fischer
Fixing solutions for logistic & storage systems

fischer
innovative solutions

A brand and its promise to perform

fischer
innovative solutions

Customers who choose fischer get more than just a range of secure fixing products. Our goal is to ensure that we always offer our customers the best solutions with real added value.

In addition to innovative and outstanding products, this primarily includes user-oriented advice and benefit-oriented services. fischer is a leading brand in which engineering experts throughout the world place their trust.

Global presence

With more than 40 national subsidiaries and more than 100 importers, fischer has a global network with a strong presence. The advantages for you as a project customer are clear. There'll always be a competent technical or sales partner in your vicinity and a high level of product availability is also guaranteed.

Customer advice

Our technical support service provides cost-effective, legally compliant advice for all questions relating to fastening systems. Services that you can access include test installations, pull-out tests, individual designs, comparative calculations, and the development of special solutions. Around the world, more than 130 engineers support you with their concentrated fastening expertise. We're happy to give you advice – at our fischer Academy, at your office or at the construction site itself.

Products

We offer you a wide range of fastening solutions from the fields of chemical resins, steel and plastics. We cover a very broad application spectrum with our standard products as well as project-based solutions and customer-specific special developments. All of these are based on our know-how and experience gleaned during more than 60 years in anchoring technology. You can depend on it.

Services for logistic & storage systems.

Research & development

We have our own research and development teams for chemical resins, steel and plastics. This allows our own research results, market trends and customer requirements to be quickly embraced and converted into market-ready products. In addition to the capability and quality of our products, safe and fast installation is also vital. This pays off by saving you time, money and labour.

Production

With research and development, tool-making, special machine construction and production facilities for chemistry, steel and plastics, the entire production process of our products takes place in-house. Our quality management system is certified in accordance with DIN EN ISO 9001.

Through the fischer Process System (fPS), we continuously optimise our processes and adapt flexibly to customer requirements. In this way, we ensure that you can rely on innovative products with a constantly high level of quality.

Design software

Our new modular design software suite is called „Fixperience". It offers safe and reliable design along with top processing comfort. The relevant design standards (ETAG 001 and EC2), national application documents and extensive choice of all conventional load and measurement units make the software suitable for international use. A free „live update" is available at all times at: www.fischer.de/fixperience

