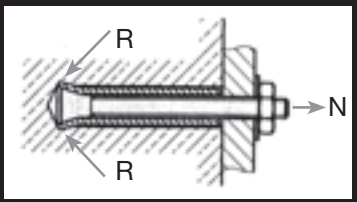
A form closure is produced between the anchor rod and the hammer-drilled rough hole wall by a cured resin adhesive.

Friction



Friction, R transfers the tensile load, N, to the base material. The expansion force, F_{exp}, is necessary for this to take place. It is produced, for example, by driving in an expansion plug.

Undercut



The tensile load, N, is in equilibrium with the supporting forces, R, with keying acting on the base material.

Installation Types

There are several types of installations. With **through-hole mounting**, the attachment part (bore pattern) is used to create the drill hole and pushes the anchor into the base material itself. The diameter of the hole must in part be greater than or equal to the drill-hole diameter. **Pre-insertion mounting** creates the drill hole and inserts the anchor into the base material before the attachment part is installed.

When using **spaced mounting**, the attachment part to be fastened is installed with a space to ensure the tensile and compressive strength. Both through-hole and pre-insertion mounting can be used with this technique.

- Distance = lever arm a
- Bending moment = shear force * lever arm
- Mb = V · a [Nm]

Theory Section

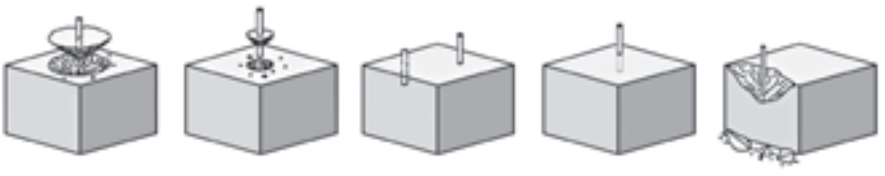
How Anchors Hold in Base Materials

More Information

- The approvals for the respective anchor sizes accurately define the holes of the attachment part. These specifications must be taken into account.
- An additional bending moment occurs that is usually the decisive bending moment for spaced mounting with lateral load V.
- The attachment part must be laid out level and dry on the base material and can be reinforced with a compression-proof leveling layer of a maximum of 3 mm. If this is not the case, the anchoring must be measured as a spaced mounting with lever arm.
- The attachment part must fit the entire length of the through hole (the thickness of the attachment part) on the anchor/threaded bolts. If this is not the case, the anchoring must be measured as a spaced mounting with lever arm.
- Note the maximum mounting height, also described as the usable length, in the manufacturer's specifications: t_{fix} = attachment part thickness + non-load bearing surfaces up to load-bearing base material.
- A specified torque, which ensures the required pretensioning force and correct anchor mounting, is required for tightening many anchors approved by construction authorities. A calibrated torque wrench should be used for this. For chemical anchors, observe the required hardening time before applying the tightening torque or actual load.
- Anchors must be installed as standard units. Replacing or removing parts is not allowed.

Effects of Static Loading

Anchor fastenings subjected to a continually increased load can cause the failure patterns depicted here:



A B C C1 D

Modes of Failure

The cause of failure is determined by the weakest point in an anchor fastening. The following modes of failure occur mostly when a pure tensile load is placed on single anchors that are a sufficient distance from an edge or the next anchor:

- break-out (A)
- anchor pull-away (B)
- failure of anchor parts (C/C1)

These failure causes govern the maximum loading capacity of anchors. If the anchor is only a small distance from the edge, this may cause edge breaking (D). In this case, the ultimate loads are smaller than those of the previously mentioned modes of failure. In the cases of break-out, edge breaking and anchor pull-away, the tensile strength of the fastening base material is exceeded.

Combined Load

Essentially, the same modes of failure take place under a combined load. As the angle between the direction of the applied load and the anchor axis increases, break-out (A) becomes less common.

Shear Load

A shell-like area of spall on one side of the anchor hole is generally caused by shear loads. The anchor parts then suffer bending tension or shear failure. However, the edge breaks away if the distance from an edge is small and the shear load is towards the free edge of a building component.

Theory Section
Failure Modes

Influence of Cracks

Under working conditions, it is not possible for a reinforced concrete structure to be built that does not have cracks. However, as long as they do not exceed a certain width it is not necessary to regard the cracks as structural defects. Keeping this in mind, the designer of a structure assumes that cracks will exist in the tension zone of reinforced concrete components when carrying out the design work. In a composite construction, suitably sized ribbed steel bars absorb tensile forces from bending, whereas the concrete (compression zone) absorbs the compressive forces from bending. Only if the concrete in the tension zone is permitted to be stressed (elongated) to such an extent that it cracks under the working load can the reinforcement be utilized efficiently. The static/design system and the location at which the load is applied to the structure determine the position of the tension zone. Cracks normally run in a single direction (line or parallel cracks). Cracks can run in two directions, but only in rare instances, such as with reinforced concrete slabs stressed in two planes.

Conditions for testing and applying anchors are currently being drafted internationally based on the research results of anchor manufacturers and universities. These will guarantee the functional reliability and safety of anchor fastenings made in cracked concrete.

Efficient Utilization of Reinforcement

The tensile stress condition of rotational symmetry around the anchor axis establishes equilibrium when anchor fastenings are made in non-cracked concrete.

Load-Bearing Mechanisms

Because virtually no annular tensile forces can be absorbed beyond the edge of a crack, the existence of a crack seriously distrupts the load-bearing mechanisms. The disruption caused by the crack reduces the load-bearing capacity of the anchor system.

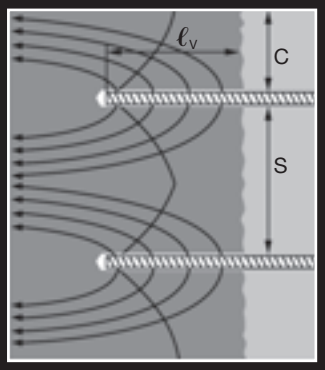
Reduction Factor for Cracked Concrete

International testing conditions for anchors are based on the above mentioned crack widths. For this reason, no theoretical relationship between ultimate tensile loads and different crack widths has been given.

Theory Section
Reinforcement Bars

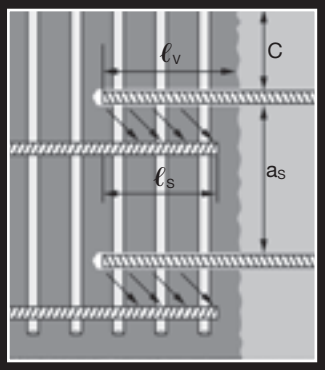
General

Reinforcement bars must be set in mortar. The bars act as a transmitter of the external forces such as tensile strength into the concrete. The transfer of the tensile strength is different based on two different applications using reinforcement bars.



Doweling

Doweling is one application that can be done using reinforcing bars. Using this method, it is possible to apply a shear load on the dowel. In this method the tensile strength is transferred into the concrete. Two failure modes are possible with this application: concrete cone failure and steel failure.



Post-Installed Rebars

Reinforcement bars increase the tensile strength of the concrete. Cast in reinforcement bars are positioned prior to pouring concrete into the reinforced iron cast created by the rebars. Post-installed rebars are installed into an existing concrete structure. Post-installed rebars transfer the tensile strength between the neighboring reinforcement bars. It is not possible to add a shear load on a rebar and there are three types of failures modes that can occur with this type of application. These failure modes include: (1) failure of mortar or concrete, (2) failure of anchor or mortar and (3) a combination of different failures. The concrete volume needs to be large enough to accommodate the transfer of tensile strength. The overlap connection of the reinforcement bars are governed by the Rules for Concrete Building Europe Code 2 (EC2).

Images are from the DIBt.

Theory Section
Reinforcement Bars

Allowable Application

The allowable application cases are demonstrated in the certification and the important cases are shown below.

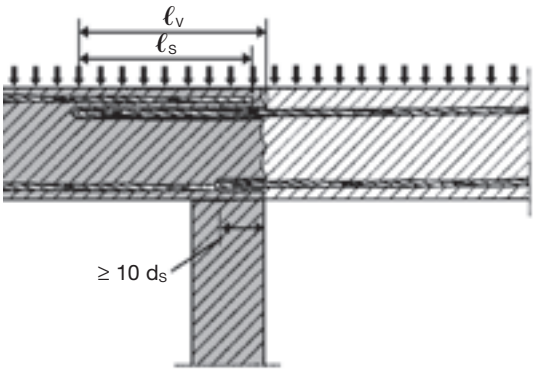


Figure: The overlapping for the reinforcement connection from slabs and beams.

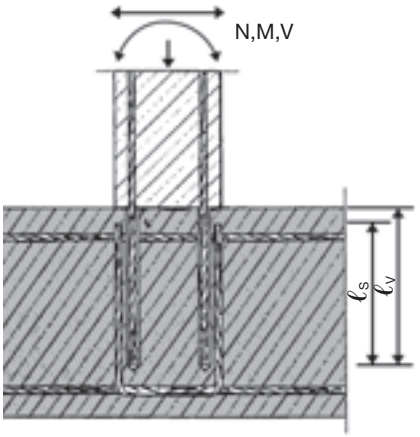


Figure: Vertical force from a wall or pillar.

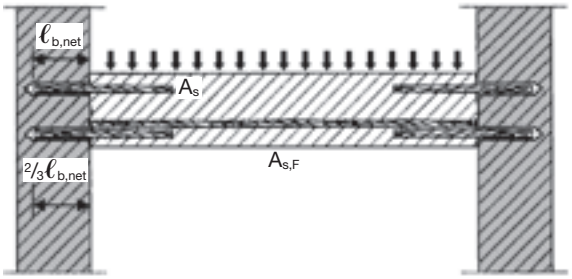


Figure: The end anchor of slabs, beams or starter bars.

The temperature limitations of the curing mortar should be observed. The measurement of the reinforcement connections and the transmission of loads must be calculated by an engineer according to the EC2. The necessary interconnection lengths for anchoring and the overlap connection are determined by the EC2. There is a minimum embedment depth according to the diameter of the reinforced bar, which must be considered according to the rules. The connection joints of the concrete must be roughened before laying concrete for a new structure. This will allow for the transfer of forces between the new and exiting structures. The connection strength for the injection mortar from artificial resin can be weakened when the temperature goes up. Therefore, reinforcement connections are tested for fire behavior. The reinforcement bar systems always require certification.

Images are from the DIBt.

Theory Section
Types of Steel Quality

General

Most anchors are available in two material types, electrogalvanized steel (sherardized or coated with Delta-Tone) and rust-resistant steel (mostly 1.4401 (A4) or 1.4571 (A5)). Other types of anchors do exist, however, they are not normally covered in the approval (e.g. hot-dip galvanized or copper-plated).

Reference values for general thicknesses:

- Delta-Tone coated 10 to 15 µm
- Sherardized 45 to 60 µm
- Sendzimir galvanized up to 20 µm
- Hot-dip galvanized 45 to 60 µm
- Electrogalvanized up to 25 µm

For outdoor use or where there is moisture, anchors must be made from rust-resistant stainless steel. Steel types 1.4401 and 1.4571 are equivalent in the approvals in terms of corrosion resistance. Electrogalvanized anchors (thickness usually 5 – 15 µm) are only permitted in dry interior rooms. For particularly aggressive ambient conditions (e.g. chlorine gases in the ceiling areas of swimming pools, tunnels, contact with sea water, etc.), anchors made of highly corrosion-resistant steel are available (also known as HCR steel 1.4529).

If two or more components of different metallic materials are joined together so that they are electrically conductive, an electrochemical potential forms (i.e. low current flows). This causes contact corrosion and the lower grade material corrodes at the point of contact.

Fixing elements / Attached parts	Brass	Rust-resistant steel	Structural steel	Aluminum alloy	Hot-dip galvanized	Electro-galvanized
Brass	🟡	🔴	🔴	🔴	🔴	🔴
Copper	🔴	🔴	🔴	🔴	🔴	🔴
Tin	🟡	🟢	🔴	🔴	🔴	🔴
CrNi(Mo) steel	🔴	🟢	🔴	🔴	🔴	🔴
Chrome steel	🟡	🟢	🔴	🔴	🔴	🔴
Cast steel	🟢	🟢	🔴	🔴	🔴	🔴
Structural steel	🟢	🟢	🟢	🔴	🔴	🔴
Cadmium coating	🟢	🟢	🟢	🟢	🟡	🔴
Aluminum alloy	🟢	🟢	🟢	🟢	🟡	🔴
Hot-dip galvanized parts	🟢	🟢	🟢	🟢	🟢	🟢
Zinc	🟢	🟢	🟢	🟢	🟢	🟢

🟢 Minor or no corrosion of fixing element
🟡 Medium corrosion of fixing element
🔴 Severe corrosion of fixing element

Theory Section
Measurement Basics

General

For anchor fixings to be safe, measurements using engineering principles are mandatory. Testable calculations and design drawings must be provided. Various measurement concepts can be used for measuring fixings.

Measurement concepts with global and partial safety factors differ. The latter is finding increased application because it can more easily account for variations and uncertainties with regard to material or assumed loads (constant and fluctuating) as well as mounting factors by allocating a global safety factor.

The following table lists and explains the technical terms used for measurement procedures.

Peak load	Represents the measured maximum load in one test.
Mean peak load	Represents the mean value of the measured peak loads in multiple tests.
5% quantile	Statistical value that specifies that only 5% of the individual values with a certain confidence level (level of safety for approvals of fixing elements; generally 90%) lie under this limit value.
Characteristic resistance	For anchors, pertains to the 5% quantile of peak loads for the respective type of failure and the direction of stress.
Measurement value of resistance	Corresponds to a characteristic resistance divided by the relevant material and mounting safety factors. $R_d = R_k/\gamma_M$
Permitted load perm. F	Corresponds to a value that the anchoring element can bear while complying with the conditions of use. This value takes safety factors into account. A useful life of 50 years is assumed in the approvals of the German Institute for Structural Engineering. Permitted loads are also sometimes referred to as working loads.
Recommended load	Represents the loads recommended by the manufacturer. Relate to working loads. These are generally not covered by an approval.

Dimensioning for an Application

The respective approval accurately defines both the application area and the anchor load. Anchors may be permitted for a single fixing, anchor groups (two to six anchors) or only multiple loads (also known as redundancy). The absorption of pressure loads is not permitted for many approved anchors. Pressure loads must be absorbed by the entire structure (structural component and base material). The critical load for anchors is bending (lateral load with distance to anchor base material). Constant load on axial tension is not permitted for approved plastic anchors; the load must at least be at a ten-degree angle. As a result, these anchors may not be used in the ceiling (e.g. for ceiling suspensions).

The measurement of anchors approved by construction authorities is regulated in the effective approvals as follows:

- Measurement according to permitted loads (i.e. comparison of existing load with the permitted load).
- Measurement according to the Kappa procedure
- Measurement according to the DIBt procedure
- Measurement according to ETAG 001, Annex C (appendix to European guideline)
- Measurement according to ETAG TR 029

The Kappa and DIBt procedures will no longer play a role once new European approvals (ETA) are issued. The measurement procedure is stipulated for each anchor in the respective approval. Measurement of anchors approved by construction authorities must be performed using engineering principles and written proof must be presented. Henkel provides calculation software for use by architects, planners or structural designers. ChemFast PRO calculation software can be downloaded for free at www.chemical-anchoring.com.

Definitions for Anchor Measurement:

- The acting load (S_k) is the actual existing load per anchor, without partial safety factors γ_G and γ_Q.
- The recommended load (F_{rec}) is the maximum load per anchor recommended by Henkel, without partial safety factors γ_G and γ_Q (often described as working load).
- The breaking load (F_U) is the load at which an anchor or base material fails.
- The characteristic failure load is the 5% quantile. In other words, 5 of 100 anchors fail at this load and 95 anchors endure this load or exceed it.
- γ_G is the partial safety factor for constant dead loads (1,35)
- γ_Q is the partial safety factor for variable loads (1,50)
- The (general) measurement value or design value of interference S_d is equal to $S_k \times \gamma_G$ or $S_k \times \gamma_Q$.
- The measurement value of resistance R_d is equal to the 5% quantile divided by the respective partial safety factor of stress (both values are in the ETA approval documents).
- The proof for each available type of stress: $S_d \leq R_d$.

Theory Section

Measurement Procedures for Concrete Anchoring Base

General

Current approval notices stipulate that the measurement of a fixing in concrete must be carried out in accordance with the κ procedure or the measurement guidelines of DIBt or ETAG. Both differ in procedures A, B and C.

