

**fischer** 

**WRL compliant  
anchoring.  
Officially approved.**



# WRL compliant anchoring with FIS EM Plus injection system.

## Protect the environment

### WRL compliant anchoring with fischer: sealed, tested and officially approved.

Anchoring for plants containing water polluting substances that are not outfitted with two sealing levels must fulfil specialised requirements in accordance with the German Water Resources Law (WRL, in German WHG) and the regulations on facilities for handling substances that are hazardous to water (AwSV). The guidelines of the Deutscher Ausschuss für Stahlbeton (DAfStb) "Concrete construction for the handling of water polluting substances" (BUMwS) require the use of bonded anchors that have a usability certificate issued by the building approval authorities. This requirement is ideally fulfilled by a general construction technique permit (aBG). fischer has developed and tested a system approved for use with

liquid impermeable concrete (LI/LIP concrete) as well as coated concrete with the epoxy resin coating StoCretex WHG System 2 and has received the first general construction technique permits from the Deutsches Institut für Bautechnik (German technical authority and a service provider for the construction sector DIBT) for a variety of media groups. In addition to the general construction technique permit, fischer has verified through an accredited testing institute and expert report that the fixing system fulfils the WRL also for further epoxy based coatings. The system also has an European Technical Assessment (ETA) for static load, which is a requirement for the design certifications.

### Applications



Airports



Shelf warehouses



Pallet warehouses



Chemical production with silos and pipelines



Harbours with oil tanks

# Anchoring solution

## FIS EM Plus - the approved system for anchoring in sealing surfaces according to the WRL (Water Resources Law).

The fischer injection mortar FIS EM Plus is a high-quality epoxy mortar for top load-bearing capacity in cracked and non-cracked concrete and for seismic applications in performance categories C1 and C2. It is suitable, for example, for anchoring tall shelving or heavy steel constructions both inside and outside. The injection mortar is processed with approved fischer anchor rods

FIS A / RG M with variable anchoring depths or internal threaded anchor RG MI. The epoxy resin mortar may be installed in hammer drilled holes, diamond drilled holes or drill holes made with a hollow drill bit. The general construction technique permits for LI/LIP concrete and coated WRL sealing surfaces also allow the FIS EM Plus to be used for WRL compliant anchorings.



### Your advantages at a glance

- General construction technique permits for WRL sealing surfaces made of liquid impermeable concrete (LI/LIP concrete) as well as coated concrete offer security in planning and installation.
- The system, consisting of injection mortar FIS EM Plus, threaded rod FIS A / RG M M8-M30 or internal-threaded anchor RG MI M8-M20 as well as WRL marking disc offers simple, clearly regulated installation and marking of the fixing points for fast and error-free installation.
- The system is available in galvanised steel (gvz), stainless steel (R) and highly corrosion resistant steel 1.4529 (HCR) and allows for secure use in internal, external and highly corrosive areas for many different applications.
- The design software can be used to prepare structural verifications for anchors in WRL sealing surfaces.

### Certificates



ETA-17/0979,  
for cracked concrete, Seismic  
performance categories C1, C2



ICC-ES for cracked and  
uncracked concrete,  
post-installed rebar connection



aBG = general construction  
technique permit (aBG)  
Water resources law (WRL)

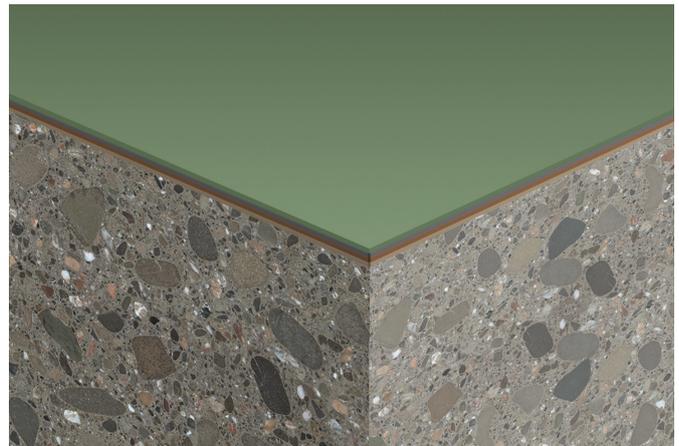


# Anchorage substrate LI/LIP concrete and coated concrete.

WRL surfaces are generally divided into two types, namely liquid impermeable concrete (LI/LIP concrete) and coated concrete.



