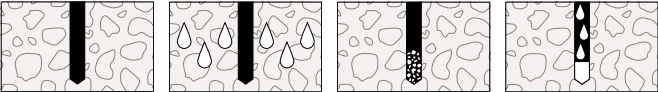


fischer 

FIS EM Plus.



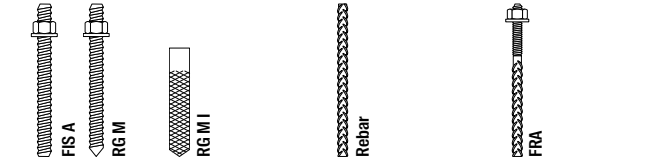
DE Gebrauchsanweisung · **EN** Operating instructions · **FR** Mode d'emploi ·
NL Montagehandleiding · **IT** Istruzioni per l'installazione · **ES** Instrucciones de uso ·
PT Instruções de utilização · **DA** Installationsvejledning · **SV** Installationsinstruk-
tioner · **NO** Installasjonsveiledning · **FI** Asennusohjeet · **IS** Notkunarleiðbeiningar ·
ET Kasutusjuhend · **LV** Lietošanas instrukcija · **LT** Naudojimo instrukcija ·
PL Instrukcja instalacji · **CS** Návod k instalaci · **SK** Návod na používanie ·
HU Szerelési útmutató · **RO** Instrucțiuni de utilizare · **SL** Navodila za namestitev ·
HR Upute za instalaciju · **SR** Uputstvo za instalaciju · **TR** Kurulum talimatları ·
EL Οδηγίες Εγκατάστασης · **BG** Инструкции за инсталиране · **RU** Инструкция по
установке · **UK** Інструкція з використання · **KK** Колдану нұсқаулығы · **ZH** 使用说明书 ·
JA 取扱説明書 · **KO** 사용 설명서 · **ID** Panduan Penggunaan · **AR** تعليمات الاستخدام



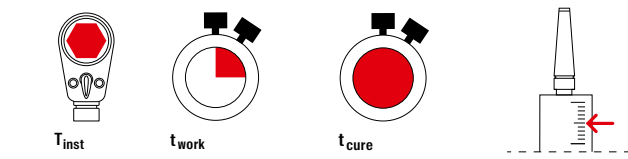
DE	Trockener Beton	Nasser Beton	Verschmutztes Bohrloch	Wassergefülltes Bohrloch
EN	Dry concrete	Water saturated concrete	Contaminated drill hole	Water filled borehole
FR	Béton sec	Béton humide	Perçage non dépoussiéré	Trou inondé
NL	Droog beton	Met water verzadigd beton	Vervuild boorgat	Met water gevuld boorgat
IT	Calcestruzzo secco	Calcestruzzo saturo d'acqua	Foro sporco	Foro pieno d'acqua nel calcestruzzo
ES	Hormigón seco	Hormigón saturado de agua	Agujero de taladrado sucio	Taladro lleno de agua en hormigón
PT	Betão seco	Betão saturado de água	Furo com sujidade	Furo cheio de água
DA	Tør beton	Vandmættet beton	Tilsmudset borehul	Vandfyldt borehul
SV	Torr betong	Vattenmättad betong	Smutsigt hål	Vattenfylt hål
NO	Tørr betong	Vannmettet betong	Tilskitnet borehull	Vannfylte borehull
FI	Kuiva betony	Veden kyllästämä betoni	Likaantunut poranreikä	Vedellä täytynyt porareikä
IS	Þurr steinsteypa	Blaut steinsteypa	Óhreinn borhola	Vatnsfyllt borhola
ET	Kuivbetoon	Märgbetoon	Mustunud puuriauk	Veega täidetud puuriauk
LV	Sauss betons	Mītrs betons	Piesārņots urbums	Urbums ar ūdeni
LT	Sausas betonas	Drėgnas betonas	Užteršta išgręžta skylė	Vandens pripildyta išgręžta skylė
PL	Beton suchy wodą	Beton nasycony wodą	Zabrudzony wywiercony otwór	Wywiercony otwór wypełniony
CS	Suchý beton	Mokrý beton otvory vyvrtné do	Znečištěný vývrt	Naplňené vodou
SK	Suchý betón	Vodou nasýtený betón	Znečistený vývrt	Vodou naplnený otvor vyvrtný
HU	Száraz beton	Nedves beton	Szennyezett furat	Vízzel töltött furat
RO	Beton uscat	Beton ud	Gaură forată contaminată	Gaură forată umplută cu apă
SL	Suh beton	Moker beton	Umazana izvrtina	Z vodo napolnjena izvrtina
HR	Suhi beton	Mokri beton	Zaprljani provrt	Vodom napunjen provrt
SR	Suv beton	Mokar beton	Zaprljan provrt	Provrt napunjen vodom
TR	Kuru beton	Yaş beton	Kirli delik	Su dolu delik
EL	Στεγνό μπετόν	Υγρό μπετόν	Βρώμικη τρύπα	Τρύπα γεμάτη νερό
BG	Сух бетон	Мокър бетон	Замърсен отвор	Пълен с вода отвор
RU	Сухой бетон	Водонасыщенный бетон	Загрязненное отверстие	Отверстие в бетоне, заполненное водой
UK	Сухий бетон	Водонасичений бетон	Забруднений отвір	Заповнений водою отвір
KK	Құрғақ бетон	Ылғалды бетон	Ластанған саңылау	Сүмен толтырылған саңылау
ZH	干燥混凝土	湿混凝土	受污的钻孔	注水的钻孔
JA	いたベトン	湿ったベトン	汚れた掘削孔	水がたまった掘削孔
KO	건조 콘크리트	습윤 콘크리트	이물질이 삽입된 드릴 구멍	물이 찬 드릴 구멍
ID	Beton kering	Beton basah	Lubang bor terkontaminasi	Lubang bor terisi air
AR	خرسانة جافة	خرسانة رطبة	ثقب ملوث	ثقب ممتلئ بالماء



DE	Gerissener Beton	Ungerissener Beton	Bewehrungsanschluss
EN	Cracked concrete	Non-cracked concrete	Reinforcement connection
FR	Béton fissuré	Béton non fissuré	Scellement d'armatures
NL	Gescheurd beton	Ongescheurd beton	Wapeningsaansluiting
IT	Calcestruzzo fessurato	Calcestruzzo non fessurato	Ferri di ripresa
ES	Hormigón agrietado	Hormigón sin grietas	Conexión de refuerzo
PT	Betão fissurado	Betão não fissurado	Conetor de reforço
DA	Revnet beton	Ikkerevnet beton	Armeringsstilslutninger
SV	Sprucken betong	Ej sprucken betong	Armeringsanslutning
NO	Betong med riss	Betong uten riss	Armeringsforbindelse
FI	Haljennut betoni	Halkeamaton betoni	Vahvistusliitäntä
IS	Sprungin steypa	Óbrotin steinsteypa	Tenging við styrkingu
ET	Pragunenud betoon	Pragudeta betoon	Sarnusühendus
LV	Betons ar plaisām	Betons bez plaisām	Stiegrojuma savienojums
LT	Sutūkiniųjų betonas	Vientisas betonas	Armatūros sujungimo elementas
PL	Beton spekany	Beton niespekany	Złącze zbrojarskie
CS	Beton s trhlinami	Beton bez trhlin	Připojka výztuže
SK	Betón s trhlinami	Betón bez trhlin	Styková výstuž
HU	Repedéses beton	Repedésmentes beton	Betonvasalatcsatlakozás
RO	Beton fisurat	Beton fără fisuri	Racord de armătură
SL	Razpokan beton	Nerazpokan beton	Priključek za armaturo
HR	Ispucani beton	Neispucani beton	Priključak armature
SR	Ispucao beton	Neispucao beton	Priključak armature
TR	Çatlamaş beton	Çatlamaşmş beton	Destek bağlantısı
EL	Μπρετόν με ρωγμές	Μπρετόν χωρίς ρωγμές	Σύνδεση οπλισμού
BG	Напукан бетон	Ненапукан бетон	Връзка за армировка
RU	Треснутый бетон	Цельный бетон	Соединитель армирования
UK	Тріснутий бетон	Бетон у зоні стиснення	Арматурні пруття
KK	Жарықтары бар бетон	Бүтін бетон	Арматуралау қосылымы
ZH	有裂缝的混凝土	无裂缝的混凝土	钢筋连接件
JA	ひび割れがあるベトン	ひび割れないベトン	強化コネクタ
KO	균열 콘크리트	비균열 콘크리트	보강재 연결
ID	Beton retak	Beton tidak licin	Sambungan penguat
AR	خرسانة متصدعة	خرسانة غير متصدعة	وصلة حديد مسلح