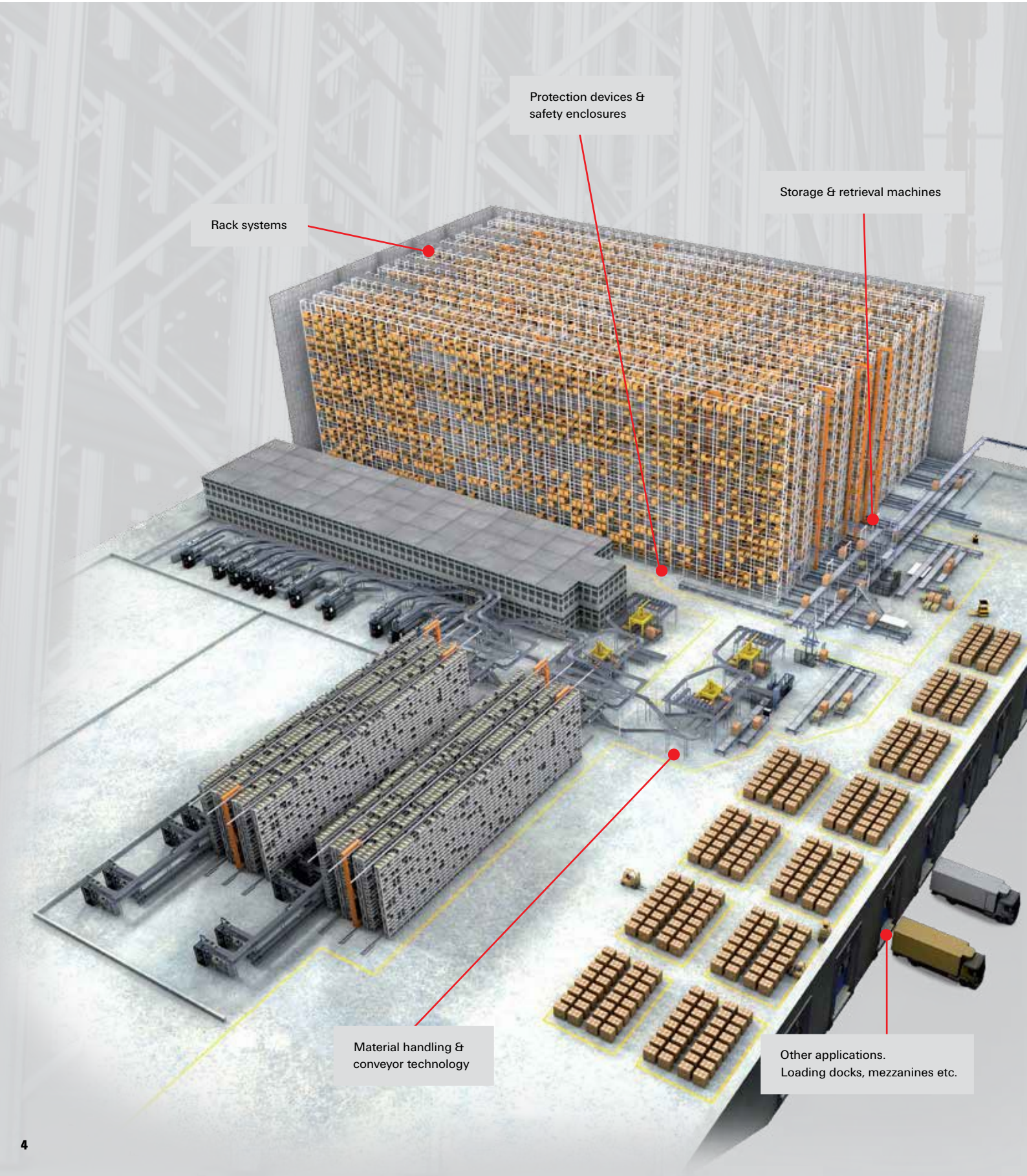
Certifications

We don't compromise on the safety of our products. We take part in the leading international, standard-setting councils in the fastening technology sector, thus contributing our knowledge to their work. Many of our products are characterised by thorough, up-to-date, international approvals, technical certifications and expert reports. For you, this means safety that you can rely on.

The environment

We actively consider the aspect of sustainable construction. Our environmental management system is certified in accordance with DIN EN ISO 14001. A growing number of our products have an Environmental Product Declaration (EPD) from the Bauen und Umwelt e.v. (IBU) institute, which constitutes the data basis for an ecological building evaluation. And our greenline product range is already based on more than 50% sustainable raw materials – certified in accordance with DIN CERTCO/TÜV Rheinland.

Solutions for logistic & storage systems.



Page

Rack systems 8

Rack-uprights must be fixed to the floor to ensure stability against over-turning and sway. The selection and design of the appropriate anchor system depends mainly on the floor base material and the acting load on the rack system.

Page

Protection devices & safety enclosures 10

Impact damage caused by forklift trucks, trolleys or other moving equipment shall be avoided by appropriate safety measures like collision protectors for racking uprights (column guards), protection for the ends of aisles or demarcation of pedestrian areas. Mesh guards are protecting employees from machinery, robotic cells or dangerous equipment.

Page

Storage & retrieval machines 12

Automated storage and retrieval material handling systems move horizontally within an aisle, most supported by one or two guide rails or channels which are fixed to the floor and ceiling guided on top to ensure accurate vertical alignment.

Page

Material handling & conveyor technology 14

Conveyor systems are an economical and highly efficient way to move goods and allow material handling in a facility without the use of manual labor. Conveyor systems like gravity, belt or roller conveyers are available in different shapes and lengths and are capable of moving light or heavy duty goods over long distances, buffering between functions and change vertical or horizontal directions.

Page

Other applications. Loading docks, mezzanines etc. 15

Loading docks offer a wide range of different applications which must be fixed: sectional gates, bumpers, dock levelers, docking seals, steel stair-cases and electrical facilities. Mezzanines for additional warehouse space, designed as a steel structure for a 2nd or even 3rd floor, must be properly anchored, to the warehouse floor.

Basic knowledge.

