fischer
Fixing Catalogue

fischer

A BRAND AND ITS PROMISE

TO PERFORM

Dear partner,

There are many trends affecting the fixings industry: the growing number of construction materials, the joining of different materials, increasing requirements for design and execution, and digitalisation. As one of the world's leading specialists in fixing systems, we set the direction and shape the market. In the process, we provide you with the best and most cost-effective solution for your fixings project quickly and flexibly. We are also a reliable partner for you when it comes to individual requests and customised solutions.

Our product portfolio includes chemical systems, steel anchors and plastic fixings. We also provide a wide range of screws, drill bits, adhesives, sealants, foams and product ranges tailored to specific applications, such as façade and thermal insulation systems, or the installation of sanitary, heating, ventilation and electrical systems. We attach high value to quality, safety and easy installation.

Our goal is to be the best in our respective industries with regard to both our products and our services. With our own national subsidiaries, sales partners, qualified sales representatives and engineers providing technical advice, we have a particularly dense network for providing individual consultation and support throughout the world. We are also amongst the pioneers in the industry in the digital environment and provide modern software tools, such as the design and construction software FIXPERIENCE and the Product Finder apps for end users and pros.

Our comprehensive range of training courses enables us to keep you up to date with regards to fixings solutions and regulations – at the fischer akademie, in more than 70 competence centers throughout Germany, on site at the user's premises, and in various locations in Germany and Europe with the help of the fischer Tour Truck.

We hope you enjoy discovering and using our products.

Florian Birkenmayer

This is fischer - Brief Introduction

fischer HQ , Germany

For over 70 years, fischer has garnered a widespread reputation for designing, engineering and building innovative fixing solutions. Since the company was established in 1948, it has been driven by a constant will to change and strive for better solutions through innovation. With 47 subsidiaries across 35 countries, production units in 7 countries, over 5200 employees and 1500 industrial property international rights, fischer group of companies is currently considered one of the most innovative companies worldwide.

Facts & Figures

- **Turnover**

  864 Million Euros (end of 2018)

- **Production**

  10 production units across 7 countries

- **Intellectual Property Rights**

  Over 1500

- **Workforce**

  5200+ worldwide (end of 2018)

  250+ regional (end of 2018)

- **Export**

  To over 9 countries in Middle East & Africa

- **Regional Presence**

  Over 12 local offices and warehouses spread across the region

Products

We offer a wide range of fastening solutions from the fields of chemical resins, steel and nylon, covering a very broad spectrum of applications in the construction industry with our outstanding product range. All of these are based on our know-how and experience gained over 70 years in the anchoring technology.

Design Software

Our new modular design software suite “FIXPERIENCE” offers the ability to create quick and reliable designs along with the best processing comfort. The relevant design standards (ETAG 001 and EC2, as well as EC1, EC3 and EC5), national application documents and an extensive choice of all conventional load and measurement units make the software highly suitable for international use.

This is fischer - Brief Introduction

With a constant will to grow, fischer has constantly been expanding its horizons in the Middle East and African markets. Today, the Middle East operations, fischer MEA is headquartered in the United Arab Emirates has offices in Saudi Arabia, Qatar, Bahrain, Kuwait, Oman, Ethiopia. Kenya, Tanzania and Pakistan with deep footprints in all major projects and trade line businesses across these regions.

fischer Middle East & Africa, JAFZA, UAE

Research & Development

We have our own research and development teams for chemical resins, steel and nylon. 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, safety and quick installation is also a vital aspect. This pays off by saving you time, money and labour.

Production

fischer is a globally oriented company with its own development and production, providing its products and services to private and professional customers around the world. As a certified DIN EN ISO 9001 company and through the fischer Process System (fPS), we continuously optimize our processes and adapt flexibly to customer requirements ensuring highly consistent level of quality. The production locations are in Argentina, Brazil, China, Germany (Waldachtal, Horb, Emmendingen, Denzlingen), Italy, the Czech Republic and the USA.

Customer Advice

Our technical support service provides cost-effective and legally compliant advices for all queries relating to fastening systems. fischer provides a range of services that you can access including installation demos , pull-out tests, individual designs, comparative calculations and the development of specialized solutions. Our dedicated engineers around the world support you with their concentrated fastening expertise and we're happy to give you advice at our fischer Academy, at your office or even at the project site.

Fixing Systems

The fixing systems is the core area and also the largest business field for fischer. With more than 14,000 articles, we offer an extensive range of fixing solutions with standard products, project based solutions and specialized customer-specific developments. We orient ourselves to the requirements of our customers and as a result, we are one of the few globally leading providers of fixing solutions in the construction industry.

Automotive Systems

fischer Automotive Systems, which was initiated in 1982 specializes in the manufacture of internal cabin components such as air vents, cup holders, storage compartments and other multifunctional dashboard accessories for top automotive brands worldwide.

fischertechnik

fischertechnik, initiated in 1965 is a specialized toys division which is well known worldwide for their robotics and DIY kits. They are also commonly utilized in schools and universities for nurturing the curiosity and creativity among children of all age groups. Another well-known concept of fischertechnik has been the fischer TiP, an ecological & creative material made from potato starch making it extremely safe and fun for children.

fischer Consulting

fischer Consulting with the know-how of the fischer process system, offers its clients the opportunity to create lean and efficient processes. The system focuses on avoiding any kind of waste in the processes. Both for medium sized companies and for international conglomerates, fischer Consulting provides local support for continuous improvement.

LNT Automation

LNT was taken over by fischer Group of Companies in 2016, thereby expanding their activities in the field of electronic devices. This new division of fischer develops and manufactures custom electronic solutions. LNT also deals with development, production and distribution of custom and so-called capacitive touch systems such as multi-touch solutions made of glass, the corresponding controllers and other electronic components all in-house.

The Range of Fastening Systems

fischer offers a comprehensive range of nylon, steel and chemical fixing solutions, as well as accessories for professionals and DIY enthusiasts. Consequently, fischer also covers an extremely broad application spectrum with specialized customer-specific solutions. In a way, the products from fischer represents the innovative power, safety, quality and expertise accrued over 70 dedicated years in fixing technology.

Chemical Fixing

fischer's chemical fixing range of products are well-known in the global construction industry as the go-to solution when faced with demanding requirements such as extremely high loads, extreme temperatures, dynamic / seismic effects or underwater assembly applications. Our chemical fixing product range is equipped to address even the most challenging of fixing scenarios.

Steel Fixing

fischer's steel anchors are considered among the best performing anchors on the market and are well-known worldwide for setting new standards in the field of heavy duty anchors. Especially the FAZ II anchor bolt, which is considered one of the strongest and versatile products among fischer's steel anchor range for its use in cracked concrete with its two anchorage depths, allowing it to be used in a wide variety of applications.

Nylon & General Fixing

fischer's general fixing division started off with the invention of the grey S-Plug anchor back in 1958. With further research and development over the years, fischer has continued to set new standards in the global market by introducing highly efficient and practical nylon based solutions. For instance, the SXRL with its long expansion parts is highly sought after in the installation of modern high-insulating building materials.

Installation Systems

fischer installation systems is one of fischer fixing system's most innovative and sought after range of products worldwide, providing a complete system for the safe guiding and fixing of all kinds of MEP components with solutions such as Universal rails, brackets, joints clamps and more. With such a diverse range of assembly accessories, fischer installation systems allows for extremely varied and efficient combinations for a wide range of applications. This is the most ideal solution being economically convincing, highly modular in design and also extremely assembly-friendly.

fischer Facade Systems

The highly advanced facade system provides a complete system for ventilated curtain facades with innovative panel anchors and complete sub-structure systems. This highly innovative solution is known for its modular and easy to install approach allowing architects and planners to create facade areas and joints without visible anchoring elements, but also providing an unrivaled design freedom with glass, stone, ceramics and many more materials used in the field of facade fixing.

Greenline Fixing Range

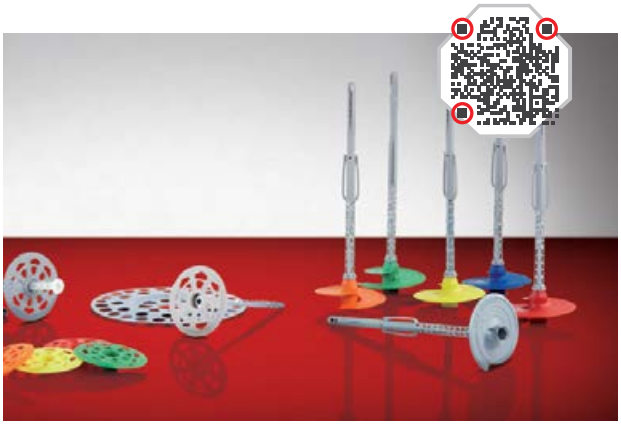
The greenline product range of fischer is the first ever bio-based fixing system in the world. With sustainability as the core principle and manufactured with at least 50% renewable raw materials – certified by DIN CERTCO / TÜV Rheinland, the greenline product range is considered highly eco-friendly as it reduces ecological waste considerably when building, renovating, decorating or even demolishing buildings.

Electrical Fixings

The electrical fixing range of products are an innovative extension of fischer fixing systems in the area of electrical and building technology. The product range is based on plug-in elements which automatically wedge into the drill hole and thereby combining the functions of both anchors and screws. These can be considered as truly convenient solution for fast, efficient and hassle-free assembly.

Insulation Fixings

The external thermal insulation composite systems are one of fischer's specialized divisions meant for fixing thermal insulation on the external walls of buildings. It is an extremely easy to use fixing solution that ensures the most optimal and economical installation of the thermal insulations, maximizing the energy savings in buildings.



FireStop

fischer's range of passive fire protection products, offers a wide range of solutions from mastics, foams, sealants, putties, boards to pipe sleeves and collars, all offering highly efficient passive fire protection. With many of them approved with the imminent ETA, British Standard (BS 476 part 20 & 22) and UL approval, fischer's new firestop range has been designed and developed for today and for the future.

fischer Trade Specialist is a widely known division under fischer innovative solutions that deals through two types of sales channels: Trade Specialists & Do-It-Yourself (DIY). fischer's Trade Specialist assortment of products include nylon/steel anchors, chemical fixings, abrasives, drill bits, sealants, foams, adhesives, zinc sprays and more.

Under the DIY section, fischer offers a wide assortment of blister cards for nylon, mechanical, chemical and cavity fixing range of products.

Anchors

fischer trade division offers all types of anchors like nylon, mechanical and chemical including S-Plug, FWA, FWB, GM, EAN, RM, FTR to their customers. We offer the complete concept of fixing solutions covering all the applications for all the types of base materials.

Screws

fischer offers a wide range of screws for the entire wood segment including chipboard screws, partially and fully threaded screws for constructive wood applications and special screws e.g. for decking. The Power-Fast technology stands for fischer's own combination of properties which makes these screws the best choice. Fast to process, safe to use and gentle on the material.

Foams and Sealants

fischer offers impressive construction chemical products such as 1K and 2K polyurethane foams for filling cavities and insulating window and door frames. fischer sealants are ideally suited to connect the joints through expansion. This guarantees long-lasting joints with fungicidal properties to ensure clean look over the long term.

Adhesives and Zinc Spray

fischer offers a wide range of flexible adhesives for numerous applications for indoor and outdoor use. fischer's highly innovative products allow for vibration dampening and stress compensating connections for even the most demanding applications. Our Express Cement is a clever solution with its ready-made cement mixture from the injection cartridge for repairs to joints and damaged areas. Likewise, fischer's zinc spray is also well known for its ability to protect the metal from corrosion in the long term.

Drill Bits and Chisels

fischer offers three different types of drill bits - HSS Drill Bits for metal, SDS+ & Max and Chisels for concrete. fischer's highly advanced engineering expertise allows these products a long life and are safe to use.

Abrasives

fischer also offers a wide range of grinding and cutting discs that last longer and enable you to work quickly with less effort. The successful combination of a long life and good performance enables effortless cutting. fischer's diamond grinding heads are the idle choice for hard surfaces such as granite. The continuous turbo grinding ring produces fine grinding results suitable for quick grinding on thick concrete layers. fischer's flap disc provides outstanding finish on metal and stainless products.

Approvals & Certifications

European Technical Approval
European Technical Assesmemt

Biobased Scheme 50-85% Product partly produced from biobased raw material

DIN - 4102:Part 1 Fire behaviour of building Material and elements Part 1

CC = International Code Council, formed from BOCA, ICBO and SBCCI

General building authority approval German Approval issued by the DIBt. Berlin.

Environmental Product Declaration from the Institute of building and Environmental (IBU)

A + "Very Low emission" Very Low VOC volatile substances

Fixing of high-quality, aging - resistant nylon (polyamide).

We have an environmental management system certified according to DIN ISO 14001

The anchor system is suitable for loads under seismic (Earthquake) action.

Fixing that can be dynamically loaded The fixing is suitable and approved for anchoring of "not predominantly static"

For Sprinkler Systems Meets the requirements according to VdS CEA 4001.

FM Certificate Factory Mutual research Corporation for property Conservation, American insurance company

Fire-Tested Fixing The fixing was subjected to a fire test.

Fire behaviour tested according temperature - time curve of ZTV-ING: 2003-1, part 5 tunnel

Fire behaviour tested according (RWS) time - temperature curve.

UL is an abbreviation for Underwriters Laboratories Inc. which is an independant,

Certifire is an independant Third Party Certification organisation.

Fire tests on building materials and structures.

EN 13501-1:2007 + A1:2009
Fire classification of construction products and building elements. Reaction to Fire.

EN 13501-2:2007 + A1:2009
Fire classification of construction products and building elements. Reaction to Fire.

Fire resistance tests for service installations - Penetration seals.

Fire resistance tests for service installations - Linear joint seals.

Test method for Surface Burning Characteristics of Building materials.

Test method for Fire-Resistive Joint Systems. UL 2079 - equivalent

Test method for Fire Tests of Through Penetrations Firestops. UL 1479 - equivalent

The laboratory measurement of airborne sound insulation of buildng elements.

Air permeability test method.

Water permeability test method.

We are quality management certified according to DIN ISO 9001

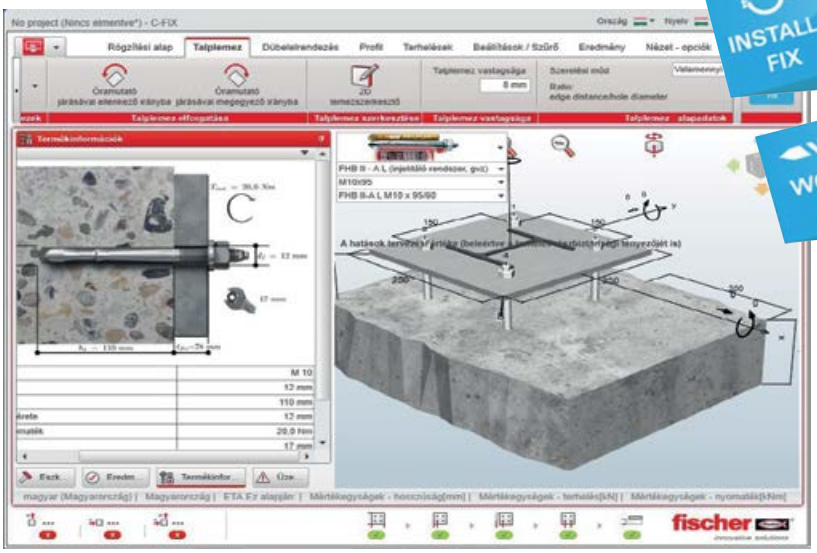
Evaluation of comfomitoi and the factory production control of Fire Stop products for use in buildings based on ETAG 026

Fixperience - Innovative Design and Calculation Software

To enrich the experience further and simplify our clientele's workload, fischer also offers our world renowned FIXPERIENCE software and design calculation services to all clients.

C-Fix Anchor Design Programme

- Baseplate design
- Approval details
- Installation details
- CAD database and more



More software options to better your experience

Wood-fix
Rebar-fix
Rail-fix

Samontec software
CAD fixings database is also available

Services beyond Products

Trainings & Seminars

fischer being a leader in the research and development of fixing solutions conducts seminars and trainings across the region for contractors and consultants on various topics, enabling proper transfer of knowledge on a variety of concepts.

Onsite Testing & Technical Support

fischer conducts on-site testing for our customers and business partners as part of our value-added services.

Webinar

Further expanding our knowledge sharing platform, fischer frequently conducts webinars on various topics ranging from fischer's FIXPERIENCE design software to project case studies and more to the benefit of its customers.

Onsite Delivery

Ensuring our continued commitment to service excellence, fischer provides its valuable customer base the benefit of delivering goods on-site.

fischer

Few of our Seminars & Training topics:

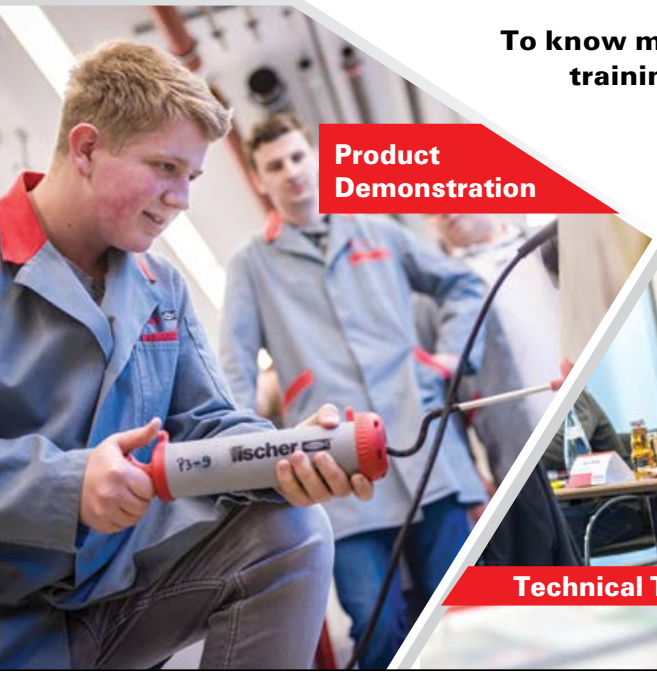
- Design Principles for Anchors CPD CERTIFIED
- fischer Solution for MEP & Seismic Applications CPD CERTIFIED
- Principles on Firestop Passive Protection CPD CERTIFIED
- Anchor vs Rebar Theory
- Installation Systems (SaMontec)
- Advanced Curtain Wall Technique

CPD CERTIFIED
The CPD Certification Service

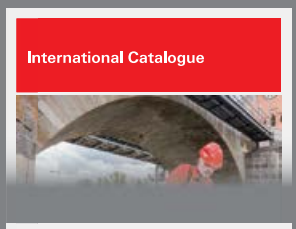
- fischer Solution for Civil Applications
- Inspection Methodology
- Types of Corrosion
- fischer design software: FIXPERIENCE
- Specific Solutions for Facade
- Specific Solutions for Solar Fix
- fischer Solutions for Steel & Metal

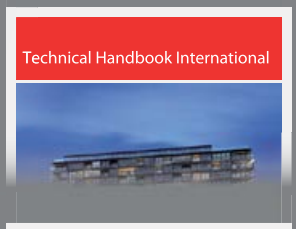
To know more about our seminars, technical trainings & literature, write to us at

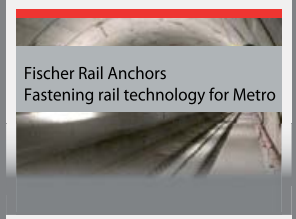
marketing@fischer.ae

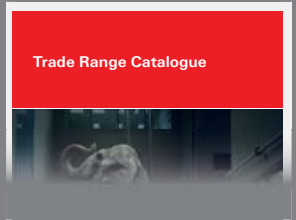


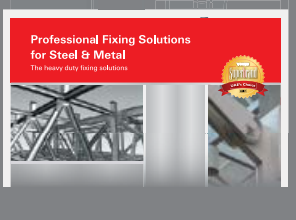
fischer library











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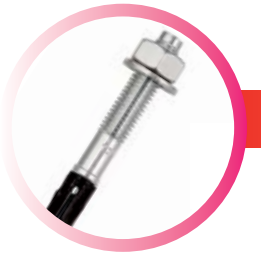

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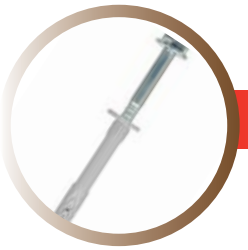

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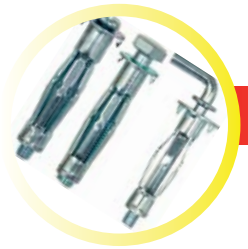

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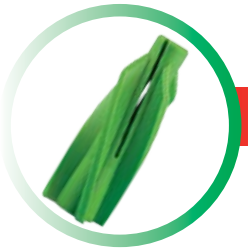

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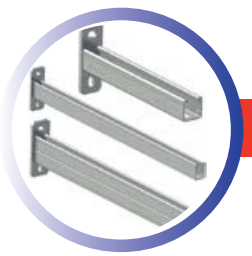

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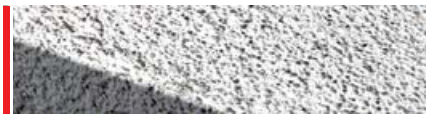
Injection mortar FIS VL 38



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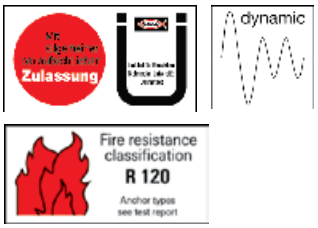
The best in class amongst dynamic anchors

Production robots

APPROVALS



ADVANTAGES

- During the setting process, the injection mortar FIS HB fills the annular gap in the fixture, and ensures optimum load distribution. This allows for the absorption of dynamic alternating loads.
- The cone shape of the FHB-A dyn anchor rod ensures a controlled expansion under dynamic stress, thus allowing for use in cracked concrete.
- The Highbond anchor dynamic system can achieve even greater shear loads thanks to the additional sleeve of the anchor rod FHB-A dyn V, and therefore provides an increased level of safety.

APPLICATION

- Jib cranes
- Gantry and overhead cranes
- Guide rails for elevators
- Tunnel ventilators (jet fans)
- Gantries in road construction
- Antennas and transmitter masts
- Industrial robots

BUILDING MATERIALS

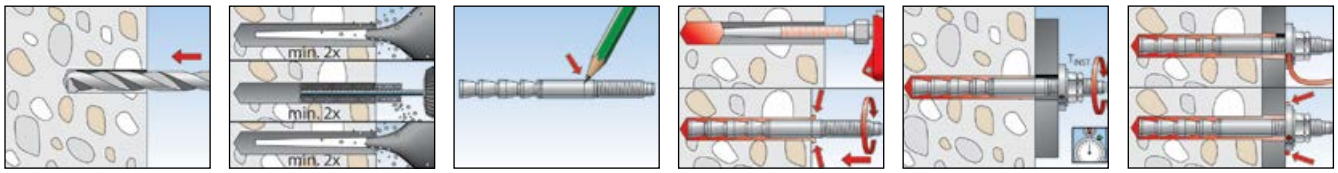
Approved for:

- Concrete C20/25 to C50/60
- Cracked and non-cracked

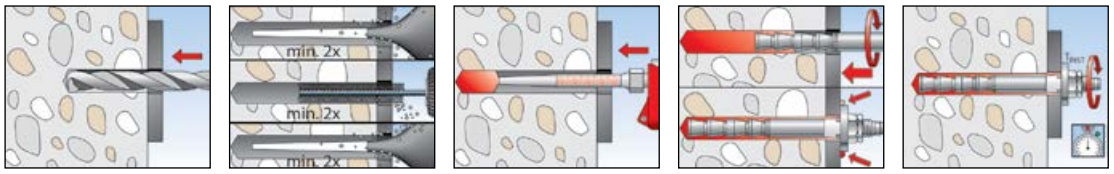
VERSIONS

- Zinc-plated steel
- High corrosion resistant steel

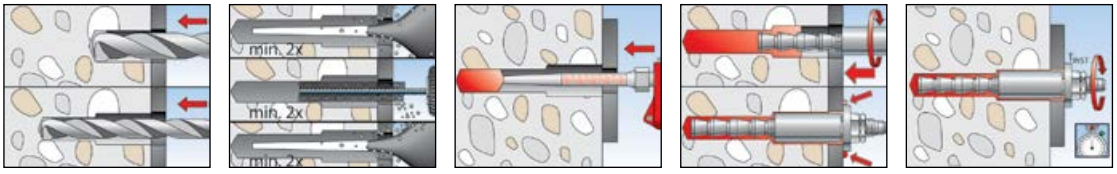
PRE-POSITIONED INSTALLATION FHB DYN



PUSH-THROUGH INSTALLATION FHB DYN



PUSH-THROUGH INSTALLATION FHB DYN V



CURING TIME - FIS HB

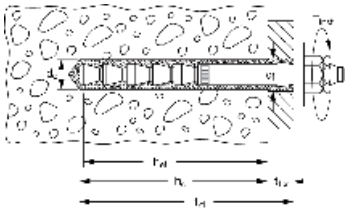
Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

TECHNICAL DATA

FHB-A dyn

FHB-A dyn V



Item	Zinc-plated steel Art-No. gvz	Highly corrosion resistant steel Art-No. C	Drill hole diameter do (mm)	Drill depth through fixture ho (mm)	Anchorage depth h_{ef} (mm)	Min, -max. usable length t_{fix} (mm)	Drill hole diameter in object df (Ø mm)	Width across nut ⬡SW (mm)	Sales unit (pcs)
FHB-A dyn 12 x 100/25	**092018**	**531384**	14	130	100	8 - 25	15	19	10
FHB-A dyn 12 x 100/50	**092019**	–	14	155	100	8 - 50	15	19	10
FHB-A dyn 16 x 125/25	**092020**	–	18	155	125	10 - 25	19	24	10
FHB-A dyn 16 x 125/50	**092036**	**093445**[1)]	18	180	125/100	10 - 50	19	24	10
FHB-A dyn 20 x 170/50	**092037**	–	24	225	170	12 - 50	25	30	10
FHB-A dyn 24 x 220/50	**092038**	–	28	275	220	14 - 50	29	36	5
FHB-A dyn 12 x 100/50V[2)]	**092039**	–	14	85	105	8 - 50	21	19	10
FHB-A dyn 16 x 125/50 V[3)]	**092040**	–	18	100	130	10 - 50	29	24	10

(1) Prices and delivery time on request. (2) Stepped: 1st drill hole with Φ 20mm and depth 85mm. 2nd drill hole Φ14mm and depth 160mm.
(3) Stepped: 1st drill hole with Φ 28mm and depth 100mm. 2nd drill hole Φ18mm and depth 185mm.

Injection mortar **FIS HB 345 S**

Static mixer **FIS MR PLUS**

Item	Item	Languages on the cartridge	Contents	Sales unit (pcs)
FIS HB 345 S	**033211**	D, GB, F, E, NL, CZ	1 cartridge 360 ml, 2 x static mixer FIS MR PLUS	6
FIS MR PLUS	**545853**	–	10 static mixer	10

FILLING QUANTITIES

Item	Mortar volume in scale units	Anchors per cartridge FIS HB 345 S *)
FHB-A dyn 12 x 100 / 25	7	24
FHB-A dyn 12 x 100 / 50	8	21
FHB-A dyn 16 x 125 / 25	9	18
FHB-A dyn 16 x 125 / 50	10	17
FHB-A dyn 20 x 170 / 50	23	7
FHB-A dyn 24 x 220 / 50	38	4
FHB-A dyn 12 x 100 / 50 V	12	14
FHB-A dyn 16 x 125 / 50 V	20	8

*) max. number with one static mixer

LOADS

Highbond anchor dynamic FHB dyn

zinc-plated steel / high corrosion-resistant steel C

Design values for cyclic fatigue loading[1] of a single anchor in cracked or non-cracked normal concrete of strength class C20/25 [3]										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [5] [mm]	Installation torque T_{inst} [Nm]	Design value of tensile load $\Delta N_{Ed,max}$ [2] [kN]	Design value of shear load $\Delta V_{Ed,max}$ [2] [9] [kN]	Required edge distance (with one edge) for Max. tension load ΔN_{Ed} c [6] [8] [mm]	Max. shear load ΔV_{Ed} c [8] [mm]	Required spacing for Max. Load s_{cr} [6] [mm]	Min. spacing s_{min} [5] [mm]	Min. edge distance c_{min} [5] [mm]
FHB dyn 12 x 100	gvz	100	130	40	14,1	6,7	200	200	300	100	200 [4] [7]
			200				120	100			100 [4]
	C / 1.4529		130		11,3	4,4	200	200			200 [4] [7]
			200				100	100			100 [4] [7]
FHB dyn 12 x 100 V	gvz	105	130	40	14,1	9,6	200	200	315	100	200 [4] [7]
			200				105	130			100
FHB dyn 16 x 125	gvz	125	160	60	23,0	11,9	200	200	375	100	200 [4] [7]
			250				185	145			100
	C / 1.4529		160		15,6	11,9	200	200			200 [4] [7]
			250				100	145			100 [7]
FHB dyn 16 x 125 V	gvz	130	160	60	23,0	17,0	200	260	375	100	200 [7]
			250				170	200			100
FHB dyn 20 x 170	gvz	170	220	100	28,4	17,0	175	190	510	80	80
FHB dyn 24 x 220	gvz	220	440	120	28,9	22,2	180	200	660	180	180 [7]

For the design the complete approval Z-21.3-1748 has to be considered.

(1) The design values of the cyclic fatigue loading apply for ≥ 5 x 10_6 load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x hef . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accor dance with the approval.

(2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.

The capsule system for the anchoring of dynamic loads

Slewing cranes

APPROVALS

ADVANTAGES

- The bushing fills the annular gap in the fixture and, in combination with the anchor rod UMV-A dyn, ensures an even load distribution. This allows for the bearing of dynamic alternating loads.
- The cone shape of the UMV-A dyn anchor rod ensures a controlled expansion under dynamic stress, thus allowing for use in cracked concrete.
- The pre-portioned resin capsule ensures a quick and easy installation on the construction site, and helps to avoid errors.
- The glass particles of the capsule body rough up the drill hole wall during the setting process, and improve the bond between the anchor rod and concrete.

APPLICATION

- Jib cranes
- Gantry and overhead cranes
- Guide rails for elevators
- Tunnel ventilators (jet fans)
- Gantries in road construction
- Antennas and transmitter masts
- Industrial robots

BUILDING MATERIALS

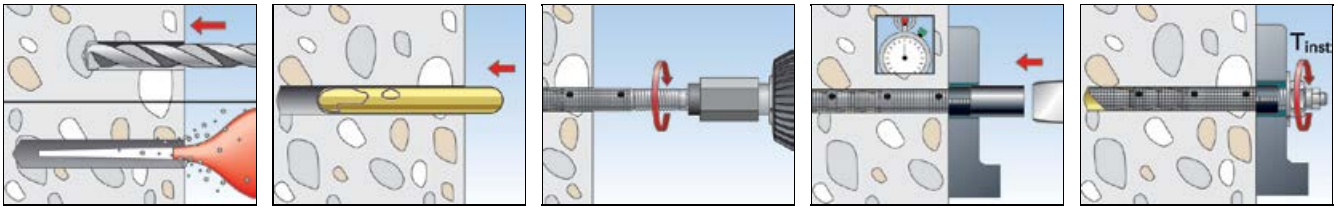
Approved for:

- Concrete C20/25 to C50/60
- Cracked and non-cracked

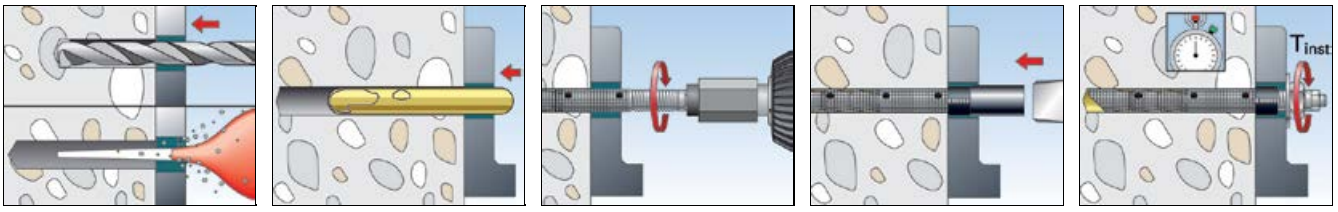
VERSIONS

- Zinc-plated steel

PRE-POSITIONED INSTALLATION



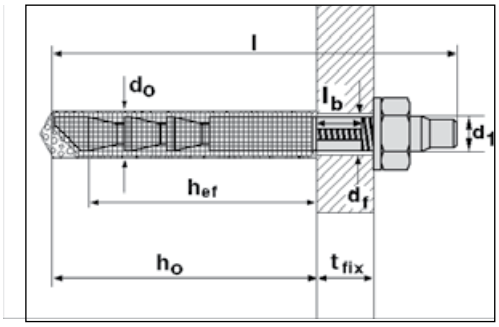
PUSH-THROUGH INSTALLATION



TECHNICAL DATA

UMV-A

UMV-P



Item	Zinc-plated steel Art-No.	Drill hole diameter d_0 (mm)	Total length l (mm)	Fixing range t_{fix} (mm)	Drill hole depth h_0 (mm)	Through hole diameter d_f (mm)	Height of clumping chucks l_b (mm)	Sales unit UMV-P UMV-A (mm)	Recommended Capsule Item	Recommended Capsule Art-No.
	gvz									
UMV-A dyn 12 x 100/10	**007943**	15	145	5 - 10	115	16	5	10	**UMV-P 12 x 100**	**007947**
UMV-A dyn 12 x 100/15	**007988**	15	150	8 - 10	115	16	8	10	**UMV-P 12 x 100**	**007947**
UMV-A dyn 12 x 100/25	**008004**	15	160	15 - 25	115	16	15	10	**UMV-P 12 x 100**	**007947**
UMV-A dyn 12 x 100/50	**008005**	15	185	25 - 50	115	16	15	10	**UMV-P 12 x 100**	**007947**
UMV-A dyn 16 x 125/30	**008006**	18	200	15 - 30	140	19	15	10	**UMV-P 16 x 125**	**007948**
UMV-A dyn 16 x 125/60	**008007**	18	230	30 - 60	140	19	15	10	**UMV-P 16 x 125**	**007948**
UMV-A dyn 20 x 170/40	**008008**[1)]	25	255	20 - 40	190	26	20	10	**UMV-P 20 x 170**	**007949**
UMV-A dyn 24 x 220/50	**008009**[1)]	28	325	25 - 50	245	29	25	5	**UMV-P 24 x 220**	**007973**

(1) Without external hexagon. Please use a separate setting tool.

LOADS

UMV multicone dynamic bonded anchor

zinc-plated steel

Design values for cyclic fatigue loading[1)] of a single anchor in cracked or non-cracked normal concrete of strength class C20/25[3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Installation torque T_{inst} [Nm]	Design value of tensile load $\Delta N_{Ed,max}$[2)] [kN]	Design value of shear load $\Delta V_{Ed,max}$[2)6)] [kN]	Required edge distance (with one edge) for Max. tension load ΔN_{Ed} c[5)] [mm]	Required edge distance (with one edge) for Max. shear load ΔV_{Ed} c[5)] [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [mm]	Min. edge distance c_{min} [mm]
UMV dyn 100 M12	gvz	100	200	40	12,2	5,6	125	100	300	100	100[4)]
UMV dyn 125 M16	gvz	125	250	60	14,8	6,7	130	130	375	130	130[7)]
UMV dyn 170 M20	gvz	170	340	100	31,4	16,3	255	170	510	170	170[4)]
UMV dyn 220 M24	gvz	220	440	120	38,5	16,3	260	220	660	220	220[4)]

For the design the complete approval Z-21.3-1662 has to be considered.

(1) The design values of the cyclic fatigue loading apply for ≥ 5 x 10_6 load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x hef . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accordance with the approval.

(2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.

(3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.

(4) Without reduction of the shear load.

(5) Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.

(6) Valid for pulsating loads. For alternating loads see approval.

(7) Without reduction of the tensile and the shear load.

The best performance in cracked concrete

Steel girders

APPROVALS

ETA-05/0164
ETAG 001-5
Option 1 for cracked concrete

Fire resistance classification
R 120
Anchor types see test report

ZTV
1200 °C

ADVANTAGES

- The Highbond system FHB II achieves the highest load values in cracked concrete. Thus fewer fixing points and smaller anchor plates are required.
- 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. Thus, you can select the most economical solution based on requirements.
- The pre-portioned resin capsule FHB II-P/PF can be used in uncleaned drill holes. This makes it an economical and fast solution. In addition, it is perfect for single and underwater applications.
- The special formulation used in the capsule FHB II-PF ensures particularly fast setting.
- The large cartridge size of the injection mortar FIS HB is ideally suited for serial installation.

BUILDING MATERIALS

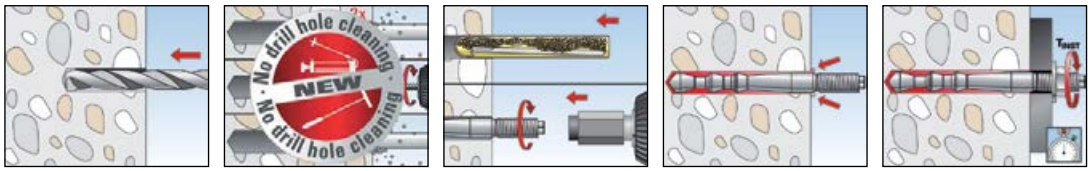
Approved for:

- Concrete C20/25 to C50/60
- Cracked and non-cracked

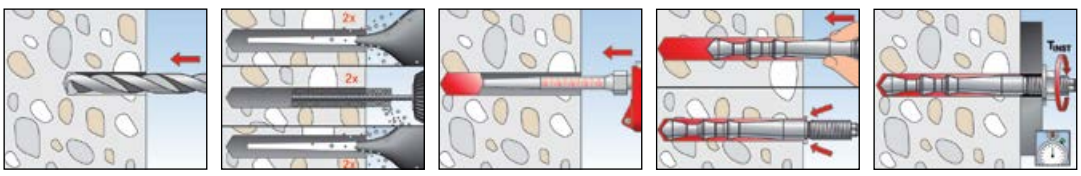
Also suitable for:

- Concrete C12/15

INSTALLATION WITH CAPSULE



INSTALLATION WITH INJECTION MORTAR



CURING TIME - FIS HB / FHB II P / FHB II-PF

Cartridge temperature FIS HB (minimum + 5°C)	Gelling time			Temperature at anchoring base	Curing time		
	FIS HB	FHB II P	FHB II-PF		FIS HB	FHB II P	FHB II-PF
- 5°C - 0°C	–	–	–	5°C - 0°C	360 min.	240 min.	8 min.
± 0°C - + 5°C	–	–	–	± 0°C - + 5°C	180 min.	45 min.	6 min.
+ 5°C - +20°C	15 min.	–	–	+ 5°C - +20°C	90 min.	20 min.	4 min.
+20°C - +30°C	6 min.	–	–	+20°C - +30°C	35 min.	10 min.	2 min.
+30°C - +40°C	4 min.	–	–	+30°C - +40°C	20 min.	–	–
> +40°C	2 min.	–	–	> +40°C	12 min.	–	–

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

TECHNICAL DATA

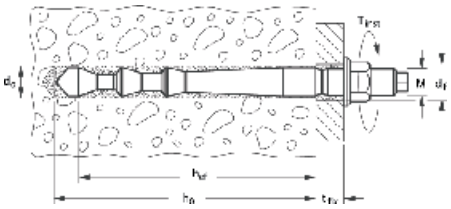
Injection mortar **FIS HB 345 S**

Static mixer **FIS MR Plus**

Item	Art. No.	Languages on the cartridge	Contents	Sales unit (pcs)
FIS HB 345 S	**33211**	D, GB, F, E, NL, CZ	1 cartridge 360 ml, 2 x static mixer FIS MR Plus	6
FIS MR Plus	**545853**	–	10 static mixer	10

FHB II-A S (shortversion)

FHB II-A L (longversion)



Resin capsule **FHB II-P** (standard)

Resin capsule **FHB II-PF** (quick version)

Item	Zinc plated Art-No.	Stainless steel Art-No.	HCR [2]	Drill dia d_0	Drill depth h_0	Usable length t_{fix}	SW	Recommended Capsule FHB II-P	Art-No.	FHB II-PF	Art-No.	Sales unit (pcs)
FHB II-A S M10 x 60/10	**097072**	**097630**	**097704[1]**	10	75	10	17	**10 x 60**	**096487**	**10 x 60**	**500547**	10
FHB II-A S M10 x 60/20	**097073**	**097631**	–	10	75	20	17	**10 x 60**	**096487**	**10 x 60**	**500547**	10
FHB II-A S M10 x 60/40	–	**097632**	–	10	75	40	17	**10 x 60**	**096487**	**10 x 60**	**500547**	10
FHB II-A S M10 x 60/60	**097074**	**097633**	–	10	75	60	17	**10 x 60**	**096487**	**10 x 60**	**500547**	10
FHB II-A S M10 x 60/100	**097206**	**097634**	–	10	75	100	17	**10 x 60**	**096487**	**10 x 60**	**500547**	10
FHB II-A S M10 x 75/10	**506884**	**506888**	–	10	90	10	17	**10 x 75**	**508016**	**10 x 75**	**507999**	10
FHB II-A S M10 x 75/20	**506885**	**506889**	–	10	90	20	17	**10 x 75**	**508016**	**10 x 75**	**507999**	10
FHB II-A S M10 x 75/40	–	**506890**	–	10	90	40	17	**10 x 75**	**508016**	**10 x 75**	**507999**	10
FHB II-A S M10 x 75/60	**506886**	**506891**	–	10	90	60	17	**10 x 75**	**508016**	**10 x 75**	**507999**	10
FHB II-A S M10 x 75/100	**506887**	**506892**	–	10	90	100	17	**10 x 75**	**508016**	**10 x 75**	**507999**	10
FHB II-A S M12 x 75/10	**097257**	**097635**	–	12	90	10	19	**12 x 75**	**096848**	**12 x 75**	**500548**	10
FHB II-A S M12 x 75/25	**097268**	**097636**	**097706[1]**	12	90	25	19	**12 x 75**	**096848**	**12 x 75**	**500548**	10
FHB II-A S M12 x 75/40	–	**097637**	–	12	90	40	19	**12 x 75**	**096848**	**12 x 75**	**500548**	10
FHB II-A S M12 x 75/60	**097274**	**097638**	–	12	90	60	19	**12 x 75**	**096848**	**12 x 75**	**500548**	10
FHB II-A S M12 x 75/100	**097275**	**097639**	–	12	90	100	19	**12 x 75**	**096848**	**12 x 75**	**500548**	10
FHB II-A S M12 x 75/165	**097280**	**097640**	–	12	90	165	19	**12 x 75**	**096848**	**12 x 75**	**500548**	10
FHB II-A S M16 x 95/30	**097281**	**097641**	**097708[1]**	16	110	30	24	**16 x 95**	**096849**	**16 x 95**	**500549**	10
FHB II-A S M16 x 95/60	**097286**	**097642**	–	16	110	60	24	**16 x 95**	**096849**	**16 x 95**	**500549**	10
FHB II-A S M16 x 95/100	**097295**	**097643**	–	16	110	100	24	**16 x 95**	**096849**	**16 x 95**	**500549**	10
FHB II-A S M16 x 95/165	**097296**	**097644**	–	16	110	165	24	**16 x 95**	**096849**	**16 x 95**	**500549**	10
FHB II-A S M20 x 170/50	**506917**	**506919**	–	25	190	50	30	**20 x 170**	**507925**	**20 x 170**	**508003**	4
FHB II-A S M24 x 170/50	**097297**	**097645**	–	25	190	50	36	**24 x 170**	**096851**	**24 x 170**	**500550**	4
FHB II-A L M8 x 60/10	**097032**	**097298**	**097696[1]**	10	75	10	13	**8 x 60**	**096824**	**8 x 60**	**500542**	10
FHB II-A L M8 x 60/30	**097033**	**097299**	–	10	75	30	13	**8 x 60**	**096824**	**8 x 60**	**500542**	10
FHB II-A L M8 x 60/50	**097034**	**097440**	–	10	75	50	13	**8 x 60**	**096824**	**8 x 60**	**500542**	10
FHB II-A L M10 x 95/10	**096907**	**097616**	–	12	110	10	17	**10 x 95**	**096843**	**10 x 95**	**500543**	10
FHB II-A L M10 x 95/20	**096940**	**097617**	**097699[1]**	12	110	20	17	**10 x 95**	**096843**	**10 x 95**	**500543**	10
FHB II-A L M10 x 95/40	–	**097618**	–	12	110	40	17	**10 x 95**	**096843**	**10 x 95**	**500543**	10
FHB II-A L M10 x 95/60	**096941**	**097619**	–	12	110	60	17	**10 x 95**	**096843**	**10 x 95**	**500543**	10
FHB II-A L M10 x 95/100	**096942**	**097620**	–	12	110	100	17	**10 x 95**	**096843**	**10 x 95**	**500543**	10
FHB II-A L M12 x 100/10	**506893**	**506897**	–	14	115	10	19	**12 x 100**	**507922**	**12 x 100**	**508000**	10
FHB II-A L M12 x 100/25	**506894**	**506898**	–	14	115	25	19	**12 x 100**	**507922**	**12 x 100**	**508000**	10
FHB II-A L M12 x 100/40	–	**506899**	–	14	115	40	19	**12 x 100**	**507922**	**12 x 100**	**508000**	10
FHB II-A L M12 x 100/60	**506895**	**506901**	–	14	115	60	19	**12 x 100**	**507922**	**12 x 100**	**508000**	10
FHB II-A L M12 x 100/100	**506896**	**506902**	–	14	115	100	19	**12 x 100**	**507922**	**12 x 100**	**508000**	10
FHB II-A L M12 x 120/10	**096943**	**097621**	–	14	135	10	19	**12 x 120**	**096844**	**12 x 120**	**500544**	10
FHB II-A L M12 x 120/25	**096944**	**097622**	**097700[1]**	14	135	25	19	**12 x 120**	**096844**	**12 x 120**	**500544**	10
FHB II-A L M12 x 120/40	–	**097623**	–	14	135	40	19	**12 x 120**	**096844**	**12 x 120**	**500544**	10
FHB II-A L M12 x 120/60	**097014**	**097624**	–	14	135	60	19	**12 x 120**	**096844**	**12 x 120**	**500544**	10
FHB II-A L M12 x 120/100	**097031**	**097625**	–	14	135	100	19	**12 x 120**	**096844**	**12 x 120**	**500544**	10
FHB II-A L M16 x 125/30	**506903**	**506906**	–	18	140	30	24	**16 x 125**	**507923**	**16 x 125**	**508001**	10
FHB II-A L M16 x 125/60	**506904**	**506909**	–	18	140	60	24	**16 x 125**	**507923**	**16 x 125**	**508001**	10
FHB II-A L M16 x 125/100	**506905**	**506910**	–	18	140	100	24	**16 x 125**	**507923**	**16 x 125**	**508001**	10
FHB II-A L M16 x 145/30	**506911**	**506914**	–	18	160	30	24	**16 x 145**	**507924**	**16 x 145**	**508002**	10
FHB II-A L M16 x 145/60	**506912**	**506915**	–	18	160	60	24	**16 x 145**	**507924**	**16 x 145**	**508002**	10
FHB II-A L M16 x 145/100	**506913**	**506916**	–	18	160	100	24	**16 x 145**	**507924**	**16 x 145**	**508002**	10
FHB II-A L M16 x 160/30	**097035**	**097626**	**097702[1]**	18	175	30	24	**16 x 160**	**096845**	**16 x 160**	**500545**	10
FHB II-A L M16 x 160/60	**097038**	**097627**	–	18	175	60	24	**16 x 160**	**096845**	**16 x 160**	**500545**	10
FHB II-A L M16 x 160/100	**097070**	**097628**	–	18	175	100	24	**16 x 160**	**096845**	**16 x 160**	**500545**	10
FHB II-A L M20 x 210/50	**097071**	**097629**	**097703[1]**	25	235	50	30	**20 x 210**	**096846**	**20 x 210**	**500546**	4
FHB II-A L M20 x 210/150	**052370**	–	–	25	235	150	30	**20 x 210**	**096846**	**20 x 210**	**500546**	8/4[3]
FHB II-A L M24 x 210/50	**506920**	**506921**	–	25	235	50	36	**24 x 210**	**507926**	**24 x 210**	**508004**	4

(1) Delivery time on request (2) HCR - Highly Corrosion Resistant steel (3) Sales Unit for (FHB II -AL M20 x 210/150) is 8, Sales unit for (FHB II - P 20 x 210, FHB II - PF 20 x 210) is 4

LOADS

Highbond-system FHB II

Loads for a single anchor[1)2)6)7)] in concrete C20/25 [5)] For the design the complete approval ETA - 05/0164 has to be considered.

Item	Effective anchorage depth h_{ef} (mm)	Minimum member thickness h_{min} (mm)	Installation torque T_{inst} (Nm)	Min spacing s_{min} (mm)	Min edge distance c_{min} (mm)	Cracked Concrete				Non-cracked Concrete			
						Design tensile load N_d (kN)	Design shear load V_d (kN)	Permissible tensile load N_{rec} (kN)	Permissible shear load V_{rec} (kN)	Design tensile load N_d (kN)	Design shear load V_d (kN)	Permissible tensile load N_{rec} (kN)	Permissible shear load V_{rec} (kN)
FHB II - AS M10x60	60	100	15.0	40	40	11.2	15.8	8.0	11.3	15.7	15.8	11.2	11.3
FHB II - AS M10x75	75	120	15.0	40	40	15.5	15.8	11.1	11.3	16.8	15.8	12.0	11.3
FHB II - AS M12x75	75	120	30.0	40	40	15.5	21.8	11.1	15.6	21.8	21.8	15.6	15.6
FHB II - AS M16x95	95	150	50.0	50	50	22.3	40.6	15.9	29.0	31.2	40.6	22.3	29.0
FHB II - AS M20x170	170	240	100.0	80	80	53.2	64.3	38.0	45.9	74.6	64.3	53.3	45.9
FHB II - AS M24x170	170	240	100.0	80	80	53.2	91.4	38.0	65.3	74.6	91.4	53.3	65.3
FHBII - AS M10x60 A4	60	100	15.0	40	40	11.2	19.3	8.0	13.8	15.7	19.3	11.2	13.8
FHBII - AS M10x75 A4	75	120	15.0	40	40	15.5	19.3	11.1	13.8	16.8	19.3	12.0	13.8
FHBII - AS M12x75 A4	75	120	30.0	40	40	15.5	27.0	11.1	19.3	21.8	27.0	15.6	19.3
FHBII - AS M16x95 A4	95	150	50.0	50	50	22.3	44.4	15.9	31.7	31.2	50.1	22.3	35.8
FHBII - AS M20x170 A4	170	240	100.0	80	80	53.2	78.3	38.0	55.9	74.6	78.3	53.3	55.9
FHBII - AS M24x170 A4	170	240	100.0	80	80	53.2	99.5	38.0	71.1	74.6	99.5	53.3	71.1
FHBII - AL M 8x60	60	100	15.0	40	40	11.2	10.9	8.0	7.8	15.7	10.9	11.2	7.8
FHBII - AL M10x95	95	140	20.0	40	40	22.3	16.7	15.9	11.9	23.0	16.7	16.4	11.9
FHBII - AL M12x100	100	140	40.0	50	50	23.9	24.2	17.1	17.3	33.2	24.2	23.7	17.3
FHBII - AL M12x120	120	170	40.0	50	50	31.5	24.2	22.5	17.3	33.2	24.2	23.7	17.3
FHBII - AL M16x125	125	170	60.0	55	55	33.6	45.1	24.0	32.2	47.0	45.1	33.6	32.2
FHBII - AL M16x145	145	190	60.0	60	60	41.9	45.1	29.9	32.2	58.8	45.1	42.0	32.2
FHBII - AL M16x160	160	220	60.0	70	70	48.6	45.1	34.7	32.2	64.4	45.1	46.0	32.2
FHBII - AL M20x210	210	280	100.0	90	90	73.1	70.3	52.2	50.2	91.7	70.3	65.5	50.2
FHBII - AL M24x210	210	280	100.0	90	90	73.1	101.5	52.2	72.5	91.7	101.5	65.5	72.5
FHBII - AL M8x60 A4	60	100	15.0	40	40	11.2	12.2	8.0	8.7	15.7	12.2	11.2	8.7
FHBII - AL M10x95 A4	95	140	20.0	40	40	22.3	18.6	15.9	13.3	23.0	18.6	16.4	13.3
FHBII - AL M12x100 A4	100	140	40.0	50	50	23.9	27.0	17.1	19.3	33.2	27.0	23.7	19.3
FHBII - AL M12x120 A4	120	170	40.0	50	50	31.5	27.0	22.5	19.3	33.2	27.0	23.7	19.3
FHBII - AL M16x125 A4	125	170	60.0	55	55	33.6	50.1	24.0	35.8	47.0	50.1	33.6	35.8
FHBII - AL M16x145 A4	145	190	60.0	60	60	41.9	50.1	29.9	35.8	58.8	50.1	42.0	35.8
FHBII - AL M16x160 A4	160	220	60.0	70	70	48.6	50.1	34.7	35.8	64.4	50.1	46.0	35.8
FHBII - AL M20x210 A4	210	280	100.0	90	90	73.1	78.3	52.2	55.9	91.7	78.3	65.5	55.9
FHBII - AL M24x210 A4	210	280	100.0	90	90	73.1	112.8	52.2	80.6	91.7	112.8	65.5	80.6

(1) The partial safety factors for material resistance as regulated in the approval.
(2) Partial safety factor for load γ_L= 1.4 are considered for recommended load capacities.
(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load/ design load.
(4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(6) Valid for injection mortar FIS HB. For using the glass capsule FHP II-P or FHP II-PF see approval.
(7) The given loads are valid for injection mortar FIS HB for fixations in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and best possible drillhole cleaning according approval. When the glass capsule FHB II-P or FHB II-PF are used no drillhole cleaning is required. Please see approval.

The powerful injection mortar for cracked concrete

Rebar connections

APPROVALS

ETA-17/0979
EAD 330499-00-0601
Option 1 for cracked concrete
seismic performance category C1, C2

ETA-17/1056
ETAG 001-5
Post-installed rebar connection

Fire resistance classification R 120
Anchor types see test report

SEISMIC

ICC ES ESR-1990
See ICC-ES Evaluation Report at www.icc-es.org
Inspection agency: IEA (AA-707)

Zulassung

ADVANTAGES

- Approved for seismic applications, which ensure safety even under extreme conditions.
- Highest temperature range for epoxy mortar.
- Longest shelf life up to 3 years provides flexibility of storage.
- FIS EM Plus is also approved for diamond drilled and water-filled drill holes, thus ensuring more flexibility on the construction site.
- High bond strengths and minor mortar shrinkage allow maximum load application in cracked and non-cracked concrete, even with large threaded rod diameters of up to M30 and rebar diameter up to T40.
- The low voc content complies with green building requirements/leed.

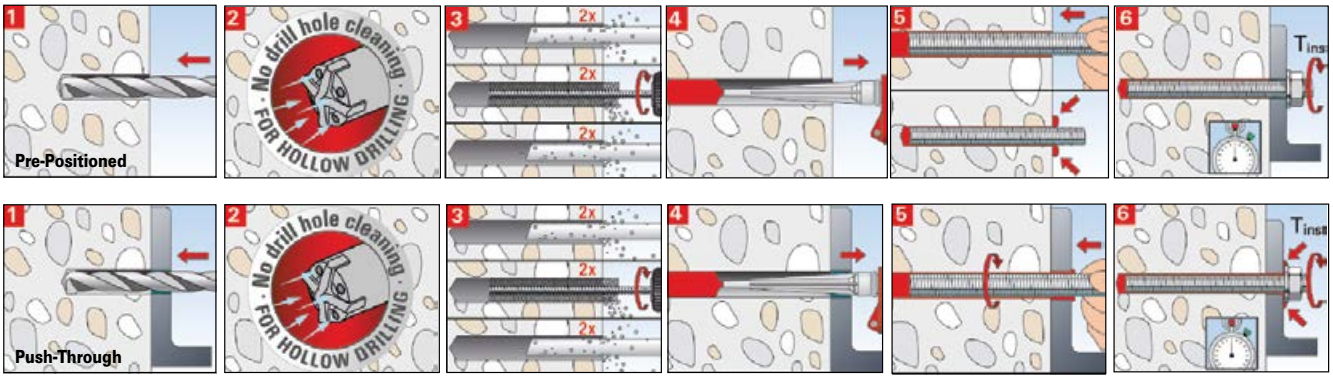
BUILDING MATERIALS

Approved for anchoring in:
- Concrete C20/25 to C50/60 Cracked and non-cracked
- Seismic conditions
- Under water
- Diamond drill holes

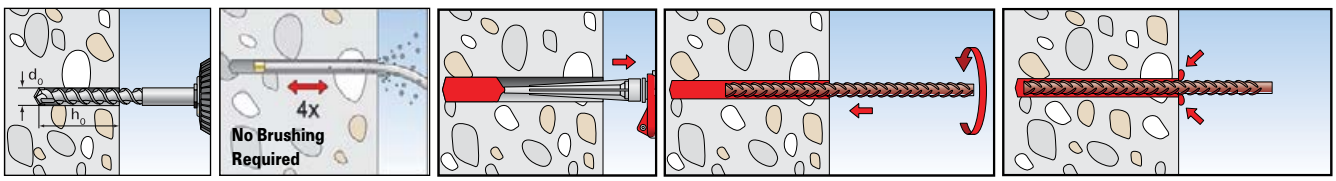
Also suitable for:
- Concrete C12/15

Also tested for:
- Natural stone with dense structure

INSTALLATION - Threaded Rod



INSTALLATION DETAILS - Rebar Acc. to ETA 17/1056



TECHNICAL DATA

Injection mortar **FIS EM Plus**

Static mixer **FIS MR Plus**

Item	Art-No.	Languages on the cartridge	Contents	Sales unit (pcs)
FIS EM Plus 390 S	**544154**	DE, EN, FR, NL, ES, PT	1 cartridge 390 ml, 2 x static mixer FIS MR Plus	6
FIS EM Plus 390 S BT (bucket)	**544172**	DE, EN, FR, NL, ES, PT	20 cartridges 390 ml + 20 static mixer FIS MR	1
FIS MR Plus	**545853**	–	10 static mixer FIS MR Plus in Polybag	10
FIS MR Plus PBH	**546158**	–	10 static mixer FIS MR Plus in Polybag with hanger	10

CURING TIME

Cartridge temperature (mortar)	Gelling time (Maximmum processing time)	Temperature at anchoring base	Curing time
+ 5°C - +9°C	120 min.	+ 5°C - +9°C	40 hrs.
+10°C - +19°C	30 min.	+10°C - +19°C	18 hrs.
+20°C - +29°C	14 min.	+20°C - +29°C	10 hrs.
≥30°C	7 min.	≥30°C	5 hrs.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.
In wet concrete or water filled holes the curing times must be doubled.

LOADS

Epoxy mortar FIS EM Plus

Loads for a single anchor in concrete [1) 2) 5) 8) 9)]

For the design the complete approval ETA - 17/0979 has to be considered.

Design Resistance [1)]

Rod diameter	Dia 8				Dia 10				Dia 12				Dia 14				Dia 16				Dia 18	Dia 20			
hef(mm)	80				100				120				140				160				180	200			
Anchor type	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	12				14				14			16	16			18	18			20	25	24			25
Torque (Nm)	10			-	20			-	40			-	50			-	60			-	-	120			-
Non-cracked Concrete																									
Tension C20/25 N_{rd} (kN)	12.7	19.5	13.7	18.2	19.3	30.9	21.7	28.4	28.7	44.3	31.6	40.8	38.7	55.8	43.1	55.7	52.6	68.1	58.8	68.1	81.3	82.0	95.2	91.7	95.2
Tension C50/60 N_{rd} (kN)	12.7	19.5	13.7	18.2	19.3	30.9	21.7	28.4	28.7	45.0	31.6	40.8	38.7	61.3	43.1	55.7	52.6	83.7	58.8	72.7	92.0	82.0	130.7	91.7	113.5
Shear ≥ C25/25	7.2	11.7	8.2	10.1	12.0	18.5	13.0	15.8	16.8	26.9	18.9	22.8	23.2	36.8	25.8	31.1	31.2	50.2	35.2	40.6	51.5	48.8	78.4	54.9	63.5
Cracked Concrete																									
Tension C20/25 N_{rd} (kN)	10.0	10.0	10.0	9.4	15.7	15.7	15.7	14.7	27.1	27.1	27.1	24.1	34.9	34.9	34.9	32.8	45.6	45.6	45.6	42.9	54.3	67.9	67.9	67.9	67.0
Tension C50/60 N_{rd} (kN)	11.0	11.0	11.0	10.2	17.1	17.1	17.1	16.0	28.7	29.6	29.6	26.3	38.0	38.0	38.0	35.8	49.7	49.7	49.7	46.7	59.1	77.6	77.6	77.6	73.0
Shear ≥ C25/25	7.2	11.7	8.2	10.1	12.0	18.5	13.0	15.8	16.8	26.9	18.9	22.8	23.2	36.8	25.8	31.1	31.2	50.2	35.2	40.6	51.5	48.8	78.4	54.9	63.5

Rod diameter	Dia 22				Dia 24				Dia 25	Dia 26	Dia 27			Dia 28	Dia 30				Dia 32	Dia 34	Dia 36	Dia 40
hef(mm)	220				240				250	260	270			280	300				320	340	360	400
Anchor type	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	Rebar	Rebar
Drill diameter (mm)	25			30	28			30	30	35	30			35	35			40	40	40	45	55
Torque (Nm)	135			-	150			-	-	-	200			-	300			-	-	-	-	-
Non-cracked Concrete																						
Tension C20/25 N_{rd} (kN)	101.3	109.9	109.9	109.9	118.0	125.2	125.2	125.2	133.1	141.1	149.4	149.4	149.4	157.7	174.9	174.9	174.9	174.9	192.7	211.1	230.0	269.3
Tension C50/60 N_{rd} (kN)	101.3	161.6	113.4	137.4	118.0	188.3	132.1	157.7	171.1	185.1	153.0	231.4	214.2	214.7	187.0	271.0	261.8	246.4	280.4	290.1	325.3	401.6
Shear ≥ C25/25	60.8	97.0	67.9	76.9	71.2	113.0	79.2	91.5	99.3	107.4	92.0	146.9	102.9	124.6	112.8	179.5	125.8	143.0	162.7	183.7	206.0	254.4
Cracked Concrete																						
Tension C20/25 N_{rd} (kN)	78.3	67.9	67.9	67.9	89.2	89.2	89.2	89.2	94.9	100.6	106.5	106.5	106.5	112.4	124.7	124.7	124.7	124.7	137.4	150.5	163.9	192.0
Tension C50/60 N_{rd} (kN)	93.9	85.3	85.3	80.3	111.7	111.7	111.7	105.1	114.1	123.4	141.4	141.4	141.4	143.1	174.6	174.6	174.6	164.3	186.9	211.0	236.6	292.1
Shear ≥ C25/25	60.8	97.0	67.9	76.9	71.2	113.0	113.0	91.5	99.3	107.4	92.0	146.9	102.9	124.6	112.8	179.5	125.8	143.0	162.7	183.7	206.0	254.4

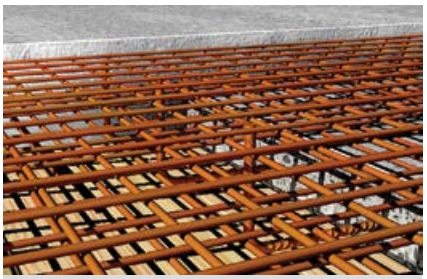
Recomended Resistance [2)]

Rod diameter	Dia 8				Dia 10				Dia 12				Dia 14				Dia 16				Dia 18	Dia 20			
hef	80				100				120				140				160				180	200			
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	12				14				14			16	16			18	18			20	25	24			25
Torque (Nm)	10			-	20			-	40			-	50			-	60			-	-	120			-
Non-cracked concrete																									
Tension C20/25 N_{rd} (kN)	9.1	13.9	9.8	13.0	13.8	22.1	15.5	20.3	20.5	31.6	22.5	29.2	27.6	39.8	30.8	39.8	37.6	48.7	42.0	48.7	58.1	58.6	68.0	65.5	68.0
Tension C50/60 N_{rd} (kN)	9.1	13.9	9.8	13.0	13.8	22.1	15.5	20.3	20.5	32.1	22.5	29.2	27.6	43.8	30.8	39.8	37.6	59.8	42.0	51.9	65.7	58.6	93.3	65.5	81.1
Shear ≥ C25/25	5.1	8.4	5.9	7.2	8.6	13.2	9.3	11.3	12.0	19.2	13.5	16.3	16.6	26.3	18.4	22.2	22.3	35.9	25.2	29.0	36.8	34.9	56.0	39.2	45.4
Cracked Concrete																									
Tension C20/25 N_{rd} (kN)	7.2	7.2	7.2	6.7	11.2	11.2	11.2	10.5	19.4	19.4	19.4	17.2	24.9	24.9	24.9	23.4	32.5	32.5	32.5	30.6	38.8	48.5	48.5	48.5	47.8
Tension C50/60 N_{rd} (kN)	7.8	7.8	7.8	7.3	12.2	12.2	12.2	11.4	20.5	21.1	21.1	18.8	27.2	27.2	27.2	25.6	35.5	35.5	35.5	33.4	42.2	55.4	55.4	55.4	52.2
Shear ≥ C25/25	5.1	8.4	5.9	7.2	8.6	13.2	9.3	11.3	12.0	19.2	13.5	16.3	16.6	26.3	18.4	22.2	22.3	35.9	25.2	29.0	36.8	34.9	56.0	39.2	45.4

Rod diameter	Dia 22				Dia 24				Dia 25	Dia 26	Dia 27			Dia 28	Dia 30				Dia 32	Dia 34	Dia 36	Dia 40
hef	220				240				250	260	270			280	300				320	340	360	400
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	Rebar	Rebar
Drill diameter (mm)	25			30	28			30	30	35	30			35	35			40	40	40	45	55
Torque (Nm)	135			-	150			-	-	-	200			-	300			-	-	-	-	-
Non-cracked concrete																						
Tension C20/25 N_{rd} (kN)	72.4	78.5	78.5	78.5	84.3	89.4	89.4	89.4	95.1	100.8	106.7	106.7	106.7	112.7	125.0	125.0	125.0	125.0	137.7	150.8	164.3	192.4
Tension C50/60 N_{rd} (kN)	72.4	115.4	81.0	98.1	84.3	134.5	94.4	112.7	122.2	132.2	109.3	165.3	153.0	153.3	133.6	193.6	187.0	176.0	200.3	207.2	232.3	286.8
Shear ≥ C25/25	43.4	69.3	48.5	55.0	50.9	80.7	56.6	65.4	70.9	76.7	65.7	104.9	73.5	89.0	80.6	128.2	89.9	102.1	116.2	131.2	147.2	181.7
Cracked Concrete																						
Tension C20/25 N_{rd} (kN)	55.9	48.5	48.5	48.5	63.7	63.7	63.7	63.7	67.8	71.9	76.1	76.1	76.1	80.3	89.1	89.1	89.1	89.1	98.1	107.5	117.1	137.1
Tension C50/60 N_{rd} (kN)	67.1	61.0	61.0	57.4	79.8	79.8	79.8	75.1	81.5	88.1	101.0	101.0	101.0	102.2	124.7	124.7	124.7	117.3	133.5	150.7	169.0	208.6
Shear ≥ C25/25	43.4	69.3	48.5	55.0	50.9	80.7	56.6	65.4	70.9	76.7	65.7	104.9	73.5	89.0	80.6	128.2	89.9	102.1	116.2	131.2	147.2	181.7

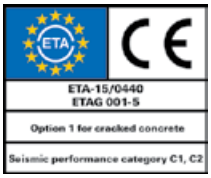
(1) The partial safety factors for material resistance as regulated in the approval.
(2) Partial safety factor for load γ_L= 1.4 are considered for recommended load capacities.
(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load/ design load.
(4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(6) The given loads are valid in dry and humid concrete for temperatures substrate up to +35°C (resp. short term up to 60°C) and best possible cleaning according to approval.
(7) Rebar grade used for above calculation is FY= 460 n/mm²).
(8) The above loads use for embedment depth = 10 x dia.
(9) Embedment depth can be reduced or increased to get desired loads as per approval.

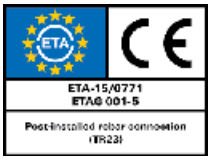
The basic epoxy mortar for applications in concrete



Rebar fixings

APPROVALS





ADVANTAGES

- Approved for seismic applications, which ensure safety even under extreme conditions.
- The low voc content complies with green building requirements /leed
- High bond strengths and minor mortar shrinkage allow maximum load application in cracked and non-cracked concrete, even with large threaded rod diameters of up to M30 and rebar diameter up to T40.
- Longest shelf life up to 3 years provides flexability of storage.
- FIS EB is also approved for diamond drilled and water-filled drill holes, thus ensuring more flexibility on the construction site.
- Highest temperature range for epoxy mortar.

BUILDING MATERIALS

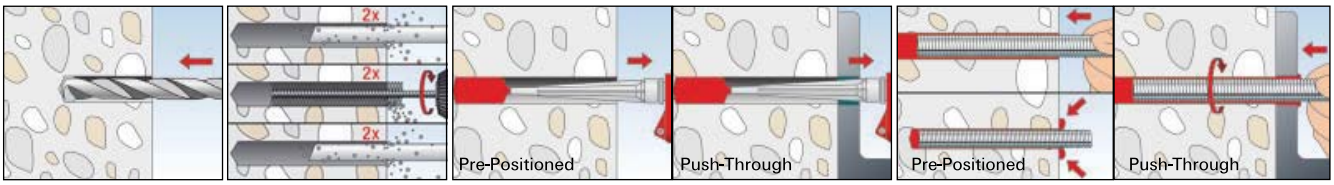
Approved for anchoring in:

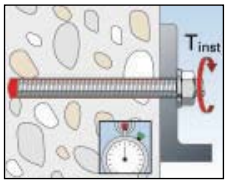
- Concrete C20/25 to C50/60
- Cracked and non-cracked
- Seismic conditions
- Diamond drill holes

Approved for rebar connection in:

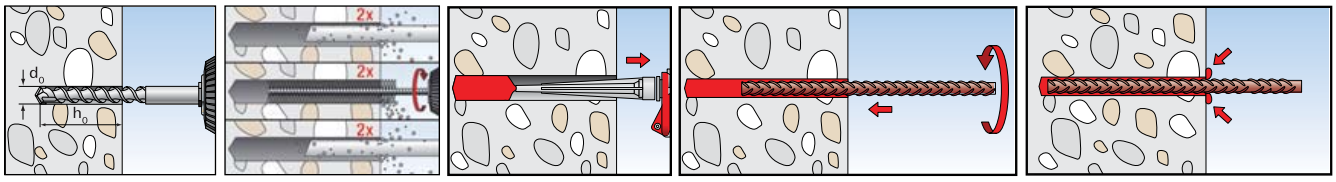
- Concrete C12/15 to C50/60

INSTALLATION - Threaded Rod





INSTALLATION DETAILS - Rebar Acc. to ETA 15/0771



TECHNICAL DATA

Epoxy mortar **FIS EB**

FIS MR Plus

Item	Art-No.	Languages on the cartridge	Contents	Sales unit (pcs)
FIS EB 390 S	**534984**	D, GB, E, P	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS MR Plus	**545853**	–	10 static mixer	10

CURING TIME

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
+ 5°C - +10°C	2 hrs.	+ 5°C - +10°C	45 hrs.
+10°C - +20°C	30 min.	+10°C - +20°C	22 hrs.
+20°C - +30°C	14 min.	+20°C - +30°C	12 hrs.
≥30°C	7 min.	≥30°C	6 hrs.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.
In wet concrete or flooded holes, the curing time must be doubled.

LOADS

Epoxy mortar FIS EB

Loads for a single anchor in concrete [1) 2) 5) 8) 9)]

For the design the complete approval ETA - 15/0440 has to be considered.

Design Resistance [1)]

Rod diameter	Dia 8				Dia 10				Dia 12				Dia 14				Dia 16				Dia 18	Dia 20			
hef(mm)	80				100				120				140				160				180	200			
Anchor type	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	12				14				14			16	16			18	18			20	25	24			25
Torque (Nm)	10			-	20			-	40			-	50			-	60			-	-	120			-
Non-cracked Concrete																									
Tension C20/25 N_{rd} (kN)	12.7	14.7	13.7	14.7	19.3	20.9	20.9	20.9	28.7	30.1	30.1	30.1	36.9	36.9	36.9	36.9	48.2	48.2	48.2	48.2	61.0	67.0	67.0	67.0	67.0
Tension C50/60 N_{rd} (kN)	12.7	16.1	13.7	16.1	19.3	22.8	21.7	22.8	28.7	32.9	31.6	32.9	38.7	40.2	40.2	40.2	52.6	52.6	52.6	52.6	66.5	73.0	73.0	73.0	73.0
Shear ≥ C25/25	7.2	12.0	8.3	10.1	12.0	18.4	12.8	15.8	16.8	27.2	19.2	22.8	23.2	36.8	25.6	31.2	31.2	50.4	35.2	40.7	51.5	48.8	78.4	55.1	63.6
Cracked Concrete																									
Tension C20/25 N_{rd} (kN)	6.7	6.7	6.7	6.7	10.5	10.5	10.5	10.5	15.1	15.1	15.1	15.1	20.5	20.5	20.5	20.5	21.4	21.4	21.4	21.4	27.1	33.5	33.5	33.5	33.5
Tension C50/60 N_{rd} (kN)	7.3	7.3	7.3	7.3	11.4	11.4	11.4	11.4	16.4	16.4	16.4	16.4	22.4	22.4	22.4	22.4	23.4	23.4	23.4	23.4	29.6	36.5	36.5	36.5	36.5
Shear ≥ C25/25	7.2	12.0	8.3	10.1	12.0	18.4	12.8	15.8	16.8	27.2	19.2	22.8	23.2	36.8	25.6	31.2	31.2	50.4	35.2	40.7	51.5	48.8	78.4	55.1	63.6

Rod diameter	Dia 22				Dia 24				Dia 25	Dia 26	Dia 27			Dia 28	Dia 30				Dia 32	Dia 34	Dia 36	Dia 40
hef(mm)	220				240				250	260	270			280	300				320	340	360	400
Anchor type	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	Rebar	Rebar
Drill diameter (mm)	25			30	28			30	30	35	30			35	35			40	40	40	45	55
Torque (Nm)	135			-	150			-	-	-	200			-	300			-	-	-	-	-
Non-cracked Concrete																						
Tension C20/25 N_{rd} (kN)	67.5	67.5	67.5	67.5	80.4	80.4	80.4	80.4	87.2	88.4	95.4	95.4	95.4	102.6	117.8	117.8	117.8	117.8	134.0	151.2	169.6	195.4
Tension C50/60 N_{rd} (kN)	73.6	73.6	73.6	73.6	87.6	87.6	87.6	87.6	95.1	96.4	104.0	104.0	104.0	111.8	128.3	128.3	128.3	128.3	146.0	164.9	184.8	213.0
Shear ≥ C25/25	60.8	97.0	68.0	76.9	71.2	112.8	79.5	91.6	99.4	107.5	92.0	147.2	103.2	124.7	112.8	180.0	126.3	143.1	162.7	183.8	206.0	254.4
								6														
Cracked Concrete																						
Tension C20/25 N_{rd} (kN)	42.2	42.2	42.2	42.2	50.2	50.2	50.2	50.2	54.5	59.0	63.6	63.6	63.3	68.4	78.5	78.5	78.5	78.5	62.5	70.6	79.1	97.7
Tension C50/60 N_{rd} (kN)	46.0	46.0	46.0	46.0	54.8	54.8	54.8	54.8	59.4	64.3	69.3	69.3	69.3	74.5	85.6	85.6	85.6	85.6	68.1	76.9	86.2	106.5
Shear ≥ C25/25	60.8	97.0	68.0	76.9	71.2	112.8	79.5	91.6	99.4	107.5	92.0	147.2	103.2	124.7	112.8	180.0	126.3	143.1	162.7	183.8	206.0	254.4

Recommended Resistance [2)]

Rod diameter	Dia 8				Dia 10				Dia 12				Dia 14				Dia 16				Dia 18	Dia 20			
hef	80				100				120				140				160				180	200			
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	12				14				14			16	16			18	18			20	25	24			25
Torque (Nm)	10			-	20			-	40			-	50			-	60			-	-	120			-
Non-cracked concrete																									
Tension C20/25 N_{rd} (kN)	9.1	10.5	9.8	10.5	13.8	15.0	15.0	15.0	20.5	21.5	21.5	21.5	26.4	26.4	26.4	26.4	34.5	34.5	34.5	34.5	43.6	47.8	47.8	47.8	47.8
Tension C50/60 N_{rd} (kN)	9.1	11.5	9.8	11.5	13.8	16.3	15.5	16.3	20.5	23.5	22.5	23.5	27.6	28.7	28.7	28.7	37.6	37.6	37.6	37.6	47.5	52.2	52.2	52.2	52.2
Shear ≥ C25/25	5.1	8.6	6.0	7.2	8.6	13.2	9.3	11.3	12.0	19.4	13.7	16.3	16.6	26.3	18.3	22.3	22.3	36.0	25.1	29.1	36.8	34.9	56.0	39.4	45.4
Cracked Concrete																									
Tension C20/25 N_{rd} (kN)	4.8	4.8	4.8	4.8	7.5	7.5	7.5	7.5	10.8	10.8	10.8	10.8	14.7	14.7	14.7	14.7	15.3	15.3	15.3	15.3	19.4	23.9	23.9	23.9	23.9
Tension C50/60 N_{rd} (kN)	5.2	5.2	5.2	5.2	8.1	8.1	8.1	8.1	11.7	11.7	11.7	11.7	16.0	16.0	16.0	16.0	16.7	16.7	16.7	16.7	21.1	26.1	26.1	26.1	26.1
Shear ≥ C25/25	5.1	8.6	6.0	7.2	8.6	13.2	9.2	11.3	12.0	19.4	13.7	16.3	16.6	26.3	18.3	22.3	22.3	36.0	25.1	29.1	36.8	34.9	56.0	39.4	45.4

Rod diameter	Dia 22				Dia 24				Dia 25	Dia 26	Dia 27			Dia 28	Dia 30				Dia 32	Dia 34	Dia 36	Dia 40
hef	220				240				250	260	270			280	300				320	340	360	400
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	Rebar	Rebar	Rebar
Drill diameter (mm)	25				28			30	30	35	30			35	35			40	40	40	45	55
Torque (Nm)	135			-	150			-	-	-	200			-	300			-	-	-	-	-
Non-cracked concrete																						
Tension C20/25 N_{rd} (kN)	48.2	48.2	48.2	48.2	57.4	57.4	57.4	57.4	62.3	63.2	68.1	68.1	68.1	73.3	84.1	84.1	84.1	84.1	95.7	108.0	121.1	139.6
Tension C50/60 N_{rd} (kN)	52.6	52.6	52.6	52.6	62.6	62.6	62.6	62.6	67.9	68.9	74.3	74.3	74.3	79.9	91.7	91.7	91.7	91.7	104.3	117.8	132.0	152.1
Shear ≥ C25/25	43.4	69.3	48.6	55.0	50.9	80.6	56.8	65.4	71.0	76.8	65.7	105.1	73.7	89.1	80.6	128.6	90.2	102.2	116.2	131.3	147.2	181.7
Cracked Concrete																						
Tension C20/25 N_{rd} (kN)	30.2	30.2	30.2	30.2	35.9	35.9	35.9	35.9	38.9	42.1	45.4	45.4	45.4	48.8	56.1	56.1	56.1	56.1	44.7	50.4	56.5	69.8
Tension C50/60 N_{rd} (kN)	32.9	32.9	32.9	32.9	39.1	39.1	39.1	39.1	42.4	45.9	49.5	49.5	49.5	53.2	61.1	61.1	61.1	61.1	48.7	55.0	61.6	76.1
Shear ≥ C25/25	43.4	69.3	48.6	55.0	50.9	80.6	56.8	65.4	71.0	76.8	65.7	105.1	73.7	89.1	80.6	128.6	90.2	102.2	116.2	131.3	147.2	181.7

(1) The partial safety factors for material resistance as regulated in the approval.
(2) Partial safety factor for load γ= 1.4 are considered for recommended load capacities.
(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load/ design load.
(4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(6) The given loads are valid in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 72°C) and best possible cleaning according approval.
(7) Rebar grade used for above calculation is FY= 460 n/mm²).
(8) The above loads use for embedment depth = 10 x dia.
(9) Embedment depth can be reduced or increased to get desired loads as per approval.

The concrete all-rounder

Steel structure

APPROVALS

ETA-12/0258
ETAG 001-5
Option 1 for cracked concrete
seismic performance category C1, C2

ETA-13/0651
ETAG 001-5
Post-installed rebar connection
(TR23)

Fire resistance classification
R 120
Anchor types see test report

SEISMIC

ICC ES
ESR-3572
See ICC-ES Evaluation Report at www.icc-es.org

ADVANTAGES

- Thanks to its high bond strength, Superbond mortar FIS SB achieves a very high load level for safe use in cracked and non-cracked concrete.
- Besides the standard version the Superbond mortar is also available as fast curing FIS SB HIGH SPEED e.g. for installations at extreme minus temperatures (from –20 °C) and as FIS SB LOW SPEED with extended setting times.
- Variable anchorage depths from 4x to 20x anchor rod diameter allows for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- The Superbond mortar can even be used at extremely high temperatures of up to +150 °C. This opens up new application fields, where no chemical anchor could be used so far.
- The Superbond mortar FIS SB is approved for seismic applications, which ensures safety even under extreme conditions.

BUILDING MATERIALS

Approved for anchoring in:

- Concrete C20/25 to C50/60
- Cracked and non-cracked
- Seismic conditions
- Diamond drill holes with capsules

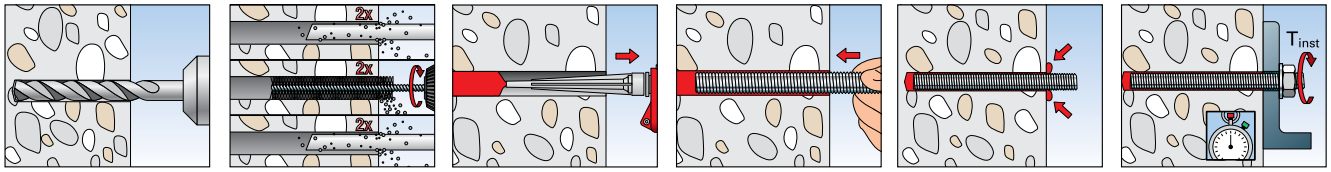
Approved for rebar connection in:

- Concrete C12/15 to C50/60

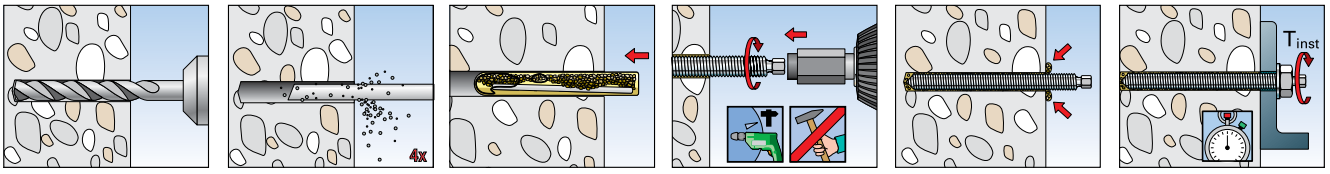
Also suitable for:

- Natural stone with dense structure

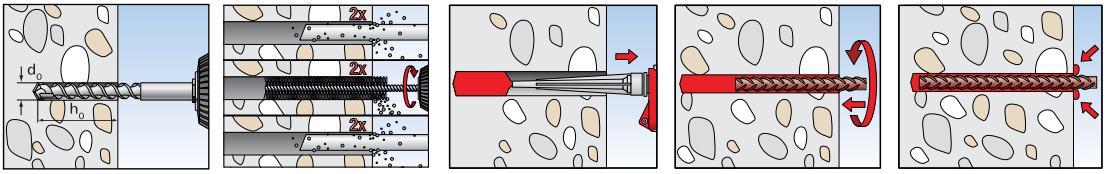
INSTALLATION WITH INJECTION MORTAR FIS SB IN HAMMER-DRILLED DRILL HOLE



INSTALLATION WITH RESIN CAPSULE RSB IN HAMMER-DRILLED DRILL HOLE



INSTALLATION DETAILS - Rebar



CURING TIME

Temperature in the anchorage base	Maximum gelling time t_{work} (minutes)			Maximum curing time t_{cure} (minutes)			
	FIS SB Low speed	FIS SB	FIS SB High speed	FIS SB Low speed	FIS SB	FIS SB High speed	RSB
>-5 to ±0	-	20	10	-	8 hours	2 hours	10 hours
>±0 to +5	30	13	5	17 hours	4 hours	1 hour	45
>+5 to +10	15	9	3	8 hours	120	45	30
>+10 to +20	12	5	2	4.5 hours	60	30	20
>+20 to +30	8	4	1	60	45	15	5
≥30°C	5	2	-	30	30	-	3

TECHNICAL DATA

Resin capsule **RSB**

Item	Art-No.	Drill-Ø do	Anchorage depth hef	Suitable for	Sales unit (units)
RSB 8	**518807**	10	80	RG M8	10
RSB 10 mini	**518820**	12	75 / 150 [1]	RG M10	10
RSB 10	**518821**	12 / 14 [2]	90	RG M10/RG M8 I	10
RSB 12 mini	**518822**	14	75 / 150 [1]	RG M12	10
RSB 12	**518823**	14 / 18 [2]	110 / 90 [2]	RG M12 / RG M10 I	10
RSB 16 mini	**518824**	18	95 / 190	RG M16	10
RSB 16	**518825**	18 / 20 [2]	125	RG M16 / RG M12 I	10
RSB 16 E	**518826**	18	160	RG M16 I	10
RSB 20	**518827**	25	170	RG M20	10
RSB 20 E/24	**518828**	24 / 28 / 32 [2]	210 / 200 [2]	RG M20 / RG M24 / RG M20 I	5
RSB 30	**518829**	35	280	RG M30	5

(1) with 2 capsules RSB mini per drill hole (2) if used with internal threaded rod anchor RG MI

FIS SB 390 S

FIS MR Plus

Item	Art-No.	Language	Description	Content (scale units)	Sales unit (units)
FIS SB 390 S	**518831**	GB, E, P	1 cartridge 390 ml + 2 mixing nozzles	180	6
FIS MR Plus	**545853**	-	10 mixing nozzles	-	10

LOADS

Superbond System - FIS SB

Loads for a single anchor in concrete [1) 5) 8) 9)]

For the design the complete ETA - 12/0258 has to be considered

Design Resistance [1)]

Rod diameter	Dia 8				Dia 10				Dia 12				Dia 14	Dia 16				Dia 20				Dia 24			Dia 25
hef(mm)	80				100				120				140	160				200				240			250
Anchor type	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	10				12				14				18	18			20	24			25	28			30
Torque (Nm)	10			-	20			-	40			-	-	60			-	120			-	150			-
Non-cracked Concrete																									
Tension C20/25 N_{rd} (kN)	12.6	16.0	13.9	10.7	19.3	25.1	21.9	17.8	28.6	36.1	31.5	27.1	36.9	52.6	68.1	58.8	50.9	82.0	95.2	91.7	79.5	118.0	125.1	125.1	98.1
Tension C50/60 N_{rd} (kN)	12.6	17.6	13.9	11.7	19.3	27.6	21.9	19.5	28.6	39.8	31.5	29.6	40.6	52.6	76.6	58.8	56.0	82.0	119.7	91.7	87.5	118.0	159.2	132.0	129.5
Shear ≥ C25/25	7.2	12.0	8.3	10.1	12.0	18.4	12.8	15.8	16.0	27.2	19.2	22.8	31.1	31.2	50.2	35.2	40.6	48.8	78.4	55.0	63.5	71.2	112.8	79.2	99.3
Cracked Concrete																									
Tension C20/25 N_{rd} (kN)	8.0	8.0	8.0	6.0	13.6	13.6	13.6	11.5	22.6	22.6	22.6	16.5	22.5	40.2	40.2	40.2	34.8	62.8	62.8	62.8	50.2	89.2	89.2	89.2	78.5
Tension C50/60 N_{rd} (kN)	8.8	8.8	8.8	6.6	14.8	14.8	14.8	12.5	24.8	24.8	24.8	18.1	24.8	44.2	44.2	44.2	38.0	69.1	69.1	69.1	54.8	99.5	99.5	99.5	86.3
Shear ≥ C25/25	7.2	12.0	8.3	10.1	12.0	18.4	12.8	15.8	16.8	27.0	19.2	22.8	31.1	31.2	50.2	35.2	40.6	48.8	78.4	55.0	63.5	71.2	112.8	79.2	99.3

Rod diameter	Dia 27			Dia 28	Dia 30			Dia 32
hef(mm)	270			280	300			320
Anchor type	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	30			35	35			40
Torque (Nm)	200			-	300			-
Non-cracked Concrete								
Tension C20/25 N_{rd} (kN)	149.0	149.0	149.0	139.5	174.9	174.9	174.9	160.8
Tension C50/60 N_{rd} (kN)	153.3	167.9	167.9	153.5	187.3	207.3	207.3	176.9
Shear ≥ C25/25	92.0	146.9	103.0	124.6	112.8	179.5	125.9	162.7
Cracked Concrete								
Tension C20/25 N_{rd} (kN)	106.4	106.4	106.4	98.5	124.7	124.7	124.7	128.5
Tension C50/60 N_{rd} (kN)	117.5	117.5	117.5	108.3	145.0	145.0	145.0	141.5
Shear ≥ C25/25	92.0	147.0	103.0	124.6	112.8	179.5	125.9	162.7

LOADS

Superbond System - FIS SB

Loads for a single anchor in concrete [1) 2) 5) 8) 9)]

For the design the complete ETA - 12/0258

Recommended Resistance [2)]

Rod diameter	Dia 8				Dia 10				Dia 12				Dia 14	Dia 16				Dia 20				Dia 24			Dia 25
hef(mm)	80				100				120					160				200				240			250
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	12				14				14			16	18	18			20	24			25	28			30
Torque (Nm)	10			-	20			-	40			-	-	60			-	120			-	150			-
Non-cracked Concrete																									
Tension C20/25 N_{rd} (kN)	9.0	11.5	9.8	7.7	13.8	17.9	15.6	12.7	20.4	25.8	22.5	19.4	26.4	37.6	48.7	42.0	36.4	58.6	68.0	65.5	56.8	84.3	89.4	89.4	70.1
Tension C50/60 N_{rd} (kN)	9.0	12.6	9.9	8.3	13.8	19.7	15.6	13.9	20.4	28.4	22.5	21.1	29.0	37.6	54.7	42.0	40.0	58.6	85.5	65.5	62.5	84.3	113.7	94.3	92.5
Shear ≥ C25/25	5.1	8.6	5.9	7.2	8.6	13.1	9.1	11.3	12.0	19.4	13.7	16.3	22.3	22.3	35.9	25.2	29.0	34.9	56.0	39.3	45.4	50.9	80.6	56.6	70.9
Cracked Concrete																									
Tension C20/25 N_{rd} (kN)	5.7	5.7	5.7	4.3	9.7	9.7	9.7	8.2	16.1	16.1	16.1	11.8	16.1	28.7	28.7	28.7	24.9	44.9	44.9	44.9	35.9	63.7	63.7	63.7	56.1
Tension C50/60 N_{rd} (kN)	6.3	6.3	6.3	4.7	10.6	10.6	10.6	9.0	17.7	17.7	17.7	12.9	17.7	31.6	31.6	31.6	27.1	49.4	49.4	49.4	39.1	71.1	71.1	71.1	61.6
Shear ≥ C25/25	5.1	8.6	5.9	7.2	8.6	13.1	9.1	11.3	12.0	19.4	13.7	16.3	22.2	22.3	35.9	25.2	29.0	34.9	56.0	39.3	45.4	50.9	80.6	56.6	70.9

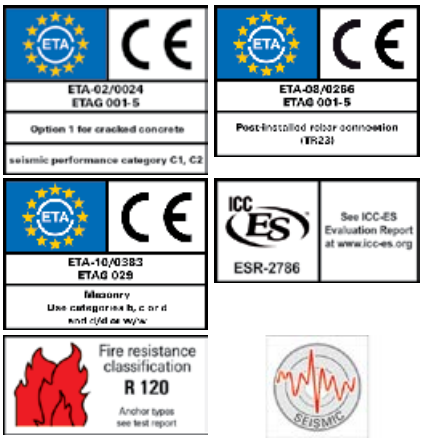
Rod diameter	Dia 27			Dia 28	Dia 30			Dia 32
hef(mm)	270			280	300			320
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Drill diameter (mm)	30			35	35			40
Torque (Nm)	200			-	300			-
Non-cracked Concrete								
Tension C20/25 N_{rd} (kN)	106.4	106.4	106.4	99.6	124.9	124.9	124.9	114.9
Tension C50/60 N_{rd} (kN)	109.5	119.9	119.9	109.6	133.8	133.8	133.8	126.4
Shear ≥ C25/25	65.7	104.9	73.6	89.0	80.6	128.2	89.9	116.2
Cracked Concrete								
Tension C20/25 N_{rd} (kN)	76.0	76.0	76.0	70.4	89.1	89.1	89.1	91.8
Tension C50/60 N_{rd} (kN)	83.9	83.9	69.3	77.4	103.6	103.6	103.6	101.1
Shear ≥ C25/25	65.7	105.0	73.6	89.0	80.6	128.2	89.9	116.2

(1) The partial safety factors for material resistance as regulated in the approval.
(2) Partial safety factor for load γ_L= 1.4 are considered for recommended load capacities.
(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load/ design load.
(4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(6) The given loads are valid for fixations in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and best possible drillhole cleaning according approval.
(7) Rebar grade used for above calculation is FY= 460 n/mm²).
(8) The above loads use for embedment depth = 10 x dia.
(9) Embedment depth can be reduced or increased to get desired loads as per approval.

The proven bonded anchor for universal application

Rescue ladders

APPROVALS



ADVANTAGES

- The FIS V injection mortar has numerous system approvals, such as in cracked and non-cracked concrete, masonry and for rebar connections. FIS V is thus the universal injection in mortar family with guaranteed reliability for practically all areas of application.
- FIS VW HIGH SPEED has a significantly shorter curing time than FIS V, thus also ensuring swift work progress even at low temperatures.
- FIS VS LOW SPEED with extended gelling time prevents premature curing of the mortar at higher temperatures and is ideally suited to large drill hole depths.
  The extensive range of accessories is ideally suited to the
- FIS V injection mortar family, increases the great flexibility of the system and thus allows for a broad range of applications.

BUILDING MATERIALS

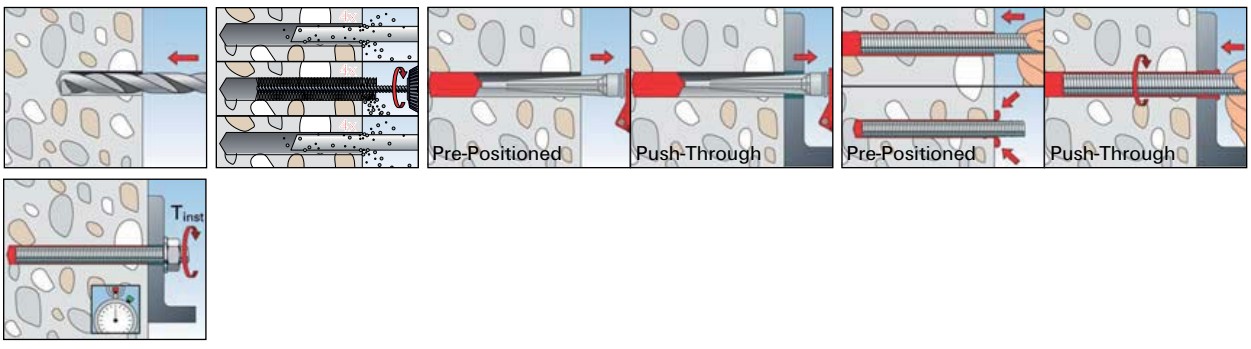
Approved for anchoring in:

- Concrete C20/25 to C50/60
- Cracked and non-cracked
- Seismic conditions
- Hollow blocks made from lightweight concrete
- Hollow blocks made from concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick
- Rebar connections
- Remedial wall tie VBS 8
- Weather facing reconstruction system FWS II
- Stand-off installation Thermax

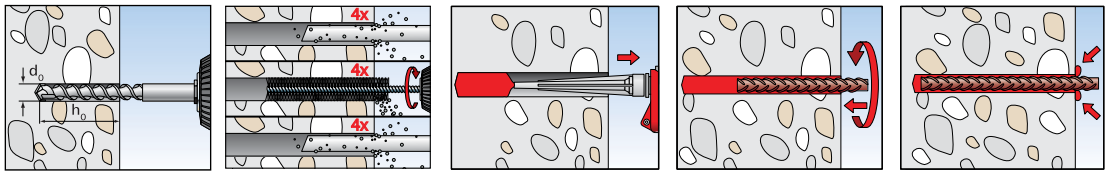
Approved for rebar connection in:

- Concrete C12/15 to C50/60

INSTALLATION



INSTALLATION DETAILS - Rebar



d_0 ≥ 18 mm with oil free compressed air (P > 6 bar)

TECHNICAL DATA

Item	Art-No.	Languages on the cartridge	Contents	Sales unit (pcs)
FIS V 360 S	**094405**	GB, I, P, E, PRC, JP	1 cartridge 360 ml, 2 x static mixer FIS S	6
FIS MR PLUS	**545853**	–	10 static mixer	10
FIS V 360 S in bucket	**503025**	GB, I, P, E, PRC, JP	20 cartridges 360 ml, 20 x static mixer FIS S	1

CURING TIME

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5°C - ± 0°C	24 hrs.
		± 0°C - + 5°C	3 hrs.
+ 5°C - +10°C	9 min.	+ 5°C - +10°C	90 min.
+ 10°C - + 20°C	5 min.	+ 10°C - + 20°C	60 min.
+ 20°C - + 30°C	4 min.	+ 20°C - + 30°C	45 min.
≥30°C	2 min.	≥30°C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Injection mortar FIS V

Loads for a single anchor in concrete [1) 2) 5) 8) 9)]
For the design the complete approval ETA - 02/0024 has to be considered.

Design Resistance [1)]

Rod diameter	Dia 6				Dia 8				Dia 10				Dia 12				Dia 16				Dia 20			
hef(mm)	60				80				100				120				160				200			
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Non-cracked Concrete																								
Tension C20/25 N_{rd} (kN)	6.6	6.7	6.7	–	12.6	14.7	13.7	14.7	19.3	23.0	21.7	23.0	28.6	33.1	31.5	33.1	52.3	53.6	53.6	53.6	79.5	79.5	79.5	79.5
Tension C50/60 N_{rd} (kN)	6.6	8.5	7.5	–	12.6	18.5	13.7	18.1	19.3	29.0	21.7	28.0	28.6	41.8	31.5	40.8	52.3	67.5	58.7	67.5	82.0	100.2	91.7	100.2
Shear ≥ C25/25	4.0	6.4	4.5	–	7.2	11.7	8.2	10.1	12.0	18.5	13.0	15.8	16.8	26.9	18.9	22.8	31.2	50.2	35.2	40.5	48.8	78.4	54.9	63.5
Cracked Concrete																								
Tension C20/25 N_{rd} (kN)	–	–	–	–	–	–	–	–	12.5	12.5	12.5	6.2	18.0	18.0	18.0	15.0	32.1	32.1	32.1	26.8	46.0	46.0	46.0	37.6
Tension C50/60 N_{rd} (kN)	–	–	–	–	–	–	–	–	15.8	15.8	15.8	7.9	22.8	22.8	22.8	19.0	40.5	40.5	40.5	33.7	58.0	58.0	58.0	47.5
Shear ≥ C25/25	–	–	–	–	–	–	–	–	12.0	18.5	13.0	12.5	16.8	26.9	18.9	22.8	31.2	50.2	35.2	40.6	48.8	78.3	54.9	63.5

Rod diameter	Dia 24				Dia25	Dia 27				Dia28	Dia 30		
hef(mm)	240				250	270				280	300		
Quality	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70
Non-cracked Concrete													
Tension C20/25 N_{rd} (kN)	108.5	108.5	108.5	–	117.8	129.7	129.7	129.7	–	139.5	160.2	160.2	160.2
Tension C50/60 N_{rd} (kN)	118.0	136.8	132.1	–	148.4	153.3	163.5	163.5	–	175.6	187.3	201.8	201.8
Shear ≥ C25/25	71.2	112.9	79.1	–	99.3	92.0	146.8	102.9	–	124.5	112.8	179.5	125.8
Cracked Concrete													
Tension C20/25 N_{rd} (kN)	54.2	54.2	54.2	–	52.3	61.0	61.0	61.0	–	65.6	75.3	75.3	75.8
Tension C50/60 N_{rd} (kN)	68.3	68.3	68.3	–	65.9	76.9	76.9	76.9	–	82.7	95.0	95.0	95.0
Shear ≥ C25/25	71.2	108.5	79.1	–	99.3	92.0	122.1	102.9	–	124.5	112.8	150.7	125.8

Recommended Resistance [2)]

Rod diameter	Dia 6				Dia 8				Dia 10				Dia 12				Dia 16				Dia 20			
hef(mm)	54				80				90				110				150				180			
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Non-cracked Concrete																								
Tension C20/25 N_{rd} (kN)	4.7	4.8	4.8	–	9.0	10.5	9.8	10.5	13.8	16.5	15.5	16.4	20.4	23.6	22.5	23.6	37.4	38.3	38.3	38.3	56.8	56.8	56.8	56.8
Tension C50/60 N_{rd} (kN)	4.7	6.1	5.4	–	9.0	13.2	9.8	12.9	13.8	20.7	15.5	20.2	20.4	29.9	22.5	29.1	37.4	48.2	41.9	48.2	58.6	71.6	65.5	71.6
Shear ≥ C25/25	2.9	4.6	3.2	–	5.1	8.4	5.9	7.2	8.6	13.2	9.3	11.3	12.0	19.2	13.5	16.3	22.3	35.9	25.2	28.9	34.9	56.0	39.2	45.4
Cracked Concrete																								
Tension C20/25 N_{rd} (kN)	–	–	–	–	–	–	–	–	8.9	8.9	8.9	4.4	12.9	12.9	12.9	10.7	22.9	22.9	22.9	19.1	32.9	32.9	32.9	26.9
Tension C50/60 N_{rd} (kN)	–	–	–	–	–	–	–	–	11.3	11.3	11.3	5.6	16.3	16.3	16.3	13.6	28.9	28.9	28.9	24.1	41.4	41.4	41.4	33.9
Shear ≥ C25/25	–	–	–	–	–	–	–	–	8.6	13.2	9.3	8.9	12.0	19.2	13.5	16.3	22.3	35.9	25.1	29.0	34.9	55.9	39.2	45.4

Rod diameter	Dia 24				Dia 25	Dia 27				Dia 28	Dia 30		
hef(mm)	220				250	270				280	300		
Quality	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70
Non-cracked Concrete													
Tension C20/25 N_{rd} (kN)	77.5	77.5	77.5	–	84.1	92.6	92.6	92.6	–	99.6	114.4	114.4	114.4
Tension C50/60 N_{rd} (kN)	84.3	97.7	94.4	–	106.0	109.5	109.5	116.8	–	125.4	133.8	144.1	144.1
Shear ≥ C25/25	50.9	80.6	56.5	–	70.9	65.7	65.7	104.9	–	88.9	80.6	128.2	89.9
Cracked Concrete													
Tension C20/25 N_{rd} (kN)	38.7	38.7	38.7	–	37.4	43.6	43.6	43.6	–	46.9	53.8	53.8	53.8
Tension C50/60 N_{rd} (kN)	48.8	48.8	48.8	–	47.1	54.9	54.9	54.9	–	59.1	67.9	67.9	67.9
Shear ≥ C25/25	50.9	77.5	56.5	–	70.9	65.7	65.7	87.2	–	88.9	80.6	107.6	89.9

(1) The partial safety factors for material resistance as regulated in the approval.
(2) Partial safety factor for load γ_L= 1.4 are considered for recommended load capacities.
(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load/ design load.
(4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(6) The given loads are valid for use in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and best possible drillhole cleaning according approval.
(7) Rebar grade used for above calculation is FY= 460 n/mm²).
(8) The above loads use for embedment depth = 10 x dia.
(9) Embedment depth can be reduced or increased to get desired loads as per approval.

The solid injection mortar for anchorings in cracked concrete, non-cracked concrete and masonry

Heavy Duty Steel Structure Fixing

APPROVALS

ETA-10/0352
ETAG 001-5
Option 1 for cracked concrete

ETA-15/0263
ETAG 029
Masonry
Use categories b, c or d
and d/d or w/w

ETA-15/0539
ETAG 001-5

ADVANTAGES

- The FIS VL is approved for use in cracked concrete, non-cracked concrete and masonry, and achieves a high load-bearing capacity.
- Approved for Post installed rebar connections
- The injection mortar, based on vinyl ester resin, allows for anchorings in water-filled drill holes, thus allowing for rapid progress.
- The temperature resistance of the FIS VL injection mortar of -40°C to +120°C allows for a solid load level even when subjected to high temperature demands, thus providing great flexibility.

BUILDING MATERIALS

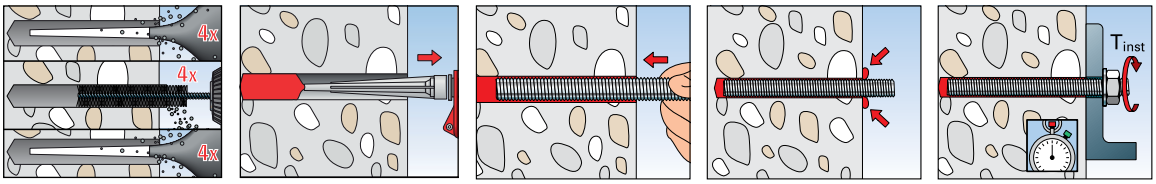
Approved for anchoring in:

- Concrete C20/25 to C50/60
- Cracked and Non-cracked
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick
- Hollow blocks made from concrete
- Aerated concrete

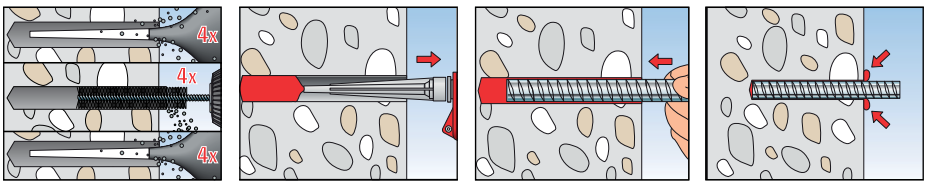
Also suitable for:

- Concrete C12/15

PRE-POSITIONED INSTALLATION



$d_0 \geq 18$ mm with oil free compressed air (P > 6 bar)



$d_0 \geq 18$ mm with oil free compressed air (P > 6 bar)

TECHNICAL DATA

Injection mortar **FIS VL 360S**

Item	Art-No.	Languages on the cartridge	Scale unit	Contents	Sales unit (pcs)
FIS VL 360S	**538892**	GB, I, P, E, PL, CZ	180	1 cartridge 360 ml, 2 x FIS easy mixer	12

CURING TIME

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5°C - ± 0°C	24 hrs.
+ 5°C - +10°C	13 min.	± 0°C - + 5°C	3 hrs.
+ 10°C - + 20°C	9 min.	+ 5°C - +10°C	90 min.
+ 20°C - + 30°C	5 min.	+ 10°C - + 20°C	60 min.
≥30°C	4 min.	+ 20°C - + 30°C	45 min.
+40°C	2 min.	+ 30°C - + 40°C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Injection mortar FIS VL

Loads for a single anchor in concrete [1) 6)]

For the design the complete approval ETA - 10/0352 has to be considered.

Design Resistance [1)]

Rod diameter	M6				M8				M10				M12				M16				M20			
hef(mm)	60				80				100				120				160				200			
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Non-cracked Concrete (Temperature range (-40°C to +80°C)																								
Tension C20/25 N_{rd} (kN)	5.7	5.7	5.7	–	12.2	12.3	12.3	12.3	19.2	19.2	19.2	19.2	27.6	27.6	27.6	27.6	44.7	44.7	44.7	44.7	66.3	66.3	66.3	66.3
Tension C50/60 N_{rd} (kN)	6.7	7.1	7.1	–	12.2	15.5	15.5	15.3	19.3	24.2	24.2	24.2	28.1	34.8	34.8	34.7	52.3	56.3	56.3	56.3	81.7	83.6	83.6	83.6
Shear ≥ C25/25	4.0	6.4	4.5	–	7.3	11.7	8.2	9.2	11.6	18.6	13.0	14.5	16.9	27.0	18.9	20.8	31.4	50.2	35.2	37.0	49.0	78.4	55.0	57.8
Cracked Concrete (Temperature range (-40°C to +80°C)																								
Tension C20/25 N_{rd} (kN)	–	–	–	–	–	–	–	–	10.5	10.5	10.5	5.2	15.1	15.1	15.1	12.6	26.8	26.8	26.8	22.3	38.4	38.4	38.4	31.4
Tension C50/60 N_{rd} (kN)	–	–	–	–	–	–	–	–	13.2	13.2	13.2	6.6	19.0	19.0	19	15.8	33.8	33.8	33.8	28.1	48.4	48.4	48.4	39.6
Shear ≥ C25/25	–	–	–	–	–	–	–	–	11.6	18.6	13.0	10.5	16.9	27.0	18.9	15.5	31.4	50.2	35.2	28.9	49.0	76.8	55.0	45.1

Rod diameter	M24				M25	M27				M28	M30		
hef(mm)	240				250	270				280	300		
Quality	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70
Non-cracked Concrete (Temperature range (-40°C to +80°C)													
Tension C20/25 N_{rd} (kN)	90.5	90.5	90.5	–	98.2	108.1	108.1	108.1	–	116.3	133.5	133.5	133.5
Tension C50/60 N_{rd} (kN)	114.0	114.0	114.0	–	123.7	136.2	136.2	136.2	–	146.5	168.2	168.2	168.2
Shear ≥ C25/25	70.6	113.0	79.2	–	90.3	91.8	146.9	103.0	–	113.3	112.2	179.5	125.9
Cracked Concrete (Temperature range (-40°C to +80°C)													
Tension C20/25 N_{rd} (kN)	–	–	–	–	43.6	–	–	–	–	54.7	–	–	–
Tension C50/60 N_{rd} (kN)	–	–	–	–	55.0	–	–	–	–	69.0	–	–	–
Shear ≥ C25/25	–	–	–	–	87.3	–	–	–	–	109.4	–	–	–

Recomended Resistance [2)]

Rod diameter	M6				M8				M10				M12				M16				M20			
hef(mm)	54				80				90				110				150				180			
Quality	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar	5.8	8.8	A4-70	Rebar
Non-cracked Concrete (Temperature range (-40°C to +80°C)																								
Tension C20/25 N_{rd} (kN)	4.0	4.0	4.0	–	8.7	8.8	8.8	8.8	13.7	13.7	13.7	13.7	19.7	19.7	19.7	19.7	31.9	31.9	31.9	31.9	47.4	47.4	47.4	47.4
Tension C50/60 N_{rd} (kN)	4.8	5.1	5.1	–	8.7	11.1	11.1	11.0	13.8	17.3	17.3	17.3	20.1	24.9	24.9	24.8	37.4	40.2	40.2	40.2	58.3	59.7	59.7	59.7
Shear ≥ C25/25	2.9	4.6	3.2	–	5.2	8.4	5.9	6.6	8.3	13.3	9.3	10.4	12.0	19.3	13.5	14.9	22.4	35.9	25.2	26.4	35.0	56.0	39.3	41.3
Cracked Concrete (Temperature range (-40°C to +80°C)																								
Tension C20/25 N_{rd} (kN)	–	–	–	–	–	–	–	–	7.5	7.5	7.5	3.7	10.8	10.8	10.8	9.0	19.1	19.1	19.1	16.0	27.4	27.4	27.4	22.4
Tension C50/60 N_{rd} (kN)	–	–	–	–	–	–	–	–	9.4	9.4	9.4	4.7	13.6	13.6	13.6	11.3	24.1	24.1	24.1	20.1	34.6	34.6	34.6	28.3
Shear ≥ C25/25	–	–	–	–	–	–	–	–	8.3	13.3	9.3	7.5	12.0	19.3	13.5	11.1	22.4	35.9	25.2	20.6	35.0	54.8	39.3	32.2

Rod diameter	M24				M25	M27				M28	M30		
hef(mm)	220				250	270				280	300		
Quality	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70	Rebar	Rebar	5.8	8.8	A4-70
Non-cracked Concrete (Temperature range (-40°C to +80°C)													
Tension C20/25 N_{rd} (kN)	64.6	64.6	64.6	–	70.1	77.2	77.2	77.2	–	83.1	95.4	95.4	95.4
Tension C50/60 N_{rd} (kN)	81.4	81.4	81.4	–	88.3	97.3	97.3	97.3	–	104.7	120.1	120.1	120.1
Shear ≥ C25/25	50.4	80.7	56.6	–	64.5	65.6	104.9	73.6	–	81.0	80.1	128.2	89.9
Cracked Concrete (Temperature range (-40°C to +80°C)													
Tension C20/25 N_{rd} (kN)	–	–	–	–	31.2	–	–	–	–	39.1	–	–	–
Tension C50/60 N_{rd} (kN)	–	–	–	–	39.3	–	–	–	–	49.3	–	–	–
Shear ≥ C25/25	–	–	–	–	62.3	–	–	–	–	78.2	–	–	–

(1) The partial safety factors for material resistance as regulated in the approval.
(2) Partial safety factor for load γ_L= 1.4 are considered for recommended load capacities.
(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load/ design load.
(4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(6) The given loads are valid for use in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and best possible drillhole cleaning according approval.
(7) Rebar grade used for above calculation is FY= 460 n/mm²).
(8) The above mentioned loads for rebars are based on internal tests.
(9) Embedment depth can be reduced or increased to get desired loads as per approval.

The expansion-free polyester resin anchoring system for masonry

Masonry

T.V. Plate

ADVANTAGES

- Styrene free mortar for reduced health risks.
- Performs well in masonry building materials.
- Expansion-free anchoring. Allows low axial spacing and edge distances.
- Extensive range of accessories for a wide variety of applications.

APPLICATION

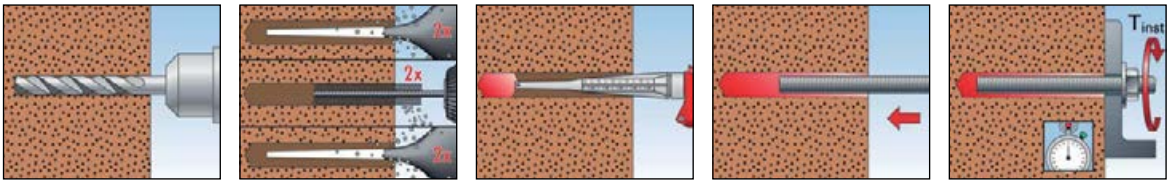
- Railings
- Consoles
- Ladders
- Cable trays
- Staircases
- Gates
- Facades
- Window elements
- High racks
- Canopies

BUILDING MATERIALS

Suitable for:

- Solid brick
- Solid sand-lime brick
- Solid block made from lightweight concrete
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks
- Concrete

INSTALLATION IN SOLID MATERIAL



TECHNICAL DATA

Item	Art No.	Languages on Cartridge	Content	Sales Unit
FIS P 380C	**59234**	GB / E / P	1 Cartridge 380 ml + 1 Fischer Easy Mixer	1

LOADS

							Perforated brick masonry			
Type	**Compressive brick strength** fb **(N/mm²)**	**Min. effective anchorage depth[4]** hef,min **(mm)**	**Brick type, naming acc, DIN** **(-)** **(-)**	**Max. torque moment** Tinst,max **(Nm)**	**Design [1] tensile load** Nd **(kN)**	**Design[1] shear load** Vd **(kN)**	**Permissible tensile load [2]** Nrec **(kN)**	**Permissible Shear load [2]** Vrec **(kN)**	**Min spacing [2]** Smin **(mm)**	**Min. edge distance [2]** Cmin **(mm)**
Vertically perforated brick Hlz										
M8/M10	8	110	Hlz	2.0	0.79	0.79	0.57	0.57	80	100
M12/M16	8	110	Hlz	2.0	0.60	0.79	0.43	0.57	80	120
M8/M10	10	110	Hlz	2.0	0.99	0.60	0.71	0.43	80	100
M12/M16	10	110	Hlz	2.0	1.40	0.60	1.00	0.43	80	120
M8/M10	12	110[7]	Hlz	2.0	0.79	0.79	0.57	0.57	80	100
M12/M16	12	110	Hlz	2.0	1.40	0.79	1.00	0.57	80	120
M8/M10	28	85	Hlz	2.0	1.40	1.43	1.00	1.71	100	240
M12/M16	28	110	Hlz	2.0	-	-	-	-	-	-
Perforated sandlime brick KSL										
M8/M10	12	85	KSL	2.0	0.60	1.80	0.71	1.29	80	100
M12/M16	12	110	KSL	2.0	1.20	1.80	0.86	1.29	80	120
M8/M10	20	85	KSL	2.0	1.40	2.39	1.00	1.71	80	100
M12/M16	20	110	KSL	2.0	1.80	2.39	1.29	1.71	80	120
Hollow block of lightweight aggregate concrete Hbl										
M8/M10	6	110	Hbl	2.0	0.47	0.60	0.34	0.71	80	100
M12/M16	6	110	Hbl	2.0	0.47	0.60	0.34	0.71	80	120

(1) to be compared against factored reactions.
(2) Partial safety factor for load γ_L= 1.4 are considered for recommended load capacities.
(3)Load to be verified with Pull-out test on the site

The approved injection mortar for anchorings in masonry

Cable duct

APPROVALS

ETA-11/0419
ETAG 029
Masonry

ADVANTAGES

- With FIS P Plus, anchorings in masonry for which approval is relevant can be realised in a particularly economical manner.
- FIS P Plus 300 T can be used with stable, standard silicone injection dispensers. No special equipment is required. As a result, procurement costs can be reduced on the basis of polyester resin.

BUILDING MATERIALS

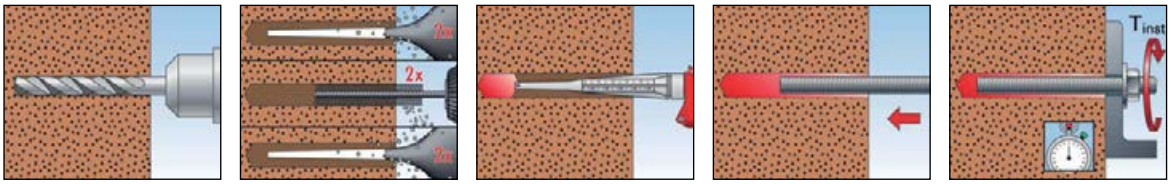
Approved for anchorings in:

- Vertically perforated brick
- Perforated sand-lime brick
- Solid brick and solid sand-lime brick
- Perforated blocks made from lightweight concrete
- Aerated concrete

Also suitable for:

- Non-cracked concrete
- Solid brick made from lightweight concrete

INSTALLATION IN SOLID MATERIAL



TECHNICAL DATA

Injection mortar **FIS P Plus 380 C**

Item	Art-No.	Languages on the cartridge	Scale unit	Contents	Sales unit (pcs)
FIS P Plus 380 C	**522178**	GB, E, P	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
FIS MR Plus	**096448**	–	–	10 static mixer	10

LOADS

Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum installation torque T_{max} [Nm]	Permissible tension load N_{perm} [6] [kN]	Design tension load N_{Rd} [6,9] [kN]	Permissible shear load V_{perm} [6] [kN]	Design shear load V_{Rd} [6,9] [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Required spacing Max. load s_{cr} [mm]	While reducing the load: Min. spacing s_{min} [7] [mm]	While reducing the load: Min. edge distance c_{min} [7] [mm]
FIS A M 8	**5.8**	100	60	10	4.7	6.6	5.1	7.14	75	70	180	40	40
		110	80		6.2	8.7					240		
		190	160		9.0	12.6			50	65	480		
	8.8	100	60		4.7	6.6	8.6	12.04	75	130	180		
		110	80		6.2	8.7				115	240		
		190	160		12.4	17.4				95	480		
	A4-70	100	60		4.7	6.6	6.0	8.4		85	180		
		110	80		6.2	8.7				75	240		
		190	160		9.9	13.9			55		480		
	C-70	100	60		4.7	6.6	7.4	10.36	75	110	180		
		110	80		6.2	8.7				100	240		
		190	160		12.4	17.4				85	480		

Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum installation torque T_{max} [Nm]	Permissible tension load N_{perm} 6) [kN]	Design tension load N_{Rd} 6,9) [kN]	Permissible shear load V_{perm} 6) [kN]	Design shear load V_{Rd} 6,9) [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Required spacing Max. load s_{cr} [mm]	While reducing the load: Min. spacing s_{min} 7) [mm]	While reducing the load: Min. edge distance c_{min} 7) [mm]
FIS A M 10	5.8	100	60	20	5.8	8.1	8.6	12.04	90	125	180	45	45
		120	90		8.8	12.3			95	105	270		
		230	200		13.8	19.3			60	90	600		
	8.8	100	60		5.8	8.1	11.7	16.38	90	175	180		
		120	90		8.8	12.3	13.1	18.34	95	170	270		
		230	200		19.4	27.2				125	600		
	A4-70	100	60		5.8	8.1	9.2	12.88	90	135	180		
		120	90		8.8	12.3			95	110	270		
		230	200		15.7	22.0			70	95	600		
	C-70	100	60		5.8	8.1	11.4	15.96	90	170	180		
		120	90		8.8	12.3			95	145	270		
		230	200		19.4	27.2				115	600		
FIS A M 12	5.8	100	70	40	8.2	11.5	12.0	16.8	105	175	210	55	55
		140	110		12.8	17.9			115	130	330		
		270	240		20.5	28.7			75	110	720		
	8.8	100	70		8.2	11.5	16.3	22.82	105	245	210		
		140	110		12.8	17.9	19.4	27.16	115	230	330		
		270	240		28.0	39.2				160	720		
	A4-70	100	70		8.2	11.5	13.7	19.18	105	200	210		
		140	110		12.8	17.9			115	155	330		
		270	240		22.5	31.5			85	125	720		
	C-70	100	70		8.2	11.5	16.3	22.82	105	245	210		
		140	110		12.8	17.9	17.1	23.94	115	200	330		
		270	240		28.0	39.2				145	720		
FIS A M 16	5.8	120	80	60	12.4	17.4	22.3	31.22	120	305	240	65	65
		170	125		19.4	27.2			150	235	375		
		360	320		37.6	52.6			105	165	960		
	8.8	120	80		12.4	17.4	24.9	34.86	120	345	240		
		170	125		19.4	27.2	36.0	50.4	150	405	375		
		360	320		49.8	69.7				235	960		
	A4-70	120	80		12.4	17.4	24.9	34.86	120	345	240		
		170	125		19.4	27.2	25.2	35.28	150	270	375		
		360	320		42.0	58.8			120	180	960		
	C-70	120	80		12.4	17.4	24.9	34.86		345	240		
		170	125		19.4	27.2	31.4	43.96	150	350	375		
		360	320		49.8	69.7				215	960		
FIS A M 20	5.8	140	90	120	16.2	22.7	32.3	45.22	135	400	270	85	85
		220	170		30.5	42.7	34.9	48.86	180	300	510		
		450	400		58.6	82.0			140	215	1200		
	8.8	140	90		16.2	22.7	32.3	45.22	135	400	270		
		220	170		30.5	42.7	56.0	78.4	180	525	510		
		450	400		71.8	100.5				320	1200		
	A4-70	140	90		16.2	22.7	32.3	45.22	135	400	270		
		220	170		30.5	42.7	39.4	55.16	180	350	510		
		450	400		65.7	92.0			160	240	1200		
	C-70	140	90		16.2	22.7	32.3	45.22	135	400	270		
		220	170		30.5	42.7	49.1	68.74	180	455	510		
		450	400		71.8	100.5				285	1200		
FIS A M 24	5.8	160	96	150	20.7	29.0	41.4	57.96	150	490	290	105	105
		270	210		45.2	63.3	50.9	71.26	225	390	630		
		540	480		84.3	118.0			165	275	1440		
	8.8	160	96		20.7	29.0	41.4	57.96	150	490	290		
		270	210		45.2	63.3	80.6	112.84	225	675	630		
		540	480		103.4	144.8			215	420	1440		
	A4-70	160	96		20.7	29.0	41.4	57.96	150	490	290		
		270	210		45.2	63.3	56.8	79.52	225	445	630		
		540	480		94.3	132.0			195	300	1440		
	C-70	160	96		20.7	29.0	41.4	57.96	150	490	290		
		270	210		45.2	63.3	70.9	99.26	225	580	630		
		540	480		103.4	144.8			215	355	1440		

For the design the complete assessment ETA-18/0383 has to be considered. 8)

(1) The partial safety factors for material resistance as regulated in the ETA-18/0383 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-18/0383.

(2) Also valid for anchor rod RGM in the same property class.

(3) The given loads are valid for injection mortar FIS P Plus for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-18/0383.

(4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(5) Drill method hammer drilling. For further allowable application conditions see ETA-18/0383.

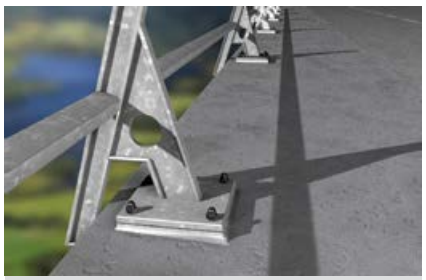
(6) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

(7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

(8) The given loads refer to the European Technical Assessment ETA-18/0383, issue date 06/09/2018. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

(9) Partial safety factor for load actions of γL = 1.4 is not considered.

The bonded anchor for cracked concrete and standard threaded rods without drill hole cleaning



Rail fixing

APPROVALS

ETA-16/0340

Option 1 for cracked concrete

Fire resistance classification R 120

Anchor types see test report

ADVANTAGES

- The pre-portioned resin capsule is especially economical for individual applications and overhead installations.
- No drill-hole cleaning is required, even for applications in cracked concrete.
- The wide range of approved steel types allows for use in all corrosion resistant classes and offers the best possible application safety.
- The extensive range of RG M from M8-M30 opens up a wide range of applications and therefore offers great flexibility.
- Usable under a wide range of conditions (Wet/Dry Concrete, Flooded Hole)
- Application temperature between -15°C to +40°C.

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60
- Cracked and Non-cracked
- Holes made of hollow drill bits

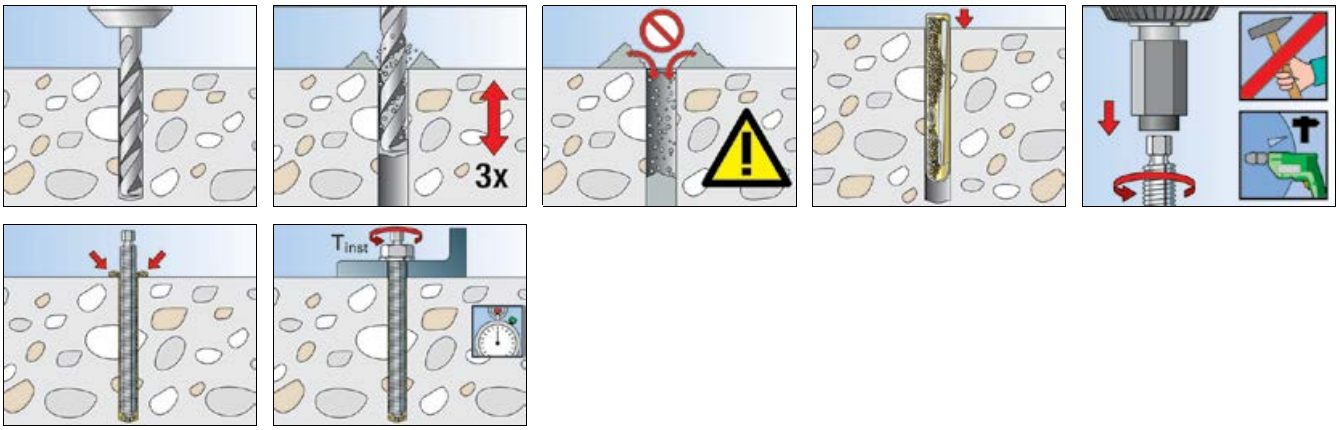
Also suitable for:

- Concrete C12/15, cracked and non-cracked
- Natural stone with dense structure

VERSION

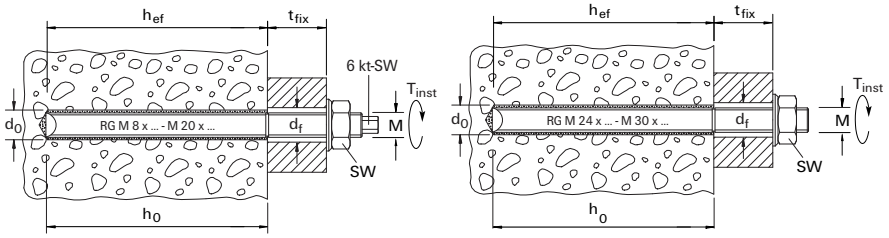
- Zinc-plated steel
- Stainless steel
- High corrosion-resistant steel

INSTALLATION



TECHNICAL DATA

Resin capsule **R M II**



Item	Art-No.	Drill hole diameter d_0 (mm)	Min. drill hole depth h1 (mm)	Effective anchoring depth h_{ef} (mm)	Fits	Sales unit (pcs)
R M II 8	**539796**	10	80	80	RG M 8	10
R M II 10	**539797**	12	90	90	RG M 10	10
R M II 12	**539798**	14	110	110	RG M 12	10
R M II 14	**539799**	16	120	120	RG M 14	10
R M II 16	**539800**	18	125	125	RG M 16	10
R M II 16 E	**539801**	18	190	190	RG M 16 E	10
R M II 20/22	**539802**	25	170	170	RG M 20	10
R M II 24	**539803**	28	210	210	RG M 24	5

CURING TIME

Temperature at anchoring base	Min. Curing time
- 5 °C to -1°C	10 hrs.
± 0 °C to + 5 °C	45 min.
+ 6 °C to + 10 °C	30 min.
+ 11 °C to + 20 °C	20 min.
+ 21 °C to + 30 °C	5 min.
> + 30 °C	3 min.

(1) In wet concrete and flooded holes the curing time has to be doubled.

LOADS

Resin anchor RM II capsule

Highest permissible load for a single anchor[1)] in concrete C20/25 [4) 6)]

For the design, the complete approval ETA - 16/0340 has to be considered.

						Cracked Concrete				Non-cracked Concrete			
Item	Effective anchorage depth h_{ef} (mm)	Minimum member thickness h_{min} (mm)	Installation torque T_{inst} (Nm)	Min spacing s_{min}[2)] (mm)	Min edge distance c_{min}[2)] (mm)	Design tensile load V_d (kN)	Design shear load N_d (kN)	Permissible tensile load N_{perm}[3)] (kN)	Permissible shear load N_{perm}[3)] (kN)	Design tensile load V_d (kN)	Design shear load V_d (kN)	Permissible tensile load N_{prem}[3)] (kN)	Permissible shear load N_{prem}[3)] (kN)
RG M 8	80	110	10	40	40	–	–	–	–	11.8	7.1	8.4	5.1
RG M 10	90	120	20	45	45	5.5	12.0	3.9	8.6	16.5	12.0	11.8	8.6
RG M 12	110	140	40	55	55	8.1	16.8	5.8	12.0	24.2	16.8	17.3	12.0
RG M 16	125	161	60	65	65	12.2	29.3	8.7	20.9	36.7	31.2	26.2	22.3
RG M 20	170	220	120	85	85	20.7	48.9	14.8	34.9	62.2	48.9	44.4	34.9
RG M 24	210	266	150	105	105	30.8	71.3	22.0	50.9	85.4	71.3	61.0	50.9
RG M 8 A4	80	110	10	40	40	–	–	–	–	11.8	10.4	8.4	7.4
RG M 10 A4	90	120	20	45	45	5.5	13.2	3.9	9.4	16.5	16.0	11.8	11.4
RG M 12 A4	110	140	40	55	55	8.1	19.3	5.8	13.8	24.2	23.9	17.3	17.1
RG M 16 A4	125	161	60	65	65	12.2	29.3	8.7	20.9	36.7	44.0	26.2	31.4
RG M 20 A4	170	220	120	85	85	20.7	49.8	14.8	35.6	62.2	68.7	44.4	49.1
RG M 24 A4	210	266	150	105	105	30.8	73.9	22.0	52.8	85.4	99.3	61.0	70.9
RG M 8 I	90	120	10	55	55	6.6	11.6	4.7	8.3	17.9	11.6	12.8	8.3
RG M 10 I	90	125	20	65	65	8.8	18.6	6.3	13.3	23.9	18.6	17.1	13.3
RG M 12 I	125	165	40	75	75	13.7	27.0	9.8	19.3	37.2	27.0	26.6	19.3
RG M 16 I	160	205	80	95	95	21.6	43.3	15.4	30.9	56.8	43.3	40.6	30.9
RG M 20 I	200	260	120	125	125	34.2	60.1	24.4	42.9	79.4	60.1	56.7	42.9

(1) The partial safety factors for material resistance as regulated in the approval for load actions of gL = 1.4 are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x hef and an edge distance c ≥ 1.5 x hef.

(2) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

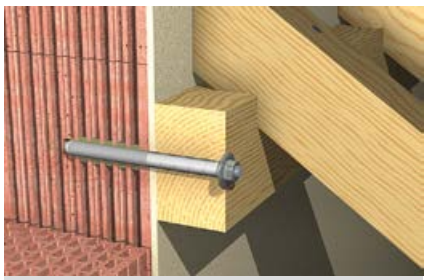
(3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

(4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(5) The given loads are valid for glass capsile RM II for fixations in dry and humid concrete for temperatures in the substrate up to 72 °C (resp. short term up to 120 °C).

(6) Drill method hammer drilling. For further allowable drill methods and application conditions see approval.

The versatile fixing system with injection anchor sleeves for masonry


Frame fixing

ADVANTAGES

- The grating structure of the FIS H K anchor sleeve is adapted for the injection mortars FIS V, FIS VS , FIS VW Fis VT and Fis P, and ensures sparing mortar use with the best interlock.
- The centering blades perfectly align the anchor in the anchor sleeve, and allow for use with various threaded rod diameters.
- The barbed hooks secure the anchor sleeve in the drill hole and allow for a trouble-free overhead installation.
- The geometry of the anchor sleeves allows for the bridging of non-bearing layers for a simple and convenient installation.