DE	Ankerstangen	Innengewindeanker	Bewehrungsstab	Bewehrungsanker
EN	Anchor rods	Internal thread anchors	Reinforcement rod	Reinforcement anchor
FR	Tiges filetées	Douilles taraudées	Barres d'armatures	Ancrage d'armature
NL	Ankerstangen	Binnendraadanker	Wapeningsstaaf	Wapeningsanker
IT	Barre di ancoraggio	Ancoraggio con filettatura interna	Ferro di ripresa	Ancoraggio di ripresa
ES	Barras de anclaje	Anclaje de rosca interior	Barra de refuerzo	Anclaje de refuerzo
PT	Tirantes de ancoragem	Ancoragem de rosca interna	Barra de armação	Ancoragem de reforço
DA	Gevindstænger	Anker med indvendigt gevind	Armeringsstav	Armeringsanker
SV	Förankringsstänger	Ankare med innergånga	Armeringsjårm	Armeringsankare
NO	Ankerstenger	Innvendig gjengeanker	Wapeningsstaaf	Wapeningsanker
FI	Harustangot	Sisäkierreankkuri	Tartuntateräs	Tartuntaankkuri
IS	Festistangir	Festing með skrúfgangi að innanverðu	Styrktarteinn	Styrktarfesting
ET	Ankurvardad	Sisekeermega ankur	Sarrusvarras	Sarrusankur
LV	Enkura stienis	Iekšējās vītnes enkurs	Enkura stieģrojuma	Enkura stienis
LT	Inkariniai strypai	Strypas su vidiniu sriegiu	Armaturinis strypas	Armaturinis inkaras
PL	Kotwy	Kotwy z gwintem wewnêtrznym	Prêt zbrojarski	Kotwa zbrojarska
CS	Kotevní tyče	Švorník s vnitřním závitem	Výztužná tyč	Kotva výztuže
SK	Kotviace tyče	Kotva s vnútorným závitom	Výstužný prút	Vystužovacia kotva
HU	Horgonyrudak	Belsőmenetes horgony	Betonvas rúd	Horgonyzó vas
RO	Bară de ancorare	Ancoră cu filet interior	Tijă de armătură	Ancoră de armătură
SL	Sidra	Sidro z notranjim navojem	Armatura palica	Sidro armature
HR	Sidrene šipke	Sidro s unutrašnjim navojem	Armatura šipka	Armatura sidro
SR	Šipke za ankerovanje	Kotva s unutrašnjim navojem	Armatura šipka	Armatura kotva
TR	Dübel çubukları	İçten dişli dübel	Takviye çubuğu	Takviye demiri
EL	Νηέες αγκυρώσεις	Αγκύρια εσωτερικού σπειρώματος	Ράβδος οπλομού	Αγκύριο οπλομού
BG	Анкерни пръти	Анкерен болт с вътрешна резба	Армировъчен прът	Армировъчен анкерен болт
RU	Анкерные болты	Анкеры с внутренней резьбой	Арматурный стержень	Арматурный анкер
UK	Анкерні шпильки	Анкер із внутрішнім різьбленням	Арматурний стрижень	Арматурний анкер
KK	Анкерлік болттары	Ішкі бұрандасы бар анкерлер	Арматуралық өзек	Арматуралық анкері
ZH	系杆	内部螺纹系杆	钢筋	钢筋锚杆
JA	アンカーロッド	めねじアンカー	鉄筋	強化アンカー
KO	앵커 로드	頂踵 蝶溺荷 操	보강 로드	보강 앵커
ID	Batang jangkar	Jangkar berulir dalam	Batang penguat	Jangkar penguat
AR	قضبان تثبيت	لولية تثبيت داخلية	قضيب حديد مسلح	تثبيت حديد مسلح



DE	Drehmoment	Verarbeitungszeit	Aushärtezeit	Skalenteile
EN	Required torque	Open time	Hardening time	Scale divisions
FR	Couple	Temps de manipulation	Temps de durcissement	Graduations
NL	Draaimoment	Verwerkingstijd	Uithardtijd	Schaalonderdelen
IT	Coppia	Tempo di lavorazione	Tempo di indurimento	Divisioni di scala
ES	Par	Tiempo de tratamiento	Tiempo de endurecimiento	Unidades de escala
PT	Binário	Tempo de processamento	Tempo de endurecimento	Intervalos de gradação
DA	Tilspændingsmoment	Forarbejdningstid	Hardetid	Skalatrin
SV	Vridmoment	Bearbetningstid	Hårdningstid	Skaldelar
NO	Dreiemoment	Bearbeidelsestid	Herdetid	Skaldeler
FI	Vääntömomentti	Käsittelyaika	Kovettumisaika	Asteikkojaot
IS	Snúningsátak	Vinnslutími	Þornunartími	Mælikvarði
ET	Pöördemoment	Töötlemissaeg	Kõvastumisaeg	Kaala jaotused
LV	Griezes moments	Apstrādājamības laiks	Sacietēšanas laiks	Skalas iedaļas
LT	Sukimo momentas	Darbo su medžiaga laikas	Kietėjimo laikas	Skalės padalos
PL	Moment dokręcenia	Czas żelowania	Czas wiązania	Podziałki skali
CS	Utahovací moment	Doba zpracování	Doba vytvrzení	Dílky na stupnici
SK	Utahovací moment	Doba spracovania	Doba vytvrdnutia	Diely na stupnici
HU	Forgatónyomaték	Feldolgozási idő	Kikeményedési idő	Skálárészértékek
RO	Cuplu	Timp de punere în operă	Timp de întărire	Diviziuni scală
SL	Navor	Čas obdelave	Čas strjevanja	Razdelki na skali
HR	Okretni moment	Vrijeme obrade	Vrijeme stvrdnjavanja	Djelovi skale
SR	Obrtni moment	Vreme obrade	Vreme otvrdnjavanja	Delovi skale
TR	Tork	Kullanma süresi	Sertleşme süresi	Kadran bölümleri
EL	Ροπή ούοφλης	Χρόνος επεξεργασίας	Χρόνος σκλήρυνσης	Διαβιβίσεις κλίμακας
BG	Въртящ момент	Време за обработка	Време за втвърдяване	Части на скалата
RU	Крутящий момент	Время обработки	Время отверждения	Деление шкалы
UK	Крутий момент	Час обробки	Час затвердіння	Поділки шкали
KK	Айналдыру моменті	Өңделу уақыты	Қатаю уақыты	Шәкіл бөліктері
ZH	扭矩	加工时间	硬化时间	刻度
JA	トルク	加工時間	凝固時間	目盛り分割
KO	토크	작업 시간	경화 시간	스케일의 눈금폭
ID	Torsi	Waktu pemrosesan	Waktu pengerasan	Bagian skala
AR	عزم الدوران	وقت التصنيع	وقت التصليب	أجزاء المقياس



FIS EM Plus		
°C]	t _{work}	t _{cure}
-5 °C – ± 0 °C	240 min.	200 h
> ± 0 °C – +5 °C	150 min.	90 h
> +5 °C – +10 °C	120 min.	40 h
> +10 °C – +20 °C	30 min.	18 h
> +20 °C – +30 °C	14 min.	10 h
> +30 °C – +40 °C	7 min.	5 h

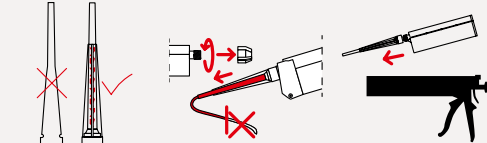
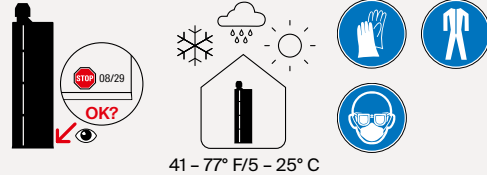


ETA-17/0979
EAD 330499-02-0601
Option 1 for cracked concrete

ETA-23/0842
EAD 330250-01-0601
Post-installed fasteners in concrete
under fatigue cyclic loading



*Information sur le niveau d'émission de substances volatiles dans l'air intérieur, présentée en regard du test NF EN 12526, sur une échelle de classe allant de A+ (plus économe) à C (moins économe).