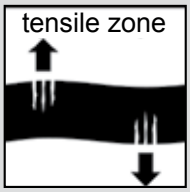
Logistic & storage systems are designed to store and move materials on pallets or skids. Although there are many varieties of storage equipment, all systems allow the storage of palletized materials in horizontal rows with multiple levels. Such systems including pallet racking, drive in racking, single or multi-tier shelving and mezzanines have become an essential and widely used element of most modern storage requirements. Due to the scale and size of such storage systems, some reaching a size of up to 45 m. Due to the potential for accidental impact forces when loading and decentering the systems it is essential that correct design and installation of the systems is conducted. The selection of the appropriate fasteners for fixing racking-uprights and protection equipment should be done carefully and depends on the floor base material.

Design criteria for pallet racking according EN 15512:2009

The design forces in the floor fixings shall be calculated for the most difficult load combination at the ultimate limit state and the anchorages shall be designed in accordance with ETAG No 001. Each upright to floor connection shall be able to transfer a minimum un-factored force of 3 kN in tension and 5 kN in shear. For anchorages in concrete, the following parameters are important:

a) Thickness of the structural concrete floor (any added screed will not contribute to the strength of the anchorage)
b) Quality of the concrete
c) Percentage of reinforcement in the top of the slab
d) Whether the anchorage is in the tension or compression zone
e) Distance between anchors
f) Distance between anchorage and edge of the concrete slab
g) Difference between size of the hole in the base plate and diameter of the anchorage

When the concrete slab is placed directly on the soil, the tensile stresses in the upper layers of the concrete are generally small and the top of the slab may be considered as being in the compression zone.



Cracked concrete

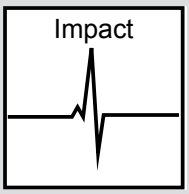
When anchoring in concrete, it is often presumed that tensile cracks are present in the anchoring area that influence the bearing capacity of the fixings. However, it is very complicated, if not impossible, to prove whether the concrete is cracked or non-cracked. For safety reasons, the use of fixings suitable for cracked concrete is recommended. Fixings with an approval according to ETAG 001 for cracked concrete have proved their suitability in cracks and may be used without restriction in the tensile and compressive zones of concrete members. Fixings suitable for cracked concrete are also checked and approved according to American standards. These "evaluation reports" are prepared according to ACI 318.

Load-bearing behaviour of anchors in steel fibre concrete (SFRC)

Steel Fibre Reinforced Concrete (SFRC) is a modern day composite material in which the concrete's relatively low tensile strength and ductility are counteracted by the inclusion of steel fiber reinforcement. This inclusion produces a material which exhibits the same load bearing capabilities to traditional reinforced concrete. The use of post installed anchors in SFRC has not been regulated at present, unlike traditional concrete where they follow the guidelines and codes as documented in the ETAG 001 or ACI 318-D for standard grades of concrete from C25 to C50.

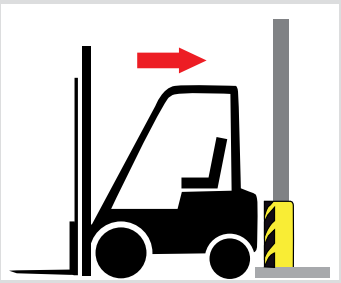
Tests with resin systems, expansion anchors and concrete screws have been performed in SFRC with a steel content of 25 and 60 kg/m³ by independent institutes to investigate the load bearing capacity and failure mechanism. The test series did not

show any significant difference between SFRC and normal weight concrete in failure loads. Thus, calculations for applications can be based on a comparable normal weight concrete in line with the stipulations of ETAG 001 Appendix C or TR 029. However, as there is no building authority approval, it is necessary to get the permission of the authorities or an individual approval by a qualified engineer. The calculation should be carried out for the assumption of cracked concrete with suitable anchor systems. Possible shrinkage cracking is avoided by saw cutting joints into the surface of the slab. The joints should be considered as an edge in the design. Special attention should be paid to the load transfer of the forces applied by the anchor. Therefore we recommend carrying out additional tests to verify the load-bearing capacity of the used anchor system.

