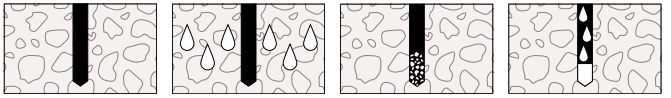
fischer

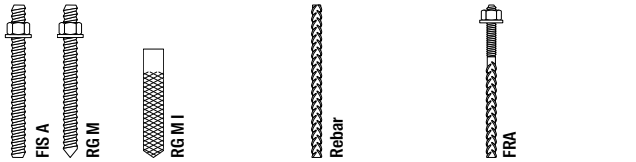
FIS EM Plus.

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** Installationsinstruktioner · **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** Қолдану нұсқаулығы · **ZH** 使用说明书 · **JA** 取扱説明書 · **KO** 사용 설명서 · **ID** Panduan Penggunaan · **AR** تعليمات الاستخدام

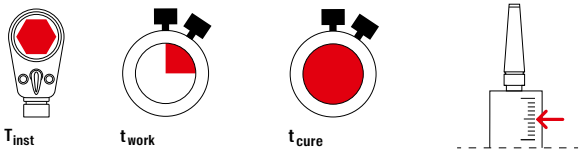


DE	Trockener Beton	Nasser Beton	Verschmutztes Bohrloch	Wassergefülltes Bohrloch
EN	Dry concrete	Water saturated concrete	Contaminated drill hole	Water filled borehole
FR	Béton sec	Béton humide	Perçage non dépoussiéré	Trou inondé
NL	Droog beton	Met water verzadigd beton	Vervuild boorgat	Met water gevuld 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	Vattenfyllt hål
NO	Tørr betong	Vannmettet betong	Tilskitnet borehull	Vannfylte borehull
FI	Kuiva betony	Veden kyllästämä betoni	Likaantunut poranreikä	Vedellä täyttynyt porareikä
IS	Þurr steinsteypa	Blaut steinsteypa	Óhrein borhola	Vatnsfyllt borhola
ET	Kuivbetoon	Märgbetoon	Mustunud puuriauk	Veega täidetud puuriauk
LV	Sauss betons	Mitrs betons	Piesārņots urbums	Urbums ar ūdeni
LT	Sausas betonas	Drėgnas betonas	Užtersta išgręžta skylė	Vandens pripildyta išgręžta skylė
PL	Beton suchy wodą	Beton nasycony wodą	Zabrudzony wywiercony otwór	Wywiercony otwór wypełnionym
CS	Suchý beton	Mokrý beton otvory vyvrtané do	Znečištěný vývrt	Naplněné vodou
SK	Suchý betón	Vodou nasýtený betón	Znečistený vývrt	Vodou naplnený otvor vyvŕtaný
HU	Száraz beton	Nedves beton	Szennyezett furat	Vízzel töltött furat
RO	Beton uscat	Beton ud	Gaură foratã contaminatã	Gaură foratã umplutã 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	Сумен 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 콘트리트	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 ممتلىء 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	Armeringstilslutninger
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	Sarrusühendus
LV	Betons ar plaisām	Betons bez plaisām	Stiegrojuma savienojums
LT	Sutrūkinėjęs betonas	Vientisas betonas	Armatūros sujungimo elementas
PL	Beton spękany	Beton niespękany	Złącze zbrojarskie
CS	Beton s trhlinami	Beton bez trhlin	Přípojka výztuže
SK	Betón s trhlinami	Betón bez trhlín	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	Çatlamış beton	Çatlamamış beton	Destek bağlantısı
EL	Μπετόν με ρωγμές	Μπετόν χωρίς ρωγμές	Σύνδεση οπλισμού
BG	Напукан бетон	Ненапукан бетон	Връзка за армировка
RU	Треснутый бетон	Целый бетон	Соединитель армирования
UK	Тріснутий бетон	Бетон у зоні стиснення	Арматурне 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	ひび割れのな 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 innergänga	Armeringsjärn	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 stiegrojuma	Enkura stienis
LT	Inkariniai strypai	Strypas su vidiniu sriegiu	Armatūrinis strypas	Armatūrinis inkaras
PL	Kotwy	Kotwy z gwintem wewnętrznym	Pręt zbrojarski	Kotwa zbrojarska
CS	Kotevní tyče	Svorník 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	Bare de ancorare	Ancoră cu filet interior	Tijă de armătură	Ancoră de armătură
SL	Sidra	Sidro z notranjim navojem	Armaturna palica	Sidro armature
HR	Sidrene šipke	Sidro s unutrašnjim navojem	Armaturna šipka	Armaturno sidro
SR	Šipke za ankerovanje	Kotva s unutrašnjim navojem	Armaturna šipka	Armaturna kotva
TR	Dübel çubukları	İçten dişli dübel	Takviye çubuğu	Takviye demiri
EL	Ντίζες αγκύρωσης	Αγκύρια εσωτερικού σπειρώματος	Ράβδος οπλισμού	Αγκύριο οπλισμού
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	頂睡 蝶溯萄 操	보강 로드	보강 앵커
ID	Batang jangkar	Jangkar berulir dalam	Batang penguat	Jangkar penguat
AR	قضبان تثبيت	لولبة تثبيت داخلية	قضيب حد 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 graduação
DA	Tilspændingsmoment	Forarbejdsningstid	Hærdetid	Skalatrin
SV	Vridmoment	Bearbetningstid	Härdningstid	Skaldelar
NO	Dreiemoment	Bearbeidelsestid	Herdetid	Skaladeler
FI	Vääntömomentti	Käsittelyaika	Kovettumisaika	Asteikkojaot
IS	Snúningsátak	Vinnslutími	Þornunartími	Mælikvarði
ET	Pöördemoment	Töötlemisaeg	Kõvastumisaeg	Skaala 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	Skálarészértékek
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	Dijelovi skale
SR	Obrtni moment	Vreme obrade	Vreme otvrdnjavanja	Delovi skale
TR	Tork	Kullanma süresi	Sertleşme süresi	Kadran bölümleri
EL	Ροπή σύσφιξης	Χρόνος επεξεργασίας	Χρόνος σκλήρυνσης	Διαβαθμίσεις κλίμακας
BG	Въртящ момент	Време за обработка	Време за втвърдяване	Части на скалата
RU	Крутящий момент	Время обработки	Время отверждения	Деление шкалы
UK	Крутний момент	Час обробки	Час затвердіння	Поділки шкали
KK	Айналдыру моменті	Өңдеу 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 눈 금폭
ID	Torsi	Waktu pemrosesan	Waktu pengerasan	Bagian skala
AR	عزم الدوران	وقت التصنيع	وقت التصلب	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 fatique cyclic loading