FIS MR Plus/FIS UMR

FIS EM Plus

	Typ	Art. No.	
300 ml	KPM 3	541441	FIS MR Plus
390 ml	FIS DM S Pro	563337	FIS MR Plus
390 ml	FIS AM	058000	FIS MR Plus
390 ml	FIS DB S Pro	558955	FIS MR Plus
390 ml	FIS AP	058027	FIS MR Plus
585 ml	FIS DM S-L	567768	FIS UMR
585 ml	FIS DP S-L	511125	FIS UMR
1500 ml	FIS DP S-XL	512401	FIS UMR

FIS A, RG M

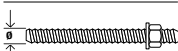
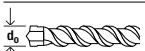
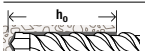
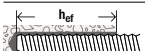
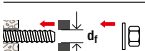
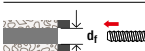
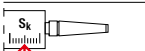


FIS A



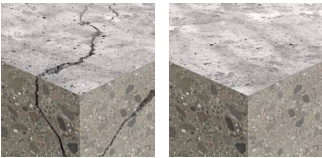
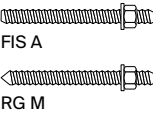
RG M

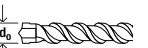
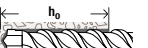
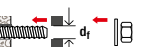
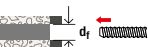
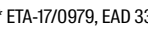


		M6	M8	M10	M12	M14	M16	M20
								
		—	●	●	●	●	●	●
	d_0 [mm]	8	10	12	14	16	18	22/ 24
	h_0	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$
	$h_{0,min}$ [mm]	50	60	60	70	75	80	90
	$h_{0,max}$ [mm]	120	160	200	240	280	320	400
	fischer BS	ø 8	ø 10	ø 12	ø 14	ø 16	ø 18	ø 14
	d_0 [mm]	9	11	14	16	20	20	26
	d_f [mm]	7	9	12	14	16	18	22
	d_f [mm]	9	12	14	16	18	20	26
	S_k ($h_{0,min}$) [—]	2	2	3	3	5	5	11
	S_k ($h_{0,max}$) [—]	4	5	7	10	16	19	48
	max T_{inst} [Nm]	5	10	20	40	50	60	120

* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete

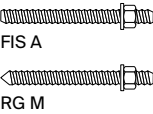
FIS A, RG M



		M22	M24	M27	M30	M33	M36	M40
 *		●	●	●	●	–	–	–
 d_0 [mm]		25	28	30	35	37	40	44
 h_0		$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$
 h_{ef}	$h_{ef,min}$ [mm]	93	96	108	120	132	144	160
	$h_{ef,max}$ [mm]	440	480	540	600	660	720	800
 fischer BS		ø 25	ø 28	ø 35	ø 35	ø 37	ø 40	ø 44
 d_b [mm]		27	30	40	40	40	42	47
 d_t [mm]		24	26	30	33	36	39	43
 d_t [mm]		28	30	33	40	43	46	50
 S_k ($h_{0,min}$) [-]		10	15	15	27	29	36	50
	S_k ($h_{0,max}$) [-]	46	69	73	132	144	179	245
 max T_{inst} [Nm]		135	150	200	300	400	500	600

* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete

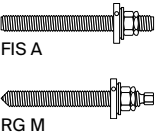
FIS A, RG M

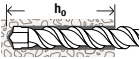
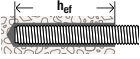
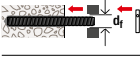
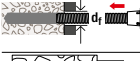
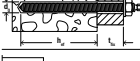
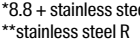
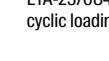


		3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"
		–	●	●	●	●	●	●
	d0 [mm]	11,1	14,3	19,1	22,2	25,4	28,6	31,8
	d0 [inch]	7/16	9/16	3/4	7/8	1	1 1/8	1 1/4
	h0	h0 ≥ h _{ef}	h0 ≥ h _{ef}	h0 ≥ h _{ef}	h0 ≥ h _{ef}	h0 ≥ h _{ef}	h0 ≥ h _{ef}	h0 ≥ h _{ef}
	h _{ef} min [mm]	60,0	70,0	79,0	89,0	89,0	102,0	178,0
	h _{ef} max [mm]	191,0	254,0	318,0	381,0	445,0	508,0	572,0
	fischer BS	ø 12	ø 14	ø 18	ø 20	ø 25	ø 28	ø 32
	d0 [mm]	14	16	20	25	27	30	40
	dt [mm]	8,9	11,9	14,0	16,0	18,0	22,1	23,9
	dt [mm]	11,9	14,0	16,0	18,0	20,1	25,9	27,9
	S _k (h _{0,min}) [-]	3	3	5	11	10	15	27
	S _k (h _{0,max}) [-]	7	10	19	48	46	69	132
	max T _{inst} [Nm]	18	41	60	107	136	173	180

* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete

FIS A, RG M



	M12*	M16*	M20**	M24**
	●	●	●	●
 d_0 [mm]	14	18	24	28
 h_0	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$
 $h_{ef,min}$ [mm]	70	80	90	96
 $h_{ef,max}$ [mm]	240	320	400	480
 fischer BS	ø 14	ø 18	ø 24	ø 28
 d_b [mm]	16	20	26	30
 d_f [mm]	14 - 16	18 - 20	22 - 26	26 - 30
 d_f [mm]	15 - 16	19 - 20	25 - 26	29 - 30
 $t_{fix,min}$ [mm]	6	8	10	12
 $t_{fix,max}$ [mm]	200	200	200	200
 S_k ($h_{0,min}$) [-]	3	5	11	15
 S_k ($h_{0,max}$) [-]	10	19	48	69
 max T_{inst} [Nm]	40	60	120	150

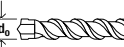
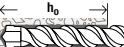
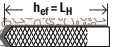
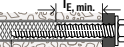
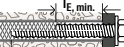
*8.8 + stainless steel R

**stainless steel R

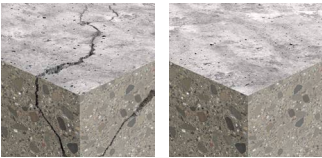
*** ETA-23/0842, EAD 330250-01-0601, Post-installed fasteners in concrete under fatigue cyclic loading

RG M I



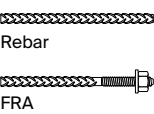
		M5	M6	M8	M10	M12	M16	M20
								
		—	—	●	●	●	●	●
	d_0 [mm]	10	12	14	18	20	24	32
	h_0 [mm]	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$
	$h_{ef} = L_H$ [mm]	75	75	90	90	125	160	200
	$l_{E, min}$ [mm]	8	8	8	10	12	16	20
	$l_{E, max}$ [mm]	14	16	18	23	26	35	45
	fischer BS	Ø 10	Ø 12	Ø 14	Ø 18	Ø 20	Ø 24	Ø 35
	d_0 [mm]	11	14	16	20	25	26	40
	d_f [mm]	6	7	9	12	14	18	22
	S_k [—]	3	3	3	4	6	8	24
	$\max T_{inst}$ [Nm]	—	—	10	20	40	80	120

* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete



		3/8"	1/2"	5/8"	3/4"
		-	-	●	●
	d_b [mm] d_b [inch]	18 3/4	20 13/16	24 1	32 1 1/4
	h_0	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$
	$h_{ef} = L_H$	90	125	160	200
	$l_{E, min}$ $l_{E, max}$	10 23	12 26	16 35	20 45
	fischer BS d_b [mm]	$\varnothing 18$ 20	$\varnothing 20$ 25	$\varnothing 24$ 26	$\varnothing 35$ 40
	d_f [mm]	12	14	18	22
	S_k [$l_{inst, min}$]	4	6	8	24
	$\max T_{inst}$ [Nm]	20	40	80	120

* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete

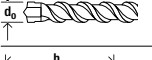
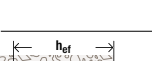
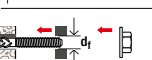
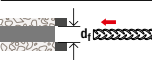


	Rebar	$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 14$	$\varnothing 16$	$\varnothing 18$	$\varnothing 20$	$\varnothing 22$	$\varnothing 24$
	FRA	-	-	M12	-	M16	-	M20	-	-
	Rebar	●	●	●	●	●	●	●	●	●
	FRA	-	-	●	-	●	-	●	-	-
	d_b [mm]	10/ 12	12/ 14	14/ 16	18	20	25	25	30	30
	Rebar	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$
	FRA	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$
	Rebar	$h_{ef, min}$ [mm] $h_{ef, max}$ [mm]	60 160	60 200	70 240	75 280	80 320	85 360	90 400	98 440
	FRA	$h_{ef, min}$ [mm] $h_{ef, max}$ [mm]	- -	- -	70 140	- -	80 120	- -	90 300	- -
	fischer BS	$\varnothing 12$	$\varnothing 14$	$\varnothing 16$	$\varnothing 18$	$\varnothing 20$	$\varnothing 25$	$\varnothing 25$	$\varnothing 30$	$\varnothing 30$
	d_b [mm]	14	16	20	20	25	27	27	40	40
	FRA	d_f [mm]	-	-	14	-	18	-	22	-
	FRA	d_f [mm]	-	-	18	-	22	-	26	-
	Rebar	S_k [$l_{inst, min}$]	3	3	4	5	6	12	9	18
	S_k [$l_{inst, max}$]	7	9	13	17	22	51	40	81	69
	FRA	S_k [$l_{inst, min}$]	-	-	10	-	14	-	21	-
	S_k [$l_{inst, max}$]	-	-	14	-	24	-	43	-	-
	FRA	$\max T_{inst}$ [Nm]	-	-	40	-	60	-	120	-