BUILDING MATERIALS

Approved for:

- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Hollow blocks made from concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick

Also suitable for:

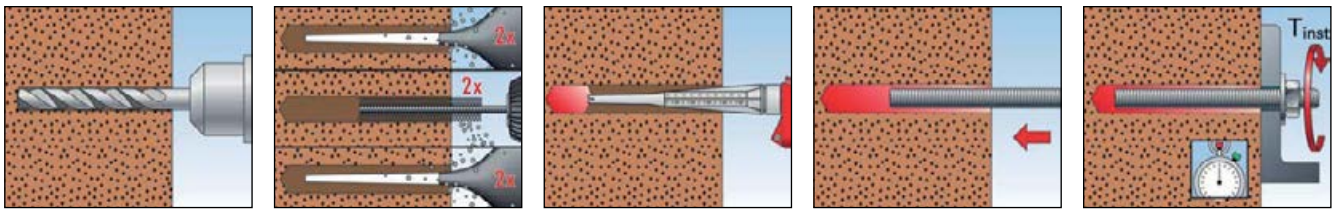
- Hollow pumice slabs
- Slabs made of hollow brick and other perforated brick
- Solid pumice and other solid building materials

VERSION

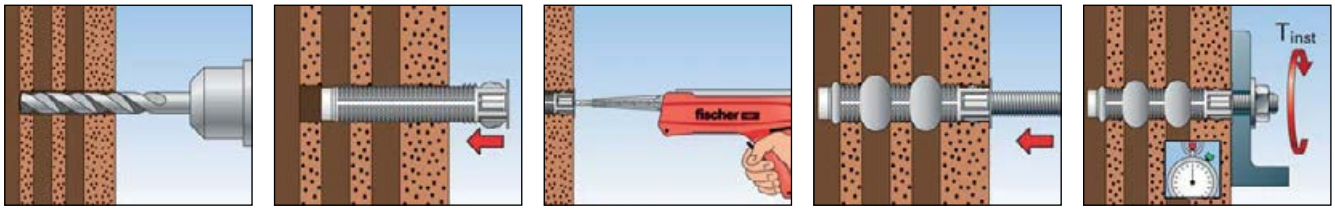
- Zinc-plated steel
- Stainless steel

DIFFERENT TYPES OF MASONRY

INSTALLATION IN SOLID MATERIAL

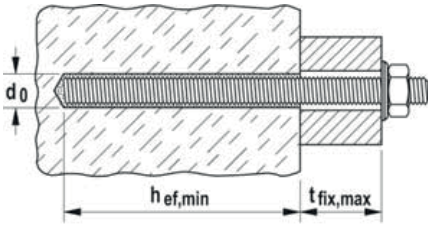


INSTALLATION IN PERFORATED AND HOLLOW MATERIAL



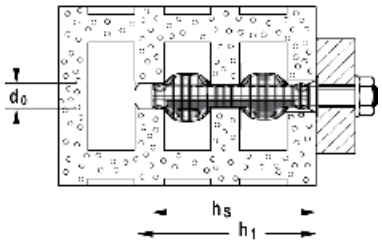
TECHNICAL DATA

Internal threaded sockets **FIS E**



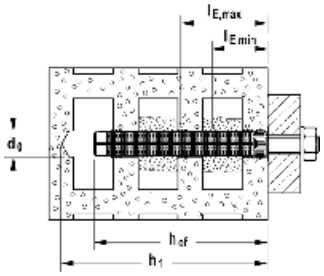
Item	Zinc-plated steel Art-No.	Drill hole diameter in perforated brick masonry d_0 (mm)	Effect. anchoring depth h_{ef} (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,miax}$ (mm)	Suitable injection anchor sleeve	Sales unit (pcs)
FIS E 11 x 85 M6	**043631**	16 20	85	6	60	FIS H 16 x 85 K FIS H 20 x 85 K	10
FIS E 11 x 85 M8	**043632**	16 20	85	8	60	FIS H 16 x 85 K FIS H 20 x 85 K	10
FIS E 15 x 85 M10	**043633**	20	85	10	60	FIS H 20 x 85 K	10
FIS E 15 x 85 M12	**043634**	20	85	12	60	FIS H 20 x 85 K	10

Injection anchor sleeve with net **FIS H N**



Item	Art-No.	Drill hole diameter d_0 (mm)	Min. drill hole depth h_1 (mm)	Min. anchorage depth anchor h_V (mm)	Filling quantity per sleeve (scale units)	Fits	Sales unit (pcs)
FIS H 16 x 85 N	**050470**	16	95	90	15	Ø8/M8	20
FIS H 18 x 85 N	**050472**	18	95	90	17	Ø10/M10	20
FIS H 20 x 85 N	**050474**	20	95	90	18	Ø12/M12	20

Injection anchor sleeve **FIS H K**



Item	Art-No.	Drill hole diameter do (mm)	drill hole depth acc. ETA (mm)	Effect. anchorage depth hef (mm)	Match	Fill quantity per sleeve	Sales unit (pcs)
FIS H 12 x 50 K	**041900**	12	55	50	FIS A M6-M8	5	50
FIS H 12 x 85 K	**041901**	12	90	85	FIS A M6-M8	10	50
FIS H 16 x 85 K	**041902**	16	90	85	FIS A M8-M10, FIS E M6-M8	12	50
FIS H 16 x 130 K	**041903**	16	135	130	FIS A M8-M10	15	20
FIS H 20 x 85 K	**041904**	20	90	85	FIS A M12-M16, FIS E M10-M12	15	20
FIS H 20 x 130 K	**046703**	20	135	130	FIS A M12-M16	25	20
FIS H 20 x 200 K	**046704**	20	205	200	FIS A M12-M16	40	20

Injection anchor sleeve, 1 m length **FIS H L**

Item	Art-No.	Drill hole diameter do (mm)	Total length l (mm)	Match	Fill quantity per 10cm	Sales unit (pcs)
FIS H 12 x 1000 L	**050598**	12	1000	Ø6 / M 6 - Ø8 / M 8	17	10
FIS H 16 x 1000 L	**050599**	16	1000	Ø10/M10 / Ø12/M12	14	10
FIS H 22 x 1000 L	**045301**	22	1000	Ø12/M12 - Ø16/M16	20	6
FIS H 30 x 1000 L	**000645**	30	1000	Ø16/M16 - Ø22/M22	26	4

LOADS

Injection system FIS V with threaded rod FIS A [5] in solid brick.

Highest loads [1)6)] for a single anchor in solid brick masonry for pre-positioned or push-through installation.
For the design, the complete approval ETA-10/0383 has to be considered.

							Solid brick masonry					
Type	Compressive brick strength f_b (N/mm²)	Brick raw density P (kg/dm³)	Minimum brick dimension[7)] (L x W x H) (mm)	Min. effective anchorage depth[4)] h_{ef} (mm)	Min. member thickness h_{min} (mm)	Maximum torque $T_{inst,max}$ (Nm)	Design tensile load N_d (kN)	Design shear load V_d (kN)	Permissible tensile load [3)] N_{rec} (kN)	Permissible Shear load [3)] V_{rec} (kN)	Min spacing [2)] s_{min} (mm)	Min. edge distance [2)] c_{min} (mm)
Solid brick Mz, 2DF acc. EN 771-1												
M8	≥ 10	≥ 1.8	240x115x113	50	115	10	1.20	1.20	0.86	0.86	120	60
M10	≥ 10			50			1.20	1.40	0.86	1.00	120	60
M12	≥ 10			100			2.19	1.40	1.57	1.00	120	60
M8	≥ 16			50			1.80	2.00	1.29	1.43	120	60
M10	≥ 16			50			1.80	2.19	1.29	1.57	120	60
M12	≥ 16			100			3.20	2.19	2.29	1.57	120	60
Solid sand-lime brick KS acc. EN 771												
M8	≥ 10	≥ 2.0	250x240x240	50	240	10	2.80	1.80	2.00	1.29	80	60
M10	≥ 10			50			2.80	1.80	2.00	1.29	80	60
M12	≥ 10			50			2.80	1.80	2.00	1.29	80	60
M16	≥ 10			50			2.19	1.80	1.57	1.29	80	60
M8	≥ 20			50			3.60	2.60	2.57	1.86	80	60
M10	≥ 20			50			3.60	2.60	2.57	1.86	80	60
M12	≥ 20			50			3.60	2.60	2.57	1.86	80	60
M16	≥ 20			50			3.00	2.60	2.14	1.86	80	60
M8	≥ 28			50			3.60	3.60	2.57	2.57	80	60
M10	≥ 28			50			3.60	3.60	2.57	2.57	80	60
M12	≥ 28			50			3.60	3.60	2.57	2.57	80	60
M16	≥ 28			50			3.60	3.60	2.57	2.57	80	60
Solid sand-lime brick KS acc. EN 771												
M8	≥ 4	≥ 1.6	250x240x239	50	240	4	.80	1.20	0.57	0.86	250	130
M8	≥ 4			85			1.40	1.40	1.00	1.00	250	130
M10	≥ 4			85			1.60	1.40	1.14	1.00	250	130
M8	≥ 6			50			1.20	1.80	0.86	1.29	250	130
M8	≥ 6			85			2.00	1.80	1.43	1.29	250	130
M10	≥ 6			85			2.60	2.19	1.86	1.57	250	130
M12	≥ 6			110			3.00	2.60	2.14	1.86	250	130
M8	≥ 8			50			1.60	2.40	1.14	1.71	250	130
M8/M10	≥ 8			85			3.40	2.80	2.43	2.00	250	130
M12/M16	≥ 8			85			3.60	3.40	2.57	2.43	250	130

Injection system FIS VL with threaded rod FIS A [5] and anchor sleeve FIS H..K.

Highest permissible loads [1)6)] for a single anchor in perforated brick masonry for pre-positioned installation.
For the design the complete approval ETA-15/0263 has to be considered.

							Solid brick masonry					
Type	Compressive brick strength f_b (N/mm²)	Brick raw density P (kg/dm³)	Minimum brick dimension[7)] (L x W x H) (mm)	Min. effective anchorage depth[4)] h_{ef} (mm)	Min. member thickness h_{min} (mm)	Maximum torque $T_{inst,max}$ (Nm)	Design tensile load N_d (kN)	Design Shear load V_d (kN)	Permissible tensile load [3)] N_{rec} (kN)	Permissible Shear load [3)] V_{rec} (kN)	Min spacing [2)] s_{min} (mm)	Min. edge distance [2)] c_{min} (mm)
Perforated sand lime brick, acc. EN 771-2												
M8	≥ 12	≥ 1.4	240x175x113	85	115	2	0.99	0.99	0.71	0.71	115	100
M8 / M10	≥ 12						1.20	1.81	0.86	1.29	115	100
M12	≥ 12						1.40	1.81	1.00	1.29	115	100
M8	≥ 20						1.79	1.81	1.28	1.29	115	100
M8 / M10	≥ 20						2.00	3.00	1.43	2.14	115	100
M12	≥ 20						2.39	3.00	1.71	2.14	115	100
Vertically perforated brick Hlz, acc. EN 771-1												
M6 / M10	≥ 8	≥ 0.6	370x250x245	85	250	2	0.80	0.80	0.57	0.57	245	120
M8 / M10	≥ 8						0.80	1.20	0.57	0.86	245	120
M12 / M16	≥ 8						0.80	0.60	0.57	0.43	245	120
Vertically perforated brick Hlz, acc. EN 771-1												
M6 / M10	≥ 10	≥ 0.9	240x175x113	85	175	2	1.60	1.60	1.14	1.14	115	100
M8 / M10	≥ 10						1.40	2.20	1.00	1.57	115	100
M12 / M16	≥ 10						1.40	2.39	1.00	1.71	115	100

(1) The required partial safety factors for material resistance included as per approval. Partial safety factor for load actions of γ_L = 1,4 are considered for recommended capacities.
(2) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
(3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(4) The max. anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).
(5) gvz, A4 and C.
(6) The given loads are valid for fixations in dry and wet masonry for temperatures in the substrate up to °50+C (resp. short term up to °80C) and best possible drillhole cleaning according approval.

LOADS

Injection system FIS VL with threaded rod FIS A [5] in solid brick.

Highest loads [1)6)] for a single anchor in solid brick masonry for pre-positioned or push-through installation.
For the design the complete approval ETA-15/0263 has to be considered.

							Solid brick masonry					
Type	Compressive brick strength f_b (N/mm²)	Brick raw density P (kg/dm³)	Minimum brick dimension[7)] (L x W x H) (mm)	Min. effective anchorage depth[4)] h_{ef} (mm)	Min. member thickness h_{min} (mm)	Maximum torque $T_{inst,max}$ (Nm)	Permissible tensile load [3)] N_{rec} (kN)	Design tensile load N_d (kN)	Permissible Shear load [3)] V_{rec} (kN)	Design Shear load V_d (kN)	Min spacing [2)] s_{min} (mm)	Min. edge distance [2)] c_{min} (mm)
Solid brick MZ, acc. EN 771-1												
M8	≥ 10	≥ 1.8	240x115x71	50	115	10	1.14	1.60	0.71	0.99	75	100
M10	≥ 10			50			1.00	1.40	1.14	1.60	75	100
M10	≥ 10			80			1.43	2.00	1.14	1.60	75	100
M10	≥ 10			200			2.43	3.40	3.40	4.76	75	150
M12	≥ 10			50			0.86	1.20	1.14	1.60	75	100
M12	≥ 10			80			1.51	2.11	1.14	1.60	75	100
M12	≥ 10			200			3.20	4.48	2.43	3.40	75	150
M8	≥ 20			50			1.57	2.20	1.14	1.60	75	100
M10	≥ 20			50			1.43	2.00	1.71	2.39	75	100
M10	≥ 20			80			2.00	2.80	1.71	2.39	75	100
M10	≥ 20			200			2.43	3.40	2.43	3.40	75	150
M12	≥ 20			50			1.29	1.81	1.57	2.20	75	100
M12	≥ 20			80			2.29	3.21	1.57	2.20	75	100
M12	≥ 20			200			2.43	3.40	2.43	3.40	75	150
Solid sand-lime brick acc. EN 771-2												
M8	≥ 10	≥ 1.8	240x115x71	50	115	10	0.71	0.99	1.14	1.60	75	100
M10	≥ 10			50			0.71	0.99	1.14	1.60	75	100
M10	≥ 10			80			0.71	0.99	1.14	1.60	75	100
M10	≥ 10			200			2.43	3.40	1.14	1.60	75	150
M12	≥ 10			50			0.71	0.99	1.43	2.00	75	100
M12	≥ 10			80			0.71	0.99	1.43	2.00	75	100
M12	≥ 10			200			2.43	3.40	1.43	2.00	75	150
M8	≥ 20			50			1.00	1.40	1.57	2.20	75	100
M10	≥ 20			50			1.00	1.40	1.57	2.20	75	100
M10	≥ 20			80			1.00	1.40	1.57	2.20	75	100
M10	≥ 20			200			2.43	3.40	1.57	2.20	75	150
M12	≥ 20			50			1.00	1.40	2.00	2.80	75	100
M12	≥ 20			80			1.00	1.40	2.00	2.80	75	100
M12	≥ 20			200			2.43	3.40	2.00	2.80	75	150

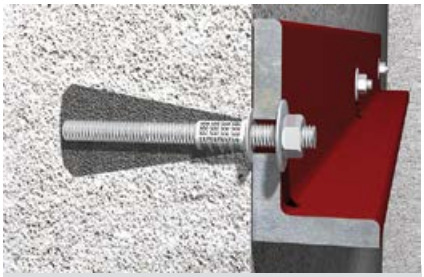
Injection system FIS V, FIS VS and FIS VW with threaded rod FIS A [5] and anchor sleeve FIS H..K

Highest loads [1)6)] for a single anchor in perforated brick masonry for pre-positioned installation.
For the design, the complete approval ETA-10/0383 has to be considered.

							Solid brick masonry			
Type	Compressive brick strength f_b (N/mm²)	Min. effective anchorage depth[4)] $h_{ef,min}$ (mm)	Brick type, naming acc, DIN (-) (-)	Max. torque moment $T_{inst,max}$ (Nm)	Design tensile load N_d (kN)	Design shear load V_d (kN)	Permissible tensile load [3)] N_{rec} (kN)	Permissible Shear load [3)] V_{rec} (kN)	Min spacing [2)] s_{min} (mm)	Min. edge distance [2)] c_{min} (mm)
Solid brick Mz										
M8	10	85	Mz	4.0	1.00	1.20	0.71	0.86	80	50
M10	10	85	Mz	4.0	1.00	1.20	0.71	0.86	80	50
M8	16	85	Mz	4.0	1.00	1.60	0.71	1.14	80	50
M10	16	85	Mz	4.0	1.00	1.60	0.71	1.14	80	50
Solid sand-lime brick and solid block KS										
M8	10	85	KS (2DF)	4.0	0.60	1.20	0.43	0.86	80	50
M10	10	85	KS (2DF)	4.0	0.60	1.20	0.43	0.86	80	50
M8	20	85	KS (2DF)	4.0	0.80	1.80	0.57	1.29	80	50
M10	20	85	KS (2DF)	4.0	0.80	1.80	0.57	1.29	80	50
M8	10	85	KS (2DF)	4.0	2.00	1.20	1.43	0.86	80	50
M10	10	85	KS (2DF)	4.0	2.00	1.20	1.43	0.86	80	50
M8	28	85	KS (2DF)	4.0	3.60	2.00	2.57	1.43		50
Solid block of lightweight aggregate concrete without slots Vbl										
M8	2	110	Vbl	4.0	0.80	0.60	0.57	0.43	80	50
M10	2	110	Vbl	4.0	0.80	0.60	0.57	0.43	80	50
M12	2	110	Vbl	4.0	1.00	0.60	0.71	0.43	80	50
M12	2	180	Vbl	4.0	1.40	0.60	1.00	0.43	80	50
M16	2	110	Vbl	4.0	1.00	0.60	0.71	0.43	80	50
M16	2	180	Vbl	4.0	1.40	0.60	1.00	0.43	80	50

(1) The required partial safety factors for material resistance included as per approval. Partial safety factor for load actions of γ_L = 1,4 are considered for recommended capacities.
(2) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
(3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(4) The max. anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).
(5) gvz, A4 and C.
(6) The given loads are valid for fixations in dry and wet masonry for temperatures in the substrate up to °50+C (resp. short term up to °80C) and best possible drillhole cleaning according approval.

Secure hold in aerated concrete using undercut technology



Aerated concrete fixing

APPROVALS

Fire resistance classification R 120

ETA-10/0383
ETAG 029

ADVANTAGES

- The cone-shaped drill hole guarantees maximum load-bearing capacity in aerated concrete thanks to the interlock.
- The centering sleeve PBZ fixes the anchor in the drill hole, thus also allowing for overhead installation.
- Two anchorage depths in combination with the threaded rod FIS A allows for the ideal adaptation to the load to be applied.
- The internal threaded anchor FIS E allows for surface flush removal and reuse of the fixing point, and therefore offers the best possible flexibility.

BUILDING MATERIALS

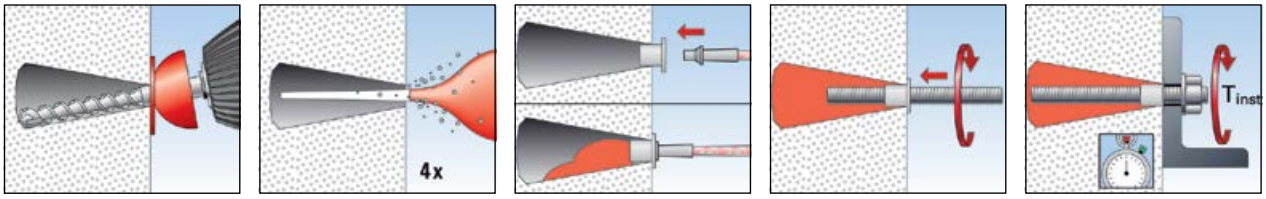
Approved for:

- Reinforced roof and ceiling boards made of aerated concrete
- Aerated concrete blocks
- Prefabricated reinforced and non-reinforced wall components made of aerated concrete

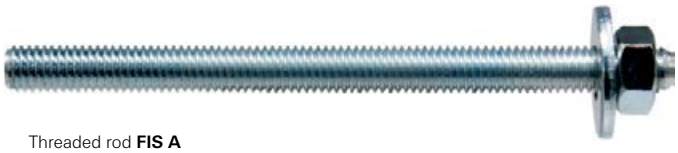
VERSION

- Zinc-plated steel
- Stainless steel

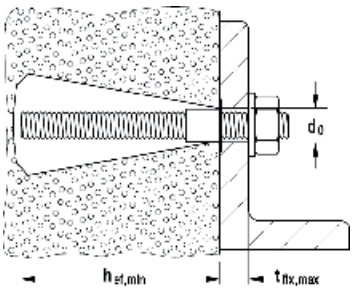
INSTALLATION



TECHNICAL DATA



Threaded rod **FIS A**



Item	Zinc-plated, steel grade 5.8 Art-No. gvz	Stainless steel Art-No. A4	Drill hole diameter in aerated concrete d_0 (mm)	Min. anchoring depth in aerated concrete $h_{ef,min}$ (mm)	Max. useful length in aerated concrete $h_{ef,max}$ (mm)	Fill quantity for effect. anchoring depth in aerated concrete (scale units)	Sales unit (pcs)
FIS A M 8 x 90	090274	090440	14	75	5	15	10
FIS A M 8 x 110	090275	090441	14	75	25	15	10
FIS A M 8 x 130	090276	090442	14	75	45	15	10
FIS A M 8 x 175	090277	090443	14	75	90	15	10
FIS A M 10 x 110	090278	090444	14	75	25	15	10
FIS A M 10 x 130	090279	090447	14	75	45	15	10
FIS A M 10 x 150	090281	090448	14	75	65	15	10
FIS A M 10 x 170	044969	044973	14	75	85	15	10
FIS A M 10 x 200	090282	090449	14	75	115	15	10
FIS A M 12 x 120	044971	044974	14	75	30	15	10
FIS A M 12 x 140	090283	090450	14	75	50	15	10
FIS A M 12 x 160	090284	090451	14	75	70	15	10
FIS A M 12 x 180	090285	090452	14	75	90	15	10
FIS A M 12 x 210	090286	090453	14	75	115	15	10
FIS A M 12 x 260	090287	090454	14	75	170	15`	10

ACCESSORIES

Cone drill **PBB**

Centering sleeve **PBZ**

Item	Art-No.	Fits	Sales unit (pcs)
Cone drill PBB	**090634**	M8 - M12; FIS E	1
Centering sleeve PBZ	**090671**	M8 - M12; FIS E	10

Internal threaded sockets **FIS E**

Item	Zinc-plated steel Art-No.	Drill hole diameter do (mm)	Effect. anchorage depth hef (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,max}$ (mm)	Fill quantity for effect. anchorage depth in aerated concrete (scale units)	Sales unit (pcs)
FIS E 11 x 85 M6	**043631**	14	85	6	60	20	10
FIS E 11 x 85 M8	**043632**	14	85	8	60	20	10

LOADS

Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with threaded rod FIS A [5]

Highest loads [1] [6] for a single anchor in aerated concrete walls.
For the design the complete approval ETA- 10/0383 has to be considered.

									Perforated brick masonry			
Type	Compressive brick strength f_b (N/mm²)	Brick raw density P (kg/dm³)	Minimum brick dimension [7] (L x W x H) (mm)	Min. effective anchorage depth [4] h_{ef} (mm)	Min. member thickness h_{min} (mm)	Maximum torque $T_{inst,max}$ (Nm)	Design tensile load N_d (kN)	Design shear load V_d (kN)	Permissible tensile load [3] N_{rec} (kN)	Permissible Shear load [3] V_{rec} (kN)	Min spacing [2] s_{min} (mm)	Min. edge distance [2] c_{min} (mm)
Aerated concrete acc. EN 771-4												
M8 [8]	≥ 4	≥ 0.50	130	100	–	1.0	0.99	0.99	0.71	0.71	250	100
M10 [8]	≥ 4	≥ 0.50		100		2.0	1.5	1.25	1.07	0.89	250	100
M12 [8]	≥ 4	≥ 0.50		100		2.0	1.25	1.25	0.89	0.89	250	100
M8 [7]	≥ 4	≥ 0.50	125	95		2.0	1.75	1.5	1.25	1.07	250	150
M10 [7]	≥ 6	≥ 0.65		95		2.0	2.0	2.99	1.43	2.14	250	150
M12 [7]	≥ 6	≥ 0.65		95		2.0	2.0	2.99	1.43	2,14	250	150

(1) The required partial safety factors for material resistance included as per approval. Partial safety factor for load actions of γ_L = 1,4 are considered for recommended capacities.
(2) Minimum possible axial spacings resp. edge distance. Details concerning the distances to joints see assessment.
(3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.
(4) gvz, A4 and C.
(5) The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and drillhole cleaning according to assessment. The given brick types in combination with the permissible loads are only a small extract of the assessment.
(6) Drilling with cone drill PBB. Only pre-positioned installation possible.
(7) Cylindrical drill hole. Pre-positioned and push-through installation possible.

Threaded rod with hexagonal installation drive

High-bay warehouses

ADVANTAGES

- Due to the high bond strength in conjunction with the injection mortars, the system achieves a very high load level in cracked and non cracked concrete, resulting in a safe application.
- Variable anchorage depths.
- Diameter allows for ideal adaptation to the load to be applied, and ensures an optimised installation time and use of materials.
- The low anchorage depth allows for use in thin base materials.
- The wide range of approved steel types allows for use in all corrosion resistant classes and offers maximum application safety.
- The wide range of approved steel types allows for use in all corrosion resistant classes.

BUILDING MATERIALS

Approved for:

- Concrete C20/25toC50/60
- Cracked and non-cracked
- Seismic conditions

Also suitable for:

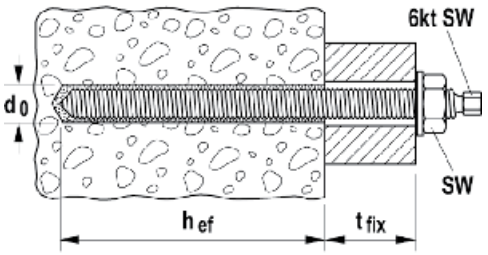
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised
- Highly corrosion resistance

TECHNICAL DATA

Threaded rod **RG M**



	highly corrosion resistant steel	hot-dip galvanised steel	Approval	Drill hole diameter	Effect. anchorage depth	Max. fixture thickness	Hexagon drive	Hexagon nut	Fits capsules	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	6kt SW [mm]	○ SW [mm]		[pcs]
Item	**C**	**fvz**								
RG M 10 x 130	**096217**	–	■	12	90	20	7	17	539797 RM II 10	10
RG M 12 x 160	**096218**	**512247**	■	14	110	25	8	19	539798 RM II 12	10
RG M 16 x 165	–	**537062**	■	18	125	8	12	24	539800 RM II 16	10
RG M 16 x 190	**096219**	**512250**	■	18	125	35	12	24	539800 RM II 16	10

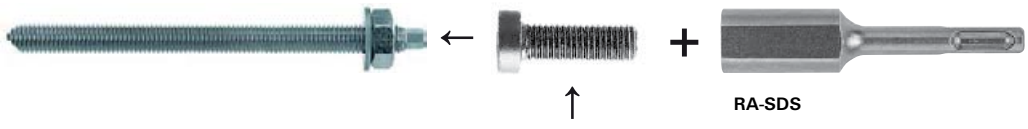
Item	Zinc-plated, steel grade 5.8 Art-No. gvz	Zinc-plated, steel 8.8 Art-No. gvz	Stainless steel Art-No. A4	Drill hole diameter d_0 (mm)	Effect. anchoring depth h_{ef} (mm)	Max. fixture thickness fix (mm)	Hexagon drive 6kt SW (mm)	Hexagon nut ⬡ SW (mm)	Fits capsules	Sales unit (pcs)
RG M 8 x 110	**050256**	–	**050263**	10	80	14	5	13	50270 RM 8	10
RG M 8 x 150	**095698**	**519443**	**050293**	10	80	54	5	13	50270 RM 8	10
RG M 10 x 110	**535007**	–	**535009**	12	90	-	7	17	50271 RM 10	10
RG M 10 x 130	**050257**	–	**050264**	12	90	20	7	17	50271 RM 10	10
RG M 10 x 165	**050280**	–	**050294**	12	90	55	7	17	50271 RM 10	10
RG M 10 x 190	**050281**	–	**050296**	12	90	80	7	17	50271 RM 10	10
RG M 10 x 220	–	**519444**	–	12	90	110	7	17	50271 RM 10	10
RG M 10 x 250	**095703**	–	**095701**	12	90	140	7	17	50271 RM 10	10
RG M 10 x 350	**095718** [1]	–	**095709**	12	90	240	7	17	50271 RM 10	10
RG M 12 x 120	**535010**	–	**535011**	14	110	-	8	19	50272 RM 12	10
RG M 12 x 160	**050258**	–	**050265**	14	110	26	8	19	50272 RM 12	10
RG M 12 x 180	**512248**	–	**512249**	14	110	50	8	19	50272 RM 12	10
RG M 12 x 200	**050572**	–	**050576**	14	150	26	8	19	48501 RM 12 E	10
RG M 12 x 220	**050283**	**519445**	**050297**	14	110	86	8	19	50272 RM 12	10
RG M 12 x 250	**050284**	–	**095702**	14	110	116	8	19	50272 RM 12	10
RG M 12 x 300	**050285**	–	**095705**	14	110	166	8	19	50272 RM 12	10
RG M 12 x 380	**095720** [1]	–	**095710** [1]	14	110	246	8	19	50272 RM 12	10
RG M 14 x 170	**050286**	–	–	16	120	38	10	22	50278 RM 14	10
RG M 16 x 165	**050287**	–	**095704**	18	125	8	12	24	50273 RM 16	10
RG M 16 x 190	**050259**	–	**050266**	18	125	33	12	24	50273 RM 16	10
RG M 16 x 250	**050288**	–	**050298**	18	125	93	12	24	50273 RM 16	10
RG M 16 x 270	–	**519446**	–	18	125	113	12	24	50273 RM 16	10
RG M 16 x 300	**050289**	–	**050299**	18	125	143	12	24	50273 RM 16	10
RG M 16 x 380	**095722** [1]	–	**095712** [1]	18	125	223	12	24	50273 RM 16	10
RG M 16 x 500	**095723** [1]	–	**095713** [1]	18	125	343	–	24	50273 RM 16	10
RG M 20 x 220	**512251**	–	–	25	170	-	12	30	50274 RM 20	10
RG M 20 x 260	**050260**	–	**050267**	25	170	54	12	30	50274 RM 20	10
RG M 20 x 290	–	**519447**	–	25	170	84	12	30	50274 RM 20	10
RG M 20 x 350	**095707**	–	**095706**	25	170	124	12	30	50274 RM 20	10
RG M 20 x 500	**095725** [1]	–	–	25	170	294	–	30	50274 RM 20	10
RG M 22 x 280	**512252** [1]	–	–	30	190	65	–	32	512763 RM 22	5
RG M 24 x 295	–	**519448** [1]	–	28	210	56	–	36	50275 RM 16	10
RG M 24 x 300	**050261** [1]	–	**050268** [1]	28	210	61	–	36	50275 RM 24	10
RG M 24 x 400	**095727** [1]	–	**095715** [1]	28	210	161	–	36	50275 RM 24	10
RG M 24 x 600	**095728** [1]	–	–	28	210	361	–	36	50275 RM 24	5
RG M 27 x 340	**090720** [1]	–	**090725** [1]	32	250	60	–	41	79843 RM 27	5
RG M 30 x 380	**050262** [1]	–	**090726** [1]	35	280	65	–	46	50276 RM 30	5
RG M 30 x 500	**095730** [1]	–	–	35	280	185	–	46	50276 RM 30	5

(1) Straight cut, setting tool is enclosed.
(2) Delivery time on request.
(3) Straight cut, additional setting tool required

SETTING TOOLS FOR RGM/FIS A

Setting tool with SDS adapter

For simple installation of bonded anchors for example Resin anchor R, Highbond anchor FHB II, Superbond resin capsule RSB.



RA-SDS

included with each package

The variable fixing system for concrete/masonry

Bridge railings

ADVANTAGES

- Due to the high bond strength in connection with the injection mortar FIS EM, the system achieves a very high load level in cracked and non cracked concrete, resulting in a safe application.
- Variable anchorage depths from 4x to 20x the threaded rod diameter allows for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- The low anchorage depth allows for use in thin base materials.
- The wide range of approved steel types allows for use in all corrosion resistance classes and offers maximum application safety.

BUILDING MATERIALS

Approved for:

- Concrete C20/25toC50/60
- Cracked and non-cracked
- Seismic conditions

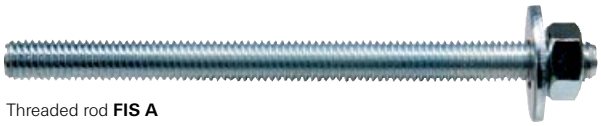
Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

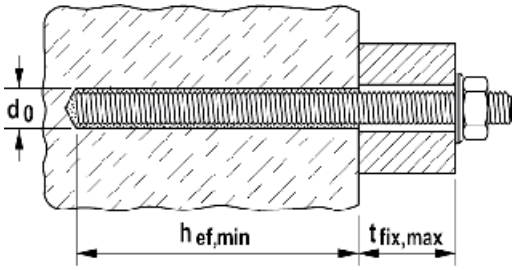
VERSION

- Zinc-plated steel
- Stainless steel

TECHNICAL DATA



Threaded rod **FIS A**



Item	Zinc-plated, steel grade 5.8 Art-No.	Zinc-plated, steel grade 8.8 Art-No.	Stainless steel A4-70 Art-No.	Drill hole diameter d_0 (mm)	Min. anchorage depth $h_{ef,min}$ (mm)	Usable length with hef,min t_{fix},$h_{ef\ min}$ (mm)	Fill quantity FIS SB at hef, min (scal units)	Max. anchorage depth $h_{ef,max}$ (mm)	Usable length with hef,max t_{fix},$h_{ef\ max}$ (mm)	Fill quantity FIS SB at hef, max (scal units)	Sales unit (units)
FIS A M 8 x 90	090274	519390	090440	10	60	619	2	78	1	3	10
FIS A M 8 x 110	090275	519391	090441	10	60	39	2	98	1	3	10
FIS A M 8 x 130	090276	519392	090442	10	60	59	2	118	1	4	10
FIS A M 8 x 175	090277	519393	090443	10	60	104	2	160	4	5	10
FIS A M 8 x 1000	509214	509222	509230	10	60	–	2	160	–	5	10
FIS A M 10 x 110	090278	–	090444	12	60	37	3	96	1	4	10
FIS A M 10 x 130	090279	–	090447	12	60	57	3	116	1	5	10
FIS A M 10 x 150	090281	517935	090448	12	60	77	3	136	1	5	10
FIS A M 10 x 170	044969	519395	044973	12	60	97	3	156	1	6	10
FIS A M 10 x 190	–	517936	519420	12	60	117	3	176	1	7	10
FIS A M 10 x 200	090282	519396	090449	12	60	127	3	186	1	7	10
FIS A M 10 x 1000*	509215	509223	509231	12	60	–	3	200	–	7	10
FIS A M 12 x 120	044971	519397	044974	14	70	34	3	103	1	5	10
FIS A M 12 x 140	090283	519398	090450	14	70	54	3	123	1	6	10
FIS A M 12 x 160	090284	517937	090451	14	70	74	3	143	1	7	10
FIS A M 12 x 180	090285	519399	090452	14	70	94	3	163	1	7	10
FIS A M 12 x 200	–	517938	519421	14	70	114	3	183	1	8	10
FIS A M 12 x 210	090286	–	090453	14	70	124	3	193	1	9	10
FIS A M 12 x 260	090287	–	090454	14	70	174	3	240	4	10	10
FIS A M 12 x 1000*	509216	509224	509232	14	70	–	3	240	–	10	10
FIS A M 16 x 130	044972	519400	044975	18	80	30	5	109	1	7	10
FIS A M 16 x 175	090288	519401	090455	18	80	75	5	154	1	10	10
FIS A M 16 x 200	090289	517939	090456	18	80	100	5	179	1	11	10
FIS A M 16 x 250	090290	517940	090457	18	80	150	5	229	1	14	10
FIS A M 16 x 300	090291	519402	090458	18	80	200	5	279	1	17	10
FIS A M 16 x 1000*	509217	509225	509233	18	80	–	5	320	–	19	10
FIS A M 20 x 245	090292	519404	090459	24	90	131	11	220	1	28	10
FIS A M 20 x 290	090293	519406	090460	24	90	176	11	265	1	32	10
FIS A M 20 x 1000*	–	519410	519427	24	90	–	11	400	–	48	10
FIS A M 24 x 290	090294	–	090468	28	96	165	15	260	1	39	5
FIS A M 24 x 380	090295	–	090462	28	96	255	15	350	1	52	5
FIS A M 30 x 340	090296	–	090463	35	120	185	28	304	1	67	5
FIS A M 30 x 430	090297	–	090464	35	120	275	28	394	1	88	5

* excluding nuts and washers – FIS A highly corrosion-resistant steel 1.4529 on request. Additional sizes on request.

Threaded rod **FIS A** 1m

Item	Zinc-plated, steel grade 5.8 Art-No.	Zinc-plated, steel grade 8.8 Art-No.	Stainless steel Art-No.	Drill hole diameter FIS EM d_0 (mm)	Max. useful length FIS EM $t_{fix,max}$ (mm)	Sales unit (pcs)
	gvz	gvz	A4			
FIS A M 8 x 1000	**509214** [1]	**509222** [1]	**509230** [1]	12	60	10
FIS A M 10 x 1000	**509215** [1]	**509223** [1]	**509231** [1]	14	60	10
FIS A M 12 x 1000	**509216** [1]	**509224** [1]	**509232** [1]	14	70	10
FIS A M 16 x 1000	**509217** [1]	**509225** [1]	**509233** [1]	18	80	10

(1) Order washer and nut separately.

Hexagonal nut and washer

Item	Zinc-plated, steel grade 5.8 Art-No.	Stainless steel Art-No.	Width across nut ⬡ SW (mm)	Washer (outer diameter x thickness) (mm)	Fits (mm)	Sales unit (pcs)
Nut & washer M8	**510509**	**510513**	13	16 x 1.6	FIS A M 8 x 1000	50
Nut & washer M10	**510510**	**510514**	17	20 x 2	FIS A M 10 x 1000	50
Nut & washer M12	**510511**	**510515**	19	24 x 2.5	FIS A M 12 x 1000	25
Nut & washer M16	**510512**	**510516**	24	30 x 3	FIS A M 16 x 1000	20
Nut & washer M20	**519737**	**519738**	30	37 x 3	FIS A M 20 x 1000	10

Internal threaded anchor **RG MI**

Item	Zinc-plated, steel grade 5.8 Art-No.	Stainless steel A4-70 Art-No.	Connection thread M	Nominal drill diameter d_0 (mm)	Anchorage depth h_{ef} (mm)	RSB	Fill quantity FIS SB (scale units)	Min. bolt penetration (mm)	Max. bolt penetration (mm)	Sales unit (pcs)
RG 12 x 90 M8 I	**050552**	**050565**	M8	14	90	RSB 10	5	8	18	10
RG 16 x 90 M10 I	**050553**	**050566**	M10	18	90	RSB 12	7	10	23	10
RG 16 x 125 M12 I	**050562**	**050567**	M12	20	125	RSB 16	11	12	26	10
RG 22 x 160 M16 I	**050563**	**050568**	M16	24	160	RSB 16 E	17	16	35	5
RG 28 x 200 M20 I	**050564**	**050569**	M20	32	200	RSB 20 E/24	48	20	45	5

REBAR CASE

FIS-Rebar Case
for reinforcement connection

Item	Art.-No.	Contents	Sales unit (pcs)
FIS-Rebar case lnt	**505942**	8 x Cleaning brush, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 24 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 8 x Cleaning nozzle, 1 x Marker tape, 1 x Digital thermometer, 1 x Protective goggles, 1 x Installation instructions (german, english, french, italian, spanish), 10 x Installation report, 2 x Flat spanner SW 7 and the relevant approvals	**1**

ACCESSORIES FOR REBAR INSTALLATION

Injection adapter for drill Ø12-25 mm

Injection adapter for drill Ø30 - 55 mm

Extension tube

Item	Art-No.	Colour	Sales unit (pcs)
Injection-adapter (Ø 9) for drill-Ø 12 mm	**001497**	white	10
Injection-adapter (Ø 9 for drill-Ø 14 mm	**001498**	blue	10
Injection-adapter (Ø 9) for drill-Ø 16 mm	**001499**	red	10
Injection-adapter (Ø 9) for drill-Ø 18 mm	**001483**	yellow	10
Injection-adapter (Ø 9 for drill-Ø 20 mm	**001506**	green	10
Injection-adapter (Ø 15) for drill-Ø 20 mm	**001508**	green	10
Injection-adapter (Ø 9) for drill-Ø 25 mm	**001507**	black	10
Injection-adapter (Ø 15) for drill-Ø 25 mm	**001509**	black	10
Injection-adapter (Ø 9) for drill-Ø 30 mm	**090689**	grey	10
Injection-adapter (Ø 15) for drill-Ø 30 mm	**090700**	grey	10
Injection-adapter (Ø 9) for drill-Ø 35 mm	**090699**	brown	10
Injection-adapter (Ø 15) for drill-Ø 35 mm	**090701**	brown	10
Injection-adapter (Ø 9) for drill-Ø 40 mm	**505077**	transparent	10
Injection-adapter (Ø 15) for drill-Ø 40 mm	**505079**	transparent	10
Injection-adapter (Ø 9) for drill-Ø 45 mm	**508909**	transparent	10
Injection-adapter (Ø 15) for drill-Ø 45 mm	**508910**	transparent	10
Injection-adapter (Ø 9) for drill-Ø 55 mm	**505078**	transparent	10
Injection-adapter (Ø 15) for drill-Ø 55 mm	**505080**	transparent	10
FIS Extension tube 1000 mm	**048983**	transparent	10
Extension tube Ø 15 (1,9 m) 10000 mm	**530800**	transparent	10

DISPENSERS

Dispenser **FIS AM**

Dispenser **FIS DM S**

Dispenser **FIS AC**

Item	Art-No.	Adapted for	Performance data	Sales unit (pcs)
FIS DM S	**511118**	FIS V 360 S, FIS HB 345 S, FIS HB 150 C, FIS EM 390 S, FIS EM Plus 390 S. FIS VS 150 C, FIS VL, FIS VW 360 S, FIS P 360 S, FIS P 300 T and 1K-cartridges	-	1
FIS AM	**058000**	FIS V 360 S, FIS HB 345 S, FIS HB 150 C, FIS EM 390 S, FIS EM Plus 390 S. FIS VS 150 C, FIS VW 360 S, FIS P 360 S, FIS P 300 T and 1K-cartridges	-	1
FIS AC	**096497**	FIS P 380 C, FIS P Plus 380 C	-	1

DISPENSERS - BATTERY

Dispenser **FIS DC S**

Item	Art-No.	Adapted for	Performance data	Sales unit (pcs)
FIS DC S	**513423**	FIS V 360 S, FIS HB 345 S, FIS EM 390 S, FIS EM Plus 390 S. FIS VS 300 T, FIS P 300 T, FIS SB 390 S, FIS PM 360 S, FIS VL 300 T and 1K-cartridges	-	1
Battery Pack	**513425**	FIS DC S	-	1

DISPENSERS - PNEUMATIC

Dispenser **FIS AP**

Dispenser **FIS DP-S L**

Dispenser **FIS DP-S XL**

Item	Art-No.	Adapted for	Performance data	Sales unit (pcs)
FIS AP	**058027**	Cartridges with 150 ml, 300 ml, 360 ml and 390 ml content Ex: FIS EM 390 S, FIS EM Plus 390 S. FIS VS 150 C, FIS VW 360 S,	-	1
FIS DP-S L	**511125**	FIS EM Plus 585, FIS SB 585 S FIS RC 585	-	1
FIS DP-S XL	**512401**	FIS SB 1500 S, FIS EM PLUS 1500 S	-	1

CLEANING ACCESSORIES

Compressed-air cleaning gun

Blow-out pump **AB G**

Compressed air nozzle

Item	Art-No.	Fits	Sales unit (pcs)
Compressed-air cleaning gun ABP	**059456**	RG M 8 - M 30	1
AB G big blow-out pump	**089300**	–	1
Compressed air nozzle D12-D15	**511956**	Drill diameter Ø 12 - 15 mm	2
Compressed air nozzle D16-D19	**511957**	Drill diameter Ø 16 - 19 mm	2
Compressed air nozzle D20-D25	**511958**	Drill diameter Ø 20 - 25 mm	2
Compressed air nozzle D30-D35	**511959**	Drill diameter Ø 30 - 35 mm	2
Compressed air nozzle D40-D55	**511960**	Drill diameter Ø 40 - 45 mm	2

Cleaning brush with thread M8

Cleaning brush **BS** for concrete

Item	Art-No.	Colour	Length (mm)	Sales unit (pcs)
Brush for drill-Ø 12 mm	**001490**	white	180	1
Brush for drill-Ø 14 mm	**001491**	blue	180	1
Brush for drill-Ø 16 mm	**001492**	red	180	1
Brush for drill-Ø 18 mm	**001493**	yellow	180	1
Brush for drill-Ø 20 mm	**001494**	green	180	1
Brush for drill-Ø 25 mm	**001495**	black	180	1
Brush for drill-Ø 30 mm	**090063**	grey	180	1
Brush for drill-Ø 35 mm	**090071**	brown	180	1
Brush for drill-Ø 40 mm	**505061**	–	180	1
Brush for drill-Ø 45 mm	**506254**	–	180	1
Brush for drill-Ø 55 mm	**505062**	–	180	1
FIS brush extension	**508791**	–	420	1
SDC Chuck with internal thread M 8	**530332**	–	180	1

Item	Art-No.	Brush diameter (mm)	Thread	Sales unit (pcs)
BS ø 10	**078178**	11	M 8	1
BS ø 12	**078179**	13	M 10	1
BS ø 14	**078180**	16	M 12	1
BS ø 16/18	**078181**	20	M14, M16	1
BS ø 25	**097806**	27	M 20	1
BS ø 28	**078183**	30	M 24	1
BS ø 35	**078184**	40	M22, M27, M30	1

Centring wedge

Machine setting tool **RA-SDS**

Adapter **SDS plus 1/2" VK**

Adapter **SK SW 8 1/2" VK**

Adapter **SDS max 1/2" VK**

Adapter **SDS max 3/4" VK**

Item	Art-No.	Match	Sales unit (pcs)
Centering wedge	**093076**	for overhead installations	10
RA-SDS	**062420**	Adapter suitable fits set screw	1
SK SW 8 1/2	**001536**	Adapter suitable fits threaded rods M8 - M22	1
SDS plus 1/2	**001537**	Adapter suitable fits threaded rods M8 - M16	1
SDS max 1/2	**001538**	Adapter suitable fits threaded rods M16 - M20	1
SDS max 3/4	**001539**	Adapter suitable fits threaded rods M20 - M30	1

Drilling aid

Item	Art.-No.	Sales unit [pcs]
Drilling aid 3pcs.	**090819**	1

High Performance Steel Anchors

fischer

Cracked Concrete

Bolt anchor FAZ II 61

Bolt anchor FBZ 65

Multi-Use Concrete Screw FBS II 68

Ultracut Concrete Screw FBS II A4 72

High performance anchor FH II 75

High performance anchor FH II-I 79

ZYKON undercut anchor FZA 87

ZYKON Hammerfix anchor FZEA II 92

Drop-in anchor EA II 94

Nail anchor FNA II 102

Ceiling nail FDN II 104

Cost-efficient Ceiling Nail FDZ 105

Non-cracked Concrete

Bolt anchor FAZ II 61

Bolt anchor FBZ 65

Multi-Use Concrete Screw FBS II 68

Ultracut Concrete Screw FBS II A4 72

High performance anchor FH II 75

High performance anchor FH II-I 79

Bolt anchor FBN II 82

Bolt Anchor FXA 85

ZYKON undercut anchor FZA 87

ZYKON Hammerfix anchor FZEA II 92

Drop-in anchor EA II 94

Drop-in anchor EA N 97

Brass fixing MS 99

Nail anchor FNA II 102

Ceiling nail FDN II 104

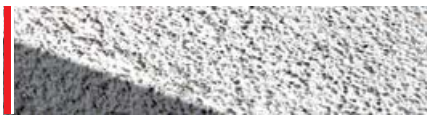
Cost-efficient Ceiling Nail FDZ 105

Bolt Anchor FWA 106

Hollow-core Slab

Drop-in anchor EA II Short 94

Hollow-ceiling anchor FHY 100



Aerated Concrete

Aircrete anchor FPX-I 109

For highest demands of cracked concrete. Powerful and flexible.

Balcony railings

APPROVALS

ETA 05/0069

Fire resistance classification R 120 Anchor types see test report

ICC ES ESR-2948 See ICC-ES Evaluation Report at www.ic-es.org Inspection agency: IEA (AA-707)

ZTV 1200 °C

M8 - M20

FM APPROVED from M10

SEISMIC

ADVANTAGES

- The optimised expansion clip allows for a high load-bearing capacity. Thus fewer fixing points and smaller anchor plates are required.
- The international approvals guarantee maximum safety and the best performance.
- The bolt geometry allows for optimal load distribution and therefore enables use close to edges and in thin components.
- Fewer hammer blows and the minimal torque slippage allow for a noticeably simpler installation.
- The drive-in pin protects the thread from damage and ensures a trouble-free dismantling of the fixture

BUILDING MATERIALS

Approved for:
- Concrete C20/25toC50/60
- Cracked and non-cracked
- Seismic conditions

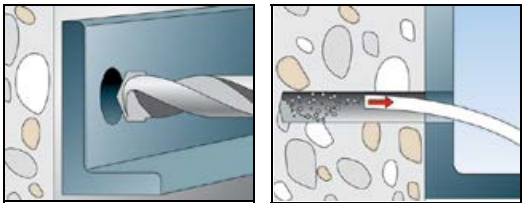
Also suitable for:
- Concrete C12/15 & C80/95
- Natural stone with dense structure

VERSION

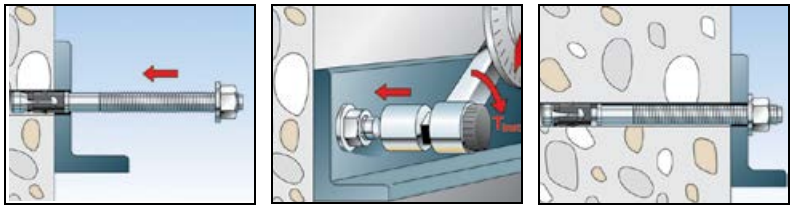
- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

INSTALLATION

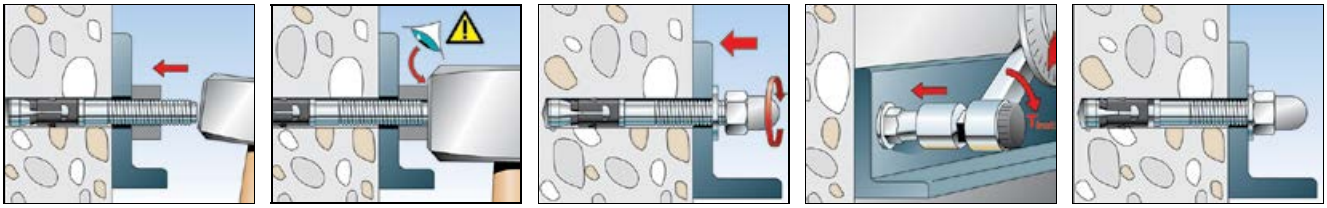
DRILL HOLE PREPARATION



PUSH-THROUGH INSTALLATION WITH HEXAGON NUT



PUSH-THROUGH INSTALLATION OF THE CUP NUT VERSION WITH SETTING GAUGE



Anchor Type			FAZ II M6			FAZ II M8			FAZ II M10			FAZ II M12			FAZ II M16			FAZ II M20			FAZ II M24		
			gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C
drill hole diameter		d_0 (mm)	6			8			10			12			16			20			24		
$h_{ef,min}$		(mm)	–			–			40			50			65			–			–		
Minimum member thickness[1]		(mm)	–			–			80			100			140			–			–		
$h_{ef,max}$		(mm)	40			45			60			70			85			100			125		
Minimum member thickness[1]		(mm)	80			100			120			140			170			200			250		
Torque moment		T_{inst} (Nm)	8			20			45			60			110			200			270		
Cracked Concrete	Min. spacing	s_{min}[2] (mm)	35			35			40			50			65			95			100		
	Min. edge distance	c_{min}[2] (mm)	45			40			45			55			65			85			100		
Non-cracked Concrete	Min. spacing	s_{min}[2] (mm)	35			40			40			50			65			95			100		
	Min. edge distance	c_{min}[2] (mm)	45			40			45			55			65			95			135		

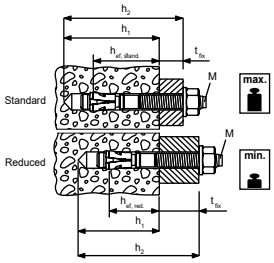
(1)According approval the minimum member thickness ($h_{min} \geq 2 \times h_{ef}$) can be reduced under specific conditions.
(2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness (hmin 2 x hef). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.

TECHNICAL DATA

Bolt anchor **FAZ II**

Bolt anchor **FAZ II H**

Bolt anchor **FAZ II K/FAZ II K GS (short version)**



Item	Zinc-plated steel Art-No. gvz	Stainless steel Art-No. A4	Highly corrosion resistant steel Art-No. C	Letter code marking	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Drill hole depth for pre-position fixing Stand/Red. h1 (mm)	Drill hole depth for through fixing h2 (mm)	Max. usable length hef, stand/hef,red t_{fix} (mm)	Thread Ø length (mm)	Width across nut ⬡SW (mm)	Sales unit (pcs)
FAZ II 6/10	**542621**	**542623**	–	–	6	65	–	60	10/	M 6 x 35	10	50
FAZ II 6/20	**542622**	**542624**	–	–	6	75	–	70	20/	M 6 x 45	10	50
FAZ II 8/10	**94871**[1)]	**501396**[1)]	–	B	8	75	55	65	10/20	M 8 x 38	13	50
FAZ II 8/10	–	–	**501428**	B	8	75	55	65	10/20	M 8 x 38	13	10
FAZ II 8/30	**94877**[1)]	**501399**[1)]	–	F	8	95	55	85	30/40	M 8 x 58	13	50
FAZ II 8/30	–	–	**501429**	F	8	95	55	85	30/40	M 8 x 58	13	10
FAZ II 8/50	**94878** [1)]	**501401**[1)]	–	K	8	115	55	105	50/60	M 8 x 78	13	50
FAZ II 8/100	**94879**[1)]	–	–	P	8	165	55	155	100/110	M 8 x 128	13	25
FAZ II 8/160	**503251**	–	–	T	8	225	55	215	160/170	M 8 x 100	13	20
FAZ II 10/10	**94981**[1)]	**501403**[1)]	–	B	10	95	75/55	85	10/30	M 10 x 53	17	50
FAZ II 10/10	–	–	**501430**	B	10	95	75/55	85	10/30	M 10 x 53	17	10
FAZ II 10/20	**94982**[1)]	–	–	D	10	105	75/55	95	20/40	M 10 x 63	17	25
FAZ II 10/20	–	**501406**[1)]	–	D	10	105	75/55	95	20/40	M 10 x 63	17	50
FAZ II 10/30	**94983**[1)]	–	–	F	10	115	75/55	105	30/50	M 10 x 73	17	25
FAZ II 10/30	–	**501407**[1)]	–	F	10	115	75/55	105	30/50	M 10 x 73	17	50
FAZ II 10/30	–	–	**503185**	F	10	115	75/55	105	30/50	M 10 x 73	17	10
FAZ II 10/50	**94984** [1)]	**501409**[1)]	–	K	10	135	75/55	125	50/70	M 10 x 93	17	20
FAZ II 10/70	–	**501410**[1)]	–	M	10	155	75/55	145	70/90	M 10 x 113	17	20
FAZ II 10/80	**94985**[1)]	–	–	N	10	165	75/55	155	80/100	M 10 x 123	17	20
FAZ II 10/100	**94986**[1)]	**501411**	–	P	10	185	75/55	175	100/120	M 10 x 143	17	20
FAZ II 10/160	**503252**	–	–	T	10	245	75/55	235	160/180	M 10 x 193	17	20
FAZ II 10/160	–	**501412**	–	T	10	245	75/55	235	160/180	M 10 x 193	17	20
FAZ II 12/10	**95419**[1)]	**501413**[1)]	–	B	12	110	90/70	100	10/30	M 12 x 61	19	20
FAZ II 12/10	–	–	**503186**	B	12	110	90/70	100	10/30	M 12 x 61	19	10
FAZ II 12/20	**95420**[1)]	**501415**[1)]	–	D	12	120	90/70	110	20/40	M 12 x 71	19	20
FAZ II 12/30	**95421**[1)]	**501416**[1)]	–	F	12	130	90/70	120	30/50	M 12 x 81	19	20
FAZ II 12/30	–	–	**501431**	F	12	130	90/70	120	30/50	M 12 x 81	19	10
FAZ II 12/50	**95446**[1)]	**501419**[1)]	–	K	12	150	90/70	140	50/70	M 12 x 101	19	20
FAZ II 12/60	–	**501420**[1)]	–	L	12	160	90/70	150	60/80	M 12 x 111	19	20
FAZ II 12/80	**95454**[1)]	–	–	N	12	180	90/70	170	80/100	M 12 x 131	19	20
FAZ II 12/100	**95470**[1)]	**501421**[1)]	–	P	12	200	90/70	190	100/120	M 12 x 151	19	20
FAZ II 12/160	**503253**	–	–	T	12	260	90/70	250	160/180	M 12 x 186	19	10
FAZ II 12/160	–	**503180**	–	T	12	260	90/70	250	160/180	M 12 x 186	19	20
FAZ II 12/200	**95605**	–	–	V	12	300	90/70	290	200/220	M 12 x 186	19	10
FAZ II 16/5	–	**522125**	–	A	16	128	110/90	115	5/25	M 16 x 64	-	10
FAZ II 16/5	**522124**[1)]	–	–	A	16	128	110/90	115	5/25	M 16 x 64	-	20
FAZ II 16/25	**95836**[1)]	–	**501432**	E	16	148	110/90	135	25/45	M 16 x 84	24	10
FAZ II 16/25	–	**501423**[1)]	–	E	16	148	110/90	135	25/45	M 16 x 84	24	20
FAZ II 16/50	**95864**[1)]	–	**503187**	K	16	173	110/90	160	50/70	M 16 x 109	24	10
FAZ II 16/50	–	**501424**[1)]	–	K	16	173	110/90	160	50/70	M 16 x 109	24	20
FAZ II 16/100	**95865**[1)]	**501425**[1)]	–	P	16	223	110/90	210	100/120	M 16 x 159	24	10
FAZ II 16/160	**503254**	–	–	T	16	283	110/90	270	160/180	M 16 x 189	24	10
FAZ II 16/200	**95967**[1)]	–	–	V	16	323	110/90	310	200/220	M 16 x 189	24	10
FAZ II 16/250	**95968**	–	–	W	16	373	110/90	360	250/270	M 16 x 100	24	10
FAZ II 16/300	**96188**	–	–	X	16	423	110/90	410	300/320	M 16 x 100	24	10
FAZ II 20/30	**46632**[1)]	–	–	F	20	172	125	155	30/	M 20 x 54	30	5
FAZ II 20/30	–	**501426**[1)]	–	F	20	172	125	155	30/	M 20 x 54	30	5
FAZ II 20/60	**46633**[1)]	–	–	L	20	202	125	185	60/	M 20 x 84	30	5
FAZ II 20/60	–	**503183**[1)]	–	L	20	202	125	185	60/	M 20 x 84	30	4
FAZ II 20/160	**503255**[1)]	–	–	T	20	302	125	285	160/	M 20 x 100	30	5
FAZ II 24/30	**46635**[1)]	–	–	F	24	205	155	185	30/	M 24 x 58	36	5
FAZ II 24/30	–	**501427**[1)]	–	F	24	205	155	185	30/	M 24 x 58	36	4
FAZ II 24/60	**46636**[1)]	–	–	L	24	235	155	215	60/	M 24 x 88	36	5
FAZ II 24/60	–	**503184**[1)]	–	L	2	235	155	215	60/	M 24 x 88	36	4
FAZ II 8/ 5 K	**538989**	**538990**	–	–	8	60	35	45	5/	M 8 x 23	13	50
FAZ II 10/10 K	**522108**	**522116**	–	B	10	75	55/25	65	10	M 10 x 33	17	50
FAZ II 10/20 K	**522110**	–	–	D	10	85	55/25	75	20	M 10 x 43	17	25

1) Approval Seismic C1/C2 only with maximum embedment depth

TECHNICAL DATA

Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Letter code marking	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Drill hole depth for pre-position fixing Stand/Red. h1 (mm)	Drill hole depth for through fixing h2 (mm)	Max. usable length hef, stand/hef,red t_{fix} (mm)	Thread Ø length (mm)	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz	A4	C									
FAZ II 10/20 K	–	**522117**	–	D	10	85	55/25	75	20	M 10 x 43	17	50
FAZ II 12/10 K	**522118**	**522122**	–	B	12	90	70/30	80	10	M 12 x 41	19	20
FAZ II 12/20 K	**522119**	**522123**	–	D	12	100	70/40	90	20	M 12 x 51	19	20
FAZ II 10/10 K GS	**522115**	–	–	B	10	75	55/25	65	10	M 10 x 33	17	50
FAZ II 12/10 K GS	**522121**	–	–	B	12	90	70/30	80	10	M 12 x 41	19	20
FAZ II 10/10 H	**543392**[1)]	**543396**[1)]	–	B	10	95	77/57	87	10/30	M 10 x 53	17	20
FAZ II 10/20 H	**543393**[1)]	**543397**[1)]	–	D	10	105	77/57	97	20/40	M 10 x 63	17	20
FAZ II 12/10 H	**543394**[1)]	**543398**[1)]	–	B	12	109	89/69	99	10/30	M 12 x 61	19	20
FAZ II 12/20 H	**543395**[1)]	**543399**[1)]	–	D	12	119	89/69	109	20/40	M 12 x 71	19	20

1) Available from spring 2018
Approval Seismic C1/C2 only with maximum embedment depth

LOADS

Bolt anchor FAZ II zinc plated steel / stainless steel A4 / high corrosion resistant steel C

Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 9)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} (kN)	Permissible shear load V_{perm} (kN)	Design Tension load N_{des} (kN)	Design Shear Load V_{des} (kN)
FAZ II 6 [5)]	galv.	40	0.7	3.4	0.98	4.76
FAZ II 6 [5) 6)]	A4	40	0.7	5.0	0.98	7
	C					
FAZ II 8 [6)]	galv.	35 [4)]	2.6	7.8	3.64	10.92
		45	3.8		5.32	
	A4	35 [4)]	2.6	8.9	3.64	12.46
		45	3.8	9.6	5.32	13.44
	C	35 [4)]	2.6	8.9	3.64	12.46
		45	3.8	9.6	5.32	13.44
FAZ II 10 [6)]	galv.	40	4.3	11.3	6.02	15.82
		60	6.2	12.2	8.68	17.08
	A4	40	4.3	11.3	6.02	15.82
		60	6.2	15.1	8.68	21.14
	C	40	4.3	11.3	6.02	15.82
		60	6.2	15.1	8.68	21.14
FAZ II 12 [6)]	galv.	50	6.1	17.5	8.54	24.5
		70	9.5		13.3	
	A4	50	6.1	18.8	8.54	26.32
		70	9.5	21.9	13.3	30.66
	C	50	6.1	18.8	8.54	26.32
		70	9.5	21.9	13.3	30.66
FAZ II 16 [6)]	galv.	65	9.0	28.7	12.6	40.18
		85	13.4	31.4	18.76	43.96
	A4	65	9.0	28.7	12.6	40.18
		85	13.4	39.9	18.76	55.86
	C	65	9.0	28.7	12.6	40.18
		85	13.4	39.9	18.76	55.86
FAZ II 20 [6)]	galv.	100	17.1	44.6	23.94	62.44
	A4					
	C					
FAZ II 24 [6)]	galv.	125	24.0	57.5	33.6	80.5
	A4					
	C					
FAZ II 10 H	galv.	60	6.2	12.2	8.68	17.08
	A4			15.1		21.14
FAZ II 12 H	galv.	70	9.5	17.5	13.3	24.5
	A4			21.9		30.66

For the design the complete assessment ETA-05/0069 has to be considered.
(1) The partial safety factors for material resistance as regulated in the ETA-05/0069 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef.
(2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(3) For all allowable drill methods see ETA-05/0069.
(4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.
(5) Diamond drilling not permitted.
(6) Hollow drilling is not permitted for this size.
(7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
(8) The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03/07/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).
(9) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at wk ~ 0.3mm.

LOADS

Bolt anchor FAZ II zinc plated steel / stainless steel A4 / high corrosion resistant steel C

Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} (kN)	Permissible shear load V_{perm} (kN)	Design Tension load N_{des} (kN)	Design Shear Load V_{des} (kN)
FAZ II 6 [5)]	**galv.**	40	3.6	3.4	5.04	4.76
FAZ II 6 [5) 6)]	**A4**	40	5.0	5.0	7	7
	C					
FAZ II 8 [6)]	**galv.**	35 [4)]	5.0	7.8	7	10.92
		45	6.7		9.38	
	A4	35 [4)]	5.0	9.6	7	13.44
		45	6.7		9.38	
	C	35 [4)]	5.0		7	
		45	6.7		9.38	
FAZ II 10 [6)]	**galv.**	40	6.1	12.2	8.54	17.08
		60	9.5		13.3	
	A4	40	6.1	15.1	8.54	21.14
		60	9.5		13.3	
	C	40	6.1		8.54	
		60	9.5		13.3	
FAZ II 12 [6)]	**galv.**	50	8.5	17.5	11.9	24.5
		70	10.5		14.7	
	A4	50	8.5	21.9	11.9	30.66
		70	10.5		14.7	
	C	50	8.5		11.9	
		70	10.5		14.7	
FAZ II 16 [6)]	**galv.**	65	12.6	31.4	17.64	43.96
		85	18.8		26.32	
	A4	65	12.6	39.9	17.64	55.86
		85	18.8		26.32	
	C	65	12.6		17.64	
		85	18.8		26.32	
FAZ II 20 [6)]	**galv.**	100	24.0	46.5	33.6	65.1
	A4			60.7		84.98
	C					
FAZ II 24 [6)]	**galv.**	125	33.6	62.9	47.04	88.06
	A4			80.7		112.98
	C					
FAZ II 10 H	**galv.**	60	9.5	12.2	13.3	17.08
	A4			15.1		21.14
FAZ II 12 H	**galv.**	70	10.5	17.5	14.7	24.5
	A4			21.9		30.66

For the design the complete assessment ETA-05/0069 has to be considered.

(1) The partial safety factors for material resistance as regulated in the ETA-05/0069 as well as a partial safety factor for load actions of $\gamma_L = 1.4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$.

(2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(3) For all allowable drill methods see ETA-05/0069.

(4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

(5) Diamond drilling not permitted.

(6) Hollow drilling is not permitted for this size.

(7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

(8) The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03/07/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

(9) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at wk ~ 0.3mm.

Efficient fixing for cracked concrete

Facade Base plates

APPROVALS

ETA-17/0624
EAD 330232-00-0601
Option 1 for cracked concrete

Fire resistance classification R 120
Anchor types see test report

ADVANTAGES

- The interaction of cone and expansion clip ensures high load capacity. Thus fewer fixing points and smaller anchor plates are required.
- The international approvals guarantee maximum safety and the best performance.
- The bolt geometry allows for optimal load distribution and therefore enables use close to edges and in thin components.
- The distinctive design ensures safe and comfortable setting of the anchor ensuring quick and reliable installation.
- The drive-in pin protects the thread from damage and ensures a trouble-free dismantling of the fixture.

BUILDING MATERIALS

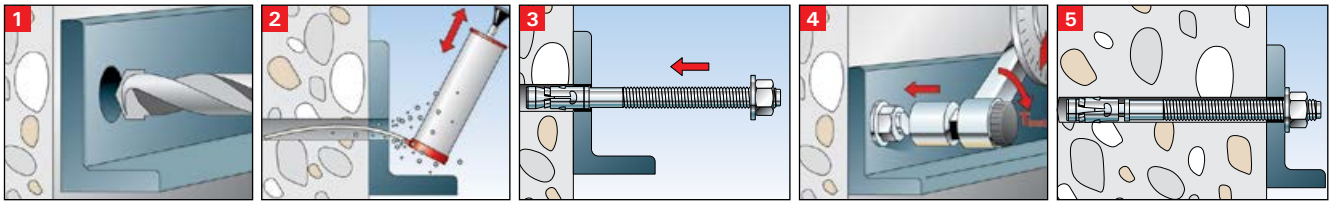
Approved for:
- Concrete C20/25 to C50/60
- Cracked and non-cracked

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel

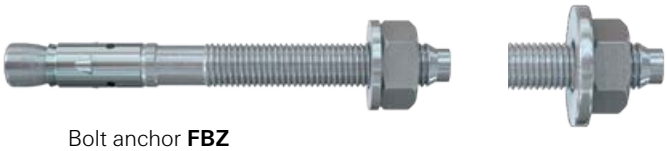
INSTALLATION



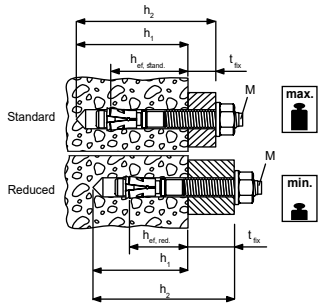
Anchor Type			FBZ M8		FBZ M10		FBZ M12		FBZ M16	
			gvz	A4	gvz	A4	gvz	A4	gvz	A4
drill hole diameter		do (mm)	8		10		12		16	
hef,min		(mm)	35[4]		40[4]		50		65	
Minimum member thickness[1]		(mm)	80		80		100		140	
hef,max		(mm)	45		60		70		85	
Torque moment		Tinst (Nm)	20		45		60		110	
Cracked Concrete	Min. spacing	Smin[2] (mm)	35		40		50		65	
	Min. edge distance	Cmin[2] (mm)	40		45		55		65	
Non-cracked Concrete	Min. spacing	Smin[2] (mm)	35		40		50		65	
	Min. edge distance	Cmin[2] (mm)	40		45		55		65	

1) According to approval the minimum member thickness ($h_{min} \geq 2 \times h_{ef}$) can be reduced under specific conditions.
2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness (hmin 2 x hef). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according to approval.
4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

TECHNICAL DATA



Bolt anchor **FBZ**



	Art.-No.		Drill diameter	Min. drill hole depth for push through installation	Anchor length	Standard embedment depth with respective usable length		Reduced embedment depth with respective usable length		Washer (outer diameter x thickness)	Thread	Sales unit	
	Steel, zinc-plated	stainless steel	d_0	h_2	l	$h_{ef,\,std.}$	t_{fix}	$h_{ef,\,red.}$	t_{fix}		⌀ x length	gvz	A4
Item	**gvz**	**A4**		**(mm)**	**(mm)**	**(mm)**	**(mm)**	**(mm)**	**(mm)**	**(mm)**	**(mm)**	**(pcs)**	**(pcs)**
FBZ 8/10	**543400**	**543409**	8	70	75	45	10	35	20	16 x 1.6	M 8 x 38	50	50
FBZ 10/10	**543401**	**543410**	10	87	95	60	10	40	30	20 x 2.0	M 10 x 53	50	50
FBZ 10/20	**543402**	**543411**	10	97	105	60	20	40	40	20 x 2.0	M 10 x 63	25	50
FBZ 10/30	**543961**	**543963**	10	107	115	60	30	40	50	20 x 2.0	M 10 x 73	25	50
FBZ 12/10	**543403**	**543412**	12	99	110	70	10	50	10	24 x 2.5	M 12 x 61	20	20
FBZ 12/20	**543404**	**543413**	12	109	120	70	20	50	20	24 x 2.5	M 12 x 71	20	20
FBZ 12/30	**543962**	**543964**	12	119	130	70	30	50	50	24 x 2.5	M 12 x 81	20	20
FBZ 16/25	**543405**	**543414**	16	133	148	85	25	65	45	30 x 3.0	M 16 x 84	10	20
FBZ 8/10 GS	**543406**	**543415**	8	70	75	45	10	35	20	22 x 2.5	M 8 x 38	50	50
FBZ 10/10 GS	**543407**	**543416**	10	87	95	60	10	40	30	25 x 3.0	M 10 x 53	50	50
FBZ 10/20 GS	**–**	**543417**	10	97	105	60	20	40	40	25 x 3.0	M 10 x 63	-	50
FBZ 12/10 GS	**543408**	**–**	12	99	110	70	10	50	30	30 x 3.0	M 12 x 61	20	-

1) With reduced embedment depth only for statically indeterminate systems.

LOADS

Bolt anchor FBZ zinc plated steel / stainless steel A4

Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [5)] (kN)	Permissible shear load V_{perm} [5)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)	Required edge distance (with one edge) for: Max. tension load c (mm)	Required edge distance (with one edge) for: Max. shear load c (mm)	Required spacing for Max. load s_{cr} (mm)
FBZ 8	**galv.**	35 [4)]	1.9	6.9	2.66	9.66	45	175	105
	A4			8.9		12.46		235	
	galv.	45	2.9	6.9	4.06	9.66	40	170	135
								150	
	A4			9.2		12.88		235	
								210	
FBZ 10	**galv.**	40	3.3	11.3	4.62	15.82	45	290	120
	A4								
	galv.	60	4.8	12.2	6.72	17.08	60	270	180
							45	245	
	A4			15.1		21.14	60	340	
							45	310	
FBZ 12	**galv.**	50	4.8	17.5	6.72	24.50	55	400	150
	A4			18.8		26.32		435	
	galv.	70	7.6	17.5	10.64	24.5	75	350	210
								320	
	A4			21.4		29.96		435	
								400	
FBZ 16	**galv.**	65	7.1	28.7	9.94	40.18	75	545	195
	A4								
	galv.	85	12.4	31.4	17.36	43.96	115	585	255
								525	
	A4			32.7		45.78		610	
								550	

For the design the complete assessment ETA-17/0624 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0624 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-17/0624.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Hammer drilling resp. hollow drilling

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of ....non-structural systems.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-17/0624.

7) The given loads refer to the European Technical Assessment ETA-17/0624, issue date 08/09/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be

LOADS

Bolt anchor FBZ zinc plated steel / stainless steel A4

Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Installation torque T_{inst} (kN)	Permissible tension load N_{perm} [5)] (kN)	Permissible shear load V_{perm} [5)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FBZ 8	galv.	35 [4)]	20	3.8	6.9	5.32	9.66
	A4				9.2		12.88
	galv.	45		5.2	6.9	7.28	9.66
	A4				9.2		12.88
FBZ 10	galv.	40	45	4.8	12.2	6.72	17.08
	A4				15.1		21.14
	galv.	60		7.6	12.2	10.64	17.08
	A4				15.1		21.14
FBZ 12	galv.	50	60	7.1	17.5	9.94	24.5
	A4				21.4		29.96
	galv.	70		8.1	17.5	11.34	24.50
	A4				21.4		29.96
FBZ 16	galv.	65	110	10.5	31.4	14.7	43.96
	A4				32.7		45.78
	galv.	85		16.2	31.4	22.68	43.96
	A4				32.7		45.78

For the design the complete assessment ETA-17/0624 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0624 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-17/0624.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Hammer drilling resp. hollow drilling

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-17/0624.

7) The given loads refer to the European Technical Assessment ETA-17/0624, issue date 08/09/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at wk ~ 0.3mm.

The powerful concrete screw for top installation comfort

Inclined supports

CERTIFICATES

ADVANTAGES

- Top flexibility with regard to load and fixture thickness due to up to three approved embedment depths.
- The special saw tooth geometry enables fast cutting into the concrete.
- No drill hole cleaning is required for installation in ceilings or floors, or use of hollow drills with suction
- The expansion-free anchorage (under-cut) ensures really low edge and axial clearances.
- The ETA approval covers applications in cracked concrete and seismic power categories C1 and C2.
- Approval-compliant adjustment allows the concrete screw to be undone twice and the fixture to be underlaid or adjusted.
- The national approval allows multiple usage for temporary anchorings (for example, formwork construction).

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

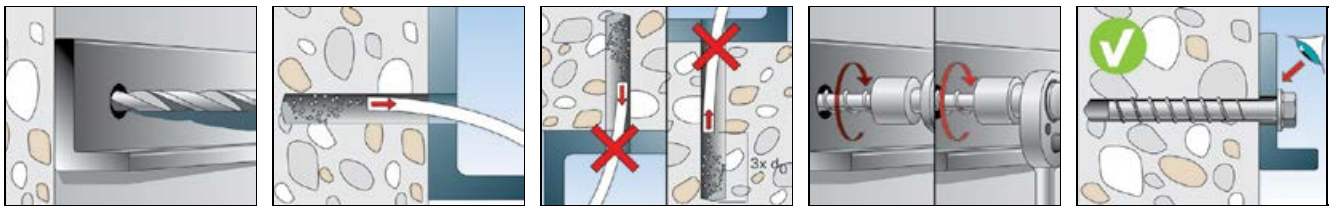
Also suitable for:

- Concrete C12/15
- Solid building materials
- Masonry with a dense structure

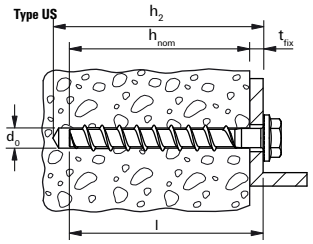
VERSIONS

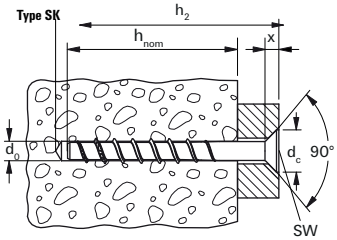
- Zinc-plated steel

INSTALLATION



INSTALLATION DATA - CONCRETE C20/25 - C50/60





	X [mm]	d_c [mm]
ULTRACUT FBS II 8	6	20
ULTRACUT FBS II 10	7	23

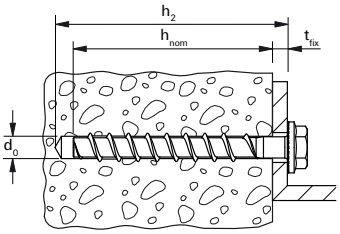
Anchor Type			8	10	12	14
Drill hole diameter	d_0	[mm]	8	10	12	14
Nominal screw-in depth	h_{nom1}	[mm]	50	55	60	65
	h_{nom2}	[mm]	–	65	75	85
	h_{nom3}	[mm]	65	85	100	115
Drill hole depth (push-through installation)	$h_2 \geq$	[mm]	l + 10	l + 10	l + 10	l + 15
Clearance hole diameter	d_f	[mm]	10.6 - 12	12.8 - 14	14.8 - 16	16.9 - 18
Max. torque for installation with impact screw driver in concrete	$T_{imp, max}$	[Nm]	600	650	650	650
Max. torque for manual installation in concrete	T_{max}	[Nm]	65	100	150	250
Width across the flat	SW	[mm]	13	15	17	21
Drive	T_{orx}	–	T40 (SK a.US)	T50 (SK a.US)	–	–

INSTALLATION DATA - MASONRY

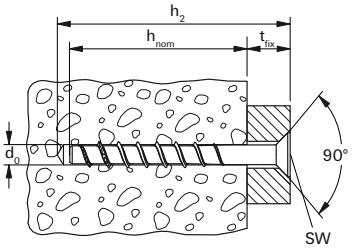
Building material	Compressive strength class [N/mm²]	Size	[mm]	8	10
		h_{nom}	[mm]	65	85
Solid clay brick (EN771-1)	≥ 12	T_{inst}	[Nm]	5	10
Solid sand-lime brick (EN771-2)	≥ 12	T_{inst}	[Nm]	15	15
Aerated concrete (ED771-4)	≥ 6	T_{inst}	[Nm]	5	10

TECHNICAL DATA

ULTRACUT FBS II US hexagon head with integral washer



ULTRACUT FBS II SK - countersunk head



Item	Art.-No.	Drill hole diameter	Min. drill hole depth for through fixings	Screw	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Drive	Sales unit
		d_0	h_2	$d_a \times l_s$	h_{nom1} / $t_{fi\,x}$	h_{nom2} / $t_{fi\,x}$	h_{nom3} / $t_{fi\,x}$	t_{fix}	
	gvz	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(pcs)
ULTRACUT FBS II 8x55 5/- US TX	536851	8	65	10 x 55	50 / 5	-	-	TX40/SW13	50
ULTRACUT FBS II 8x70 20/5 US TX	536852	8	80	10 x 70	50 / 20	-	65 / 5	TX40/SW13	50
ULTRACUT FBS II 8x80 30/15 US TX	536853	8	90	10 x 80	50 / 30	-	65 / 15	TX40/SW13	50
ULTRACUT FBS II 8x90 40/25 US TX	536854	8	100	10 x 90	50 / 40	-	65 / 25	TX40/SW13	50
ULTRACUT FBS II 8x100 50/35 US TX	536855	8	110	10 x 100	50 / 50	-	65 / 35	TX40/SW13	50
ULTRACUT FBS II 8x110 60/45 US TX	536856	8	120	10 x 110	50 / 60	-	65 / 45	TX40/SW13	50
ULTRACUT FBS II 8x130 80/65 US TX	536857	8	140	10 x 130	50 / 80	-	65 / 65	TX40/SW13	50
ULTRACUT FBS II 10x60 5/-/- US	536858	10	70	12 x 60	55 / 5	-	-	SW 15	50
ULTRACUT FBS II 10x70 15/5/- US	536859	10	80	12 x 70	55 / 15	65 / 5	-	SW 15	50
ULTRACUT FBS II 10x80 25/15/- US	536860	10	90	12 x 80	55 / 25	65 / 15	-	SW 15	50
ULTRACUT FBS II 10x90 35/25/5 US	536861	10	100	12 x 90	55 / 35	65 / 25	85 / 5	SW 15	50
ULTRACUT FBS II 10x100 45/35/15 US	536862	10	110	12 x 100	55 / 45	65 / 35	85 / 15	SW 15	50
ULTRACUT FBS II 10x120 65/55/35 US	536863	10	130	12 x 120	55 / 65	65 / 55	85 / 35	SW 15	50
ULTRACUT FBS II 10x140 85/75/55 US	536864	10	150	12 x 140	55 / 85	65 / 75	85 / 55	SW 15	50
ULTRACUT FBS II 10x160 105/95/75 US	536865	10	170	12 x 160	55 / 105	65 / 95	85 / 75	SW 15	50
ULTRACUT FBS II 10x200 145/135/115 US	536866	10	210	12 x 200	55 / 145	65 / 135	85 / 115	SW 15	20
ULTRACUT FBS II 10x230 175/165/145 US	536867	10	240	12 x 230	55 / 175	65 / 165	85 / 145	SW 15	20
ULTRACUT FBS II 10x260 205/195/175 US	536868	10	270	12 x 260	55 / 205	65 / 195	85 / 175	SW 15	20
ULTRACUT FBS II 12x70 10/-/- US	536869	12	80	14 x 70	60 / 10	-	-	SW 17	20
ULTRACUT FBS II 12x85 25/10/- US	536870	12	95	14 x 85	60 / 25	75 / 10	-	SW 17	20
ULTRACUT FBS II 12x110 50/35/10 US	536871	12	120	14 x 110	60 / 50	75 / 35	100 / 10	SW 17	20
ULTRACUT FBS II 12x130 70/55/30 US	536872	12	140	14 x 130	60 / 70	75 / 55	100 / 30	SW 17	20
ULTRACUT FBS II 12x150 90/75/50 US	536873	12	160	14 x 150	60 / 90	75 / 75	100 / 50	SW 17	20
ULTRACUT FBS II 14x75 10/-/- US	536874	14	90	16 x 75	65 / 10	-	-	SW 21	20
ULTRACUT FBS II 14x95 30/10/- US	536875	14	110	16 x 95	65 / 30	85 / 10	-	SW 21	20
ULTRACUT FBS II 14x100 35/15/- US	536876	14	115	16 x 100	65 / 35	85 / 15	-	SW 21	20
ULTRACUT FBS II 14x125 60/40/10 US	536877	14	140	16 x 125	65 / 60	85 / 40	115 / 10	SW 21	10
ULTRACUT FBS II 14x150 85/65/35 US	536878	14	165	16 x 150	65 / 85	85 / 65	115 / 35	SW 21	10
ULTRACUT FBS II 8x60 10/- SK	536880	8	70	10 x 80	50 / 30	-	-	TX40	50
ULTRACUT FBS II 8x80 30/15 SK	536881	8	90	10 x 90	50 / 40	-	65 / 15	TX40	50
ULTRACUT FBS II 8x90 40/25 SK	536882	8	100	12 x 65	55 / 10	-	65 / 25	TX50	50
ULTRACUT FBS II 10x65 10/-/- SK	536884	10	75	12 x 80	55 / 25	-	-	TX50	50
ULTRACUT FBS II 10x80 25/15/- SK	536885	10	90	12 x 95	55 / 40	65 / 15	-	TX50	50
ULTRACUT FBS II 10x95 40/30/10 SK	536886	10	105	12 x 100	55 / 45	65 / 30	85 / 10	TX50	50
ULTRACUT FBS II 10x100 45/35/15 SK	536887	10	110	12 x 120	55 / 65	65 / 35	85 / 15	TX50	50
ULTRACUT FBS II 10x120 65/55/35 SK	536888	10	130	10 x 60	50 / 10	65 / 55	85 / 35	TX40	50

Item	Art.-No.	Drill hole diameter d_0	Min. drill hole depth for through fixings h_2	Screw $d_a \times l_s$	Screw-in depth with fixture thickness h_{nom1} / $t_{fi\,x}$	Screw-in depth with fixture thickness h_{nom2} / $t_{fi\,x}$	Screw-in depth with fixture thickness h_{nom3} / $t_{fi\,x}$	Drive t_{fix}	Sales unit
	gvz	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(pcs)
FBS II 6x30/5 P	**546377**	6	40	7.5 x 30	-	-	-	T30	100
FBS II 6x40/5 P	**546378**	6	50	7.5 x 40	-	-	-	T30	100
FBS II 6x40/5 LP	**546379**	6	50	7.5 x 40	-	-	-	T30	100
FBS II 6x60/5 P	**546380**	6	70	7.5 x 50	-	-	-	T30	100
FBS II 6x80/25 P	**546381**	6	90	7.5 x 80	-	-	-	T30	100
FBS II 6x30/5 SK	**546382**	6	40	7.5 x 30	-	-	-	T30	100
FBS II 6x40/5 SK	**546383**	6	50	7.5 x 40	-	-	-	T30	100
FBS II 6x60/5 SK	**546384**	6	70	7.5 x 50	-	-	-	T30	100
FBS II 6x80/25 SK	**546385**	6	90	7.5 x 80	-	-	-	T30	100
FBS II 6x100/45 SK	**546386**	6	110	7.5 x 100	-	-	-	T30	100
FBS II 6x120/65 SK	**546387**	6	130	7.5 x 120	-	-	-	T30	100
FBS II 6x140/85 SK	**546388**	6	150	7.5 x 140	-	-	-	T30	100
FBS II 6x160/105 SK	**546389**	6	170	7.5 x 160	-	-	-	T30	100
FBS II 6x40/5 US	**546390**	6	50	7.5 x 40	-	-	-	SW 10	100
FBS II 6x60/5 US	**546391**	6	70	7.5 x 50	-	-	-	SW 10	100
FBS II 6x80/25 US	**546392**	6	90	7.5 x 80	-	-	-	SW 10	100
FBS II 6x100/45 US	**546393**	6	110	7.5 x 110	55 - 25	-	-	SW 10	100
FBS II 6x120/65 US	**546394**	6	130	7.5 x 120	55 - 25	-	-	SW 10	100

ACCESSORIES

Checking gauge **PUF**

Nut SW

Nut TX

FMB T40 Maxx Bit

Profi-bit **FPB T50 5/16"**

Item	Art.-No.	Internal diameter D [mm]	Drive	Match	Sales unit [pcs]
Checking gauge FUP 10	**537201**	12.0	–	FBS II 10	1
Checking gauge FUP 12	**537202**	13.0	–	FBS II 12	1
Checking gauge FUP 14	**537203**	15.0	–	FBS II 14	1
Nut SW13	**538578**	–	1/2" / SW13	FBS II 8	1
Nut SW15	**538579**	–	1/2" / SW15	FBS II 10	1
Nut SW17	**538580**	–	1/2" / SW17	FBS II 12	1
Nut SW21	**538581**	–	1/2" / SW21	FBS II 14	1
Nut TX40	**538575**	–	1/2" - 1/4"	FBS II 8 / FBS II 8 SK	1
Nut TX50	**538576**	–	1/2" - 5/16"	FBS II 10 / FBS II 10 SK	1
FMB T40 Maxx Bit W 5	**533159**	–	TX40	FBS II 8 / FBS II 8 SK	10
FPB Profi-Bit T50 5/16"	**538574**	–	TX50	FBS II 10 SK	1

1) Suitable for FMB T40 Maxx Bit
2) Suitable for FPB Profi-Bit T50 5/16"

Filling washer **FFD**

Washer **U**

Item	Art. No.	Internal diameter [mm]	External - Ø d [mm]	Product Match [mm]	Sales Unit [pcs]
FFD 26 x 12 x 6	**538458**	12.0	12.0	FBS II 8	4
FFD 30 x 14 x 6	**538459**	14.2	14.2	FBS II 10 / FBS II 12	4
FFD 38 x 19 x 7	**538460**	19.2	19.2	FBS II 14	4
Washer for FBS 10	**520471**	13.5	13.5	FBS II 10	50

LOADS

Concrete screw with hexagon head and washer FBS II US

& Counter sunk Head FBSII SK

Design & Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]

Item	Screw in depth h_{nom} (mm)	Permissible tension load N_{perm} [7)] (kN)	Permissible shear load V_{perm} [7)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)	Minimum spacings while reducing the load: Min. spacing s_{min} [8)] (mm)	Minimum spacings while reducing the load: Min. edge distance c_{min} [8)] (mm)
FBS II 6 [5)]	40	3.8	4.3	5.32	6.02	35	35
	45	4.8		6.72			
	50	5.7		7.98			
	55	6.4	6.3	8.96	8.82		
FBS II 8	50	6.1	6.1	8.54	8.54	35	35
	65	9.0	9.0	12.6	12.60		
FBS II 10	55	6.8	6.8	9.52	9.52	40	40
	65	8.8	14.0	12.32	19.60		
	85	13.5	16.6	18.9	23.24		
FBS II 12	60	7.7	15.2	10.78	21.28	50	50
	75	11.2		15.68			
	100	17.5	20.3	24.5	28.42		
FBS II 14	65	8.5	17.0	11.9	23.80	60	60
	85	13.2	22.1	18.48	30.94		
	115	21.6	29.4	30.24	41.16		

LOADS

Concrete screw with hexagon head and washer FBS II US

& Counter sunk Head FBSII SK

Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 10)]

Item	Screw in depth h_{nom} (mm)	Permissible tension load N_{perm} [7)] (kN)	Permissible shear load V_{perm} [7)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FBS II 6 [5)]	40	1.2	4.3	1.68	6.02
	45	1.7		2.38	
	50	1.9		2.66	
	55	2.4	6.3	3.36	8.82
FBS II 8	50	2.9	4.3	4.06	6.02
	65	5.7	9.0	7.98	12.60
FBS II 10	55	4.3	4.8	6.02	6.72
	65	5.7	12.5	7.98	17.50
	85	9.6	16.6	13.44	23.24
FBS II 12	60	5.5	11.0	7.70	15.40
	75	8.0	15.2	11.20	21.28
	100	12.5	20.3	17.50	28.42
FBS II 14	65	6.1	12.1	8.54	16.94
	85	9.4	18.8	13.16	26.32
	115	15.4	29.4	21.56	41.16

For the design the complete assessment ETA-15/0352 has to be considered. [9)]

1) The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-15/0352.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

5) Diamond drilling not permitted.

6) Maximum allowable torque for installation with any tangential impact screw driver.

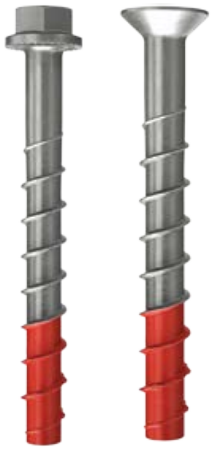
7) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

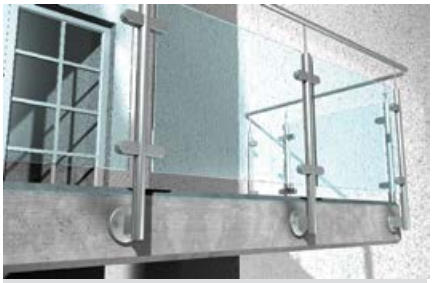
8) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

9) The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

10) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at wk ~ 0.3mm.

The powerful concrete screw for top installation comfort





Balcony railings

CERTIFICATES

ETA-17/0740
EAD 330011-00-0601
Option 1 for cracked concrete
seismic performance category C1, C2

Fire resistance classification
R 120
Anchor types see test report

ADVANTAGES

- The specially hardened red tip provides a faster and more secure installation.
- The stainless steel concrete screw guarantees a high level of corrosion resistance especially for wet rooms and external applications.
- No drill hole cleaning is required for installation in ceilings or floors, or use of hollow drills with suction.
- The expansion-free anchorage (under-cut) ensures really low edge and axial clearances.
- The ETA approval covers applications in cracked concrete and seismic power categories C1 and C2.
- After the installation, the concrete screw is fully removable and reusable.
- Underhead fluting for more hold and security during the installation.
- Different head shapes for a variety of applications.

BUILDING MATERIALS

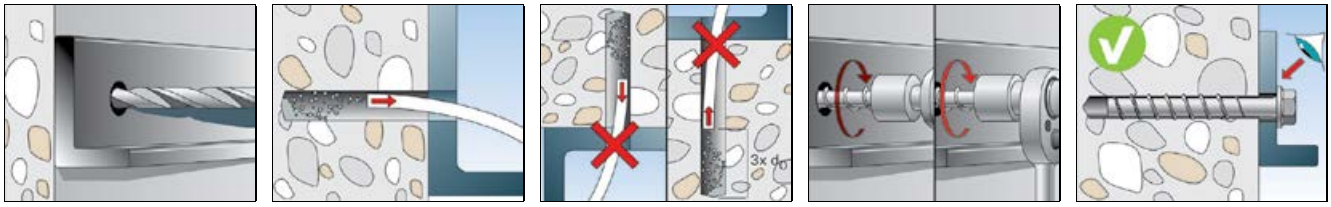
Approved for:
- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:
- Concrete C12/15
- Solid building materials
- Solid masonry

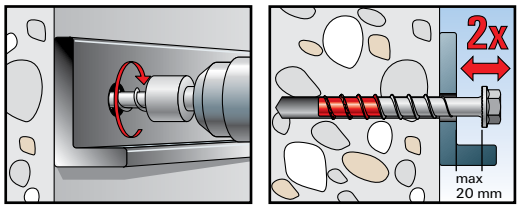
VERSIONS

- Stainless Steel

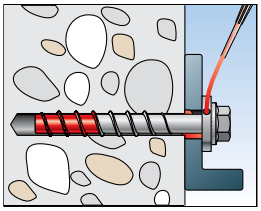
INSTALLATION



Fixture adjustment in accordance with the approval requirements



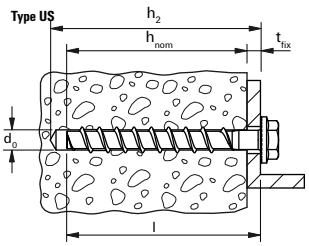
Also for seismic

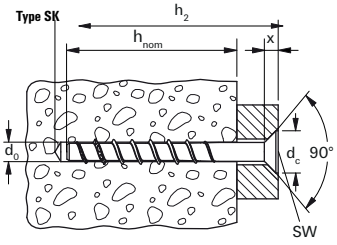


INSTALLATION DATA - MASONRY

Building material	Compressive strength class [N/mm²]	Size	[mm]	8	10
		h_{nom}	[mm]	65	85
Solid clay brick (EN771-1)	≥ 12	T_{inst}	[Nm]	10	10
Solid sand-lime brick (EN771-2)	≥ 12	T_{inst}	[Nm]	15	15
Aerated concrete (ED771-4)	≥ 6	T_{inst}	[Nm]	5	5

INSTALLATION DATA - CONCRETE C20/25 - C50/60



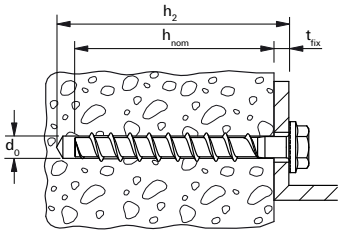


	X [mm]	d_c [mm]
ULTRACUT FBS A4 II 8	6	20
ULTRACUT FBS A4 II 10	7	23

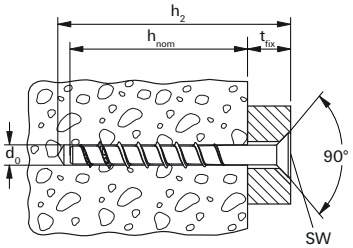
Anchor Type			8	10	12
Drill hole diameter	d_0	[mm]	8	10	12
Nominal screw-in depth	h_{nom}	[mm]	65	85	100
Drill hole depth (push-through installation)	$h_2 \geq$	[mm]	l + 10	l + 10	l + 10
Clearance hole diameter	d_f		10.6 - 12	12.8 - 14	14.8 - 16
Max. torque for installation with impact screw driver in concrete	$T_{imp,\,max}$		450	450	600
Width across the flat	SW		13	15	17
Drive	T_{orx}		T40 (SK a.US)	T50 (SK)	–

TECHNICAL DATA

ULTRACUT FBS II A4 US - hexagon head with integral washer



ULTRACUT FBS II A4 SK - countersunk head



Item	Art. No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Anchor length $d_a \times l_s$ [mm]	Screwing depth h_{nom1} [mm]	Screwing depth t_{fix} [mm]	Width across flat / Torx [SW/TX]	Sales unit [pcs]
FBS II 8x70 5/- US A4	543566	8	80	70	65	5	13	50
FBS II 8x80 15/- US A4	543567	8	90	80	65	15	13	50
FBS II 8x90 25/- US A4	543568	8	100	90	65	25	13	50
FBS II 10x90 5/- US A4	543572	10	100	90	85	5	15	50
FBS II 10x100 15/- US A4	543573	10	110	100	85	15	15	50
FBS II 10x120 35/- US A4	543574	10	130	120	85	35	15	50
FBS II 12x110 10/- US A4	543577	12	120	110	100	10	17	20
FBS II 12x130 30/- US A4	543578	12	140	130	100	30	17	20
FBS II 8x80 15/- SK A4	543580	8	90	80	65	15	T40	50
FBS II 8x90 25/- SK A4	543581	8	100	90	65	25	T40	50
FBS II 10x95 10/- SK A4	543584	10	105	95	85	10	T50	50
FBS II 10x100 15/- SK A4	543585	10	110	100	85	15	T50	50
FBS II 10x120 35/- SK A4	543586	10	130	120	85	35	T50	50

ACCESSORIES

Filling disc **FFD in A4**

Item	Art. No.	Internal diameter [mm]	External diameter d [mm]	Match [mm]	Sales unit [pcs]
FFD 26 x 12 x 6 A4	541986	12	26	FBS II 8 A4	4
FFD 30 x 14 x 6 A4	541987	14	30	FBS II 10 A4 / FBS II 12 A4	4

LOADS

Concrete screw with hexagon head and washer FBS II A4 US

& counter sunk head FBSII A4 SK stainless steel A4

Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]

Item	Screw in depth h_{nom} (mm)	Permissible tension load N_{perm} [5)] (kN)	Permissible shear load V_{perm} [5)] (kN)	Design Tension load Vd (kN)	Design Shear Load Vd (kN)	Minimum spacings while reducing the load	
						Min. spacing s_{min} [6)] (mm)	Min. edge distance c_{min} [6)] (mm)
FBS II 8x50	50	3.3	6.1	4.62	8.54	35	35
FBS II 8x65	65	6.7	9.0	9.38	12.6	35	35
FBS II 10x55	55	4.0	6.8	5.6	9.52	40	40
FBS II 10x65	65	6.7	8.8	9.38	12.32	40	40
FBS II 10x85	85	13.5	20.9	18.9	29.26	40	40
FBS II 12x60 US only	60	4.8	7.7	6.72	10.78	50	50
FBS II 12x75 US only	75	5.7	22.4	7.98	31.36	50	50
FBS II 12x100 US only	100	17.5	26.2	24.5	36.68	50	50

LOADS

Concrete screw with hexagon head and washer FBS II A4 US

& counter sunk head FBSII A4 SK stainless steel A4

Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]

Item	Screw in depth h_{nom} (mm)	Permissible tension load N_{perm} [5)] (kN)	Permissible shear load V_{perm} [5)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)	Minimum spacings while reducing the load	
						Min. spacing s_{min} [6)] (mm)	Min. edge distance c_{min} [6)] (mm)
FBS II 8x50	50	1.9	4.3	2.66	6.02	35	35
FBS II 8x65	65	4.3	6.4	6.02	8.96	35	35
FBS II 10x55	55	2.1	4.8	2.94	6.72	40	40
FBS II 10x65	65	2.9	6.2	4.06	8.68	40	40
FBS II 10x85	85	7.6	19.2	10.64	26.88	40	40
FBS II 12x60	60	2.1	5.5	2.94	7.7	50	50
FBS II 12x75	75	5.2	15.9	7.28	22.26	50	50
FBS II 12x100	100	12.5	25.0	17.5	35	50	50

For the design the complete assessment ETA-17/0740 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-17/0740.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-17/0740.

4) Maximum allowable torque for installation with any tangential impact screw driver.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The push-through anchor for fixings with sophisticated design in cracked concrete

Banisters

APPROVALS

ETA 07/0025

Fire resistance classification R 120
Anchor types see test report

ESR-2691

FM APPROVED from M10

SEISMIC

M8 - M20

ADVANTAGES

- The anchor construction allows for wide-ranging head shapes for fixing points with sophisticated design.
- The ideal interaction of screw shank and sleeve allows for a high shear loads. Thus fewer fixing points are required.
- The international approvals guarantee maximum safety and the best performance.
- The optimised geometry reduces the energy required for installation.
- The detachable screw connection allows for surface flush removal.

BUILDING MATERIALS

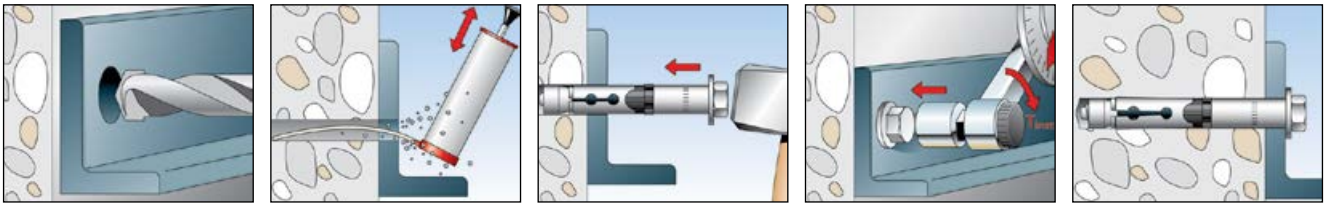
Approved for:
- Concrete C20/25toC50/60
- Cracked and non-cracked
- Seismic conditions

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel

INSTALLATION

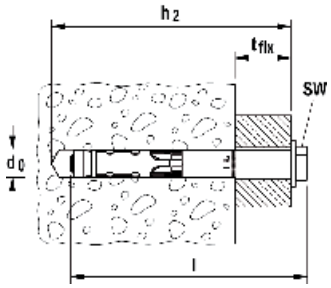


Anchor type		FH II 10 M6		FH II 12 M8		FH II 15 M10		FH II 18 M12		FH II 24 M16		FH II 28 M20	FH II 32 M24
		gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	gvz
Diameter of thread		M 6	M 6	M 8	M 8	M 10	M 10	M 12	M 12	M 16	M 16	M 20	M 24
Nominal drill hole diameter	d_o (mm)	10	10	12	12	15	15	18	18	24	24	28	32
Drill depth	h_1 (mm)	55	55	80	80	90	90	105	105	125	125	155	180
Effective anchorage depth	h_{ef} (mm)	40	40	60	60	70	70	80	80	100	100	125	150
Clearance-hole in fixture to be attached	d_f (mm)	12	12	14	14	17	17	20	20	26	26	31	35
Drill hole depth for through fixing	t_d (mm)	$t_d = h_1 + t_{fix}$											
Required installation torque	type B T_{inst} (Nm)	10	15	17.5	25	38	40	80	100	120	160	180	200
	type H	10	15	22.5	25	40	40	80	100	90	160	–	–
	type S	10	15	22.5	25	40	40	80	100	160	160	180	200
	type SK	10	10	22.5	25	40	40	80	100	–	–	–	–
Minimum thickness of concrete member	h_{min} (mm)	80	80	120	120	140	140	160	160	200	200	250	300
Non-cracked concrete[2]													
Minimum spacing	s_{min} (mm)	40	40	60	60	70	70	80	80	100	100	120	160
For required edge distances	for c (mm)	70	70	100	100	100	100	160	160	200	200	220	360
Minimum edge distances	c_{min} (mm)	40	40	60	60	70	70	80	80	100	100	120	180
For required spacing	for s (mm)	70	70	100	100	140	140	200	200	220	220	240	380
Cracked concrete[2]													
Minimum spacing	s_{min} (mm)	40	40	50	50	60	60	70	70	80	80	100	120
For required edge distances	for c (mm)	40	40	80	80	120	120	140	140	180	180	200	260
Minimum edge distances	c_{min} (mm)	40	40	50	50	60	60	70	70	80	80	100	120
For required spacing	for s (mm)	40	40	80	80	120	120	160	160	200	200	220	280

(1) Internal hexagon. (2) Intermediate values by linear interpolation.

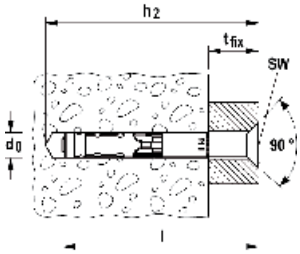
TECHNICAL DATA

High performance anchor **FH II-S** - with hexagonal head



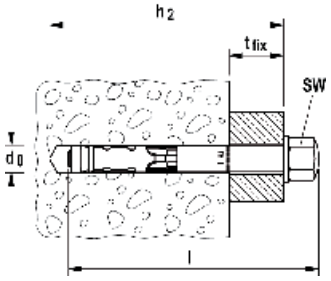
Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Drill hole diameter d_0 (mm)	Min. drill hole depth for through fixing h_2 (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Thread M	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz	A4							
FH II 10/10 S	**503133**	–	10	65	70	10	M 6	10	50
FH II 10/10 S	–	**510923**	10	65	69	10	M 6	10	50
FH II 10/25 S	**503134**	–	10	80	85	25	M 6	10	50
FH II 10/25 S	–	**510924**	10	80	84	25	M 6	10	50
FH II 10/50 S	**503135**	–	10	105	110	50	M 6	10	50
FH II 12/10 S	**044884**	–	12	90	90	10	M 8	13	50
FH II 12/10 S	–	**510925**	12	90	90	10	M 8	13	50
FH II 12/25 S	**044885**	–	12	105	105	25	M 8	13	50
FH II 12/25 S	–	**510926**	12	105	105	25	M 8	13	20
FH II 12/50 S	**044886**	–	12	130	130	50	M 8	13	25
FH II 15/10 S	**044887**	–	15	100	106	10	M 10	17	25
FH II 15/10 S	–	**510927**	15	100	107	10	M 10	17	50
FH II 15/25 S	**044888**	–	15	115	121	25	M 10	17	25
FH II 15/25 S	–	**510928**	15	115	122	25	M 10	17	20
FH II 15/50 S	**044889**	–	15	140	146	50	M 10	17	25
FH II 18/10 S	**046847**	–	18	115	118	10	M 12	19	20
FH II 18/25 S	**044894**	–	18	130	132	25	M 12	19	20
FH II 18/25 S	–	**510929**	18	130	133	25	M 12	19	10
FH II 18/50 S	**044896**	–	18	155	157	50	M 12	19	20
FH II 24/25 S	**044898**	–	24	150	160	25	M 16	24	10
FH II 24/25 S	–	**502711**	24	150	160	25	M 16	24	8
FH II 24/50 S	**044900**	–	24	175	185	50	M 16	24	10
FH II 28/30 S	**044901**	–	28	185	192	30	M 20	30	4
FH II 28/60 S	**044902**	–	28	215	222	60	M 20	30	4
FH II 32/30 S	**044903**	–	32	210	215	30	M 24	36	4
FH II 32/60 S	**044904**	–	32	240	245	60	M 24	36	4

High performance anchor **FH II-SK** with countersunk head



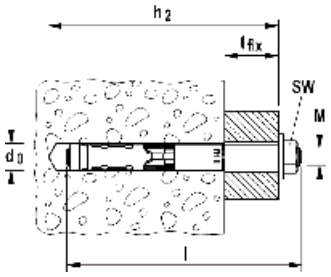
Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Drill hole diameter d_0 (mm)	Min. drill hole depth for through fixing h_2 (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Thread M	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz	A4							
FH II 10/15 SK	**503136**	–	10	70	65	15	M 6	4	50
FH II 10/25 SK	**503137**	–	10	80	75	25	M 6	4	50
FH II 10/50 SK	**503138**	–	10	105	100	50	M 6	4	50
FH II 12/15 SK	**044917**	–	12	95	90	15	M 8	5	25
FH II 12/15 SK	–	**510931**	12	95	90	15	M 8	6	25
FH II 12/25 SK	**044918**	–	12	105	100	25	M 8	5	25
FH II 12/30 SK	–	**510932**	12	110	105	30	M 8	6	25
FH II 12/50 SK	**044919**	–	12	130	125	50	M 8	5	25
FH II 12/50 SK	–	**510933**	12	130	125	50	M 8	6	25
FH II 15/15 SK	**044920**	–	15	105	100	15	M 10	6	25
FH II 15/15 SK	–	**510934**	15	105	100	15	M 10	6	25
FH II 15/25 SK	**044921**	–	15	115	110	25	M 10	6	25
FH II 15/50 SK	**044922**	–	15	140	135	50	M 10	6	25
FH II 18/15 SK	**044923**	–	18	120	115	15	M 12	8	20
FH II 18/25 SK	**044924**	–	18	130	125	25	M 12	8	20
FH II 18/30 SK	–	**510935**	18	135	130	30	M 12	8	20
FH II 18/50 SK	**044925**	–	18	135	150	30	M 12	8	20

High performance anchor **FH II-H** with cap nut



Item	Zinc-plated steel Art-No.	Drill hole diameter d_0 (mm)	Min. drill hole depth for through fixing h_2 (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Thread M	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz							
FH II 10/10 H	**503139**	10	65	70	10	M 6	13	50
FH II 10/25 H	**503140**	10	80	90	25	M 6	13	50
FH II 10/50 H	**503141**	10	105	115	50	M 6	13	50
FH II 12/10 H	**044905**	12	90	100	10	M 8	17	50
FH II 12/25 H	**044906**	12	105	115	25	M 8	17	50
FH II 12/50 H	**044907**	12	130	140	50	M 8	17	25
FH II 15/10 H	**044908**	15	100	115	10	M 10	17	25
FH II 15/25 H	**044909**	15	115	130	25	M 10	17	25
FH II 15/50 H	**044910**	15	140	155	50	M 10	17	25
FH II 18/25 H	**044915**	18	130	145	25	M 12	19	20
FH II 18/50 H	**044916**	18	155	170	50	M 12	19	20

High performance anchor **FH II-B** with hexagon nut and threaded bolt



Item	Zinc-plated steel Art-No.	Drill hole diameter d_0 (mm)	Min. drill hole depth for through fixing h_2 (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Thread M	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz							
FH II 10/10 B	**503142**	10	65	70	10	M 6	10	50
FH II 10/25 B	**503143**	10	80	85	25	M 6	10	50
FH II 10/50 B	**503144**	10	105	110	50	M 6	10	50
FH II 12/10 B	**048773**	12	90	95	10	M 8	13	50
FH II 12/25 B	**048774**	12	105	110	25	M 8	13	50
FH II 12/50 B	**048775**	12	130	135	50	M 8	13	25
FH II 12/100 B	**046832**	12	180	185	100	M 8	13	25
FH II 15/10 B	**048776**	15	100	110	10	M 10	17	25
FH II 15/25 B	**048777**	15	115	125	25	M 10	17	25
FH II 15/50 B	**048778**	15	140	150	50	M 10	17	25
FH II 15/100 B	**046835**	15	190	200	100	M 10	17	20
FH II 18/25 B	**048779**	18	130	140	25	M 12	19	20
FH II 18/50 B	**048780**	18	155	165	50	M 12	19	20
FH II 18/100 B	**046841**	18	205	215	100	M 12	19	10
FH II 24/25 B	**048886**	24	150	167	25	M 16	24	10
FH II 24/50 B	**048887**	24	175	192	50	M 16	24	10
FH II 24/100 B	**046842**	24	225	242	100	M 16	24	5
FH II 28/30 B	**047547**	28	185	299	30	M 20	30	4
FH II 28/60 B	**047548**	28	215	229	60	M 20	30	4
FH II 28/100 B	**506630** [1]	28	255	271	100	M 20	30	4
FH II 32/30 B	**047549**	32	210	231	30	M 24	36	4
FH II 32/60 B	**047550**	32	240	261	60	M 24	36	4

LOADS

High performance anchor FH II-B, FH II-S, FH II-H and FH II-SK
zinc plated steel / stainless steel
Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25)[2) 3) 11)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load[1)] N_{perm}[4)] (kN)	Permissible shear load[1)] V_{perm}[4)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FH II 10	gvz	40	3.6	4.3	5.04	6.02
	A4					
FH II 12	gvz	60	5.7	15.4[10)] / 15.9	7.98	21.56/22.26
	A4					
FH II 15	gvz	70	7.6	20.1	10.64	28.14
	A4					
FH II 18	gvz	80	11.9	24.5	16.66	34.3
	A4					
FH II 24	gvz	100	17.1	34.3	23.94	48.02
	A4					
FH II 28	gvz	125	24.0	47.9	33.6	67.06
FH II 32	gvz	150	31.5	63.0	44.1	88.2

For the design the complete assessment ETA-07/0025 has to be considered.[6)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025.
2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
3) Drill method Hammer drilling resp. hollow drilling.
4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.
5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
6) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).
7) Only valid for FH II-S A4.
8) Only valid for FH II-B.
9) Only valid for FH II-S, -SK and -H.
10) Only valid for FH II-B and -H.
11) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.
12) Only valid for FH II-S A4 and -SK A4.

LOADS

High performance anchor FH II-B, FH II-S, FH II-H and FH II-SK
zinc plated steel / stainless steel
Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25)[1) 2)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load[1)] N_{perm}[3)] (kN)	Permissible shear load[1)] V_{perm}[3)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FH II 10	gvz	40	6.1	6.1	8.54	8.54
	A4					
FH II 12	gvz	60	11.2	15.4[8)] / 18.9[9)]	15.68	21.56 / 26.46
	A4		9.5	16.0	13.3	22.4
FH II 15	gvz	70	14.1	23.4[8)] / 28.2[9)]	19.74	32.76 / 39.48
	A4			11.4[10)] / 24.6 [5)]		15.96 / 34/44
FH II 18	gvz	80	17.2	34.4	24.08	48.16
	A4					
FH II 24	gvz	100	24.0	48.1	33.6	67.34
	A4					
FH II 28	gvz	125	33.6	67.2	47.04	94.08
FH II 32	gvz	150	44.2	88.4	61/88	123.76

For the design the complete assessment ETA-07/0025 has to be considered.

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_L =1.4 are considered. As a single anchor count e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025.
2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible and drill method Hammer drilling resp. hollow drilling.
3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.
4) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
5) Only valid for FH II-S A4.
6) Only valid for FH II-B.
7) Only valid for FH II-S, -SK and -H.
8) Only valid for FH II-B and -H.
9) Only valid for FH II-S, -SK.
10) Only valid for FH II-SK A4.
11) Only valid for FH II-S A4 and -SK A4.

The intelligent internally threaded anchor with easy mounting for fixings in cracked concrete

Stadium Chair leg fixing

APPROVALS

ETA 07/0025

Fire resistance classification R 120
Anchor types see test report

ADVANTAGES

- The functional principle of the FH II-I enables fast, deformation controlled expansion with a hexagon wrench, thus ensuring top installation comfort.
- The visual setting control with a predefined gap **"U"** between the anchor and the concrete surface allows a compliant approved setting process without a torque wrench.
- The metric internal thread allows for the use of standard screws and threaded rods for perfect adaptation in line with the attachment.
- He FH II-I enables surface flush removal and the reuse of the undamaged fixing point, thus offering optimum flexibility.
- Furthermore, the FH II-I offers all of the benefits of the FH II.
- The material of the steel is 8.8 grade in zinc plated version.

BUILDING MATERIALS

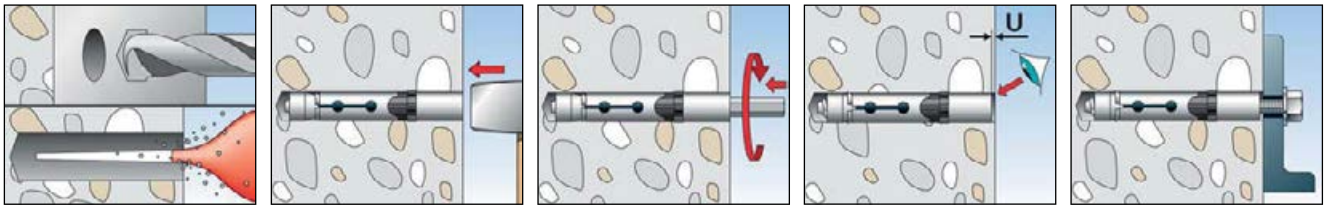
Approved for:
- Concrete C20/25toC50/60
- Cracked and non-cracked

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel

INSTALLATION



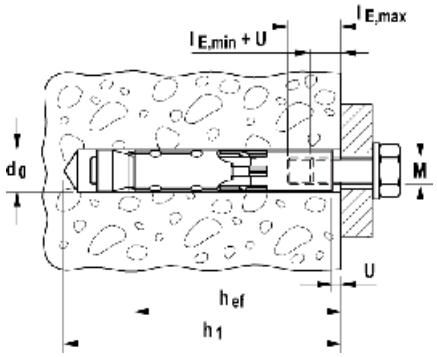
Anchor type		FH II 12 M6 I	FH II 12 M8 I	FH II 15 M10	FH II 18 M12
Diameter of thread	M (mm)	6	8	10	12
Nominal drill hole diameter	d_0 (mm)	12	12	15	15
Drill depth	h_1 (mm)	85	85	95	95
Effective anchorage depth	h_{ef} (mm)	60	60	70	70
Clearance-hole in fixture to be attached	d_f (mm)	7	9	12	14
Required installation torque of the anchor [1]	T_{inst} (mm)	15	15	25	25
Maximum installation torque on the fixture	T_{max} (mm)	3	8	15	20
Required gap after torquing	u (mm)	3-5			
Minimum thickness of concrete member	h_{min} (mm)	125	125	150	150
Non-cracked concrete [2]					
Minimum spacing	s_{min} (mm)	60	60	70	70
For required edge distances	for c (mm)	100	100	100	100
Minimum edge distances	c_{min} (mm)	60	60	70	70
For required spacing	for c (mm)	100	100	140	140
Cracked concrete					
Minimum spacing	s_{min} (mm)	50	50	60	60
For required edge distances	for c (mm)	80	80	120	120
Minimum edge distances	c_{min} (mm)	50	50	60	60
For required spacing	for c (mm)	80	80	120	120

(1) Only one of both requirements has to be fullfilled.

(2) Intermediate values by linear interpolation.

TECHNICAL DATA

High performance anchor **FH II-I**



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Drill hole diameter d_o (mm)	Min. drill hole depth for pre-position installation h_1 (mm)	Anchor length l (mm)	Thread M	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,max}$ (mm)	Sales unit (pcs)
	gvz	A4							
FH II 12/M6 I	**520358**	**520360**	12	85	77.5	M 6	11 + U	25	25
FH II 12/M8 I	**520359**	**520361**	12	85	77.5	M 8	13 + U	25	25
FH II 15/M10 I	**519014**	**519018**	15	95	90	M 10	10 + U	25	25
FH II 15/M12 I	**519015**	**519019**	15	95	90	M 12	12 + U	25	20

ACCESSORIES

Setting tool **FH II-I**

Item	Art-No.	Matching anchor type	Sales unit [pcs]
Setting tool FH II-I M6-M10	**532780**	FH II 12/M6 I, FH II 15/M 10 I	10
Setting tool FH II-I M8-M12	**532781**	FH II 12/M8 I, FH II 15/M 12 I	10

LOADS

High performance anchor with internal thread FH II-I
zinc plated steel / stainless steel
Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25)[2) 3) 6)]

Item	Screw material resp.screw surface	Effective anchorage depth h_{ef} (mm)	Permissible tension load[3)] N_{perm}[4)] (kN)	Permissible shear load[3)] V_{perm}[4)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FH II 12/ M 6 I	5.8	60	4.3	2.9	6.02	4.06
	8.8			4.6		6.44
	A4 - 70			3.2		4.48
FH II 12/ M 8 I	5.8	60	4.3	5.1	6.02	7.14
	8.8			8.0		11.2
	A4 - 70			6.0		8.4
FH II 15/ M 10 I	5.8	70	5.7	8.6	7.98	12.04
	8.8			13.1		18.34
	A4 - 70			9.2		12.88
FH II 15/ M 12 I	5.8	70	5.7	12.0	7.98	16.8
	8.8			13.7		19.18
	A4 - 70					

For the design the complete assessment ETA-07/0025 has to be considered.[5)]

[1)] The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·h_{ef} and an edge distance c ≥ 1,5·h_{ef}. Accurate data see ETA-07/0025..

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method Hammer drilling resp. hollow drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

[5)] The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[6)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at w_k ~ 0.3mm begrenzt.

LOADS

High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Design & permissible loads of single anchor in non-cracked concrete (concrete compression zone) of strength class C20/25 (~B25)[2)]

Item	Screw material resp.screw surface	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [4)] (kN)	Permissible shear load V_{perm} [4)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FH II 12/ M 6 I	5.8	60	4.8	2.9	6.72	4.06
	8.8		7.6	4.6	10.64	6.44
	A4 - 70		5.3	3.2	7.42	4.48
FH II 12/ M 8 I	5.8	60	9.0	5.1	12.6	7.14
	8.8		9.5	8.0	13.3	11.2
	A4 - 70			6.0		8.4
FH II 15/ M 10 I	5.8	70	13.8	8.6	19.32	12.04
	8.8		14.1	13.1	19.74	18.34
	A4 - 70			9.2		12.88
FH II 15/ M 12 I	5.8	70	14.1	12.0	19.74	16.8
	8.8			13.7		19.18
	A4 - 70					

For the design the complete assessment ETA-07/0025 has to be considered.[5)]

[1)] The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025..

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method Hammer drilling resp. hollow drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

[5)] The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The efficient fixing for flexible use in non-cracked concrete

Column bases

APPROVALS

ETA 07/0211

Fire resistance classification R 120
Anchor types see test report

ADVANTAGES

- The standard anchorage depth achieves the maximum load-bearing capacities. Thus fewer fixing points and smaller anchor plates are required.
- The reduced anchorage depth reduces the drill hole depth. This minimises the amount of time needed for installation while increasing flexibility.
- The long thread balances component tolerances and allows for stand-off installations, thus increasing flexibility.
- Few hammer blows and minimal torque slippage allow for a noticeably simpler installation.
- The drive-in pin protects the thread from damage, and thus ensures a faster installation and dismantling of the attachment.

BUILDING MATERIALS

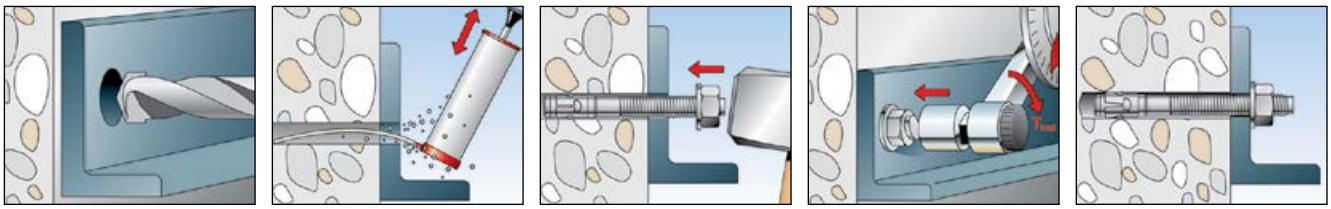
Approved for:
- Concrete C20/25 to C50/60
- Non-cracked

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised

INSTALLATION

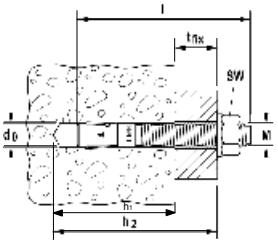


Anchor Type			FBN II M 6		FBN II M 8		FBN II M 10		FBN II M 12		FBN II M 16		FBN II M 20	
			gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	A4
drill hole diameter		do (mm)	6		8		10		12		16		20	
hef,min		(mm)	–		30		40		50		65		80	
Minimum member thickness[1]		(mm)	–		100		100		100		120		160	
hef,max		(mm)	30		40		50		65		80		105	
Minimum member thickness[1]		(mm)	100		100		100		120		160		200	
Torque moment		Tinst (Nm)	4.0		15.0	10.0	30.0	20.0	50.0	35.0	100.0	80.0	200.0	150.0
Non-cracked Concrete	Min. spacing	Smin[2] (mm)	40	40	40	50[5]/40[6]	50	50[5]/70[6]	70	70	90	90[5]/120[6]	120	140[5]/120[6]
	Min. edge distance	Cmin[2] (mm)	40	40	40	45	80[3]/50[4]	80[3]/55[4]	100[3]/70[4]	100[3]/70[4]	120[3]/90[4]	120[3]/80[4]	120	120

(1)According to approval the minimum member thickness ($h_{min} \geq 2 \times h_{ef}$) can be reduced under specific conditions.
(2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness (hmin 2 x hef). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according to approval.
(3) Min. edge distance for $h_{ef,min}$.
(4) Min. edge distance for $h_{ef,max}$.
(5) Min. spacing for $h_{ef,min}$.
(6) Min. spacing for $h_{ef,max}$.

TECHNICAL DATA

Bolt anchor **FBN II**



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Hot-dip galvanised steel Art-No.	Letter code marking	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Drill hole depth for pre-position fixing Stand/Red. h_1 (mm)	Drill hole depth for through fixing h_2 (mm)	Max. usable length hef stand/hef,red t_{fix} (mm)	Thread Ø length (mm)	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz	A4	C									
FBN II 6/5	**505526**	–	–	A	6	50	40	45	5/–	M 6 x 12	10	100
FBN II 6/10	**505527**	**505532**	–	B	6	55	40	50	10/–	M 6 x 17	10	100
FBN II 6/30	**505528**	**505535**	–	F	6	75	40	70	30/–	M 6 x 35	10	100
FBN II 8/5	**040662**	–	–	A	8	66	56/46	61	5/15	M 8 x 34	13	50
FBN II 8/10	**040664**	**507555**	–	B	8	71	56/46	66	10/20	M 8 x 39	13	50
FBN II 8/10	–	–	**507575**	B	8	71	56/46	66	10/20	M 8 x 39	13	50
FBN II 8/20	**040669**	–	–	D	8	81	56/46	76	20/30	M 8 x 49	13	50
FBN II 8/30	**040700**	**507556**	–	F	8	91	56/46	86	30/40	M 8 x 59	13	50
FBN II 8/30	–	–	**507576**	F	8	91	56/46	86	30/40	M 8 x 59	13	50
FBN II 8/50	**040771**	**507557**	–	K	8	111	56/46	106	50/60	M 8 x 79	13	50
FBN II 8/50	–	–	**507577**	K	8	111	56/46	106	50/60	M 8 x 79	13	50
FBN II 8/70	**040777**	–	–	M	8	131	56/46	126	70/80	M 8 x 99	13	20
FBN II 8/70	–	–	**507578**	M	8	131	56/46	126	70/80	M 8 x 99	13	20
FBN II 8/100	**040783**	–	–	P	8	161	56/46	156	100/110	M 8 x 129	13	20
FBN II 10/10	**040827**	**507558**	–	B	10	86	68/58	78	10/20	M 10 x 46	17	50
FBN II 10/10	–	–	**507579**	B	10	86	68/58	78	10/20	M 10 x 46	17	50
FBN II 10/20	**040851**	**507559**	–	D	10	96	68/58	88	20/30	M 10 x 56	17	50
FBN II 10/30	**040854**	**507560**	–	F	10	106	68/58	98	30/40	M 10 x 66	17	50
FBN II 10/30	–	–	**507580**	F	10	106	68/58	98	30/40	M 10 x 66	17	50
FBN II 10/50	**040855**	**507561**	–	K	10	126	68/58	118	50/60	M 10 x 86	17	20
FBN II 10/50	–	–	**507582**	K	10	126	68/58	118	50/60	M 10 x 86	17	20
FBN II 10/70	**040931**	–	–	M	10	146	68/58	138	70/80	M 10 x 106	17	20
FBN II 10/100	**040943**	**507562**	–	P	10	176	68/58	168	100/110	M 10 x 136	17	20
FBN II 10/100	–	–	**507583**	P	10	176	68/58	168	100/110	M 10 x 136	17	20
FBN II 10/140	**040944**	–	–	S	10	216	68/58	208	140/150	M 10 x 176	17	20
FBN II 10/160	**040945**	–	–	T	10	236	68/58	228	160/170	M 10 x 196	17	20
FBN II 12/10	**040950**	**507563**	–	B	12	106	85/70	95	10/25	M 12 x 59	19	20
FBN II 12/10	–	–	**507589**	B	12	106	85/70	95	10/25	M 12 x 59	19	20
FBN II 12/20	**044558**	**507564**	–	D	12	116	85/70	105	20/35	M 12 x 69	19	20
FBN II 12/30	**045263**	**507565**	–	F	12	126	85/70	115	30/45	M 12 x 79	19	20
FBN II 12/30	–	–	**507591**	F	12	126	85/70	115	30/45	M 12 x 79	19	20
FBN II 12/50	**045264**	**507566**	–	K	12	146	85/70	135	50/65	M 12 x 99	19	20
FBN II 12/50	–	–	**507592**	K	12	146	85/70	135	50/65	M 12 x 99	19	20
FBN II 12/80	**045265**	–	–	N	12	176	85/70	165	80/95	M 12 x 129	19	20
FBN II 12/100	**045266**	**507567**	–	P	12	196	85/70	185	100/115	M 12 x 149	19	20
FBN II 12/100	–	–	**507596**	P	12	196	85/70	185	100/115	M 12 x 149	19	20
FBN II 12/120	**045267**	–	–	R	12	216	85/70	205	120/135	M 12 x 169	19	20
FBN II 12/140	**045268**	–	–	S	12	236	85/70	225	140/155	M 12 x 189	19	20
FBN II 12/160	**045269**	–	–	T	12	256	85/70	245	160/175	M 12 x 189	19	20
FBN II 16/10	–	**507568**	–	B	16	130	104/89	114	10/25	M 16 x 74	24	10
FBN II 16/25	**045564**	**507569**	–	E	16	145	104/89	129	25/40	M 16 x 89	24	10
FBN II 16/25	–	–	**507598**	E	16	145	104/89	129	25/40	M 16 x 89	24	10
FBN II 16/50	**045565**	**507570**	–	K	16	170	104/89	154	50/65	M 16 x 105	24	10
FBN II 16/50	**045565**	**507570**	–	K	16	170	104/89	154	50/65	M 16 x 105	24	10
FBN II 16/50	–	–	**507553**	K	16	170	104/89	154	50/65	M 16 x 105	24	10
FBN II 16/80	**045566**	–	–	N	16	200	104/89	184	80/95	M 16 x 144	24	10
FBN II 16/100	**045567**	–	–	P	16	220	104/89	204	100/115	M 16 x 164	24	10
FBN II 16/100	–	–	**507554**	P	16	220	104/89	204	100/115	M 16 x 164	24	10
FBN II 16/140	**045568**	–	–	S	16	260	104/89	244	140/155	M 16 x 184	24	10
FBN II 16/160	**045569**	–	–	T	16	280	104/89	264	160/175	M 16 x 184	24	10
FBN II 16/200	**045570**	–	–	V	16	320	104/89	304	200/215	M 16 x 100	24	10
FBN II 20/30	**045573**	**507571**	–	F	20	187	135/110	165	30/55	M 20 x 90	30	10
FBN II 20/30	–	–	**508015**	F	20	187	135/110	165	30/55	M 20 x 90	30	50
FBN II 20/60	**045574**	**507572**	–	L	20	217	135/110	195	60/85	M 20 x 90	30	10
FBN II 20/80	**045575**	–	–	N	20	237	135/110	215	80/105	M 20 x 90	30	10
FBN II 20/120	**045576**	–	–	R	20	277	135/110	255	120/145	M 20 x 90	30	10
FBN II 8/5 K	**040806**	**508007**	**508012**	A	8	56	46	51	–/5	M 8 x 24	13	50
FBN II 8/10 K	**040807**	–	–	B	8	61	46	56	–/10	M 8 x 29	13	50
FBN II 10/5 K	**040946**	**508010**	**508013**	A	10	71	58	63	–/5	M 10 x 31	17	50
FBN II 10/10 K	**040947**	–	–	B	10	76	58	68	–/10	M 10 x 36	17	50
FBN II 12/5 K	**045272**	**508011**	**508014**	A	12	86	70	75	–/5	M 12 x 39	19	20
FBN II 12/10 K	**045273**	–	–	B	12	91	70	80	–/10	M 12 x 44	19	20
FBN II 12/30 K	**045274**	–	–	F	12	111	70	100	–/30	M 12 x 64	19	20

Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Hot-dip galvanised steel Art-No.	Letter code marking	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Drill hole depth for pre-position fixing Stand/Red. h_1 (mm)	Drill hole depth for through fixing h_2 (mm)	Max. usable length hef stand/hef,red t_{fix} (mm)	Thread Ø length (mm)	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz	A4	C									
FBN II 16/15 K	045571	508745	507597	C	16	120	89	104	–/15	M 16 x 64	24	10
FBN II 16/25 K	045572	–	507597	E	16	130	89	114	–/25	M 16 x 74	24	10
FBN II 20/10 K	045577	–	–	B	20	142	110	120	–/10	M 20 x 50	30	10

LOADS

Bolt anchor FBN II zinc plated steel / stainless steel A4 / hot dip galvanised steel

Design & Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25)[2) 3)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [6)] (kN)	Permissible shear load V_{perm} [6)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FBN II 8 [5)]	galv.	30 [4)]	2.9	7.1	4.06	9.94
	A4					
	fvz					
FBN II 8	galv.	40	6.1	7.6	8.54	10.64
	A4			7.3		10.22
FBN II 8 [5)]	fvz	40	6.1	7.6	8.54	10.64
FBN II 10 [5)]	galv.	40	6.1	12.0	8.54	16.80
	A4			11.6		16.24
	fvz			12.0		16.80
FBN II 10	galv.	50	8.5	12.0	11.90	16.80
	A4			11.6		16.24
FBN II 10 [5)]	fvz	50	8.5	12.0	11.90	16.80
FBN II 12 [5)]	galv.	50	8.5	17.9	11.90	25.06
	A4			15.7		21.98
	fvz			17.9		25.06
FBN II 12	galv.	65	12.6	17.9	17.64	25.06
	A4			15.7		21.98
FBN II 12 [5)]	fvz	65	12.6	17.9	17.64	25.06
FBN II 16 [5)]	galv.	65	12.6	29.0	17.64	40.60
	A4					
	fvz					
FBN II 16	galv.	80	17.2	31.5	24.08	44.10
	A4			29.1		40.74
FBN II 16 [5)]	fvz	80	17.2	31.5	24.08	44.10
FBN II 20 [5)]	galv.	80	17.2	38.3	24.08	53.62
	A4			39.6		55.44
	fvz			38.3		53.62
FBN II 20	galv.	105	25.9	38.3	36.26	53.62
	A4			49.1		68.74
FBN II 20 [5)]	fvz	105	25.9	38.3	36.26	53.62

For the design the complete assessment ETA-07/0211 has to be considered. [8)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0211 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-07/0211.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Hammer drilling resp. hollow drilling

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

5) Hollow drilling is not permitted for this size.

6) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

8) The given loads refer to the European Technical Assessment ETA-07/0211, issue date 19/05/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

Cost efficient fixing with ETA approval for non-cracked concrete

Steel Structures

APPROVALS

ETA 13/0772

EDELSTAHL Rostfrei INOX STAINLESS STEEL

ADVANTAGES

- The standard anchorage depth achieves the maximum load-bearing capacities. Thus fewer fixing points and smaller anchor plates are required.
- Few hammer blows and minimal torque slippage, installation is a simple process.
- The drive-in pin protects the thread from damage, and thus ensures a faster installation and dismantling of the attachment.

BUILDING MATERIALS

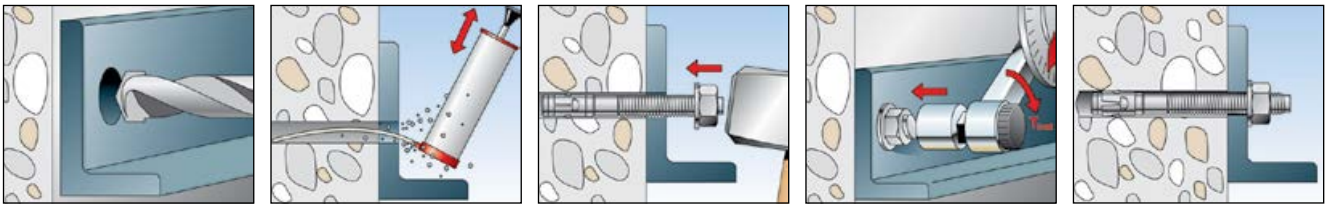
Approved for:
- Concrete C20/25 to C50/60
- Non-cracked

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel

INSTALLATION

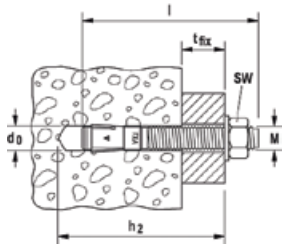


Anchor Type			FXA M 8		FXA M 10		FXA M 12		FXA M 16	
			gvz	A4	gvz	A4	gvz	A4	gvz	A4
drill hole diameter		do (mm)	8		10		12		16	
Effective anchorage depth		hef (mm)	40		50		65		80	
Minimum member thickness[1]		hmin (mm)	100		100		120		160	
Torque moment		Tinst (Nm)	15	10	30	20	50	35	100	80
Non-cracked Concrete	Min. spacing	Smin[2] (mm)	40	40	70	70	70	70	120	120
	Min. edge distance	Cmin[2] (mm)	45	45	55	55	70	70	90	90

(1)According approval the minimum member thickness ($h_{min} \geq 2 \times h_{ef}$) can be reduced under specific conditions.
(2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness (hmin 2 x hef). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.

TECHNICAL DATA

Through bolt **FXA**



Item	Zinc-plated steel Art-No. gvz	Stainless steel Art-No. A4	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Min. drill hole depth for through fixings h_2 (mm)	Max. usable length t_{fix} (mm)	Thread Ø length (mm)	Width across nut ⬡SW (mm)	Sales unit (pcs)
FXA 8/5	**523129**	–	8	66	61	5	M 8 x 34	13	50
FXA 8/10	**523131**	**523270**	8	71	66	10	M 8 x 39	13	50
FXA 8/30	**523132**	**523271**	8	91	86	30	M 8 x 59	13	50
FXA 8/50	**523222**	**523272**	8	111	106	50	M 8 x 79	13	50
FXA 10/10	**523133**	**523273**	10	86	78	10	M 10 x 46	17	50
FXA 10/20	**523134**	**523274**	10	96	88	20	M 10 x 56	17	50
FXA 10/30	**523223**	–	10	106	98	30	M 10 x 66	17	50
FXA 10/50	**523135**	**523276**	10	126	118	50	M 10 x 86	17	20
FXA 10/100	**523136**	–	10	176	168	100	M 10 x 136	17	20
FXA 12/10	**523137**	**523277**	12	106	95	10	M 12 x 59	19	20
FXA 12/20	**523138**	**523278**	12	116	105	20	M 12 x 69	19	20
FXA 12/30	**523139**	–	12	126	115	30	M 12 x 79	19	20
FXA 12/50	**523141**	**523304**	12	146	135	50	M 12 x 99	19	20
FXA 12/100	**523142**	–	12	196	185	100	M 12 x 149	19	20
FXA 16/25	**523143**	**523305**	16	145	129	25	M 16 x 89	24	10
FXA 16/50	**523144**	**523306**	16	170	154	50	M 16 x 105	24	10
FXA 16/100	**523145**	–	16	220	204	100	M 16 x 164	24	10

LOADS

Bolt anchor FXA zinc plated steel / stainless steel A4

Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [4)] (kN)	Permissible shear load V_{perm} [4)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FXA 8	**galv.**	40	4.8	6.1	6.72	8.54
	A4					
FXA 10	**galv.**	50	6.3	8.5	8.82	11.9
	A4					
FXA 12	**galv.**	65	9.9	14.3	13.86	20.02
	A4					
FXA 16	**galv.**	80	16.7	26.9	23.38	37.66
	A4					

For the design the complete assessment ETA-13/0772 has to be considered. [6)]

1) The partial safety factors for material resistance as regulated in the ETA-13/0772 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-13/0772.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-13/0772, issue date 27/09/2017. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The fixing system with the highest safety in cracked concrete

Installations in tunnels

APPROVALS

ETA 98/0004

Fire resistance classification R 120

Anchor types see test report

Zulassung

Shock-tested

ADVANTAGES

- The special ZYKON undercut technology allows for a positive fit connection and ensures maximum safety, even in large cracks.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, and thereby enables flexible use.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The drill hole geometry allows for a very low setting energy, thus reducing the energy required for installation.
- The ideal interaction of threaded bolts and sleeve with FZA-D allows for a high shear load and therefore fewer fixing points.
- The material of the steel is 8.8 grade in zinc plated version.

BUILDING MATERIALS

Approved for:

- Concrete C20/25toC50/60
- Cracked and non-cracked

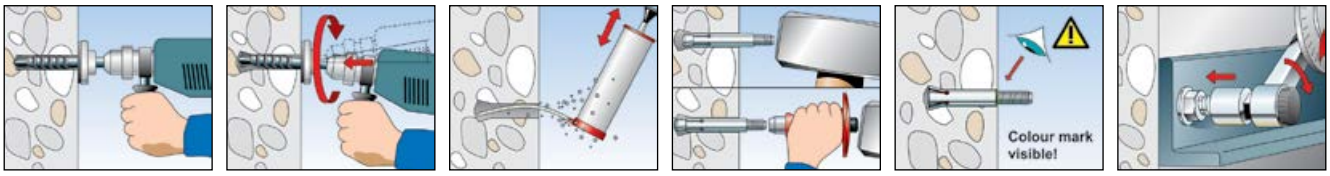
Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel
- High corrosion-resistant steel

INSTALLATION



ANCHOR INSTALLATION DATA

Zykon Bolt anchor FZA

Anchor type		FZA 10x40 M 6	FZA 12x40 M 8	FZA 14x40 M 10	FZA 12x50 M 8	FZA 14x60 M 10	FZA 18x80 M 12	FZA 22x100 M 16	FZA 22x125 M 16
Diameter of thread		M 6	M 8	M 10	M 8	M 10	M 12	M 16	M 16
Nominal drill hole diameter	d_o (mm)	10	12	14	12	14	18	22	22
Drill depth	h_o (mm)	43	43	43	54	63	83	103	127
Effective anchorage depth	h_{ef} (mm)	40	40	40	50	60	80	100	125
Clearance-hole in fixture to be attached	d_f (mm)	≤ 7	≤ 9	≤ 12	≤ 9	≤ 12	≤ 14	≤ 18	≤ 18
Wrench size	SW (mm)	10	13	17	13	17	19	24	24
Required torque	T_{inst} (Nm)	8.5	20	40	20	40	60	100	100
Minimum thickness of concrete member	h_{min} (mm)	100	100	100	110	130	160	200	250
Minimum spacing	S_{min} (mm)	40	40	70	50	60	80	100	125
Minimum edge distances	C_{min} (mm)	35	40	70	45	55	70	100	125

Zykon Through anchor FZA-D

Anchor type		FZA 12x50 M 8 D	FZA 12x60 M 8 D	FZA 12x80 M 8 D	FZA 14x80 M 10 D	FZA 14x100 M 10 D	FZA 18x100 M 12 D	FZA 18x130 M 12 D	FZA 22x125 M 16 D
Diameter of thread		M 8	M 8	M 8	M 10	M 10	M 12	M 12	M 16
Nominal drill hole diameter	d_o (mm)	12	12	12	14	14	18	18	22
Drill depth	h_o (mm)	43	53	53	63	63	83	83	105
Effective anchorage depth	h_{ef} (mm)	40	50	50	60	60	80	80	100
Clearance-hole in fixture to be attached	d_f (mm)	≤ 14	≤ 14	≤ 14	≤ 16	≤ 16	≤ 20	≤ 20	≤ 24
Wrench size	SW (mm)	13	13	13	17	17	19	19	24
Required torque	T_{inst} (Nm)	20	20	20	40	40	60	60	100
Minimum thickness of concrete member	h_{min} (mm)	100	110	110	130	130	160	160	200
Minimum spacing	S_{min} (mm)	40	50	50	60	60	80	80	100
Minimum edge distances	C_{min} (mm)	35	45	45	55	55	70	70	100

ZYKON Internally-threaded anchor FZA-I

Anchor type		FZA 12x40 M 6 I gvz / A4	FZA 12x50 M 6 I gvz / A4	FZA 14x60 M 8 I gvz / A4	FZA 18x80 M 10 I gvz / A4	FZA 22x100 M 12 I gvz / A4	FZA 22x125 M 12 I gvz / A4
Diameter of thread		M 6	M 6	M 8	M 10	M 12	M 12
Nominal drill hole diameter	d_o (mm)	12	12	14	18	22	22
Drill depth	h_o (mm)	43	53	63	83	103	127
Effective anchorage depth	h_{ef} (mm)	40	50	60	80	100	125
Clearance-hole in fixture to be attached	d_f (mm)	≤ 7	≤ 7	≤ 9	≤ 12	≤ 14	≤ 14
Screw penetration depth	e_{min}/e_{max} (mm)	8 /13	8 /13	11 /17	13 /21	15 /25	15 /25
Required torque	T_{inst} (Nm)	8.5	8.5	15	30	60	60
Gap	U (mm)	0 - 4.0	0 - 4.0	0 - 4.0	0 - 4.5	0 - 4.5	0 - 4.5
Minimum thickness of concrete member	h_{min} (mm)	100	100	130	160	200	250
Minimum spacing	S_{min} (mm)	40	50	60	80	100	125
Minimum edge distances	C_{min} (mm)	35	45	55	70	10	125

Intermediate values by linear linear interpolation.

ACCESSORIES

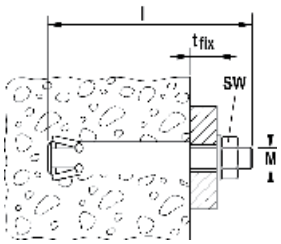
Drilling and setting tools	Item	Art-No.	Suitable for fixing types Materials: zinc plated, passivated steel, stainless steel A4 and high corrosion resistant steel 1.4529 Bolt anchor	Push-through anchor	Internal thread anchor	Shear (pcs)
Drill bit **FZUB**	**FZUB 10 x 40**	**060622**	FZA 10 x 40 M 6	–	–	1
	FZUB 12 x 40	**060623**	FZA 12 x 40 M 8	–	FZA 12 x 40 M 6 I	1
	FZUB 12 x 50	**060627**	FZA 12 x 50 M 8	FZA 12 x 50 M 8 D/10	FZA 12 x 50 M 6 I	1
	FZUB 12 x 60	**060625**	–	FZA 12 x 60 M 8 D/10	–	1
	FZUB 12 x 80	**060626**	–	FZA 12 x 80 M 8 D/30	–	1
	FZUB 14 x 40	**060624**	FZA 14 x 40 M 10	–	–	1
	FZUB 14 x 60	**060628**	FZA 14 x 60 M 10	–	FZA 14 x 60 M 8 I	1
	FZUB 14 x 80	**060629**	–	FZA 14 x 80 M 10 D/20	–	1
	FZUB 14 x 100	**060630**	–	FZA 14 X 100 M 10 D/40	–	1
	FZUB 18 x 80	**060634**	FZA 18 x 80 M 12	–	FZA 18 x 80 M 10 I	1
	FZUB 18 x 100	**060632**	–	FZA 18 x 100 M 12 D/20	–	1
	FZUB 18 x 130	**060633**	–	FZA 18 x 130 M 12 D/50	–	1
	FZUB 22 x 100	**060636**	FZA 22 x 100 M 16	–	FZA 22 x 100 M 12 I	1
	FZUB 22 x 125	**060638**	FZA 22 x 125 M16	FZA 22 x 125 M 16 D/25	FZA 22 x 125 M 12 I	1
Setting tool **FZE plus**	**FZE 10 plus** [1]	**044637**	FZA 10 x ... M 6	–	–	1
	FZE 12 plus	**044638**	FZA 12 x ... M 8	FZA 12 x ... M 8 D	FZA 12 x ... M 6 I	1
	FZE 14 plus	**044639**	FZA 14 x ... M 10	FZA 14 x ... M 10 D	FZA 14 x ... M 8 I	1
	FZE 18 plus	**044640**	FZA 18 x ... M 12	FZA 18 x ... M 12 D	FZA 18 x ... M 10 I	1
	FZE 22 plus	**044641**	FZA 22 x ... M 16	FZA 22 x ... M 16 D	FZA 22 x ... M 12 I	1

(1) Without centering pin.

TECHNICAL DATA

ZYKON Bolt anchor **FZA**

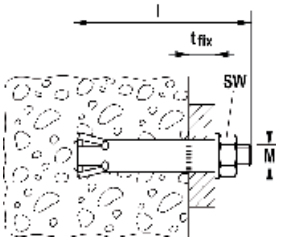
Zykon anchor for fixing step irons **FZA ST A4**



Item	Zinc-plated steel Art-No. gvz	Stainless steel Art-No. A4	Highly corrosion resistant steel Art-No. C	Required drill bit FZUB	Required setting tool FZE plus	Bolt length l (mm)	Max. fixture thickness t_{fix} (mm)	Thread M	Width across nut ⬡SW (mm)	Sales unit (pcs)
FZA 10 x 40 M6/10	**060712**	**060772**	**096214** [1]	10 x 40	FZE 10 plus	60	10	M 6	10	25
FZA 10 x 40 M6/35	**–**	**–**	**096361** [1]	10 x 40	FZE 10 plus	85	35	M 6	10	25
FZA 12 x 40 M 8/15	**060715**	**060775**	**096215** [1]	12 x 40	FZE 12 plus	69	15	M 8	13	25
FZA 12 x 50 M 8/15	**060716**	**060776**	**096227** [1]	12 x 50	FZE 12 plus	79	15	M 8	13	20
FZA 12 x 50 M 8/50	**–**	**060774**	**096362** [1]	12 x 50	FZE 12 plus	114	50	M 8	13	20
FZA 14 x 40 M10/25	**060718**	**–**	**–**	14 x 40	FZE 14 plus	79	25	M 10	17	25
FZA 14 x 40 M10/25	**–**	**060778**	**096228** [1]	14 x 40	FZE 14 plus	79	25	M 10	17	20
FZA 14 x 60 M10/25	**060719**	**060779**	**096216** [1]	14 x 60	FZE 14 plus	102	25	M 10	17	10
FZA 14 x 60 M10/50	**–**	**060766**	**096358** [1]	14 x 60	FZE 14 plus	126	50	M 10	17	10
FZA 18 x 80 M12/25	**060721**	**060781**	**096315** [1]	18 x 80	FZE 18 plus	126	25	M 12	19	10
FZA 18 x 80 M12/55	**–**	**060767**	**096359** [1]	18 x 80	FZE 18 plus	156	55	M 12	19	10
FZA 22 x 100 M16/25	**–**	**–**	**033800** [1]	22 x 100	FZE 22 plus	151	25	M 16	24	10
FZA 22 x 100 M16/30	**–**	**–**	**024523** [1]	22 x 100	FZE 22 plus	156	30	M 16	24	10
FZA 22 x 100 M16/60	**060724**	**060782**	**096364** [1]	22 x 100	FZE 22 plus	184	60	M 16	24	10
FZA 22 x 125 M16/60	**060725**	**060768**	**096360** [1]	22 x 125	FZE 22 plus	209	60	M 16	24	6
FZA 14 x 40 ST A4	**–**	**060686** [2]	**–**	14 x 40	FZE 14 plus	-	30	M 10	16	20
FZA 14 x 60 ST A4	**–**	**060687** [2]	**–**	14 x 60	FZE 14 plus	-	30	M 10	16	20

(1) Delivery time on request. (2) According to DIN 1211GS/1212GS.

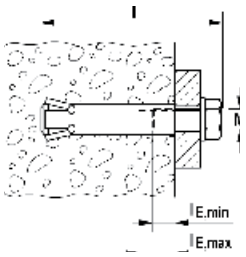
ZYKON Through anchor **FZA-D**



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Required drill bit FZUB	Required setting tool FZE plus	Bolt length l (mm)	Max. fixture thickness t_{fix} (mm)	Thread M	Width across nut ⬡SW (mm)	Sales unit (pcs)
	gvz	A4	C							
FZA 12 x 50 M 8 D/10	**060652**	**060664**	–	12 x 50	FZE 12 plus	69	10	M 8	13	25
FZA 12 x 50 M 8 D/10	–	–	**096319** [1]	12 x 50	FZE 12 plus	69	10	M 8	13	20
FZA 12 x 60 M 8 D/10	**060653**	**060665**	–	12 x 60	FZE 12 plus	79	10	M 8	13	25
FZA 12 x 80 M 8 D/30	**060654**	**060666**	–	12 x 80	FZE 12 plus	99	30	M 8	13	25
FZA 12 x 80 M 8 D/30	–	–	**096354** [1]	12 x 80	FZE 12 plus	99	30	M 8	13	20
FZA 14 x 80 M10 D/20	**060657**	**060669**	**096355** [1]	12 x 80	FZE 14 plus	102	20	M 10	17	10
FZA 14 x 100 M 8 D/30	**060658**	**060670**	–	14 x 100	FZE 14 plus	126	40	M 10	17	10
FZA 18 x 100 M12 D/20	**060684**	**060672**	**096356** [1]	18 x 100	FZE 18 plus	126	20	M 12	19	10
FZA 18 x 130 M12 D/50	**060685**	**060673**	**096357** [1]	18 x 130	FZE 18 plus	156	50	M 12	19	10
FZA 22 x 125 M16 D/25	**060663**	**060675**	–	22 x 125	FZE 22 plus	156	25	M 16	24	10

(1) Delivery time on request.

ZYKON Internally-threaded anchor **FZA-I**



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Required drill bit FZUB	Required setting tool FZE plus	Internal thread M	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,max}$ (mm)	Sales unit (pcs)
	gvz	A4						
FZA 12 x 40 M 6 I	**060758**	**060783**	12 x 40	FZE 12 plus	M 6	8	13	25
FZA 12 x 50 M 6 I	–	**060784**	12 x 50	FZE 12 plus	M 6	8	13	25
FZA 14 x 60 M 8 I	**060760**	**060786**	14 x 60	FZE 14 plus	M 8	11	17	20
FZA 18 x 80 M 10 I	**060761**	**060787**	18 x 80	FZE 18 plus	M 10	13	21	10
FZA 22 x 100 M 12 I	**060763**	**060788**	22 x 100	FZE 22 plus	M 12	15	25	10
FZA 22 x 125 M 12 I	**060769**	**060770**	22 x 125	FZE 22 plus	M 12	15	25	10

LOADS

Zykon Bolt anchor FZA

zinc plated steel / stainless steel A4 / high corrosion resistant steel C / hot dip galvanised steel

Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 7)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [4)] (kN)	Permissible shear load V_{perm} [4)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FZA 10x40 M6	galv.	40	2.4	4.6	3.36	6.44
	A4			3.2		4.48
	C			4.0		5.60
FZA 12x40 M8	galv.	40	2.4	5.6	3.36	7.84
	A4					
	C					
	fvz					
FZA 12x50 M8	galv.	50	4.3	7.9	6.02	11.06
	A4			5.9		8.26
	C			7.3		10.22
	fvz			7.9		11.06
FZA 14x40 M10	galv.	40	2.4	5.6	3.36	7.84
	A4					
	C					
	fvz					
FZA 14x60 M10	galv.	60	5.7	13.3	7.98	18.62
	A4			9.3		13.02
	C			11.6		16.24
	fvz			13.3		18.62
FZA 18x80 M12	galv.	80	9.5	19.3	13.3	27.02
	A4			13.5		18.90
	C			16.9		23.66
	fvz			19.3		27.02
FZA 22x100 M16	galv.	100	17.1	34.3	23.94	48.02
	A4			25.2		35.28
	C			31.4		43.96
	fvz			34.3		48.02
FZA 22x125 M16	galv.	125	19.0	35.9	26.60	50.26
	A4			25.2		35.28
	C			31.4		43.96
FZA 12X50 M8 D	galv.	40	2.4	5.6	3.36	7.84
	A4					
	C					
FZA 12X60 M8 D	galv.	50	4.3	7.9	6.02	11.06
	A4			5.9		8.26
	C			7.3		10.22
FZA 14X80 M10 D	galv.	60	5.7	13.3	7.98	18.62
	A4			9.3		13.02
	C			11.6		16.24
FZA 18X100 M12 D	galv.	80	9.5	19.3	13.30	27.02
	A4			13.5		18.9
	C			16.9		23.66
FZA 22X125 M16 D	galv.	100	17.1	34.3	23.94	48.02
	A4			25.2		35.28
FZA 12x40 M6 I	8.8	40	2.4	4.1	3.36	5.74
	A4-70			3.2		4.48
FZA 12X50 M6 I	A4-70	50	4.3	3.2	6.02	4.48
FZA 14x60 M8 I	8.8	60	5.7	5.4	7.98	7.56
	A4-70			4.3		6.02
FZA 18x80 M10 I	8.8	80	9.5	5.6	13.30	7.84
	A4-70		9.0	5.4	12.60	7.56
FZA 22x100 M12 I	8.8	100	17.1	13.2	23.94	18.48
	A4-70			12.7		17.78
FZA 22x125 M12 I	8.8	125	19.0	13.2	26.60	18.48
	A4-70			12.7		17.78

For the design the complete assessment ETA-98/0004 has to be considered. [6)]

1) The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-98/0004.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

7) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at wk ~ 0.3mm.

LOADS

Zykon Bolt anchor FZA

zinc plated steel / stainless steel A4 / high corrosion resistant steel C / hot dip galvanised steel

Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25)[2) 3)]

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [4)] (kN)	Permissible tension load N_{perm} [4)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FZA 10x40 M6	galv.	40	3.6	4.6	5.04	6.44
	A4			3.2		4.48
	C			4.0		5.6
FZA 12x40 M8	galv.	40	3.6	7.9	5.04	11.06
	A4			5.9		8.26
	C			7.3		10.22
	fvz			7.9		11.06
FZA 12x50 M8	galv.	50	5.7	8.4	7.98	11.76
	A4			5.9		8.26
	C			7.3		10.22
	fvz			8.4		11.76
FZA 14x40 M10	galv.	40	3.6	7.9	5.04	11.06
	A4					
	C					
	fvz					
FZA 14x60 M10	galv.	60	9.5	13.3	13.30	18.62
	A4			9.3		13.02
	C			11.6		16.24
	fvz			13.3		18.62
FZA 18x80 M12	galv.	80	14.3	19.3	20.02	27.02
	A4			13.5		18.9
	C			16.9		23.66
	fvz			19.3		27.02
FZA 22x100 M16	galv.	100	19.0	35.9	26.60	50.26
	A4			25.2		35.28
	C			31.4		43.96
	fvz			35.9		50.26
FZA 22x125 M16	galv.	125	19.0	35.9	26.60	50.26
	A4			25.2		35.28
	C			31.4		43.96
FZA 12X50 M8 D	galv.	40	3.7	7.9	5.04	11.06
	A4			5.9		8.26
	C			7.3		10.22
FZA 12X60 M8 D	galv.	50	5.7	8.4	7.98	11.76
	A4			5.9		8.26
	C			7.3		10.22
FZA 14X80 M10 D	galv.	60	9.5	13.3	13.30	18.62
	A4			9.3		13.02
	C			11.6		16.24
FZA 18X100 M12 D	galv.	80	14.3	19.3	20.02	27.02
	A4			13.5		18.9
	C			16.9		23.66
FZA 22X125 M16 D	galv.	100	19.0	35.9	26.60	50.26
	A4			25.2		35.28
FZA 12x40 M6 I	8.8	40	3.6	4.1	5.04	5.74
	A4-70			3.2		4.48
FZA 12X50 M6 I	A4-70	50	5.4	3.2	7.56	4.48
FZA 14x60 M8 I	8.8	60	9.3	5.4	13.02	7.56
	A4-70		7.1	4.3	9.94	6.02
FZA 18x80 M10 I	8.8	80	9.6	5.6	13.44	7.84
	A4-70		9.0	5.4	12.60	7.56
FZA 22x100 M12 I	8.8	100	19.0	13.2	26.60	18.48
	A4-70			12.7		17.78
FZA 22x125 M12 I	8.8	125	19.0	13.2	26.60	18.48
	A4-70			12.7		17.78

For the design the complete assessment ETA-98/0004 has to be considered.

1) The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of γL = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-98/0004.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

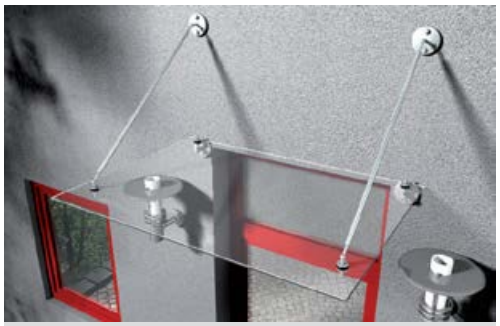
3) Drill method hammer drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The internally threaded anchor with low anchoring depth for individual fixings in cracked concrete



Canopies

APPROVALS

ETA 06/271

Fire resistance classification R 120
Anchor types see test report

M8 - M20

FM APPROVED from M10

ADVANTAGES

- The combination of hammerset and ZYKON undercut anchor allows for individual fixings in cracked concrete.
- The special ZYKON undercut technology reduces the energy required for installation.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, thereby enabling flexible use.

BUILDING MATERIALS

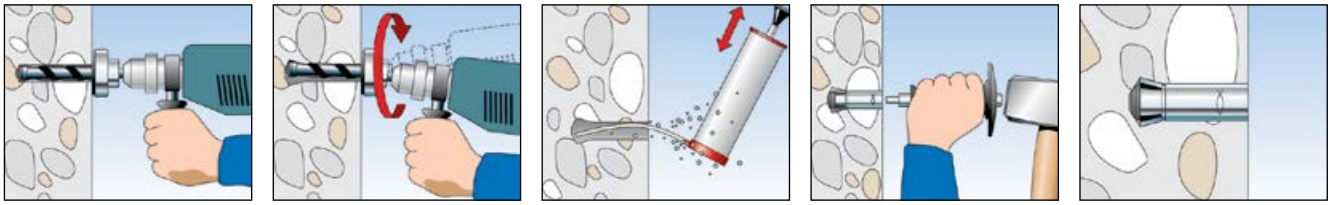
Approved for:
- Concrete C20/25 to C50/60
- Cracked and non-cracked

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

INSTALLATION

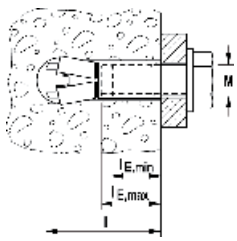


Anchor size			FZEA II 10 x 40 M8			FZEA II 12 x 40 M10			FZEA II 14 x 40 M12		
			gvz	A4	C	gvz	A4	C	gvz	A4	C
Effective anchorage depth		h_{ef} (mm)	40	40	40	40	40	40	40	40	40
Minimum member thickness		h_{min} (mm)	80	80	80	80	80	80	80	80	80
Installation Torque		T_{inst} (Nm)	10.0	15.0	15.0	15.0	20	20.0	20	40.0	40.0
cracked Concrete	Min. spacing	S_{min}[1] (mm)	40	40	40	45	45	45	50	50	50
	Min. edge distance	C_{min}[1] (mm)	40	40	40	45	45	45	50	50	50
Non-cracked Concrete	Min. spacing	S_{min}[1] (mm)	40	40	40	45	45	45	50	50	50
	Min. edge distance	C_{min}[1] (mm)	40	40	40	45	45	45	50	50	50

(1) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

TECHNICAL DATA

Zykon-Hammerset anchor **FZEA II**



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Required drill bit FZUB	Required setting tool FZED plus	Length l (mm)	Internal thread M	Max. bolt penetration $l_{E,max}$ (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Sales unit (pcs)
	gvz	A4	C							
FZEA II 10 x 40 M 8	047303	047306	047309	10 x 40	FZED 10 plus	43	M 8	17	11	100
FZEA II 12 x 40	047304	047307	047310	12 x 40	FZED 12 plus	43	M 10	19	13	100
M10FZEA II 14 x 40 M12	047305	047308	047311	14 x 40	FZED 14 plus	43	M 12	21	15	50

ACCESSORIES

Drill bit **FZUB**

Setting tool **FZED plus**

Item	Art-No.	Fits anchor	Sales unit (pcs)
FZED 10 plus	**044642**	FZEA II 10 x 40	1
FZED 12 plus	**044643**	FZEA II 12 x 40	1
FZED 14 plus	**044644**	FZEA II 14 x 40	1
FZUB 10 x 40	**060622**	FZEA II 10 x 40	1
FZUB 12 x 40	**060623**	FZEA II 12 x 40	1
FZUB 14 x 40	**060624**	FZEA II 14 x 40	1

LOADS

ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25)[5)]

Item	Screw material resp.screw surface	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [2)] (kN)	Permissible shear load V_{perm} [2)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FZEA II 10 x 40 M8	5.6	40	1.6	3.7	2.24	5.18
	5.8			4.7		6.58
	8.8					
	A4 - 70			5.6		7.84
	C - 70					
FZEA II 12 x 40 M10	5.6	40	3.0	5.6	4.2	7.84
	5.8					
	8.8					
	A4 - 70					
	C - 70					
FZEA II 14 x 40 M12	5.6	40	3.6	5.6	5.04	7.84
	5.8					
	8.8					
	A4 - 70					
	C - 70					

ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25)

Item	Screw material resp.screw surface	Effective anchorage depth h_{ef} (mm)	Permissible tension load N_{perm} [2)] (kN)	Permissible shear load V_{perm} [2)] (kN)	Design Tension load Nd (kN)	Design Shear Load Vd (kN)
FZEA II 10 x 40 M8	5.6	40	3.6	3.7	5.04	5.18
	5.8			4.7		6.58
	8.8					
	A4 - 70			5.7		7.98
	C - 70					
FZEA II 12 x 40 M10	5.6	40	3.6	6.1	5.04	8.54
	5.8			7.8		10.92
	8.8					
	A4 - 70			7.9		11.06
	C - 70					
FZEA II 14 x 40 M12	5.6	40	3.6	7.9	5.04	11.06
	5.8					
	8.8					
	A4 - 70					
	C - 70					

For the design the complete assessment ETA-06/0271 has to be considered.

1) The partial safety factors for material resistance as regulated in the ETA-06/0271 as well as a partial safety factor for load actions of $\gamma F = 1.4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-06/0271. For higher concrete strength classes up to C50/60 higher permissible loads may be possible. Drill methodhammer drilling.

2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-06/0271.

3) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

4) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-06/0271.

5) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.

The internally threaded anchor with rim for simple hammerset installation

Pipe line support

APPROVALS

ETA 07/0142

Fire resistance classification R 120
Anchor types see test report

ETA 007/0135

FM APPROVED from M10

M8 - M20

ADVANTAGES

- The embossed rim prevents the anchor sleeve from slipping, thus ensuring a trouble-free hammerset installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.
- The EMS machine setting tool allows for effortless installation, particularly in the case of series installations.
- The embossing that is applied when expanding with the EHS Plus setting tool offers a simple control of the anchoring and provides increased safety.
- Fixing point at hef 25 mm prevents anchor from falling out of the drill hole before being expanded.

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked,for the multiple fixings of non-load-bearing systems
- Approved for pre-stressed hollow core slabs
- Concrete C20/25 to C50/60
- Non-cracked

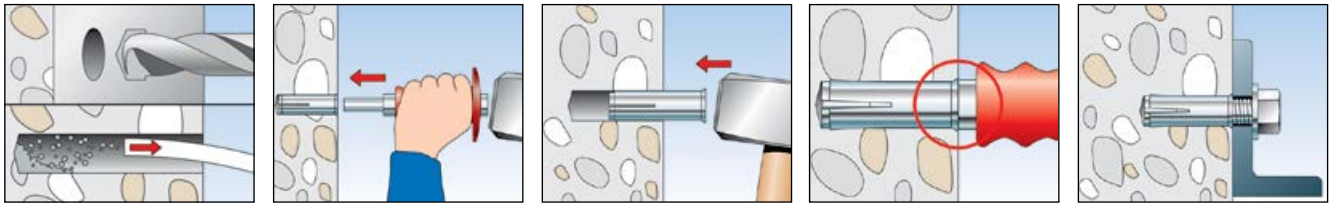
Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

VERSION

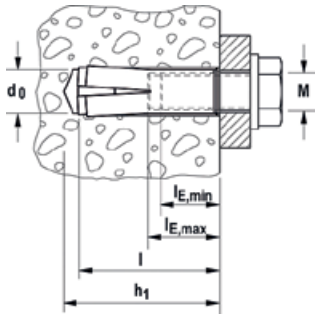
- Zinc-plated steel
- Stainless steel

INSTALLATION



TECHNICAL DATA

Hammerset anchor **EA II & EA II - Short**



Item	Zinc-plated stell gvz Art-No.	Stainless stell A4 Art-No.	Drill hole diameter do (mm)	Anchor length l (mm)	Internal Thread M (mm)	Sales unit (pcs.)
EA II M 6 x 25	**532230**	–	8	25	M 6	100
EA II M 6 x 30	**048264**	**48410**	8	30	M 6	100
EA II M 8 x 25	**532231**	–	10	25	M 8	100
EA II M 8 x 30	**048284**	**48411**	10	30	M 8	100
EA II M 8 x 40	**048323**	**48412**	10	40	M 8	100
EA II M 10 x 25	**532232**	–	12	25	M 10	50
EA II M 10 x 30	**048332**	–	12	30	M 10	50
EA II M 10 x 40	**048339**	**48414**	12	40	M 10	50

Item	Zinc-plated stell gvz Art-No.	Stainless stell A4 Art-No.	Drill hole diameter d_o (mm)	Anchor length l (mm)	Internal Thread M (mm)	Sales unit (pcs.)
EA II M 12 x 25	**532233**	–	15	25	M 12	50
EA II M 12 x 50	**048406**	**48415**	25	50	M 12	50
EA II M 16 x 65	**048408**	**48416**	20	65	M 16	25
EA II M 20 x 80	**048409**	**48417**	25	80	M 20	25
EA II M 12 D	**048407**	–	16	50	M 12	25

Associated setting tool for manual installation (EAW H plus), for installation with hammer drill (EA II-S-SDS)

ACCESSORIES

Setting tool **EHS H Plus** hand impact protection for your safety and embossing tool.

Setting tool **EA-ST**

Machine setting tool **EMS**

Item	Art-No.	Match	Sales unit (pcs)
EHS H 6 Plus	**044630**	EA II M 6 x 25 , EA II M 6 x 30	1
EHS H 8 Plus	**044631**	EA II M 8 x 25 , EA II M 8 x 30	1
EHS H 8 x 40 Plus	**044632**	EA II M 8 x 40	1
EHS H 10 Plus	**044633**	EA II M 10 x 40	1
EHS H 10 x 30 Plus	**048487**	EA II M 10 x 25 , EA II M 10 x 30	1
EHS H 12 Plus	**044634**	EA II M 12, EA II M 12 D	1
EHS H 16 Plus	**044635**	EA II M 16	1
EHS H 20 Plus	**044636**	EA II M 20	1
EHS H 12x25 Plus	**532568**	EA II M 12 x 25	1
EA-ST 12	**504585**	EA II M 6	1
EMS M 6 x 25/30	**048065**	EA II M 6 x 25, EA II M 6 x 30	1
EMS M 8 x 25/30	**048066**	EA II M 8 x 25, EA II M 8 x 30	1
EMS M 8 x 40	**048067**	EA II M 8 x 40	1
EMS M 10 x 25/30	**048068**	EA II M 10 x 25, EA II M 10 x 30	1
EMS M 10 x 40	**048070**	EA II M 10 x 40	1
EMS M 12 x 25	**532569**	EA II M 12 x 25	1
EMS M 12 x 50	**048071**	EA II M 12 x 50 D / EA II M 12 x 50 / EA M 12 x 50 N D	1
EMS M 16 x 65	**048072**	EA II M 16 x 65	1
EMS M 20 x 80	**048073**	EA II M 20 x 80	1

Stop drill EBB

Item	Art-No.	Tool holder	Drill hole diameter d_o (mm)	Drill hole depth h_o (mm)	Match
EBB 8 x 25	**532607**	SDS plus	8	27	EA II M 6 x 25
EBB 10 x 25	**532608**	SDS plus	10	27	EA II M 8 x 25
EBB 12 x 25	**532609**	SDS plus	12	27	EA II M 10 x 25
EBB 15 x 25	**532610**	SDS plus	15	27	EA II M 12 x 25

LOADS

Hammerset anchor EA II (screw property class 4.6)

Design [2] and Recommended loads [1] for a single anchor for multiple use for non structural applications in pre stressed **hollow core slabs**[4] For the design the complete approval ETA-07/0142 has to be considered.

Item	Bottom flange thickness (mm)	Effective anchorage depth h_{ef} (mm)	Maximum torque moment $T_{inst,max}$ (Nm)	Recommended load F_{rec} (kN)	Design load Fd (kN)	Min. spacing S_{min} [3] (mm)	Min. edge distance C_{min} [3] (mm)
EA II M 6 x 25	≥35[5]	25	4.0	1.0	1.4	200	150
EA II M 8 x 25			8.0	1.4	1.9		
EA II M 10 x 25			15.0	1.9	2.7		
EA II M 12 x 25			35.0	1.9	2.7		

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of $\gamma_L = 1{,}4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1{,}5 \times h_{ef}$. Accurate data see approval.

(2)The required safety factor for material is considered.

(3) Minimum possible axial spacings resp.edge distance while reducing the permissible load.

(4) Concrete strength class C30/37 up to C50/60

(5) The anchor may be used in a flange thicknessed dh = 30 mm with the same charecteristic resistance, but the drill hole must not cut a cavity.

Hammerset anchor EA II (screw property class 8.8/A4 - 70)

Design [2] and Recommended loads [1] for a single anchor in non-cracked concrete C20/25[4].
For the design the complete approval ETA - 07/0135 has to be considered.

				Non-cracked concrete					
Item	Effective anchorage depth h_{ef} (mm)	Minimum member thickness h_{min} (mm)	Maximum torque moment T_{inst} (Nm)	Recommended tensile load N_{rec} (kN)	Design tensile load N_d (kN)	Recommended shear load V_{rec} (kN)	Design shear load V_d (kN)	Min. spacing s_{min} [3] (mm)	Min. edge distance c_{min} [3] (mm)
EA II M 6 x 30[5]	30	120	4.0	4.0	5.6	3.9	5.6	65	115
EA II M 8 x 30[5]	30	120	8.0	4.0	5.6	4.9	6.8	70	115
EA II M 8 x 40	40	120	8.0	6.1	8.5	4.9	6.8	70	115
EA II M 10 x 30[5]	30	120	15.0	4.0	5.6	6.2	8.6	85	140
EA II M 10 x 40	40	120	15.0	6.1	8.5	6.2	8.6	95	150
EA II M 12 x 50	50	120	35.0	8.5	11.9	11.3	15.8	145	200
EA II M 12D x 50	50	120	35.0	8.5	11.9	15.4	22.1	145	200
EA II M 16 x 65	65	160	60.0	12.6	17.6	18.3	25.6	180	240
EA II M 20 x 80	80	200	120.0	17.2	24.0	29.1	40.7	190	280
EA II M 6 x 30 A4[5]	30	120	4.0	4.0	5.6	3.2	4.4	65	115
EA II M 8 x 30 A4[5]	30	120	8.0	4.0	5.6	5.6	7.8	70	115
EA II M 8 x 40 A4	40	120	8.0	6.1	8.5	5.6	7.8	70	115
EA II M 10 x 30 A4[5]	30	120	15.0	4.0	5.6	6.9	9.6	85	140
EA II M 10 x 40 A4	40	120	15.0	6.1	8.5	7.1	9.9	95	150
EA II M 12 x 50 A4	50	120	35.0	8.5	11.9	12.9	18.6	145	200
EA II M 12 D x 50 A4	50	120	35.0	8.5	11.9	13.5	18.9	145	200
EA II M 16 x 65 A4	65	160	60.0	12.6	17.9	21.1	29.5	180	240
EA II M 20 x 80 A4	80	200	120.0	17.2	24.8	33.7	47.1	190	280

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of $\gamma_L = 1{,}4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1{,}5 \times h_{ef}$. Accurate data see approval.

(2)The required safety factor for material is considered.

(3) Minimum possible axial spacings resp.edge distance while reducing the permissible load.

(4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(5) Only for multiple use of non structural applications.

Hammerset anchor EA II (screw/threaded rod property class ≥ 4.6)

Design [2] and Recommended loads [1] for a single for multiple use for non-structural applications in cracked concrete (redundant fixing) C20/25 up to C50/60[5]. For the design the complete approval ETA - 07/0142 has to be considered.

				Cracked Non-cracked concrete			
Item	Effective anchorage depth h_{ef} (mm)	Minimum member thickness h_{min}[4] (mm)	Maximum torque moment $T_{inst,max}$ (Nm)	Recommended load N_{rec} (kN)	Design load N_d (kN)	Min. spacing s_{min} [3] (mm)	Min. edge distance c_{min} [3] (mm)
EA II M 6 x 25	25	80	4.0	1.0	1.4	30	60
EA II M 6 x 30	30	80	4.0	1.2	1.7	65	115
EA II M 8 x 25	25	80	8.0	1.4	1.9	50	100
EA II M 8 x 30	30	80	8.0	2.0	2.8	70	115
EA II M 8 x 40	40	80	8.0	2.0	2.8	70	115
EA II M 10 x 25	25	80	15.0	1.9	2.7	60	100
EA II M 10 x 30	30	80	15.0	2.0	2.8	85	140
EA II M 10 x 40	40	80	15.0	3.0	4.2	95	150
EA II M 12 x 25	25	80	35.0	1.9	2.7	100	110
EA II M 12 x 50	50	100	35.0	4.3	6.0	145	200

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of $\gamma_L = 1{,}4$ are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1{,}5 \times h_{ef}$. Accurate data see approval.

(2)The required safety factor for material is considered.

(3) Minimum possible axial spacings resp. edge distances while increasing the member thickness. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

(4) Minimum possible member thickness while increasing the axial spacings and edge distances. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

(5) Further data for concrete C12/15 see approval.

Drop-in anchor in zinc-plated steel for suitable hammerset installation.

EA-N

Pipe line support

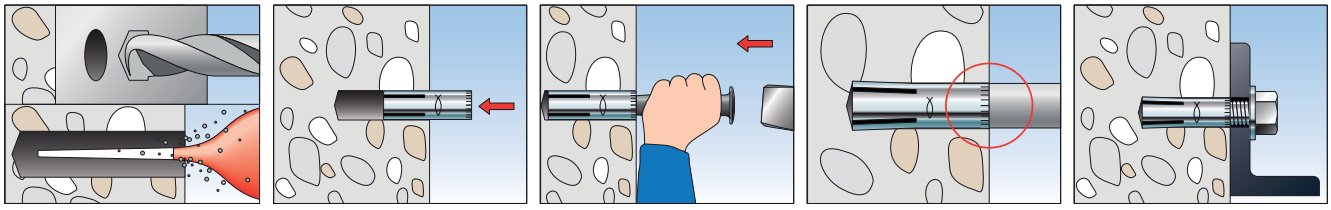
ADVANTAGES

- Hammerset anchor with internal thread for prepositioned installation.
- When the expander plug is driven in with EAW H setting tool, the anchor sleeve is expanded and is tensioned against the hole wall.
- Suitable for all screws or studs with metric threads.
- Low anchoring depth reduces drilling time and thus allows cost-efficient installation.
- Surface-flush anchor allows the attached item to be removed and refitted several times.
- Internal thread diameter 6 to 20 mm.
- Zinc-plated steel version for indoor use.
- EA - ND hammerset anchor is suitable for diamond drilling machines and diamond saws.

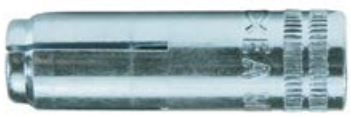
Suitable for:

- Non-cracked concrete ≥ C 20/25.
- Natural stone with dense structure.
- Anchoring light ceiling linings and suspended ceilings.

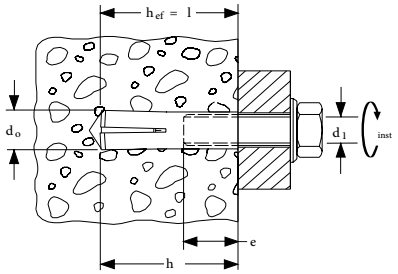
INSTALLATION



TECHNICAL DATA



EA-N



Item	Art-No.	Thread d1 M (mm)	Nominal drill-Ø do (mm)	Min. drill depth at prior insertion mode ho (mm)	Min. anchorage depth hef (mm)	Min. bolt penetration e1 (mm)	Max. bolt penetration e2 (mm)	Total length l (mm)	Installation torque Tinst (Nm)	Related setting tool (mm)	Qty. per box (pcs)
Zinc-plated steel											
EA M6 N	**531582**	6	8	25	25	6	12	25	4	504573 EA-ST 6	100
EA M8 N	**531583**	8	10	30	30	8	13	30	8	504576 EA-ST 8	100
EA M10 N	**531584**	10	12	40	40	10	17	40	15	504584 EA-ST 10	50
EA M12 N	**531586**	12	15	50	50	12	22	50	35	504585 EA-ST 12	50
EA M12 N D	**500872**	12	16	50	50	12	22	50	35	504585 EA-ST 12	50
EA M16 N	**531587**	16	20	65	65	16	27	65	60	504586 EA-ST 16	25
EA M20 N	**531588**	20	25	80	80	20	34	80	120	504587 EA-ST 20	25

ACCESSORIES

Setting tool **EAW H Plus** with hand impact protection for your safety and embossing tool

Setting tool **EA-ST**

Item	Art-No.	Fits	Sales unit (pcs)
EAW H 6 Plus	**044630**	EA M6 N	1
EAW H 8 x 30 Plus	**044631**	EA M8 N	1
EAW H 8 x 40 Plus	**044632**	EA M8 N	1
EAW H 10 Plus	**044633**	EA M10 N	1
EAW H 10 x 30 plus	**048487**	EA M10 N	1
EAW H 12 Plus	**044634**	EA M12 N	1
EAW H 16 Plus	**044635**	EA M16 N	1
EAW H 20 Plus	**044636**	EA M20 N	1
EA-ST 12	**504585**	EA M6 N	1

LOADS

Design [2] and recommended [1] resistance for a single anchor.

Anchor size			EA M6 N	EA M8 N	EA M10 N	EA M12 N	EA M16 N	EA M20 N
Recommended Tensile Load C20/25	Nrec	(kN)	1.5	2.1	3.3	4.8	7	9.5
Design Tensile Load C20/25	Nrec	(kN)	2.1	2.9	4.6	6.7	9.8	13.3
Maximum Torque	Tinst	(Nm)	4	8	15	35	60	120

(1)The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γL= 1,4 are considered.
(2)The required safety factor for material is considered.

Design [1] and Recommended Resitance [2] For Multiple Fixings with Large Spacing & Edge Distances

Anchor size			EA M6 N	EA M8 N	EA M10 N	EA M12 N
Recommended Tensile Load C20/25	Nrec	(kN)	0.5	0.5	0.5	0.5
Design Tensile Load C20/25	Nrec	(kN)	0.7	0.7	0.7	0.7
Maximum Torque	Tinst	(Nm)	4	8	15	35

(1)The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γL= 1,4 are considered.
(2)The required safety factor for material is considered.

The brass expansion fixing with metric thread

Handrails

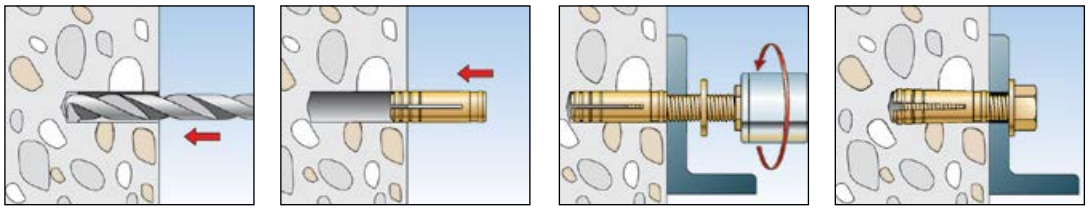
ADVANTAGES

- The compact design of the brass fixing reduces the amount of drilling required, helping to ensure a fast installation.
- The special surface structure of the MS prevents the fixing from rotating in the drill hole. This provides increased installation safety.
- The internal thread allows for the use of standard metric screws or threaded rods, and for surface flush removal and reuse of the fixing point. This provides great flexibility.

BUILDING MATERIALS

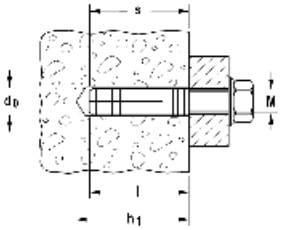
- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

INSTALLATION



TECHNICAL DATA

Brass fixing **MS** for metric screws



Item	Art-No.	Drill hole diameter h_o (mm)	Min.drill hole depth h_1 (mm)	Anchor length l (mm)	Internal thread M	Bolt penetration S (mm)	Sales unit (pcs)
MS 4 x 15	**026424**	5	20	15	M 4	15	100
MS 5 x 18	**026425**	6	25	18	M 5	18	100
MS 6 x 22	**078660**	8	27	22	M 6	22	100
MS 8 x 28	**078981**	10	35	28	M 8	28	50
MS 10 x 32	**078661**	12	39	32	M 10	32	25
MS 12 x 37	**078662**	15	46	37	M 12	37	10
MS 16 x 43	**078663**	20	50	43	M 16	43	10

LOADS

Recommended resistance for a single anchor.
The given loads are valid for machine screws with the specified thread size.

Anchor size		**MS 4 x 15**	**MS 5 x 18**	**MS 6 x 22**	**MS 8 x 28**	**MS 10 x 32**	**MS 12 x 37**	**MS 4 x 15**
Thread size	(M)	M4	M5	M6	M8	M10	M12	M16
Recommended loads in the respective base material base F Frec2)								
Concrete ≥ C 20/25	(kN)	0.25	0.40	0.65	1.10	1.60	2.20	3.30
Solid brickwork	(kN)	0.20	0.35	0.55	0.90	1.30	1.60	2.30

(1) Required safety factors are considered.

(2) Valid for tensile load, shear load and oblique load under any angle.

The installation-friendly internally threaded anchor for fixings in pre-stressed hollow-core concrete slabs

Cable trays in pre-stressed hollow-core concrete slabs

APPROVALS

Zulassung

Fire resistance classification R 120
Anchor types see test report

from M8

SEISMIC

ADVANTAGES

- The active principle of the anchor means that the FHY can be used in cavities or in solid materials up to 5cm from the tensioning wire. This ensures the highest flexibility and user-friendly installation.
- The embossed edge prevents the anchor sleeve from slipping in the cavity, thus allowing for trouble-free installation.
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.

BUILDING MATERIALS

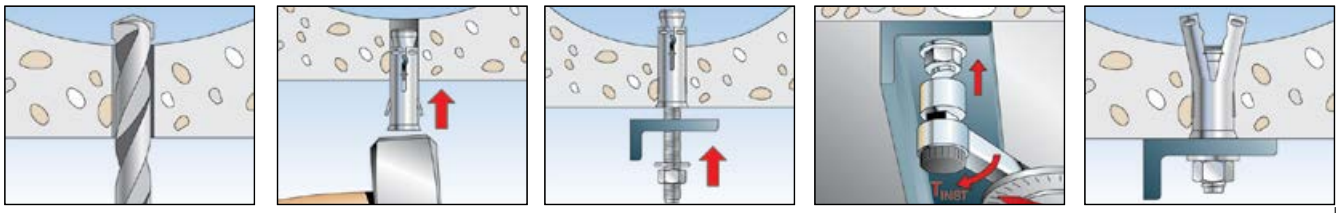
Approved for:

- Pre-stressed hollow-core concrete slabs ≥ C45/55

VERSION

- Zinc-plated steel
- Stainless steel

INSTALLATION

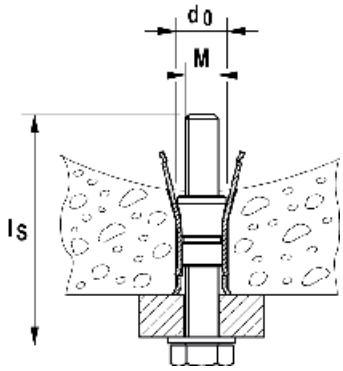


Anchor size			FHY M6				FHY M8				FHY M10				FHY M12			
Zinc-plated - gvz																		
Web thickness	d_u	(mm)	25 - 29	30 - 39	40 - 49	≥50	25 - 29	30 - 39	40 - 49	≥50	25 - 29	30 - 39	40 - 49	≥50	25 - 29	30 - 39	40 - 49	≥50
Min. anchorage depth	h_{ef}	(mm)	30	30	30	30	35	35	35	35	40	40	40	40	40	40	40	40
Torque moment	T_{inst}	(Nm)	10	10	10	10	10	10	10	10	20	20	20	20	30	30	30	30
Critical spacing [1]		(mm)	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Edge distance [2]		(mm)	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Stainless steel - A4																		
Web thickness	d_u	(mm)	25 - 29	30 - 39	40 - 49	≥50	25 - 29	30 - 39	40 - 49	≥50	25 - 29	30 - 39	40 - 49	≥50	–	–	–	–
Min. anchorage depth	h_{ef}	(mm)	30	30	30	30	35	35	35	35	40	40	40	40	–	–	–	–
Torque moment	T_{inst}	(Nm)	10	10	10	10	10	10	10	10	20	20	20	20	–	–	–	–
Critical spacing [1]		(mm)	300	300	300	300	300	300	300	300	300	300	300	300	–	–	–	–
Edge distance [2]		(mm)	150	150	150	150	150	150	150	150	150	150	150	150	–	–	–	–

(1) Minimum spacing is dependent on d_u. (Follow DIBt approval Z-21.1-1711 or IEA to design with min. spacing)
(2) Minimum allowed edge distance can be 100mm. (Follow DIBt approval Z-21.1-1711 or IEA to design with min. spacing)

TECHNICAL DATA

Hollow-ceiling anchor **FHY**, zinc-plated steel



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Thread M	Min drill hole depth h_1 (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Sales unit (pcs)
	gvz	A4*						
FHY M 6	**030138**	**030139**	10	37	M 6	50	37	50
FHY M 8	**030146**	**030147**	12	43	M 8	60	43	25
FHY M10	**030148**	**030151**	16	52	M 10	65	52	20
FHY M12	**545512**	–	18	52	M 12	65	52	25

LOADS

Design [2)] and Recommended [1)] resistance for a single anchor in pre-stressed hollow-core concrete stabs of strength class ≥ B55 resp. C45/55. For the design the compete test document has to be considered.

Item	Anchor size	Web Thickness d_U (mm)	Recommended Tensile Load N_{rec} (kN)	Recommended Shear Load V_{rec} (kN)	Design Tension load N_d (kN)	Design Shear Load V_d (kN)
FHY M6	gvz	25-29	0.7	0.7	1.0	1.0
		30-39	0.9	0.9	1.3	1.3
	A4	40-50	2.0	2.0	2.8	2.8
		≥50	2.0	2.0	2.8	2.8
FHY M8	gvz	25-29	0.7	0.7	1.0	1.0
		30-39	0.9	0.9	1.3	1.3
	A4	40-50	2.0	2.0	2.8	2.8
		≥50	2.0	2.0	2.8	2.8
FHY M10	gvz	25-29	0.7	0.7	1.0	1.0
		30-39	1.2	1.2	1.7	1.7
	A4	40-50	3.0	3.0	4.2	4.2
		≥50	3.0	3.0	4.2	4.2
FHY M12	gvz	25-29	1.1	0.7	1.5	1.5
		30-39	1.8	1.4	2.5	2.5
		40-50	3.6	3.6	5.0	5.0
		≥50	3.6	3.6	5.0	5.0

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of $\gamma_L = 1.4$ are considered.
(2) The required safety factor for material is considered.

The installation-friendly hammerset anchor for multiple fixings

Fire protection boards

APPROVALS

ETA 06/0175

Fire resistance classification R 120
Anchor types see test report

RWS 1350 °C

ZTV 1200 °C

from M8

ADVANTAGES

- The special active principle allows for a simple hammerset installation and therefore, a short processing time.
- The optimised expansion clip ensures hold when placing in the drill hole, and prevents it falling out during overhead installations.
- The massive shaft cross-section guarantees a high load-bearing capacity, thus offering an extremely high level of safety.
- A range of head shapes allows for the fixing of wide-ranging fixtures, and for the ideal adaptation to suit the intended use.

BUILDING MATERIALS

Approved for:

- Concrete C12/15 to C50/60 cracked, for multiple fixings of non-structural applications

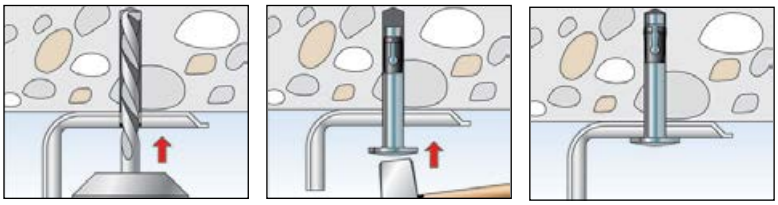
Also suitable for:

- Solid sand-lime brick
- Natural stone with dense structure
- Prestressed hollow-core concrete slabs

VERSION

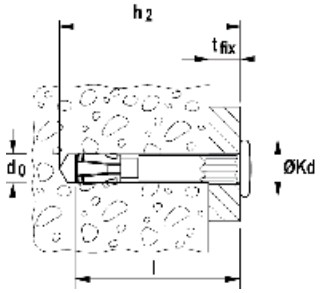
- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

INSTALLATION



TECHNICAL DATA

Nail anchor **FNA II** with nail head



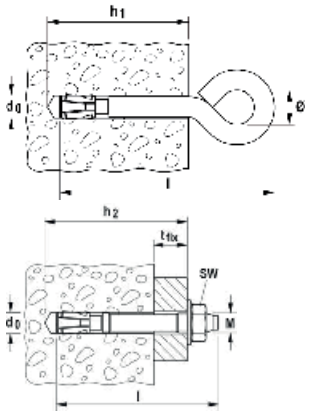
Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Min. drill hole depth for through fixing h_2 (mm)	Max. fixture thickness t_{fix} (mm)	KD head Ø (mm)	Sales unit (pcs)
	gvz	A4	C						
FNA II 6 x 25/5	044121[1)]	–	–	6	35	40	5	13	100
FNA II 6 x 30/5	044115 [1)]	044122	–	6	40	45	5	13	100
FNA II 6 x 30/5	–	–	044124	6	40	45	5	13	25
FNA II 6 x 30/20	–	–	506147	6	55	60	20	13	50
FNA II 6 x 30/30	044116	044123	–	6	65	70	30	13	50
FNA II 6 x 30/30	–	–	044125	6	65	70	30	13	25
FNA II 6 x 30/50	044117	046024	500569	6	85	90	50	13	50
FNA II 6 x 30/75	044118	–	500573[2)]	6	110	115	75	13	50
FNA II 6 x 30/100	044119	–	500574[2)]	6	135	140	100	13	50
FNA II 6 x 30/120	044120	–	500575[2)]	6	155	160	120	13	50

(1) with hexagon below the nail head for anti-rotation lock of hole and wire hangers (for example) and centering for optional setting tool FNA-S
(2) On request.

Nail anchor **FNA II-H** with hook

Nail anchor **FNA II-OE** with eye

Nail anchor **FNA II M6** with thread and flange nut



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Min. drill hole depth h_2 (mm)	Max. fixture thickness t_{fix} (mm)	Inner diamete of the hook/eye (Ø mm)	Thread l	KD head Ø (mm)	Sales unit (pcs)
	gvz	A4	C								
FNA II 6 x 25 H	**044126**	–	–	6	54	35	–	10	M 6	–	50
FNA II 6 x 25 OE	**044127**	–	–	6	54	35	–	10	M 6	–	50
FNA II 6 x 25 M6/5	**044111**	–	–	6	45	40	5		M 6	10	100
FNA II 6 x 30 M6/5	**044109**	–	–	6	50	45	5		M 6	10	100
FNA II 6 x 30 M6/5	–	**044122** [2]	–	6	50	45	5		M 6	10	50
FNA II 6 x 30 M6/5	–	–	**044113** [2]	6	50	45	5		M 6	10	25
FNA II 6 x 30 M6x41	**044110** [1]	–	–	6	41	40	–		M 6	10	100
FNA II 6 x 30 M6/10	**046022**	–	–	6	55	45	10		M 6	10	100
FNA II 6 x 30 M8/5	**044114**	–	–	6	51	45	5		M 8	13	50

(1) With nut ; e.g. for fixing of pipe clamps.

(2) With nut and washer (no flange nut).

LOADS

Nail anchor FNA II

zinc plated steel / stainless steel / high corrosion resistant steel

Design & Highest permissible loads[1] for a single fixing point as part of a multiple fixing of non-structural systems[3] in concrete C20/25 up to C50/60

Item	Material fixing element	Effective anchorage depth h_{ef} (mm)	Maximum torque moment T_{inst} (Nm)	Permissible load F_{perm} [2] (kN)	Design Tensile load Nd (kN)	Required edge distance (with one edge) for Max. tension load c (mm)	Required spacing for Max load s (mm)	Minimum spacings while reducing the load Min. spacing s_{min} (mm)	Min. edge distance c_{min} (mm)
FNA II 6 x 25	gvz	25	–	1.4	1.96	100 for s ≥ 200	100 for s ≥ 200	40	40
FNA II 6 x 30	gvz A4 C	30	–	2.4	3.36				
FNA II 6 x 25 M6	gvz	25	4	1.4	1.96				
FNA II 6 x 30 M6	gvz A4 C	30	4	2.4	3.36				
FNA II 6 x 30 M8	gvz	30	4	2.4	3.36				
FNA II 6 x 25 OE	gvz	25	–	0.7	0.98				

For the design the complete approval ETA - 06/0175 has to be considered.

1) The partial safety factors for material resistance as regulated in the approval as w ell as a partial safety factor for load ac tions of γ_L = 1,4 are considered.
2) Valid for tensile, shear and oblique loads under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
3) Multiple use is defined acc ETAG 001 Part 6 with min. 3 fixing points with min. one anchor per fixing point and a permissible load of 1.4 kN or min. 4 fixing points with min. one anchor an a permissible load of 2.1 kN.

ACCESSORIES

Machine setting tool **FNA S-SDS**

Machine setting tool **FNA S-SBO**
for mounting on the drill bit (drill-Ø 6mm)

Hand tool **FNA S-H**

Item	Art-No.	Print table text	Technical details	Sales unit (pcs)
FNA S-SDS	**061547**	for all FNA II with nail head	The ideal setting tool for the serial installation with SDS-plus adapter for driving in FNA II with nail head using a hammer drill.	1
FNA S-sbo	**061548**	for all FNA II with nail head	For a power saving and fast installation to be placed on the drill.	1
FNA S-H	**095990**	for FNA II with metric thread M6	E.g. for the fixing of installation of mounting rails. Chuck with outer diameter of 15mm for the installation of FNA II M6 by hand.	1

The installation friendly hammerset anchor for multiple fixings

Suspended ceilings

APPROVALS

ETA-17/0736

Fire resistance classification R 120
Anchor types see test report

ADVANTAGES

- The simple active principle allows for a fast hammerset installation without special tools.
- The FDN II can be installed without cleaning of the drill hole as per ETA assessment.
- The two hit zones (first nail head, then expansion pin) ensure correct installation especially in narrow drill holes and also ensure high safety in use.
- The new short version of the FDN II requires less drilling effort and hammer blows, thus saving time and avoid reinforcement strikes.

BUILDING MATERIALS

Approved for:

- Concrete C12/25 to C50/60, cracked, for multiple fixings of non-structural applications

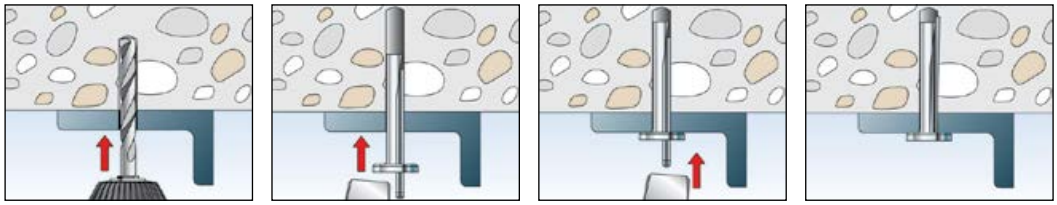
Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

VERSION

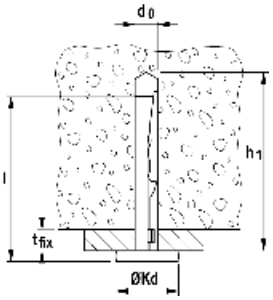
- Zinc-plated steel

INSTALLATION



TECHNICAL DATA

Ceiling nail **FDN II**



Item	Zinc-plated steel Art-No. gvz	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Effective anchorage depth h_{ef} (mm)	Max. fixture thickness t_{fix} (mm)	KD head Ø (mm)	Sales unit (pcs)
FDN II 6/5	**545636**	6	37	32	5	15	100
FDN II 6/35	**545637**	6	67	32	35	15	100
FDN II 6/5 K	**545638**	6	30	25	5	15	100
FDN II 6/35 K	**545639**	6	60	25	35	15	100

LOADS

Design [2] and recommended [1] resistance for a single anchor for multiple fixing [4] for non-structural applications in concrete C20/25 upto C50/60. For the design the complete approval ETA - has to be considered.

				Cracked or Non-cracked concrete			
Item	Effective anchor depth h_{ef}, (mm)	Minimum member thickness h_{min} (mm)	Torque moment T_{inst} (Nm)	Design load F_d [3] (kN)	Permissible load F_{rec} [3] (kN)	Min. spacing s_{min} [4] (mm)	Min. edge distance c_{min} [4] (mm)
FDN II 6	32	80	–	2.4	1.7	50	60
FDN II 6 K	25	80	–	1.7	1.2	60	70

(1)The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γ_L= 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1{,}5 \times h_{ef}$. Accurate data see approval.

(2)The required safety factor for material is considered.

(3) Valid for tensile, shear and oblique loads under any angle. For combinations of loads with bending moments see approval.

(4) A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1.4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2.1 kN.

The cost-efficient hammerset anchor for multiple fixings

Suspended ceilings

APPROVALS

ETA-17/0737

Fire resistance classification R 120
Anchor types see test report

ADVANTAGES

- The FDZ can be installed without cleaning of the drill hole as per ETA assessment.
- The simple active principle allows for a fast hammerset installation without special tools.
- The two hit zones (first nail head, then expansion pin) ensure correct installation especially in narrow drill holes and also ensure high safety in use.
- The yellow expansion pin enables a clear visual differentiation to the FDZ

BUILDING MATERIALS

Approved for:

- Concrete C12/25 to C50/60, cracked, for multiple fixings of non-structural applications

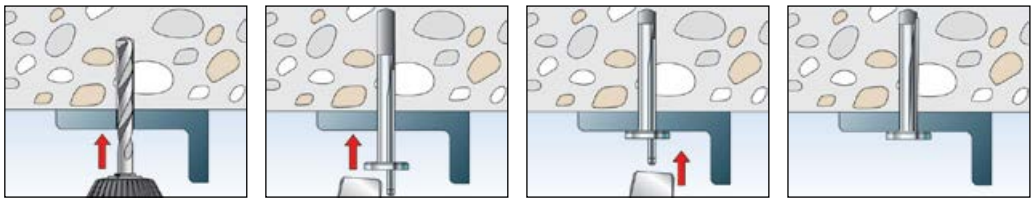
Also suitable for:

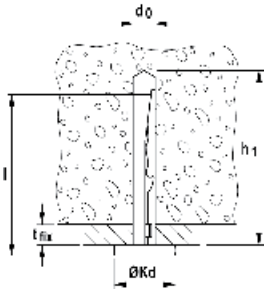
- Concrete C12/15
- Natural stone with dense structure

VERSION

- Zinc-plated steel

INSTALLATION





TECHNICAL DATA

Ceiling nail **FDZ**

Item	Zinc-plated steel Art-No. gvz	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Effective anchorage depth h_{ef} (mm)	Max. fixture thickness t_{fix} (mm)	KD head Ø (mm)	Sales unit (pcs)
FDZ 6/5	**544103**	6	37	32	5	15	100
FDZ 6/35	**544104**	6	67	32	35	15	100

LOADS

Design [2] and recommended [1] resistance for a single anchor for multiple fixing [4] for non-structural applications in concrete C20/25 upto C50/60. For the design, the complete approval ETA - 17/0737 has to be considered.

				Cracked or Non-cracked concrete			
Item	Effective anchor depth h_{ef} (mm)	Minimum member thickness h_{min} (mm)	Torque moment T_{inst} (Nm)	Design load F_d [3] (kN)	Permissible load F_{rec} [3] (kN)	Min. spacing s_{min} [4] (mm)	Min. edge distance c_{min} [4] (mm)
FDZ 6	32	80	-	1.4	1.0	50	60

(1)The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γL= 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x h_{ef} and an edge distance c ≥ 1,5 x h_{ef}. Accurate data see approval.
(2)The required safety factor for material is considered.
(3) Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments see approval.
(4) A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1.4 kN or by at least 4 fixing points with atleaast one anchor each and a permissible load per fixing point of 2.1 kN.

Bolt anchor in zinc-plated steel and hot-dipped galvanised steel with A2 clip.

FWA, zinc-plated steel

FWA, hot-dipped galvanised steel with A2-clip

Stormwater overflow tank manholes

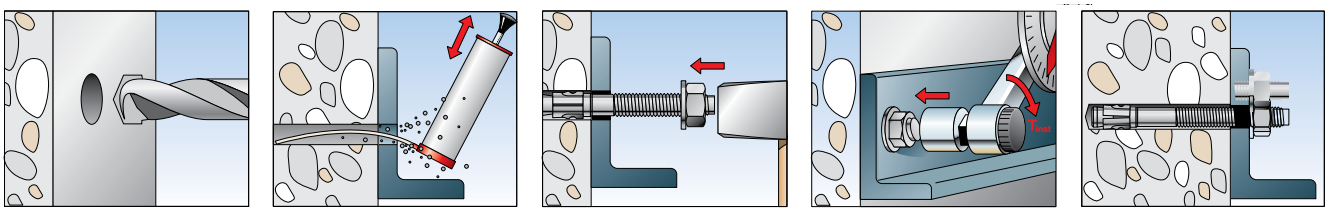
ADVANTAGES

- Anchor bolt for push-through installation.
- When the hexagon nut is tightened, the cone bolt is pulled into the expansion clip and expands it against the whole wall
- Thread diameter 6 to 20 mm.
- Zinc-plated steel version for indoor use.
- Hot-dipped galvanised version for temporary outdoor use.

Suitable for:

- Non-cracked concrete ≥ C 20/25.
- Natural stone with dense structure.

INSTALLATION

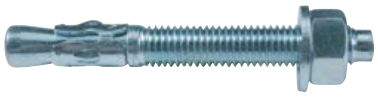


Anchor size		M 8			M 10			M 12			M 16			M 20	
		gvz	+	hdg	gvz	+	hdg	gvz	+	hdg	gvz	+	hdg	gvz	+ hdg
Effective anchorage depth	$h_{ef} \geq$ (mm)	25	30*	40	30	40*	50	40	50*	60	50	65*	80	80*	100
Drill hole diameter	d_0 (mm)	8	8	8	10	10	10	12	12	12	16	16	16	20	20
Min. edge distance	c_{min} (mm)	40	45	60	45	60	75	60	75	90	75	100	120	120	150
Min. spacing	s_{min} (mm)	80	90	120	90	120	150	120	150	180	150	200	240	240	300
Min. structual component thickness	h_{min} (mm)	100	100	100	100	100	100	100	100	120	100	130	160	160	200
Clearance-hole in the fixture to be attached[1)]	d_f	9	9	9	12	12	12	14	14	14	18	18	18	22	22

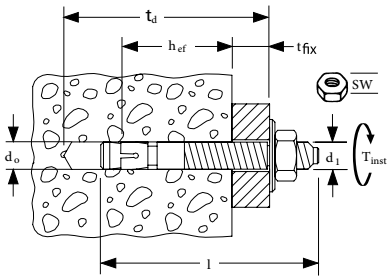
*prefered embedment depth

(1) Values only suitable for pre-positioned installation mode. Using push-through installation 1 mm to be added.

TECHNICAL DATA



Bolt Anchor - **FWA**



Item	Art-No.	Thread d1 M (mm)	Nominal drill-Ø d_o (mm)	Max. fixing thickness t_{fix} (mm)	Min. fixing thickness t_{fix} (mm)	Min. anchorage depth h_{ef} (mm)	Min. drill depth at push-through mode t_d (mm)	Total length l (mm)	Width across flat SW (mm)	Installation torque T_{inst} (Nm)	Sales unit (pcs)
FWA 6 x 40	**45536**	6	3	-	25	-	40	40	10	7.5	100
FWA 6 x 55	**45582**	6	15	5	25	35	55	55	10	7.5	100
FWA 6 x 70	**45598**	6	30	20	25	35	70	70	10	7.5	100
FWA 6 x 120	**502920**	6	80	60	25	35	120	120	10	7.5	50
FWA 8 x 50	**45644**	8	5	-	25	-	50	50	13	15	50
FWA 8 x 60	**502893**	8	15	-	25	-	60	60	13	15	50
FWA 8 x 65	**45788**	8	20	5	25	40	65	65	13	15	50
FWA 8 x 80	**45789**	8	35	20	25	40	80	80	13	15	50
FWA 8 x 95	**45790**	8	50	35	25	40	95	95	13	15	50
FWA 8 x 120	**45791**	8	75	60	25	40	120	120	13	15	50
FWA 10 x 60	**502894**	10	5	-	30	-	60	60	17	30	50
FWA 10 x 65	**45645**	10	10	-	30	-	65	65	17	30	50
FWA 10 x 80	**45792**	10	25	5	30	50	80	80	17	30	50
FWA 10 x 95	**45793**	10	40	20	30	50	95	95	17	30	50
FWA 10 x 115	**45794**	10	60	40	30	50	115	115	17	30	25
FWA 10 x 130	**45646**	10	75	55	30	50	130	130	17	30	25
FWA 10 x 140	**503367**	10	85	65	30	50	140	140	17	30	25
FWA 10 x 160	**503368**	10	105	85	30	50	160	160	17	30	25
FWA 10 x 180	**503369**	10	115	105	30	50	180	180	17	30	25
FWA 10 x 200	**503370**	10	135	115	30	50	200	200	17	30	25
FWA 12 x 80	**45647**	12	10	-	40	-	80	80	19	50	25
FWA 12 x 100	**45648**	12	30	10	40	60	100	100	19	50	25
FWA 12 x 120	**45795**	12	50	30	40	60	120	120	19	50	25
FWA 12 x 150	**45796**	12	80	60	40	60	150	150	19	50	25
FWA 12 x 160	**503371**	12	90	70	40	60	160	160	19	50	25
FWA 12 x 180	**503372**	12	110	90	40	60	180	180	19	50	25
FWA 12 x 200	**503373**	12	130	110	40	60	200	200	19	50	25
FWA 12 x 220	**503374**	12	150	130	40	60	220	220	19	50	25
FWA 12 x 240	**503377**	12	170	150	40	60	240	240	19	50	25
FWA 16 x 105	**45649**	16	15	-	50	-	95	105	24	100	20
FWA 16 x 125	**502921**	16	35	5	50	80	115	125	24	100	20
FWA 16 x 140	**45798**	16	50	20	50	80	130	140	24	100	10
FWA 16 x 180	**45799**	16	90	60	50	80	170	180	24	100	10
FWA 16 x 200	**503379**	16	110	80	50	80	190	200	24	100	10
FWA 16 x 240	**503380**	16	150	120	50	80	230	240	24	100	10
FWA 16 x 300	**503381**	16	190	160	50	80	290	300	24	100	10
FWA 20 x 160	**45800**	20	40	20	80	100	150	160	30	200	10
FWA 20 x 200	**503382**	20	80	60	80	100	190	200	30	200	10
FWA 20 x 220	**56133**	20	100	80	80	100	210	220	30	200	10
FWA 20 x 240	**503383**	20	120	100	80	100	230	240	30	200	10
FWA 20 x 300	**503387**	20	160	140	80	100	290	300	30	200	10
FWA 24 x 200	**503388**	24	50	25	100	125	190	200	36	260	10
FWA 24 x 250	**503389**	24	100	75	100	125	240	250	36	260	10
FWA 24 x 300	**503390**	24	150	125	100	125	290	300	36	260	10
FWA 8 x 65 hdg	**502922**	8	20	5	25	40	65	65	13	15	50
FWA 8 x 80 hdg	**502923**	8	35	20	25	40	80	80	13	15	50
FWA 8 x 95 hdg	**502924**	8	50	35	25	40	95	95	13	15	50
FWA 8 x 120 hdg	**502925**	8	75	60	25	40	120	120	13	15	50
FWA 10 x 80 hdg	**502926**	10	25	5	30	50	80	80	17	30	50
FWA 10 x 95 hdg	**502927**	10	40	20	30	50	95	95	17	30	50
FWA 10 x 115 hdg	**502928**	10	60	40	30	50	115	115	17	30	25
FWA 10 x 130 hdg	**502929**	10	75	55	30	50	130	130	17	30	25
FWA 12 x 80 hdg	**502972**	12	10	-	40	-	80	80	19	50	25
FWA 12 x 100 hdg	**502973**	12	30	10	40	60	100	100	19	50	25
FWA 12 x 120 hdg	**502974**	12	50	30	40	60	120	120	19	50	25
FWA 12 x 150 hdg	**502975**	12	80	60	40	60	150	150	19	50	25
FWA 16 x 105 hdg	**502976**	16	15	-	50	-	95	105	24	100	20
FWA 16 x 125 hdg	**502977**	16	35	5	50	80	115	125	24	100	20
FWA 16 x 140 hdg	**502978**	16	50	20	50	80	130	140	24	100	10
FWA 16 x 180 hdg	**502979**	16	90	60	50	80	170	180	24	100	10
FWA 20 x 160 hdg	**502980**	20	40	20	80	100	150	160	30	200	10

LOADS

Design and recommended resistance of a single anchor in concrete C20/25

	Non-cracked concrete					
Item	Effective anchorage depth $h_{ef} \geq$ (mm)	Design tensile load N_d (kN)	Recommended tensile load N_{rec} (kN)	Design shear load V_d (kN)	Recommended shear load V_{rec} (kN)	Recommended bending moment M_{rec} (Nm)
FWA M 6	25	1.8	1.3	1.8	1.3	1.4
FWA M 6	35	2.9	2.1	2.9	2.1	1.4
FWA M 8	25	1.9	1.4	1.9	1.4	3.5
FWA M 8	30	2.5	1.8	2.5	1.8	3.5
FWA M 8	40	3.9	2.8	3.9	2.8	3.5
FWA M 10	30	2.5	1.8	2.5	1.8	6.9
FWA M 10	40	3.9	2.8	3.9	2.8	6.9
FWA M 10	50	5.3	3.8	5.3	3.8	6.9
FWA M 12	40	4.4	3.2	4.4	3.2	13.2
FWA M 12	50	6.1	4.4	6.1	4.4	13.2
FWA M 12	60	8.1	5.8	8.1	5.8	13.2
FWA M 16	50	6.1	4.4	6.1	4.4	31.3
FWA M 16	65	8.6	6.2	8.6	6.2	31.3
FWA M 16	80	11.9	8.5	11.9	8.5	31.3
FWA M20	80	13.5	9.7	13.5	9.7	72.2
FWA M20	100	18.9	13.5	18.9	13.5	72.2

All load values for non-cracked concrete C20/25 without edge and spacing influences. Recommended loads: material safety factor γ_M and safety factor for load γ_L=1.4 included.

The strong internally threaded anchor with unique 4-way expansion for fi xings in aerated concrete

Air conditioning units

APPROVALS

ETA-12/0456

Metal anchor for use in autoclaved aerated concrete

Fire resistance classification R 120

Anchor types see test report

M8 - M12

ADVANTAGES

- The FPX-I enables easy tightening via the hexagon wrench using a cordless screwdriver or ratchet and therefore offers top installation comfort.
- The deformation-controlled expan-sion of the anchor with the hexagon wrench ensures safe, even and gentle installation.
- The unique 4-way expansion of the FPX-I with a square expansion sleeve prevents the rotation of the anchor in the drill hole and ensures high tension and shear loads, which means fewer fixing points.
- The releasing of the hexagonal wrench guarantees an automatical setting control for each installation process.
- The first steel anchor with an ETA-Approval and fire protection certificate for fixings in aerated concrete enables use for safety relevant fixings, too.

BUILDING MATERIALS

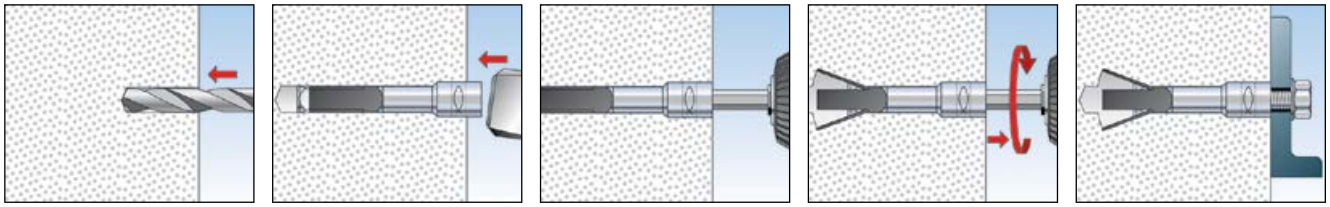
Approved for:

- Aerated concrete with compressive strength 2 to 7 N/mm²
- Aerated concrete wall or ceiling boards with compressive strength 3.3 to 4.4 N/mm²
- Planked aerated concrete masonry, e.g. plastered, tiled, papered etc.

VERSION

- Zinc-plated steel

INSTALLATION



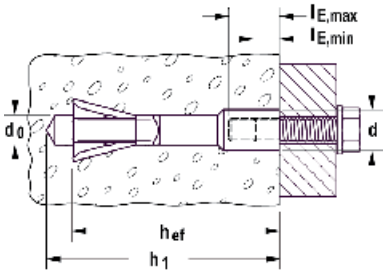
ANCHOR INSTALLATION DATA

Required component dimensions in aerated masonry.

Anchor type		FPXI M6, M8, M10, M12	
Component Dimensions			
Minimum member thickness with drill hole cleaning	h_{min} (mm)	10	
Minimum member thickness without drill hole cleaning	h_{min} (mm)	70	
Single Anchor			
Minimum Spacing between Single Anchors	a (mm)	375	
Minimum Edge Distance	c1 (mm)	125	
Minimum Distance to joints	c_F [4] (mm)	75 [2] / 125	
Minimum Edge Distance orthogonal to c1	c2 (mm)	190	
Anchor group with 2 or 4 anchors Actions		Shear + Oblique Tension	Only Axial Tension
Minimum spacing	s_{min} (mm)	100	100
Minimum edge distances c1	c1 (mm)	250	125
Minimum Spacing between Single Anchors	a (mm)	750	375
Minimum Edge Distance orthogonal to c1	c2 (mm)	375	190

TECHNICAL DATA

Aircrete anchor **FPX-I**



Item	Art-No.	Drill hole diameter d_0 (mm)	Anchor length l (mm)	Min. drill hole depth for pre-positioned installation h_2 (mm)	Effective anchorage deprth h_{ef} (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,max}$ (mm)	Sales unit (pcs)
	gvz							
FPX M6-I	**519021**	10	75	95	70	10	15	25
FPX M8-I	**519022**	10	75	95	70	8	15	25
FPX M10-I	**519023**	10	75	95	70	10	15	25
FPX M12-I	**519024**	10	75	95	70	12	15	25

ACCESSORIES

Setting tool **FPX M6 I**

Setting tool **FPX M8-M12 I**

Item	Art-No.	Matching anchor type (mm)	Sales unit (pcs)
Setting tool FPX M6 I	**522517**	FPX M6-I	25
Setting tool FPX M8-12 I	**522518**	FPX M8-I to FPX M12-1	25

LOADS

High performance anchor for aerated masonry

Highest Permissible Loads[1) 5)] and design Loads[5)] for FPXI M6, M8, M10 & M12in Aerated Masonry

Compressive Strength of AAC Blocks	Permissible Loads F_{perm} [1) 5)] (mm)	Design Loads F_{design} [5)] (mm)
AAC Compressive Strength ≥ 1.6 N/mm²	0.32	0.43
AAC Compressive Strength ≥ 2 N/mm²	0.43	0.58
AAC Compressive Strength ≥ 4 N/mm²	0.89	1.20
AAC Compressive Strength ≥ 6 N/mm²	1.43	1.93

For the design the complete approval ETA - 12/0456 has to be considered.

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1.4 are considered.

[2)] cF for tensile load and/or shear load parallel to the joint which is not filled with mortar with width ≤ 2 mm.

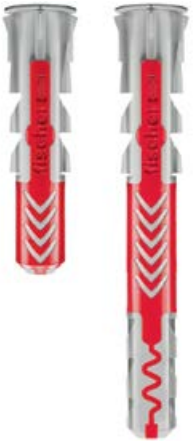
[3)] $F_{perm,Group}$ = 2 x $F_{perm,single\ anchor}$ valid in case of anchor groups with 2 or 4 anchors.

[4)] In case of non visible joints F_{perm} has to be divided in half.

[5)] Grade of the screw, resp. threaded rod ≥ 4.8.

Frame fixing & General fixing

The duo of power and intelligence



Wall cabinets

CERTIFICATES

ADVANTAGES

- Two components materials for top load values and intelligent functioning (expansion, folding, knotting), depending on building material - solid, perforated or panel material.
- Great feeback (feel-good-factor) of the plug. You can feel exactly when the plug is installed perfectly.
- The narrow plug rim prevents slipping into the drill hole.
- The serrated anti-rotation feature interlock in the building material and prevents rotation in the drill hole during installation.

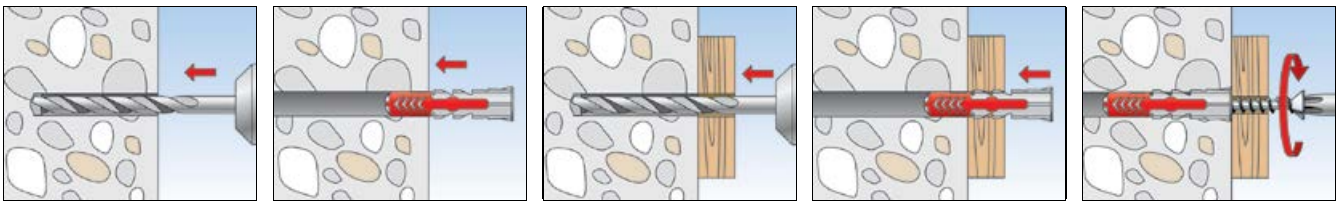
BUILDING MATERIALS

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards

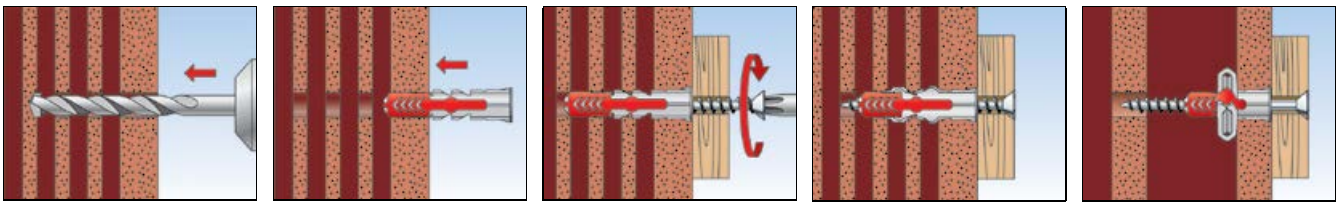
APPLICATIONS

- TV consoles
- Lighting
- Shelves
- Mirror cabinets
- Letter boxes
- Pictures
- Fixing blinds
- Curtain rails
- Wash basin fixings

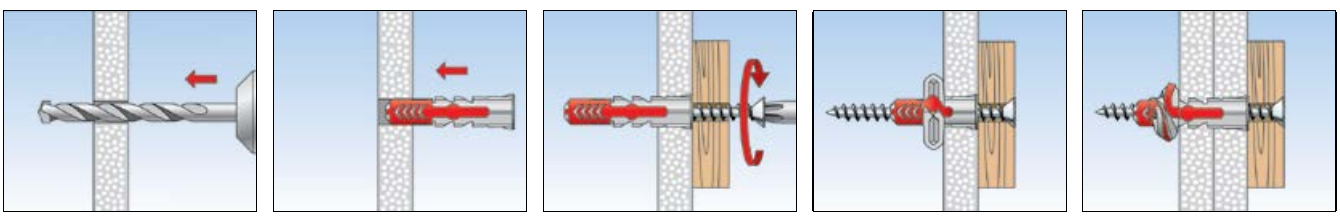
INSTALLATION IN SOLID BUILDING MATERIALS



INSTALLATION IN HOLLOW BUILDING MATERIALS



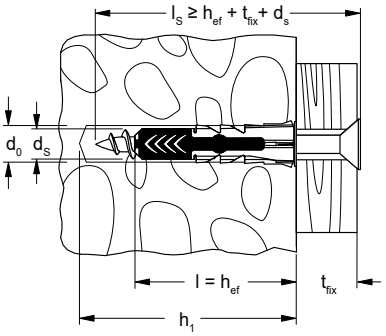
INSTALLATION IN PANEL BUILDING MATERIALS



TECHNICAL DATA

DUOPOWER

DUOPOWER with greater anchorage depth



Item	Art.-NO. without screw	Art.-No. with screw	Drill hole diameter d_0 (mm)	Min.drill-hole depth h_1 (mm)	Min. panel thickness d_p (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Anchor length l (mm)	Wood and chipboard screws $d_S/d_S \times l_S$ (mm)	Drive	Max fixture thickness T_{fix} (mm)	Sales unit (pcs)
DUOPOWER 5 x 25	**555005**	–	5	35	12.5	28	25	3 - 4	–	–	100
DUOPOWER 6 x 30	**555006**	–	6	40	12.5	34	30	4 - 5	–	–	100
DUOPOWER 8 x 40	**555008**	–	8	50	12.5	45	40	4.5 - 6	–	–	100
DUOPOWER 10 x 50	**555010**	–	10	60	12.5	56	50	6 - 8	–	–	50
DUOPOWER 5 x 25 S	–	**555105**	5	35	12.5	29	25	4 x 35	PZ2	6	50
DUOPOWER 6 x 30 S	–	**555106**	6	40	12.5	35	30	4.5 x 40	PZ2	5	50
DUOPOWER 8 x 40 S	–	**555108**	8	60	12.5	45	40	5 x 60	PZ2	15	50
DUOPOWER 10 x 50 S	–	**555110**	10	70	12.5	57	50	7 x 69	SW 13 / TX 40	13	25
DUOPOWER 6 x 50	**538240**	–	6	60	12.5	55	50	4 - 5	–	–	100
DUOPOWER 8 x 65	**538241**	–	8	75	2 x 12.5	70	65	4.5 - 6	–	–	50
DUOPOWER 10 x 80	**538242**	–	10	90	–	87	80	6 - 8	–	–	25
DUOPOWER 12 x 60	**538243**	–	12	70	–	68	60	8 - 10	–	–	25
DUOPOWER 14 x 70	**538244**	–	14	80	–	80	70	10 - 12	–	–	20
DUOPOWER 6 x 50 S	–	**538245**	6	75	12.5	55	50	4.5 x 70	PZ2	15	50
DUOPOWER 8 x 65 S	–	**538246**	8	85	2 x 12.5	70	65	5 x 80	PZ2	10	25
DUOPOWER 10 x 80 S	–	**538247**	10	112	–	87	80	7 x 107	SW 13	20	10
DUOPOWER 12 x 60 S	–	**538248**	12	85	–	68	60	8 x 80	SW 13	12	10
DUOPOWER 14 x 70 S	–	**538249**	14	100	–	80	70	10 x 95	SW 17	15	8

(1) Not preassembled.

LOADS

DUOPOWER

Highest recommended loads[1)] for a single anchor.
The given loads are valid for wood screws with the specified diameter.

Type			DUOPOWER 5 x 25	6 x 30	6 x 50	8 x 40	8 x 65	10 x 50	10 x 80	12 x 60	14 x 70
Wood screw diameter	Ø	[mm]	4	5	5	6	6	8	8	10	12
Min. edge distance concrete	c_{min}	[mm]	30	35	35	50	50	65	65	80	100
Recommended loads in the respective base material F_{rec}[2)]											
Concrete	≥ C20/25	[kN]	0,40	0,95	1,65	1,10	2,30	2,15	4,20	3,30	5,30
Solid brick	≥ Mz 12	[kN]	0,30	0,50	0,55	0,62	0,69	1,20	1,45	1,30	1,35
Solid sand-lime brick	≥ KS 12	[kN]	0,50	1,00	1,60	1,25	2,25	2,20	3,85	2,80	4,50
Aerated concrete	≥ PB 2, PP 2 (G 2)	[kN]	0,05	0,10	0,15	0,10	0,16	0,20	0,30	0,24	0,35
Aerated concrete	≥ PB 4, PP 4 (G 4)	[kN]	0,25	0,38	0,55	0,42	0,60	0,60	1,10	1,00	1,45
Vertically perforated brick	≥ Hlz 12 ($\rho \geq 0,9$ kg/dm³)	[kN]	0,13	0,15	0,17	0,25	0,40	0,25	0,40	0,35	0,40
Perforated sand-lime brick	≥ KSL 12 ($\rho \geq 1,6$ kg/dm³)	[kN]	0,40	0,60	0,60	0,70	1,00	0,70	2,00	0,75	1,50
Gypsum block	($\rho \geq 0,9$ kg/dm³)	[kN]	0,10	0,18	0,37	0,25	0,50	0,35	0,65	0,50	0,50
Gypsum fibreboard	12,5 mm	[kN]	0,24	0,33	0,35	0,35	-	0,50	-	-	-
Gypsum plasterboard	12,5 mm	[kN]	0,12	0,15	0,15	0,15	-	0,15	-	-	-
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,13	0,15	0,24	0,20	0,32	0,30	-	-	-
Mattone Forato Typ F8		[kN]	0,30	0,30	-	0,25	-	0,25	-	-	-
Tramezza Doppio UNI 19		[kN]	0,15	0,15	0,23	0,15	0,30	0,20	0,52	0,35	0,35
Sepa Parpaing		[kN]	0,30	0,45	0,25[3)]	0,45	0,45[3)]	0,45	0,45[3)]	0,60[3)]	0,60[3)]

1) Required safety factors are considered.
2) The load data are valid for tension, shear and combined tension and shear load.
3) Load determination on plastered wall.

The all-round solution with short drill hole depth

Facade sub-structures

APPROVALS

ETA 07/0121

Fire resistance classification R 120
Anchor types see test report

Zulassung

FLUOR CHLOR BROM HALOGENFREE

Rost frei

NYLON

ADVANTAGES

- The special functioning allows for use in solid and hollow building materials with an anchorage depth of just 50 mm, ensuring an economical fixing.
- The ETA approval covers use in a range of solid and hollow building materials, and guarantees a secure fixing.
- The specially developed combination of plugs and screws ensures the very best handling. The plug has a noticeable hold, making installation convenient.
- The extensive range with diameters of 6, 8 and 10 mm offers the right plug for every fixing.
- Available with three types of head

BUILDING MATERIALS

Approved for:

- Concrete≥C12/15
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid block made from light
- weight and normal weight concrete
- Solid brick
- Thermal insulation blocks

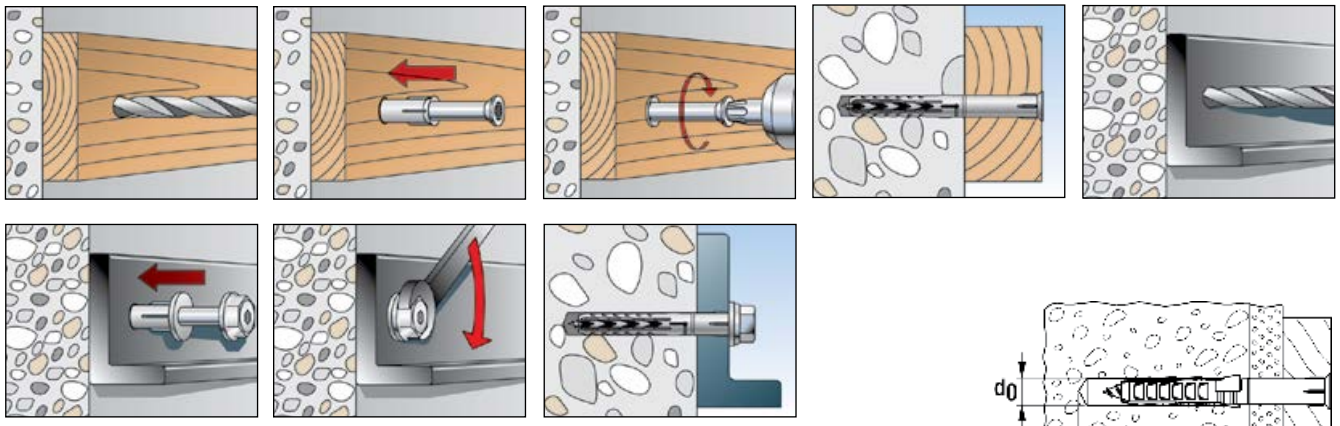
Also suitable for:

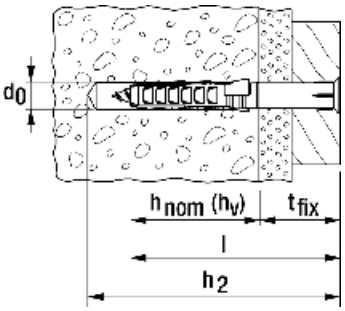
- Natural stone with dense structure
- Solid panel made from gypsum

VERSIONS

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised steel

INSTALLATION





TECHNICAL DATA

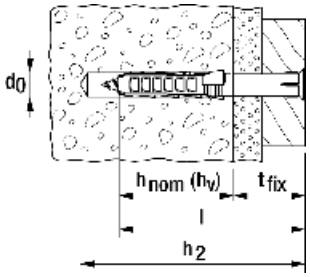
SXR-T - with fischer safety screw

Item	zinc-plated steel Art.-NO.	stainless steel Art.-No.	hot-dip galvanised steel Art.-No.	Drill hole diameter d_0 (mm)	Min.drill-hole depth for through fixings h_2 (mm)	Min. embedment depth $h_{nom}(h_v)$ (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Drive	Sales unit (pcs)
	gvz	A4	fvz							
SXR 8 x 60 T	502999	-	-	8	70	50	60	10	T30	50
SXR 8 x 80 T	503000	-	-	8	90	50	80	30	T30	50
SXR 8 x 100 T	503001	-	-	8	110	50	100	50	T30	50
SXR 8 x 120 T	503002	-	-	8	130	50	120	70	T30	50
SXR 10 x 80 T	046263	046272	-	10	90	50	80	30	T40	50
SXR 10 x 100 T	046264	046274	-	10	110	50	100	50	T40	50
SXR 10 x 100 T	-	-	509534	10	110	50	100	50	T40	50
SXR 10 x 120 T	046265	046278	-	10	130	50	120	70	T40	50

Item	zinc-plated steel Art.-NO.	stainless steel Art.-No.	hot-dip galvanised steel Art.-No.	Drill hole diameter d_0 (mm)	Min.drill-hole depth for through fixings h_2 (mm)	Min. embedment depth $h_{nom}(h_v)$ (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Drive	Sales unit (pcs)
	gvz	A4	fvz							
SXR 10 x 120 T	-	-	509535	10	130	50	120	70	T40	50
SXR 10 x 140 T	046266	046279	-	10	150	50	140	90	T40	50
SXR 10 x 140 T	-	-	509536	10	150	50	140	90	T40	50
SXR 10 x 160 T	046267	046283	-	10	170	50	160	110	T40	50
SXR 10 x 180 T	046268	046285	-	10	190	50	180	130	T40	50
SXR 10 x 200 T	046269	046286	-	10	210	50	200	150	T40	50
SXR 10 x 230 T	046270	046287	-	10	240	50	230	180	T40	50
SXR 10 x 260 T	046271	046288	-	10	270	50	260	210	T40	50

SXR - without screw

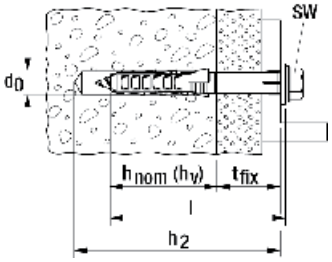
SXR-Z - with zinc-plated fischer safety screw for crossdrive PZ-bit



Item	Art.-NO.	Drill hole diameter do (mm)	Min.drill-hole depth for through fixings h2 (mm)	Min. embedment depth hoom (hv) (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Drive	Sales unit (pcs)
SXR 6 x 35	503228	6	45	30	35	5	-	100
SXR 6 x 50	503229	6	60	30	50	20	-	100
SXR 6 x 60	503230	6	70	30	60	30	-	100
SXR 8 x 60	506194	8	70	50	60	10	-	100
SXR 8 x 80	506196	8	90	50	80	30	-	100
SXR 8 x 100	506198	8	110	50	100	50	-	100
SXR 8 x 120	506199	8	130	50	120	70	-	100
SXR 6 x 50 Z	503232	6	60	30	50	20	PZ2	50
SXR 6 x 60 Z	503233	6	70	30	60	30	PZ2	50

(1) not pre-assembled

SXR-FUS - with fischer hexagon safety screw, moulded-on washer and integrated bit T40



Item	zinc-plated steel Art.-NO.	stainless steel Art.-No.	hot-dip galva-nised steel Art.-No.	Drill hole diameter d_0 (mm)	Min.drill-hole depth for through fixings h_2 (mm)	Min. embedment depth $h_{nom}(h_v)$ (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Drive	Sales unit (pcs)
	gvz	A4	fvz							
SXR 10 x 52 FUS	502456	-	-	10	62	50	52	2	T 40/SW 13	50
SXR 10 x 60 FUS	046329	046339	-	10	70	50	60	10	T 40/SW 13	50
SXR 10 x 60 FUS	-	-	509537	10	70	50	60	10	T 40/SW 13	50
SXR 10 x 80 FUS	046330	046340	-	10	90	50	80	30	T 40/SW 13	50
SXR 10 x 80 FUS	-	-	509538	10	90	50	80	30	T 40/SW 13	50
SXR 10 x 100 FUS	046331	046342	-	10	110	50	100	50	T 40/SW 13	50
SXR 10 x 100 FUS	-	-	509539	10	110	50	100	50	T 40/SW 13	50
SXR 10 x 120 FUS	046332	046343	-	10	130	50	120	70	T 40/SW 13	50
SXR 10 x 140 FUS	046333	046344	-	10	150	50	140	90	T 40/SW 13	50
SXR 10 x 140 FUS	-	-	509540	10	150	50	140	90	T 40/SW 13	50
SXR 10 x 160 FUS	046334	046345	-	10	170	50	160	110	T 40/SW 13	50
SXR 10 x 180 FUS	046335	046361	-	10	190	50	180	130	T 40/SW 13	50
SXR 10 x 200 FUS	046336	046362	-	10	210	50	200	150	T 40/SW 13	50
SXR 10 x 230 FUS	046337	046363	-	10	240	50	230	180	T 40/SW 13	50
SXR 10 x 260 FUS	046338	046364	-	10	270	50	260	210	T 40/SW 13	50

(1) not pre-assembled

SXR- not pre-assembled

SXR- not pre-assembled

Item	zinc-plated steel Art.-NO. gvz	Drill hole diameter d_0 (mm)	Min.drill-hole depth for through fixings h_2 (mm)	Min. embedment depth $h_{nom}(h_v)$ (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Drive	Screw d_S x l_S (mm)	Sales unit (pcs)
SXR 8 x 60 WZ Is	**503738**	8	70	50	60	10	PZ3	5.5 x 65	100
SXR 8 x 80 WZ Is	**503740**	8	90	50	80	30	PZ3	5.5 x 85	100
SXR 8 x 100 WZ Is	**503741**	8	110	50	100	50	PZ3	5.5 x 105	100
SXR 8 x 120 WZ Is	**503742**	8	130	50	120	70	PZ3	5.5 x 125	100
SXR 10 x 80 WZ Is	**505461**	10	90	50	80	30	PZ3	7 x 87	100
SXR 10 x 100 WZ Is	**505462**	10	110	50	100	50	PZ3	7 x 107	100
SXR 10 x 120 WZ Is	**505463**	10	130	50	120	70	PZ3	7 x 127	100
SXR 10 x 140 WZ Is	**505464**	10	150	50	140	90	PZ3	7 x 147	100
SXR 10 x 160 WZ Is	**505465**	10	170	50	160	110	PZ3	7 x 167	100

LOADS

Loads for a single anchor for multiple fixings of non-structural application in normal concrete ≥ C12/15 resp. ≥ B15. For the design the complete approval ETA-07/0121 has to be considered.

Item[4]	Tem. Range	Min. anchorage depth hnom (hv) (mm)	Min. member thickness hmin (mm)	Load in Cracked or Non-cracked concrete					
				Tensile load		Shear load [10]		Min. spacing Smin [2] (mm)	Min. edge distance Cmin [2] (mm)
				Design Nd [3] [5] (kN)	Recommended Nrec [3] [1] (kN)	Design Vd [5] [3] (kN)	Recommended Vrec [5] [3] (kN)		
SXR 6[6]	-	30	-	0.35	0.25 [7]	0.35	0.25	-	50
SXR 8	Internal application[8]	50	100	1.7	1.2	4.8	3.43	70	70
SXR 8	External application[9]	50	100	1.4	1.0	4.8	3.43	70	70
SXR 10	Internal application[8]	50	100	2.8	2.0	8.37	5.98	70	85
SXR 10	External application[9]	50	100	2.5	1.8	8.37	5.98	70	85

(1) The required partial safety factors for material resistance as well as a partial (safety factor for load actions γ_L= 1,4 are considered.)
(2) Minimum possible axial spacings (anchor group) resp. edge distance for concrete ≥ C16/20 while reducing the permissible load. The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval. Values for concrete C12/15 see approval.
(3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.
(4) Valid for zinc coated screws and for screws made of stainless steel.
(5) The required safety factor for material is considered.
(6) Not Covered by ETA (7) For ≥ C20/25 concrete
(8) Valid for temperature in the substrate up to +30 °C (resp. short term up to 50 °C)
(9) Valid for temperature in the substrate up to +50 °C (resp. short term up to 80 °C)
(10) The permissible shear load determined acc. ETAG 020, Annex C considers exclusively steel failure of the screw(A4). due to that the expected displacements will disable the proper function of the fixture with a maximum shear load on the basis of table C2.1 of the approval is recommended.

LOADS

Load capacity for SXR - screws

Item	Screw Dia (mm)	Screw Data					
		Design Tension load (kN)		Design Shear load (kN)		Design Bending capacity M^0_{RKS} (Nm)	
		gvz	A4	gvz	A4	gvz	A4
SXR 8	6	9.9	7.9	5.9	4.8	9.9	8.1
SXR 10	7	14.0	14.0	8.4	8.4	16.5	16.5

Loads[1) 6)] for a single anchor for multiple fixings of non-structural applications in masonry. For the design the complete approval ETA-07/0121 has to be considered

Item[4]	Brick Compressive strength fb (N/mm2)	Brick type, naming acc. DIN (-)	Min. anchorage depth hnom (hv) (mm)	Min. member thickness hmin (mm)	Design load F d[3) 5) 9)] (kN)	Recommended load Frec[3) 5) 1)] (kN)	Min.spacing Smin [2)] (mm)	Min.edge distance Cmin [2)] (mm)
Solid Brick Mz								
SXR 6 [8]	≥12	Mz	30	-	0.28	0.2	-	-
SXR 8	≥20	Mz	50	100	0.99	0.71	100	100
SXR 10	≥20	Mz	50	100	1.20	0.86	100	100
Solid sand-line brick and solid block KS								
SXR 6[8]	≥12	KS	30	-	0.28	0.2	-	-
SXR 8	≥10	KS	50	100	1.00	0.71	100	100
SXR 10	≥10	KS	50	100	1.20	0.86	100	100
Vertically perforated brick Hlz								
SXR 6 [8]	≥12	Hlz	30	-	0.14	0.1	-	-
SXR 8	≥20	Hlz	50	100	0.48	0.34	100	100
SXR 10	≥12	Hlz	50	100	0.36	0.26	100	-
SXR 10	≥20	Hlz	50	100	1.00	0.71	100	100

Item[3]	Brick Compressive strength f_b (N/mm2)	Brick type, naming acc. DIN	Min. anchorage depth $h_{nom\ (hv)}$ (mm)	Min. member thickness h_{min} (mm)	Design load F_d [3) 5) 9)] (kN)	Recommended load F_{rec} [3) 5) 1)] (kN)	Min. spacing s_{min} [2)] (mm)	Min. edge distance c_{min} [2)] (mm)
Perforated sand-line brick KSL								
SXR 6 [8)]	≥12	KSL	30	-	0.28	0.20	-	-
SXR 8	≥12	KSL	50	100	0.80	0.57	100	100
SXR 10	≥12	KSL	50	100	0.80	0.57	100	100
Hollow block of lightweight aggregate concrete Hbl								
SXR 6 [8)]	≥10	Hbl	50	100	1.00	0.71	100	100
SXR 8	≥ 6	Hbl	50	100	1.00	0.71	100	100
SXR 10	≥10	Hbl	50	100	1.00	0.71	100	100
Solid brick and solid block of lightweight aggregate concrete V								
SXR 8	≥ 2	V	50	100	0.48	0.34	100	100
SXR 10	≥ 2	V	50	100	0.29	0.21	100	100
Aerated concrete blocks and reinforced panels AAC								
SXR 8	≥ 2	AAC	50	100	0.20	0.14 [7)]	200	100
SXR 10	≥ 6	AAC	50	100	0.38	0.27	200	100

(1) The required partial safety factors for material resistance as well as a partial safety factor for load actions γ_L = 1.4 are considered.
(2) Minimum possible axial spacings (anchor group) resp. edge distance while reducing the permissible load. The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.
(3) Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see approval.
(4) Valid for zinc coated screws and for screws made of stainless steel.
(5) The given values for hollow or perforated masonry apply for rotary drilling (without impact). The given loads are reference values which may change due to type of brick and manufacturer. If brick change, pullout test (5 Nos.) are recommended.
(6) Valid for temperatures in the substrate up to +50° C (resp. short term up to 80° C). For long term temperatures up to 30° C higher permissible loads may be possible.
(7) Drill hole created by punching.
(8) Not covered by ETA
(9) The required safety factor for material is considered.

The powerful problem solver with multiple anchorage depths

Timber sub-structures

APPROVALS

ETA 07/0121

Fire resistance classification R 120
Anchor types see test report

ADVANTAGES

- Through the special geometry of the plug, the loads are evenly distributed in the drill hole.
- When the plug is to be set below the plaster, the longer ribs prevent plug rotation during installation.
- Multiple anchorage depths of 50, 70 or 90 mm for SXRL 8 and SXRL 10 and 70 or 90 mm for SXRL 14 making SXRL a versatile product.
- When anchoring in hollow and solid construction materials, the two expansion zones lead to optimum retention values.
- Complete range available with diameters of 8, 10 and 14mm with usable lengths up to 290 mm provides the right plug for every application.
- Available with two types of heads.

BUILDING MATERIALS

Approved for:

- Vertically perforated brick
- Aerated concrete
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Thermal insulation blocks
- Solid block made from lightweight and normal weight concrete
- Solid brick
- Solid sand-lime brick
- Concrete ≥ C12/15

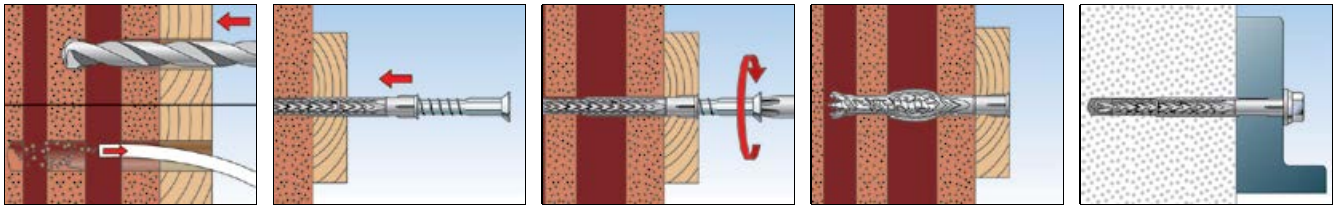
Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum

VERSIONS

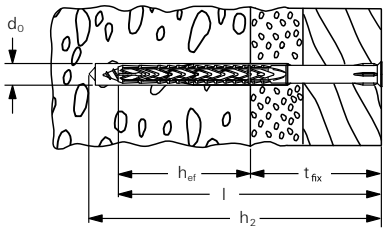
- Zinc-plated steel
- Stainless steel

INSTALLATION



TECHNICAL DATA

SXRL-T- with fischer countersunk head safety screw



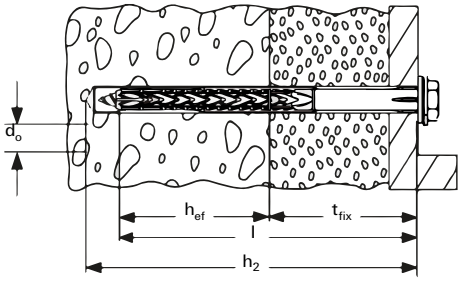
Item	Zinc-plated steel Art.-NO.	Stainless steel Art.-No.	Drill hole diameter d_0 (mm)	Min. drill-hole depth for through fixings h_2 (mm)	Usable length at anchorage depth 50mm t_{fix} (mm)	Usable length at anchorage depth 70mm t_{fix} (mm)	Usable length at anchorage depth 90mm t_{fix} (mm)	Anchor length l (mm)	Drive	Sales unit (pcs)
	gvz	A4								
SXRL 8 x 60 T	540113	540119	8	70	10	–	–	60	T30	50
SXRL 8 x 80 T	540114	540121	8	90	30	10	–	80	T30	50
SXRL 8 x 100 T	540115	540123	8	110	50	30	10	100	T30	50
SXRL 8 x 120 T	540116	540124	8	130	70	50	30	120	T30	50
SXRL 8 x 140 T	540117	540125	8	150	90	70	50	140	T30	50
SXRL 8 x 160 T	540118	540126	8	170	110	90	70	160	T30	50
SXRL 10 x 60 T	546477	546505	10	70	10	–	–	60	T40	50
SXRL 10 x 80 T	522698	522709	10	90	30	10	–	80	T40	50
SXRL 10 x 100 T	522699	522710	10	110	50	30	10	100	T40	50

TECHNICAL DATA

Item	Zinc-plated steel Art.-NO.	Stainless steel Art.-No.	Drill hole diameter d_o (mm)	Min. drill-hole depth for through fixings h_2 (mm)	Usable length at anchorage depth 50mm t_{fix} (mm)	Usable length at anchorage depth 70mm t_{fix} (mm)	Usable length at anchorage depth 90mm t_{fix} (mm)	Anchor length l (mm)	Drive	Sales unit (pcs)
	gvz	A4								
SXRL 10 x 120 T	**522700**	**522711**	10	130	70	50	30	120	T40	50
SXRL 10 x 140 T	**522701**	**522712**	10	150	90	70	50	140	T40	50
SXRL 10 x 160 T	**522703**	**522713**	10	170	110	90	70	160	T40	50
SXRL 10 x 180 T	**522704**	**522714**	10	190	130	110	90	180	T40	50
SXRL 10 x 200 T	**522705**	**522715**	10	210	150	130	110	200	T40	50
SXRL 10 x 230 T	**522706**	**522716**	10	240	180	160	140	230	T40	50
SXRL 10 x 260 T	**522707** [1]	**522717** [1]	10	270	210	190	170	260	T40	50
SXRL 10 x 290 T	**522708** [1]	**522718** [1]	10	300	240	220	200	290	T40	50
SXRL 14 x 80 T	**530920**	**530932**	14	95	–	10	–	80	T50	50
SXRL 14 x 100 T	**530921**	**530933**	14	115	–	30	10	100	T50	50
SXRL 14 x 120 T	**530922**	**530934**	14	135	–	50	30	120	T50	50
SXRL 14 x 140 T	**530923**	**530935**	14	155	–	70	50	140	T50	50
SXRL 14 x 160 T	**530924**	**530936**	14	175	–	90	70	160	T50	50
SXRL 14 x 180 T	**530925**	**530937**	14	195	–	110	90	180	T50	50
SXRL 14 x 200 T	**530926**	**530938**	14	215	–	130	110	200	T50	50
SXRL 14 x 230 T	**530927**	**530939**	14	245	–	160	140	230	T50	50
SXRL 14 x 260 T	**530928**	**530940**	14	275	–	190	170	260	T50	50
SXRL 14 x 300 T	**530929** [1]	**530941** [1]	14	315	–	230	210	300	T50	20
SXRL 14 x 330 T	**530930** [1]	**530942** [1]	14	345	–	260	240	330	T50	20
SXRL 14 x 360 T	**530931** [1]	**530943** [1]	14	375	–	290	270	360	T50	20

(1) Not pre-assembled.

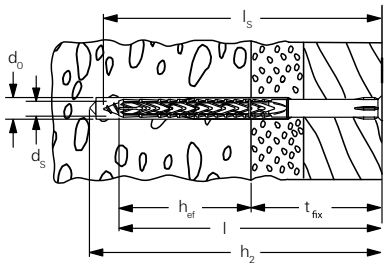
SXRL - FUS - with fischer hexagon head safety screw, moulded washer and integrated bit recess



Item	Zinc-plated steel Art.-NO.	Stainless steel Art.-No.	Drill hole diameter d_o (mm)	Min. drill-hole depth for through fixings h_2 (mm)	Usable length at anchorage depth 50mm t_{fix} (mm)	Usable length at anchorage depth 70mm t_{fix} (mm)	Usable length at anchorage depth 90mm t_{fix} (mm)	Anchor length l (mm)	Drive	Sales unit (pcs)
	gvz	A4								
SXRL 8 x 60 FUS	**540127**	**540135**	8	70	10	–	–	60	T30/SW 10	50
SXRL 8 x 80 FUS	**540129**	**540136**	8	90	30	10	–	80	T30/SW 10	50
SXRL 8 x 100 FUS	**540130**	**540137**	8	110	50	30	10	100	T30/SW 10	50
SXRL 8 x 120 FUS	**540131**	–	8	130	70	50	30	120	T30/SW 10	50
SXRL 8 x 140 FUS	**540133**	–	8	150	90	70	50	140	T30/SW 10	50
SXRL 8 x 160 FUS	**540134**	–	8	170	110	90	70	160	T30/SW 10	50
SXRL10 x 60 FUS	**546506**	**546507**	10	70	10	–	–	60	T40/SW 13	50
SXRL10 x 80 FUS	**522719**	**522730**	10	90	30	10	–	80	T40/SW 13	50
SXRL10 x 100 FUS	**522720**	**522731**	10	110	50	30	10	100	T40/SW 13	50
SXRL10 x 120 FUS	**522721**	**522732**	10	130	70	50	30	120	T40/SW 13	50
SXRL10 x 140 FUS	**522723**	**522733**	10	150	90	70	50	140	T40/SW 13	50
SXRL10 x 160 FUS	**522724**	**522734**	10	170	110	90	70	160	T40/SW 13	50
SXRL10 x 180 FUS	**522725**	**522735**	10	190	130	110	90	180	T40/SW 13	50
SXRL10 x 200 FUS	**522726**	**522736**	10	210	150	130	110	200	T40/SW 13	50
SXRL10 x 230 FUS	**522727**	**522737**	10	240	180	160	140	230	T40/SW 13	50
SXRL10 x 260 FUS	**522728**	**522738**	10	270	210	190	170	260	T40/SW 13	50
SXRL10 x 290 FUS	**522729**	**522739**	10	300	240	220	200	290	T40/SW 13	50
SXRL 14 x 80 FUS	**530946**	**530955**	14	95	–	10	–	80	T50/SW 17	50
SXRL 14 x 100 FUS	**530947**	**530956**	14	115	–	30	10	100	T50/SW 17	50
SXRL 14 x 120 FUS	**530948**	**530957**	14	135	–	50	30	120	T50/SW 17	50
SXRL 14 x 140 FUS	**530949**	**530958**	14	155	–	70	50	140	T50/SW 17	50
SXRL 14 x 160 FUS	**530950**	**530959**	14	175	–	90	70	160	T50/SW 17	50
SXRL 14 x 180 FUS	**530951**	**530960**	14	195	–	110	90	180	T50/SW 17	50
SXRL 14 x 200 FUS	**530952**	**530961**	14	215	–	130	110	200	T50/SW 17	50
SXRL 14 x 230 FUS	**530953**	**530962**	14	245	–	160	140	230	T50/SW 17	50
SXRL 14 x 260 FUS	**530954**	**530963**	14	275	–	190	170	260	T50/SW 17	50

ACCESSORIES

SXRL- without screw



Item	Art.-No.	Drill hole diameter d_o (mm)	Min. drill-hole depth for through fixings h_2 (mm)	Usable length at anchorage depth 50mm t_{fix} (mm)	Usable length at anchorage depth 70mm t_{fix} (mm)	Usable length at anchorage depth 90mm t_{fix} (mm)	Anchor length l (mm)	Screw diameter d_s (mm)	Min. screw length l_s (mm)	Sales unit (pcs)
SXRL 8 x 60	**540879**	8	70	10	–	–	60	5.5 - 6.0	65	100
SXRL 8 x 80	**540880**	8	90	30	10	–	80	5.5 - 6.0	85	100
SXRL 8 x 100	**540881**	8	110	50	30	10	100	5.5 - 6.0	105	100
SXRL 8 x 120	**540882**	8	130	70	50	30	120	5.5 - 6.0	125	100

LOADS

Frame fixing SXRL[3)]

Highest recommended loads[1)] for a single anchor as part of a multiple fixing of non-structural systems.
The given loads are valid for wood screws with the specified diameter.

Type			SXRL 8		
Anchorage depth	h_{nom}	[mm]	50	70	90
Screw diameter	Ø	[mm]	6.0	6.0	6.0
Min. edge distance concrete	a_r	[mm]	60	80	100
Recommended loads in the respective base material Frec					
Concrete	≥ C20/25	[kN]	0.60	1.00	1.00
Solid brick	≥ Mz 12	[kN]	0.45	0.60	0.60
Solid sand-line brick	≥ KS 12	[kN]	0.40	0.50	0.50
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 1.0 kg/dm³)	[kN]	0.15	0.15	0.15
Perforated sand-line brick	≥ KSL 12	[kN]	0.10	0.40	0.40
Aerated concrete	AAC 2	[kN]	–	0.10	0.10
Aerated concrete	AAC 4	[kN]	–	0.15	0.20

(1) Required safety factors are considered.
(2) Valid for tensile load, shear load and oblique load under any angle.
(3) Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.

LOADS

Loads[1)] for a single anchor for multiple fixing of non-structural application in normal concrete ≥ C12/15 resp ≥ B15. For the design, the complete approval ETA-07/0121 has to be considered.

Item[4)]	Anchorage depth h_{nom} (mm)	Min. member thickness h_{min} (mm)	Load in Cracked or Non-cracked concrete						Min. spacing S_{min} [2)] (mm)	Min. edge distance C_{min} [2)] (mm)
			Tensile load [3)]		Shear load					
			Design N_d (kN)	Recommended N_{rec} [1)] (kN)	Design V_d [5)] (kN)		Recommended V_{rec} [3) 1)] (kN)			
					gvz	A4	gvz	A4		
SXRL 8	50	80	2.22	1.59	5.92	5.50	4.23	3.93	85	85
SXRL 8	70	100	2.77	1.98	5.92	5.50	4.23	3.93	85	85
SXRL 8	90	120	2.77	1.98	5.92	5.50	4.23	3.93	85	85
SXRL 10	50	100	2.77	1.98	8.37	8.37	5.98	5.98	70	70
SXRL 10	70	100	3.61	2.58	8.37	8.37	5.98	5.98	70	70
SXRL 10	90	120	3.61	2.58	8.37	8.37	5.98	5.98	70	70
SXRL 14	70	110	4.71	3.37	17.36	16.28	12.40	11.63	85	85
SXRL 14	90	130	4.71	3.37	17.36	16.28	12.40	11.63	85	85

(1) The required partial safety factors for material resistance as well as a partial safety factor for load actions γ_L = 1.4 are considered.
(2) Minimum possible axial spacings (anchor group) resp. edge distance while reducing the permissible load. The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.
(3) Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see approval.
(4) The required saftey factor for material is considered.
(5) The permissible shear load determined acc. ETAG 020, Annex C considers exclusively steel failure of the screw (A4). due to that the expected displacements will disable the proper function of the fixture a maximum shear load on the basis of table 7 of the approval is recommended.

LOADS

Load capacity for SXR-L screws

Item	Screw Dia (mm)	Screw Data					
		Design Tension load (kN)		Design Shear load (kN)		Design Bending capacity M_{RKS} (Nm)	
		gvz	A4	gvz	A4	gvz	A4
SXRL 8	6	9.8	9.8	5.9	5.5	9.9	9.3
SXRL 10	7	14.0	14.0	8.4	8.4	16.5	16.5
SXRL 14	9.6	28.9	27.1	17.4	16.3	39.0	36.4

Loads [6] for a single anchor for multiple fixings of non-structural applications in masonry. For the design the complete approval ETA-07/0121 has to be considered

Item[4]	Brick Compressive strength fb (N/mm2)	Brick type, naming acc. DIN (-)	Anchorage depth h_{nom} (mm)	Min. member thickness h_{min} (mm)	Design load F_d [3] [5] (kN)	Recommended load F_{rec} [3] [5] (kN)	Min.spacing S_{min} [2] (mm)	Min.edge distance C_{min} [2] (mm)
Solid Brick Mz								
SXRL 8	≥12	Mz	70	115	1.00	0.71	100	100
SXRL 8	≥20	Mz	70	115	1.60	1.14	100	100
Solid sand-lime brick and solid block KS								
SXRL 8	≥20	KS	70	115	1.20	0.86	100	100
Vertically perforated brick Hlz								
SXRL 8	≥10	Hlz	70	115	0.24	0.17	100	100
Perforated sand-lime brick KSL								
SXRL 8	≥12	KSL	70	115	0.60	0.43	100	100
Hollow block of lightweight aggregate concrete Hbl								
SXRL 8	≥2	HBL	70	115	0.80	0.57	100	100
SXRL 8	≥6	HBL	70	115	1.00	0.71	100	100
Lightweight concrete block V								
SXRL 8	≥6	V	70	115	0.80	0.57	100	100
Aerated concrete blocks and reinforced panels AAC								
SXRL 8	≥4	AAC	70	175	0.60	0.43	110	110
SXRL 8	≥6	AAC	70	175	1.00	0.71	110	110

Loads [6] for a single anchor for multiple fixings of non-structural applications in masonry. For the design the complete approval ETA-07/0121 has to be considered

Item[4]	Brick Compressive strength fb (N/mm2)	Brick type, naming acc. DIN (-)	Min. anchorage depth hnom (hv) (mm)	Min. member thickness hmin (mm)	Design load F d [3] [5] (kN)	Recommended load Frec [3] [5] (kN)	Min.spacing Smin [2] (mm)	Min.edge distance Cmin [2] (mm)
Solid Brick Mz								
SXRL 10	≥20	Mz	70	110	1.60	1.14	100	100
SXRL 10	≥28	Mz	70	110	2.20	1.57	100	100
Solid sand-line brick and solid block KS								
SXRL 10	≥12	KS	70	110	2.60	1.86	100	100
Vertically perforated brick Hlz								
SXRL 10	≥20	Hlz	70	110	0.48	0.34	100	100
Perforated sand-line brick KSL								
SXRL 10	≥20	KSL	70	110	1.40	1.00	100	100
Hollow block of lightweight aggregate concrete Hbl								
SXRL 10	≥6	Hbl	70	110	0.60	0.43 [7]	100	100
SXRL 10	≥10	Hbl	70	110	1.00	0.71 [7]	100	100
Solid brick and solid block of lightweight aggregate concrete V								
SXRL 10	≥2	V	70	100	0.48	0.34	100	100
Aerated concrete blocks and reinforced panels AAC								
SXRL 10	≥2	AAC	90	175	0.45	0.32	200	100
SXRL 10	≥6	AAC	90	175	2.00	1.43	200	100

Loads [1] [6] for a single anchor for multiple fixings of non-structural applications in masonry. For the design the complete approval ETA-14/0297 has to be considered

Item[4]	Brick Compressive strength fb (N/mm2)	Brick type, naming acc. DIN (-)	Bulk density ρ (kg/m³)	Min.brick formate (L x W x H) (mm)	Min. anchorage depth hnom (hv) (mm)	Mni. member thickness hmin (kN)	Design load Fd [3] [5] [8] (kN)	Recommended load Frec [3] [5] [1] (kN)	Min. spacing Smin [2] (mm)	Min. edge distance Cmin [2] (mm)
Solid Brick Mz acc DIN 105-100:2012-01, EN 771-1:2011										
SXRL 14	≥10	Mz	≥1.8	NF (240 x 113 x 71)	70	115	1.20	0.86	100	100
SXRL 14	≥10	Mz					1.81	1.29	100	200
SXRL 14	≥20	Mz					1.60	1.14	100	100
SXRL 14	≥20	Mz					2.39	1.71	100	200
Solid sand-lime brick KS acc. DIN V 106, DIN EN 771-2										
SXRL 14	≥10	KS		NF (240 x 113 x 71)	70	115	1.20	0.86	100	100

Loads[1) 6)] for a single anchor for multiple fixings of non-structural applications in masonry. For the design the complete approval ETA-14/0297 has to be considered

Item[4]	Brick Compressive strength fb (N/mm2)	Brick type, naming acc. DIN (-)	Bulk density P (kg/m³)	Min.brick formate (L x W x H) (mm)	Min. anchorage depth hnom (hv) (mm)	Mni. member thickness hmin (kN)	Design load Fd [3) 5) 8)] (kN)	Recommended load Frec [3) 5) 1)] (kN)	Min. spacing Smin [2)] (mm)	Min. edge distance Cmin [2)] (mm)
SXRL 14	≥10	KS	≥1.8	NF (240 x 113 x 71)	70	115	1.40	1.00	100	200
SXRL 14	≥20	KS					1.81	1.29	100	100
SXRL 14	≥20	KS					2.00	1.43	100	200
SXRL 14	≥8	KS	≥1.8	2 DF (240 x 115 x 113)	70	115	0.80	0.57	100	100
SXRL 14	≥8	KS					2.20	1.57	100	200
SXRL 14	≥12	KS	≥2.0				1.40	1.00	100	100
SXRL 14	≥12	KS					3.40	2.43	100	200
Solid brick of lightweight aggregate concrete V acc. DIN 18152-100, DIN EN 771-3										
SXRL 14	≥2	V	≥1.2	250 x 240 x 245	70	115	0.48	0.34	100	100
SXRL 14	≥6	V	≥1.6				0.80	0.57	100	100
SXRL 14	≥6	V					1.81	1.29	100	200
SXRL 14	≥10	V					1.40	1.00	100	100
SXRL 14	≥10	V					2.80	2.00	100	200
Vertically perforated brick Hlz acc. DIN 105-100:2012-01, DIN EN 771-1:2011										
SXRL 14	≥6	Hlz	≥1.0	3 DF (240 x 175 x 113)	70	115	0.48	0.34[5)]	100	100
SXRL 14	≥8	Hlz					0.60	0.43 [5)]	100	100
SXRL 14	≥10	Hlz					0.80	0.57 [5)]	100	100
SXRL 14	≥12	Hlz					0.80	0.57 [5)]	100	100
Perforated sand-lime brick KSL acc. DIN V 106, DIN EN 771-2										
SXRL 14	≥6	KSL	≥1.4	2 DF (240 x 115 x 113)	70	115	0.48	0.34	100	100
SXRL 14	≥8	KSL					0.60	0.43	100	100
SXRL 14	≥10	KSL					0.80	0.57	100	100
SXRL 14	≥10	KSL		9 DF (340 x 175 x 240)			0.80	0.57	100	100
SXRL 14	≥20	KSL					0.60	1.14	100	100
Hollow brick of lightweight aggregate concrete Hbl acc. DIN V 18153-100, EN 771-3										
SXRL 14	≥0.7	Hbl	≥2.0	240 x 500 x 240 [7)]	70	115	0.60	0.43 [5)]	100	100
Aerated concrete blocks acc. DIN V 4165-100:2005-10, EN 771-4 and reinforced wall panels acc. EN 12602, DIN 4223										
SXRL 14	≥2	AAC	–	–	70	175	0.45	0.32	80	80
SXRL 14	≥2	AAC			90	175	2.00	0.43	80	80
SXRL 14	≥6	AAC			70	300	0.45	1.43	80	100
SXRL 14	≥6	AAC			90	300	2.00	1.80	100	120

(1) The required partial safety factors for material resistance as well as a partial safety factor for load actions ϒF = 1,4 are considered.
(2) Minimum possible axial spacings (anchor group) resp. edge distance while reducing the permissible load. The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.
(3) Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see approval.
(4) Valid for zinc coated screws and for screws made of stainless steel.
(5) The given values for hollow or perforated masonry apply for rotary drilling (without impact). The given loads are reference values which may change due to type of brick and manufacturer.
(6) Valid for temperatures in the substrate up to +50°C (resp. short term up to 80°C). For long term temperatures up to 30°C higher permissible loads in solid and hollow bricks may be possible.
(7) Thickness of outer web 50 mm.
(8) The required safety factor for material is considered.

