

Rebar anchor FRA

Welded reinforcement bar with shaft made of stainless steel.

OVERVIEW



Rebar anchor FRA



Suitable for:

- Concrete $\geq C12/15$ and $\leq C50/60$



For fixing of:

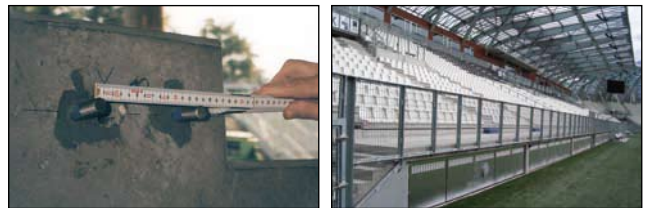
- Steel constructions
- Railings
- Consoles
- Canopies
- Machines
- Staircases



in preparation

DESCRIPTION

- A problem solver for high-tension loads at low edge distances and spacing.
- Transfer of loads to the available reinforcement in the component by way of overlapping abutment for maximum load utilisation.
- Design of the FRA reinforcement anchor according to DIN 1045-1: 2001-07.
- Metric thread in stainless steel A4 or 1.4529 for reliable use inside and outside.



Advantages/benefits

- Overlap connections allow the highest recommended tensile loads with small axial spacings and edge distances.
- Post-installed rebar connections provide flexible planning.

Accessories

- Threaded rods in concrete see page 82.
- Post-installed rebar connections see page 103.

INSTALLATION

Type of installation

- Pre-positioned installation

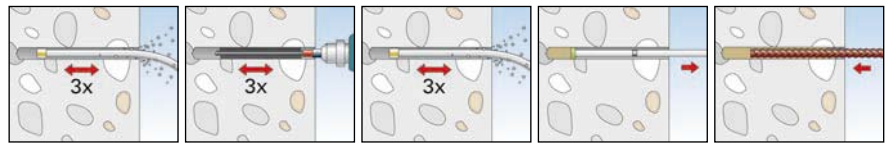
Installation tips

FIS V / FIS VS

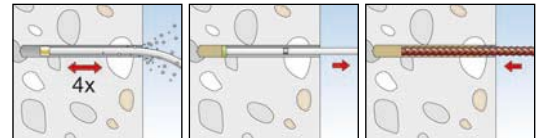
Cleaning of the drill-hole

- Blow out the drill hole three times from the bottom with a suitable cleaning nozzle (oil-free compressed air at least 6 bar).
- Clamp the extension with a suitable steel brush into the power tool.
- Brush out the drill hole three times.
- Blow out the drill hole three times from the bottom with a suitable cleaning nozzle (oil-free compressed air at least 6 bar).

FIS V and FIS VS



FIS EM (hammer-drilled holes only, diamond-drilled holes see Installation tips)



FIS EM (hammer-drilled hole)

Cleaning of the drill-hole

- Blow out the drill hole four times from the bottom with a suitable cleaning nozzle (oil-free compressed air, at least 6 bar).

FIS EM (diamond-drilled hole)

Cleaning of the drill-hole

- Rinse out the drill hole thoroughly.
- Blow out the drill hole twice from the bottom with a suitable cleaning nozzle (oil-free compressed air, at least 6 bar).
- Clamp the extension with a suitable steel into the power tool.
- Brush out the drill hole twice.
- Again blow out the drill hole twice from the bottom with a suitable cleaning nozzle (oil-free compressed air, at least 6 bar).

Filling the drill hole

- Place the mortar cartridge in the injection gun.
- Fit the static mixer, extension tube and injection adapter.
- Slowly withdraw the injection gun - following the pressure - while filling.

Inserting the reinforcement bar

- Push the reinforcement bar into the filled hole up to the setting depth mark with considerable force, while rotating it.
- Wait for the duration of the curing time.

TECHNICAL DATA

Rebar anchor **FRA**

Type	Art.No.	approvals	total length	max. fixing thickness	drill-hole	fill quantity	Qty. per box
		● DIBt ■ ETA	l	t _{fix}	d ₀	[scale units]	pcs.
			[mm]	[mm]	[Ø mm]		
FRA 12/900 M12-60	1) 2) 505529	● 2)	975	60	16	50	8
FRA 16/1100 M16-60	1) 2) 505533	● 2)	1180	60	20	81	8
FRA 20/1400 M20-60	1) 2) 505534	● 2)	1485	60	25	160	4

1) Further sizes on request.