* ETA-17/0979, EAD 330499-02-0602, Option 1 for cracked concrete

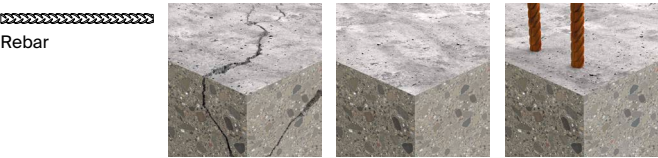
Rebar, FRA

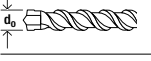
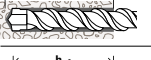
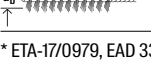


	Rebar	ø 25	ø 26	ø 28	ø 30	ø 32	ø 34	ø 36	ø 40
	FRA	M24	-	-	-	-	-	-	-
	Rebar	●	●	●	●	●	●	●	●
	FRA	●	-	-	-	-	-	-	-
	d ₀ [mm]	30	35	35	40	40	40	45	55
	Rebar	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$
	FRA	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$	$h_0 = h_{ef} + l_e = h_{nom}$
	Rebar	$h_{ef,min}$ [mm]	100	104	112	120	128	136	144
	Rebar	$h_{ef,max}$ [mm]	500	520	560	600	640	680	720
	FRA	$h_{ef,min}$ [mm]	96	-	-	-	-	-	-
	FRA	$h_{ef,max}$ [mm]	380	-	-	-	-	-	-
	fischer BS	ø 30	ø 35	ø 35	ø 40	ø 40	ø 40	ø 45	ø 55
	d ₀ [mm]	40	40	40	42	42	42	47	58
	FRA	d _f [mm]	26	-	-	-	-	-	-
	FRA	d _f [mm]	32	-	-	-	-	-	-
	Rebar	S _k [-]	(h _{0,min})	13	26	23	38	34	28
	Rebar	S _k [-]	(h _{0,max})	61	127	110	188	164	135
	FRA	S _k [-]	(h _{0,min})	26	-	-	-	-	-
	FRA	S _k [-]	(h _{0,max})	63	-	-	-	-	-
	FRA	max T _{inst} [Nm]	150	-	-	-	-	-	-

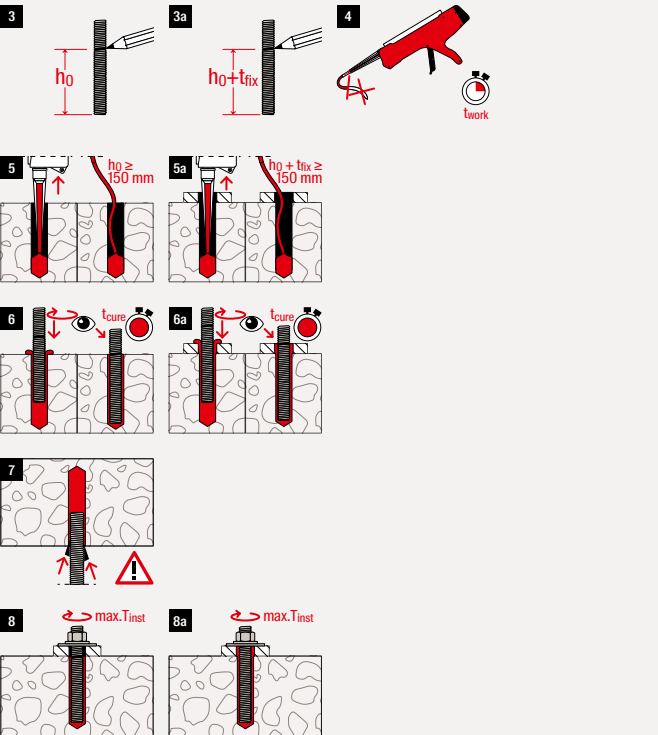
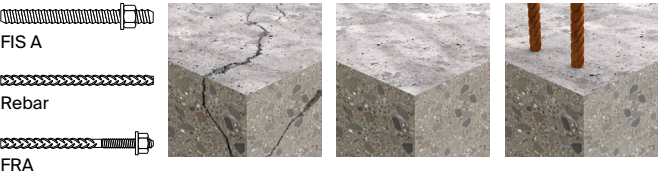
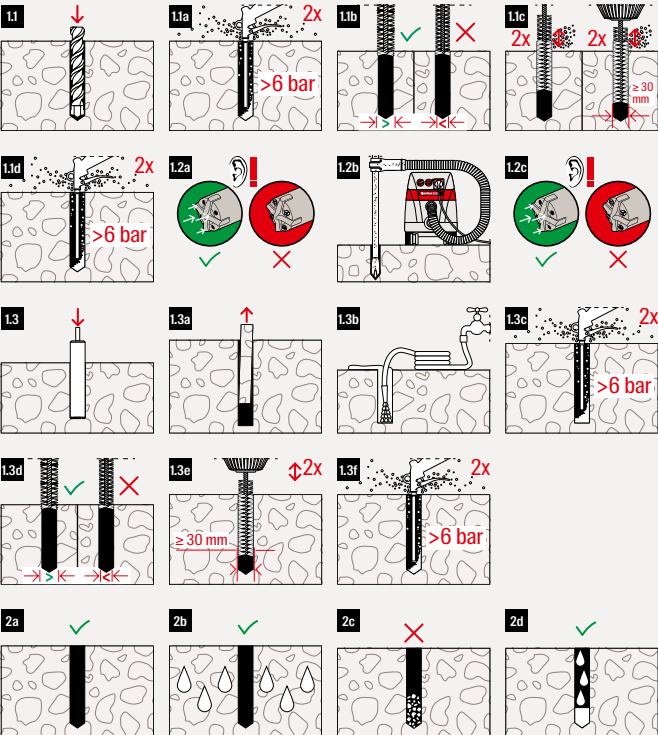
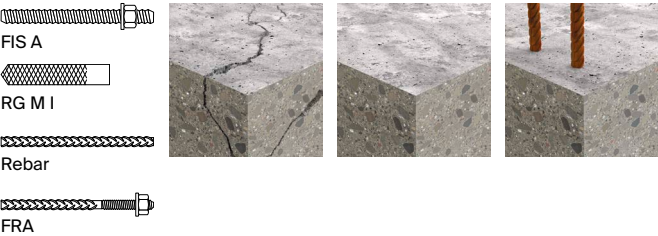
* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete

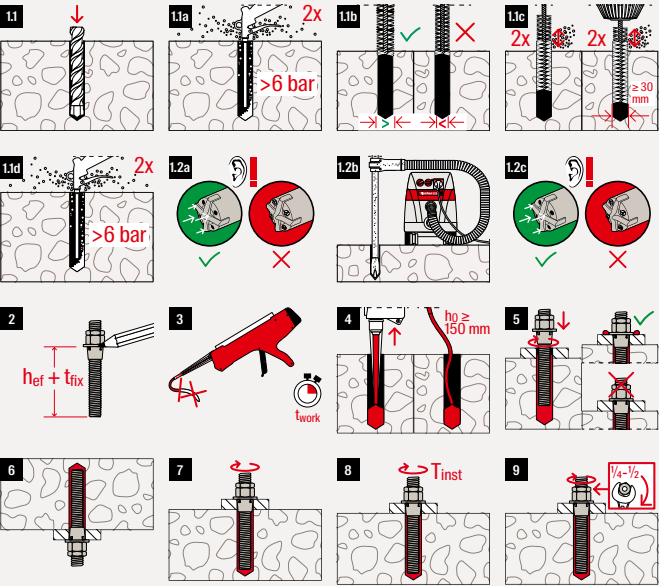
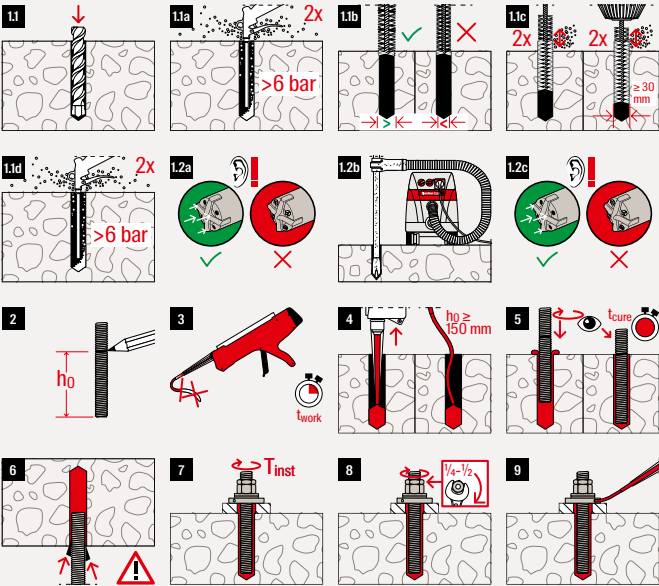
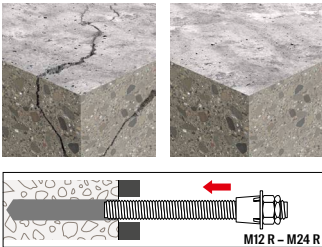
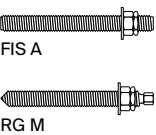
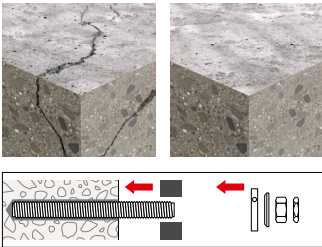
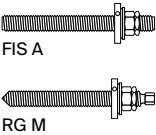
Rebar

