fischer

Strong Undercut Anchor FSU.

The anchoring system for extreme safety and load requirements.

Strong Undercut Anchor FSU.
For extreme load and safety requirements.

The DMC (DataMatrix-Code) for **unique identification and readout of product data** offers the possibility for flexible and exact data information and storage before and after installation. The DMC can be scanned using the fischer PRO app.

The perfect form fit in the undercut guarantees the **absorption of high loads** (head bolt theory) for applications with the highest level of safety.

The plastic element of the FSU prevents the anchor from falling out of the drill hole and allows **easy and safe overhead installation.**

The setting depth marking ensures a quick visual installation check and provides additional **safety and installation convenience.**

Six robust cutting teeth and the principle of self-undercutting enable **fast setting in the concrete and thus simple installation.**

The low spreading forces of the FSU allow **small edge and axial distances** and offer **maximum flexibility** in all applications.

The plastic cap **prevents the thread from being damaged** during installation.

Advantages at a glance

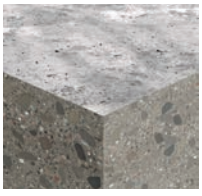
- Approved according to ETA Option 1 for high safety requirements.
- The ETA rating guarantees a service life of 100 years.
- The head bolt theory principle allows for maximum tensile loads for mechanical systems.
- The perfect matched components enable highest shear loads.
- Available in galvanized steel and in stainless steel for for indoor and outdoor applications.
- Fast and complete dismantling with the disassembly tool FSU-DT.

Functionality

- The FSU is suitable for pre-setting installation, the FSU-P is suitable for push-through installation.
- First, the drill hole is created with the collar drill FSU-SD.
- After cleaning, the anchor is inserted with the setting tool FSU-ST. The anchor cuts itself the undercut, creating a positive connection.
- The setting depth markings on the anchor and setting tool indicate when the anchor is set correctly.
- With the disassembly tool FSU-DT, the anchor can be removed quickly and completely.

Building materials

Cracked concrete



Non-cracked concrete

Certificates

ETA 22/0674, for cracked concrete

FM APPROVED

R 120 Fire resistance class R120

Seismic C2

BZS D 24-601

100 Years Service life

Applications in heavy duty steel construction

Industry

Walkways

Power plants

Oil and gas

Infrastructure

Heavy duty steel construction

Design methods compared: Undercut vs. bolt anchor.

Applications in heavy duty steel construction require systems that match extreme demands on safety. When designing according to the **anchor theory** the loads in the anchors are transferred into the concrete and depend on the concrete's tensile strength to resist the load. In order to reduce these load values, applying the **headed bolt theory**, using a higher safety coefficient, has proven effective.

The following example, comparing the FSU undercut anchor with the FAZ II Plus expansion anchor, demonstrates the difference in load values:

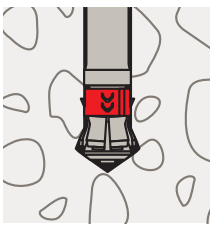
Parameters: Anchor: FSU 12 x125/30 vs. FAZ II Plus 12/50, h_{ef}=125mm, C20/25 cracked concrete

FSU

$$N_{Ed} \leq N_{Rd,c} \leq \frac{N_{Rk,c}}{\gamma_{Mc}}$$

$$N^{0}_{Rk,c} = k_1 \times \sqrt{f_{ck}} \times h_{ef}^{1,5} = 8{,}9 \times \sqrt{20\,\frac{N}{mm^2}} \times \frac{(125mm)^{1,5}}{1000\,\frac{N}{kN}} = \mathbf{55{,}63kN}$$

$$N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{Mc}} = \frac{55{,}63kN}{1{,}5} = 37{,}08kN$$



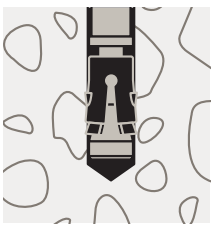
With **positive connection**, the anchor geometry adapts to the shape of the drill hole. The anchor makes maximum use of the load-bearing capacity of the substrate. There are no or only low expansion forces.