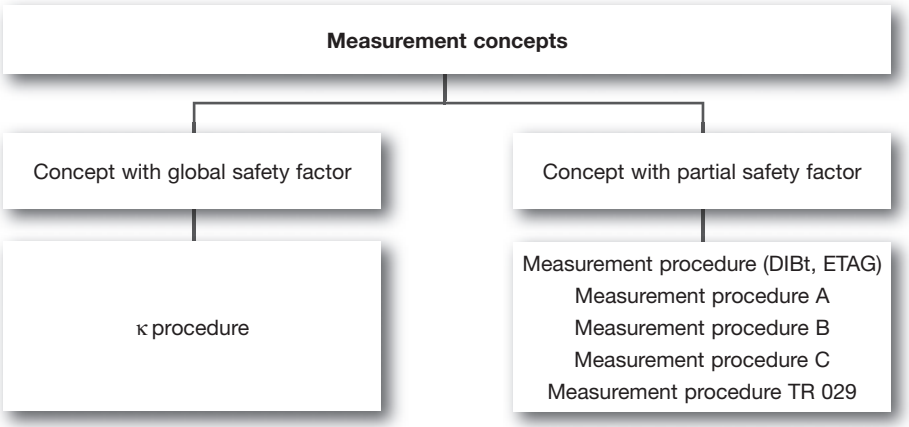


Figure: Measurement concepts and procedures based on approvals

The general approvals and European technical approvals of fixings require that measurements be performed by an experienced engineer at the anchoring and concrete construction sites. In the process, testable calculations and design drawings must be prepared. The design drawings must specify the location of the anchor.

During preselection of a fixing system, it must be checked whether the minimum edge distances, minimum center distances, and minimum component thickness have been maintained. Interferences and influences must also be determined. After this, the actual measurement is performed by determining the characteristic resistance.

The condition of the concrete anchoring base is a basic influencing factor on the characteristic resistance for concrete failure. For this reason, it is important to clarify whether or not the concrete is cracked before selecting anchors and beginning measurement. As a rule, it is generally assumed that concrete is cracked. Non-cracked concrete can only be assumed if it is verified in each individual case that the fixing is secured in non-cracked concrete for the entire length of the anchor.

$\sigma L + \sigma R \leq 0$
Equation 1

σL Tension in concrete caused by external loads, including anchor loads

σR Tension in concrete caused by local deformation
(e.g. concrete shrinkage or by external pressure)
(e.g. local deformations arising from external influences)
(e.g. from displacement at support or temperature fluctuations)

If no exact check is carried out, use σR to 3 N/mm^2.

Tensions σL and σR are to be calculated under the assumption that the concrete is not cracked. Equation 1 must be met for both directions for flat components that support loads in two directions (e.g. plates or walls). After calculating equation 1, it must be assumed that fixings in walls are usually in cracked concrete because tensile stress in the wall length direction is caused by anchor loads and force and there is no pressure from other loads. If equation 1 cannot be met, only fixing systems approved for use in cracked concrete are to be used.

Measurement According to the κ Procedure

The κ procedure operates under the assumption that the load of an individual anchor with large center and edge distances is permitted, independent of the load direction. The κ factors take the influences of diminished center and edge distances into account. The permitted load of an anchor is obtained by multiplying the maximum permitted load by the respective κ factors.

While the κ procedure is simple and easy to use, it does have its disadvantages. For example, the calculation of the permitted load does not consider the upper load bearing capacity of anchors under lateral load in the component surface. However, the upper required edge distances under lateral load are determined for all load directions because concrete edge failure becomes decisive with decreasing edge distance under lateral load. For the measurement of off-center loaded anchor groups for all anchors of the group, the load of the highest stressed anchor must be determined. Measurements according to the κ procedure are generally reliable, but present considerable restrictions in practice.

General

Four different measurement procedures are available. Measurement according to procedure A leads to the best utilization of the performance capacity of fixings. The basic features of procedures A, B and C are compiled in the following figure.

Measurement procedure (DIBt, ETAG) – Overview

Measurement procedure A/TR 029
Characteristic resistance – dependent on load direction
Consideration of all types of failure and edge and center distances

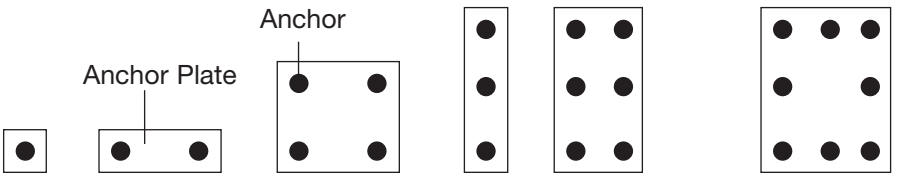
Measurement procedure B
Characteristic resistance – independent of performance
Consideration of edge and center distances

Measurement procedure C
Characteristic resistance – independent of load direction
No consideration of edge and center distances

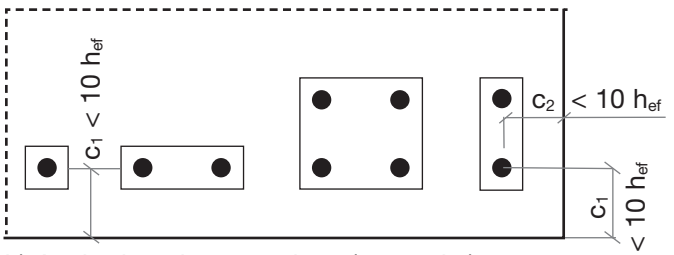
Figure: Measurement characteristics of procedures A, B and C are based on the measurement guidelines from DIBt and ETAG

The measurement procedures A, B and C regulate the applications presented below.

Specific to TR 029



a) Anchoring away from edges ($c \geq 10\ h_{ef}$)



$c_1, c_2 < 10\ h_{ef}$
$< 60\ d$

b) Anchoring close to edges ($c < 10\ h_{ef}$)

Figure: Regulated anchor groups according to approvals. Figures are from ETAG Annex C and TR 029.

Theory Section
Measurement Guideline Procedure A

Procedure A

Measurement according to procedure A is based on the measurement concept with partial safety factors. The proof of load bearing capacity is provided by equation 2.

Sd ≤ Rd Equation 2
Sd Measurement value of influence
Rd Measurement value of resistance

The characteristic resistances depend on the load direction and take all possible types of failure into account. The influences which are active on the anchors must be less than or equal to the resistance for proof of load bearing capacity. This verification is to be performed for each load direction and for each type of failure. If this condition is fulfilled, the fixing has been adequately measured.

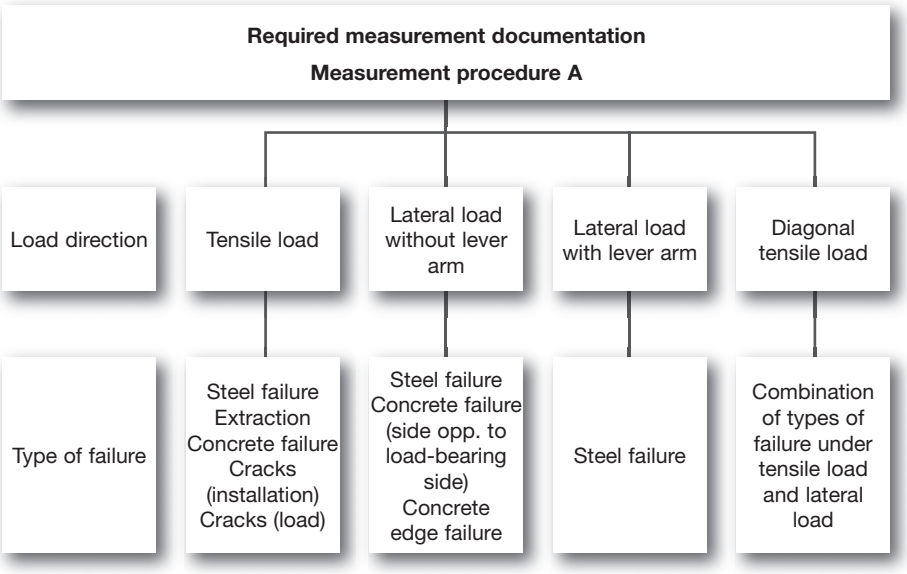


Figure: Shows measurement procedure A required measurement documentation

The measurement value of active influences is equal to the effective load multiplied by the partial safety factor for the load. The distribution of invasive cutting forces (normal force, overhung load, bending and torsional moments) on the individual anchors of a group is calculated according to the theory of elasticity under the assumption that all anchors are equally rigid. For the calculation assumptions to be met, the anchor plate must be sufficiently rigid. The portions of the diagonal and lateral tensile load must be determined separately for diagonal tensile load below a particular angle.

Theory Section
Measurement Guideline Procedure A

Procedure A

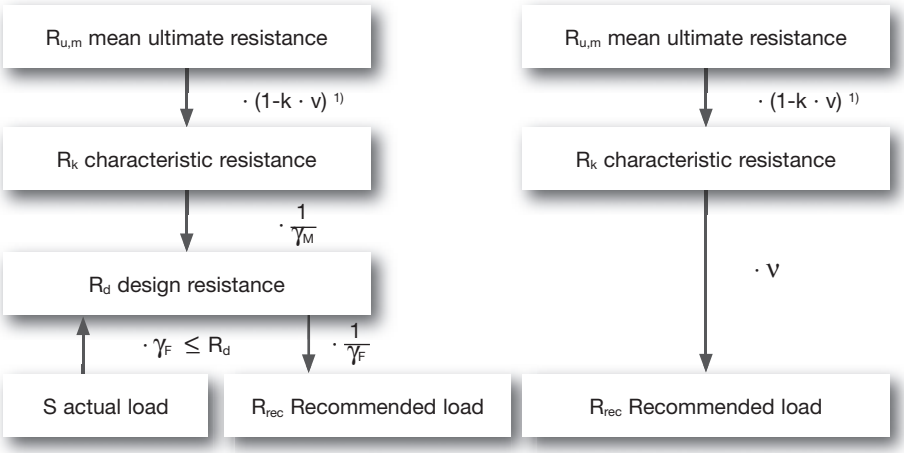
The measurement value of resistance is equal to the characteristic resistance divided by the partial safety factor for the material resistance of the respective failure type. Characteristic resistances are generally specified in the approvals (tensile load: steel failure, extraction; traverse load: steel failure). Characteristic resistances are determined according to general measurement equations for the measurement of concrete failure under tensile load and traverse load (tensile load: concrete failure, cracks; traverse load: concrete failure on side opposite the load-bearing side, concrete edge failure). Edge and center distance influences are considered as well as the component thickness using the concrete capacity procedure, if necessary. The existing concrete compressive strength can also be factored in. In this measurement, the minimum measurement value of resistance in a load direction is a decisive factor. The heaviest loaded anchor is relevant for off-center stressed group fixings for steel failure and extraction under tension as well as steel failure under lateral load.

The partial safety factors for material resistance depend on the type of failure and the installation safety of the anchor system and are specified in the approval documents.

The partial safety factor for extraction and concrete failure under tension is determined from the mounting safety factor of an anchor or its anchor size. This mounting safety factor is derived from the results of tests that are performed as part of the approval procedure. Mounting inconsistencies that can occur at the construction site are simulated in these tests, however it is assumed that crude errors in mounting (e.g. using the wrong drill) are ruled out by appropriate measures at the construction site.

Safety Concept

This technical handbook uses two different safety concepts:
Partial safety factor concept, γ_M, γ_F
Global safety factor concept, ν



1) k, depends on the number of tests,
v, coefficient of variation.

Increasingly, the partial safety factor concept is replacing the global safety factor concept. One important feature of the partial safety factor concept is the strict separation of partial safety factors for the applied loads and partial safety factors for the resistance of the fastening to these loads. Partial safety factors for loads are intended to cover uncertainties and the scatter where loads are concerned. Partial safety factors for resistance cover uncertainties and the scatter pertaining to the resistance, i.e. the load bearing capacity of the fastening.

Design Methods

To ensure that not only the anchor fastening design is optimally utilized, but also that the required level of safety is guaranteed, it is often necessary to size anchors in accordance with standard engineering practice when making top-quality medium and heavy-duty fastenings in concrete. This product information was based on the current international state of the art regarding ETAG 001. This design method was simplified to retain as much as possible of the previous design method, while including as much of the most current approach as possible.

New design method

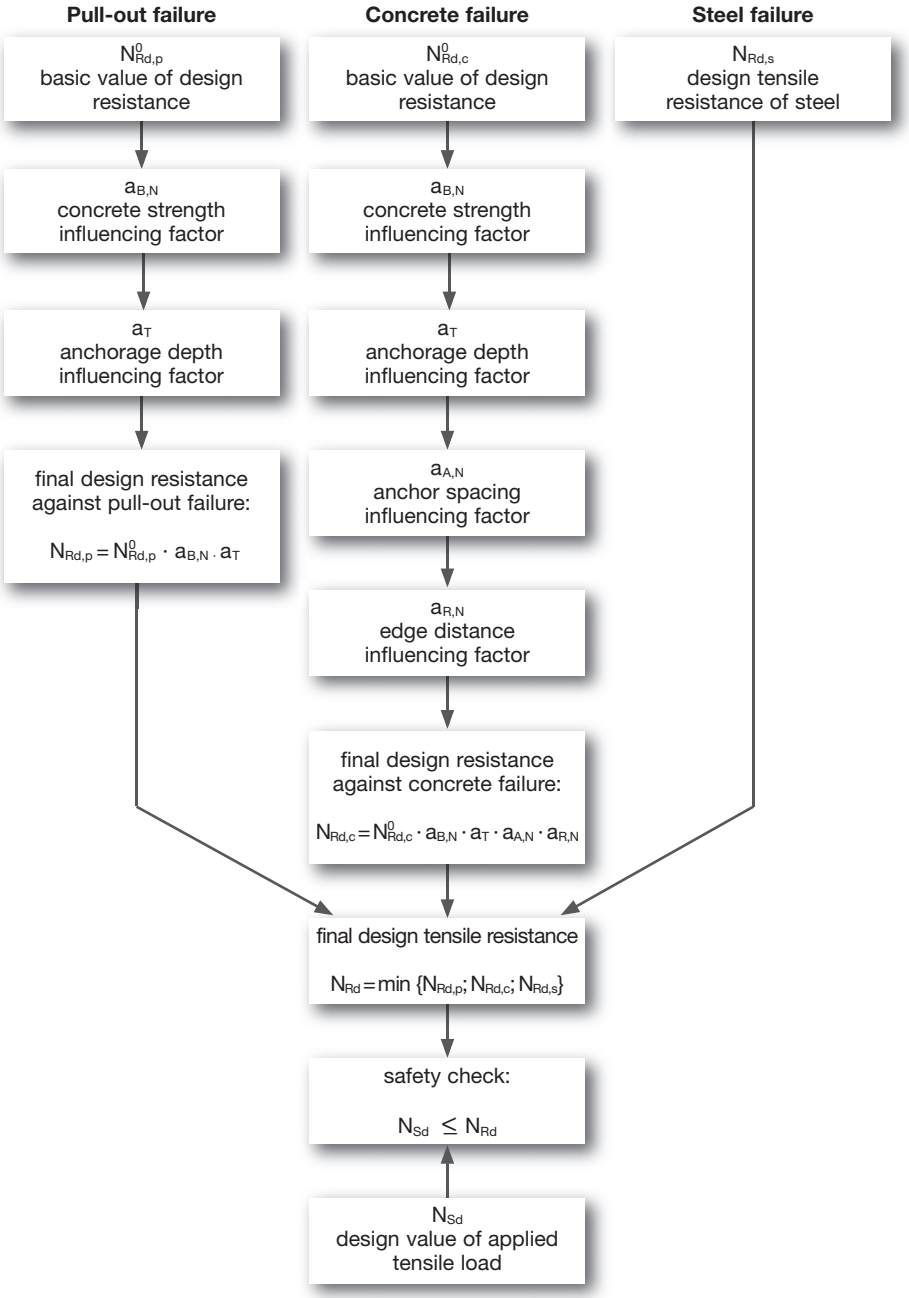
In the new design method, failure modes are differentiated (e.g. pull-out, concrete, or steel failure). The different failure modes that occur when the anchor is loaded to the point of failure are treated separately. In addition, safety factors are differentiated based on different failure modes. How these features are used in the actual fastening design is shown on the following pages.

This approach offers the following benefits:

- The actual anchor behavior is reflected in a more accurate fashion. This leads to higher loads in certain applications.
- The differentiation between failure modes allows more flexibility with regard to the steel elements without having to perform a new design calculation.
- The data given conforms with upcoming design codes (e.g. the design method according to ETAG Annex C).

