

ICC-ES Evaluation Report

ESR-3572

Reissued April 2026

This report also contains:


- [CA Supplement](#)

Subject to renewal April 2028

- [FL Supplement w/HVHZ](#)

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<p>DIVISION: 03 00 00— CONCRETE</p> <p>Section: 03 16 00— Concrete Anchors</p> <p>DIVISION: 05 00 00— METALS</p> <p>Section: 05 05 19— Post-Installed Concrete Anchors</p>	<p>REPORT HOLDER:</p> <p>fischerwerke GmbH & Co. KG</p>	<p>EVALUATION SUBJECT:</p> <p>fischer SUPERBOND ADHESIVE ANCHORING SYSTEM FOR CRACKED AND UNCRACKED CONCRETE</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018 and 2015 [International Building Code® \(IBC\)](#)
- 2024, 2021, 2018 and 2015 [International Residential Code® \(IRC\)](#)

Main references of this report are for the 2024 IBC and IRC. See [Table 19](#) and [Table 20](#) for applicable sections of the code for previous IBC and IRC editions.

Property evaluated:

- Structural

2.0 USES

fischer Superbond Adhesive Anchor System consist of the cartridge system FIS SB or the capsule system RSB. The adhesive anchors using the cartridge system FIS SB are used to resist static, wind and earthquake (IBC Seismic Design Categories A through F) tension and shear loads in cracked and uncracked normal-weight concrete. The adhesive anchors using the capsule system RSB are used to resist static, wind and earthquake (IBC Seismic Design Categories A through F) tension and shear loads in cracked and uncracked normal-weight concrete with M10, M12, M16, M20, M24, M30 RG M metric diameter (0.39, 0.47, 0.63, 0.79, 0.94 and 1.18 inch) threaded steel rods and are used to resist static, wind and earthquake (IBC Seismic Design Categories A and B only) tension and shear loads in cracked and uncracked normal-weight concrete with M8 RG M metric diameter (0.31 inch) threaded steel rods.

Use is limited to normal-weight concrete with a specified compressive strength, f'_c , of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).

The anchor system complies with anchors as described in Section 1901.3 of the 2024 IBC. The anchor systems may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The fischer Superbond Adhesive Anchor System is comprised of the following components:

Cartridge

- fischer FIS SB 390 S, fischer FIS SB 585 S or fischer FIS SB 1500 S adhesive packaged in cartridges
- Adhesive mixing and dispensing equipment
- Equipment for hole cleaning and adhesive injection

Capsule:

- fischer RSB 8, fischer RSB 10mini, fischer RSB 10, fischer RSB 12mini, fischer RSB 12, fischer RSB 16mini, fischer RSB 16, fischer RSB 20, fischer RSB 20E/24, fischer RSB 30 packaged in capsules.
- setting tool and equipment for hole cleaning

fischer FIS SB adhesive may only be used with continuously threaded steel rods or deformed steel reinforcing bars described in [Tables 2, 3, and 4](#) of this report. The primary components of the fischer adhesive anchor system, including the fischer FIS SB Adhesive and 3 anchoring elements are shown in [Figure 4](#) of this report. fischer RSB adhesive may only be used with continuously threaded steel rods RG M described in [Tables 2 and 3](#) of this report. The primary components of the fischer adhesive anchor system, including the fischer RSB Adhesive and the anchoring element RG M are shown in [Figure 5](#) of this report.

Installation information and parameters are shown in [Figure 3](#) of this report.

The manufacturer's printed installation instructions (MPII), as included with each adhesive unit package, are shown in [Figure 7](#) and [8](#) of this report.

3.2 Materials:

3.2.1 fischer Superbond Adhesive: fischer Superbond Adhesive Anchoring system include the capsule system RSB and the cartridge system FIS SB.

3.2.1.1 fischer FIS SB: fischer FIS SB Adhesive is an injectable, vinyl ester adhesive. The two components are kept separate in a dual-chambered cartridge. The two components combine and react when dispensed through a static mixing nozzle attached to the manifold. The system is labeled fischer FIS SB 390 S [13.2 oz (390 mL)], or fischer FIS SB 585 S [19.8 oz. (585 mL)], or fischer FIS SB 1500 S [50.7 oz (1500 mL)]. These three cartridge sizes are denoted as fischer FIS SB.

3.2.1.2 fischer RSB: fischer RSB Adhesive is a resin capsule. The two components are kept in a glass capsule. The two components combine and react when the anchor is driven in while using a hammer drill set on rotary hammer action. The capsules are labeled fischer RSB 8, RSB 10mini, RSB 10, RSB 12mini, RSB 12, RSB 16mini, RSB 16, RSB 20, RSB 20E/24, RSB 30.

The cartridge FIS SB and the RSB box are stamped with the adhesive expiration date. The shelf life, as indicated by the expiration date, corresponds to an unopened cartridge or RSB box stored in a dry, dark environment. Storage temperature of the adhesive is 41°F to 77°F (5°C to 25°C).

3.2.2 Hole cleaning equipment: Hole cleaning equipment comprised of steel wire brushes supplied by fischer and air nozzles must be used in accordance with [Figure 7](#) and [8](#) of this report.

3.2.3 Dispensers: fischer FIS SB adhesive must be dispensed with manual dispensers, cordless electric dispensers or pneumatic dispensers supplied by fischer.

3.2.4 Setting tool: fischer RSB adhesive must be set with the setting tool and using a suitable adapter. The anchor element is driven into the capsule using a hammer drill set on rotary hammer action.

3.2.5 Steel anchor elements:

3.2.5.1 Standard threaded steel rods: Threaded steel rods must be clean, continuously threaded rods (all-thread) in diameters as described in [Tables 5 and 13](#) of this report. Steel design information for common grades of threaded rod and associated nuts are provided in [Tables 2, 3, 5 and 13](#) of this report. Carbon steel threaded rods are furnished with a 0.0002-inch-thick (0.005 mm) zinc electroplated coating in accordance with ASTM B633 SC 1, or must be hot-dipped galvanized in accordance with ASTM A153, Class C or D.

The stainless steel threaded rods must comply with [Table 3](#) of this report. Steel grades and types of material (carbon, stainless) for the washers and nuts must match the threaded rods. Threaded steel rods must be straight and free of indentations or other defects along their length. The end may be stamped with identifying marks and the embedded end may be blunt cut or cut on the bias (chisel point).

3.2.5.2 fischer threaded steel rods FIS A and RG M: fischer FIS A and RG M anchor rods are threaded rods classified as ductile steel elements in accordance with section 3.2.5.4 of this report. The fischer FIS A is a threaded rod with flat shape on both end. The fischer RG M is a threaded rod with a chamfer shape on the embedded section and flat or hexagonal end on the concrete surface side, as shown in [Tables 2, 3](#) and [Figure 6](#). Mechanical properties for the fischer FIS A and RG M are provided in [Tables 2, 3](#) and [5](#) of this report. The anchor rods are available in diameters as shown in [Table 5](#). fischer FIS A and RG M anchor rods are produced from carbon steel and furnished with a 0.0002-inch-thick (0.005 mm) zinc electroplated coating. Fischer FIS A R and fischer RG M R are fabricated from stainless steel, and fischer A HCR and fischer RG M HCR are fabricated from high corrosion resistant steel. Steel grades and types of material (carbon, stainless) for the washers and nuts must match the threaded rods. The threaded rods are marked on the head with an identifying mark (see [Figure 6](#)).

3.2.5.3 Steel Reinforcing bars: Steel reinforcing bars are deformed reinforcing bars as described in [Table 4](#) of this report. [Tables 10](#) and [16](#) summarize reinforcing bar size ranges. The embedded portions of reinforcing bars must be straight, and free of mill scale, rust, mud, oil and other coatings that impair the bond with the adhesive. Reinforcing bars must not be bent after installation, except as set forth in ACI 318-19 Section 26.6.3.2 (b), with the additional condition that the bars must be bent cold, and heating of reinforcing bars to facilitate field bending is not permitted.

3.2.5.4 Ductility: In accordance with ACI 318-19 Section 2.3, in order for a steel element to be considered ductile, the tested elongation must be at least 14 percent and reduction of area must be at least 30 percent. Steel elements with a tested elongation of less than 14 percent or a reduction of area of less than 30 percent, or both, are considered brittle. Values for various steel materials are provided in [Tables 2](#) and [3](#) of this report. Where values are nonconforming or unstated, the steel must be considered brittle.

3.3 Concrete:

Normal-weight concrete must comply with Sections 1903 and 1905 of the IBC. The specified compressive strength of the concrete must be from 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).

4.0 DESIGN AND INSTALLATION

4.1 Strength Design:

4.1.1 General: The design strength of anchors under the 2024 IBC, as well as the 2024 IRC must be determined in accordance with ACI 318-19 and this report.

The strength design of anchors must comply with ACI 318-19 Section 17.5.1.2, except as required in ACI 318-19 Section 17.10. An index for the different design strengths is provided in [Table 1](#) of this report.

Design parameters are provided in [Tables 5](#) through [18](#) of this report. Strength reduction factors, ϕ , as described in ACI 318-19 Section 17.5.3, must be used for load combinations calculated in accordance with Section 1605.1 of the 2024 IBC or ACI 318-19 Section 5.3.

4.1.2 Static Steel Strength in Tension: The nominal steel strength of a single anchor in tension, N_{sa} , shall be calculated in accordance with ACI 318-19 Section 17.6.1.2, and the associated strength reduction factors, ϕ , in accordance with ACI 318-19 Section 17.5.3, are given in [Tables 5, 10, 13](#), and [16](#) of this report for the anchor element types included in this report. See [Table 1](#).

4.1.3 Static Concrete Breakout Strength in Tension: The nominal static concrete breakout strength in tension of a single anchor or group of anchors, N_{cb} or N_{cbg} , must be calculated in accordance with ACI 318-19 Section 17.6.2 with the following addition:

The basic concrete breakout strength of a single anchor in tension, N_b , must be calculated in accordance with ACI 318-19 Section 17.6.2.2 using the values of $k_{c,cr}$, and $k_{c,uncr}$ as described in the tables of this report. Where analysis indicates no cracking in accordance with ACI 318-19 Section 17.6.2.5, N_b must be calculated using $k_{c,uncr}$ and $\Psi_{c,N} = 1.0$, see [Table 1](#) of this report. For anchors in lightweight concrete see ACI 318-19 Section 17.2.4. The value of f'_c used for calculation must be limited to 8,000 psi (55 MPa) in accordance with ACI 318-19 Section 17.3.1. Additional information for the determination of nominal bond strength in tension is given in Section 4.1.4 of this report.

4.1.4 Static Bond Strength in Tension: The nominal static bond strength of a single adhesive anchor or group of adhesive anchors in tension, N_a or N_{ag} , must be calculated in accordance with ACI 318-19 Section 17.6.5. Bond strength values are a function of the adhesive system, concrete compressive strength, whether the concrete is cracked or uncracked, the concrete temperature range, and the installation conditions (dry, water-saturated concrete, and water-filled holes). The resulting characteristic bond strength shall be

multiplied by the associated strength reduction factor ϕ_{nn} and must be modified with the factor κ_{nn} for cases where holes are drilled in dry concrete (κ_d), where the holes are drilled in water-saturated concrete (κ_{ws}) or where the holes are water-filled at the time of anchor installation (κ_{wf}), as follows:

CONCRETE TYPE	PERMISSIBLE INSTALLATION CONDITIONS	BOND STRENGTH	ASSOCIATED STRENGTH REDUCTION FACTOR
Uncracked	Dry	$\tau_{uncr} \cdot \kappa_d$	ϕ_d
	Water-saturated	$\tau_{uncr} \cdot \kappa_{ws}$	ϕ_{ws}
	Standing water in hole	$\tau_{uncr} \cdot \kappa_{wf}$	ϕ_{wf}
Cracked	Dry	$\tau_{cr} \cdot \kappa_d$	ϕ_d
	Water-saturated	$\tau_{cr} \cdot \kappa_{ws}$	ϕ_{ws}
	Standing water in hole	$\tau_{cr} \cdot \kappa_{wf}$	ϕ_{wf}

Figure 1 and 2 of this report presents a bond strength design selection flowchart. Strength reduction factors for determination of the bond strength are given in Tables 8, 9, 12, 15 and 18 of this report. See Table 1. Adjustments to the bond strength may also be taken for increased concrete compressive strength as noted in the footnotes to the corresponding tables and above.

4.1.5 Static Steel Strength in Shear: The nominal static strength of a single anchor in shear as governed by the steel, V_{sa} , in accordance with ACI 318-19 Section 17.7.1.2, and the associated strength reduction factors, ϕ , in accordance with ACI 318-19 Section 17.5.3, are given in Tables 5, 10, 13, and 16 for the anchor element types included in this report. See Table 1.