FAZ II Plus

$$N_{Ed} \leq N_{Rd,c} \leq \frac{N_{Rk,c}}{\gamma_{Mc}}$$

$$N^{0}_{Rk,c} = k_1 \times \sqrt{f_{ck}} \times h_{ef}^{1,5} = 7{,}7 \times \sqrt{20\,\frac{N}{mm^2}} \times \frac{(125mm)^{1,5}}{1000\,\frac{N}{kN}} = \mathbf{48{,}13kN}$$

$$N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{Mc}} = \frac{48{,}13kN}{1{,}5} = 32{,}08kN$$



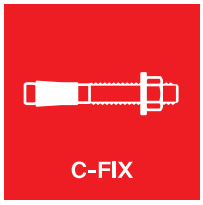
With **friction locking**, the expansion part of the anchor is pressed against the wall of the drill hole. The tensile forces are absorbed by friction.

C-FIX Online and Offline.

For the dimensioning of steel and bonded anchors as well as frame fixings in steel-reinforced concrete and masonry.

Advantages

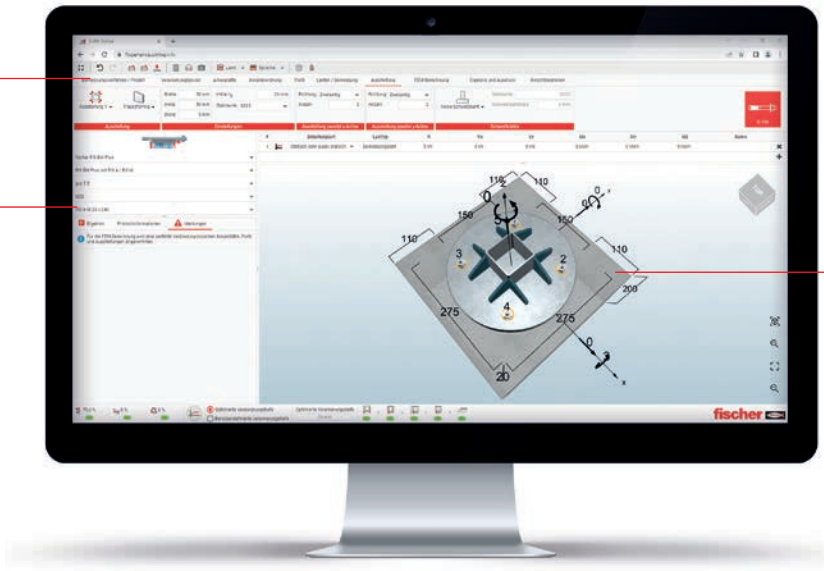
- Dimensioning of injection systems in masonry
- Dimensioning under dynamic influences - threshold or alternating loads
- Dimensioning with seismic conditions (earthquakes)
- Dimensioning under fire exposure
- Realistically calculation by considering the anchor stiffness and the base plate stiffness, including profiles and stiffeners.



For verification on the basis of European Technical Evaluations (ETA) for anchorages with plugs. Additional verification according to "ENSO" with with the extended dimensioning models according to fib. Integration of the European dimensioning principles, such as ETAG 001 Annex C, TR 029 and DIN EN 1992-4. In addition, C-FIX offers the possibility to select the force and measurement units individually.

Input bar
structured in a chronologically logical way

Product information
such as approvals/ evaluations and error notes



3D input graphic

Offline and Online program features

Anchor editor for free anchor arrangements according ENSO

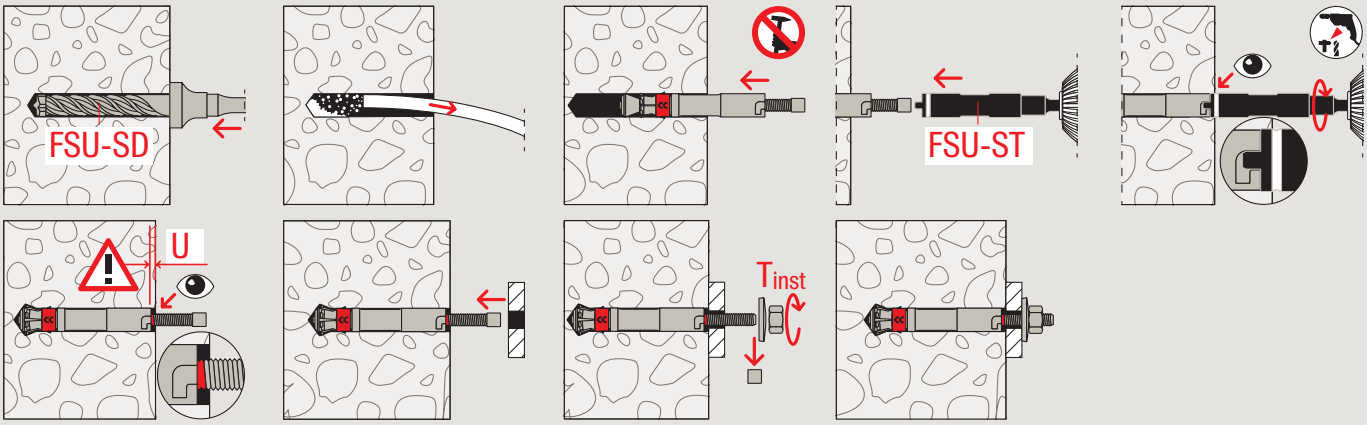
Dimensioning and display of the steel connection plate according to FE method