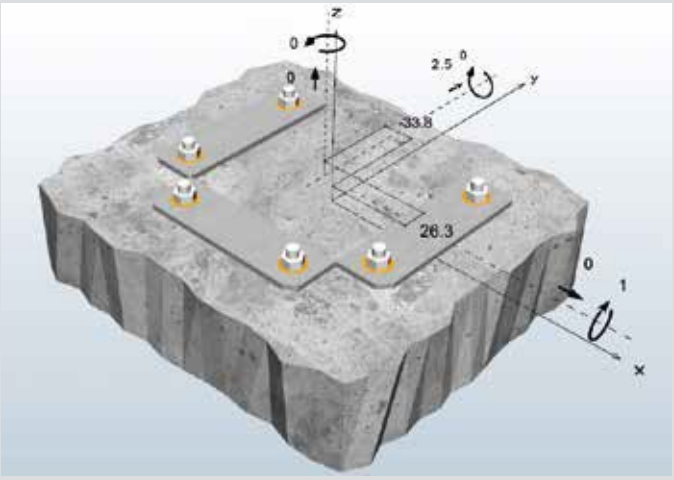


Safety equipment – collision protectors

Safety equipment, such as guardrails, low level barriers, bollards and rack column protector guards help to prevent damage caused by lift trucks, roller containers, transport trolleys or pallet trucks. They protect shelves, cabinets, wall mounted protruding equipment as well as pedestrians against damage from collision. Post protectors help to extend the life time of pallet racks and building columns by protecting against vehicle collision. They absorb and distribute shock from sudden impact, preventing potential hazardous effects. The protectors are mainly made of steel plates and are brake-formed to protect posts on exposed sides.



According EN 1991-1-7, design values for accidental actions due to impact from forklift trucks should be determined to take into account the dynamic behavior of the forklift truck as well as the structure. The structural response may allow for non-linear deformation. As an alternative to a dynamic analysis, an equivalent static design force F may be applied. DIN EN 1991-1-7/NA (National Appendix Germany) is providing complementary information for impact loads caused by the impact of forklifts into shelves. For the load case „forklift collision" to authoritative shelf props on the way side a horizontal load of 2.5 kN must be considered at 0.4 m height in the cross-aisle direction and 1.25 kN in down aisle direction. For the design of the supports, the loads are not acting simultaneously; the load cases must be evaluated separately. Alternatively, the German BGR 234; 4.2.5 (Trade association rules for safety and health at work - Storage facilities and equipment) and EN 15512 states: A collision protector should have a min. height of 400 mm and is sufficiently designed if it can withstand 400 Nm impact energy. With the new fischer FIXPERIENCE design software complicated base plate geometries can be easy designed and calculated (see picture below). Nevertheless, national codes and guidelines must be observed when designing the fixings for collision protectors.



Rack systems.

FAZ II

ETA-05/0069
ETAG 001
Option 1 for cracked concrete
seismic performance category C1, C2

ICC ES ESR-2948
See ICC-ES Evaluation Report at www.icc-es.org

Fire resistance classification R 120

- The tried-and-trusted expansion clip makes large load-bearing capacities possible, so fewer fixing points and smaller anchor plates are required.
- The reduced anchorage depths makes considerably shorter drill hole depths possible, so providing a noticeably faster installation.
- Fewer hammer blows and minimal torque slippage ensure safe and easy setting.
- The international approvals guarantee maximum safety and the best performance. Applications in earthquake regions (Seismic) are also covered by these approvals.

FBN II

ETA-07/0211
ETAG 001-2
Option 7 for non-cracked concrete

Fire resistance classification R 120

- The standard anchorage depth achieves the maximum load-bearing capacity in non-cracked concrete.
- The reduced anchorage depth reduces the drill hole depth. This minimizes the amount of time needed for drilling and enables less wear on the drill.
- Great flexibility throughout the load range.
- Few hammer blows and the minimal torque slippage allow for a noticeably simpler installation.

FBS

ETA-11/0005
ETAG 001-3

Fire resistance classification R 120

- The self-tapping concrete screw enables a complete dismantling and is ideal for temporary fixings.
- The expansion pressure-free anchoring ensures low edge distances and axial spacings.
- The FBS is installed in a single step, which saves time and money.
- The molded washer allows the usage also for fixtures with larger clearance holes.

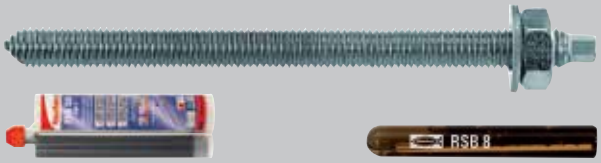
FHB II

Fire resistance classification R 120

Shock-tested; BZS approval for shockproof fixings in civilian shelters.