4.1.6 Static Concrete Breakout Strength in Shear: The nominal static concrete breakout strength of a single anchor or group of anchors in shear, V_{cb} , or V_{cbg} , must be calculated in accordance with ACI 318-19 Section 17.7.2, based on information given in Tables 6, 7, 11, 14, and 17 of this report. See Table 1. The basic concrete breakout strength of a single anchor in shear, V_b , must be calculated in accordance with ACI 318-19 Section 17.7.2.2 using the values of d given in Tables 6, 7, 11, 14, and 17 for the corresponding anchor steel in lieu of d_a . In addition, h_{ef} must be substituted for ℓ_e . In no case shall ℓ_e exceed $8d$. The value of f'_c shall be limited to a maximum of 8,000 psi (55 MPa) in accordance with ACI 318-19 Section 17.3.1.

4.1.7 Static Concrete Pryout Strength in Shear: The nominal static pryout strength of a single anchor or group of anchors in shear, V_{cp} or V_{cpg} , shall be calculated in accordance with ACI 318-19 Section 17.7.3 .

4.1.8 Interaction of Tensile and Shear Forces: For designs that include combined tension and shear, the interaction of tension and shear must be calculated in accordance with ACI 318-19 Section 17.8.

4.1.9 Minimum Member Thickness, h_{min} , Anchor Spacing, s_{min} , and Edge Distance, c_{min} : In lieu of ACI 318-19 Section 17.9.2, values of s_{min} and c_{min} described in this report (Tables 6, 7, 11, 14, and 17) must be observed for anchor design and installation. The minimum member thickness, h_{min} , described in this report (Tables 6, 7, 11, 14, and 17) must be observed for anchor design and installation. For adhesive anchors that will remain untorqued, ACI 318-19 Section 17.9.3 applies.

4.1.10 Critical Edge Distance c_{ac} and $\psi_{cp,Na}$: The modification factor $\psi_{cp,Na}$, must be determined in accordance with ACI 318-19 Section 17.6.5.5 except as noted below:

For all cases where $c_{Na}/c_{ac} < 1.0$, $\psi_{cp,Na}$ determined from ACI 318-19 Eq. 17.6.5.5.1b, need not be taken less than c_{Na}/c_{ac} . For all other cases, $\psi_{cp,Na}$ shall be taken as 1.0.

The critical edge distance, c_{ac} must be calculated according to Eq. 17.6.5.5.1c for ACI 318-19.

$$c_{ac} = h_{ef} \cdot \left(\frac{\tau_{k, uncr}}{1160} \right)^{0.4} \cdot \left[3.1 - 0.7 \frac{h}{h_{ef}} \right]$$

(Eq. 17.4.5.5.1c for ACI 318-19)

where

$\left[\frac{h}{h_{ef}}\right]$ need not be taken as larger than 2.4; and

$\tau_{k,uncr}$ = the characteristic bond strength stated in the tables of this report whereby $\tau_{k,uncr}$ need not be taken as larger than:

$$\tau_{k,uncr} = \frac{k_{uncr} \sqrt{h_{ef} f'_c}}{\pi \cdot d_a} \quad \text{Eq. (4-1)}$$

4.1.11 Design Strength in Seismic Design Categories C, D, E and F: In structures assigned to Seismic Design Category C, D, E or F under the IBC or IRC, anchors must be designed in accordance with ACI 318-19 Section 17.10. The nominal steel shear strength, V_{sa} , must be adjusted by $\alpha_{V,seis}$ as given in [Tables 5, 10, 13, and 16](#) of this report for the anchor element types included in this report. The nominal bond strength $\tau_{k,cr}$ must be adjusted by $\alpha_{N,seis}$ as noted in [Tables 8, 9, 12, 15, and 18](#) of this report.

4.2 Installation:

Installation parameters are illustrated in [Figure 3](#) of this report. Installation must be in accordance with ACI 318-19 Section 26.7.2. Anchor locations must comply with this report and the plans and specifications approved by the code official. Installation of the fischer FIS SB and fischer RSB Adhesive Anchor System must conform to the manufacturer's printed installation instructions included in each unit package as described in [Figure 7](#) (FIS SB) and [Figure 8](#) (RSB) of this report.

The adhesive anchor system may be used for upwardly inclined orientation applications (e.g. overhead). Upwardly inclined and horizontal orientation applications are to be installed using the appropriate injection adapter and wedges to support the anchor during curing time as described in [Figure 7](#).

Installation of anchors in horizontal or upwardly inclined orientations shall be fully restrained from movement throughout the specified curing period through the use of temporary wedges, external supports, or other methods. Where temporary restraint devices are used, their use shall not result in impairment of the anchor shear resistance.

4.3 Special Inspection:

Periodic special inspection must be performed where required in accordance with Sections 1705.1.1 and Table 1705.3 of the 2024 and this report. The special inspector must be on the jobsite initially during anchor installation to verify anchor type, anchor dimensions, concrete type, concrete compressive strength, adhesive identification and expiration date, hole dimensions, hole cleaning procedures, anchor spacing, edge distances, concrete thickness, anchor embedment, tightening torque and adherence to the manufacturer's published installation instructions.

The special inspector must verify the initial installations of each type and size of adhesive anchor by construction personnel on site. Subsequent installations of the same anchor type and size by the same construction personnel are permitted to be performed in the absence of the special inspector. Any change in the anchor product being installed or the personnel performing the installation requires an initial inspection. For ongoing installations over an extended period, the special inspector must make regular inspections to confirm correct handling and installation of the product.

Continuous special inspection of adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be performed in accordance with ACI 318-19 Section 26.13.3.2(e).

Under the IBC, additional requirements as set forth in Sections 1705, 1706, or 1707 of the IBC must be observed, where applicable.

5.0 CONDITIONS OF USE:

The fischer Superbond Adhesive Anchor System described in this report is a suitable alternative to what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** fischer Superbond adhesive anchors must be installed in accordance with this report and the manufacturer's printed installation instructions included in the adhesive packaging and described in [Figure 7](#) (FIS SB) and [Figure 8](#) (RSB) of this report.
- 5.2** The anchors must be installed in cracked or uncracked normal-weight concrete having a specified

compressive strength $f'_c = 2,500$ psi to 8,500 psi (17.2 MPa to 58.6 MPa).

- 5.3 The values of f'_c used for calculation purposes must not exceed 8,000 psi (55 MPa).
- 5.4 Anchors must be installed in concrete base materials in holes predrilled in accordance with the instructions provided in [Figures 7](#) and [8](#) of this report.
- 5.5 Loads applied to the anchors must be adjusted in accordance with Section 1605.1 of the 2024 IBC for strength design.
- 5.6 fischer Superbond adhesive anchors are recognized for use to resist short- and long-term loads, including wind and earthquake loads, subject to the conditions of this report.
- 5.7 In structures assigned to Seismic Design Category C, D, E or F under the IBC or IRC, anchor strength must be adjusted in accordance with Section 4.1.11 of this report.
- 5.8 fischer Superbond adhesive anchors are permitted to be installed in concrete that is cracked or that may be expected to crack during the service life of the anchor, subject to the conditions of this report.
- 5.9 Strength design values are established in accordance with Section 4.1 of this report.
- 5.10 Minimum anchor spacing and edge distance, as well as minimum member thickness, must comply with the values given in this report.
- 5.11 Prior to installation, calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.12 The fischer Superbond Adhesive Anchoring System is not permitted to support fire-resistive construction. Where not otherwise prohibited by the code, the fischer Superbond Adhesive Anchoring System is permitted for installation in fire-resistive construction provided that at least one of the following conditions is fulfilled:
 - Anchors are used to resist wind or seismic forces only.
 - Anchors that support gravity load-bearing structural elements are within a fire-resistive envelope or a fire-resistive membrane, are protected by approved fire-resistive materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
 - Anchors are used to support nonstructural elements.
- 5.13 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of adhesive anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under such conditions is beyond the scope of this report.
- 5.14 Use of zinc-plated carbon steel threaded rods or steel reinforcing bars is limited to dry, interior locations.
- 5.15 Use of hot-dipped galvanized carbon steel and stainless steel rods is permitted for exterior exposure or damp environments.
- 5.16 Steel anchoring materials in contact with preservative-treated and fire-retardant-treated wood must be of zinc-coated carbon steel or stainless steel. The minimum coating weights for zinc-coated steel must comply with ASTM A153.
- 5.17 Periodic special inspection must be provided in accordance with Section 4.3 of this report. Continuous special inspection for anchors installed in horizontal or upwardly inclined orientations resist sustained tension loads must be provided in accordance with Section 4.3 of this report.
- 5.18 Installation of anchors in horizontal or upwardly inclined orientations to resist sustained tension loads shall be performed by personnel certified by an applicable certification program in accordance with ACI 318-19 Section 26.7.2(e).
- 5.19 Anchors may be used for applications where the concrete temperature can vary from 40°F (5°C) to 80°F (27°C) within a 12-hour period. Such applications may include but are not limited to anchorage of building facade systems and other applications subject to direct sun exposure.
- 5.20 fischer Superbond adhesive is manufactured by fischerwerke GmbH & Co. KG, Denzlingen, Germany, under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements AC308 \(24\)](#), published April 2025.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labelling, or the evaluation report number (ICC-ES ESR-3572) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, fischer Superbond adhesive is identified by packaging labeled with the manufacturer's name (fischerwerke) and address, product name, lot number, and expiration date. Threaded rods, nuts, washers and deformed reinforcing bars are standard elements and must conform to applicable national or international specifications as set forth in [Tables 2, 3, and 5](#) of this report.
- 7.3 The report holder's contact information is the following:

fischerwerke GmbH & Co. KG
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72178 WALDACHTAL
GERMANY
+49 7443 120
www.fischer-international.com