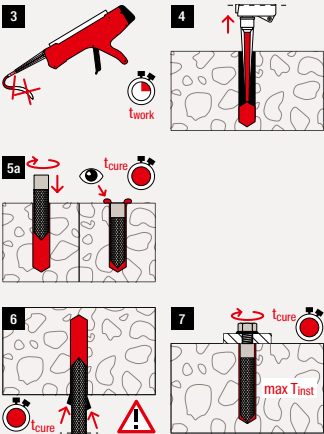
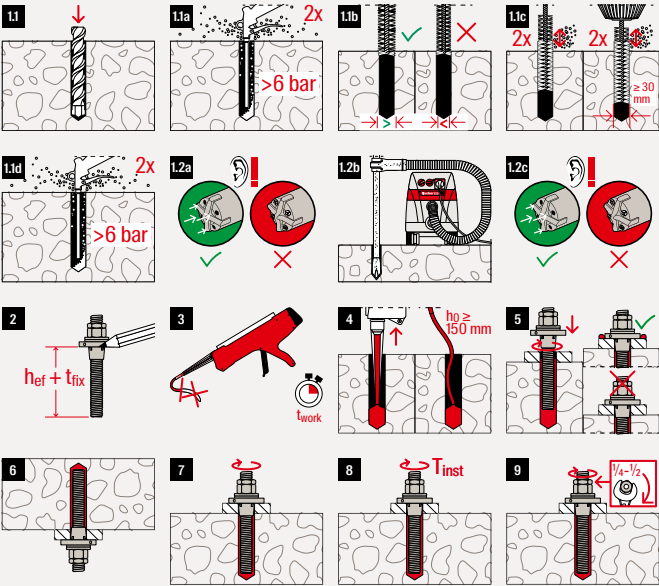
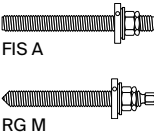


	Rebar	#3	#4	#5	#6	#7	#8	#9	#10
		●	●	●	●	●	●	●	●
	d ₀ [mm]	12,7	15,9	19,1	22,2	28,6	31,8	34,9	38,1
	d ₀ [inch]	1/2	5/8	3/4	7/8	1 1/8	1 1/4	1 3/8	1 1/2
	h ₀	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$	$h_0 \geq h_{ef}$
	Rebar	$h_{ef,min}$ [mm]	60	70	79	89	89	102	114
	Rebar	$h_{ef,max}$ [mm]	191	254	318	381	445	508	572
	fischer BS	ø 14	ø 16	ø 18	ø 20	ø 28	ø 32	ø 35	ø 40
	d ₀ [mm]	16	20	20	25	30	40	40	42

* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete









see ICC-ES Evaluation Report
No. 1990 at www.icc-es.org

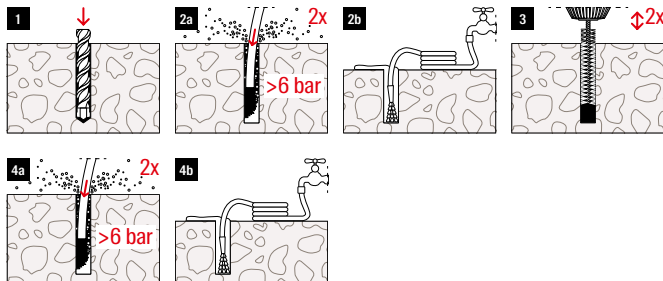
EN

fischer adhesive anchoring system FIS EM Plus

fischer FIS EM Plus is an epoxy adhesive anchoring system for fastenings in normal weight concrete.

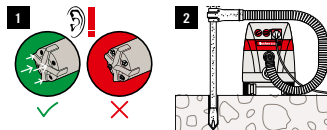
Important: Before use, read and review the installation instructions and the SDS (safety data sheet). Do not use expired adhesive. Minimal concrete temperature -5°C (23°F).

Drilling and cleaning the hole (hammer drilling with standard drill bit)



- 1 Drill the hole. Nominal drill hole diameter d_0 and drill hole depth h_0 see **Tables II, III, IV or VI, VII, VIII** respectively.
- 2a Cleaning of the drill hole (not applicable for underwater installation): Blow out the drill hole twice, with oil free compressed air ($p \geq 6 \text{ bar}$ / 87 psi).
- 2b For underwater installation only: Flush the drill hole with clean water until it flows clear.
- 3 Brush the drill hole at least twice, brush type see **Table I** or **V** respectively. For drill hole diameter $\geq 30 \text{ mm}$ / 1 1/2 inch use a power drill. For deep holes use an extension.
- 4a Cleaning of the drill hole (not applicable for underwater installation): Blow out the drill hole twice, with oil free compressed air ($p \geq 6 \text{ bar}$ / 87 psi).
- 4b For underwater installation only: Flush the drill hole with clean water until it flows clear.
→ Go to step 6.

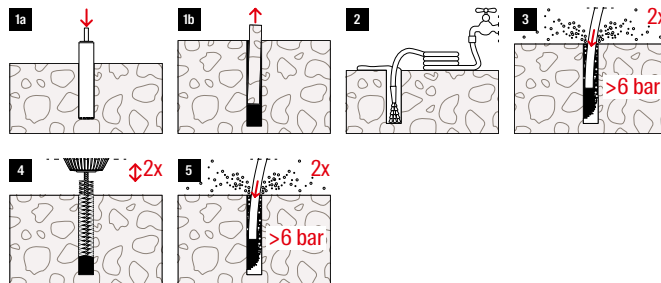
Drilling and cleaning the hole (hammer drilling with hollow drill bit)



- 1 Check a suitable hollow drill for correct operation of the dust extraction.
- 2 Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with at least equivalent performance data (volume

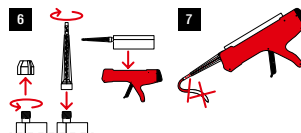
flow at the hose end $\geq 36 \text{ l/s}$ / 1.27 cfs). Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Nominal drill hole diameter d_0 and drill hole depth h_0 see **Tables II, III, IV or VI, VII, VIII** respectively.
→ Go to step 6.

Drilling and cleaning the hole (wet drilling with diamond drill)

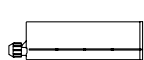
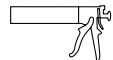


- 1a Drill the hole. Drill hole diameter d_0 and nominal drill hole depth h_0 see **Tables II, III, IV or VI, VII, VIII** respectively.
- 1b Break the drill core and remove it.
- 2 Flush the drill hole with clean water until it flows clear.
- 3 Blow out the drill hole at least twice, using oil free compressed air ($p \geq 6 \text{ bar}$ / 87 psi).
- 4 Brush the drill hole at least twice using a power drill, brush type see **Table I** or **V** respectively.
- 5 Blow out the drill hole at least twice, using oil free compressed air ($p \geq 6 \text{ bar}$ / 87 psi).

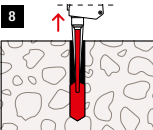
Preparing the cartridge



- 6 Remove the sealing cap. Screw on the static mixer (the spiral in the static mixer must be clearly visible). Place the cartridge into the dispenser.
- 7 Extrude approximately 10 cm / 4 inch of material out until the resin is evenly grey in colour. Do not inject mortar that is not uniformly grey.