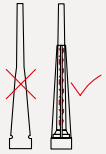
ESR-1990
See ICC-ES Evaluation Report at www.icc-es.org

Seismic C2 | R 120 | Dynamic

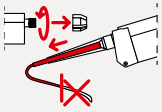
ÉMISSIONS DANS L'AIR INTÉRIEUR* A+ (A+ A B C)

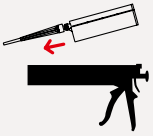
*Information sur le niveau d'émission des substances volatiles dans l'air intérieur, présentant un risque de toxicité par inhalation, sur une échelle de classe allant de A+ (très émissions) à C (forte émissions).

41 – 77° F/5 – 25° C



FIS MR Plus/FIS UMR

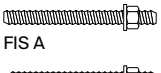




FIS EM Plus

	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
		M6	**M8**	**M10**	**M12**	**M14**	**M16**	**M20**
CE *		–	●	●	●	●	●	●
d_o	d_o [mm]	8	10	12	14	16	18	22/ 24
h_o	h_o	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$
h_{ef}	$h_{ef,min}$ [mm]	50	60	60	70	75	80	90
	$h_{ef,max}$ [mm]	120	160	200	240	280	320	400
d_b	fischer BS	ø 8	ø 10	ø 12	ø 14	ø 16	ø 18	ø 14
	d_b [mm]	9	11	14	16	20	20	26
d_f	d_f [mm]	7	9	12	14	16	18	22
d_f	d_f [mm]	9	12	14	16	18	20	26
S_k	S_k ($h_{o,min}$) [–]	2	2	3	3	5	5	11
	S_k ($h_{o,max}$) [–]	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

FIS A

RG M

		M22	M24	M27	M30	M33	M36	M40
CE *		●	●	●	●	–	–	–
d_o	d_o [mm]	25	28	30	35	37	40	44
h_o	h_o	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$
h_{ef}	$h_{ef,min}$ [mm]	93	96	108	120	132	144	160
	$h_{ef,max}$ [mm]	440	480	540	600	660	720	800
d_b	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_f	d_f [mm]	24	26	30	33	36	39	43
d_f	d_f [mm]	28	30	33	40	43	46	50
S_k	S_k ($h_{o,min}$) [–]	10	15	15	27	29	36	50
	S_k ($h_{o,max}$) [–]	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

FIS A

RG M

		3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"
CE *		–	●	●	●	●	●	●
d_o	d_o [mm]	11,1	14,3	19,1	22,2	25,4	28,6	31,8
	d_o [inch]	7/16	9/16	3/4	7/8	1	1 1/8	1 1/4
h_o	h_o	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$
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
d_b	fischer BS	ø 12	ø 14	ø 18	ø 20	ø 25	ø 28	ø 32
	d_b [mm]	14	16	20	25	27	30	40
d_f	d_f [mm]	8,9	11,9	14,0	16,0	18,0	22,1	23,9
d_f	d_f [mm]	11,9	14,0	16,0	18,0	20,1	25,9	27,9
S_k	S_k ($h_{o,min}$) [–]	3	3	5	11	10	15	27
	S_k ($h_{o,max}$) [–]	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


