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FIS EM Plus



ETA-17/1056
EAD 331522-00-0601

Post-installed rebar connection
(TR23)



Mit allgemeiner Bauzugenehmigung
Z-74.8-199



ETA-17/0979
EAD 330499-01-0601

Option 1 for cracked concrete

Seismic performance category C1, C2

ÉMISSIONS DANS L'AIR INTÉRIEUR



A+
A+ A B C

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



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



Fire resistance
classification
R 240
Anchor types
see test report

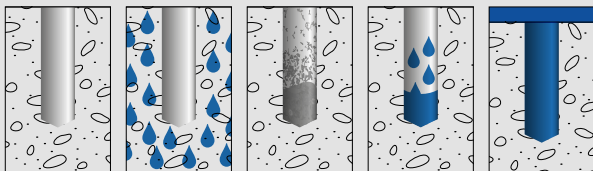


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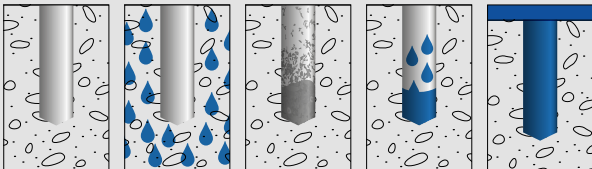
FIS EM Plus



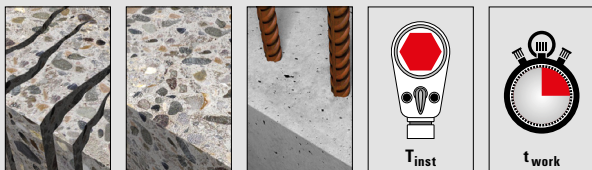
DE	Gebrauchsanweisung	HR	Upute za instalaciju
EN	Operating instructions	SR	Uputstvo za instalaciju
FR	Mode d'emploi	TR	Kurulum talimatları
NL	Montagehandleiding	EL	Οδηγίες Εγκατάστασης
IT	Istruzioni per l'installazione	BG	Инструкции за инсталиране
ES	Instrucciones de uso	RU	Инструкция по установке
PT	Instruções de utilização	UK	Інструкція з використання
DA	Installationsvejledning	KK	Қолдану нұсқаулығы
SV	Installationsinstruktioner	ZH	使用说明书
NO	Installasjonsveiledning	JA	取扱説明書
FI	Asennusohjeet	KO	사용 설명서
IS	Notkunarleiðbeiningar	HI	Panduan Penggunaan
ET	Kasutusjuhend	AR	تعليمات الاستخدام
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		



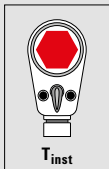
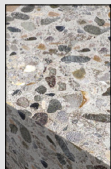
DE	Trockener Beton	Nasser Beton	Verschmutztes Bohrloch	Wassergefülltes Bohrloch	Bohrloch unter Wasser
EN	Dry concrete	Water saturated concrete	Contaminated drill hole	Water filled borehole	Drillhole under water
FR	Béton sec	Béton humide	Perçage non dépolisé	Trou inondé	Forage sous l'eau
NL	Droog beton	Met water verzadigd beton	Vervuild boorgat	Met water gevuld boorgat	Boorgat onder water
IT	Calcestruzzo secco	Calcestruzzo saturo d'acqua	Foro sporco	Foro pieno d'acqua nel calcestruzzo	Foro sotto acqua
ES	Hormigón seco	Hormigón saturado de agua	Agujero de taladrado sucio	Taladro lleno de agua en hormigón	Perforación bajo el agua
PT	Betão seco	Betão saturado de água	Furo com sujidade	Furo cheio de água	Furo debaixo de água
DA	Tør beton	Vandmættet beton	Tilsmudset borehul	Vandfyldt borehul	Borehul under vandet
SV	Torr betong	Vattenmättad betong	Smutsigt hål	Vattenfyllt hål	Borrhål under vattnet
NO	Tørr betong	Vannmettet betong	Tilskitnet borehull	Vannfylte borehull	Borehull under vann
FI	Kuiva betony	Veden kyllästämä betoni	Likaantunut poranreikä	Vedellä täyttynyt porareikä	Porausreikä veden alla
IS	Purr steinsteypa	Blaut steinsteypa	Óhrein borhola	Vatnsfyllt borhola	Borhola neðansjávar
ET	Kuivbetoon	Märgbetoon	Mustunud puuriauk	Veega täidetud puuriauk	Puurkaev vee all
LV	Sauss betons	Mitrš betons	Piesārņots urbums	Urbums ar ūdeni	Urbums zem ūdens
LT	Sausas betonas	Drėgnas betonas	Užteršta išgręžta skylė	Vandens pripildyta išgręžta skylė	Gręžinys po vandeniu
PL	Beton suchy wodą	Beton nasycony wodą	Zabrudzony wywiercony otwór	Wywiercony otwór wypełnionym	Odwiert pod wodą
CS	Suchý beton	Mokrý beton otvory vyvratané do	Znečištěný vývrt	Naplněné vodou	Vrt pod vodou
SK	Suchý betón	Vodou nasýtený betón	Znečistený vývrt	Vodou naplnený otvor vyvrátaný	Vrt pod vodou
HU	Száraz beton	Nedves beton	Szennyezett furat	Vízzel töltött furat	Fúróluk a víz alatt
RO	Beton uscat	Beton ud	Gaură forată contaminată	Gaură forată umplută cu apă	Foraj sub apă
SL	Suh beton	Moker beton	Umazana izvrtina	Z voda napolnjena izvrtina	Izvrtina pod vodo