LI/LIP concrete in general is a type of concrete with optimised resistance against penetration by water polluting substances. LIP concrete is a liquid impermeable concrete after penetration testing. LI/LIP concrete is designed so as to be considered liquid impermeable.



If the WRL surface is created by applying a coating to the concrete, then the coating alone is responsible for sealing against water polluting substances. fischer has developed a system in which the seal against water polluting substances is retained, even if holes are drilled into the coated concrete.

WRL marking for using FIS EM Plus in LI/LIP concrete as well as coated concrete:



Optional WRL Set for using FIS EM Plus in coated concrete:



# List of permitted liquids.

Tested media for use in concrete and steel reinforced concrete structures for the storage, filling and handling of substances hazardous to water		Coated concrete Media group 1 of the DIBt media list	Uncoated concrete Media group 4 of the DIBt media list	Coated concrete with StoCretec WHG System 2 according to aBG Z-74.8-211
1	Gasoline fuels in accordance with DIN EN 228 with a maximum (bio) ethanol content of 5 Vol.-% according to DIN EN 15376	•	•	•
1a	Gasoline fuels in accordance with DIN EN 228 with added bio-fuel components according to Directive 2009/28/EC up to a total content of max. 20 Vol.-% (incl. group 1)	•	•	•
2	Jet fuels	•	•	•
3	Heating oil EL in accordance with DIN 51603-1, unused combustion engine motor oils, unused vehicle gearbox oils Mixtures of saturated and aromatic hydrocarbons with an aromatic content of ≤ 20 Ma.-% and a flame point of >60 °C	•	•	•
3b	Diesel fuels in accordance with DIN EN 590 with added biodiesel according to DIN EN 14214 up to a total content of max. 20 Vol.-%	•	•	•
3c	Diesel fuel blends according to DIN EN 16709 with a high percentage of FAME up to a total content of max. 30 Vol.-% (incl. group 3b)	•	•	
4	Hydrocarbons and mixtures containing benzene with max. 5 Vol.-% Benzene, except for fuels (incl. groups 2, 3, 4b and 4c, except for groups 1, 1a, 3b, 3c and 4a)	•		
	Hydrocarbons and mixtures containing benzene with max. 5 Vol.-% Benzene, except for fuels		•	•
4a	Benzene and mixtures containing benzene	•		
	Aliphatic and cycloaliphatic hydrocarbons		•	•
4b	Raw oils	•		
	Aromatic hydrocarbons		•	•
4c	Used combustion engine motor oils and used vehicle gearbox oils with a flame point > 60 °C	•	•	•
5	Monovalent and polyvalent alcohols with max. 48 Vol.-% methanol and ethanol (in total), glycol, polyglycols, their monoethyl ethers and their aqueous mixtures (incl. group 5b)	•		
	Alcohols and glycol ethers		•	•
5a	Alcohols and glycol ethers as well as their aqueous mixtures (incl. groups 5, 5b and 5c)	•		
	Alcohols and glycol ethers, except for methanol and blends containing methanol		•	•
5b	Mono- and polyvalent alcohols ≥ C2 with max. 48 Vol.-% ethanol and its aqueous mixtures	•		
5c	Ethanol, including ethanol according to DIN EN 15376 (regardless of the manufacturing process) and its aqueous solutions	•		
6b	Aromatic halogenated hydrocarbons		•	•
7	Organic esters and ketones, except for biodiesel (incl. group 7a)	•		
	Biodiesel according to DIN EN 14214 (fatty acid methyl ester (FAME) according to DIN EN 14214, vegetable oil fuel - rapeseed oil according to DIN 51605 and vegetable oil fuel according to DIN 51623)		•	•
7a	Aromatic esters and ketones, except for biodiesel	•		
	Biodiesel according to DIN EN 14214		•	•
7b	Biodiesel according to DIN EN 14214	•		
8	Aqueous solutions of aliphatic aldehyde up to 40 %	•		
	Organic ketones		•	•
8a	Aliphatic aldehydes and their aqueous solutions (incl. group 8)	•		
9	Aqueous solutions of organic acids (carboxylic acids) up to 10% as well as their salts (in aqueous solutions) except for lactic acid and formic acid	•		
	Aqueous solutions of aliphatic aldehydes up to 40 %		•	•
9a	Organic acids (carboxylic acids, except for formic acid >10 %) and their salts (in aqueous solution)	•		
10	Inorganic acids (mineral acids) up to 20% and acidic, hydrolysing, inorganic salts in aqueous solutions (pH <6), except for hydrofluoric acid and oxidising acids and their salts.	•		
11	Inorganic lyes and alkaline hydrolysing, inorganic salts in aqueous solutions (pH >8), except for ammonia solutions and oxidising solutions of salts (such as hypochlorite)	•		
12	Aqueous solutions of inorganic, non-oxidising salts with a pH value between 6 and 8	•		
13	Amines and their salts (in aqueous solution)	•		
14	Aqueous solutions of organic tensides	•		
<b>Individual media</b>				
E 85	Ethanol fuel E85 according to DIN 51625		•	
E10	Gasoline E10 according to DIN EN 228		•	
	Adblue	•		