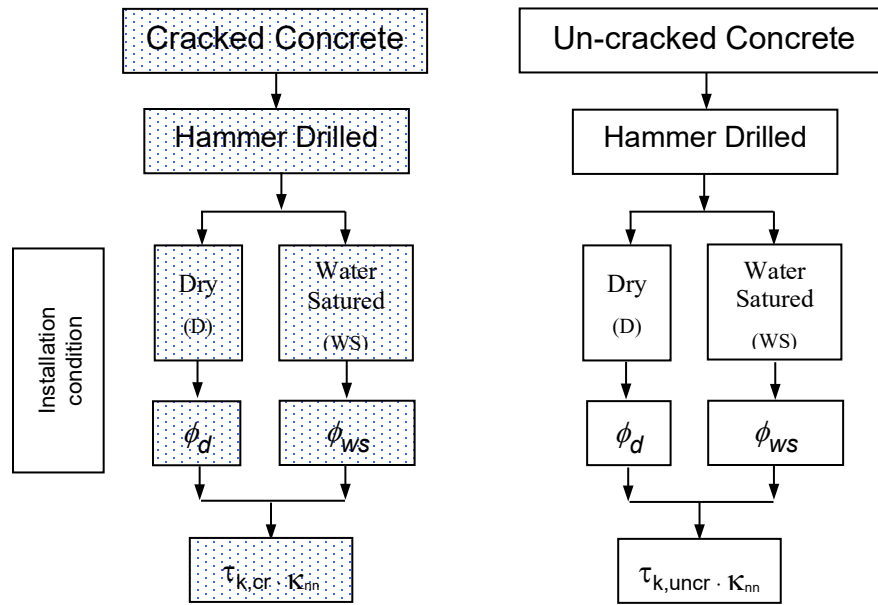


FIGURE 1—FLOWCHART: STRENGTH REDUCTION FACTORS FOR DETERMINATION OF THE DESIGN BOND STRENGTH WITH FIS SB

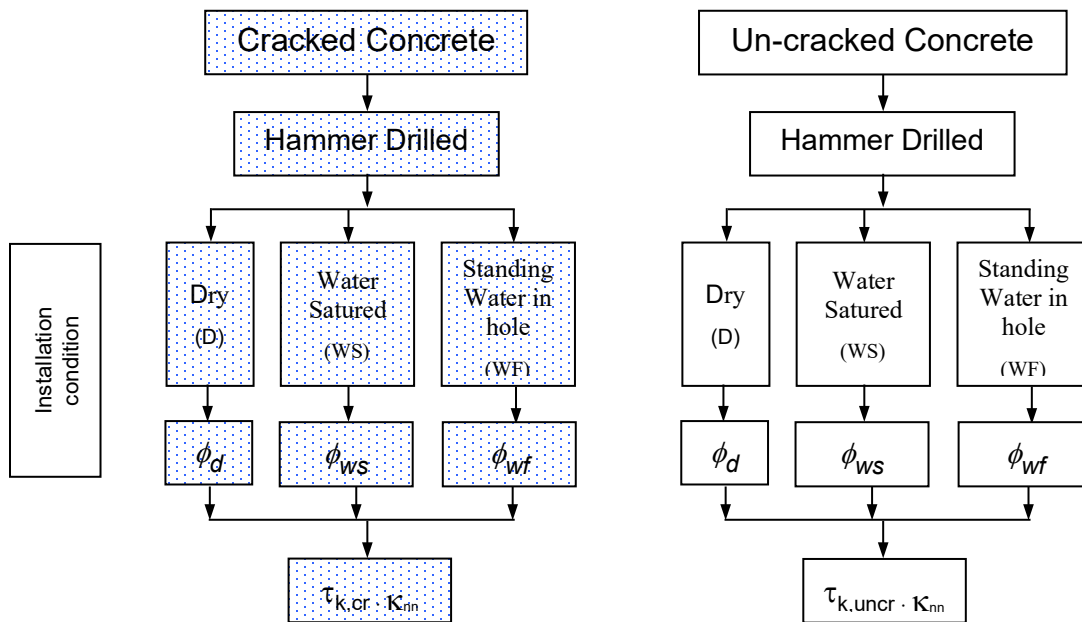


FIGURE 2—FLOWCHART: STRENGTH REDUCTION FACTORS FOR DETERMINATION OF THE DESIGN BOND STRENGTH WITH RSB


TABLE 1—DESIGN TABLE INDEX

Design strength ¹		Threaded rod		Deformed reinforcement	
		Metric	Fractional	Metric	Fractional
Steel	N_{sa}, V_{sa}	Table 5	Table 13	Table 10	Table 16
Concrete	$N_{cb}, N_{cbg}, V_{cb}, V_{cbg}, V_{cp}, V_{cpb}$	Table 6, 7	Table 14	Table 11	Table 17
Bond ²	N_b, N_{bg}	Table 8, 9	Table 15	Table 12	Table 18
Bond reduction factors	$\phi_d, \phi_{ws}, \phi_{wf}, K_d, K_{ws}, K_{wf}$	Table 8, 9	Table 15	Table 12	Table 18

¹Design strengths are as set forth in ACI 318.19 Section 17.5.1.2.

²See Section 4.1 of this report for bond strength information.

TABLE 2—SPECIFICATIONS AND PHYSICAL PROPERTIES OF COMMON CARBON STEEL THREADED ROD MATERIALS¹ AND fischer THREADED RODS FIS A AND RG M

THREADED ROD SPECIFICATION		Minimum specified ultimate strength (f_{uta})	Minimum specified yield strength 0.2% offset (f_{ya})	f_{uta}/f_{ya}	Elongation, min. (percent) ⁷	Reduction of Area, min. (percent)	Specification for nuts ⁸
	ISO 898-1 ² Class 5.8	MPa (psi)	500 (72,519)	400 (58,015)	1.25	_9	DIN 934 Grade 6
	ISO 898-1 ² Class 8.8	MPa (psi)	800 (116,030)	640 (92,824)	1.25	12 ⁹	52
ASTM F568M ³ Class 5.8 (equivalent to ISO 898-1 ² Class 5.8)	MPa (psi)	500 (72,519)	400 (58,015)	1.25	10 ⁹	35	ASTM A563 Grade DH DIN 934 Grade 6 (8-A2K)
ASTM A36 ⁴ and F1554 ⁵ Grade 36	MPa (psi)	400 (58,000)	248 (36,000)	1.61	23	40	ASTM A194 / A563 Grade A
ASTM F1554 ⁵ Grade 55	MPa (psi)	517 (75,000)	380 (55,000)	1.36	23	40	
ASTM A193 ⁶ Grade B7 ≤ 2 1/2 in. (≤64mm)	MPa (psi)	862 (125,000)	724 (105,000)	1.19	16	50	ASTM A194 / A563 Grade DH
ASTM F1554 ⁵ Grade 105	MPa (psi)	862 (125,000)	724 (105,000)	1.19	15	45	

¹fischer Superbond must be used with continuously threaded carbon steel rod (all-thread) with thread characteristics comparable with ANSI B1.1 UNC Coarse Thread Series or ANSI B1.13M M Profile Metric Thread Series.

²Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs.

³Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners.

⁴Standard Specification for Carbon Structural Steel.

⁵Standard Specification for Anchor Bolts, Steel, 36, 55 and 105ksi Yield Strength.

⁶Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service.


⁷Based on 2-in. (50 mm) gauge length except ISO 898, which is based on 5d.

⁸Nuts of other grades and styles having specified proof load stresses greater than the specified grade and style are also suitable. Nuts must have specified proof load stresses equal or greater than the minimum tensile strength of the specific threaded rods. Material types of the nuts and washers must be matched to the threaded rods.

⁹≥14 % for fischer FIS A and RG M.

¹⁰≥30 % for fischer FIS A and RG M.

TABLE 3—SPECIFICATIONS AND PHYSICAL PROPERTIES OF COMMON STAINLESS STEEL THREADED ROD MATERIALS¹ AND fischer THREADED RODS FIS A AND RG M

THREADED ROD SPECIFICATION		Minimum specified ultimate strength (f_{uta})	Minimum specified yield strength 0.2% offset (f_{ya})	f_{uta}/f_{ya}	Elongation, min. (percent) ⁴	Reduction of Area, min. (percent)	Specification for nuts ⁶
							
ISO 3506-1 ² A4-80 and fischer FIS A / RGM Type R and HCR Grade 80 M8-M30	MPa (psi)	800 (116,000)	600 (87,000)	1.34	12 ⁷	. ⁸	ISO 4032
ISO 3056-1 ² A4-70 and fischer FIS A / RGM Type R and HCR Grade 70 M8-M30	MPa (psi)	700 (101,500)	450 (65,250)	1.56	16 ⁷	. ⁸	
ISO 3506-1 ² stainless C-80 M8-M30	MPa (psi)	800 (116,000)	600 (87,000)	1.34	12	-	ISO 4032
ISO 3506-1 ² stainless C-70 M8-M30	MPa (psi)	700 (101,500)	450 (65,250)	1.56	16	-	
ASTM F593 ³ CW1 (316) 1/4 to 5/8 in.	MPa (psi)	689 (100,000)	448 (65,000)	1.54	20		ASTM F594 Alloy group 1, 2, 3
ASTM F593 ³ CW2 (316) 3/4 to 1 1/2 in.	MPa (psi)	586 (85,000)	310 (45,000)	1.89	25		
ASTM A193 ⁴ Grad B8/B8M, Class 1	MPa (psi)	517 (75,000)	207 (30,000)	2.50	30	50	ASTM F594 Alloy Group 1, 2 or 3
ASTM A193 ⁴ Grad B8/B8M, Class 2B	MPa (psi)	655 (95,000)	517 (75,000)	1.27	25	40	

¹fischer Superbond may be used with continuously threaded stainless steel rod (all-thread) with thread characteristics comparable with ANSI B1.1 UNC Coarse Thread Series or ANSI B1.13M M Profile Metric Thread Series.

²Mechanical properties of corrosion resistant stainless steel fasteners – Part 1: Bolts, screws and studs

³Standard Steel Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.

⁴Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service.


⁵Based on 2-in. (50 mm) gauge length except ISO 898, which is based on 5d.

⁶Nuts of other grades and styles having specified proof load stresses greater than the specified grade and style are also suitable. Nuts must have specified proof load stresses equal or greater than the minimum tensile strength of the specific threaded rods. Material types of the nuts and washers must be matched to the threaded rods.

⁷≥14 % for fischer FIS A and RG M.

⁸≥30 % for fischer FIS A and RG M.

TABLE 4—SPECIFICATIONS AND PHYSICAL PROPERTIES OF COMMON STEEL REINFORCING BARS¹

REINFORCING BAR SPECIFICATION		Minimum specified ultimate strength (f_{uta})	Minimum specified yield strength (f_{ya})
			
DIN 488 B500B, B500C ¹	MPa (psi)	550 (79,750)	500 (72,500)
ASTM A615 ² , ASTM A767 ³ Gr. 40	MPa (psi)	414 (60,000)	276 (40,000)
ASTM A615 ² , ASTM A767 ³ Gr. 60	MPa (psi)	620 (90,000)	420 (60,000)
ASTM A706 ⁴ , ASTM A767 ³ Gr. 60	MPa (psi)	550 (80,000)	414 (60,000)

¹Reinforcing steel; reinforcing steel bars; dimensions and masses.

²Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

³Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

⁴Billet Steel Bars for Concrete Reinforcement.

FIS SB + RSB

TABLE 5—STEEL DESIGN INFORMATION FOR METRIC THREADED ROD¹

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (mm)						
				M8	M10	M12	M16	M20	M24	M30
ROD OUTSIDE DIAMETER		<i>d</i>	mm	8	10	12	16	20	24	30
			(in.)	(0.31)	(0.39)	(0.47)	(0.63)	(0.79)	(0.94)	(1.18)
ROD effective cross-sectional area		<i>A_{se}</i>	mm ²	36.6	58.0	84.3	156.7	244.8	352.5	560.7
			(in. ²)	(0.057)	(0.090)	(0.131)	(0.243)	(0.379)	(0.546)	(0.869)
ISO 898-1 Class 5.8	Nominal strength as governed by steel strength	<i>N_{sa}</i>	kN	18.3	29.0	42.2	78.4	122.4	176.3	280.4
			(lb)	(4,114)	(6,520)	(9,476)	(17,615)	(27,518)	(39,625)	(63,028)
		<i>V_{sa}</i>	kN	11.0	17.4	25.3	47.0	73.4	105.8	168.2
			(lb)	(2,469)	(3,912)	(5,686)	(10,569)	(16,511)	(23,775)	(37,817)
	Reduction for seismic shear	<i>α_{V,seis}</i>	-	not applicable	1.0				0.87	
	Strength reduction factor <i>φ</i> for tension ²	<i>φ</i>	-	0.65 ³ / 0.75 ⁴						
Strength reduction factor <i>φ</i> for shear ²	<i>φ</i>	-	0.60 ³ / 0.65 ⁴							
ISO 898-1 Class 8.8	Nominal strength as governed by steel strength	<i>N_{sa}</i>	kN	29.3	46.4	67.4	125.4	195.8	282.0	448.6
			(lb)	(6,583)	(10,432)	(15,162)	(28,183)	(44,029)	(63,399)	(100,845)
		<i>V_{sa}</i>	kN	17.6	27.8	40.5	75.2	117.5	169.2	269.1
			(lb)	(3,950)	(6,259)	(9,097)	(16,910)	(26,417)	(38,040)	(60,507)
	Reduction for seismic shear	<i>α_{V,seis}</i>	-	not applicable	0.90					
	Strength reduction factor <i>φ</i> for tension ²	<i>φ</i>	-	0.65 ³ / 0.75 ⁴						
Strength reduction factor <i>φ</i> for shear ²	<i>φ</i>	-	0.60 ³ / 0.65 ⁴							
ISO 3506-1 Class A4-70 and stainless HCR 70	Nominal strength as governed by steel strength	<i>N_{sa}</i>	kN	25.6	40.6	59.0	109.7	171.4	246.8	392.5
			(lb)	(5,760)	(9,128)	(13,267)	(24,661)	(38,525)	(55,474)	(88,240)
		<i>V_{sa}</i>	kN	15.4	24.4	35.4	65.8	102.8	148.1	235.5
			(lb)	(3,456)	(5,477)	(7,960)	(14,796)	(23,115)	(33,285)	(52,944)
	Reduction for seismic shear	<i>α_{V,seis}</i>	-	not applicable	0.90					
	Strength reduction factor <i>φ</i> for tension ²	<i>φ</i>	-	0.65 ³ / 0.75 ⁴						
Strength reduction factor <i>φ</i> for shear ²	<i>φ</i>	-	0.60 ³ / 0.65 ⁴							
ISO 3506-1 Class A4-80 and stainless HCR 80	Nominal strength as governed by steel strength	<i>N_{sa}</i>	kN	29.3	46.4	67.4	125.4	195.8	282.0	448.6
			(lb)	(6,583)	(10,432)	(15,162)	(28,183)	(44,029)	(63,399)	(100,845)
		<i>V_{sa}</i>	kN	17.6	27.8	40.5	75.2	117.5	169.2	269.1
			(lb)	(3,950)	(6,259)	(9,097)	(16,910)	(26,417)	(38,040)	(60,507)
	Reduction for seismic shear	<i>α_{V,seis}</i>	-	not applicable	0.90					
	Strength reduction factor <i>φ</i> for tension ²	<i>φ</i>	-	0.65 ³ / 0.75 ⁴						
Strength reduction factor <i>φ</i> for shear ²	<i>φ</i>	-	0.60 ³ / 0.65 ⁴							

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

¹Values provided for common rod material types are based on specified strength and calculated in accordance with ACI 318-19 Eq. 17.6.1.2 and Eq 17.7.1.2b. Nuts and washers must be appropriate for the rod strength and type.