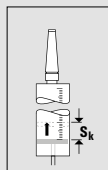
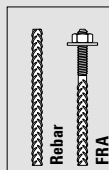
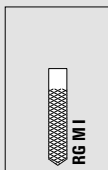
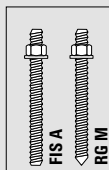
HR	Suhi beton	Mokri beton	Zaprljani provrt	Vodom napunjen provrt	Bušotina pod vodom
SR	Suv beton	Mokar beton	Zaprljan provrt	Provrt napunjen vodom	Bušotina pod vodom
TR	Kuru beton	Yaş beton	Kirli delik	Su dolu delik	Kuyu sualtı
EL	Στεγνό μπετόν	Υγρό μπετόν	Βρώμικη τρύπα	Τρύπα γεμάτη νερό	Υποβρύχια γεώτρηση
BG	Сух бетон	Мокър бетон	Замърсен отвор	Пълен с вода отвор	Сондаж под вода
RU	Сухой бетон	Водонасыщенный бетон	Загрязненное отверстие	Отверстие в бетоне, заполненное водой	Буровая скважина на под водой
UK	Сухий бетон	Водонасичений бетон	Забруднений отвір	Заповнений водою отвір	Скважина під водою
KK	Кұрғақ бетон	Ылғалды бетон	Ластанған саңылау	Сумен толтырылған саңылау	Су астындағы ұңғыма
ZH	干燥混凝土	湿混凝土	受污的钻孔	注水的钻孔	水下钻孔
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	水中ボアホール
KO	건조 콘크리트	습윤 콘크리트	이물질이 삽입된 드릴 구멍	물이 찬 드릴 구멍	수중 시추공
HI	Beton kering	Beton basah	Lubang bor terkontaminasi	Lubang bor terisi air	Lubang bor di bawah air
AR	خرسانة جافة	خرسانة رطبة	ثقب ملوث	ثقب ممتلئ بالماء	بئر تحت الماء



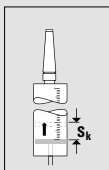
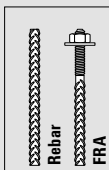
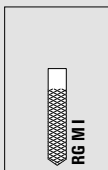
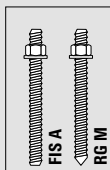
DE	Gerissener Beton	Ungerissener Beton	Bewehrungsanschluss	Drehmoment	Verarbeitungszeit
EN	Cracked concrete	Non-cracked concrete	Reinforcement connection	Required torque	Open time
FR	Béton fissuré	Béton non fissuré	Scellement d'armatures	Couple	Temps de manipulation
NL	Gescheurd beton	Ongescheurd beton	Wapeningsaansluiting	Draaimoment	Verwerkingstijd
IT	Calcestruzzo fessurato	Calcestruzzo non fessurato	Ferri di ripresa	Coppia	Tempo di lavorazione
ES	Hormigón agrietado	Hormigón sin grietas	Conexión de refuerzo	Par	Tiempo de tratamiento
PT	Betão fissurado	Betão não fissurado	Conetor de reforço	Binário	Tempo de processamento
DA	Revnet beton	Ikkerevnet beton	Armerings-tilslutninger	Tilspændingsmoment	Forarbejdsningstid
SV	Sprucken betong	Ej sprucken betong	Armeringsanslutning	Vridmoment	Bearbetningstid
NO	Betong med riss	Betong uten riss	Armeringsforbindelse	Dreiemoment	Bearbeidelsestid
FI	Haljennut betoni	Halkeamaton betoni	Vahvistusliitäntä	Vääntömomentti	Käsittelyaika
IS	Sprungin steypa	Óbrotin steinsteypa	Tenging við styrkingu	Snúningsáttak	Vinnslutími
ET	Pragunenud betoon	Pragudeta betoon	Sarrusühendus	Pöördemoment	Töötlemissaeg
LV	Betons ar plaisām	Betons bez plaisām	Stiegrojuma savienojums	Griezes moments	Apstrādājamības laiks
LT	Sutrūkinėjęs betonas	Vientisas betonas	Armatūros sujungimo elementas	Sukimo momentas	Darbo su medžiaga laikas
PL	Beton spēkany	Beton niespękany	Złącze zbrojarskie	Moment dokręcenia	Czas żelowania
CS	Beton s trhlinami	Beton bez trhlin	Přípojka výztuže	Utahovací moment	Doba zpracování
SK	Betón s trhlinami	Betón bez trhlin	Styková výstuž	Utahovací moment	Doba spracovania
HU	Repedéses beton	Repedésmentes beton	Betonvasalatcsatlakozás	Forgatónyomaték	Feldolgozási idő
RO	Beton fisurat	Beton fără fisuri	Racord de armătură	Cuplu	Timp de punere în operă
SL	Razpokan beton	Nerazpokan beton	Priključek za armaturo	Navor	Čas obdelave