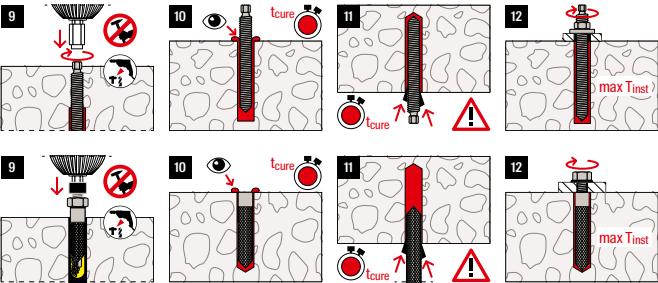
FIS EM Plus			
			
Cartridge	Dispenser	Item No.	Static mixer
300 ml	KPM 3	541441	FIS MR Plus
390 ml	FIS DM S Pro	563337	FIS MR Plus
390 ml	FIS DB S Pro	558955	FIS MR Plus
390 ml	FIS AP	058027	FIS MR Plus
585 ml	FIS DM S-L	510992	FIS UMR
585 ml	FIS DP S-L	511125	FIS UMR
1,500 ml	FIS DP S-XL	512401	FIS UMR

Injection of the mortar



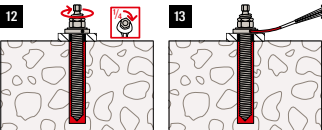
- 8 Fill approximately 2/3 of the drilled hole with mortar. Always begin from the bottom of the hole and avoid air pockets or voids. For drill hole depth $h_0 \geq 150$ mm / 6 inch use an extension tube.
For overhead installation, deep holes ($h_0 > 250$ mm / 10 inch) or drill hole diameter ($d_0 \geq 40$ mm / 1 1/2 inch) use an injection-adapter see Table I or V respectively.

Installation of anchor rods or fischer internal threaded anchors RG M I



- 9 Only use clean and oil-free metal parts. Mark the setting depth on the anchor rod. Push the anchor rod or fischer internal threaded anchor RG M I down to the bottom of the hole, turning it slightly while doing so.
10 After inserting the anchor element, excess mortar must be emerged around the anchor element.
11 For overhead installations support the anchor element with wedges (e. g. fischer centering wedges) or fischer overhead clips. For push through installation fill the annular gap with mortar.
12 Wait for the specified curing time t_{cure} see Table IX. Mounting the fixture max. T_{inst} see Tables II, IV or VI, VIII respectively.

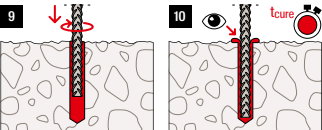
- 12 Wait for the specified curing time t_{cure} see Table IX. Mounting the fixture max. T_{inst} see Tables II, IV or VI, VIII respectively.



Option

After the minimum curing time is reached, the gap between anchor element and fixture (annular clearance) may be filled with mortar via the fischer filling disc FFD. Compressive strength ≥ 50 N/mm² / 7250 psi (e.g. fischer injection mortars FIS HB, FIS SB, FIS V, FIS EM Plus). **ATTENTION:** Using fischer filling disc FFD reduces t_{fix} (usable length of the anchor).

Installation reinforcing bars



- 9 Only use clean and oil-free reinforcing bars. Mark the setting depth. Turn while using force to push the reinforcement bar into the filled hole up to the setting depth mark. When the setting depth mark is reached, excess mortar must be emerged from the mouth of the drill hole.
10 Wait for the specified curing time t_{cure} see Table IX.



see ICC-ES Evaluation Report
No. 1990 at www.icc-es.org

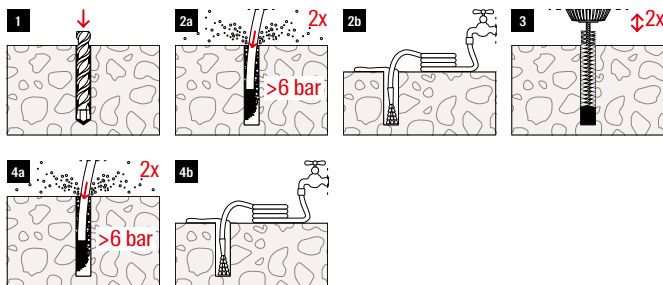
ES

Mortero de inyección fischer FIS EM Plus

fischer FIS EM Plus es un sistema de anclaje de resina epoxi para fijaciones en hormigón de peso normal.

Importante: Antes de utilizarlo, lea y revise las instrucciones de instalación y la hoja de datos de seguridad. No utilice adhesivo caducado. Temperatura mínima del hormigón -5°C.

Perforación y limpieza del agujero (perforación con percutor con broca estándar)



1 Perfore el agujero. Diámetro nominal del agujero d_0 y profundidad del agujero h_0 véanse los **Tablas II, III, IV o VI, VII, VIII** respectivamente.

2a La limpieza del agujero de perforación (no se aplica a la instalación submarina): Sople el agujero de perforación dos veces, con aire comprimido sin aceite ($p \geq 6 \text{ bar} / 87 \text{ psi}$).

2b Sólo para instalación submarina: Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.

3 Cepille el agujero de perforación al menos dos veces, el tipo de cepillo ver **Tabla I o V** respectivamente.

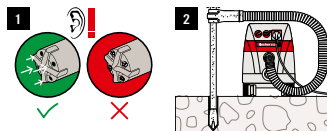
Para el diámetro del orificio de perforación $\geq 30 \text{ mm} / 1 \frac{1}{2} \text{ inch}$ utilice un taladro eléctrico. Para agujeros profundos use una extensión.

4a La limpieza del agujero de perforación (no se aplica a la instalación submarina): Sople el agujero de perforación dos veces, con aire comprimido sin aceite ($p \geq 6 \text{ bar} / 87 \text{ psi}$).

4b Sólo para instalación submarina: Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.

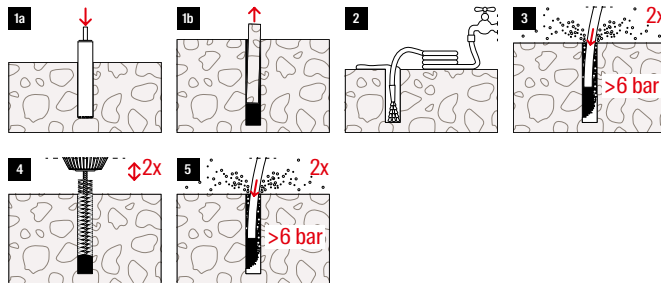
→ Ir al paso 6.

Perforación y limpieza del agujero (perforación con percutor con broca hueca)



- 1 Verifique un taladro hueco adecuado para el correcto funcionamiento de la extracción de polvo.
- 2 Utilice un sistema de extracción de polvo adecuado, por ejemplo fischer FVC 35 M o un sistema de extracción de polvo comparable con datos de rendimiento al menos equivalentes (volumen de flujo en el extremo de la manguera $\geq 36 \text{ l/s} / 1.27 \text{ cfs}$). Taladrar el agujero con una broca hueca. El sistema de extracción de polvo debe extraer el polvo de la broca sin parar durante el proceso de perforación y debe ajustarse a la potencia máxima. Diámetro nominal del taladro d_0 y profundidad del taladro h_0 véanse los **Tablas II, III, IV o VI, VII, VIII** respectivamente.
→ Ir al paso 6.

Perforación y limpieza del agujero (perforación húmeda con broca de diamante)



1a Perfore el agujero. Diámetro del agujero d_0 y profundidad nominal del agujero h_0 véanse los **Tablas II, III, IV o VI, VII, VIII** respectivamente.

1b Rompa el núcleo del taladro y retírelo.

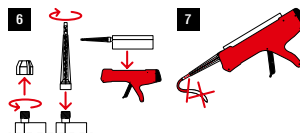
2 Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.

3 Sople el agujero de perforación al menos dos veces, con aire comprimido sin aceite ($p \geq 6 \text{ bar} / 87 \text{ psi}$).

4 Cepille el agujero de la broca al menos dos veces usando un taladro eléctrico, el tipo de cepillo ver **Tabla I o V** respectivamente.

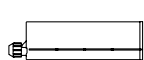
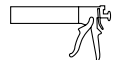
5 Sople el agujero de perforación al menos dos veces, con aire comprimido sin aceite ($p \geq 6 \text{ bar} / 87 \text{ psi}$).

Preparación del cartucho

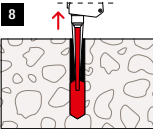


6 Quite el tapón del cartucho. Atornille la cánula mezcladora (la espiral en la cánula mezcladora debe ser claramente visible). Coloque el cartucho en el dispensador.

7 Extraiga aproximadamente 10 cm / 4 inch de material hasta que la resina tenga un color gris uniforme. No inyecte mortero que no sea uniformemente gris.