²The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met. Values correspond to a brittle steel element.

³Values correspond to a brittle steel element, applicable for standard threaded rods.

⁴Values correspond to a ductile steel element, applicable for fischer FIS A and RG M threaded rods only.

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TABLE 6—CONCRETE BREAKOUT DESIGN INFORMATION FOR METRIC THREADED ROD

DESIGN INFORMATION	Symbol	Units	Nominal rod diameter (mm)						
			8	10	12	16	20	24	30
Min. embedment depth	$h_{ef,min}$	mm	60	60	70	80	90	96	120
		(in.)	(2.36)	(2.36)	(2.76)	(3.15)	(3.54)	(3.78)	(4.72)
Max. embedment depth	$h_{ef,max}$	mm	160	200	240	320	400	480	600
		(in.)	(6.299)	(7.87)	(9.45)	(12.60)	(15.75)	(18.90)	(23.62)
Effectiveness factor for cracked concrete	$k_{c,cr}$	SI	7.1						
		(in.lb)	(17)						
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	SI	10						
		(in.lb)	(24)						
Min. anchor spacing	s_{min}	mm / (in.)	$s_{min} = c_{min}$						
Min. edge distance	c_{min}	mm	40	45	55	65	85	105	140
		(in.)	(1.575)	(1.77)	(2.17)	(2.56)	(3.35)	(4.13)	(5.51)
Minimum member thickness	h_{min}	mm	$h_{ef} + 30 (\geq 100)$			$h_{ef} + 2d_0^{(2)}$			
		(in.)	$h_{ef} + 1.25 (\geq 3.937)$						
Critical edge distance for splitting failure	c_{ac}	mm	See Section 4.1.10 of this report.						
Strength reduction factor for tension, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.65						
Strength reduction factor for shear, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.70						

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

¹The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met.

² d_0 = drill hole diameter.

RSB

TABLE 7—CONCRETE BREAKOUT DESIGN INFORMATION FOR METRIC THREADED ROD RG M

DESIGN INFORMATION	Symbol	Units	Nominal rod diameter (mm)						
			8	10	12	16	20	24	30
Minimum embedment depth	$h_{ef,1}$	mm	-	75	75	90	-	-	-
		(in.)	-	(2.95)	(2.95)	(3.54)	-	-	-
Medium embedment depth	$h_{ef,2}$	mm	80	90	110	125	170	210	280
		(in.)	(3.15)	(3.54)	(4.33)	(4.92)	(6.69)	(8.27)	(11.02)
Maximum embedment depth	$h_{ef,3}$	mm	-	150	150	190	210	-	-
		(in.)	-	(5.91)	(5.91)	(7.48)	(8.27)	-	-
Effectiveness factor for cracked concrete	$k_{c,cr}$	SI	7.1						
		(in.lb)	(17)						
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	SI	10						
		(in.lb)	(24)						
Min. anchor spacing	s_{min}	mm / (in.)	$s_{min} = c_{min}$						
Min. edge distance	c_{min}	mm	40	45	55	65	85	105	140
		(in.)	(1.57)	(1.77)	(2.17)	(2.56)	(3.35)	(4.13)	(5.51)
Minimum member thickness	h_{min}	mm	$h_{ef} + 30$		$h_{ef} + 2d_0^2$				
		(in.)	$h_{ef} + 1.25$						
Critical edge distance for splitting failure	c_{ac}	(mm)	See Section 4.1.10 of this report.						
Strength reduction factor for tension, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.65						
Strength reduction factor for shear, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.70						

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met.

² d_0 = drill hole diameter.

FIS SB

TABLE 8—BOND STRENGTH DESIGN INFORMATION FOR METRIC THREADED ROD¹

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (mm)						
				8	10	12	16	20	24	30
Min. embedment depth		$h_{ef,min}$	mm	60	60	70	80	90	96	120
			(in.)	(2.36)	(2.36)	(2.76)	(3.15)	(3.54)	(3.78)	(4.72)
Max. embedment depth		$h_{ef,max}$	mm	160	200	240	320	400	480	600
			(in.)	(6.299)	(7.87)	(9.45)	(12.60)	(15.75)	(18.90)	(23.62)
Temperature range A ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.8	4.3	4.3	4.3	4.6	4.6	4.8
			(psi)	(406)	(624)	(624)	(624)	(667)	(667)	(696)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	8.2	10.4	10.0	9.5	9.2	8.9	8.5
			(psi)	(1,189)	(1,508)	(1,450)	(1,378)	(1,334)	(1,291)	(1,233)
Temperature range B ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.5	3.9	3.9	3.9	4.2	4.2	4.4
			(psi)	(363)	(566)	(566)	(566)	(609)	(609)	(638)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	7.5	9.5	9.2	8.7	8.4	8.1	7.8
			(psi)	(1,088)	(1,378)	(1,334)	(1,262)	(1,218)	(1,175)	(1,131)
Temperature range C ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.2	3.5	3.5	3.5	3.7	3.7	3.9
			(psi)	(319)	(508)	(508)	(508)	(537)	(537)	(566)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	6.6	8.4	8.1	7.7	7.4	7.2	6.9
			(psi)	(957)	(1,218)	(1,175)	(1,117)	(1,073)	(1,044)	(1,001)
	Reduction for seismic tension	$\alpha_{N,seis}$	-	not applicable	1.0					
Strength reduction factor for permissible installation conditions	Dry concrete	ϕ_d	-	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Water saturated concrete	ϕ_{ws}	-	0.65	0.65	0.55	0.55	0.55	0.45	0.45

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹Characteristic bond strength values correspond to concrete compressive strength $f_c=2,500$ psi (17.2 MPa). For concrete compressive strength f_c between 2,500 psi (17.2 MPa) and 8,000 psi (55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f_c/2,500)^{0.1}$ (for SI: $(f_c/17.2)^{0.1}$). See Section 4.1.4 of this report for bond strength determination.

²Temperature range A: Maximum short term temperature = 176°F (80°C), Maximum long term Temperature = 122°F (50°C).
 Temperature range B: Maximum short term temperature = 248°F (120°C), Maximum long term Temperature = 162°F (72°C).
 Temperature range C: Maximum short term temperature = 302°F (150°C), Maximum long term Temperature = 194°F (90°C).

Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a results of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

RSB

TABLE 9—BOND STRENGTH DESIGN INFORMATION FOR METRIC
THREADED RODS - RG M¹

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (mm)						
				8	10	12	16	20	24	30
Minimum embedment depth	$h_{ef,1}$	mm	-	75	75	90	-	-	-	
		(in.)	-	(2.95)	(2.95)	(3.54)	-	-	-	
Medium embedment depth	$h_{ef,2}$	mm	80	90	110	125	170	210	280	
		(in.)	(3.15)	(3.54)	(4.33)	(4.92)	(6.69)	(8.27)	(11.02)	
Maximum embedment depth	$h_{ef,3}$	mm	-	150	150	190	210	-	-	
		(in.)	-	(5.91)	(5.91)	(7.48)	(8.27)	-	-	
Temperature range A ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.8	4.3	4.3	4.3	4.6	4.6	4.8
			(psi)	(406)	(624)	(624)	(624)	(667)	(667)	(696)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	8.2	10.4	10	9.5	9.2	8.9	8.5
			(psi)	(1,189)	(1,508)	(1,450)	(1,378)	(1,334)	(1,291)	(1,233)
Temperature range B ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.5	3.9	3.9	3.9	4.2	4.2	4.4
			(psi)	(363)	(566)	(566)	(566)	(609)	(609)	(638)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	7.5	9.5	9.2	8.7	8.4	8.1	7.8
			(psi)	(1,088)	(1,378)	(1,334)	(1,262)	(1,218)	(1,175)	(1,131)
Temperature range C ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.2	3.5	3.5	3.5	3.7	3.7	3.9
			(psi)	(319)	(508)	(508)	(508)	(537)	(537)	(566)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	6.6	8.4	8.1	7.7	7.4	7.2	6.9
			(psi)	(957)	(1,218)	(1,175)	(1,117)	(1,073)	(1,044)	(1,001)
Reduction for seismic tension		$\alpha_{N,seis}$	-	not applicable	1.0					
Strength reduction factor for permissible installation conditions	Dry concrete	ϕ_d	-	0.65	0.65	0.65	0.65	0.65	0.65	0.65
		κ_d	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water saturated concrete	ϕ_{ws}	-	0.55	0.55	0.55	0.65	0.65	0.65	0.65
		κ_{ws}		1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Standing water in hole	ϕ_{wf}		0.45	0.45	0.55	0.55	0.55	0.55	0.55
		κ_{wf}		0.97	0.97	1.0	1.0	1.0	1.0	1.0

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006897 MPa.
For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

¹Characteristic bond strength values correspond to concrete compressive strength $f_c = 2,500$ psi (17.2 MPa). For concrete compressive strength f_c between 2,500 psi (17.2 MPa) and 8,000 psi (55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f_c/2,500)^{0.1}$ (for SI: $(f_c/17.2)^{0.1}$). See Section 4.1.4 of this report for bond strength determination.

²Temperature range A: Maximum short term temperature = 176°F (80°C), Maximum long term Temperature = 122°F (50°C).
Temperature range B: Maximum short term temperature = 248°F (120°C), Maximum long term Temperature = 162°F (72°C).
Temperature range C: Maximum short term temperature = 302°F (150°C), Maximum long term Temperature = 194°F (90°C).

Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a results of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

FIS SB

TABLE 10—STEEL DESIGN INFORMATION FOR COMMON STEEL REINFORCING BARS¹

DESIGN INFORMATION		Symbol	Units	Bar size							
				8	10	12	16	20	25	28	32
Nominal bar diameter	<i>d</i>	mm	8	10	12	16	20	25	28	32	
		(in.)	0.31	0.39	0.47	0.63	0.79	0.98	1.1	1.26	
Bar effective cross-sectional area	<i>A_{se}</i>	mm ²	50.2	78.5	113.1	201.1	314.2	490.9	615.8	804.2	
		(in. ²)	0.078	0.112	0.175	0.312	0.487	0.761	0.954	1.247	
DIN 488 B500B, B500C	Nominal strength as governed by steel strength	<i>N_{sa}</i>	kN	28.0	43.2	62.2	110.6	172.8	270.0	338.7	442.3
			(lb)	6294	9711	13983	24863	38845	60696	76140	99429
	<i>V_{sa}</i>	kN	13.8	25.9	37.3	66.4	103.7	162.0	203.2	265.4	
		(lb)	3102	5822	8385	14927	23312	36418	45679	59662	
Reduction for seismic shear	<i>α_{V,seis}</i>	-	not applicable		1.00						
Strength reduction factor <i>φ</i> for tension ²	<i>φ</i>	-	0.65								
Strength reduction factor <i>φ</i> for shear ²	<i>φ</i>	-	0.60								

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.

For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 150.0 psi.

¹Values provided for common reinforcing bar based on specified strength and calculated in accordance with ACI 318-19 Eq. 17.6.1.2 and Eq. 17.7.1.2(b).

²The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met. Values correspond to a brittle steel element.

FIS SB

TABLE 11—CONCRETE BREAKOUT DESIGN INFORMATION FOR COMMON STEEL REINFORCING BARS¹

DESIGN INFORMATION		Symbol	Units	Bar size						
				8	10	12	16	20	25	28
Min. embedment depth	<i>h_{ef,min}</i>	mm	60	60	70	80	90	100	112	128
		(in.)	2.36	2.36	2.76	3.15	3.54	3.94	4.41	5.04
Max. embedment depth	<i>h_{ef,max}</i>	mm	160	200	240	320	400	500	560	640
		(in.)	6.30	7.87	9.45	12.60	15.75	19.69	22.05	25.20
Effectiveness factor for cracked concrete	<i>k_{c,cr}</i>	SI	7.1							
		(in.lb)	17							
Effectiveness factor for uncracked concrete	<i>k_{c,uncr}</i>	SI	10							
		(in.lb)	24							
Min. anchor spacing	<i>s_{min}</i>	mm / (in.)	<i>s_{min}</i> = <i>c_{min}</i>							
Min. edge distance	<i>c_{min}</i>	mm	40	45	55	65	85	110	130	160
		(in.)	(1.57)	(1.77)	(2.17)	(2.56)	(3.35)	(4.33)	(5.12)	(6.30)
Minimum member thickness	<i>h_{min}</i>	mm	<i>h_{ef}</i> + 30 (≥ 100)			<i>h_{ef}</i> + 2 <i>d₀</i> ²				
		(in.)	<i>h_{ef}</i> + 1.25 (≥ 3.937)							
Critical edge distance for splitting failure	<i>c_{ac}</i>	mm	See Section 4.1.10 of this report.							
Strength reduction factor for tension, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	<i>φ</i>	-	0.65							
Strength reduction factor for shear, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	<i>φ</i>	-	0.7							

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.