HR	Ispucani beton	Neispucani beton	Priključak armature	Okretni moment	Vrijeme obrade
SR	Ispucao beton	Neispucao beton	Priključak armature	Obrtni moment	Vreme obrade
TR	Çatlamış beton	Çatlamamış beton	Destek bağlantısı	Tork	Kullanma süresi
EL	Μπετόν με ρωγμές	Μπετόν χωρίς ρωγμές	Σύνδεση οπλισμού	Ροπή σύσφιξης	Χρόνος επεξεργασίας
BG	Напукан бетон	Ненапукан бетон	Връзка за армировка	Въртящ момент	Време за обработка
RU	Треснутый бетон	Цельный бетон	Соединитель армирования	Крутящий момент	Время обработки
UK	Тріснутий бетон	Бетон у зоні стиснення	Арматурне пруття	Крутий момент	Час обробки
KK	Жарықтары бар бетон	Бүтін бетон	Арматуралау қосылымы	Айналдыру моменті	Өңделу уақыты
ZH	有裂缝的混凝土	无裂缝的混凝土	钢筋连接件	扭矩	加工时间
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	トルク	加工時間
KO	균열 콘크리트	비균열 콘크리트	보강재 연결	토크	작업 시간
HI	Beton retak	Beton tidak licin	Sambungan penguat	Torsi	Waktu pemrosesan
AR	خرسانة متصدعة	خرسانة غير متصدعة	وصلة حديد مسلح	عزم الدوران	وقت التصنيع






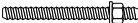
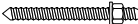












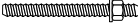



DE	Aushärtezeit	Ankerstangen	Innengewindeanker	Bewehrungsstab, Bewehrungsanker	Skalenteile
EN	Hardening time	Anchor rods	Internal thread anchors	Reinforcement rod, Reinforcement anchor	Scale divisions
FR	Temps de durcissement	Tiges filetées	Douilles taraudées	Barres d'armatures, Ancre d'armature	Graduations
NL	Uithardtijd	Ankerstangen	Binnendraadanker	Wapeningsstaaf, Wapeningsanker	Schaalonderdelen
IT	Tempo di indurimento	Barre di ancoraggio	Ancoraggio con filettatura interna	Ferro di ripresa, Ancoraggio di ripresa	Divisioni di scala
ES	Tiempo de endurecimiento	Barras de anclaje	Anclaje de rosca interior	Barra de refuerzo, Anclaje de refuerzo	Unidades de escala
PT	Tempo de endurecimento	Tirantes de ancoragem	Ancoragem de rosca interna	Barra de armação, Ancoragem de reforço	Intervalos de gradação
DA	Hærdetid	Gevindstænger	Anker med indvendigt gevind	Armeringsstav, Armeringsanker	Skalatrín
SV	Hårdningstid	Förankringsstänger	Ankare med innergånga	Armeringsjärn, Armeringsankare	Skaldelar
NO	Herdetid	Ankerstenger	Innvendig gjengeanker	Wapeningsstaaf, Wapeningsanker	Skaladeler
FI	Kovettumisaika	Harustangot	Sisäkierreankkuri	Tartuntateräs, Tartuntaankkuri	Asteikkojaot
IS	Pornunartími	Festistangir	Festing með skrufgangi að innanverðu	Styrktarteinn, Styrktarfesting	Mælikvarði
ET	Kõvastumisaeg	Ankurvõrdad	Sisekeermega ankur	Sarrusvarras, Sarrusankur	Skaala jaotused
LV	Sacietēšanas laiks	Enkura stienis	Iekšējās vītnes enkurs	Enkura stiegrojuma, Enkura stienis	Skalas iedaļas
LT	Kietėjimo laikas	Inkariniai strypai	Strypas su vidiniu sriegiu	Armatūrinis strypas, Armatūrinis inkaras	Skalės padalos
PL	Czas wiązania	Kotwy	Kotwy z gwintem wewnętrznym	Pręt zbrojarski, Kotwa zbrojarska	Podziałki skali
CS	Doba vytvrzení	Kotevní tyče	Svorník s vnitřním závitem	Výztužná tyč, Kotva výztuže	Dílky na stupnici
SK	Doba vytvrdnutia	Kotviace tyče	Kotva s vnútorným závitom	Výstužný prút, Vystužovacia kotva	Diely na stupnici
HU	Kikeményedési idő	Horgonyrudak	Belsőmenetes horgony	Betonvas rúd, Horgonyzó vas	Skálárészértékek
RO	Timp de întărire	Bare de ancorare	Ancoră cu filet interior	Tijă de armătură, Ancoră de armătură	Diviziuni scală
SL	Čas strjevanja	Sidra	Sidro z notranjim navojem	Armaturna palica, Sidro armature	Razdelki na skali

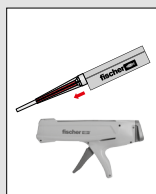
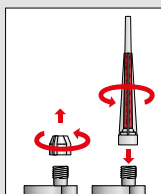
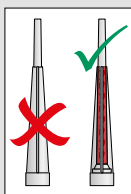
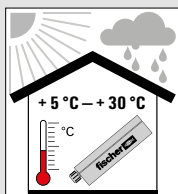