\* Media lists apply to sealing materials and seal designs in systems for storing, filling and handling water polluting substances (last updated June 2018)  
For approved loading levels, see the expert report.

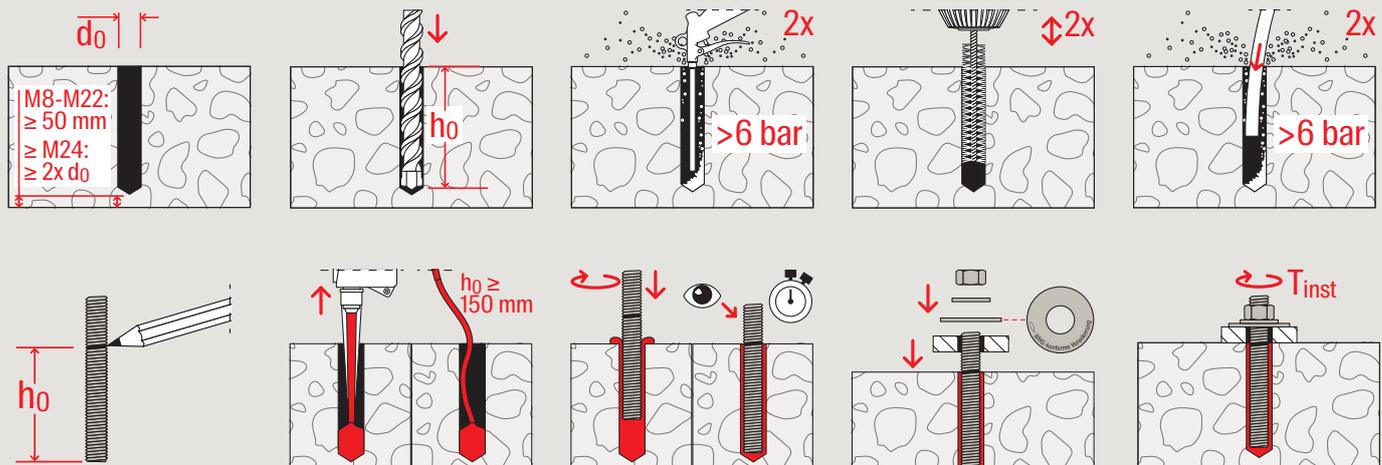
# Installation

## Installation documentation for LI/LIP concrete and coated concrete:

The general construction technique permits require documentation that the anchorings have been constructed properly. However, it is important to carefully document installation and use, not only due to documentary requirements related to the approval, but for

quality assurance purposes as well. fischer provides an installation protocol for this purpose which includes all necessary information and serves as a legally secure document.