ACCESSORIES (SXR, SXRL, SXS)

Cover cap **ADT**

Item	Art-No.	Colour	Cap (Ø mm)	Fits safety screw with seat ITX-Star recess	Sales unit (pcs)
ADT 15 W	**060326**	White	15	40	100
ADT 15 DB	**060329**	Dark Brown	15	40	100
ADT 18 W	**060334**	White	18	40	100
ADT 18 DB	**060337**	Dark Brown	18	40	100

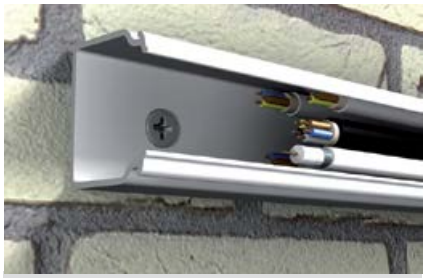
Washer **U** stainless steel A2

Item	Art-No.	External d (mm)	Hole Ø (Ø mm)	Thickness S (mm)	Fits anchor	Sales unit (pcs)
U 11,5 x 21 x 1,5 DIN 522 A2	**010026**	21	11.5	1.5	SXR 10, FUR 10, SXS 10	500

Aircrete hole punch **GBS**

Item	Art-No.	Drill-hole do (mm)	Min. drill hole depth for through fixing h2 (mm)	Fits	Sales unit (pcs)
GBS 10 x 80	**050590**	9	85	SXR 10 x 52, SXR 10 x 60, SXR 10 x 80	1
GBS 10 x 100	**050591**	9	105	SXR 10 x 100	1
GBS 10 x 135	**050593**	9	140	SXR 10 x 120	1
GBS 10 x 160	**050594**	9	165	SXR 10 x 140, SXR 10 x 160	1
GBS 10 x 185	**050595**	9	190	SXR 10 x 180	1
GBS 10 x 230	**050596**	9	235	SXR 10 x 200, SXR 10 x 230	1

The hammer-in plug for a simple, fast and economical installation



Cable ducts

APPROVALS

ADVANTAGES

- The rapid hammerset installation reduces the amount of time required and allows for an economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely (jamming), thus enabling a problem free installation
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.
- The wide range of diameters, usage lengths and head shapes provides the correct plug for every fixing.

BUILDING MATERIALS

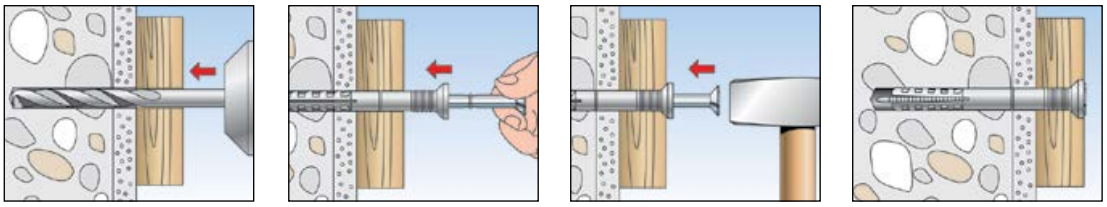
Approved for:

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid block made from lightweight concrete

VERSIONS

- Zinc-plated steel
- Stainless steel

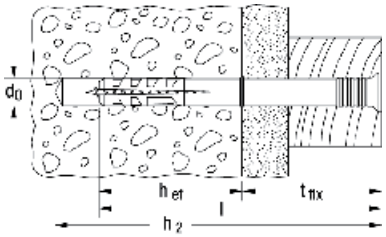
INSTALLATION



TECHNICAL DATA

Hammerfix **N-S** with nail, pre-assembled

Hammerfix **N-S A2** with stainless steel A2 nail, pre-assembled



Item	zinc-plated steel Art.-NO. gvz	stainless steel A2 Art.-No. A2	Drill hole diameter d_0 (mm)	Effect. ancho-ring depth h_{ef} (mm)	Anchor length l (mm)	Min.drill-hole depth for through fixings h_2 (mm)	Max. fixture thickness t_{fix} (mm)	Sales unit (pcs)
N 5 x 30/5 S (100)	050395	050370	5	25	30	45	5	100
N 5 x 30/5 S (200)	513732	–	5	25	30	45	5	200
N 5 x 40/15 S (100)	050351	–	5	25	40	55	15	100
N 5 x 40/15 S (200)	513733	–	5	25	40	55	15	200
N 5 x 50/25 S (100)	050352	–	5	25	50	65	25	100
N 5 x 50/25 S (200)	513734	–	5	25	50	65	25	200
N 6 x 40/10 S (50)	050354	050372	6	30	40	55	10	50
N 6 x 40/10 S (100)	048788	–	6	30	40	55	10	100
N 6 x 40/10 S (200)	513834	–	6	30	40	55	10	200
N 6 x 60/30 S (50)	050355	050373	6	30	60	75	30	50
N 6 x 60/30 S (100)	048789	–	6	30	60	75	30	100
N 6 x 60/30 S (200)	513835	–	6	30	60	75	30	200
N 6 x 80/50 S (50)	050353	–	6	30	80	95	50	50
N 6 x 80/50 S (100)	048790	–	6	30	80	95	50	100
N 6 x 80/50 S (200)	513836	–	6	30	80	95	50	200
N 8 x 60/20 S (50)	050356	050374	8	40	60	75	20	50
N 8 x 60/20 S (100)	048791	–	8	40	60	75	20	100
N 8 x 80/40 S (50)	050358	050375	8	40	80	95	40	50
N 8 x 80/40 S (100)	048792	–	8	40	80	95	40	100
N 8 x 100/60 S (50)	050357	050376	8	40	100	115	60	50
N 8 x 100/60 S (100)	048793	–	8	40	100	115	60	100
N 8 x 120/80 S (50)	050359	–	8	40	120	135	80	50
N 8 x 120/80 S (100)	048794	–	8	40	120	135	80	100

N 10 x 100/50 S (50)	**050346**	–	10	50	100	115	50	50
N 10 x 135/85 S (50)	**050347**	–	10	50	135	150	85	50
N 10 x 160/110 S (50)	**050348**	–	10	50	160	175	110	50
N 10 x 230/180 S (50)	**050335**	–	10	50	230	245	180	50

(1) not pre-assembled
(2) also specially suitable for fischer Pipe clips FC, see chapter Electrical fixings.

Hammerfix **N-P** with flat edge and nail, pre-assembled

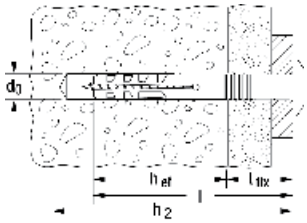
Hammerfix **N-P A2** with flat edge and stain-less steel A2 nail, pre-assembled

N-S M with nail and connection thread M 6

Hammerfix **N-F** with cylindrical head and nail, pre-assembled

Hammerfix **N-S D A2** with isolating washer and nail, pre-assembled

Hammerfix **N-P K** with flat edge and plastic nail, pre-assembled



	zinc-plated steel Art.-N0.	stainless steel A2 Art.-No.	Drill hole diameter d_0 (mm)	Effect. ancho-ring depth h_{ef} (mm)	Anchor length l (mm)	Min.drill-hole depth for through fixings h_2 (mm)	Max. fixture thickness t_{fix} (mm)	Sales unit (pcs)
Item	**gvz**	**A2**						
N 5 x 30/5 P (100)	**050338**	–	5	25	30	45	5	100
N 6 x 30/1 P (100)	**514869**	–	6	30	30	45	1	100
N 6 x 40/7 P (50)	**050339**	–	6	30	40	55	7	50
N 6 x 40/7 P A2 (50)	–	**050369**	6	30	40	55	7	50
N 6 x 40/7 P (100)	**048795**	–	6	30	40	55	7	100
N 6 x 40/7 P A2 (100)	–	**092520**	6	30	40	55	7	100
N 6 x 40/7 P (200)	**514871**	–	6	30	40	55	7	200
N 8 x 40/1 P (50)	**015903**	–	8	40	40	55	1	50
N 8 x 40/1 P (100)	**514870**	–	8	40	40	55	1	100
N 5 x 25/1 F (100)	**514872**	–	5	25	25	40	1	100
N 5 x 25/1 F (200)	**514873**	–	5	25	25	40	1	200
N 5 x 30/5 F (100)	**513736**	–	5	25	30	45	5	100
N 5 x 30/5 F (200)	**513739**	–	5	25	30	45	5	200
N 5 x 40/15 F (100)	**513737**	–	5	25	40	55	15	100
N 5 x 40/15 F (200)	**513740**	–	5	25	40	55	15	200
N 5 x 50/25 F (100)	**513738**	–	5	25	50	65	25	100
N 5 x 50/25 F (200)	**513741**	–	5	25	50	65	25	200
N 6 x 35/5 F (100)	**522948**	–	6	30	35	40	5	100
N 6 x 40/10 F (50)	**513837**	–	6	30	40	55	10	50
N 6 x 40/10 F (100)	**513840**	–	6	30	40	55	10	100
N 6 x 40/10 F (200)	**513843**	–	6	30	40	55	10	200
N 6 x 60/30 F (50)	**513838**	–	6	30	60	75	30	50
N 6 x 60/30 F (100)	**513841**	–	6	30	60	75	30	100
N 6 x 60/30 F (200)	**513844**	–	6	30	60	75	30	200
N 6 x 80/50 F (50)	**513839**	–	6	30	80	95	50	50
N 6 x 80/50 F (100)	**513842**	–	6	30	80	95	50	100
N 6 x 80/50 F (200)	**513845**	–	6	30	80	95	50	200
N 8 x 60/20 F (50)	**513697**	–	8	40	60	75	20	50
N 8 x 60/20 F (100)	**513701**	–	8	40	60	75	20	100
N 8 x 80/40 F (50)	**513698**	–	8	40	80	95	40	50
N 8 x 80/40 F (100)	**513702**	–	8	40	80	95	40	100
N 8 x 100/60 F (50)	**513699**	–	8	40	100	115	60	50
N 8 x 100/60 F (100)	**513703**	–	8	40	100	115	60	100
N 8 x 120/80 F (50)	**513700**	–	8	40	120	135	80	50
N 8 x 120/80 F (100)	**513704**	–	8	40	120	135	80	100
N 6 x 40/7 P K (50)	**050342**	–	6	30	40	55	7	50
N 6 x 40/10 S M6 (50)	**050398**	–	6	30	40	55	10	50
N 6 x 40/10 S D A2 (50)	**050367**	–	6	30	40	55	10	50
N 6 x 60/30 S D A2 (50)	**050368**	–	6	30	60	75	30	50

LOADS

Recommended Loads [1) 2)] for a single anchor.
The given loads are valid for screw nails with the specified diameter.

Item			**N5**	**N6** [3)]	**N8**	**N10**
Screw nail diameter	Ø	(mm)	3.5	4	5	7
Recommended loads in the respective base material Frec 2)						
Concrete	≥ C20/25	(kN)	0.20	0.25	0.27	0.33
Solid brick	≥ Mz 12	(kN)	0.14	0.18	0.24	0.30
Solid sand-lime brick	≥ KS 12	(kN)	0.18	0.22	0.24	0.33
Solid brick of lightweight aggregate concrete	≥ V4	(kN)	0.05	0.12	0.15	0.16
Aerated concrete	≥ PB2	(kN)	0.03	0.04	0.05	0.10
Aerated concrete	≥ PB4	(kN)	0.07	0.10	0.13	0.16

(1) Includes the safety factor 4.
(2) Valid for tensil load, shear load and oblique load under any angle.
(3) The values have to be reduced by 50% for N 6x 40/7 PK.

The fixing for stress-free installation of window and door frames with high fire resistance

Fire protection doors

APPROVALS

Fire resistance classification R 120
Anchor types see test report

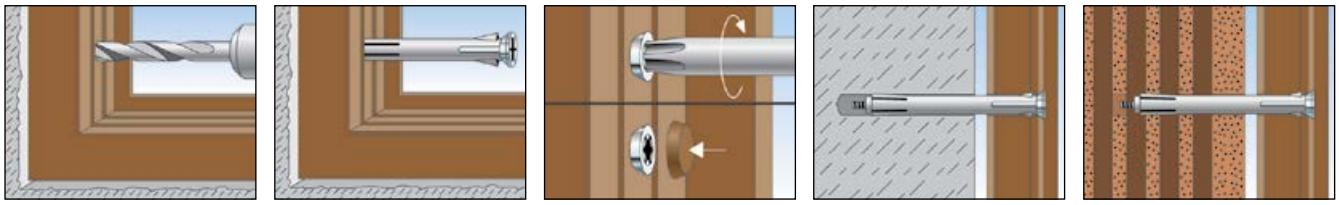
ADVANTAGES

- The F-M metal frame plug achieves fire resistance F 120. This allows for use in areas where fire resistance is relevant.
- The operating principle prevents the window frame from being pulled against the substrate, and ensures a stress-free and longlasting fixing of the frame.
- The special plug geometry anchors the metal and plastic profiles against compressive and tensile loads, and allows for a secure hold of the window frame.
- The cover caps (available separately) can be used to discreetly cover the screw heads.

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow block made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid block made from lightweight concrete
- Solid brick

INSTALLATION

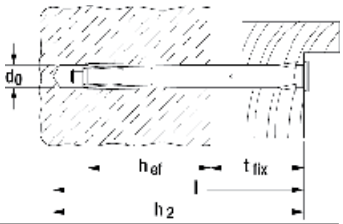


TECHNICAL DATA

F 8 M - with flat mushroom type head screw and crossdrive recess PZ 2

F 10 M - with countersunk screw and cross-drive recess PZ 3

Cover cap **ADM 10**



Item	Art-No.	Drill hole diameter d_0 (mm)	Min.drill- hole depth for through fixings h_2 (mm)	Effect. ancho-ring depth h_{ef} (mm)	Anchor length l (mm)	Max. fixture thickness t_{fix} (mm)	Drive	Sales unit (pcs)
F 8 M 72	**088660** 1)	8	90	30	72	42	PH2	100
F 8 M 92	**088662** 1)	8	110	30	92	62	PH2	100
F 8 M 112	**088664** 1)	8	130	30	112	82	PH2	100
F 8 M 132	**088666** 1)	8	150	30	132	102	PH2	100
F 10 M 72	**088670** 2)	10	90	30	72	42	PH3	100
F 10 M 92	**088672** 2)	10	110	30	92	62	PH3	100
F 10 M 112	**088674** 2)	10	130	30	112	82	PH3	100
F 10 M 132	**088676** 2)	10	150	30	132	102	PH3	100
F 10 M 152	**088678** 2)	10	170	30	152	122	PH3	100
F 10 M 182	**088680** 2)	10	200	30	182	152	PH3	50
F 10 M 202	**061064** 2)	10	220	30	202	172	PH3	50
ADM 10 W weiß	**088688** 3)	-	-	-	-	-	-	100
ASM 10 W weiß	**060320** 3)	-	-	-	-	-	-	100

(1) Screw head Ø 9 mm (2) Screw head Ø 13 mm (3) Fits for F10M

LOADS

Recommended Loads[1)] for a single anchor for multiple use for non-structural application

Type			F 8 M	F 10 M
Recommended loads in the respective base material Frec 2)				
Concrete	≥ C20/25	(kN)	1.00	1.4
Solid brick	≥ Mz12	(kN)	0.30	1.30
Solid sand-lime brick	≥ KS12	(kN)	0.70	1.30

Type			F 8 M	F 10 M
Recommended loads in the respective base material Frec 2)				
Perforated sand-lime brick	≥ KSL 6	(kN)	0.25	0.60
Solid brick of lightweight aggregate concrete	≥ V2	(kN)	-	0.50

(1) Includes the safety factor 4. (2) Valid for tensile load, shear load and oblique load under any angle

The economical special screw for window installation

Window frames

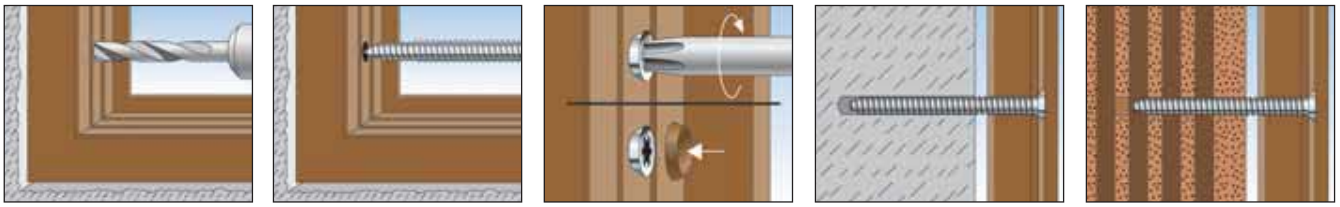
ADVANTAGES

- No additional plugs are required for screw installation, thus allowing work to progress quickly and economically.
- The small drill bit diameter of 6 mm allows for efficient work, including in the case of series installation.
- The continuous thread prevents the window frame from being pulled against the substrate, and ensures a stress-free and long-lasting fixing of the frame.
- The optimised special thread reduces the amount of force required for screwing in the screws, meaning that the installation process can be completed without the use of too much force.

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow block made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid block made from lightweight concrete
- Solid brick

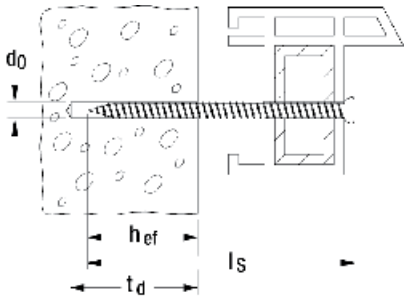
INSTALLATION



TECHNICAL DATA

Frame fixing screw **FFS** - with flat head

Frame fixing screw **FFSZ**- with cylinder head

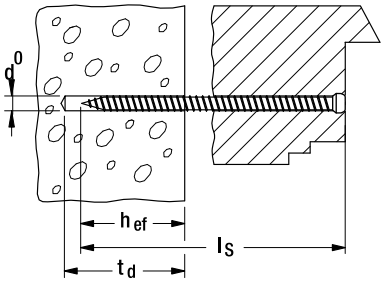


Item	Art-No.	Drill hole diameter do (mm)	Screw length ls (mm)	Drive	Head (Ømm)	Sales unit (pcs)
FFS 7,5 x 42	**062379**	6	42	T30	11.5	100
FFS 7,5 x 52	**062395**	6	52	T30	11.5	100
FFS 7,5 x 62	**062396**	6	62	T30	11.5	100
FFS 7,5 x 72	**061550**	6	72	T30	11.5	100
FFS 7,5 x 82	**068955**	6	82	T30	11.5	100
FFS 7,5 x 92	**061551**	6	92	T30	11.5	100
FFS 7,5 x 102	**068956**	6	102	T30	11.5	100
FFS 7,5 x 112	**061552**	6	112	T30	11.5	100
FFS 7,5 x 122	**068957**	6	122	T30	11.5	100
FFS 7,5 x 132	**061553**	6	132	T30	11.5	100
FFS 7,5 x 152	**061554**	6	152	T30	11.5	100
FFS 7,5 x 182	**061555**	6	182	T30	11.5	100
FFS 7,5 x 202	**068958**	6	202	T30	11.5	100
FFS 7,5 x 212	**061556**	6	212	T30	11.5	100
FFSZ 7,5 x 52 T25	**092695**	6	52	T30	8.5	100
FFSZ 7,5 x 62 T25	**092697**	6	62	T30	8.5	100
FFSZ 7,5 x 72 T25	**092698**	6	72	T30	8.5	100
FFSZ 7,5 x 82 T25	**092699**	6	82	T30	8.5	100
FFSZ 7,5 x 92 T25	**092700**	6	92	T30	8.5	100
FFSZ 7,5 x 102 T25	**092701**	6	102	T30	8.5	100

Item	Art-No.	Drill hole diameter d_0 (mm)	Screw length l_s (mm)	Drive	Head (Ømm)	Sales unit (pcs)
FFSZ 7,5 x 112 T25	**092702**	6	112	T30	8.5	100
FFSZ 7,5 x 122 T25	**092703**	6	122	T30	8.5	100
FFSZ 7,5 x 132 T25	**092704**	6	132	T30	8.5	100
FFSZ 7,5 x 152 T25	**092705**	6	152	T30	8.5	100
FFSZ 7,5 x 182 T25	**092706**	6	182	T30	8.5	100
FFSZ 7,5 x 202 T25	**092708**	6	202	T30	8.5	100
FFSZ 7,5 x 212 T25	**092709**	6	212	T30	8.5	100

TECHNICAL DATA

Window frame screw with cylinder head
FFSZ



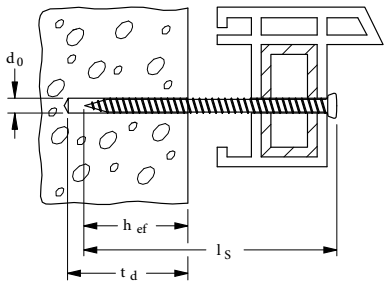
Anchorage depth h_{ef}
$h_{ef} \geq 30$mm in concrete
$h_{ef} \geq 40$mm in solid brick
$h_{ef} \geq 60$mm in perforated brick / aerated concrete

t_d: drill hole depth $\geq h_{ef} + 10$ mm

Item	Art-No.	Drill hole diameter d_0 [mm]	Screw length l_s [mm]	Drive [mm]	Head [Ø mm]	Sales unit [pcs]
FFSZ 7,5 x 52 T30	**532906**	6	52	T30	8	100
FFSZ 7,5 x 62 T30	**532907**	6	62	T30	8	100
FFSZ 7,5 x 72 T30	**532908**	6	72	T30	8	100
FFSZ 7,5 x 82 T30	**532909**	6	82	T30	8	100
FFSZ 7,5 x 92 T30	**532910**	6	92	T30	8	100
FFSZ 7,5 x 102 T30	**532911**	6	102	T30	8	100
FFSZ 7,5 x 112 T30	**532912**	6	112	T30	8	100
FFSZ 7,5 x 122 T30	**532913**	6	122	T30	8	100
FFSZ 7,5 x 132 T30	**532914**	6	132	T30	8	100
FFSZ 7,5 x 152 T30	**532915**	6	152	T30	8	100
FFSZ 7,5 x 182 T30	**532916**	6	182	T30	8	100
FFSZ 7,5 x 202 T30	**532917**	6	202	T30	8	100
FFSZ 7,5 x 212 T30	**532919**	6	212	T30	8	100
FFSZ 7,5 x 252 T30	**532920**	6	252	T30	8	100
FFSZ 7,5 x 302 T30	**532921**	6	302	T30	8	100

No pre-drilling in aerated concrete.

Window frame screw with flat head **FFS**



Anchorage depth h_{ef}
$h_{ef} \geq 30$mm in concrete
$h_{ef} \geq 40$mm in solid brick
$h_{ef} \geq 60$mm in perforated brick / aerated concrete
t_d: drill hole depth $\geq h_{ef} + 10$ mm

Item	Art-No.	Drill hole diameter d_0 [mm]	Screw length l_s [mm]	Drive [mm]	Head [Ø mm]	Sales unit [pcs]
FFS 7,5 x 42 T30	**532922**	6	42	T30	11,5	100
FFS 7,5 x 52 T30	**532923**	6	52	T30	11,5	100
FFS 7,5 x 62 T30	**532925**	6	62	T30	11,5	100
FFS 7,5 x 72 T30	**532927**	6	72	T30	11,5	100
FFS 7,5 x 82 T30	**532928**	6	82	T30	11,5	100
FFS 7,5 x 92 T30	**532930**	6	92	T30	11,5	100
FFS 7,5 x 102 T30	**532931**	6	102	T30	11,5	100
FFS 7,5 x 112 T30	**532932**	6	112	T30	11,5	100
FFS 7,5 x 122 T30	**532934**	6	122	T30	11,5	100
FFS 7,5 x 132 T30	**532935**	6	132	T30	11,5	100
FFS 7,5 x 152 T30	**532941**	6	152	T30	11,5	100
FFS 7,5 x 182 T30	**532942**	6	182	T30	11,5	100
FFS 7,5 x 202 T30	**532943**	6	202	T30	11,5	100
FFS 7,5 x 212 T30	**532944**	6	212	T30	11,5	100
FFS 7,5 x 252 T30	**532945**	6	252	T30	11,5	100
FFS 7,5 x 302 T30	**532946**	6	302	T30	11,5	100

No pre-drilling in aerated concrete.

ACCESSORIES

Cover cap **FFSZ-A**

Item	Art.-No.	Colour	Cap [Ø mm]	Cap height [mm]	Match	Sales unit [pcs]
FFSZ-A W	**538708**	white	14	2,2	FFSZ - cylinder head	100
FFSZ-A BR	**538709**	brown	14	2,2	FFSZ - cylinder head	100

ACCESSORIES

Cover cap **FFS-A**

Item	Art.-No.	Colour	Cap [Ø mm]	Cap height [mm]	Match	Sales unit [pcs]
FFS-A W	**061560**	white	15	4,8	FFS - flat head	100
FFS-A BR	**061561**	brown	15	4,8	FFS - flat head	100

LOADS

Window frame screws FFSZ and FFS

Highest recommended loads[1)] of a single screw.

Type			FFSZ			FFS		
Screw diameter	Ø	[mm]	7,5			7,5		
Anchorage depth	$h_{ef} \geq$	[mm]	30	40	60	30	40	60
Anchorage in concrete ≥ C20/25								
Recommended tensile load		[kN]	1,00	-		1,00	-	
Recommended shear load		[kN]	0,70	-		0,70	-	
Min. edge distance[5)]	c_{min}	[mm]	30	-		30	-	
Anchorage in masonry								
Recommended tensile load in solid brick	≥ Mz 12	[kN]	-	0,40[3)]	0,80	-	0,40[3)]	0,80
Recommended shear load in solid brick	≥ Mz 12	[kN]	-	0,30[3)]	0,70	-	0,30[3)]	0,70
Recommended tensile load in solid sand-lime brick	≥ KS 12	[kN]	-	1,00	-	-	1,00	-
Recommended shear load in solid sand-lime brick	≥ KS 12	[kN]	-	0,60	-	-	0,60	-
Recommenced tensile load in vertically perforated brick	≥ HLz 12	[kN]	-		0,25[3)]	-		0,25[3)]
Recommenced shear load in vertically perforated brick	≥ HLz 12	[kN]	-		0,40[3)]	-		0,40[3)]
Min. edge distance[5)]	c_{min}	[mm]	-	40		-	40	
Anchorage in aerated concrete								
Recommended load[2)] in aerated concrete	≥ AAC 2	[kN]	-		0,10[4)]	-		0,10[4)]
	≥ AAC 4	[kN]	-		0,25[4)]	-		0,25[4)]
Min. Randabstand[5)]	c_{min}	[mm]	-		40	-		40

(1) Required safety factors are considered. As a single screw counts e.g. a screw with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1,5 \times h_{ef}$.
(2) Valid for tensile load, shear load and oblique load under any angle.
(3) Rotary drilling.
(4) Without pre-drilling.
(5) Minimal possible edge distance while reducing the recommended loads.

The powerful nylon plug with 4-way expansion

Wall consoles

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

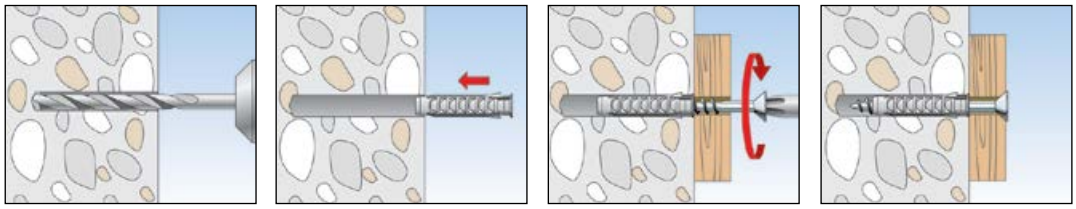
ADVANTAGES

- The 4-way expansion provides the optimum force distribution in the material, and offers high load-bearing capacities in solid and hollow building materials.
- The expansion-free plug neck prevents the creation of expansion forces on the material surface whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- The pronounced rim prevents the plug from slipping into the drill hole, thus allowing for a simple installation.
- The greater anchorage depth of the SX 6x50, 8x65 and 10x80 means that the plug is especially suited to fixings in hollow building materials, aerated concrete and to bridge plaster.

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow block made from lightweight concrete
- Cavity floor slabs made of brick, concrete,etc.
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

INSTALLATION

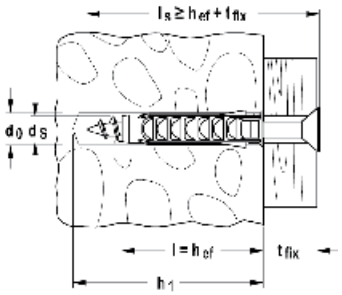


TECHNICAL DATA

Plug **SX** with rim

Plug **SX** - with greater anchorage depth, without rim

Plug **SX** with rim and screw



Item	With rim Art-No.	With greater anchorage depth without rim Art-No.	With rim and screw Art-No.	Drill Hole diameter d_0 (mm)	Min. drill hole depth h_1 (mm)	Anchor length l (mm)	Max fixture thickness t_{fix} (mm)	Wood and chip-board screw ds/ds x/s (mm)	Sales unit (pcs)
	SX	SX	SX-S						
SX 4 x 20	070004	-	-	4	25	20	-	2 - 3	200
SX 5 x 25	070005	-	-	5	35	25	-	3 - 4	100
SX 6 x 30	070006	-	-	6	40	30	-	4 - 5	100
SX 6 x 30	-	-	070021	6	40	30	5	4.5 x 40	50
SX 6 x 50	078185	024827	-	6	60	50	-	4 - 5	100
SX 8 x 40	070008	-	-	8	50	40	-	4.5 - 6	100
SX 8 x 40	-	-	070022	8	50	40	15	5 x 60	50
SX 8 x 65	-	024828	-	8	75	65	-	4.5 - 6	50
SX 10 x 50	070010	-	-	10	70	50	-	6 - 8	50
SX 10 x 80	-	024829	-	10	95	80	-	6 - 8	25
SX 12 x 60	070012	-	-	12	80	60	-	8 - 10	25
SX 14 x 70	070014	-	-	14	90	70	-	10 - 12	20
SX 16 x 80	070016	-	-	16	100	80	-	12 (1/2")	10

LOADS

Recommended loads[1)] for single anchor. The given loads are valid for woodscrew with the specified diameter.

Type			SX 4 x 20	SX 5 x 25	SX 6 x 30 SX 6 x 50	SX 8 x 40 SX 8 x 65	SX 10 x 50	SX 10 x 80	SX 12 x 60	SX 14 x 70	SX 16 x 80
Screw diameter	Ø	(mm)	3	4	5	6	8	8	10	12	12
Min. edge distance in concrete	cmin	(mm)	20	25	35	40	50	50	65	100	120
Recommended loads in the respective base material Frec [2)]											
Concrete	≥ C20/25	(kN)	0.16	0.30	0.65	0.70	1.20	1.20	1.70	2.00	2.60
Solid brick	≥ Mz 12	(kN)	0.11	0.25	0.30	0.45	0.65	1.20	0.70	0.80	0.90
Solid sand lime stone	≥ KS 12	(kN)	0.17	0.30	0.50	0.45	1.20	1.20	1.70	2.00	2.60
Aerated concrete	≥ PB2, PP2 (G2)	(kN)	0.03	0.03	0.03	0.04	0.09	0.20	0.14	0.30	0.40
Aerated concrete	≥ PB 4, PP4 (G4)	(kN)	0.07	0.09	0.09	0.14	0.30	0.60	0.45	0.50	0.60
Vertically perforated bricks ≥ Hlz 12	(ρ ≥ 1.0 kg/dm³)	(kN)	0.13	0.07	0.07	0.17	0.17	0.50	0.26	0.40	0.60
Perforated sand-lime brick	≥ KSL 12	(kN)	0.15	0.17	0.30	0.35	0.30	0.80	0.35	0.30	0.40
Plaster wall		(kN)	-	-	-	0.26	0.37	-	1.00	1.00	-

(1) Includes the safety factor 7. (2) Valid for tensile load, shear load and oblique load under any angle.

The nylon plug for all building materials

Mirror fixings

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

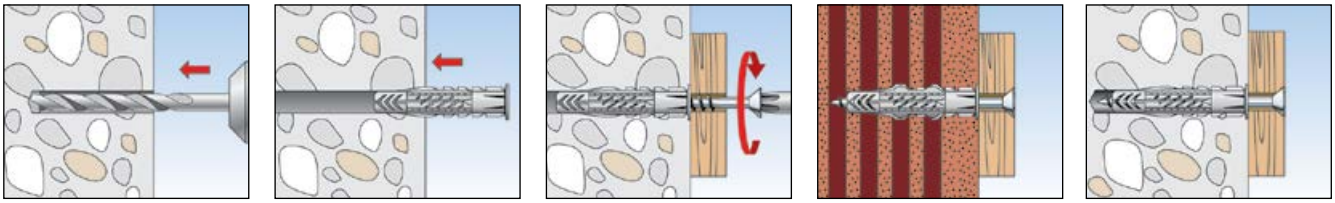
ADVANTAGES

- 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.
- The UX's angled connection ridges allow for optimum screw guidance.
  Serrated anti-rotation locks prevent rotation in the drill hole. This guarantees the greatest possible installation safety.
- Fixing sets with screws, eye screws and hooks provide the right solution for all applications.

BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow block made from lightweight concrete
- Cavity floor slabs made of brick, concrete, etc.
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chip board
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

INSTALLATION

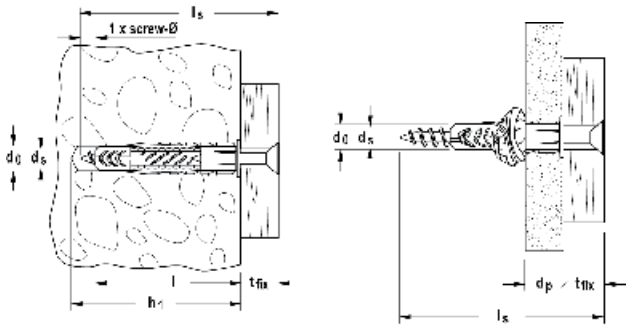


TECHNICAL DATA

UX - without rim

UX R - with rim

UX R S - with rim and screw



Item	Without rim Art-No. UX	Without rim Art-No. UX R	With rim and screw Art-No. UX R S	Drill Hole diameter d0 (mm)	Min. drill hole depth h1 (mm)	Min. panel thickness dp (mm)	Anchor length l (mm)	Wood and chip-board screws ds/ds xls (mm)	Max fixture thickness tfix (mm)	Sales unit (pcs)
UX 5 x 30	094721	094722	–	5	40	9.5	30	3 - 4	–	100
UX 6 x 35	062754	062756	–	6	45	9.5	35	4 - 5	–	100
UX 6 x 35	–	–	094758	6	60	9.5	35	4.5 x 60	20	25
UX Green 6 x 35 R	–	518885	–	6	45	9.5	50	4 - 5	–	100
UX 6 x 50	072094	072095	–	6	60	9.5	35	4 - 5	–	100
UX 6 x 50	–	–	094759	6	75	9.5	50	4.5 x 75	20	25
UX 8 x 40	–	505483	–	8	50	9.5	40	4.5 - 6	–	100
UX 8 x 50	077869	077870	–	8	60	9.5	50	4.5 - 6	–	100
UX 8 x 50	–	–	094762	8	70	9.5	50	5 x 70	15	25
UX 8 x 50	–	–	094760	8	80	9.5	50	5 x 80	25	25
UX Green 8 x 50 R	–	518886	–	8	60	9.5	50	4.5 - 6	–	25
UX Green 10 x 60 R	–	518887	–	10	75	9.5	60	6 - 8	–	20
UX 10 x 60	077871	077872	–	10	75	12.5	60	6 - 8	–	50
UX 10 x 60	–	–	094761	10	85	12.5	70	6 x 8	20	10
UX 12 x 70	062758	–	–	12	85	–	75	58 - 10	–	25
UX 14 x 75	062757	–	–	14	95	–		10 - 12	–	20

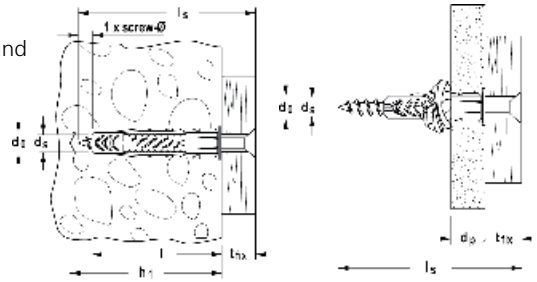
UX RH - with rim and round hook

UX RH - with rim and angle hook

UX RH N - with rim and round hook (whitecoated)

UX WH N - with rim and angle hook (white coated)

UX OH N - with rim and eyebolt (whitecoated)



Item	Without rim and round hook Art-No. RH	With round hook(white coated Art-No. RH N	With rim and angle hook Art-No. WH	With angle hook(white coated Art-No. WH N	With eyebolt (white coated) Art-No. OH N	Drill Hole diameter d_0 (mm)	Min. drill Hole depth h_1 (mm)	Min. panel thickness dp (mm)	Anchor length l (mm)	Dimension of hook screw ds x ls (mm)	Sales unit (pcs)
UX 6 x 35	**094407**	–	–	–	–	6	45	9.5	35	4.5 x 67	25
UX 6 x 35	–	–	**094408**	–	–	6	45	9.5	35	4.5 x 51	25
UX 8 x 50	**094409**	**094412**	–	–	**094414**	8	60	9.5	50	5.5 x 87	25
UX 8 x 50	–	–	**094410**	**094413**	–	8	60	9.5	50	5.5 x 70	25

LOADS

Recommended loads [1] for single anchor. The given loads are valid for woodscrew with the specified diameter.

Type			UX5	UX6	UX6 x 50	UX8	UX10	UX12	UX14
Screw diameter	Ø	(mm)	4	5	5	6	8	10	12
Recommended loads in the respective base material F_{rec} [2]									
Concrete	≥ C20/25	(kN)	0.30	0.40	0.60	0.60	1.00	1.50	1.80
Solid brick	≥ Mz 12	(kN)	0.20	0.20	0.30	0.30	0.50	0.70	0.80
Hollow sand lime stone	≥ KSL 12	(kN)	0.30	0.40	0.40	0.50	0.60	0.80	0.80
Vertically perforated brick	≥ Hlz 12	(kN)	0.20	0.20	0.20	0.20	0.20	0.30	0.40
Aerated concrete	≥PB4, PP4 (G4)	(kN)	0.15	0.20	0.20	0.30	0.40	0.60	0.70
Gypsum plasterboard	12,5 mm	(kN)	0.10	0.10	0.10	0.10	0.10	-	-
Gypsum plasterboard	25 mm	(kN)	0.10	0.15	0.15	0.15	0.15	-	-
Gypsum fibreboard	(Fermacell)	(kN)	0.20	0.20	0.20	0.20	0.25	-	-
Plaster wall	ρ≥0,9 kg/dm³	(kN)	-	-	-	0.15	0.35	0.45	0.50

(1) Includes the safety factor 7. (2) Valid for tensile load, shear load and oblique load under any angle.

Universal plug UX with hook screws respective eye screws

Recommended loads [1] for single anchor. The given loads are valid for included hookscrew respective eyescrew.

Type			UX6 RH	UX6 WH	UX8 RH	UX8 WH	UX8 OE
Recommended loads in the respective base material F_{rec} [2]							
Concrete	≥ C20/25	(kN)	0.25	0.30	0.40	0.45	0.40
Vertically perforated brick	≥ Hlz 12	(kN)	0.20	0.20	0.20	0.20	0.20
Gypsum plasterboard	12.5 mm	(kN)	0.05	0.05	0.05	0.05	0.05

(1) Includes the safety factor 4 (failure by bending the hook). (2) Valid for tensile load, shear load and oblique load under any angle.

FISCHER SAFETY STST SCREW

Stud screw STST with bit head

Material: Steel 4.6
Zinc plating: electro zinc-plated, min. 3µm

Item	Art-No.	Length l (mm)	Thread M	Drive
STST 6 x 60	**504400**	60	M 6	T15
STST 6 x 80	**077714**	80	M 6	T15
STST 8 x 50	**079780**	50	M 8	T25
STST 8 x 60	**079781**	60	M 8	T25
STST 8 x 80	**079782**	80	M 8	T25
STST 8 x 100	**079783**	100	M 8	T25
STST 8 x 120	**079784**	120	M 8	T25
STST 8 x 140	**079785**	140	M 8	T25
STST 8 x 180	**079786**	180	M 8	T25
STST 10 x 60	**077689**	60	M 10	T25
STST 10 x 80	**077707**	80	M 10	T25
STST 10 x 100	**077708**	100	M 10	T25
STST 10 x 120	**077709**	120	M 10	T25
STST 10 x 140	**077711**	140	M 10	T25
STST 10 x 180	**077712**	180	M 10	T25

The economical hammerset plug - easy and quick fixing of threaded rods

Suspended ceilings

ADVANTAGES

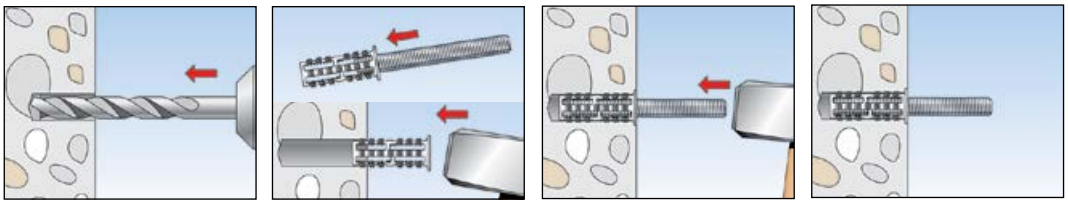
- The innovative plug geometry allows quick and easy installation of the threaded rod with only a hammer.
- The short plug length prevents reinforcement hits and guarantees a secure utilization in reinforced concrete.
- The teeth inside the plug allow standard, metric threads to be held. This saves a large assortment of stud screws.
- The visible edge of the plug serves as visual setting check and guarantees correct setting.
- Easy to check the setting depth, the closed plug tip is used as a stop point. This predetermined break point also allows the threaded rod to be hammered-in deeper.

BUILDING MATERIALS

Approved for:

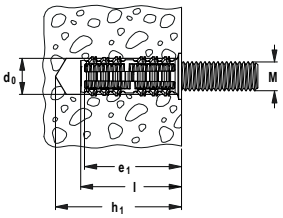
- Concrete
- Solid sand-lime brick
- Solid brick

INSTALLATION WITHIN THE SYSTEM OR WITH INDIVIDUAL COMPONENTS



TECHNICAL DATA

Threaded rod plug **RODFORCE FGD**



Item	Art.-NO.	Drill hole diameter d_0 (mm)	Min. drill-hole depth h_2 (mm)	Min. drop-in penetration e_1 (mm)	Anchor length l (mm)	Threaded Rod (mm)	Sales unit (pcs)
RODFORCE FGD 10 M6	**542106**	10	40	35	33	–	50
RODFORCE FGD 10 M6 TR 50	**542107**	10	40	35	33	M 6 x 50	25
RODFORCE FGD 10 M6 TR 60	**542108**	10	40	35	33	M 6 x 60	25
RODFORCE FGD 10 M6 TR 80	**542109**	10	40	35	33	M 6 x 80	25
RODFORCE FGD 12 M8	**542111**	12	40	35	33	–	50
RODFORCE FGD 12 M8 TR 50	**542112**	12	40	35	33	M 8 x 50	25
RODFORCE FGD 12 M8 TR 60	**542113**	12	40	35	33	M 8 x 60	25
RODFORCE FGD 12 M8 TR 80	**542114**	12	40	35	33	M 8 x 80	25

LOADS

Highest recommended loads[1] for a single anchor.

Type			RODFORCE FGD M6	RODFORCE FGD M8
Thread size	Ø	[mm]	M6	M8
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	0.31	0.36
Solid brick	≥ Mz 12	[kN]	0.19	0.33
Solid sand-line brick	≥ KS 12	[kN]	0.31	0.36

(1) Required safety factors are considered. (2) Valid for tensile load, shear load and oblique load under any angle.

Approved safety in aerated concrete

Pipes

APPROVALS

ADVANTAGES

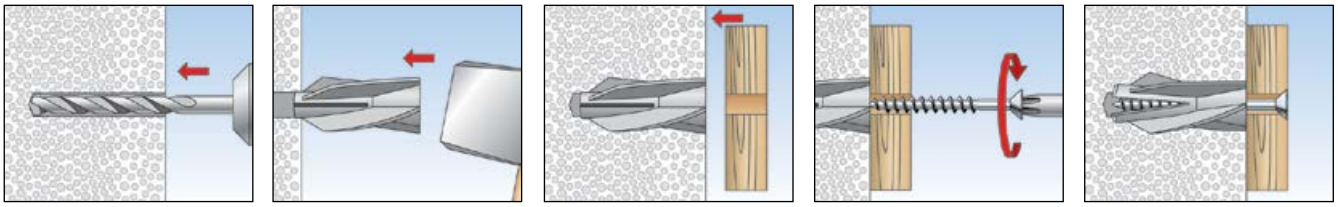
- The general building approval guarantees approved safety for use in safety relevant applications.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring the best pressure distribution and load-bearing capacity.
- Can be applied with a hammer - there is no need for special tools, thus saving time and money for the installation.
- The GB can also be used safely outside (e.g. in façade installation) when combined with the approved fischer safety screw in A4.

BUILDING MATERIALS

Approved for:

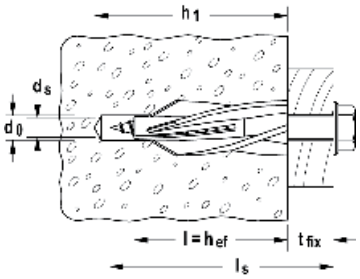
- Aerated concrete with compressive strength 2 to 4 N/mm2
- Aerated concrete wall or ceiling boards with compressive strength 3.3 to 4.4 N/mm2

INSTALLATION



TECHNICAL DATA

Aircrete anchor **GB**



Item	Art-No.	Drill hole diameter do (mm)	Min. drill hole depth h1 (mm)	Plug length= min. anchoring depth l = hef (mm)	fischer safety screw ds (mm)	Sales unit (pcs)
GB 8	**050491**	8	60	50	5	25
GB 10	**050492**	10	65	55	7	20
GB 14	**050493**	14	90	75	10	10

LOADS

Recommended loads[1)] for a single anchor in aerated concrete.The given loads are valid for fischer- safety screws[4)] acc. attached table.
For the design the complete approval Z-21.2-123 has to be considered.

Type			GB 8	GB 10	GB 14
Min. spacing [7)]	s_{min}	(mm)	150 (100) [8)]	200 (100) [8)]	300 (200) [8)]
Min. edge distance [2)]	c_{min}	(mm)	100 (75) [8)]	150 (75) [8)]	200 (150) [8)]
Min. edge distance to solidified joints [6)]	c_{min}	(mm)	9	10	12
min. member thickness	h_{min}	(mm)	75	100	200[5)]
Anchorage depth	h_{ef}	(mm)	50	55	75
Permissible load in the respective base material Fperm [3)]					
Aerated concrete	PB2, PP2 (G2)	(kN)	0.20	0.25	0.40
Aerated concrete	P3,3 (GB3,3)	(kN)	0.30	0.50	0.80
Aerated concrete	≥PB4, PP4, P4,4 (≥ G4, GB4,4)	(kN)	0.40	0.60	0.90
Tensile zone of aerated concrete roof- and ceiling slaps acc. DIN 4223	≥ P3,3 (GB3,3)	(kN)			0.30

(1) Required safety factors are considered.
(2) Minimum permissible edge distance.
(3) Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see approval.
(4) gvz and A4.
(5) The minimum member thickness of aerated concrete roof- and ceiling slabs is 150 mm.
(6) Only in aerated concrete walls.
(7) Minimum possible axial spacing while reducing the permissible load.
(8) Values in brackets apply to PB2, PP2 (G2).

Cavity & Insulation fixing

The versatile metal cavity fixing with metric screws

Curtain rails

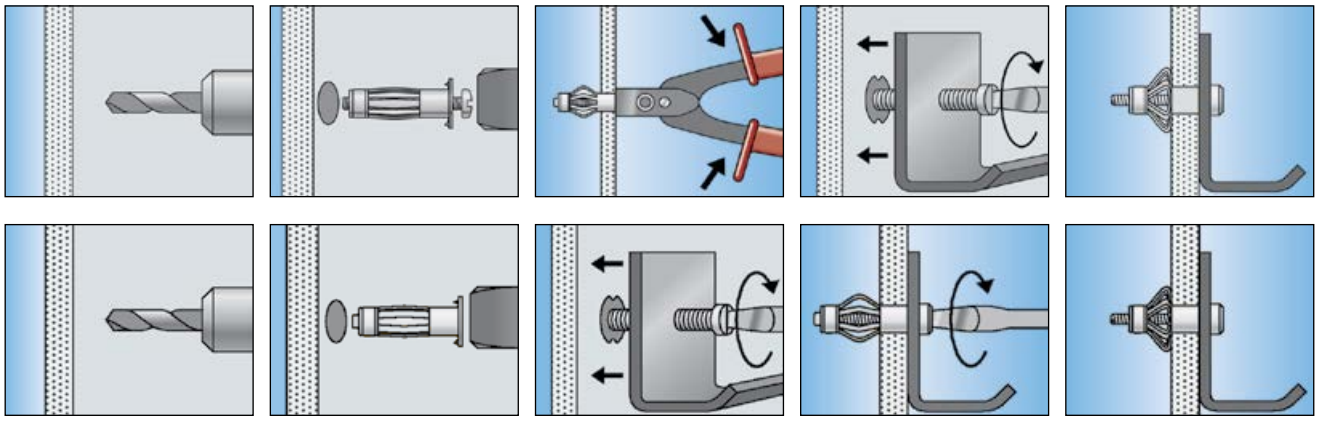
ADVANTAGES

- Due to the extensive range, the HM is suitable for board building materials with a thickness of 3-50 mm and thus suitable for a number of different applications.
- The metric internal thread allows the attachment to be removed and refitted several times, thus offering the best possible flexibility.
- The HM's expanding arms ensure a large supporting surface, thus allowing a high load-bearing capacity.
- The claws around the edge of the fixing penetrate the board building material, preventing the fixing from rotating, thus ensuring a secure installation.

BUILDING MATERIALS

- Gypsum plaster board and gypsum fibre boards
- Cavity floor slabs
- Light building boards made of wood wool
- Chipboard
- Plywood

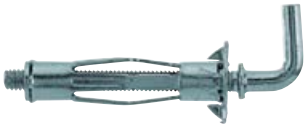
INSTALLATION



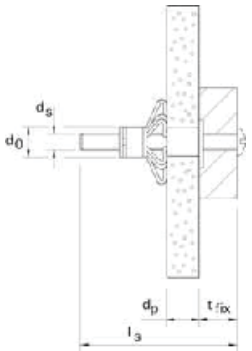
TECHNICAL DATA

HM-S with metric screw

HM-SS with hexagon headed screw



HM-H with angle hook



Item	Art.-NO.	Drill hole diameter d_0 (mm)	Min.drill hole depth h_1 (mm)	Anchor length l (mm)	Screw d_s x l_s (mm)	Max. panel thickness d_p (mm)	Max. fixture thickness t_{fix} (mm)	Sales unit (pcs)
HM 4 x 32 S	**519769**	8	40	32	M 4 x 40	3 - 13	≤ 15 - 25	50
HM 4 x 52 S	**519770**	8	52	45	M 4 x 52	16 - 23	≤ 12 - 21	50
HM 4 x 60 S	**519771**	8	65	60	M 4 x 65	31 - 40	≤ 12 - 21	50
HM 5 x 37 S	**519772**	10	45	37	M 5 x 45	6 - 15	≤ 8 - 17	50

Item	Art.-NO.	Drill hole diameter do (mm)	Min.drill hole depth h_1 (mm)	Anchor length l (mm)	Screw d_s x l_s (mm)	Max. panel thickness d_p (mm)	Max. fixture thickness t_{fix} (mm)	Sales unit (pcs)
HM 5 x 52 S	**519774**	10	58	52	M 5 x 58	7 - 21	≤ 10 - 24	50
HM 5 x 65 S	**519775**	10	71	65	M 5 x 71	20 - 34	≤ 12 - 26	50
HM 6 x 37 S	**519777**	12	45	37	M 6 x 45	6 - 15	≤ 12 - 21	50
HM 6 x 52 S	**519778**	12	58	52	M 6 x 58	7 - 21	≤ 14 - 28	50
HM 6 x 65 S	**519782**	12	71	65	M 6 x 71	17 - 34	≤ 13 - 30	50
HM 6 x 80 S	**519779**	12	88	80	M 6 x 88	32 - 50	≤ 16 - 34	50
HM 8 x 54 S	**519783**[1)]	12	60	54	M 8 x 60	7 - 21	≤ 16 - 30	50
SHM 4 x 32 H	**519780**	8	45	32	–	3 - 13	–	50
HM 5 x 65 H	**519781**	10	71	65	–	20 - 34	–	50

ACCESSORIES

HM Z 1 - the professional installation tool

HM Z 2 the DIY installation tool

Item	Art.-No.	Sales unit (pcs)
HM Z 1	**062320**	1
HM Z 2	**062321**	1

LOADS

Recommended loads[1)] for a single anchor.

Type			HM 4 x 32 S	HM 4 x 45 S	HM 5 x 37 S	HM 5 x 52 S	HM 5 x 65 S	HM 6 x 37 S	HM 6 x 52 S	HM 6 x 65 S	HM 8 x 54 SS
Thread size		M	M4	M4	M5	M5	M5	M6	M6	M6	M8
Installation parameter											
Drill hole diameter		(mm)	8	8	10	10	10	12	12	12	12
Panel thickness		(mm)	3 -13	16 - 23	6 - 15	7 - 21	20 - 34	6 - 15	7 - 21	17 - 34	7 - 21
Recommended loads in the respective base material Frec [2)]											
Gypsum plasterboard	9.5 mm	(kN)	0.15	-	0.15	0.15	-	0.15	0.15	-	0.15
Gypsum plasterboard	12.5 mm	(kN)	0.15	-	0.15	0.15	-	0.15	0.15	-	0.15
Gypsum plasterboard	19 mm (2 x 9.5 mm)	(kN)	-	0.25	-	0.25	-	-	0.25	0.25	0.25
Gypsum plasterboard	25 mm (2 x 12.5 mm)	(kN)	-	-	-	-	0.3	-	-	0.3	-
Chipboard	10 mm	(kN)	0.25	-	0.25	0.25	-	0.25	0.25	-	0.25
Chipboard	13 mm	(kN)	0.25	-	0.25	0.25	-	0.25	0.25	-	0.25
Chipboard	28 mm	(kN)	-	-	-	-	0.5	-	-	0.5	-
Plywood	4 mm	(kN)	0.1	-	-	-	-	-	-	-	-
Hardboard	3 mm	(kN)	0.1	-	-	-	-	-	-	-	-
Wood wool slab	16 mm	(kN)	-	0.05	-	0.05	-	-	0.05	-	0.05
Wood wool slab	25 mm	(kN)	-	-	-	-	0.05	-	-	0.05	-
Fibre cement board	8 mm	(kN)	0.15	-	0.15	0.15	-	0.25	0.25	-	0.25
Gypsum fibreboard	10 mm	(kN)	0.15	-	0.15	0.15	-	0.25	0.25	-	0.25
Gypsum fibreboard	15 mm	(kN)	-	-	0.25	0.25	-	0.25	0.25	-	0.25

(1) Includes the safety factor 3.

(3) Valid for tensile load, shear load and oblique load under any angle.

The cavity fixing for different board thicknesses and large usage lengths

Ceiling lamps

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

fischer NYLON QUALITY

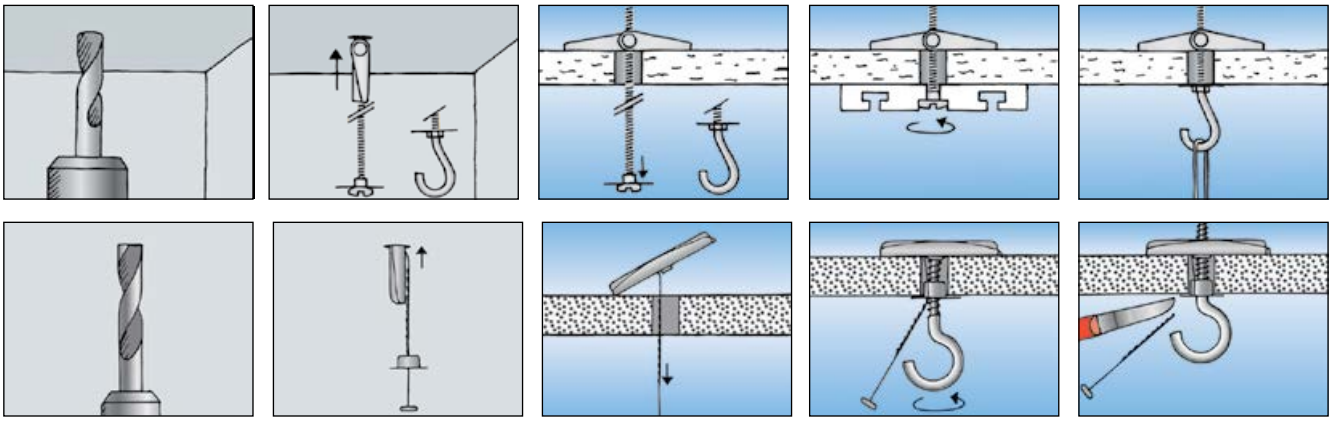
ADVANTAGES

- The long threaded rod of the toggle fixings KD and KDH allows for use with different board thicknesses and thick attachments, and offers maximum flexibility.
- An integrated tension spring causes the catch elements of the spring toggles KD 3+4 and KDH 3+4 to open independently, thus allowing for a simple installation.
- The wide transition beams ensure a good load distribution. This achieves a high load-bearing capacity.
- The nylon gravity toggle K54 allows for the use of standard wood and chipboard screws.

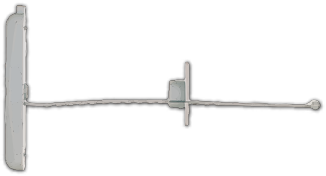
BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Cavity floor slabs made of bricks and concrete
- Chip board
- Plywood

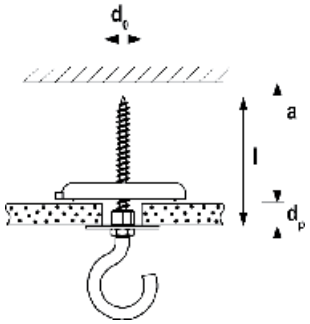
INSTALLATION



TECHNICAL DATA



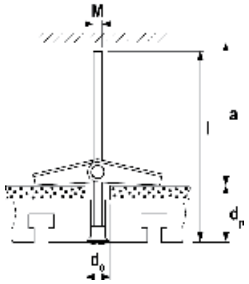
Nylon toggle **K 54**



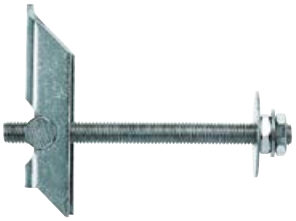
Item	Art-No.	Drill hole diameter do (mm)	Max. panel thickness dp (mm)	Min. cavity depth a (mm)	Anchor length l (mm)	Thread Ø x length (mm)	Sales unit (pcs)
K 54	**050323**	10	65	58	125	woodscrew 4mm	25

Spring toggle **KD 3 + 4**

Spring toggle **KDH 3 + 4**

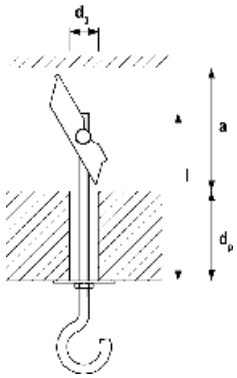


Item	Art-No.	Drill hole diameter do (mm)	Max. panel thickness dp (mm)	Min. cavity depth a (mm)	Anchor length l (mm)	Thread Ø x length (mm)	Sales unit (pcs)
KD 3	**80181**	12	65	27	95	M 3 x 90	50
KDH 3	**80182**	12	51	27	105	M 3 x 80	25
KD 3 B	**80192**	12	65	27	95	M 3 x 90	10
KD 4	**80183**	14	69	34	105	M 4 x 100	25
KDH 4	**80184**	14	35	34	95	M 4 x 70	25
KD 4 B	**80193**	14	69	34	105	M 4 x 100	10

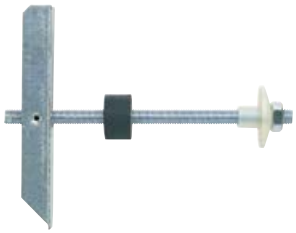


Gravity toggle **KD 5 + 6 + 8**

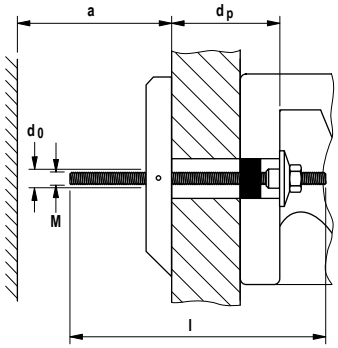
Gravity toggle **KDH 5 + 6 + 8**



Item	Art-No.	Drill hole diameter do (mm)	Max. panel thickness dp (mm)	Min. cavity depth a (mm)	Anchor length l (mm)	Thread Ø x length (mm)	Sales unit (pcs)
KD 5	**80187**	16	63	70	100	M 5 x 100	25
KDH 5	**80188**	16	60	70	130	M 5 x 90	20
KD 6	**80185**	16	63	70	100	M 6 x 100	25
KDH 6	**80186**	16	60	70	130	M 6 x 100	20
KD 8	**80178**	20	55	75	100	M 8 x 100	20
KDH 8	**80179**	20	55	75	130	M 8 x 100	20



Gravity toggle **KM 10**



Item	Art-No.	Drill hole diameter do (mm)	Max. panel thickness dp (mm)	Min. cavity depth a (mm)	Anchor length l (mm)	Screw ds x ls (mm)	Sales unit (pcs)
KM 10	**050326**	30	90	140	180	M 10 x 180	25

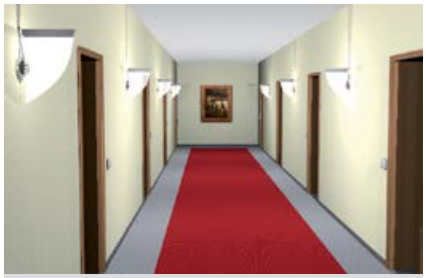
LOADS

Recommended loads[1] for a single anchor.

Type			KD 3	KD 4	KD5	KD6	KD8	KDH3	KDH4	KDH5	KDH6	KDH8
Thread size		M	M3	M4	M5	M6	M8	M3	M4	M5	M6	M8
Recommended loads in the respective base material Frec [3]												
Max. possible recommended load[2]		(kN)	0.45	0.90	2.20	2.80	4.30	0.07 [2]	0.13 [2]	0.30 [2]	0.45 [2]	1.40
Gypsum plasterboard[1]	12,5 mm	(kN)	0.15	0.15	0.15	0.15	0.18	0.07 [2]	0.13 [2]	0.15	0.15	0.18
Oriented strand board[1]	≥15 mm	(kN)	0.34	0.58	0.85	0.85	0.89	0.07 [2]	0.13 [2]	0.30 [2]	0.45 [2]	0.89

(1) Includes the safety factor 4. Failure of the base material decisive.
(2) Includes the safety factor 2.25. Steel failure/bending of the hook decisive.
(3) Valid for axial tensile load

The fastest installation in gypsum plasterboard



Wall lamps in series installation

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

fischer NYLON QUALITY

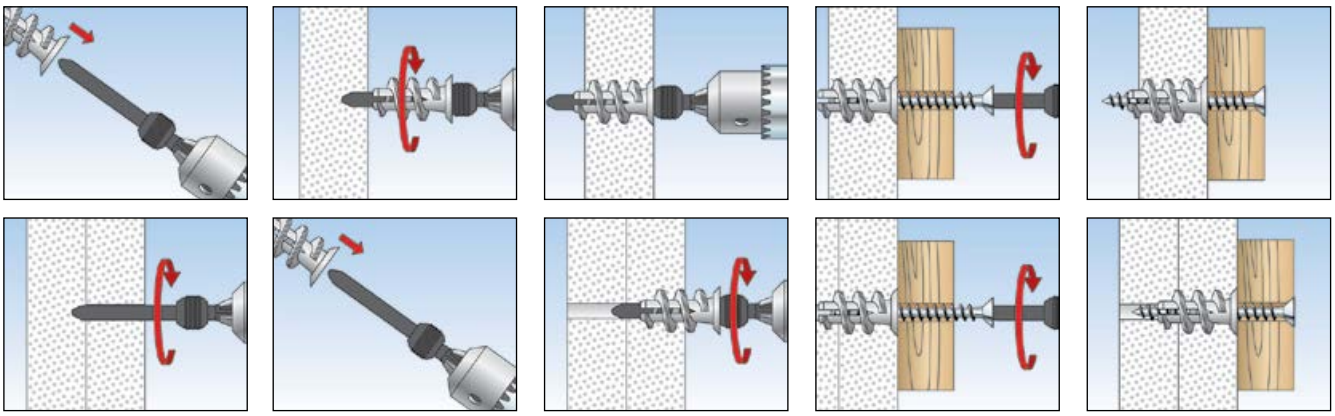
ADVANTAGES

- The included setting tool combines the drilling and fixing setting functions. It thus allows for a fast and simple installation.
- The sharp, self-tapping thread of the GK enables a secure, positive fit fixing. This achieves a high load-bearing capacity.
- The short fixing length means that only a small amount of space is required behind the board. As a result, the GK can also be used in the case of unknown board thickness an cavity depth.
- The cross-drive recess in the head of the fixing means that the GK can also be screwed out like a screw without a setting tool.
- The GK can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.

BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

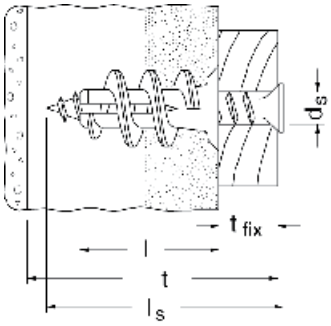
INSTALLATION



TECHNICAL DATA

Plasterboard fixing **GK**

Plasterboard fixing **GKS**



Item	Art-No.	Anchor length l (mm)	Max. thickness to first supporting layer t (mm)	Min. fixture thickness t_{fix} (mm)	Screw ds x ls (mm)	Actuation	Sales unit (pcs)
GK	052389 1)	22	25	–	4.5 - 5.0 x LS	–	100
GKS	052390 2)	22	25	13	4.5 x 35	PZ2	50

(1) Min. screw length = length of plug 22 mm + thickness of building component.

(2) Supplied with plasterboard screw.

installation tool **GKW**

Item	Art.-No.	Sales unit (pcs)
GKW	052393	10

LOADS

Recommended loads[1] for a single anchor. The given loads are valid for chipboard screws with the specified diameters.

Type			GK
Chipboard screw	Ø	(mm)	4.0 - 5.0
Recommended loads in the respective base material Frec [2]			
Gypsum plasterboard	9.5 mm	(kN)	0.07

Type			GK
Gypsum plasterboard	12.5 mm	(kN)	0.08
Gypsum plasterboard	2 x 12.5 mm	(kN)	0.11

(1) Includes the safety factor 4.

(2) Valid for tensile load, shear load and oblique load under any angle.

(3) If the failure of the base material is not possible.

The self-tapping metal fixing for gypsum plasterboard and gypsum fibreboard

Wall lamps

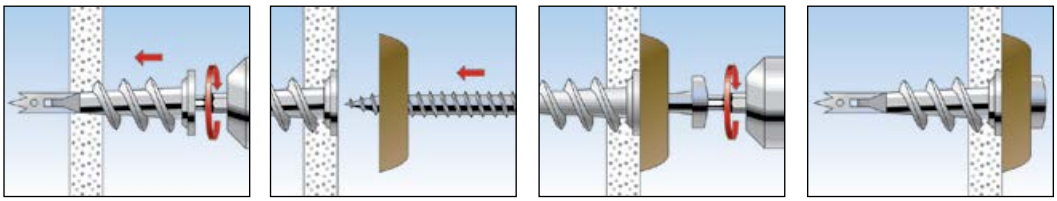
ADVANTAGES

- Due to its material properties, the GKM can be used in gypsum plasterboard and gypsum fibreboard, and can be used with the most wide-ranging screws, hooks and eyescrews. This allows for a broad range of applications.
- The sharp, self-tapping thread enables a secure, positive fit fixing. This achieves a high load-bearing capacity.
- The cross-drive recess means that a standard screwdriver or bit can be used. No special setting tool is required.
- The short fixing length means that only a small amount of space is required behind the board. As a result, the GKM can also be used in the case of unknown board thickness and cavity

BUILDING MATERIALS

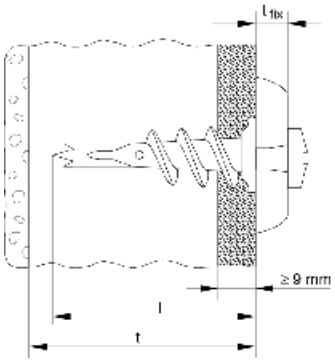
- Gypsum fibreboard
- Gypsum plasterboard

INSTALLATION



TECHNICAL DATA

Plasterboard fixing metal **GKM**



Item	Art-No.	Anchor length l (mm)	Max. thickness to first supporting layer t (mm)	Min. fixture thickness t_{fix} (mm)	Screw d_S x l_S (mm)	Actuation	Sales unit (pcs)
GK	**024556**	31	35	–	4.5 - 5.0 x LS	–	100
GKM 12	**040432**[1)]	31	35	12	4.5 x 35	PZ2	100
GKM 27	**040434**[2)]	31	35	27	4.5 x 50	PZ2	100

LOADS

Recommended loads[1)] for a single anchor. The given loads are valid for chipboard screws with the specified diameters.

Type			GKM
Chipboard screw	Ø	(mm)	4.0 - 5.0
Recommended loads in the respective base material Frec [2)]			
Gypsum plasterboard	9.5 mm	(kN)	0.07
Gypsum plasterboard	12.5 mm	(kN)	0.08
Gypsum plasterboard	2 x 12.5 mm	(kN)	0.11

(1) Required safety factors are considered.
(2) Valid for tensile load, shear load and oblique load under any angle

The expansion plug for fixings in gypsum plasterboard, gypsum fibreboard and wooden panels

Towel rails

CHARACTERISTICS

FLUOR CHLOR BROM HALOGENFREE

fischer PURE MATERIAL NYLON QUALITY HIGH-QUALITY NYLON

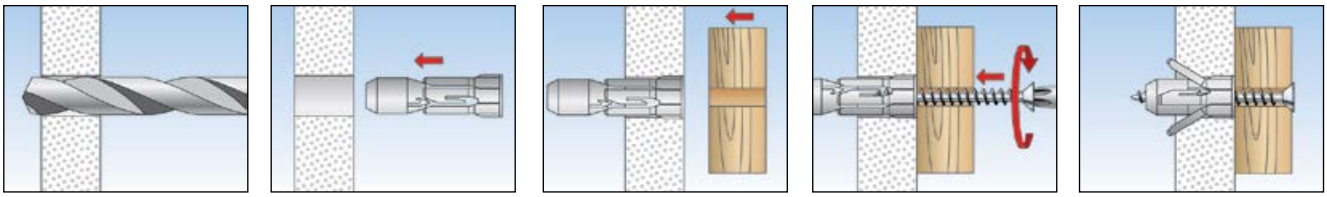
ADVANTAGES

- The operating principle of the fixing allows for use in various board thicknesses, including in low cavity depths. This provides great flexibility.
- The special fixing geometry with a nylon cone ensures a high tightening torque that can be identified immediately. This offers a high level of installation safety.
- The longitudinal ribs prevent the fixing from rotating in the drill hole, thus allowing for a reliable installation.
- The board fixing PD can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.

BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Wooden boards
- MDF boards
- Multiplex boards
- OSB boards
- Plywood boards
- Chipboard
- Wood core plywood boards

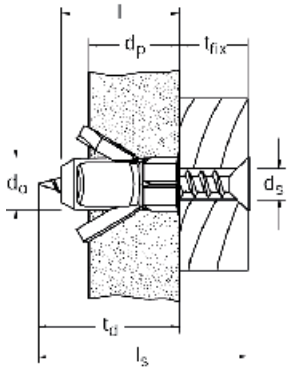
INSTALLATION



TECHNICAL DATA

Board fixing **PD**

Board fixing **PD S** - with chipboard screw



Item	Art-No.	Drill hole diameter do (mm)	Min. drill depth h1 (mm)	Min. panel thickness dp (mm)	Anchor length l (mm)	Screw ds/ds x ls (mm)	Max. fixture thickness tfix (mm)	Sales unit (pcs)
PD 8	**024771**	8	31	6	29	4	–	100
PD 10	**015935**	10	30	7	28	5	–	100
PD 12	**015937**	12	29	9	27	6	–	50
PD 8 S	**024772**[1)]	8	31	6	29	4 x 40	11	50
PD 10 S	**015936**[1)]	10	30	7	28	5 x 40	12	50
PD 12 S	**015938**[1)]	12	29	9	27	6 x 40	22	25

LOADS

Recommended loads[1)] for a single anchor. The given loads are valid for chipboard screws with the specified diameters.

Type			PD 8	PD 10	PD 12
Chipboard screw	Ø	(mm)	4	5	6
Recommended loads in the respective base material Frec [2)]					
Gypsum plasterboard	9.5 mm	(kN)	0.10	0.10	0.10
Gypsum plasterboard	12.5 mm	(kN)	0.10	0.10	0.15
Gypsum plasterboard	2 x 12.5 mm	(kN)	0.15	0.15	0.15
Gypsum fibreboard	12.5 mm	(kN)	0.20	0.25	0.30
Plywood	–	(kN)	0.15	0.40	0.80
Chipboard	16 mm	(kN)	0.25	0.25	0.25

(1) Required safety factors are considered. (2) Valid for tensile load, shear load and oblique load under any angle.

The installation-friendly nylon toggle - for high loads in plaster board

Kitchen hanging cabinets

APPROVALS

ADVANTAGES

- Small drill hole diameter (10mm) and toggle element (39mm) for easy installation in narrow, also insulated cavities.
- Fibre-glass reinforced 2-component toggle element and collar-sleeve for high tensile and shear loads.
- No cutting-in and therefore no weakening of the plasterboard.
- Flexible screw holder for chipboard screws or threaded rods with lock nuts.
- Also usable as an expansion plug for drill holes in solid materials like concrete or wood.
- Easy pre-assembly - collar-sleeve prefixes plug without screw
- Several parallel fixing points with small distances possible.

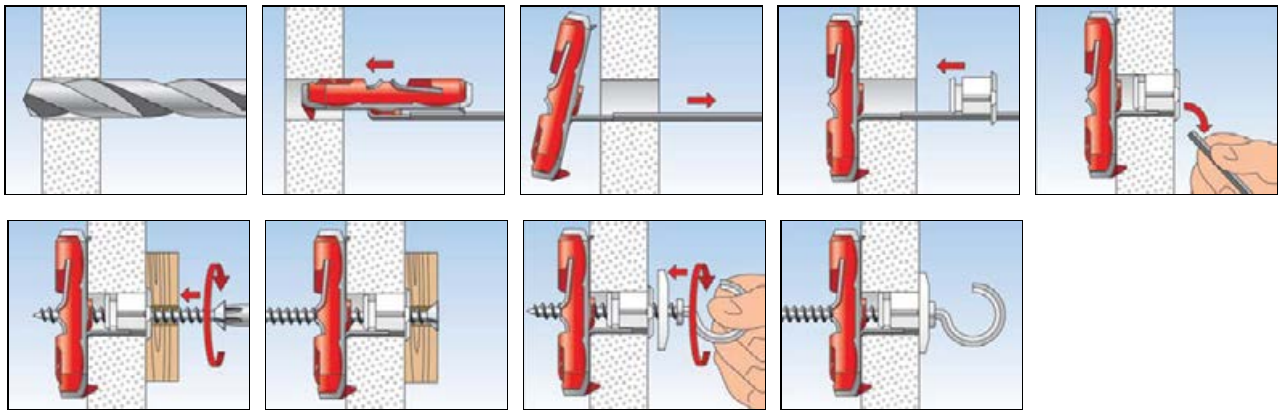
BUILDING MATERIALS

- Gypsum plasterboard
- Gypsum fi breboard
- Wooden panels, such as OSB boards, chipboard, MDF plywood sheets
- Steel plates
- Plastic boards

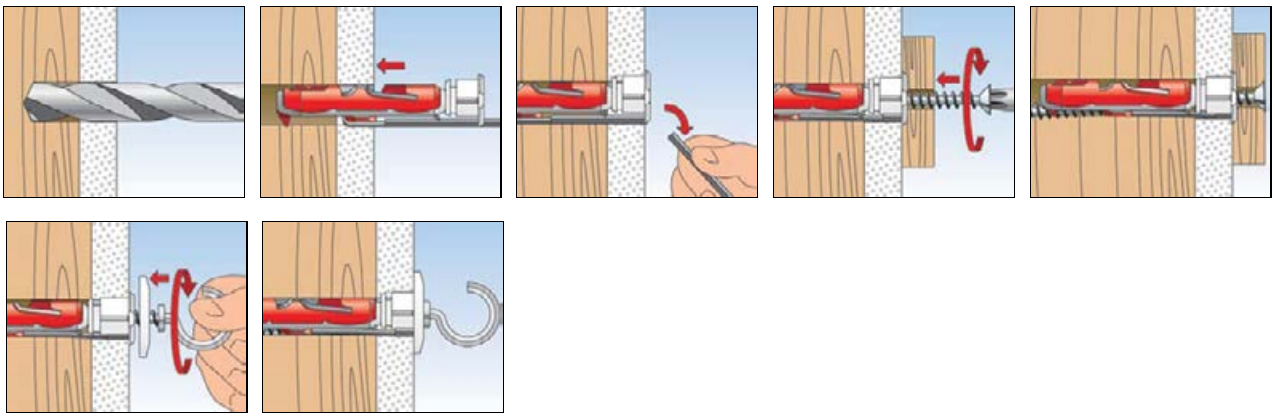
Also functioning in:

- Solid materials, such as concrete and wood

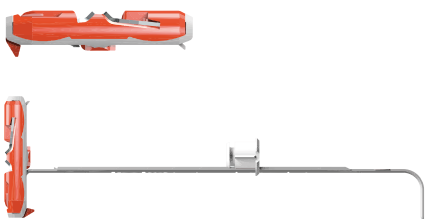
INSTALLATION BOARD MATERIAL



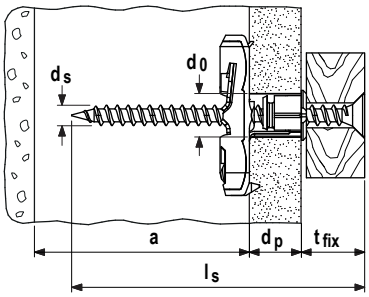
TECHNICAL DATA BOARD MATERIAL



TECHNICAL DATA BOARD MATERIAL

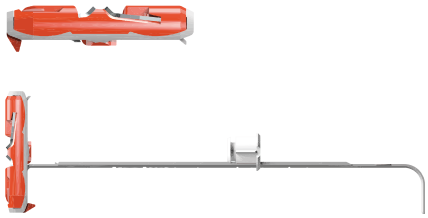


Nylon toggle **DUOTEC**

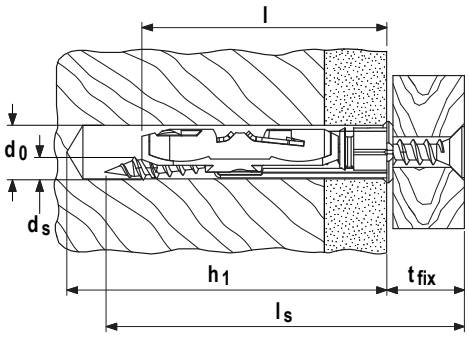


Item	Art-No:	Drill hole diameter do (mm)	Min.panel thickness dp (mm)	Max.panel thickness dp (mm)	Min. cavity depth a (mm)	Screw diameter ds (mm)	Screw length ls (mm)	Sales unit (pcs)
DUOTEC	**537258**	10	9.5	55	40	4.5 - 5	≥ dp + tfix + 20	50
DUOTEC S	**537259**	10	9.5	55	40	5.0	70	25
DUOTEC S PH	**539025**	10	9.5	55	40	5.0	70	25

TECHNICAL DATA SOLID MATERIAL



Nylon toggle **DUOTEC**



Item	Art-No:	Drill hole diameter do (mm)	Min.drill hole depth h1 (mm)	Screw diameter ds (mm)	Min. screw length (mm)	Anchor length l (mm)	Max. fixture thickness tfix (mm)	Sales unit (pcs)
DUOTEC	**537258**	10	ls + 10	4.5 - 5	≥ dp + tfix + 20	47	–	50
DUOTEC S	**537259**	10	80	5.0	70	47	10	25
DUOTEC S PH	**539025**	10	80	5.0	70	47	10	25

LOADS

Recommended loads[1)] for a single anchor.

Type			Duotec			
			Chipboard screw		Metric thread	fischer hook
Screw diameter		M	4.5	5	5	5
Recommended loads in the respective base material Frec for a span in the construction b = 625mm						
Gypsum plasterboard	9.5 mm	(kN)	0.17	0.17	0.17	0.17
Gypsum plasterboard	12.5 mm	(kN)	0,20	0,20	0,20	0,20
Gypsum plasterboard	2 x 12.5 mm	(kN)	0.43	0.43	0.43	0.30 [2)]
Gypsum fiberboard	12.5 mm	(kN)	0.51	0.51	0.51	0.30 [2)]
Chipboard	16 mm	(kN)	0.71	0.71	0.71	0.30 [2)]
OSB-Board	18 mm	(kN)	0.75	0.75	0.75	0.30 [2)]
Recommended loads in the respective base material Frec for a span in the construction b = 625mm						
Gypsum plasterboard	9.5 mm	(kN)	0.20	0.20	0.20	0.20
Gypsum plasterboard	12.5 mm	(kN)	0.36	0.36	0.36	0.30 [2)]
Gypsum plasterboard	2 x 12.5 mm	(kN)	0.59	0.59	0.59	0.30 [2)]
Gypsum fiberboard	12.5 mm	(kN)	0.75	0.75	0.75	0.30 [2)]
Chipboard	16 mm	(kN)	0.75	0.75	0.75	0.30 [2)]
OSB-Board	18 mm	(kN)	0.75	0.75	0.75	0.30 [2)]
Recommended loads in the respective base material Frec						
Concrete	≥ C20/25	(kN)	0.45	0.75	–	0.30 [2)]
Wood	–	(kN)	0.30	0.75	–	0.30 [2)]

The cost-effective plastic insulation support for all conventional insulating boards

Insulating materials in rear-ventilated façades

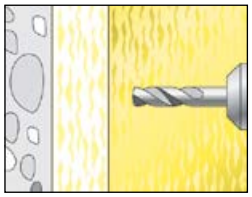
ADVANTAGES

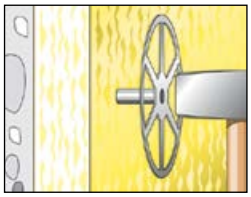
- The optimised geometry of the expansion section ensures a low anchorage depth and reduces the amount of drilling required.
- Flexible pins in the plate area adapt to the insulating material, and ensure a sustained contact pressure.
- The simple hammerset installation allows for a quick installation process and thus reduces workload.
- The colouring of the DHK 90 means that it does not stand out on black clad insulating material in rear-ventilated façades.
- The DHK 45 is suitable for use in pressure-resistant insulating boards and reveals.

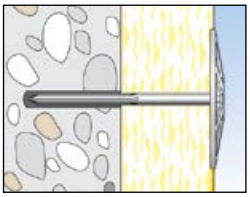
VERSIONS

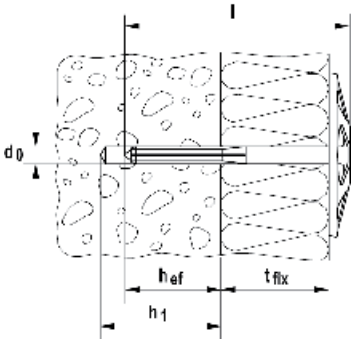
- Concrete
- Hollow block made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid block made from lightweight concrete
- Solid brick

INSTALLATION









TECHNICAL DATA

Insulation support **DHK 45**
plate-ø 45 mm

Insulation support **DHK**
plate-ø 90 mm

Item	Art-No.	Drill hole diameter do (mm)	Min. drill hole depth h1 (mm)	Effect. anchoring depth hef (mm)	Anchor length l (mm)	Max. fixture thickness tfix (mm)	Sales unit (pcs)
DHK 40	**080937**	8	30	20	65	40	250
DHK 60	**080938**	8	30	20	85	60	250
DHK 80	**080939**	8	30	20	105	80	250
DHK 100	**080940**	8	30	20	125	100	250
DHK 120	**080941**	8	30	20	145	120	200
DHK 140	**080949**	8	30	20	165	140	200
DHK 160	**512150**	8	30	20	185	160	100
DHK 180	**512151**	8	30	20	205	180	100
DHK 200	**512153**	8	30	20	225	200	100
DHK 220	**512154**	8	30	20	245	220	100
DHK 45/40	**080892**	8	30	20	65	40	250
DHK 45/60	**080893**	8	30	20	85	60	250
DHK 45/80	**080894**	8	30	20	105	80	250
DHK 45/100	**080895**	8	30	20	125	100	250

LOADS

Recommended loads[1] for a single anchor.

Type			DHK
Recommended loads in the respective base material Frec [2]			
Concrete	≥ C12/15	(kN)	0.03
Solid brick	Mz 12	(kN)	0.03

Type			DHK
Solid sand-lime brick	KS 12	(kN)	0.03
Perforated sand-lime brick	KSL 6	(kN)	0.03
Vertically perforated brick	Hlz 12	(kN)	0.02
Aerated concrete	≥ PB2, PP2 (G2)	(kN)	0.02

(1) Includes the safety factor 4. (2) Valid for tensile load.

The fire-protection-tested metal insulation support for fire-resistant insulating boards

Pressure-resistant insulating materials in curtain façades

APPROVALS

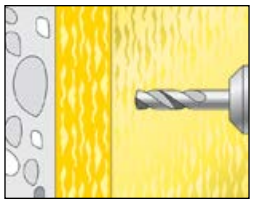
ADVANTAGES

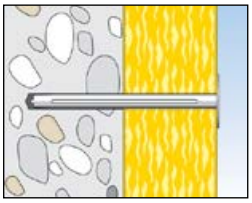
- The metal insulation support achieves fire resistance F 120. This means that it can be used where there are fire resistance requirements.
- The DTM 80 plate for soft insulating materials (available separately) simplifies storage and minimises costs.
- The simple hammerset installation allows for a quick installation process and thus reduces workload.
- The shaft geometry allows setting in aerated concrete without pre-drilling, thus saving a stage of installation.

BUILDING MATERIALS

- Concrete
- Hollow block made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid block made from lightweight concrete
- Solid brick

INSTALLATION





TECHNICAL DATA

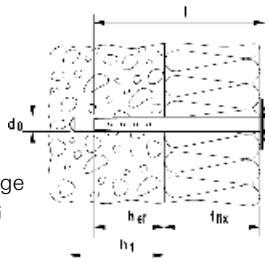
Insulation support metal **DHM**, washer-ø35mm

Insulation retaining metal washer **DTM 80**, washer-ø 85mm, inside-ø 14mm

Cover cap - White **DHM ADK-W**

Cover cap - Grey **DHM ADK-GR**

Cover cap - Beige **DHM ADK-BG**

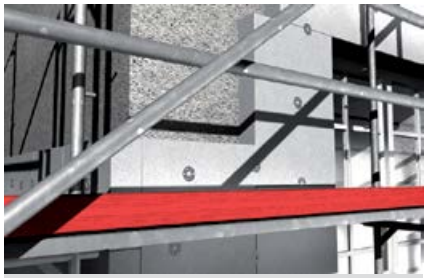


Item	Hot-dip galvanised steel Art-No.	Stainless steel A2 Art-No.	Drill hole diameter do (mm)	Min. drill hole depth h1 (mm)	Effect. anchoring depth hef (mm)	Anchor length l (mm)	Usable length tfix (mm)	Sales unit (pcs)
	fvz	A2						
DHM 40	536253	536262	8	50	40	80	10 - 40	250
DHM 70	536254	536264	8	50	40	110	40 - 70	250
DHM 100	536256	536265	8	50	40	140	70 - 100	250
DHM 130	536257	536266	8	50	40	170	100 - 130	250
DHM 160	536258	536267	8	50	40	200	130 - 160	125
DHM 210	536259	536268	8	50	40	250	170 - 210	125
DHM 260	536260	536269	8	50	40	300	220 - 260	250
DTM 80	536261	536271	–	–	–	–	–	

ACCESSORIES

Item	Art-No:	Diameter D (mm)	Sales unit (pcs)
DHM ADK-W	013330	37	250
DHM ADK-GR	046843	37	250
DHM ADK-BG	046844	37	250

The cost-effective drive anchor with plastic nail



Pressure-resistant insulation boards with rendering

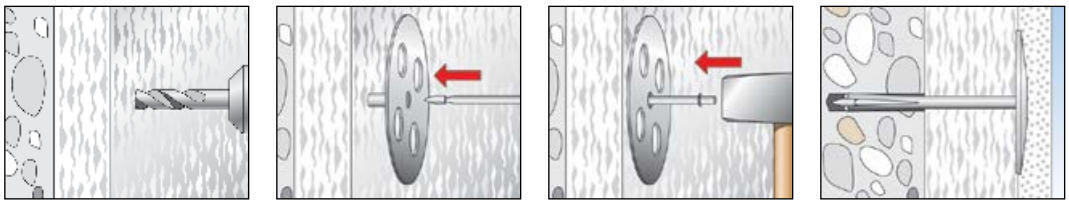
ADVANTAGES

- The glass-fibre-reinforced plastic nail (GRP nail) reduces the heat transmission and prevents marks on the plaster surface.
- The simple hammerset installation allows for a quick installation process and thus reduces workload.
- The well-proven design with low anchorage depth reduces the amount of drilling required, thus achieving a high level of efficiency.
- The DIPK can be used universally in rear-ventilated curtain façades, as well as in plaster façades.

BUILDING MATERIALS

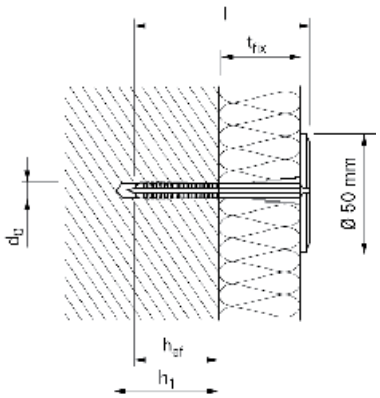
- Concrete
- Hollow block made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

INSTALLATION



TECHNICAL DATA

Render fixing **DIPK**



Item	Art-No.	Drill hole diameter do (mm)	Usable length t_{fix} (mm)	Min. drill hole depth h_1 (mm)	Effect. anchoring depth h_{ef} (mm)	Nail length (mm)	Fixing length l (mm)	Sales unit (pcs)
DIPK 8/20-40	**041865**	8	20 - 40	40	30	77	70	200
DIPK 8/40-60	**041866**	8	40 - 60	40	30	97	90	200
DIPK 8/60-80	**041867**	8	60 - 80	40	30	117	110	200
DIPK 8/80-100	**041868**	8	80 - 100	40	30	137	130	200
DIPK 8/100-120	**041869**	8	110 - 120	40	30	157	150	200
DIPK 10/10-30	**043966**	10	10 - 30	40	30	67	60	200
DIPK 10/40-60	**043967**	10	40 - 60	40	30	97	90	200
DIPK 10/60-80	**043968**	10	60 - 80	40	30	117	110	200
DIPK 10/80-100	**043969**	10	80 - 100	40	30	137	130	200
DIPK 10/100-120	**043970**	10	110 - 120	40	30	157	150	200
DIPK 10/120-140	**043971**[1)]	10	120 - 160	40	30	117	170	200
DIPK 10/140-160	**043972**[1)]	10	140 - 160	40	30	137	190	200

(1) Installation with setting tool, included in each package.

Termoz PN 8 hammerset fixing

Setting the hammerset fixing on polystyrene rigid foam boards

APPROVALS

ETA 09/0171
ETAG 014

Use categories A, B, C

NO THERMAL BRIDGING

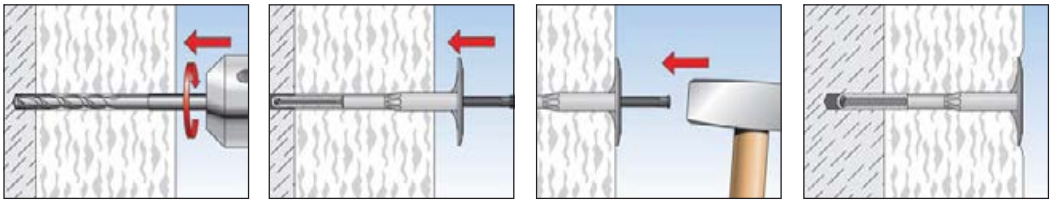
ADVANTAGES

- Optimised retention forces thanks to the glass fibre reinforced plastic nail (GRP).
- Small anchoring depth of 35 mm saves on drilling times.
- Thanks to the GRP nail, the fi xing is free of thermal bridging with the chi value 0.000 (W/K)
- The compression zone in the shank allows the disc to be drawn precisely into the insulation.
- The disc fits tight into the insulation thanks to its thickness of only 2.5 mm. Thus allows the application of low-cost, thin reinforcement layers.
- Can be combined with the insulating discs DT 90, DT 110 and DT 140 for very soft insulating materials.
- For insulating material thicknesses up to 180 mm.

BUILDING MATERIALS

- Building material classes A, B, C
- Concrete
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick

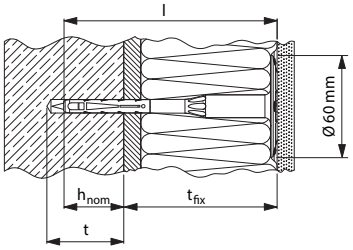
INSTALLATION



TECHNICAL DATA

termoz **PN 8**

Item	Art-No.	Drill hole diameter do (mm)	Min. drill hole depth h_1 (mm)	Effect. anchorage depth h_{nom} (mm)	Anchor length l (mm)	Max. usable length t_{fix} (mm)	Disk Ø (mm)	Sales unit (pcs)
termoz PN 8/110	**506325**	8	45	35	108	70	60	100
termoz PN 8/130	**506326**	8	45	35	128	90	60	100
termoz PN 8/150	**506327**	8	45	35	148	110	60	100
termoz PN 8/170	**506328**	8	45	35	168	130	60	100
termoz PN 8/190	**506329**	8	45	35	188	150	60	100
termoz PN 8/210	**506330**	8	45	35	208	170	60	100
termoz PN 8/230	**506331**	8	45	35	228	190	60	100



t_{fix} ≠ thickness of insulation + glue + old render

LOADS

Permissible loads[1] for a single anchor for fixing of external thermal insulation composite system. For the design the complete approval ETA-09/0171 has to be considered.

Base material [3]	Min. raw denisity class ρ (kg/dm³)	Min. compressive brick strength f_b (N/mm²)	Drilling method [2] (-)	Permissible loads according ETA-approval
Concrete	–	C12/15	H	0.17
Concrete	–	C16/20	H	0.17
Concrete	–	C50/60	H	0.17
Solid sand-lime brick KS	1.8	12	H	0.20
Solid brick Mz	2.0	12	R	0.20
Perforated sand-lime brick KSL	1.4	12	H	0.13

Base material [3]	Min. raw density class ρ (kg/dm³)	Min. compressive brick strength f_b (N/mm²)	Drilling method [2] (-)	Permissible loads according ETA-approval
Vertically perforated brick Hlz	1.0	12	R	0.13
Hollow brick of lightweight aggregate concrete Hbl	1.2	10	H	0.17
Triple-skin outer wall panels made of concrete	–	C20/25	H	0.17

(1) The required partial safety factors for material resistance as well as a partial safety factor for load actions F = 1,5 are considered. (2) H = Hammer drilling; R = Rotary drilling
(3) Restrictions concerning each producer and the possible hole pattern resp. web thickness please see approval. The characteristic tension resistance of the anchor may be determined by means of job site pullout tests carried out on the material actually used, if a characteristic resistance of the base material does not exist. (4) Tensile loads only

Discs for Combining nail and frame fixing, as well as screws.

ADVANTAGES

- The various disc diameters allow for individual adaptation to various insulation materials and requirements and offer the greatest flexibility with wide ranging applications.
- The flexible pins in the DT 90 ensure sustained pressure on the insulation, thus providing a secure hold.
- The DTM 60 made of stainless steel A4 makes it possible to use a frame fixing, and allows for a secure fixing of the insulation material in façade construction in cases of high requirement.

TECHNICAL DATA

HV 36 plastic | HV 36 zinc | ISO-disk 8/60 | DT 60/10 | DTM-A4 | DTM 70/10 | DT 90

Item	Art-No:	Disc Ø (mm)	Disc height (mm)	Through hole df (mm)	Steel sheet thickness (mm)	Sales unit (pcs)
HK 36 plastic	**042830**	36	4.5	5	–	100
HV 36 zinc	**042860**	36	4.5	5	0.7	100
ISO-disk 8/60	**001680**	60	7	8	–	100
DT 60/10	**044317**	60	7	10	–	50
DTM 60/10 A4	**088805**	60	3	10.5	0.5	100
DTM 70/10 zinc	**044318**	70	3	10.5	–	50
DT 90/4	**080957**[1)]	90	9.3	4	–	250
DT 90/8	**080958**	90	9.3	8.2	–	250

Insulation system summary

LOADS

	Characteristic loads in kN according to ETA -approval					Failure loads for the fasteners without approval from the building authorities		
Building material	**tremoz PN**	**tremoz CN**	**tremoz 8NZ**	**tremoz 8UZ* tremoz 8U**	**tremoz 8SV**	**DIPK 8**	**DIPK 10**	**DHM**
Fixing type	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
Solid sand lime brick, unperforated ≧ KS 12	–	–	–	–	–	–	–	–
Claybricks ≧ Mz 12	0.6	0.9	1.50	1.50	1.5	0.61	0.83	1.00
Solid sand lime bricks ≧ KS 12	0.6	0.9	1.50	1.20*/1.50	1.5	–	0.86	–
Concrete C12/15	0.5	0.9	1.50	1.20*/1.50	1.5	–	0.80	–
Concrete ≧ C16/20	0.5	0.9	1.50	1.20*/1.50	1.5	–	0.86	1.00
Concrete ≧ C50/60	0.5	0.9	–	–	–	–	–	1.00
Vertically perforated claybrick ≧ Hlz 12, Apparent density ≧ 1,0 kg/dm	0.4	0.6	0.75	0.60*/0.75	1.2	– –	0.35 –	– –
Lightweight aggregate concrete	–	–	0.40	0.25*/0.40	–	–	–	–
Vertically perforated sandlime brick ≧ KSL 12	0.4	0.5	1.20	0.60*/0.75	1.5	–	0.57	–
Vertically perforated sandlime brick ≧ KSL 20	–	0.75	–	–	–	–	–	–
Lightweight concrete hollow blocks ≧ Hbl 2[2)]	–	–	0.40	0.40	0.4	–	0.23	–
Lightweight concrete hollow blocks ≧ Hbl 10	0.5	0.6	–	–	–	–	0.23	–
Solid concrete block ≧ Vbn 20	–	0.75	–	–	–	–	0.48	–
Lightweight concrete solid blocks ≧ Vbl 8	–	0.6	–	–	–	0.44	–	–
Lightweight concrete solid blocks ≧ Vbl 4	–	–	0.40	0.4*/0.60	0.3	–	–	–
Lightweight aggregate concrete ≧ LAC 2	–	–	–	–	0.2	–	–	–
Lightweight aggregate concrete ≧ LAC 4	–	0.4	–	–	–	–	–	–
Lightweight aggregate concrete ≧ LAC 6	–	0.6	–	–	–	–	–	–
Aerated concrete ≧ PB2; PP2; P3.3	–	–	–	–	–	–	–	–
Aerated concrete ≧ PB4; PP4; P4.4	–	–	–	–	0.4	–	–	–

The installation-friendly polyamide retaining disc for panel building materials

Pressure-resistant insulation boards on timber constructions

APPROVALS

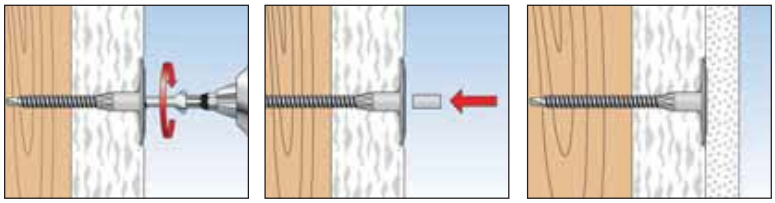
ADVANTAGES

- The DHT-S screw allows setting with out pre-drilling, thus saving a stage of installation.
- The plug reduces the heat transmission and prevents marks on the plaster surface.
- The extremely thin disc construction allows for use with thin layers of plaster and reinforcements and offers maximum flexibility.

BUILDING MATERIALS

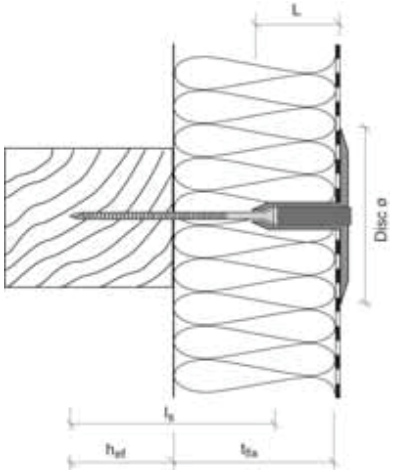
- Wood and wooden materials
- Sheet thickness up to 0.8 mm

INSTALLATION



TECHNICAL DATA

Retaining disc with screw **DHT S**



Item	Art-no:	Colour	Usable length t_{fix} (mm)	Shaft length L (mm)	Screw length l_s (mm)	Effect. anchorage depth h_{ef} (mm)	Disk Ø (mm)	Sales unit (pcs)
DHT S 30 W	**044390**	White	30	20	45	25	50	500
DHT S 50 W	**044392**	White	40 - 50	20	65	25	50	500
DHT S 70 W	**044394**	White	60 - 70	40	65	25	50	500
DHT S 80 W	**044395**	White	70 - 80	40	75	25	50	500
DHT S 100 W	**044388**	White	90 - 105	40	100	25	50	500
DHT S 120 W	**044389**	White	110 - 125	40	120	25	50	500
DHT S 150 W	**516154**	White	140 - 155	40	150	25	50	500

fischer

fischer
greenline
FIS GREEN
300 T
INJECTION MORTAR
Biobased 50–85 %, certified by DIN CERTCO / TÜV Rheinland.
Suitable for many mountings in solid and perforated brick as well as concrete.
Materials:
System:
475 g e 300 ml Art. No. 522223
fischer
greenline
UX GREEN 8x50 R
UX 12
UX 10
fischer

The nylon plug for all building materials

Repairing damaged curtain rails

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

fischer NYLON QUALITY

DIN CERTCO 8C029

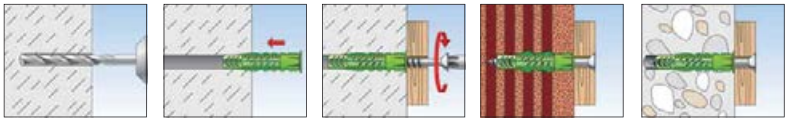
ADVANTAGES

- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular UX plugs.
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX GREEN is the correct choice for unknown base materials.
- Plug collar for anti-slip safety and saw tooth sides as turning lock ensure the highest installation safety.

BUILDING MATERIALS

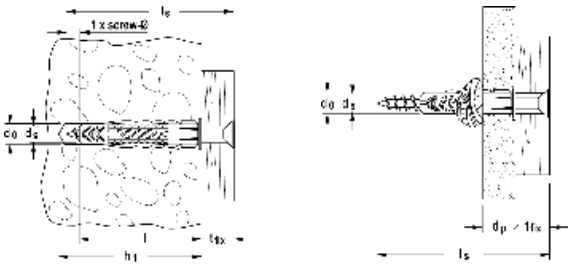
- Concrete and Aerated concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow block made from lightweight concrete
- Cavity floor slabs made of brick, concrete, etc.
- Solid and Perforated sand-lime brick
- Natural stone
- Chipboard
- Solid brick made from lightweight concrete
- Solid brick

INSTALLATION



TECHNICAL DATA

Universal plug **UX GREEN R** - with rim



Item	With rim Art-No.	Without rim Art-No.	Drill Hole diameter d_0 (mm)	Min. drill hole depth h_1 (mm)	Min. panel thickness d_p (mm)	Anchor length l (mm)	Wood and chipboard screws ds/ds xls (mm)	Max fixture thickness t_{fix} (mm)	Sales unit (pcs)
	UX	UX R							
UX GREEN 6 x 35	**518885**	–	6	45	9.5	35	4 - 5	–	40
UX GREEN 6 x 50	**524855**	–	6	60	9.5	50	4 - 5	–	40
UX GREEN 8 x 50	**518886**	–	8	60	9.5	50	4.5 - 6	–	40
UX GREEN 10 x 60	**518887**	–	10	75	12.5	60	6 - 8	–	20
UX GREEN 12 x 70	–	**524858**	12	85	–	70	8 - 10	–	18

LOADS

Recommended loads [1] for single anchor. The given loads are valid for woodscrew with the specified diameter.

Type			UX GREEN 6 X 35	UX GREEN 6 X 50	UX GREEN 8 X 50	UX GREEN 10 X 50	UX GREEN 12 X 60
Screw diameter	Ø	(mm)	5	5	6	8	10
Recommended loads in the respective base material F_{rec} [2]							
Concrete	≥ C20/25	(kN)	0.40	0.60	0.60	1.00	1.50
Solid brick	≥ Mz 12	(kN)	0.20	0.30	0.30	0.50	0.70
Hollow sand lime stone	≥ KSL 12	(kN)	0.40	0.40	0.50	0.60	0.80
Vertically perforated brick	≥ Hlz 12	(kN)	0.20	0.20	0.20	0.20	0.30
Aerated concrete	≥PB4, PP4 (G4)	(kN)	0.20	0.20	0.30	0.40	0.60
Gypsum plasterboard	12.5 mm	(kN)	0.10	0.10	0.10	0.10	–
Gypsum plasterboard	25 mm	(kN)	0.15	0.15	0.15	0.15	–
Gypsum fibreboard	(Fermacell)	(kN)	0.20	0.20	0.20	0.25	–
Plaster wall	ρ≥0,9 kg/dm [3]	(kN)	–	–	0.15	0.35	0.45

(1) Includes the safety factor 7. (2) Valid for tensile load, shear load and oblique load under any angle.

The powerful nylon plug with 4-way expansion

Wall consoles

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

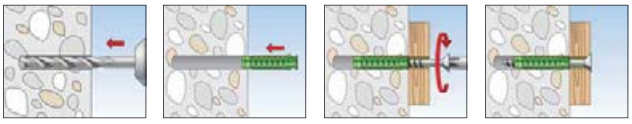
ADVANTAGES

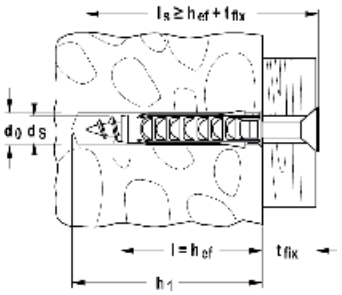
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular SX plugs.
- The powerful 4-way expansion provides optimum force transmission in the building material, thus enabling high load values and security.
- The anti-rotation lock prevents the plug from spinning in the drill hole.
- The expansion-free plug neck prevents the creation of expansion forces on the material whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- Fast and easy push-through installation reduces installation time.

BUILDING MATERIALS

- Concrete and Aerated concrete
- Vertically perforated brick
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow block made from lightweight concrete
- Cavity floor slabs made of brick, concrete, etc.
- Solid and Perforated sand-lime brick
- Natural stone
- Chipboard
- Solid brick made from lightweight concrete
- Solid brick

INSTALLATION





TECHNICAL DATA

Plug **SX GREEN** with rim

Plug **SX GREEN** - with greater anchorage depth, without rim

Plug **SX GREEN S** with rim and screw

Item	With rim Art-No.	Without rim Art-No.	Without rim and screw Art-No.	Drill Hole diameter d_0 (mm)	Min. drill hole depth h_1 (mm)	Anchor length l (mm)	Max fixture thickness t_{fix} (mm)	Wood and chip-board screws ds/ds xls (mm)	Sales unit (pcs)
	SX	SX	SX-S						
SX GREEN 5 x 25	**524859**	–	–	5	35	25	–	3 - 4	90
SX GREEN 6 x 30	**524860**	–	–	6	40	30	–	4 - 5	90
SX GREEN 6 x 30	–	–	**524866**	6	40	30	5	4.5 x 40	45
SX GREEN 6 x 50	–	**524861**	–	6	60	50	–	4 - 5	90
SX GREEN 8 x 40	**524862**	–	–	8	50	40	–	4.5 - 6	90
SX GREEN 8 x 40	–	–	**524867**	8	60	40	15	5 x 60	45
SX GREEN 8 x 65	–	**524863**	–	8	75	65	–	4.5 - 6	45
SX GREEN 10 x 50	**524864**	–	–	10	70	50	–	6 - 8	45
SX GREEN 12 x 60	**524865**	–	–	12	80	60	–	8 - 10	20

LOADS

Recommended loads [1] for a single anchor.The given loads are valid for wood screws with the specified diameter.

Type			SX GREEN 5 X 25	SX GREEN 6 X 30 SX GREEN 6 X 50	SX GREEN 8 X 40 SX GREEN 8 X 65	SX GREEN 10 X 50	SX GREEN 12 X 60
Screw diameter	Ø	(mm)	4	5	6	8	10
Min. edge distance in concrete	cmin	(mm)	25	35	40	50	65
Recommended loads in the respective base material F_{rec} [2]							
Concrete	≥ C20/25	(kN)	0.30	0.65	0.70	1.20	1.70
Solid brick	≥ Mz 12	(kN)	0.25	0.30	0.45	0.65	0.70
Solid sand lime stone	≥ KS 12	(kN)	0.30	0.50	0.45	1.20	1.70
Aerated concrete	≥ PB2, PP2 (G2)	(kN)	0.03	0.03	0.04	0.09	0.14
Aerated concrete	≥PB4, PP4 (G4)	(kN)	0.09	0.09	0.14	0.30	0.45
Vertically perforated bricks ≥ Hlz 12	($\rho \geq 1.0$ kg/dm³)	(kN)	0.07	0.07	0.17	0.17	0.26
Perforated sand-lime brick	≥ KSL 12	(kN)	0.17	0.30	0.35	0.30	0.35
Plaster wall		(kN)	-	-	0.26	0.37	1.00

(1) Includes the safety factor 7. (2) Valid for tensile load, shear load and oblique load under any angle.

Secure in aerated concrete

Radiators

APPROVALS

FLUOR CHLOR BROM HALOGENFREE

fischer NYLON QUALITY – HIGH-QUALITY NYLON

BIOBASED 50 - 85% DIN Geprüft BC029

ADVANTAGES

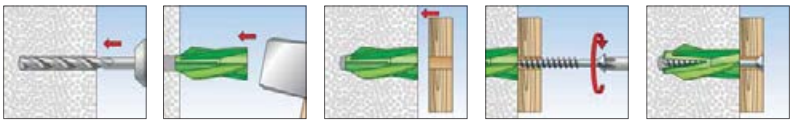
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular GB plugs.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring best pressure distribution and load-bearing capacity.
- Can be applied with a hammer – there is no need for special tools, thus saving time and money for the installation.

BUILDING MATERIALS

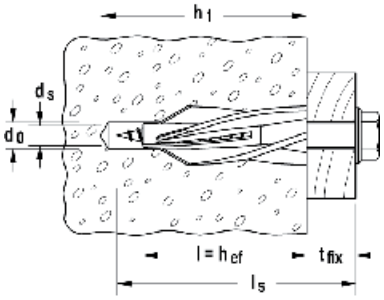
Approved for:

- Aerated concrete with compressive strength 2 to 4 N/mm2
- Aerated concrete wall or ceiling boards with compressive strength 3.3 to 4.4 N/mm2

INSTALLATION



Aircrete anchor **GB GREEN**



Item	Art-No.	Drill hole diameter d_0 (mm)	Min.drill hole depth t (mm)	Plug length= min. anchoring depth $l = h_{ef}$ (mm)	fischer safety screws ds x ls (mm)	Sales unit (pcs)
GB 8 GREEN	**524870**	8	60	50	5	20
GB 10 GREEN	**524871**	10	65	55	7	18

LOADS

Recommended loads [1] for single anchor. The given loads are valid for chipboard screws with the specified diameter.

Type			GB GREEN 8	GB GREEN10
Min. spacing [6]	smin	(mm)	150 (100) [7]	200 (150) [7]
Min. edge distance [2]	cmin	(mm)	100 (75) [8]	150 (100) [7]
Min. edge distance to solidified joints [5]	cmin	(mm)	9	10
min. member thickness	hmin	(mm)	75	100
Anchorage depth	hef(hv)	(mm)	50	55
Recommended loads in the respective base material F_{rec} [3]				
Aerated concrete	PB2, PP2 (G2)	(kN)	0.20	0.25
Aerated concrete	P3,3 (GB3,3)	(kN)	0.30	0.50
Aerated concrete	≥PB4, PP4, P4,4 (≥ G4, GB4,4)	(kN)	0.40	0.60

(1) Required safety factors are considered.
(2) Minimum permissible edge distance.
(3) Valid for tensile load, shear load and oblique load under any angle without any blending.
(4) gvz and A4.
(5) Only in aerated concrete walls.
(6) Minimum possible axial spacing while reducing the permissible load.
(7) Values in brackets apply to PB2, PP2 (G2).

The first injection mortar made from renewable resources for solid and perforated building materials

Bonding in interior construction

APPROVALS

ETA 14/0471
ETA 14/0408

Fire resistance classification R 120

8C048

Certified to NSF/ANSI 61

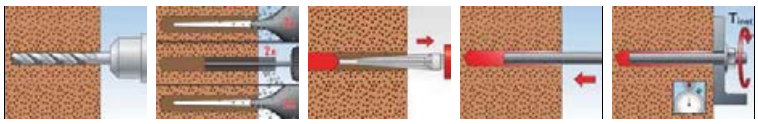
ADVANTAGES

- The worldwide first injection mortar with renewable raw materials. The share of renewable raw materials is certified by DIN CERTCO / TÜV Rheinland.
- Because of the european Technical assessment system in the area of public buildings.
- The low content of volatile organic compounds (VOC) has a positive effect for the evaluation of fixings in "Green building"-projects.
- Biobased raw materials increase the residential and workplace quality and preserve valuable resources for future generations.
- The injection system is not mandatory for indication and thus reduces risks for installers and the environment.
- FIS GREEN is suitable for the use with the complete fischer injection accessories.

BUILDING MATERIALS

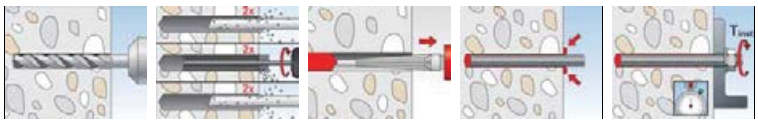
- Reinforced / unreinforced concrete
- Solid and vertically perforated brick
- Sand-lime, solid and perforated bricks
- Hollow blocks made from concrete
- Aerated concrete
- Natural stone
- Concrete C 20/25 to C 50.60
- Non-cracked

INSTALLATION IN SOLID BRICK



INSTALLATION IN PERFORATED BRICK

INSTALLATION IN PERFORATED BRICK



TECHNICAL DATA

Injection mortar **FIS GREEN**

Item	Art-No.	Contents	Sales unit (pcs)
FIS GREEN 300 T (F)	**522989**	1 catridge 300 ml, 2 x easy mixer	4
FIS GREEN 300 T (IT)	**523245**	1 catridge 300 ml, 2 x easy mixer	12
Installation mortar GREEN 300 T	**522223**	1 catridge 300 ml, 2 x easy mixer	12
FIS GREEN 300 T K	**523244**	1 Cartidge 300 ml, 2 x Static mixer (incl. clip with europerforation)	4
FIS GREEN 300 T	**532972**	1 Cartridge 300 ml, 2 x Easy Mixer with transparent Clip	12

LOADS

Recommended loads [1] for a single anchor [1) 9)] in concrete C20/25 [8)]
For the design the complete approval ETA-14/0408 has to be considered.

					Non-cracked concrete			
Item	Min. effective anchorage depth hef,min (mm)	Max. effective anchorage depth hef,max (mm)	Min. member thickness hmin (mm)	Max. torque moment Tinst,max (Nm)	Recommended tensile load Nperm [3)] (kN)	Recommended shear load Vperm [3)] (kN)	Min. spacing smin [7)] (mm)	Min. edge distance cmin [7)] (mm)
FIS A M8 (5.8)	60		100	10.0	5.7	5.1	40	40
		160	190	10.0	9.0	5.1	40	40
FIS A M10 (5.8)	60		100	20.0	6.7	8.6	45	45
		200	230	20.0	13.8	8.6	45	45
FIS A M12 (5.8)	70		100	40.0	8.9	12.0	55	55
		240	270	40.0	20.5	12.0	55	55
FIS A M16 (5.8)	80		116	60.0	12.0	22.3	65	65
		320	356	60.0	37.6	22.3	65	65
FIS A M20 (5.8)	90		138	120.0	14.6	34.9	85	85
		400	448	120.0	58.6	34.9	85	85

Recommended loads [1) 6)] for a single anchor in solid brick mansory for pre-positioned or push-through installation.
For the design the complete approval has to be considered.

Item	Brick compressive strength fb (N/mm2)	Min. brick dimensions (L x W x H) (mm)	Min. embedment depth hef (mm)	Min. member thickness hmin (mm)	Design tensile load [3)] Nd (kN)	Recommended tensile load [3)] Nrec (kN)	Design shear load [3)] Vd (kN)	Recommended shear load [3)] Verc (kN)	Min. spacing smin [2)] (mm)	Min. edge distance cmin [2)] (mm)
Solid brick Mz										
M 8	≥10		50		1.20	0.86	0.99	0.71	150	100
M 10	≥10		50		0.99	0.71	1.40	1.00	150	100
M 12	≥10	240 x 115 x 71	80	115	1.60	1.14	1.40	1.00	150	100
M 8	≥20		50		1.60	1.14	1.60	1.14	150	100
M 10	≥20		50		1.60	1.14	2.00	1.43	150	100
M 12	≥20		80		2.39	1.71	1.81	1.29	150	100
M 8	≥16		50		0.80	0.57	1.60	1.14	150	100
M 10	≥16	230 x 108 x 55	50	108	0.99	0.71	2.20	1.57	150	100
M 12	≥16		50		1.20	0.86	2.20	1.57	150	100
Solid sand-lime brick and solid block KS										
M 8	≥10		50		1.20	0.86	1.60	1.14	150	100
M 10	≥10		50		0.99	0.71	1.60	1.14	150	100
M 10	≥10		80		1.20	0.86	1.60	1.14	240	100
M 12	≥10	240 x 115 x 71	80	115	1.20	0.86	2.00	1.43	240	100
M 8	≥20		50		1.60	1.14	2.20	1.57	150	100
M 10	≥20		50		1.40	1.00	2.20	1.57	150	100
M 10	≥20		80		1.81	1.29	2.20	1.57	240	100
M 12	≥20		80		1.81	1.29	2.80	2.00	240	100
M 8/M 10 [4)]	≥20	230 x 115 x 113	85	115	1.20	0.86	2.60	1.86	230	100
M 12/M 16 [4)]	≥20		85		3.21	2.29	2.60	1.86	230	100
Aerated concrete blocks AAC										
M 8	≥1.8		100		0.99	0.71	0.45	0.32	115	80
M 10	≥1.8		100		0.99	0.71	0.45	0.32	115	80
M 12	≥1.8		100		1.25	0.89	0.45	0.32	115	80
M 16	≥1.8		100		1.25	0.89	0.60	0.43	115	80
M 8	≥4.0		100		1.25	0.89	0.76	0.54	115	80
M 10	≥4.0	500 x 300 x 250	100	300	1.50	1.07	0.76	0.54	115	80
M 12	≥4.0		100		1.50	1.07	0.76	0.54	115	80
M 16	≥4.0		100		1.25	0.89	0.76	0.54	115	80
M 8	≥5.4		100		1.75	1.25	1.25	0.89	115	80
M 10	≥5.4		100		2.00	1.43	1.25	0.89	115	80
M 12	≥5.4		100		2.00	1.43	1.25	0.89	115	80
M 16	≥5.4		100		1.50	1.07	0.99	0.71	115	80
Vertically perforated brick Hlz										
M 8 [4)]		230 x 106 x 55	85	106	0.80	0.57	1.00	0.71	55	100
M 10 [4)]			50		0.80	0.57	1.60	1.14	115	120
M 8/M 10 [4)]					0.80	0.57	2.20	1.57	115	120
M 12/M 16 [4)]	≥12	240 x 175 x 113	85	175	1.00	0.71	2.39	1.71	115	120
M 8/M 10 [4)]					1.40	1.00	2.20	1.57	115	120
M 8/M 10 [4)]			130	175	0.80	0.57	2.39	1.71	115	120
M 8/M 10 [4)]					0.80	0.57	2.39	1.71	115	120
Perforated sand-lime brick KSL										
M 10 [4)]	≥8				1.40	1.00	3.60	2.57	115	120
M 12 [4)]	≥8	240 x 175 x 113	130	175	0.80	0.57	3.00	2.14	115	120
M 16 [4)]	≥8				0.80	0.57	3.00	2.14	115	120

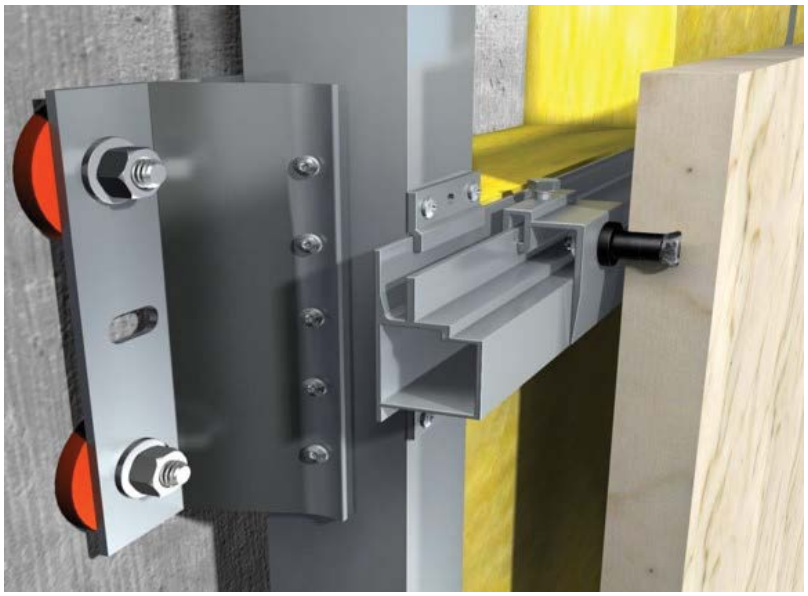
(1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered.
(2) Minimum possible edge distance resp. axial spacing for anchor groups. For further measures e.g. the corresponding axial spacing for anchor groups or the minimum distance between anchor groups please see approval.
(3) For combinations of tensile loads, shear loads, bending moments as well as reduced axial spacings (anchor groups) see approval.
(4) The maximum embedment depth is corresponding with relevant anchor sleeves FIS HK (See technical data)
(5) gvz, A4 and C.
(6) The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drillhole cleaning according approval. The given brick types in combination with the permissible loads are only an extract of the approval.
(7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
(8) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
(9) The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

fischer Facade Systems

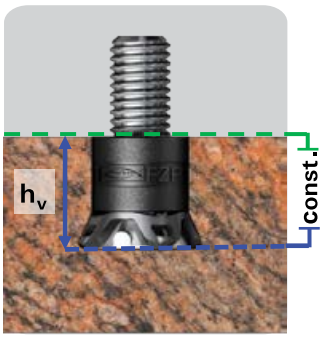
fischer Facade Systems

fischer Facade Systems - the key to a new facade aesthetics. With this, fischer offers architects and specifiers an innovative, high-quality and an all-inclusive system for fixing ventilated cladding. Apart from technical and financial advantages, the fischer Facade Systems also provides a particularly extensive scope for architectural design.

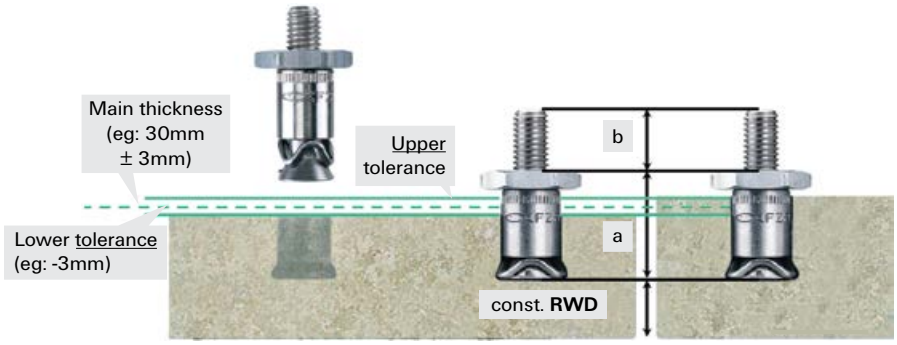
APPROVALS



INSTALLATION TYPE



Flush Installation



Stand-off Installation

INSTALLATION FZP II

Undercut technology - Possible materials

Natural stone / Cast stone
from 20 mm panel thickness

FZP II

FZP II Carbon

Thin panel materials
e.g. Ceramic, HPL, Fibre cement

FZP II T

Glass
from 8 mm panel thickness

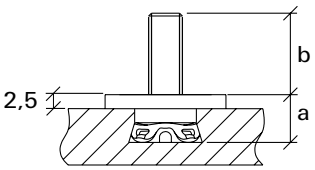
FZP G

TERGO+ FZP II - PA

APPLICATION

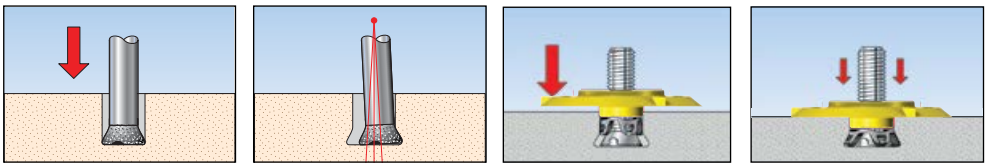
DESCRIPTION

- Undercut anchor for HLP, fiber cement and fine stoneware from 10 mm panel thickness.
- Application with bracket systems for other attachment parts.



INSTALLATION

- Special drilling machines from fischer, are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool.



TECHNICAL DATA

Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Colour code of shim washer	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP-II 11x6 M6/T/9 D40 PA	532644	8	11	red	6	M6	9	250
FZP-II 11x8 M6/T/10 D40 PA	532645	10	11	yellow	8	M6	10.0	250
Tergo+ 11x6 M6/T/10 PA	532641	8.5	11	red	6	M6	10.0	250

Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Colour code of shim washer	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
Tergo+ 11x6 M6/T/13 PA	532642	8.5	11	red	6	M6	13.0	250
Tergo+ 11x8 M6/T/10 PA	537974	10.5	11	yellow	8	M6	10.0	250
Tergo+ 11x8 M6/T/13 PA	537975	10.5	11	yellow	8	M6	13.0	250

fischer Zykon-Panel Anchor FZP-II-T

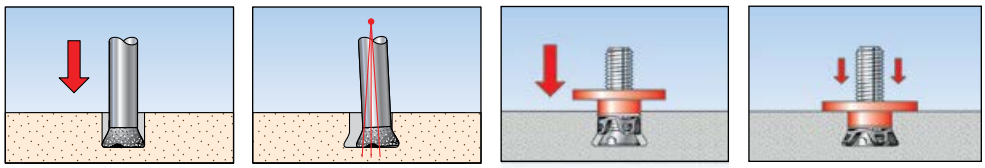
DESCRIPTION

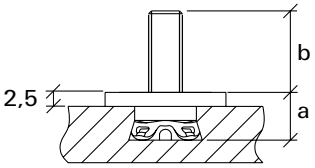
- Undercut anchor for ceramic and fine stoneware from 10 mm panel thickness.
- Application with bracket systems for other attachment parts.

APPLICATION

INSTALLATION

- Special drilling machines from fischer, are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool.





TECHNICAL DATA

Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Colour code of shim washer	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 11x 6 M6/T/10 PA	520365	8.0	11	red	6	M6	10.0	250
FZP II 11x 8 M6/T/10 PA	520367	10.0	11	yellow	8	M6	10.0	250
FZP II 11x 10 M6/T/9 PA	520369	12.0	11	green	10	M6	9.0	250

fischer Zykon-Panel Anchor FZP-II

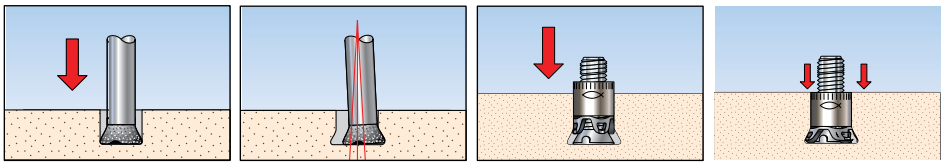
DESCRIPTION

- Undercut anchor for natural stone from 2 cm panel thickness.
- Application with reveal angle or other attachment parts.

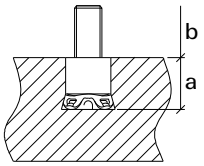
APPLICATION

INSTALLATION

- Special drilling machines from fischer, are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool.



TECHNICAL DATA



Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 11x12 M6/13 A4*	512131	12	11	12	M6	13	250
FZP II 11x12 M6/18 A4*	512133	12	11	12	M6	18	250
FZP II 11x15 M6/10 A4*	512134	15	11	15	M6	10	250
FZP II 11x15 M6/18 A4*	512135	15	11	15	M6	18	250
FZP II 13x15 M8/10 A4*	512136	15	13	15	M8	10	250
FZP II 13x15 M8/15 A4*	512137	15	13	15	M8	15	250

Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 13x15 M8/23 A4*	512138	15	13	15	M8	23	250
FZP II 13x15 M8/28 A4*	512139	15	13	15	M8	28	250
FZP II 13x17 M8/17 A4*	512140	17	13	17	M8	17	250
FZP II 13x21 M8/9 A4**	512141	21	13	21	M8	9	250
FZP II 13x21 M8/17 A4**	512142	21	13	21	M8	17	250
FZP II 13x21 M8/22 A4**	512143	21	13	21	M8	22	250

fischer Zykon-Panel Anchor FZP-II Carbon

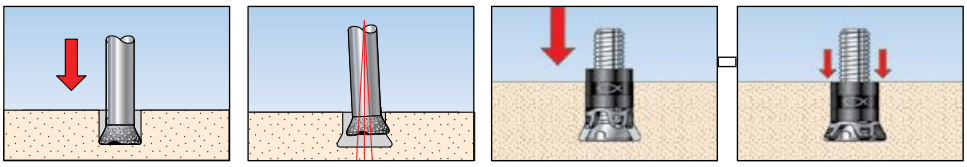
DESCRIPTION

- Undercut anchor for natural stone from 2 cm panel thickness.
- Application with reveal angle or other attachment parts.

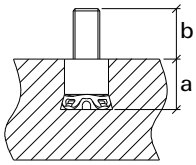
APPLICATION

INSTALLATION

- Special drilling machines from fischer, are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool.



DESCRIPTION



Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 11x12 M6/13 Carbon*	511966	12	11	12	M6	13	250
FZP II 11x12 M6/18 Carbon*	511967	12	11	12	M6	18	250
FZP II 11x15 M6/10 Carbon*	511968	15	11	15	M6	10	250
FZP II 11x15 M6/18 Carbon*	511969	15	11	15	M6	18	250
FZP II 13x15 M8/10 Carbon*	511970	15	13	15	M8	10	250
FZP II 13x15 M8/15 Carbon*	511971	15	13	15	M8	15	250

Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 13x15 M8/23 Carbon*	511972	15	13	15	M8	23	250
FZP II 13x15 M8/28 Carbon*	511973	15	13	15	M8	28	250
FZP II 13x17 M8/17 Carbon*	511980	17	13	17	M8	17	250
FZP II 13x21 M8/9 Carbon*	511974	21	13	21	M8	9	250
FZP II 13x21 M8/17 Carbon*	511975	21	13	21	M8	17	250
FZP II 13x21 M8/22 Carbon*	511976	21	13	21	M8	22	250

fischer Zykon-Panel Anchor FZP-II-SO

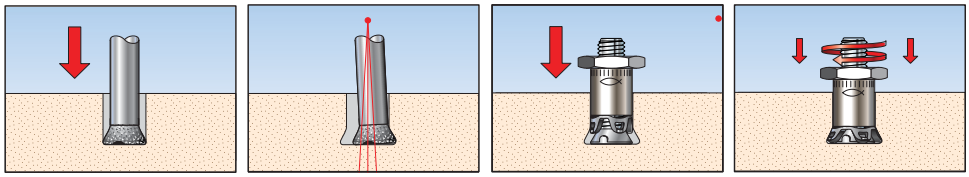
DESCRIPTION

- Undercut anchor for natural stone from 3 cm panel thickness. Application with reveal angle or other attachment parts.