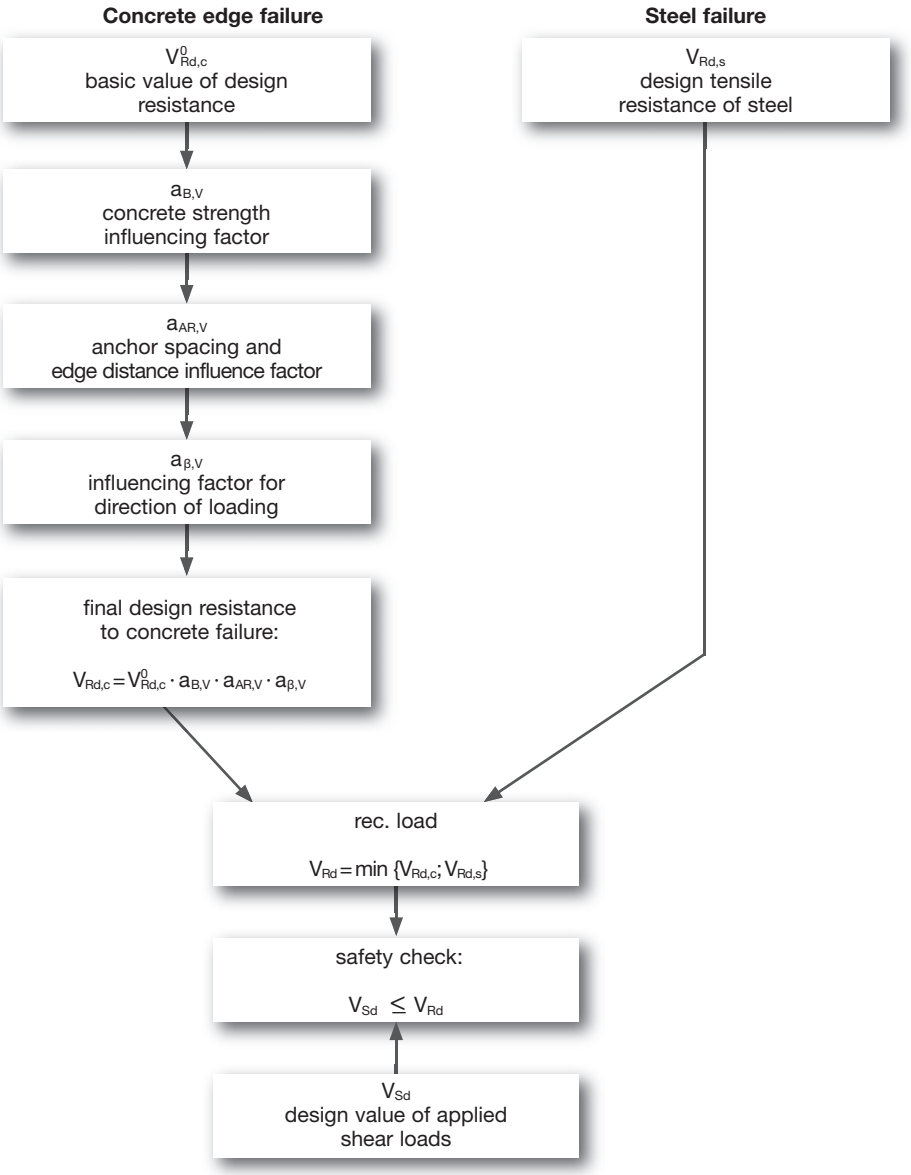
Tensile Resistance

In this load direction, three failure modes can appear. These are pull-out failure, concrete failure and failure of the steel element. The flow of required calculations is displayed in the following chart:



Shear Resistance

Two failure modes are distinguished with this type (direction) of loading. These are concrete edge failure (i.e. breaking away of the concrete component edge) and the shear failure of the steel element. The flow of required calculations is displayed in the following chart:



Combined Load

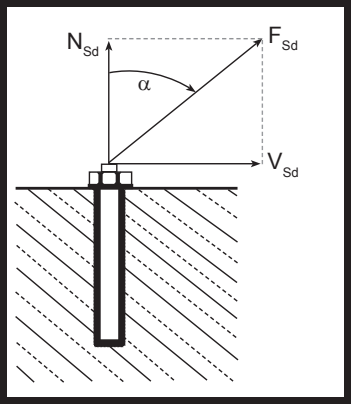
If there are combinations of tensile and shear loads (i.e. loads under an angle α with respect to the anchor axis) the design check is given by:

$$F_{Sd}(\alpha) \leq F_{Rd}(\alpha)$$

The design action, F_{Sd}, at an angle α is given by:

$$F_{Sd} = \sqrt{N_{Sd}^2 + V_{Sd}^2}$$

$$\alpha = \arctan\left[\frac{V_{Sd}}{N_{Sd}}\right]$$

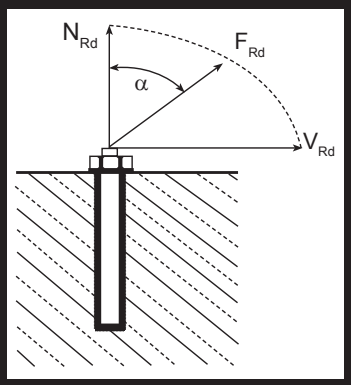


Where:

N_{Sd} = tensile component
V_{Sd} = shear component

The design resistance (loading capacity), F_{Rd}, at an angle α is given by:

$$F_{Rd} = \left[\left(\frac{\cos\alpha}{N_{Rd}}\right)^{1.5} + \left(\frac{\sin\alpha}{V_{Rd}}\right)^{1.5}\right]^{-2/3}$$



Where:

N_{Rd} = design resistance for pure tension
V_{Rd} = design resistance for pure shear as calculated previously

Theory Section

Differences Compared to the Design Method According to ETAG Annex C

Summary

In this handbook, various factors in ETAG Annex C have been combined into a single factor and some of the factors have been left out in order to make a simple manual calculation possible. Refer to the document “Metal Anchors for Use in Concrete, Guideline for European Technical Approval Annex C” for details regarding the statements below.

Resistance to tensile loads:

- Resistance to steel failure: no changes
- Resistance to pull-out failure: no changes
- Resistance to concrete cone failure: The general formula for concrete cone resistance is:

$$N_{Rk,c} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot \psi_{ec,N} \cdot \psi_{re,N} \cdot \psi_{ucr,N}$$

Resistances to concrete cone failure are based on a standard concrete quality of C20/25. The factor $a_{B,N}$ accounts for different concrete grades, which are already reflected in:

$N^0_{Rk,c}$ · The factors $a_{A,N}$ and $a_{A,R}$ combine the factors $\frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot$

The simplified design method does not include the factor $\psi_{ec,N}$, which relates to the eccentricity of the acting load on the anchor plate. The factor $\psi_{re,N}$ relates to a spalling of the concrete above the first layer of reinforcing bars. This failure mode is not decisive for an embedment depth greater than 100 mm or a reasonable layout of the reinforcing bars. The factor $\psi_{ucr,N}$ accounts for the different resistances of cracked and uncracked concrete. This manual gives these different values in separate tables. For this reason, $\psi_{ucr,N}$ is unnecessary.

Resistance to splitting failure:

Splitting is not decisive if the minimum value for the thickness of the concrete member is taken into account.

Theory Section

Differences Compared to the Design Method According to ETAG Annex C

Summary

Resistance to shear loads:

- Resistance to steel failure without lever arm: no changes
- Resistance to steel failure with lever arm: With this simplified method, it is not possible to calculate a stand-off fastening.
- Resistance to concrete pry-out: This failure mode is only decisive with short, rigid anchors and is therefore ignored in this simplified method.
- Resistance to concrete edge failure: The general formula for concrete edge resistance is:

$$V_{Rk,c} = V^0_{Rk,c} \cdot \frac{A_{c,V}}{A^0_{c,V}} \cdot \psi_{s,V} \cdot \psi_{h,V} \cdot \psi_{a,V} \cdot \psi_{ec,V} \cdot \psi_{ucr,N}$$

A standard concrete quality of C20/25 at a minimum edge distance was used as a basis for the resistances given previously. The factor $a_{B,N}$ accounts for the different concrete grades, which are already integrated in $V^0_{Rk,c}$ the factors $f_{AR,V}$ combines the factors $\frac{A_{c,V}}{A^0_{c,V}} \cdot \psi_{s,V} \cdot \psi_{h,V} \cdot$

The factor $\psi_{ec,N}$ relates to an eccentricity of the load on the anchor plate. The simplified method ignores this. The factor $\psi_{a,V}$ calculates the effect of the load direction and is $a_{\beta,V}$ in this manual.

The factor $\psi_{ucr,N}$ takes into account the different resistances for cracked and uncracked concrete. In this manual, these different values are given in separate tables. For this reason, $\psi_{ucr,N}$ is not necessary.

Theory Section
ChemFast PRO Anchoring Software

CF PRO

Calculation Software

ChemFast PRO (CF PRO) offers a new Henkel design method in addition designing according to different international approvals. This method differs from the simplified method in this manual in several ways. For this reason, the results can differ as well.

1. The aforementioned restrictions for eccentricity do not apply.
2. Geometries for anchor plates and all anchor positions are allowed, necessitating an engineering judgment of the design (especially for shear forces close to an edge). The main assumption is the even load redistribution on all anchors.
3. Anchor forces are calculated in relation to the bedding of the anchor plate on the concrete if a bending moment is acting on the anchor plate. This results in different results than if anchor forces were calculated according to simplified measures (e.g. rigid anchor plate).
4. For bonded anchors with a bigger embedment depth than standard, the concrete resistance is calculated as a combination of concrete cone failure and pull-out failure.

ChemFast PRO includes approved and standard load applications. Furthermore, CF PRO allows calculation with varying embedment depths for CF920 and CF1000 according to ETAG approved guidelines.
In each result, CF PRO will signify whether the anchor type is approved or standard. Standard load applications are values received from testing done by Henkel. Whether using the calculations from the manual or those from the anchor program, you will still obtain conservative results (the results are on the safe side).

Please see page 4.1 for more information. ChemFast PRO is free and available for download at www.chemical-anchoring.com.

Product Overview

Chemical Systems and Product Performance Measurements

Chemical Anchor Systems

Chemical Anchoring consists of fixing high-load carriers into construction materials, by injecting a 2-component injection mortar into a drilled hole and screwing in the mechanical element. Chemical Anchor can be used in a range of applications and project sizes. (Refer to Application Overview).

Chemical Anchors are based on two different types of chemical systems:

A Reaction Resin Mortar System

Materials:
- For use in various solid stones
- Concrete
- Hollow brick

Drilling Method:
- Hammer-drilled holes*

Drill Holes:
- Suitable for drill holes with a gap of up to 2 mm between anchor and substrate (due to shrinkage)

Curing Time:
- Fast

B Epoxy System

Materials:
- Only for use in concrete

Boring Method:
- Ideal for diamond-drilled holes
- Hammer-drilled holes

Drill Holes:
- Suitable for drill holes with a gap of up to 4 mm between anchor and substrate

Curing Time:
- Slower curing time allows for more flexibility in working conditions

* See page 1.2 for more information on selecting the correct drilling method.

Relative Performance Measurements

	CF800	CF850	CF900	CF920	CF1000
Concrete	yes	yes	yes	yes	yes
Solid stone	yes	yes	yes	yes	no
Hollow brick	yes	yes	yes	yes	no
Certification	yes	no	yes	yes	yes
Underwater	no	no	yes	yes	yes
Wet and water-filled holes	no	no	yes	yes	yes
Cracked concrete**	no	no	no	no	yes
Weight of load possible	+	+	+ +	+ + +	+ + + +
Chemical resistance	+	+	+ + +	+ + +	+ + + +
Shrinkage behavior	approx. 1.0 %	approx. 1.0 %	approx. 0.6 %	approx. 0.6 %	0 %
Styrene	yes	no	no	no	no
Curing time	fast	fast	fast	fast	slow
Drilling method	hammer	hammer	hammer	hammer	diamond hammer
Maximum drill hole gap	up to 2 mm	up to 2 mm	up to 2 mm	up to 2 mm	up to 4 mm

** Certification pending completion

Product Overview

Product Technologies: Chemical System A

Polyester Technology

The 2-component injection mortars based on polyester technology meet the basic expectations for all general applications. The Pattex CF800 and CF850 mortar based on polyester resin are developed for the structural chemical bonding to fixate mechanical elements into solid and hollow materials. These products should be used in dry conditions.

CF800

Special Properties

- German certification
- Basic solution for general applications in standard conditions
- Fast curing
- Economic
- Hammer-drilled holes

CF850

Special Properties

- Basic solution for general applications in standard conditions
- Fast curing
- Styrene free
- Hammer-drilled holes

Range of Use

These products can be applied in solid and hollow materials and places where expandable dowels cannot be used. These products should only be used in dry conditions.

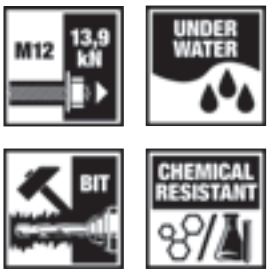
Product Overview

Product Technologies: Chemical System A

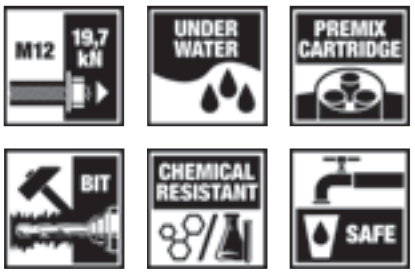
Vinylester Technology

The 2-component injection mortars based on vinylester resins unify the good thermal and mechanical properties of the epoxy resins with the easy and fast processability of the unsaturated polyester resins. Reaction resin mortars based on vinylester technology distinguish themselves by their very high chemical resistance. They are suitable for wet and water-filled drill holes and underwater applications.

CF900



CF920



Special Properties

- German and European certification
- Suitable for wet and underwater application
- Certified as fire resistant up to F120
- Very good thermal and mechanical properties
- High chemical resistance
- Universal solution for wider applications and heavier loads
- Styrene free
- Hammer-drilled holes

Same Properties as CF900 PLUS

- 20% stronger power than CF900
- 30% easier extrusion based on new Premix cartridge system
- Professional solution for wider applications and heavier loads
- Certified as fire resistant up to F120
- European and US certification *
- NSF/ANSI 61 certified for use as a drinking water system component

Range of Use

These styrene-free vinylester products can be used in solid and hollow materials and places where expandable dowels cannot be used. These products cure in wet and underwater holes.

* Certification pending completion

Product Overview

Product Technologies: Chemical System A

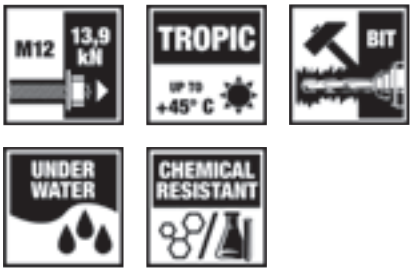
Vinylester Technology: Speciality Products

CF900 ICE

Special Properties

- Cold climate solution for wide range of applications and heavier loads
- Use down to –20°C
- Very good thermal and mechanical properties
- High chemical resistance
- Suitable for wet and underwater application
- Styrene free
- Hammer-drilled holes

CF900 TROPIC



Special Properties

- Warm climate solution for wide range of applications and heavier loads
- Use up to 45°C
- Suitable for wet and underwater application
- Very good thermal an mechanical properties
- High chemical resistance
- Styrene free
- Hammer-drilled holes

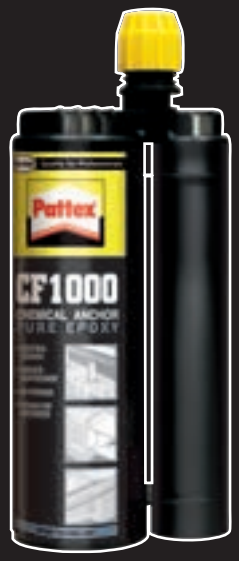
Range of Use

These styrene-free vinylester products can be used in solid and hollow materials and places where expandable dowels cannot be used. These products cure in wet and underwater holes.

These products are not kept in stock but are made to order. Specific minimum order quantities apply. Check your local Henkel office or dealer for details.

Product Overview

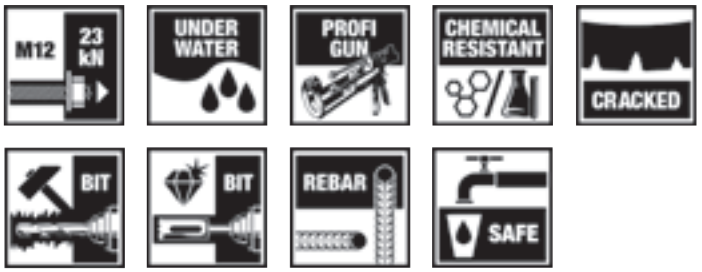
Product Technologies: Chemical System B



Epoxy Technology

The pure epoxy technology is the newest chemical anchoring technology with an outstanding chemical resistance and industrial strength. It can be used underwater and shows no shrinkage due to hardening. Working times are flexible at elevated temperatures. Good compound properties achieve outstanding load values in diamond-drilled holes and larger annular gaps.