## Installation LI/LIP concrete:



An anchoring in LI/LIP concrete must be designed so that no liquid can penetrate through the anchor into the concrete. The drill hole can be constructed using hammer drilling or with a hollow drill. The drill hole depth must always be at least 50 mm less than the existing component thickness. The epoxy mortar FIS EM Plus,

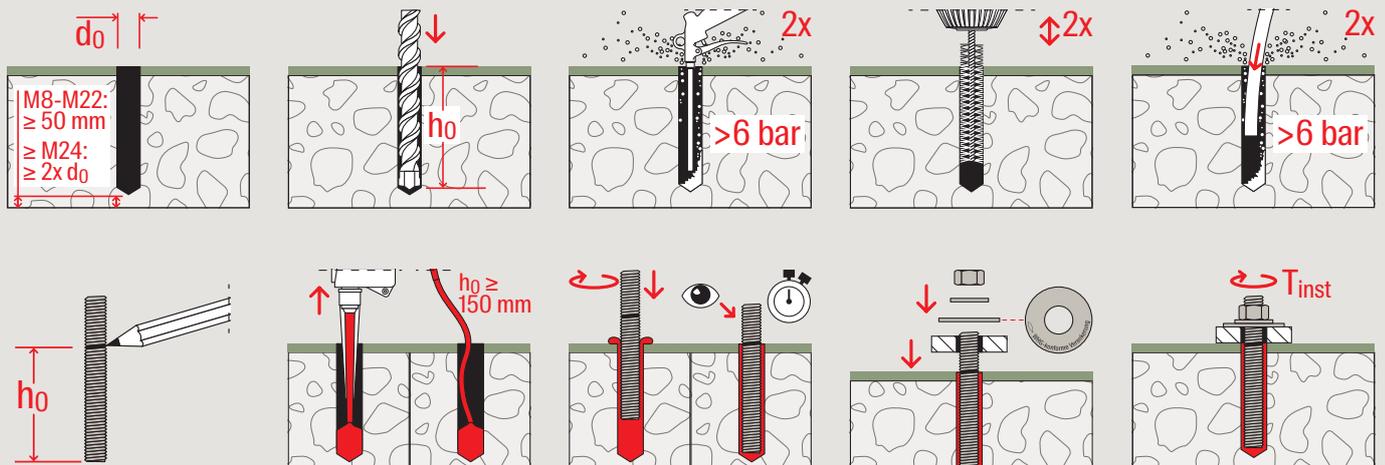
anchor rod FIS A / RG M or internal-threaded anchor RG M I and WRL marking are required for anchorings in LI/LIP concrete. In general, the aBG requires anchoring materials made of stainless steel for WRL applications.

## WRL marking:

The WRL marking disc is an important part of the fischer WRL fixing system. It clearly and permanently indicates use of the

correct system and facilitates simple, reliable building approvals. It is mounted between the washer and attachment.

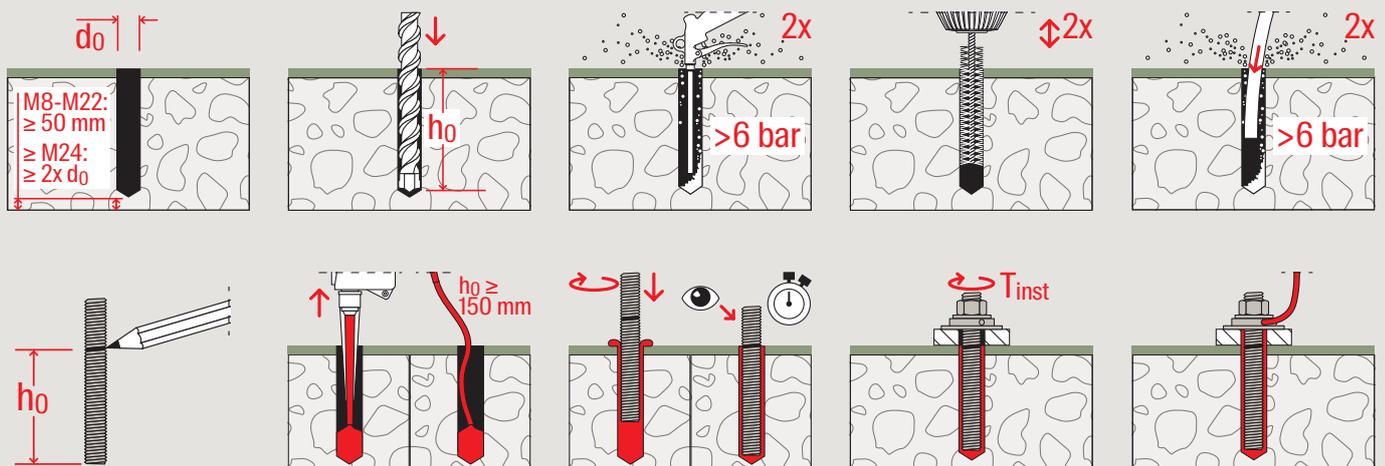
**Installation coated concrete:**



The anchoring solution in coated concrete includes epoxy mortar FIS EM Plus, anchor rod FIS A / RG M or internal-threaded anchor RG M I and the WRL marking disc.