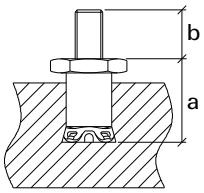
APPLICATION

INSTALLATION

- Special drilling machines from fischer, are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool.



TECHNICAL DATA



Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 11x21 M6/SO/ 9 AL*	512144	21	11	12-16	M6	9	250
FZP II 11x21 M6/SO/ 12 AL*	512145	21	11	12-16	M6	12	250
FZP II 13x26 M8/SO/17 AL*	512146	26	13	15-21	M8	17	250
FZP II 13x30 M8/SO/ 13 AL*	513226	30	13	12-25	M8	13	250

fischer Zykon-Panel Anchor FZP-II-SO Carbon

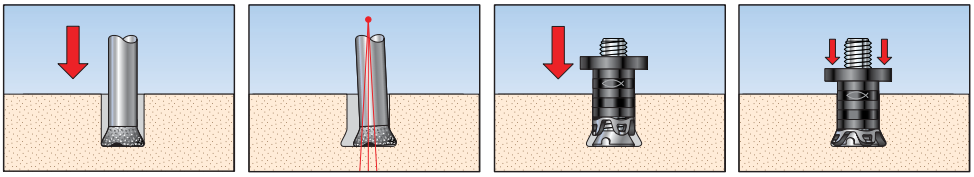
DESCRIPTION

- Undercut anchor for natural stone from 3 cm panel thickness. Application with reveal angle or other attachment parts.

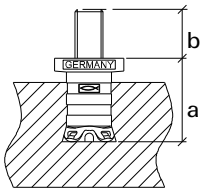
APPLICATION

INSTALLATION

- Special drilling machines from fischer, are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool.



TECHNICAL DATA



Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Bolt projection length mm b	Box quantity pieces
FZP II 11x21 M6/SO/ 9 Carbon*	511977	21	11	12-16	M6	9	250
FZP II 11x21 M6/SO/ 12 Carbon*	511978	21	11	12-16	M6	12	250
FZP II 13x26 M8/SO/17 Carbon*	511979	25	13	15-21	M8	17	250

fischer Zykon-Panel Anchor FZP II M8-I

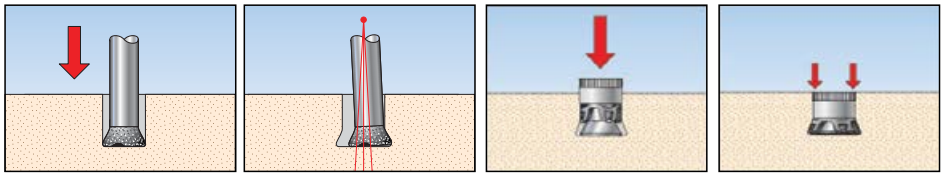
DESCRIPTION

- Undercut anchor with internal thread for natural stone from 2cm panel thickness for indoor or outdoor application. Application with any attachment parts.

APPLICATION

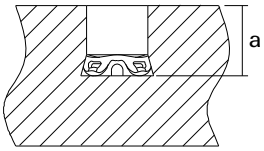
INSTALLATION

- Special drilling machines from fischer are necessary for the drilling of the undercut hole. The anchor will be installed by a special fischer setting tool. E.g. SGB, SGA. FZE



TECHNICAL DATA

Item	Art.- No.	Installed anchor length mm a	Drill hole Ø mm	Anchorage depth mm	Thread diameter	Box quantity pieces
FZP II 13 x 12 M6 I	**512958**	12	13	12	M6	250
FZP II 15 x 12 M8-I	**539478**	12	15	12	M8	250
FZP II 15 x 15 M8-I	**539479**	15	15	15	M8	250
FZP II 15 x 21 M8-I	**540298**	21	15	21	M8	250



TECHNICAL DATA / QUALITY EQUIPMENT

DPL

HVL

STU

Product	Art.-No.	Item description	Diameter	Adapter
DPL 11	61081	Diameter gauge for good - / no good test	Ø 11 mm	FZP II M 6 - FZP II M 6/SO
DPL 11 T	804089	Diameter gauge for good - / no good test	Ø 11 mm	FZP II M 6 - FZP II M 6/SO
DPL 13	61082	Diameter gauge for good - / no good test	Ø 13 mm	FZP II M 8 - FZP II M 8/SO
DLP 15	804184	Diameter gauge for good - / no good test	Ø 15 mm	FZP II M8i
HVL 11	61079	Undercut minimum volume gauge for good - / no good test	Ø 11 mm	FZP II M 6
HVL 11 T	802732	Undercut minimum volume gauge for good - / no good test	Ø 13 mm	FZP II M 6
HVL 13	61080	Undercut minimum volume gauge for good - / no good test	Ø 11 y Ø 13mm	FZP II M 8
HVL 15	80418	Undercut minimum volume gauge for good - / no good test	Ø 15 mm	FZP II M8i
STU 10-30	61083	Dial Gauge	Ø 11 / 13mm	All FZP II

Machinary

SBN 502

Technical data SBN 502	Art. No. 61500
Dimensions	Drill rig: 210 x 155 x 160 cm, (W x D x H)
Weights	approx. 480 kg
Table size / Table height	170 x 130 / 80 cm
Maximum load **Connections**	each table roller ⌀60mm: 200 N Electricity: 230 V, 16 A Water: ½ inch cross section, at least 3 bar
Consumption data	Power consumption: ca. 2 kW Water consumption: ca. 3 l/min (idle running)
Panel sizes which can be drilled	Without help of side tables: 157 x 150 x 6 cm
Precision of drilling position	approx. 1 mm
Drill bit types	FZP B 9 Item-No. 60 713 for FZP-M6 anchors FZP B 11 Item-No. 60 710 for FZP-M8 anchors

BSN 100

Technical data BSN 100	Art. No. 61502
Dimensions	Drill head with suction pad: 35 x 30 x 50 cm
Weights	Drill head with suction pad: ca. 18 kg BSN 100 in wooden case 69 x 61 x 38 cm
Suction pad size	Standard size: SF 100, 25 x 25 cm Special size: SF 100-S, 15 x 40 cm
Connections	Electricity: 230 V, 10 or 16 A Water: ½ inch cross section, at least 3 bar
Consumption data	Power consumption: approx. 1.2 kW Water consumption: approx. 1.5 l/min
Panel sizes which can be drilled	Minimum in dependence on used suction pad model
Maximum hole-distance from edge	95mm, with special setting: drill head is turned 180° and suction pad is placed beside the panel
Precision of drilling position	approx. 1 mm
Drill bit types	FZP B 11 Item-No. 60 710 for FZP-M6 anchors FZP B 13 Item-No. 60 711 for FZP-M8 anchors

LBT 80

Technical data LBT 80	Art. No. 46225
Dimensions	80 x 78 x 150 cm, (W x D x H)
Weight	approx. 65 kg
Table size / Table height	40 x 80 cm / 75 cm
Maximum load	400 N / each carnier roller
Connections	electricity: 230 V, 10 or 16 A water: ½ inch cross section, at least 3 bar
Consumption data	power consumption: approx. 1.2 kW water consumption: approx. 1.5 l/min
Panel sizes which can be drilled	without help of side tables: 80 x 50 x 5 cm
Maximum hole-distances from edge	backwards: 125 mm sidewards: approx. 2 m
Panel clamp	⌀ 100 mm
Precision of drilling position	approx. 1mm
Drill bit types	FZP B 9 Item-No. 60 713 for FZP-M6 anchors FZP B 11 Item-No. 60 710 for FZP-M8 anchors

Setting Tools

ASV 80 - GNT

Technical data ASV 80 - GNT	Art. No. 517409
Dimensions	ca. 102 x 92 x 120 cm (W x D X H)
Total weight (without crate packing) Weight for table top support only Weight for tool box with accessories only	ca. 66 kg ca. 17,5 kg ca. 7,5 kg
Table dimensions Table height Maximum / minimum swivel range (radius)	ca. 100 x 90 cm (W x D) ca. 84 cm ca. 995 / 350 mm
Suitable for panel size	ca. max. 110 x 90 cm
Performance	Time for setting procedure for one anchor: ca. 10-15sec.
Costs / Configuration	for hires and purchase costs refer to separate list

SGB

Technical data SGB	Art. No. 46237
Dimensions	345 x 275 x 90 mm (B x T X H)
Total weight	5.5 kg
Setting Tool Weight (setting tool) Operating voltage Pulling strength	 2.1 kg (incl. battery) 12 Volt DC 13,000 N
Battery Nominal Voltage Nominal Capacity Weight	 14.4 V 1.3 Ah 0.35 kg

SGT

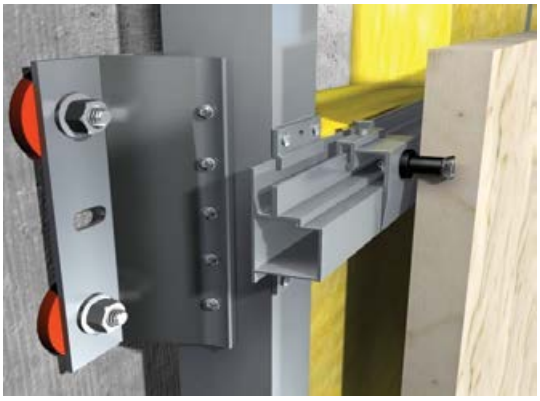
Technical data SGT	Art. No. 517408
Dimensions (Plastic carrying case)	36 x 31 x 6 cm (B x T X H)
Total weight	1.5 kg
Setting Tool Weight (Setting tool) Total stroke	 Ca. 800 gr Ca. 5 mm

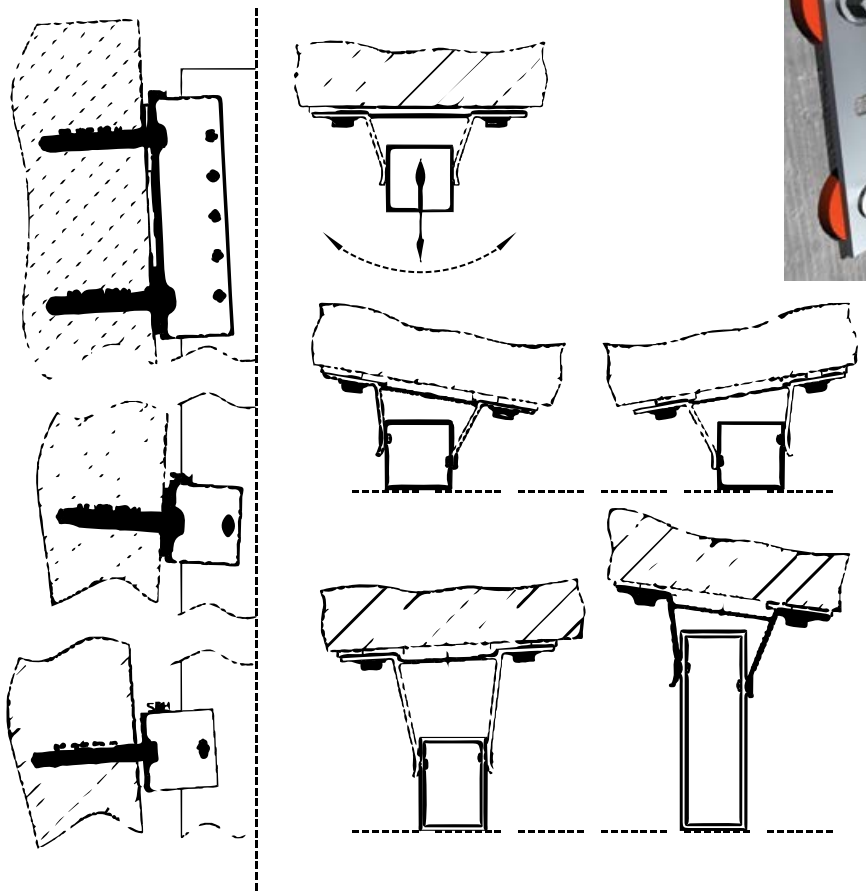
FZE Hammer setting tool

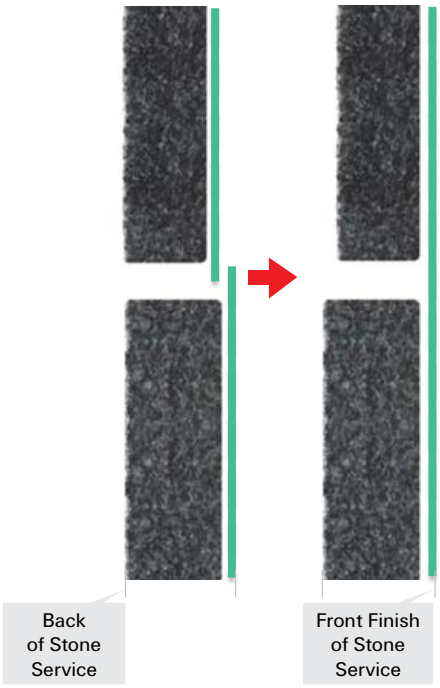
FZE M6 - Art. No. 44637
FZE M8 - Art. No. 44638
FZE M8i - Art. No. 44639

Setting adaptor for power tools SGA with adjustable torque
SGA M6 - Art. No. 803749
SGA M8 - Art. No. 803748
SGA M8i - Art. No. 804432

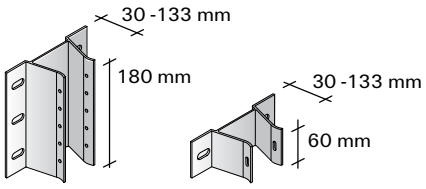
fischer SystemOne







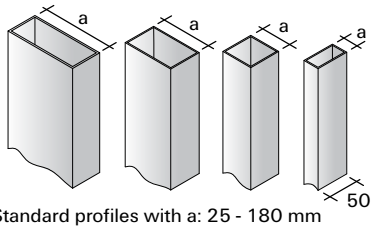
1 Wall holders



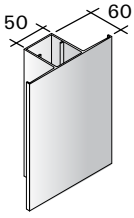
Fix point holder
e.g. FPH 68

Sliding point holder
e.g. SPH 68

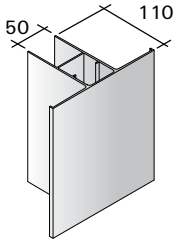
2 Vertical Profiles



Standard profiles with a: 25 - 180 mm
e.g. VP 50/2



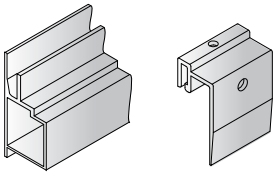
T-Profile
T 60



T-Profile
T 110

3 Bracket Solution

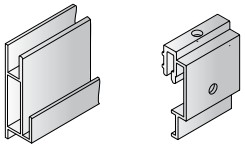
Bracket Solution



Horizontal profile
HP-BS

Bracket
e.g. BR 50-M8

Bracket Solution Light

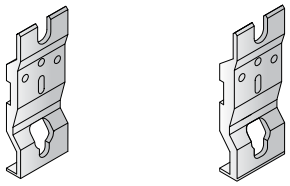


Horizontal profile
HP-BSL

Bracket
e.g. BRL 40-M6

4 Vertical Solution

Vertical Solution



Fix point vertical
bracket e.g. BRV 50-F

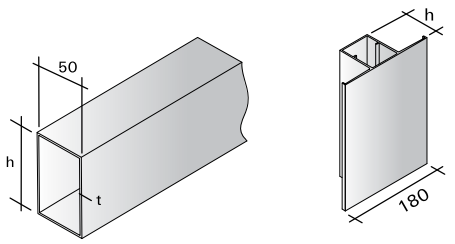
Sliding point vertical
bracket e.g. BRV 50-S

fischer SystemOne - Bracket Solution & Bracket Solution Light

TECHNICAL DATA

Vertical Profiles

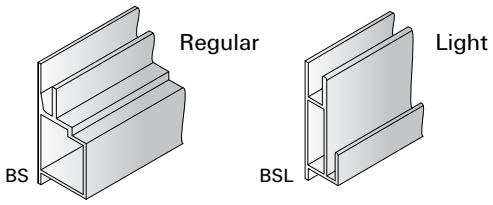
Item	Art.- No.	Size w x h x t (mm)	Length (mm)	Pack Unit (pcs)
VP 25/2	18441	50 x 25 x 2	6000	1
VP 30/2	77545	50 x 30 x 2	6000	1
VP 40/2	77546	50 x 40 x 2	6000	1
VP 50/2	48895	50 x 50 x 2	6000	1
VP 80/2	48896	50 x 80 x 2	6000	1
VP 100/2	48897	50 100 x 2	6000	1
VP 120/3	48898	50 x 120 x 3	6000	1
VP 150/3	97884	50 x 150 x 3	6000	1
VP 180/3	97885	50 x 180 x 3	6000	1
T 60	77692	50 x 60 x 180	6000	1
T 110	509279	50 x 110 x 180	6000	1



Vertical Profiles

Horizontal Profiles

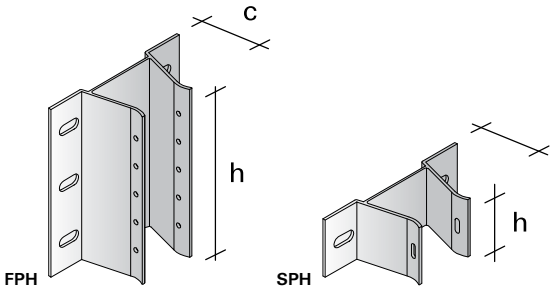
Item	Art.- No.	Pack Unit (pcs)	Fit With
HP BS	48899	1	BR - BS
HP BSL	18438	1	BR - BSL



Horizontal Profiles

Brackets

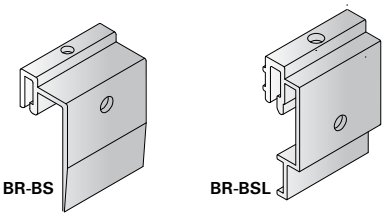
Item	Art.- No.	Size w x h x t (mm)	Pack Unit (pcs)
FPH 30	18442	180 x 30	40
FPH 54	18444	180 x 54	40
FPH 68	48900	180 x 68	30
FPH 93	48901	180 x 93	20
FPH 133	30367	180 x 133	24
SPH 30	18443	60 x 30	100
SPH 54	18445	60 x 54	100
SPH 68	48902	60 x 68	90
SPH 93	48903	60 x 93	75
SPH 133	30368	60 x 133	50



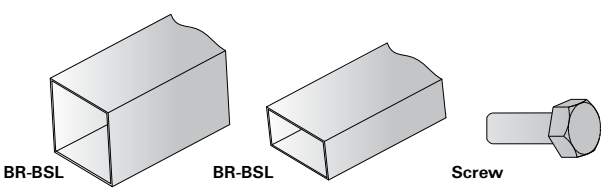
Brackets

Holders & accessories

Item	Art.- No.	Pack Unit (pcs)
BR-BS M6/50	48904	250
BR-BS M6/100	91536	125
BR-BS M8/50	49238	250
BR-BS M8/100	78585	125
BR-BS M8/150	78587	100
BR-BSL M6/40	18439	250
BR-BSL M8/40	18448	250
BR-BSL M8/90	18447	200
BR-BSL FZN/40	18440	250
SystemOne - Adjustment Screw - M6 x 16		
ES-BS	521673	50
ES-BSL	521672	50
SystemOne - Horizontal Profile Connection		
PSV-BS	521665	25
PSV-BSL	18446	25

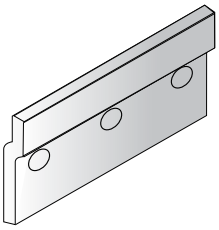


Holders

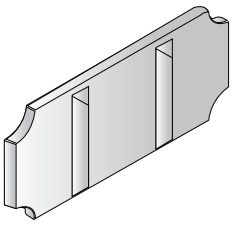


PSV

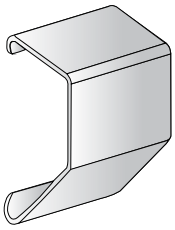
fischer SystemOne - Connecting Elements and Accessories



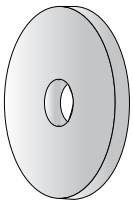
Profile Guidance



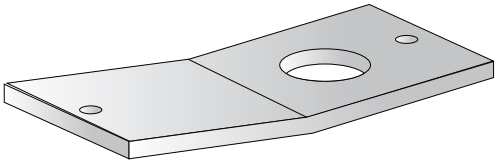
Fixit



Cover plate



Cold bridge stop



Stripe holder

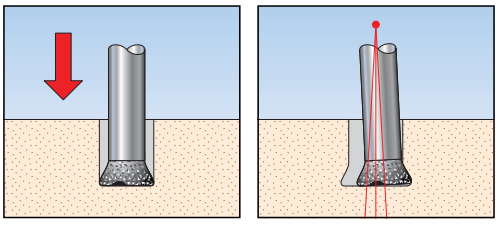
Rivet

Type	Art.-No.	Item Description	Size	Pack Unit (pcs)
GLB	48906	Profile Guidance	-	200
FIX	48905	Fixit	-	250
HP-Clip	96451	Cover plate	-	300
CBS	92680	Cold bridge stop	-	200
SH-BS	508259	Stripe holder	-	50
RS	521664	Rivet	4.8 x 12 A4	100

Undercut Anchor Drill Bit - Diamond (Stone and Ceramic)

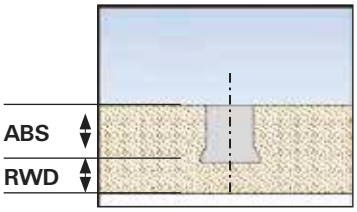
Drill bit

Adaptor for **CNC Machine**

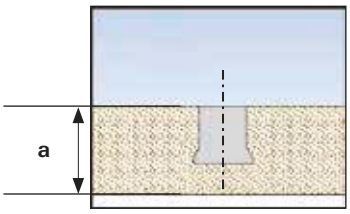


Type	Art.-No.	for BSN 100	for SBN502 MB2 for LBT 80 - MB2	Box quantity pcs
FZPB 9	60713	–	FZP II M6 - drilling 11 mm	1
FZPB 11	60710	FZP II M6 - drilling 11 mm	FZP II M8 - drilling 13 mm	1
FZPB 9 T for Porcelain	530910	–	FZP II M6 - drilling 11 mm	1
FZPB 13	60711	FZP II M8 - drilling 13 mm	FZP M8i	1
FZPB 15	530908	FZP M8i	–	1
CNC - Adaptor	536935	–	–	1

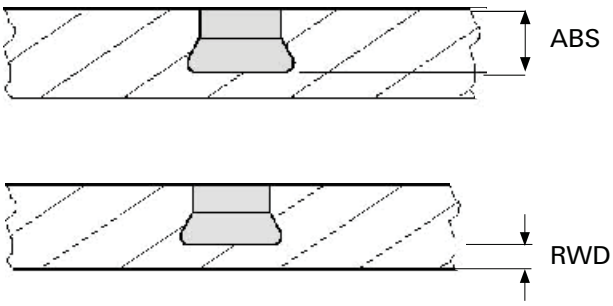
DRILL HOLE GEOMETRY



ABS - Absolute depth
RWD - Residual wall depth



Stone thickness



Fixing systems:
The drill hole and the FZP anchor geometry represent a system designed for use together. Thus, for example, only a correctly configured undercut can ensure the proper load-bearing capacity.

The active principle behind the undercut fixing is the so-called "interlock". Fixings that use undercut anchors do not create any expansion forces on the facade panel.

The functioning of the FZP anchor requires a drill hole geometry comprising a **cylindrical** drill hole and a **conical** undercut diameter. The fischer **Zykon** ("Zy" from zylindrish" or "cylindrical" and "Kon from "Konisch" or "conical") principle.

Absolute depth ABS drilling procedure

ABS dimensions constant (e.g. for soffit)
The **absolute depth** procedure is used for the fischer **FZP flush installation anchor.** The set undercut anchor is flush with the rear of the panel. In other words, the drill hole depth ABS and the length of the set anchor ar identical. The drill hole depth is always the same, regardless of the tolerances of the panel thickness. Standard drill hole depths (length of the FZP flush installation anchor): 6,7 ,8 ,9, 10,12,15,17, 20, 21 mm.

Residual wall depth RWD

Residual wall depth RWD drilling procedure:
RWD dimensions constant (e.g. for agraffe systems). The residual wall depth procedure is used for the fischer FZP stand-off installation anchor. The set undercut anchor protrudes out the back of the panel. To compensate for panel thickness tolerances, a constant drill hole excess RWD is drilled. The drill hole depth is. therefore, different depending on the panel thickness. The dimensions of the residual wall depth RWD together with the length of the set anchor result in a consistent installation dimension for the facade panels for an even facade surface.
Differences up to a maximum of 4 mm in the panel thickness can be compensated for. The dimensions of the RWD are stipulated on a project-by-project basis by the planning office. If in doubt, please contact the fischer Facade Systems department of fischerwerke.

Drill hole depth

The drill hole depth results from the requirement of the fixing system and the planning stipulations.
It can be set using two different procedures.

Absolute drill hole depth ABS drilling procedure: The absolute depth ABS is set by the clamp (depth stop, ABS) below the drill bit head and by the adjustment sleeves. By using adjustment sleeves of various lengths, a smaller or larger drill bit projection to the clamp can be created in line with the FZP flush installation anchors.

- **Absolute depth → ABS dimension**

Residual wall depth RWD drilling procedure: The residual wall depth RWD for the machine bench is set to the back right of the drill bit head. The RWD stop stops the drill bit prior to the drill bar (zero line of the machine bench). The dimensions of the residual wall depth RWD are preset using a RWD plug.

- **Residual wall depth → RWD dimension**

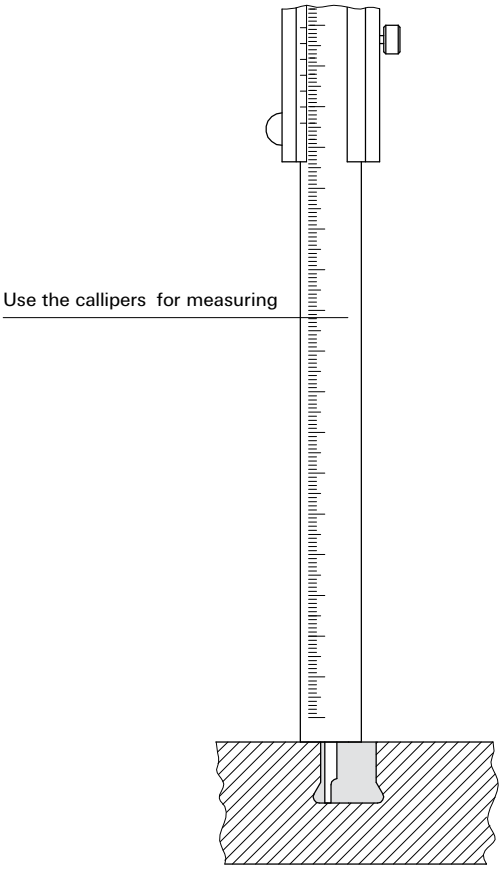
Safety Checks

All checking procedures must be performed only by reliable, qualified and trained personnel.

- Handle instruments with care, and protect them from shock or impact.
- Use only instruments that is in full working order.

> The **instruments and gauges** are subject to considerable wear. Therefore, they must **be checked** regularly and replaced if required.

- All information regarding tolerances and the frequency of testing must be followed. Beyond these, the design specifications shall also apply.
- Ensure that each specific anchor type is checked with the corresponding instruments.



1. Checking the drill hole depth

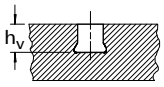
If the measured value corresponds with the design specifications, the drill hole is acceptable.

if the measurement deviates from the specifications, the drill hole must be discarded.

Each anchor type corresponds to a specific drill hole depth. The second numerical value, contained in the name of anchor, points out the length of the expanded anchor. This numerical value is the necessary drill hole depth value h_v.

The range of tolerance is h_v +0.4/-0.1 mm

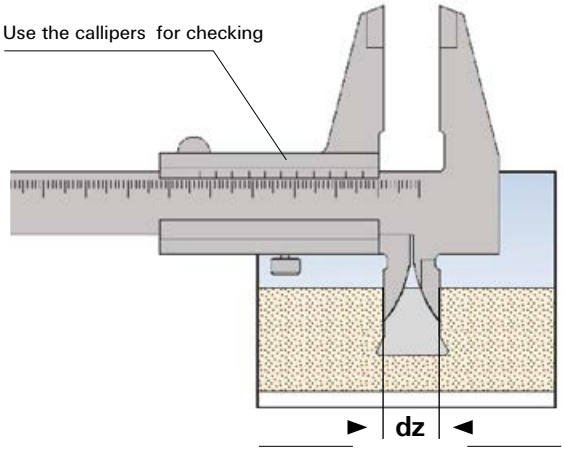
e.g. anchor type FZP13 x 15 M8. needs a drill hole depth of 15+0,4/–0,1mm. Use suitable callipers equipped with a depth gauge.

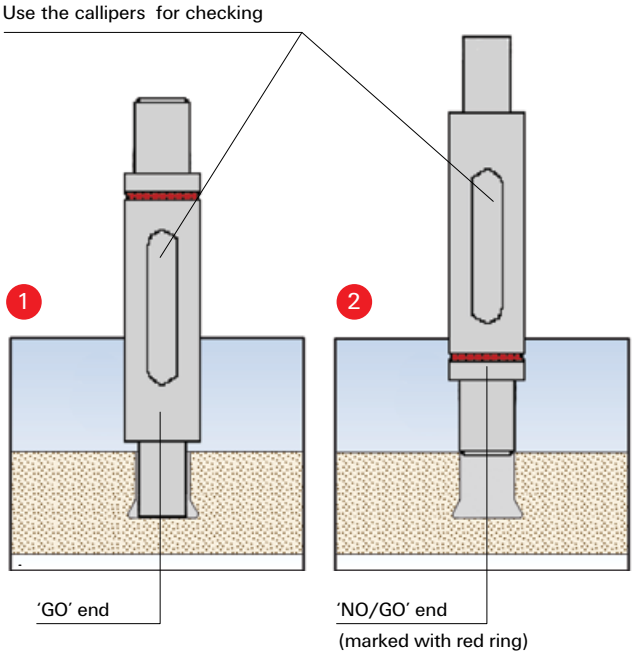
Anchor type Examples:	Art. - No.	 Drill hole depth (hv), in mm
FZP II 13 x 15 M8/15 A4	512137	15 + 0.4/– 0.1
FZP II 13 x 21 M8/ 22 A4	512143	21 + 0.4/– 0.1

Using the callipers, check measurements:

- Atleast once in every 100 drill holes, in addition to the planning specifications
- Prior to each production shift
- When you change the drill bit
- When you change machine settings
- When the operating personnel changes
- When you change materials
- When you change the drill hole diameter
- After a prolonged machine rest period ($\geq$ 2 days)

> The **instruments and gauges** are subject to considerable wear. Therefore, they must **be checked** regularly and replaced if required.
>
> Check the callipers with depth gauge:
> - Atleast once in each 100 measurements.





2.1 Checking cylindrical drill hole diameter

If the measured value matches the specifications A (see table), - the drill hole is acceptable.

If the measurement deviates from the specifications, the drill hole - must be discarded.

2.2 Checking cylindrical drill hole diameter

1. The testing gauge fits into the drill hole with its 'GO' end. This way, the drill hole is acceptable.

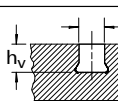
If the testing gauge does not fit into the drill hole in this position, the drill hole must be discarded!

2. The testing gauge does not fit into the drill hole with its 'NO/GO' end. This way, the drill hole is acceptable.

If the testing gauge fits into the drill hole in this position, the drill hole must be discarded!

Each anchor type corresponds to a specific drill hole diameter. For checking, use:

- Suitable callipers. Use the d_z value listed in the table
- Diameter testing gauge (DPL fischerwerke). Use the gauge type listed in the table.

Anchor type **Examples:** **FZP II 11 x 12 ,M6/18 A4** **FZP II 13 x 15 M8/23 A4**	 **Drill hole depth (dz), in mm**	**Diameter open gauge (DPL), type**
with threaded connection M6	11 + 0.4/– 0.2	DPL 11
with threaded connection M8	13 + 0.4/– 0.2	DPL 13

Anchor type **Examples:** **FZP II 11 x 12 ,M6/18 A4** **FZP II 13 x 15 M8/23 A4**	**Checking gauge diameter, lower wear limit (d1), in mm**	**Checking gauge diameter, lower wear limit (d2)with red ring, in mm**
with threaded connection M6	10.8	11.35
with threaded connection M8	12.8	13.35

Using the callipers, check measurements:

- Prior to each production shift
- When you change the drill bit
- When you change the machine settings
- When the operation personnel changes
- When you change materials
- When you change the drill hole diameter
- After a prolonged machine rest period (≥ 2 days)

Use the gauge:

- Atleast once in every 100 drill holes, in addition to the planning specifications

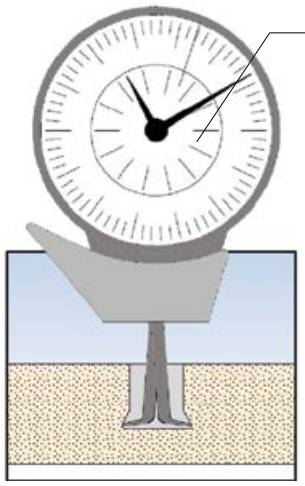
The **instruments and gauges** are subject to considerable wear. Therefore, they must **be checked** regularly and replaced if required.

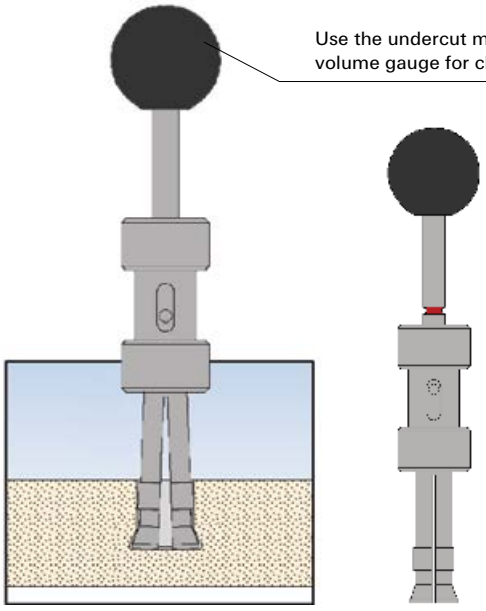
Check the callipers equipped with a depth gauge:
- Atleast once in each 100 measurements.

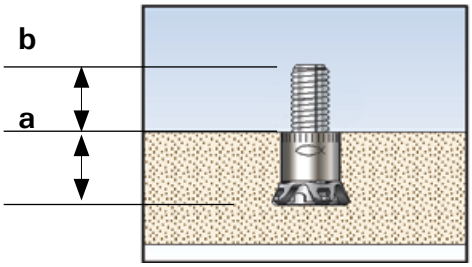
Check the diameter gauge, using the **values d1** and **d2** from the table:
- Atleast once in each 100 measurements.

When checking with the diameter gauge.
2 conditions must be met:

- 'GO' end must fit in to hole
- 'NO/GO' end (marked with red ring) does not fit into hole.







3. Checking undercut diameter and volume

Each anchor type corresponds to a specified undercut diameter. For checking, use:

- suitable dial gauge. Use the d_H value listed in the table
- Undercut minimum volume gauge (HVL fischerwerke) Use the gauge type listed in the table

Anchor type Examples:	Art. - No.	Undercut diameter (d_H), in mm
FZP II11x15 M6/18 A4	512135	13.5 ±0.3*
FZP II13x21 M8/9 A4	512141	15.5 ±0.3
FZP II13x15 M8/15 Carbon	511971	15.5 ±0.3*

Anchor type Examples:	Undercut volume gauge (HVL),type	Undercut minimum volume gauge, lower wear limit (d1),inmm
FZP II11x15 M6/18 A4	HVL 11	12.8
FZP II13x21 M8/9 A4	HVL 13	14.8
FZP II13x15 M8/15 Carbon	HVL 13	14.8

- 13.5 +0.1 - 0.3
- 15.5 +0.1 - 0.3

with soft rock, i.e limestone not applicable by the use of FZP M8-W Anchor

Using dial gauge to check measurements:

- Prior to each production shift
- When you change the drill bit
- When you change the machine settings
- When the operation personnel changes
- When you change materials
- When you change the drill hole diameter
- After a prolonged machine rest period (≥ 2 days)

Use the undercut minimum volume gauge:

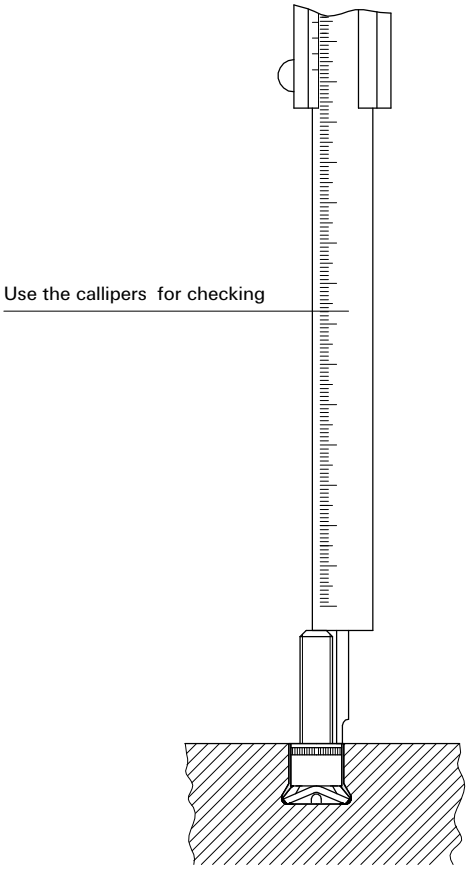
- Atleast once in every 100 drill holes, in addition to the required specifications

The **instruments and gauges** are subject to considerable wear. Therefore, they must **be checked** regularly and replaced if required.
Check the dial gauge:

- Atleast once in each 100 measurements.

The dial guage can be checked by means of the supplied setting sleeve. It can be readjusted by turning the outer adjustment scale.
Check the undercut minimum volume testing gauge, using the value d_1 from the table

- Atleast once in each 100 measurements.



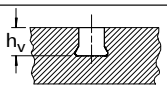
4. Checking anchor installation

if the measured value matches the specifications (see table), the anchor is acceptable.

If the measurement deviates from the specifications, the anchor must be discarded.

After installation. each anchor type must have a specific thread projection, For checking use:

- Suitable callipers with depth gauge. Calculate the value b.
- Setting gauge (SKL fischerwerke)

Anchor type	 Thread projection (b), in mm
The thread projection b of the FZP–anchors can be calculated: length of cone bolt minus second numerical value contained in the name of anchor. The length of cone bolt can be measured or checked in the price-list. e.g. FZP 13 x 15 M8 / 15 A4 measured length of cone bolt: 30 (+1) mm minus 15 makes a thread projection b ≥ 15 mm.	

With flush anchor installation. always check that:

- The anchor sleeve is flush with the panel surface

Use callipers or gauge to check:

- At least once in every 100 anchors, in addition to the planning specifications.

The **instruments and gauges** are subject to considerable wear. Therefore, they must **be checked** regularly and replaced if required.

Check the callipers with integrated depth gauge:
- Atleast once in each 100 measurements.

Check the setting gauge, calculate the **value P**: P = b-1 mm
- Atleast once in each 1000 measurements.

FireStop

fischer
FIRE STOP
FFRS
310 ml
fischer
FIRE STOP
fischer
FIRE STOP
fire protection mortar

Flexible fire resistant acoustic mastic

Construction joints

APPROVALS

ETA-14/0378
ETA-14/0379
1121-CPR-M/5044

Approved CF 5034

British Standard
BS 476 - 20
BS EN ISO 10140-3:1995
BS EN 1026
BS EN 1366-4
BS EN 1366-3

FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH PENETRATIONS FIRE STOP

EU

ADVANTAGES

- Low VOC
- Movement capability ± 25 %
- Excellent acoustic properties
- Approved for infinite linear gap length
- Halogen and solvent free
- Paintable and excellent slump characteritics

FUNCTIONING

- FiAM is a one-part water based acrylic emulsion.
- It has a fire resistance of up to 5 hours when used in construction joints and services in both vertical and horizontal applications.
- When exposed to fire, it reacts to form a highly insulative char that slows down heat transfer and provides a barrier to fire seal.
- It is suitably compatible in a variety of materials, and is utilised within the FCPS which is designed to seal large openings in fi re rated fl oors and walls.

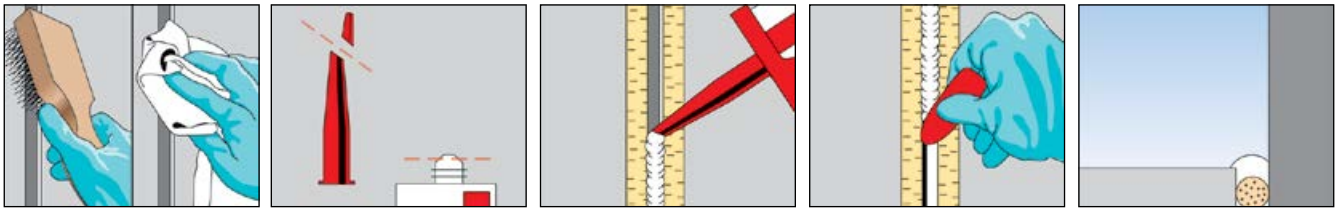
APPLICATIONS

- Metallic pipes: 6" (159 mm)
- Cable trays: 18" x 2" (450 x 50 mm)
- Cable bunches: 3" (80 mm)
- Linear joints: flexible and rigid construction elements
- Joints between FCPS coated panel system

BUILDING MATERIALS

- Flexible wall constructions
- Rigid floor and wall constructions
- Masonry
- Concrete
- Timber
- Steel
- FCPS System

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Languages on the cartridge	Contents [ml]	Suitable for use with	Sales unit [pcs]
FiAM 310	**053011**	D, F, NL, CZ, PL, SK	310	–	25
FiAM 310	**538152**	DK, SE, NO, FIN	310	–	25
FiAM 310	**538150**	TR, ES, PT, IT	310	–	25
FiAM 310	**538151**	PL, CZ, DK, N, S, FIN	310	–	25
FiAM 600	**056006**	–	600	–	25
KP M2	**053117**	–	–	FiAM 310, FFRS 310, UFS 310, FiGM 310	1
Applicator gun 600 ml	**097967**	–	–	FiAM 600	1

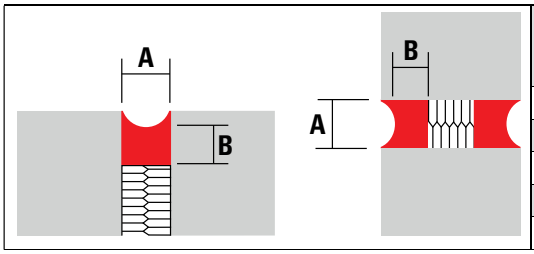
All items are available in grey and are subject to minimum order requirement.

TECHNICAL DATA

Chemical base	Water-based acrylic
Relative gravity	Approx 1.6 g/cm3
Skin-forming time	Approx 10 minutes at 23 °C RH
Curing rate	Approx 1.5 mm per 24 hours*
Storage temperature	+5 °C to +25 °C
Movement capability	± 25 %
Slump	Nil up to 30 mm
Shelf-life	18 months (under recommended conditions)
pH Value	08.09.2005
Sound transmission class	63 dB
Yield per l/m	1.55 yield per linear metre
Colour	White, grey
European Technical Approval	ETA 14-0378, ETA 14-0379
CE marking	1121-CPR-JA5044

* Curing rate is dependent on substrate, air humidity and weather conditions.

APPLICATION DATA



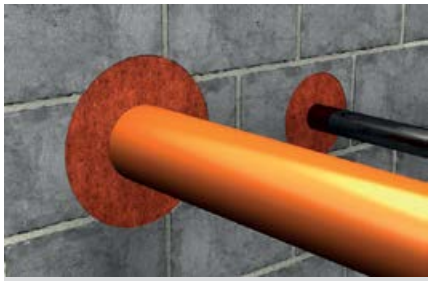
Joint width A [mm]	Joint depth B [mm]	Yield per linear meters
30	20	0.5
20	15	1
15	8	1.25
10	10	3
6	6	4.25

Substrate	Max. joint width [mm]	Fire ratings	
		Integrity rating [minutes]	Insulation rating [minutes]
Concrete/concrete	60	240	240
Brick/concrete	25	240	30
Steel/blockwork	50	300	90
Hardwood/blockwork	50	60	60
Softwood/blockwork	25	30	30
Drywall/concrete/head detail	20	120	120

Service type size		Fire ratings	
		Integrity rating [minutes]	Insulation rating [minutes]
Copper/steel/metal pipes	14 - 159 mm diam.	Up to 120	Up to 90
Loaded cable tray	450 x 50 (tray) cables to 21 mm	Up to 120	Up to 90
Single/bunched cables	30 - 80 mm diam. cables	Up to 90	Up to 90

* Copper, steel and metal pipes with an insulation rating of up to 90 minutes are in conjunction with the Thermal Defense Wrap (TDW).

Universal firestopping sealant which is suitable for metallic non-metallic services and construction joints



Metallic and non-metallic pipes

APPROVALS

FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH PENETRATIONS FIRE STOP SYSTEMS

FM APPROVED

American Standard
ASTM E 814 (UL 1479)
ASTM E 84 (UL 723)
ASTM E 1966 (UL 2079)

ADVANTAGES

- Flexible set
- Contains mould growth inhibitor
- Freeze - thaw capabilities
- Paintable
- Accelerated age and humidity tested
- Low VOC
- Excellent acoustic properties

FUNCTIONING

- UFS 310 is a one-part water based intumescent sealant which is used for sealing construction joints and service penetration in both vertical and horizontal applications.
- Up to 4 hours of fi re rating can be provided.
- It exhibits excellent slump characteristics, is easy to apply and cures to a flexible set. It is suitable for internal applications and conditions where dynamic movement may occur.
- UFS 310 can be used for most application properties.

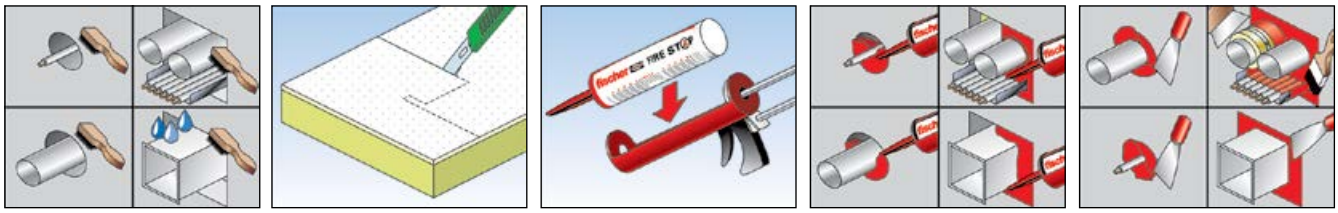
APPLICATIONS

- Metallic services: steel and cast iron 20" (500 mm) - copper 6" (150 mm)
- Non metallic service: PVC 2" (51 mm open) 3" (75 mm closed)
- Insulated service: 20" (500 mm)
- Construction joints: 4" (100 mm)
- HVAC 100" (2500 mm)
- Cable bunches 4" (100 mm): busway 27" (686)

BUILDING MATERIALS

- Wall constructions - linear joints
- Floor constructions - linear joints
- Flexible wall
- Masonry
- Concrete

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Languages on the cartridge	Contents [ml]	Contents [l]	Suitable for use with	Sales unit [pcs]
UFS 310	**516538**	D, F, GB, NL	310	–	–	12
UFS 310	**538137**	DK, SE, NO, FIN	310	–	–	12
UFS 310	**538135**	TR, ES, PT, IT	310	–	–	12
UFS 310	**538136**	PL, CZ, SK, H	310	–	–	12
UFS 19	**533889**	–	–	19	–	1
KP M2	**053117**	–	–	–	FiAM 310, FFRS 310, UFS 310, FiGM 310	1

TECHNICAL DATA

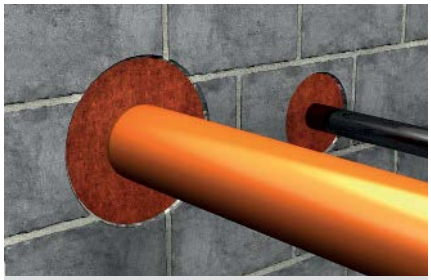
Chemical base	Water-based elastomeric
Density	Approx. 1.31 g/cm^3
Application temperature	+5 °C to +40 °C
Skin-forming time	Approx. 20 - 30 min.
Curing rate	Approx. 4 mm in 72 hours*
Storage temperature	+2 °C to +49 °C
Movement capability	Up to 50 %**
Intumescent activation	From 190 °C to 593 °C
Shelf life	Up to 36 months (under recommended conditions)
pH Value	6.5 to 7
Sound transmission class (dB) Tested in a UL 411 wall assembly to ASTM E90	62 dB
Surface burning characteristics ASTM E 84 UL 723 Tunnel Test	Flame spread - 5 Smoke index - 5
VOC Value	15.700 g/ltr (Less water)
Colour	Red

* Curing rate is dependant on substrate, air humidity and weather conditions.
* Movement capability depends on UL listed system and configuration.

APPLICATION DATA

Services		Fire ratings (minutes)	
Types	**Sizes**	**Integrated rating**	**Insulation rating**
PVC/CPVC closed pipe systems	3" (75 mm)	120	120
PVC/CPVC open pipe systems	2" (50 mm)	120	120
Steel and cast iron pipes	20" (508 mm)	180	0
Copper pipes	6" (152 mm)	180	0
Insulated services	20" (508 mm)	120	120
Construction joints	4" (100 mm)	120	120
HVAC	100" (2,500 mm)	120	120
Cable bunches	4" (100 mm)	120	120
Cable tray/ladder	24" (600 mm)	120	45

General purpose fire resistant sealant designed for UL specific applications



Non combustible services

APPROVALS

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH PENETRATIONS FIRE STOP SYSTEMS SEE UL FIRE RESISTANCE DIRECTORY 6FC9

American Standard
ASTM E 814 (UL 1479)
ASTM E 84 (UL 723)
ASTM E 1966 (UL 2079)

ADVANTAGES

- Excellent acoustic properties
- Low VOC
- Halogen and solvent free
- Various applications with two products only
- Age resistant
- Smoke resistant
- Excellent adhesion
- F-rating up to 3 hrs
- T-rating up to 3 hrs

FUNCTIONING

- The FiAM US is a one-part water based fire resistant sealant designed for a wide range of UL listed applications.
- The FiAM US can be used in construction joint and service penetration applications.
- The FiAM US can be used in both vertical and horizontal orientation and can be used in conjunction with the FiWS for a wide range of combustible services.

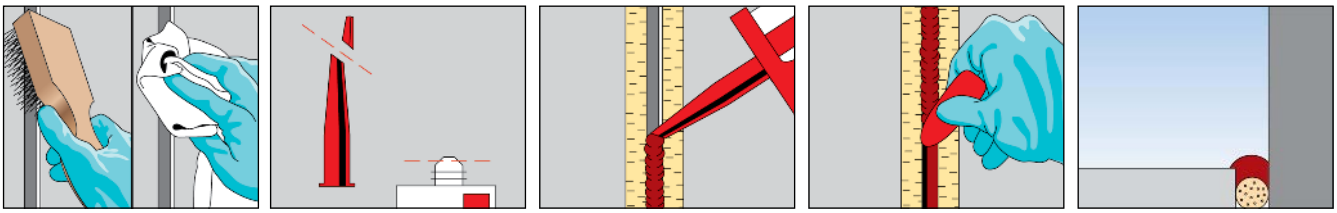
APPLICATIONS

- Linear joints: flexible and rigid construction elements with dynamic movement
- Metallic pipes
- Insulated metallic pipes
- Conduits
- Cable and cable bunches
- Cable trays

BUILDING MATERIALS

- Flexible wall constructions
- Rigid floor and wall constructions
- Masonry
- Concrete
- Steel

INSTALLATION



PRODUCT DATA

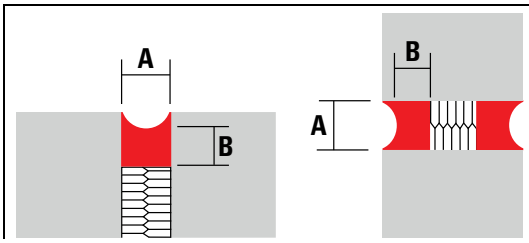
Item	Art.-No.	Languages on the cartridge	Contents [ml]	Suitable for use with	Sales unit [pcs]
FiAM US	**546487**	DE, EN, ES, TR	310	–	12
KP M2	**053117**	–	–	FiAM 310, FFRS 310, UFS 310, FiGM 310	1

TECHNICAL DATA

Chemical base	Water-based acrylic
Relative gravity	Approx 1.6 g/cm3
Skin-forming time	Approx 10 minutes at 23 °C RH
Curing rate	Approx 1.5 mm per 24 hours*
Storage temperature	+5 °C to +25 °C
Movement capability	± 25 %
Slump	Nil up to 30 mm
Shelf-life	18 months (under recommended conditions)
pH Value	08.09.2005
Sound transmission class	63 dB
Yield per l/m	1.55 yield per linear metre
Colour	White, grey
European Technical Approval	ETA 14-0378, ETA 14-0379
CE marking	1121-CPR-JA5044

* Curing rate is dependent on substrate, air humidity and weather conditions.

APPLICATION DATA



Joint width A [mm]	Joint depth B [mm]	Linear metres per cartridge
30	20	0.5
20	15	1
15	8	2.6
10	10	3
6	10	5.1

Rapid fire resistant sealant

Head of wall

APPROVALS

FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH PENETRATIONS FIRE STOP SYSTEMS

American Standard
ASTM E 814 (UL 1479)
ASTM E 84 (UL 723)
ASTM E 1966 (UL 2079)

FM APPROVED

ADVANTAGES

- Flexible set
- Contains mould growth inhibitor
- Freeze - thaw capabilities
- Paintable
- Accelerated age and humidity tested
- Low VOC
- Spray or brush applied
- Excellent smoke seal
- Water resistant
- Asbestos and solvent free
- Can be used for internal applications and for conditions where dynamic movement may occur.

FUNCTIONING

- RFS 640 is a spray grade one-part water based, fire rated sealant, which has been designed to provide smoke and fire protection on construction joints and service penetrations in both vertical and horizontal applications.
- Provides up to 3 hours fi re rating (also in accordance with ASTM E 2307).
- Meeting the new requirements of ASTM E 1399, RFS 640 has been cycled tested up to 500 times.
- Can be used for internal applications and for conditions where dynamic movement may occur.
- RFS 640 has also been tested at positive pressure with a minimum 0.01in. (2.5 mPa) water i.a.w UL 2079 test standards.

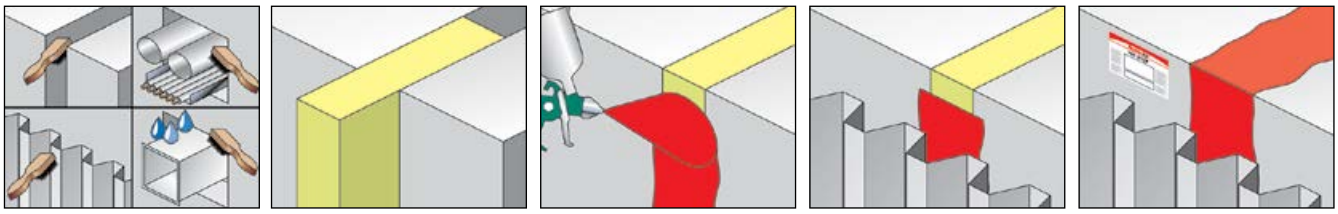
APPLICATIONS

- Curtain wall/slab edge: 8" (200 mm)
- Head of wall: 4" (100 mm)
- General construction joints: 8" (200 mm)
- Cable tray: 24" x 4" (600 mm x 100 mm)
- Steel pipes: 8" (200 mm)

BUILDING MATERIALS

- Flexible wall constructions
- Rigid floor and wall constructions
- Flexible wall
- Masonry
- Concrete

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Contents [l]	Sales unit [pcs]
RFS 640	**516539**	19	1

TECHNICAL DATA

Chemical base	Water-based
Density	Approx 1.25 g/cm³
Application temperature	+5 °C to +40 °C
Skin-forming time at 25 °C	Approx. 30 - 45 minutes*
Curing time at 25 °C	Approx. 5 - 7 days*
Storage temperature	+2 °C to +49 °C

TECHNICAL DATA

Movement capability	Up to 50 %**
Water resistant	Yes***
Shelf life	24 months (under recommended conditions)
pH Value	7 to 8
Sound transmission class (dB) Tested in a UL 411 wall assembly to ASTM E90	65 dB
Surface burning characteristics ASTM E 84 UL 723 Tunnel Test	Flame spread - 5 Smoke index - 5
VOC Value	2.33 g/ltr (Less water)
Colour	Red

* Skin-forming and curing time is dependant on substrate, air humidity and weather conditions.
** Movement capability depends on UL listed system and configuration.
*** Is water resistant in accordance with UL 2079.

APPLICATION DATA

Joint width [inch]	Joint width [mm]	Ft/gallon	Ft/pail	LM/gallon	LM/pail
0.25	6	198	1,325	89	404
0.50	13	164	1,099	74	335
0.75	19	141	941	63	287
1.00	25	124	830	56	253
1.25	32	109	731	49	223
2.00	51	82	548	37	167
4.00	102	49	328	22	100
6.00	152	35	233	16	71
8.00	203	27	180	12	55

Elastomeric fire resistant coating for construction joint and assemblies

Building envelope

APPROVALS

ETA-15/0203
1121-CPR-JA5065

British Standard
BS EN 10140
BS EN 1366-4: 2006
BS EN 1026
BS EN 1027
BS 476-20

EU

ADVANTAGES

- Openings up to 20" (500 mm) wide
- Movement capabilities of 50 %
- Working temperature between -10 °C and 95 °C
- Can be spray or brush applied
- Air permeability
- Acoustic performance
- 80 kg/m³ stone wool base
- 2.5 mm WFT required

FUNCTIONING

- FFB-ES is a one-part water based acrylic coating, which has been designed to provide smoke and fire protection on construction joints in both vertical and horizontal applica-tions.
- Developed for use on 80 kg/m³ stone wool base.
- Once applied, it prevents the passage of fire and smoke and can contribute to the acoustic value of a structure between fire rated compartments giving a fire resistance for up to EI 240.

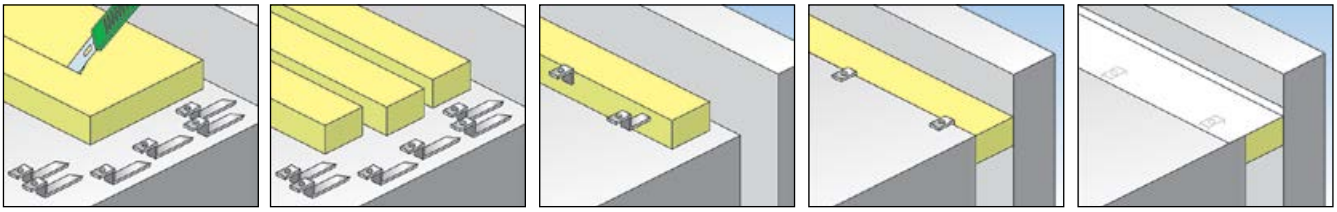
APPLICATIONS

- Linear joints in construction elements up to 20" (500 mm) wide
- Floor to floor
- Wall to wall
- Head of wall
- Bottom of wall
- Curtain wall

BUILDING MATERIALS

- Flexible wall constructions
- Rigid floor and wall constructions
- Concrete
- Masonry

INSTALLATION



TECHNICAL DATA

Item	Art.-No.	Contents [l]	Colour	Sales unit [pcs]
FFB-ES/W	**520753**	20	white	1
FFB-ES/G	**520755**	20	grey	1
FFB-ES/R	**520756**	20	red	1

Quantity per box is subject to minimum order requirement.

PRODUCT DATA

Description	Water-based, flexible acrylic coating
Colour	White = standard/grey and red to order only
Density	1.25 – 1.3 g/cm³
Coating thickness	2.5 mm nominal, wet film thickness
Sealant coverage	2.8 kg/m², 2.24 l/m²
Fire resistance	EN1366-4:2006 120 EI

TECHNICAL DATA

Acoustic performance	43 dB when installed with one 100 mm thick 80 kg/m³ stone wool and tested to EN10140 52 dB when installed with 200 mm thick 80 kg/m³ stone wool and testedTested to EN10140
Air permeability	600 PA positive and negative pressure and tested to EN1026
Water permeability	450 PA positive pressure and tested to EN1027
Container size	20 l
Spraying guidance	For optimum results, an airless sprayer should be utilised at a pressure of 90 psi using a spray tip of approx. 29 - 35 thou. +5 °C and +32 °C
Application temperature	For long term storage and ease of installation, it is recommended that ElastoSeal be stored indoors and in dry conditions
Storage and disposal	Storage temperature between -5 °C and +25 °C. For health and safety details, refer to fischer technical department
Shelf life	12 months from date of manufacture
European Technical Approval	ETA 15-0203
CE marking	1121-CPR-JA5065

APPLICATION DATA

Joint width [inch]	Joint width [mm]	Ft/gallon	Ft/pail	LM/gallon	LM/pail
0.25	6	119	800	54	244
0.50	13	99	683	44	202
0.75	19	85	567	38	173
1.00	25	73	492	33	150
1.25	32	66	443	30	135
2.00	51	49	328	22	100
4.00	102	31	207	14	63
6.00	152	22	148	10	45
8.00	203	16	108	7	33

The above table provides an approx. yield for a coverage of 2.5 mm Wet Film Thickness (WFT) with a 12.5 mm overlap.
Figures above are approx. guide only.

High performance intumescent graphite fire resistant mastic

Non-metallic pipes

APPROVALS

ETA 14/0381
1121-CPR-JA5047

British Standard
BS 476 - 20
BS EN 1026
BS EN ISO 140-3:1995
BS EN 1366-3: 2004

Approved CF 5151

EU

ADVANTAGES

- Low VOC
- Excellent acoustic properties
- Halogen and solvent free
- Excellent slump characteristics

FUNCTIONING

- FiGM is a one-part water based flexible acrylic emulsion containing a high pressure intumescent graphite, which is used to seal service penetrations in both vertical and horizontal applications.
- It can expand up to 20 times its own volume and cures to form a resilient, flexible fire seal.

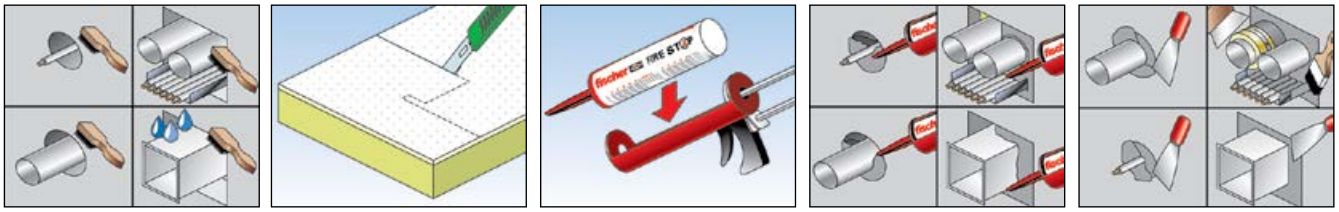
APPLICATIONS

- Metallic pipes: 6″ (159 mm)
- Non-metallic pipes: 5″ (125 mm)
- Cable bunches: 1″ (21 mm)
- Insulated service: 6″ (159 mm)
- Construction joints: 1″ (25 mm)
- Mixed services

BUILDING MATERIALS

- Concrete
- Masonry
- Steel
- Timber

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Languages on the cartridge	Contents [ml]	Suitable for use with	Sales unit [pcs]
FiGM 310 ml	**508765**	D, F, GB, NL	310	–	25
FIGM 310 ml	**538147**	TR, ES, PT, IT	310	–	25
FiGM 310 ml	**538148**	PL, CZ, SK, HU	310	–	25
FiGM 310 ml	**538149**	DK, SE, NO, FIN	310	–	25
KP M2	**053117**	–	–	FiAM 310, FFRS 310, UFS 310, FiGM 310	1

TECHNICAL DATA

Form	Aqueous thixotropic paste
Density	Ca. 1.3g/cm^3
Cure rate	1.7 mm per 24 hours dependent on conditions
Application temperature	+5 °C to +35 °C
Tack free	30 minutes
Cure system	Water-based
U.V. resistance	Good
Expansion onset temperature	Ca. 180 °C
Expansion	Up to 20 times
Skinning time	15 minutes at 25 °C / 50 % RH
Service temp range	Store in cool dry conditions between ±5 °C and ±25 °C
Shelf life	Up to 18 months unopened
European Technical Approval	ETA 14/0381
CE marking	1121-CPR-JA5047
Chemical and water resistance	The cured sealant is unaffected by water, dilute acids and alkalis, soap and household detergents. Contains a plasticised acrylic polymer, fire retardant fillers, blowing agents and mirror additives. No component labelled as dangerous under EEC directives criteria.

APPLICATION DATA

Services		Fire ratings (minutes)	
Types	**Sizes**	**Integrated rating**	**Insulation rating**
PVC pipe	Up to 125 mm diam.	120	120
HDPE pipe	Up to 90 mm diam.	120	120
ABS pipe	Up to 90 mm diam.	180	120
Insulated copper pipe	Up to 60 mm diam. pipe + up to 32 mm insulation	180	120
Cables	Up to 21 mm diam. x bunches 10 max	120	120
Mixed	Up to 63 mm diam. HDPE + 21 mm diam cables x 10	120	120

Minimum wall thickness = 100 mm

Elastomeric fire resistant sealant

Wall to wall construction joint

APPROVALS

ETA-15/0799
1121-CPR-JA5098

British Standard
BS 476 - 20
BS EN 1366-4
BS EN 1026
BS EN ISO 10140-3:1995
ISO 11600

warrington certifire certification
Approved CF 5093

ADVANTAGES

- Excellent acoustic properties
- Primerless adhesion to most
- sub-strates
- Approved for infinite linear gap length
- Halogen and solvent free
- Excellent slump characteristics
- Movement capability ± 25 %

FUNCTIONING

- FFRS is a one part silicone based sealant that can provide up to 5 hours fire resistance when used in construction joints.
- It provides primerless adhesion to a wide range of porous and non-porous substrates.

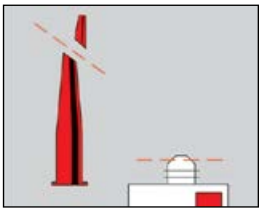
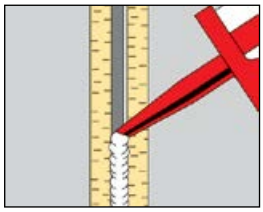
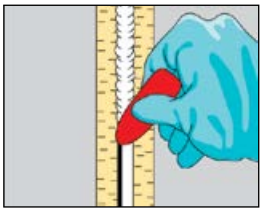
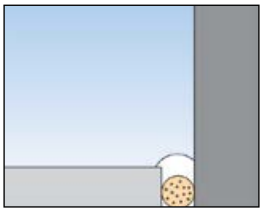
APPLICATIONS

- General construction joints in floor to floor, wall to wall, floor to wall and head of wall 2″ (50 mm)
- Internal and external applications

BUILDING MATERIALS

- Concrete
- Masonry
- Steel
- Timber

INSTALLATION

PRODUCT DATA

Item	Art.-No.	Languages on the cartridge	Contents [ml]	Suitable for use with	Sales unit [pcs]
FFRS White 310 ml	**512374**	DT, FR, EN, NL	310	–	12
FFRS White 310 ml	**538140**	DK, SE, FI, NO	310	–	12
FFRS White 310 ml	**538138**	TR, ES, PT, IT	310	–	12
FFRS White 310 ml	**538139**	PL, CZ, SK, HU	310	–	12
KP M2	**053117**	–	–	FiAM 310, FFRS 310, UFS 310, FiGM 310	1

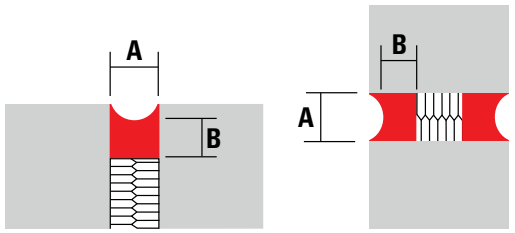
All items are available in grey and are subject to minimum order requirement.

TECHNICAL DATA

Cure system	Alcoxy
Relative gravity	1.17 kg/m^3
Skinning time	Approx. 5/10 minutes (at 25 °C and 50 % relative humidity)
Tack free time	Approx. 20 minutes (at 25 °C and 50 % relative humidity)
Full cure	Approx. 2 - 3 mm per 24 hours (at 25 °C and 50 % relative humidity)
Shore a hardness	16
Extrudability g/min	55 (standard NMRPS 495A 3 mm/3 bars)
Movement accommodation	± 25 %
Application temperature range	+5 °C to +40 °C
Service temperature range	Range: -50 °C to +150 °C - must not be stored above 35 °C
Shelf life	Up to 12 months when stored in unopened cartridges under cool, dry conditions
Colour	White, grey, black
European Technical Approval	ETA 15-0799
Elastic recovery	> 90 %
Slump	Nil up to 30 mm
VOC Value	13.800 g/ltr (Less water)
Sound transmission class	38 dB

The cured sealant is unaffected by water, dilute acids and alkalis, soap and household detergents. Certain solvents may soften and swell the cured rubber on prolonged contact.

APPLICATION DATA



Joint width A [mm]	Joint depth B [mm]	Yield per linear meters
30	20	0.5
20	15	1
15	8	1.25
10	10	3
6	6	4.25

Above provides approx. yield from 1 x 310 ml cartridge

Substrate	Max. joint width [mm]	Depth of sealant [mm]	Fire ratings	
			Integrity rating [minutes]	Insulation rating [minutes]
Concrete/concrete	12	6	300	122
Concrete/concrete	30	15	300	86
Concrete/concrete	50	25	300	65
Steel/concrete	12	6	300	48
Steel/concrete	20	15	300	43
Steel/concrete	50	25	300	33
Softwood/concrete	12	6	199	5
Softwood/concrete	30	15	143	–

Universal intumescent wrap strip for sealing combustible services

Floor application

APPROVALS

American Standard
ASTM E 814
(UL 1479)

ASTM E 84
(UL 723)

FM
APPROVED

CLASSIFIED c UL us
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH
PENETRATIONS FIRE STOP
SYSTEMS SEE UL DIRECTORY

ADVANTAGES

- Efficient and effective for sealing of pipe openings in floors and walls
- Easy to fit
- Moisture resistant
- Freeze-thaw characteristics
- No mechanical fixing required
- Economical solution
- Up to 4 hours fire resistance
- Asbestos and halogen free

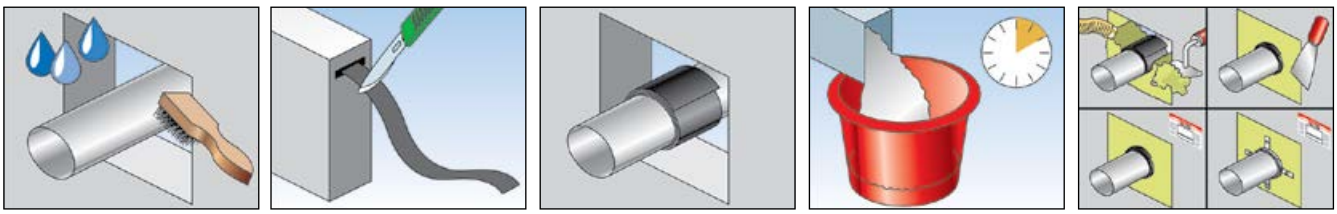
FUNCTIONING

- FiWS is a flexible, intumescent graphite based synthetic compound strip, which has been designed to be installed in both vertical and horizontal applications.
- FiWS has been developed as a PRE or cast-in FireStop solution, and has been designed to work with the fischer Universal Collar for retro fi tting or surface mounted applica-tions.
- For large openings, the FiWS can be used in conjunction with the FFSC.

APPLICATIONS

- Non-metallic service: PVC 14" (355 mm), cPVC 8" (203 mm), ABS 6" (152 mm), FRPP 4" (102 mm)
- Insulated service: Steel 10" (254 mm), Iron 10" (254 mm), Copper 4" (102 mm), Glass fibre 3" (75 mm), AB/PVC fl exible foam 1" (25 mm)
- Cable bunches: 3" (76 mm)

INSTALLATION



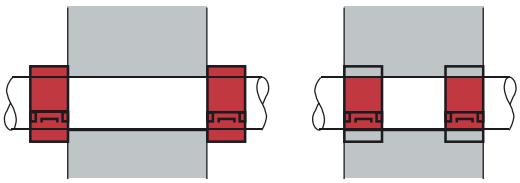
PRODUCT DATA

Item	Art.-No.	Dimensions [mm / inch]	Sales unit [pcs]
FiWS-2	**531397**	50 mm x 6 mm x 3.66 m / 2 ″ x 1/4 ″ x 12 ″	1
Universal Collar 2	**536053**	50 mm x 15 m / 2" x 50 ft	1

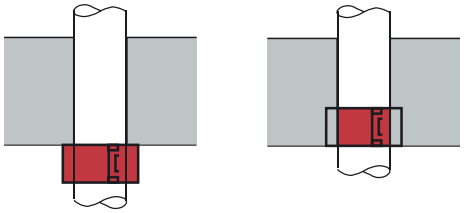
TECHNICAL DATA

State / Odour	Solid / Odourless
Colour	Black inner component in outer red carrier
Density	1.3 kg/m3
Expansion ratio	1 : 40
Significant expansion occurs at temperature	> 190 °C
Application temperature	-40 °C to 130 °C
Available sizes	Max. < 355 mm (14")
Flame spread (ASTM E 84 - UL723)	5
Smoke index (ASTM E 84 - UL723)	5
Shelf life	5 years = 60 months

APPLICATION DATA



Both sides of the wall



Bottom of floor

FiWS 2 - typical configuration			
Pipe diameter [mm]	No. of layers	No. of stacks for 2" wraps	Length [m]
50	1	1	0,34
75	2	1	1,1
100	2	1	1,42
150	3	1	3,18
200	4	1	5,64
305	4	2	16,56

An intumescent single or endless wrap for sealing flammable pipes

Floor application

APPROVALS

ETA-15/0694
1121-CPR-AA5092

British Standard
BS 476 - 20
BS EN 1366-3

UL EU

warrington certifire certification

ADVANTAGES

- Efficient and effective for sealing of pipe openings in floors and walls
- Easy to fit
- Moisture resistant
- No mechanical fixing required
- Economical solution
- Up to 4 hours fire resistance
- Asbestos and halogen free
- Available on a roll for more flexibility in pipe diameters

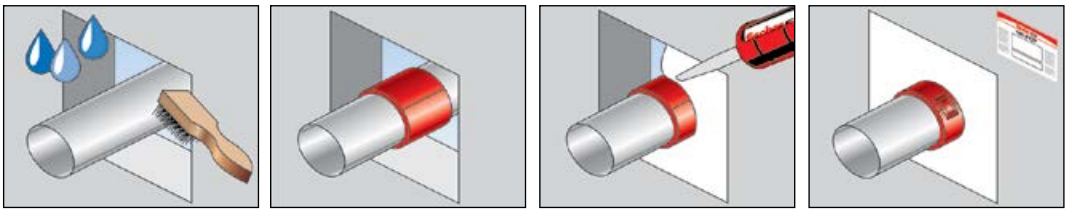
FUNCTIONING

- FiPW is a flexible composite strip, which is composed of thermoplastic component containing intumescent graphite in a synthetic compound and enclosed in an outer polyethylene cover.
- Can also be used as a cast-in solution. For large openings, use in conjunction with FCPS or FFSC.

APPLICATIONS

- Non-metallic pipes
- Polyvinyl Chloride PVC
- Chlorinated Polyvinyl Chloride cPVC
- Medium-density Polyethylene MDPE
- High-density Polyethylene HDPE
- Acrylonitrile Butadiene ABS

INSTALLATION



PRODUCT DATA

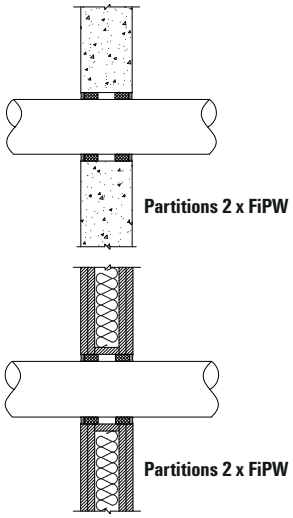
Item	Art.-No.	Fits pipe-Ø	Fire rating	Sales unit [pcs]
FiPW E/2mm	**539608**	30 - 200	2	1
FIPW 2/30-32	**052546**	30 - 32	2	20
FIPW 2/38-40	**052547**	38 - 40	2	20
FIPW 2/55	**052548**	55	2	20
FIPW 2/63	**052560**	63	2	20
FIPW 2/75	**052561**	75	2	20
FIPW 2/82	**052562**	82	2	20
FIPW 2/110	**052563**	110	2	20
FIPW 2/125	**052890**	125	2	20
FIPW 2/160	**052891**	160	2	20
FIPW 2/200	**053000**	200	2	20

Note: Details on 4 hours fire rated wraps are available on request.

TECHNICAL DATA

State	Solid
Colour	Black inner component in outer red carrier
Odour	Odourless
Density	1.3 kg/m³
Expansion ratio	1 : 25
Significant expansion occurs at temperature	> 180 °C
Application temperature	-40 °C to 130 °C minutes
Available sizes	> 30 mm and max. up to 200 mm
Storage temperature	N/a
Shelf life	60 months
Dimensions (thickness x diameter)	4 mm up to 63 mm - 6 mm up to 110 mm - 10 mm thereafter

APPLICATION DATA



Configuration for up to 120 min.			
Outer pipe diam. [mm]	**No. wraps**	**Thickness**	**Length (theoretically) [mm]**
40	1	2	126
55	2	4	352
63	2	4	402
75	2	4	478
82	2	4	521
90	3	6	867
110	3	6	1055
125	4	8	1608
160	4	8	2047
200	5	10	3203

Collar for sealing a wide range of combustible pipes where passing through fire rated walls and floors

Wall applications

APPROVALS

ETA-15/0696
1121-CPR-JA5094

British Standard
BS 476 - 20
BS EN 1366-3

EU

ADVANTAGES

- Easy retrofit at any time
- Water resistant
- No minimum annular service required
- Pre-fixed attachment lugs
- Fold back tag for secure fixture

FUNCTIONING

- FFC is a powder coated cylindrical steel sleeve, which contains a heat reactive graphite based intumescent material that expands during fire.
- Designed to be securely fitted around the pipe and held in position with a retaining bolt.
- Any gaps up to 10 mm around FFC should be backfilled with FiAM or larger annular space should be closed with FCPS or FFSC.

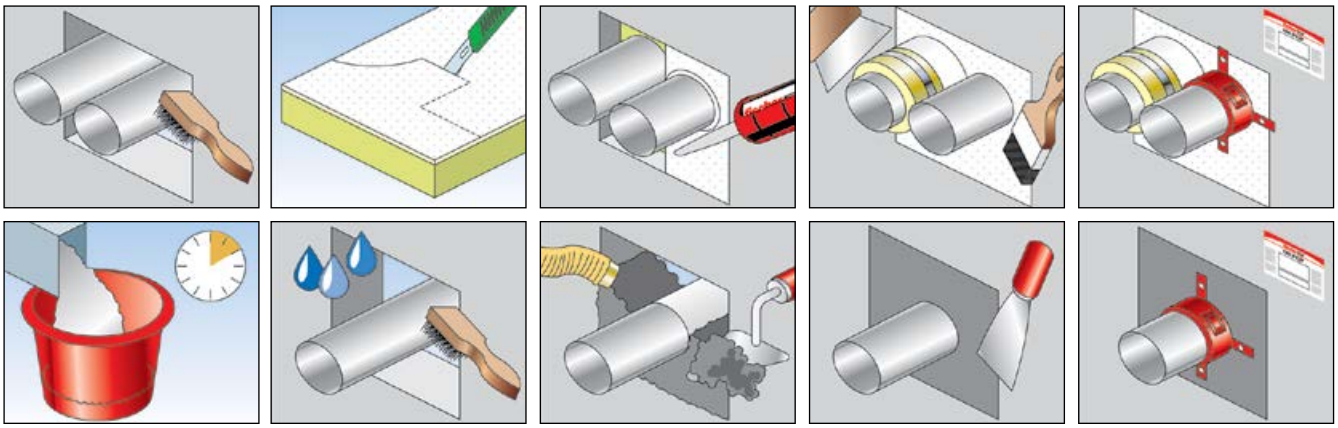
APPLICATIONS

- Non-metallic pipes: like PVC, HDPE, MDPE, ABS of various sizes through fire rated walls and floor assemblies

BUILDING MATERIALS

- Flexible and rigid wall constructions
- Solid concrete floors
- Hollow precast floors

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Dimensions [mm / inch]	Sales unit [pcs]
FFC 2/30-32	**052456**	30 - 32	32
FFC 2/38-40	**052480**	38 - 40	32
FFC 2/55	**052481**	55	100
FFC 2/63	**052482**	63	50
FFC 2/75	**052483**	75	50
FFC 2/82	**052486**	82	50
FFC 2/90	**052487**	90	40
FFC 2/110	**052488**	110	40
FFC 2/125	**052489**	125	25
FFC 2/160	**052500**	160	10
FFC 2/200	**052501**	200	10

*Details on larger sizes up to 400 mm and 4 hours fire rated collars are available on request. *Smaller sales units available on request.

TECHNICAL DATA

State	Solid
Colour	Red sleeve with black inner component
Odour	Odourless
Fire rating	Up to 4 hours
Available sizes	> 30 mm and max up to 200 mm
Significant expansion occurs at temperature	> 180 °C
Storage temperature	N/a
Shelf life	N/a

FireStop coated panel system for multiple service penetrations

Mix penetration through wall

APPROVALS

ETA-14/0388
1121-CPR-JA5050

ETA-14/0382
1121-CPR-JA5048

British Standard
BS 476-20
BS 476: Part 22
BS EN 1366-3
BS EN ISO 10140-3:1995

UL EU

ADVANTAGES

- Approved for light partition walls
- Can be installed dry
- No coatback required for services
- Excellent acoustic properties
- 4 hours integrity and 2 hours
- insulation

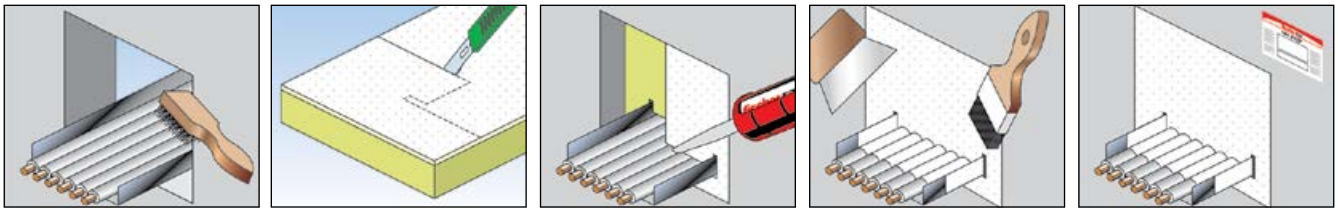
FUNCTIONING

- FCPS is a rock fibre core coated with ablative sealant FPC for use in both vertical and horizontal applications.
- It maintains the sound reduction index of a structure.
- Provides up to 4 hours integrity and 2 hours insulation on a wide range of applications.
- The FCPS will allow additional services to be added or removed and will accommodate thermal and mechanical movement of services.
- FPC can be used to adhere sections of FCPS board when jigsaw assembly is required and can also be used to enhances smoke and acoustic performance.

APPLICATIONS

- Small and large openings
- Cables/cable trays
- Air ducts with dampers
- Metallic or non-metallic pipes

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Dimensions DxsxLxB [mm]	Contents [l]	Contents [ml]	Suitable for use with	Sales unit [pcs]
FCPS/50	**053252**	1200 mm x 600 mm x 50 mm	–	–	–	1
FPC/5lt	**053253**	–	5	–	–	1
FiAM 310	**053011**	–	–	310	–	25
KP M2	**053117**	–	–	–	FiAM 310, FFRS 310, UFS 310, FiGM 310	1

TECHNICAL DATA

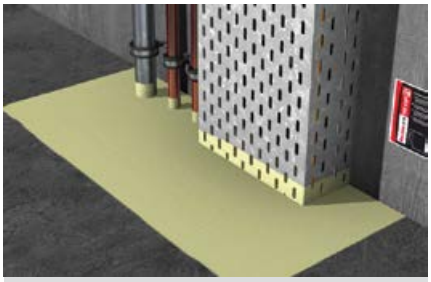
Dimensions	1200 mm x 600 mm x 50 mm
Density of board	140 kg/m3
Coating thickness	1 mm DFT
Fire resistance	4 hours - BS476 Part 20 and 22
Acoustic performance	23 dB mean reduction up to 56 dB reduction (with one 50 mm FCPS board). 29 dB mean reduction up to 65 dB reduction (with two 50 mm FCPS board)
Thermal conductivity (U value)	0.034 W/mK at 10 °C
Maximum size of seal	Wall 5.76 m2, floor 2.88 m2
Maximum size unsupported	1.2 m x 1.2 m (no services)
Mechanical support	30 mm x 30 mm x 1.6 mm steel angle
Density of panel coating FPC	1.25 - 1.3 g/cm3
Panel coating FPC coverage	3.5 litres/m2
Shelf life of board	N/a
Shelf life of panel coating FPC	12 months
European Technical Approval	ETA 14-0388 and ETA 14-0382
CE marking	1121-CPR-JA5050

APPLICATION DATA

Services	Rigid partition walls [Fire rating - hours]	Flexible partition walls [Fire rating - hours]	Concrete floors [Fire rating - hours]
Cable ladder/tray/basket	up to 4	up to 2	up to 2
Cables up to 26 mm diameter	up to 2	up to 2	up to 2
Cables up to 80 mm diameter	up to 4	up to 2	up to 2
Steel/Copper pipes up to 159 mm diameter	up to 2	up to 2	n/a
PVC pipes*up to 110 mm diameter	up to 1	up to 1	n/a
Steel ducts up to 445 mm x 445 mm diameter	up to 2	up to 2	n/a
Blank seals	up to 4	up to 2	up to 2

PVC Pipes must be protected in conjunction with FiPW, which must be securely sealed in place within the FCPS.

Structural fire resistant seal for floors and walls



Mix service penetrations

APPROVALS

ETA-14/0387
1121-CPR-JA5049

FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH PENETRATIONS FIRE STOP SYSTEMS

British Standard
BS 476-20

BS EN ISO 10140-3:1995

BS EN 1366-3

American Standard
ASTM E 814
(UL 1479)

ADVANTAGES

- Water based
- Low VOC
- Load bearing
- Excellent acoustic properties
- Both vertical and horizontal applications
- Halogen and asbestos free

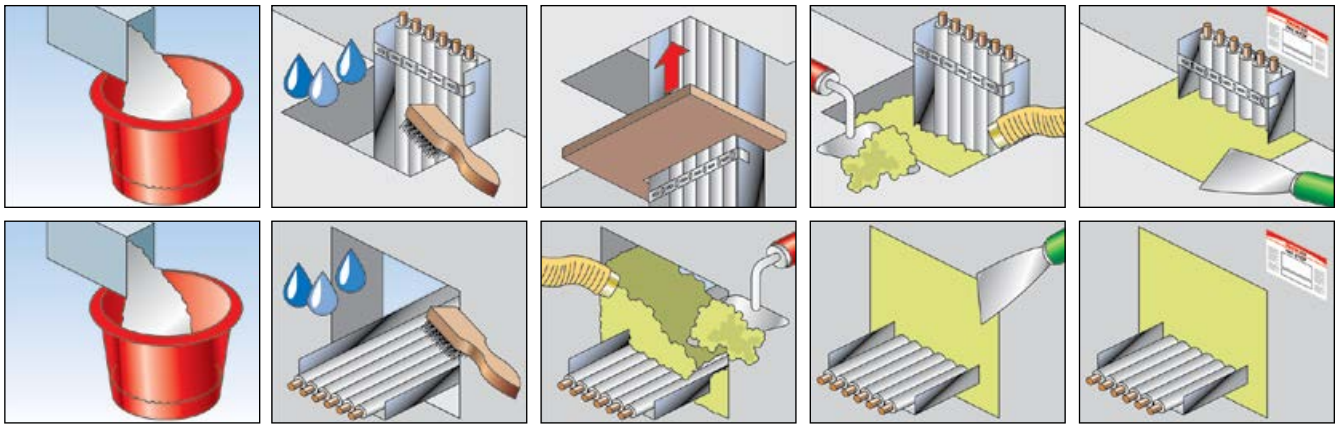
FUNCTIONING

- FFSC is a specially formulated gypsum based compound, which when mixed with water can be trowelled or poured.
- FFSC can provide up to 4 hours integrity and insulation.
- Set within 45 min depending on ambient temperature
- Capable of accommodating foot traffic within 72 hours.

APPLICATIONS

- Metallic services with steel and cast iron pipes
- Non-metallic services with FiP intumescent pipe wrap or FFC
- Voids or cavities in floors or walls
- Cable bunches

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Weight [kg]	Sales unit [pcs]
FFSC/20 kg	**533247**	20	1

TECHNICAL DATA

Chemical base	Gypsum
Colour	Off white
Weight	20 kg
Bulk density	950 kg/m3
Wet density	1,850 kg/m3
Setting time (min)	20

TECHNICAL DATA

Application temperature range	+5 °C to +40 °C
Temperature resistance	- 5 °C to +100 °C
Compressive strength	17 N/mm2
Sound insulation	50 dB
Reaction to fire (EN13501-1)	Class F
Shelf life	12 months
European Technical Approval	ETA 14-0387
Tensile strength	30/mm^2
Load bearing capacity	1,000 mm span - 10.29 kN/m^2
Load bearing capacity	1,200 mm Span - 8.57 kN/m^2
Load bearing capacity	1,500 mm Span - 6.86 kN/m^2
Load bearing capacity	2,000 mm Span - 5.15 kN/m^2
Thermal conductivity - EN1745	0.57 W/mK at 50 % /0.65 W/mK at 90 %
VOC Value	< 0.010 g/ltr (Less water)
Average yield	4 bags per M2 at 100 mm thickness

APPLICATION DATA

	By volume **Powder to water ratio**
Pourable grade	2.5:1
Trowelable grade	3:01

* These are approximate calculations based on 20 kg bags. The coverage does not take into account the percentage of the hole filled with services.
** As a further safety margin, we would recommend that all floor seals with clear areas greater than 1,800 mm x 1,800 mm must be reinforced.
Load bearing note: the open area free of services: Thickness of seal ratios for non-reinforced seals given above allow an ample safety margin for normal foot traffic, e.g. loads of two men

FireStop Foam and FireStop Block for use in a System. Or individually. ETA approved and UL listed applications.

Mixed penetrations through wall or floor assembly

APPROVALS

EN 1366-3: 2004

EN 13501-1

American Standard

ASTM E 814 (UL 1479)

ASTM E 84 (UL 723)

ADVANTAGES

- Easy access for difficult to reach openings
- Low VOC
- Various applications with two only
- Age resistant
- Smoke resistant
- Resistant to damp
- Re-enterable and repairable
- Excellent adhesion
- No backing material required
- F-rating / E-rating up to 2 hours
- T-rating / I-rating up to 2 hours

FUNCTIONING

- **FBS** is a two component polyurethane expanding sound, smoke and firestopping seal for hard to reach locations which expands to up to 5 times of its volume.
- **FBB** are highly elastic mouldable blocks.
- **FIB** is a glass fiber reinforced intumescent wrap to enhance the insulation value of ETA applications.
- Tested in accordance with ASTM E 814 (UL 1479), ASTM E84 (UL 723) as well as EN 1366-3, EN 13501 the Barrier System PLUS allows an easy application which saves time and costs on site.

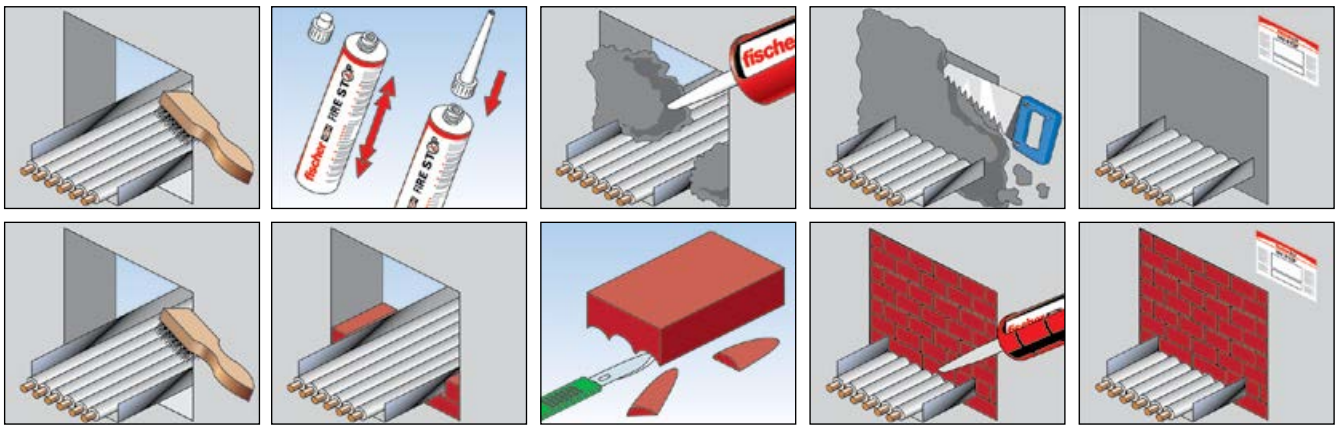
APPLICATIONS

- Metallic pipes up to 8 in. (203 mm)
- Insulated metallic pipes
- Conduits
- Cable and cable bunches
- Cable trays
- Mixed multiple penetrations

BUILDING MATERIALS

- Concrete (wall and floors)
- Masonry
- Flexible wall

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Contents [ml]	Dimensions [mm]	Sales unit [pcs]
FBS-UL	**544079**	380	–	6
FBB-UL FireStop Block	**544083**	–	200 mm x 130 mm x 60 mm	12
FBS-EN (DE, FR, EN, IT)	**544084**	380	–	6
FBS-EN (DK, FI, SE, NO)	**544085**	380	–	6
FBS-EN (PL, SK, CZ, HU)	**544086**	380	–	6

PRODUCT DATA

FBS-EN (TR, PT, ES, NL)	**544087**	380	–	6
FBB-EN FireStop Block	**544088**	–	200 mm x 144 mm x 60 mm	4
FIB Insulating Bandage	**544089**	–	5000 mm x 150 mm	1
FFBD Foam Barrier Dispenser	**544090**	–	–	1

TECHNICAL DATA

Criteria	FBS-UL	FBS-EN	FBB-UL	FBB-EN
Density		≥ 215 kg/m³		240 kg/m³ to 300 kg/m³
Temperature resistance	≤ 80 °C	≤ 80 °C	≤ 80 °C	≤ 80 °C
Construction material class		B2 - as per DIN 4102		B2 - as per DIN 4102
Cartridge content	380 ml	380 ml		
Yield	≤ 1.9 l	≤ 2.1 l		
Cure time	Approx. 90 s	Approx. 90 s		
Colour	Red-brown	Red-brown	Red-brown	Red-brown
Pack size	Boxed in 6	Boxed in 6	Boxed in 4	Boxed in 18
Shelf life	12 months from date of manufacturing	12 months from date of manufacturing		
Storage Temperature	+5 °C to +30 °C	+5 °C to +30 °C		
Sound Transmission Class		43.5 dB - 66 dB		45.5 dB - 68 dB
Application Temp Range	+15 °C to +30 °C	+15 °C to +30 °C		

APPLICATION DATA - UL

	Blank Opening	Metallic Pipes and Conduits	Cables / Cable Trays	Insulated Metal Pipes	Mixed Penetrations
Max. possible sizes of penetrants	Max 32 in. x 32 in. (813 x 813 mm)	Max 8 in. (203 mm) diameter	Max 24 in. (610 mm) wide by max 6 in. (152 mm) deep cable tray	Max 8 in. (203 mm) diameter with 1 in. (25 mm) insulation	See listed system
Barrier System PLUS UL	C-AJ-0158, W-L-0052	C-AJ-1669	C-AJ-3341; C-AJ-4110; W-L-4091	C-AJ-5383	C-AJ-8260; C-AJ-8261

APPLICATION DATA - ETA

		Seal thickness 144 mm	Seal thickness 200 mm
Cable / Cable Trays and Ladders	Sheated electrical cables up to 80 mm	Wall: E120 / EI60 - Floor: EI60	Wall / Floor: E120 / EI90
	Tied cable bundles up to 100mm		
	Non-sheated electrical cables	Wall: E120 / EI45 - Floor: E60 / EI30	Wall/ Floor E120 / EI60
Condiuts	Conduits / pipes of plastic up to a max. diameter of 40 mm	Wall: E120 / EI60 - Floor: E60 / EI30	Wall / Floor EI120
Pipes	Insulated metal pipes with max. diameter of 54 mm	Wall: E120 / EI90 - Floor: EI60	Wall / Floor E120 / EI90
	Non-insulated metal pipes with max. diameter of 28 mm	Wall: E120 / EI60 - Floor: EI60	Wall / Floor E120 / EI90
	Insulated metal pipes with AF/Armaflex insulation up to 88.9 mm diameter	Wall: E120 / EI90 - Floor: EI60	Wall / Floor EI120
	Combustible pipes with max. 50 mm diameter	Wall: EI120 - Floor: EI60	Wall / Floor EI120
For detailled information please refer to ETA 17/0845. Remaining space around penetrants can be filled with FBB FireStop Block.			

FireStop solution for temporary and permanent service penetrations in both vertical and horizontal applications

Floor application

APPROVALS

ETA 14/0380
1121-CPR-JA5045

British Standard
BS 476 - 20
BS EN 1366-3
BS EN ISO 10140-3:1995

EU

ADVANTAGES

- Approved as permanent fire barrier
- Reusable
- Dry installation
- Quick and easy installation
- No shelf life
- Moisture resistant
- Up to 2 hours fire protection

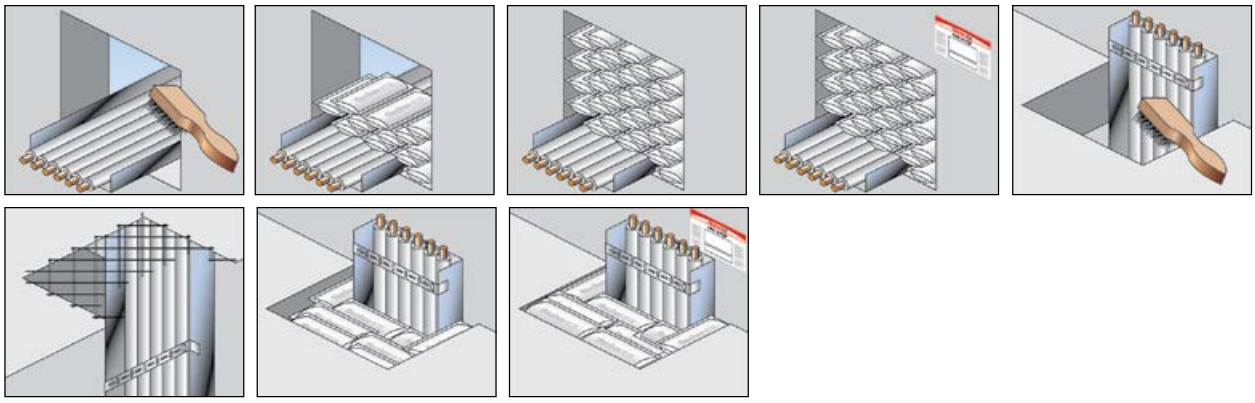
FUNCTIONING

- FiP is an intumescent graphite and mineral fi bre blend covered in a glass fibre PVC coated cloth bag.
- FiP is suitable for applications where temporary and permanent fire barriers are required.

APPLICATIONS

- Metal pipes
- Cables/cable trays
- Electrical trunking
- Electrical trunking: for conformance with the 17th Edition of the IEE Wiring Regulations (BS 7671:2008)

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Dimensions [mm]	Sales unit [pcs]
FiP/S	**516960**	330 mm x 50 mm x 20 mm	50
FiP/Std	**533890**	330 mm x 100 mm x 20 mm	25
FiP/M	**516959**	330 mm x 200 mm x 25 mm	50
FiP/L	**516958**	330 mm x 200 mm x 45 mm	25

TECHNICAL DATA

State	Solid
Colour	Black
Odour	Odourless
Weight per pillow	FiP/S - 80 g, FiP/Std - 120 g, FiP/M - 230 g, FiP/L - 420 g
Volumetric expansion	3 times
Significant expansion occurs at temperature	> 140 °C
Remain flexible between	-20 °C to 130 °C
European Technical Approval	ETA 14-0380
CE marking	1121-CPR-JA5046

ESTIMATION QUANTITIES

Width	Length [mm]												
	Size	Large	Medium	Large	Medium	Large	Medium	Large	Medium	Large	Medium	Large	Medium
[mm]	Seal type	100		300		500		700		900		1,000	
200	Wall	3	5	7	13	12	22	17	31	21	39	24	47
	Floor	2	3	4	7	6	12	9	17	11	22	12	27
400	Wall	5	9	14	26	24	44	33	61	42	78	47	95
	Floor	3	5	7	15	12	24	17	34	22	43	24	52
600	Wall	7	13	21	39	35	65	49	91	63	117	70	143
	Floor	4	7	11	22	18	36	25	51	33	65	36	79
800	Wall	9	18	28	52	47	87	66	122	84	157	94	192
	Floor	5	10	15	29	24	48	34	67	33	87	48	107
1,000	Wall	10	22	35	65	59	109	82	152	105	196	117	217
	Floor	6	12	18	36	30	60	42	84	54	108	60	120

A single component filler foam with effective fire resistance

Back filling material

APPROVALS

British Standard
BS 476 - 20

DIN

BS EN 1366-4

BS EN ISO 10140-3:1995

ADVANTAGES

- High foam yield
- No post shrinkage or expansion
- CFC free propellant
- Effective seal against smoke
- Rendered, cut, painted or sanded
- High bond strength
- Good adhesion to most building materials
- Excellant acoustic and thermal properties

FUNCTIONING

- FireStop Foam is a single component self expanding polyurethane foam, which has been designed to be self curing via the absorption of moisture from the atmosphere.
- The foam has excellent adhesion properties and can adhere to most building materials. When the foam sets it cures to a semi-rigid structure, which accommodates low movement and vibration.

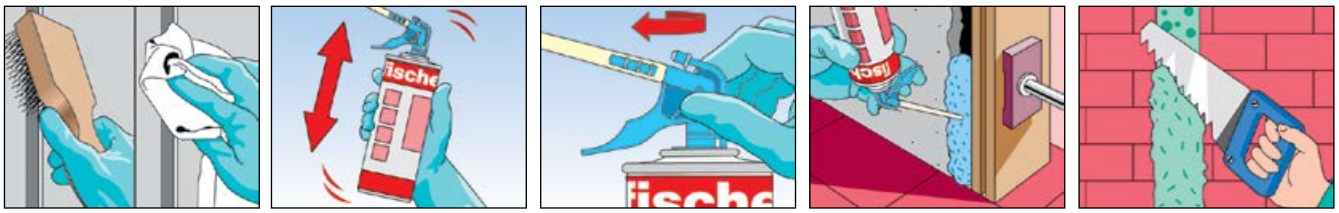
APPLICATIONS

- Construction joints in walls and floors
- Insulating and sealing doors and windows: non-fire rated application
- Backfilling material only for service penetrations
- Filling general voids and cavities: non-fire rated application

BUILDING MATERIALS

- Concrete
- Masonry
- Steel as backing material
- Timber as backing material

INSTALLATION



PRODUCT DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FireStop Foam Hand	**042757**	750	12
FireStop Foam Gun	**043712**	750	12

TECHNICAL DATA

Base	Polyurethane
Consistency	Stable foam
Curing system	Moisture-cure
Yield	1,000 ml yields 35 - 40 l cured foam when extruded in beads
Specific gravity	Ca. 27 kg/m3 extruded, fully cured
Skinning formation (20 °C/65 % R.H.)	10 min
Drying time (20 °C/65 % R.H.)	Non tacky after approx. 8 min
Curing rate (20 °C/65 % R.H.)	hr for 30 mm bead
Shrinkage	None
Post expansion	None

SPECIFICATIONS

Cellular structure	70 % closed cells, fine cellular structure
Temperature resistance	-40 °C to +90 °C when cured
Colour	Light red
Packaging	750 ml can
Storage temperature	+5 °C to +25 °C
Shelf life	Up to 9 months when stored in unopened cartridges under cool, dry conditions
Construction material as per DIN 4102	B1
STC rating	58 dB

Ablative firestop coating design to prevent the propagation of fire along internal and external electrical cable

Cable assignment through wall

APPROVALS

IEC 60331-21:1999

EN 60332-3-22:2010

EN 60332-1-2:2004

FM APPROVED

ADVANTAGES

- Water based, odorless and solvent
- free
  Suitable for internal and external
- applications
- Quick curing
- Spray or brush applied
- Halogen, fibres and asbestos free
  High yield

FUNCTIONING

- Can be sprayed, painted or brush applied.
- Multiple layers and overhead applica-tion possible due to its thixotropic consistecy.
- Base surface should be clean, dry and suitably prepared.
- Thickness of application: see approval or test.
- When exposed to fi re, it reacts to form a highly isolative char that slows down heat transfer, and provides a protective fire barrier.
- When spray applied:
  Min. 170 bar; Nozzle spray angle 40°
  Flow rate 0,78 mm; Liters/minute 3,5

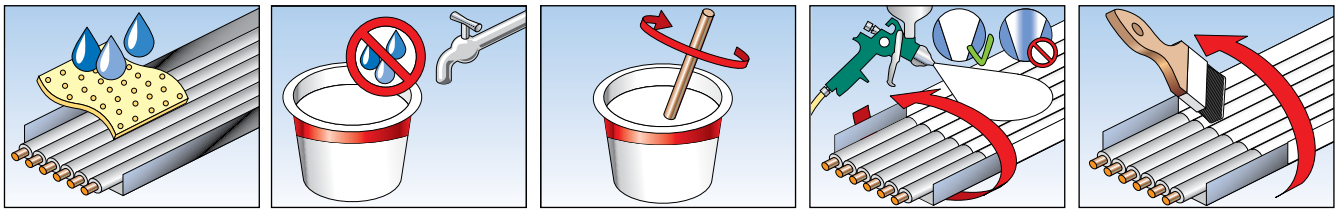
APPLICATIONS

- Power plants (IEC 332 Pt3)
- Telecommunication
- Industrial plants
- Petrochemical plants
- Factories and production facilities

BUILDING MATERIALS

- Drywall
- Concrete
- Masonry

INSTALLATION



PRODUCT DATA

Description	Art.-No.	Size	Qty. Per Box
FCC Cable Coating	539609	12,5 lt	1

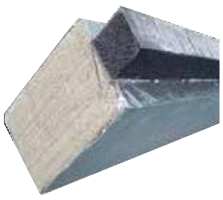
TECHNICAL DATA

Chemical base	Water-Based
Density	1,55 g/cm³
Application temperature	+ 5°C to + 40°C
Storage temperature	+5°C to +30°C to be protected from frost and direct sunlight
Odour	slight
Water resistant	yes
Shelf life	1 year
pH Value	approx. 8
Coating thickness	0.5 - 0.8 mm (IEC 60332-3)
(Dry film)	1.6 mm (Factory Mutual)
Colour	White
Curing time at room temperature	1 - 3 days*

* depending on humidity, air and ambiant temperature

Designed to protect the building void between the inner and outer construction elements

Fire | Barr VentiStop



Fire | Barr Fleximescent **FFB-FM**

FBB-FM Fleximescent

APPROVALS

British Standard
BS 476 - 20: 1987

ADVANTAGES

- fischer Fire | Barr VentiStop has been designed to provide a 25mm air gap, that allows air flow & moisture to pass down the back of the cladding. Under fire conditions, the powerful intumescent along the front edge, expands horizontally to close the gap and prevent the passage of fire.
- Voids up to 450 mm wide and has life expectancy of over 25 years.
- Contributes to Green Building.
- Free of halogens, asbestos, fibres and silica and is non-toxic.
- Fire resistant testing to BS476 to120 & 60 Minutes and air permeability testing to EN1026to 600Pa.
- Acoustic isolation on testing to EN10140 to 39dB (non-ventilated).

APPLICATIONS

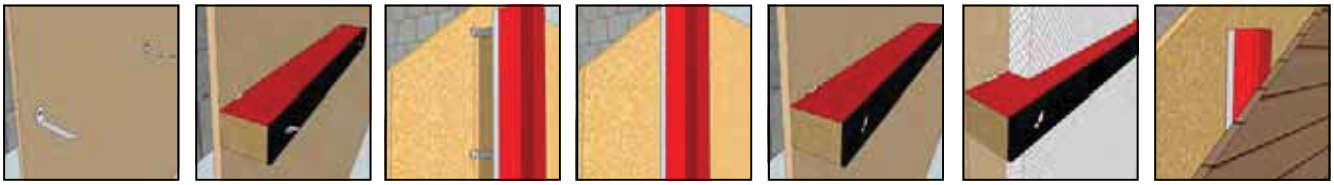
- Suitable to close up to 25 mm ventilation gap.
- Horizontal and vertical cavities between the inner and outer construction elements.

BUILDING MATERIALS

Suitable for:

- Concrete slabs, columns & walls.
- Curtain wall assemblies.
- Stone cladding etc.

INSTALLATION



PRODUCT DATA

Fire | Barr VentiStop **FFB-VS**

Items to order only Item	Art No.	To suit cavity void width [mm]	Colour	Fire Rating	Pack quantity [pcs]
FFB-VS / 25-50	521520	25-50	Red / Silver / Black	1hr	48
FFB-VS / 51-100	521521	51-100	Red / Silver / Black	1hr	24
FFB-VS / 101-150	521522	101-150	Red / Silver / Black	1hr	18
FFB-VS / 151-200	521523	151-200	Red / Silver / Black	1hr	14
FFB-VS / 201-250	521524	201-250	Red / Silver / Black	1hr	11
FFB-VS / 251-300	521525	251-300	Red / Silver / Black	1hr	11
FFB-VS / 301-350	521526	301-350	Red / Silver / Black	1hr	TBA
FFB-VS / 351-400	521527	351-400	Red / Silver / Black	1hr	9
FFB-VS / 401-450	521528	401-450	Red / Silver / Black	1hr	6

IMPORTANT- Please provide TOTAL cavity width for your application, excluding any insulation there might be.

PRODUCT DATA

Fire | Barr Fleximescent **FFB-FM**

Items to order only Item	Art No.	To suit cavity void width [mm]	Colour	Fire Ratin	Pack quantity [pcs]
FFB-FM/25-50	521511	25-50	Red / Silver / Black	2hr	*On request
FFB-FM/51-100	521512	51-100	Red / Silver / Black	2hr	*On request
FFB-FM/101-150	521513	101-150	Red / Silver / Black	2hr	*On request
FFB-FM/151-200	521514	151-200	Red / Silver / Black	2hr	*On request
FFB-FM/201-250	521515	201-250	Red / Silver / Black	2hr	*On request
FFB-FM/251-300	521516	251-300	Red / Silver / Black	2hr	*On request
FFB-FM/301-350	521517	301-350	Red / Silver / Black	2hr	*On request
FFB-FM/351-400	521518	351-400	Red / Silver / Black	2hr	*On request
FFB-FM/401-450	521519	401-450	Red / Silver / Black	2hr	*On request

IMPORTANT- Please provide TOTAL cavity width for your application, excluding any insulation there might be.

TECHNICAL DATA

Description	Foil faced stone with a black intumescent edge
Fire Resistance - FFB - VS	BS467 20/22 60 min, DIN 4102 B2 - 30/30
Fire Resistance - FFB - FM	BS467 20/22 120 min
Closure Time - FFB - VS	>5min
Activation	Approx 180^{0}C (Intumescent material)
Expansion Volume - FBB - FM	25 times thickness of material (1.4mm to 30mm)
Expansion Pressure	Approx.07N/mm^2
Density	Stone Wool - 80Kg/m^3 intumescent 1.3g/cm^3
Weather Resistance	yes
Sag	0%
Acoustic Isolation (EN10140) - FBB - FM	39db
Air Permeability (EN1026) - FBB - FM	600pa - 100pa 11.1/89m^3/h/m^2
Open Void Size - FBB - VS	25mm to 50mm
Dimensions	75mm Thick 1000mm Long
Width	FBB - VS (30mm to 450mm) FBB - FM (40mm to 450mm)
Brackets	FBB - VS (3 per unit) FBB - FM (2 per unit)

ADDITIONAL INFORMATION

Note: Please refer to SDS for further information

Storage

1. **Storage temperatures between +2°C and +49°C**
2. **Store away from heat sources**

Designed to protect the building void between the inner and outer construction elements

APPROVALS

British Standard
BS 476-20

BS EN1366-4: 2006

ADVANTAGES

- Tested to EN 1366-4 & BS 476
- Classification to EN 13501-2, EN 13501-1.
- Air Permeability to EN 1026 to 600Pa.
- Acoustic Isolation to EN 10140 to 31dB
- GWP of 0% Global Warming Potential.
- ODP of 0% Ozone Depletion Potential.
- Superior Level of Sustainability
- Encased Fibre Migration for Air Plenum Use.
- Brackets included in the pack.
- Life expectancy of over 25 years.
- Contributes to Green Building
- Voids up to 590mm wide.

FUNCTIONING

- FCFcl Cavity Barrier comprises of a one piece closed dimension stone wool core.
- The product is encased with an aluminium foil face which provides class 'O' rating and exhibits excellent resistance to smoke.
- The FCFcl provides a resilient lateral compression which is required to ensure a tight fit.
- Designed to be used in Ceiling Cavity, Slab Edge or Under Floor installations

APPLICATION

- Tested in Masonry, Concrete Timber

Suitable for application:

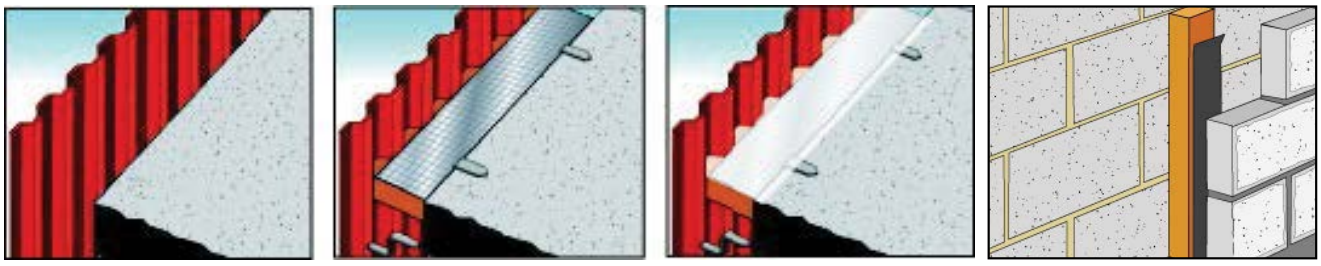
- Ceiling Cavity Barriers
- Under Floor Cavity Barriers
- Slab Edge Barriers

BUILDING MATERIALS

Suitable for:

- Concrete slabs, columns & walls.
- Curtain wall assemblies.
- Stone cladding etc.

INSTALLATION



PRODUCT DATA

Type	Art.-No.	Dimensions	Qty, Per Box
FCFcl 100	**53046**	1200 x 600 x 100 mm	1
FCFcl 75.	**–**	300 x 29 x 1 mm	1
Foil Tape	**–**	–	1
Multi Purpose Bracket	**58577**	400 x 25 x 1 mm	2

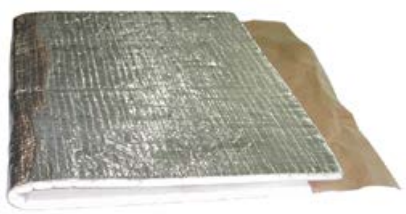
TECHNICAL DATA

Description	Silver Foil Wrapped Structural Stone Wool Composite
Density	80kg/m3
Thermal	0.35 to 0.37W/mk
Fire Resistance	EN 1366-3 EI 60/30, BS 476 60mins
Classification	EN 13501-2, EN 13501-1
Acoustic Isolation	31dB EN 10140
Air Permeability	600Pa EN 1026 - 100Pa 2.6/4.2 m3/h/m2
Thickness	75mm and 100mm
Dimensions	1200 x 600 / cut to size
Brackets	Not required under 310mm for 75mm product
Vold Size	600mm wide x Length
Storage Temperature	+2°C to +49°C

Other Products

Thermal defense wrap TDW

Thermal defense wrap for high insulation and temperature stability



Cable tray application in wall

ADVANTAGES

- Remains flexible -10 to +160
- Low VOC
- High insulation and temperature stability
- Pre-formed 300 mm roll
- Fast and efficient installation
- Remains flexible without aging

APPLICATIONS

- Metallic services with steel and cast iron pipes
- General construction joints: wall to floor to head of wall
- Drywall partitions, connections
- FCPS joints

Intumescent Putty Pad FiPP

External application

APPROVALS

British Standard
BS EN 1366-3
BS EN 1026
BS EN ISO 10140-3:1995

ADVANTAGES

- Excellent acoustic properties
- Internal and external versions available
- Primerless adhesion to most substrates
- Robust detail part E handbook accepted
- No electrical conductivity
- Air permeability
- Quick and simple installation

APPLICATIONS

- Most flexible partition assemblies
- Fire and insulation resistance
- Acoustic sealing
- Air permeability
- Plastic and metal electrical outlets

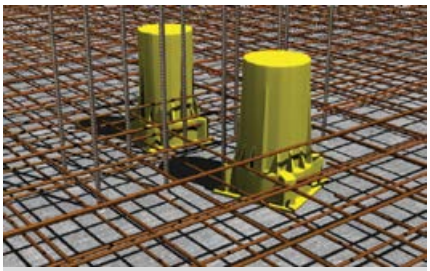
BUILDING MATERIALS

- Most flexible wall partitions constructed from plasterboard/gypsum board, timber and steel studs

Cast in Device FCID

Fast and efficient solution for forming service penetrations through concrete floors

FCID FCID-E MRF



Installation of FCID within reinforced concrete floor

APPROVALS

British Standard
BS 476 - 20

Australien Standard
AS 1530: Part 4

ADVANTAGES

- Quick installation
- Watertight seal
- Higher tolerance
- Easily extendable
- Wider base for further connections
- No further collars or wraps required
- Reduce working at heights
- Cost saving
- Reduced foot plate
- Eco-friendly extension tube
- Closer proximity positioning

APPLICATIONS

- Sealing and firestopping PVC and
- HDPE pipes up to 6″ (160 mm)
- Forms holes up to 10″ (200 mm) thick concrete floors
- FCID and MRF creates recesses in slabs for lower positioning of soil
- Manifold units in wet room applications

BUILDING MATERIALS

- Reinforced cast concrete slabs
- Some prefabricated slab systems (subject to design)

AIR SEALANT GUNS & FOAM GUNS

Applicator Gun KPM1

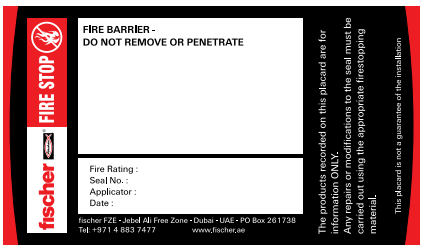
Applicator Gun KPM2

Applicator Gun 0.5

FBS Foam Gun

Type	Art No.	Adapted For	Qty.Per Box
KPM2 Applicator Gun	53117	Fiam, FFRS, UFS 310, FBS 0.2	1
KPM1 Applicator Gun	53115	Fiam, FFRS, UFS 310, FBS 0.2	1
Applicator Gun 0.5	97967	Fiam 600ml	1
FBS Foam Gun	503115	FBS 0.5	1

FIRESTOP LABELS



Type	Art No.	Dimensions	Qty.Per Box
FLS FireStop Lable Stickers	T. B. C.	140mm x 80mm	25
FLP FireStop Label Plate	T. B. C.	140mm x 80mm	25

Installation Systems

Hinged pipe clamp FGRS

Fixation with multi-connector

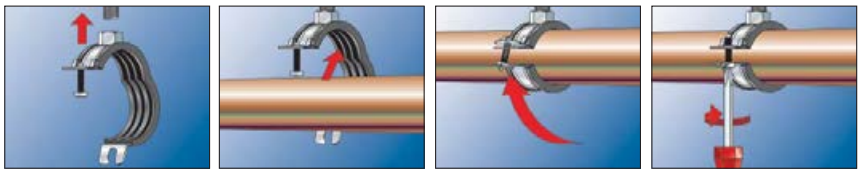
PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332 acc. to DIN EN 10111/ASTM A569
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1 Also available in SC3 on special request.
- **Connecting nut:** resistance welded, M8, SW 13
- **Locking screw:** Flat head screw with combination recessed head
- **Material sound insulation insert:** EPDM; chlorine-free; silicone-free
- **Sound insulation:** for DIN 4109
- **Temperature range:** -40 °C to +100 °C
- **Hardness:** 45 ± 5° Shore A
- **Fire behaviour:** DIN 4102: Class B2

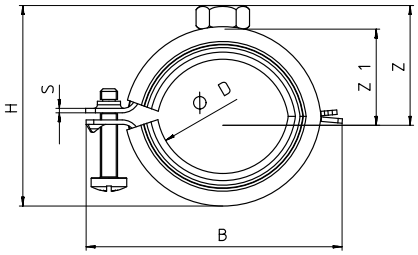
ADVANTAGES/BENEFITS

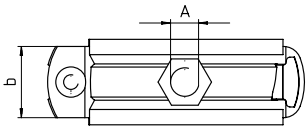
- The floating single screw allows for simple, one-handed installation
- The safety latch fastening guarantees secure pipe installation without the clamp springing open.
- The compact construction of the pipe clamp allows for simple post-installation insulation.
- The screw's design stops it falling out during installation

INSTALLATION



TECHNICAL DATA





Item	Art.-NO.	Thread A	Size (inch)	Clamping range D (mm)	Width B (mm)	Height H (mm)	b x s (mm)	Height Z (mm)	Locking Screw	Recommended load N_{rec} (kN)	Design load N_d (kN)	Sales unit (pcs)
FGRS 8 - 11	**537212**	M 8	–	8 - 11	45	29	20 x 1.25	17	M 5	0.80	1.12	100
FGRS 12 - 14	**079420**	M 8	1/4"	12 - 14	48	31	20 x 1.25	21	M 5	0.80	1.12	100
FGRS 15 - 19	**079421**	M 8	3/8"	15 - 19	52	36	20 x 1.25	14	M 5	0.80	1.12	100
FGRS 20 - 24	**079422**	M 8	1/2"	20 - 24	58	41	20 x 1.25	26	M 5	0.80	1.12	100
FGRS 25 - 30	**079423**	M 8	3/4"	25 - 30	63	47	20 x 1.25	28	M 5	0.80	1.12	100
FGRS 32 - 37	**079424**	M 8	1"	32 - 37	72	54	20 x 1.25	32	M 5	0.80	1.12	100
FGRS 40 - 44	**079425**	M 8	1 1/4"	40 - 44	79	61	20 x 1.5	37	M 5	0.90	1.26	50
FGRS 45 - 50	**079426**	M 8	1 1/2"	45 - 50	88	67	20 x 1.5	42	M 5	0.90	1.26	50
FGRS 50 - 55	**079427**	M 8	–	50 - 55	94	72	20 x 1.5	45	M 5	0.90	1.26	50
FGRS 56 - 63	**079428**	M 8	2"	56 - 63	99	80	20 x 1.5	46	M 5	0.90	1.26	50

Height adjustable pipe installation

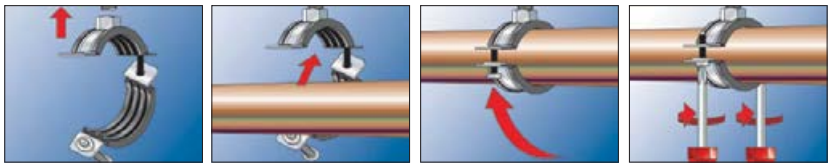
PROPERTIES

- **Material:** Steel DD11 (material no.1.0330) acc. to DIN EN 10130/ASTM A569
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **HDG. Zinclamella** acc to DIN EN ISO 10683 / 13858 min 15 µm
- **Standard:** Comply with ASTM B633 SC1, also available in SC 3 on special request.
- **Material:** Stainless steel (material no. 1.4401) of the corrosion resistance class III, e.g. A4
- **Sound insulation insert:** Material-SBR/ EPDM chlorine-free & silicone-free
- **Sound insulation:** According to DIN 4109
- **Temperature range:** -40° C to 100°+C
- **Hardness:** 55 ± 5° Shore A
- **Fire behaviour:** DIN 4102: Class B2

ADVANTAGES/BENEFITS

- The fire test report guarantees independently tested functional safety
- The combination nut with thread M8/M10 allows for optimised mounting choices
- The sound insulation insert offers noise protection and prevents contact corrosion

INSTALLATION

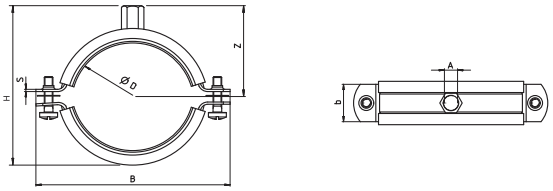


APPROVALS

Fire resistance classification **R 120** according DIN EN 1363-1

MLAR German standard regulations for fire safety requirements for piping systems (11/2005) **R 30** Certificate of compliance of the minimum distance ≤ 50 mm

TECHNICAL DATA



Item	Art.-NO. G.I.	Art.-NO. HDG	Thread A	Size (inch)	Clamping range D (mm)	Width B (mm)	Height H (mm)	b x s (mm)	hight Z (mm)	Recommended load N_{rec} (kN)	Design load N_d (kN)	Sales unit (pcs)
FRS 12 - 15 M8/M10	**510969**	**537981**	M 8/M 10	1/4"	12 - 15	55	39	20 x 1.25	31	1.00	1.40	100
FRS 15 - 19 M8/M10	**042535**	**537982**	M 8/M 10	3/8"	15 - 19	59	43	20 x 1.25	29	1.00	1.40	100
FRS 20 - 24 M8/M10	**042536**	**537983**	M 8/M 10	1/2"	20 - 24	65	48	20 x 1.25	32	1.00	1.40	100
FRS 25 - 30 M8/M10	**042537**	**537984**	M 8/M 10	3/4"	25 - 30	72	54	20 x 1.25	35	1.00	1.40	100
FRS 32 - 37 M8/M10	**042538**	**537985**	M 8/M 10	1"	32 - 37	77	61	20 x 1.25	38	1.00	1.40	100
FRS 40 - 45 M8/M10	**042554**	**537986**	M 8/M 10	1 1/4"	40 - 45	89	69	20 x 1.25	42	1.00	1.40	50
FRS 48 - 54 M8/M10	**510970**	**537987**	M 8/M 10	1 1/2"	48 - 54	99	78	20 x 1.25	46	1.00	1.40	50
FRS 55 - 61 M8/M10	**042555**	**537988**	M 8/M 10	2"	55 - 61	105	85	20 x 1.25	50	1.00	1.40	50
FRS 63 - 67 M8/M10	**091488**	**537989**	M 8/M 10	–	63 - 67	110	91	20 x 1.25	53	1.00	1.40	50
FRS 72 - 80 M8/M10	**091489**	**537990**	M 8/M 10	2 1/2"	72 - 80	125	104	20 x 2.00	60	1.50	2.10	25
FRS 87 - 92 M8/M10	**091505**	**537991**	M 8/M 10	3"	87 - 92	137	116	20 x 2.00	66	1.50	2.10	25
FRS 108 - 116 M8/M10	**091506**	**537992**	M 8/M 10	4"	108 - 116	164	140	25 x 2.00	78	2.00	2.80	20
FRS 121 - 128 M8/M10	**079456**	**537993**	M 8/M 10	–	121 - 128	176	152	25 x 2.50	84	2.50	3.50	10
FRS 133 - 141 M8/M10	**079457**	**537994**	M 8/M 10	5"	133 - 141	187	165	25 x 2.50	90	2.50	3.50	10
FRS 159 - 165 M8/M10	**079458**	**537995**	M 8/M 10	–	159 - 165	211	198	25 x 2.50	102	2.50	3.50	8
FRS 165 - 168 M8/M10	**079459**	**537996**	M 8/M 10	6"	165 - 168	225	192	25 x 2.50	104	2.50	3.50	8
FRS 3/8" A4	**064864**	–	M 8	3/8"	15 - 19	62	40	20 x 1.20	23	1.00	1.40	100
FRS 1/2" A4	**064865**	–	M 8	1/2"	20 - 24	68	45	20 x 1.20	26	1.00	1.40	100
FRS 3/4" A4	**064866**	–	M 8	3/4"	25 - 30	75	52	20 x 1.20	29	1.00	1.40	100
FRS 1" A4	**064868**	–	M 8	1"	31 - 38	80	60	20 x 1.20	32	1.00	1.40	100
FRS 1 1/4" A4	**064869**	–	M 8	1 1/4"	40 - 46	90	67	20 x 1.20	37	1.00	1.40	50
FRS 1 1/2" A4	**064870**	–	M 8	1 1/2"	48 - 54	97	75	20 x 1.20	41	1.00	1.40	50
FRS 54 - 58 A4	**064873**[1)]	–	M 8	–	54 - 59	104	80	20 x 1.20	44	1.00	1.40	50
FRS 2" A40	**064874**	–	M 8	2"	60 - 64	110	85	20 x 1.20	46	1.00	1.40	50
FRS 67 - 71 A4	**064875**[1)]	–	M 8	–	67 - 71	119	92	25 x 1.20	49	1.00	1.40	25
FRS 2 1/2" A4	**064879**	–	M 10	2 1/2"	72 - 78	130	99	25 x 1.50	53	1.30	1.82	25
FRS 81 - 86 A4	**064892**[1)]	–	M 10	–	81 - 86	132	107	25 x 1.50	58	1.30	1.82	25
FRS 3" A4	**064893**[1)]	–	M 10	3"	87 - 92	144	113	25 x 1.50	60	1.30	1.82	25
FRS 95 - 103 A4	**064894**[1)]	–	M 10	–	95 - 103	156	124	25 x 1.50	66	1.30	1.82	25
FRS 4" A4	**064898**	–	M 10	4"	102 - 116	172	138	25 x 2.00	73	2.00	2.80	20
FRS 121 - 127 A4	**064899**[1)]	–	M 10	–	121 - 127	192	149	25 x 2.00	79	2.00	2.80	10
FRS 133 - 141 A4	**064901**[1)]	–	M 10	5"	133 - 141	198	163	25 x 2.00	86	2.00	2.80	10
FRS 159 - 168 A4	**064903**	–	M 10	6"	159 - 168	218	191	25 x 2.00	100	2.00	2.80	8

(1) Delivery time on request.