FIS A


RG M

Dynamic

		M12*	M16*	M20**	M24**
CE ***		●	●	●	●
d_o	d_o [mm]	14	18	24	28
h_o	h_o	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$
h_{ef}	$h_{ef,min}$ [mm]	70	80	90	96
	$h_{ef,max}$ [mm]	240	320	400	480
d_b	fischer BS	ø 14	ø 18	ø 24	ø 28
	d_b [mm]	16	20	26	30
d_f	d_f [mm]	14 – 16	18 – 20	22 – 26	26 – 30
d_f	d_f [mm]	15 - 16	19 - 20	25 - 26	29 - 30
t_{fix}	$t_{fix,min}$ [mm]	6	8	10	12
	$t_{fix,max}$ [mm]	200	200	200	200
S_k	S_k ($h_{o,min}$) [–]	3	5	11	15
	S_k ($h_{o,max}$) [–]	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 fatique cyclic loading

RG M I


RG M I

		M5	M6	M8	M10	M12	M16	M20
CE *		–	–	●	●	●	●	●
d_o	d_o [mm]	10	12	14	18	20	24	32
h_o	h_o [mm]	$h_o \geq h_{ef} = L_H$	$h_o \geq h_{ef} = L_H$	$h_o \geq h_{ef} = L_H$	$h_o \geq h_{ef} = L_H$	$h_o \geq h_{ef} = L_H$	$h_o \geq h_{ef} = L_H$	$h_o \geq h_{ef} = L_H$
$h_{ef} = L_H$	$h_{ef} = L_H$ [mm]	75	75	90	90	125	160	200
$l_{E,min.}$ / $l_{E,max.}$	$l_{E,min}$ [mm]	8	8	8	10	12	16	20
	$l_{E,max}$ [mm]	14	16	18	23	26	35	45
d_b	fischer BS	ø 10	ø 12	ø 14	ø 18	ø 20	ø 24	ø 35
	d_b [mm]	11	14	16	20	25	26	40
d_f	d_f [mm]	6	7	9	12	14	18	22
S_k	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

RG M I

RG M I

		3/8"	1/2"	5/8"	3/4"
CE *		–	–	●	●
d_0	d_0 [mm]	18	20	24	32
	d_0 [inch]	3/4	13/16	1	1 1/4
h_0	h_0	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$	$h_0 \geq h_{ef} = L_H$
$h_{ef} = L_H$	$h_{ef} = L_H$ [mm]	90	125	160	200
$l_{E,min}$ / $l_{E,max}$	$l_{E,min}$ [mm]	10	12	16	20
	$l_{E,max}$ [mm]	23	26	35	45
d_b	fischer BS	ø 18	ø 20	ø 24	ø 35
	d_b [mm]	20	25	26	40
d_f	d_f [mm]	12	14	18	22
S_k	S_k [–]	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, FRA

Rebar

FRA

			ø 8	ø 10	ø 12	ø 14	ø 16	ø 18	ø 20	ø 22	ø 24
ø	Rebar										
ø	FRA		–	–	M12	–	M16	–	M20	–	–
CE *	Rebar		●	●	●	●	●	●	●	●	●
	FRA		–	–	●	–	●	–	●	–	–
d_0		d_0 [mm]	10/ 12	12/ 14	14/ 16	18	20	25	25	30	30
h_0	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		$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$	$h_0 = h_{ef}+l_e = h_{nom}$
h_{ef}	Rebar	$h_{ef,min}$ [mm]	60	60	70	75	80	85	90	94	98
		$h_{ef,max}$ [mm]	160	200	240	280	320	360	400	440	480
	FRA	$h_{ef,min}$ [mm]	–	–	70	–	80	–	90	–	–
		$h_{ef,max}$ [mm]	–	–	140	–	120	–	300	–	–
d_b	fischer BS		ø 12	ø 14	ø 16	ø 18	ø 20	ø 25	ø 25	ø 30	ø 30
		d_b [mm]	14	16	20	20	25	27	27	40	40
d_f	FRA	d_f [mm]	–	–	14	–	18	–	22	–	–
d_f	FRA	d_f [mm]	–	–	18	–	22	–	26	–	–
S_k	Rebar S_k [–]	($h_{o,min}$)	3	3	4	5	6	12	9	18	15
		($h_{o,max}$)	7	9	13	17	22	51	40	81	69
	FRA S_k [–]	($h_{o,min}$)	–	–	10	–	14	–	21	–	–
		($h_{o,max}$)	–	–	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