CF1000



Special Properties

- Professional solution for specialized applications
- European and US certifications *
- Heaviest loads / industrial strength
- Fire resistance and highest chemical resistance
- Suitable for cracked concrete *
- For fastening in diamond-drilled holes
- Suitable for underwater application
- No shrinkage
- Specialist for concrete reinforcement
- Flexible working time at elevated temperatures
- Diamond and hammer-drilled holes
- NSF/ANSI 61 certified for use as a drinking water system component

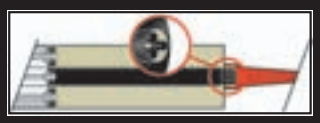
* Certifications pending completion

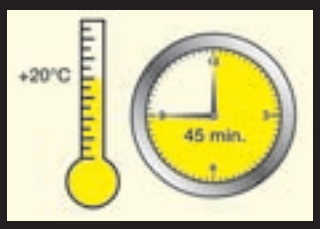
Range of Use

This pure epoxy product can be used with a professional gun and applied in solid materials. It is preferred for anchoring reinforcing bars and for post-installed rebar applications. The product can cure in wet and underwater holes.

Product Overview

Product Availability / Curing Times





Product Availability

Cartridge type	Sizes **	Product availability **	Tool
Coaxial	150 ml 380 ml	CF800 CF850 CF900 CF920	Special gun (150 ml with an adapter)
Peeler	280 ml	CF800 CF850 CF900 CF920	Standard gun
Foil pack	165 ml 300 ml	CF800 CF850 CF900 CF920	Standard gun
Side by side	345 ml 385 ml	CF800 CF850 CF900 CF920 CF1000	Special gun
Premix	380 ml	CF920	Special gun

** Availability of product, size and cartridge type depends on local market offerings.

Curing Time

Curing start / Working time					
Temperature	**CF800**	**CF850**	**CF900**	**CF920**	**CF1000**
–5°C			90 min	90 min	
0°C			45 min	45 min	180 min
5°C	25 min	25 min	25 min	25 min	150 min
10°C	15 min	15 min	15 min	15 min	120 min
20°C	6 min	6 min	6 min	6 min	30 min
30°C	4 min	4 min	4 min	4 min	20 min
35°C	2 min	2 min	2 min	2 min	16 min
40°C				1,5 min	12 min

Curing end time / Minimum loading time					
Temperature	**CF800**	**CF850**	**CF900**	**CF920**	**CF1000**
–5°C			360 min	840 min	
0°C			180 min	420 min	72 hours
5°C	120 min	120 min	120 min	120 min	37 hours
10°C	80 min	80 min	80 min	80 min	30 hours
20°C	45 min	45 min	45 min	45 min	10 hours
30°C	25 min	25 min	25 min	25 min	6 hours
35°C	20 min	20 min	20 min	20 min	5 hours
40°C					4 hours

* Curing time for the CF900 ICE and CF900 TROPIC can be found in the Product Details section.

Product Overview
Certification Overview

Certification Overview

Product	Certification	Language available
CF800	DIBt solid and hollow brick (Germany)	German English
CF900	ETA uncracked concrete M10 – M16 steel-quality 5,8; A4; HC	German English
	DIBt solid and hollow brick (Germany)	German English
	IBMB/MPA fire resistance test F120 (Germany)	German English
CF920	ETA uncracked concrete* M8 – M30 steel-quality zinc galv.; A4; HC	German English
	ICC uncracked concrete* M8 – M30 steel-quality zinc galv.; A4; HC	English
	IBMB/MPA fire resistance test F120 (Germany)	German English
	NSF/ANSI standard 61 drinking water system components	English
CF1000	ETA cracked and uncracked concrete* M8 – M30 steel-quality zinc galv.; A4; HC	German English
	ICC cracked and uncracked concrete* M8 – M30 steel-quality zinc galv.; A4; HC	English
	IBMB/MPA fire resistance test F120 (Germany)*	German English
	NSF/ANSI standard 61 drinking water system components	English

* Certifications pending completion

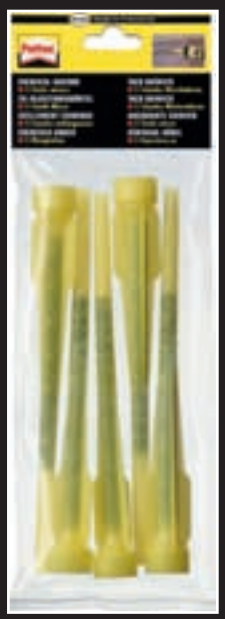
Product Overview
Cleaning and Product Accessories

Reminder: Follow proper cleaning instructions for the drill hole in order to achieve optimal load values.

- Conrete: blow out 4 x, brush out 4 x, blow out 4 x
- Hollow brick: blow out 2 x, brush out 2 x, blow out 2 x


①


②


③

Cleaning Accessories

Pattex Cleaning Pump

Pattex Nylon – Cylinder Brush

With wood handle for hollow materials

Pattex Wire Brush

With M 6 steel thread, for anchor rods M 8 115x80x12 mm / M 10 115x80x14 mm

Selecting a brush size

Threaded bar	Rebar	D_b Bore hole diameter	D Brush diameter	D_{min} Brush diameter	L Total brush length
	(mm)	(mm)	(mm)	(mm)	(mm)
M 8		10	12	10,5	170
M 10	8	12	14	12,5	170
M 12	10	14	16	14,5	200
	12	16	18	16,5	200
M 16	14	18	20	18,5	300
M 20	16	24	26	24,5	300
M 24	20	28	30	28,5	300
M 27	25	30	32	30,5	300
M 30	28	35	37	35,5	300
	32	38	40	38,5	300

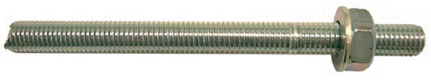
Product Accessories

Pattex Perforated Sleeves ①

For anchoring in hollow brick 13x100 mm / 15x100 mm

Pattex Standard Anchor Rods ②

M 8x100 / M 10x110, quality 5.8



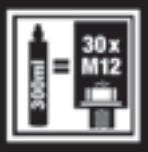
Pattex Special Static Mixer ③

Pattex Universal Gun

Can be used with:

- Foil pack (165 ml, 300 ml)
- Peeler (280 ml)
- Coaxial (150 ml, 380 ml)
- Side by side (385 ml)
- Premix (380 ml)

Product Overview
Consumption Overview Chart



Number of Fixings in Concrete and Solid Material *

Anchor diameter	M 8	M 10	M 12	M 16	M 20	M 24	M 30
Borehole diameter (mm)	10	12	14	18	24	28	35
Setting depth (mm)	80	90	110	125	175	210	280
165 ml	41	25	15	8	3	2	1
280 ml	74	46	27	15	6	4	2
300 ml	80	49	30	16	6	4	2
345 ml	93	57	34	18	7	4	2
380 ml	103	63	38	20	8	5	2
385 ml	104	64	39	21	8	5	2

Number of Fixings in Hollow Brick *

Anchor diameter		M 8	M 10	M 12	M 16
Approved sleeve		13x100	15x100	–	–
Standard sleeve		13x85	13x85	13x85	18x85
Standard	165 ml	12	12	12	6
Approved	165 ml	11	8	–	–
Standard	280 ml	23	23	23	12
Approved	280 ml	19	14	–	–
Standard	300 ml	24	24	24	13
Approved	300 ml	21	16	–	–
Standard	345 ml	28	28	28	15
Approved	345 ml	24	18	–	–
Standard	380 ml	31	31	31	16
Approved	380 ml	27	20	–	–

* These numbers are based on the best-case scenario. This information can be used as a guide for planning purposes. Consumption chart values can vary based on specific usage and circumstances.

Product Details
Material and Safety Data Sheet (MSDS)

Material and Safety Data Sheet

Material and Safety Data Sheets contain information about the two components in a Pattex Chemical Anchor product. The document includes safety information pertaining to the following areas:

- Identification of the substance / preparation and of the company / undertaking
- Hazards identification
- Composition / information on ingredients
- First aid measures
- Fire fighting measures
- Accidental release measures
- Handling and storage
- Exposure controls / personal protection
- Physical and chemical properties
- Stability and reactivity
- Toxicological information
- Ecological information
- Disposal consideration
- Transport information
- Regulations – classification and identification
- and other information.

For the most up-to-date Material and Safety Data Sheets:

1. Go to: www.chemical-anchoring.com
2. Select the Downloads menu from the homepage
3. Choose Material and Safety Data Sheets
4. Type in the product name (example: CF900) and click on start search

Contact and Emergency Information:

The e-mail address for issues related to the Material and Safety Data Sheet is: **uaproductsafety.de@henkel.com.**

Emergency information is available 24 hours a day by calling +49 211 797 3350.

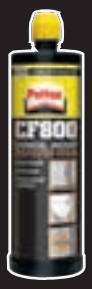
The product is registered at the “Information Centers for Cases of Poisoning” in Germany.
In poisoning cases, the centers are equipped to provide around-the-clock information.
Central emergency phone number: +49 30 19240.

Note

You can find a copy of all Material and Safety Data Sheets in the Appendix to the Chemical Anchoring Technical Handbook. For the most up-to-date version please go to www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification documents.

Product Details
CF800 Technical Information



CF800
Reaction resin mortar, polyester-based

Concrete / solid stone

1. Areas of Application

Usage

- Heavy load-carrying attachments in solid stone, concrete, porous concrete and light concrete
- Suitable for attachment points close to the edge, since chemical anchoring is free of expansion forces
- Also suitable as repair or adhesive mortar for concrete components
- Attachment of anchor rods, threaded collars, reinforcement bars, profiles etc.

2. Benefits

- Can be used in various solid stones
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Galvanized steel, stainless steel, highly corrosion-resistant steel

3. Properties

- For use with a special application gun and static mixers
- Bending tensile strength mean value of 56 N/mm²
- Compression strength mean value of 108 N/mm²
- Dynamic elasticity module mean value of 1200 N/mm²
- Raw density mean value of 1,61 kg/dm³
- Temperature resistant up to 80°C
- Application temperature of the cartridge should be at least 20°C
- Storage temperature from 5°C up to a max. of 25°C
- Storage life: 12 months

Usage Instructions

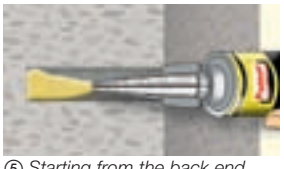
Undersurface: Concrete, solid stone


① Drill hole with percussion drill

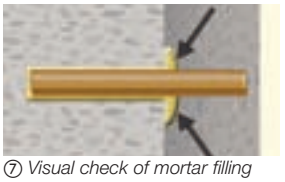

② Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)

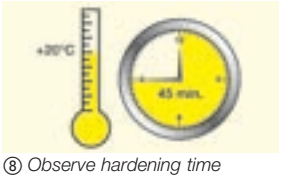

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use

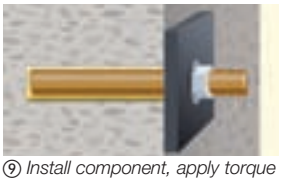

⑤ Starting from the back end, fill hole completely with mortar


⑥ Push anchor into base of hole while turning clockwise


⑦ Visual check of mortar filling



⑧ Observe hardening time

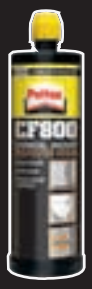

⑨ Install component, apply torque

Materialprüfanstalt f. d. Bauwesen
MPA NRW
Nordrhein-Westfalen

Pattex

Product Details

CF800 Technical Information



CF800

Reaction resin mortar, polyester-based

Hollow brick

1. Areas of Application

Usage

- Used for medium-load applications
- The perforated sleeve can be used in hollow bricks, Hlz 4 to DIN 105, sand-lime hollow bricks, KSL 4 to DIN 106, hollow light concrete bricks, Hbl 2 to DIN 18 151 and hollow concrete bricks, Hbn 4 to DIN 18 153
- Suitable for attachment of façades, projecting roofs, wooden constructions, metal constructions, metal profiles, consoles, railings, grills, sanitary fittings, pipe connections, cable runs etc.

2. Benefits

- Secure anchoring in hollow brick; high load bearing capacity
- No expansion effect, allowing attachment points to be placed close to edges etc.
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap

3. Properties

- Anchoring by composite form-fitting between injection mortar, sleeve collar, anchor rod and anchoring surface
- Galvanized steel, stainless steel, highly corrosion-resistant steel

Usage Instructions

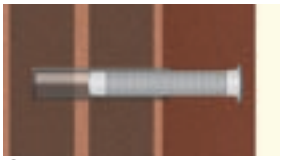
Undersurface: Hollow brick

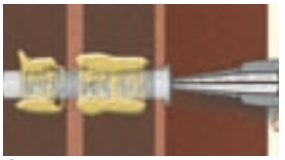

① *Drill hole with percussion drill*

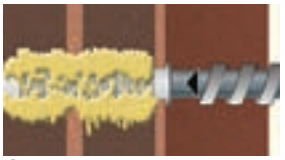

② *Clean drill hole (blow out: 2x, brush out: 2x, blow out: 2x)*

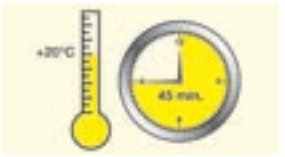

③ *Screw mixer to cartridge*

④ *Squeeze out and discard approx. 10 cm of compound before use*


⑤ *Insert perforated sleeve*


⑥ *Starting from the back end, fill hole completely with mortar*


⑦ *Push anchor into base of sleeve while turning clockwise*



⑧ *Observe hardening time*


⑨ *Install component, apply torque*

Reaction Characteristics

Tem-perature	Curing start	Curing end
5°C	25 min	120 min
10°C	15 min	80 min
20°C	6 min	45 min
30°C	4 min	25 min
35°C	2 min	20 min

Product Details
CF800 Technical Information

CF800
Reaction resin mortar, polyester-based

Performance data / Concrete for standard application

Design Values

Resin	Concrete			M 8	M 10	M 12	M 16	M 20
Polyester	≧ C 20/25	N_{Rk}	[kN]	11,4	17,4	24,2	27,1	45,6
		N_{Rd}	[kN]	6,3	9,6	13,5	15,1	25,4
Safety factor for tension loads 1,8 acc. to ETAG								
Polyester	Steel quality 5.8	V_{Rk}	[kN]	8,3	12,9	18,9	35,3	55,1
		V_{Rd}	[kN]	5,3	8,3	12,1	22,6	35,3
		rec. torque		12,9	25,6	44,8	113,7	222,9
Polyester	Steel quality A4	V_{Rk}	[kN]	9,2	14,5	21,1	39,3	61,3
		V_{Rd}	[kN]	5,9	9,3	13,5	25,2	39,3
		rec. torque		12	23,9	41,9	106,7	207,9

Safety factor for share loads 1,56 acc. to ETAG

Recommended Loads

Resin	Concrete			M 8	M 10	M 12	M 16	M 20
Polyester	≧ C 20/25	$F_{rec.}$	[kN]	4,5	6,9	9,6	10,8	18,1

Installation Parameters

Edge distance	$c_{cr,N}$	[mm]	80	90	110	130	170
Min. edge distance	c_{min}	[mm]	40	50	60	70	90
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340
Min. axial distance	s_{min}	[mm]	80	90	110	125	170
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170
Minimum part thickness	h_{min}	[mm]	130	140	160	175	220
Thread diameter	d	[mm]	8	10	12	16	20
Drill diameter	d_B	[mm]	10	12	14	18	24
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22
Tightening torque	$T_{inst.}$	[Nm]	10	20	40	60	120

Product Details
CF800 Technical Information

CF800
Reaction resin mortar, polyester-based

Performance data / Hollow brick

Recommended Loads

Recommended loads			Standard sleeve				Approved sleeve *	
Stone	**Strength class**		**M 6**	**M 8**	**M 10**	**M 12**	**M 8**	**M 10**
Hollow brick	Hlz 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	0,3	0,3
	Hlz 6		0,4	0,4	0,4	0,4	0,4	0,4
	Hlz 12		0,7	0,8	0,8	0,8	0,8	0,8
Sand-lime hollow brick	KSL 4	$F_{rec.}$ [kN]	0,3	0,4	0,4	0,4	0,4	0,4
	KSL 6		0,4	0,6	0,6	0,6	0,6	0,6
	KSL 12		0,7	0,8	0,8	0,8	0,8	0,8
Sand-lime solid brick	KS 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7	1,7	1,7
Solid brick	Mz 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	–	–
	Hbl 4		0,5	0,6	0,6	0,6	–	–
Concrete hollow brick	Hbn 4	$F_{rec.}$ [kN]	0,5	0,6	0,6	0,6	–	–
Standard sleeve	12x50	[mm]	x					
	15x85			x	x	x		
	15x130				x	x		
Approved sleeve	SH 13x100	[mm]					x	
	SH 15x100							x

Installation Parameters

Installation parameters			Standard sleeve				Approved sleeve *	
Axial distance plug group	$s_{cr,N}$	[mm]	Hlz, KSL, Mz, KS = 100 Hbl, Hbn = 200				100	
Min. axial distance plug group	min s	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 200				50	
Axial distance between single plugs	$s_{singl.}$	[mm]	250				250	
Edge distance	$c_{cr,N}$	[mm]	250				200	250
Min. edge distance	min c	[mm]	250				50	60
Drilling depth	h_{ef}	[mm]	55	90	90	90	105	105
Drilling depth without sleeve	h_{ef}	[mm]	65	85	95	100	85	95
Minimum part thickness	min h	[mm]	110				110	
Drill diameter	d_B	[mm]	13	16	16	16	14	16
Hole diameter in part	d_{Bau}	[mm]	7	9	12	14	9	12
Tightening torque	$T_{inst.}$	[Nm]	3	8	8	8	2	2

* See approval Z-21.3-1808

Product Details
CF800 Certification

DEUTSCHES INSTITUT FÜR BAUTECHNIK

Allgemeine bauaufsichtliche Zulassung

CF800 Certification
Deutsches Institut für Bautechnik (DIBt)

National Technical Approval Z-21.3-1808

Valid until: October 31, 2010

This certification is for the Pattex Composite Anchor System CF800. It consists of the CF800 injection mortar, a perforated sleeve and an anchor bolt with nuts in M 8 and M 10 sizes. The anchor bolt (including nut and washer) is made from galvanized or stainless steel.