Auditable and detailed printout with reference to the respective regulation

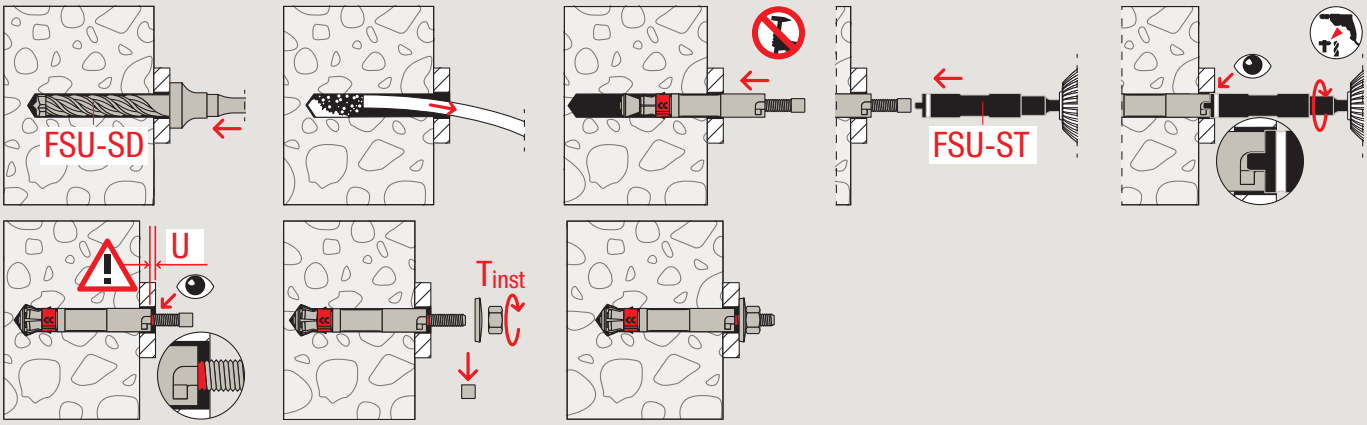
C-FIX is available as an online or offline version. Further information can be found under the following link:
www.fischer-international.com/en/service/planning-aids/fixperience