FRA

			ø 25	ø 26	ø 28	ø 30	ø 32	ø 34	ø 36	ø 40
ø		Rebar								
ø		FRA	M24	–	–	–	–	–	–	–
CE *		Rebar	●	●	●	●	●	●	●	●
		FRA	●	–	–	–	–	–	–	–
d_o		d_o [mm]	30	35	35	40	40	40	45	55
h_o	Rebar		$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$
	FRA		$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$	$h_o = h_{ef}+l_e = h_{nom}$
h_{ef}	Rebar	$h_{ef,min}$ [mm]	100	104	112	120	128	136	144	160
		$h_{ef,max}$ [mm]	500	520	560	600	640	680	720	800
	FRA	$h_{ef,min}$ [mm]	96	–	–	–	–	–	–	–
		$h_{ef,max}$ [mm]	380	–	–	–	–	–	–	–
d_b	fischer BS		ø 30	ø 35	ø 35	ø 40	ø 40	ø 40	ø 45	ø 55
		d_b [mm]	40	40	40	42	42	42	47	58
d_f	FRA	d_f [mm]	26	–	–	–	–	–	–	–
d_f	FRA	d_f [mm]	32	–	–	–	–	–	–	–
S_k	Rebar S_k [–]	$(h_{o,min})$	13	26	23	38	34	28	47	101
		$(h_{o,max})$	61	127	110	188	164	135	233	503
	FRA S_k [–]	$(h_{o,min})$	26	–	–	–	–	–	–	–
		$(h_{o,max})$	63	–	–	–	–	–	–	–
	FRA	max T_{inst} [Nm]	150	–	–	–	–	–	–	–

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

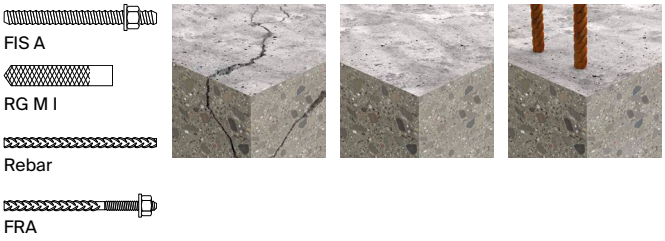
Rebar

Rebar

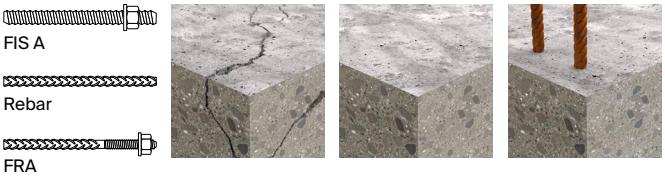
		Rebar	#3	#4	#5	#6	#7	#8	#9	#10
CE *			●	●	●	●	●	●	●	●
d_o		d_o [mm]	12,7	15,9	19,1	22,2	28,6	31,8	34,9	38,1
		d_o [inch]	1/2	5/8	3/4	7/8	1 1/8	1 1/4	1 3/8	1 1/2
h_o		h_o	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$	$h_o \geq h_{ef}$
h_{ef}		$h_{ef,min}$ [mm]	60	70	79	89	89	102	114	127
		$h_{ef,max}$ [mm]	191	254	318	381	445	508	572	635
d_b	fischer BS		ø 14	ø 16	ø 18	ø 20	ø 28	ø 32	ø 35	ø 40
		d_b [mm]	16	20	20	25	30	40	40	42

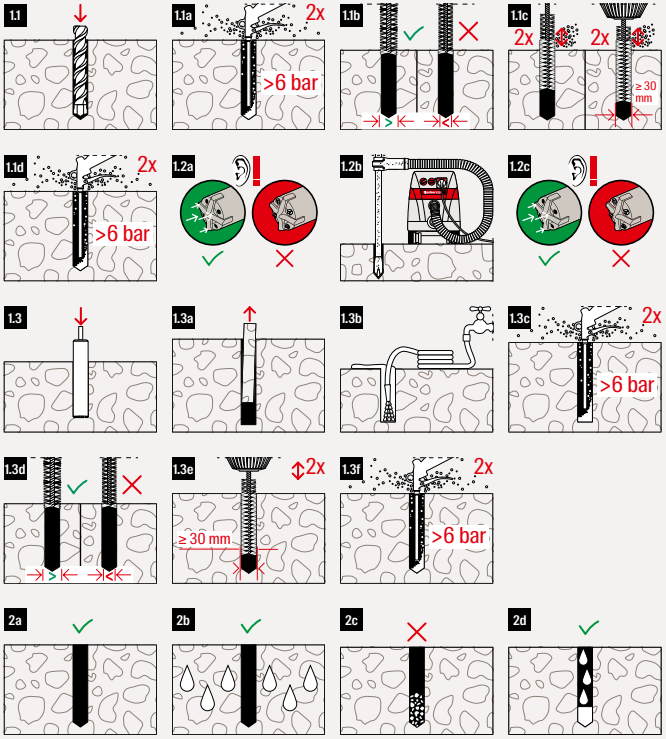
* ETA-17/0979, EAD 330499-02-0601, Option 1 for cracked concrete