HR	Vrijeme stvrdnjavanja	Sidrene šipke	Sidro s unutrašnjim navojem	Armaturna šipka, Armaturno sidro	Dijelovi skale
SR	Vreme otvrdnjavanja	Šipke za ankerovanje	Kotva s unutrašnjim navojem	Armaturna šipka, Armaturna kotva	Delovi skale
TR	Sertleşme süresi	Dübel çubukları	İçten dişli dübel	Takviye çubuğu, Takviye demiri	Kadran bölümleri
EL	Χρόνος σκλήρυνσης	Ντιζές αγκύρωσης	Αγκύρια εσωτερικού σπειρώματος	Ράβδος οπλισμού, Αγκύριο οπλισμού	Διαβαθμίσεις κλίμακας
BG	Време за втвърдяване	Анкерни пръти	Анкерен болт с вътрешна резба	Армировъчен прът, Армировъчен анкерен болт	Части на скалата прът
RU	Время отверждения	Анкерные болты	Анкеры с внутренней резьбой	Арматурный стержень, Арматурный анкер	Деление шкалы
UK	Час затвердіння	Анкерні шпильки	Анкер із внутрішнім різьбленням	Арматурний стрижень, Арматурний анкер	Поділки шкали
KK	Қатаю уақыты	Анкерлік болттары	Ішкі бұрандасы бар анкерлер	Арматуралық езек, Арматуралық анкері	Шәкіл бөліктері
ZH	硬化时间	系杆	内部螺纹系杆	钢筋, 钢筋锚杆	刻度
JA	凝固時間	アンカーロッド	めねじアンカー	鉄筋, 強化アンカー	目盛り分割
KO	경화 시간	앵커 로드	頂睡 蝶溯菊操	보강 로드, 보강 앵커	스케일의 눈 금폭
HI	Waktu pengerasan	Batang jangkar	Jangkar berulir dalam	Batang penguat, Jangkar penguat	Bagian skala
AR	وقت التصلب	قضبان تثبيت	لولبة تثبيت داخلية	قضيب حد مسلح تثبيت جديد مسلح	أجزاء المقياس

	 FIS EM Plus	 FIS EM Plus
	- 5 °C - ± 0 °C	240 min.
> ± 0 °C - + 5 °C	150 min.	90 h
> + 5 °C - + 10 °C	120 min.	40 h
> + 10 °C - + 20 °C	30 min.	22 h
> + 20 °C - + 30 °C	14 min.	10 h
> + 30 °C - + 40 °C	7 min.	5 h



		 ETA-17/0979 EAD 330499-01-0601 Option 1 for cracked concrete	 	FIS A, RG M	10, 11, 15-17
		 ETA-17/0979 EAD 330499-01-0601 Option 1 for cracked concrete		RG M I	12, 15, 17
		 ETA-17/0979 EAD 330499-01-0601 Option 1 for cracked concrete	 	Rebar, FRA	13-16
		 See ICC ES Evaluation Report at www.icc-es.org ESR-1990	   	FIS A, RG M, RG M I, Rebar	18-23



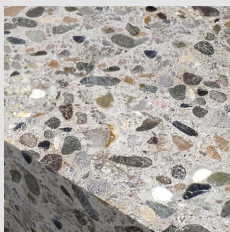
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	FIS AM	058000	
	FIS DCD S	543629	
	FIS AP	058027	
585 ml	FIS DM S-L	510992	FIS UMR
	FIS DP S-L	511125	
1500 ml	FIS DP S-XL	512401	





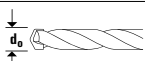
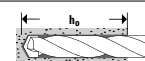
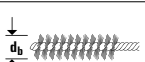
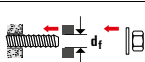
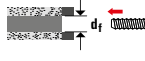
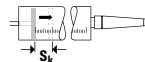
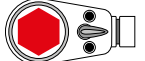
FIS A



RG M



FIS A, RG M

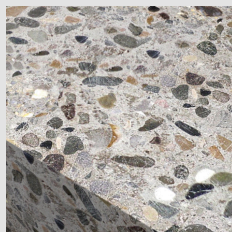
	M6	M8	M10	M12	M14	M16	M20
	-	✓	✓	✓	✓	✓	✓
 d_0 [mm]	8	10	12	14	16	18	24
 $h_{0,min}$ [mm]	50	60	60	70	75	80	90
	$h_{0,max}$ [mm]	120	160	200	240	280	320
 d_b [mm]	fischer BS	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18
	d_b [mm]	10	11	14	16	20	20
 d_f [mm]	7	9	12	14	16	18	22
 d_f [mm]	9	12	14	16	18	20	26
 $s_k(h_{0,min})$ [-]	2	3	4	3	5	5	11
	$s_k(h_{0,max})$ [-]	4	8	12	10	16	19
 T_{inst} [Nm]	5	10	20	40	50	60	120






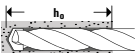

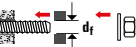

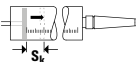
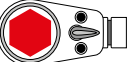
FIS A