For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met.

²*d₀* = drill hole diameter.

FIS SB

TABLE 12—BOND STRENGTH DESIGN INFORMATION FOR COMMON STEEL REINFORCING BARS¹

DESIGN INFORMATION		Symbol	Units	Bar size							
				8	10	12	16	20	25	28	32
Min. embedment depth	$h_{ef,min}$	mm		60	60	70	80	90	100	112	128
		(in.)		(2.36)	(2.36)	(2.76)	(3.15)	(3.54)	(3.94)	(4.41)	(5.04)
Max. embedment depth	$h_{ef,max}$	mm		160	200	240	320	400	500	560	640
		(in.)		(6.30)	(7.87)	(9.45)	(12.60)	(15.75)	(19.69)	(22.05)	(25.20)
Temperature range A ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	2.1	3.2	3.2	3.2	3.4	3.4	3.4	3.6
			(psi)	(305)	(464)	(464)	(464)	(493)	(493)	(493)	(522)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	-	7.8	7.5	7.1	6.9	6.6	6.5	6.3
			(psi)	(-)	(1131)	(1088)	(1030)	(1001)	(957)	(943)	(914)
Temperature range B ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	1.9	3	3	3	3.1	3.1	3.1	3.3
			(psi)	(276)	(435)	(435)	(435)	(450)	(450)	(450)	(479)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	-	7.1	6.9	6.6	6.3	6.1	5.9	5.8
			(psi)	(-)	(1030)	(1001)	(957)	(914)	(885)	(856)	(841)
Temperature range C ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	N/mm ²	1.7	2.6	2.6	2.6	2.8	2.8	2.8	2.9
			(psi)	(247)	(377)	(377)	(377)	(406)	(406)	(406)	(421)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	N/mm ²	-	6.3	6.1	5.8	5.6	5.4	5.2	5.1
			(psi)	(-)	(914)	(885)	(841)	(812)	(783)	(754)	(740)
	Reduction for seismic tension	$\alpha_{N,seis}$	-	not applicable	0.98	1.0					
Strength reduction factor for permissible installation conditions	Dry concrete	ϕ_d	-	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Water saturated concrete	ϕ_{ws}	-	0.65	0.65	0.55	0.55	0.55	0.45	0.45	0.45

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

¹Characteristic bond strength values correspond to concrete compressive strength $f_c = 2,500$ psi (17.2 MPa). For concrete compressive strength f_c between 2,500 psi (17.2 MPa) and 8,000 psi (55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f_c / 2,500)^{0.1}$ (for SI: $(f_c / 17.2)^{0.1}$). See Section 4.1.4 of this report for bond strength determination.

²Temperature range A: Maximum short term temperature = 176°F (80°C), Maximum long term Temperature = 122°F (50°C)

Temperature range B: Maximum short term temperature = 248°F (120°C), Maximum long term Temperature = 162°F (72°C)

Temperature range B: Maximum short term temperature = 302°F (150°C), Maximum long term Temperature = 194°F (90°C)

Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

FIS SB

TABLE 13—STEEL DESIGN INFORMATION FOR FRACTIONAL THREADED ROD¹

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (in.)								
				3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	
ROD OUTSIDE DIAMETER		<i>d</i>	in.	0.375	0.5	0.625	0.75	0.875	1	1,125	1.25	
			(mm)	(9.5)	(12.7)	(15.9)	(19.1)	(22.2)	(25.4)	(28.6)	(31.8)	
ROD effective cross-sectional area		<i>A_{se}</i>	in ² .	0.0775	0.1419	0.2260	0.3345	0.4617	0.6057	0.7626	0.9691	
			(mm ²)	(50)	(92)	(146)	(216)	(298)	(391)	(492)	(625)	
ASTM F568M Class 5.8 / ISO 898-1 Class 5.8	Nominal strength as governed by steel strength		<i>N_{sa}</i>	lb	5,620	10,290	16,385	24,250	33,475	43,915	55,301	70,260
				(kN)	(25.0)	(45.8)	(72.9)	(107.9)	(148.9)	(195.3)	2(46)	(312.5)
			<i>V_{sa}</i>	lb	3,370	6,170	9,830	14,550	20,085	26,350	33,180	42,160
				(kN)	(15.0)	(27.5)	(43.7)	(64.7)	(89.3)	(117.2)	(147.6)	(187.5)
	Reduction for seismic shear		<i>α_{v,seis}</i>	-	0.74				0.6			
	Strength reduction factor <i>φ</i> for tension ²		<i>φ</i>	-	0.65							
Strength reduction factor <i>φ</i> for shear ²		<i>φ</i>	-	0.60								
ASTM A36 Grade 36 / F1554 Grade 36	Nominal strength as governed by steel strength		<i>N_{sa}</i>	lb	4,496	8,273	13,128	19,423	26,796	35,159	44,241	56,200
				(kN)	(20.0)	(36.8)	(58.4)	(86.4)	(119.2)	(156.4)	(196.8)	(250.0)
			<i>V_{sa}</i>	lb	2,698	4,964	7,877	11,654	16,078	21,095	26,544	33,720
				(kN)	(12.0)	(22.1)	(35.0)	(51.8)	(71.5)	(93.8)	(118.1)	(150.0)
	Reduction for seismic shear		<i>α_{v,seis}</i>	-	0.74				0.6			
	Strength reduction factor <i>φ</i> for tension ²		<i>φ</i>	-	0.65							
Strength reduction factor <i>φ</i> for shear ²		<i>φ</i>	-	0.6								
F1554 Grade 55	Nominal strength as governed by steel strength		<i>N_{sa}</i>	lb	5,811	10,692	16,968	25,104	34,634	45,443	57,181	72,639
				(kN)	(25.9)	(47.6)	(75.5)	(111.7)	(154.1)	(202.1)	(254.4)	(323.1)
			<i>V_{sa}</i>	lb	3,487	6,415	10,181	15,062	20,780	27,266	34,309	43,583
				(kN)	(15.5)	(28.5)	(45.3)	(67.0)	(92.4)	(121.3)	(152.6)	(193.9)
	Reduction for seismic shear		<i>α_{v,seis}</i>	-	0.74				0.6			
	Strength reduction factor <i>φ</i> for tension ²		<i>φ</i>	-	0.65							
Strength reduction factor <i>φ</i> for shear ²		<i>φ</i>	-	0.6								
ASTM A193 B7 ASTM F1554 Grade105	Nominal strength as governed by steel strength		<i>N_{sa}</i>	lb	9,690	17,740	28,250	41,810	57,710	75,710	95,117	121,135
				(kN)	(43.1)	(78.9)	(125.7)	(186.0)	(256.7)	(336.8)	(423.1)	(538.8)
			<i>V_{sa}</i>	lb	5,810	10,640	16,950	25,085	34,625	45,425	57,070	72,680
				(kN)	(25.9)	(47.3)	(75.4)	(111.6)	(154.0)	(202.1)	(253.8)	(323.3)
	Reduction for seismic shear		<i>α_{v,seis}</i>	-	0.74				0.6			
	Strength reduction factor <i>φ</i> for tension ³		<i>φ</i>	-	0.75							
Strength reduction factor <i>φ</i> for shear ³		<i>φ</i>	-	0.65								

FIS SB

TABLE 13—STEEL DESIGN INFORMATION FOR FRACTIONAL THREADED ROD¹
(Continued)

ASTM A 193 Grade B8/B8M Class 1 Stainless	Nominal strength as governed by steel strength	N_{sa}	lb	4,420	8,090	12,880	19,065	26,315	34,525	43,470	55,240
			(kN)	(19.7)	(36.0)	(57.3)	(84.8)	(117.1)	(153.6)	(193.4)	(245.7)
		V_{sa}	lb	2,650	4,855	7,730	11,440	15,790	20,715	26,080	33,145
			(kN)	(11.8)	(21.6)	(34.4)	(50.9)	(70.2)	(92.1)	(116.0)	(147.4)
	Reduction for seismic shear	$\alpha_{V,seis}$		0.74				0.6			
Strength reduction factor ϕ for tension ²	ϕ		0.65								
Strength reduction factor ϕ for shear ²	ϕ		0.6								
ASTM A 193 Grade B8/B8M Class 2B Stainless	Nominal strength as governed by steel strength	N_{sa}	lb	7,362	13,546	21,498	31,805	43,879	57,572	72,444	92,028
			(kN)	32.8	60.3	95.6	141.5	195.2	256.1	322.3	409.4
		V_{sa}	lb	4,417	8,128	12,899	19,083	26,327	34,543	43,466	55,217
			(kN)	19.7	36.2	57.4	84.9	117.1	153.7	193.4	245.6
	Reduction for seismic shear	$\alpha_{V,seis}$		0.74				0.6			
Strength reduction factor ϕ for tension ²	ϕ		0.65								
Strength reduction factor ϕ for shear ²	ϕ		0.6								
ASTM F593, CW Stainless	Nominal strength as governed by steel strength	N_{sa}	lb	7,740	14,175	22,580	28,420	39,230	51,470	65,255	82,350
			(kN)	(34.4)	(63.1)	(100.4)	(126.4)	(174.5)	(228.9)	(290.3)	(366.3)
		V_{sa}	lb	4,645	8,505	13,550	17,055	23,540	30,880	39,153	49,410
			(kN)	(20.7)	(37.8)	(60.3)	(75.9)	(104.7)	(137.4)	(174.2)	(219.8)
	Reduction for seismic shear	$\alpha_{V,seis}$		0.74				0.6			
Strength reduction factor ϕ for tension ²	ϕ		0.65								
Strength reduction factor ϕ for shear ²	ϕ		0.6								

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006897 MPa.
For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

¹Values provided for common rod material types are based on specified strength and calculated in accordance with ACI 318-19 Eq.17.6.1.2 and Eq. 17.7.1.2(b). Nuts and washers must be appropriate for the rod strength and type.

² The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met. Values correspond to a brittle steel element.

³ The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met. Values correspond to a ductile steel element.

FIS SB

TABLE 14—CONCRETE BREAKOUT DESIGN INFORMATION FOR FRACTIONAL THREADED ROD¹

DESIGN INFORMATION	Symbol	Units	Nominal rod diameter (in.)							
			3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"
Min. embedment depth	$h_{ef,min}$	in.	2.36	2.76	3.11	3.50	3.50	4.02	4.49	5.00
		(mm)	60	70	79	89	89	102	114	127
Max. embedment depth	$h_{ef,max}$	in.	7.52	10.00	12.52	15.00	17.52	20.00	22.52	25.00
		(mm)	191	254	318	381	445	508	572	635
Effectiveness factor for cracked concrete	$k_{c,cr}$	in.lb	17							
		(SI)	7.1							
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	in.lb	24							
		(SI)	10							
Min. anchor spacing	s_{min}	in. / (mm)	$s_{min} = c_{min}$							
Min. edge distance	c_{min}	in.	1.69	2.28	2.56	3.15	3.74	4.33	5.12	6.30
		(mm)	(43)	(58)	(65)	(80)	(95)	(110)	(130)	(160)
Minimum member thickness	h_{min}	in.	$h_{ef} + 30 (\geq 100)$		$h_{ef} + 2d_0^2$					
		(mm)	$h_{ef} + 1.25 (\geq 3.937)$							
Critical edge distance for splitting failure	c_{ac}	in. / (mm)	See Section 4.1.10 of this report.							
Strength reduction factor for tension, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.65							
Strength reduction factor for shear, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.7							

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met.

² d_0 = drill hole diameter.