- The Highbond system FHB II achieves high load values in cracked concrete. Thus fewer fixing points and smaller anchor plates are required.
- The resin capsule FHB II-P/PF can be used in uncleaned drill holes. This makes it an economical and fast solution.
- The injection mortar FIS HB and the capsules FHB II-P/PF offer the same performance and can be used with the FHB II- A S (short version) or L (long version) anchor rods. This enables you to select the most economical solution based on your requirements.

Superbond (Anchor rod FIS A /RG M)



Fire resistance classification R 120

SEISMIC

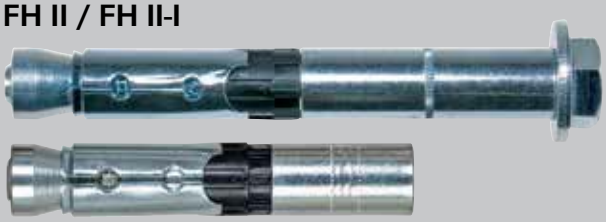
- The Superbond system is a combined capsule and injection system for cracked and non-cracked concrete. The injection mortar FIS SB and resin capsule RSB perform the same. This gives the installer maximum flexibility.
- Approved for seismic applications (performance category C2 with FIS SB and C1 for capsule) as well as in waterfilled and diamond drilled holes (capsule only) ensures safety even in extreme conditions.
- Maximum application temperatures of up to +150°C and minimum temperatures of -30°C open up new areas of use for bonded anchors

More from fischer - Installation systems

See for further information: www.fischer.de

Protection devices & safety enclosures.

FH II / FH II-I



- The optimized geometry reduces the setting energy thus ensuring power-saving installation.
- The anchor design enables different head shapes for fixing points with a sophisticated design.
- The international approvals guarantee maximum safety and the best performance. Applications in earthquake regions (Seismic) are also covered by these approvals.
- The detachable bolt connection allows for surface flush removal.

FBN II

- The standard anchorage depth achieves the maximum load-bearing capacity in non-cracked concrete.
- The reduced anchorage depth reduces the drill hole depth. This minimizes the amount of time needed for drilling and enables less wear on the drill.
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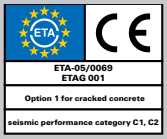
FAZ II



- The tried-and-trusted expansion clip makes large load-bearing capacities possible, so fewer fixing points and smaller anchor plates are required.
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Superbond (Anchor rod FIS A /RG M/ RG MI)

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More from fischer - Drill bits

See for further information: www.fischer.de

Storage & retrieval machines.

FAZ II

ETA-05/0069
ETAG 001
Option 1 for cracked concrete
seismic performance category C1, C2

ICC ES ESR-2948
See ICC-ES Evaluation Report at www.icc-es.org

Fire resistance classification R 120

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FBN II

ETA-07/0211
ETAG 001-2
Option 7 for non-cracked concrete

Fire resistance classification R 120

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FBS

Fire resistance classification R 120

- The self-tapping concrete screw enables a complete dismantling and is ideal for temporary fixings.
- The expansion pressure-free anchoring ensures low edge distances and axial spacings.
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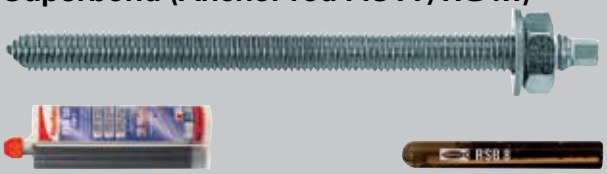
Superbond (Anchor rod FIS A /RG M)



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More from fischer - Electrical fixings

See for further information: www.fischer.de

Material handling & conveyor technology.

FAZ II

ETA-05/0069
ETAG 001
Option 1 for cracked concrete
seismic performance category C1, C2

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ETAG 001-3

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Other applications.
Loading docks, mezzanines etc.

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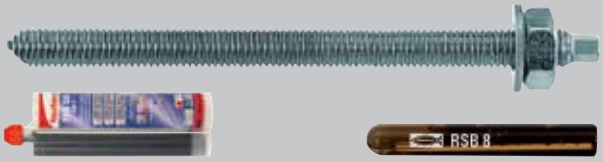

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Other applications.
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FBN II

ETA-07/0211
ETAG 001-2
Option 7 for non-cracked concrete

Fire resistance classification
R 120

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SX / UX

SANS HALOGENE

fischer NYLON QUALITY

SX

- The 4-way expansion provides the optimum force distribution in the drill hole, and offers high load-bearing capacities in solid and hollow building materials.