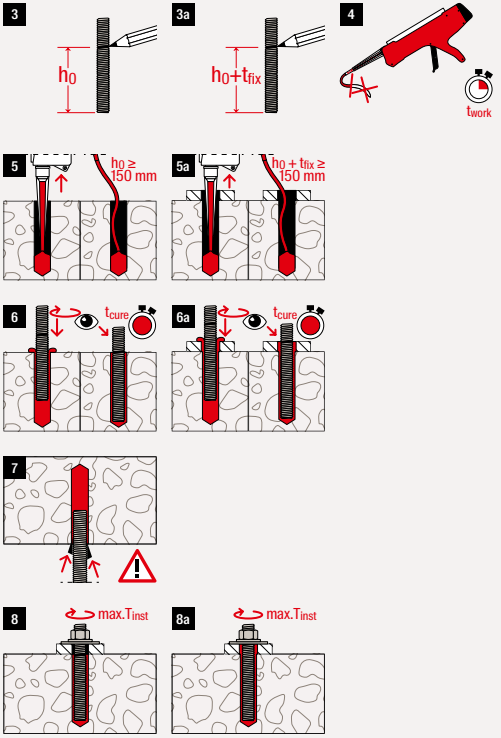
FIS A, RG M I, Rebar, FRA



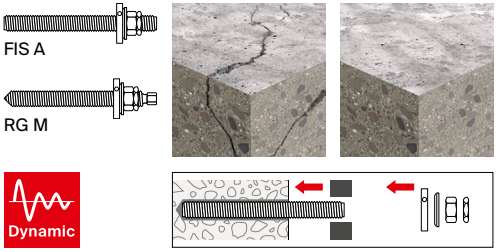
FIS A, Rebar, FRA

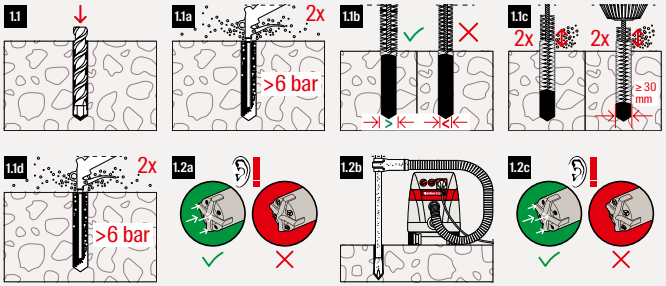




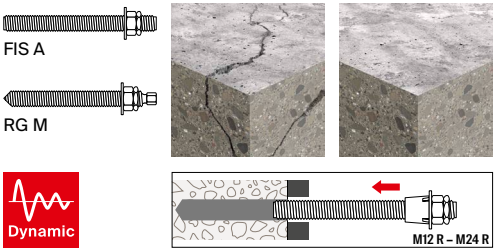


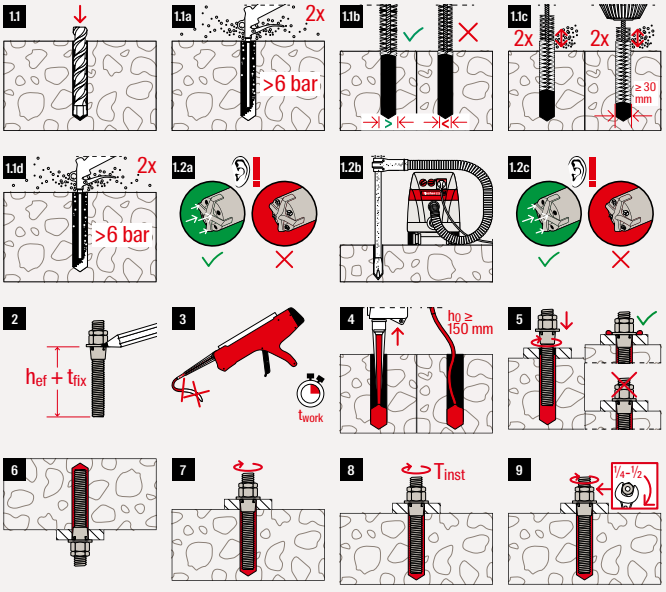
FIS A, RG M





FIS A, RG M



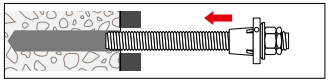


FIS A, RG M

FIS A

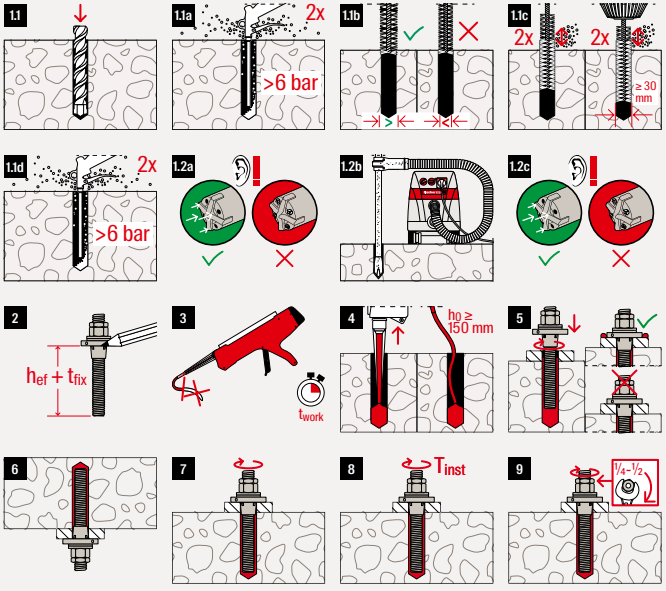
RG M

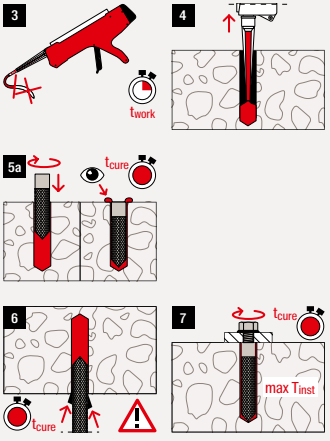
Dynamic



RG M I

RG M I





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

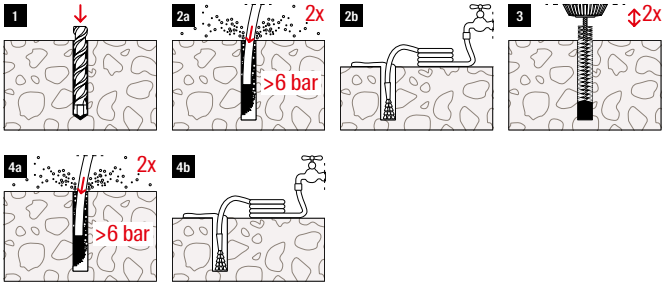
EN

fischer adhesive anchoring system FIS EM Plus

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

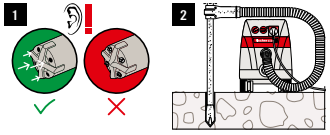
Important: Before use, read and review the installation instructions and the SDS (safety data sheet). Do not use expired adhesive. Minimal concrete temperature – 5 °C (23 °F).

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



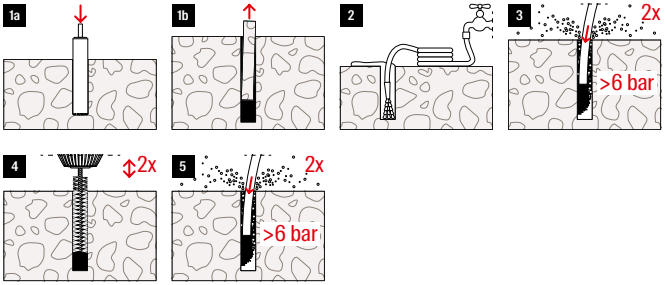
1 Drill the hole. Nominal drill hole diameter $\mathbf{d_0}$ and drill hole depth $\mathbf{h_0}$ see **Tables II, III, IV** or **VI, VII, VIII** respectively.
2a Cleaning of the drill hole (not applicable for underwater installation): Blow out the drill hole twice, with oil free compressed air (p ≥ 6 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 ≥ 30 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 ≥ 6 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)