2) ETA in preparation.

Rebar anchor FRA

LOADS

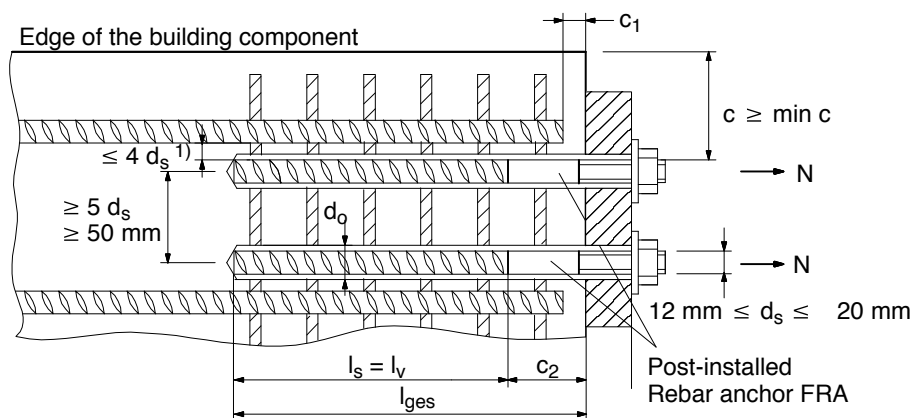
Design resistant and permissible tension loads ¹⁾ of a single anchor of fischer Rebar anchor FRA installed with Injection mortar FIS V, FIS VS and FIS EM.

Rebar anchor type		FRA 12/900 M12-60	FRA 16/1100 M16-60	FRA 20/1400 M20-60
Threaded section	Material	A4	A4	A4
	(H _s)	175	180	185
Anchorage section ³⁾	Material	BSt 500	BSt 500	BSt 500
	l _s	800 ³⁾	1000 ³⁾	1300 ³⁾
Total length of the rebar anchor		l	975	1180
Design resistant tension loads N _{Rd} of single anchor				
in concrete C16/20 ²⁾		N _{Rd} [kN]	49.2	87.4
Design resistant tension loads N _{perm} of single anchor				
in concrete C16/20 ²⁾		N _{perm} [kN]	35.1	62.4
Component dimensions and anchor characteristics				
Concrete cover	≥ c ₂	[mm]	100	100
Minimum spacing	min s	[mm]	60	80
Minimum concrete cover ⁴⁾ (with/without drill aid)	min c	[mm]	81/47 ⁴⁾	93/51 ⁴⁾
Thread diameter			M12	M16
Rebar diameter	d _s	[mm]	Ø 12	Ø 16
Nominal drill diameter	d ₀	[mm]	16	20
Drill hole depth	l _{ges} = l _s + c ₂	[mm]	850	1050
Clearance in fixture to be attached	≤ d ₂	[mm]	14	18
Required torque	≤ T _{inst}	[Nm]	50	100
Required mortar volume l _{ges}		[Scale units]	50	81

- ¹⁾ The partial material safety factors according to German standard DIN 1045 as well as a safety factor for load $\gamma_L = 1.4$ are considered. For a detailed design of the fischer Rebar anchor FRA the German approval as well as the local standard for reinforced concrete of your country has to be observed.
- ²⁾ The German approval permits the use of the FRA in concrete of the strength classes C12/15 up to C50/60.
- ³⁾ For higher concrete strength classes ≤ C30/37 but corresponding to the static design of the anchorage the anchorage section may be shortened.
- ⁴⁾ The minimum concrete cover according to the local standard for reinforced concrete has to be observed.

General rules of constructions

- The Rebar anchor FRA is permitted to transfer tension loads in direction of the axis of the rebar only.
- l_v and l_s according to approval.
- According approval it has to be proved that sufficient transverse reinforcement is available.



- c Concrete cover of the post-installed rebar anchor
- c₁ Concrete cover of the front side of the existing rebar
- c₂ Concrete cover above the welding
- min c Minimum concrete cover acc. to approval
- d_s Diameter of the post-installed rebar anchor
- l_s Lap length
- l_v Effective anchorage depth of the rebar anchor
- l_{ges} Embedment depth of the rebar anchor
- d₀ Nominal drill diameter

¹⁾ If the clear distance between the lapping rebars is more than $4 \times d_s$, then the local standard for reinforcement is to be used.