FIS SB

TABLE 15—BOND STRENGTH DESIGN INFORMATION FOR FRACTIONAL THREADED ROD¹

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (in.)								
				3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	
Min. embedment depth	$h_{ef,min}$	in.		2.36	2.76	3.11	3.50	3.50	4.02	4.49	5.00	
		(mm)		60	70	79	89	89	102	114	127	
Max. embedment depth	$h_{ef,max}$	in.		7.52	10.00	12.52	15.00	17.52	20.00	22.52	25.00	
		(mm)		191	254	318	381	445	508	572	635	
Temperature range A ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	psi		624	624	624	667	667	667	667	754
			(N/mm ²)		(4.3)	(4.3)	(4.3)	(4.6)	(4.6)	(4.6)	(4.6)	(5.2)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	psi		1,523	1,436	1,378	1,334	1,305	1,276	1,247	1,218
			(N/mm ²)		(10.5)	(9.9)	(9.5)	(9.2)	(9.0)	(8.8)	(8.6)	(8.4)
Temperature range B ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	psi		566	566	566	609	609	609	609	696
			(N/mm ²)		(3.9)	(3.9)	(3.9)	(4.2)	(4.2)	(4.2)	(4.2)	(4.8)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	psi		1,392	1,320	1,276	1,233	1,189	1,160	1,146	1,117
			(N/mm ²)		(9.6)	(9.1)	(8.8)	(8.5)	(8.2)	(8.0)	(7.9)	(7.7)
Temperature range C ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	psi		508	508	508	537	537	537	537	609
			(N/mm ²)		(3.5)	(3.5)	(3.5)	(3.7)	(3.7)	(3.7)	(3.7)	(4.2)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	psi		1,233	1,175	1,117	1,088	1,059	1,030	1,015	986
			(N/mm ²)		(8.5)	(8.1)	(7.7)	(7.5)	(7.3)	(7.1)	(7.0)	(6.8)
	Reduction for seismic tension	$\alpha_{N,seis}$	-	1.0								
Strength reduction factor for permissible installation conditions	Dry concrete	ϕ_d	-	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
	Water saturated concrete	ϕ_{ws}	-	0.65	0.55	0.55	0.55	0.45	0.45	0.45	0.45	

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹Characteristic bond strength values correspond to concrete compressive strength $f_c = 2,500$ psi (17.2 MPa). For concrete compressive strength f_c between 2,500 psi (17.2 MPa) and 8,000 psi (55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f_c / 2,500)^{0.1}$ (for SI: $(f_c / 17.2)^{0.1}$). See Section 4.1.4 of this report for bond strength determination.

²Temperature range A: Maximum short term temperature = 176°F (80°C), Maximum long term Temperature = 122°F (50°C)
 Temperature range B: Maximum short term temperature = 248°F (120°C), Maximum long term Temperature = 162°F (72°C)
 Temperature range C: Maximum short term temperature = 302°F (150°C), Maximum long term Temperature = 194°F (90°C)

Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

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TABLE 16—STEEL DESIGN INFORMATION FOR FRACTIONAL REINFORCING BARS¹

DESIGN INFORMATION		Symbol	Units	BAR SIZE							
				#3	#4	#5	#6	#7	#8	#9	#10
ROD OUTSIDE DIAMETER		d	in.	³ / ₈	¹ / ₂	⁵ / ₈	³ / ₄	⁷ / ₈	1	¹ / ₈	¹ / ₄
			(mm)	(9.5)	(12.7)	(15.9)	(19.1)	(22.2)	(25.4)	(28.6)	(31.8)
ROD effective cross-sectional area		A_{se}	in ² .	0.11	0.2	0.31	0.44	0.6	0.79	1	1.27
			(mm ²)	(71)	(129)	(200)	(284)	(387)	(510)	(645)	(819)
ASTM A615 Grade 40	Nominal strength as governed by steel strength	N_{sa}	lb	6,609	12,004	18,591	26,392	35,990	47,410	59,999	76,207
			(kN)	(29.4)	(53.4)	(82.7)	(117.4)	(160.1)	(210.9)	(266.9)	(339)
		V_{sa}	lb	3,956	7,194	11,150	15,848	21,603	28,437	35,990	45,724
			(kN)	(17.6)	(32)	(49.6)	(70.5)	(96.1)	(126.5)	(160.1)	(203.4)
	Reduction for seismic shear	$\alpha_{V,seis}$	-	0.74							0.93
	Strength reduction factor ϕ for tension ²	ϕ	-	0.65							
Strength reduction factor ϕ for shear ²	ϕ	-	0.60								
ASTM A615 Grade 60	Nominal strength as governed by steel strength	N_{sa}	lb	9,891	18,006	27,898	39,610	53,997	71,104	90,010	114,311
			(kN)	(44)	(80.1)	(124.1)	(176.2)	(240.2)	(316.3)	(400.4)	(508.5)
		V_{sa}	lb	5,935	10,790	16,748	23,761	32,394	42,667	53,997	68,586
			(kN)	(26.4)	(48)	(74.5)	(105.7)	(144.1)	(189.8)	(240.2)	(305.1)
	Reduction for seismic shear	$\alpha_{V,seis}$	-	0.74							0.93
	Strength reduction factor ϕ for tension ²	ϕ	-	0.65							
Strength reduction factor ϕ for shear ²	ϕ	-	0.60								
ASTM A706 Grade 60	Nominal strength as governed by steel strength	N_{sa}	lb	8,790	16,006	24,795	35,204	47,995	63,191	80,006	101,610
			(kN)	(39.1)	(71.2)	(110.3)	(156.6)	(213.5)	(281.1)	(355.9)	(452)
		V_{sa}	lb	5,283	9,599	14,882	21,131	28,797	37,924	47,995	60,966
			(kN)	(23.5)	(42.7)	(66.2)	(94)	(128.1)	(168.7)	(213.5)	(271.2)
	Reduction for seismic shear	$\alpha_{V,seis}$	-	0.74							0.93
	Strength reduction factor ϕ for tension ²	ϕ	-	0.65							
Strength reduction factor ϕ for shear ²	ϕ	-	0.60								

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹Values provided for common rod material types are based on specified strength and calculated in accordance with ACI 318-19 Eq.17.6.1.2 and Eq 17.7.1.2b. Nuts and washers must be appropriate for the rod strength and type.

²The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met. Values correspond to a brittle steel element.

FIS SB

TABLE 17—CONCRETE BREAKOUT DESIGN INFORMATION FOR FRACTIONAL REINFORCING BAR¹

DESIGN INFORMATION	Symbol	Units	Nominal rod diameter (in.)							
			#3	#4	#5	#6	#7	#8	#9	#10
Min. embedment depth	$h_{ef,min}$	in.	2,36	2,76	3,11	3,50	3,50	4,02	4,49	5,00
		(mm)	60	70	79	89	89	102	114	127
Max. embedment depth	$h_{ef,max}$	in.	7,52	10,00	12,52	15,00	17,52	20,00	22,52	25,00
		(mm)	191	254	318	381	445	508	572	635
Effectiveness factor for cracked concrete	$k_{c,cr}$	in.lb	17							
		(SI)	7.1							
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	in.lb	24							
		(SI)	10							
Min. anchor spacing	s_{min}	in. / (mm)	$s_{min} = c_{min}$							
Min. edge distance	c_{min}	in.	1.67	2.26	2.56	3.15	3.74	4.33	5.12	6.30
		(mm)	43	58	65	80	95	110	130	160
Minimum member thickness	h_{min}	in.	$h_{ef} + 30 (\geq 100)$		$h_{ef} + 2d_0^2$					
		(mm)	$h_{ef} + 1.25 (\geq 3.937)$							
Critical edge distance for splitting failure	c_{ac}	in. / (mm)	See Section 4.1.10 of this report.							
Strength reduction factor for tension, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.65							
Strength reduction factor for shear, concrete failure modes, (Condition B, supplementary reinforcement not present) ¹	ϕ	-	0.7							

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 Section 17.5.3 are met.

² d_0 = drill hole diameter.

FIS SB

TABLE 18—BOND STRENGTH DESIGN INFORMATION FOR FRACTIONAL REINFORCING BAR¹

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (in.)							
				#3	#4	#5	#6	#7	#8	#9	#10
Min. embedment depth	$h_{ef,min}$	in.		2,36	2,76	3,11	3,50	3,50	4,02	4,49	5,00
		(mm)		60	70	79	89	89	102	114	127
Max. embedment depth	$h_{ef,max}$	in.		7,52	10,00	12,52	15,00	17,52	20,00	22,52	25,00
		(mm)		191	254	318	381	445	508	572	635
Temperature range A ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	psi	464	464	464	493	493	493	493	566
			(N/mm ²)	(3.2)	(3.2)	(3.2)	(3.4)	(3.4)	(3.4)	(3.4)	(3.9)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	psi	1,131	1,073	1,044	1,001	972	957	928	914
			(N/mm ²)	(7.8)	(7.4)	(7.2)	(6.9)	(6.7)	(6.6)	(6.4)	(6.3)
Temperature range B ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	psi	435	435	435	450	450	450	450	522
			(N/mm ²)	(3.0)	(3.0)	(3.0)	(3.1)	(3.1)	(3.1)	(3.1)	(3.6)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	psi	1044	986	957	928	899	870	856	841
			(N/mm ²)	(7.2)	(6.8)	(6.6)	(6.4)	(6.2)	(6.0)	(5.9)	(5.8)
Temperature range C ²	Characteristic bond strength in cracked concrete	$\tau_{k,cr}$	psi	377	377	377	406	406	406	406	464
			(N/mm ²)	(2.6)	(2.6)	(2.6)	(2.8)	(2.8)	(2.8)	(2.8)	(3.2)
	Characteristic bond strength in uncracked concrete	$\tau_{k,uncr}$	psi	928	870	841	812	798	769	754	740
			(N/mm ²)	(6.4)	(6.0)	(5.8)	(5.6)	(5.5)	(5.3)	(5.2)	(5.1)
	Reduction for seismic tension	$\alpha_{N,seis}$	-	1.0							
Strength reduction factor for permissible installation conditions	Dry concrete	ϕ_d	-	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Water saturated concrete	ϕ_{ws}	-	0.65	0.55	0.55	0.55	0.45	0.45	0.45	0.45

For SI: 1 inch = 25.4 mm, 1lbf = 4.448 N, 1 psi = 0.006897 MPa.
 For pound-inch units: 1 mm = 0.03937 inch, 1 N = 0.2248 lbf, 1MPa = 145.0 psi.

¹Characteristic bond strength values correspond to concrete compressive strength $f_c=2,500$ psi (17.2 MPa). For concrete compressive strength f_c between 2,500 psi (17.2 MPa) and 8,000 psi (55.2 MPa), the tabulated characteristic bond strength may be increased by a factor of $(f_c/2,500)^{0.1}$ (for SI: $(f_c/17.2)^{0.1}$). See Section 4.1.4 of this report for bond strength determination.

²Temperature range A: Maximum short term temperature = 176°F (80°C), Maximum long term Temperature = 122°F (50°C)
 Temperature range B: Maximum short term temperature = 248°F (120°C), Maximum long term Temperature = 162°F (72°C)
 Temperature range C: Maximum short term temperature = 302°F (150°C), Maximum long term Temperature = 194°F (90°C)

Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

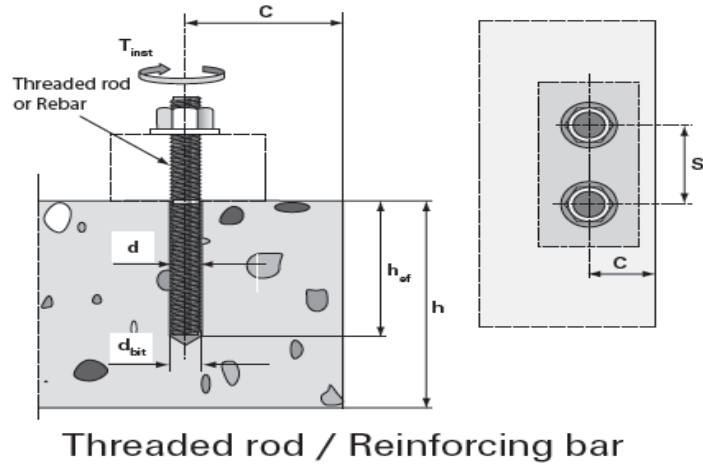


FIGURE 3—INSTALLATION PARAMETERS FOR THREADED ROADS AND REINFORCING BARS

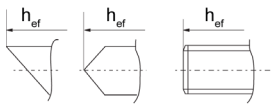


FIGURE 4—FIS SB ANCHORING SYSTEM & STEEL ELEMENTS

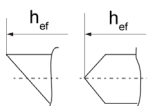


FIGURE 5—RSB ANCHORING SYSTEM & RGM

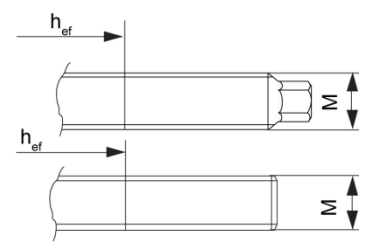
Alternative point geometry threaded rod FIS A



Alternative point geometry threaded rod RGM



Alternative head geometry threaded rod FIS A and RGM



Marking (on the head):
 Property class 8.8 or high corrosion-resistant steel, property class 80: •
 Stainless steel A4, property class 70; high corrosion-resistant steel, property class 70 and property class 5.8: no marking

FIGURE 6—FISCHER THREADED RODS FIS A AND RGM

TABLE 19— APPLICABLE SECTIONS OF THE IBC CODE UNDER EACH EDITION OF THE IBC

2024 IBC	2021 IBC	2018 IBC	2015 IBC
Section 1605.1		Section 1605.2	
Section 1705.1.1			
Table 1705.3			
Section 1705			
Section 1706			
Section 1707			
Section 1901.3			
Section 1903			
Section 1905			

TABLE 20— APPLICABLE SECTIONS OF ACI 318 UNDER EACH EDITION OF THE IBC

2024 IBC	2021 IBC	2018 IBC	2015 IBC
ACI 318-19		ACI 318-14	
2.3		2.3	
5.3		5.3	
17.2.4		17.2.6	
17.3.1		17.2.7	
17.5.1.2		17.3.1	
17.5.3		17.3.3	
17.6.1.2		17.4.1.2	
Eq. 17.6.1.2 and Eq 17.7.1.2b		Eq. 17.4.1.2 and Eq 17.5.1.2b	
17.6.2		17.4.2	
17.6.2.2		17.4.2.2	
17.6.2.5		17.4.2.6	
17.6.5		17.4.5	
17.6.5.5		17.4.5.5	
Eq. 17.6.5.5.1b		Eq. 17.4.5.5b	
Eq. 17.6.5.5.1c		Eq. 17.4.5.5c	
17.7.1.2		17.5.1.2	
17.7.2		17.5.2	
17.7.2.2		17.5.2.2	
17.7.3		17.5.3	
17.8		17.6	
17.9.2		17.7.1 and 17.7.3	
17.9.3		17.7.4	
17.10		17.2.3	
26.6.3.2 (b)		26.6.3.1 (b)	
26.7.2		17.8.1 and 17.8.2	
26.7.2(e)		17.8.2.2 or 17.8.2.3	
26.13.3.2(e)		17.8.2.4, 26.7.1(h) and 26.13.3.2(c)	

Installation instruction



see ICC-ES Evaluation Report No. 3572 at www.icc-es.org

fischer adhesive anchoring system FIS SB

fischer FIS SB 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.