The anchorage system depends on the bond and positive fit of injection mortar, perforated sleeve, anchor bolt and anchor base.

This certification is for anchoring in hollow brick.
REMINDER: When anchoring in concrete or solid brick a perforated sleeve is not necessary.

Note

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification document.

CF850

Reaction resin mortar, polyester-based styrene-free

Concrete / solid stone

1. Areas of Application

Usage

- Heavy load-carrying attachments in solid stone, concrete, porous concrete and light concrete
- Suitable for attachment points close to the edge, since chemical anchoring is free of expansion forces
- Also suitable as repair mortar or adhesive mortar for concrete components
- Attachment of anchor rods, threaded collars, reinforcement bars, profiles etc.

2. Benefits

- Can be used in various solid stones
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Galvanized steel, stainless steel, highly corrosion-resistant steel

3. Properties

- For use with a special application gun and static mixers
- Bending tensile strength mean value of 56 N/mm²
- Compression strength mean value of 108 N/mm²
- Dynamic elasticity module mean value of 3300 N/mm²
- Raw density mean value of 1,63 kg/dm³
- Temperature resistant up to 80°C
- Application temperature of the cartridge should be at least 20°C
- Storage temperature from 5°C up to a max. of 25°C
- Storage life: 12 months

Usage Instructions

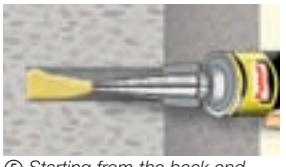
Undersurface: Concrete, solid stone


① *Drill hole with percussion drill*

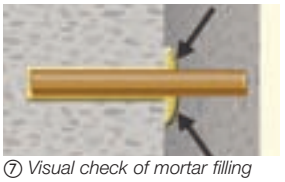

② *Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)*

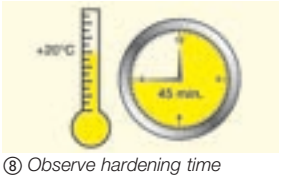

③ *Screw mixer to cartridge*

④ *Squeeze out and discard approx. 10 cm of compound before use*

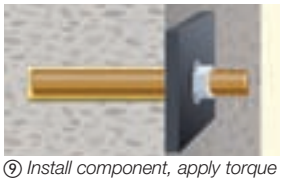

⑤ *Starting from the back end, fill hole completely with mortar*


⑥ *Push anchor into base of hole while turning clockwise*


⑦ *Visual check of mortar filling*



⑧ *Observe hardening time*


⑨ *Install component, apply torque*

Materialprüfanstalt f. d. Bauwesen
MPA NRW
Nordrhein-Westfalen

Product Details
CF850 Technical Information

CF850
Reaction resin mortar, polyester-based styrene-free

Hollow brick

1. Areas of Application

Usage

- Used for medium-load applications
- The perforated sleeve can be used in hollow bricks, Hlz 4 to DIN 105, sand-lime hollow bricks, KSL 4 to DIN 106, hollow light concrete bricks, Hbl 2 to DIN 18 151 and hollow concrete bricks, Hbn 4 to DIN 18 153
- Suitable for attachment of façades, projecting roofs, wooden constructions, metal constructions, metal profiles, consoles, railings, grills, sanitary fittings, pipe connections, cable runs etc.

2. Benefits

- Secure anchoring in hollow brick; high load bearing capacity
- No expansion effect, allowing attachment points to be placed close to edges etc.
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap

3. Properties

- Anchoring by composite form-fitting between injection mortar, sleeve collar, anchor rod and anchoring surface
- Galvanized steel, stainless steel, highly corrosion-resistant steel

Usage Instructions

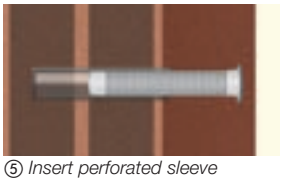
Undersurface: Hollow brick

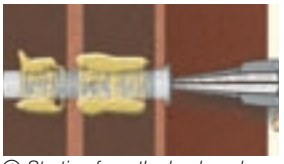

① *Drill hole with percussion drill*

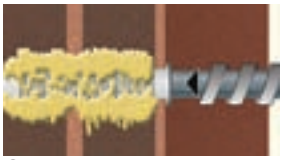

② *Clean drill hole (blow out: 2x, brush out: 2x, blow out: 2x)*

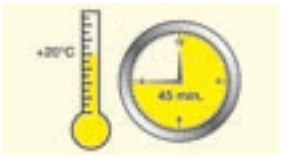

③ *Screw mixer to cartridge*

④ *Squeeze out and discard approx. 10 cm of compound before use*


⑤ *Insert perforated sleeve*


⑥ *Starting from the back end, fill hole completely with mortar*


⑦ *Push anchor into base of sleeve while turning clockwise*



⑧ *Observe hardening time*


⑨ *Install component, apply torque*

Reaction Characteristics

Tem-perature	Curing start	Curing end
5°C	25 min	120 min
10°C	15 min	80 min
20°C	6 min	45 min
30°C	4 min	25 min
35°C	2 min	20 min

CF850

Reaction resin mortar, polyester-based styrene-free

Performance data / Concrete for standard application

Design Values

Resin	Concrete			M 8	M 10	M 12	M 16	M 20
Polyester styrene-free	≧ C 20/25	N_{Rk}	[kN]	11,9	17,8	25,2	28,3	47,3
		N_{Rd}	[kN]	6,6	9,9	14,0	15,7	26,3
Safety factor for tension loads 1,8 acc. to ETAG								
Polyester styrene-free	Steel quality 5.8	V_{Rk}	[kN]	8,3	12,9	18,9	35,3	55,1
		V_{Rd}	[kN]	5,3	8,3	12,1	22,6	35,3
		rec. torque		12,9	25,6	44,8	113,7	222,9
Polyester styrene-free	Steel quality A4	V_{Rk}	[kN]	9,2	14,5	21,1	39,3	61,3
		V_{Rd}	[kN]	5,9	9,3	13,5	25,2	39,3
		rec. torque		12,0	23,9	41,9	106,7	207,9

Safety factor for share loads 1,56 acc. to ETAG

Recommended Loads

Resin	Concrete			M 8	M 10	M 12	M 16	M 20
Polyester styrene-free	≧ C 20/25	$F_{rec.}$	[kN]	4,7	7,1	10,0	11,2	18,8

Installation Parameters

			M 8	M 10	M 12	M 16	M 20
Edge distance	$c_{cr,N}$	[mm]	80	90	110	130	170
Min. edge distance	c_{min}	[mm]	40	50	60	70	90
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340
Min. axial distance	s_{min}	[mm]	80	90	110	125	170
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170
Minimum part thickness	h_{min}	[mm]	130	140	160	175	220
Thread diameter	d	[mm]	8	10	12	16	20
Drill diameter	d_B	[mm]	10	12	14	18	24
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22
Tightening torque	$T_{inst.}$	[Nm]	10	20	40	60	120

Pattex

Product Details

CF850 Technical Information

CF850

Reaction resin mortar, polyester-based styrene-free

Performance data / Hollow brick

Recommended Loads

Recommended loads			Standard sleeve			
Stone	**Strength class**		**M 6**	**M 8**	**M 10**	**M 12**
Hollow brick	Hlz 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	Hlz 6		0,4	0,4	0,4	0,4
	Hlz 12		0,7	0,8	0,8	0,8
Sand-lime hollow brick	KSL 4	$F_{rec.}$ [kN]	0,3	0,4	0,4	0,4
	KSL 6		0,4	0,6	0,6	0,6
	KSL 12		0,7	0,8	0,8	0,8
Sand-lime solid brick	KS 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7
Solid brick	Mz 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	Hbl 4		0,5	0,6	0,6	0,6
Concrete hollow brick	Hbn 4	$F_{rec.}$ [kN]	0,5	0,6	0,6	0,6
Standard sleeve	12x50	[mm]	x			
	15x85			x	x	x
	15x130				x	x

Installation Parameters

Installation parameters			Standard sleeve			
Axial distance plug group	$s_{cr,N}$	[mm]	Hlz, KSL, Mz, KS = 100 Hbl, Hbn = 200			
Min. axial distance plug group	s_{min}	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 200			
Axial distance between single plugs	$s_{singl.}$	[mm]	250			
Edge distance	$c_{cr,N}$	[mm]	250			
Min. edge distance	c_{min}	[mm]	250			
Drilling depth	h_{ef}	[mm]	55	90	90	90
Drilling depth without sleeve	h_{ef}	[mm]	65	85	95	100
Minimum part thickness	h_{min}	[mm]	110			
Drill diameter	d_B	[mm]	13	16	16	16
Hole diameter in part	d_{Bau}	[mm]	7	9	12	14
Tightening torque	$T_{inst.}$	[Nm]	3	8	8	8

Pattex

Product Details
CF900 Technical Information

CF900
Reaction resin mortar, vinylester-based styrene-free

Concrete / solid stone

1. Areas of Application

Usage

- Heavy load-carrying attachments in solid stone, concrete, porous concrete and light concrete
- Suitable for attachment points close to the edge, since anchoring is free of expansion forces
- Also suitable as repair or adhesive mortar for concrete components
- Attachment of anchor rods, threaded collars, reinforcement bars, profiles etc.

2. Benefits

- Can be used in various solid stones
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Galvanized steel, stainless steel, highly corrosion-resistant steel

3. Properties

- For use with a special application gun and static mixers
- Bending tensile strength mean value of 37 N/mm²
- Compression strength mean value of 103 N/mm²
- Dynamic elasticity module mean value of 1200 N/mm²
- Raw density mean value of 1,61 kg/dm³
- Temperature resistant up to 80°C; for short periods up to 120°C
- Application temperature of the cartridge should be at least 20°C
- High chemical resistance
- Storage temperature from 5°C up to a max. of 25°C
- Storage life: 12 months

Usage Instructions

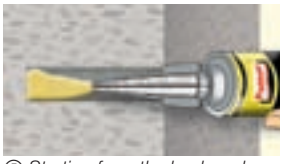
Undersurface: Concrete, solid stone


① Drill hole with percussion drill


② Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)

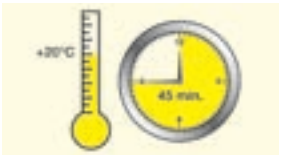

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use


⑤ Starting from the back end, fill hole completely with mortar


⑥ Push anchor into base of hole while turning clockwise


⑦ Visual check of mortar filling



⑧ Observe hardening time


⑨ Install component, apply torque

ETA
Europäische Technische Zulassung - Option 7 für ungerissenen Beton

- ETA-05/0133
- ETA-05/0134
- ETA-05/0135

Feuerwiderstandsklasse F 120

Materialprüfanstalt f. d. Bauwesen MPA NRW Nordrhein-Westfalen

Product Details
CF900 Technical Information

CF900
Reaction resin mortar, vinylester-based styrene-free

Hollow brick

1. Areas of Application

Usage

- Used for medium-load applications
- The perforated sleeve can be used in hollow bricks, Hlz 4 to DIN 105, sand-lime hollow bricks, KSL 4 to DIN 106, hollow light concrete bricks, Hbl 2 to DIN 18 151 and hollow concrete bricks, Hbn 4 to DIN 18 153
- Suitable for attachment of façades, projecting roofs, wooden constructions, metal constructions, metal profiles, consoles, railings, grills, sanitary fittings, pipe connections, cable runs etc.

2. Benefits

- Secure anchoring in hollow brick; high load bearing capacity
- No expansion effect, allowing attachment points to be placed close to edges etc.
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap

3. Properties

- Anchoring by composite form-fitting between injection mortar, sleeve collar, anchor rod and anchoring surface
- Galvanized steel, stainless steel, highly corrosion-resistant steel

Usage Instructions

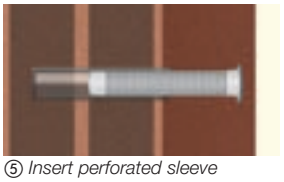
Undersurface: Hollow brick

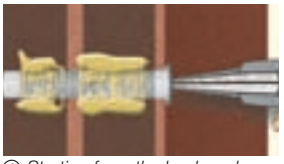

① *Drill hole with percussion drill*

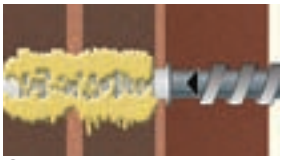

② *Clean drill hole (blow out: 2x, brush out: 2x, blow out: 2x)*

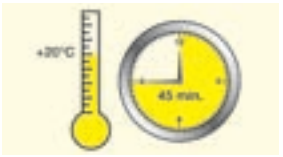

③ *Screw mixer to cartridge*

④ *Squeeze out and discard approx. 10 cm of compound before use*


⑤ *Insert perforated sleeve*


⑥ *Starting from the back end, fill perforated sleeve with mortar*


⑦ *Push anchor into base of sleeve while turning clockwise*



⑧ *Observe hardening time*


⑨ *Install component, apply torque*

Reaction Characteristics

Underground temperature	Curing start	Curing end dry underground	Curing end wet underground
–5°C	90 min	360 min	720 min
0°C	45 min	180 min	360 min
+5°C	25 min	120 min	240 min
+10°C	15 min	80 min	160 min
+20°C	6 min	45 min	90 min
+30°C	4 min	25 min	50 min
+35°C	2 min	20 min	40 min

CF900

Reaction resin mortar, vinylester-based styrene-free

Performance data / Approved application in concrete

Design Values

Attend approvals ETA -05/0133; ETA -05/0134 and ETA -05/0135!				M 10	M 12	M 16
Pull-out and concrete cone failure	C 20/25 (50 °C /80 °C)	$N^0_{Rk,c}$	[kN]	20,0	25,0	35,0
		$N_{Rk,p}$	[kN]			
	C 20/25 (72 °C /120 °C)	$N^0_{Rk,c}$	[kN]	16,0	20,0	30,0
		$N_{Rk,p}$	[kN]			
Increasing factors for concrete	C 30/37	Ψc		1,22		
	C 40/50	Ψc		1,41		
	C 50/60	Ψc		1,55		
Safety factor for tension loads 1,8 acc. to ETAG						
Steel failure without lever arm	quality 5.8	$V_{Rk,s}$	[kN]	15,0	22,0	41,0
	safety factor	γ_{Ms}		1,30		
	quality A 4; HC	$V_{Rk,s}$	[kN]	20,0	30,0	55,0
	safety factor	γ_{Ms}		1,56		
Steel failure with lever arm	quality 5.8	$M^0_{Rk,s}$	[Nm]	39,0	68,0	173,0
	safety factor	γ_{Ms}		1,30		
	quality A 4; HC	$M^0_{Rk,s}$	[Nm]	52,0	92,0	233,0
	safety factor	γ_{Ms}		1,56		