Reinforcement bars

Using the fischer Injection mortar FIS V, FIS VS or FIS EM.

oVeRVieW



FiS-Rebar case
for reinforcement
connection



For fixing of:

- Post-installed rebars
- Rebar anchor FRA



DeSc RipTio N

- Resin system for post installation of reinforcement bar anchorages in concrete in conjunction with Injection mortar FIS V, FIS VS or FIS EM.
- Defined load-bearing capacity as per approval and secure anchorage like cast-in reinforcement bars to European standard (EC 2) and DIN 1045-1.

Advantages/benefits

- Subsequent and flexible planning enables changes to existing buildings.
- Simple installation procedure reduces work involved and thus costs.
- German official building supervisory approval (DIBt) for reinforcement connections guarantees safety.



iNSTALLATio N

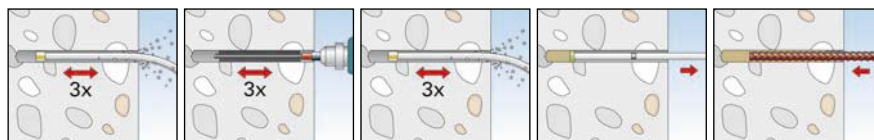
installation tips

FiS V / FiS VS

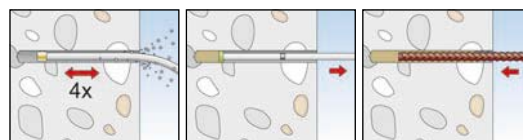
cleaning of the drill-hole

- Blow out the drill hole three times from the bottom with a suitable cleaning nozzle (oil-free compressed air at least 6 bar).
- Clamp the extension with a suitable steel brush in the drill.
- Brush out the drill hole three times.
- Blow out the drill hole three times from the bottom with a suitable cleaning nozzle (oil-free compressed air at least 6 bar).

FiS V and FiS VS



FiS eM (hammer-drilled holes only, diamond-drilled holes see installation tips)



FiS eM (hammer-drilled hole)

cleaning of the drill-hole

- Blow out the drill hole four times from the bottom with a suitable cleaning nozzle (oil-free compressed air, at least 6 bar).

Reinforcement bars

in STall aTiOn

FIS eM (diamond-drilled hole)

cleaning of the drill-hole

- Rinse out the drill hole thoroughly.
- Blow out the drill hole twice from the bottom with a suitable cleaning nozzle (oil-free compressed air, at least 6 bar).
- Clamp the extension with a suitable steel into the power tool.
- Brush out the drill hole twice.
- Again blow out the drill hole twice from the bottom with a suitable cleaning nozzle (oil-free compressed air, at least 6 bar).

Filling the drill hole

- Place the mortar cartridge in the injection gun.
- Fit the static mixer, extension tube and injection adapter.
- Slowly withdraw the injection gun - following the pressure - while filling.

inserting the reinforcement bar

- Push the reinforcement bar into the filled hole up to the setting depth mark with considerable force, while rotating it.
- Wait for the duration of the curing time.

For the installation according to the approval, a special certification is necessary.

Technic al D aTa



FIS-Rebar Case
for reinforcement connection

Type	Art.-No.	approval	content	qty. per box
		<ul style="list-style-type: none"> ● DIBt ■ ETA 		pcs.
FIS-Rebar Case for reinforcement connection (D)	505941	<ul style="list-style-type: none"> ● ■ 	8 x Cleaning brush, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 8 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 2 x Cleaning nozzle for drill-Ø 12 - Ø 15, 2 x Cleaning nozzle for drill-Ø 16 - Ø 19, 2 x Cleaning nozzle for drill-Ø 20 - Ø 25, 2 x Cleaning nozzle for drill-Ø 30 - Ø 35, 1 x Marker tape (blue), 1 x Installation instructions, 10 x Installation report, 2 x Flat spanner SW 7	1
FIS-Rebar Case for reinforcement connection (D, GB, F, I, E)	505942	<ul style="list-style-type: none"> ● ■ 	8 x Cleaning brush, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 8 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 2 x Cleaning nozzle for drill-Ø 12 - Ø 15, 2 x Cleaning nozzle for drill-Ø 16 - Ø 19, 2 x Cleaning nozzle for drill-Ø 20 - Ø 25, 2 x Cleaning nozzle for drill-Ø 30 - Ø 35, 1 x Marker tape (blue), 1 x Installation instructions, 2 x Flat spanner SW 7	1