A Preparing the cartridge

- 1 Remove the cap by turning and pulling it off.
- 2 Screw on the static mixer (FIS MR Plus/FIS UMR) tightly and lock it in place (turn to the right). **The spiral element mixer in the static mixer must be clearly visible. Never use without the static mixer!**
- 3 Place the cartridge in the dispenser. Press approx. 10 cm of material out **until the resin mortar comes out evenly grey in colour.** Mortar which is not grey colour will not cure and must be disposed off.
The temperature of the concrete must be at least 5 °F (-15 °C) and at most 104 °F (40 °C) (see Table VII). - The temperature of the cartridge must be at least 5 = 41 °F (5 °C). After finishing work, leave the static mixer attached to the cartridge.

Important: If the processing time is exceeded, use a new static mixer and if necessary remove encrusted material in the cartridge mouth.

B Installation

Important: Installation instructions – follow the pictograms 1–7 for the sequence of operating and refer to Tables I–VI for setting details. The construction drawings must be adhered. For any applications not covered by this document, or by any problems with installation contact **fischer**.

- 1 Drill hole with a hammer drill set. Observe the correct hole diameter and depth according to Tables I–VI.
- 2.1/2.2a/2.2b/2.3 Standing water in bore holes must be completely removed by blowing out before cleaning the bore hole. The drill hole must be blown out twice with compressed air (oil-free ≥ 87 psi (6 bar)), brushed two times (minimal by hand) starting from the bottom of the hole and then again blown out twice with compressed air (oil-free ≥ 87psi (6bar)). For drill holes $d_0 < 18$ mm it is allowed to use hand pump. The diameters of the brushes are given in Table I. Clean dirty brushes. Check brushes for wear with brush gauge (brush $\varnothing \geq$ drill hole \varnothing). If required use brush extension.
- 3 Fill approx. $\frac{2}{3}$ of the hole with mortar starting from the bottom of the hole. For drill hole depth > 150 mm use an extension tube. Observe processing time.
- 4 Anchoring element must be straight and free of oil and other contaminants. Mark the anchor with correct embedment depth. Press the anchoring element down to the bottom of the hole, turning it slightly while so doing. After insert the anchoring element, excess mortar must emerge from the mouth of the hole.
- 5 For overhead installations use wedges to support the anchor. For overhead installations, drill hole diameter > 30 mm, or drill hole depth > 250 mm use an injection adapter.

Installation instruction

- 6 Do not disturb the anchoring element until cure time has elapsed. Do not apply load or installation torque moment to the anchor until the prescribed curing times are elapsed. The allowable working time and the minimum curing time are given in Table VII.
- 7 The installation torque moments are given in Table II.

Table I
Drill hole diameter / Accessories for metric sizes

Drill bit		Rods	Rebar	Brush		Injection adapter	
\varnothing [mm]	\varnothing [inch]	\varnothing [mm]	\varnothing [mm]	Type	Item No.	Size	Color
10	3/8	M8	-	BS 10	78178	-	-
12	7/16	M10	8	BS12	78179	12	nature
14	9/16	M12	10	BS14	78180	14	blue
16	5/8	-	12	BS16/18	78181	16	red
18	3/4	M16	-	BS16/18	78181	18	yellow
20	13/16	-	16	BS20	52277	20	green
24	1	M20	-	BS24	78182	24	brown
25	1	-	20	BS25	97806	25	black
28	1 1/8	M24	-	BS28	78183	28	blue
30	1 1/4	-	25	BS35	78184	30	grey
35	1 3/8	M30	28	BS35	78184	35	brown
40	1 1/2	-	32	BS40	505061	40	red

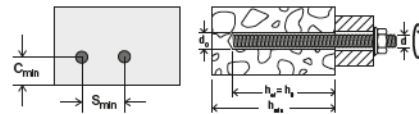


Table II
Metric threaded rods

d	d0	hef,min		hef,max		hmin		Smin = Cmin		Tinst	
	[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[Nm]	[ft-lb]
M8	10	3/8	60	2 3/8	160	6 2/7	hef	40	14/7	10	7
M10	12	7/16	60	2 3/8	200	7 7/8	hef + 30	46	17/9	20	15
M12	14	9/16	70	2 3/4	240	9 4/9	hef + 1,25	55	2 1/6	40	30
M16	18	3/4	80	3 1/7	320	12 3/5	hef	65	25/9	60	44
M20	24	1	90	3 5/9	400	15 3/4	hef + 2do	85	3 1/8	120	89
M24	28	1 1/8	96	3 7/9	480	18 8/9	hef + 2do	105	4 1/8	150	111
M30	35	1 3/8	120	4 5/7	600	23 5/8	hef	140	5 1/2	300	221

FIGURE 7—FIS SB INSTALLATION INFORMATION

Installation instruction

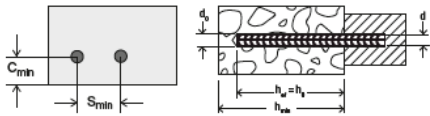


Table III
Metric reinforcing bars

d	d ₀	h _{ef,min}	h _{ef,max}	h _{min}	S _{min} = C _{min}
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
8	12	60	160	6 2/7	45
10	14	60	200	7 7/8	45
12	16	70	240	9 4/9	55
16	20	80	320	12 3/5	65
20	25	90	400	15 3/4	85
25	30	100	500	19 2/3	110
28	35	112	560	22	130
32	40	128	640	25 1/5	160

Table IV
Drill hole diameter / Accessories for fractional sizes

Drill bit		Rods	Rebar	Brush	Injection adapter	
ø [mm]	ø [inch]	ø [mm]	ø [inch]	Type	Item No.	Size
12	7/16	3/8	-	BS12	78179	-
14	1/2	-	#3	BS14	78180	12
15	9/16	1/2	-	BS14	78180	14
16	5/8	-	#4	BS16/18	78181	16
18	3/4	5/8	-	BS20	52277	18
20	3/4	-	#5	BS20	52277	18
22	7/8	3/4	#6	BS20	52277	20
25	1	7/8	-	BS25	97806	25
28	1 1/8	1	#7	BS28	78183	28
32	1 1/4	1 1/8	#8	BS35	78184	30
35	1 3/8	1 1/4	#9	BS35	78184	35
40	1 1/2	-	#10	BS40	505061	35

Installation instruction

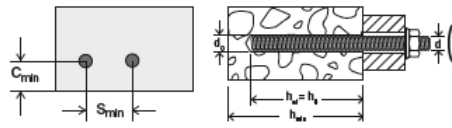


Table V
Fractional threaded rods

d	d ₀	h _{ef,min}	h _{ef,max}	h _{min}	S _{min} = C _{min}	T _{inst}
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[mm]
3/8	7/16	12	60	7 1/2	12/3	42.5
1/2	9/16	15	70	10	2 1/4	57.5
5/8	3/4	18	79	12 1/2	2 5/8	65
3/4	7/8	22	89	15	3 1/7	80
7/8	1	25	89	17 1/2	3 3/4	95
1	1 1/8	28	102	20	4 1/3	110
1 1/8	1 1/4	32	114	22 1/2	5 1/3	135
1 1/4	1 3/8	35	127	25	6 2/7	160

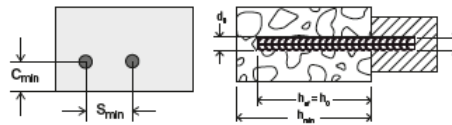


Table VI
Fractional reinforcing bars

d	d ₀	h _{ef,min}	h _{ef,max}	h _{min}	S _{min} = C _{min}
[inch]	[mm]	[inch]	[mm]	[inch]	[mm]
#3	14	1/2	60	2 3/8	191
#4	16	5/8	70	2 3/4	254
#5	20	3/4	79	3 1/8	318
#6	22	7/8	89	3 1/2	381
#7	28	1 1/8	89	3 1/2	445
#8	32	1 1/4	102	4	508
#9	35	1 3/8	114	4 1/2	572
#10	40	1 1/2	127	5	635

Table VII
Processing and curing times.

Temperature range		Adhesive Temperature		Working time / processing time	Curing time
[°C]	[°F]	[°C]	[°F]	[min]	[h]
-15 to -10	+ 5 to +14	≥+5	≥+41	60	36
-10 to -5	+14 to +23	≥+5	≥+41	30	24
-5 to ±0	+23 to +32	≥+5	≥+41	20	8
± 0 to +5	+32 to +41	≥+5	≥+41	13	4
+5 to +10	+41 to +50	≥+5	≥+41	9	2
+10 to +20	+50 to +68	≥+10	≥+50	5	1
+20 to +30	+68 to +96	≥+20	≥+68	4	3/4
+30 to +40	+86 to +104	≥+25	≥+77	2	1/2

Store mortar in a cool dry place.

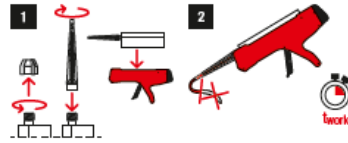


41 - 77° F / 5 - 25° C

FIGURE 7—FIS SB INSTALLATION INFORMATION (Continued)

Installation instruction

A FIS SB 390 S / FIS SB 585 S



Cartridge	Dispenser	Item No.	Static mixer
390 ml = 13.2 fl oz	FIS DM S Pro	563337	FIS MR Plus
390 ml = 13.2 fl oz	FIS AM	058000	FIS MR Plus
390 ml = 13.2 fl oz	FIS DB S Pro	558955	FIS MR Plus
390 ml = 13.2 fl oz	FIS AP	058027	FIS MR Plus
585 ml = 19.8 fl oz	FIS DM S-L	567768	FIS UMR
585 ml = 19.8 fl oz	FIS DP S-L	511125	FIS UMR

B

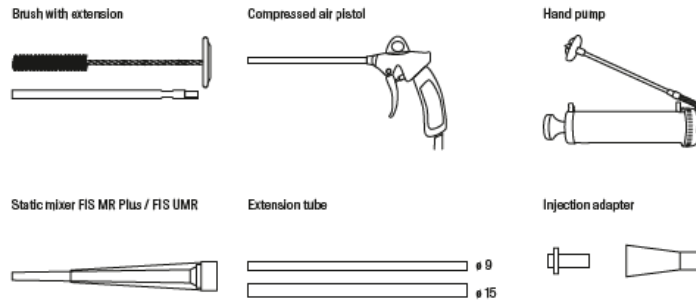
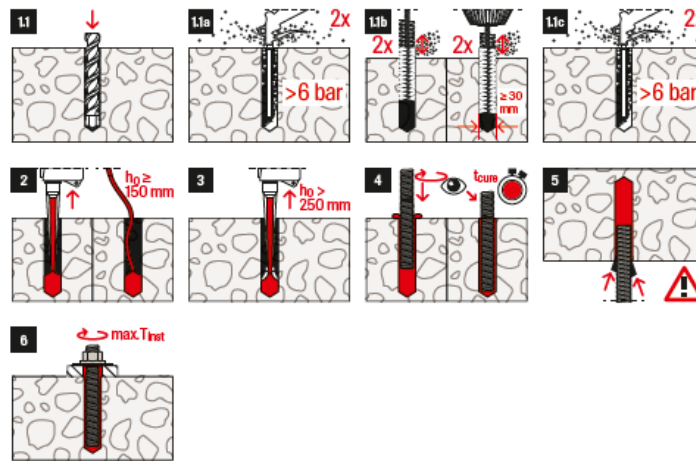


FIGURE 7—FIS SB INSTALLATION INFORMATION (Continued)

Installation instruction



see ICC-ES Evaluation Report No. 3572 at www.icc-es.org

fischer adhesive anchoring system RSB

fischer RSB is an adhesive anchoring system for anchorage in normal weight concrete.