RG M

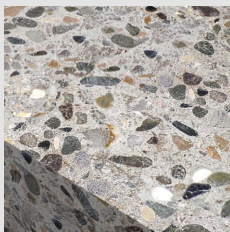


FIS A, RG M



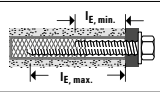
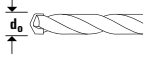
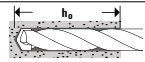
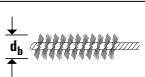
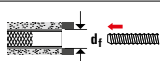
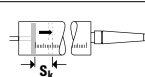
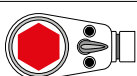
	M22	M24	M27	M30	M33	M36	M40	
	✓	✓	✓	✓	-	-	-	
 d_0 [mm]	25	28	30	35	37	40	44	
 $h_{0,min}$ [mm]	93	96	108	120	132	144	160	
	$h_{0,max}$ [mm]	440	480	540	600	660	800	
 fischer BS	Ø 25	Ø 28	Ø 35	Ø 35	Ø 37	Ø 40	Ø 44	
	d_b [mm]	27	30	40	40	42	47	
 d_f	24	26	30	33	36	39	43	
 d_f	28	30	33	40	43	46	50	
 S_k	$S_k(h_{0,min})$ [-]	10	14	17	27	29	36	50
	$S_k(h_{0,max})$ [-]	46	69	85	132	144	179	245
 T_{inst} [Nm]	135	150	200	300	400	500	600	



RG M I



RG M I

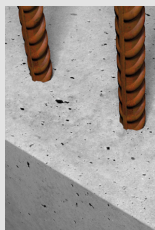
		M5	M6	M8	M10	M12	M16	M20
		-	-	✓	✓	✓	✓	✓
	$l_{E, \min}$ [mm]	8	8	8	10	12	16	20
	$l_{E, \max}$ [mm]	14	16	18	23	26	35	45
	d_0 [mm]	10	12	14	18	20	24	32
	h_0 [mm]	75	75	90	90	125	160	200
	fischer BS d_b [mm]	Ø 10	Ø 12	Ø 14	Ø 18	Ø 20	Ø 24	Ø 35
	d_f [mm]	6	7	9	12	14	18	22
	s_k [-]	3	3	4	6	11	17	39
	T_{inst} [Nm]	-	-	10	20	40	80	120



Rebar

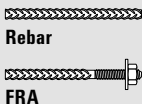


FRA



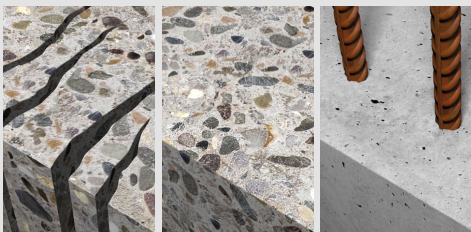
Rebar, FRA

	Rebar	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20	Ø 22	Ø 24	
	FRA	-	-	M12	-	M16	-	M20	-	-	
	Rebar	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	FRA	-	-	✓	-	✓	-	✓	-	-	
	d_0 [mm]	10/12	12/14	14/16	18	20	25	25	30	30	
	Rebar	$h_{0,min}$ [mm]	60	60	70	75	80	85	90	94	98
		$h_{0,max}$ [mm]	160	200	240	280	320	360	400	440	480
	FRA	$h_{0,min}$ [mm]	-	-	170	-	180	-	190	-	-
		$h_{0,max}$ [mm]	-	-	240	-	320	-	400	-	-
	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	
	FRA	d_f [mm]	-	-	14	-	18	-	22	-	-
	FRA	d_f [mm]	-	-	18	-	22	-	26	-	-
	Rebar	$h_{0,min}$	3	3	4	5	6	12	10	18	15
		$h_{0,max}$	7	10	14	18	24	50	45	80	69
	FRA	$h_{0,min}$	-	-	10	-	14	-	22	-	-
		$h_{0,max}$	-	-	14	-	24	-	45	-	-
	FRA	T_{inst} [Nm]	-	-	40	-	60	-	120	-	-



Rebar

FRA



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 $h_{0,min}$ [mm]	100	104	112	120	128	136	144	160
	$h_{0,max}$ [mm]	500	520	560	600	640	680	720	800
	FRA $h_{0,min}$ [mm]	196	-	-	-	-	-	-	-
	$h_{0,max}$ [mm]	480	-	-	-	-	-	-	-
	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
	FRA d_f [mm]	26	-	-	-	-	-	-	-
	FRA d_f [mm]	32	-	-	-	-	-	-	-
	Rebar $h_{0,min}$	13	26	24	36	35	28	47	101
	S_k [-]	65	127	116	175	173	135	233	457
	FRA $h_{0,min}$	26	-	-	-	-	-	-	-
	S_k [-]	63	-	-	-	-	-	-	-
	FRA T_{inst} [Nm]	150	-	-	-	-	-	-	-