Installation

Pre-setting anchor FSU

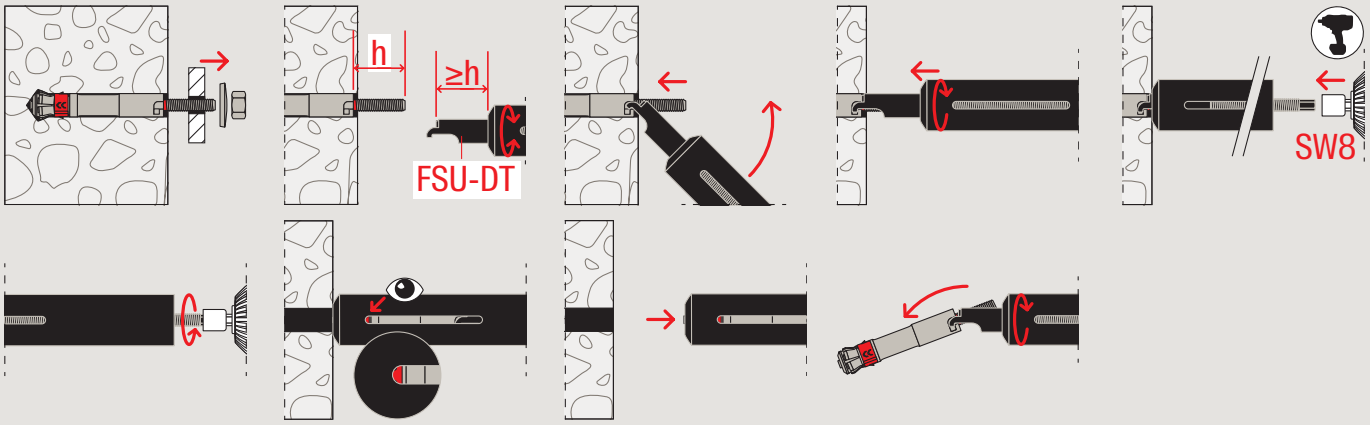


Push-through anchor FSU-P

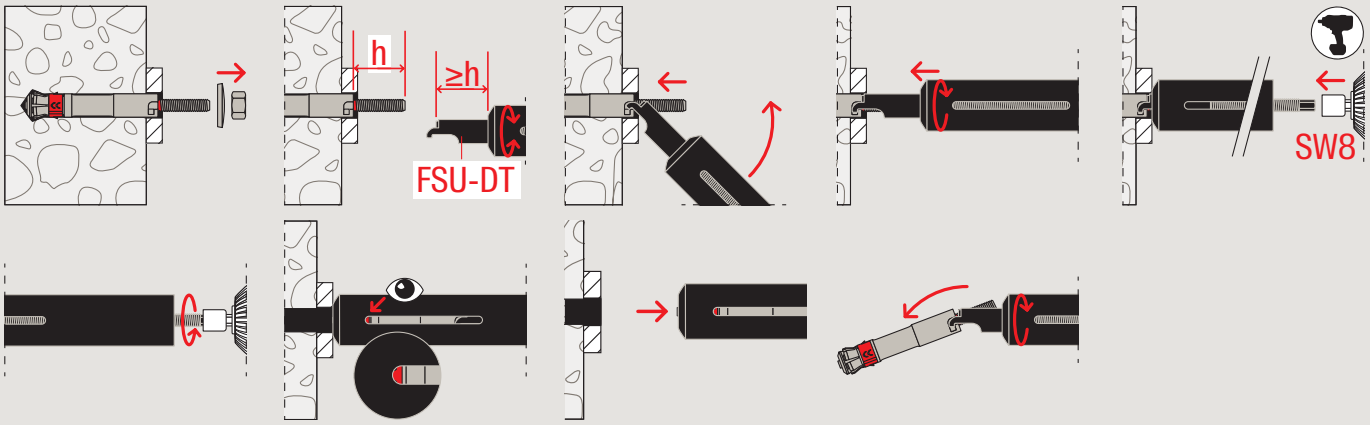


Disassembly

Disassembly pre-setting anchor FSU



Disassembly push-through anchor FSU-P



Performance characteristics and system components.

Always on the safe side with FSU:

Approved for seismic applications of the performance categories C1 and C2.

Approval for sprinkler systems:

The FSU complies with the VdS CES guidelines for sprinkler systems, planning and installation when using the corresponding approval (ETA 22/0674).

Safe even in extreme situations:

Safety when it counts! Especially load-bearing steel constructions must not fail in the event of a fire. The FSU has proven its performance even under fire load. The ETA also allows dimensioning up to fire resistance class R 120.

Safe into the future:

The ETA rating guarantees a service life of 100 years. The FSU will last a whole century and is therefore perfect for large, long-lasting construction projects.

Keeping track of things:

The DMC (DataMatrix-Code) for unique identification and readout of product data on the anchor offers the possibility for flexible and exact data transparency and storage before and after installation.

Stop drill FSU-SD

- The stop drill FSU-SD is specially designed for the length of the undercut anchor FSU and thus ensures simple and reliable drill hole creation in the subsoil in accordance with ETA.

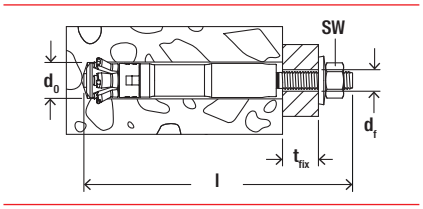
Setting tool FSU-ST

- The setting tool FSU-ST is used for the simple and quick installation of undercut anchors FSU according to ETA.

Disassembly tool FSU-DT

- The FSU-DT disassembly tool is used for easy uninstallation of undercut anchors FSU.