The application is approved for the epoxy coating StoCretec WHG System 2 and and proven by expert reports for other epoxy resin coatings.

**Installation in coated concrete with WRL set:**



**WRL set:**

Optionally, the WRL set can additionally be used for anchorings in coated concrete. The set consists of the WRL marking disc, a filling disc, a rounded washer and an injection adapter and is available in

galvanized steel and stainless steel. The WRL set is used to fill and additionally seal the annular gap and to mark the fixing point as a WRL-compliant anchorage.

# Assortment & Accessories

## Epoxy mortar FIS EM Plus



FIS EM Plus 390 S



FIS EM Plus 585 S



FIS EM Plus 1500 S



FIS MR Plus

FIS UMR

Item	Item No.	Approval			Languages on the cartridge	Contents	Sales unit [pcs]
		WRL	ETA	ICC			
FIS EM Plus 390 S	544154	●	●	●	EN, FR, NL	1 cartridge 390 ml + 2 x static mixer FIS MR Plus	6
FIS EM Plus 390 S	544155	●	●	●	EN, ZH, AR	1 cartridge 390 ml + 2 x static mixer FIS MR Plus	6
FIS EM Plus 390 S	544176	●	●	●	CS, SK, RO	1 cartridge 390 ml + 2 x static mixer FIS MR Plus	6
FIS EM Plus 390 S	544159	●	●	●	RU, UK, KK	1 cartridge 390 ml + 2 x static mixer FIS MR Plus	6
FIS EM Plus 585 S	567989	●	●	●	DE, FR, NL	1 cartridge 585 ml + 2 x static mixer FIS UMR	6
FIS EM Plus 585 S	544165	●	●	●	PL, CS, SK, KO	1 cartridge 585 ml + 2 x static mixer FIS UMR	6
FIS EM Plus 585 S	544175	●	●	●	EN, ZH, KO	1 cartridge 585 ml + 1 x static mixer FIS UMR, 1 x extension tube Ø 9 x 250mm	6
FIS EM Plus 1500 S	544167	●	●	●	DE, FR, IT, ES, EN	1 cartridge 1500 ml + 2 x static mixer FIS UMR	4
FIS MR Plus	545853	-	-	-	-	10 static mixer for FIS EM Plus 390 S	10
FIS UMR	520593	-	-	-	-	10 static mixer for FIS EM Plus 585 S, FIS EM Plus 1500 S	10

## WRL marking



WRL marking

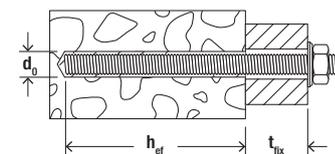
Item	Item No.	Content	Outer diameter [mm]	Sales Unit [pcs]
WRL marking M8	558307	10x WRL marking disc M8	35	10
WRL marking M10	558308	10x WRL marking disc M10	35	10
WRL marking M12	558309	10x WRL marking disc M12	40	10
WRL marking M16	558310	10x WRL marking disc M16	50	10
WRL marking M20	558311	10x WRL marking disc M20	60	10
WRL marking M24	558312	10x WRL marking disc M24	65	10

## Nut and washer



Hexagonal nut and washer

Item	Item No. Zinc plated gVz	Item No. Stainless steel R	Width across nut SW	Washer (outer diameter x thickness) [mm]	Match	Sales unit [pcs]
Nut & washer M8	510509	510113	13	16 x 1.6	FIS A M8 x 1.000	50
Nut & washer M10	510510	510514	17	20 x 2.0	FIS A M10 x 1.000	50
Nut & washer M12	510511	510515	19	24 x 2.5	FIS A M12 x 1.000	25
Nut & washer M16	510512	510516	24	30 x 3.0	FIS A M16 x 1.000	20
Nut & washer M20	519737	519738	30	37 x 3.0	FIS A M20 x 1.000	10
Nut & washer M24	552110	-	36	37 x 3,0	FIS A M24 x 1.000	5
Nut & washer M30	559124	-	46	56 x 4,0	FIS A M30 x 1.000	5