FIS A



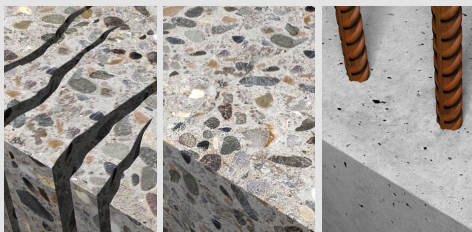
RG M I



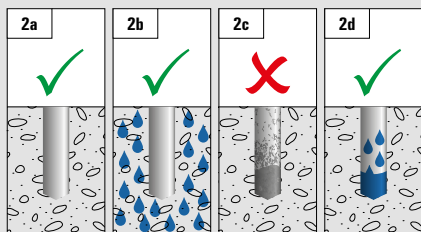
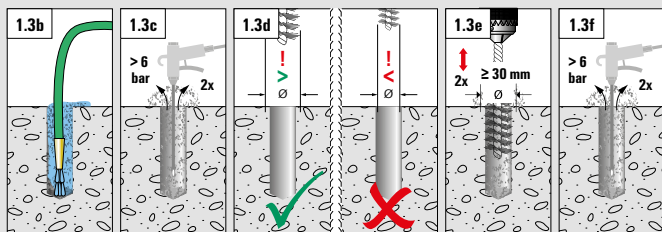
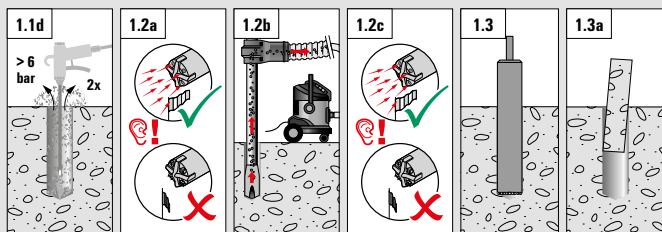
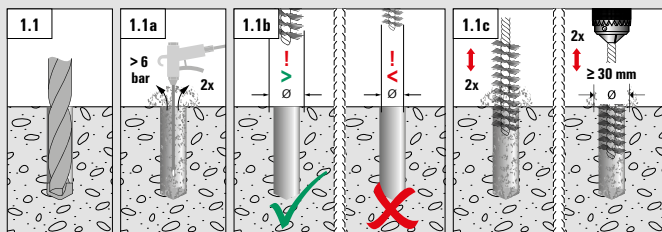
Rebar



FRA



FIS A, RG M I, Rebar, FRA





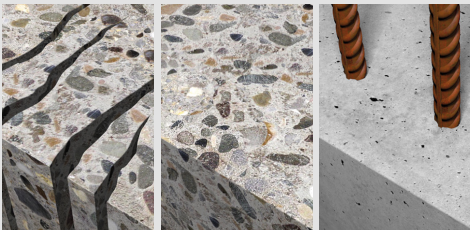
FIS A



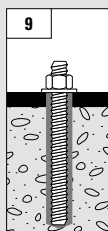
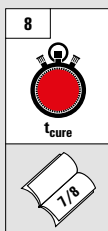
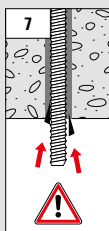
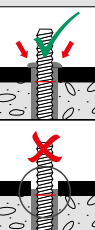
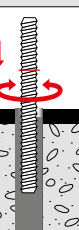
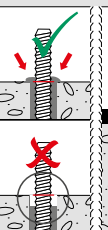
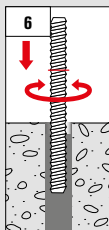
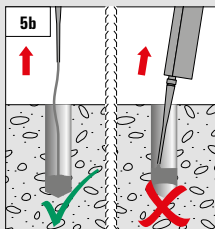
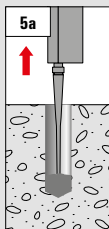
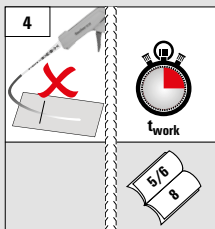
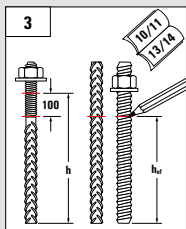
Rebar



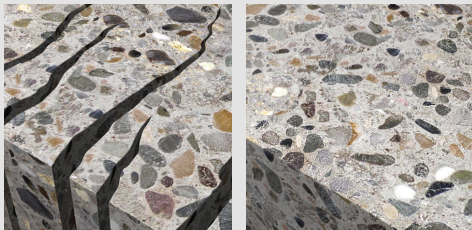
FRA



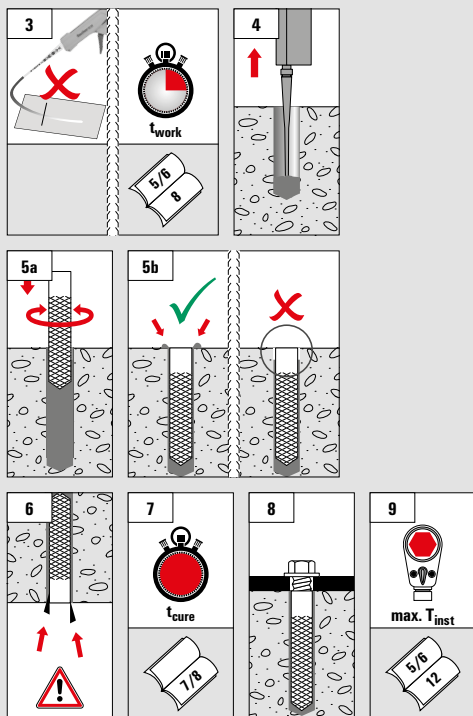
FIS A, Rebar, FRA



RG M I



RG M I

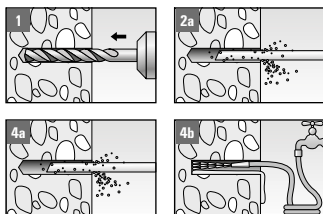


EN fischer adhesive anchoring system FIS EM Plus

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 ($p \geq 6$ 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 ($p \geq 6$ 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)