Installation Parameters

			M 10	M 12	M 16
Edge distance	$c_{cr,N}$	[mm]	90	110	125
Min. edge distance	c_{min}	[mm]	45	55	62,5
Axial distance	$s_{cr,N}$	[mm]	180	220	250
Min. axial distance	s_{min}	[mm]	90	110	125
Anchorage depth	h_{ef}	[mm]	90	110	125
Minimum part thickness	h_{min}	[mm]	130	160	160
Thread diameter	d	[mm]	10	12	16
Drill diameter	d_B	[mm]	12	14	18
Brush paramater	d_{brush}	[mm]	14	16	20
Hole diameter in part	d_{part}	[mm]	12	14	18
Tightening torque	$T_{inst.}$	[Nm]	20	40	60

ETA
CE
Europäische Technische Zulassung - Option 7 für ungerissenen Beton

- ETA-05/0133
- ETA-05/0134
- ETA-05/0135

CF900

Reaction resin mortar, vinylester-based styrene-free

Performance data / Standard application in concrete

Design Values

Design value	Concrete			M 8	M 10	M 12	M 16	M 20
Vinylester	≧ C 20/25	N_{Rk}	[kN]	15,9	25,0	34,9	49,9	74,6
		N_{Rd}	[kN]	8,8	13,9	19,4	27,7	41,5
Safety factor for tension loads 1,8 acc. to ETAG								
Vinylester	Steel quality 5.8	V_{Rk}	[kN]	8,3	12,9	18,9	35,3	55,1
		V_{Rd}	[kN]	5,3	8,3	12,1	22,6	35,3
		rec. torque		12,9	25,6	44,8	113,7	222,9
Vinylester	Steel quality A4	V_{Rk}	[kN]	9,2	14,5	21,1	39,3	61,3
		V_{Rd}	[kN]	5,9	9,3	13,5	25,2	39,3
		rec. torque		12,0	23,9	41,9	106,7	207,9

Safety factor for share loads 1,56 acc. to ETAG

Recommended Loads

Resin	Concrete			M 8	M 10	M 12	M 16	M 20
Vinylester	≧ C 20/25	$F_{rec.}$	[kN]	6,3	9,9	13,9	19,8	29,6

Installation Parameters

Edge distance	$c_{cr,N}$	[mm]	80	90	110	130	170
Min. edge distance	c_{min}	[mm]	40	50	60	70	90
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340
Min. axial distance	s_{min}	[mm]	80	90	110	125	170
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170
Minimum part thickness	h_{min}	[mm]	130	140	160	175	220
Thread diameter	d	[mm]	8	10	12	16	20
Drill diameter	d_B	[mm]	10	12	14	18	24
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22
Tightening torque	$T_{inst.}$	[Nm]	10	20	40	60	120

CF900

Reaction resin mortar, vinylester-based styrene-free

Recommended Loads

Performance data / Hollow brick

Recommended loads			Standard sleeve				Approved sleeve *	
Stone	Strength class		M 6	M 8	M 10	M 12	M 8	M 10
Hollow brick	Hlz 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	0,3	0,3
	Hlz 6		0,4	0,4	0,4	0,4	0,4	0,4
	Hlz 12		0,7	0,8	0,8	0,8	0,8	0,8
Sand-lime hollow brick	KSL 4	$F_{rec.}$ [kN]	0,3	0,4	0,4	0,4	0,4	0,4
	KSL 6		0,4	0,6	0,6	0,6	0,6	0,6
	KSL 12		0,7	0,8	0,8	0,8	0,8	0,8
Sand-lime solid brick	KS 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7	1,7	1,7
Solid brick	Mz 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	-	-
	Hbl 4		0,5	0,6	0,6	0,6	-	-
Concrete hollow brick	Hbn 4	$F_{rec.}$ [kN]	0,5	0,6	0,6	0,6	-	-
Standard sleeve	12x50	[mm]	x					
	15x85			x	x	x		
	15x130				x	x		
Approved sleeve	SH 13x100	[mm]					x	
	SH 15x100							x

Installation Parameters

Installation parameters			Standard sleeve				Approved sleeve *	
Axial distance plug group	$s_{cr,N}$	[mm]	Hlz, KSL, Mz, KS = 100 Hbl, Hbn = 200				100	
Min. axial distance plug group	min s	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 200				50	
Axial distance between single plugs	$s_{singl.}$	[mm]	250				250	
Edge distance	$c_{cr,N}$	[mm]	250				200	250
Min. edge distance	min c	[mm]	250				50	60
Drilling depth	h_{ef}	[mm]	55	90	90	90	105	105
Drilling depth without sleeve	h_{ef}	[mm]	65	85	95	100	85	95
Min. part thickness	min h	[mm]	110				110	
Drill diameter	d_B	[mm]	13	16	16	16	14	16
Hole diameter in part	d_{Bau}	[mm]	7	9	12	14	9	12
Tightening torque	$T_{inst.}$	[Nm]	3	8	8	8	2	2

* See approval Z-21.3-1800

CF900

Reaction resin mortar, vinylester-based styrene-free

Fire Resistance Classification

Fire resistance classification of Pattex injection anchors with styrol-free vinylester in combination with anchor rods of sizes M 8 to M 20 of galvanised steel, in relation to maximum centric tension.

Recommended Loads

Resin	Resistance class		M 8	M 10	M 12	M 16	M 20
Vinylester (valid for standard and approved applications)	F30	F_{fire} [kN]	≦1,90	≦4,50	≦6,00	≦11,00	≦16,00
	F60	F_{fire} [kN]	≦0,85	≦2,10	≦3,00	≦6,60	≦9,00
	F90	F_{fire} [kN]	≦0,55	≦1,35	≦2,00	≦4,90	≦6,40
	F120	F_{fire} [kN]	≦0,40	≦1,00	≦1,50	≦4,00	≦5,00

Feuerwider-standsklasse F 120

Materialprüfanstalt f. d. Bauwesen Braunschweig MPA BS 3

Product Details
CF900 Chemical Resistance

CHEMICAL RESISTANT

CF900
Resistance of cured CF900 vinylester resin – styrene-free to different chemical agents at 20°C

Chemical agent	Concentration weight %	Resistant	Partly resistant	Not resistant
Aceton	5		x	
Formic acid	30	x		
Ammonia	conc.		x	
Aniline			x	
Ethanol	96		x	
Boric acid, aq.	all	x		
Calcium hydroxide			x	
Diesel fuel		x		
Acetic acid	10	x		
Acetic acid	40		x	
Acetic acid	80		x	
Formaldehyde, aq.	50	x		
Formaldehyde, aq.	20			x
Ethylenglycol		x		
Fuel oil		x		
Isopropyl alcohol		x		
Potassium hydroxyde	20		x	
Potassium hydroxyde	conc.		x	
Potassium carbonate, aq.	all		x	
Potassium chloride, aq.	all	x		
Potassium nitrate, aq.	all	x		
Linseed oil		x		
Magnesium chloride, aq.	all	x		
Methanol				x
Lactic acid	10	x		
Lactic acid	80	x		
Sodium chloride, aq.	all	x		
Sodium phosphate, aq.	all	x		
Sodium hydroxide	20		x	
Spdium hydroxide	50		x	
Oleic acid		x		
Phenol, aq.	1		x	
Phenol, aq.	5			x
Phosphoric acid	80	x		
Phosphoric acid	95		x	
Nitric acid	30		x	
Hydrochloric acid	all			x
Sulfuric acid, aq.	< 50	x		
Tetrachloroethylene			x	
Carbon tetrachloride		x		
Toluene				x
Trichloroethylene				x
Sodium silicate, aq.	all		x	
Tartaric acid, aq.		x		
Citric acid, aq.	50	x		
Kerosine		x		
Sulphate ion		x		

Product Details
CF900 Certification


Deutsches Institut für Bautechnik

DIBt

European Technical Approval ETA-05/0133

EOTA

European Technical Approval

ETA-05/0133
ETA-05/0134
ETA-05/0135

CF900 Certification
Deutsches Institut für Bautechnik (DIBt)

European Technical Approval

ETA-05/0133
ETA-05/0134
ETA-05/0135

Valid until: June 10, 2010

The European Technical Approval (ETA) for CF900 is an approval for a bonded anchor (injection type) with anchor rods of sizes M 10, M 12 and M 16. The approval includes three different steel qualities: 5.8 (galvanized steel), A4 (stainless steel) and HC (stainless steel 1.4529/1.4565).

The Pattex CF900 with anchor rod is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar Pattex CF900 and an anchor rod with hexagon nut and washer in the range of M 10, M 12 and M 16. The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between anchor rod, injection mortar and concrete.

Note

Europäische Technische Zulassung - Option 7 für ungerissenen Beton

ETA-05/0133
ETA-05/0134
ETA-05/0135

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification documents.

Product Details
CF900 Certification


DEUTSCHES INSTITUT FÜR BAUTECHNIK

Allgemeine bauaufsichtliche Zulassung

CF900 Certification
Deutsches Institut für Bautechnik (DIBt)

National Technical Approval Z-21.3-1800

Valid until: June 10, 2010

This certification is for the Pattex Composite Anchor System CF900. It consists of the CF900 injection mortar, a perforated sleeve and an anchor bolt with nut in M 8 and M 10 sizes. The anchor bolt (including nut and washer) is made of galvanized or stainless steel.

The anchorage system depends on the bond and positive fit of injection mortar, perforated sleeve, anchor bolt and anchor base.

This certification is for anchoring in hollow brick.
REMINDER: When anchoring in concrete or solid brick a perforated sleeve is not necessary.

Note

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification documents.

Product Details
CF900 Certification

CF900 Certification
Institut Für Baustoffe Massivbau und Brandschutz (iBMB)

Test report number (3392/8845)-CM-of March 03, 2006

Valid until: December 20, 2007 (original)
December 20, 2012 (extension)

This is a test and evaluation of Henkel injection adhesive anchors **Henkel Injection Anchor Pattex CF900** (dimensions M 8 to M 20) in connection with anchor rods made of zinc-plated steel (strength class 5.8), set in the tension zone of reinforced concrete floor sections and subjected to centric applied tensile loads of their fire behavior to determine their fire resistance time.

Note

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification documents.

CF900 ICE

Reaction resin mortar, vinylester-based styrene-free

Concrete / solid stone

1. Areas of Application

Usage

- Heavy load-carrying attachments in solid stone, concrete, porous concrete and light concrete
- Suitable for attachment points close to the edge, since anchoring is free of expansion forces
- Also suitable as repair mortar or adhesive mortar for concrete components
- Attachment of anchor rods, threaded collars, reinforcement bars, profiles etc.

2. Benefits

- Can be used in various solid stones
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Accurate dosage of the compound by means of scaling
- Galvanized steel, stainless steel, highly corrosion-resistant steel

3. Properties

- For use with a special application gun and static mixers
- Temperature resistant up to 80°C; for short periods up to 120°C
- The cartridge is applicable up to a temperature of –20°C
- High chemical resistance
- Storage and application temperature from –20°C up to a max. of 25°C
- Storage life: 18 months for cartridges

Usage Instructions

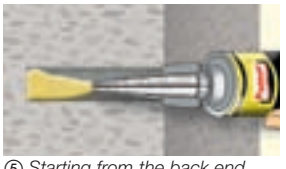
Undersurface: Concrete, solid stone


① Drill hole with percussion drill

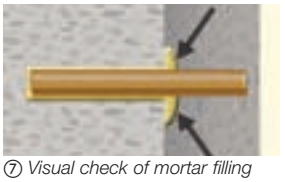

② Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)

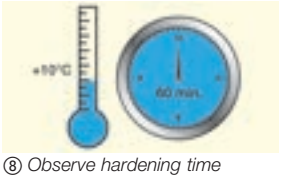

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use

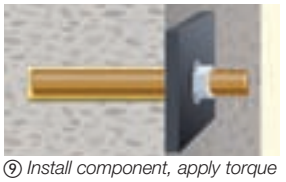

⑤ Starting from the back end, fill hole completely with mortar


⑥ Push anchor into base of hole while turning clockwise


⑦ Visual check of mortar filling



⑧ Observe hardening time


⑨ Install component, apply torque

Pattex

Product Details

CF900 ICE Technical Information

CF900 ICE

Reaction resin mortar, vinylester-based styrene-free

Hollow brick

1. Areas of Application

Usage

- Used for medium-load applications
- The perforated sleeve can be used in hollow bricks, Hlz 4 to DIN 105, sand-lime hollow bricks, KSL 4 to DIN 106, hollow light concrete bricks, Hbl 2 to DIN 18 151 and hollow concrete bricks, Hbn 4 to DIN 18153
- Suitable for attachment of façades, projecting roofs, wooden constructions, metal constructions, metal profiles, consoles, railings, grills, sanitary fittings, pipe connections, cable runs etc.

2. Benefits

- Secure anchoring in hollow brick; high load bearing capacity
- No expansion effect, allowing attachment points to be placed close to edges etc.
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap

3. Properties

- Anchoring by composite form-fitting between injection mortar, sleeve collar, anchor rod and anchoring surface
- Galvanized steel, stainless steel, highly corrosion-resistant steel

Usage Instructions

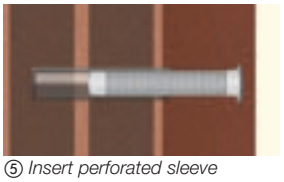
Undersurface: Hollow brick

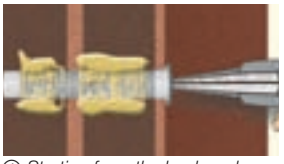

① Drill hole with percussion drill

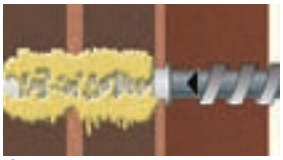

② Clean drill hole (blow out: 2x, brush out: 2x, blow out: 2x)

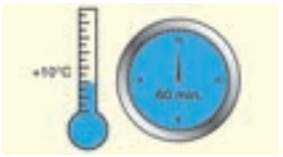

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use


⑤ Insert perforated sleeve


⑥ Starting from the back end, fill perforated sleeve with mortar


⑦ Push anchor into base of sleeve while turning clockwise



⑧ Observe hardening time


⑨ Install component, apply torque

Reaction Characteristics

Temperature	Curing start	Curing time
–20°C	90 min	24 h
–15°C	75 min	16 h
–10°C	60 min	10 h
–5°C	50 min	5 h
0°C	25 min	150 min
5°C	10 min	80 min
10°C	6 min	60 min
15°C	3 min	45 min
20°C	1,5 min	35 min

CF900 ICE

Reaction resin mortar, vinylester-based styrene-free

Performance data / Concrete for standard application

Design Values

Design values	Concrete			M 8	M 10	M 12	M 16	M 20
Vinylester	≧ C 20/25	N_{Rk}	[kN]	15,9	25,0	34,9	49,9	74,6
		N_{Rd}	[kN]	8,8	13,9	19,4	27,7	41,5
Safety factor for tension loads 1,8 acc. to ETAG								
Vinylester	Steel quality 5.8	V_{Rk}	[kN]	8,3	12,9	18,9	35,3	55,1
		V_{Rd}	[kN]	5,3	8,3	12,1	22,6	35,3
		rec. torque		12,9	25,6	44,8	113,7	222,9
Vinylester	Steel quality A4	V_{Rk}	[kN]	9,2	14,5	21,1	39,3	61,3
		V_{Rd}	[kN]	5,9	9,3	13,5	25,2	39,3
		rec. torque		12	23,9	41,9	106,7	207,9

Safety factor for share loads 1,56 acc. to ETAG

Recommended Loads

Design values	Concrete			M 8	M 10	M 12	M 16	M 20
vinylester	≧ C 20/25	$F_{rec.}$	[kN]	6,3	9,9	13,9	19,8	29,6

Installation Parameters

Edge distance	$c_{cr,N}$	[mm]	80	90	110	130	170
Min. edge distance	c_{min}	[mm]	40	50	60	70	90
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340
Min. axial distance	s_{min}	[mm]	80	90	110	125	170
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170
Minimum part thickness	h min	[mm]	130	140	160	175	220
Thread diameter	d	[mm]	8	10	12	16	20
Drill diameter	d_B	[mm]	10	12	14	18	24
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22
Tightening torque	$T_{inst.}$	[mm]	10	20	40	60	120

CF900 ICE

Reaction resin mortar, vinylester-based styrene-free

Performance data / Hollow brick

Recommended Loads

Recommended loads			Standard sleeve			
Stone	**Strength class**		**M 6**	**M 8**	**M 10**	**M 12**
Hollow brick	Hlz 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	Hlz 6		0,4	0,4	0,4	0,4
	Hlz 12		0,7	0,8	0,8	0,8
Sand-lime hollow brick	KSL 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	KSL 6		0,4	0,4	0,4	0,4
	KSL 12		0,7	0,8	0,8	0,8
Sand-lime solid brick	KS 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7
Solid brick	Mz 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	Hbl 4		0,5	0,6	0,6	0,6
Concrete hollow brick	Hbn 4	$F_{rec.}$ [kN]	0,5	0,6	0,6	0,6
Standard sleeve	9x50	[mm]	x			
	13x85			x	x	x
	13x130				x	x
Approved sleeve	SH 13x100	[mm]				
	SH 15x100					

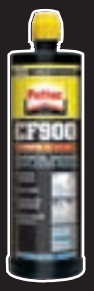
Installation Parameters

Installation parameters			Standard sleeve			
Axial distance plug group	$s_{cr,N}$	[mm]	Hlz, KSL, Mz, KS = 100 Hbl, Hbn = 200			
Min. axial distance plug group	min s	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 200			
Axial distance between single plugs	$s_{singl.}$	[mm]	250			
Edge distance	$c_{cr,N}$	[mm]	250			
Min. edge distance	min c	[mm]	250			
Drilling depth	h_{ef}	[mm]	55	90	90	90
Drilling depth without sleeve	h_{ef}	[mm]	65	85	95	100
Minimum part thickness	h min	[mm]	110			
Drill diameter	d_B	[mm]	11	16	16	16
Hole diameter in part	d_{Bau}	[mm]	7	9	12	14
Tightening torque	$T_{inst.}$	[Nm]	3	8	8	8

Pattex

Product Details

CF900 TROPIC Technical Information



CF900 TROPIC

Reaction resin mortar, vinylester-based styrene-free

Concrete / solid stone

1. Areas of Application

Usage

- Heavy load-carrying attachments in solid stone, concrete, porous concrete and light concrete
- Suitable for attachment points close to the edge, since anchoring is free of expansion forces
- Also suitable as repair mortar or adhesive mortar for concrete components
- Attachment of anchor rods, threaded collars, reinforcement bars, profiles etc.