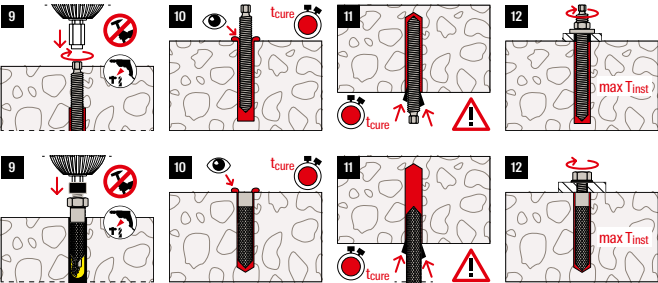
FIS EM Plus			
			
Cartucho	Dispensador	Número de artículo	Cánula mezcladora
300 ml	KPM 3	541441	FIS MR Plus
390 ml	FIS DM S Pro	563337	FIS MR Plus
390 ml	FIS DB S Pro	558955	FIS MR Plus
390 ml	FIS AP	058027	FIS MR Plus
585 ml	FIS DM S-L	510992	FIS UMR
585 ml	FIS DP S-L	511125	FIS UMR
1500 ml	FIS DP S-XL	512401	FIS UMR

Inyección del mortero



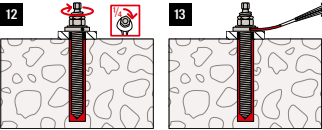
- 8 Rellene aproximadamente 2/3 del agujero perforado con mortero. Empiece siempre desde el fondo del agujero y evite las bolsas de aire o los vacíos. Para la profundidad del agujero de perforación $h_0 \geq 150 \text{ mm} / 6 \text{ inch}$ usar un tubo de extensión. Para la instalación en la parte superior, agujeros profundos ($h_0 > 250 \text{ mm} / 10 \text{ inch}$) o el diámetro del agujero de perforación ($d_0 \geq 40 \text{ mm} / 1\frac{1}{2} \text{ inch}$) utilice un adaptador de inyección ver **Tabla I** o **V** respectivamente.

Instalación de varillas roscadas o varillas con roscado interno de fischer RG M I



- 9 Sólo utilice piezas de metal limpias y sin aceite. Marque la profundidad de ajuste en la barra de anclaje. Empuje la varilla de anclaje o el anclaje de rosca interna de fischer RG M I hasta el fondo del agujero, girándolo ligeramente mientras lo hace.
- 10 Después de insertar el elemento de anclaje, el exceso de mortero debe emerger alrededor del elemento de anclaj.
- 11 En el caso de las instalaciones aéreas, apoye el elemento de anclaje con cuñas (por ejemplo, las cuñas de centrado de fischer) o clips aéreos de fischer. Para la instalación de empuje, rellene el hueco anular con mortero.

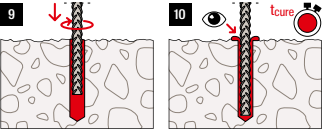
- 12 Espere el tiempo de curado especificado t_{cure} ver **Tabla IX**. Montar el accesorio max. T_{inst} ver **Tablas II, IV o VI, VIII** respectivamente.



Opción

Una vez alcanzado el tiempo mínimo de curado, el espacio entre el elemento de anclaje y el accesorio (espacio anular) puede rellenarse con mortero a través del disco de relleno de fischer FFD. Resistencia a la compresión $\geq 50 \text{ N/mm}^2 / 7250 \text{ psi}$ (por ejemplo, morteros de inyección de fischer FIS HB, FIS SB, FIS V, FIS EM Plus). **ATENCIÓN:** El uso del disco de relleno de fischer FFD reduce el t_{fix} (longitud útil del anclaje).

Instalación de barras de refuerzo



- 9 Sólo usar barras de refuerzo limpias y sin aceite. Marque la profundidad de ajuste. Gire mientras usa la fuerza para empujar la barra de refuerzo en el agujero lleno hasta la marca de profundidad de ajuste. Cuando se alcanza la marca de profundidad de fraguado, el exceso de mortero debe salir de la boca del taladro.
- 10 Espere el tiempo de curado especificado t_{cure} ver **Tabla IX**.

Installation instruction

Table I.
Drill hole diameter /
Accessories for metric sizes.

Drill bit	Rods	Rebar	Internal threaded anchor	Brush	Injection adapter		
Broca de perforación	Varilla roscada	Acero corrugado	Varilla con roscado interno	Cepillo	Adaptador de inyección		
							
ø [inch]	ø [mm]	ø [mm]	ø [mm]	Type Tipo [BS]	Item No. Número de artículo	Size Tamaño	Color
3/8	10	M8	–	–	10	78178	–
7/16	12	M10	–	–	12	78179	12 nature
9/16	14	M12	10	RG M8 I	14	78180	14 blue
5/8	16	–	12	–	16/18	78181	16 red
3/4	18	M16	–	RG M10 I	16/18	78181	18 yellow
13/16	20	–	16	RG M12 I	20	52277	20 green
1	24	M20	–	RG M16 I	24	78182	24 brown
1	25	–	20	–	25	97806	25 black
1 1/8	28	M24	–	–	28	78183	28 blue
1 1/4	30	M27	25	–	35	78184	30 grey
1 1/4	32	–	–	RG M20 I	35	78184	30 grey
1 3/8	35	M30	28	–	35	78184	35 brown
1 1/2	40	–	32	–	40	505061	40 red

Tabla I.
Diámetro del agujero de perforación /
Accesorios para medidas métricas.

ø [inch]	ø [mm]	ø [mm]	ø [mm]	Type Tipo [BS]	Item No. Número de artículo	Size Tamaño	Color
3/8	10	M8	–	–	10	78178	–
7/16	12	M10	–	–	12	78179	12 nature
9/16	14	M12	10	RG M8 I	14	78180	14 blue
5/8	16	–	12	–	16/18	78181	16 red
3/4	18	M16	–	RG M10 I	16/18	78181	18 yellow
13/16	20	–	16	RG M12 I	20	52277	20 green
1	24	M20	–	RG M16 I	24	78182	24 brown
1	25	–	20	–	25	97806	25 black
1 1/8	28	M24	–	–	28	78183	28 blue
1 1/4	30	M27	25	–	35	78184	30 grey
1 1/4	32	–	–	RG M20 I	35	78184	30 grey
1 3/8	35	M30	28	–	35	78184	35 brown
1 1/2	40	–	32	–	40	505061	40 red

Table II.
Metric threaded rods.

d _a	d ₀	h _{ef, min}		h _{ef, max}		h _{min}		S _{min} = C _{min}		max T _{inst}		
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[mm]	[inch]	[Nm]	[ft · lb]	
M8	10	3/8	60	2.36	160	6.30	h _{ef} +30 (≥ 100)	h _{ef} +1.25 (≥ 4)	40	1.57	10	7
M10	12	7/16	60	2.36	200	7.87			45	1.77	20	15
M12	14	9/16	70	2.76	240	9.45			55	2.17	40	30
M16	18	3/4	80	3.15	320	12.60			65	2.56	60	44
M20	24	1	90	3.54	400	15.75	h _{ef} + 2d ₀	h _{ef} + 2d ₀	85	3.35	120	89
M24	28	1 1/8	96	3.78	480	18.90			105	4.13	150	111
M27	30	1 1/4	108	4.25	540	21.26			120	4.72	200	148
M30	35	1 3/8	120	4.72	600	23.62			140	5.51	300	221

Tabla II.
Varillas métricas roscadas.

d _a	d ₀	h _{ef, min}		h _{ef, max}		h _{min}		S _{min} = C _{min}		max T _{inst}		
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[mm]	[inch]	[Nm]	[ft · lb]	
M8	10	3/8	60	2.36	160	6.30	h _{ef} +30 (≥ 100)	h _{ef} +1.25 (≥ 4)	40	1.57	10	7
M10	12	7/16	60	2.36	200	7.87			45	1.77	20	15
M12	14	9/16	70	2.76	240	9.45			55	2.17	40	30
M16	18	3/4	80	3.15	320	12.60			65	2.56	60	44
M20	24	1	90	3.54	400	15.75	h _{ef} + 2d ₀	h _{ef} + 2d ₀	85	3.35	120	89
M24	28	1 1/8	96	3.78	480	18.90			105	4.13	150	111
M27	30	1 1/4	108	4.25	540	21.26			120	4.72	200	148
M30	35	1 3/8	120	4.72	600	23.62			140	5.51	300	221

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Installation instruction

Table III.
Metric reinforcing bars.

d _a / d _b	d ₀		h _{ef, min}		h _{ef, max}		h _{min}		S _{min} = C _{min}		max T _{inst} 1)	
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[Nm]	[ft · lb]
10	14	9/16	60	2.36	200	7.87	h _{ef} +30 (≥ 100)	h _{ef} +1.25 (≥ 4)	45	1.77	30	22
12	16	5/8	70	2.76	240	9.45			55	2.17	50	37
16	20	13/16	80	3.15	320	12.60			65	2.56	110	81
20	25	1	90	3.54	400	15.75			85	3.35	190	140
25	30	1 1/4	100	3.94	500	19.69			120	4.72	280	207
28	35	1 3/8	112	4.41	560	22.05			140	5.51	350	258
32	40	1 1/2	128	5.04	640	25.20			160	6.30	430	317

Tabla III.
Barras métricas de refuerzo.

d _a / d _b	d ₀		h _{ef, min}		h _{ef, max}		h _{min}		S _{min} = C _{min}		max T _{inst} 1)	
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[Nm]	[ft · lb]
10	14	9/16	60	2.36	200	7.87	h _{ef} +30 (≥ 100)	h _{ef} +1.25 (≥ 4)	45	1.77	30	22
12	16	5/8	70	2.76	240	9.45			55	2.17	50	37
16	20	13/16	80	3.15	320	12.60			65	2.56	110	81
20	25	1	90	3.54	400	15.75			85	3.35	190	140
25	30	1 1/4	100	3.94	500	19.69			120	4.72	280	207
28	35	1 3/8	112	4.41	560	22.05			140	5.51	350	258
32	40	1 1/2	128	5.04	640	25.20			160	6.30	430	317

1) Torque moment only required when using threaded reinforcing bars to resist seismic loading.