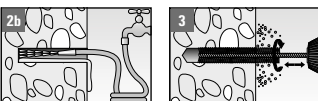
- 1** Check a suitable hollow drill for correct operation of the dust extraction.
- 2** Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with at least equivalent performance data (volume flow at the hose end ≥ 36 l/s / 1.27 cfs). Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during

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 ($p \geq 6$ 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 ($p \geq 6$ 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

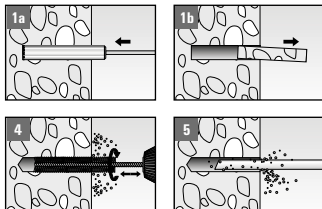
the drilling process and must be adjusted to maximum power. Nominal drill hole diameter d_0 and drill hole depth h_0 see **Tables II, III, IV or VI, VII, VIII** respectively.

→ Go to step 6.

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.

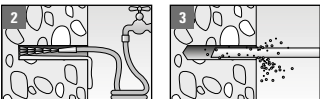
→ Ir al paso 6.

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



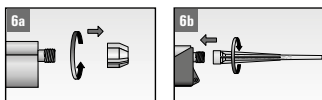
- 1a** Drill the hole. Drill hole diameter d_0 and nominal drill hole depth h_0 see **Tables II, III, IV or VI, VII, VIII** respectively.
- 1b** Break the drill core and remove it.
- 2** Flush the drill hole with clean water until it flows clear.
- 3** Blow out the drill hole at least twice, using oil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

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



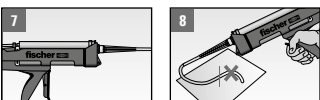
- 1** Perfore el agujero. Diámetro del agujero d_0 y profundidad nominal del agujero h_0 véanse los **Tablas II, III, IV o VI, VII, VIII** respectivamente.
- 1b** Rompa el núcleo del taladro y retírelo.
- 2** Enjuague el agujero de perforación con agua limpia hasta que fluya con claridad.
- 3** Sople el agujero de perforación al menos dos veces, con aire comprimido sin aceite ($p \geq 6$ 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 ($p \geq 6$ bar / 87 psi).

Preparing the cartridge





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

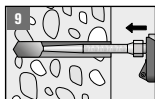
Preparación del cartucho



- 6a** Quite el tapón del cartucho.
- 6b** Atornille la cánula mezcladora (la espiral en la cánula mezcladora debe ser claramente visible).
- 7** Coloque el cartucho en el dispensador.
- 8** 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.

Cartridge Cartucho	Dispenser Dispensador	Item No. Número de artículo	Static mixer Cánula mezcladora
390 ml	FIS DM S	511118	FIS Mixer Red Plus 
	FIS DCD S	543629	
	FIS AP	058027	
585 ml	FIS DM S-L	510992	FIS Ultra Mixer Red 
	FIS DP S-L	511125	
1500 ml	FIS DP S-XL	512401	

Injection of the mortar



- 9** Fill approximately 2/3 of the drilled hole with mortar. Always begin from the bottom of the hole

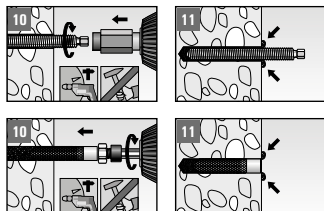
Inyección del mortero

- 9** 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

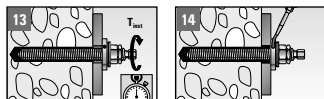
and avoid air pockets or voids. For drill hole depth $h_0 \geq 150$ mm / 6 inch use an extension tube. For overhead installation, deep holes ($h_0 > 250$ mm / 10 inch) or drill hole diameter ($d_0 \geq 40$ mm / 1 1/2 inch) use an injection-adaptor see **Table I or V** respectively.

$h_0 \geq 150$ mm / 6 inch usar un tubo de extensión. Para la instalación en la parte superior, agujeros profundos ($h_0 > 250$ mm / 10 inch) o el diámetro del agujero de perforación ($d_0 \geq 40$ mm / 1 1/2 inch) utilice un adaptador de inyección ver **Tabla I o V** respectivamente.

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

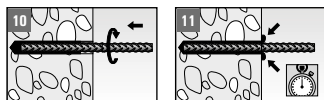


- 10 Only use clean and oil-free metal parts. Mark the setting depth on the anchor rod. Push the anchor rod or fischer internal threaded anchor RG M I down to the bottom of the hole, turning it slightly while doing so.
- 11 After inserting the anchor element, excess mortar must be emerged around the anchor element.
- 12 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.
- 13 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.