Water Supply Pipe Support

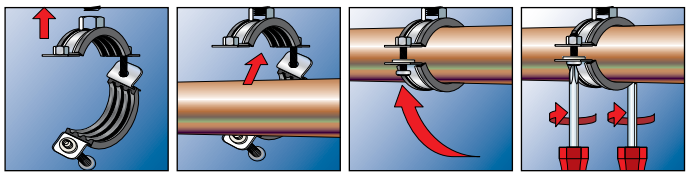
PROPERTIES

- **Material:** Steel
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** Comply with ASTM B633 SC1, available in SC3 on special request. Also available in dacromet finish 8.6 mm for more details check annex (B)
- **Connecting nut:** Resistance welded, M8, SW 13
- **Locking screw:** Flat head screw with combination recessed head
- **Sound Insulation inserts:** Material EPDM chlorine-free & silicone-free
- **Sound insulation:** acc. to DIN 4109
- **Temperature range:** -40° C to +100° C
- **Hardness:** 60 ± 5° Shore
- Comply with MSS SP 69/MSS SP 58 Type 12

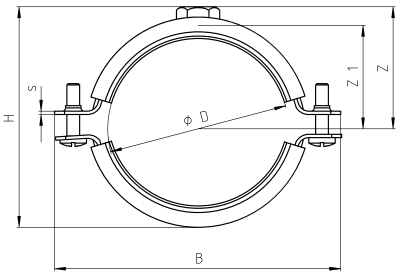
ADVANTAGES/BENEFITS

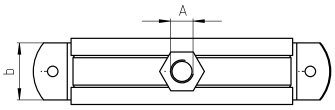
- Simple installation due to large opening angle.
- Locking screw secured against loss.
- Combination connecting thread for cost-effective warehousing and flexibility at the construction site.
- Can be used with PVC, HDPE and PPR pipes

INSTALLATION



TECHNICAL DATA





Item	Art.-NO. G.I.	Art No. Dacromet	Qty. per box pcs.	Size (inch)	Clamping range D (mm)	s x b (mm)	Screw M	Thread diameter A (mm)	Recommended load N_{rec} (kN)	Design load N_d (kN)
FRSR 11-14 M8 / M10	**534133**	**560283**	100	1/4"	11 - 14	1.2 x 20	M5 x 16	M8 + M10	0.85	1.19
FRSR 15-19M8 / M10	**534134**	**560284**	100	3/8"	15 - 19	1.2 x 20	M5 x 16	M8 + M10	0.85	1.19
FRSR 20-25 M8 / M10	**534135**	**560285**	100	1/2"	20 - 25	1.2 x 20	M5 x 16	M8 + M10	0.85	1.19
FRSR 26-30 M8 / M10	**534136**	**560286**	100	3/4"	26 - 30	1.2 x 20	M5 x 16	M8 + M10	0.85	1.19
FRSR 32-36 M8 / M10	**534137**	**560287**	100	1"	32 - 36	1.2 x 20	M5 x 16	M8 + M10	0.85	1.19
FRSR 38-43 M8 / M10	**534138**	**560288**	50	1-1/4"	38 - 43	1.2 x 20	M5 x 20	M8 + M10	0.85	1.19
FRSR 47-51 M8 / M10	**534139**	**560289**	50	1-1/2"	47 - 51	1.2 x 20	M5 x 20	M8 + M10	0.85	1.19
FRSR 53-58 M8 / M10	**534140**	**560290**	50	–	53 - 58	1.2 x 20	M5 x 20	M8 + M10	0.85	1.19
FRSR 60-64 M8 / M10	**534141**	**560291**	50	2"	60 - 64	1.2 x 20	M5 x 20	M8 + M10	0.85	1.19
FRSR 63-67 M8 / M10	**534142**	**560292**	25	–	63 - 67	1.2 x 20	M5 x 20	M8 + M10	0.85	1.19
FRSR 68-72 M8 / M10	**534143**	**560294**	25	–	68 - 72	1.5 x 20	M6 x 20	M8 + M10	0.85	1.19
FRSR 75-80 M8 / M10	**534144**	**560295**	25	2-1/2"	75 - 80	1.5 x 20	M6 x 20	M8 + M10	0.85	1.19
FRSR 81-86 M8 / M10	**534145**	**560296**	25	–	81 - 86	1.5 x 20	M6 x 20	M8 + M10	1.60	2.24
FRSR 87-92 M8 / M10	**534146**	**560297**	25	3"	87 - 92	1.5 x 20	M6 x 20	M8 + M10	1.60	2.24
FRSR 99-105 M8 / M10	**534147**	**560298**	20	3-1/2	99 - 105	2.0 x 20	M6 x 20	M8 + M10	1.60	2.24
FRSR 107-112 M8 / M10	**534148**	**560299**	20	–	107 - 112	2.0 x 20	M6 x 20	M8 + M10	1.60	2.24
FRSR 113-118 M8 / M10	**534149**	**560300**	10	4"	113 - 118	2.0 x 20	M6 x 20	M8 + M10	2.20	3.08
FRSR 125-130 M8 / M10	**534150**	**560301**	10	–	125 - 130	2.0 x 20	M6 x 20	M8 + M10	2.20	3.08
FRSR 138-142 M8 / M10	**534151**	**560303**	10	5"	138 - 142	2.0 x 20	M6 x 20	M8 + M10	2.20	3.08
FRSR 159-166 M8 / M10	**534152**	**560305**	8	6"	159 - 166	2.0 x 20	M6 x 20	M8 + M10	2.20	3.08
FRSR 200-212 M8 / M10	**534153**	**–**	8	–	200 - 212	2.0 x 20	M6 x 20	M8 + M10	2.50	3.50
FRSR 215-220 M8 / M10	**534154**	**–**	8	8"	215 - 220	2.0 x 20	M6 x 20	M8 + M10	2.50	3.50

Silicon pipe clamp FRSH

Silicone pipe clamp on sliding element

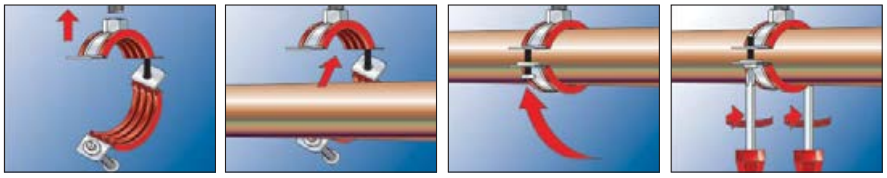
PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332 acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Connecting nut:** (up to FRSH 59-63) resistance welded, M8 and M8/M10 SW 13,M10 SW 17
- **Locking screw:** Flat head screw with combination recessed head
- **Material Sound insulation insert:** Silicone
- **Sound insulation:** for DIN 4109
- **Temperature range:** -40 °C to +220 °C
- **Hardness:** 60 ± 5° Shore A
- **Fire behaviour:** DIN 4102: Class B2

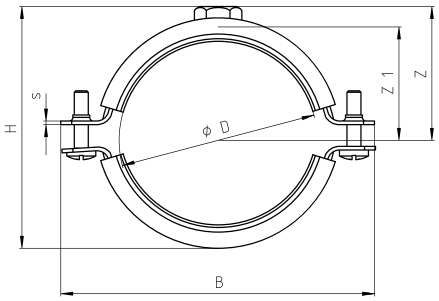
ADVANTAGES/BENEFITS

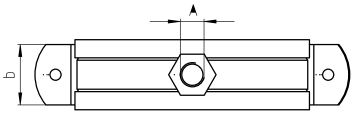
- The special silicone sound insulation insert allows for use with average temperatures of up to +220°C
- The two screws allow for easy adjust-ment to suit the outer pipe diameter
- The screws' safety feature ensures trouble-free installation

INSTALLATION



TECHNICAL DATA





Item	Art.-NO.	Thread A	Size (inch)	Clamping range D (mm)	Width B (mm)	Height H (mm)	b x s (mm)	Hight Z (mm)	Locking Screw	Recommended load Nrec (kN)	Design load Nd (kN)	Sales unit (pcs)
FRSH 15 - 19	**063490**	M 8	3/8"	15-19	62	41	20 x 1.25	24	M 5	1.00	1.40	100
FRSH 20 - 24	**063492**	M 8	1/2"	20-24	68	46	20 x 1.25	26	M 5	1.00	1.40	100
FRSH 25 - 30	**063494**	M 8	3/4"	25-30	75	52	20 x 1.25	29	M 5	1.00	1.40	100
FRSH 32 - 37	**063495**	M 8	1"	32-37	80	59	20 x 1.25	33	M 5	1.00	1.40	100
FRSH 40 - 45	**063498**	M 8	1-1/4"	40-45	90	67	20 x 1.25	37	M 5	1.00	1.40	50
FRSH 48 - 53	**063499**	M 8	1-1/2"	48-53	97	75	20 x 1.25	41	M 5	1.00	1.40	50
FRSH 54 - 59	**063500**[1)]	M 8	–	54-49	104	81	20 x 1.25	44	M 5	1.00	1.40	50
FRSH 60 - 64	**063502**	M 8	2"	60-64	110	86	20 x 1.25	46	M 5	1.00	1.40	50
FRSH 68 - 73	**063504**[1)]	M 10	–	68-73	122	95	25 x 1.5	51	M 6	1.30	1.82	25
FRSH 72 - 78	**063505**	M 10	2-1/2"	72-78	130	100	25 x 1.5	55	M 6	1.30	1.82	25
FRSH 80 - 86	**063511**[1)]	M 10	–	80-86	130	108	25 x 1.5	58	M 6	1.30	1.82	25
FRSH 89 - 92	**063513**[1)]	M 10	3"	87-92	141	114	25 x 1.5	61	M 6	1.30	1.82	25
FRSH 95 - 103	**063518**[1)]	M 10	–	95-103	156	125	25 x 1.5	67	M 6	1.30	1.82	25
FRSH 102 - 116	**063520**	M 10	4"	102-116	172	140	25 x 2.0	74	M 6	2.00	2.80	20
FRSH 133 - 141	**063537**[1)]	M 8/M 10	5"	133-141	198	174	25 x 2.5	95	M 8	2.00	2.80	10
FRSH 159 - 168	**091507**[1)]	M 8/M 10	–	159-168	226	201	25 x 2.5	109	M 8	2.00	2.80	8

(1) Delivery time on request.

Chilled water pipe support

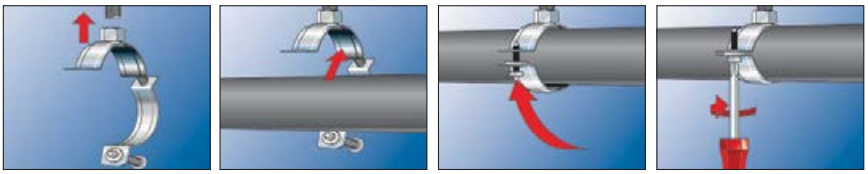
PROPERTIES

- **Material:** Steel
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1 Also available in SC3 on special request. Also available in dacroment finish 8.6 mm for more detail check annex (B)
- **Connecting nut:** resistance welded, M8, SW 13
- **Locking screw:** flat head screw with combination recessed head
- **Hardness:** 60 ± 5° Shore

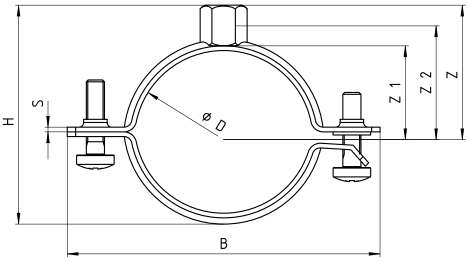
ADVANTAGES/BENEFITS

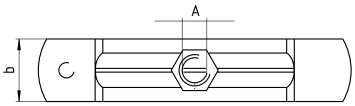
- Simple installation due to large opening angle.
- Locking screw secured against loss.
- Combination connecting thread for cost-effective warehousing and flexibility at the construction site.
- To be used with rubber support inserts for Chilled Water Pipes (CHWP).

INSTALLATION



TECHNICAL DATA





Item	Art.-NO.	Size (inch)	Clamping range D (mm)	s x b (mm)	Screw M	Thread diameter A (mm)	Recommended load N_{rec} (kN)	Design load N_d (kN)	Sales unit (pcs.)
FRSR-N 11-14 M8 / M10	**549800**	1/4"	11-14	1.2 x 20	M5 x 16	M8+M10	0.85	1.19	100
FRSR-N 15-19M8 / M10	**549801**	3/8"	15-19	1.2 x 20	M5 x 16	M8+M10	0.85	1.19	100
FRSR-N 20-25 M8 / M10	**549802**	1/2"	20-25	1.2 x 20	M5 x 16	M8+M10	0.85	1.19	100
FRSR-N 26-30 M8 / M10	**549803**	3/4"	26-30	1.2 x 20	M5 x 16	M8+M10	0.85	1.19	100
FRSR-N 32-36 M8 / M10	**549804**	1"	32-36	1.2 x 20	M5 x 16	M8+M10	0.85	1.19	100
FRSR-N 38-43 M8 / M10	**549805**	1-1/4"	38-43	1.2 x 20	M5 x 20	M8+M10	0.85	1.19	50
FRSR-N 47-51 M8 / M10	**549806**	1-1/2"	47-51	1.2 x 20	M5 x 20	M8+M10	0.85	1.19	50
FRSR-N 53-58 M8 / M10	**549807**	–	53-58	1.2 x 20	M5 x 20	M8+M10	0.85	1.19	50
FRSR-N 60-64 M8 / M10	**549808**	2"	60-64	1.2 x 20	M5 x 20	M8+M10	0.85	1.19	50
FRSR-N 63-67 M8 / M10	**549809**	65	63-67	1.2 x 20	M5 x 20	M8+M10	0.85	1.19	25
FRSR-N 68-72 M8 / M10	**549810**	–	68-72	1.5 x 20	M6 x 20	M8+M10	0.85	1.19	25
FRSR-N 75-80 M8 / M10	**549811**	2-1/2"	75-80	1.5 x 20	M6 x 20	M8+M10	0.85	1.19	25
FRSR-N 81-86 M8 / M10	**549812**	–	81-86	1.5 x 20	M6 x 20	M8+M10	1.60	2.24	25
FRSR-N 87-92 M8 / M10	**549813**	3"	87-92	1.5 x 20	M6 x 20	M8+M10	1.60	2.24	25
FRSR-N 99-105 M8 / M10	**549814**	3-1/2	99-105	2.0 x 20	M6 x 20	M8+M10	1.60	2.24	20
FRSR-N 107-112 M8 / M10	**549815**	–	107-112	2.0 x 20	M6 x 20	M8+M10	1.60	2.24	20
FRSR-N 113-118 M8 / M10	**549816**	4"	113-118	2.0 x 20	M6 x 20	M8+M10	2.20	3.08	10
FRSR-N 125-130 M8 / M10	**549817**	–	125-130	2.0 x 20	M6 x 20	M8+M10	2.20	3.08	10
FRSR-N 138-142 M8 / M10	**549818**	5"	138-142	2.0 x 20	M6 x 20	M8+M10	2.20	3.08	10
FRSR-N 159-166 M8 / M10	**549819**	6"	159-166	2.0 x 20	M6 x 20	M8+M10	2.20	3.08	8
FRSR-N 200-212 M8 / M10	**549820**	–	200-212	2.0 x 20	M6 x 20	M8+M10	2.50	3.50	8
FRSR-N 215-220 M8 / M10	**549821**	8"	215-220	2.0 x 20	M6 x 20	M8+M10	2.50	3.50	8

Waste water pipe

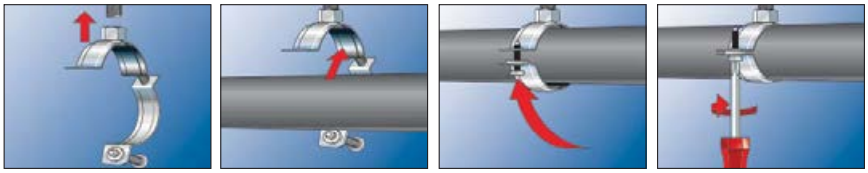
PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332 acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1
- **Connecting nut:** resistance welded, M8 and M8/M10 SW 13, M10/M12 SW 17
- **Locking screw:** Flat head screw with combination recessed head

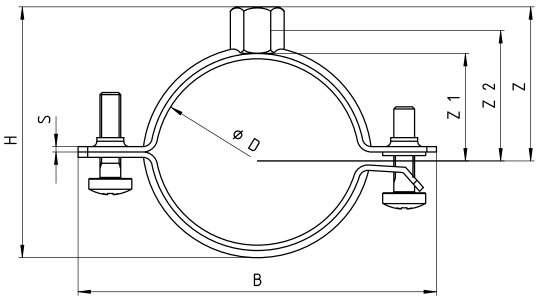
ADVANTAGES/BENEFITS

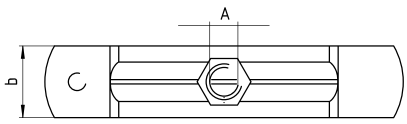
- The FRSN without the sound insulation insert is ideal for use in industrial applications and plastic pipes
- The combination connecting nut with thread M8/M10 allows for optimised mounting choices
- The two screws allow for ideal adaptation to suit the outer pipe diameter
- The screws' safety feature ensures trouble-free installation

INSTALLATION



TECHNICAL DATA





Item	Art.-N0.	Thread A	Size (inch)	Clamping range D (mm)	Width B (mm)	Height H (mm)	b x s (mm)	Hight Z (mm)	Locking Screw	Recommended load N_{rec} (kN)	Design load N_d (kN)	Sales unit (pcs)
FRSN 15 - 19 M8/M10	**049459**	M 8/M 10	3/8"	15-19	56	37	20 x 1.5	27	M 6	1.50	2.10	100
FRSN 21 - 23 M8/M10	**049789**	M 8/M 10	1/2"	21-23	60	41	20 x 1.5	28	M 6	1.50	2.10	100
FRSN 25 - 28 M8/M10	**049790**	M 8/M 10	3/4"	25-28	67	46	20 x 1.5	30	M 6	1.50	2.10	100
FRSN 32 - 36 M8/M10	**049793**	M 8/M 10	1"	32-36	74	54	20 x 1.5	34	M 6	1.50	2.10	100
FRSN 38 - 43 M8/M10	**049794**	M 8/M 10	1-1/4"	38-43	78	61	20 x 1.5	38	M 6	1.50	2.10	50
FRSN 44 - 49 M8/M10	**049902**	M 8/M 10	1-1/2"	44-49	88	67	20 x 1.5	41	M 6	1.50	2.10	50
FRSN 50 - 56 M8/M10	**049922**	M 8/M 10	–	50-56	92	74	20 x 1.5	43	M 6	1.50	2.10	50
FRSN 57 - 61 M8/M10	**049944**	M 8/M 10	2"	57-61	98	79	20 x 1.5	47	M 6	1.50	2.10	50
FRSN 63 - 70 M8/M10	**049945**	M 8/M 10	–	63-70	105	88	20 x 1.5	54	M 6	1.50	2.10	50
FRSN 70 - 77 M8/M10	**049947**	M 8/M 10	2-1/2"	70-77	112	95	20 x 1.5	55	M 6	1.50	2.10	25
FRSN 80 - 83 M8/M10	**049948**	M 8/M 10	–	80-83	116	101	20 x 1.5	58	M 6	1.50	2.10	25
FRSN 83 - 91 M8/M10	**049979**	M 8/M 10	3"	83-91	128	111	20 x 2.0	63	M 6	2.50	3.50	25
FRSN 100 - 106 M8/M10	**050006**	M 8/M 10	–	100-106	143	126	20 x 2.0	70	M 6	2.50	3.50	25
FRSN 108 - 114 M8/M10	**050008**	M 8/M 10	4"	108-114	156	134	20 x 2.0	75	M 6	2.50	3.50	25
FRSN 118 - 122 M8/M10	**500744**	M 8/M 10	–	118-122	160	142	20 x 2.0	78	M 6	2.50	3.50	25
FRSN 123 - 128 M8/M10	**050009**	M 8/M 10	–	123-128	173	149	25 x 2.5	82	M 6	2.50	3.50	25
FRSN 131 - 136 M8/M10	**050010**	M 8/M 10	–	131-136	176	157	25 x 2.5	86	M 6	2.50	3.50	25
FRSN 137 - 146 M8/M10	**050023**	M 8/M 10	5"	137-146	180	167	25 x 2.5	91	M 6	2.50	3.50	25
FRSN 146 - 156 M8/M10	**500746**	M 8/M 10	–	146-156	195	177	25 x 2.5	96	M 6	2.50	3.50	25
FRSN 159 - 165 M10/M12	**500747**	M 10/M 12	–	159-165	203	191	25 x 2.5	106	M 6	2.50	3.50	25
FRSN 166 - 175 M10/M12	**500748**[1)]	M 10/M 12	–	166-175	211	201	25 x 2.5	110	M 8	2.50	3.50	20
FRSN 200 - 206 M10/M12	**500751**[1)]	M 10/M 12	–	200-206	248	232	25 x 2.5	126	M 8	2.50	3.50	10
FRSN 210 - 219 M10/M12	**500752**[1)]	M 10/M 12	8"	210-219	261	245	25 x 2.5	133	M 8	2.50	3.50	10

(1) The band of the clamp is perforated from Ø 166 and connected with locking screw and nut.

Heavy duty pipe clamp FRSM M10 / M12 / M16

Heavy pipe on cantilever

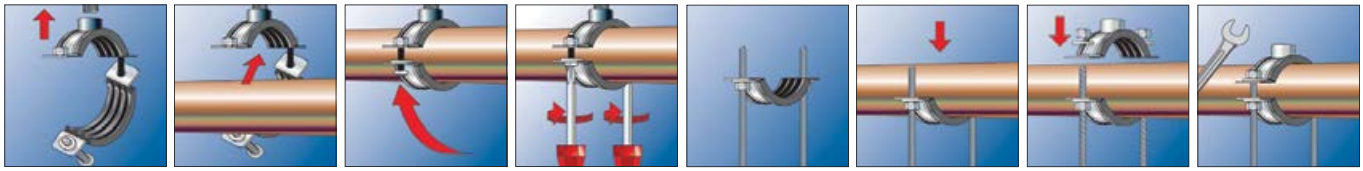
PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332 acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated 5 - 9 µm Also available in HDG on request.
- **Connecting nut:** M 10/M 12 = SW 17, M 12/ M 16 = SW 22, M 16 = SW 24
- **Material sound insulation insert:** EPDM; chlorine-free; silicone-free
- **Temperature range:** -50 °C to +110 °C
- **Hardness:** 45 ± 5° Shore A
- **Fire behaviour:** DIN 4102: Class B2

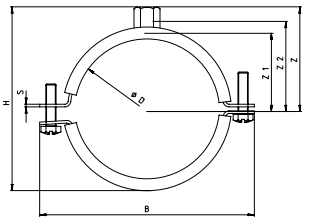
ADVANTAGES/BENEFITS

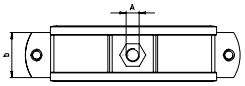
- High tested loads guarantees safe functioning of the FRSM
- The combination connecting nut with thread M10/M12, M12/M16 or M16 allows for optimised mounting choices
- From Ø 124 mm it is possible to install with 2 threaded rods, e.g. for the fixing of cast iron roof drainage pipes
- The two screws allow for easy adjustment to suit the outer pipe diameter
- The screws' safety features ensures trouble-free installation

INSTALLATION



TECHNICAL DATA





Item	Art.-NO.	Thread A	Size (inch)	Clamping range D (mm)	Width B (mm)	Height H (mm)	b x s (mm)	Hight Z (mm)	Locking Screw	Recommended load N_{rec} (kN)	Design load N_d (kN)	Sales unit (pcs)
FRSM 1/2" M10/M12	**504589**	M 10/M 12	1/2"	19-23	76	57	25 x 2.5	39	M 6	2.50	3.50	50
FRSM 3/4" M10/M12	**504590**	M 10/M 12	3/4"	24-29	80	63	25 x 2.5	42	M 6	2.50	3.50	50
FRSM 1" M10/M12	**504591**	M 10/M 12	1"	33-36	89	70	25 x 2.5	45	M 6	2.50	3.50	50
FRSM 1 1/4" M10/M12	**504592**	M 10/M 12	1-1/4"	40-45	98	79	25 x 2.5	50	M 6	2.50	3.50	20
FRSM 1 1/2" M10/M12	**093700**	M 10/M 12	1-1/2"	47-52	105	86	25 x 2.5	53	M 6	2.50	3.50	20
FRSM 53 - 58 M10/M12	**093701**	M 10/M 12	–	53-58	111	91	25 x 2.5	55	M 6	2.50	3.50	20
FRSM 2" M10/M12	**093702**	M 10/M 12	2"	60-65	118	99	25 x 2.5	60	M 6	2.50	3.50	20
FRSM 2 1/2" M10/M12	**093703**	M 10/M 12	2-1/2"	73-78	136	113	30 x 3.0	67	M 8	3.00	4.20	20
FRSM 79 - 85 M10/M12	**504593**	M 10/M 12	–	79-85	144	120	30 x 3.0	70	M 8	3.00	4.20	20
FRSM 3" M10/M12	**093704**	M 10/M 12	3"	88-93	152	129	30 x 3.0	75	M 8	3.00	4.20	20
FRSM 102 M10/M12	**093705**	M 10/M 12	–	100-106	166	142	30 x 3.0	81	M 8	3.00	4.20	20
FRSM 4" M10/M12	**093707**	M 10/M 12	4"	108-116	175	152	30 x 3.0	86	M 8	3.00	4.20	20
FRSM 124 - 129 M10/M12	**093709**[1)]	M 10/M 12	–	124-129	194	165	30 x 3.0	92	M 8	3.00	4.20	20
FRSM 133 M10/M12	**093710**[1)]	M 10/M 12	–	131-137	202	173	30 x 3.0	97	M 8	3.00	4.20	20
FRSM 5" M10/M12	**093711**[1)]	M 10/M 12	5"	138-145	210	180	30 x 3.0	100	M 8	3.00	4.20	20
FRSM 160 M10/M12	**093712**[1)]	M 10/M 12	–	156-162	227	198	30 x 3.0	109	M 8	3.00	4.20	20
FRSM 6" M10/M12	**093713**[1)]	M 10/M 12	6"	165-171	255	207	30 x 3.0	114	M 8	3.00	4.20	20
FRSM 7" M10/M12	**093714**[1)]	M 10/M 12	7"	188-194	278	230	30 x 3.0	125	M 8	3.00	4.20	10
FRSM 200 M10/M12	**093715**[1)]	M 10/M 12	–	196-203	287	239	30 x 3.0	130	M 8	3.00	4.20	10
FRSM 212 M12/M16	**505453**[1)]	M 12/M 16	–	205-214	289	264	40 x 4.0	147	M 12	5.00	7.00	10
FRSM 8" M12/M16	**505454**[1)]	M 12/M 16	8"	219-225	300	272	40 x 4.0	152	M 12	5.00	7.00	10
FRSM 250 M12/M16	**505455**[1)]	M 12/M 16	–	244-250	325	300	40 x 4.0	165	M 12	5.00	7.00	10
FRSM 10" M12/M16	**505456**[1)]	M 12/M 16	10"	267-273	348	323	40 x 4.0	177	M 12	5.00	7.00	10
FRSM 300 M12/M16	**505457**[1)]	M 12/M 16	–	297-304	379	354	40 x 4.0	192	M 12	5.00	7.00	10
FRSM 12" M12/M16	**505458**[1)]	M 12/M 16	12"	320-328	403	378	40 x 4.0	204	M 12	5.00	7.00	10
FRSM 348 - 356 M16	**504594**[1)]	M 16	–	348-356	480	403	50 x 5.0	213	M 16	8.00	11.20	1
FRSM 364 - 372 M16	**504595**[1)]	M 16	–	364-372	496	419	50 x 5.0	221	M 16	8.00	11.20	1
FRSM 400 - 409 M16	**504596**[1)]	M 16	–	400-409	533	456	50 x 5.0	240	M 16	8.00	11.20	1
FRSM 454 - 462 M16	**504597**[1)]	M 16	–	454-462	586	509	50 x 5.0	266	M 16	8.00	11.20	1
FRSM 500 - 508 M16	**504598**[1)]	M 16	–	500-508	632	555	50 x 5.0	290	M 16	8.00	11.20	1

(1) The bond of the clamp is perforated from Ø 124 and connected with locking screw and nut.

Sprinkler clamp FRSP C

Fire fighting pipe

PROPERTIES

- **Material:** Carbon Steel Q 235
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1
  Also available in SC3 on special request.
- Comply with MSS SP 69/MSS SP 58
  Type 7

ADVANTAGES/BENEFITS

- The FM-approval guarantees independently tested safety for the use in sprinkler systems.
- The sprinkler loop with clearance hole for easy fixing with threaded rod and nut.
- The UL approval guarantees the use in firefighting and sprinkler applications
- Easy to install without tools

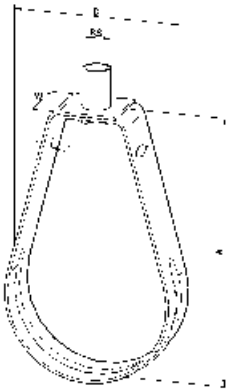
APPROVALS

UL

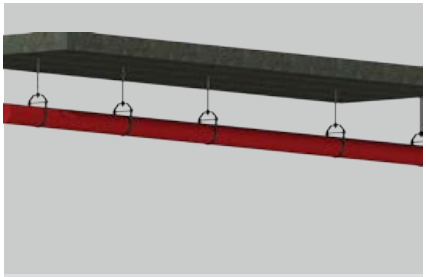
FM APPROVED

INSTALLATION

TECHNICAL DATA



Item	Art.-NO.	Clamping range D (mm)	Rod size RS (mm)	Height A (mm)	Max. rec. load P (kN)	Width W (mm)	Thickness T (mm)	Sale unit (pcs.)
FRSP C 1/2"	**516662**	19-23	M 10	72	1.3	16	1.2	100
FRSP C 3/4"	**516663**	25-29	M 10	78	1.3	16	1.2	100
FRSP C 1"	**516664**	33-36	M 10	86	1.3	16	1.2	100
FRSP C 1-1/4"	**516665**	40-45	M 10	94	1.3	16	1.2	100
FRSP C 1-1/2"	**516666**	47-52	M 10	99	1.3	16	1.2	100
FRSP C 2"	**516667**	60-65	M 10	109	1.3	16	1.2	100
FRSP C 2-1/2"	**516668**	73-78	M 10	141	4.5	19	2.2	60
FRSP C 3"	**516669**	88-93	M 10	162	4.5	19	2.2	60
FRSP C 4"	**516670**	110-116	M 10	195	5.0	19	2.2	24
FRSP C 5"	**532356**	138-145	M 12	226	5.0	19	2.5	24
FRSP C 6"	**516671**	165-171	M 12	267	5.6	19	3.0	24
FRSP C 8"	**516672**	217-221	M 12	316	5.6	19	3.0	12



Heavy pipe suspended support

PROPERTIES

- **Material:** Carbon Steel Q 235
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1 Also available in SC3 on special request.
- Comply with MSS SP 69/MSS SP 58 Type-1
- Sizes for Chilled Water Pipes (CHWP) available on request.

ADVANTAGES/BENEFITS

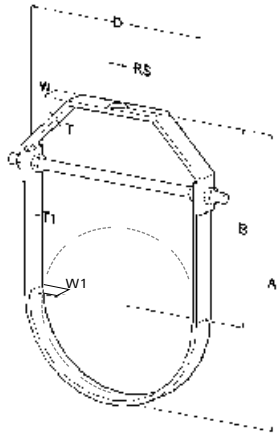
- Heavy duty Clevis Hanger.
- Designer for chilled water pipe work and fire fighting systems.
- Design allows vertical adjustment of pipe after installation.
- Nuts above Clevis must be tightened securely to ensure proper hanger performance.

APPROVALS

UL

FM APPROVED

TECHNICAL DATA



Item	Art.-NO.	Clamping range D (mm)	Rod size RS (mm)	Height A (mm)	Distance center to top B (mm)	Max. rec. load (kN)	W (mm)	T (mm)	W-1 (mm)	T-1 (mm)	Sales unit (pcs.)
FCH 1/2"	**532187**	19 - 23	M 10	51.0	37.6	2.7	19	2.5	19	2.0	150
FCH 3/4"	**532190**	25 - 29	M 10	58.4	42.3	2.7	19	2.5	19	2.0	120
FCH 1	**532195**	33 - 36	M 10	70.0	50.5	2.7	19	2.5	19	2.0	120
FCH 1-1/4"	**532197**	40 - 45	M 10	84.0	59.9	2.7	25	2.5	25	2.0	56
FCH 1-1/2"	**532198**	47 - 52	M 10	100.0	72.9	2.7	25	2.5	25	2.0	56
FCH 2"	**516695**	60 - 65	M 10	114.3	81.2	2.7	25	3.0	25	2.0	56
FCH 2-1/2"	**516696**	71 - 75	M 12	132.7	92.7	5.0	30	3.0	30	2.5	60
FCH 3"	**516697**	87 - 92	M 12	152.6	104.4	5.0	30	3.5	30	2.5	48
FCH 4"	**516699**	110 - 116	M 16	192.0	130.4	5.0	30	5.0	30	3.0	24
FCH 5"	**516700**	138 - 145	M 16	237.8	161.4	6.4	30	6.0	30	4.0	24
FCH 6"	**516701**	165 - 171	M 20	272.3	181.2	8.6	38	8.0	38	5.0	12
FCH 8"	**516702**	217 - 221	M 20	333.4	216.4	8.9	38	9.0	38	5.0	6
***FCH 10"**	**516703**	271 - 275	M 20	400.0	254.5	16.0	50	9.0	50	6.0	2
***FCH 12"**	**516704**	321 - 326	M 20	479.1	308.2	16.9	50	9.0	50	6.0	2

(1) * 516703, 516704 approvals not available

Riser Clamp RCWR

Riser pipe

PROPERTIES

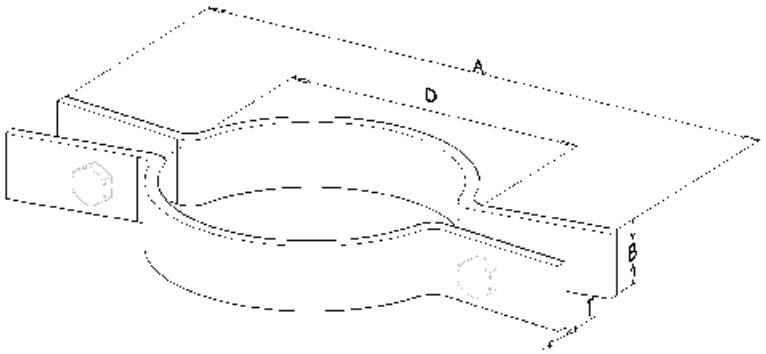
- **Material:** Carbon Steel Q 235
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1 Also available in SC3 on special request. Comply with MSS SP 69/MSS SP 58 Type-42

ADVANTAGES/BENEFITS

- Riser clamps are used for support of vertical piping by friction, no welding required on pipe.
- The UL approval guarantees tested safety for fire fighting riser pipes.

APPROVALS

TECHNICAL DATA



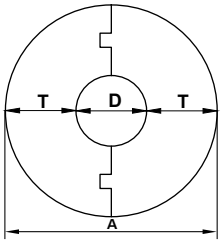
Item	Art.-NO.	Clamping range D (mm)	Bolt size (mm)	Widht A (mm)	Bolt diameter B (mm)	Max. rec. load (kN)	T (mm)	Torque (N.m)	Sales unit (pcs.)
RCWR 1/2"	**516673**	19 - 23	M 10	215.0	25	1.0	5.0	41	35
RCWR 3/4"	**516674**	24 - 28	M 10	228.5	25	1.0	5.0	41	30
RCWR 1"	**516675**	31 - 35	M 10	229.5	25	1.0	5.0	31	25
RCWR 1-1/4"	**516676**	40 - 44	M 10	240.5	25	1.1	5.0	31	25
RCWR 1-1/2"	**516677**	46 - 50	M 10	251.0	25	1.1	3.0	31	25
RCWR 2"	**516678**	56 - 61	M 10	261.6	30	1.3	5.0	31	25
RCWR 2-1/2"	**532380**	75 - 80	M 10	281.3	30	1.8	5.0	31	25
RCWR 3"	**516679**	88 - 93	M 10	298.5	30	2.2	5.0	45	20
RCWR 4"	**516680**	108 - 115	M 12	328.6	38	3.3	6.0	75	12
RCWR 5"	**516681**	133 - 140	M 12	362.0	38	6.7	6.0	75	12
RCWR 6"	**516682**	167 - 172	M 12	393.7	50	7.1	6.0	75	8
RCWR 8"	**516683**	219 - 225	M 16	463.5	50	11.1	9.5	129	4

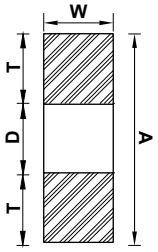
Chilled water pipe support

PROPERTIES

- **Density:** 1268 kg/m³
- **Thermal conductivity:** 0.219 W/m.k
- **Temperature range:** from 0° to 50° C
- **BS-3974-1 : 1974**

TECHNICAL DATA





Si.No.	Nom. Pipe size Schedule 40		Pipe O.D. D	T = 3/4" (19mm)				T = 1" (25mm)				T = 1 1/4" (32mm)				T = 1 1/2" (38mm)			
	(in)	(mm)	(mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)
1.	1/2"	15	21.3	549822	250	25	59	532357	180	25	71	549842	108	25	85	532833	120	25	97
2.	3/4"	20	26.7	549823	184	25	65	532358	160	25	77	549843	108	25	91	532834	90	25	103
3.	1"	25	33.4	549824	160	25	71	532359	120	25	83	549844	90	25	97	532835	60	25	109
4.	1-1/4"	32	42.1	549825	126	25	80	532360	100	25	92	549845	62	25	106	532836	50	25	118
5.	1-1/2"	40	48.2	549826	108	25	86	532361	90	25	98	549846	62	25	112	532837	50	25	124
6.	2"	50	60.3	549827	90	25	98	532362	60	25	110	549847	56	25	124	532838	40	25	136
7.	2-1/2"	65	73.0	549828	44	38	111	532363	35	38	123	549848	28	38	137	532839	28	38	149
8.	3"	80	89.9	549829	36	38	127	532364	28	38	139	549849	15	38	153	532840	13	38	165
9.	3-1/2"	90	102.6	549830	32	38	140	532365	28	38	152	549850	13	38	166	532841	13	38	178
10.	4"	100	114.3	549831	28	38	152	532366	24	38	164	549851	13	38	178	532842	13	38	190
11.	5"	125	141.3	549832	13	38	179	532367	13	38	191	549852	11	38	205	532843	11	38	217
12.	6"	150	168.3	549833	9	50	206	532369	7	50	218	549853	7	50	232	532844	7	50	244
13.	8"	200	219.1	549834	5	50	257	532370	5	50	269	549854	5	50	283	532845	5	50	295
14.	10"	250	273.0	549835	5	50	311	532371	5	50	323	549855	5	50	337	532846	5	50	349
15.	12"	300	324.8	549836	5	50	362	532373	5	50	374	549856	5	50	388	532847	5	50	400
16.	14"	350	356.6	549837	5	50	394	532374	5	50	406	549857	5	50	420	532848	5	50	432
17.	16"	400	406.4	549838	1	50	444	532375	1	50	456	549858	1	50	470	532849	1	50	482
18.	18"	450	457.2	549839	1	50	495	532376	1	50	507	549859	1	50	521	532850	1	50	533
19.	20"	500	508.0	549840	1	50	546	532377	1	50	558	549860	1	50	572	532851	1	50	584
20.	24"	600	610.6	549841	1	50	648	532378	1	50	660	549861	1	50	674	532852	1	50	686

Si.No.	Nom. Pipe size Schedule 40		Pipe O.D. D	T = 2" (50mm)				T = 2 1/2" (65mm)				T = 3" (75mm)			
	(in)	(mm)	(mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)	Art.No.	Sales unit (pcs.)	W (mm)	A (mm)
1.	1/2"	15	21.3	532853	64	25	121	533385	40	25	151	533405	20	25	171
2.	3/4"	20	26.7	532854	50	25	127	533386	40	25	157	533406	20	25	177
3.	1"	25	33.4	532855	40	25	133	533387	20	25	163	533407	20	25	183
4.	1-1/4"	32	42.1	532856	40	25	142	533388	18	25	172	533408	20	25	192
5.	1-1/2"	40	48.2	532857	40	25	148	533389	18	25	178	533409	18	25	198
6.	2"	50	60.3	532858	40	25	160	533390	18	25	190	533410	12	25	210
7.	2-1/2"	65	73.0	532859	16	38	173	533391	13	38	203	533411	11	38	223
8.	3"	80	89.9	532860	13	38	189	533392	11	38	219	533412	9	38	239
9.	3-1/2"	90	102.6	532861	13	38	202	533393	9	38	232	533413	9	38	252
10.	4"	100	114.3	532862	12	38	214	533394	9	38	244	533414	9	38	264
11.	5"	125	141.3	532863	10	38	241	533395	7	38	271	533415	7	38	291
12.	6"	150	168.3	532864	7	50	268	533396	5	50	298	533416	5	50	318
13.	8"	200	219.1	532865	5	50	319	533397	5	50	349	533417	5	50	369
14.	10"	250	273.0	532866	5	50	373	533398	5	50	403	533418	5	50	423
15.	12"	300	324.8	532867	5	50	424	533399	5	50	454	533419	5	50	474
16.	14"	350	356.6	532868	5	50	456	533400	1	50	486	533420	1	50	506
17.	16"	400	406.4	532869	1	50	506	533401	1	50	536	533421	1	50	556
18.	18"	450	457.2	532870	1	50	557	533402	1	50	587	533422	1	50	607
19.	20"	500	508.0	532871	1	50	608	533403	1	50	638	533423	1	50	658
20.	24"	600	610.6	532872	1	50	710	533404	1	50	740	533424	1	50	760

Fire fighting pipe

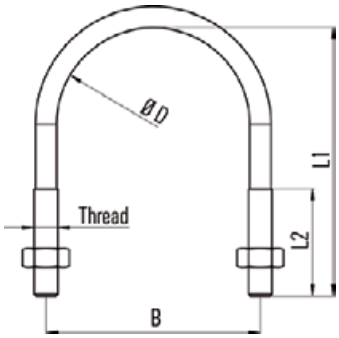
PROPERTIES

- **Material:** Steel with min. tensile strength of 360 N/mm²)
- **Zinc plating:** Electro zinc plated, ≥ 5 µm
  Also available with Rubber lining.

ADVANTAGES/BENEFITS

- Good for use as a guide mounting.
- The U-Bolt's two screws allow for ideal adaptation to suit the outer pipe diameter.

TECHNICAL DATA



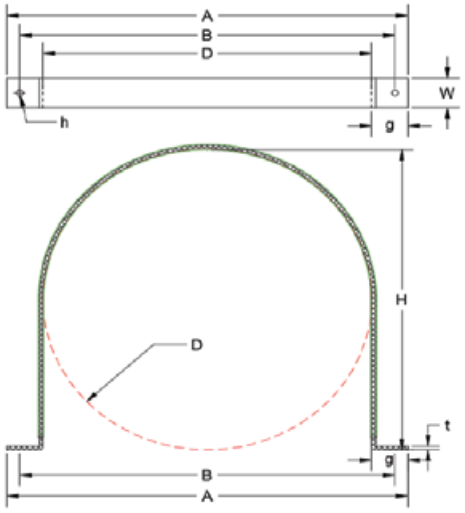
Item	Art.-NO.	Qty. per box (pcs.)	Outer carton (pcs)	Thread M	Size (inch)	Width B (mm)	Length L_1 (mm)	Length L_2 (mm)
ETR 8 - 13	**024415**	10	100	M 6	1/4"	20	30	18
ETR 12 - 17	**024416**	10	100	M 6	3/8"	24	35	18
ETR 15 - 21	**024417**	10	100	M 6	1/2"	28	40	22
ETR 20 - 27	**024418**	10	50	M 8	3/4"	36	50	30
ETR 26 - 34	**024419**	10	50	M 8	1"	43	55	30
ETR 33 - 42	**024420**	10	50	M 8	1-1/4"	51	68	35
ETR 40 - 49	**024421**	10	50	M 8	1-1/2"	58	70	35
ETR 50 - 60	**024422**	10	50	M 8	2"	69	80	35
ETR 60 - 70	**024423**	10	50	M 10	–	82	100	38
ETR 66 - 76	**024424**	10	50	M 10	2-1/2"	88	110	45
ETR 70 - 82	**024425**	10	50	M 10	–	94	115	45
ETR 80 - 90	**024426**	10	50	M 10	3"	102	115	45
ETR 90 - 102	**024427**	5	50	M 12	3-1/2"	116	145	50
ETR 100 - 108	**024428**	5	50	M 12	–	122	150	50
ETR 102 - 114	**024429**	5	50	M 12	4"	128	156	55
ETR 121 - 127	**024430**	5	50	M 12	–	141	170	55
ETR 126 - 133	**024431**	5	50	M 12	–	147	180	65
ETR 131 - 140	**024432**	5	25	M 14	5"	156	185	65
ETR 143 - 153 [1]	**024433**	5	25	M 14	–	169	193	65
ETR 150 - 159	**024434**	5	25	M 14	–	175	200	65
ETR 168	**024435**	5	25	M 14	6"	184	210	65
ETR 193.7	**024436**	5	25	M 14	–	209	232	65
ETR 219	**024437**	5	25	M 14	8"	236	270	65

[1] Delevery time on request.

PROPERTIES

- **Material:** Carbon steel Q235
- **Finish Electro Galvanized:** ASTM B 633 standard SC3 12 µm
- **Finish HDG:** 40 µm
- **Rubber specifications:**
  A - EPDM
  B - Temperature Resistance (-20 To 110 degree)
  C - Noise reduction rating Up to 18dB
  D - Color = Black
  E - Thick = 1.5 mm

TECHNICAL DATA



Item	Art.-NO.	D (mm)	A (mm)	B (mm)	H (mm)	t (mm)	W (mm)	h (mm)	Bolt	g (mm)
RL U-STRAP 20	**542513**	20	80	56	20	2	30	10	8	30
RL U-STRAP 25	**542514**	25	85	61	25	2	30	10	8	30
RL U-STRAP 32	**542515**	32	92	68	32	2	30	10	8	30
RL U-STRAP 36	**542516**	36	96	72	36	2	30	10	8	30
RL U-STRAP 40	**542517**	40	100	76	40	2	30	10	8	30
RL U-STRAP 43	**542518**	43	103	79	43	2	30	10	8	30
RL U-STRAP 50	**542519**	50	110	86	50	2	30	10	8	30
RL U-STRAP 56	**542520**	56	116	92	56	2	30	10	8	30
RL U-STRAP 63	**542522**	63	123	99	63	2	30	10	8	30
RL U-STRAP 75	**542523**	75	135	111	75	2	30	10	8	30
RL U-STRAP 82	**542524**	82	142	118	82	2	30	10	8	30
RL U-STRAP 90	**542525**	90	150	126	90	2	30	10	8	30
RL U-STRAP 110	**542526**	110	180	150	110	2	30	12	10	35
RL U-STRAP 160	**542527**	160	230	200	160	2	30	12	10	35
RL U-STRAP 200	**542528**	200	270	240	200	2	30	12	10	35
RL U-STRAP 250	**542529**	250	320	290	250	2	30	12	10	35
RL U-STRAP 315	**542530**	315	385	355	315	2	30	12	10	35
RL U-STRAP 400	**542531**	400	470	440	400	2	30	12	10	35

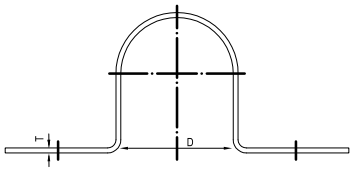
[1] Delevery time on request.

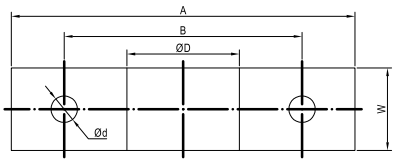
Suspended pipe support

PROPERTIES

- **Material:** Carbon Steel Q 235
- **Zinc plating:** Electro zinc plated 5 - 9 µm
- **Standard:** comply with ASTM B633 SC1
- Available in SC3 on special request.
- Available in Hot Dipped Galvanized approx. 40 µm

TECHNICAL DATA





S.No.	Art. No.	D (mm)	A (mm)	B (mm)	t x w (mm)	Bolt size (mm)	Sales unit (pcs.)
1.	541787	21	81	54	2 x 25	8	100
2.	541788	27	87	60	2 x 25	8	100
3.	541789	33	93	66	2 x 25	8	100
4.	516708	42	102	75	2 x 25	8	100
5.	516709	48	108	81	2 x 25	8	100
6.	541790	59	119	92	2 x 25	8	100
7.	541791	65	125	98	2 x 25	8	100
8.	535020	72	132	105	2 x 25	8	50
9.	516711	76	172	136	2 x 25	10	50
10.	541792	80	176	140	2 x 25	10	50
11.	541793	84	180	144	2 x 25	10	30
12.	541795	86	182	146	2 x 25	10	30
13.	541796	89	185	149	2 x 25	10	–
14.	541797	92	188	152	2 x 25	10	–
15.	535022	98	194	158	2 x 25	10	30
16.	541798	102	198	162	3 x 25	10	30
17.	541799	106	202	166	3 x 25	10	30
18.	541800	110	206	170	3 x 25	10	30
19.	541801	114	210	174	3 x 25	10	30
20.	541802	118	214	178	3 x 25	10	30
21.	541803	122	218	182	3 x 25	10	–
22.	532394	126	222	186	3 x 25	10	30
23.	541804	134	230	194	3 x 25	10	20
24.	541806	138	234	198	3 x 25	10	–
25.	541807	141	237	201	3 x 25	10	20
26.	532395	148	244	208	3 x 25	10	20
27.	541808	152	248	212	3 x 25	10	–
28.	541809	156	252	216	3 x 25	10	20
29.	541810	160	256	220	3 x 25	10	–
30.	541811	164	260	224	3 x 25	10	10
31.	532397	168	264	228	3 x 25	10	10
32.	535027	172	268	232	3 x 25	10	10
33.	541812	177	273	237	3 x 25	10	–
34.	532398	179	275	239	3 x 25	10	10
35.	541813	183	279	243	3 x 38	10	10
36.	541814	188	284	248	3 x 38	10	–
37.	541815	191	287	251	3 x 38	10	10
38.	541816	198	294	258	3 x 38	10	–
39.	541817	202	298	262	3 x 38	10	10
40.	532400	205	301	265	3 x 38	10	10
41.	541818	210	306	270	3 x 38	10	5
42.	541819	214	310	274	3 x 38	10	–
43.	541820	218	314	278	3 x 38	10	5
44.	535032	223	319	283	3 x 38	10	5
45.	541821	232	328	292	3 x 38	10	5
46.	541822	238	334	298	3 x 38	10	–
47.	532403	241	337	301	3 x 38	10	5
48.	541823	244	356	314	3 x 38	12	5
49.	541824	251	363	321	3 x 38	12	5
50.	535034	257	369	327	3 x 38	12	5

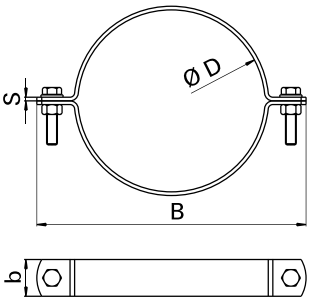
S.No.	Art. No.	D (mm)	A (mm)	B (mm)	t x w (mm)	Bolt size (mm)	Sales unit (pcs.)
51.	541825	264	376	334	3 x 38	12	5
52.	541826	268	380	338	3 x 38	12	5
53.	541827	272	384	342	3 x 38	12	5
54.	535123	283	395	353	3 x 38	12	5
55.	535125	291	403	361	3 x 38	12	5
56.	532406	295	407	365	3 x 38	12	3
57.	541828	298	410	368	3 x 38	12	–
58.	541829	311	423	381	3 x 38	12	3
59.	541830	318	430	388	3 x 38	12	3
60.	532816	323	435	393	3 x 38	12	3
61.	535128	337	449	407	4 x 50	12	3
62.	541831	349	461	419	4 x 50	12	3
63.	541832	355	467	425	4 x 50	12	3
64.	541833	361	473	431	4 x 50	12	3
65.	535131	369	481	439	4 x 50	12	3
66.	541834	373	485	443	4 x 50	12	3
67.	541835	387	499	457	4 x 50	12	3
68	535133	393	505	463	4 x 50	12	3
69.	541836	399	511	469	4 x 50	12	3
70.	541837	403	515	473	4 x 50	12	–
71.	541838	405	517	475	4 x 50	12	3
72.	541839	419	531	489	4 x 50	12	3
73.	541840	423	535	493	4 x 50	12	–
74.	541841	431	543	501	4 x 50	12	3
75.	541842	444	556	514	4 x 50	12	3
76.	541843	453	565	523	4 x 50	12	–
77.	532821	456	568	526	4 x 50	12	3
78.	541844	470	582	540	4 x 50	12	3
79.	541845	473	585	543	4 x 50	12	–
80.	541846	483	595	553	4 x 50	12	3
81.	541847	495	607	565	4 x 50	12	3
82.	541848	506	618	576	4 x 50	12	3
83.	541849	521	633	591	4 x 50	12	3
84.	532824	533	645	603	4 x 50	12	3
85.	541850	536	648	606	4 x 50	12	–
86.	535142	546	658	616	4 x 50	12	2
87.	541851	566	678	636	4 x 50	12	2
88.	535143	572	684	642	4 x 50	12	2
89.	541852	584	696	654	4 x 50	12	2
90.	541853	587	699	657	4 x 50	12	–
91.	541854	608	720	678	4 x 50	12	2
92.	535144	638	750	708	4 x 50	12	2
93.	541855	647	759	717	4 x 50	12	2
94.	532828	658	770	728	4 x 50	12	2
95.	541856	673	785	743	4 x 50	12	2
96.	541857	685	797	755	4 x 50	12	2
97.	541858	709	821	779	4 x 50	12	2
98.	541859	739	851	809	4 x 50	12	2
99.	541860	759	871	829	4 x 50	12	2

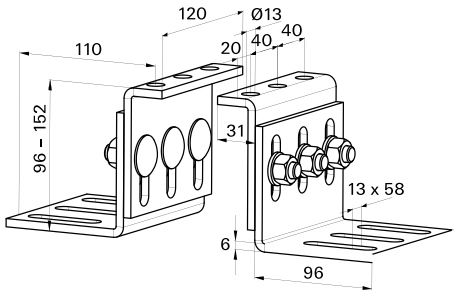
Fixpoint-pipecollar

PROPERTIES

- **FFPS:** S185-Z-150 NA-AK (Material no. 1.0035) acc. to DIN EN 10035
- **FFPK:** S234 JR (Material No. 1.0037) acc. to DIN EN 10025
- **Zinc plating:** Electro zinc plated, min 5µm Available on HDG on special request.
- **Fixpoint clamp:** Prevent unwanted movement of the pipe
- **Fixpoint clamp:** Ensure expansion in the desired direction.
- **Loads applicable:** For steel pipes

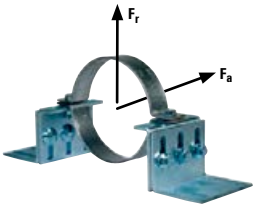
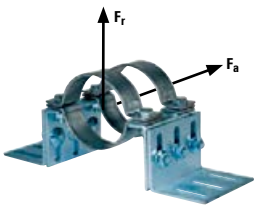
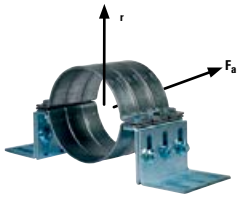
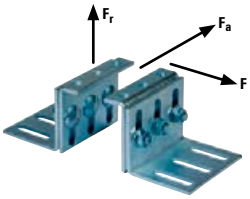
TECHNICAL DATA





Item	Art.-NO.	Clamping range D (mm)	Reqd. torque with Gr 8.8 M 12 bolt (Nim.)	Size (inch)	Width B (mm)	Locking screw	b x s (mm)	Sales unit (pcs.)
FFPS								
FFPS 2"	**48510**	56 - 61	80	2"	137	M 12	40 x 4	1
FFPS 2 1/2"	**48511**	75 - 80	80	2 1/2"	156	M 12	40 x 4	1
FFPS 3"	**48512**	88 - 93	80	3"	170	M 12	40 x 4	1
FFPS 4"	**48513**	108 - 115	80	4"	191	M 12	40 x 4	1
FFPS 5"	**48660**	133 - 140	80	5"	217	M 12	40 x 4	1
FFPS 159 – 166	**48662**	159 - 166	80	159 - 166	243	M 12	40 x 4	1
FFPS 6"	**48663**	167 - 172	80	6"	250	M 12	40 x 4	1
FFPS 8"	**48664**	219 - 225	80	8"	303	M 12	40 x 4	1
FFPS 10"	**48665**	267 - 274	80	10"	351	M 12	40 x 4	1
FFPK	**48666**	–	–	–	–	–	–	1

LOADS

Type				
Load for Zinc Plated Clamp	**Fixpoint** 1 clamp Max. recom. load axial F_a = 5500 N radial F_r = 4660 N	**Fixpoint** 2 clamps Max. recom. load axial F_a = 11000 N radial F_r = 9320 N	**Fixpoint** 3 clamps Max. recom. load axial F_a = 16500 N radial F_r = 13980 N	**FFPK** Saddle max. recom. loads radial F_r = 42000 N lateral F_l = 17500 N
Load for HDG Clamp	**Fixpoint** 1 clamp Max. recom. load axial F_a = 4125 N radial F_r = 4660 N	**Fixpoint** 2 clamps Max. recom. load axial F_a = 8250 N radial F_r = 9320 N	**Fixpoint** 3 clamps Max. recom. load axial F_a = 12375 N radial F_r = 13980 N	**FFPK** Saddle max. recom. loads radial F_r = 42000 N lateral F_l = 17500 N

GL

FSC1

SBS

Sliding element on console

Pipe elongation with sliding element and upright pipe

PROPERTIES - GL

- **Material:** Steel S235 JR (material no. 1.0037) acc. to DIN EN10025
- **Zinc plating:** Electro zinc plated, min. 8 µm
- **Material sliding strips:** Nylon 6.6
- **Adhesion friction factor:** 0.27 - 0.3
- **Sliding friction facto:** 0.13 - 0.17
- **Thermal load capacity:** up tp + 130 °C

PROPERTIES - FSC1

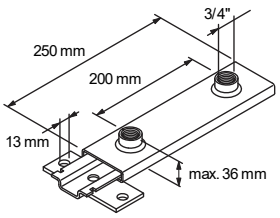
- **Material:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111.
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Temperature range:** -30 °C to +120 °C

PROPERTIES - SBS

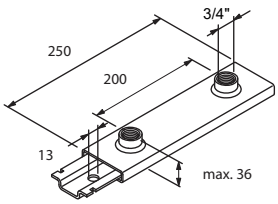
- **Material:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111 / PA
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Adhesion friction factor:** 0.25 - 0.30
- **Sliding friction facto:** 0.16 - 0.18
- **Temperature range:** -40 °C to +100 °C

APPROVALS - SBS

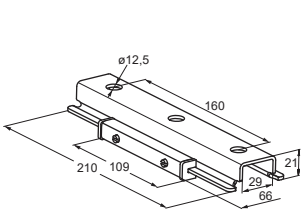
TECHNICAL DATA

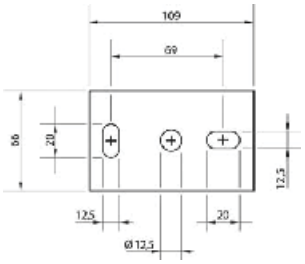


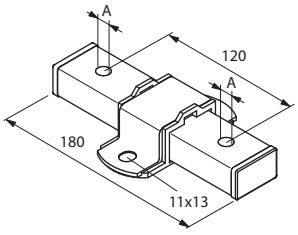
GLL 3/4"



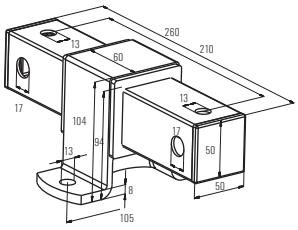
GL 3/4"







SBS



SBS 12/16

Item	Art.-NO.	Sales unit (pcs)
GLL 3/4"	064038	5
GL 3/4"	064041	5
FSC 1	507866	12

Item	Art.-NO.	Thread A	Sales unit (pcs)
SBS M 8	079685	M 8	8
SBS M 10	079686	M 10	8
SBS 12 / 16	047726	M 12 / 16	1

Item	Art.-NO.	Recommended suspended N_{rec} (kN)	Design suspended N_d (kN)	Recommended vertical N_{rec} (kN)	Design vertical N_d (kN)
GLL 3/4"	064038	3.50	4.90	4.00	5.56
GL 3/4"	064041	3.50	4.90	4.00	5.56
FSC 1	507866	1.30	1.82	1.00	1.40
SBS M 8	079685	1.50	2.10	1.50	2.10
SBS M 10	079686	1.50	2.10	1.50	2.10
SBS 12 / 16	047726	7.80	10.92	7.80	10.92

SB

PDH

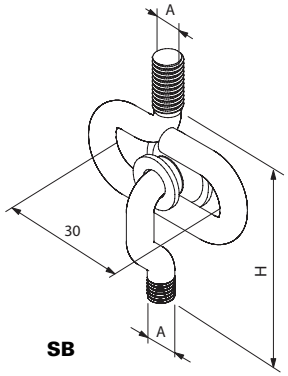
Channel with sliding element

Double pendulum hanger

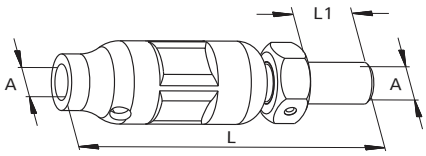
PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated, min. 3 µm
  Electro zinc plated, min. 5 µm

TECHNICAL DATA



SB

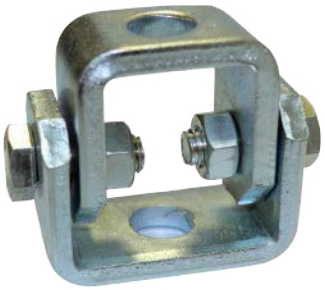


PDH

Item	Art.-NO.	Thread A1	Height H (mm)	Sales unit (pcs)
SB M 8	079680	M 8	75	25
SB M 10	079681	M 10	90	25

Item	Art.-NO.	Thread A1	Lenght L (mm)	Lenght L1 (mm)	Sales unit (pcs)
PDH K M 8	068267	M 8	50	18	50
PDH K M 10	068269	M 10	54	18	50
PDH M 8	079676	M 8	76	18	50
PDH M 10	079677	M 10	80	18	50
PDH M 12	064037	M 12	90	20	25

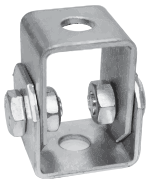
Item	Art.-NO.	Recommended load N_{rec} (kN)	Design load N_d (kN)
SB M 8	079680	0.40	0.56
SB M 10	079681	0.65	0.91
PDH K M 8	068267	2.40	3.36
PDH K M 10	068269	3.00	4.20
PDH M 8	079676	2.40	3.36
PDH M 10	079677	3.00	4.20
PDH M 12	064037	3.50	4.90



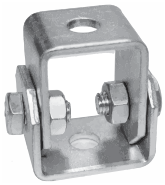
Height adjustable pipe installation

PROPERTIES

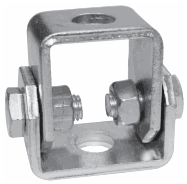
- **Material:** Steel DD11 (material no. 1.0332) acc. to DINEN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Zinc plating:** Hot-dip galvanized, approx. 45 µm



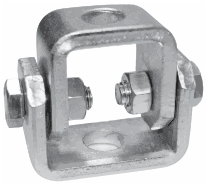
SWIVEL Type 10-3



SWIVEL Type 12-4

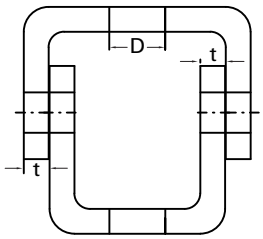


SWIVEL Type 16-5



SWIVEL Type 16-8

TECHNICAL DATA



Item	Finish	Art.No.	Thickness mm	D mm	Width mm	Recommendation				Pack size
						Tensile Load N	Max. Inclination	Rotation	Torque Nm	
SWIVEL Type 10-3	**G.I**	548734	3	13	35	2750	60°	90°	40	50
SWIVEL Type 12-4	**G.I**	548735	4	13	35	4300	60°	90°	40	50
SWIVEL Type 16-5	**G.I**	548736	5	18	35	5800	60°	90°	40	25
SWIVEL Type 16-8	**G.I**	548737	8	18	40	10000	60°	90°	40	25
SWIVEL Type 10-3	**HDG**	548738	3	13	35	2750	60°	90°	40	50
SWIVEL Type 12-4	**HDG**	548739	4	13	35	4300	60°	90°	40	50
SWIVEL Type 16-5	**HDG**	548740	5	18	35	5800	60°	90°	40	25
SWIVEL Type 16-8	**HDG**	548741	8	18	40	10000	60°	90°	40	25

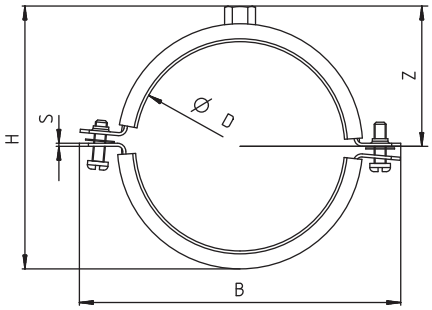
Spiral airduct on cantilever

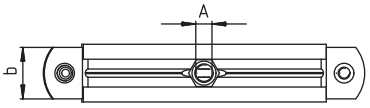
PROPERTIES

- **Material:** Steel DX5 1D+Z 275 MA-C (material no. 1.0226+Z) acc. to DIN EN 10327
- **Zinc plating:** sendzimir-galvanised, app.15 µm
- **Connecting nut:** resistance welded domed nut, M8 / M 10, SW 13
- **Locking screw:** Oval head screw with combination recessed head.
- **Material sound insulation insert:** SBR/EPDM; chlorine-free; silicone-free
- **Sound insulation:** For DIN 4109
- **Temperature range:** 50 °C to +100 °C
- **Hardness:** 45 ± 5 °C Shor A
- **Fire behaviour:** DIN 4102: Class B2

INSTALLATION

TECHNICAL DATA





Item	Art.-NO.	Thread A	Clamping range D (mm)	Height H (mm)	Width B (mm)	b x s (mm)	Hight Z (mm)	Locking Screw	Recommended load N_{rec} (kN)	Design load N_d (kN)	Sales unit (pcs)
LGS 80	**079491**	M 8/M 10	80	110	134	25 x 1.25	62	M 6	0.6	0.84	25
LGS 90	**079492**	M 8/M 10	90	120	144	25 x 1.25	67	M 6	0.6	0.84	25
LGS 100	**079493**	M 8/M 10	100	131	155	25 x 1.25	72	M 6	0.6	0.84	20
LGS 112	**079494**	M 8/M 10	112	143	167	25 x 1.25	78	M 6	0.6	0.84	20
LGS 125	**079495**	M 8/M 10	125	156	180	25 x 1.25	85	M 6	0.6	0.84	10
LGS 140	**079496**	M 8/M 10	140	171	195	25 x 1.25	92	M 6	0.6	0.84	10
LGS 150	**079497**	M 8/M 10	150	181	205	25 x 1.25	97	M 6	0.6	0.84	10
LGS 160	**079498**	M 8/M 10	160	191	215	25 x 1.25	102	M 6	0.6	0.84	10
LGS 180	**079499**	M 8/M 10	180	211	235	25 x 1.25	112	M 6	0.6	0.84	10
LGS 200	**079500**	M 8/M 10	200	231	255	25 x 1.25	122	M 6	0.6	0.84	15
LGS 224	**079501**	M 8/M 10	224	255	279	25 x 1.5	134	M 6	0.6	0.84	15
LGS 250	**079502**	M 8/M 10	250	281	305	25 x 1.5	147	M 6	0.6	0.84	10
LGS 280	**079503**	M 8/M 10	280	311	335	25 x 1.5	162	M 6	0.6	0.84	10
LGS 300	**079504**	M 8/M 10	300	331	356	25 x 1.5	172	M 6	0.6	0.84	10
LGS 315	**079505**	M 8/M 10	315	347	371	25 x 1.5	180	M 6	0.6	0.84	10
LGS 355	**079506**	M 8/M 10	355	387	411	25 x 1.5	200	M 6	0.6	0.84	10
LGS 400	**079507**	M 8/M 10	400	431	356	25 x 1.5	222	M 6	0.6	0.84	10
LGS 450	**024637**[1)]	M 8/M 10	450	485	524	25 x 2.5	247	M 10	0.8	1.12	1
LGS 500	**024638**[1)]	M 8/M 10	500	535	574	25 x 2.5	272	M 10	0.8	1.12	1
LGS 560	**024639**[1)]	M 8/M 10	560	595	634	25 x 2.5	302	M 10	0.8	1.12	1
LGS 600	**024640**[1)]	M 8/M 10	600	635	674	25 x 2.5	322	M 10	0.8	1.12	1
LGS 630	**024641**[1)]	M 8/M 10	630	665	705	25 x 3.0	338	M 10	0.8	1.12	1
LGS 710	**024642**[1)]	M 8/M 10	710	745	785	25 x 3.0	378	M 10	0.8	1.12	1
LGS 800	**024643**[1)]	M 8/M 10	800	835	875	25 x 3.0	423	M 10	0.8	1.12	1
LGS 900	**024644**[1)]	M 8/M 10	900	935	975	25 x 3.0	473	M 10	0.8	1.12	1
LGS 1000	**024645**[1)]	M 8/M 10	1000	1035	1075	25 x 3.0	523	M 10	0.8	1.12	1
LGS 1120	**024646**[1)]	M 8/M 10	1120	1155	1195	25 x 3.0	583	M 10	0.8	1.12	1
LGS 1250	**024647**[1)]	M 8/M 10	1250	1285	1326	25 x 3.0	648	M 10	0.8	1.12	1

(1) The installation with two threaded rods allows to double the given recommended loads.

Textile web strapping GWB / Perforated steel banding LBV / LBK

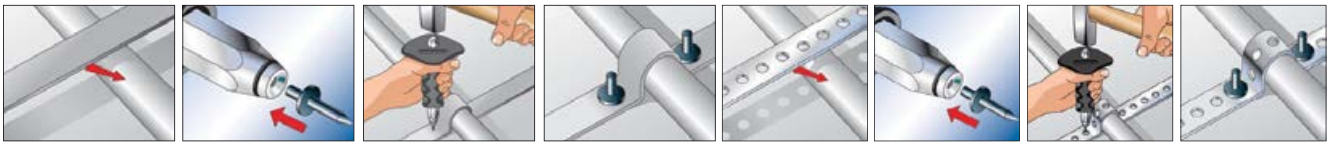
PROPERTIES

- **Material:** Polypropylene (GWB)
  Steel DX5 1D+Z (material no. 1.0226) acc. to DIN EN 10327
- **Zinc plating:** Electro zinc plated, min. 7 µm
  Protective coating LBK: PE

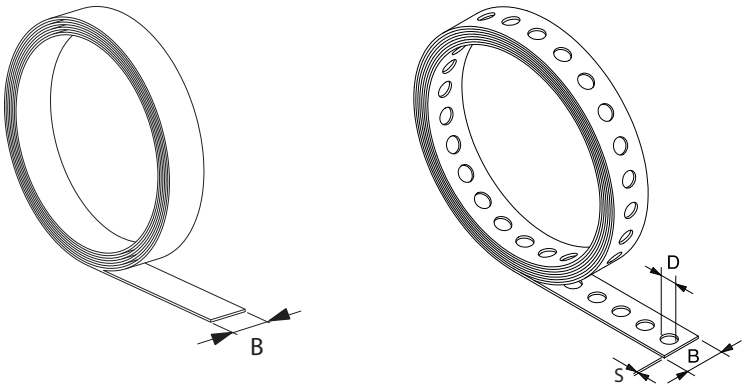
ADVANTAGES

- The perforated tapes' material thicknesses and plastic covering allows the tapes to be easily cut to size using metal shears.
- The perforated tapes' hole geometry enables concrete fixing using the impact nail
- Pipe fastening using textile tape allows for cheap and simple installation
- The textile tape roll allows the correct tape length to be chosen to suit the diameter in question
- Hangings with textile tape are a fast solution for temporary fixings

INSTALLATION



TECHNICAL DATA



Item	Art.-NO.	Total length l (mm)	Width B B (mm)	Thickness S (mm)	Sales unit (pcs)
GWB	**020959**	10.000	15	1.1	10

Item	Art.-NO.	Total length l (mm)	Width B B (mm)	Thickness S (mm)	Eye Ø D (mm)	Sales unit (pcs)
LBV 12	**079549**	10.000	12	0.75	6.0	10
LBV 17	**079550**	10.000	17	0.75	6.5	10
LBV 25	**079551**	10.000	25	0.88	8.5	8
LBK 14	**079553**	10.000	14	2.60	5.0	10
LBK 19	**079554**	10.000	19	2.40	6.5	8
LBK 27	**079555**	10.000	27	2.40	8.5	5

Air duct fixing with channel

PROPERTIES

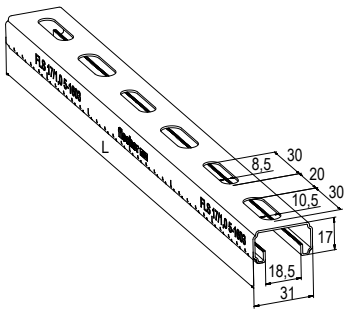
- **Material:** Steel S-250-GD (material no.: 1.0242) acc. to DIN EN 10346
- **Zinc plating:** Sendzimir-galvanised, app. 20 µm

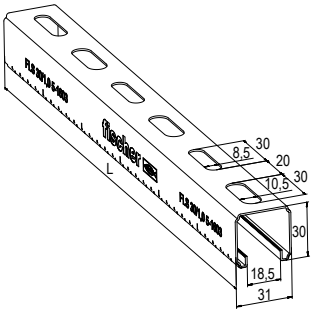
APPROVALS

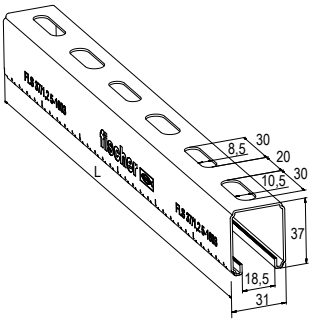
Fire resistance classification **R 120** according DIN EN 1363-1

MLAR German standard regulations for fire safety requirements for piping systems (11/2005) **R 30** Certificate of compliance of the minimum distance ≤ 50 mm

TECHNICAL DATA







Item	Art.-NO.	Fire test report	Thickness S (mm)	Length l (mm)	Sales Unit (pcs.)
FLS 17/1.0 - 2 m	**538753**	–	1.0	2000	10
FLS 17/1.0 - 3 m	**538754**	–	1.0	3000	8
FLS 30/1.0 - 2 m	**538755**	–	1.0	2000	10
FLS 30/1.0 - 3 m	**538756**	–	1.0	3000	8
FLS 37/1.2 - 2 m	**538757**	X	1.2	2000	10
FLS 37/1.2 - 3 m	**538758**	X	1.2	3000	8
FLS 37/1.2 - 6 m	**538759**	X	1.2	6000	1

LOADS

Item	Art.-NO.	Weight (kg/m)	Profile cross section (cm^2)	Moment of inertia I_y (cm^4)	Moment of inertia I_z (cm^4)	Section modulus W_y (cm^3)	Section modulus W_z (cm^3)	Max. design static load for 1m length F_{design} (kN)
FLS 17/1.0 - 2 m	**538753**	0.58	0.72	0.25	0.91	0.26	0.59	0.13
FLS 17/1.0 - 3 m	**538754**	0.58	0.72	0.25	0.91	0.26	0.59	0.13
FLS 30/1.0 - 2 m	**538755**	0.78	0.98	1.02	1.46	0.64	0.94	0.48
FLS 30/1.0 - 3 m	**538756**	0.78	0.98	1.02	1.46	0.64	0.94	0.48
FLS 37/1.2 - 2 m	**538757**	1.06	1.33	2.03	2.01	1.04	1.29	0.97
FLS 37/1.2 - 3 m	**538758**	1.06	1.33	2.03	2.01	1.04	1.29	0.97
FLS 37/1.2 - 6 m	**538759**	1.06	1.33	2.03	2.01	1.04	1.29	0.97

(1) Maximum permissible deflection under load = L/200
(2) load safety factor 1.4 is included
(3) For more load information, refer Design Curves section under Annexure - C.

Cable tray on cantilever arm

PROPERTIES

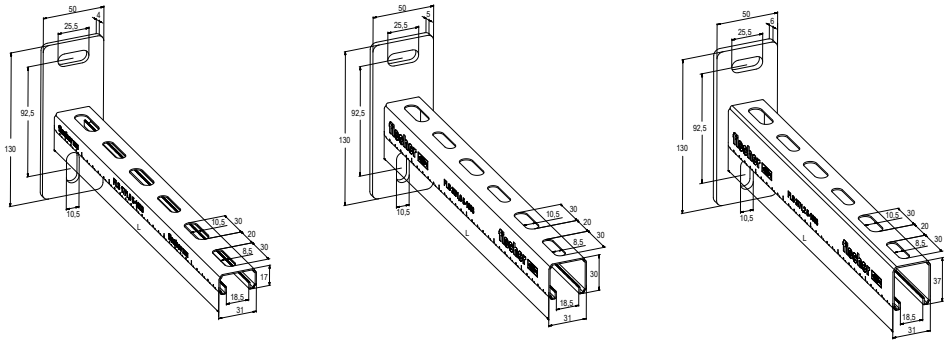
- **Material Base plate:** Steel E295 (material no.: 1.0050) acc. to DIN EN 10025-2
- **Material Channel:** Steel S215 G (material no.: 10116 G) acc. to DIN 1623
- **Zinc plating:** Electro zinc-plated, min.13 µm

APPROVALS

Fire resistance classification **R 120** according DIN EN 1363-1

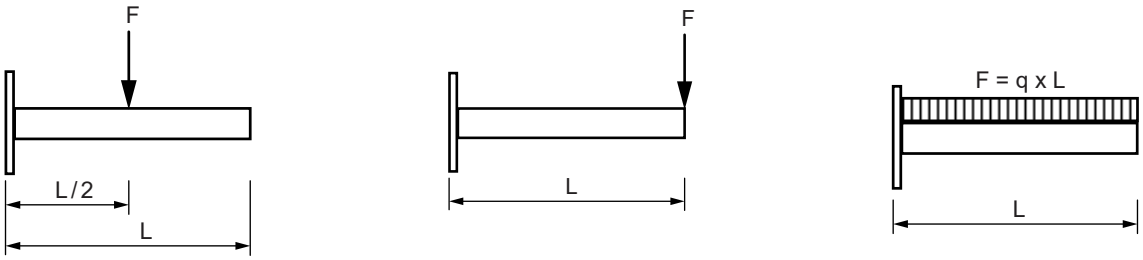
MLAR German standard regulations for fire safety requirements for piping systems (11/2005) **R 30** Certificate of compliance of the minimum distance ≤ 50 mm

TECHNICAL DATA



Item	Art.-NO.	Profile	Length l (mm)	Sales Unit (pcs.)
ALK 17-200	538738	17/1.0	200	10
ALK 17-300	538739	17/1.0	300	10
ALK 30-200	538740	30/1.0	200	10
ALK 30-300	538741	30/1.0	300	10
ALK 30-450	538742	30/1.0	450	10
ALK 37-300	538743	37/1.2	300	10
ALK 37-450	538744	37/1.2	450	10
ALK 37-600	538745	37/1.2	600	5

LOADS



Item	Art.-NO.	Max. recommended static load Load case 1 F_{rec} (kN)	Max. recommended static load Load case 2 F_{rec} (kN)	Max. recommended static load Load case 3 F_{rec} (kN)
ALK 17-200	538738	0.49	0.24	0.49
ALK 17-300	538739	0.33	0.12	0.31
ALK 30-200	538740	1.18	0.59	1.18
ALK 30-300	538741	0.79	0.39	0.79
ALK 30-450	538742	0.53	0.22	0.53
ALK 37-300	538743	1.27	0.64	1.27
ALK 37-450	538744	0.86	0.41	0.86
ALK 37-600	538745	0.63	0.24	0.63

FSM Clix P

FSM Clix M

Channel Connection

PROPERTIES

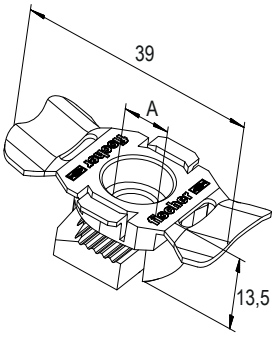
- **Material channel nut:** Steel S420MC (material no.: 1.0980) acc. DIN EN 10149-2
- **Material plasic cage:** Polypropylene PP, item number 11400, Color black
- **Zinc plating:** Electro zinc-plated, min. 5 µm acc. DIN EN ISO 4042

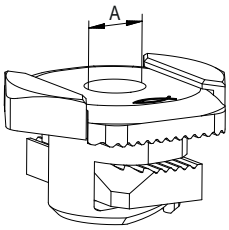
APPROVALS

Fire resistance classification **R 120** according DIN EN 1363-1

MLAR German standard regulations for fire safety requirements for piping systems (11/2005) **R 30** Certificate of compliance of the minimum distance ≤ 50 mm

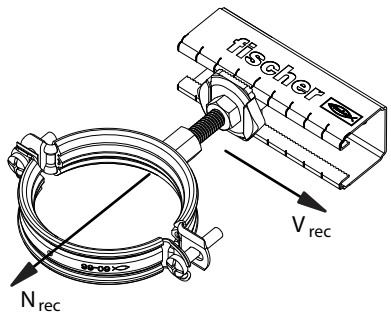
TECHNICAL DATA



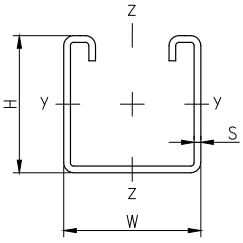


Item	Art.-NO.	Thread A	Sales unit (pcs.)
FSM Clix P 6	**538643**	M 6	50
FSM Clix P 8	**538647**	M 8	50
FSM Clix P 10	**538649**	M 10	50
FSM Clix M 6	**538650**	M 6	50
FSM Clix M 8	**538651**	M 8	50
FSM Clix M 10	**538652**	M 10	50

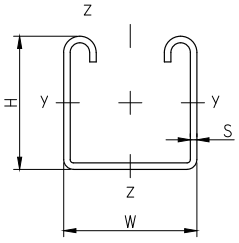
LOADS



Item	Art.-NO.	Max. recommended tensile load for FLS 17/1.0 and FLS 30/1.0 N_{rec} (kN)	Max. recommended tensile load for FLS 37/1.2 B_{ec} (kN)	Max. recommended shear load V_{rec} (kN)	Tightening torque T_{inst} (Nm)
FSM Clix P 6	**538643**	1.5	2.0	1.0	10
FSM Clix P 8	**538647**	1.5	2.0	1.0	10
FSM Clix P 10	**538649**	1.5	2.0	1.0	10
FSM Clix M 6	**538650**	1.5	2.0	1.0	8
FSM Clix M 8	**538651**	1.5	2.0	1.0	8
FSM Clix M 10	**538652**	1.5	2.0	1.0	8



U Channel



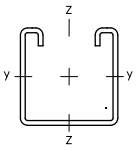
UL Channel

PROPERTIES

- **Material U Channel:** Steel S250 GD-C (material no. 1.0242+Z) acc. to DIN EN 1.0346
- **Material UL Channel:** ASTM A653 - CS type A, min. yeild = 275 MPa
- **Zinc plating U Channel:** Sendzimir zinc plated, approx. 20 µm
- **Zinc plating UL Channel:** Z180 min. 12 µm
- **HDG:** Hot-dip galvanized, approx. 45 µm acc. to DIN EN ISO 1461

Item	Art.-No.	Min order qty (pcs.)	Thickness S (mm)	Size W x H (mm)	Length l (M)	Coating
U Channel 21/1.5 - 3M	545479	1	1.5	41 x 21	3	Pre-Galvanized
U Channel 21/2.0 - 3M	545483	1	2.0	41 x 21	3	Pre-Galvanized
U Channel 21/2.5 - 3M	545487	1	2.5	41 x 21	3	Pre-Galvanized
U Channel 21/1.5 - 6M	545480	1	1.5	41 x 21	6	Pre-Galvanized
U Channel 21/2.0 - 6M	545484	1	2.0	41 x 21	6	Pre-Galvanized
U Channel 21/2.5 - 6M	545488	1	2.5	41 x 21	6	Pre-Galvanized
U Channel 41/1.5 - 3M	545481	1	1.5	41 x 41	3	Pre-Galvanized
U Channel 41/2.0 - 3M	545485	1	2.0	41 x 41	3	Pre-Galvanized
U Channel 41/2.5 - 3M	545489	1	2.5	41 x 41	3	Pre-Galvanized
U Channel 41/1.5 - 6M	545482	1	1.5	41 x 41	6	Pre-Galvanized
U Channel 41/2.0 - 6M	545486	1	2.0	41 x 41	6	Pre-Galvanized
U Channel 41/2.5 - 6M	545490	1	2.5	41 x 41	6	Pre-Galvanized
U Channel 62/2.5 - 6M	545491	1	2.5	41 x 62	6	Pre-Galvanized
U Channel 21/2.0 - 3M HDG	545499	1	2.0	41 x 21	3	Hot Dipped Galvanized
U Channel 21/2.0 - 6M HDG	545500	1	2.0	41 x 21	6	Hot Dipped Galvanized
U Channel 41/2.0 - 3M HDG	545501	1	2.0	41 x 41	3	Hot Dipped Galvanized
U Channel 41/2.0 - 6M HDG	545502	1	2.0	41 x 41	6	Hot Dipped Galvanized
U Channel 41/2.5 - 3M HDG	545503	1	2.5	41 x 41	3	Hot Dipped Galvanized
U Channel 41/2.5 - 6M HDG	545504	1	2.5	41 x 41	6	Hot Dipped Galvanized
U Channel 62/2.5 - 6M HDG	545505	1	2.5	41 x 62	6	Hot Dipped Galvanized
U Channel 21/1.5 - 3M HDG	545514	1	1.5	41 x 21	3	Hot Dipped Galvanized
U Channel 41/1.5 - 3M HDG	545515	1	1.5	41 x 41	3	Hot Dipped Galvanized
UL Channel 41 x 21 x 1.5 - GI	545820	1	1.5	41 x 21	3	Pre-Galvanized
UL Channel 41 x 21 x 2 - GI	545811	1	2.0	41 x 21	3	Pre-Galvanized
UL Channel 41 x 41 x 1.5 - GI	545822	1	1.5	41 x 41	3	Pre-Galvanized
UL Channel 41 x 41 x 2 - GI	545815	1	2.0	41 x 41	3	Pre-Galvanized
UL Channel 41 x 21 x 1.5 - HDG	545823	1	1.5	41 x 21	3	Hot Dipped Galvanized
UL Channel 41 x 21 x 2 - HDG	545817	1	2.0	41 x 21	3	Hot Dipped Galvanized
UL Channel 41 x 41 x 1.5 - HDG	545824	1	1.5	41 x 41	3	Hot Dipped Galvanized
UL Channel 41 x 41 x 2 - HDG	545819	1	2.0	41 x 41	3	Hot Dipped Galvanized

LOADS



Profile	Profile weight kg/m	Profile cross section mm²	Moment of inertia Iy mm⁴	Moment of inertia Iz mm⁴	Section modulus Wy mm³	Section modulus Wz mm³
U 41X21X1.5	1.15	126	7800	37000	720	1800
U 41X21X2.0	1.45	168	9700	46600	890	2270
U 41X21X2.5	1.78	199	10300	52800	930	2580
U 41X41X1.5	1.65	186	44600	62000	2120	3000
U 41X41X2.0	2.09	248	53300	76900	2580	3750
U 41X41X2.5	2.61	300	60000	89900	2850	4380
U 41X62X2.5	3.33	405	177000	129000	5620	6290
UL 41X21X1.5	0.98	126	7465	33547	626	1636
UL 41X21X2	1.31	168	9503	42901	779	2092
UL 41X41X1.5	1.45	186	39923	56963	1791	2778
UL 41X41X2	1.93	248	52135	73344	2296	3577
UL HDG 41X21X1.5	0.98	126	7465	33547	626	1636
UL HDG 41X21X2	1.31	168	9503	42901	779	2092
UL HDG 41X41X1.5	1.45	186	39923	56963	1791	2778
UL HDG 41X41X2	1.93	248	52135	73344	2296	3577

FUS 21

FUS 41

FUS 62

FUS 21D

FUS 41D

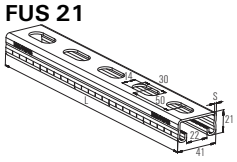
FUS 62D

PROPERTIES

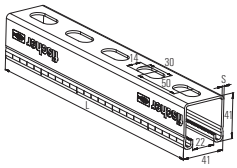
- **Material:** Steel S250 GD-C (material no. +1.0242Z) acc. to DIN EN 1.0346
- **Zinc plating:** Sendzimir zinc plated, approx. 20 µm
- **Material HDG:** Steel S235 JR (material no. 1.0037) acc. to EN 10025
- **HDG:** Coating thickness, minimum 45 µm; Average coating 55 µm acc. to DIN EN ISO 1461
- **Material SS A2:** Steel 304, NO.1.4301 1 acc DIN EN 0088-1
- **Material SS A4:** Steel 316, NO.1.4401 acc DIN EN 10088-1

TECHNICAL DATA

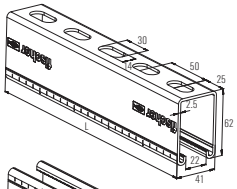
FUS 21



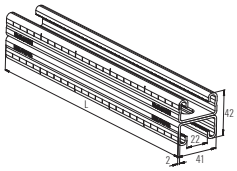
FUS 41



FUS 62



FUS 21D



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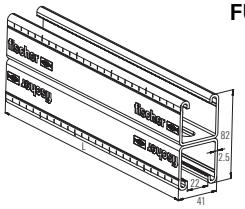
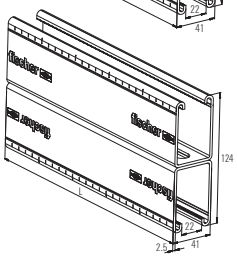


FUS 62D



APPROVALS

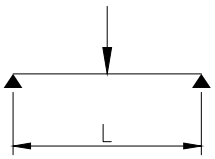
MLAR
German standard regulations for fire safety requirements for piping systems (11/2005)
R 30
Certificate of compliance of the minimum distance ≤ 50 mm

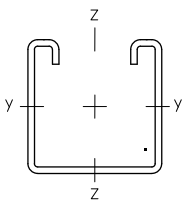
Fire resistance classification
R 120
according DIN EN 1363-1

Item	G.I. Art.-NO.	HDG Art.-NO.	SS-A2 Art.-NO.	SS-A4 Art.-NO.	Qty.per box (pcs.)	Length L (m)	Thickness S (mm)
FUS 21/1.5 – 2 m	545117	–	–	–	1	2	1.5
FUS 21/1.5 – 3 m	545118	545128	–	–	1	3	1.5
FUS 21/1.5 – 6 m	545119	–	–	–	1	6	1.5
FUS 21/2.0 – 2 m	40391	–	504466	504472	1	2	2.0
FUS 21/2.0 – 3 m	97660	537653	–	–	1	3	2.0
FUS 21/2.0 – 6 m	97661	–	542735	542738	1	6	2.0
FUS 21/2.5 – 2 m	92867	–	–	–	1	2	2.5
FUS 21/2.5 – 3 m	77349	–	–	–	1	3	2.5
FUS 21/2.5 – 6 m	77541	–	–	–	1	6	2.5
FUS 21D/2.0 – 3 m	504458	537659	–	–	1	3	2.0
FUS 21D/2.0 – 6 m	535531	537661	–	–	1	6	2.0
FUS 41/1.5 – 2 m	545120	–	–	–	1	2	1.5
FUS 41/1.5 – 3 m	545126	545129	–	–	1	3	1.5

Item	G.I. Art.-NO.	HDG Art.-NO.	SS-A2 Art.-NO.	SS-A4 Art.-NO.	Qty.per box (pcs.)	Length L (m)	Thickness S (mm)
FUS 41/1.5 – 6 m	545127	–	–	–	1	6	1.5
FUS 41/2.0 – 2 m	40390	–	504468	504474	1	2	2.0
FUS 41/2.0 – 3 m	97658	517426	–	–	1	3	2.0
FUS 41/2.0 – 6 m	97659	537656	542736	540498	1	6	2.0
FUS 41/2.5 – 2 m	92295	–	504470	504475	1	2	2.5
FUS 41/2.5 – 3 m	77347	–	–	–	1	3	2.5
FUS 41/2.5 – 6 m	77537	537658	540495	540499	1	6	2.5
FUS 41D/2.0 – 6 m	540493	–	–	–	1	6	2.0
FUS 41D/2.5 – 6 m	504459	537662	–	–	1	6	2.5
FUS 62/2.5 – 3 m	–	517427	–	–	1	3	2.5
FUS 62/2.5 – 6 m	504457	517428	–	–	1	6	2.5
FUS 62D/2.5 – 6 m	504460	537663	–	–	1	6	2.5

LOADS





Item	Weight W (kg/m)	Area A (mm²)	Moment of inertia Iy (mm⁴)	Moment of inertia Iz (mm⁴)	Section modulus Wy (mm³)	Section modulus Wz (mm³)	Max. design static load Length = .5 M F_{design} (N)	Length = 1 M F_{design} (N)	Length = 1.5 M F_{design} (N)	Length = 2 M F_{design} (N)	Length = 3 M F_{design} (N)
FUS 21/1.5	1.20	135	8000	36900	758	1800	1289	384	171	96	43
FUS 21/2.0	1.44	172	9700	46600	890	2270	1529	466	207	116	52
FUS 21/2.5	1.67	199	10300	52800	930	2580	1598	494	220	124	55
FUS 41/1.5	1.80	195	42600	60300	2070	2940	3557	1779	909	511	227
FUS 41/2	2.06	252	53300	76900	2580	3750	4433	2217	1137	640	284
FUS 41/2.5	2.45	300	60000	89900	2850	4380	4897	2449	1280	720	320
FUS 62/2.5	3.27	405	177000	129000	5620	6290	9657	4829	3219	2124	944
FUS 21D/2	2.87	344	54900	93100	2610	4540	4485	2243	1171	659	293
FUS 41D/2.5	4.89	600	350100	179000	8760	8780	15053	7527	5018	3763	1867
FUS 62D/2.5	6.55	809	1110000	258000	17900	12580	30759	15380	10253	7690	5127

(1) Maximum permissible deflection under load = L/200 (2) load safety factor 1.4 is included

Refrigerant pipe clamp on sliding element

PROPERTIES

- **Material:**Base plate: Steel (material no. 1.0330),
  DC01 acc. DIN EN 10139, Channel: Steel S235
  JR acc. DIN EN 10025, material no. 10037
- **Zinc plating:** Electro zinc plated, min. 13 µm
- **Material HDG:** Steel S235 JR (material no. 1.0045) acc. to EN 10027-2
- **HDG:** Coating thickness, minimum 45 µm; mean
  coating 55 µm acc. to DIN EN ISO 1461
- **Material SS A4:** NO 1.4401 acc DIN EN 10088-1

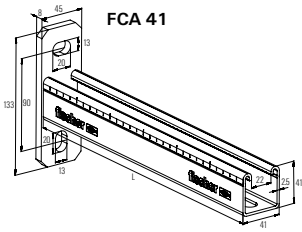
APPROVALS

Fire resistance classification **R 120** according DIN EN 1363-1

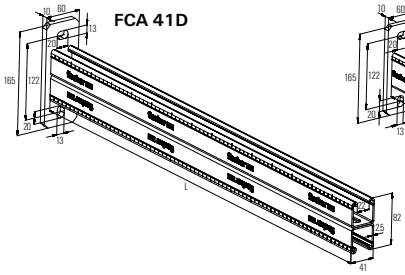
MLAR German standard regulations for fire safety requirements for piping systems (11/2005) **R 30** Certificate of compliance of the minimum distance ≤ 50 mm

TECHNICAL DATA

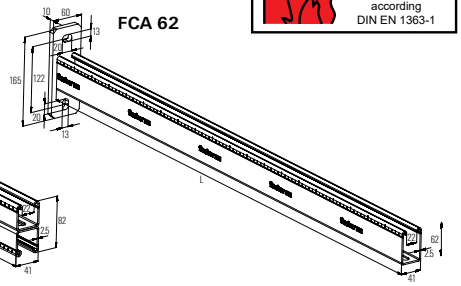
FCA 41



FCA 41D



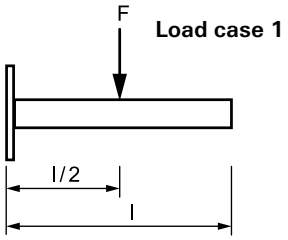
FCA 62

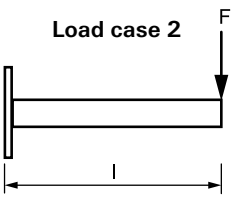


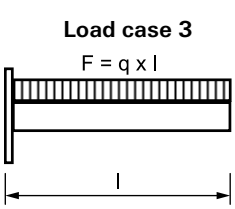
Item	Art.-NO.	Qty. per box (pcs.)	Profile	Length l mm
FCA 21 - 200	537207	1	21/2	200
FCA 21 - 300	537208	1	21/2	300
FCA 21 - 450	537209	1	21/2	450
FCA 41 - 300	077359	1	41/2.5	300
FCA 41 - 450	077361	1	41/2.5	450
FCA 41 - 600	077363	1	41/2.5	600
FCA 41 - 750	077365	1	41/2.5	750
FCA 62 - 1000	504315	1	62/2.5	1000
FCA 21D - 300	536978	1	21D/2	300
FCA 21D - 450	536979	1	21D/2	450
FCA 21D - 600	536980	1	21D/2	600
FCA 21D - 750	504317	1	41D/2.5	750
FCA 41D - 1000	504319	1	41D/2.5	1000

Item	Art.-NO.	Qty. per box (pcs.)	Profile	Length l mm
FCA 41 - 300 hdg	517411	1	41/2.5	300
FCA 41 - 450 hdg	517412	1	41/2.5	450
FCA 41 - 600 hdg	517413	1	41/2.5	600
FCA 41 - 750 hdg	517414	1	41/2.5	750
FCA 62 - 1000 hdg	517415	1	62/2.5	1000
FCA 41D - 750 hdg	517416	1	41D/2.5	750
FCA 41D - 1000 hdg	517417	1	41D/2.5	1000
FCA 41 A4 - 300	505487	1	41/2	300
FCA 41 A4 - 450	505488	1	41/2	450
FCA 41 A4 - 600	505489	1	41/2	600

LOADS







Item	Max. recommended static load load case 1 F_{rec} [kN]	Max. recommended static load load case 2 F_{rec} [kN]	Max. recommended static load load case 3 F_{rec} [kN]
FCA 21 - 200	1.43	0.72	1.43
FCA 21 - 300	0.95	0.45	0.95
FCA 21 - 450	0.65	0.21	0.65
FCA 41 - 300	1.80	0.90	1.80
FCA 41 - 450	1.20	0.60	1.20
FCA 41 - 600	0.90	0.45	0.90
FCA 41 - 750	0.72	0.36	0.72

Item	Max. recommended static load load case 1 F_{rec} [kN]	Max. recommended static load load case 2 F_{rec} [kN]	Max. recommended static load load case 3 F_{rec} [kN]
FCA 62 - 1000	1.25	0.62	1.25
FCA 21D - 300	1.83	0.92	1.83
FCA 21D - 450	1.24	0.62	1.24
FCA 21D - 600	0.92	0.46	0.92
FCA 21D - 750	2.50	1.25	2.50
FCA 41D - 1000	1.90	0.93	1.90

(1) Maximum permissible deflection under load = L/180
(2) load safety factor 1.4 is included

Channel connector for easy preparation of double channels

FUS double channel with channel connector

PROPERTIES

- **Material base plate:** JIS G3131-SPHE (similar to DD13 according to DIN EN 10111, material no.: 1.0335)
- **Material screw:** steel grade 8.8
- **Zinc plating:** electro zinc-plated, min. 5 µm

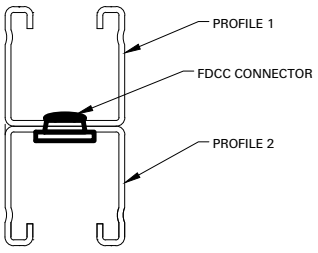
ADVANTAGES / BENEFITS

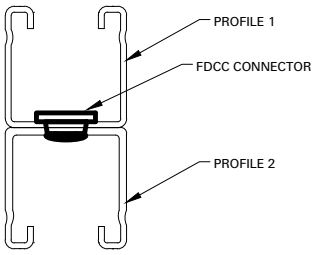
- Easy connection of single channels back to back to built double channels.
- Simple solution to create individual double channels on job site.
- For dry inside environment.
- Suitable for channels such as FUS with thickness 2.0 and 2.5 mm.

TECHNICAL DATA

Item	Art.-No.	Thread A	Drive	Tightening torque T_{inst} [Nm]	Sales unit [pcs]
FDCC	**546148**	M 10	Hexagon socket 5 mm	25	100

TECHNICAL DATA - Connection between two channels





Profile 1 Top	Profile 2 Bottom	Weight kg/m	Area mm²	Moment of inertia Iy mm⁴	Moment of inertia Iz mm⁴	Section modulus Wy mm³	Section modulus Wz mm³	FDCC spacing mm
FUS 21/2	**FUS 21/2**	2.88	344.00	60262	93200	2870	4546	250
FUS 21/2	**FUS 21/2.5**	3.11	371.00	64548	99400	2949	4849	250
FUS 21/2	**FUS 41/2**	3.50	424.00	164807	123500	4973	6024	250
FUS 21/2	**FUS 41/2.5**	3.89	472.00	181307	136500	5739	6659	250
FUS 21/2	**FUS 62/2.5**	4.71	577.00	403674	175600	9357	8566	200
FUS 21/2.5	**FUS 21/2**	3.11	371.00	64548	99400	2949	4849	250
FUS 21/2.5	**FUS 21/2.5**	3.34	398.00	69419	105600	3306	5151	250
FUS 21/2.5	**FUS 41/2**	3.73	451.00	175578	129700	5112	6327	250
FUS 21/2.5	**FUS 41/2.5**	4.12	499.00	193792	142700	5916	6961	250
FUS 21/2.5	**FUS 62/2.5**	4.94	604.00	429112	181800	9636	8868	200
FUS 41/2	**FUS 21/2**	3.50	424.00	164807	123500	4973	6024	250
FUS 41/2	**FUS 21/2.5**	3.73	451.00	175578	129700	5112	6327	250
FUS 41/2	**FUS 41/2**	4.12	504.00	321703	153800	7846	7502	250
FUS 41/2	**FUS 41/2.5**	4.51	552.00	351584	166800	8174	8137	250
FUS 41/2	**FUS 62/2.5**	5.33	657.00	652831	205900	12437	10044	200
FUS 41/2.5	**FUS 21/2**	3.89	472.00	181307	136500	5739	6659	250
FUS 41/2.5	**FUS 21/2.5**	4.12	499.00	193792	142700	5916	6961	250
FUS 41/2.5	**FUS 41/2**	4.51	552.00	351584	166800	8174	8137	250
FUS 41/2.5	**FUS 41/2.5**	4.90	600.00	385928	179800	9413	8771	250
FUS 41/2.5	**FUS 62/2.5**	5.72	705.00	712869	218900	13484	10678	200
FUS 62/2.5	**FUS 21/2**	4.71	577.00	403674	175600	9357	8566	200
FUS 62/2.5	**FUS 21/2.5**	4.94	604.00	429112	181800	9636	8868	200
FUS 62/2.5	**FUS 41/2**	5.33	657.00	652831	205900	12437	10044	200
FUS 62/2.5	**FUS 41/2.5**	5.72	705.00	712869	218900	13484	10678	200
FUS 62/2.5	**FUS 62/2.5**	6.54	810.00	1157450	258000	18669	12585	200

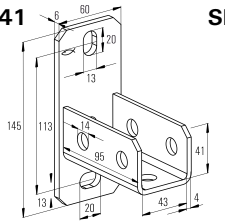
Saddle flange SF L

PROPERTIES

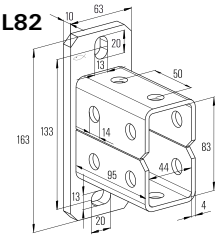
- **Material:** Base plate: DC01 (steel 1.0330) acc.DIN EN 10139, Channel: S235JR (material no.1.0037) acc. to DIN EN 10025
- **Zinc plating:** Electro zinc plated, min. 8 µm
- **Material:** Base plate: Steel DC01 (material no.1.0330) acc. to DIN EN 10139, U profile: S235 JR (material no. 1.0037) acc. to DIN EN 10025
- **Zinc plating HDG:** Hot-dip galvanized, approx 45 µm acc. to DIN EN ISO 1461
- **Material A4:** Stainless steel of corrosion resistance class III, e.g. A4

TECHNICAL DATA

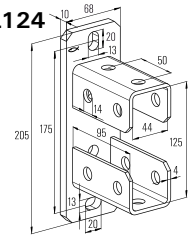
SF L41



SF L82



SF L124



APPROVALS

Fire resistance classification **R120** according DIN EN 1363-1

MLAR German standard regulations for fire safety requirements for piping systems (11/2005) **R 30** Certificate of compliance of the minimum distance ≤ 50 mm

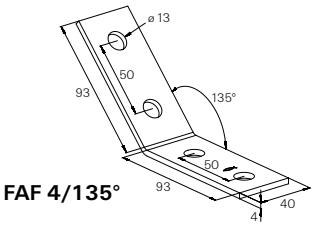
Item	Art.-NO.	Qty. per box (pcs.)	For profile FUS
SF L 41	**504355**	10	21; 41; 21D; 62
SF L 82	**504357**	5	41D
SF L 124	**504358**	5	62D
SF L 41 hdg.	**517421**	10	21; 41; 21D; 62
SF L 82 hdg.	**538125**	5	41D
SF L 124 hdg.	**538126**	5	62D
SF L 41 A4	**504522**	10	FUS 21 + FUS 41

Angle fittings FAF

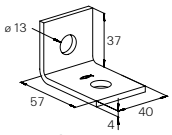
PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

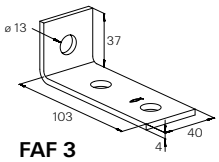
TECHNICAL DATA



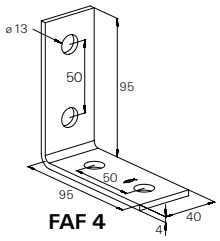
FAF 4/135°



FAF 2



FAF 3



FAF 4

Item	Art.No.	Qty. per box (pcs.)
FAF 2 - angle fittings	547502	25
FAF 3 - angle fittings	547503	25
FAF 4 - angle fittings	547504	25
FAF 4/135° - angle fittings	547505	25
FAF 2 A4	547512	25
FAF 4 A4	547513	25
FAF 4/135° A4	547514	25
FAF 4/135° - angle fittings hdg	547511	25
FAF 2 - angle fittings hdg	547508	25
FAF 3 - angle fittings hdg	547509	25
FAF 4 - angle fittings hdg	547510	25

FZF 21

FZF 41

FUF 21

FUF 41

FUF 180°R

FUF 180°L

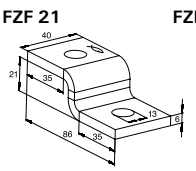
FUF 4Y

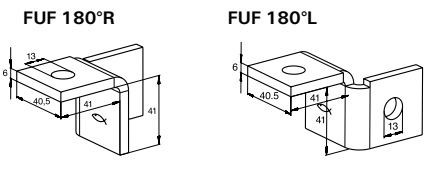
FUF 8T

PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332) acc. to DINEN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm

TECHNICAL DATA

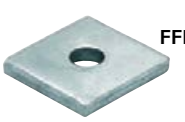




Item	Art.No.	Qty. per box (pcs.)
FZF 21	504375	25
FZF 41	504515	25
FUF 21	504376	25
FUF 41	504377	25
FUF 4Y	504378	20
FUF 180°L	504379	20
FUF 180°R	504383	20

Type	Art.No.	Qty. per box (pcs.)
FUF 8T	504387	10
FZF 21 hdg	537588	25
FZF 41 hdg	537589	25
FUF 4Y hdg	537585	20
FUF 180°L hdg	537586	20
FUF 180°R hdg	537587	20
FUF 8T hdg	537590	10

Flat fittings FFF


FFF 1

FFF 4

FFF 4D

FFF 3I

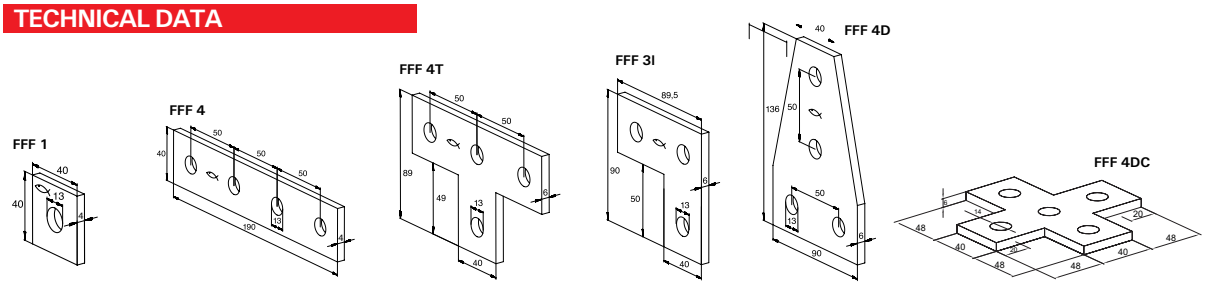
FFF 4T

FFF 4DC

PROPERTIES

- **Material:** Steel DD11 (material no. 1.0332) acc. to DINEN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm

TECHNICAL DATA



Item	Art.No.	Qty. per box (pcs.)
FFF 1 – Flat fitting	547500	25
FFF 3 L – Flat fitting	504498	25
FFF 4 – Flat fitting	547501	25
FFF 4 T – Flat fitting	504500	25
FFF 4 D – Flat fitting	504368	25

Item	Art.No.	Qty. per box (pcs.)
FFF 1 hdg	547506	25
FFF 3 L hdg	537581	25
FFF 4 hdg	547507	25
FFF 4 T hdg	537583	25
FFF 4 D hdg	537584	25

VB

FSB 45°

PROPERTIES

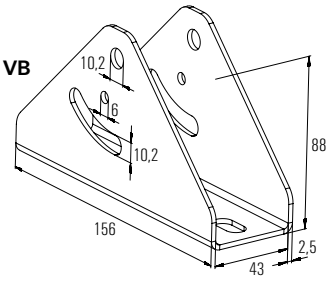
- **Material:** Steel DD11 (material no. 1.0332) acc. to DIN EN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm

PROPERTIES

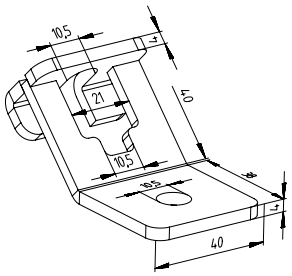
- **Material:** Steel DD11 (material no. 1.0332) acc. to DINEN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm

TECHNICAL DATA

VB

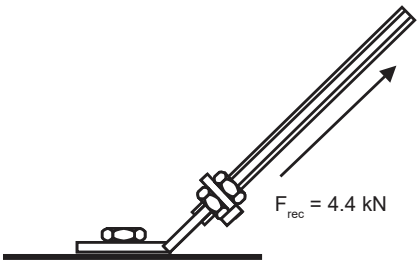


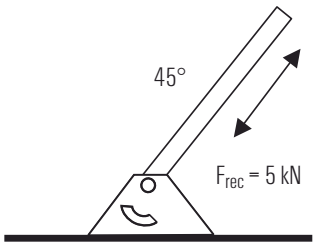
FSB



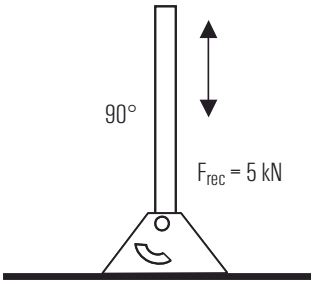
Type	Art.No.	Qty. per box (pcs.)
FSB 45°	71269	20
VB	04850	4
FSB 45° hdg	538120	20
VB hdg	071750	4

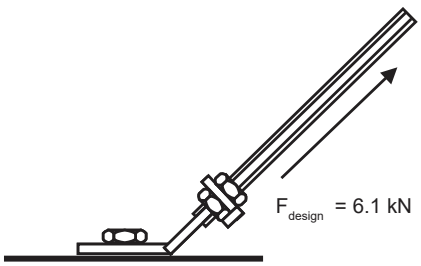
LOADS

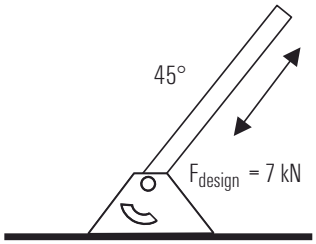


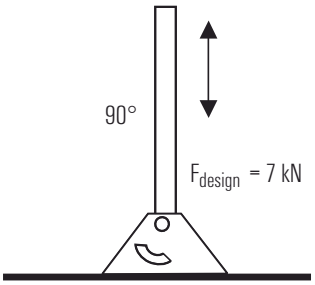


* load safety factor 1.4 is included



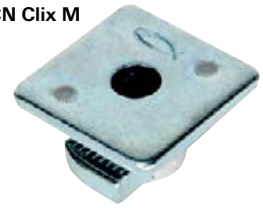






FCN Clix P

FCN Clix M



FCN

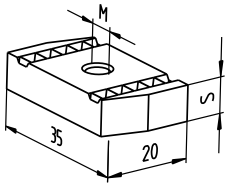
FCN-L

PROPERTIES

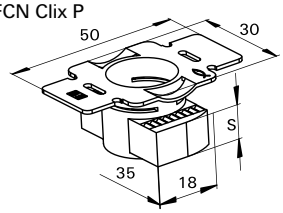
- **Material 1:** Steel S235 JR (material no. 1.0037) acc. DIN EN 10025, plastic nylon PA6
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Material 2 HDG:** Steel S235 JR (material no.1.0037) acc. to DIN EN 10025
- **Zinc plating HDG:** Hot-dip galvanized, approx 40 µm acc. to DIN EN ISO 1461
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4
- **Plastic:** Nylon PA 6
- **Material:** ISO 898-1, DIN 975 & 976 (Steel: 4.8 & 8.8)
- **Finish FCN-L:** Electro galvanized (as per ASTM B633), Electro Galvanized (as per ASTM B633),
- **Material SS316:** DIN EN ISO 3506-1

TECHNICAL DATA

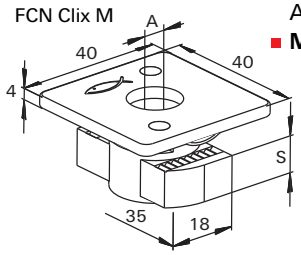
FCN

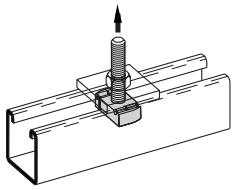


FCN Clix P

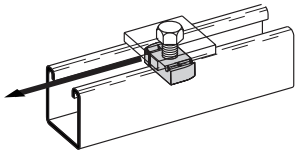


FCN Clix M





Spring nut tensile resistance



Spring nut shear resistance

Item	Art.-NO.	Qty. per box (pcs.)	Thread M	Thickness S (mm)	Max. tension load for FUS 2.0 mm Nrec (kN)	Max. tension load for FUS 2.0 mm Ndesign (kN)	Max. tension load for FUS 2.5 mm Nrec (kN)	Max. tension load for FUS 2.5 mm Ndesign (kN)	Max. shear load Vrec (kN)	Max. shear load Vdesign (kN)	Tightening torque for screw grade≥ 8.8 Tinst (Nm)
FCN Clix P 6	**504326**	100	M 6	6.0	3.0	4.2	3.0	4.2	1.0	1.4	10
FCN Clix P 8	**504327**	100	M 8	6.0	4.0	5.6	4.0	5.6	2.0	2.8	20
FCN Clix P 10	**504329**	100	M 10	8.0	5.0	7.0	8.0	11.2	2.5	3.5	40
FCN Clix P 12	**504331**	100	M 12	9.5	5.0	7.0	8.0	11.2	3.0	4.2	50
FCN Clix M 6	**504344**	100	M 6	6.0	3.0	4.2	3.0	4.2	1.0	1.4	10
FCN Clix M 8	**504345**	100	M 8	6.0	4.0	5.6	4.0	5.6	2.0	2.8	20
FCN Clix M 10	**504346**	100	M 10	8.0	5.0	7.0	8.0	11.2	2.5	3.5	40
FCN Clix M 12	**504347**	100	M 12	9.5	5.0	7.0	8.0	11.2	3.0	4.2	50
FCN Clix P 8 HDG	**538106**	100	M 8	6.0	4.0	5.6	4.0	5.6	1.0	1.4	20
FCN Clix P 10 HDG	**538107**	100	M10	8.0	5.0	7.0	8.0	11.2	1.5	2.1	40
FCN Clix P 12 HDG	**517420**	100	M 12	9.5	5.0	7.0	8.0	11.2	1.5	2.1	50
FCN Clix M 8 HDG	**538108**	100	M 8	6.0	4.0	5.6	4.0	5.6	1.0	1.4	20
FCN Clix M 10 HDG	**538109**	100	M10	8.0	5.0	7.0	8.0	11.2	1.5	2.1	40
FCN Clix M 12 HDG	**538110**	100	M 12	9.5	5.0	7.0	8.0	11.2	1.5	2.1	50
FCN Clix P 8 A4	**504436**	100	M 8	6.0	4.0	5.6	4.0	5.6	2.0	2.8	20
FCN Clix P 10 A4	**504437**	100	M 10	8.0	5.0	7.0	8.0	11.2	2.5	3.5	40
FCN Clix P 12 A4	**504439**	100	M 12	9.5	5.0	7.0	8.0	11.2	3.0	4.2	50
FCN Clix M 8 A4	**504440**	100	M 8	6.0	4.0	5.6	4.0	5.6	2.0	2.8	20
FCN Clix M 10 A4	**504447**	100	M 10	8.0	5.0	7.0	8.0	11.2	2.5	3.5	40
FCN 6	**77405**	100	M 6	6.0	3.0	4.2	3.0	4.2	1.0	1.4	10
FCN 8	**77407**	100	M 8	6.0	4.0	5.6	4.0	5.6	2.0	2.8	20
FCN 10	**77409**	100	M 10	8.0	5.0	7.0	8.0	11.2	2.5	3.5	40
FCN 12	**77411**	100	M 12	9.0	5.0	7.0	8.0	11.2	2.5	3.5	50

Item	Art.-NO. GI	Art.-NO. HDG	Art.-NO. SS316	Spring length (mm)	Thread D	Max. tension load for FUS 2.0 mm Nrec (kN)	Max. tension load for FUS 2.0 mm Ndesign (kN)	Max. tension load for FUS 2.5 mm Nrec (kN)	Max. tension load for FUS 2.5 mm Ndesign (kN)	Max. shear load Vrec (kN)	Max. shear load Vdesign (kN)	Tightening torque for screw grade≥ 8.8 Tinst (Nm)
FCN-L6	**516750**	**516765**	**516774**	6.0	M 6	3.0	4.2	3.0	4.2	1.0	1.4	10
FCN-L8	**516751**	**516766**	**516775**	6.0	M 8	4.0	5.6	4.0	5.6	2.0	2.8	20
FCN-L10	**516752**	**516767**	**516776**	8.0	M 10	5.0	7.0	8.0	11.2	2.5	3.5	40
FCN-L12	**516753**	**516768**	–	9.0	M 12	5.0	7.0	8.0	11.2	2.5	3.5	50
FCN-L12	–	–	**516777**	9.2	M 12	5.0	7.0	8.0	11.2	2.5	3.5	50
FCN-L12	–	**516769**	–	1.02	M 12	5.0	7.0	8.0	11.2	2.5	3.5	50

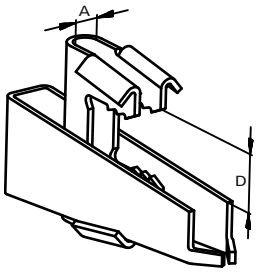
Beam Clamp Steel TKLS Steel Bite

PROPERTIES

- **Material TKLS:** Steel HX420LAD+ZAD, material no. 1.0935, DIN EN 10346
- **Zinc plating:** Electro zinc plated, min. 7 µm
- **Material SS-TKLS:** Steel DX51D acc. to EN 10214, Material no.1.0226
- **Zinc plating:** Electro zinc plated, min. 5 µm

TECHNICAL DATA

TKLS



APPROVALS

VdS

FM APPROVED

Item	Art.-NO.	Hole diameter A (mm)	Clamping range D (mm)	Sales unit (pcs.)
TKLS Ø 9	**531134**	9	8 - 20	25
TKLS Ø 11	**531136**	11	8 - 20	25
TKLS Ø 13	**531137**	13	8 - 20	25
TKLS Ø 17	**531138**	17	11 - 26	16
SS-TKL M10/M12	**048154**	–	–	25

LOADS

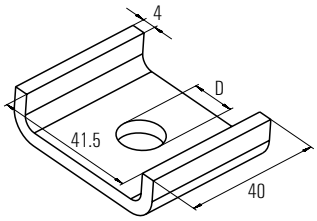
Item	Art.-NO.	Recommended load N_{rec} (kN)	Design load N_d (kN)	Recommended. pipe-Ø acc. VDS CEA 4001
TKLS Ø 9	**531134**	2.00	2.80	> DN 50
TKLS Ø 11T	**531136**	3.50	4.90	> DN 50 ≤ DN 100
KLS Ø 13T	**531137**	5.00	7.00	> DN 100 ≤ DN 200
KLS Ø 17	**531138**	10.00	14.00	> DN 200 ≤ DN 250

Channel washer HK 41

PROPERTIES

- **Material:** Steel S235 JR (material no. 1.0037) acc. to DIN EN10025
- **Zinc plating:** Electro zinc plated, min. 8 µm
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA



Item	Art.-NO.	Qty. per box (pcs.)	D (mm)
HK 41 8.5	**547492**	50	8.5
HK 41 10.5	**547493**	50	10.5
HK 41 12.5	**547494**	50	12.5
HK 41 12.5 - A4	**547497**	50	12.5
HK 41 10.5 hdg	**547496**	50	10.5
HK 41 12.5 hdg	**547495**	50	12.5

Beam clamp TKR

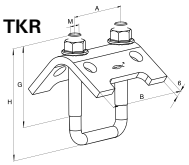
Channel to steelbeam

PROPERTIES

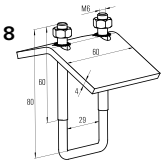
- **Material:** Plate / U-bolt pipe hanger: Steel S235 JR (material no. 1.0037) acc. DINEN10025 Hexagon nut: Steel acc. ISO 898-2 resistance min. 4
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

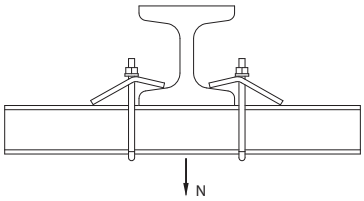
TECHNICAL DATA

TKR



TKR 27/18





Item	Art.-NO.	Qty. per box (pcs.)	For profile	Width B (mm)	Hight H (mm)	Hight g (mm)	Thread M (mm)	Width A (mm)	Max. load(tension) Nrecom (kN)	Max. load(tension) Ndesign (kN)
TKR 21 – 41	**504363**	20	MS 38/40 - FUS 21/41/21D	79	97	48	8	52	5.0	7.0
TKR 82	**504366**	20	MS 40/60 - FUS 62/41D	79	137	80	10	54	10.0	14.0
TKR 124	**504367**	10	MS 40/120 - FUS 62D	79	179	80	10	54	10.0	14.0
TKR 21 – 41 A4	**504476**	20	FUS 21 – FUS 41	–	–	–	–	–	5.0	7.0
TKR 21 – 41 HDG	**538122**	20	MS 38/40 - FUS 21/41/21D	79	97	48	8	52	5.0	7.0
TKR 82 HDG	**538123**	20	MS 40/60 - FUS 62/41D	79	137	80	10	54	10.0	14.0
TKR 124 HDG	**538124**	10	MS 40/120 - FUS 62D	79	179	80	10	54	10.0	14.0

Clamp hanger TKL

Heavy drainage pipe on beam clamp

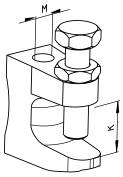
PROPERTIES

- **Material TKL:** TKL: Malleable cast iron EN-GJMB-350-10 acc. to DIN 1562 Bolt: Steel 8.8 acc. ISO 4017 Nut: Steelacc. ISO 4035, resistance min. 4
- **Material SS-TKL:** Steel DX51D acc. to EN 10214, material no. 1.0226
- **Zinc plating:** Electro zinc plated, min. 5 µm

APPROVALS

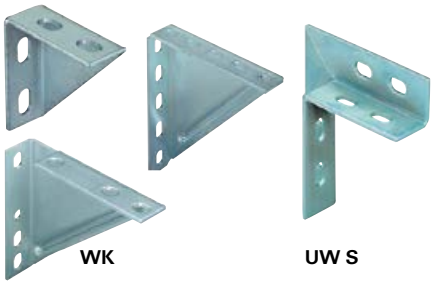
UL FM APPROVED VdS

TECHNICAL DATA



Item	Art.-NO.	Qty. per box (pcs.)	Clamping range K (mm)	EYE Ø D	Stamp on item	Max. load(tension) Nrecom (kN)	Max. load(tension) Ndesign (kN)
TKL L M8	**064055**	50	0 - 18	M 8	TK M 8	1.2	1.6
TKL M8	**079687**	50	0 - 23	M 8	TK 10	2.5	3.5
TKL Ø 9	**077605**	50	0 - 18	9	TK N 8	1.2	1.6
TKL M10	**079688**	50	0 - 20	M 10	TK N 10	2.5	3.5
TKL Ø 11	**079689**	50	0 - 20	11	TK N 10	2.5	3.5
TKL M12	**020949**	50	0 - 26	M 12	TK 12	3.5	4.9
TKL Ø 13	**043275**	50	0 - 26	13	TK 12	3.5	4.9
SS-TKL M10/M12	**048154**	25	–	10/12	SS - TKR	–	–

* SS-TKL M 10/M 12 only require in case design according to VdS approval



WK UW S

Suspended pipe under angle bracket

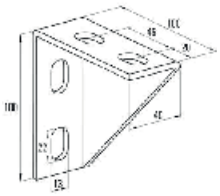
PROPERTIES - WK

- **Material:** Steel DD11 (material no. 1.0332) acc. to DIN EN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm

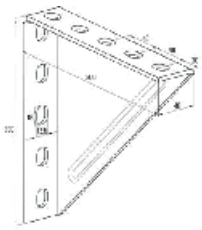
PROPERTIES - UW S

- **Material:** Steel DD11 (material no. 1.0332) acc. to DIN EN10111
- **Zinc plating:** Electro zinc plated, min. 5 µm

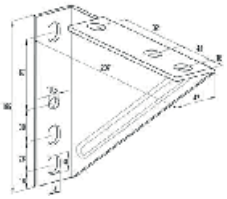
TECHNICAL DATA



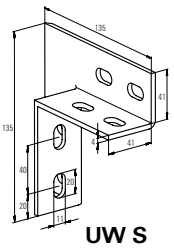
WK 100/100



WK 200/200



WK 207/165

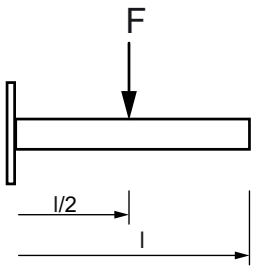


UW S

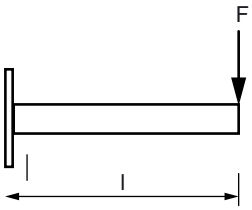
Item	Art.-NO.	Qty.per box (pcs.)
WK 100/100	063559	5
WK 200/200	079570	5
WK 207/165	079571	6
UW S	49479	4
UW S HDG	538115	10

LOADS

LOAD CASE 1

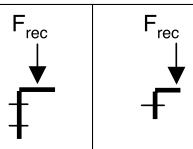


LOAD CASE 2

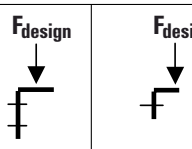


Item	Art.-NO.	Max. static load case1		Max. static load case2	
		Frecom. (kN)	Fdesign (kN)	Frecom. (kN)	Fdesign (kN)
WK 100/100	063559	–	–	4.0	5.6
WK 200/200	079570	4.0	5.6	1.8	2.5
WK 207/165	079571	–	–	1.8	2.5

LOADS - UW S



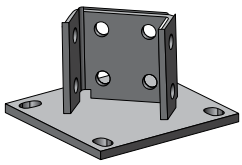
Connector	Channel	Double (kN)	Single (kN)	Torque (Nm)
FCN P M 10	41/21-2	5	2.5	40
	41/21-2.5	5	2.5	40
	41/41-2	5	2.5	40
	41/41-2.5	5	2.5	40
	41/62-2.5	5	2.5	40



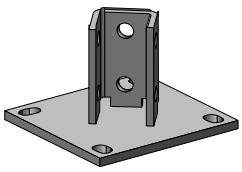
Connector	Channel	Double (kN)	Single (kN)	Torque (Nm)
FCN P M 10	41/21-2	7	3.5	40
	41/21-2.5	7	3.5	40
	41/41-2	7	3.5	40
	41/41-2.5	7	3.5	40
	41/62-2.5	7	3.5	40

* load safety factor 1.4 is included

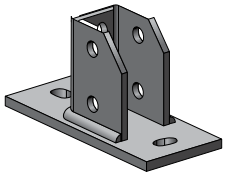
Channel base



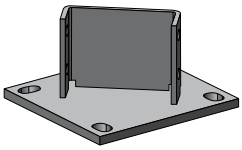
FBP 41D



FBP 41H



FBP 41N

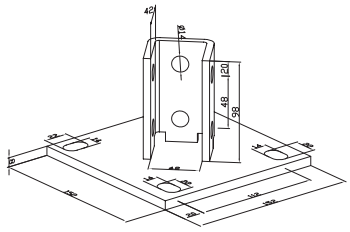


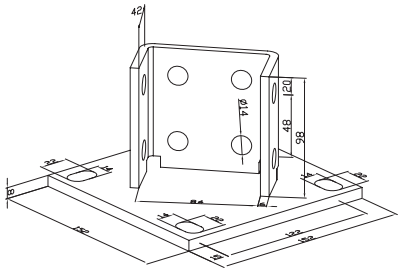
FBP 62D

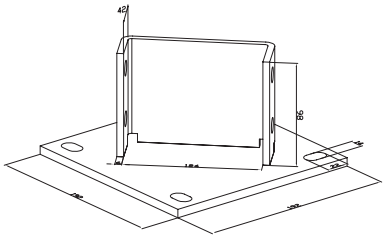
PROPERTIES

- **Material:** Q235 high-quality carbon steel,profile thickness 8mm
- **Surface treatment:** Galvanized, min zinc layer is 5 µm thick
  Hot dip galvanized, min zinc layer is 45 µm thick
  Epoxy coated, min coating is 60 µm thick

TECHNICAL DATA







Item	Art.-NO.			Qty.per box (pcs.)
	HDG	Gal.	Epoxy	
FBP 41H	550450	550454	550458	4
FBP 41D	550451	550455	550459	4
FBP 41N	550467	550469	550602	6
FBP 62D	550453	550457	550461	4

Cover cap FEC

FEC 21 B

FEC 41 B

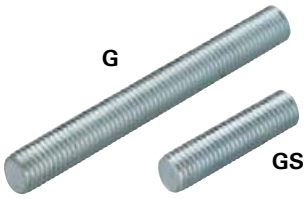
FEC 62 B

PROPERTIES

- **Material:** Polyethylene, black

TECHNICAL DATA

Item	Art.-NO.	Qty. per box (pcs.)	Fits to
FEC 21 B	077357	100	FUS 21, FUS 21 D
FEC 41 B	077355	100	FUS 41, FUS 41 D
FEC 62 B	505551	100	FUS 62, FUS 62 D
FEC 21	545930	200	FUS 21, FUS 21 D
FEC 41	545929	200	FUS 41, FUS 41 D



PROPERTIES THREADED ROD G

- **Material (G 6 – G 24):** DIN 976 Steel 4.8 acc. to DIN EN ISO 898-1
- **Material (G 1/2" – G 3/4"):** Steel S235 JR (material no. 1.0037) acc. to
- DIN EN 10025
  Zinc plating: Electro zinc plated, 5 - 8 µm

PROPERTIES THREADED STUD GS

- **Material:** DIN 976 Steel 4.6 acc. to DIN EN ISO 898-1
- **Zinc plating:** Electro zinc plated, 3 - 8 µm

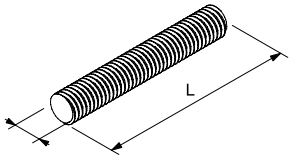
PROPERTIES THREADED STUD GS A4

- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

PROPERTIES THREADED ROD G A2/A4

- **Material A2:** Stainless steel of the corrosion resistance class II, e.g. A2
- **Material A2:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA



Item	Art.-NO.	Qty. per box (pcs.)	Length L (mm)	Thread M
Threaded rod G				
G 6	**020956**	50	1000	M 6
G 8	**079740**	25	1000	M 8
G 10	**079744**	25	1000	M 10
G 12	**020957**	20	1000	M 12
G 16	**020958**	10	1000	M 16
G 20	**557295**	5	1000	M 20
G 24	**557270**	5	1000	M 24
G 8/2	**079741**	25	2000	M 8
G 10/2	**079745**	25	2000	M 10
G 12/2	**579746**	25	2000	M 12
G 10/3	**557092**	5	3000	M 10
G 12/3	**064056**	5	3000	M 12
G 1/2"	**064093**	10	2000	1/2"
G 3/4"	**077580**	5	2000	3/4"
Stainless Steel A2				
G 8 A2	**77644**	5	1000	M 8
G 10 A2	**65173**	5	1000	M 10
Stainless Steel A4				
G 8 A4	**77645**	5	1000	M 8
G 10 A4	**65174**	5	1000	M 10
Threaded stud GS A4				
GS 8/40 A4	**505536**	100	40	M 8
GS 8/60 A4	**505537**	100	60	M 8
GS 10/40 A4	**505538**	100	40	M 10
GS 10/60 A4	**505539**	100	60	M 10

Type	Art.-NO.	Qty. per box (pcs.)	Length L (mm)	Thread M
Threaded stud GS				
G S 8/25	**079750**	100	25	M 8
GS 8/40	**079751**	100	40	M 8
GS 8/50	**079752**	100	50	M 8
GS 8/60	**079753**	100	60	M 8
GS 8/70	**079754**	100	70	M 8
GS 8/80	**079755**	100	80	M 8
GS 8/100	**079757**	100	100	M 8
GS 8/150	**079758**	50	150	M 8
GS 8/200	**079759**	50	200	M 8
GS 10/25	**079765**	100	25	M 10
GS 10/40	**079766**	100	40	M 10
GS 10/60	**079767**	100	60	M 10
GS 10/80	**079768**	100	80	M 10
GS 10/100	**079769**	100	100	M 10
GS 10/120	**079770**	50	120	M 10
GS 10/150	**079771**	50	150	M 10
GS 10/200	**079772**	50	200	M 10
GS 12/40	**091442**	100	40	M 12
GS 12/60	**091443**	100	60	M 12
GS 12/80	**091444**	100	80	M 12
GS 12/100	**091461**	100	100	M 12
GS 12/120	**091462**	50	120	M 12
GS 12/150	**091463**	50	150	M 12
GS 12/200	**091464**	50	200	M 12
–	–	–	–	–

LOADS

Technical Data - Threaded Rod GS

Item	Weight (kg/m¹)	Stressed area (mm²)	Moment of inertia (mm⁴)	Section modulus (mm³)	Permissible tensile force (kN)
GS 8	0.39	37	201	50	5.3
GS 10	0.61	58	491	98	8.4
GS 12	0.88	84	1018	170	12.1

(1) - Yield strength = 240 Mpa (2) -Material safety factor = 1.2 & Load safety factor 1.4 are included

Technical Data - Threaded Rod G

Item	Weight (kg/m¹)	Stressed area (mm²)	Moment of inertia (mm⁴)	Section modulus (mm³)	Permissible tensile force (kN)
G 6	0.22	20	64	21	3.9
G 8	0.39	37	201	50	7.0
G 10	0.61	58	491	98	11.1
G 12	0.88	84	1018	170	16.2
G 14	1.20	115	1885	269	22.2
G 16	1.57	157	3216	402	30.1
G 18	1.99	192	5152	572	37.0
G 20	2.45	245	7853	785	47.0
G 22	2.97	303	11497	1045	58.3
G 24	3.53	353	16283	1357	67.7

(1) - Yield strength = 320 Mpa (2) -Material safety factor = 1.2 & Load safety factor 1.4 are included

TRS

PROPERTIES

- **Material SS316:** DIN EN ISO 3506-1
- **Material:** ISO 898-1, DIN 975 & 976 (Steel Grades: 8.8 & Steel: 4.8)
- **Finish:** Electro Galvanized 5 µm (as per ASTM B633), Hot Dip Galvanized (as per ASTM A153)
- **Steel Grade 8.8**
  Yield strength 640 MPa, Tensile strength 800 MPa
- **Steel Grade 4.8**
  Yield strength 320 MPa, Tensile strength 400 MPa
- Material safety factor = 1.2 & Load safety factor 1.4 are included
- Vickers hardness, HV between (250 and 320 ≤ 16 mm) & Between (255 & 335 > 16 mm)