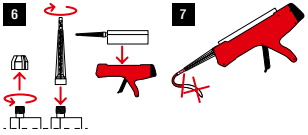
1 Check a suitable hollow drill for correct operation of the dust extraction.
2 Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with at least equivalent performance data (volume flow at the hose end ≥ 36 l/s / 1.27 cfs). Drill the hole with hollow 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 $\mathbf{d_0}$ and drill hole depth $\mathbf{h_0}$ see **Tables II, III, IV** or **VI, VII, VIII** respectively.
→ Go to step 6.

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

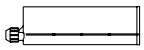
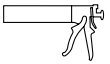


1a Drill the hole. Drill hole diameter $\mathbf{d_0}$ and nominal drill hole depth $\mathbf{h_0}$ see **Tables II, III, IV** or **VI, VII, VIII** respectively.
1b Break the drill core and remove it.
2 Flush the drill hole with clean water until it flows clear.
3 Blow out the drill hole at least twice,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

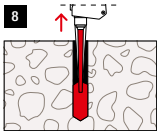
Preparing the cartridge



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.

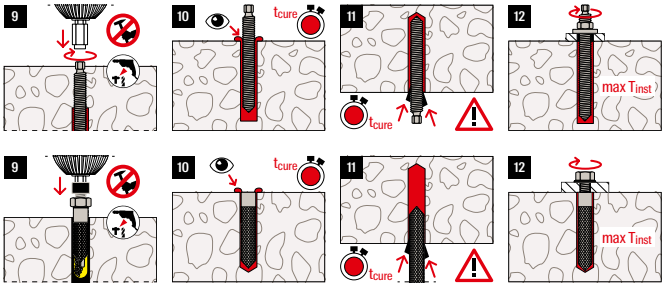
FIS EM Plus			
 Cartridge	 Dispenser	Item No.	 Static mixer
300 ml	KPM 3	541441	FIS MR Plus
390 ml	FIS DM S Pro	563337	FIS MR Plus
390 ml	FIS DB S Pro	558955	FIS MR Plus
390 ml	FIS AP	058027	FIS MR Plus
585 ml	FIS DM S-L	510992	FIS UMR
585 ml	FIS DP S-L	511125	FIS UMR
1,500 ml	FIS DP S-XL	512401	FIS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