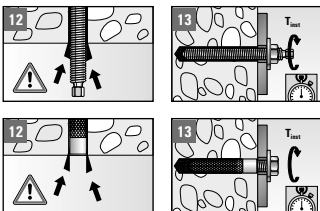
Option After the minimum curing time is reached, the gap between anchor element and fixture (annular clearance) may be filled with mortar via the fischer filling disc FFD. Compressive strength ≥ 50 N/mm² / 7250 psi (e.g. fischer injection mortars FIS HB, FIS SB, FIS V, FIS EM Plus). **ATTENTION:** Using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

Installation reinforcing bars



- 10 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.
- 11 Wait for the specified curing time t_{cure} see **Table IX**.

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



- 10 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.
- 11 Después de insertar el elemento de anclaje, el exceso de mortero debe emerger alrededor del elemento de anclaje.
- 12 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.
- 13 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 ≥ 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 t_{fix} (longitud útil del anclaje).

Instalación de barras de refuerzo

- 10 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.
- 11 Espere el tiempo de curado especificado t_{cure} ver **Tabla IX**.

Table I.

Drill hole diameter /
Accessories for metric sizes.







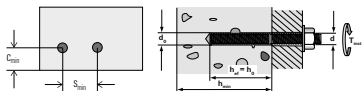
Drill bit Broca de perforación		Rods Varilla roscada	Rebar Acero corrugado	Internal threaded anchor Varilla con roscado interno	Brush Cepillo	Injection adapter Adaptador de inyección		
								
ϕ [inch]	ϕ [mm]	ϕ [mm]	ϕ [mm]	ϕ [mm]	Type Tipo [BS]	Item No. Número de artículo	Size Tamaño	Color
3/8	10	M8	-	-	10	78178	-	-
7/16	12	M10	-	-	12	78179	12	nature
9/16	14	M12	-	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.

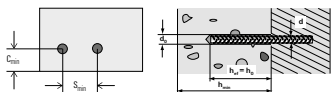
**Table II.**

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

**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	$h_{ef} + 2d_0$	$h_{ef} + 2d_0$	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	$h_{ef} + 2d_0$	$h_{ef} + 2d_0$	160	6.30	430	317

Tabla III.

Barras métricas de refuerzo.

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.

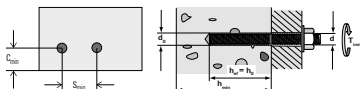


Table IV.

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]	[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

Tabla IV.

Varillas métricas con roscado interno métricas.

Table V.

Drill hole diameter /
Accessories for fractional sizes.

Drill bit Broca de perforación		Rods Varilla roscada		Rebar Acero corrugado		Internal threaded anchor Varilla con roscado interno		Brush Cepillo		Injection adapter Adaptador de inyección	
\emptyset [inch]	\emptyset [mm]	\emptyset [inch]		#		\emptyset [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	-	4	RG M 1 3/8	16/18	78181	18	yellow		
13/16	20	-	5	-	RG M 1 1/2	20	52277	20	green		
7/8	22	3/4	-	6	-	20	52277	20	green		
1	25	7/8	-	7	RG M 1 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 1 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		

Tabla V.

Diámetro del agujero de perforación /
Accesorios para tamaños fraccionarios.

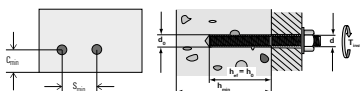


Table VI.

Fractional 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]	[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	$h_{ef} + 2d_0$	$h_{ef} + 2d_0$	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			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		

Tabla VI.

Varillas roscadas fraccionadas.

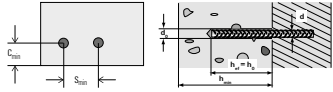


Table VII.
Fractional reinforcing bars.

d_a / d_b	d_0		$h_{ef, min}$		$h_{ef, max}$		h_{min}		$s_{min} = c_{min}$		$max T_{inst}^1)$	
	[mm]	[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.

Tabla VII.
Barras de refuerzo fraccionadas.

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

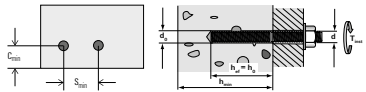


Table VIII.
Fractional internal threaded anchors.

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 1 3/8	16	5/8	18	3/4	90	3.54	125	4.92	65	2.56	20	15
RG M 1 1/2	18	11/16	20	13/16	125	4.92	165	6.50	75	2.95	40	30
RG M 1 5/8	22	7/8	24	1	160	6.30	205	8.07	95	3.74	80	59
RG M 1 3/4	28	1 1/8	32	1 1/4	200	7.87	260	10.24	125	4.92	120	89

Tabla VIII.
Varillas fraccionadas con roscaado interno.

Table IX.
Processing and curing times.

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

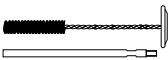
Store mortar in a cool dry place.

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.

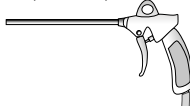
Brush with extension



Static mixer FIS MR Plus / FIS UMR
and extension tube



Compressed air pistol



Injection adapter



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