TECHNICAL DATA

Item	Art.-NO. GI 4.8	Art.-NO. HDG 4.8	Art.-NO. SS 316	Art.-NO. GI 8.8	Art.-NO. HDG 8.8	Length	Thread
TRS 6x1 mtr	516559	–	–	–	-	1000	M 6
TRS 8x1 mtr	516560	–	–	–	–	1000	M 8
TRS 10x1 mtr	516561	–	–	–	–	1000	M 10
TRS 12x1 mtr	516562	–	–	–	–	1000	M 12
TRS 16x1 mtr	516581	–	–	–	–	1000	M 16
TRS 20x1 mtr	516564	–	–	–	–	1000	M 20
TRS 24x1 mtr	516565	–	–	–	–	1000	M 24
TRS 6x2 mtr	545025	543680	543707	543687	543697	2000	M 6
TRS 8x2 mtr	545026	543681	543708	543688	543698	2000	M 8
TRS 10x2 mtr	545027	543682	543709	543689	543699	2000	M 10
TRS 12x2 mtr	545028	543683	543710	543690	543700	2000	M 12
TRS 16x2 mtr	545029	543684	543711	543691	543701	2000	M 16
TRS 20x2 mtr	545031	543685	543712	543692	543702	2000	M 20
TRS 24x2 mtr	545032	543686	543713	543693	543703	2000	M 24
TRS 27x2 mtr	–	–	543714	543694	543704	2000	M 27
TRS 30x2 mtr	–	–	543715	543695	543705	2000	M 30
TRS 33x2 mtr	–	–	543716	543696	543706	2000	M 33
TRS 6x3 mtr	545033	545042	–	–	–	3000	M 6
TRS 8x3 mtr	545034	545043	–	–	–	3000	M 8
TRS 10x3 mtr	545035	545044	–	–	–	3000	M 10
TRS 12x3 mtr	545036	545045	–	–	–	3000	M 12
TRS 16x3 mtr	545037	545046	–	–	–	3000	M 16
TRS 20x3 mtr	545038	545047	–	–	–	3000	M 20
TRS 24x3 mtr	545041	545048	–	–	–	3000	M 24

CHARACTERISTICS

Item	Pitch mm	Stressed Diameter mm	Weight kg/m¹	Stressed Area mm²	Moment of Inertia mm⁴	Section Modulus mm³	Grade 4.8		Grade 8.8	
							Permissible Tensile Force (KN)	Permissible Shear Force (KN)	Permissible Tensile Force (KN)	Permissible Shear Force (KN)
TRS 6	1.00	5.00	0.22	20	31	10	3.8	2.3	7.7	4.6
TRS 8	1.25	6.75	0.39	37	102	25	7.4	4.4	14.1	8.4
TRS 10	1.50	8.50	0.61	58	256	51	11.6	7.0	22.3	13.4
TRS 12	1.75	10.25	0.88	84	542	90	16.8	10.0	32.4	19.4
TRS 14	2.00	12.00	1.20	115	1018	145	23.0	13.8	44.3	26.6
TRS 16	2.00	14.00	1.57	157	1885	236	31.4	18.8	60.2	36.1
TRS 18	2.50	15.50	1.99	192	2833	315	38.4	23.0	73.9	44.3
TRS 20	2.50	17.50	2.45	245	4603	460	49.0	29.4	94.0	56.4
TRS 22	2.50	19.50	2.97	303	7096	645	60.6	36.4	116.5	69.9
TRS 24	3.00	21.00	3.55	353	9547	795	70.6	42.4	135.4	81.2
TRS 27	3.00	24.00	4.49	459	16286	1206	91.8	55.1	172.0	103.0
TRS 30	3.50	26.50	5.55	561	24208	1613	112.2	67.3	214.0	127.0
TRS 33	3.50	29.50	6.71	694	37176	2253	138.8	83.3	259.0	154.0
TRS 36	4.00	32.00	7.99	817	51472	2859	163.4	98.0	309.0	183.0

Threaded rod TRSL

TRSL

PROPERTIES

- **Material SS316:** DIN EN ISO 3506-1
- **Material:** ISO 898-1, DIN 975 & 976 (Steel Grades: 8.8 & Steel: 4.8)
- **Finish:** Electro Galvanized 5 µm (as per ASTM B633), Hot Dip Galvanized (as per ASTM A153)
- **Steel Grade 8.8**
  Yield strength 640 MPa, Tensile strength 800 MPa
- **Steel Grade 4.8**
  Yield strength 320 MPa, Tensile strength 400 MPa
- Material safety factor = 1.2 & Load safety factor 1.4 are included
- Vickers hardness, HV between (250 and 320 ≤ 16 mm) & Between (255 & 335 > 16 mm)

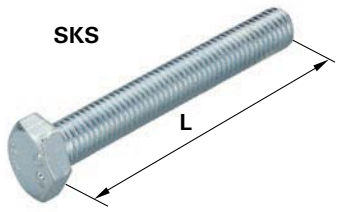
TECHNICAL DATA

Item	Art.-NO. GI 4.8	Art.-NO. HDG 4.8	Art.-NO. SS 316	Length	Thread
TRSL 6x2 mtr	**545025**	**516576**	**516584**	2000	M 6
TRSL 8x2 mtr	**545026**	**516578**	**516585**	2000	M 8
TRSL 10x2 mtr	**545027**	**516579**	**516586**	2000	M 10
TRSL 12x2 mtr	**545028**	**516580**	**516587**	2000	M 12
TRSL 16x2 mtr	**545029**	**516582**	**516647**	2000	M 16
TRSL 20x2 mtr	**545031**	–	–	2000	M 20
TRSL 24x2 mtr	**545032**	–	–	2000	M 24
TRSL 27x2 mtr	–	–	–	2000	M 27
TRSL 30x2 mtr	–	–	–	2000	M 30
TRSL 33x2 mtr	–	–	–	2000	M 33
TRSL 36x2 mtr	–	–	–	2000	M 36
TRSL 6x3 mtr	**545033**	–	–	3000	M 6
TRSL 8x3 mtr	**545034**	**516583**	**516589**	3000	M 8
TRSL 10x3 mtr	**545035**	**516557**	**516590**	3000	M 10
TRSL 12x3 mtr	**545036**	**516558**	**516591**	3000	M 12
TRSL 16x3 mtr	**545037**	–	–	3000	M 16
TRSL 20x3 mtr	**545038**	–	–	3000	M 20
TRSL 24x3 mtr	**545041**	–	–	3000	M 24

CHARACTERISTICS

Item	Pitch mm	Stressed Diameter mm	Weight kg/m¹	Stressed Area mm²	Moment of Inertia mm⁴	Section Modulus mm³	Grade 4.8	
							Permissible Tensile Force (KN)	Permissible Shear Force (KN)
TRSL 6	1.00	5.00	0.22	20	31	10	3.8	2.3
TRSL 8	1.25	6.75	0.39	37	102	25	7.4	4.4
TRSL 10	1.50	8.50	0.61	58	256	51	11.6	7.0
TRSL 12	1.75	10.25	0.88	84	542	90	16.8	10.0
TRSL 14	2.00	12.00	1.20	115	1018	145	23.0	13.8
TRSL 16	2.00	14.00	1.57	157	1885	236	31.4	18.8
TRSL 18	2.50	15.50	1.99	192	2833	315	38.4	23.0
TRSL 20	2.50	17.50	2.45	245	4603	460	49.0	29.4
TRSL 22	2.50	19.50	2.97	303	7096	645	60.6	36.4
TRSL 24	3.00	21.00	3.55	353	9547	795	70.6	42.4
TRSL 27	3.00	24.00	4.49	459	16286	1206	91.8	55.1
TRSL 30	3.50	26.50	5.55	561	24208	1613	112.2	67.3
TRSL 33	3.50	29.50	6.71	694	37176	2253	138.8	83.3
TRSL 36	4.00	32.00	7.99	817	51472	2859	163.4	98.0

Hexagonal Bolt SKS



PROPERTIES

- **Zinc plating:** Electro zinc plated, 3 – 8 µm acc. DIN-EN-ISO 4017, steel 8.8
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA

Item	Art.-NO.	Qty. per box (pcs.)	Length L (mm)	Thread D	Width across nut SW
SKS 6 x 20	**079711**	100	20	M 6	10
SKS 8 x 16	**079415**	100	16	M 8	13
SKS 8 x 30	**079713**	100	30	M 8	13
SKS 8 x 45	**079714**	100	45	M 8	13
SKS 8 x 55	**079715**	100	55	M 8	13
SKS 8 x 100	**079827**	100	100	M 8	13
SKS 10 x 20	**079416**	100	20	M 10	17
SKS 10 x 30	**079417**	100	30	M 10	17
SKS 10 x 55	**079721**	100	55	M 10	17
SKS 10 x 85	**505552**	100	85	M 10	17
SKS 12 x 20	**077610**	100	20	M 12	19
SKS 12 x 55	**077611**	100	55	M 12	19
SKS 12 x 85	**505553**	100	85	M 12	19
Stainless steel A4					
SKS M 10 x 30 A4	**505547**	100	-	M 10	17
SKS M 12 x 30 A4	**505548**	100	-	M 12	19

Hexagonal Bolt SKSL

PROPERTIES

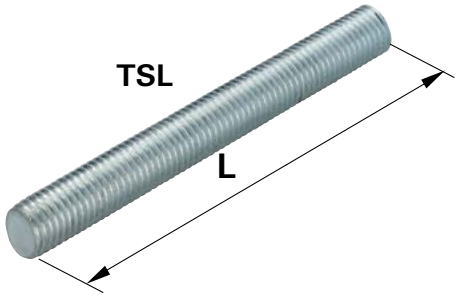
- **Material:** DIN 933 (Steel: 8.8)
- **Finish:** Electro Galvanized (as per ASTM B633), Hot Dip Galvanized (as per ASTM A153)
- **Material SS316:** DIN EN ISO 3506-1

TECHNICAL DATA

Item	Art.-NO. GI 8.8	Art.-NO. HDG 8.8	Art.-NO. SS 316	Length L (mm)	Thread D
SKSL M 6x16	**516755**	–	–	16	M 6
SKSL M 6x20	–	**516797**	–	20	M 6
SKSL M 6x25	**516756**	**516798**	**516606**	25	M 6
SKSL M 6x40	**516757**	–	–	40	M 6
SKSL M 6x50	–	–	**516607**	50	M 6
SKSL M 8x16	**516758**	–	–	16	M 8
SKSL M 8x20	**516759**	**516799**	–	20	M 8
SKSL M 8x25	**516761**	–	–	25	M 8
SKSL M 8x30	**516763**	–	–	35	M 8
SKSL M 8x35	**516762**	**516800**	–	30	M 8
SKSL M 8x45	**516764**	–	–	45	M 8
SKSL M 8x55	**516778**	–	–	55	M 8
SKSL M 8x80	–	**516552**	–	80	M 8
SKSL M 10x16	**516779**	–	–	16	M 10
SKSL M 10x20	**516780**	**516553**	–	20	M 10
SKSL M 10x25	**516781**	**516554**	**516608**	25	M 10
SKSL M 10x30	**516782**	**516555**	–	30	M 10
SKSL M 10x35	**516783**	–	–	35	M 10
SKSL M 10x40	–	**516556**	–	40	M 10
SKSL M 10x50	–	**516592**	**516609**	50	M 10
SKSL M 10x55	**516784**	–	–	55	M 10
SKSL M 10x60	–	**516593**	**516610**	60	M 10
SKSL M 10x70	–	–	**516611**	70	M 10
SKSL M 10x90	–	–	**516612**	90	M 10
SKSL M 10x100	–	**516594**	–	100	M 10
SKSL M 10x110	–	–	**516613**	110	M 10
SKSL M 10x120	–	–	**516614**	120	M 10
SKSL M 12x20	**516785**	–	–	20	M 12

Item	Art.-NO. GI 8.8	Art.-NO. HDG 8.8	Art.-NO. SS 316	Length L (mm)	Thread D
SKSL M 12x25	**516786**	–	–	25	M 12
SKSL M 12x30	–	**516595**	–	30	M 12
SKSL M 12x35	**516787**	–	–	35	M 12
SKSL M 12x40	**516788**	–	**516615**	40	M 12
SKSL M 12x50	**516789**	–	**516616**	50	M 12
SKSL M 12x55	–	**516596**	**516617**	55	M 12
SKSL M 12x60	**516790**	–	**516618**	60	M 12
SKSL M12X75	–	–	**516619**	75	M 12
SKSL M12X100	–	–	**516620**	100	M 12
SKSL M12X110	–	–	**516621**	110	M 12
SKSL M12x120	–	–	**516622**	120	M 12
SKSL M 16x30	**516791**	–	–	30	M 16
SKSL M 16x35	**516792**	–	–	35	M 16
SKSL M 16x40	**516793**	–	–	40	M 16
SKSL M 16x50	**516794**	–	–	50	M 16
SKSL M 16x55	–	**516597**	–	55	M 16
SKSL M 16x70	**516795**	–	–	70	M 16
SKSL M 16x80	–	**516598**	**516623**	80	M 16
SKSL M 16x100	–	**516599**	**516624**	100	M 16
SKSL M 20x40	**516796**	–	–	40	M 20
SKSL M 20X90	–	**516600**	–	90	M 20
SKSL M 20X125	–	**516601**	**516625**	125	M 20
SKSL M 20X130	–	**516602**	–	130	M 20
SKSL M 22X80	–	–	**516626**	80	M 22
SKSL M 22X100	–	**516603**	–	100	M 22
SKSL M 24X150	–	**516604**	**516627**	150	M 24
SKSL M 24X180	–	**516605**	–	180	M 24
–	–	–	–	-	-

High strength threaded stud TSL



PROPERTIES

- **Material SS316:** DIN EN ISO 3506-1
- **Material:** ISO 898-1, DIN 975 & 976 (Steel: 8.8)
- **Finish:** Electro Galvanized (as per ASTM B633), Hot Dip Galvanized (as per ASTM A153)
- Minimum yield strength 640 MPa (N/mm2),
- Minimum tensile strength 800 MPa (N/mm2)
- Material safety factor = 1.2 & Load safety factor 1.4 are included
- Vickers hardness, HV between (250 and 320 ≤ 16 mm) & Between (255 & 335 > 16 mm)

TECHNICAL DATA

Item	Art.-NO. GI 8.8	Art.-NO. HDG 8.8	Art.-NO. SS 316	Length L (mm)	Thread M
M 8 x 80	–	–	**516659**	80	M 8
M 8 x 110	–	–	**516660**	110	M 8
M 8 x 150	–	**516649**	**516661**	150	M 8
M 10 x 100	–	–	**516634**	100	M 10
M 10 x 120	–	–	**516635**	120	M 10
M 10 x 140	–	**516650**	–	140	M 10
M 10 x 150	–	–	**516636**	150	M 10
M 10 x 190	–	**516651**	**516637**	190	M 10
M 12 x 120	–	–	**516638**	120	M 12
M 12 x 150	–	**516652**	**516639**	150	M 12
M 12 x 200	–	**516653**	**516640**	200	M 12
M 16 x 60	**516628**	–	–	60	M 16
M 16 x 80	**516629**	–	–	80	M 16
M 16 x 100	**516630**	–	–	100	M 16
M 16 x 150	**516631**	–	**516641**	150	M 16
M 16 x 200	–	**516654**	**516642**	200	M 16
M 16 x 300	–	**516655**	**516643**	300	M 16
M 16 x 380	–	–	**516644**	380	M 16
M 20 x 180	–	–	**516645**	180	M 20
M 20 x 260	–	**516656**	**505536**	260	M 20
M 20 x 350	–	–	**505537**	350	M 20
M 20 x 380	**516633**	**516657**	–	380	M 20
M 20 x 450	–	–	**505538**	450	M 20
M 24 x 300	**516648**	**516658**	**505539**	300	M 20
M 24 x 450	–	–	**516646**	450	M 24

Item	Pitch mm	Stressed Diameter mm	Weight kg/m¹	Stressed Area mm²	Moment of Inertia mm⁴	Section Modulus mm³	Permissible Tensile Force (KN)	Permissible Shear Force (KN)
M 6	1.00	5.00	0.22	20	31	10	7.7	4.6
M 8	1.25	6.75	0.39	37	102	25	14.1	8.4
M 10	1.50	8.50	0.61	58	256	51	22.3	13.4
M 12	1.75	10.25	0.88	84	542	90	32.4	19.4
M 14	2.00	12.00	1.20	115	1018	145	44.3	26.6
M 16	2.00	14.00	1.57	157	1885	236	60.2	36.1
M 18	2.50	15.50	1.99	192	2833	315	73.9	44.3
M 20	2.50	17.50	2.45	245	4603	460	94.0	56.4
M 22	2.50	19.50	2.97	303	7096	645	116.5	69.9
M 24	3.00	21.00	3.53	353	9545	795	135.4	81.2

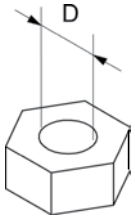
Hexagonal nut MU

MU

PROPERTIES

- **Material:** acc. DIN EN 20898-2; min. strength category 04
- **Zinc plating:** Electro zinc plated, min. 5 µm
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA



Item	Art.-NO.	Qty. per box (pcs.)	Thread D	Width across nut SW
MU M 6	**079733**	100	M 6	10
MU M 8	**079734**	100	M 8	13
MU M 10	**079735**	100	M 10	17
MU M 12	**024650**	100	M 12	19
MU M 16	**55727**	50	M 16	24
Stainless steel A4				
MU M 8 A4	**77642**	100	M 8	13
MU M 10 A4	**77641**	100	M 10	17

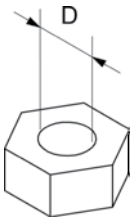
Hexagonal nut HN

HN

PROPERTIES

- **Material:** DIN 439
- **Finish:** Electro Galvanized (as per ASTM B633), Hot Dip Galvanized (as per ASTM A153)
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA



Item	Art.-NO. GI	Art.-NO. HDG	Art.-NO. SS316	Thread D (mm)
HN M6	**516801**	516806	516811	M 6
HN M8	**516802**	516807	516812	M 8
HN M10	**516803**	516808	516813	M 10
HN M12	**516804**	516809	516814	M 12
HN M16	**516805**	516810	516815	M 16
HN M20	**516739**	516741	516743	M 20
HN M24	**516740**	516742	516744	M 24

Washer U

U

PROPERTIES

- **Material:** Steel DD11 (material no. 1.0139) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated, min. 3 µm
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA

Item	Art.-NO.	Qty. per box (pcs.)	Thickness S (mm)	External Ø A (mm)	Hole Ø (mm)
U 6 x 24	**020939**	200	2.0	24	6.4
U 8 x 17	**091477**	100	1.6	17	8.4
U 8 x 28	**079725**	100	2.0	28	8.4
U 8 x 40	**079729**	100	3.0	40	8.4
U 10 x 21	**091478**	100	2.0	21	10.5
U 10 x 28	**079726**	100	2.0	28	10.5
U 10 x 40	**079730**	100	3.0	40	13.0
U 12 x 24	**557301**	100	2.5	24	13.0
U 12 x 40	**024649**	100	3.0	40	16.5
U 16 x 30	**557303**	50	3.0	30	16.5
U 8 x 28 A4	**505542**	100	2.0	28	8.4
U 8 x 40 A4	**505543**	100	3.0	40	8.4
U 10 x 28 A4	**505544**	100	2.0	30	10.5
U 10 x 40 A4	**505545**	100	3.0	40	10.5
U 12 x 24 A4	**505546**	100	2.0	24	12.5

Washer MW

MW

PROPERTIES

- **Material:** DIN 125
- **Finish:** Electro Galvanized (as per ASTM B633), Hot Dip Galvanized (as per ASTM A153)
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA

Item	Art.-NO. GI	Art.-NO. HDG	Art.-NO. SS316	Thread D (mm)
MW M6X12	516816	516832	516824	M 6
MW M8X16	516817	516833	516825	M 8
MW M8X30	516818	516834	516826	M 8
MW M8X40	516819	516835	516827	M 8
MW M10x20	516820	516836	516828	M 10
MW M10x30	516821	516837	516829	M 10
MW M10x40	516822	516838	516830	M 10
MW M12x24	516823	516839	516831	M 12
MW M16x30	516770	516745	516748	M 16
MW M16x40	516771	–	–	M 16
MW M20x37	516772	516746	516749	M 20
MW M24x44	516773	516747	516760	M 24

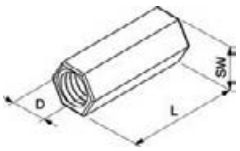
Hexagonal connector VM

VM

PROPERTIES

- **Material:** SAE 1008 (material no. 1.0213) acc. to DIN EN 10263-2
- **Zinc plating:** Electro zinc plated, 3-8 µm
- **Material A4:** Stainless steel of the corrosion resistance class III, e.g. A4

TECHNICAL DATA



Item	Art.-NO.	Qty. per box (pcs.)	Length L (mm)	Thread D	Width across nut SW
VM M 6	014319	100	25	M 6	10
VM M 8	079690	100	30	M 8	11
VM M 10	079691	100	30	M 10	13
VM M 12	020971	100	40	M 12	17
VM M 12S*	077623	100	30	M 12	17
VM M 16	508833	50	40	M 16	24
VM M 8 A4	505540	100	30	M 8	11
VM M 10 A4	505541	100	30	M 10	13

Reduction piece RD, RDM & GRD

RD

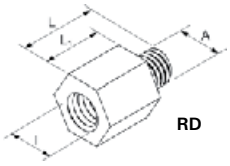
RDM

GRD

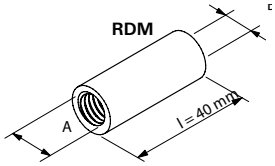
PROPERTIES

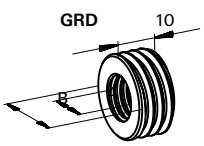
- **RD Material:** 9SMnPb28k (material no. 1.0718) acc. to DIN EN 10087
- **RDM & GRD Material:** 11SMnPb30 (material no. 1.0277) acc. to DIN EN 10277
- **Zinc plating:** Electro zinc plated, 3–8 µm

TECHNICAL DATA



RD





Item	Art.-NO.	Qty. per box (pcs.)	Internal thread I	External thread A	Length L1 (mm)	Length L (mm)	Width across nut SW
RD M 6 / M 8	079694	100	M 6	M 8	12	20	9
RD M 8 / M 6	020936	100	M 8	M 6	12	19	11
RD M 10 / M 8	079692	50	M 10	M 8	15	23	13
RD M 12 / M 10	079693	100	M 12	M 10	15	25	17
RD M 12 / M 16	504397	50	M 12	M 16	18	32	19
RD M 16 / M 12	504399	50	M 16	M 12	22	32	24
RD 1/2" / M 10	079695	100	1/2"	M 10	19	29	24

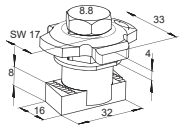
Item	Art.-NO.	Qty. per box (pcs.)	Thread A	Length B
RDM M 10 / M 8	079413	50	M 10	M 8
RDM M 12 / M10	079414	100	M 12	M 10
GRD 1/2" / M10	077609	100	M 10	1/2"
GRD 1/2" / M12	077608	100	M 12	1/2"
GRD 3/4" / M10	077607	100	M 10	3/4"
GRD 3/4" / M12	077606	100	M 12	3/4"

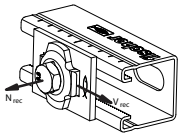
Push-through connector PFCN

PROPERTIES

- **Material Cap:** Steel DD 11 (material no.1.0332) acc. to DIN EN 10111
- **Material Sliding nut:** Steel S420MC, EN 10149-2
- **Material Hexagon nut:** 8.8 M 1028, DIN 933
- **Material Plastic parts:** Polypropylene
- **Zinc plating:** Electro zinc plated acc. to DIN 50979, min. 8 µm

TECHNICAL DATA





Item	Art.-NO.	Thread A	Sales unit (pcs.)
PFCN 41	**533739**	M 10	50

LOADS

Item	Art.-NO.	Max. recommended tension load for FUS 2.0mm Nrec (kN)	Max. recommended tension load for FUS 2.5mm Nrec (kN)	Max. recommended Shear load Vrec (kN)	Tightening torque for screw grade ≥ 8.8 Tinst (kN)
PFCN 41	**533739**	5.0	7.0	3.5	40

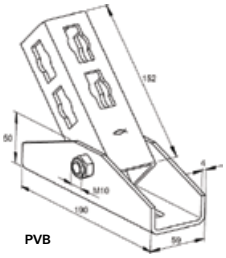
(1) Load values are based on the PFCN 41 push-through connector.

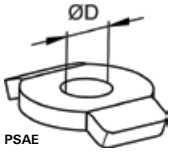
Push-through bracket PVB / PSAE

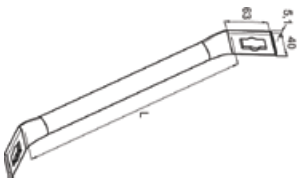
PROPERTIES

- **Material PVB:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111
- **Material PSAE:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating PVB:** Electro zinc-plated acc. to DIN 50979, min. 8 µm
- **Zinc plating PSAE:** Electro zinc-plated acc. to DIN 50979, min. 8 µm

TECHNICAL DATA







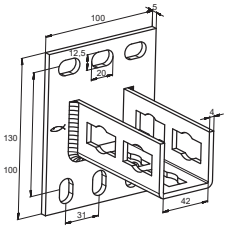
Item	Art.-NO.	Length l (mm)	Sales Unit (pcs.)
PVB	**534960**	–	5
PSAE 300 Brace element	**535269**	300	10
PSAE 500 Brace element	**535270**	500	10
PU 10,5 Washer	**535271**	–	50
PU 12,5 Washer	**535272**	–	50

Push-through saddle flange PSF

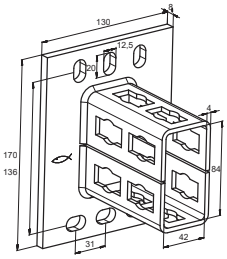
PROPERTIES

- **Material:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated acc. to DIN 50979, min. 8 µm

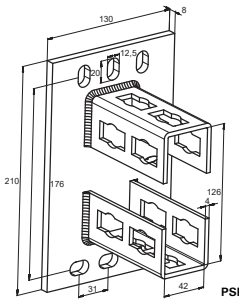
TECHNICAL DATA



PSF 41



PSF 82



PSF 124

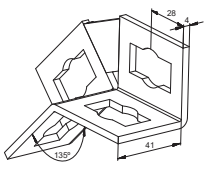
Item	Art.-NO.	For profile	Sales unit (pcs.)
PSF 41	**533740**	21D, 41, 62	10
PSF 82	**533741**	41 D	5
PSF 124	**533742**	62 D	5

Push-through bracket

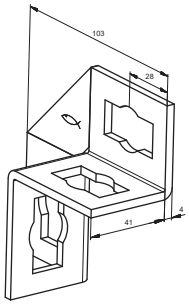
PROPERTIES

- **Material:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc plated acc. to DIN 50979, min. 8 µm

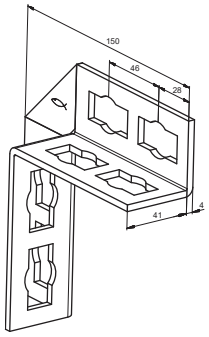
TECHNICAL DATA



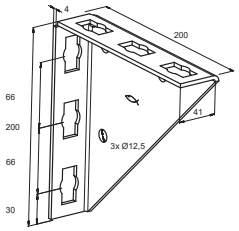
PUWS 2 x 2/135°



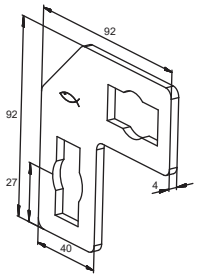
PUWS 2 x 2



PUWS 4 x 4



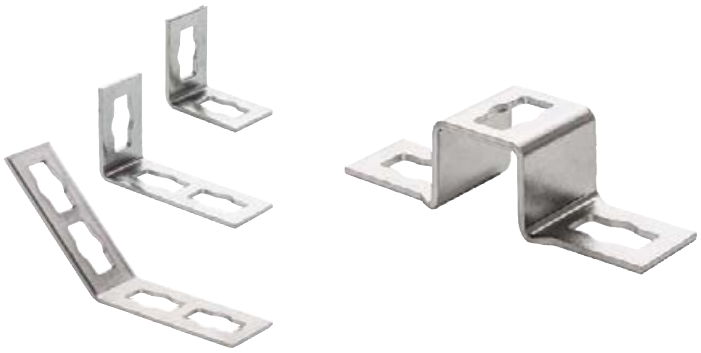
PWK 200/200



PFFF

Item	Art.-NO.	Sales unit (pcs.)
PUWS 2 x 2/135°	**533731**	10
PUWS 2 x 2	**533733**	10
PUWS 4 x 4	**533734**	8
PWK 200/200	**533744**	15
PFFF 2L	**533745**	20
PFFF 4L	**535268**	25

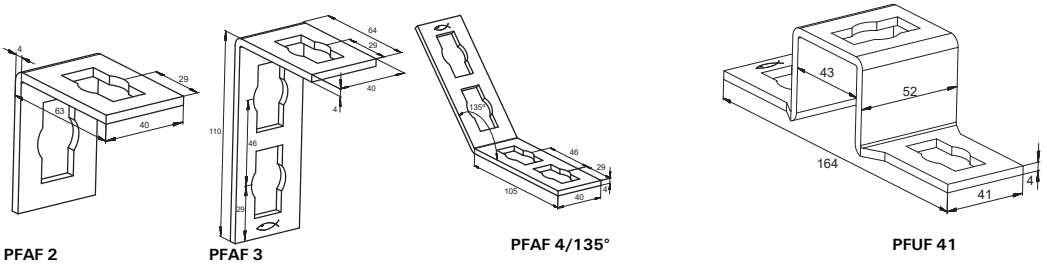
Push-through bracket PFAF / PFUF



PROPERTIES

- **Material:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc-plated acc. to DIN 50979, min. 8 µm

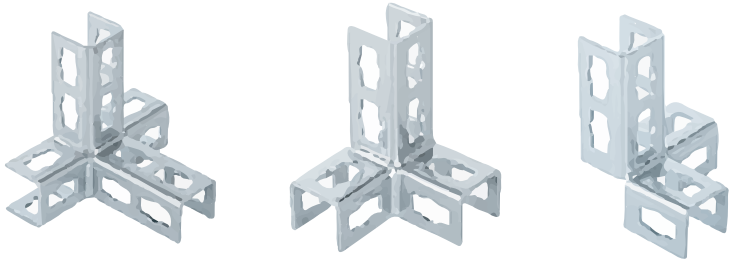
TECHNICAL DATA



PFAF 2 PFAF 3 PFAF 4/135° PFUF 41

Item	Art.-NO.	Sales unit (pcs.)
PFAF 2	533735	25
PFAF 3	533736	25
PFAF 4/135°	533737	20
PFUF 41	533738	25

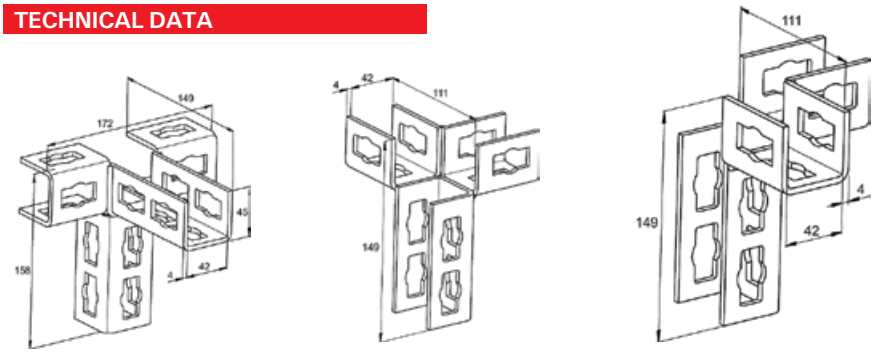
Push-through brackets PFUF D



PROPERTIES

- **Material:** Steel DD 11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating:** Electro zinc-plated acc. to DIN 50979, min. 8 µm

TECHNICAL DATA



Item	Art.-NO.	Sales unit (pcs.)
PFUF 4D	535275	10
PFUF 3D	535274	10
RPFUF 3DL	535273	10

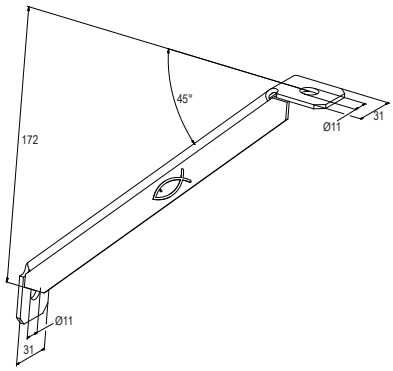
Angle brace WS 31 - 45°

Angle brace

PROPERTIES

- **Material:** Steel S235 JR (material no.: 1.0037) acc. to DIN EN 10025
- **Zinc plating:** Electro zinc-plated, min. 20 µm acc. DIN EN ISO 4042

TECHNICAL DATA



Item	Art.-NO.	Eye Ø D (mm)	Sales unit (pcs.)
WS 31-45°	**538749**	11	10

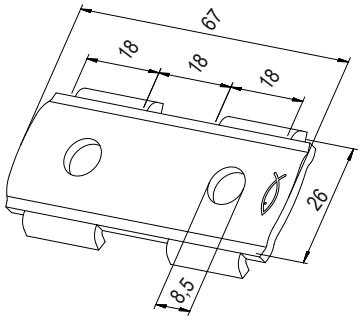
Channel connector SV 31

Channel Connection

PROPERTIES

- **Material:** Steel S235 JR+CR (material no.: 1.0037) acc. to DIN EN 1652
- **Zinc plating:** Electro zinc-plated, min. 5 µm acc. DIN EN ISO 4042

TECHNICAL DATA



Item	Art.-NO.	Hole diameter D (mm)	Sales unit (pcs.)
SV 31	**538641**	8.5	25

Channel connector FUF OC and PFUF OC

Connector for installation grid

PROPERTIES

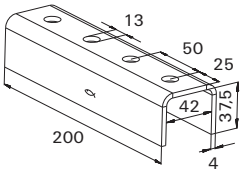
- **Material FUF OC:** Steel S235 JR (material no. 1.0037) acc. to DIN EN 10025
- **Zinc plating FUF OC:** Electro zinc plated, min. 5 µm
- **Material PFUF OC:** Steel DD11 (material no. 1.0332) acc. to DIN EN 10111
- **Zinc plating PFUF OC:** Electro zinc plated acc. DIN 50979, min. 8 µm

ADVANTAGES/BENEFITS

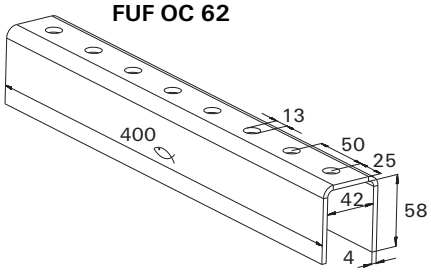
- The FUF OC connector in combination with FCN Clix P allows a simple and time-saving installation.
- The PFUF OC connector in combination with PFCN allows a simple and time-saving installation.

TECHNICAL DATA

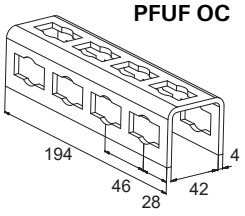
FUF OC 41



FUF OC 62



PFUF OC



Item	Art.-NO.	Length l (mm)	Sales Unit (pcs.)
FUF OC 41	504517	200	20
FUF OC 62	504518	400	10
PFUF OC	533743	194	6

Item	Art.-NO.	Length l (mm)	Sales Unit (pcs.)
FUF OC 41 HDG	517415	200	20
FUF OC 62 HDG	537591	400	10
PFUF OC HDG	542719	194	6

Channel washer HK 31

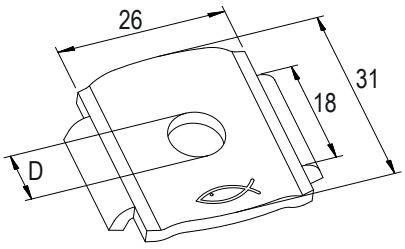
Pipe support

PROPERTIES

- **Material:** Steel S235 JR+CR (material no.: 1.0037) acc. to DIN EN 1652
- **Zinc plating:** Electro zinc-plated, min. 5 µm acc. DIN EN ISO 4042

APPROVALS

TECHNICAL DATA



Item	Art.-NO.	Hole diameter D (mm)	Sales unit (pcs.)
HK 31 8.5	538663	8.5	50
HK 31 10.5	538664	10.5	50

Anti-corrosion spray - Zinc - Alu Spray

Repair of damaged hot-dip galvanised areas

APPLICATIONS

- Repairing damaged zinc coatings
- Sheet metal coverings
- Metal constructions
- Guard rails
- Climate control and ventilation technology
- For post-galvanising and repairing damaged areas of galvanised parts drilling and cutting points and welded joints

ADVANTAGES

- Zinc Alu Spray represents a subtle repair to damaged hot-dip galvanised areas thanks to its colour matching with the hot-dip galvanisation.
- Excellent holding properties on blank metal, it guarantees a lasting connection to the base material.
- The fast-drying Zinc Alu Spray guarantees good, weatherproof corrosion protection and, as such, is suitable for use both indoors and out.

APPLICATION MATERIALS

- All iron and steel surfaces
- Hot-dip galvanised surfaces following drilling ironwork or welding
- Non-ferrous heavy metal

TECHNICAL DATA

Item	Art.-NO.	Qty. per box (pcs.)	Contents (ml)
FTC-ZA (EN/FR/ES/PT)	509241	12	400

Anti-corrosion spray - Zinc Spray Bright Grade

Welding joints, drill points & cut edges

APPLICATIONS

- For all metals that need corrosion protection.
- Conductive interlayer for spot welding.
- For HVAC systems.
- For post-galvanising and repairing damaged areas of galvanised parts.
- For the coating of drilling and cutting points as well as welded joints.

ADVANTAGES

- In the salt spray test in line with DIN EN ISO 9227, coated metal parts displayed no corrosion, even after 300 hours.
- The color "bright grade" has been perfectly adapted to that of hot-dip galvanisation. This acts as an optical color compensator.
- The innovative metal flakes form a highly resistant protective layer, even against extreme weather influences guaranteeing long lasting protection.
- Thanks to the excellent holding properties on blank metal, it guarantees a lasting connection to the base material.

APPLICATION MATERIALS

- All iron and steel surfaces
- Hot-dip galvanised surfaces following drilling ironwork or welding
- Non-ferrous heavy metal
- Blank laminations

TECHNICAL DATA

Item	Art.-NO.	Qty. per box (pcs.)	Contents (ml)
FTC-ZB (EN/FR/ES/PT)	537223	12	400

ANNEXURE - fischer Basic Information

Building Material – Concrete

The substrate's quality is crucial when selecting the correct fixing: A differentiation is made between concrete, masonry and panel building materials. Concrete is made from a mixture of cement, aggregates and water.

Concrete's main properties are:

- High level of compressive strength,but only low tensile strength(≈ 10 % of the compressive strength).
- Inserting individual rebars andor mats will increase tensile strength(steel + concrete = reinforced concrete).
- Structure easily reproducible as it isregulated by standards, therefore it isan ideal anchor base.

Concrete is mainly split into two categories:

Standard concrete and lightweight concrete. While standard concrete contains gravel; lightweight concrete contains additives such as pumice, expanded clay or polystyrene® usually with a lower compressive strength or bulk density. This leads to unfavourable conditions for anchor fixings.

The load bearing capacity of heavy duty fi xings depends on the concrete's compressive and tensile strength. This is indicated by the numbers in the abbreviations: e. g. the most commonly used concrete compressive strength is C20/25 with a cube compressive strength of 25 N/mm².

EXPERT TIP

- **Standard concrete qualities:**
  C12/15 to C50/60, even higher grades are also available for special applications. The majority of anchors approved for concrete may only be used from concrete quality from C20/25 up to a max. of C50/60. In the past, designations from DIN 1045 were used in Germany: B25 (≃ C20/25) to B55 (≃ C45/55).
- **C20/25 means:**
  C = concrete
  20 = compressive strength f_{ck} or $f_{ck, cyl}$ of a concrete test cylinder (Ø 150 mm, height 300 mm) in N/mm²
  25 = compressive strength $f_{ck,}$ cube of a concrete test cube (edge length 150 mm) in N/mm²
- **Normal concrete** without accelerating additives reaches its nominal strength after 28 days. Only then can the fixing be installed in compliance with the approval /assessment.
- **Fresh concrete:** still workable up to approx. one hour after pouring.
- **Green concrete:**.elbakrow regnol on ,sruoh ruof retfa nedrah ot strats
- **New concrete:** is hardened after 28 days, however minimum compressive strength not yet reached.
- **Hard concrete:** more than 28 days old, nominal strength reached.

Compressive strength classes in different countries

Country	Specimen	Dimensions [1] [cm]	Concrete strength class	Unit	Standard
China	Cube	15x15x15	C15,C20, C25, C30, C35, C40, C45 C50, C55,C60	N/mm²	GB50010-2010
Denmark	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	DS/EN 206
Germany	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	EN 206
France	Cylinder	16x32	B20,B25,B30, B35, B40, B45, B50	N/mm²	BAEL 91
Great Britain	Cube	15x15x15	C20, C25, C30, C37, C40, C45, C55, C60	N/mm²	BS EN 12390-3:2009
Italy	Cube	15x15c15	C 8/10, C12/15, C16/20, C20/25, C25/30, C28/35, C30/37, C32/40, C35/45, C40/50, C45/55, C50/60	N/mm²	UNI EN 206
Japan	Cylinder	10x20	≥ 15	N/mm²	JIS A 1108
Korea	Cylinder	10x20, 15x30	18, 21, 24, 27, 30	N/mm²	KS F 2405
The Netherlands	Cylinder	15x30	C 8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C45/55, C50/60	N/mm²	NEN-EN 206-1
Austria	Cube	15x15x15	C 8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C45/55, C50/60	N/mm²	ÖNORM B 4710-1
Sweden	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	SS-EN206
Switzerland	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	SIA 262
Spain	Cylinder	15x30	Unreinforced concrete: HM-20, HM-25, HM-30, HM-35, HM-40, HM-45, HM-50 Reinforced concrete: HA-25, HA-30, HA-35, HA-40, HA-45, HA-50 Pre-stressed concrete: HP-25, HP-30, HP-35, HP-40, HP-45, HP-50	N/mm²	EHE-08
USA	Cylinder	15x30	2000, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 8000	Psi	ACI 318

(1) Conversion: $f_{Cylinder} = 0.85 \times f_{Cube,\ 20x20x20}$; $f_{Cube,\ 15x15x15} = 1.05 \times f_{Cube,\ 20x20x20}$

EXPERT TIP

- **Anchors** used in **new concrete** must be **suitable** for this purpose, or may only bear loads after reaching the minimum compressive strength.
- **Concrete** always shows **cracks** (shrinkage during hardening, loading).
- **In cracked concrete,** anchors which are tested in cracked concrete must be used. These **anchors** must be able to **expand** when concrete starts to crack e. g, expansion anchors (e. g. FAZ II), form locking anchors or undercut anchors (e. g. FZA), or bonded anchors (e. g. FIS SB).
- **Cutting** through **reinforcement steel** while making **drill holes** is **not permitted.** In special cases, non load-bearing steels can be cut after consultation with the responsible engineer.
- The load bearing capacity of the concrete along the entire drill hole must be guaranteed (no honeycombing in the concrete, no voids and pockets).
- **Pre-stressed concrete:** A certain drilling distance must be maintained from the tensioning strands as stated in the approval/assessment (e. g. FHY, FBS II 6 or EA II).

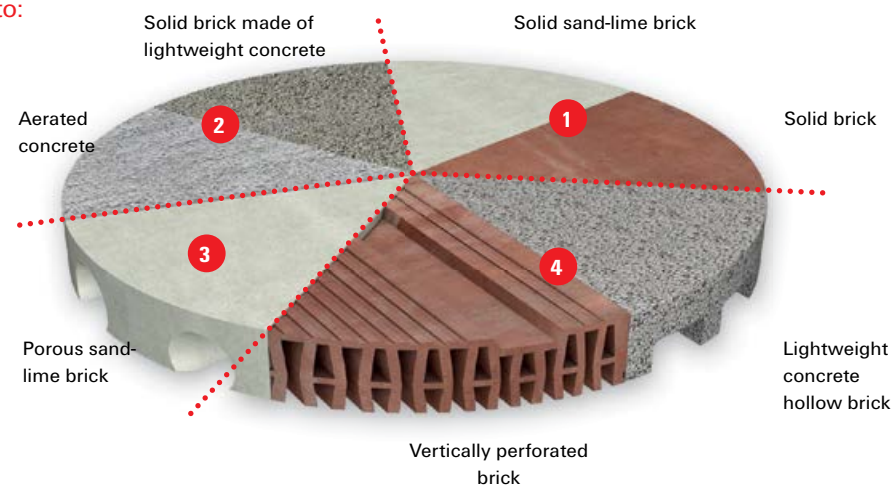
NOTE

Building Material – Masonry

Compared to concrete, there is a larger variety of masonry building materials.

Masonry can be classified according to:

- Brick type used (e. g. natural stone, lime stone or aerated concrete).
- Wall type (e. g. single or double layer).
- Brick strength class and gross density.



Generally, masonry is classifi ed into four groups:

1 **Solid bricks with a dense structure** are a highly compres-sion resistant building material, without cavities or low hole surface percentage (up to a max. 15 % e. g. as grip holes). This type is very well suited for anchor fi xings.

2 **Solid bricks with porous structure** usually have a very large number of pores and low compressive strength. Therefore, special fixings should be used, e. g. fixings with a longer expansion zone or bonded anchors.

3 **Perforated bricks with a compact structure** (perforated and hollow bricks) are mostly manufactured from the same compressive strength materials as solid blocks but with cavities. If higher loads are introduced into these building materials, special fi xings should be used (e. g. bonded anchors, FIS V), which bridge or fi ll the cavities.

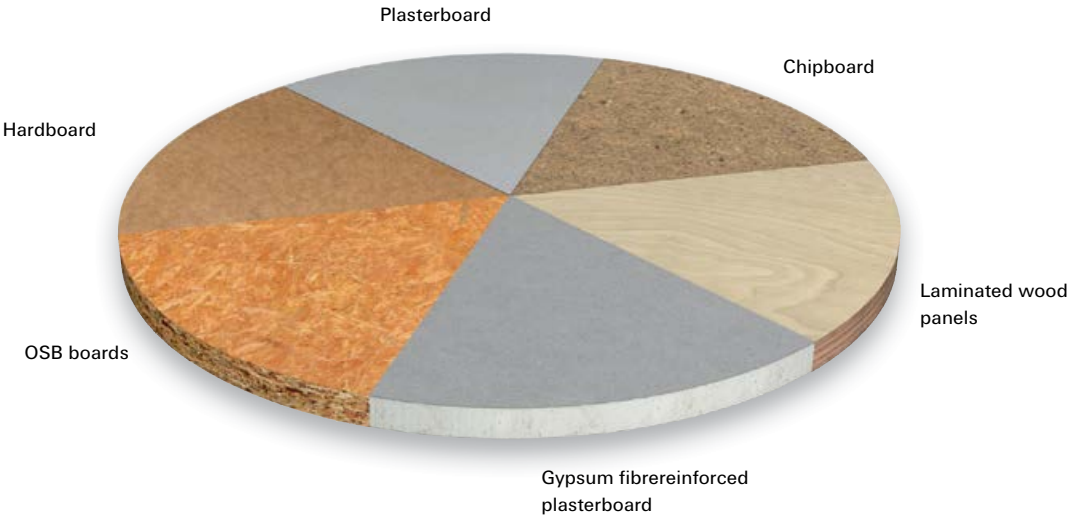
4 **Perforated bricks with porous structure** have many cavities and pores and thus generally a low compressive strength. In this case, special care is required when selecting the fi xing. Suitable fi xings include those with a long expansion zone or form locking injection anchors.

EXPERT TIP

- Before **fixing in masonry,** determine which brick type (designation, size, compressive strength) and mortar type (mortar category) has been used.
- For **safety anchoring** in unknown or old masonry, pull out tests must be carried out on-site to determine the anchor load bearing capacity.
- For **fixings close to the edge,** it is important to know if the wall is a load bearing wall as this prevents the risk of brick pull out.
- Even **solid brick** can have holes (e. g. MZ, KS). The holes are mostly larger grip-holes in the centre of the brick (up to max. 15 % cavity proportion per brick).
- Always drill without hammer function in **perforated and hollow bricks.** Here, special, sharply ground drills with hard metal tips are suitable.
- **Plaster or other non load-bearing layers** may not be added to the load-bearing base and are not to be used in calculating the anchorage depth.
- **Avoid anchoring into masonry joints** as much as possible due to joint inhomogeneity. If anchoring into a joint cannot be avoided (e. g. plaster on masonry) loads should be reduced.
- For **systems approved by building authorities, anchoring in joints** (vertical or horizontal joints) is regulated in the approval notices.
- For **anchoring high loads** in performated bricks, the anchorage depth should be increased.
- **Expansion fixings** (e. g. FAZ II or FBN II) are not suitable for use in masonry due to its high expansion forces which may lead to cracks in the brick. Frame fixings are suitable due to its longer expansion part.
- **Bonded anchors** achieve the highest possible loads in masonry.

Building Material – Drywall Panels

Panel building materials are thin-walled materials that often have limited strength – e. g. plasterboard like “Rigips”, “Knauf”, “LaGyp”, “Norgips”; Gypsum fi breboard like “Fermacell”, “Rigicell” or chip board, hard fibre boards, plywood and others.



The main characteristics of panel building materials are:

- Often thin-walled materials, mainly with limited strength.
- Easy-to-process materials for non load-bearing walls and also used as cladding material (e. g. walls, roofs or ceilings).
- A wide range of different building materials.

Special fixing elements must be used:

Cavity fixings are fixings made of plastic or metal, whichanchor by form locking into the material, e. g. by knotting or a snap on mechanism (e. g. toggles).

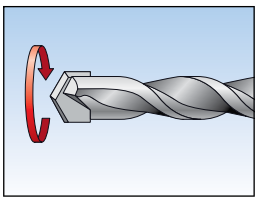
EXPERT TIP

- Only approved anchors should be used for **lightweight materials, prestressed hollow core slabs and panel materials.**
- Contact your **fischer consultant** on site before anchoring **heavy or safety-relevant loads** in the above-mentioned substrates.

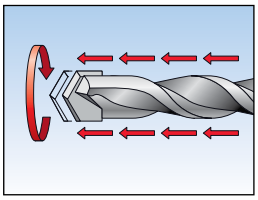
NOTE

Drilling

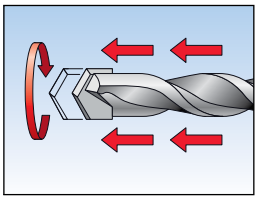
The building material determines the drilling method.
Five methods are possible:



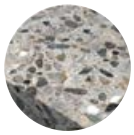
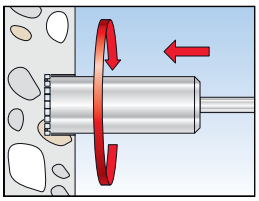
Rotary drilling
Rotary drilling without impact, uses a sharply ground carbide drill bit. When this method is used, the drill hole does not become too large and the perforated brick's webs do not break.



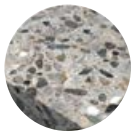
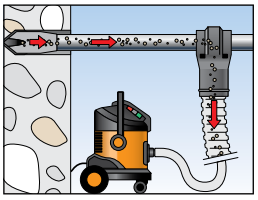
Impact drilling (mechanical)
Impact drill with rotation and a high number of light strokes, is suitable for dense structured building materials.



Hammer drilling (pneumatic)
Hammer drill uses rotation and a low number of light strokes with high impact energy, also suitable for dense structured solid building materials.

Diamond or core drilling process
Mainly used for larger drill hole diameters or for heavily reinforced components and/or if noise or vibration must be reduced.

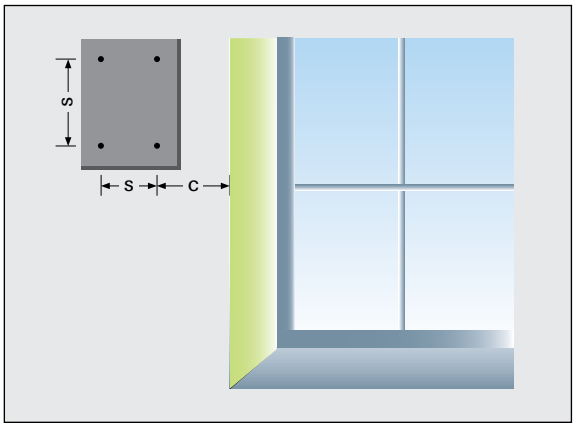
Hollow drilling
Special drill with a hollow core, which is connected to a vacuum cleaner. Cleans the drilled hole during the drilling operation. No further brushing or blowing is required. Can be used in concrete and masonry with dense structure.

EXPERT TIP

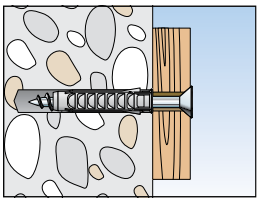
- The drilling method for approved anchors is specifi ed in the **approval / assessment.**
- Drill bits with **excessively worn cutting** edges should **not be used** (see approval /assessment).
- For certain fixings, **special drills** are required (e. g. a stop drill) as per approval /assessment.
- **Drill holes** must be **carefully cleaned** (blown out and brushed). See the respective approval /assessment or manufacturer's specifi cations.
- The **drill hole depth** is always exacly specified and relates to a given anchoring base thickness. For general applications without an approval /assessment the following applies: the drill hole depth + 30 mm should not exceed the anchoring base thickness.
- In case of **incorrect drilled** holes (hitting reinforcements or wrong location), the location for the new drill hole is regulated in the applicable fixing approval /assessment). Usually, the distance for the new drill hole must be twice the depth of the incorrect drill hole. The wrong drill hole must be fi lled with injection mortar (e. g. FIS V).
- **Diamond core drilling** is only permitted if stated in the approval/assessment or according to manufacturer's guidelines (e. g. RSB, FIS EM Plus, FAZ II, FBS II...).
- **The load bearing capacity is reduced** by water filled holes or wet substrates especially for chemical or plastic fixings.
- **Cutting** through a reinforcement is not permitted.
- **The drill hole** must be drilled perpendicular to the anchor base (an inclinement of up to 5° is permitted). Exceptional cases are regulated in the anchor approval /assessment and or according to manufacturer's guidelines.

Installation

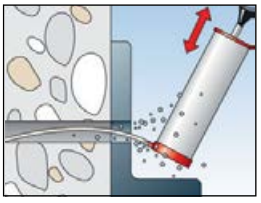
In general, the following aspects must be taken into consideration during installation:



The edge distance and centre distance, as well as the component thickness and width, must be carefully observed to ensure that the fixing can take the required load. Otherwise, it may lead to spalling of the construction material or cracks. For fixings without approval, e. g. nylon fixings, a minimum edge distance of c = 1 x h_{ef} (h_{ef} = anchorage depth) and a minimum spacing of s = 1 x h_{ef} must be adhered to for concrete. When using non approved metal anchors, a minimum edge distance of c = 1.5 x h_{ef} and a minimum spacing of s = 3 x h_{ef} must be adhered to. When using hammerset anchors, spacing and edge distance can increase due to higher expansion forces.



The drill hole depth must be larger than the anchorage depth (exception chemical anchor systems), to ensure that the screw has enough room at the end of the fixing element to penetrate at least one time the screw's diameter.



Drill hole cleaning after drilling, e. g. by blowing out, brushing or suction, is generally necessary. The load bearing capacity will be reduced, if the hole is not cleaned. (Exceptions: approved anchor systems where no hole cleaning is required, e. g. FHB II + PF - High speed capsule).

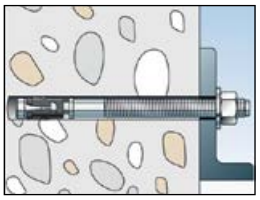
EXPERT TIP

- **Strictly adhere to specifications** for component geometry, edge and spacing distances. If this is not taken into account, the component will be damaged or the anchor capacity will be reduced.
- **Drill hole cleaning is essential.** The specifications in the approvals and the manufacturer's specifications must be observed.

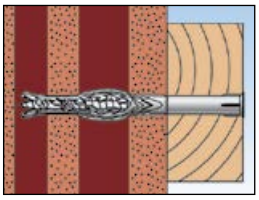
NOTE

Installation types

There are three different types of installation.



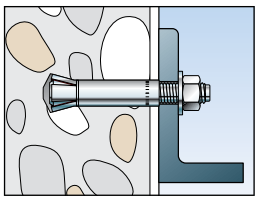
Anchor bolt FAZ II



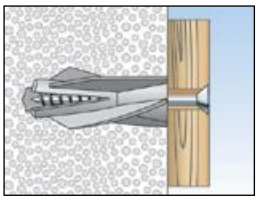
Frame fixing SXRL

Push-through installation
In particular for simplifying installation for series installations or for attachments with two or more fixing points:

- If the attachment's hole diameter is larger than the drill bit diameter, then the attachment can be used as a template. Please note: The drill bit tip is generally larger than the nominal diameter of the drill.
- In addition to facilitating a simple installation, an exact fit is also achieved.
- The fixing is inserted into the drill hole through the attachment and then tightened (e. g. FAZ II, FBN II, FH II).



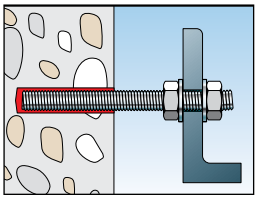
Zykon anchor FZA



Aircrete anchor GB

Pre-positioned installation
The anchor is installed before fastening the attachment. If drilling is not done precisely, then the holes in the attachment will not match up. This could mean that the anchors cannot be installed or could cause damage to the anchors. The installation sequence:

- Transfer the hole pattern of the fixture to the anchor base.
- Drill and clean the holes, install the attachment and then fix the attachment (e. g plastic fixings: S, SX, UX; metal fixings: FZA, EA II).



Threaded rod FIS A

Stand-off installation
This allows attachments to be compression and tension resistant at a certain distance from the anchor base. For this purpose, external threaded metal anchors (e. g. FAZ II, FBN II) or internal threaded anchors (e. g. EA II) with screws or threaded rods are clamped against the anchor base surface while using a bearing washer and nut. When using chemical systems with threaded rods (e. g. FIS SB, FIS V, FIS EM Plus, and FIS A), the installation can be done without using a bearing washer and nut.

EXPERT TIP

- **Clearance holes in the attachment** are specified for the respective anchor size in the approvals/assessments and manufacturer's guidelines.
- **For stand -** off installations with shear loads on the anchor, additional bending moment occurs and this must be considered.
- **The attachment must lie** fully flush on the surface base or it must have either a compression resistant levelling layer of max. 3 mm or half the anchor's diameter, otherwise the anchor must be checked for bending.
- **The attachment shall be in contact with the anchor** over its entire thickness, otherwise the anchor must be checked for bending.
- **Usable length is the maximum fixing height** t_{fix} which takes into account the attachment's thickness plus additional non-bearing layers (e. g. plaster, air, insulation etc.).
- Post-installed anchors must be tightened with a specific torque. A calibrated torque wrench must be used to ensure the correct pre-stressing force and the correct installation of the anchor. For **chemical anchors, the prescribed hardening time must be adhered to** before tightening torque or service load can be applied.
- Anchors must be mounted as a standard unit as delivered. The exchange or removal of parts is not permitted.

Loads

When selecting an anchor, it is necessary to know the load on the total construction and the resulting action forces.

Action forces can differ based on:

Dimension ▪ Direction ▪ Type of load ▪ Point of application

There are various types of loads:

Approvals generally give characteristic resistance. In the manufacturer's guidelines, **"permissible loads"** are specified for products with approvals. For anchors without an approval, **"recommended loads"** are given by the manufacturer.

- **Determine the size,** direction and point of application of the load. These parameters determine which anchor should be used.
- **Characteristic resistance** (N_{RK} or V_{RK}) describes the 5 % fractile of resistance. (Value with a 95 % probability of being exceeded, with a confidence level of 90 %).
- **Permissible loads** are working loads that already include an appropriate safety factor. These only apply if the approval conditions are complied with (N_{zul} or V_{zul}).
- **Recommended loads or maximum working loads** include an adequate safety factor. These only apply if the manufacturer's specifications are complied with (F_{rec} – valid for all load directions, N_{rec} - for compressive or tensile load or V_{rec} for shear load).
- **The calculation** is carried out by dividing the respective failure load or characteristic loads by a safety factor.
  Recommended safety factors compared to the average failure load:

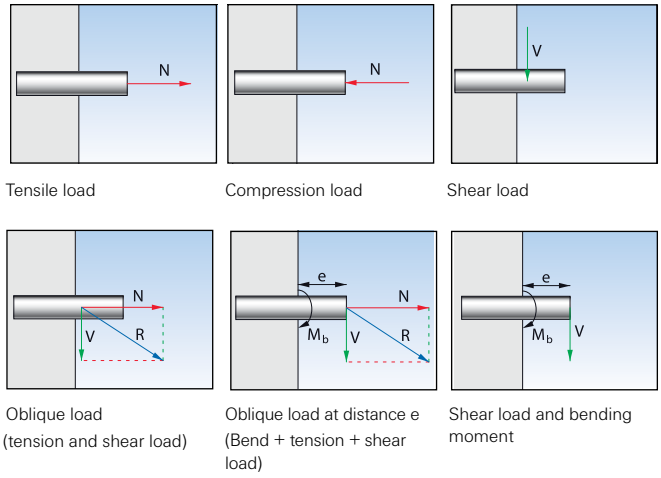
Steel and bonded anchors	$\gamma \geq 4$
Plastic anchors	$\gamma \geq 7$
Hammerfix anchors N	$\gamma \geq 4$

- **Recommended safety factors compared to the characteristic failure loads:**

Steel and bonded anchors	$\gamma \geq 3$
Plastic anchors	$\gamma \geq 5$

  For deviations to the regulation, see load tables. For certain products, the safety factors may deviate. In general, the global safety factor is calculated using the scatter of the faillure load, the failure probability and the reliability index of a product.
- **The specified loads** apply to individual anchors that are installed away from the edge, i. e. there is no influence from edges or other anchors.
- **The characteristic spacing and edge distances,** marked with $c_{cr,N}$ and $c_{cr,V}$, give the distances at which an anchor achieves its max. characteristic load.

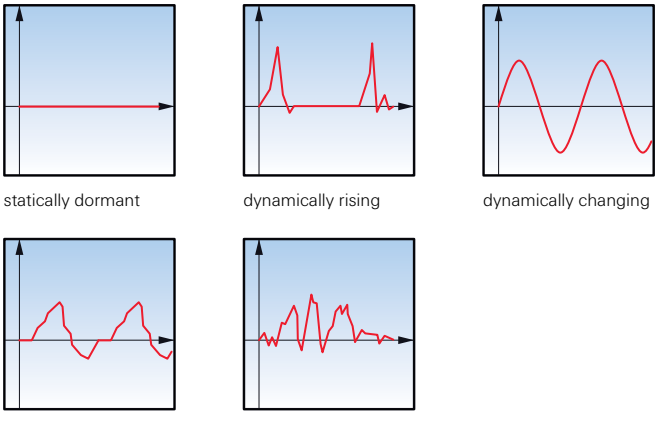
Load directions



Tensile load | Compression load | Shear load

Oblique load (tension and shear load) | Oblique load at distance e (Bend + tension + shear load) | Shear load and bending moment

Types of loads



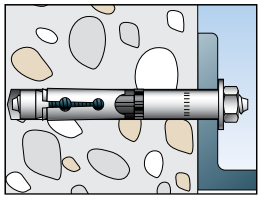
statically dormant | dynamically rising | dynamically changing

shock | seismic activity

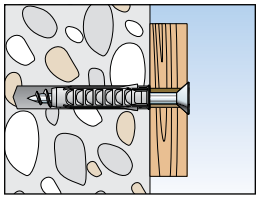
- **The specified minimum spacing and edge distance,** marked with s_{min} and c_{min}, indicates the distance at which no failure of the building material will occur when installing the anchor (cracks). These distances are mandatory and must be complied with. The characteristic spacing and edge distances may be shorter but not less than the minimum values but at the same time the load bearing capacity must be reduced. When combined loads occur, loads are determined separately for tensile and shear load and the overall utilization is determined by means of an interaction equation. As a rule, the sum of the ratio values from tensile and shear loads is less than 1.2.

Working Principles

There are different load transfer mechanisms which induce forces acting on the anchor in a building material.

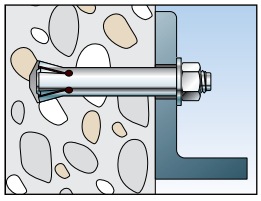


Sleeve anchor (e. g. FH II)

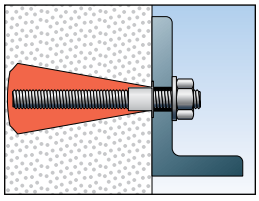


Plastic anchor (e. g. SX)

For frictional locking, the expanding part of the anchor is pressed against the drill hole wall.

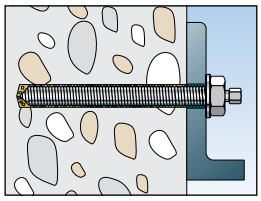


Undercut anchor (e. g. FZA)

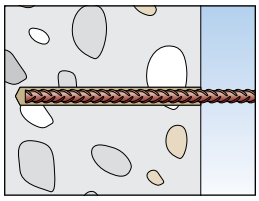


Injection anchor (e. g. FISV with cone drill PBB)

For form locking, the anchor geometry adapts to the subtrate's form or drill hole shape (e. g. conical drill hole).



Resin anchor
(e. g. Superbond RSB)



Subsequent reinforcement connector with concrete reinforcing bars

For adhesive bonding, the load will be transferred by a combination of adhesion and micro-keying (e. g. using resin / injection mortar).

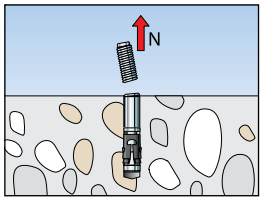
EXPERT TIP

For many fixings, a combination of working principles occurs (e. g. in soft base material a combination of friction and form locking takes place).

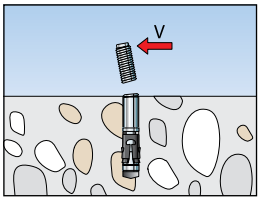
NOTE

Failure modes

If there is excessive stress, incorrect installation or a substrate with inadequate load bearing capacity, the following types of failure can occur.

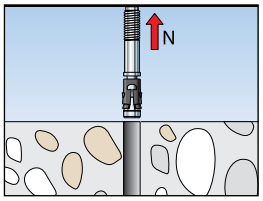


Steel failure tension

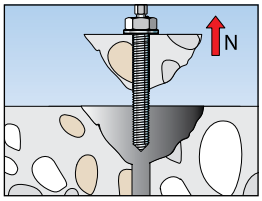


Steel failure shear

Steel failure:
- Insufficient steel stength for the applied load



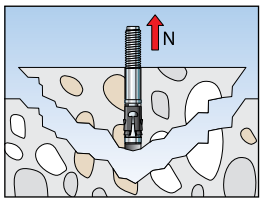
Pull out



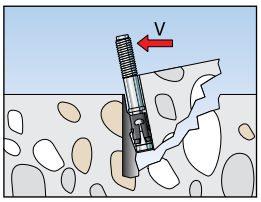
Combined failure

Pull out failure:
- Friction failure and or adhesion failure due to high load or incorrect installation

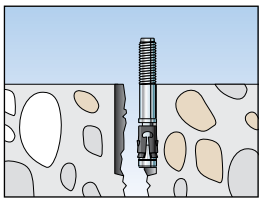
Combined failure:
- Pull out
- Concrete failure near the surface



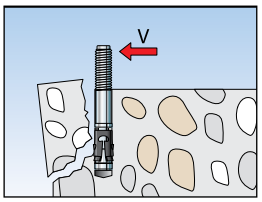
Concrete cone failure



Pry-out failure



Concrete splitting failure



Concrete edge failure

Anchor base failure:
- Tensile load "N" or shear load "V" too high
- Inadequate strength of anchor base
- Insufficient embedment depth

Anchor base splitting:
- Insufficient component dimensions
- Deviation from the spacing and edge distances
- Excessive expansion pressure

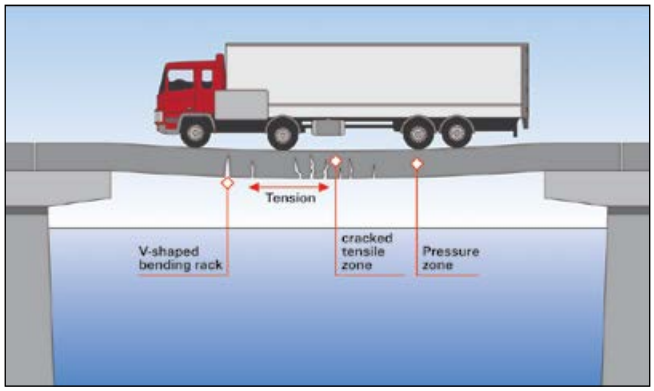
EXPERT TIP

- In most anchor approvals/assessments, the anchoring of **predominately static loads** is regulated. However, there are also approvals which regulate non-static loads (fatigue loads, e. g. FHB dyn).
- Seismic loads for post-installed anchors are regulated in Europe according to ETAG 001 Appendix E. The assessment is to be carried out in accordance with EOTA TR045 until the Eurocode 1992-4 is introduced. The seismic performance of an anchor system is categorised by performance categories C1 and C2. The classification of the seismic performance categories C1 and C2 for seismicity level and the evaluation category is the responsibility of the respective Member State (in Germany, an approval in accordance with ETAG 001 is sufficient. Classification in accordance with C1 and C2 is not necessary). The performance category and the characteristic values are found in the respective ETA (e. g. FAZ II, FH II, FIS SB, FIS EM Plus...).
- **The main causes for anchor failure are overloading, incorrect installation or an insufficient load bearing anchoring base.**

NOTE

Cracks in concrete components

Cracks can occur anywhere in concrete at any time: Factors involved in this are loads such as dead loads, traffi c or windloads, concrete shrinkage and creeping or external infl uences such as seismic activity or ground motion result in stresses and deformations thus leading to cracks.



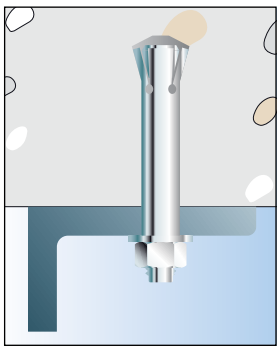
Example:
If a bridge designed as a single-span element is loaded, the bridge will buckle. Due to this buckling, cracks could occur in the element's tensile area.

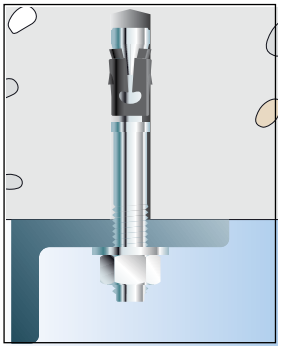
Concrete is not able to support tensile loads, therefore, reinforce-ments are placed in the element to take the tensile load area numerous cracks are formed that are barely visible to the naked eye. This is called the cracked tensile zone.

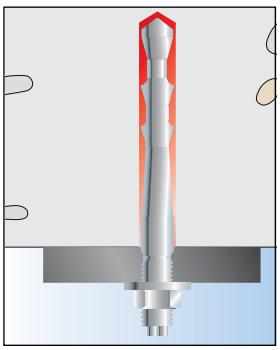
Suitable anchor systems for cracked concrete

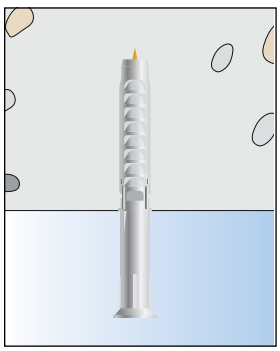
When fixing in concrete, **cracks** are always **expected in the anchoring area which will have an impact on the load bearing capacity** of the anchor system. However, it is very complicated, if not impossible, to prove whether the concrete is cracked or not cracked.

For safety reasons, designers and craftsmen should **always use anchor bolts which are suitable for cracked concrete.** Fixings with an approval/assessment according to ETAG 001 for cracked concrete have proven their suitability in cracks, therefore they can be used without any restrictions in tensile and compres-sion zones of a concrete member.


Undercut anchor FZA


Bolt anchor FAZ II


Threaded rod FHB II


Frame fixing SXS

Due to safety reasons, always use crack-suitable anchor systems such as FAZ II, FH II, FHB II, FIS SB, FIS EM plus or FIS V.

Fire protection – Fundamentals

General requirements of building structures
for fire protection.

Structural installations

Structural installations are to be ordered, erected, changed and brought into commission in such a way that:

- the emergence of a fire is prevented from breaking out.
- the spread of fire and smoke (spread of fire) is prevented
- in the event of a fire, the rescue of people and animals is possible.
- eff ective fi re-fi ghting operations are possible.

German regulation

In Germany, the procedure for construction and operational fi re protection are specified by the fi re protection standard DIN 4102, the Model Building Ordinance (MBO), Regional Construction Ordinances (LBO) and various trade-specifi c regulations from professional associations.

The following applies as per Section 1 and 2 of DIN 4102:

Building materials such as **concrete, wood, stone, metal** etc., are classified according to their behaviour **into fl ammable or non-flammable building material classes.**

However, **components composed** of different **flammable and non- flammable materials** are not classified into fire classes in building construction but they are evaluated as a complete system according to their fi re resistance duration. The fire resistance duration R is indicated in minutes and classified according to two categories:

- **Components with a fire resistance duration** of R30 and R60 are fire inhibiting.
- **Fire-resistant,** are all components with a fire resistance duration of R90, R120 and R180.

Tested systems such as cable, ventilation or duct systems are not only tested for fire resistance, but also for functional capability in the event of fire (e. g. supply lines to sprinkler systems). The fire resistance duration of these systems is e. g. E30 to E120 for electrical cable systems or L30 to L120 for specifi ed ventilation ducts. The anchors that are used to fasten these systems must have at least the same fire resistance duration.

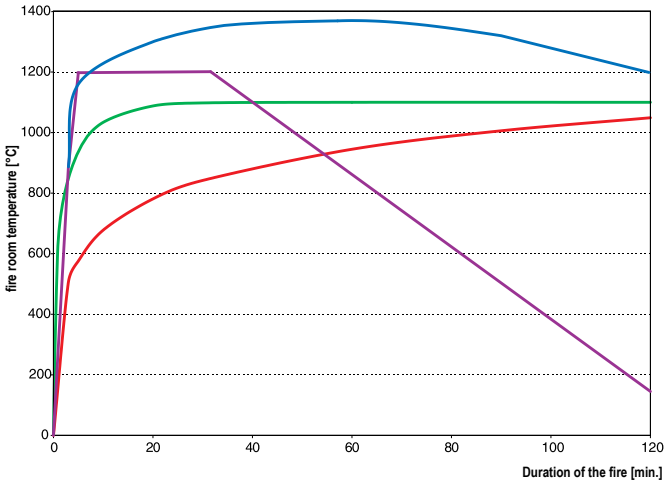
European standardisation

In accordance with the European Norm DIN EN 13501-1, the classifi cation of fi re behaviour of building materials / products is similar to that of DIN 4102. The classifications are, however, much more precise.

In addition to, the main classification criteria concerning flammability, flame spread and heat released, e. g. smoke development and dropping behaviour is tested.

Fire resistance of components has been tested in Germany in accordance with the European Norm DIN EN 1363 or DIN EN 1365 since 2000. The fire resistance duration is then labelled with the letter R for “Resistance”.

The standard temperature-time curve (ETK) of DIN 4102 and ISO 834 is based on a simulation of real fire conditions and forms the evaluation basis that is used worldwide to determine the fire resistance duration. In addition, there are other temperature curves for special fire exposures, e. g. the hydrocarbon curve for destructive fi res caused by flammable liquids or the RAB/ZTV tunnel curve (Germany) or the Rijkswaterstaat tunnel curve (the Netherlands), which describe tunnel fires.



Temperature curves: — (ETC), — Hydrocarbon curve, — RABT/ZTV tunnel curve — Rijkswaterstaat tunnel curve

Fire protection in fastening technology

The fastening technology has a vital importance in fire protection.
To ensure the functional capability and stability of railings, pipe systems, fire safety doors or ceiling elements.

Assessing fixings for fire is carried out in accordance with the technical regulation EOTA TR020 or in accordance with fire protection reports.

The labelling and classifi cation of anchors and fixings is classified in:
1 Fire behaviour (e. g. non-flammable)
2 Fire resistance duration (e. g. R90)

For this purpose, the legal regulations set down in the fi nal draft of the Delegated Act "Fire Behaviour" must be observed.

EOTA TR020 only states anchor performance ratings that have an **ETA for cracked concrete!** Meanwhile, a new evaluation document issued by the German Institute for Construction Engineering (DIBt) is used to determine the characteristic load values and the corresponding fi re resistance duration.

A partial safety factor of $\gamma_M = 1.0$ on the load side is used in the event of fire.

The fire values only refer to anchor bolts that are directly exposed to flames.

Alternatively, anchors can be protected from direct exposure to fire by using fire protection panels or fire protecting coatings.

For fixing cladding systems, it is assumed that the load bearing capacity of specified plastic screw anchors in concrete with an external diameter of 10 mm and a metal screw diameter of 7 mm and an anchoring depth of $h_{ef} = 50$ mm with a polyam-ide PA6 plastic sleeve has a suffi cient fi re resistance of at least 90 minutes (R90), if the permissible load (no permanent centric tensile load) is ≤ 0.8 kN.

Before the fire test

During the fire test

After the fire test

Corrosion – Fundamentals

Corrosion is a chemical reaction which degrades metal.

The less noble the metal ("electrochemical potential"), the more severe the material damage is, resulting in metal loss or corrosion flakes. For this reason, different appearance patterns have been determined. **The most common types of corrosion in fixings and anchors are:**

Surface corrosion: In this case, the metal corrodes relatively uniformly over the entire surface or over a part of the surface. An example of this is the invisible rusting of a screw in the transition area from anchor plate to hole due to condensation. The result: A connection that appears completely intact from the outside, but suddenly fails.

Contact corrosion: If metals with a different nobility are in contact with each other in a conductive medium, the less noble metal always corrodes (the anode). Whereas stainless is not aff ected. A decisive factor is the surface ratios of the two types of metal: The greater the surface area of the most noble metal in comparison with the less noble, the greater the corrosion. For example, if larger stainless steel sheets are screwed with galvanised screws, the screws will be agressively attacked within a very short time. Whereas using stainless screws in galvinised sheets poses no problems.

Stress corrosion cracking: Permanent internal or external tensile stresses lead to metal strain or corrosion. In this process, a crack develops due to mechanical stresses, which grows under increasing loads and thus creates a path for progressive corrosion. For example, this occurs with stainless steel of corrosion resistance Class III e. g. A4, in an atmosphere containing chlorine (swimming pools). Generally, stress corrosion cracking is not visible with fixings and usually leads to sudden failure of the anchoring.

In 1985, the suspended concrete ceiling of an indoor swimming pool collapsed in Uster, Switzerland. The stainless steel ceiling attachments exhibited no external defects, but were completely destroyed internally in some cases due to stress corrosion cracking.

Example of trans-crystalline stress corro-sion cracking on stainless steel 1.4401 with high chloride concentra-tion

Corrosion protection

There are different ways to protect fastenings from corrosion. The most important are:

Galvinised zinc coating (or also electrolytic zinc coating) followed by passivation is the most common corrosion protection used in metal finishing. A zinc coating thickness of 3 – 10 µm off ers excellent corrosion protection for damp rooms and outdoor use.

Hot-dip galvanising is the application of a metal zinc coating by dipping it in molten zinc (at approx. 450 °C). Zinc layer thickness's of 45 – 80 µm offer an excellent corrosion protec-tion for moist rooms and outdoor use.

Stainless steel fi xings of corrosion resistance class III e. g. A4, material no. 1.4401, 1.4404 and 1.4571 as well as two phased duplex steel (austenitic and ferritic structure / magnetic) are suitable for anchoring in damp rooms, in open air, in industrial atmospheres or near the sea (but not directly in sea water).

Stainless steel anchors made from high corrosion-re-sist-ant steel of the corrosion resistance class V e. g. material no. 1.4529 are used in especially aggressive environ-ments e. g. in atmospheres containing chlorine (swimming pools), in road tunnels or with direct sea water contact. Due to their high molybdenum content they are risistant is such aggressive enviroments. That means that steel type 1.4529 – containing chrome, molybdenum and nicklel – has an alloy content of 58 %. The rest consists of iron and carbon. Due to this very high alloy content, the production for this steel type is very expensive, but on the other hand the conection is safe and maintenance – free in terms of corrosion.

Dynamics

For predominantly non-static loads.

The general building approvals issued by the **German Institute of Construction Engineering (DiBt) and the European Technical Approvals / Assessments (ETA)** are mainly valid for predominately static loads. However, there are certain applications e. g. swinging cranes, crane rails, jib cranes, elevator guide rails, machines, industrial robots and blast fans in tunnels including antenna and masts which are subjeted to dynamic eff ects

In general, the anchoring of components with more than > 1000 load cycles must be carried out using fastening elements that have been checked and approved for this purpose. Until recently, the design for post-installed anchors for such dynamically loaded applications was nearly impossible. Time consuming and costly expert reports and or approvals for individual applications were required.

The bonded anchors: fi scher Highbond anchor FHB dyn and fi scher UMV multicone dyn and FDA **have a German DiBt approval for dynamic loads.** In the approval, only fatigue loads are considered as dynamic loads and not loads from shock or seismic activity.

The approvals apply to the anchoring of dynamic loads with unlimited numbers of load cycles, for tension and for shear loads.

In addition, the FHB dyn is manufactured in anchor size M12 and M16 from highly corrosion-resistant steel (e. g. corrosion resistant Class V - 1.4529).

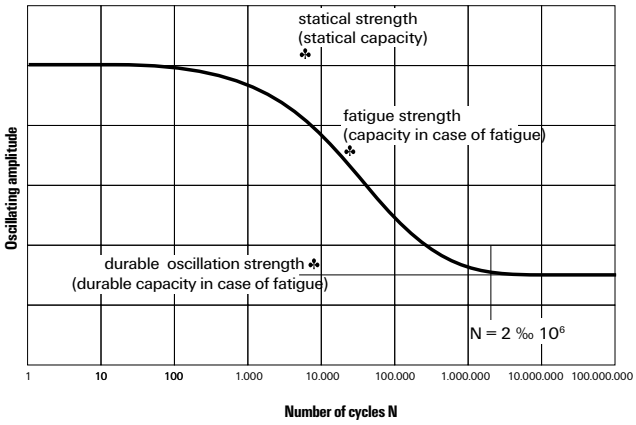
Dynamic load tests have shown - compared to normal stainless steel grades of corrosion resistant class III (e. g. 1.4401 also known as 316) – that this material is not only highly suitable for indoor and outdoor humid environments, as well as other agres-sive conditions, it is also highly suitable for dynamic loadings.

Elevator guide rails

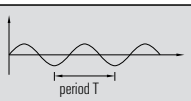
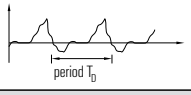
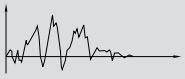
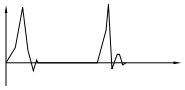
Industrial robots

Blast fans

Antenna and masts



Wöhler curve

Action	Run of the oscillation	Possible cause
harmonic	 sinusoidal; period T	Unbalances, tumbling machines
periodic	 optional, periodical; period T_0	Regularly abutting parts (e.g. punching machines) , rail- and road traffic
transient	 optional, nonperiodical	Earthquakes
impulsive	 optional, with very short time of influence	Impact, explosion

Legal basis

The European Union (EU) determines the legal foundation for the assessment, CE labelling and bringing building products into the European Economic Area (EEA).

The aim is to reduce trade barriers by harmonising the requirements of building products.

REGULATION (EU) No 305/2011 (Construction Products Regulations) OF THE EUROPEAN PARLIAMENT AND COUNCIL fully came into force on 1st July 2013. The Construction Products Regulation is law in all EU countries. However, the Construction Product Directive 89/106 / EEC is not law in all EU countries.

Construction products are products, or parts which are permanently incorporated into buildings. Their performance infl uences the structure's basic requirements (e. g. mechanical strength). Therefore, construction products and materials for safetly relevant applications are affected.

Important building requirements include:

1 Mechanical strength and stability
2 Fire protection
3 Hygiene, health and environmental protection
4 Safety and accessibility during use
5 Sound protection
6 Energy saving and heat protection
7 Sustainable use of natural resources

When a construction product is covered by a harmonised standard (hEN), or a European Technical Assessment or Approval (ETA) has been issued for this product, the manufacturer is obligated to draw up a Declaration of Performance (DoP) for this product and affi x the CE marking on the product. The application for an ETA for a construction product by the manufacturer is voluntary. National approvals may only be issued if a construction product is not marked with a CE label.

Existing European Technical Approvals (ETA) are valid until the end of the validity date and will be amended with the Declaration of Performance (DoP) by the manufacturer from the due date. The reference number of the DoP is part of the CE marking and must be determined by the manufacturer. The Declarations of Performance (DoP) are available on the fi scher website under "Approvals/Assessments": http://www.fi scher.de/sdb.

The CE mark is the only means to certify whether the manufacturer has conformed to the applicable harmonised requirements of construction products. The CE label allows the construction product to be freely traded without trade barriers in the European Economic Area.

Each Member State determines the essential characteristics for use of the construction product and its performance in its territory. The unrestricted use of a construction product in a Member State depends on whether performance values exist in the DoP for the essential characteristics determined by the Member State. If one characteristic is declared with "NPD" (No Performance Determined), this can lead to a ban on use in a Member State. Therefore, each member State must establish Product Contact Points, which will provide information on these regulations. In Germany, this is the Federal Institute for Material Research and Testing (BAM: see www.pcp.bam.de).

Assessment procedure

Fasteners which are not covered by a harmonised standard (hEN) can apply for an ETA (European Technical Assessment) on the basis of a European Assessment Document (EAD).

Existing assessment documents, such as ETAGs (European Technical Approval Guidelines) for metal and plastic fixings are still valid and transferred into EADs in accordance with the EU Const-ruction Products Regulation (CRP). The ETAGs and the new EADs can be downloaded from the EOTA website: http://www.eota.eu

The assessment document for mechanical fasteners (ETAG 001- 1, -2, -3, -4 or in the future, EAD 33-0232) and the assessment document for bonded anchors (ETAG 001-5 or in the future, EAD 33-0499) divides possible approvals of metal fixings into 12 options.

Options 1-6 are for use in cracked and non-cracked concrete, options 7-12 are only for use in non-cracked concrete. Anchors of Option 1 off er the largest range of fl exibility for assessment, since performance values for concrete of the strength classes C20/25 to C50/60, as well as the minimum spacing and edge distances are available (see table below).

Section 6 of the ETAG 001 (in the future, EAD 33-0747) regula-tes the assessment of metal fixings in cracked and non-cracked concrete for multiple use for non-structural systems. Non-load bearing systems include components which do not contribute to the stability of the construction, they only transmit their dead or wind load. These are, for instance, simple suspend-ed ceilings and false ceilings, pipelines and façade claddings.

When using fixings for multiple use, it is assumed that if excessive slippage or failure of a fixing point occurs, that the load will be transferred to neighbouring fi xing point. A fixing point can be defi ned as a single anchor or a group of anchors.

This is known as a redundant system, where stability is not affected by an individual anchor failure.

Possible assessment options according to EAD

Options	Cracked concrete	Non-cracked concrete	One value for all concrete strengths	Different values for C20/25 to C50/60	One value for load direction	Separate values for tensile and shear capacity	^{c}cr / ^{s}cr	$^{c}min < ^{c}cr$ / $^{s}min < ^{s}cr$	Design method as per EN 1992-4
1	✓	✗	✗	✓	✗	✓	✓	✓	A
2			✓	✗					
3			✗	✓	✓	✗			B
4			✓	✗					
5			✗	✓			✓	✗	C
6			✓	✗					
7	✗	✓	✗	✓	✗	✓	✓	✓	A
8			✓	✗					
9			✗	✓	✓	✗			B
10			✓	✗					
11			✗	✓			✓	✗	C
12			✓	✗					

Design of fastenings

Two different anchor designs are differentiated.

Method with global safety factors

Permissible loads are determined from the average failure load or from the 5 % fractile load and compared with the action load.

The safety factor depends on the anchoring system, the type of installation and external infl uences such as temperature and or humidity. Global safety factors are generally = 3 for steel and bonded anchors and = 5 for plastic anchors.

Methods with partial safety factors

According to this method, it is shown that the value of the design actions S_d does not exceed the value of the design resistance R_d ($S_d \leq R_d$).

The action on fi xings are determined according to the same rules and used the same partial safety factors employed in reinforcred concrete design (see Eurocode 1990; national appendix must be observed).

The design resistance is determined by using the characteristic resistance and the partial safety factor of the material ($_M$), which takes into account the scatter of the material. The values can be taken directly form the ETA. Safety is national law. The design method as well as the related partial safety factors are determined by the Member State.

Only the product specific coefficient for installation is specified in the ETA, which is used to calculate the partial factor $_M$. The design standard EN 1992-4, which is expected to be ratified in 2018, contains the national determined partial safety factors (observe the respective national appendex).

The design method as set down according to ETAG 001, Annex C - design method for metal anchors and the design method according to TR029 - bonded anchor design in concrete, as well as CEN/TS 1992-4, Section 4 (mechanical anchors) and Section 5 (chemical anchors) are the current methods for anchor design based on a European Technical Approval or Assessment (ETA). Moreover, the ETAG 001 Annex C distinguishes between three different design methods (A, B and C), method A being the most important and the most economical method since anchors are considered separately for all load directions and failure modes. Methods B and C play a minor role and are hardly used.

Other important design provisions are:

EOTA TR020 Anchor design in concrete under fi re exposure, or CEN/TS 1992-4, Part 1, Appendix D

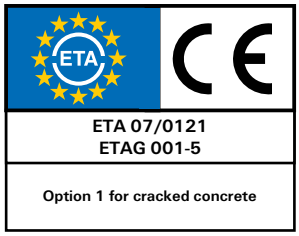
EOTA TR045
Anchor design in concrete for seismic actions
The applicable assessment design methods are generally indicated in the respective ETA. It is important that design methods are not commingled.

The design for metal anchor (under static and seismic loads as well as under fire exposure) is summarised in EN1992-4, i.e. in Section 4 of the Eurocode 2, but then must be ratified by each Member State and, if applicable, adapted for national annexes. As soon as EN1992-4 is published, all other design methods (ETAG 001 Annex C, TR045, TR020, TR029 and CEN/TS 1992-4) are no longer valid.

fischer has developed a simple yet powerful design software for daily use: the fischer - C-FIX. The software enables designers and users to carry out anchor designs according to different design methods. Complex anchor arrangements can be calculated quickly and easily. The feature "multple design" makes it possible to select the best technical and cost saving solution.

Approvals, markings and their importance

The most important symbols
are presented below.



European Technical Approval / Assessment
Issued by a European approval authority (e. g. DIBt) on the basis ofthe guidelines for European technical approvals (ETAG). ETA (Eng-lish): European Technical Approval/Assessment. CE: The CE marks the conformity of the product to all applicable legal provisions in which their installation is intended. This means that the CE mark only certifies that the requirements determined in the relevant har-monisation legal provisions of the union have been complied with.Products with the CE mark can be freely traded in the European Economic Market.

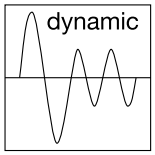
ICC International Code Council
ICC Evaluation Service Inc. (ICC ES) issues reports, e. g. for subsequent anchoring on the basis of the International Building Code® and the related standards in the United States of America

FM Certificate
Recognised for use in local water- based fire extinguisher systems (Factory Mutual Research Corporation for Property Conservation, American insurance company).

General building authority approval
German approval, issued by the DIBt, Berlin with the accompanying certificate of conformity for construction products with the general building authority approval. Confirmed by a material testing institute.

Fire-tested fixing
The anchor was subjected to a fire test. It is an "investigation report to test the anchor under fire exposure (fire behaviour) (with R-Class). Fire tests are not required when using the simplified verification method according to TR020 - then the values can be transferred directly to the ETA.

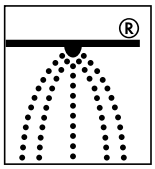
This product is made from **high corrosion resistant steel** of corrosion resistance class V, e. g. 1.4529.



Dynamically loadable anchors
The anchor is suitable and approved for anchoring of "not predominantly static" (i.e. dynamic) loads.static" (i.e. dynamic) loads.static" (i.e. dynamic) loads.

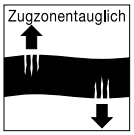
General construction-related test certificate

The fixing is suitable for anchoring under **seismic influence.** Please note: The ICC-ESRs also allow seismic stress (see Category C1 and C2 in accordance with the ETAG 001 Annex E).



Mark for labels that confirm compliance with the VDS-CEA guidelines for **sprinkler systems, planning and installation.** Fixings labelled as such may be used for fixing pipes for extinguishing systems.

Tested for **flammability** in accordance with VDE.



Fixings for tensile zones
The fixing is suitable and approved for anchoring in cracked concrete (tensile zone) and in uncracked concrete (compression zone).

Fixing made of high-quality, ageing-resistant **nylon** (polyamide).

Component test with window frame screws in accordance with ift guideline M0-01/1; Testing structural connections on windows.

The term "approvals" used in the catalogue consists of documents that are available and can be used as evidence of the usability of building products for which the documents were issued. These are (fire) reports, general construction-related approvals issued by the German Institute for Construction Technology Berlin (e.g. Z-21...) or European Technical Approvals or Assessments (ETA). In general, the usability of construction products in an EU Member State is given, if the performance of the significant characteristics required in each Member State has been clarified/ confirmed by the manu-facturer. Information on the significant necessary characteristics in a country can be found at the national Product Information Contact (Link: http://ec.europa.eu/Docs- Room/documents/4170/attach-ments/1/translations/en/renditions/native).

Fire prevention

Fire prevention is a critical consideration for those who are responsible for creating the design, specification and construction of new buildings, with consideration in the ongoing maintenance of occupied premises.

As the causes of fire vary and are often unpredictable, construction measures are being designed to influence the formation and spread of fire, smoke and toxic gases, by minimising the available factors needed to create a fire or to limit the spread of fire once it has started. Effective fire fighting within a building is generally achieved through a combination of active and passive FireStop systems and, when used in conjunction with each other, provide a balanced fire protection strategy.

Active FireStop systems

Active fire prevention systems are designed to react to the outbreak of a fire, which is then suppressed with the help of sprinkler systems, halogen installations, fire extinguishers or other proactive mechanical systems. The effects of the fire may also be lessened by the removal of smoke from the equation. By including alarms and emergency lighting, active systems also serve to provide escape paths for people inside the building.

Passive fire prevention systems

Passive fire prevention is an integral component, which is designed and built in to the fabric of the structure. It is also an essential element of the fire safety of a building. The risk of fire can be minimised by dividing the building into a series of compartment/cells bounded by fire rated walls and floors. To maintain the firestopping integrity of a compartment/cells, any gaps, openings, void or channels within the fire rated walls or floors must be sealed with an approved or certfied system to prevent the passage of fire, smoke and toxic gases.

Building codes and national regulations

Most model building codes have very clear requirements on passive fire protection. "Fire investigation reports have consistently shown that unprotected or improperly protected penetrations and joints cause millions in property damage and contribute to the loss of life and injuries due to the uncontrolled migration of fire, smoke and toxic gases." In order to promote life safety and property protection, the national building codes include fire testing and performance requirements for penetration firestop and fire resistive joint systems. The following regulations are published as statutory instruments by Parliament with respect to life safety purposes:

ENGLAND AND WALES: 1991

Section 11.2 of Approved Document B3 states: "If a fire separating element is to be effective, then every joint, or imperfection of fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire stopping so that the fire resistance of the element is not impaired"

Section 11.12 adds, under the heading of 'Fire stopping', a requirement that: "Joints between fire separating elements should be fire stopped; and all openings for pipes, ducts, conduits or cables to pass through any part of a fire separa-ting element should be:

Kept as few in number as possible and kept as small as practical fire-stopped (which in the case of a pipe or duct, should allow for thermal movement)"

BS 7671: 2008: UNITED KINGDOM

The 17th edition of the IEE Wiring Regulations (BS 7671:2008) is the national standard in the United King-dom for all commercial, domestic and industrial wiring installations.

Section: 527-02-01 states "Where a wiring system passes through elements of building construction such as floors, walls, roofs, ceilings, partitions or cavity barriers the openings remaining after passage of the wiring systems shall be sealed according to the degree of fire resistance required of the element concerned."

Section: 527-02-02 states "where a wiring system such as conduit, cable ducting, cable trunking, busbar or busbar trunking penetrates an element of building construction ha-ving specified fire resistance it shall be internally sealed so as to maintain the degree of fire resistance of the respec-tive element as well as being externally sealed to maintain the required fire resistance."

GERMANY: FEDERAL STATE BUILDING ORDER

In Germany, the Federal State Building Order is regulated at the level of the federal states. Therefore, there are 16 regional state building codes with their own regulations and guidelines. The 2002 Directive Building Code and the 2005 Directive Guidelines for conduit and ventilation systems form the basis for further consideration. The list of the Technical Building Regulations – M-ETB, includes other codes, such as the MLAR and the German Ventilation Systems Directive – MLüAR. Once guidelines are adopted into the list at regional state level List of Technical Building Regulations–LTB, the guidelines become legally binding.

NFPA 101 LIFE SAFETY CODE: UNITED STATES

Life Safety Code addresses those construction, protection, and occupancy features necessary to minimise danger to life from the effects of fire, including smoke, heat, and toxic gases created during a fire. The Code establishes minimum criteria for the designs of egress facilities, so as to allow prompt escape of occupants from buildings or, where desirable, into safe areas within buildings. The Code also addresses protective features and systems, building services, operating features, maintenance activities, and other provisions in recognition of the fact that achieving an acceptable degree of life safety depends on additional safeguards to provide adequate egress time or protection for people exposed to fire. Relevant firestop requirements can be found in below mentioned references:
8.2.2 Compartmentation Continuity
8.2.3.2.4 Penetrations and Openings In Fire barriers
8.2.4.4 Penetrations and Openings In Smoke Partitions
8.3.2 Continuity of Smoke Barriers

NFPA 5000 BUILDING CONSTRUCTION AND SAFETY CODE

NFPA 5000 – Building Construction and Safety Code is a model building code developed by the National Fire Protection Association. For the most part, the requirements for fire stops are the same in NFPA 5000 as they are in the IBC. It also addresses joints between assemblies in a similar manner to the IBC. NFPA 5000 states openings must be protected by „a system or material capable of restricting the transfer of smoke". It addresses protection for through-penetrations and membrane penetrations in Section 8.8 using the same test methods as the IBC. The requirements for F and T ratings are also the same. Joint systems, including perimeter joints at curtain walls, are addressed in the same manner as the IBC.

IBC INTERNATIONAL BUILDING CODE: UNITED STATES

In the Past: The Regional Model codes developed by the Building Officials Code Administrators International (BOCA) were used on the East Coast and throughout the Midwest of the United States, while the codes from the Southern Building Code Congress International (SBCCI) were used in the Southeast and the codes published by the International Conference of Building Officials (ICBO) covered the West Coast and across to most of the Midwest. After three years of extensive research and development, the first edition of the International Building Code was published in 1997. The code was patterned on three legacy codes previously developed by the organizations (BOCA, SBCCI, ICBO) that constitute IBC. By the year 2000, ICC had completed the International Codes series. Relevant firestop requirements can be found in below mentioned references:
702 Definitions
704.9 Separation of Vertical Openings - Sprinkler Exception
708 Fire Partitions 1 Hour Rating
709 Smoke Barriers 1 Hour Rating
710 Horizontal Assemblies
711 Penetrations (General)
711.3.2 Sprinkler Heads Electrical Boxes
711.4.1.2 „F" & „T" Rating Requirements
712 Fire-Resistant Joint Systems
712.4 Curtain Wall to Edge of Slab

OTHER RELEVANT CODES FROM IBC:UNITED STATES

The International Building Code and International Residen-tial Code are just a few of the comprehensive I-Codes the Code Council has created. The publications of the codes allow for easier following from members and allow them to observe and study the model code. Some of these codes have specific practices, such as the International Fire Code and the International Green Construction Code, or the IGCC. Here is the current list of I-Codes developed and published by the Code Council:
International Building Code
International Residential Code
International Fire Code
International Plumbing Code
International Mechanical Code
International Fuel Gas Code
International Energy Conservation Code
IBC Performance Code
International Wildland Urban Interface Code
International Existing Building Code
International Property Maintenance Code
International Private Sewage Disposal Code
International Zoning Code
International Green Construction Code.

OTHER RELEVANT CODE

NFPA is responsible for 300 codes and standards that are designed to minimize the risk and effects of fire by establi-shing criteria for building, processing, design, service, and installation.
Some of the other widely used NFPA codes are:
NFPA 70 NEC – National Electrical Code
NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
NFPA 221 - Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls

Approvals, markings and their importance

British Standard
BS 476-20

BS 476-20:1987
Fire tests on building materials and structures. Method for deter-mination of the fire resistance of elements of construc-tion (general principles).

BS EN13501-1

EN13501-1:2007+A1:2009
Fire classification of construction products and building elements. Reaction to Fire.

BS EN13501-2

EN13501-2:2007+A1:2009
Fire classification of construction products and building elements. Resistance to Fire.

BS EN1366-3: 2004

EN1366-3:2004
Fire resistance tests for service installations - Penetration seals.

BS EN1366-4: 2006

EN1366-4:2006
Fire resistance tests for service installations - Linear joint seals.

DIN

DIN 4102:Part1
Fire behaviour of building materi-al and elements - Part 1: Building materials, concepts.

American Standard
ASTM E 84 (UL 723)

ASTM E 84
Test method for Surface Bur-ning Characteristics of Building materials. The test evaluates the spread of flame along the surface of the material. It is not a resistance test.

American Standard
ASTM E 1966
(UL 2079)

ASTM E 1966
Test method for Fire-Re-sistive Joint Systems. This test is used to evaluate the performance of a joint after a cyclic movement test and fire exposure test. UL 2079 - equivalent.

American Standard
ASTM E 814 (UL 1479)

ASTM E 814
Test method for Fire Tests of Through Penetrations Fire Stops. This test is used to evaluate the performance of a firestop system, following fire ex-posure a hose stream test is conducted. UL 1479 - equivalent.

BS EN ISO 10140

BS EN ISO 10140:2010
The laboratory measurement of airborne sound insulation of buildng elements.

BS EN 1026

BS EN 1026: 2000
Air permeability test method.

BS EN 1027

BS EN 1027: 2000
Water permeability test method.

ETA
CE
ETA-XX/XXXX
ETAG XXX-X
xxx

CE marking is a declaration by the manufacturer (through verified testing) that the product meets all the appropriate provi-sions of the relevant legislations implementing certain European Directives. ETA - The European Technical Assess-ment provides information about the construction product to be declared in relation to its essential characteristics.

CLASSIFIED
C UL US

UL is an abbreviation for Under-writers Laboratories Inc. which is an independant, not for profit product safety testing and certifi-cation organisation.

UL
EU

UL-EU Mark is intended for use on products destined for the European marketplace.

FM
APPROVED

FM Approvals is an internatio-nal leader in third-party certifica-tion and approval of commercial and industrial products.

warrington certifire certification
APPROVED PRODUCT
CF xxxx

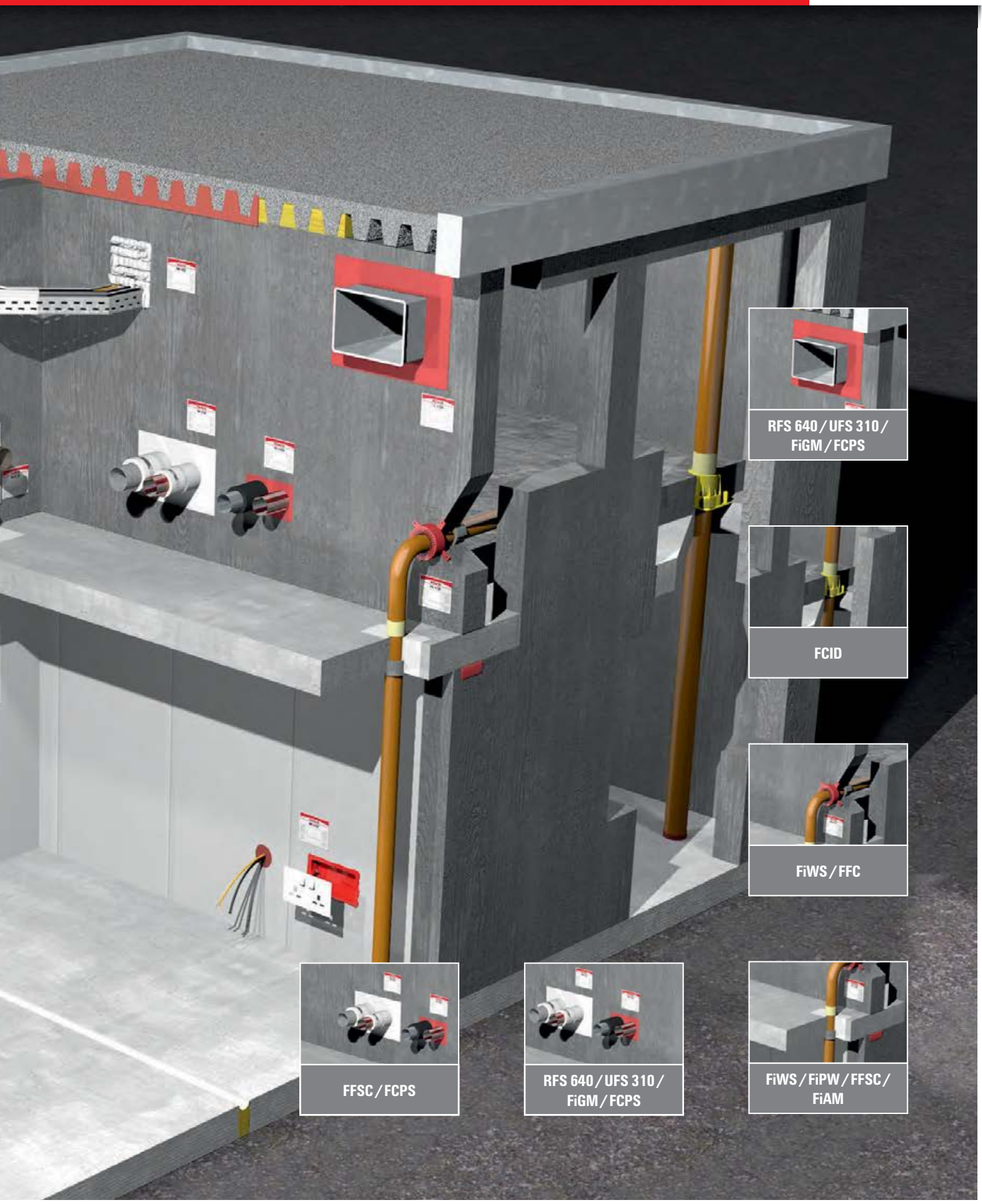
Certifire is an independant Third Party Certification organisation. The scheme under-takes require-ments such as the manufacturing of products under a Third Party Quality Management System, Independent Audit Testing, and a Comprehensive Field of Applica-tions document based on careful chosen test that helps to ensure the products and systems are used within their approval scope.

certifire

Advanced product selection guide

Product	Tested to								Approved to				Application								Page
	BS 476: Part 20	BS EN 1366-3	BS EN 1366-4	DIN 4102	AS 1530	ASTM E 814 (UL 1479)	ASTM E 1966 (UL 2079)	ASTM E84 (UL 723)	ETA/CE marking	UL approved	Certifire approved	FM approval	Construction joint	Perimeter joints	Metallic pipes	Insulated pipes	Non-metallic pipes	Cable and cable trays	Air ducts	Insulated air ducts	
Intumescent Acoustic Mastic FiAM	■	■	■				■	■	■	■	■		■		■			■	■		
Fire Rated Silicone Sealant FFRS	■		■						■		■		■								
Rapid Fire Seal RFS 640	■					■	■	■		■		■	■	■	■			■	■		
Fire | Barr ElastoSeal FBB-ES	■		■						■				■	■							
Universal FireStopping Sealant UFS 310	■					■	■	■		■		■	■		■	■	■	■	■	■	
Intumescent Graphite Mastic FiGM	■	■	■						■		■		■		■	■	■	■	■		
Intumescent Pipe Wrap FiPW	■	■							■		■					■	■				
Intumescent Wrap Strip FiWS						■		■		■		■			■	■	■				
Fire Collar FFC	■	■							■							■	■				
Cast in Device FCID	■				■												■				
Intumescent Pillows FiP	■	■							■		■				■			■	■		
Intumescent Putty Pad FiPP	■	■																■			
Coated Panel System FCPS	■	■							■		■				■	■	■	■	■		
FireStop Compound FFSC	■	■			■		■		■	■					■	■	■	■	■		
Fire | Barr Cavity Barriers	■		■										■	■							
FireStop Foam	■		■	■									■								
Thermal Defense Wrap DTW	■	■							■						■	■		■	■	■	

FiAM	Intumescent Acoustic Mastic	Page 174	UFS 310	Universal FireStopping Sealant	Page 176
FFRS	Fire Rated Silicone Sealant	Page 186	FiGM	Intumescent Graphite Mastic	Page 184
RFS 640	Rapid Fire Seal	Page 180	FiPW	Intumescent Pipe Wrap	Page 190



FFC	Fire Collar	Page 192	FCPS	Coated Panel System	Page 194
FCID	Cast in Device	Page 209	FFSC	FireStop Compound	Page 196
FiP	Intumescent Pillows	Page 200			
FiPP	Intumescent Putty Pad	Page 209			

Engineering judgement request form

Project name: _____
Consultant: _____
Contactor: _____
Contact: _____
Email: _____
Phone: _____
Fax: _____

Requested by: _____
Company: _____
Email: _____
Phone: _____
Fax: _____
Supplier: _____
fischer engineer: _____

Fire rating requirements

Frating (hours):

Trating (hours):

Approval type:

Through penetration

Assembly details: ☐ Wall ☐ Floor

Base material: ☐ Concrete ☐ Blocks ☐ Drywall

Thickness: _____

Other please specify: _____

Opening details: ☐ Circular ☐ Rectangular
Sleeved ☐ Yes ☐ No
Size
Sleeve type ☐ PVC ☐ Steel

Annular Space: Min: _____ Max: _____

Penetration details:

☐ Pipe	☐ Duct	☐ Cables	☐ Cable trays/ladders	☐ Bus Bars
Size _____	Size _____	Size _____	Size _____	Size _____
Type	Type	Type	Type	Type
Insulation	Insulation	Insulation	Insulation	Insulation
Type _____	Type _____	Type _____	Type _____	Type _____
Thick _____	Thick _____	% fill _____	Nos _____	_____

Joint

Joint type: ☐ Head of wall ☐ Wall to wall ☐ Bottom of wall ☐ Perimeter joint ☐ Floor to floor ☐ Floor to wall

Base material: ☐ Concrete ☐ Drywall ☐ Blocks ☐ Steeldeck ☐ Concrete ☐ Drywall ☐ Blocks ☐ Steeldeck

Joint details: ☐ Static ☐ Dynamic
Width _____

Movement required: _____

Curtain wall details: _____

Special conditions / comments / drawings / standards

_____
_____
_____
_____
_____
_____

Request form · Version 2 · 2017-06-22

Reference No.: _____

Calculation of Consumption Guide

CALCULATIONS FOR MASTIC / SEALANT

a = Hole diameter in mm
b = Depth of sealant in mm/wet fi lm thickness for spray material (see recommendations)
c = Pipe or bunched cables diameter in mm
d = Annular space in mm (see recommendations)
l = Length of square opening/joint
w = Width of square opening/joint
h = Cartridge or spray bucket size in ml
n = Number of holes
e = Area of hole in $mm^2 = \pi(a \div 2)^2$
f = area of pipe in $mm^2 = \pi (a \div 2)^2$
g = Amount of mastic needed per hole in ml = ((e-f) x b) ÷ 1,000

Round holes

No. of cartridges needed = n x ($\frac{g}{h}$)
Area of hole e = π x $(a \div 2)^2$ mm^2
Area of pipe f = π x $(c \div 2)^2$ mm^2
Mastic volume = g = ((e-f) x b) ÷ 1,000 ml

Example:
a = 90 mm
b = 40 mm
c = 50 mm
h = 310 ml
n = 20

e = 3.14 x 45^2 = 6,361.73 mm^2
f = 3.14 x 25^2 = 1,963.50 mm^2
g = ((6,361.73 - 1,963.50) x 40) ÷ 1,000 = 175.92 ml

No. of cartridges = 20 x ($\frac{175.92}{310}$)
= 11.35 cartridges

Square holes

No. of cartridges needed = n x ($\frac{g}{h}$)
Area of hole e = l x w mm^2
Area of pipe f = π x $(c \div 2)^2$ mm^2
Mastic volume = g = ((e-f) x b) ÷ 1,000 ml

Example:
l = 90 mm
w = 100 mm
b = 40 mm
c = 50 ml
h = 310 ml
n = 20

e = 90 x 100 = 9,000 mm^2
f = 3.14 x 25^2 = 1,963.50 mm^2
g = ((9,000 - 1,963.50) x 40) ÷ 1,000
= 281.46 ml

No. of cartridges = 20 x ($\frac{281.46}{310}$) = 18.1 cartridges

Linear joints

No. of cartridges/buckets = ($\frac{g}{h}$)
Area of joint = e = l x w mm^2
Mastic volume = ((e-f) x b) ÷ 1000 ml
= g

Example for mastic/sealant:
w = 20 mm
l = 30m = 30,000 mm
b = 10 mm
h = 310 ml
e = 20 x 30,000 = 60,000 mm^2
g = (60,000 x 10) ÷ 1,000 = 6,000 ml
No. of cartridges = ($\frac{6,000}{310}$)
= 19.4 cartridges

Example of joint Spray:
w = 100 mm, w1 = 125 mm (with overspray)
l = 300 m = 300,000 mm
b = 1.5 mm
h = 19 litres = 19,000 ml
e = 125 x 300,000 = 37,500,000 mm^2
g = (37,500,000 x 1.5) ÷ 1,000 = 56,250 ml
No. of buckets = ($\frac{56,250}{19,000}$) = 2.96 buckets

Calculation of Consumption Guide

CALCULATIONS FOR COMPOUND

l = length of the opening b = width of the opening
d = depth as per required fi re rating C = penetrant area or cross sectional area of services
Y = coverage/yield of 1 bag in litres
Volume of compound required = volume of opening - volume of services
= [(lxbxd) - (Cxd)] m3
= [(lxbxd) - (Cxd)] x 1,000 litres
= V

$$\text{No. of bags} = \frac{V}{Y}$$

Example
l = 1,000 mm = 1 m b = 500 mm = 0.5 m
d = 100 mm = 0.1 m C = 20 % of opening = l x b x 20 % = 1 x 0.5 x 0.2 = 0.1
Y = 24 litres per 22 kg bag
Volume of compound required = [(1 x 0.5 x 0.1) - (0.1 x 0.1)] x 1,000 litres
V = 40 litres

$$\text{Numbers of bags required} = \frac{40}{24}$$

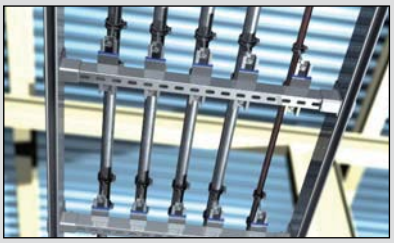
= 1.67 bags

CALCULATIONS FOR PILLOWS FIP

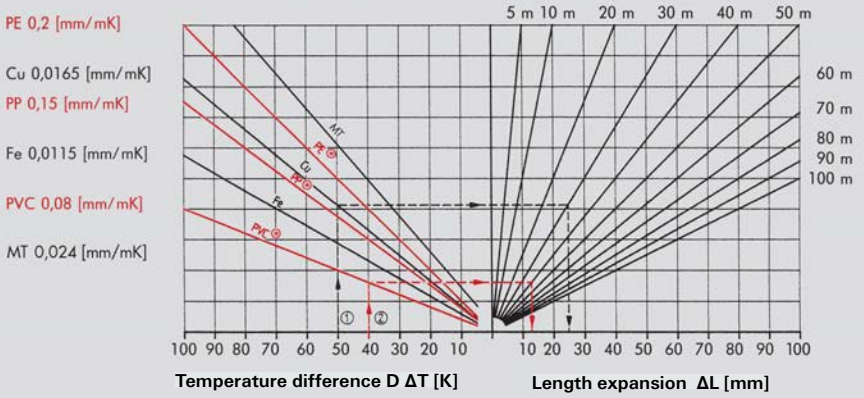
Estimation of large and medium size pillows in walls and floors openings of size up to 1 sq. meter.

Width [mm]	Size / Seal type	Length [mm] 100 Large	100 Medium	300 Large	300 Medium	500 Large	500 Medium	700 Large	700 Medium	900 Large	900 Medium	1,000 Large	1,000 Medium
200	Wall	3	5	7	13	12	22	17	31	21	39	24	47
	Floor	2	3	4	7	6	12	9	17	11	22	12	27
400	Wall	5	9	14	26	24	44	33	61	42	78	47	95
	Floor	3	5	7	15	12	24	17	34	22	43	24	52
600	Wall	7	13	21	39	35	65	49	91	63	117	70	143
	Floor	4	7	11	22	18	36	25	51	33	65	36	79
800	Wall	9	18	28	52	47	87	66	122	84	157	94	192
	Floor	5	10	15	29	24	48	34	67	33	87	48	107
1,000	Wall	10	22	35	65	59	109	82	152	105	196	117	217
	Floor	6	12	18	36	30	60	42	84	54	108	60	120

Elongation



Materials expand with heat. For long components, the change in length is mainly con-sidered. So it is not always a matter of expansion. Shrinkage upon cooling is to also be included in the calculation. This is important when installing pipes. Within piping, the change in length is to be specifi cally steered. Not doing this during installation results not only in pipe defects, but also in serious damage to components. It is therefore essential to determine how great the change in the length of a pipe can be. For this pur-pose, the pipe length and the expansion coeffi cient of the pipe material, as well as the expected temperature diff erence, must be known. This is to be determined such that not only the normal operating temperatures, but also the maximum temperatures that can arise in a case of malfunction, are taken into account. The range is therefore from around 10 °C assembly temperature up to 95°C service temperature for water fi lled systems.



Note:
For plastic pipes (PE, PP, PVC), the length expansionread from the diagram is to be multiplied by a factor of 10.

Example:

① Copper pipe, Cu – Length of pipe span 30 m
Temperature difference △T = 50 K
Length expansion △ L= 24,75 mm

② PVC pipe – Length of pipe span L = 40 m
Temperature difference △ T = 40 K
Length expansion △ L = 128 mm (table value x10)

Length expansion calculation formula

$\Delta L = L \cdot \Delta T \cdot \alpha$

[mm] [m] [K] [mm/m K]

△ L = Change in length
L = Length of the pipe span/section
△ T = Temperature difference
α = Length expansion coefficient

Soundproofing

As defined in the appropriate standards, the goal of soundproofing is to reduce the transmission to other apartments or usage areas to a given noise range. The upper limits for permissible residual noise levels are defined in the standards.

Soundproofing - VDI 4100
In principle, the VDI 4100 values are, among other things, protection against noise from building systems that are mounted in the neighbouring area. According to VDI 4100, living areas are rooms that are in need of protection; in apartments, these are all rooms with a floor space of > 8m2. This includes kitchens, bathrooms, toilets, hallways and ancillary rooms. VDI 4100 further recommends agreeing with the contracted companies the sound insulation values SSt EB I = 35 dB or SSt EB II = 30 dB for noise emerging from one's own area. Exceptions to this are all sounds that are influenced by the residents, i.e. self-installed air conditioners in the apartment or noises from flushing toilets, etc.

Soundproofing - DIN 4109
The DIN 4109 from 2016-07 still supplemented by A1 (2001-01), in which the permissible sound pressure level in living and sleeping areas for noise from building installations was reduced from 35 to 30 dB(A). The standard is not applicable to the protection against noise from building installations in one's own living area, but only to sounds coming from "external" areas as defined in VDI4100. For increased sound insulation, DIN 4109 Addendum 2 (from 1989) specifies a reduction in the permissible values by 5 dB(A) (to 25 dB(A)) as effective for noises from building installations.

Soundproofing - important influential factors for pipe mounting
Sound propagates in vibrations. These sound waves can propagate in solid, liquid and gaseous media, where the speed of this sound propagation differs greatly in the various media. So the sound in pipe installations is primarily forwarded through the pipeline itself and not through the carried medium. Transmission over the metal pipe is faster than in water, for example. In welded heating systems, for example, the individual sounds of striking a pipe can propagate throughout the entire building. The sound waves are transmitted in a medium in that the molecules constantly jolt one another, thereby transmitting the wave. Steel pipes or metallic mounting elements have an ordered metallic lattice, wherein forwarding is faster and with less loss than in amorphous materials, such as rubber (general elastomers). It can thus be determined that an inversely proportional relationship exists between the speed of sound [symbol; c] and the insulating behaviour of materials. That is, materials with a low sound speed always have better insulating properties than materials with a high sound speed (steel c = 5100 m/s). Rubber (c ~40 m/s) is therefore eminently suitable for sound insulation.
In rubber, the sound waves stop dead, so to speak, wherein the energy is converted into heat.

Therefore, the sound isolation must in principle occur between the pipes and the structure. Here, we recommend the installation of a sound insulating element as close to the sound source as possible; in the simplest case, with an insulating insert in the pipe clamp itself. Sound tested pipe clamps by fischer FRS Plus pipe clamp, FRS pipe clamp and FRS-L Universal pipe clamp.

Corrosion protection

In most cases , pipes and supply lines are installed in dry rooms. Therefore, in addition to corrosion resistant materials, such as plastics or stainless steel and copper, the steel products used for installation systems are galvanised. A zinc coating thickness of 5-8 µm by means of electrolytic process (galvanising) is standard.

For mounting rails, Sendzimir galvanised material is mainly used. Sendzimir galvanising is a method in which the material is drawn through a molten zinc bath, thereby achie-ving a zinc layer thickness of 12-20 µm. This method is used when there is no more welding for the subsequent processing. This is the case for mounting rails because they are cold-formed after galvanising. By cutting and stamping the holes, the surface in this area is not completely covered by a protective layer. Punched mounting rails are therefore only recommended for the dry interior rooms.

For cantilever brackets, non-galvanised channel pieces are used which are welded to the base plate. Following completion, the entire component is galvanised, creating a zinc coating thickness of 5-8 µm.

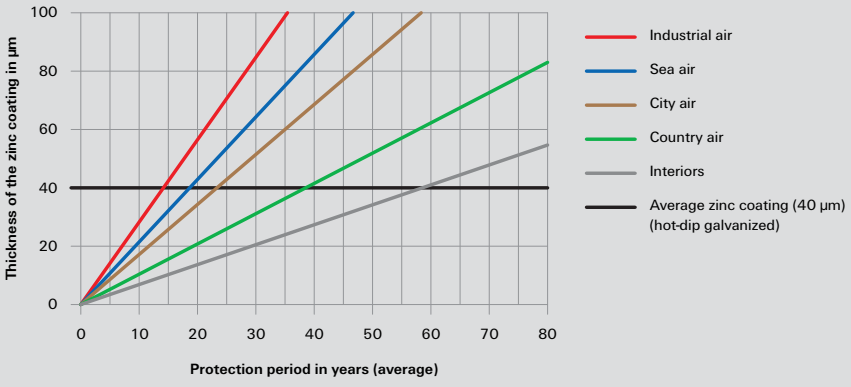
Threaded parts are either galvanised or made of stainless steel. Hot dip galvanising is less suitable for this because the large zinc layer thickness of 40-150 µm severely impairs the thread engagement

.If installation systems are installed outdoors or in wet interior rooms, they must be made of either hot dip galvanised steel or stainless steel.

Hot dip galvanising is very well suited to the protection of steel. The corrosion process is thus 10 times slower than with galvanising. The zinc loss depends on the surrounding atmoshpere and humidity. An annual zinc reduction of 1 - 10 µm can, however, be assumed. The layer thickness is therefore crucial to the durability of the material.

Crucial here are the environmental infl uences under which the systems are installed. An overview of the expected impact on the protective action can be seen in the following diagram and tables.

hot-dip galvanized steel:



Stainless steel

Steel Grade					Corrosion	
Material No.	Short Name	AISI	UNS	Designation of the Steel Group with	Resistance Class	Exposure and Typical Applications
1.4305	X8CrNiS18-9	303	S 30300	A1	I / light	Indoor climate except damp location.
1.4301	X5CrNi18-10	304	S 30400	A2	II / moderate	Accessible constructions without nameable content of chlorides or sulfur dioxide, except industrial atmosphere.
1.4307	X2CrNi 18-9	304L	S 30403	A2L		
1.4362	X2CrNiN23-4	324	S32304	A4	III / medium	Constructions with moderate chloride and sulfur dioxide exposure and inaccessible constructions.
1.4401	X5Cr-NiMo17-12-2	316	S 31600			
1.4404	X2Cr-NiMo17-12-2	316 L	S 31603	A4L		
1.4571	X6CrNi-MoTi17-12-2	316 Ti	S 31635	A5		
1.4529	X1NiCrMo-CuN25-20-7	-	N 08926	1.4529	IV / strong	High corrosion exposure due to chlorine, chloride and/or sulfur dioxide, high humidity as well as accumulation of hazardous substances.

Fire protection

Fire protection in pipe installations according to the latest standards.

- Fire-proof installations for individual pipes and pipe routes from R30 - R120 or F30 to F120.
- Proof of compliance with the criteria of MLAR (German standard pipe system directive) for installation in escape and rescue routes

Fire protection - protection goals

Firstly, fi re protection serves to protect people, and is regulated by the building laws in the respective countries (or regional states). Secondly, fi re protection serves to protect property and this is regulated by the insurance associations, such as VdS and FM. These requirements partially go beyond the building legislation. This is particularly evident in the installation of fi re protection systems, such as sprinklers, etc., as approved or recogni-sed components must be used here. (See the following section for further details on this)

Fire inspection reports for the mounting of pipe clamps and mounting rails

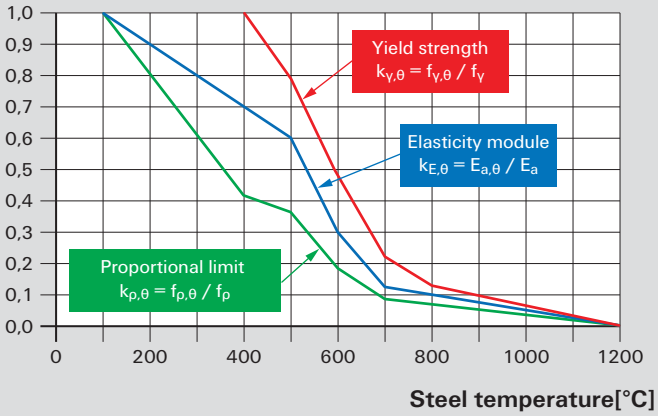
Fire safety inspection reports meet the requirements for fi re protection according to the building regulations of the countries and, especially for Germany, according to the nati-onwide homonymic German pipe systems directive (LAR), based on the standard pipe systems directive of 2005 (MLAR 2005).

Personal protection is defi ned in the MLAR Directive through clear rules for escape routes, such as corridors, stairwells and hallways between stairwells and the exit.

The key message is to ensure the safety of the escape route by ensuring the functioning of the fi re-proof sub-ceiling. To this end, compliance with the minimum distance of min a ≤ 50 mm according to MLAR is required between installations and underlying suspen-ded fi re-proof F30 sub-ceilings (fi re resistance of 30 minutes). Based on the fi re inspec-tions, load information for a fi re resistance of 30 minutes in relation to the maximum

Permissible deformation of mounting rails or pipe clamps, for example, was determined. The necessity for these considerations arises from the properties of the steel, which at 30 minutes is subjected to a temperature of > 800° C according to the standard temperature curve (ISO curve).

Reduction factors k_θ



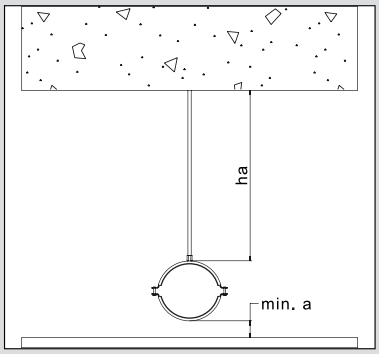
Dependency of the yield strength, proportional limit and elasticity module on the temperatutre (basis: EN1993-1-2:2012-12 Eurocode 3).

Additionally, the same information is documented in the inspection reports for a fire resistance rating of R30, R60, R90 and R120 according to EN1363-1 and DIN4102-2. (see following load tables)

Product overview with proof in inspection reports and supplementary sheets.

Product	Document no.	MLAR	R30 – R120	F30 – F120
FRS	MFPA Leipzig - GS 3.2/14-175-2	•	•	
FUS / FCA	MFPA Leipzig - GS 3.2/14-175-4	•	•	
FRS-L Universal	MFPA Leipzig - GS 3.2/15-141-3	•	•	
FLS / ALK	MFPA Leipzig - GS 3.2/15-141-4	•	•	
SB	MPA-NRW - 210005109-7			•
SBS	MPA-NRW - 210005109-4	•		•
PDH-K	MPA-NRW - 210005109-6	•		•

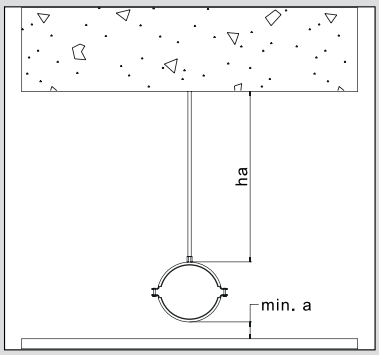
Load tables based on fire protection inspection reports.



Pipe clamp FRS - Load table based on the Adivisory Opinion No. GS 3.2/14-175-2

The following figures are valid for all FRS-L universal pipe clamps, galvanized, hdg and stainless steel.

FRS M8/M10		MLAR-loads		Max. Loads				
Threaded rods ≥ 4.8		Strain	F-resistance	Max. strain	Fire resistance time [minute]			
Clamping range	h_a	min a	30	min a	30	60	90	120
[mm]	[mm]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]	[kN]
12 - 67	≤ 250	≤ 50	0.56	51	0.56	0.29	0.20	0.15
	≤ 500	≤ 50	0.56	54				
	≤ 750	≤ 50	0.56	57				
	≤ 1000	≤ 50	5.51	60				
72 - 92	≤ 250	≤ 50	0.65	50	0.79	0.49	0.36	0.29
	≤ 500	≤ 50	0.62	53				
	≤ 750	≤ 50	0.59	56				
	≤ 1000	≤ 50	0.57	59				
108 - 116	≤ 250	≤ 50	0.48	61	0.63	0.39	0.29	0.23
	≤ 500	≤ 50	0.43	64				
	≤ 750	≤ 50	0.39	66				
	≤ 1000	≤ 50	0.35	69				
121 - 168	≤ 250	≤ 50	0.96	61	1.00	0.51	0.34	0.25
	≤ 500	≤ 50	0.89	63				
	≤ 750	≤ 50	0.82	66				
	≤ 1000	≤ 50	0.85	69				



Pipe clamp FRS-L universal load table based on the Adivisory Opinion No. GS 3.2/15-141-3

The following figures are valid for all FRS-L universal pipe clamps, galvanized, hdg and stainless steel.

FRS-L universal M8/M10		MLAR-loads		Max. loads				
Threaded rods ≥ 4.8		Strain	F-resistance	Max. strain	Fire resistance time [minute]			
Clamping range	h_a	min a	30	min a	30	60	90	120
[mm]	[mm]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]	[kN]
8 - 37	≤ 250	≤ 50	0.27	54	0.27	0.14	0.09	0.07
	≤ 500	≤ 50	0.26	57				
	≤ 750	≤ 50	0.24	60				
	≤ 1000	≤ 50	0.22	62				
38 - 66	≤ 250	≤ 50	0.17	72	0.29	0.14	0.09	0.06
	≤ 500	≤ 50	0.16	75				
	≤ 750	≤ 50	0.15	78				
	≤ 1000	≤ 50	0.13	80				
67 - 119	≤ 250	≤ 50	0.53	75	0.53	0.35	0.27	0.22
	≤ 500	≤ 50	0.53	78				
	≤ 750	≤ 50	0.53	81				
	≤ 1000	≤ 50	0.53	83				

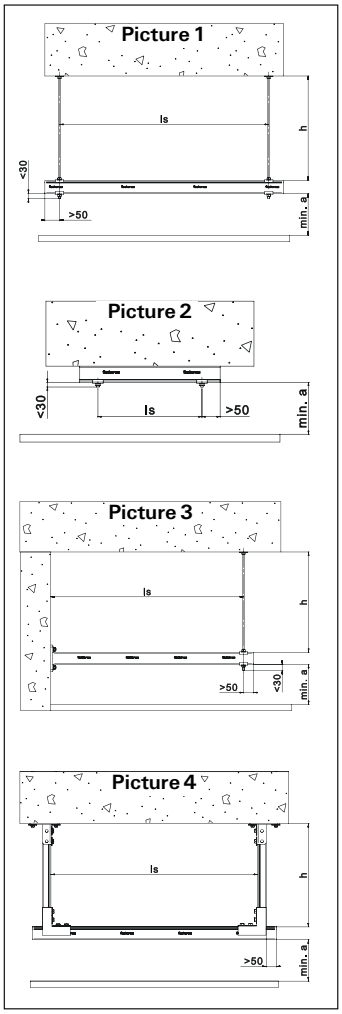
FUS-Channel/FCA-Cantilever arm - Load table based on the Adivisory Opinion No. GS 3.2/14-175-4

The following figures are valid for FUS channels and FCA cantilever arms, galvanized, hdg and stainless steel

FUS / FCA 41/2,5 (picture 1-3)		**MLAR -loads**		**Max. Loads**				
Threaded rods ≥ 4.8		strain	F-resistance	Max. strain	Fire resistance time [minute]			
Load case	l_s	min a [1]	30	min a [2]	30	60	90	120
	[mm]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]	[kN]
Point load	≤ 400	≤ 50	0,90	278	2,40	1,33	0,92	0,72
	≤ 700	≤ 50	-	320	1,61	1,04	0,80	0,67
Multiple load [3]	≤ 400	≤ 50	0,90	278	2,40	1,33	0,92	0,72
	≤ 700	≤ 50	-	320	1,61	1,04	0,80	0,67
Uniformly distributed load	≤ 400	≤ 50	1,50	258	3,00	2,10	1,41	1,06
	≤ 700	≤ 50	0,60	299	2,44	1,57	1,21	1,00
	≤ 1250	≤ 50	-	468	3,29	1,81	1,27	0,98
FUS / FCA 62/2,5 (picture 1-3)		**MLAR -loads**		**Max. Loads**				
Threaded rods ≥ 4.8		strain	F-resistance	Max. strain	Fire resistance time [minute]			
Load Case	l_s	min a [1]	30	min a [2]	30	60	90	120
	[mm]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]	[kN]
Point load	≤ 400	≤ 50	1,76	25	1,76	1,06	0,78	0,62
	≤ 1000	≤ 50	-	460	2,27	1,31	0,93	0,72
Multiple load [3]	≤ 400	≤ 50	1,76	25	1,76	1,06	0,78	0,62
	≤ 960 [4]	≤ 50	4,30	550	4,30	2,14	1,39	1,01
	≤ 1000	≤ 50	0,55	661	2,52	1,60	1,21	0,99
Uniformly distributed load	≤ 400	≤ 50	1,76	25	1,76	1,06	0,78	0,62
	≤ 960 [4]	≤ 50	4,30	550	4,30	2,14	1,39	1,01
	≤ 1000	≤ 50	0,55	661	2,52	1,60	1,21	0,99
	≤ 1250	≤ 50	0,50	592	2,41	1,65	1,31	1,11
FUS 62/2,5 (picture 4)		**MLAR -loads**		**Max. Loads**				
Vertical FUS 41/2,5		strain	F-resistance	Max. strain	Fire resistance time [minute]			
Load case	l_s	min a [1]	30	min a [2]	30	60	90	120
	[mm]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]	[kN]
Point load	≤ 1000	≤ 50	0,57	369	1,33	0,87	0,68	0,57
Multiple load [3]	≤ 1000	≤ 50	0,62	649	1,92	1,34	1,08	0,92
Uniformly distributed load	≤ 1000	≤ 50	0,62	649	1,92	1,34	1,08	0,92

[1] Valid for a suspension height ha ≤ 500 mm
[2] Based on suspension height ha = 250mm, Expansion length of threaded rods in case of fire ~ 10mm/m
[3] Given load values apply for multiple loads as summated point loads symmetrical allocated
[4] This values are valid for FCA 62/2,5 with additional support by threaded rod

Picture 1 - 3 are valid for FUS/FCA and FLS/ALK load tables

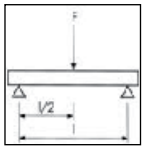


FLS-Channel/ALK-Cantilever arm - Load table based on the Adivisory Opinion No. GS 3.2/14-175-?