2. Benefits

- Can be used in various solid stones
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Accurate dosage of the compound by means of scaling
- Galvanized steel, stainless steel, highly corrosion-resistant steel

3. Properties

- For use with a special application gun and static mixers
- Bending tensile strength mean value of 37 N/mm²
- Compression strength mean value of 103 N/mm²
- Dynamic elasticity module mean value of 1200 N/mm²
- Raw density mean value of 1,61 kg/dm³
- Temperature resistant up to 80°C; for short periods up to 120°C
- Application temperature of the cartridge should be at least 20°C
- High chemical resistance
- Storage temperature from 5°C up to a max. of 25°C
- Storage life: 18 months for cartridges, 9 months for foil tubes

Usage Instructions

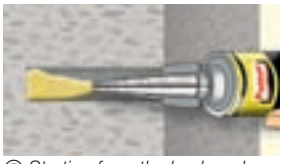
Undersurface: Concrete, solid stone


① Drill hole with percussion drill

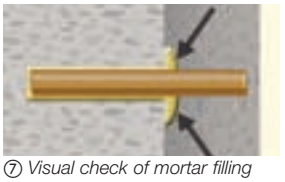

② Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)

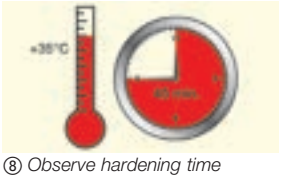

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use

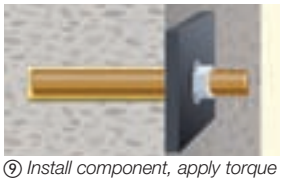

⑤ Starting from the back end, fill hole completely with mortar


⑥ Push anchor into base of hole while turning clockwise


⑦ Visual check of mortar filling

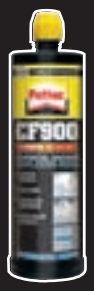


⑧ Observe hardening time


⑨ Install component, apply torque

Materialprüfanstalt f. d. Bauwesen
MPA NRW
Nordrhein-Westfalen

Product Details
CF900 TROPIC Technical Information



CF900 TROPIC
Reaction resin mortar, vinylester-based styrene-free

Hollow brick

1. Areas of Application

Usage

- Used for medium-load applications
- The perforated sleeve can be used in hollow bricks, Hlz 4 to DIN 105, sand-lime hollow bricks, KSL 4 to DIN 106, hollow light concrete bricks, Hbl 2 to DIN 18 151 and hollow concrete bricks, Hbn 4 to DIN 18 153
- Suitable for attachment of façades, projecting roofs, wooden constructions, metal constructions, metal profiles, consoles, railings, grills, sanitary fittings, pipe connections, cable runs etc.

2. Benefits

- Secure anchoring in hollow brick; high load bearing capacity
- No expansion effect, allowing attachment points to be placed close to edges etc.
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap

3. Properties

- Anchoring by composite form-fitting between injection mortar, sleeve collar, anchor rod and anchoring surface
- Galvanized steel, stainless steel, highly corrosion-resitant steel

Usage Instructions

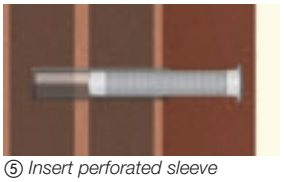
Undersurface: Hollow brick

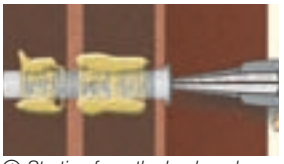

① Drill hole with percussion drill

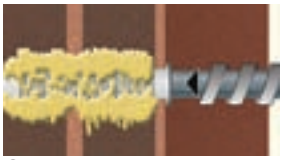

② Clean drill hole (blow out: 2x, brush out: 2x, blow out: 2x)


③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use


⑤ Insert perforated sleeve


⑥ Starting from the back end, fill perforated sleeve with mortar


⑦ Push anchor into base of sleeve while turning clockwise


⑧ Observe hardening time


⑨ Install component, apply torque

Reaction Characteristics

Temperature	Curing start	Curing end
5°C	60 min	240 min
10°C	45 min	180 min
20°C	16 min	120 min
30°C	6 min	60 min
32°C	5 min	55 min
35°C	3 min	45 min
40°C	2 min	25 min
45°C	1,5 min	15 min

CF900 TROPIC

Reaction resin mortar, vinylester-based styrene-free

Performance data / Concrete standard application

Design Values

Design value	Concrete			M 8	M 10	M 12	M 16	M 20
Vinylester	≧ C 20/25	N_{Rk}	[kN]	15,9	25,0	34,9	49,9	74,6
		N_{Rd}	[kN]	8,8	13,9	19,4	27,7	41,5
Safety factor for tension loads 1,8 acc. to ETAG								
Vinylester	Steel quality 5.8	V_{Rk}	[kN]	8,3	12,9	18,9	35,3	55,1
		V_{Rd}	[kN]	5,3	8,3	12,1	22,6	35,3
		rec. torque		12,9	25,6	44,8	113,7	222,9
Vinylester	Steel quality A4	V_{Rk}	[kN]	9,2	14,5	21,1	39,3	61,3
		V_{Rd}	[kN]	5,9	9,3	13,5	25,2	39,3
		rec. torque		12,0	23,9	41,9	106,7	207,9

Safety factor for share loads 1,56 acc. to ETAG

Recommended Loads

Resin	Concrete			M 8	M 10	M 12	M 16	M 20
Vinylester	≧ C 20/28	$F_{rec.}$	[kN]	6,3	9,9	13,9	19,8	29,6

Installation Parameters

Edge distance	$c_{cr,N}$	[mm]	80	90	110	130	170
Min. edge distance	c_{min}	[mm]	40	50	60	70	90
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340
Min. axial distance	s_{min}	[mm]	80	90	110	125	170
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170
Minimum part thickness	h min	[mm]	130	140	160	175	220
Thread diameter	d	[mm]	8	10	12	16	20
Drill diameter	d_B	[mm]	10	12	14	18	24
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22
Tightening torque	$T_{inst.}$	[Nm]	10	20	40	60	120

Pattex

Product Details

CF900 TROPIC Technical Information

CF900 TROPIC

Reaction resin mortar, vinylester-based styrene-free

Performance data / Hollow brick

Recommended Loads

Recommended loads			Standard sleeve			
Stone	**Strength class**		**M 6**	**M 8**	**M 10**	**M 12**
Hollow brick	Hlz 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	Hlz 6		0,4	0,4	0,4	0,4
	Hlz 12		0,7	0,8	0,8	0,8
Hand-lime hollow brick	KSL 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	KSL 6		0,4	0,4	0,4	0,4
	KSL 12		0,7	0,8	0,8	0,8
Hand-lime solid brick	KS 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7
Solid brick	Mz 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3
	Hbl 4		0,5	0,6	0,6	0,6
Concrete hollow brick	Hbn 4	$F_{rec.}$ [kN]	0,5	0,6	0,6	0,6
Standard sleeve	9x50	[mm]	x			
	13x85			x	x	x
	13x130				x	x
Approved sleeve	SH 13x100	[mm]				
	SH 15x100					

Installation Parameters

Installation parameters			Standard sleeve			
Axial distance plug group	$s_{cr,N}$	[mm]	Hlz, KSL, Mz, KS = 100 Hbl, Hbn = 200			
Min. axial distance plug group	min s	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 200			
Axial distance between single plugs	$s_{singl.}$	[mm]	250			
Edge distance	$c_{cr,N}$	[mm]	250			
Min. edge distance	min c	[mm]	250			
Drilling depth	h_{ef}	[mm]	55	90	90	90
Drilling depth without sleeve	h_{ef}	[mm]	65	85	95	100
Minimum part thickness	h min	[mm]	110			
Drill diameter	d_B	[mm]	11	16	16	16
Hole diameter in part	d_{Bau}	[mm]	7	9	12	14
Tightening torque	$T_{inst.}$	[Nm]	3	8	8	8

Product Details
CF920 Technical Information

CF920
Reaction resin mortar, vinylester-based styrene-free

Concrete / solid stone

1. Areas of Application

Usage

- Heavy load-carrying attachments in solid stone, concrete, porous concrete and light concrete
- Suitable for attachment points close to the edge, since anchoring is free of expansion forces
- Also suitable as repair mortar or adhesive mortar for concrete components
- Attachment of anchor rods, threaded collars, reinforcement bars, profiles etc.

2. Benefits

- Can be used in various solid stones
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Accurate dosage of the compound by means of scaling
- Galvanized steel, stainless steel, highly corrosion-resistant steel
- Safe for use as a component in a drinking water system

3. Properties

- For use with a special application gun and static mixers
- Bending tensile strength mean value of 17 N/mm²
- Compression strength mean value of 80 N/mm²
- Dynamic elasticity module mean value of 4087 N/mm²
- Raw density mean value of 1,66 kg/dm³
- Temperature resistant up to 80°C; for short periods up to 120°C
- Application temperature of the cartridge should be at least 20°C
- High chemical resistance
- Storage temperature from 5°C up to a max. of 25°C
- Storage life: 18 months for cartridges, 12 month for foil tubes

Usage Instructions

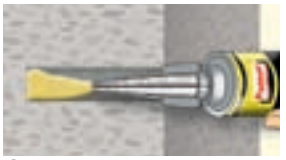
Undersurface: Concrete, solid stone


① Drill hole with percussion drill


② Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)

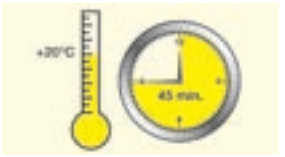

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use


⑤ Starting from the back end, fill hole completely with mortar


⑥ Push anchor into base of hole while turning clockwise


⑦ Visual check of mortar filling



⑧ Observe hardening time


⑨ Install component, apply torque

Europäische Technische Zulassung + Option 7 für ungerissenen Beton

Feuerwiderstandsklasse F 120

Certified to NSF/ANSI 61

Product Details
CF920 Technical Information

CF920
Reaction resin mortar, vinylester-based styrene-free

Hollow brick

1. Areas of Application

Usage

- Used for medium-load applications
- The perforated sleeve can be used in hollow bricks, Hlz 4 to DIN 105, sand-lime hollow bricks, KSL 4 to DIN 106, hollow light concrete bricks, Hbl 2 to DIN 18 151 and hollow concrete bricks, Hbn 4 to DIN 18 153
- Suitable for attachment of façades, projecting roofs, wooden constructions, metal constructions, metal profiles, consoles, railings, grills, sanitary fittings, pipe connections, cable runs etc.

2. Benefits

- Secure anchoring in hollow brick; high load bearing capacity
- No expansion effect, allowing attachment points to be placed close to edges etc.
- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap

3. Properties

- Anchoring by composite form-fitting between injection mortar, sleeve collar, anchor rod and anchoring surface
- Galvanized steel, stainless steel, highly corrosion-resistant

Usage Instructions

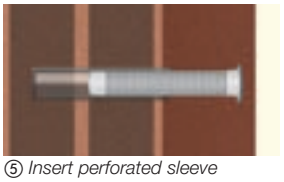
Undersurface: Hollow brick

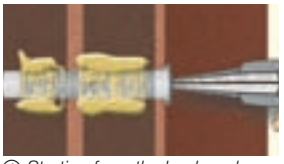

① *Drill hole with percussion drill*

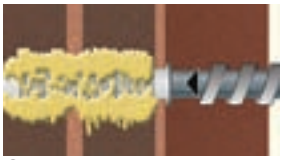

② *Clean drill hole (blow out: 2x, brush out: 2x, blow out: 2x)*

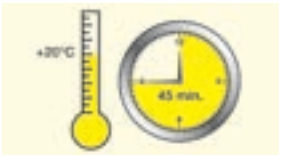

③ *Screw mixer to cartridge*

④ *Squeeze out and discard approx. 10 cm of compound before use*


⑤ *Insert perforated sleeve*


⑥ *Starting from the back end, fill perforated sleeve with mortar*


⑦ *Push anchor into base of sleeve while turning clockwise*



⑧ *Observe hardening time*


⑨ *Install component, apply torque*

Reaction Characteristics

Underground temperature	Curing start	Curing end dry underground	Curing end wet underground
–5°C	90 min	840 min	1680 min
0°C	45 min	420 min	840 min
+5°C	25 min	120 min	240 min
+10°C	15 min	80 min	160 min
+20°C	6 min	45 min	90 min
+30°C	4 min	25 min	50 min
+35°C	2 min	20 min	40 min

Product Details
CF920 Technical Information

CF920
Reaction resin mortar, vinylester-based styrene-free

Performance data / Concrete standard application

Design Values

Resin	Temperature	Anchor		M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30
Tension load	24°C/ 40°C	N_{Rk}	[kN]	20,1	33,9	49,8	75,4	128,2	174,2	203,6	237,5
		N_{Rd}	[kN]	11,2	18,8	27,6	41,9	71,2	96,8	113,1	131,9
	50°C/ 80°C	N_{Rk}	[kN]	15,1	25,4	37,3	56,5	96,1	134,6	152,7	171,5
		N_{Rd}	[kN]	8,4	14,1	20,7	31,4	53,4	74,8	84,8	95,3
Safety factor for tension loads 1,8 acc. to ETAG											
Shear load	Steel quality 5.8	V_{Rk}	[kN]	9,8	16,0	22,9	43,2	67,5	97,2	128,7	155,7
		V_{Rd}	[kN]	7,9	12,8	18,3	34,6	54,0	77,8	102,5	124,6
		rec. torque		12,7	25,6	45,1	117,1	229,0	394,8	597,4	800,5
	Steel quality A4	V_{Rk}	[kN]	13,8	22,4	32,0	60,5	94,5	136,1	179,3	218,0
		V_{Rd}	[kN]	8,8	14,4	20,5	38,8	60,6	87,2	115,0	139,7
		rec. torque		14,3	28,7	50,5	177,3	256,3	442,9	670,1	898,0

Recommended Loads

Safety factor for share loads 1,25 for 5.8 and 1,56 for A4 acc. to ETAG

Resin	Concrete			M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30
Tension load	24°C/ 40°C	$N_{rec.}$	[kN]	8,0	13,5	19,7	29,9	50,9	69,1	80,8	94,2
	50°C/ 80°C	$N_{rec.}$	[kN]	6,0	10,1	14,8	22,4	38,1	53,4	60,6	68,1
Shear load	Steel quality 5.8	$V_{rec.}$	[kN]	5,6	9,1	13,1	24,7	38,6	55,5	73,2	89,0
	Steel quality A4	$V_{rec.}$	[kN]	6,3	10,3	14,7	27,7	43,3	62,3	82,1	99,8

Installation Parameters

			M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30
Edge distance	$c_{cr,N}$	[mm]	120	135	165	187,5	255	315	360	420
Min. edge distance	c_{min}	[mm]	40	50	60	80	100	120	135	150
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340	420	480	560
Min. axial distance	s_{min}	[mm]	40	50	60	80	100	120	135	150
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170	210	240	280
Min. part thickness	hmin	[mm]	110	120	140	157	210	258	294	340
Thread diameter	d	[mm]	8	10	12	16	20	24	24	30
Drill diameter	d_B	[mm]	10	12	14	18	24	28	28	35
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22	26	29	32
Tightening torque	$T_{inst.}$	[Nm]	10	20	40	60	120	180	220	250