Cleaning brush with thread M 8

Type	Art.-No.	colour	qty. per box
			pcs.
Brush for drill-Ø 12 mm	001490	white	1
Brush for drill-Ø 14 mm	001491	blue	1
Brush for drill-Ø 16 mm	001492	red	1
Brush for drill-Ø 18 mm	001493	yellow	1
Brush for drill-Ø 20 mm	001494	green	1
Brush for drill-Ø 25 mm	001495	black	1
Brush for drill-Ø 30 mm	090063	grey	1
Brush for drill-Ø 35 mm	090071	brown	1

TECHNICAL DATA



Injection adapter
for drill Ø 12 - 25 mm



Injection adapter
for drill Ø 30 - 35 mm

Type	Art.-No.	colour	qty. per box
			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 9) for drill-Ø 25 mm	001507	black	10
Injection-adapter (Ø 15) for drill-Ø 20 mm	001508	green	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 9) for drill-Ø 35 mm	090699	brown	10
Injection-adapter (Ø 15) for drill-Ø 30 mm	090700	grey	10
Injection-adapter (Ø 15) for drill-Ø 35 mm	090701	brown	10



Drill guide



Extension tube

Type	Art.-No.	qty. per box
		pcs.
Drill guide 3 parts	090819	1
Extension tube Ø 9 (1 m)	000472	10
Extension tube Ø 15 (1,9 m)	001489	10



SDS-max scabbling tool
to roughen the connection surface

Type	Art.-No.	dimensions	qty. per box
		[mm]	pcs.
Scabbling tool	001253	45 x 240	1

Reinforcement bars

LOADS

Design resistant and permissible tension loads ¹⁾ of a single rebar post-installed with Injection mortar FIS V, FIS VS and FIS EM.

Rebar size	d_s [mm]	Post-installed rebar connection with FIS V, FIS VS, FIS EM										
		Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32	Ø 36	Ø 40
Steel grade	f_{yk} [N/mm ²]	500										
	f_{uk} [N/mm ²]	550										
Basic value for the required anchorage length in concrete C20/25 ^{2) 3)} FIS V, FIS VS	$l_{b,rqd}$ [mm]	379	472	567	661	756	945	1181	1323	-	-	-
Basic value for the required anchorage length in concrete C20/25 ³⁾ FIS EM ^{4) 6)}	$l_{b,rqd}$ [mm]	379	472	567	661	756	945	1181	1323	1510	1700	1890
Maximum design resistant tension load $N_{Rd,s}$ of a single rebar at full steel capacity												
Maximum design resistant tension load of a single rebar ⁵⁾	$N_{Rd,s}$ [kN]	21.9	34.1	49.2	66.9	87.4	136.6	213.4	267.7	349.7	442.6	546.4
Maximum permissible tension load $N_{perm,s}$ of a single rebar at full steel capacity												
Maximum permissible tension load of a single rebar ¹⁾	$N_{perm,s}$ [kN]	15.6	24.4	35.1	47.8	62.4	97.6	152.4	191.2	249.8	316.1	390.3
Installation characteristics												
Nominal drill diameter	d_0 [mm]	12	14	16	18	20	25	30	35	40	46	50
Maximum permissible embedment depth	$\max l_v$ [mm]	1800	1800	1800	1800	1800	1800	2000	2000	2000	2000	2000
Required mortar volume per 100 mm	[scale units]	4.2	5.0	5.6	6.4	7.3	11.1	13.0	20.6	27.0	34.0	42.0

¹⁾ The partial material safety factors according to the European Standard EC2 as well as a safety factor for load $\gamma_L = 1.4$ are considered.

For a detailed design of a post-installed rebar connection with FIS V, FIS VS, FIS EM the approvals as well as the local standard for reinforced concrete of your country has to be observed.

²⁾ The ETA-approval of FIS V permits post-installed rebar connections in concrete of the strength classes C12/15 up to C50/60.

³⁾ For higher concrete strength classes $\leq C25/30$ the basic value for the required anchorage length $l_{b,rqd}$ may be reduced according to the local standard for reinforced concrete of your country. However for concrete strength classes $\geq C12/15$ and $< C20/25$ the basic value for the required anchorage length $l_{b,rqd}$ has to be increased.

⁴⁾ Approval under preparation.

⁵⁾ The partial material safety factors according to the European Standard EC2 are considered.

⁶⁾ The values for FIS EM are valid for hammer drilling as well as diamond drilling.