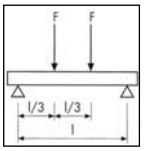
The following figures are valid for FLS channels and ALK cantilever arms, galvanized, hdg and stainless steel

FUS / FCA 41/2,5 (picture 1-3)		**MLAR -loads**		**Max. Loads**				
Threaded rods ≥ 4.8		strain	F-resistance	Max. strain	Fire resistance time [minute]			
Load case	l_s	min a	30	min a	30	60	90	120
	[mm]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]	[kN]
Point load	≤ 400 [1]	≤ 50	0,24	93	0,24	0,13	0,10	0,09
	≤ 400 [2]	≤ 50	0,09	289	0,47	0,38	0,33	0,30
	≤ 400 [4]	≤ 50	0,32	226	1,33	0,78	0,53	0,40
Multiple load [3]	≤ 400 [1]	≤ 50	0,72	93	0,72	0,38	0,30	0,27
	≤ 400 [2]	≤ 50	0,26	289	1,42	1,13	0,99	0,90
	≤ 400 [4]	≤ 50	0,81	226	1,33	0,78	0,53	0,40
Uniformly distributed load	≤ 400 [1]	≤ 50	0,72	93	0,72	0,38	0,30	0,27
	≤ 400 [2]	≤ 50	0,35	308	1,37	1,19	1,06	0,95
	≤ 400 [4]	≤ 50	0,81	226	1,33	0,78	0,53	0,40

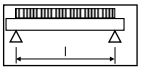
[1] Valid for a suspension height ha = 0 mm, s. picture 2
[2] Valid for a suspension height ha = 500mm, s. picture 1 (Expansion length of threaded rods in case of fire ~ 10mm/m)
[3] Given load values apply for multiple loads as summated point loads symmetrical allocated
[4] This values are valid for ALK 37-450 with additional support by threaded rod, s picture 3 (ha = 500 mm)



Single load
Spot load, e.g. a pipe clamp on the rail.



Multiple load
More than one load point on the rail, e.g. several pipe clamps.



Uniform load
Uniform distribution of load on the rails, e.g. bend-proof ventilation duct.

Mounting sprinkler systems

Sprinkler systems are usually created according to diff erent standards. For example, according to the VdS standard (VdS CEA 4001), the American FM standard 1951 (Factory Mutual Insurance Company" (FM Global)), UL 203 (Underwriters Laboratories (UL)), NFPA 13 regulations (National Fire Protection Association (NFPA)) or EN 12845.

The European Directive CEA 4001 was created in 1995 by the insurance industry in coo-peration with the manufacturers' association EUROFEU, and VdS CEA 4001 was created in Germany in 2003 by the "Association of Property Insurers" (VdS).

EN 12845 was developed on the basis of CEA 4001 from 1995 and the VdS CEA 4001 from 2003, creating a standard that was practically the same word for word. National practices, such as those for Germany, are to be included in a revised DIN 14489 as a national annex to EN 12845.

The American rules correspond to the requirements for mounting pipe installations, but they must be checked in detail in each case.

For mounting sprinkler pipes, the diff erent load values, mounting distances and connec-tion sizes for pipe loops and pipe clamps, which are listed in the following table for the most common directives, are applicable.

	FM1951				NFPA13				VdS CEA 4001			
Pipe sizes	Test load	Max. distance	Min rod size		Test load calcula-ted	Max. distance	Min rod size		Loading capacity	Max. distance	Min rod size	
DN	[kN]	[m]	[metric]	[inch]	[kN]	[m]	[metric]	[inch]	[kN]	[m]	[metric]	[inch]
15	no data	no data	no data	no data	1.4	3.60	9.5	3/8	2.0	4.00	M8	no data
20	1.512	3.6	M10	3/8	1.5	3.60	9.5	3/8	2.0	4.00	M8	no data
25	1.824	3.6	M10	3/8	1.7	3.66	9.5	3/8	2.0	4.00	M8	no data
32	1.913	3.6	M10	3/8	1.9	3.66	9.5	3/8	2.0	4.00	M8	no data
40	2.313	4.6	M10	3/8	2.4	4.57	9.5	3/8	2.0	4.00	M8	no data
50	2.825	4.6	M10	3/8	2.9	4.57	9.5	3/8	3.5	4.00	M10	no data
65	4.181	4.6	M10	3/8	3.8	4.57	9.5	3/8	3.5	6.00	M10	no data
80	4.715	4.6	M10	3/8	4.8	4.57	9.5	3/8	3.5	6.00	M10	no data
90	5.583	4.6	M10	3/8	5.7	4.57	9.5	3/8	3.5	6.00	M10	no data
100	6.561	4.6	M10	3/8	6.7	4.57	9.5	3/8	5.0	6.00	M10	no data
125	8.896	4.6	M12	1/2	9.0	4.57	12.7	1/2	5.0	6.00	M12	no data
150	11.632	4.6	M12	1/2	11.8	4.57	12.7	1/2	8.5	6.00	M12	no data
200	16.903	4.6	M12	1/2	18.2	4.57	12.7	1/2	8.5	6.00	M16	no data
250	26.044	4.6	M16	5/8	26.7	4.60	15.9	5/8	no data	6.00	no data	no data

	FM1951				NFPA13				VdS CEA 4001			
Pipe sizes	Test load	Max. distance	Min rod size		Test load calcula-ted	Max. distance	Min rod size		Loading capacity	Max. distance	Min rod size	
DN	[kN]	[m]	[metric]	[inch]	[kN]	[m]	[metric]	[inch]	[kN]	[m]	[metric]	[inch]
300	35.141	4.6	M16	5/8	36.0	4.60	15.9	5/8	no data	6.00	no data	no data
350	no data	no data	no data	no data	42.9	4.60	no data	no data	no data	6.00	no data	no data
400	no data	no data	no data	no data	55.7	4.60	no data	no data	no data	6.00	no data	no data
450	no data	no data	no data	no data	70.1	4.60	no data	no data	no data	6.00	no data	no data
500	no data	no data	no data	no data	84.4	4.60	no data	no data	no data	6.00	no data	no data

Dimensions and weights of pipes, ventilation ducts and ventilation pipes

Schedule 40 pipe table

S.no.	Nom. Pipe Size	Out Diameter	Inner Diameter	Out Diameter	Inner Diameter	Weight of pipe	Weight of water in pipe	Total pipe weight filled with
		in	in	mm	mm	kg/M`	kg/M`	kg/M`
1.	1/8"	0.405	0.269	10.3	6.8	0.4	0.04	0.4
2.	1/4"	0.540	0.364	13.7	9.2	0.6	0.1	0.7
3.	3/8"	0.675	0.493	17.1	12.5	0.8	0.1	1.0
4.	1/2"	0.840	0.622	21.3	15.8	1.3	0.2	1.5
5.	3/4"	1.050	0.824	26.7	20.9	1.7	0.3	2.0
6.	1"	1.315	1.049	33.4	26.6	2.5	0.6	3.1
7.	11/4"	1.660	1.380	42.2	35.1	3.4	1.0	4.3
8.	11/2"	1.900	1.610	48.3	40.9	4.0	1.3	5.4
9.	2"	2.375	2.067	60.3	52.5	5.4	2.2	7.6
10.	21/2"	2.875	2.469	73.0	62.7	8.6	3.1	11.7
11.	3"	3.500	3.068	88.9	77.9	11.3	4.8	16.0
12.	31/2"	4.000	3.548	101.6	90.1	13.6	6.4	19.9
13.	4"	4.500	4.026	114.3	102.3	16.1	8.2	24.3
14.	5"	5.563	5.047	141.3	128.2	21.8	12.9	34.6
15.	6"	6.625	6.065	168.3	154.1	28.2	18.6	46.8
16.	8"	8.625	7.981	219.1	202.7	42.5	32.1	74.6
17.	10"	10.750	10.020	273.1	254.5	60.2	50.7	111.0
18.	12"	12.750	11.938	323.9	303.2	79.7	72.2	151.8
19.	14"	14.000	13.000	355.6	330.2	94.3	87.0	181.3
20.	16"	16.000	15.000	406.4	381.0	123.2	113.8	237.0
21.	18"	18.000	16.874	457.2	428.6	155.9	144.6	300.5
22.	20"	20.000	18.814	508.0	477.9	182.9	179.2	362.0
23.	24"	24.000	22.626	609.6	574.7	254.7	259.2	513.9

Weights of galvanized ventilation ducts in kg/m without insulation

Sheet metal 0.75			Sheet metal 0.88						Sheet metal 1.0						Sheet metal 1.13						Sheet metal 1.25				
200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2240	2500	2800	3150	◄B ▼H
6.6	7.0	7.4	9.3	10.0	10.7	11.6	12.6	13.6	16.7	18.3	20.0	22.0	24.2	26.4	32.8	36.0	39.8	44.7	49.7	54.7	70.2	77.6	86.3	96.3	200
	7.4	7.8	9.8	10.4	11.2	12.1	13.0	14.0	17.2	18.8	20.5	22.5	24.7	26.9	33.4	36.6	40.4	45.3	50.3	55.3	70.8	78.3	86.9	97.0	224
		8.3	10.3	10.9	11.7	12.6	13.6	14.5	17.8	19.4	21.1	23.1	25.3	27.5	34.1	37.3	41.0	46.0	51.0	55.9	71.6	79.1	87.7	97.8	250
			10.8	11.5	12.3	13.2	14.1	15.1	18.5	20.0	21.8	23.8	26.0	28.2	34.8	38.0	41.8	46.7	51.7	56.7	72.5	79.9	88.6	98.6	280
				12.2	13.0	13.8	14.8	15.8	19.3	20.8	22.6	24.5	26.7	28.9	35.7	38.9	42.6	47.6	52.6	57.6	73.5	80.9	89.6	99.6	315
					13.7	14.6	15.6	16.6	20.1	21.7	23.4	25.4	27.6	29.8	36.7	39.9	43.6	48.6	53.6	58.5	74.6	82.1	90.7	100.8	355
						15.5	16.5	17.4	21.1	22.7	24.4	26.4	28.6	30.8	37.8	41.0	44.7	49.7	54.7	59.7	75.9	83.4	92.0	102.1	400
							17.4	18.4	22.2	23.8	25.5	27.5	29.7	31.9	39.0	42.3	46.0	51.0	55.9	60.9	77.3	84.8	93.4	103.5	450
								19.4	23.3	24.9	26.6	28.6	30.8	33.0	40.3	43.5	47.2	52.2	57.2	62.2	78.8	86.3	94.9	104.9	500
									24.6	26.2	27.9	29.9	32.1	34.3	41.8	45.0	48.7	53.7	58.7	63.6	80.5	88.0	96.6	106.7	560
										27.6	29.5	31.5	33.7	35.9	43.5	46.7	50.5	55.4	60.4	65.4	82.5	90.0	98.6	108.7	630
											31.2	33.2	35.4	37.6	45.5	48.7	52.5	57.4	62.4	67.4	84.4	92.3	100.9	111.0	710
												35.2	37.4	39.6	47.7	51.0	54.7	59.7	64.6	69.6	87.4	94.9	103.5	113.6	800
													39.6	41.8	50.2	53.4	57.2	62.2	67.1	72.1	90.3	97.8	106.4	116.4	900
														44.0	52.7	55.9	59.7	64.6	69.6	74.6	93.2	100.6	109.3	119.3	1000
															55.7	58.9	62.6	67.6	72.6	77.6	96.6	104.1	112.7	122.8	1120
																62.2	65.9	70.9	75.8	80.8	100.3	107.8	116.4	126.5	1250
																	69.6	74.6	79.6	84.5	104.7	112.1	120.8	130.8	1400
																		79.6	84.5	89.5	110.4	117.9	126.5	136.6	1600
																			89.5	94.5	116.2	123.6	132.3	142.3	1800
																				99.4	121.9	129.4	138.0	148.1	2000
																					128.8	136.3	144.9	155.0	2240
																						143.8	152.4	162.4	2500
																							161.0	171.1	2800
																								181.5	3150

The weights in kg/m are reference values. The weights can deviate, depending on the sheet metal thickness and the type of flange used. The flange weight is included flat-rate. The loads based on a mineral wool weight of 80 kg/m2 and a thickness of 5 cm.

Weights of galvanized ventilation ducts in kg/m with (80 kg/m³ , 5 cm thickness)

Sheet metal 0.75			Sheet metal 0.88						Sheet metal 1.00						Sheet metal 1.13						Sheet metal 1.25				
200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2240	2500	2800	3150	◄B ▼H
9.1	9.6	10.2	12.1	13.0	14.0	15.2	16.4	17.7	21.0	22.9	25.1	27.6	30.4	33.2	39.8	43.8	48.3	54.3	60.4	66.4	79.4	87.8	97.6	109.0	200
	10.2	10.8	13.8	13.6	14.6	15.8	17.0	18.3	21.7	23.6	25.8	28.3	31.1	33.8	40.6	44.5	49.0	55.0	61.1	67.1	80.2	88.6	98.4	109.8	224
		11.4	14.5	14.3	15.3	16.4	17.7	19.0	22.4	24.3	26.5	29.0	31.8	34.5	41.3	45.3	49.8	55.8	61.9	67.9	81.0	89.5	99.2	110.6	250
			15.3	15.0	16.0	17.2	18.4	19.7	23.2	25.1	27.3	29.8	32.6	35.4	42.2	46.2	50.7	56.7	62.8	68.8	82.0	90.4	100.2	111.6	280
				15.9	16.9	18.1	19.3	20.6	24.2	26.1	28.3	30.8	33.6	36.3	43.3	47.2	51.8	57.8	63.8	69.9	83.1	91.6	101.3	112.7	315
					17.9	19.1	20.3	21.6	25.3	27.2	29.4	31.9	34.7	37.4	44.5	48.4	53.0	59.0	65.0	71.1	84.4	92.9	102.6	114.0	355
						20.2	21.5	22.7	26.5	28.5	30.7	33.2	35.9	38.7	45.9	49.8	54.3	60.4	66.4	72.4	85.9	94.3	104.1	115.5	400
							22.7	24.0	27.9	29.8	32.0	34.5	37.3	40.1	47.4	51.3	55.8	61.9	67.9	73.9	87.5	96.0	105.7	117.1	450
								25.3	29.3	31.2	33.4	35.9	38.7	41.4	48.9	52.8	57.3	63.4	69.4	75.4	89.1	97.6	107.4	118.7	500
									30.9	32.9	35.1	37.6	40.3	43.1	50.7	54.6	59.1	65.2	71.2	77.3	91.1	99.5	109.3	120.7	560
										34.8	37.0	39.5	42.3	45.0	52.8	56.7	61.3	67.3	73.3	79.4	93.4	101.8	111.6	123.0	630
											39.2	41.7	44.5	47.2	55.2	59.1	63.7	69.7	75.7	81.8	96.0	104.4	114.2	125.6	710
												44.2	47.0	49.7	57.9	61.9	66.4	72.4	78.5	84.5	98.9	107.4	117.1	128.5	800
													49.7	52.5	61.0	64.9	69.4	75.4	81.5	87.5	102.1	110.6	120.4	131.8	900
														55.3	64.0	67.9	72.4	78.5	84.5	90.5	105.4	113.9	123.6	135.0	1000
															67.6	71.5	76.0	82.1	88.1	94.1	109.3	117.8	127.5	138.9	1120
																75.4	80.0	86.0	92.0	98.1	113.5	122.0	131.8	143.1	1250
																	84.5	90.5	96.6	102.6	118.4	126.9	136.6	148.0	1400
																		96.6	102.6	108.6	124.9	133.4	143.1	154.5	1600
																			108.6	114.7	131.4	139.9	149.6	161.0	1800
																				120.7	137.9	146.4	156.2	167.5	2000
																					145.7	154.2	164.0	175.3	2240
																						162.7	172.4	183.8	2500
																							182.2	193.6	2800
																								204.9	3150

Important dimensions, variables and units

Material

S 250 GD

	Material No.	Tensile strength Rm N/mm² min.	Yield strength ReH N/mm² min.	Elongation at break A80% min.
S 250 GD	1.0242	≥ 330	≥ 250	≥ 19

DX 51 D

DX 51 D	1.0226	270 - 500	- *	≥ 22

*For fischer profiles defined 240 N/mm²

DC 01

DC 01	1.0330	270 – 410	≤ 280	≥ 28

S 235 JR

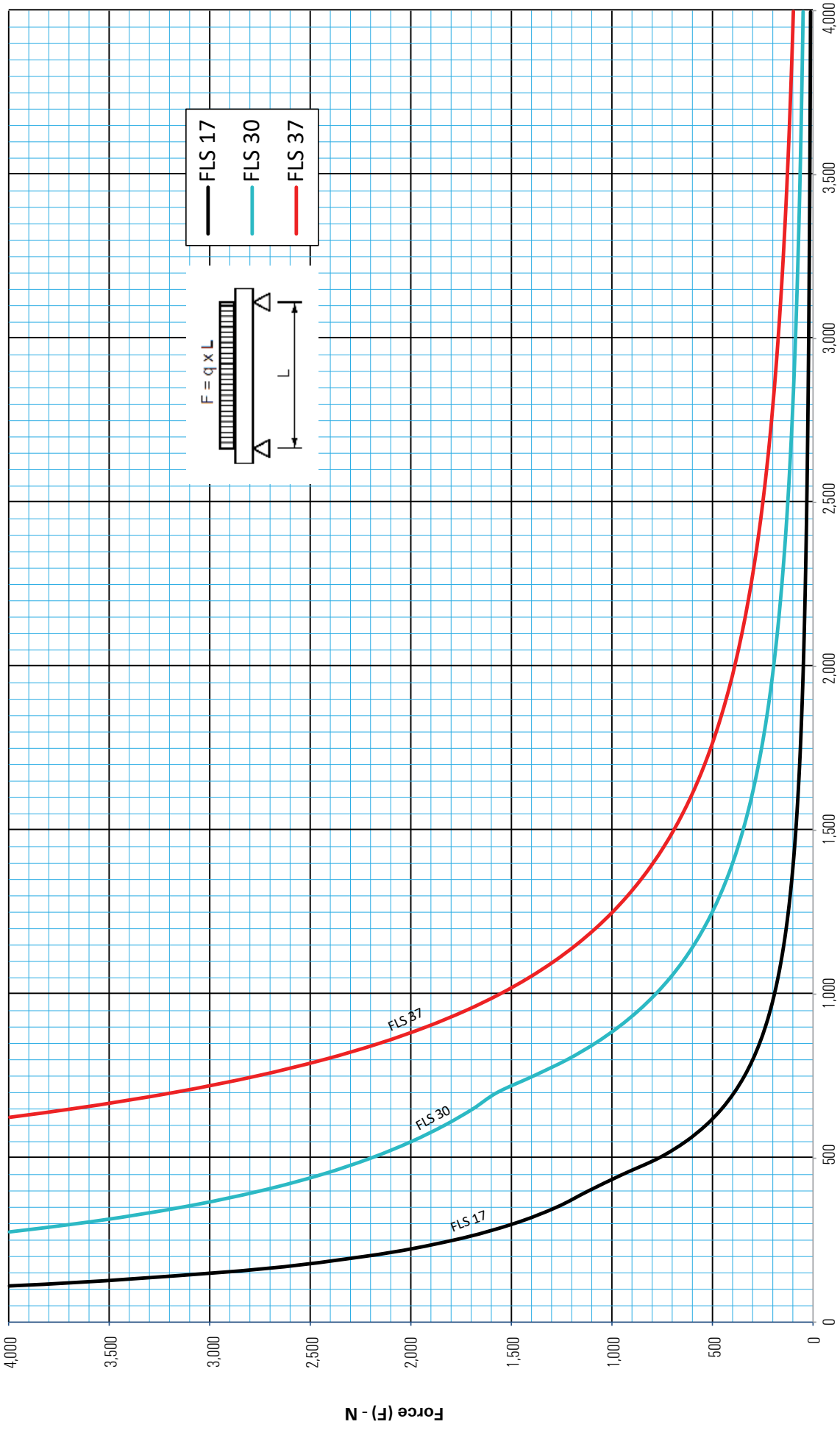
S 235 JR	1.0037	360 - 510	≥ 235	19/17

DD 11

				L0 = 80mm		L0 = 5,65√S0
DD 11	1.0332	440	170 - 360	23	24	28

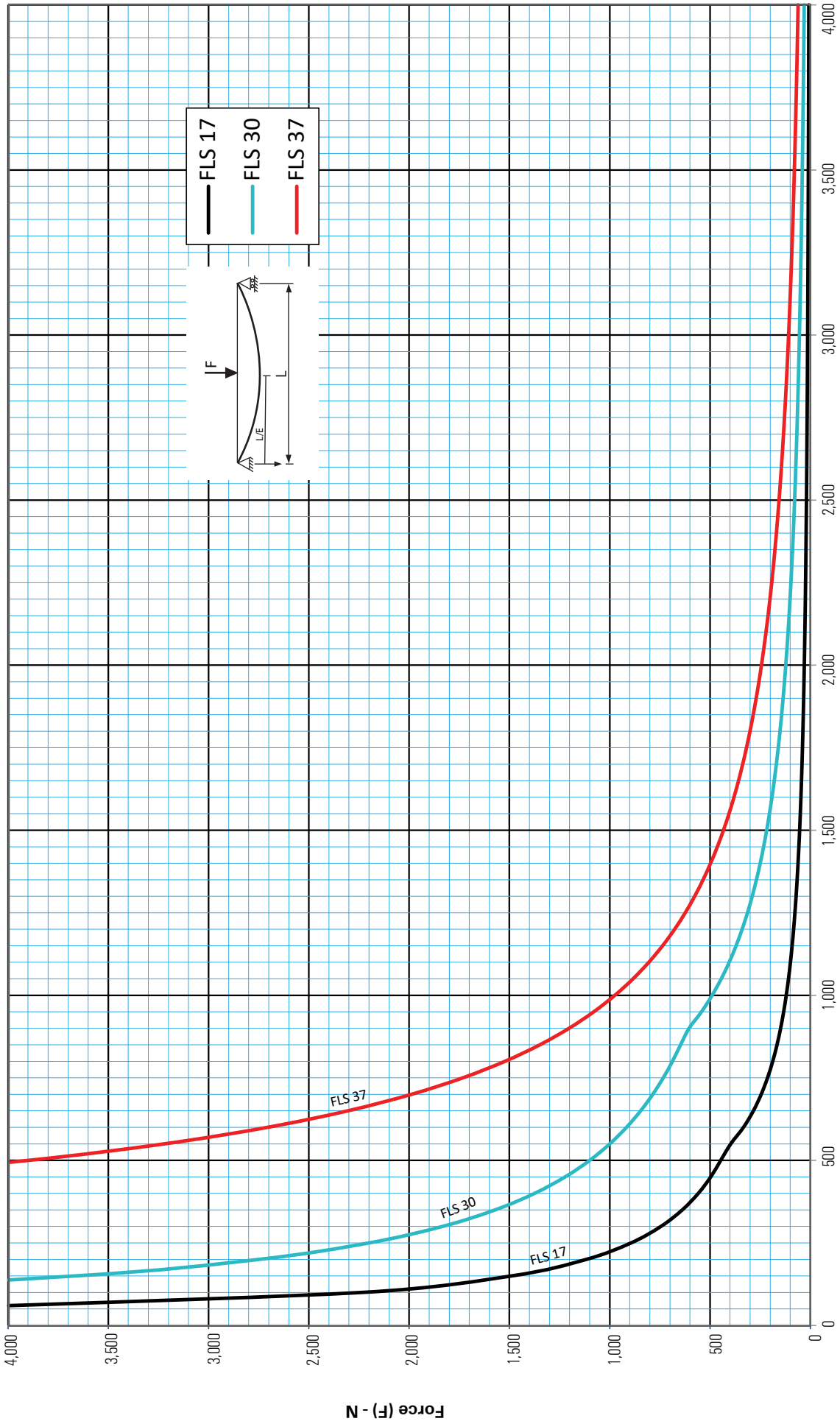
equivalents of carbon steel qualities			
DIN EN ISO			ASTM
Description	Material-no.		
S 250 GD+Z	1.0242	DIN EN 10346	A 569
DD11	1.0332	DIN EN 10111	A 569
DC01	1.0330	DIN EN 10130	A 366
St 22	1.0320	DIN 1614-1	n/a
DX51D+Z 275 NA-C	1.0226+Z	DIN EN 10327	A 653
S235JR	1.0037	DIN EN 10025	A 283
S 355 MC	1.0976	DIN EN 10149	Gr. 50
4.6; 4.8, 5.8, 8.8	DIN EN ISO 898-1		F 568M

fischer FLS (Light Duty) - Design Curve 1



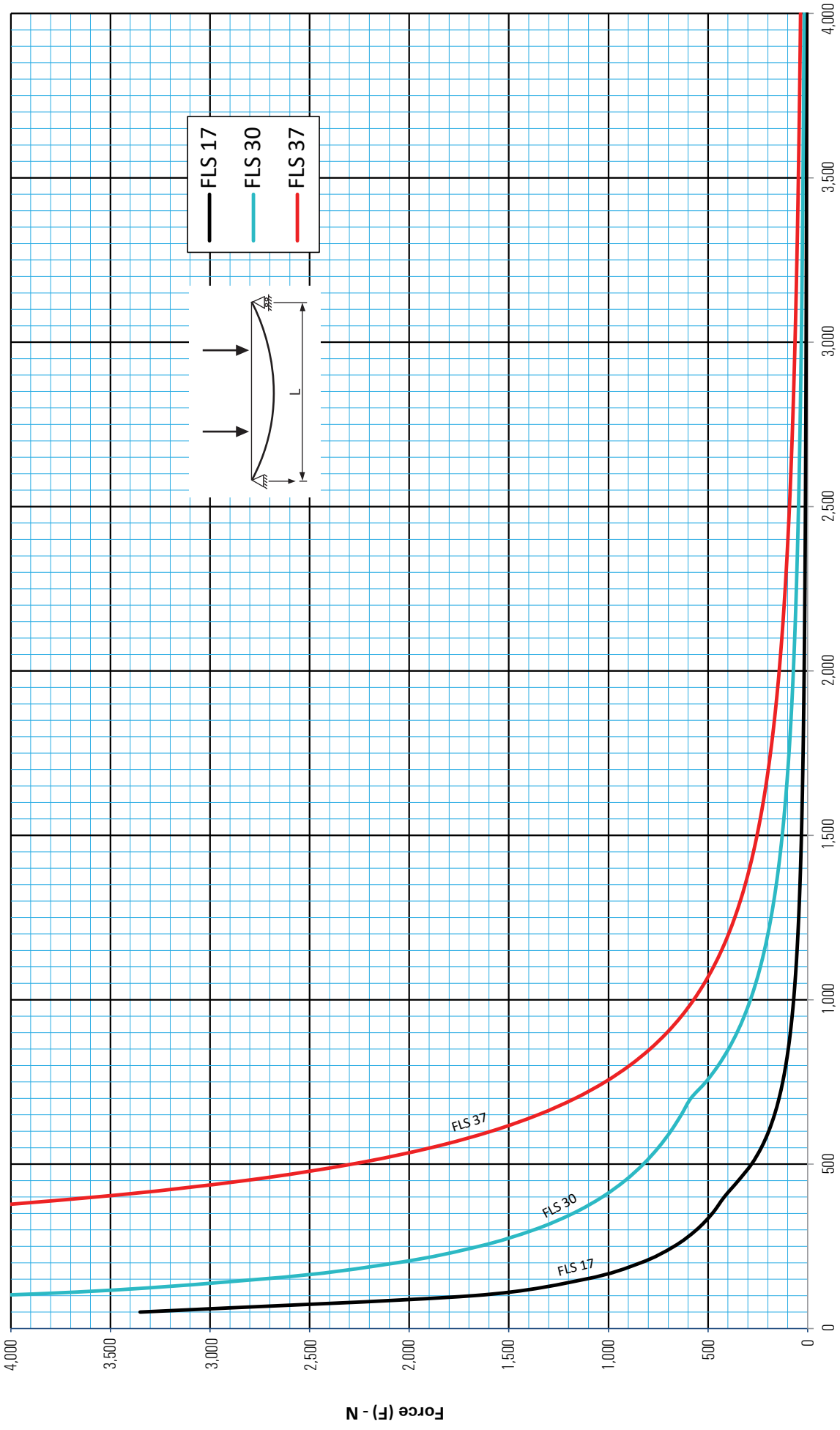
Design load under **Uniformly distributed load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer FLS (Light Duty) - Design Curve 2



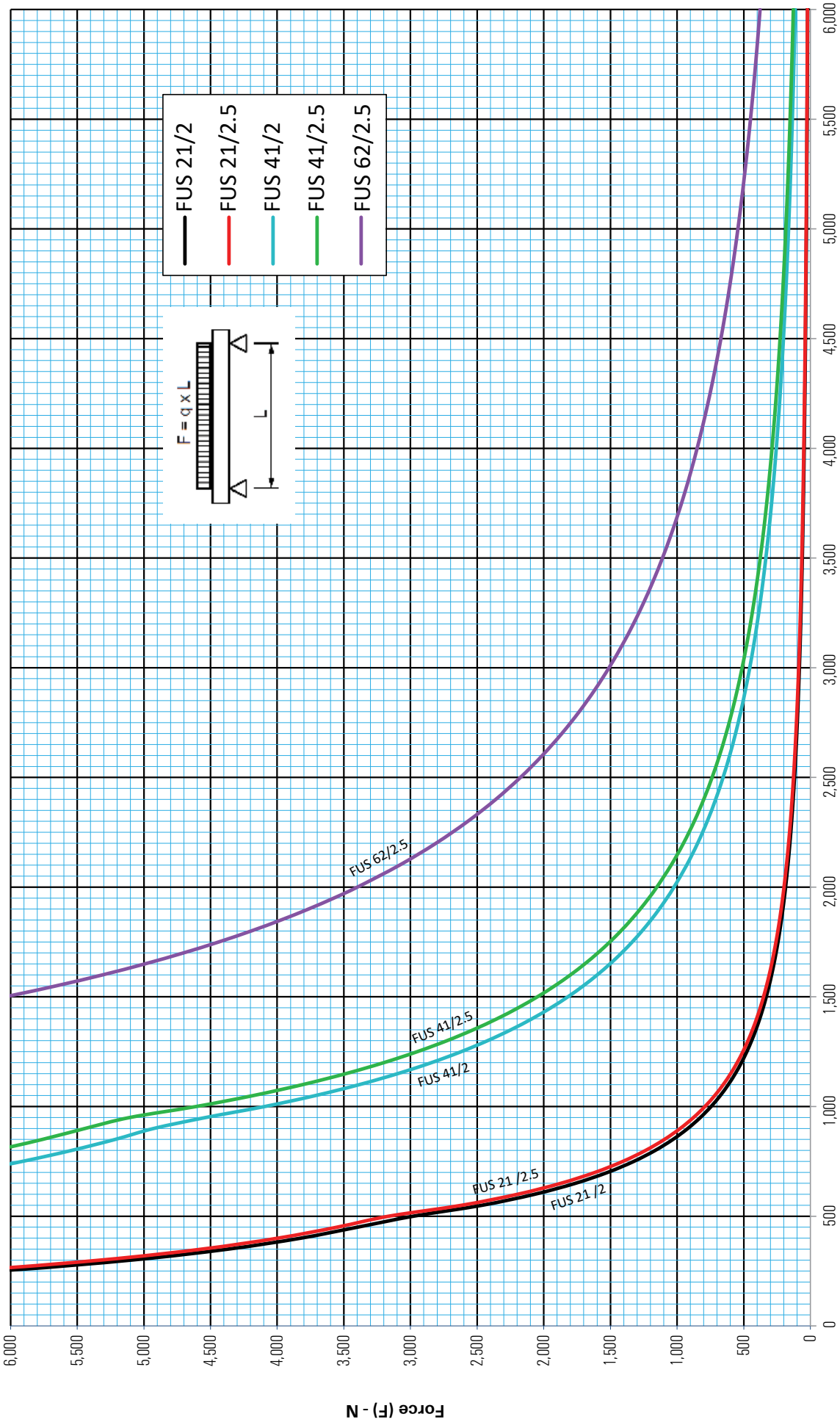
Design load under **Single concentrated load in the center** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not

fischer FLS (Light Duty) - Design Curve 3



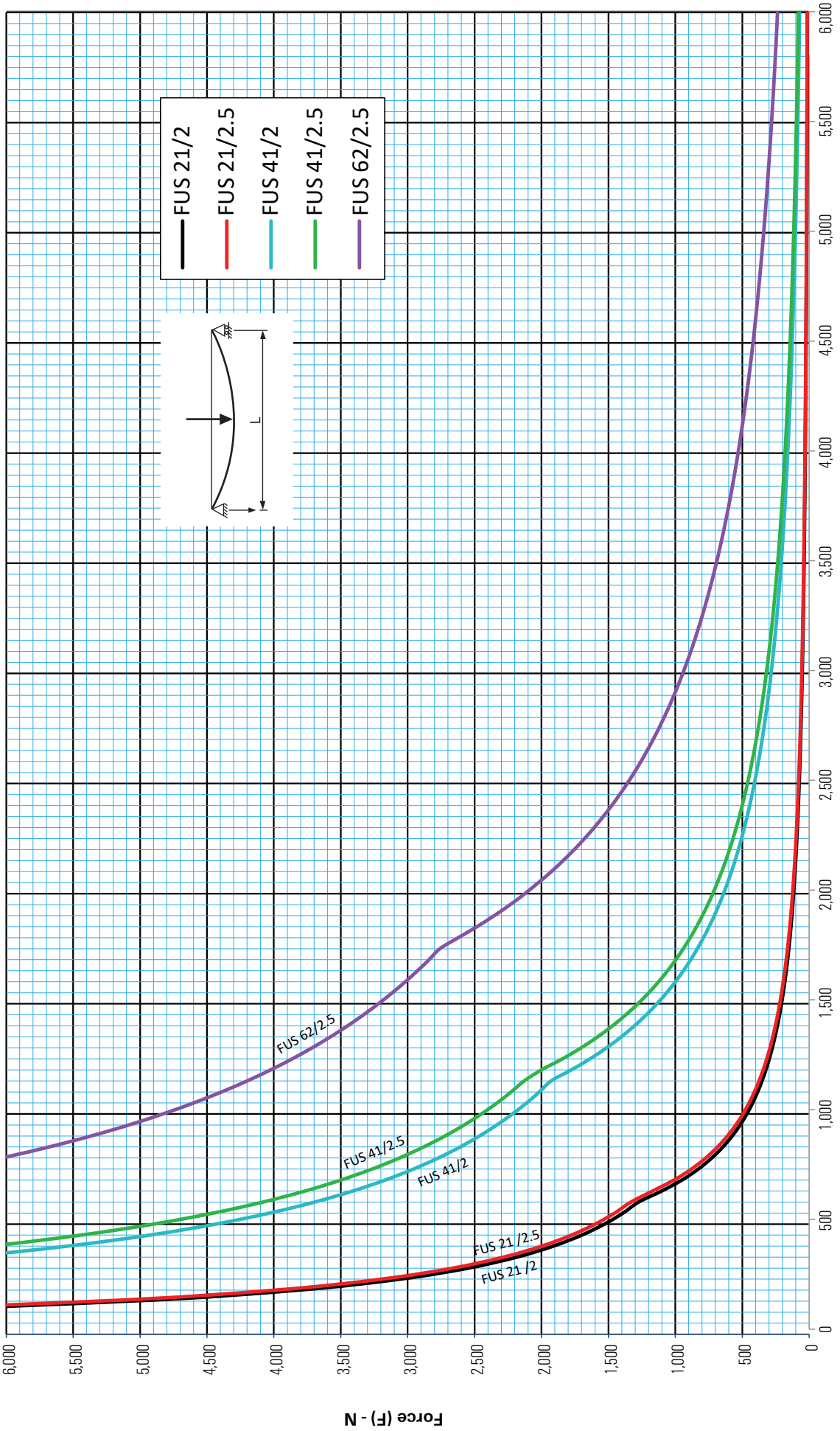
Design load under **Double concentrated load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer FUS (Medium Duty) - Design Curve 1



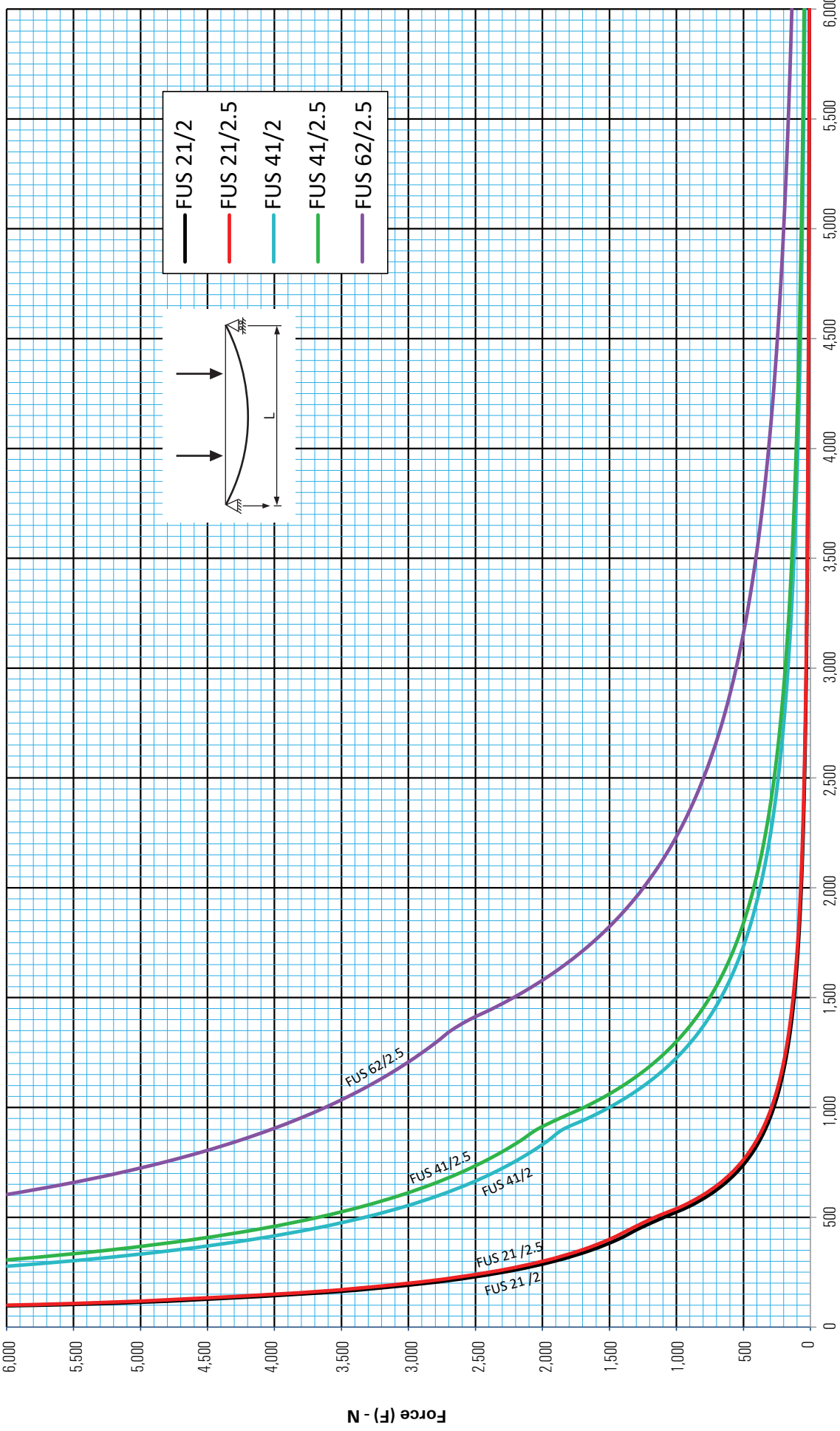
Design load under **Uniformly distributed load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:20 10-12, sec. 3.2.2.

fischer FUS (Medium Duty) - Design Curve 2



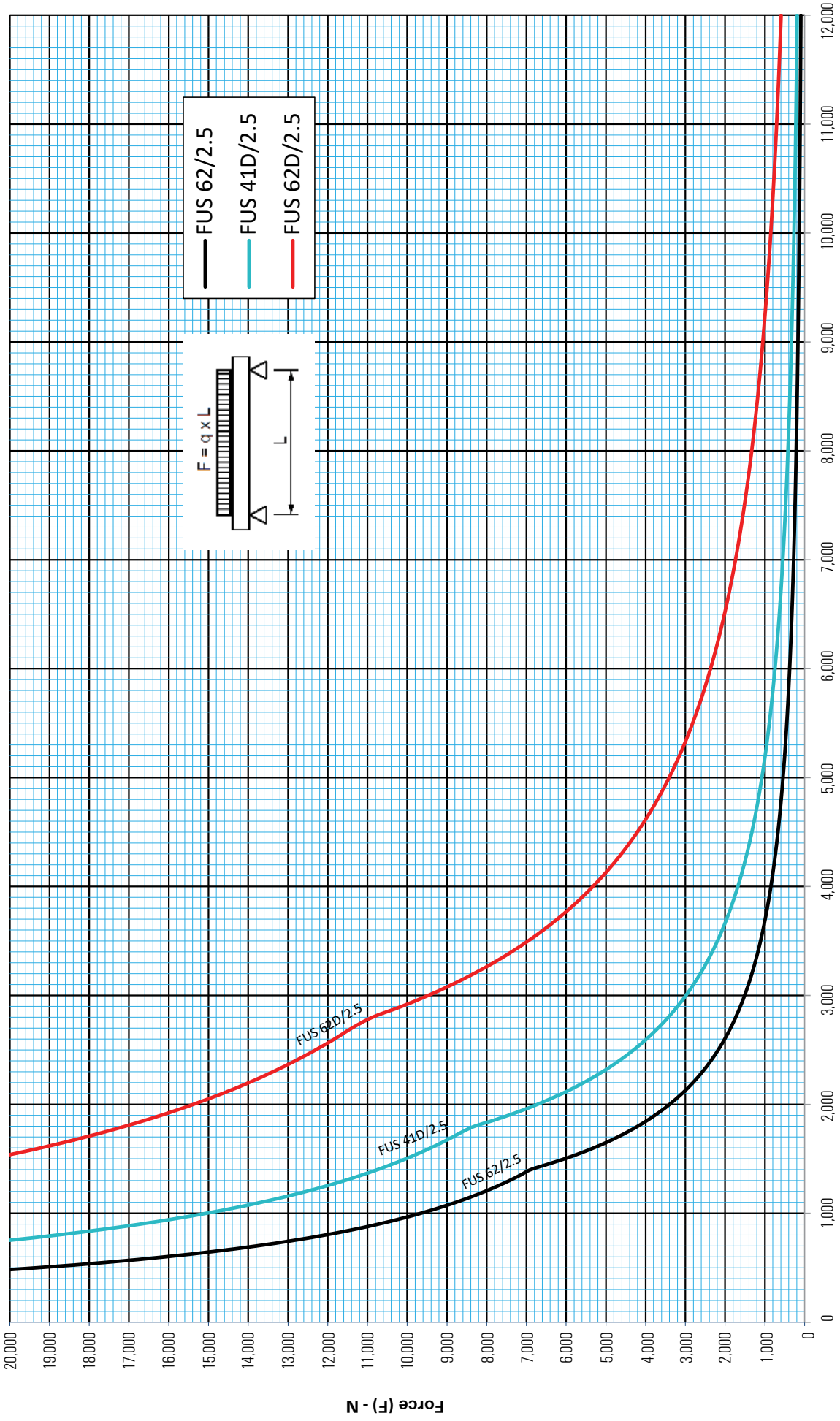
Design load under **Single concentrated load in the center** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer FUS (Medium Duty) - Design Curve 3



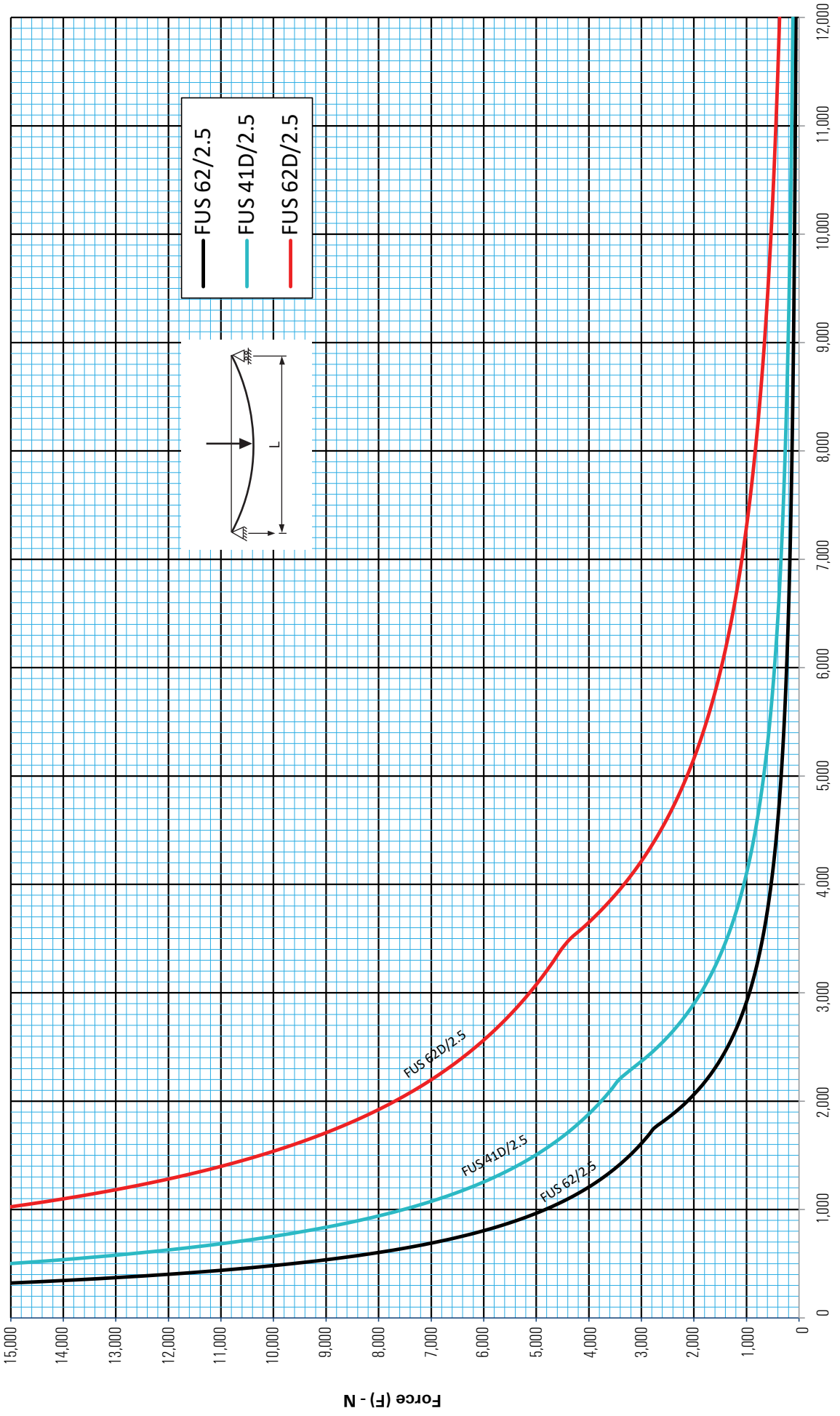
Design load under **Double concentrated load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded.
Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer FUS (Heavy Duty) - Design Curve 1



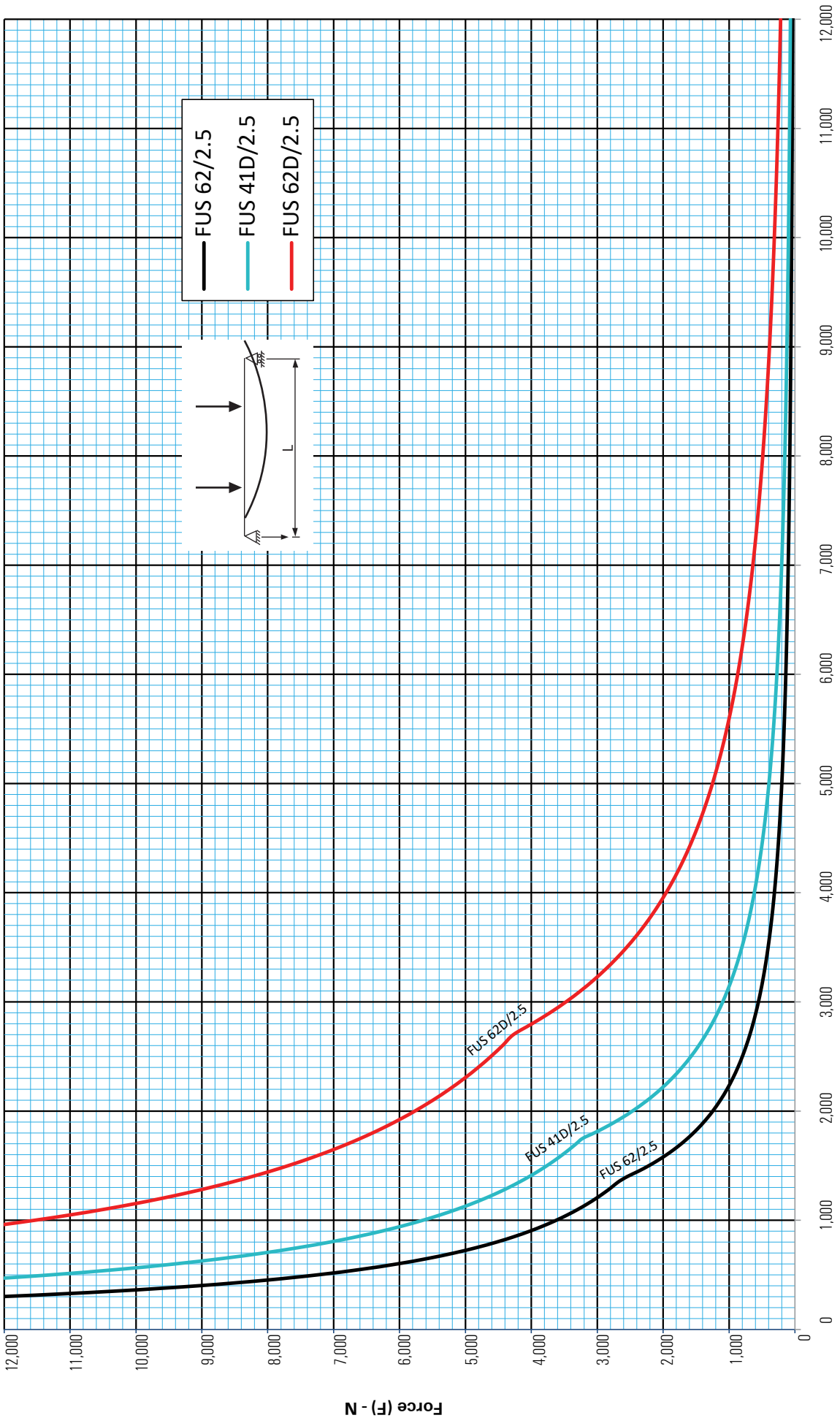
Design load under **Uniformly distributed load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer FUS (Heavy Duty) - Design Curve 2



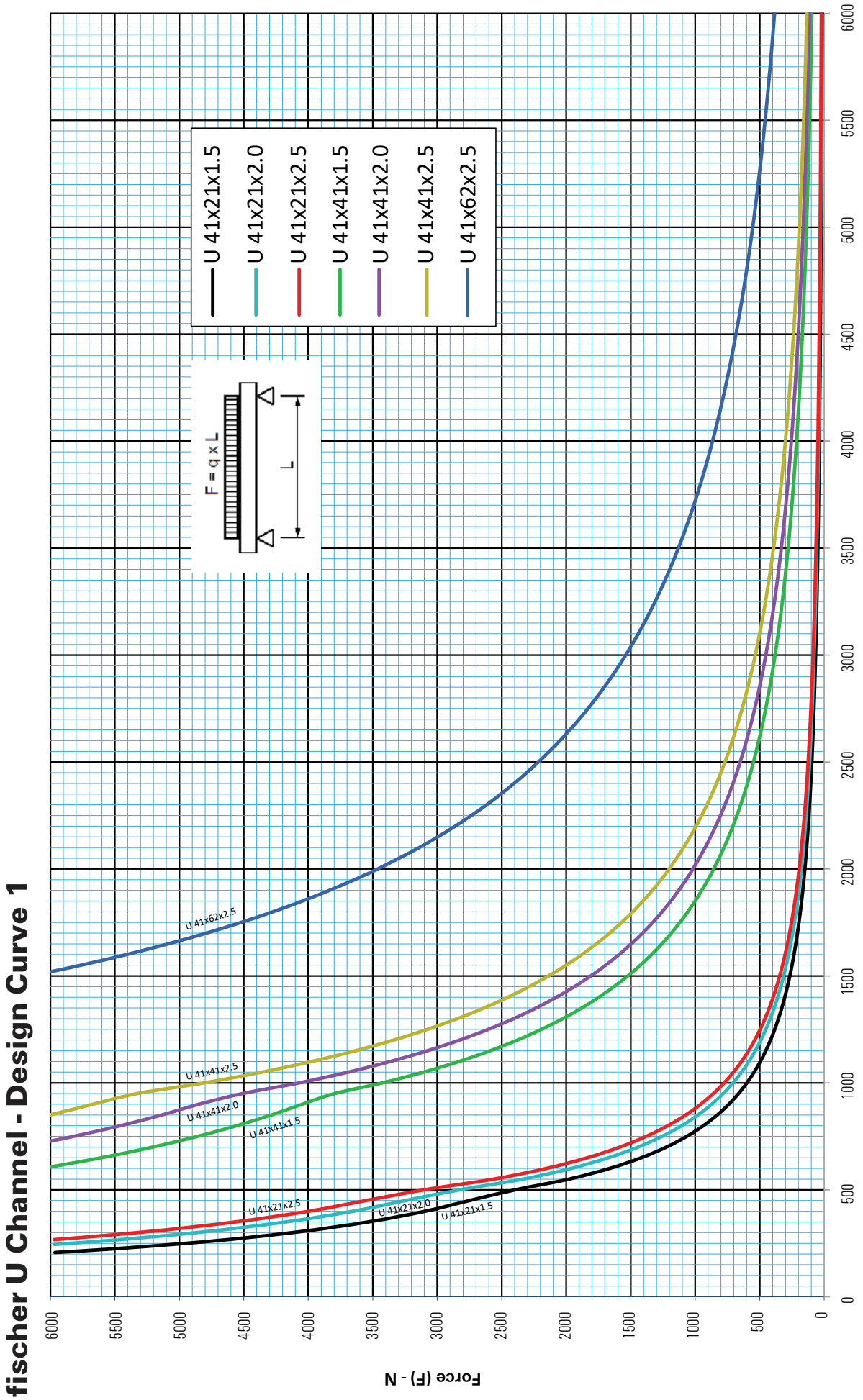
Design load under **Single concentrated load in the center** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer FUS (Heavy Duty) - Design Curve 3



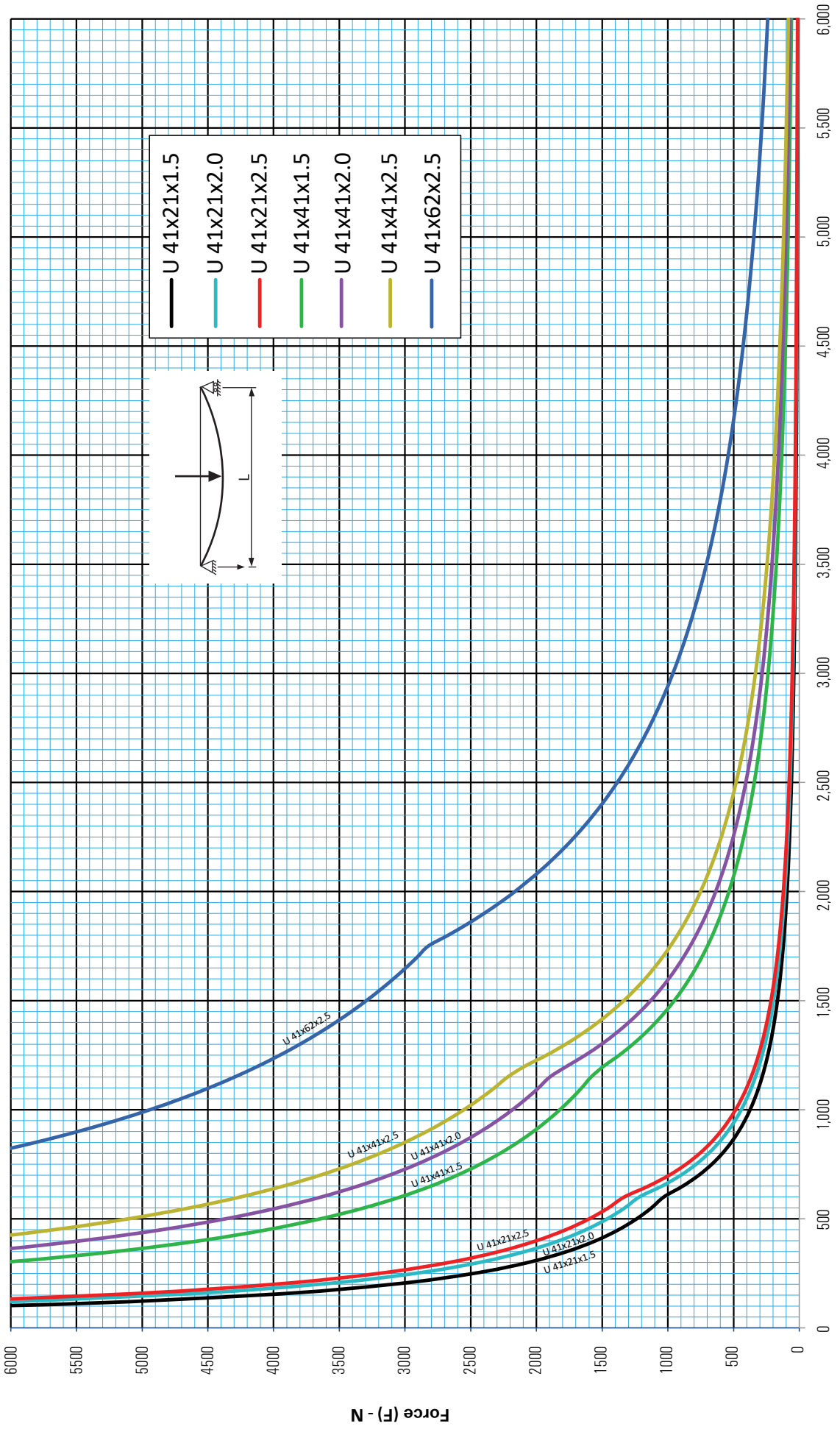
Design load under **Double concentrated load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer U Channel - Design Curve 1



Design load under **Uniformly distributed load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded.
Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

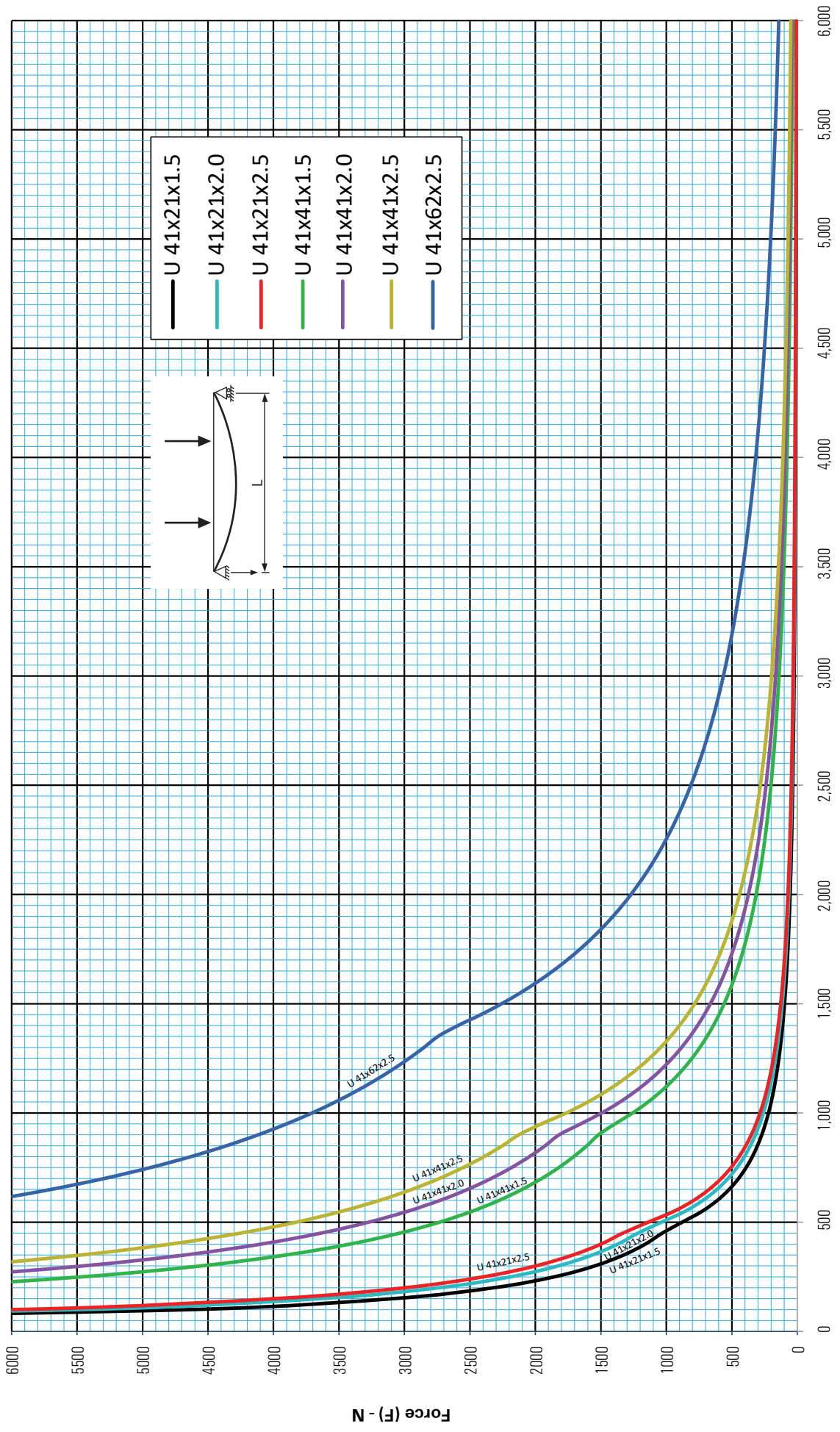
fischer U Channel - Design Curve 2



Supported length in mm (L)

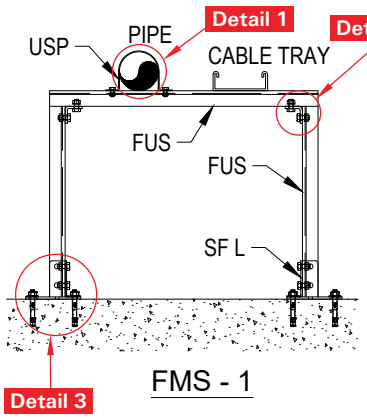
Design load under **Single concentrated load in the center** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded. Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

fischer U Channel - Design Curve 3

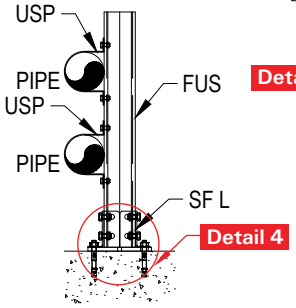


Design load under **Double concentrated load** - For the load curves, the Design steel Stress = 217 N/mm and the maximum deflection under load L/200 are not exceeded.
Fixings and screw fastenings must be calculated accordingly. The increased yield strength is calcuated according DIN EN 1993-1-3:2010-12, sec. 3.2.2.

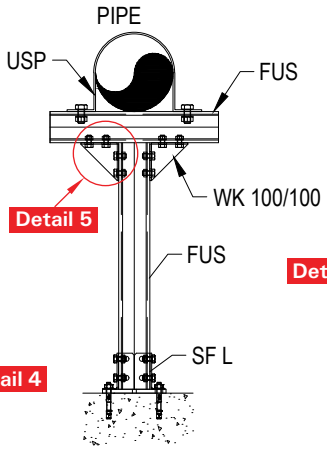
Floor Mounted Supports



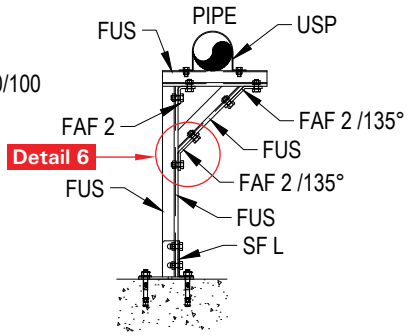
FMS - 1



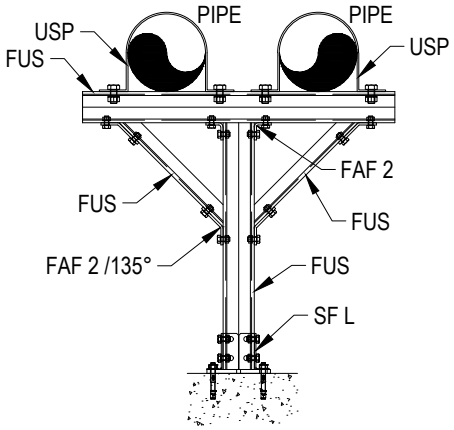
FMS - 2



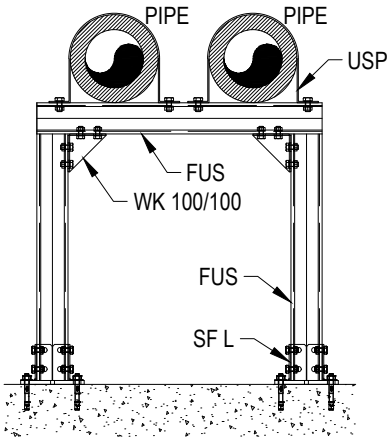
FMS - 3



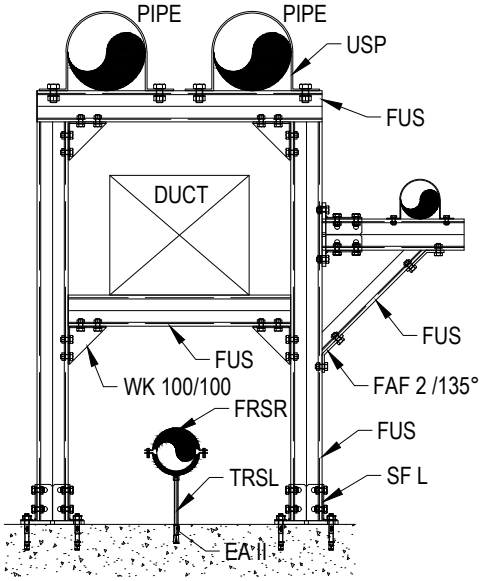
FMS - 4



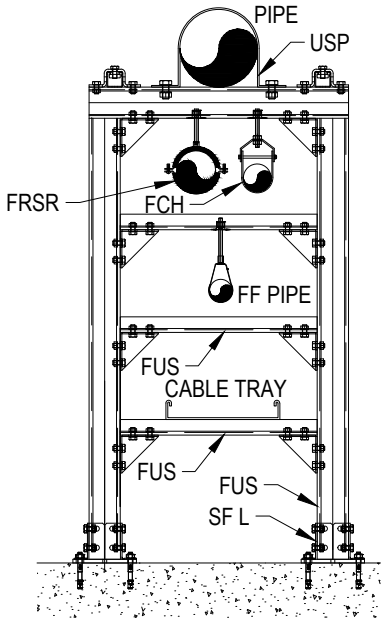
FMS - 5



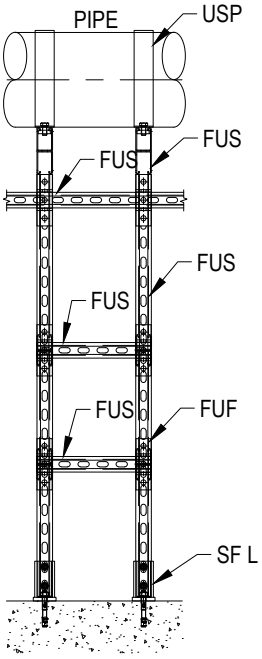
FMS - 6



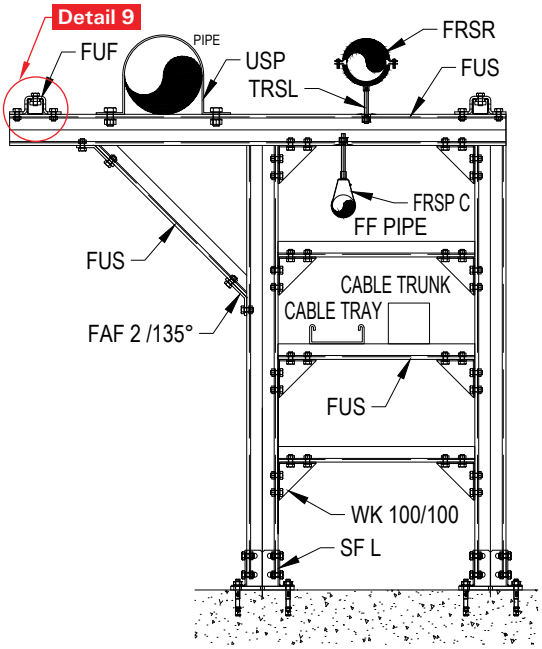
FMS - 7



FMS - 8

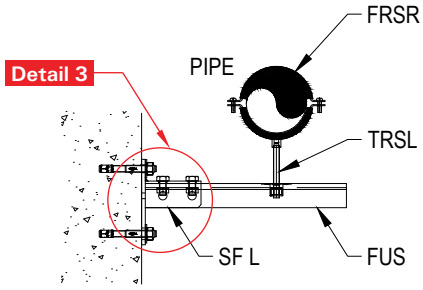


FMS - 9

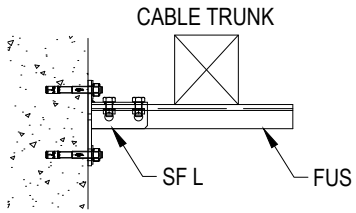


FMS - 10

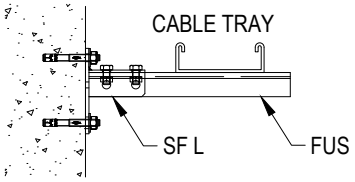
Wall Mounted / Cantilever Supports



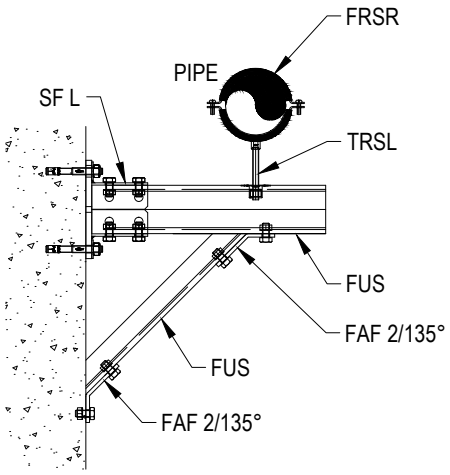
WMS - 1



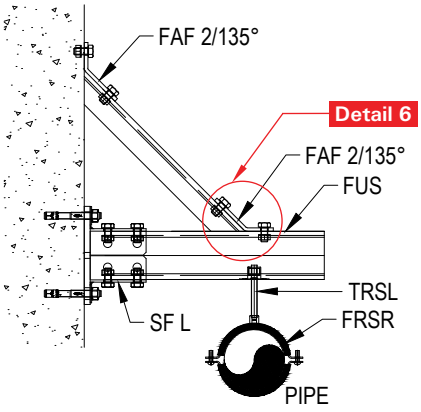
WMS - 2



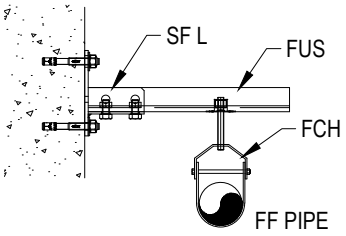
WMS - 3



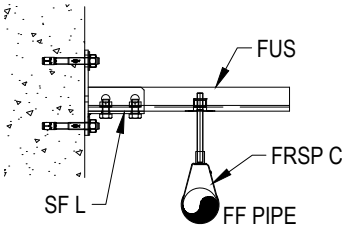
WMS - 4



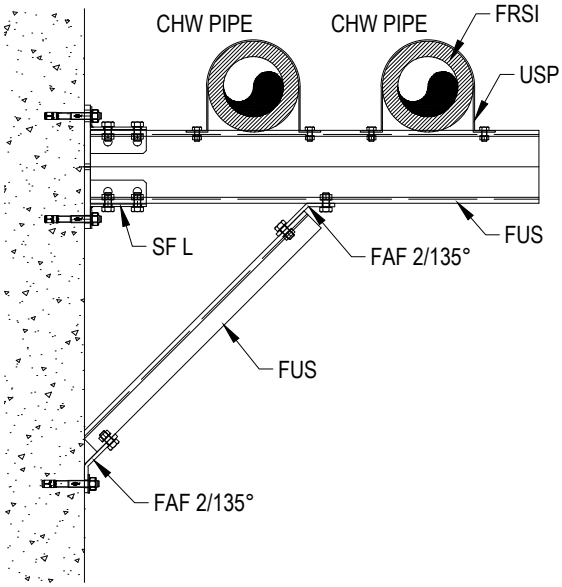
WMS - 5



WMS - 6

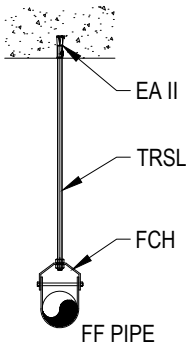


WMS - 7

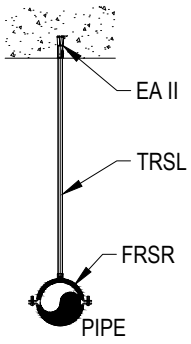


WMS - 8

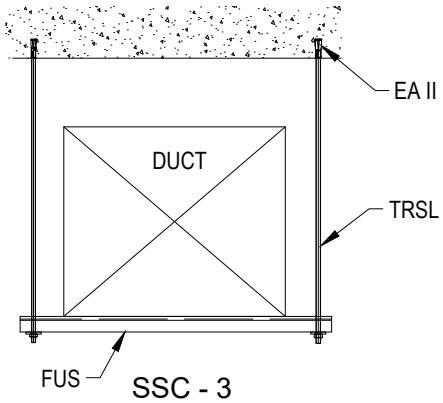
Suspended Supports (Ceiling)



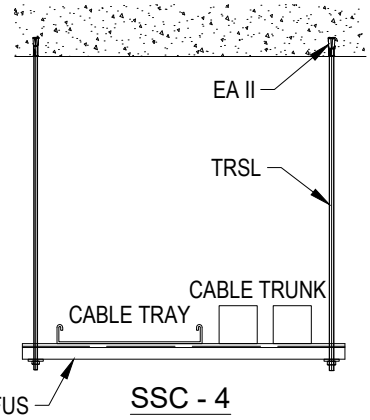
SSC - 1



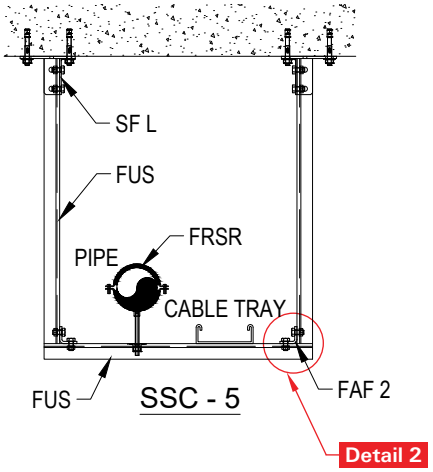
SSC - 2



SSC - 3



SSC - 4



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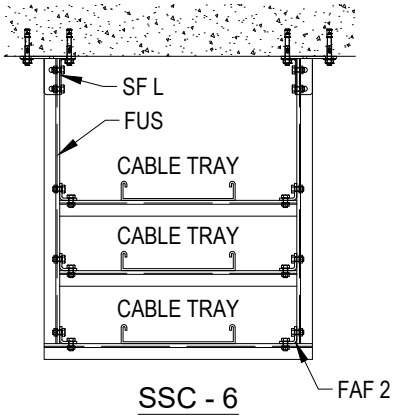
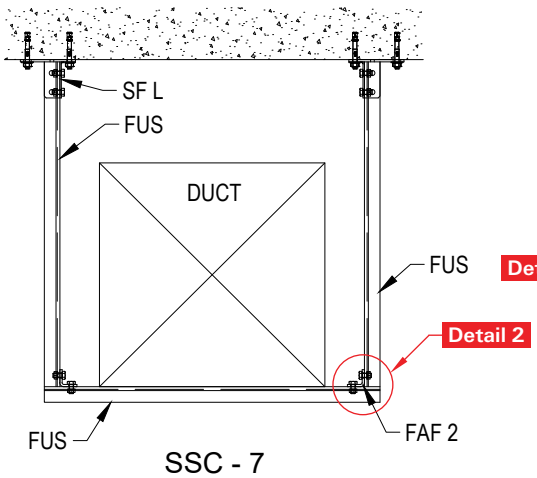
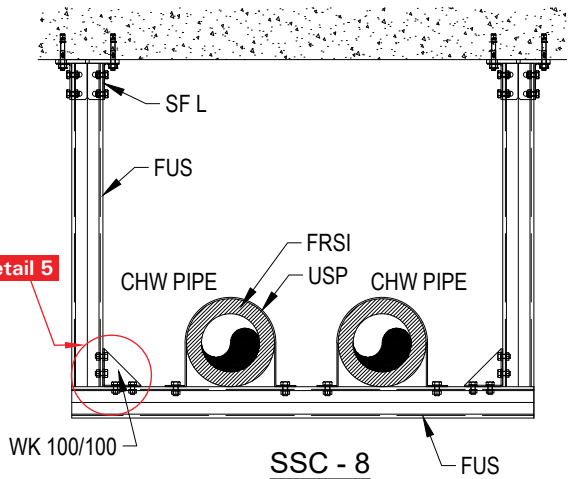


SSC - 6

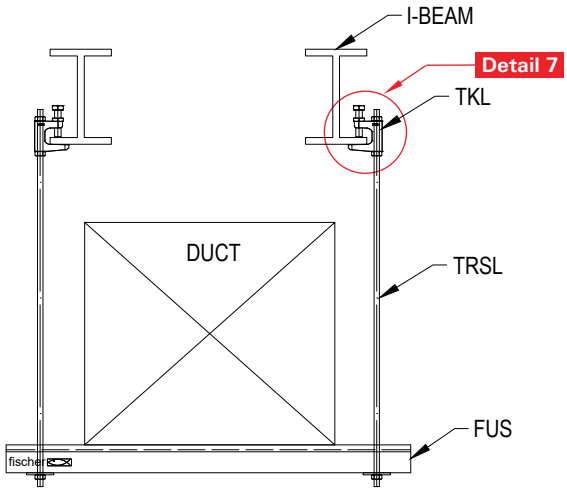


SSC - 7

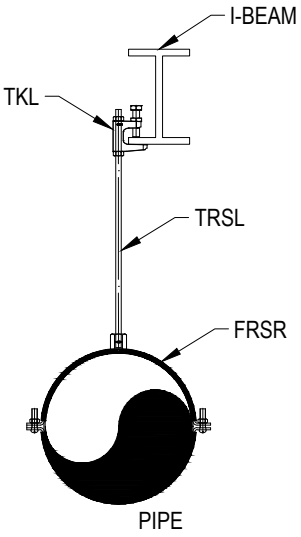


SSC - 8

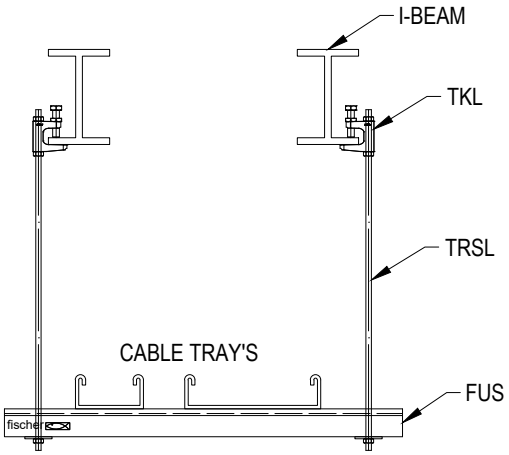
Suspended Supports (Structure)



SSS-1



SSS-2



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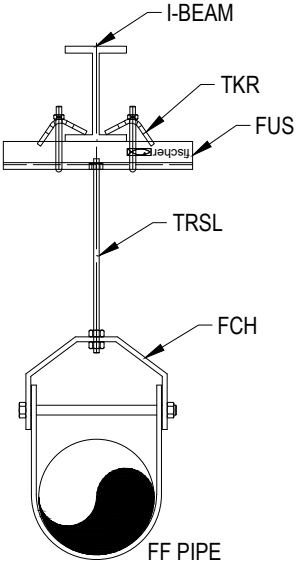
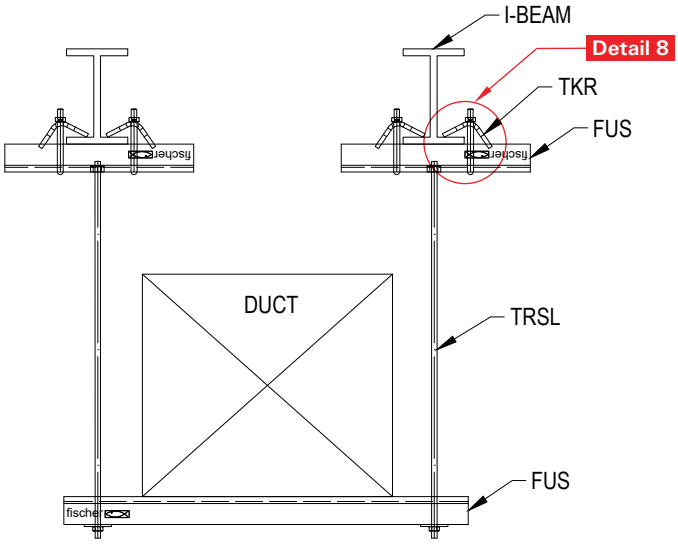
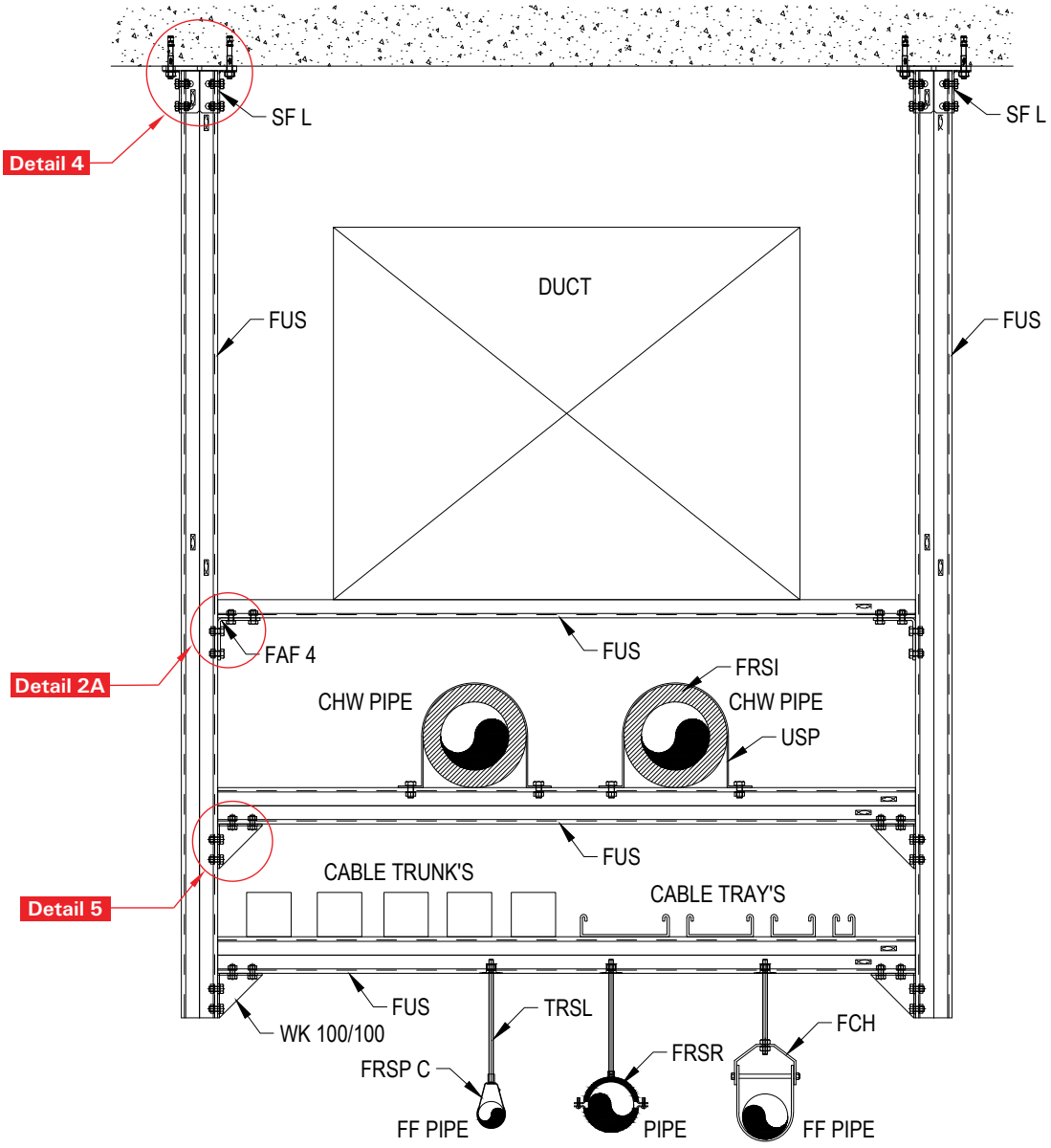


SSS-4

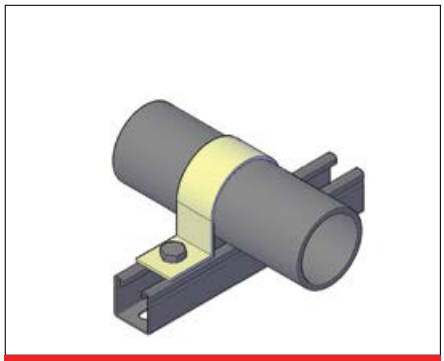


SSS-5

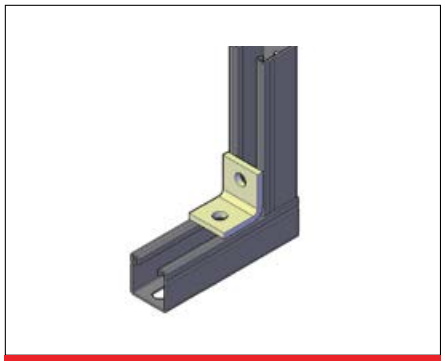
Combined Support for MEP Systems



Details

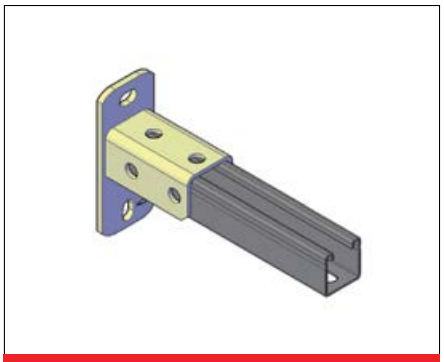


Detail 1 (U-STRAP)

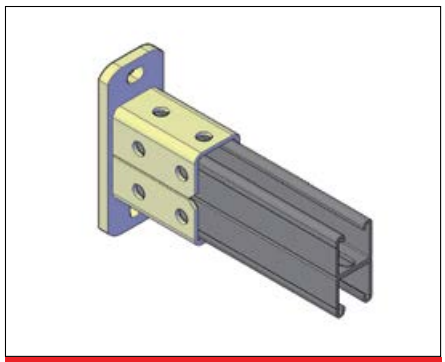


Detail 2 (FAF 2)

Detail 2A (FAF 4)



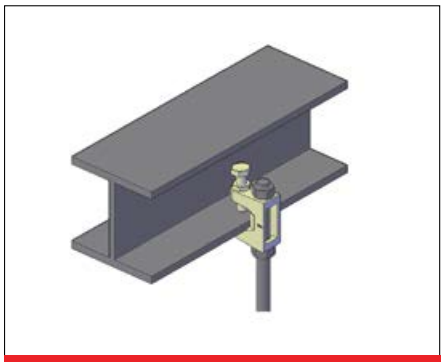
Detail 3 (SF L41)



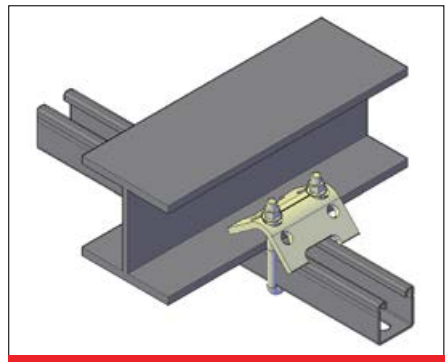
Detail 4 (SF L82)

Detail 5 (WK100/100)

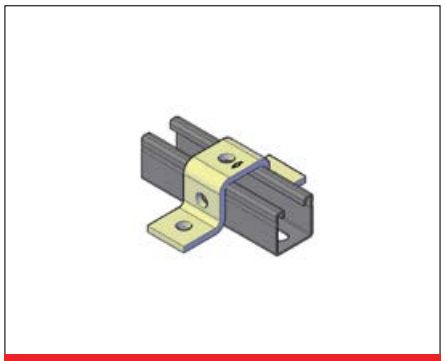
Detail 6 (FAF 2/135°)



Detail 7 (TKL)

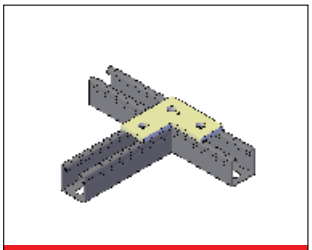


Detail 8 (TKR)

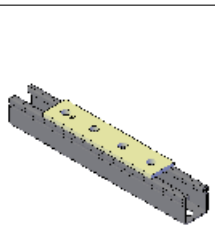


Detail 9 (FUF 41)

Typical Connection Details



FFF 3L



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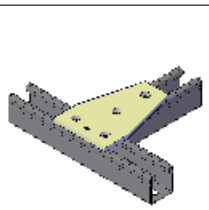
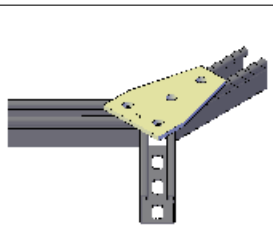
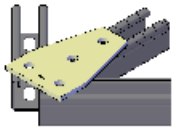


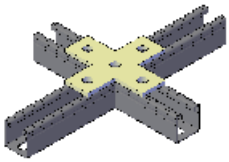
FFF 4D - Linear Arrangement



FFF 4D - Angular Arrangement 1



FFF 4D - Angular Arrangement 2



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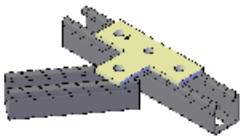
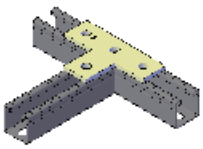
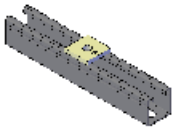


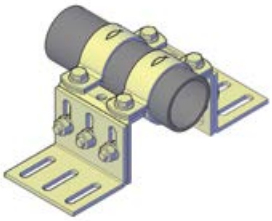
FFF 4T - Angular Arrangement



FFF 4T - Linear Arrangement



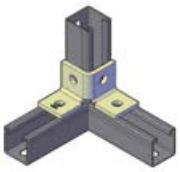
FFF1



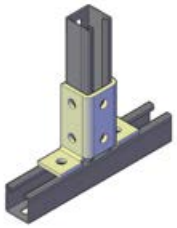
FFPK FFFS

FRSR

FSB 45°



FUF 4Y



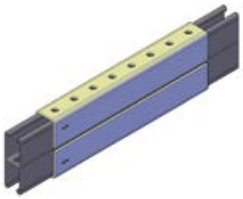
FUF 8T

FUF 21

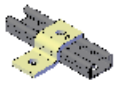
FUF 180° L

FUF 180° R

FUF OC 41

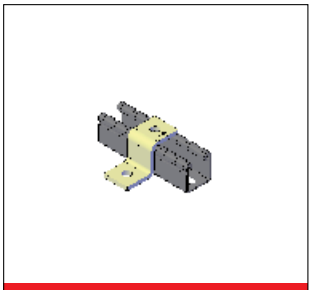


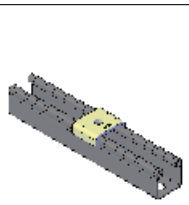
FUF OC 62



FZF 21

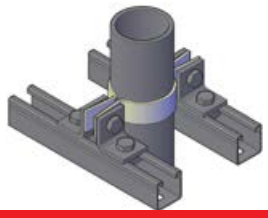
Typical Connection Details


FZF 41


HK 41

PSAE

PVB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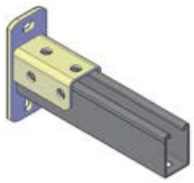
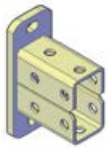
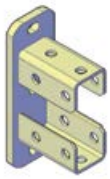

SF L41 with FUS 62

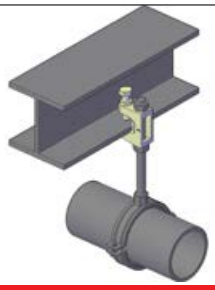
SF L41

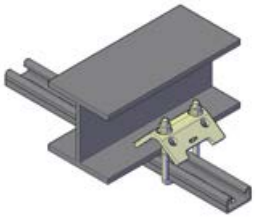

SF L82

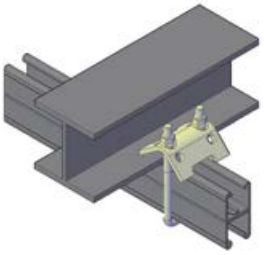
SF L124 with FUS 62D

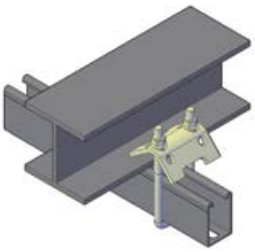

SF L124

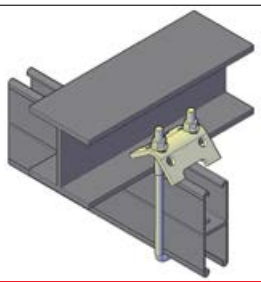
SKSL & FCN Clix Arrangement


TKL


TKR 41 with FUS 21


TKR 82 with FUS 41D

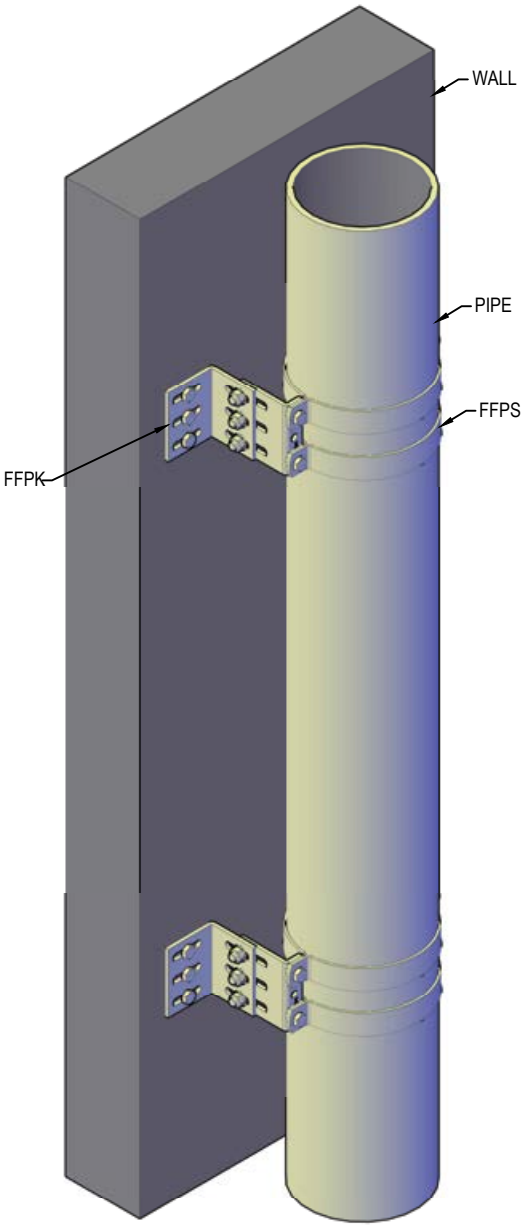

TKR 82 with FUS 62


TKR 124 with FUS 62D

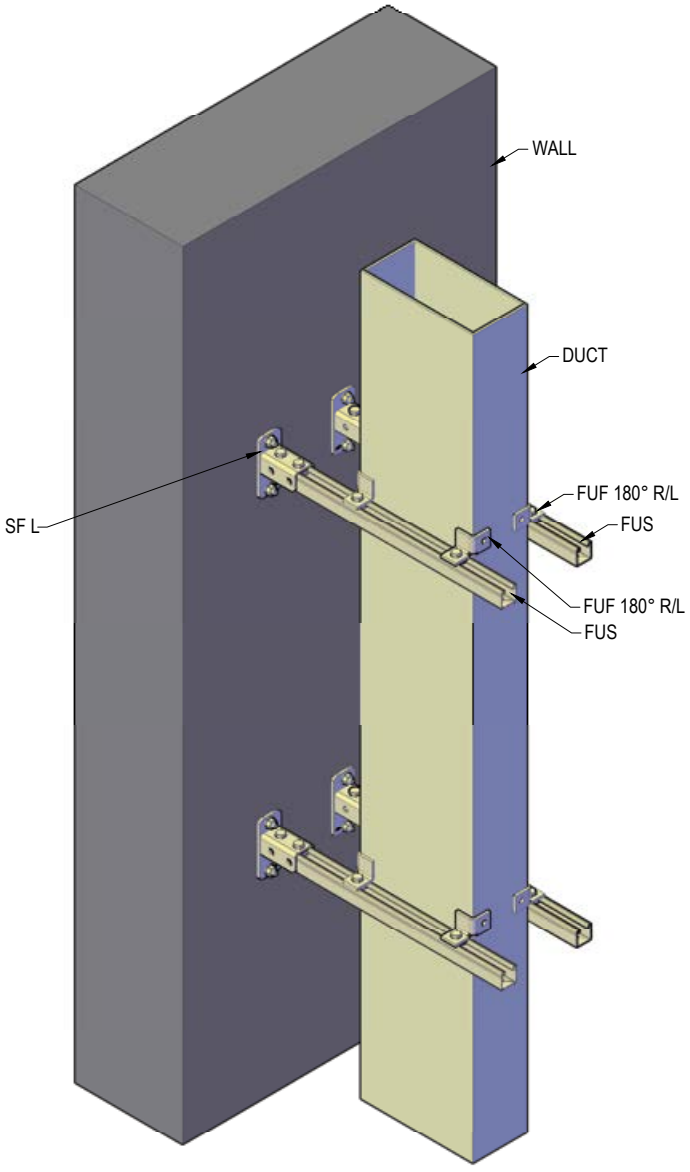
U-Bolt ETR

UW S

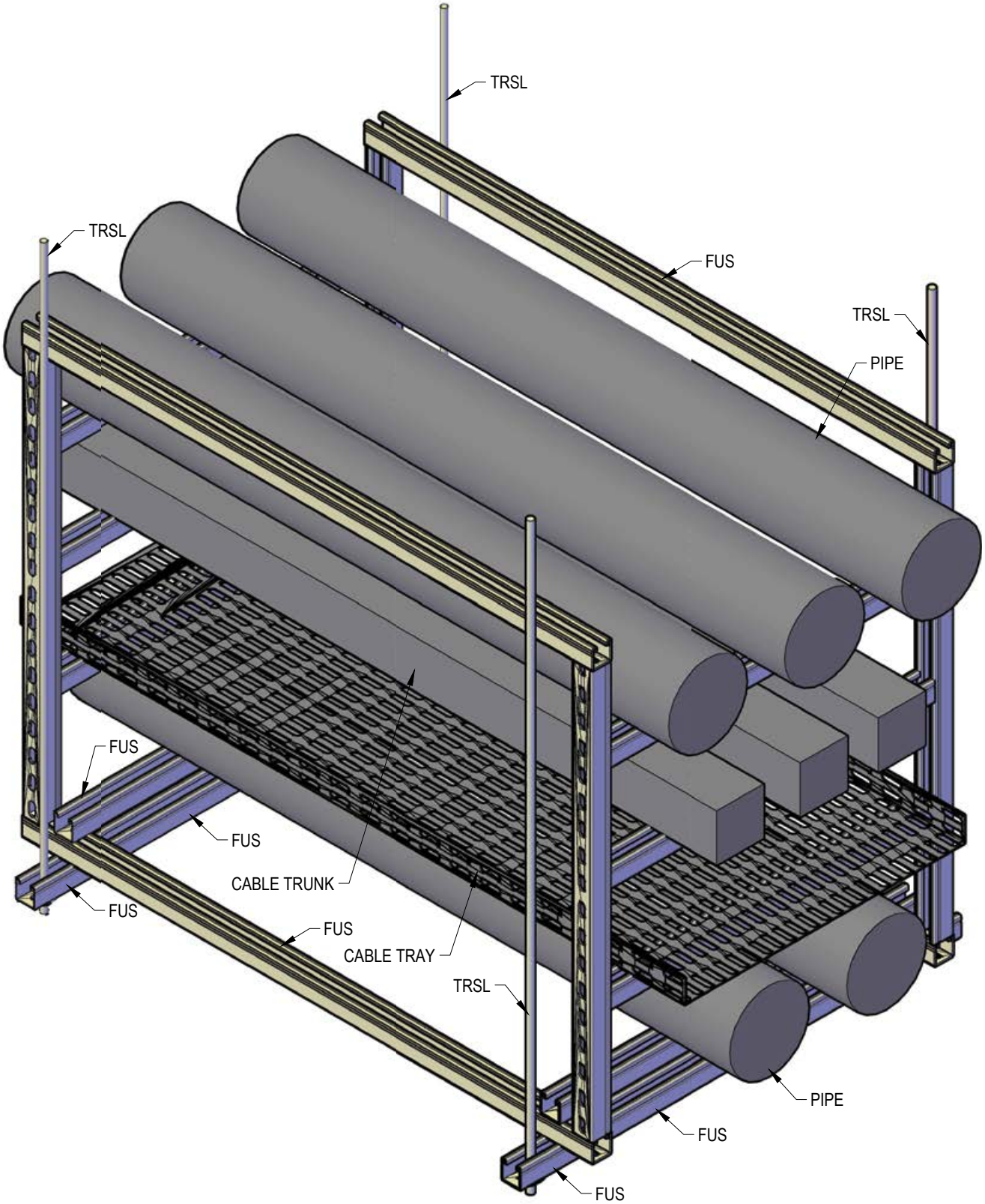
Riser Support for Pipe



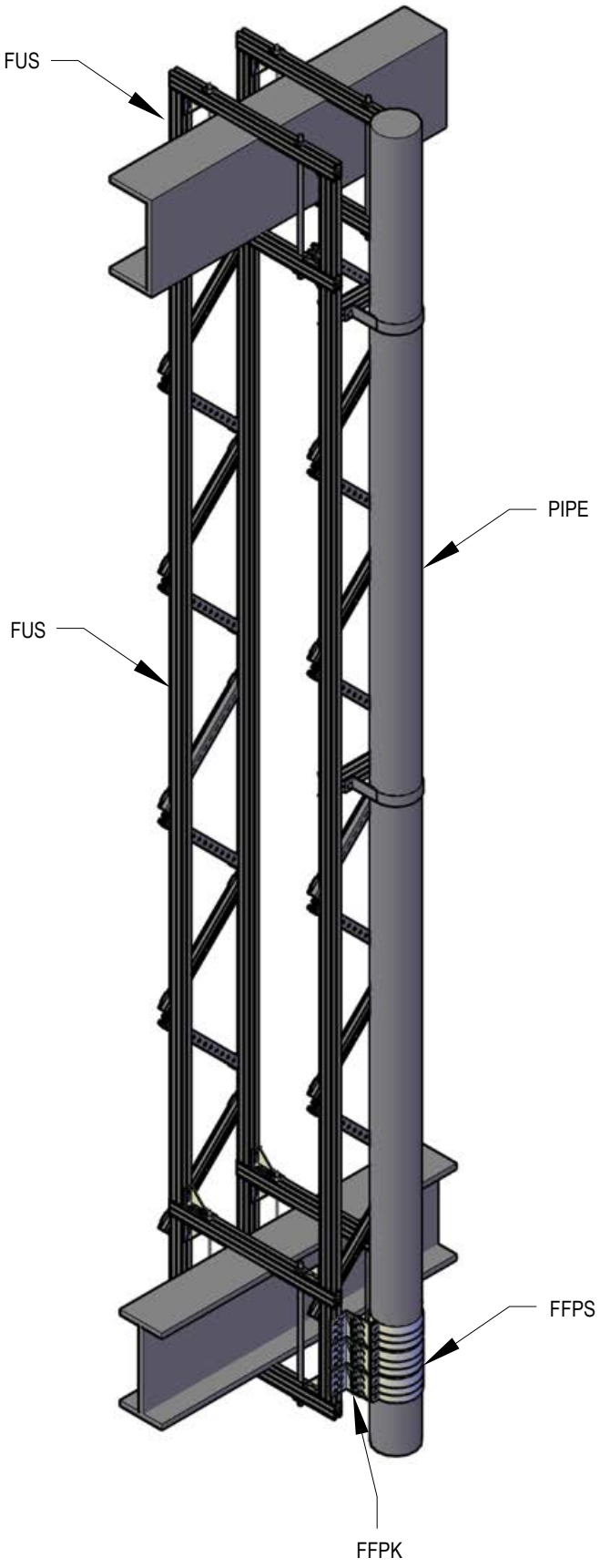
Riser Support for Duct



Modular Support for MEP Systems

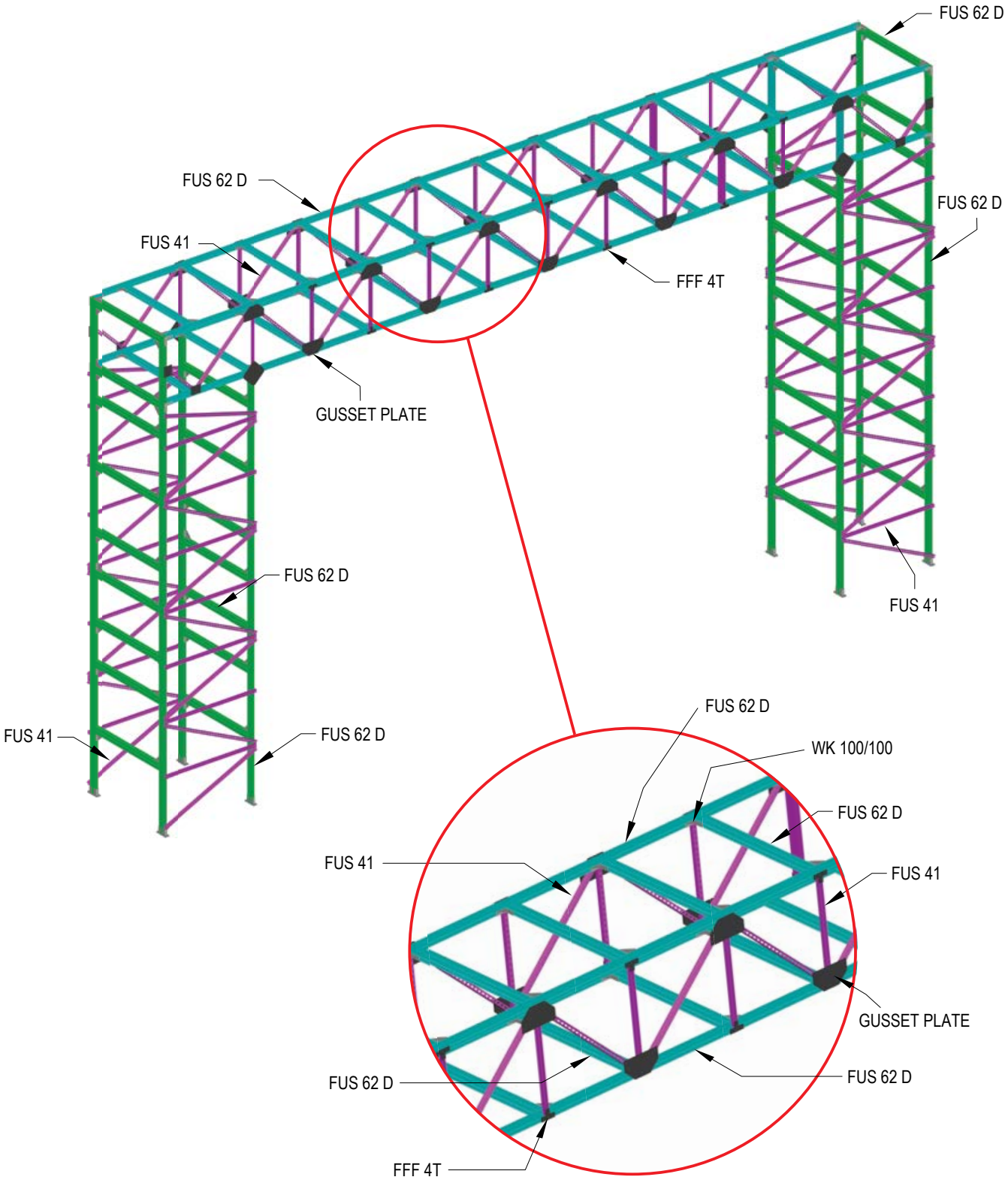


SaMontec Application - 3D Model



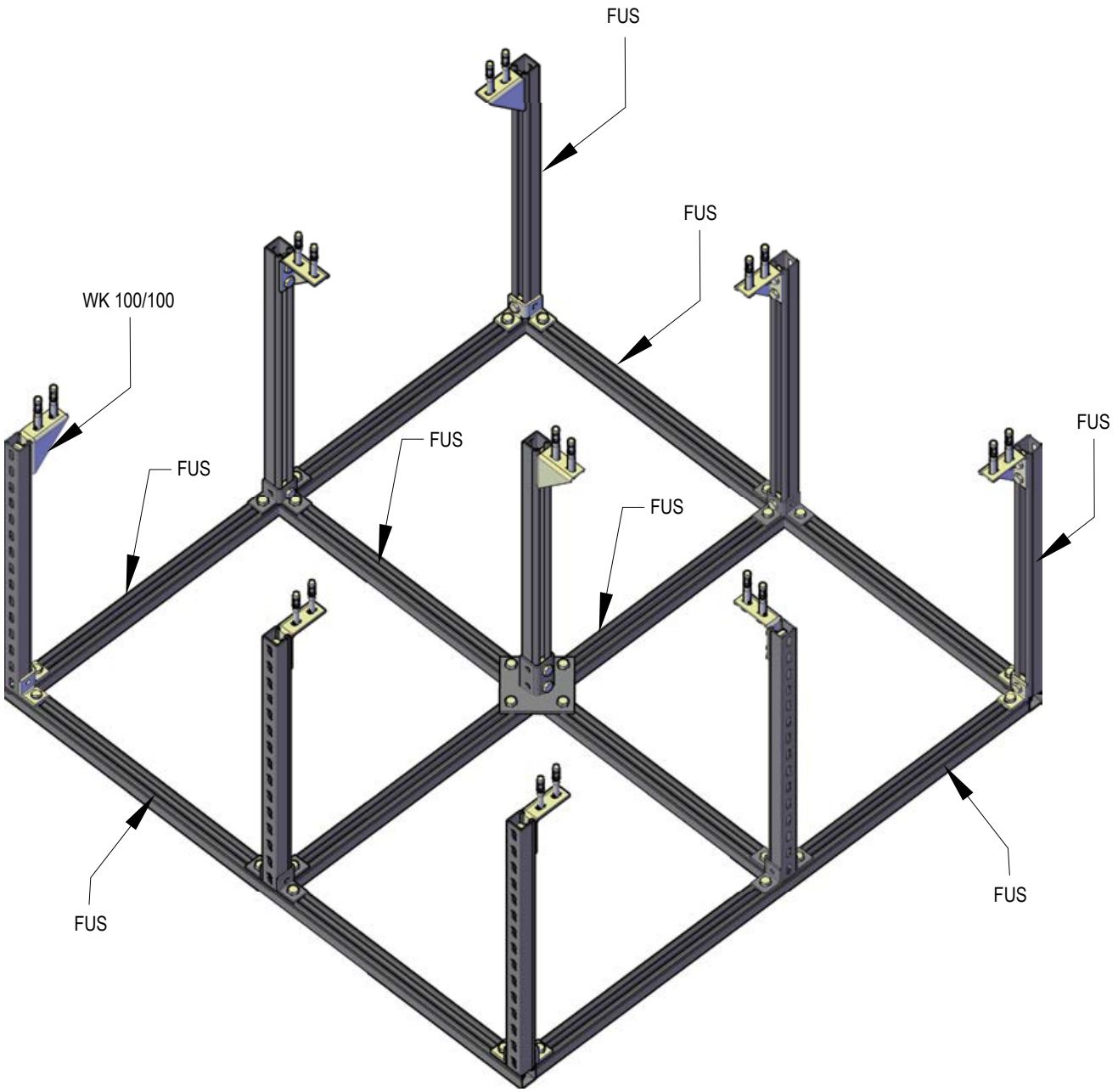
Riser Support for Pipe

SaMontec Application - 3D Model

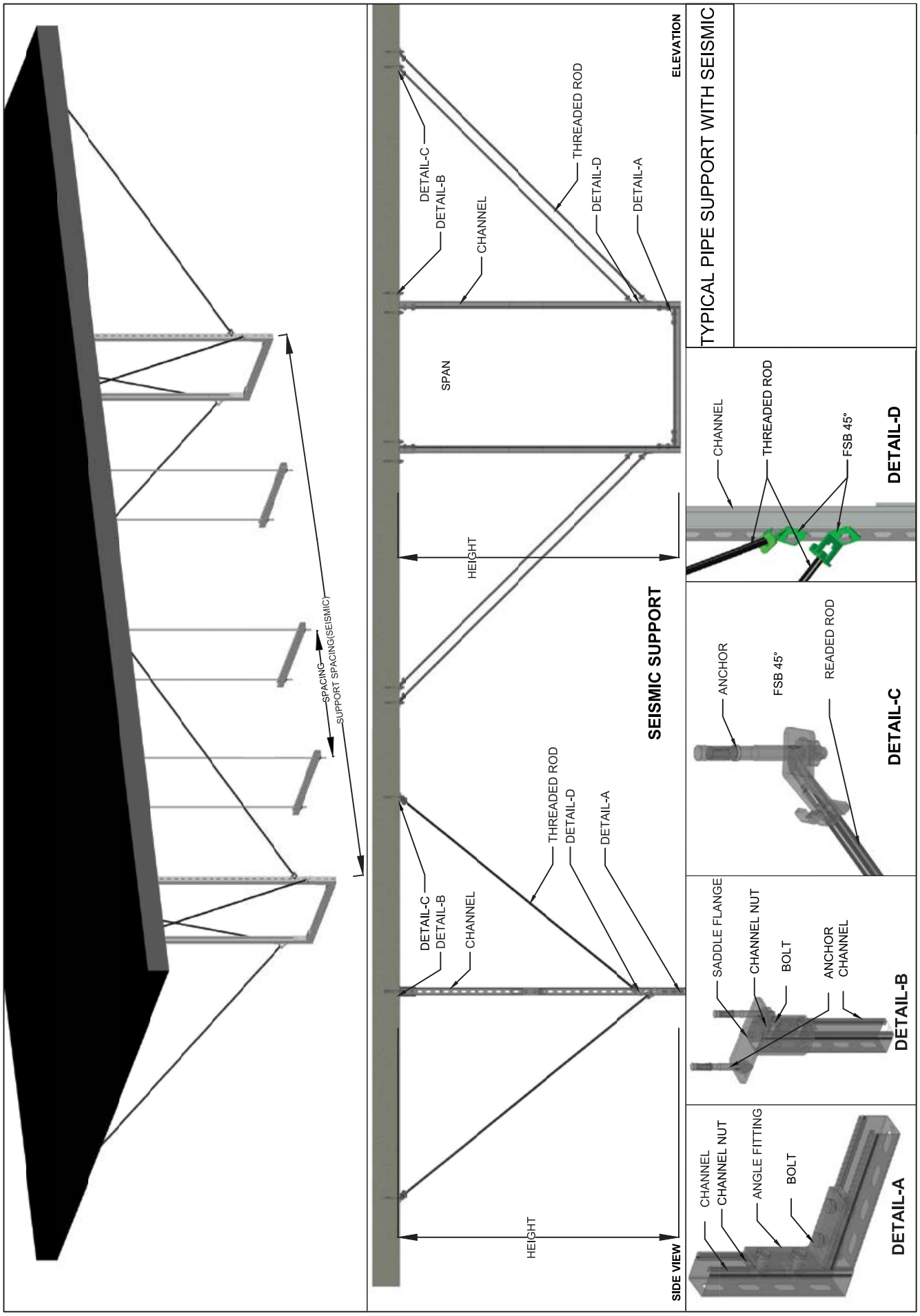


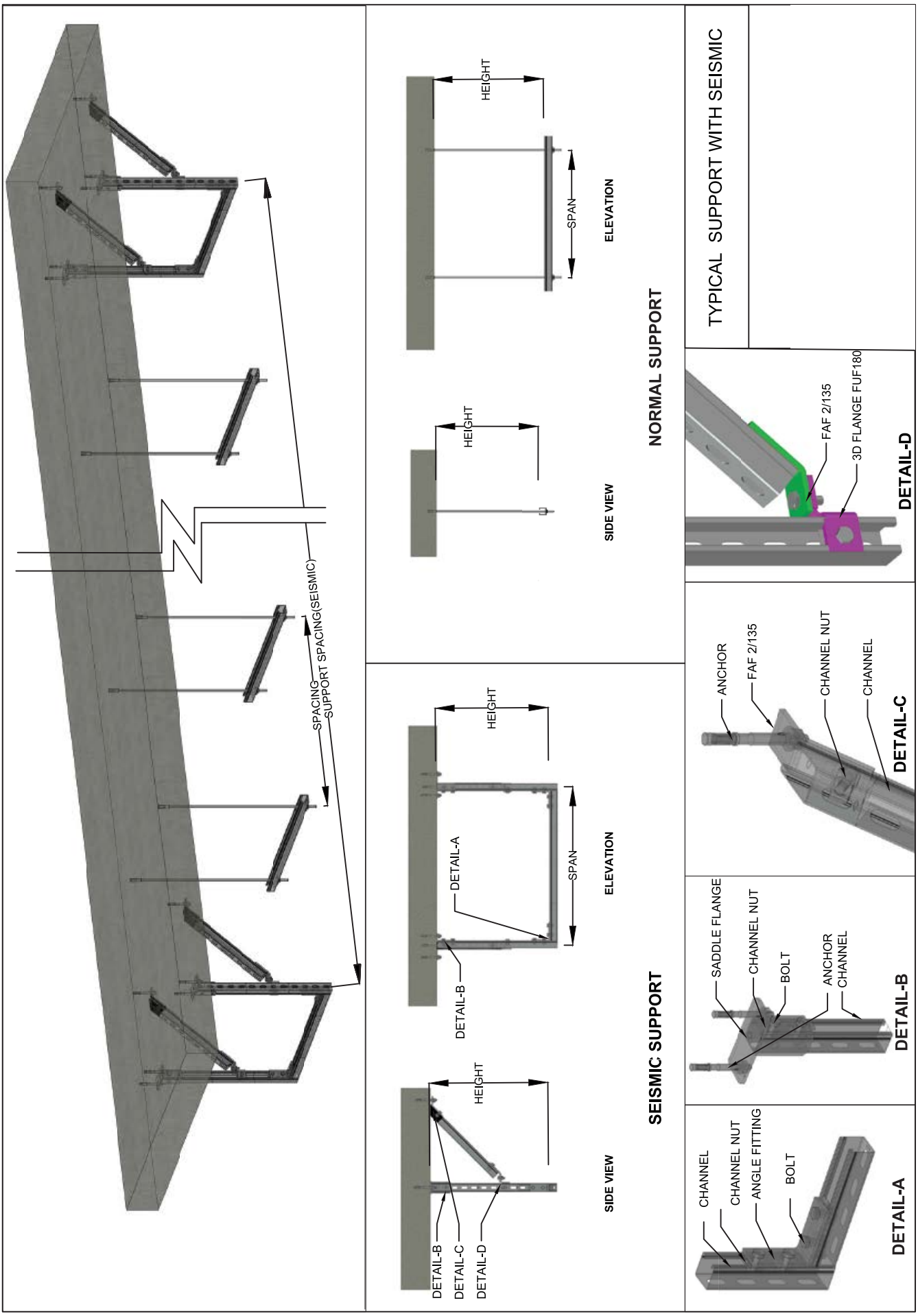
Pipe Rack / Bridge For Pipes & MEP Systems

SaMontec Application - 3D Model



Ceiling Grid System


TYPICAL PIPE SUPPORT WITH SEISMIC
SEISMIC SUPPORT
SIDE VIEW
ELEVATION
HEIGHT
SPAN
SUPPORT SPACING(SEISMIC)
SPACING
DETAIL-C
DETAIL-B
CHANNEL
THREADED ROD
DETAIL-D
DETAIL-A
DETAIL-A
CHANNEL
CHANNEL NUT
ANGLE FITTING
BOLT
DETAIL-B
SADDLE FLANGE
CHANNEL NUT
BOLT
ANCHOR CHANNEL
DETAIL-C
ANCHOR
FSB 45°
READED ROD
DETAIL-D
CHANNEL
THREADED ROD
FSB 45°


SPACING
SUPPORT SPACING(SEISMIC)
NORMAL SUPPORT
HEIGHT
SPAN
ELEVATION
HEIGHT
SIDE VIEW
SEISMIC SUPPORT
HEIGHT
DETAIL-A
SPAN
ELEVATION
DETAIL-B
HEIGHT
SIDE VIEW
DETAIL-B
DETAIL-C
DETAIL-D
TYPICAL SUPPORT WITH SEISMIC
FAF 2/135
3D FLANGE FUF180
DETAIL-D
ANCHOR
FAF 2/135
CHANNEL NUT
CHANNEL
DETAIL-C
SADDLE FLANGE
CHANNEL NUT
BOLT
ANCHOR CHANNEL
DETAIL-B
CHANNEL
CHANNEL NUT
ANGLE FITTING
BOLT
DETAIL-A

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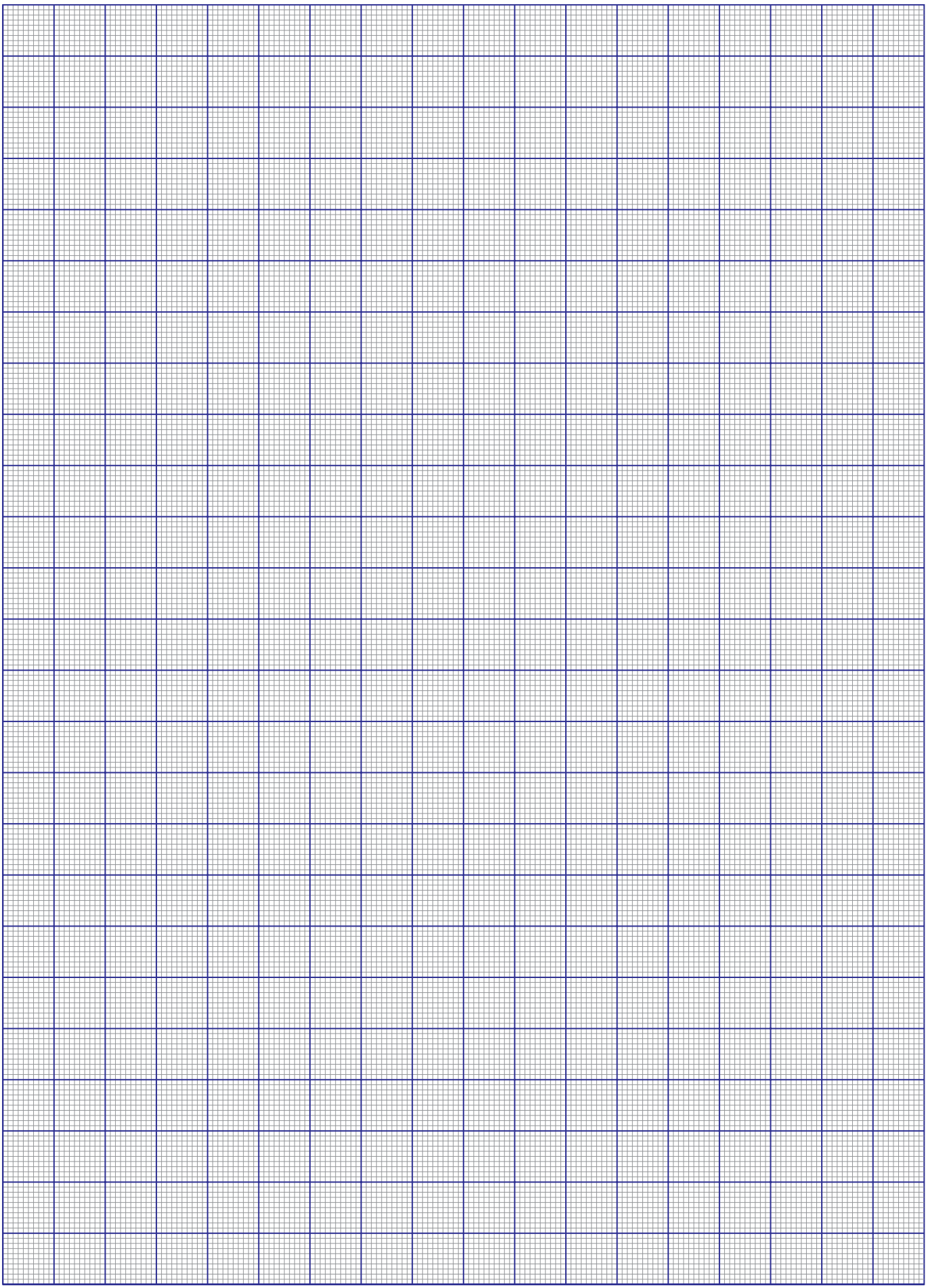

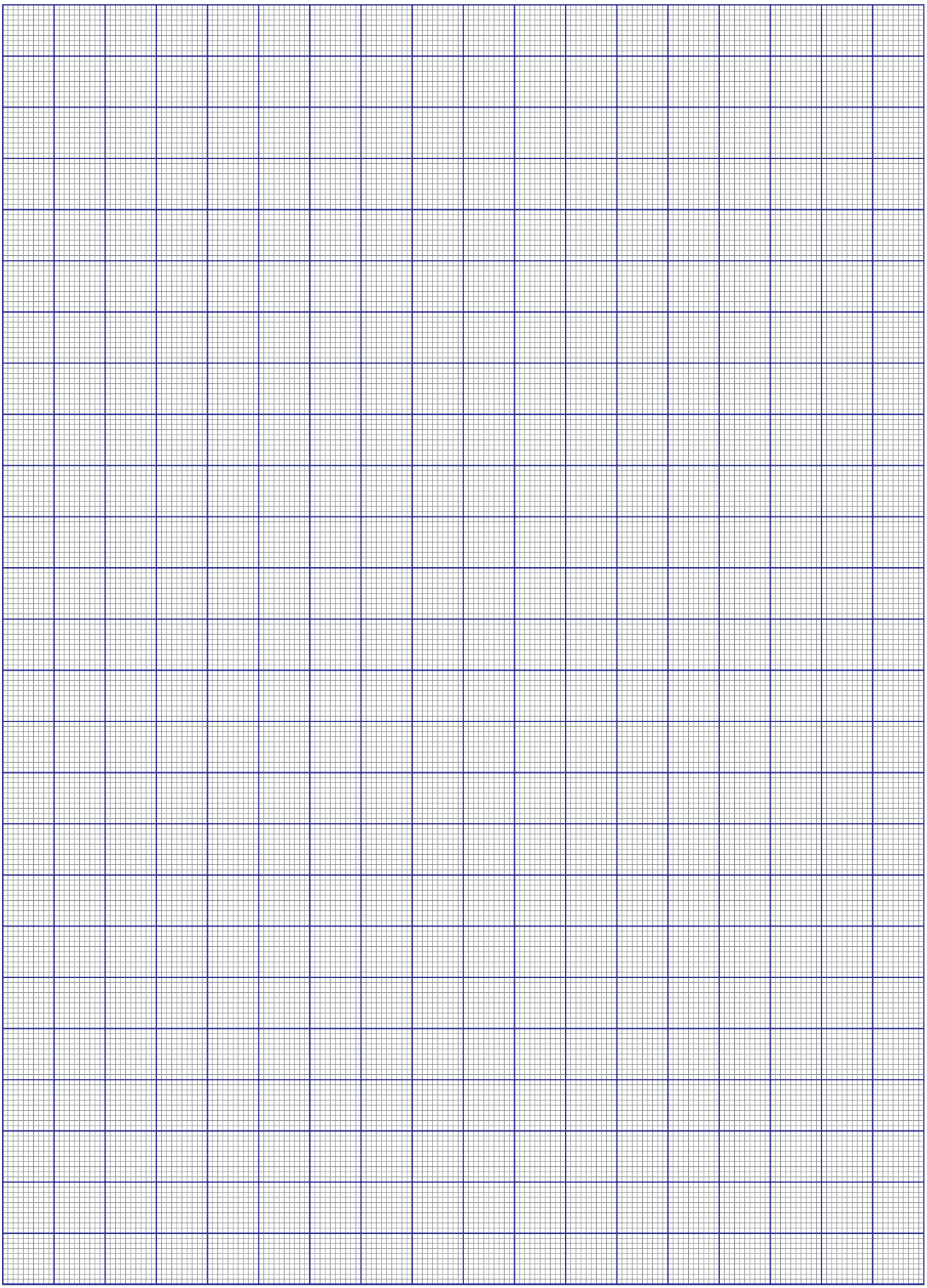

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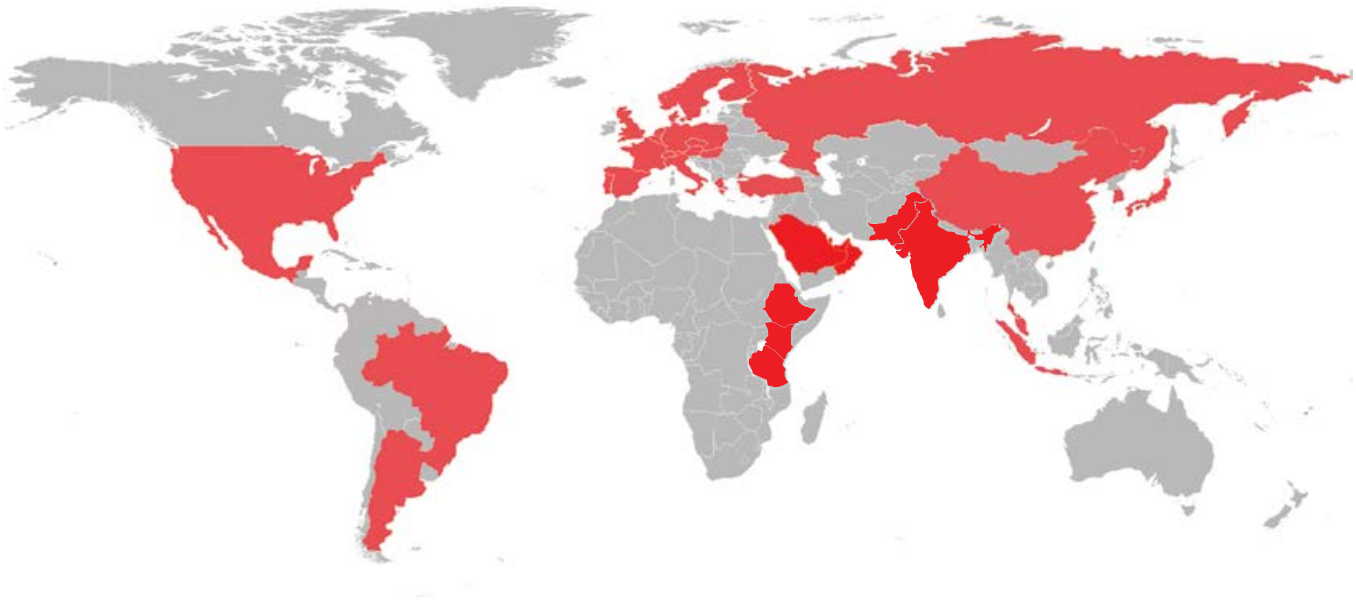

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