UX

- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX is the correct choice for unknown base materials.

More from fischer - greenline

See for further information: www.fischer.de

Accessories for installation.

- Dispensers (e.g. FIS AM or FIS DM S)

- Pneumatic cleaning tool ABP/ pneumatic dispenser FIS AP

- Cleaning brush BS for concrete/ cleaning brush with thread M8/SDS-adapter

- Drills and bits for concrete and masonry

- Blow out pump AGB

- Anchor bolt setting tool FABS (fits with FAZ II & FBN II)

- Setting tool RA-SDS (fits with RGM)

Overview fischer fixing competence.

Chemical fixings
Resin systems, in the form of cartridge or capsule systems, for fixing of high loads. A secure hold in cracked and non-cracked concrete, natural stone, masonry and aircrete – including reinforcement.

General fixings
A wide range of different nylon and metal anchors with and without screws and hooks. For fastening, assembling and installing lightweight objects in very diverse building materials.

Electrical fixings
E-fix plugs, cable and nail clamps, pipe clips, cable clasps and multi-cable supports. Everything you need for quickly laying cables and conduits.

Frame fixings / Stand-off installation
Frame fixings and nail anchors with screws with different head shapes. For fastening substructures, façades, cable trays, gates, etc. Can be used in concrete, solid brick, perforated brick, natural stone, aircrete and much more.

Foams and sealants
Gun foams and quick assembly foams for filling, insulating, sealing, gluing and fixing. Silicones, acrylic building materials and bitumen sealants for grouting, sealing and gluing in diverse applications inside and outside.

Installation systems
Basis for secure guidance and mounting of pipelines within HVAC business. A clever system of universal channels, cantilevers, connection- and construction elements, pipe clamps and accessories in different material qualities and versions for versatile applications.

High performance steel anchors
Cost-effective, easy-to-install anchor bolts for high loads, undercut anchors, sleeve anchors and hammerset anchors. For a wide range of applications in cracked and non-cracked concrete.

fischer FIXPERIENCE.
The design and information software suite.

- The modular design program includes engineering software and application modules.
- The software is based on international design standards (ETAG 001 and EC2, such as EC1, EC3 and EC5), including the national application documents. All common force and measurement units are available.
- Incorrect input will be recognized and the software gives tips to get a correct result. This ensures a safe and reliable design every time.
- The graphical display can easily be rotated through 360°, panned, tilted or zoomed as required.
- The 3D display gives a detailed and realistic image.
- The "live update" feature helps to keep the program up to date ensuring you are always working with the latest version.
- Free download and updates at www.fischer.de/fixperience-en

Our service to you.

We are available to you at any time as a reliable partner to offer technical support and advice:

- Our products range from chemical resin systems to steel anchors through to nylon anchors.
- Competence and innovation through own research, development and production.
- Global presence and active sales service in over 100 countries.
- Qualified technical consulting for economical and compliant fastening solutions. Also on-site at the construction site if requested.
- Training sessions, some with accreditation, at your premises or at the fischer ACADEMY.
- Design and construction software for demanding applications.

Regional Presence

U.A.E

fischer FZE (Regional Office)
R/A 07, BA 01 - 04
Jebel Ali Free Zone
Dubai, UAE
P. O. Box 261738
Tel: +971 4 883 7477
Fax: +971 4 883 7476
Email: enquiry@fischer.ae

Abu Dhabi
Tel: +971 2 552 5777
Fax: +971 2 552 6566
Email: enquiry@fischer.ae

State of Qatar
Tel: +974 4036 3100
Fax: +974 4471 0898
Email: qatar@fischer.ae

Kingdom of Saudi Arabia
Tel: +966 13 8140866
Fax: +966 13 8140855
Email: saudi@fischer.ae

State of Kuwait
Tel: +965 2481 8786,
+965 2482 5972
Fax: +965 2481 8385
Email: kuwait@fischer.ae

Kingdom of Bahrain
Tel: +973 17408090
Fax: +973 17404323
Email: bahrain@fischer.ae

Sultanate of Oman
Tel: +968 24445425/26/27/28/30
Fax: +968 24445423
Email: oman@fischer.ae

Pakistan
Tel: +923 01 8266216
Email: pakistan@fischer.ae

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