## Threaded rod FIS A in combination with FIS EM Plus



FIS A, Zinc plated

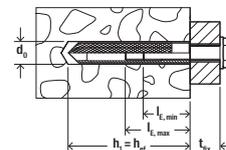


FIS A, Stainless steel

Item	Item No.	Item No.	Item No.	Drill hole diameter	Min. anchorage depth	Max. usable length	Min. filling quantity FIS EM Plus	Max. anchorage depth	Max. usable length	Max. filling quantity FIS EM Plus	Sales unit
	Zinc plated Steel grade 5.8 <sup>1)</sup>	Zinc plated Steel grade 8.8 <sup>1)</sup>	Stainless steel R FK 70 CRC III	$d_o$ [mm]	$h_{ef, min}$ [mm]	$t_{fix, hef min}$ [mm]	$h_{ef min}$ [scale units]	$h_{ef max}$ [mm]	$t_{fix, hef max}$ [mm]	$h_{ef, max}$ [scale units]	[pcs]
FIS A M 8 x 90	090274	519390	090440	10	60	19	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 140	553763	-	-	10	60	70	2	129	1	2	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	-	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 <sup>2)</sup>	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 <sup>2)</sup>	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 350	-	558865	-	18	80	250	4	320	10	16	10
FIS A M 16 x 1000 <sup>2)</sup>	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 350	-	559627	-	20	90	236	24	320	6	42	10
FIS A M 20 x 400	-	558866	-	20	90	286	10	375	1	42	10
FIS A M 20 x 1000 <sup>2)</sup>	-	519410	519427	24	90	-	11	400	-	48	10
FIS A M 24 x 290	090294	-	090461	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 24 x 450	-	558867	-	28	96	325	13	420	1	63	5
FIS A M 24 x 650	-	558868	-	28	96	525	13	480	141	63	5
FIS A M 24x 1000 <sup>2)</sup>	-	551771	-	28	96	-	13	480	-	63	5
FIS A M 30 x 430	090297	-	090464	35	120	275	28	394	1	88	5
FIS A M 30 x 550	-	558869	-	35	120	396	24	515	1	120	5
FIS A M 30 x 650	-	558870	-	35	120	496	24	600	16	120	5
FIS A M 30 x 750	-	558871	-	35	120	596	24	600	116	120	5

<sup>1)</sup> Not part of the general technique construction permit. Application regulated in expert report.<sup>2)</sup> Order washer and nut separately. – FIS A made of high-corrosion resistant steel HCR upon request. Further dimensions on request.

# Assortment & Accessories



## Internal-threaded anchor RG M I in combination with FIS EM Plus



RG M I, Zinc-plated



RG M I, Stainless steel

Item	Item No. Zinc plated Steel grade 5.8 <sup>1)</sup>	Item No. Stainless steel R	Internal thread M [mm]	Drill hole diameter d <sub>o</sub> [mm]	Anchorage depth h <sub>et</sub> [mm]	Filling quantity FIS EM Plus [scale units]	Min. bolt penetration l <sub>E,min</sub> [mm]	Max. bolt penetration l <sub>E,max</sub> [mm]	Sales unit [pcs]
RG 12 x 90 M 8 I	050552	050565	M8	14	90	5	8	18	10
RG 16 x 90 M 10 I	050553	050566	M10	18	90	7	10	23	10
RG 16 x 125 M 12 I	050562	050567	M12	20	125	11	12	26	10
RG 22 x 160 M 16 I	050563	050568	M16	24	160	17	16	35	5
RG 28 x 200 M 20 I	050564	050569	M20	32	200	48	20	45	5

<sup>1)</sup> Not part of the general technique construction permit. Application regulated in expert report.