Injection of the mortar



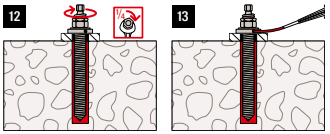
8 Fill approximately 2/3 of the drilled hole with mortar. Always begin from the bottom of the hole and avoid air pockets or voids. For drill hole depth $\mathbf{h_0}$ ≥ 150 mm / 6 inch use an extension tube.
For overhead installation, deep holes
($\mathbf{h_0}$ > 250 mm / 10 inch) or drill hole diameter
($\mathbf{d_0}$ ≥ 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



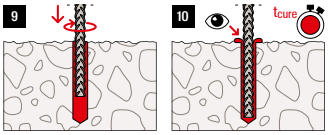
9 Only use clean and oil-free metal parts. Mark the setting depth on the anchor rod. Push the anchor rod or fischer internal threaded anchor RG M I down to the bottom of the hole, turning it slightly while doing so.
10 After inserting the anchor element, excess mortar must be emerged around the anchor 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 $\mathbf{t_{cure}}$ see **Table IX.** Mounting the fixture max. $\mathbf{T_{inst}}$ 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 disk FFD reduces $\mathbf{t_{fix}}$ (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 $\mathbf{t_{cure}}$ see **Table IX.**

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

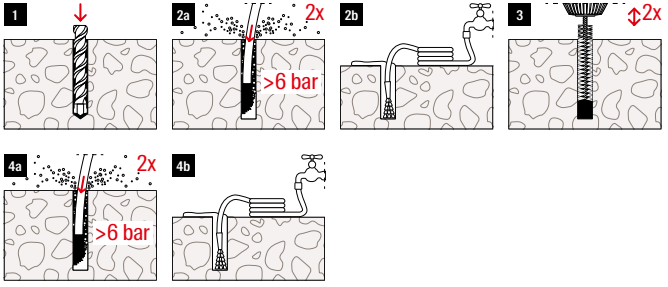
see ICC-ES Evaluation Report No. 1990 at www.icc-es.org

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 $\mathbf{d_0}$ y profundidad del agujero $\mathbf{h_0}$ 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 ≥ 6 bar / 87 psi).

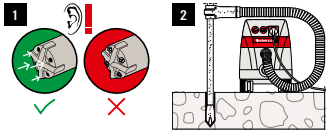
2b Sólo para instalación submarina: Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.

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 ≥ 30 mm / 1 1/2 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 ≥ 6 bar / 87 psi).

4b Sólo para instalación submarina: Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.
→ Ir al paso 6.

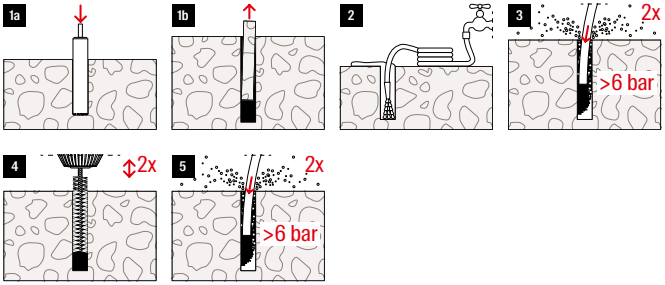
Perforación y limpieza del agujero (perforación con percutor con broca hueca)



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 ≥ 36 l/s / 1.27 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 $\mathbf{d_0}$ y profundidad del taladro $\mathbf{h_0}$ 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 $\mathbf{d_0}$ y profundidad nominal del agujero $\mathbf{h_0}$ véanse los **Tablas II, III, IV** o **VI, VII, VIII** respectivamente.

1b Rompa el núcleo del taladro y retírelo.

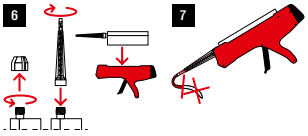
2 Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.

3 Sople el agujero de perforación al menos dos veces, con aire comprimido sin aceite (p ≥ 6 bar / 87 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.

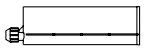
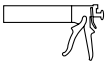
5 Sople el agujero de perforación al menos dos veces, con aire comprimido sin aceite (p ≥ 6 bar / 87 psi).

Preparación del cartucho

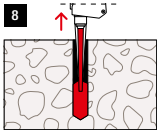


6 Quite el tapón del cartucho. Atornille la cánula mezcladora (la espiral en la cánula mezcladora debe ser claramente visible). Coloque el cartucho en el dispensador.

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.