Important: Before use, read and review the Installation Instructions and the SDS (safety data sheet). Do not use expired adhesive.

Installation in hammer-drilled hole

1. Drill the hole. Drill hole diameter d_h and drill hole depth h_d see Table II or III.
2. Before setting please make sure that the resin in the hand warm capsule flows like honey. Don't use damaged capsules.
3. Drill hole cleaning: Blow out the drill hole four times with oil-free compressed air ($p \geq 6$ bar). The use of a manual blow-out pump is possible, if at the same time the drill hole diameter is less than 18 mm resp. 11/16 inch and the embedment depth h_d is less than 10d.
4. Resin capsule RSB, RSB mini or two RSB mini, must be pushed into the drill hole by hand. Depending on the fischer RG M anchor element being installed, a suitable setting tool should be used.
5. Only use clean and grease-free anchors. Using a suitable adapter, drive the fischer RG M anchor element into the capsule using a hammer drill set on rotary hammer action. Stop when the anchor reaches the bottom of the hole and is set to the correct embedment depth.
6. When fully embedded, excess adhesive must emerge from the mouth of the drill hole. If not, the anchor must be pulled out immediately and a second resin capsule must be pushed into the drill hole. Setting process must be repeated, step (4).

7. Wait for the specified curing time t_{cure} see Table I. Admissible concrete and adhesive temperature see Table I. Mounting the fixture T_{fix} see Table III.

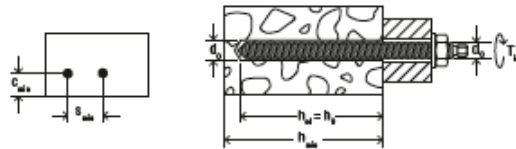


Table I

Concrete temperature range		Adhesive Temperature		Curing time
[°C]	[°F]	[°C]	[°F]	t_{cure}
> -20 - -15	> -4 - 5	≥ -15	≥ 5	48 h
> -15 - -10	> 5 - 14	≥ -15	≥ 5	30 h
> -10 - -5	> 14 - 23	≥ -10	≥ 14	16 h
> -5 - 0	> 23 - 32	≥ -5	≥ 23	10 h
> 0 - 5	> 32 - 41	≥ 0	≥ 32	45 min
> 5 - 10	> 41 - 50	≥ 5	≥ 41	30 min
> 10 - 20	> 50 - 68	≥ 10	≥ 50	20 min
> 20 - 30	> 68 - 86	≥ 20	≥ 68	5 min
> 30 - 40	> 86 - 104	≥ 25	≥ 77	3 min

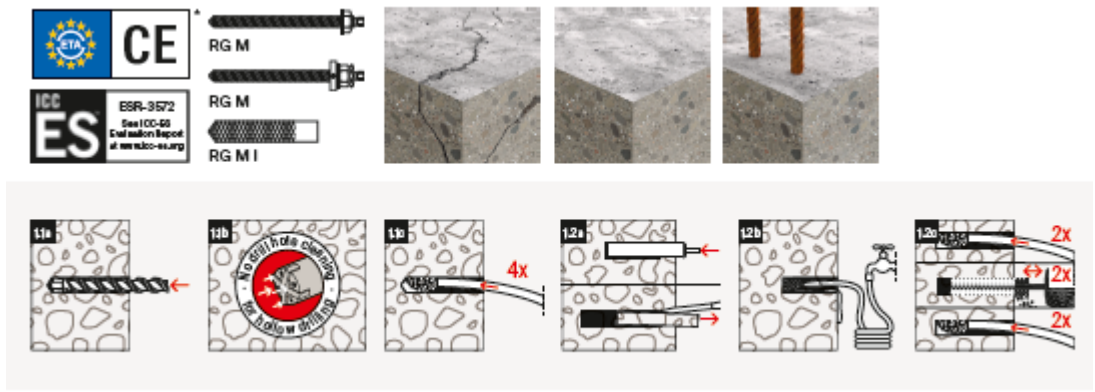
Table II

Typ	[mm]					$\emptyset d_a$ [mm]	Pcs	Typ	Item No.
		$\emptyset d_h$ [mm]	$\emptyset d_s$ [Inch]	h_d [mm]	h_d [Inch]				
	M8	10	3/8	80	3.15	11	1x	RSB 8	518807
		M10	12	15/32	75	2.95	14	1x	RSB 10 mini
	12		15/32	90	3.54	14	1x	RSB 10	518821
	12		15/32	150	5.91	14	2x	RSB 10 mini	518820
	M12	14	9/16	75	2.95	16	1x	RSB 12 mini	518822
		14	9/16	110	4.33	16	1x	RSB 12	518823
		14	9/16	150	5.91	16	2x	RSB 12 mini	518822
	M16	18	11/16	95	3.74	20	1x	RSB 16 mini	518824
		18	11/16	125	4.92	20	1x	RSB 16	518825
		18	11/16	190	7.48	20	2x	RSB 16 mini	518824
	M20	25	1	170	6.69	27	1x	RSB 20	518827
		25	1	210	8.27	27	1x	RSB 20 E/24	518828
M24	28	1 1/8	210	8.27	30	1x	RSB 20 E/24	518828	
M30	35	1 3/8	280	11.02	40	1x	RSB 30	518829	

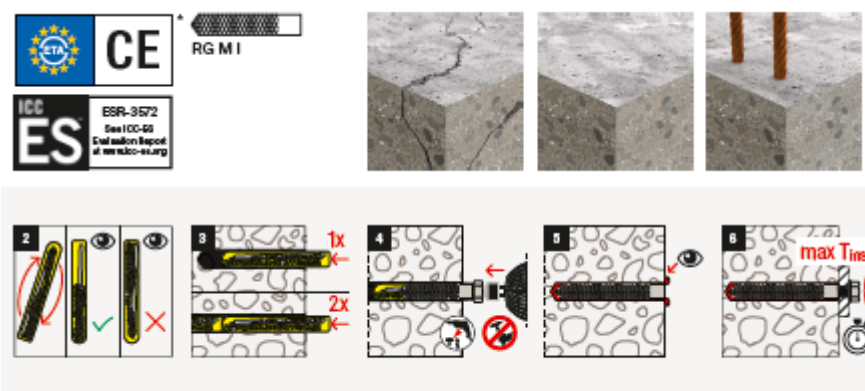
Table III

[mm]					Minimum member thickness		Minimum spacing, minimum edge distance		Maximum torque	
	$\emptyset d_h$ [mm]	$\emptyset d_s$ [Inch]	h_d [mm]	h_d [Inch]	h_{min} [mm]	h_{min} [Inch]	$s_{min} = c_{min}$ [mm]	$s_{min} = c_{min}$ [Inch]	$T_{max} \leq$ [Nm]	$T_{max} \leq$ [ft-lb]
M8	10	3/8	80	3.15	$h_d + 30$	$h_d + 1.25$	40	1.57	10	7.35
M10	12	15/32	75	2.95	$h_d + 30$	$h_d + 1.25$	45	1.77	20	14.75
	12	15/32	90	3.54	$h_d + 30$	$h_d + 1.25$	45	1.77	20	14.75
	12	15/32	150	5.91	$h_d + 30$	$h_d + 1.25$	45	1.77	20	14.75
M12	14	9/16	75	2.95	$h_d + 30$	$h_d + 1.25$	55	2.17	40	29.50
	14	9/16	110	4.33	$h_d + 30$	$h_d + 1.25$	55	2.17	40	29.50
	14	9/16	150	5.91	$h_d + 30$	$h_d + 1.25$	55	2.17	40	29.50
M16	18	11/16	95	3.74	$h_d + 2d_s$	$h_d + 2d_s$	85	2.56	60	44.25
	18	11/16	125	4.92	$h_d + 2d_s$	$h_d + 2d_s$	85	2.56	60	44.25
	18	11/16	190	7.48	$h_d + 2d_s$	$h_d + 2d_s$	85	2.56	60	44.25
M20	25	1	170	6.69	$h_d + 2d_s$	$h_d + 2d_s$	85	3.35	120	88.50
	25	1	210	8.27	$h_d + 2d_s$	$h_d + 2d_s$	85	3.35	120	88.50
M24	28	1 1/8	210	8.27	$h_d + 2d_s$	$h_d + 2d_s$	105	4.13	150	110.00
M30	35	1 3/8	280	11.02	$h_d + 2d_s$	$h_d + 2d_s$	140	5.51	300	221.25

FIGURE 8—RSB INSTALLATION INFORMATION



*ETA-12/0258 EAD 330499-01-0601 Option 1 for cracked concrete



*ETA-12/0258 EAD 330499-01-0601 Option 1 for cracked concrete

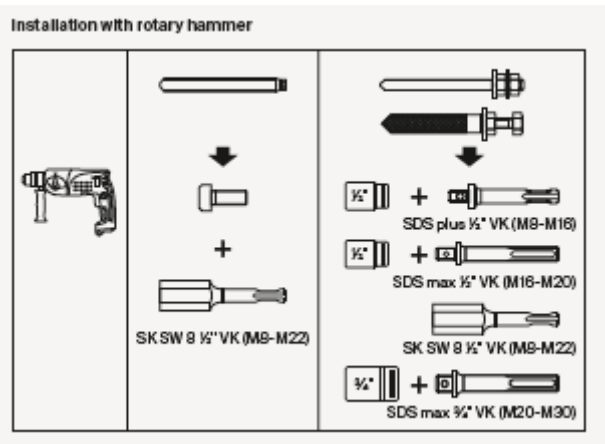


FIGURE 8—RSB INSTALLATION INFORMATION (Continued)

DIVISION: 03 00 00—CONCRETE

Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS

Section: 05 05 19—Post-Installed Concrete Anchors

REPORT HOLDER:

fischerwerke GmbH & Co. KG

EVALUATION SUBJECT:

fischer SUPERBOND ADHESIVE ANCHORING SYSTEM FOR CRACKED AND UNCRACKED CONCRETE

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the fischer Superbond Adhesive Anchor System, described in ICC-ES evaluation report [ESR-3572](#), has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2025 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2025 California Residential Code (CRC).

2.0 CONCLUSIONS**2.1 CBC:**

The fischer Superbond Adhesive Anchor System, described in Sections 2.0 through 7.0 of the evaluation report [ESR-3572](#), complies with CBC Chapter 19, provided the design and installation are in accordance with the 2024 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapter 16, 17 and 19, as applicable.

2.1.1 OSHPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The fischer Superbond Adhesive Anchor System, described in Sections 2.0 through 7.0 of the evaluation report [ESR-3572](#), complies with CRC Section R301.1.3, provided the design and installation are in accordance with the 2024 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 19, as applicable.

This supplement expires concurrently with the evaluation report, reissued April 2026.

DIVISION: 03 00 00—CONCRETE

Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS

Section: 05 05 19—Post-Installed Concrete Anchors

REPORT HOLDER:

fischerwerke GmbH & Co. KG

EVALUATION SUBJECT:

fischer SUPERBOND ADHESIVE ANCHORING SYSTEM FOR CRACKED AND UNCRACKED CONCRETE

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the fischer Superbond Adhesive Anchoring System, described in ICC-ES evaluation report [ESR-3572](#), has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2023 Florida Building Code—Building
- 2023 Florida Building Code—Residential

2.0 CONCLUSIONS

The fischer Superbond Adhesive Anchoring System, described in Sections 2.0 through 7.0 of the evaluation report [ESR-3572](#), complies with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in the ICC-ES evaluation report [ESR-3572](#) for the 2021 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the fischer Superbond Adhesive Anchoring System has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* with the following condition:

- a) For anchorage to wood members, the connection subject to uplift must be designed for no less than 700 pounds (3114 N) in accordance with item 3 of Section 2321.7 of the *Florida Building Code—Building*.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission). Florida Rule 61G20-3 is applicable to products and/or systems which comprise the building envelope and structural frame for compliance with the structural requirements of the Florida Building Code.

This supplement expires concurrently with the evaluation report, reissued April 2026.