Assortment

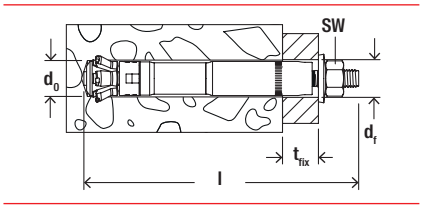


Strong Undercut Anchor FSU

FSU

FSU R

Item	Item no.	Approval ETA	Seismic-Approval	Drill diameter d_0 [mm]	Drill hole diameter in fixture $d_f \leq$ [mm]	Fixture thickness $t_{fix} \leq$ [mm]	Anchor length l [mm]	Width across nut SW [mm]	Required drill bit FSU-SD	Required setting tool	Sales unit [pcs]
FSU M10x100/20	**567778**	●	C1 / C2	20	12	20	150	17	20 x 100	FSU-ST M10	10
FSU M12x125/30	**567782**	●	C1 / C2	22	14	30	190	19	22 x 125	FSU-ST M12	10
FSU M12x125/50	**567786**	●	C1 / C2	22	14	50	210	19	22 x 125	FSU-ST M12	10
FSU M10x100/20 R	**567779**	●	C1 / C2	20	12	20	150	17	20 x 100	FSU-ST M10	10
FSU M12x125/30 R	**567783**	●	C1 / C2	22	14	30	190	19	22 x 125	FSU-ST M12	10
FSU M12x125/50 R	**567787**	●	C1 / C2	22	14	50	210	19	22 x 125	FSU-ST M12	10



Strong Undercut Anchor FSU-P

FSU-P

FSU-P R

Item	Item no.	Approval ETA	Seismic-Approval	Drill diameter d_0 [mm]	Drill hole diameter in fixture $d_f \leq$ [mm]	Fixture thickness t_{fix} [mm]	Anchor length l [mm]	Width across nut SW [mm]	Required drill bit FSU-SD	Required setting tool	Sales unit [pcs]
FSU-P M10x100/20	**567780**	●	C1 / C2	20	21	10-20	150	17	20 x 120	FSU-ST M10	10
FSU-P M12x125/30	**567784**	●	C1 / C2	22	23	12-30	190	19	22 x 155	FSU-ST M12	10
FSU-P M12x125/50	**567788**	●	C1 / C2	22	23	12-50	210	19	22 x 175	FSU-ST M12	10
FSU-P M10x100/20 R	**567781**	●	C1 / C2	20	21	10-20	150	17	20 x 120	FSU-ST M10	10
FSU-P M12x125/30 R	**567785**	●	C1 / C2	22	23	12-30	190	19	22 x 155	FSU-ST M12	10
FSU-P M12x125/50 R	**567789**	●	C1 / C2	22	23	12-50	210	19	22 x 175	FSU-ST M12	10

Assortment

Stop drill FSU-SD

FSU-SD

Item	Item no.	fits anchor pre-setting anchor	fits anchor push-through anchor	Sales unit [pcs]
FSU-SD 20x100	**567793**	FSU M10x100/20	–	1
FSU-SD 20x120	**567794**	–	FSU-P M10x100/20	1
FSU-SD 22x125	**567795**	FSU M12x125/30; FSU M12x125/50	–	1
FSU-SD 22x155	**567796**	–	FSU-P M12x125/30	1
FSU-SD 22x175	**567797**	–	FSU-P M12x125/50	1

Setting tool FSU-ST

FSU-ST

Item	Item no.	fits anchor pre-setting anchor	fits anchor push-through anchor	Sales unit [pcs]
FSU-ST M10	**568881**	FSU M10	FSU-P M10	1
FSU-ST M12	**568882**	FSU M12	FSU-P M12	1

Disassembly tool FSU-DT

FSU-DT

Item	Item no.	fits anchor pre-setting anchor	fits anchor push-through anchor	Sales unit [pcs]
FSU-DT M10	**568879**	FSU M10	FSU-P M10	1
FSU-DT M12	**568880**	FSU M12	FSU-P M12	1

Required hammer drill

Drill chuck	SDS Plus
Hammer drilling RPM	600 – 1,800 rpm
Hammer impact energy	2,5 – 6 Joule

Loads

Strong Undercut Anchor FSU

Permissible loads of a single anchor[1] in normal concrete of strength class C20/25.
For the design the complete current assessment ETA-22/0674 of 12.04.2024 has to be considered.