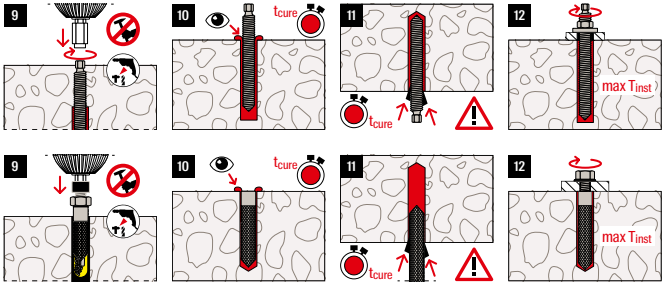
FIS EM Plus			
			
Cartucho	**Dispensador**	**Número de artículo**	**Cánula mezcladora**
300 ml	KPM 3	**541441**	FIS MR Plus
390 ml	FIS DM S Pro	**563337**	FIS MR Plus
390 ml	FIS DB S Pro	**558955**	FIS MR Plus
390 ml	FIS AP	**058027**	FIS MR Plus
585 ml	FIS DM S-L	**510992**	FIS UMR
585 ml	FIS DP S-L	**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 $\mathbf{h_0}$ ≥ 150 mm / 6 inch usar un tubo de extensión. Para la instalación en la parte superior, agujeros profundos ($\mathbf{h_0}$ > 250 mm / 10 inch) o el diámetro del agujero de perforación ($\mathbf{d_0}$ ≥ 40 mm / 1 1/2 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

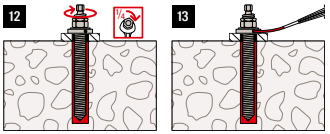


9 Sólo utilice piezas de metal limpias y sin aceite. Marque la profundidad de ajuste en la barra de anclaje. Empuje la varilla de anclaje o el anclaje de rosca interna de fischer RG M I hasta el fondo del agujero, girándolo ligeramente mientras lo hace.

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.

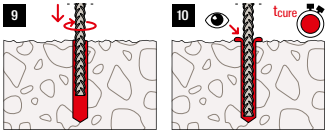
12 Espere el tiempo de curado especificado $\mathbf{t_{cure}}$ ver **Tabla IX.** Montar el accesorio max. $\mathbf{T_{inst}}$ ver **Tablas II, IV** o **VI, VIII** respectivamente.



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 ≥ 50 N/mm² / 7250 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 $\mathbf{t_{fix}}$ (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 $\mathbf{t_{cure}}$ ver **Tabla IX.**

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

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

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**	
					Type Tipo [BS]	Item No. Número de artículo	Size Tamaño	Color Color
ø [inch]	ø [mm]	ø [mm]	ø [mm]	ø [mm]				
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

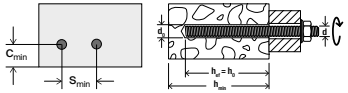


Table II.
Metric threaded rods.

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]	[inch]	[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	h_{ef} + $2d_0$	h_{ef} + $2d_0$	65	2.56	60	44
M20	24	1	90	3.54	400	15.75			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

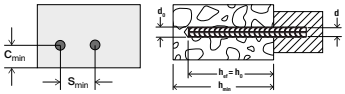


Table III.
Metric reinforcing bars.

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	h_{ef} + $2d_0$	h_{ef} + $2d_0$	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.

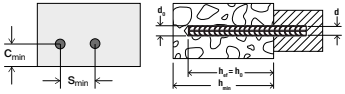


Table IV.
Metric internal threaded anchors.

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]	[inch]	[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

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

Tabla 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 inyecció	
								
ø [inch]	ø [mm]	ø [inch]	#	ø [inch]	Type Tipo [BS]	Item No. Número de artículo	Size Tamaño	Color 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

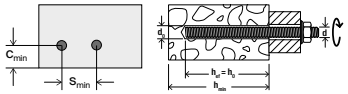


Table VI.
Fractional threaded rods.

Tabla 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]	[inch]	[Nm]	[ft · lb]
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			65	2.56	68	50
3/4	22	7/8	89	3 1/2	381	15	h_{ef} + $2d_0$	h_{ef} + $2d_0$	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
1 1/4	35	1 3/8	127	5	635	25			160	6.30	325	240

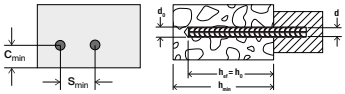


Table VII.
Fractional reinforcing bars.

Tabla 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	h_{ef} + $2d_0$	h_{ef} + $2d_0$	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.

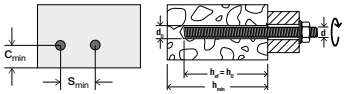


Table VIII.
Fractional internal threaded anchors.

Tabla 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	11/16	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.

Tabla IX.
Tiempos de trabajabilidad y curado.

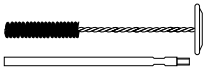
Temperature range 1) Rango de temperatura 1)		Processing time Tiempo de trabajabilidad t_{work}	Curing time Tiempo de curado t_{cure}
[°C]	[°F]	[min]	[h]
– 5 — ± 0	+ 23 — + 32	240	200
> ± 0 — + 5	> + 32 — + 41	150	90
> + 5 — + 10	> + 41 — + 50	120	40
> + 10 — + 20	> + 50 — + 68	30	22
> + 20 — + 30	>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

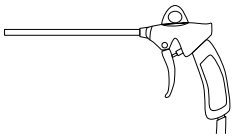
Almacenar el mortero en un lugar fresco y seco.
1) Temperatura mínima del cartucho + 5 °C / + 41 °F.

Installation instruction

Brush with extension

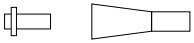


Compressed air pistol



Static mixer FIS MR Plus /
FIS UMR and extension tube

Injection adapter



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