1) El momento de torsión sólo se requiere cuando se usan barras de refuerzo roscadas para resistir la carga sísmica.

Table IV.
Metric internal threaded anchors.

d _e	d _a	d ₀		h _{ef}		h _{min}		S _{min} = C _{min}		max T _{inst}		
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[mm]	[inch]	[Nm]	[ft · lb]	
RG M8 I	12	1/2	14	9/16	90	3.54	120	4.72	55	2.17	10	7
RG M10 I	16	5/8	18	3/4	90	3.54	125	4.92	65	2.56	20	15
RG M12 I	18	11/16	20	13/16	125	4.92	165	6.50	75	2.95	40	30
RG M16 I	22	7/8	24	1	160	6.30	205	8.07	95	3.74	80	59
RG M20 I	28	1 1/8	32	1 1/4	200	7.87	260	10.24	125	4.92	120	89

Tabla IV.
Varillas métricas con roscado interno métricas.

d _e	d _a	d ₀		h _{ef}		h _{min}		S _{min} = C _{min}		max T _{inst}		
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[mm]	[inch]	[Nm]	[ft · lb]	
RG M8 I	12	1/2	14	9/16	90	3.54	120	4.72	55	2.17	10	7
RG M10 I	16	5/8	18	3/4	90	3.54	125	4.92	65	2.56	20	15
RG M12 I	18	11/16	20	13/16	125	4.92	165	6.50	75	2.95	40	30
RG M16 I	22	7/8	24	1	160	6.30	205	8.07	95	3.74	80	59
RG M20 I	28	1 1/8	32	1 1/4	200	7.87	260	10.24	125	4.92	120	89

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Installation instruction

Table V.
Drill hole diameter /
Accessories for fractional sizes.

Table V.
Diámetro del agujero de perforación /
Accesorios para tamaños fraccionarios.

Drill bit		Rods		Rebar	Internal threaded anchor	Brush	Injection adapter	
Broca de perforación		Varilla roscada		Acero corrugado	Varilla con roscado interno	Cepillo	Adaptador de inyección	
								
ø [inch]	ø [mm]	ø [inch]	#	ø [inch]	Type Tipo [BS]	Item No. Número de artículo	Size Tamaño	Color
7/16	12	3/8	–	–	12	78179	–	–
1/2	14	–	3	–	14	78180	12	nature
9/16	15	1/2	–	–	14	78180	14	blue
5/8	16	–	4	–	16/18	78181	16	red
3/4	18	5/8	–	RG M I 3/8	16/18	78181	18	yellow
13/16	20	–	5	RG M I 1/2	20	52277	20	green
7/8	22	3/4	6	–	20	52277	20	green
1	25	7/8	–	RG M I 5/8	25	97806	25	black
1 1/8	28	1	7	–	28	78183	28	blue
1 1/4	32	1 1/8	8	RG M I 3/4	35	78184	30	grey
1 3/8	35	1 1/4	9	–	35	78184	35	brown
1 1/2	40	–	10	–	40	505061	40	red
1 3/4	45	–	11	–	45	506254	45	yellow

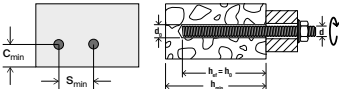


Table VI.
Fractional threaded rods.

Table VI.
Varillas roscadas fraccionadas.

d _a	d ₀	h _{ef, min}		h _{ef, max}		h _{min}		S _{min} = C _{min}	max T _{inst}			
[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[lb · ft]		
3/8	12	7/16	60	2 3/8	191	7 1/2	h _{ef} +30 (≥ 100)	h _{ef} +1.25 (≥ 4)	42.5	1.67	20	15
1/2	15	9/16	70	2 3/4	254	10			57.5	2.26	41	30
5/8	18	3/4	79	3 1/8	318	12 1/2	h _{ef} + 2d ₀	h _{ef} + 2d ₀	65	2.56	68	50
3/4	22	7/8	89	3 1/2	381	15			80	3.15	122	90
7/8	25	1	89	3 1/2	445	17 1/2			95	3.74	136	100
1	28	1 1/8	102	4	508	20			110	4.33	183	135
1 1/8	32	1 1/4	114	4 1/2	572	22 1/2	135	5.31	244	180	160	6.30
1 1/4	35	1 3/8	127	5	635	25			325	240		

Installation instruction

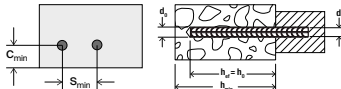


Table VII.
Fractional reinforcing bars.

Table VII.
Barras de refuerzo fraccionadas.

d _a / d _b	d ₀		h _{ef, min}		h _{ef, max}		h _{min}		S _{min} = C _{min}		max T _{inst} 1)	
[–]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[Nm]	[ft · lb]
#3	14	1/2	60	2 3/8	190	7 1/2	h _{ef} +30 (≥ 100)	h _{ef} +1.25 (≥ 4)	43	1.69	30	22
#4	16	5/8	70	2 3/4	254	10			58	2.28	60	44
#5	20	13/16	79	3 1/8	318	12 1/2			65	2.56	110	81
#6	22	7/8	89	3 1/2	382	15			80	3.15	175	129
#7	28	1 1/8	89	3 1/2	444	17 1/2			95	3.74	240	177
#8	32	1 1/4	102	4	508	20			110	4.33	320	236
#9	35	1 3/8	114	4 1/2	574	22 1/2			130	5.12	380	280
#10	40	1 1/2	127	5	644	25			160	6.30	450	332
#11	45	1 3/4	140	5 1/2	698	27 1/2			175	6.89	450	332

- 1) Torque moment only required when using threaded reinforcing bars to resist seismic loading.
- 1) El momento de torsión sólo se requiere cuando se usan barras de refuerzo roscadas para resistir la carga sísmica.

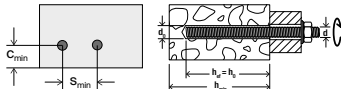


Table VIII.
Fractional internal threaded anchors.

Table VIII.
Varillas fraccionadas con roscado interno.

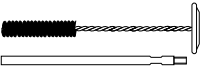
d _e	d _a		d ₀		h _{ef}		h _{min}		S _{min} = C _{min}		max T _{inst}	
[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[Nm]	[ft · lb]
RG M I 3/8	16	5/8	18	3/4	90	3.54	125	4.92	65	2.56	20	15
RG M I 1/2	18	1 1/16	20	13/16	125	4.92	165	6.50	75	2.95	40	30
RG M I 5/8	22	7/8	24	1	160	6.30	205	8.07	95	3.74	80	59
RG M I 3/4	28	1 1/8	32	1 1/4	200	7.87	260	10.24	125	4.92	120	89

Table IX.
Processing and curing times.

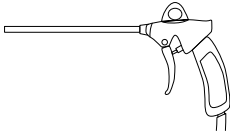
Temperature range 1) Rango de temperatura 1)		Processing time Tiempo de trabajabilidad t _{work}	Curing time Tiempo de curado t _{cure}
[°C]	[°F]	[min]	[h]
– 5 – ± 0	+ 23 – + 32	240	200
> ± 0 – + 5	> + 32 – + 41	150	90
> + 5 – + 10	> + 41 – + 50	120	40
> + 10 – + 20	> + 50 – + 68	30	22
> + 20 – + 30	> + 68 – + 86	14	10
> + 30 – + 40	> + 86 – + 104	7	5

- Store mortar in a cool dry place.
1) Minimal cartridge temperature +5 °C / +41 °F.
- Almacenar el mortero en un lugar fresco y seco.
1) Temperatura mínima del cartucho +5 °C / +41 °F.

Brush with extension



Compressed air pistol



Static mixer FIS MR Plus /
FIS UMR and extension tube



Injection adapter



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