					Cracked concrete				Non-cracked concrete			
	Material/ surface[2]	Effective anchorage depth	Minimum member thickness	Installation torque	Permissible tension (N_{perm}) and shear loads (V_{perm}); minimum spacing (s_{min}) and edge distances (c_{min}) with reduced loads				Permissible tension (N_{perm}) and shear loads (V_{perm}); minimum spacing (s_{min}) and edge distances (c_{min}) with reduced loads			
		h_{ef}	h_{min}	T_{inst}	N_{perm}[3]	V_{perm}[3]	s_{min}[3]	c_{min}[3]	N_{perm}[3]	V_{perm}[3]	s_{min}[3]	c_{min}[3]
Type		[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[kN]	[kN]	[mm]	[mm]
FSU M10 x 100	gvz	100	170	40	14.3	15.3	80	80	21.0	15.3	80	80
	R	100	170	40	14.3	18.8	80	80	21.8	18.8	80	80
FSU M12 x 125	gvz	125	220	80	19.0	21.8	90	90	31.4	21.8	90	90
	R	125	220	80	19.0	28.5	90	90	32.1	28.5	90	90
FSU-P M10 x 100	gvz	100	170	40	14.3	37.8	80	80	21.0	37.8	80	80
	R	100	170	40	14.3	42.8	80	80	21.8	42.8	80	80
FSU-P M12 x 125	gvz	125	220	80	19.0	49.4	90	90	31.4	49.4	90	90
	R	125	220	80	19.0	58.8	90	90	32.1	58.8	90	90

[1] Design according to EN 1992-4:2018 (for static resp. quasi-static loads). The partial safety factors for material resistance as regulated in the ETA 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 ETA.
[2] For material details see ETA.
[3] In the case of combinations of tension and shear loads, bending moments with reduced or minimum spacing and edge distances (anchor groups), the design must be carried out in accordance with the provisions of the complete ETA and the provisions of the EN 1992-4:2018. Assumption $t_{fix} = 12$ mm; with $t_{fix} > 12$ mm the V_{perm} values increase for FSU-P. We recommend using our anchor design software C-FIX.

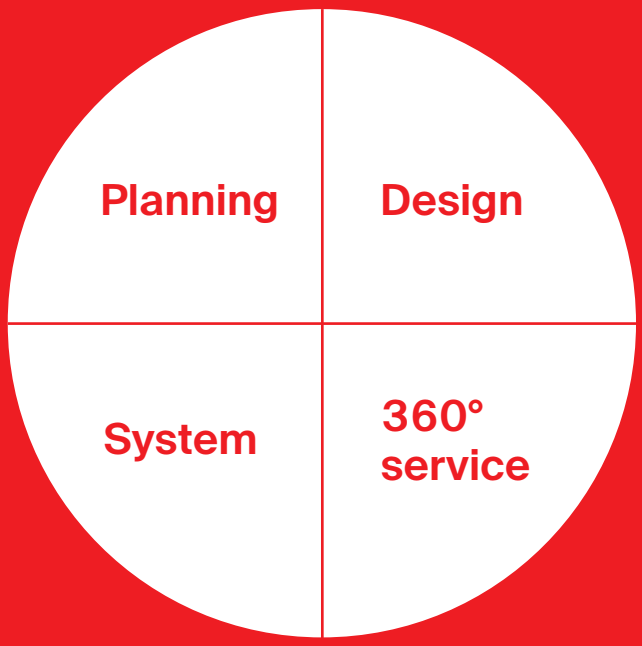
From planning to completion.

Planning safe and efficient constructions

All projects have one thing in common: They start with the planning and the proven dimensioning according to anchor theory and head bolt theory for safe anchoring in concrete. With the fischer solutions there are no longer limits to your planning.

Design - Safe and reliable with the fischer design software FiXperience

FiXperience is modular in design and can be used for a variety of of applications. Due to the intuitive interface, anchorages and fixings can be can be dimensioned easily and flexibly.



System – The right solution for every application

With the fischer systems, consisting of injection mortar and the matching accessories, you are optimally equipped for every application. From the drill hole creation to completion. The fischer range of drill bits together with the fischer dispenser complete the package.

360° service

With fischer, no customer is left alone. No matter how difficult, unique or impossible the task seems, with our 360° service package you will find the right solution for your needs. We will support you before, during and after the completion of your project.

DMC in the fischer PRO app

Information, technical data, etc. can be viewed with the fischer PRO app both before and after installation.