Pattex

Product Details

CF920 Technical Information

CF920

Reaction resin mortar, vinylester-based styrene-free

Recommended Loads

Performance data / Hollow brick

Recommended loads			Standard sleeve				Approved sleeve	
Stone	Strength class		M 6	M 8	M 10	M 12	M 8	M 10
Hollow brick	Hlz 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	0,3	0,3
	Hlz 6		0,4	0,4	0,4	0,4	0,4	0,4
	Hlz 12		0,7	0,8	0,8	0,8	0,8	0,8
Sand-lime hollow brick	KSL 4	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	0,3	0,3
	KSL 6		0,4	0,4	0,4	0,4	0,4	0,4
	KSL 12		0,7	0,8	0,8	0,8	0,8	0,8
Sand-lime solid brick	KS 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7	1,7	1,7
Solid brick	Mz 12	$F_{rec.}$ [kN]	0,5	1,7	1,7	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	$F_{rec.}$ [kN]	0,3	0,3	0,3	0,3	–	–
	Hbl 4		0,5	0,6	0,6	0,6	–	–
Concrete hollow brick	Hbn 4	$F_{rec.}$ [kN]	0,5	0,6	0,6	0,6	–	–
Standard sleeve	9x50	[mm]	x					
	13x85			x	x	x		
	13x130				x	x		
Approved sleeve	SH 13x100	[mm]					x	
	SH 15x100							x

Installation Parameters

Installation parameters			Standard sleeve				Approved sleeve	
Axial distance plug group	$s_{cr,N}$	[mm]	Hlz, KSL, Mz, KS = 100 Hbl, Hbn = 200				100	
Min. axial distance plug group	min s	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 200				50	
Axial distance between single plugs	$s_{singl.}$	[mm]	250				250	
Edge distance	$c_{cr,N}$	[mm]	250				200	250
Min. edge distance	min c	[mm]	250				50	60
Drilling depth	h_{ef}	[mm]	55	90	90	90	105	105
Drilling depth without sleeve	h_{ef}	[mm]	65	85	95	100	85	95
Min. part thickness	min h	[mm]	110				110	
Drill diameter	d_B	[mm]	13	16	16	16	14	16
Hole diameter in part	d_{Bau}	[mm]	7	9	12	14	9	12
Tightening torque	$T_{inst.}$	[Nm]	3	8	8	8	2	2

Product Details
CF920 Certification

CF920 Certification
Deutsches Institut für Bautechnik (DIBt)

European Technical Approval

Certification Pending Completion

The European Technical Approval (ETA) for CF920 is an approval for a bonded anchor (injection type) with anchor rod sizes of M 8 to M 30. The approval includes three different steel qualities: 5.8 (galvanized steel), A4 (stainless steel) and HC (stainless steel 1.4529/1.4565).

The Pattex CF920 with anchor rod is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar Pattex CF920 and an anchor rod with hexagon nut and washer in the range of M 8 to M 30. The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between anchor rod, injection mortar and concrete.

Note

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification documents.

Product Details
CF920 Certification

CF920 Certification
Institut Für Baustoffe Massivbau und Brandschutz (iBMB)

Test report number (3290/0966)-NB-of March 06, 2008

Valid until: March 6, 2013

This is a test and evaluation of Henkel injection adhesive anchors **Henkel Injection Anchor Pattex CF920** (dimensions M 8 to M 30) in connection with anchor rods made of zinc-plated steel (strength class 5.8), set in the tension zone of reinforced concrete floor sections and subjected to centric applied tensile loads of their fire behavior to determine their fire resistance classification.

Note

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

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Pattex

Product Details
CF920 Certification

CF920 Certification
International Code Council-Evaluation Service

ICC - ES

Certification pending completion

The International Code Council Evaluation Service (ICC-ES) for CF920 is an approval for a bonded anchor (injection type) with anchor rod sizes of M 8 to M 30. The approval includes three different steel qualities: 5.8 (galvanized steel), A4 (stainless steel) and HC (stainless steel 1.4529/1.4565).

Note

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Product Details
CF920 Certification

CF920 Certification

NSF International (NSF)

NSF/ANSI Standard 61 covers indirect additive products and materials, including process media, protective materials, joining and sealing materials, pipes and related products, mechanical devices, and mechanical plumbing devices (including faucets). In essence, every type of material from the well or water intakes through to the faucet are covered.

NSF/ANSI Standard 61 addresses crucial aspects of drinking water system components: whether or not contaminants that leach or migrate from the product/material into the drinking water are above acceptable levels in finished waters.

Note

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Pattex

Product Details
CF1000 Technical Information

CF1000
Epoxy-Resin-System

Concrete / solid stone

1. Areas of Application

Usage

- For concrete
- For building reconstruction and renovation
- For difficult anchoring in any kind of material

2. Benefits

- Cartridge can be used until the expiration date by replacing either the static mixer or resealing cartridge with the sealing cap
- Water-impermeable joint, i.e. no water can penetrate into the hole at the side of the adhesive compound
- Safe for use as a component in a drinking water system

3. Properties

- High chemical resistance
- Flexible working time elevated temperatures
- Good wetting ability
- Flexible setting of bore diameter/anular gap
- Good performance in diamond drilled holes
- No shrinkage
- Performance approved by the indepedent institute EMPA (report no. 431 899 1)
- Strong and secure anchoring even under water
- Transport and storage temperatures: +5°C to +25°C

Usage Instructions

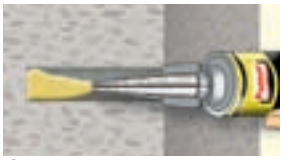
Undersurface: Concrete, solid stone


① Drill hole with percussion drill


② Clean drill hole (blow out: 4x, brush out: 4x, blow out: 4x)

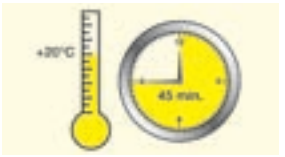

③ Screw mixer to cartridge

④ Squeeze out and discard approx. 10 cm of compound before use


⑤ Starting from the back end, fill hole completely with mortar


⑥ Push anchor into base of hole while turning clockwise


⑦ Visual check of mortar filling



⑧ Observe hardening time


⑨ Install component, apply torque

NSF
Certified to NSF/ANSI 61

Reaction Characteristics

Underground temperature	Curing start	Curing end dry concrete	Curing end wet or submerged concrete
0°C	180 min	72 h	144 h
10°C	120 min	30 h	60 h
20°C	30 min	10 h	20 h
30°C	20 min	6 h	12 h
40°C	12 min	4 h	8 h

CF1000
Epoxy-Resin-System

Performance data / Concrete for standard application

Design Values

Design value	Concrete			M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30	M 33	M 36	M 39
Tension loads	20°C/40°C	N_{Rk}	[kN]	30,1	42,4	58,0	81,6	128,1	189,9	244,2	290,1	321,2	384,3	407,8
		N_{Rd}	[kN]	16,7	23,6	32,2	45,4	71,2	105,5	135,6	161,2	178,5	213,5	226,6
Tension loads	50°C/80°C	N_{Rk}	[kN]	16,1	21,2	29,0	40,8	69,4	95,0	122,1	145,1	160,6	192,2	203,9
		N_{Rk}	[kN]	8,9	11,8	16,1	22,7	38,6	52,8	67,8	80,6	89,2	106,8	113,3
Safety factor for tension loads 1,8 acc. to ETAG														
Share loads	Steel quality 5.8	V_{Rk}	[kN]	9,9	15,8	22,9	43,2	67,5	97,2	128,1	155,7	194,0	227,7	273,9
		V_{Rd}	[kN]	7,9	12,6	18,3	34,6	54,0	77,8	102,5	124,6	155,2	182,2	219,1
		rec. torque		12,9	25,6	44,8	113,7	222,9	394,8	597,4	800,5	1113,7	1415,7	1867,7
	Steel quality A4	V_{Rk}	[kN]	13,8	22,1	32,0	60,5	94,5	136,1	179,3	218,0	271,7	318,8	383,5
		V_{Rd}	[kN]	8,9	14,1	20,5	38,8	60,6	87,2	115,0	139,7	174,1	204,3	245,8
		rec. torque		14,3	28,7	50,5	131,2	256,3	442,9	670,1	898,0	1249,3	1588,1	2095,2

Safety factor for share loads 1,25 for steel quality 5.8 and 1.56 for A4 acc. to ETAG

Recommended Loads

Resin	Concrete			M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30	M 33	M 36	M 39
Recommended tension loads	20 °C/40 °C	$N_{rec.}$	[kN]	12,0	16,8	23,0	32,4	50,8	75,4	96,9	115,1	127,5	152,5	161,8
	50 °C/80 °C	$N_{rec.}$	[kN]	6,4	8,4	11,5	16,2	27,5	37,7	48,4	57,6	63,7	76,3	80,9
Recommended shear loads	Steel quality 5.8	$V_{rec.}$	[kN]	5,6	9,0	13,1	24,7	38,6	55,5	73,2	89,0	110,9	130,1	156,5
	Steel quality A4	$V_{rec.}$	[kN]	6,3	10,1	14,7	27,7	43,3	62,3	82,1	99,8	124,4	146,0	175,6

Installation Parameters

Edge distance	$c_{cr,N}$	[mm]	80	90	110	125	170	210	240	280	310	340	370
Min. edge distance	c_{min}	[mm]	40	50	60	70	90	120	135	150	165	180	195
Axial distance	$s_{cr,N}$	[mm]	160	180	220	250	340	420	480	560	620	680	740
Min. axial distance	s_{min}	[mm]	40	50	60	70	90	120	135	150	165	180	195
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170	210	240	280	310	340	370
Min. part thickness	h min	[mm]	130	140	160	175	220	260	300	340	380	410	450
Thread diameter	d	[mm]	8	10	12	16	20	24	27	30	33	36	39
Drill diameter	d_B	[mm]	10	12	14	18	24	28	32	35	38	41	44
Hole diameter in part	d_{Bau}	[mm]	9	11	13,5	17,5	22	26	28	32	34	37	40
Tightening torque	$T_{inst.}$	[Nm]	10	20	40	60	120	150	220	250	800	1000	1300

CF1000
Epoxy-Resin-System

Performance data / Rebar application in concrete

Parameter

Rebar diameter	D_{rebar}	[mm]	8	10	12	14	16	18	20	22	25	28	32	36	40
Stress area	A_s	[mm²]	50,3	78,5	113,1	153,9	201,1	254,502	314,2	380,182	490,9	615,8	804,2	1017,9	1256,6
Tensile strength	f_{uk}	[N/mm²]	550												
Yield stress	f_{yk}	[N/mm²]	500												
Hole diameter	min D	[mm]	10	12	16	18	20	22	25	28	30	35	40	42	48
	max D	[mm]	12	14	18	20	22	25	28	30	32	37			
Embed-ment depth	min h_{ef}	[mm]	80	90	110	115	125	150	170	190	210	260	310	340	370

Bonding strength without influence of edge and axial distance

Bonding strength 1)	$f_{b,m}$	[N/mm²]	23,1	23,1	23,1	23,1	23,1	21,5	20,1	18,9	17,4	16,2	14,9	13,8	12,9
Bonding strength 2)	$f_{b,k}$	[N/mm²]	15,7	15,7	15,7	15,7	15,7	14,6	13,6	12,8	11,8	11,0	10,1	9,4	8,8
Bonding strength 3)	$f_{b,d}$	[N/mm²]	7,3	7,3	7,3	7,3	7,3	6,8	6,3	5,9	5,5	5,1	4,7	4,4	4,1

1) $f_{b,m}$ = ultimate bonding strength

2) $f_{b,k}$ = characteristic value of the bonding strength

3) $f_{b,d}$ = design value of the bonding strength including the safety factor 2.16

Factor of the concrete strength fsc

Strength class	C20/25	0,83
	C25/30	0,92
	C30/37	1,00
	C40/50	1,15

Factor for wet or submerged concrete fwc

Dry concrete	Wet concrete	Submerged concrete
1,0	0,9	0,6

The basic anchorage length l_b can be calculated from

$l_b = (ø \times f_{y,d}) / (4 \times f_{b,d} \times f_{sc})$

with $f_{y,d}$ design yield strength of post installed rebar.

Product Details
CF1000 Certification

CF1000 Certification
Deutsches Institut für Bautechnik (DIBt)

European Technical Approval

Certification pending completion

The European Technical Approval (ETA) for CF1000 is an approval for a bonded anchor (injection type) with anchor rod sizes of M 8 to M 30. The approval includes three different steel qualities: 5.8 (galvanized steel), A4 (stainless steel) and HC (stainless steel 1.4529/1.4565).

The Pattex CF1000 with anchor rod is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar Pattex CF1000 and an anchor rod with hexagon nut and washer in the range of M 8 to M 30. The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between anchor rod, injection mortar and concrete.

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Product Details
CF1000 Certification

CF1000 Certification
Institut Für Baustoffe Massivbau und Brandschutz (iBMB)

Test report pending completion

This is a test and evaluation of Henkel injection adhesive anchors **Henkel Injection Anchor Pattex CF1000** (dimensions M 8 to M 30) in connection with anchor rods made of zinc-plated steel (strength class 5.8), set in the tension zone of reinforced concrete floor sections and subjected to centric applied tensile loads of their fire behavior to determine their fire resistance classification.

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Product Details
CF1000 Certification

CF1000 Certification
International Code Council Evaluation Service

ICC - ES

Certification pending completion

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Product Details
CF1000 Certification

CF1000 Certification

NSF International (NSF)

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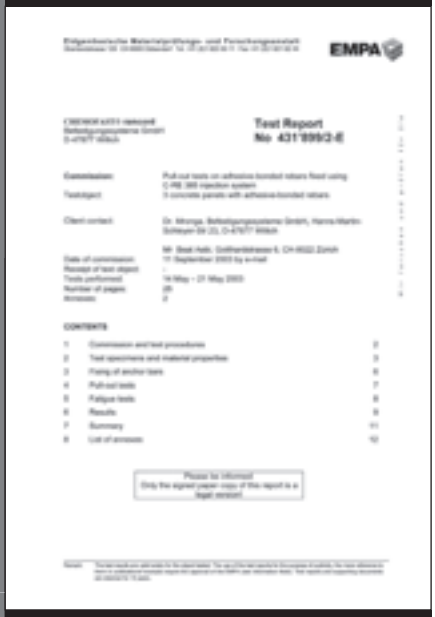
Product Details
CF1000 Certification



EMPA

Test Report
No 431'899/2-E

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Please be informed
Only the signed paper copy of this report is a legal version

CF1000 Certification
Eidgenössische Materialprüfungs- und Forschungsanstalt (EMPA)

Test report number 431'899/2-E

This document outlines the test results for the behavior of adhesive-bonded concrete rebars (reinforcing bars) when subjected to static tensile and fatigue loads up to anchorage failure.

Note

You can find a copy of this certification in the Appendix to the Chemical Anchoring Technical Handbook or at www.chemical-anchoring.com.

The text above does not replace the original certification. Always refer to the complete certification documentation.

ChemFast PRO
Calculation Software

CF PRO

NEW
ChemFast PRO Calculation Software

Available for free download at www.chemical-anchoring.com.

CF PRO will allow you to calculate anchor fixings in concrete applications. Additionally, you will know the anchor types that have international approvals and those that are based on Henkel's standard application results. CF PRO also assists you in selecting the correct product for your anchoring situation. Furthermore, you will receive additional information and technical understanding related to your specific anchoring situation.

CF PRO key features!

- Assistance with minimizing the factors that can cause up to seven modes of failure.
- Allowance of more shear forces with differences in the arm of lever in two directions.
- Preloaded standard beam types.
- Allowance of the overall edge components as well as the front side.

ChemFast PRO includes approved and standard load applications. In each result, CF PRO will signify whether the anchor type is approved or standard. Standard load applications are values received from testing performed by Henkel. Whether using the calculations from the manual or those from the anchor program, you will still obtain conservative results (the results are on the safe side).

The project page allows you to record all necessary information about the building project. This information is included on a detailed printout showing your anchoring solution.

ChemFast PRO
Calculation Software

Anchor fixing specific information can be loaded in the numeric input page.

The graphic input tab shows an image of your anchor fixing scenario. You can adjust load directions and numeric factors on this tab. Image rotation, which can provide a better view of the anchor fixing, is available.

The short results tab gives information about potential anchor stress for each anchor on the anchor plate. Results about total capacity are provided relating to seven potential modes of failure.

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