## Dispenser



FIS DM S Pro



FIS AM



FIS AM S-XL



FIS DB S Pro



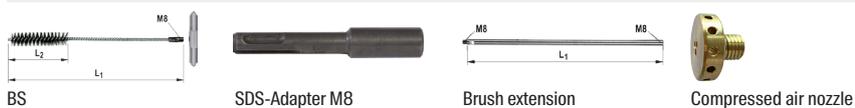
FIS DB SL Pro



FIS AP

Item	Item No.	Content	Suitable for	Sales unit [pcs]
FIS DM S Pro	563337	Manual dispenser	150 T, 300 T, 360 S, 390 S cartridges	1
FIS AM	058000	Manual dispenser	150 T, 300 T, 360 S, 390 S cartridges	1
FIS AM S-XL	563241	Manual dispenser	525 S cartridges	1
FIS DB S Pro (EU)	558955	Battery operated dispenser with 1x charger 12-36V EU, 1x battery pack 18V 2.0Ah, 1x screw off handle, 1x belt hook, 1x hard case	150 T, 300 T, 360 S, 390 S cartridges	1
FIS DB S Pro (UK)	564960	Battery operated dispenser with 1x charger 12-36V UK, 1x battery pack 18V 2.0Ah, 1x screw off handle, 1x belt hook, 1x hard case	150 T, 300 T, 360 S, 390 S cartridges	1
FIS DB S Pro Solo	567189	Battery operated dispenser with 1x screw off handle, 1x belt hook, 1x hard case	150 T, 300 T, 360 S, 390 S cartridges	1
FIS DB SL Pro (EU)	562004	Battery operated dispenser with 1x charger 12-36V EU, 1x battery pack 18V 2.0Ah, 1x screw off handle, 1x belt hook, 1x hard case	585 S, 825 S cartridges	1
FIS DB SL Pro (UK)	564961	Battery operated dispenser with 1x charger 12-36V UK, 1x battery pack 18V 2.0Ah, 1x screw off handle, 1x belt hook, 1x hard case	585 S, 825 S cartridges	1
FIS DB SL Pro Sol	567295	Battery operated dispenser with 1x screw off handle, 1x belt hook, 1x hard case	585 S, 825 S cartridges	1
FSS-B 18V 2,0Ah	563787	Battery Pack	FIS DB S Pro, FIS DB SL Pro	1
FSS-B 18V 4,0Ah	552930	Battery Pack	FIS DB S Pro, FIS DB SL Pro	1
FIS AP	058027	Pneumatic dispenser	150 T, 300 T, 360 S, 390 S cartridges	1

## Cleaning brushes



Item	Item No.	Length L <sub>1</sub> [mm]	Length L <sub>2</sub> [mm]	Brush diameter Ø [mm]	For drill diameter [mm]	Sales unit [pcs]
BS ø 10	078178	120	50	11	10	1
BS ø 12	078179	150	80	13	12	1
BS ø 14	078180	250	80	16	14	1
BS ø 16/18	078181	250	80	20	16/18	1
BS ø 24	078182	300	100	26	24	1
BS ø 28	078183	350	100	30	28	1
BS ø 30/32/35	078184	400	100	40	30/32/35	1
Brush extension	508791	410	—	—	—	1

## WRL set for coated concrete



Item	Item No. Zinc plated gvz	Item No. Stainless steel R	Suitable for	Height WRL set <sup>1)</sup> [mm]	Content	Sales unit [pcs]
WRL Set coated concrete M8	558313	558319	FIS A M8	8	10 pcs. each of marking disc, filling disc, rounded washer, 3x injection adapter	10
WRL Set coated concrete M10	558314	558320	FIS A M10	8	10 pcs. each of marking disc, filling disc, rounded washer, 3x injection adapter	10
WRL Set coated concrete M12	558315	558321	FIS A M12	9	10 pcs. each of marking disc, filling disc, rounded washer, 3x injection adapter	10
WRL Set coated concrete M16	558316	558322	FIS A M16	10	10 pcs. each of marking disc, filling disc, rounded washer, 3x injection adapter	10
WRL Set coated concrete M20	558317	558323	FIS A M20	12	10 pcs. each of marking disc, filling disc, rounded washer, 3x injection adapter	10
WRL Set coated concrete M24	558318	558324	FIS A M24	16	10 pcs. each of marking disc, filling disc, rounded washer, 3x injection adapter	10

<sup>1)</sup> When using the WRL Set, the usable length must be reduced by the height of the WRL Set.

Dealer:

[www.fischer-international.com](http://www.fischer-international.com)



fischer stands for

Fixing Systems  
Automotive  
fischertechnik  
Consulting  
Electronic Solutions

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