To do this, navigate to the tile "Productscanner" and scan the the DMC.

You will then see all the information about the scanned product. In the download area you can download the ETA and other data.

fischer PRO.
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Product advisor

NEW

Find the right fixing solution for your application with just a few clicks.

Productscanner

Scan your product and receive all relevant information. For example, for assembly.

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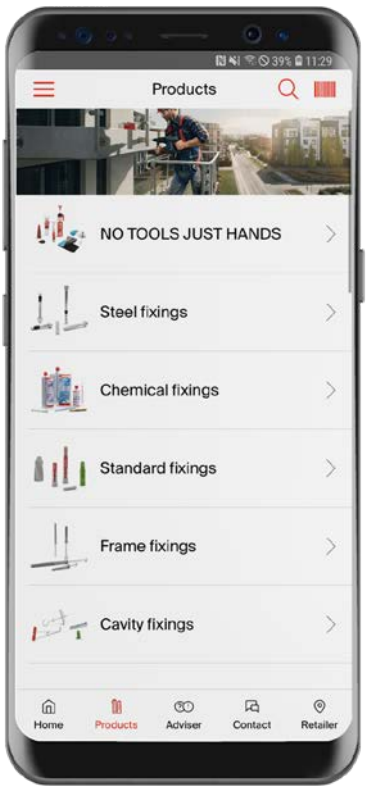

FiXperience

FiXperience.
Safe and reliable.

The fischer design Software FiXperience gives you safe and reliable support in dimensioning your projects whether you are a planer, structural engineer or craftsman. FiXperience is set up modularly and useable for a variety of applications. The program includes an engineering software with special application modules:

C-FIX

C-FIX
The anchor design program for steel and bonded anchor in concrete, as well as injection systems for masonry. Now with the new FEM design tool for the realistic design of anchorages.

WOOD-FIX

WOOD-FIX
For the calculation of on-rafter insulation systems and joints in structural timber engineering.

INSTALL-FIX

INSTALL-FIX
For the design and dimensioning of MEP installation systems.

REBAR-FIX

REBAR-FIX
For the design of post-installed rebars in reinforced concrete.

PLANNER

Electronic planner folder
All important documents and records from fischer in one program.

MORTAR-FIX

MORTAR-FIX
To determine the injection resin volume for bonded anchors in concrete and masonry.

RAIL-FIX

RAIL-FIX
For the design of fixings for railings on reinforced concrete slabs and staircases.

FACADE-FIX

FACADE-FIX
For the design of façade fixings with timber sub-structure.

CHANNEL-FIX

CHANNEL-FIX
For the design of cast-in channels and inserts.

Register on the **myfischer portal** to use **FiXperience online** or **download FiXperience** for free.

fischer Service.

Our 360° service to you.

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FiXperience

INSTALL-FIX in the design Software FiXperience

The app for the design of installation systems.
In the INSTALL-FIX module, verifications can be conducted for eleven different assemblies with brackets, frames and channels. Alternatively, the design can be started by preselecting the desired installation system. Design results or optionally the parts list can be output.

Test it now and download it for free:
www.fischer-international.com/fixperience

PRO
fischer

fischer PRO. The Mobile Guide to Fixing Solutions for Professionals.

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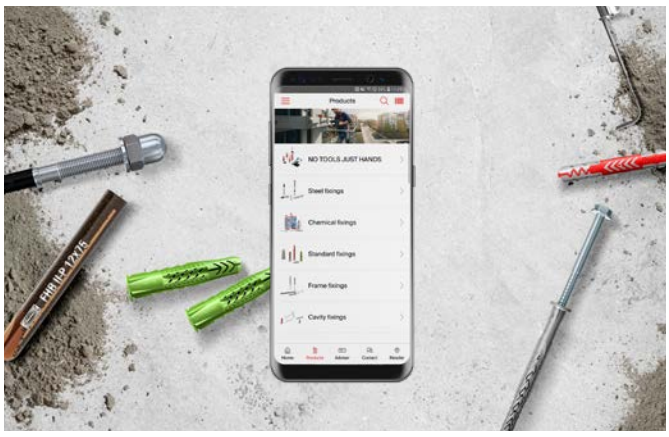

Dealer:

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fischer stands for

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fischerwerke GmbH & Co. KG
Klaus-Fischer-Straße 1 · 72178 Waldachtal
Germany
P +49 7443 12 - 0
www.fischer-international.com · info@fischer.de

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