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DE



- 6.) Erklärte Leitung(en):
- a) Mechanische Festigkeit und Standsicherheit (BWR 1) und Sicherheit bei der Nutzung (BWR 4)

[illegible]

# Leistungserklärung

Nr.: 4 - 043 - 240647 - 2024/01

DE

**EJOT®**

## b) Brandschutz (BWR 2)

| Wesentliche Merkmale | Leistungswerte |
|----------------------|----------------|
| Brandverhalten       | Klasse A1      |
|                      |                |
|                      |                |

## c) Hygiene, Gesundheit und Umweltschutz (BWR 3)

| Wesentliche Merkmale | Leistungswerte |
|----------------------|----------------|
|                      |                |

## d) Schallschutz (BWR 5)

| Wesentliche Merkmale | Leistungswerte |
|----------------------|----------------|
|                      |                |

## e) Energieeinsparung und Wärmeschutz (BWR 6)

| Wesentliche Merkmale | Leistungswerte |
|----------------------|----------------|
|                      |                |
|                      |                |
|                      |                |

## f) Nachhaltige Nutzung der natürlichen Ressourcen (BWR 7)

| Wesentliche Merkmale | Leistungswerte |
|----------------------|----------------|
|                      |                |

Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung/den erklärten Leistungen. Für die Erstellung der Leistungserklärung im Einklang mit der Verordnung (EU) Nr. 305/2011 ist allein der oben genannte Hersteller verantwortlich.

Unterzeichnet für den Hersteller und im Namen des Herstellers von:

**Dr. Jens Weber**

(Name)

**Bad Laasphe, 17.10.2024**

(Ort und Datum der Ausstellung)



(Unterschrift)

No 4 - 043 - 240647 - 2024/01

EN



- |     |                                                                                                                                                                                                                                                                           |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.) | Unique identification code of the product-type:<br><b>Injection System EJOT Multifix Hybrid / SORMAT ITH Hybrid for rebar connection</b>                                                                                                                                  |
| 2.) | Intended use:<br><b>(033) Post-installed reinforcing bar (rebar) connection with improved bond-splitting behaviour under static loading</b>                                                                                                                               |
| 3.) | Manufacturer:<br><b>EJOT SE &amp; Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany</b>                                                                                                                                                 |
| 4.) | System of AVCP:<br><b>System 1</b>                                                                                                                                                                                                                                        |
| 5.) | European Assesment Document: <b>EAD 332402-00-0601</b><br>European Technical Assessment: <b>ETA-24/0647</b><br>Technical assessment body: <b>DIBt - Deutsches Institut für Bautechnik, Berlin</b><br>Notified body: <b>2873 - IFSW - Technische Universität Darmstadt</b> |

- 6.) Declared Performance:
- a) Mechanical resistance and stability (BWR 1) and safety and accessibility (BWR 4)

[illegible]

# Declaration of Performance

No 4 - 043 - 240647 - 2024/01

EN

**EJOT®**

## b) Safety in case of fire (BWR 2)

| Essential characteristic | Performance |
|--------------------------|-------------|
| Reaction to fire         | Class A1    |
|                          |             |
|                          |             |

## c) Hygiene, health and the environment (BWR 3)

| Essential characteristic | Performance |
|--------------------------|-------------|
|                          |             |

## d) Protection against noise (BWR 5)

| Essential characteristic | Performance |
|--------------------------|-------------|
|                          |             |

## e) Energy economy and heat retention (BWR 6)

| Essential characteristic | Performance |
|--------------------------|-------------|
|                          |             |
|                          |             |
|                          |             |

## f) Sustainable use of natural resources (BWR 7)

| Essential characteristic | Performance |
|--------------------------|-------------|
|                          |             |

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

**Dr. Jens Weber**

(Name)

**Bad Laasphe, 17.10.2024**

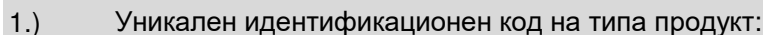
(Place and date of issue)



(Signature)

**Nº 4 - 043 - 240647 - 2024/01**

BG



2.) Предвидена употреба/употреби:

3.) Производитель:

4.) Система/системи за оценяване и проверка на постоянството на експлоатационните показатели:

5.) Европейски документ за оценяване: **EAD 332402-00-0601**

Европейска техническа оценка: **ETA-24/0647**

Орган за техническа оценка: **DIBt - Deutsches Institut für Bautechnik, Berlin**

Нотифициран орган/органи: **2873 - IFSW - Technische Universität Darmstadt**

6.) Декларирани експлоатационни показатели:

а) Механична устійновост и стабилност (BWR 1) и безопасност и достъпност (BWR 4)

[illegible]

# ДЕКЛАРАЦИЯ ЗА ЕКСПЛОАТАЦИОННИ ПОКАЗАТЕЛИ

№ 4 - 043 - 240647 - 2024/01

BG



## b) Безопасност в случай на пожар (BWR 2)

| Основни характеристики | Показатели |
|------------------------|------------|
| Реакция при пожар      | Клас A1    |
|                        |            |
|                        |            |

## c) Хигиена, здраве и околна среда (BWR 3)

| Основни характеристики | Показатели |
|------------------------|------------|
|                        |            |

## d) Защита от шум (BWR 5)

| Основни характеристики | Показатели |
|------------------------|------------|
|                        |            |

## e) Икономия на енергия и запазване на топлината (BWR 6)

| Основни характеристики | Показатели |
|------------------------|------------|
|                        |            |
|                        |            |
|                        |            |

## f) Устойчиво използване на природните ресурси (BWR 7)

| Основни характеристики | Показатели |
|------------------------|------------|
|                        |            |

Експлоатационните показатели на продукта, посочени по-горе, са в съответствие с декларираните експлоатационни показатели. Настоящата декларация за експлоатационни показатели се издава в съответствие с Регламент (ЕС) № 305/2011, като отговорността за нея се носи изцяло от посочения по-горе производител.

Подписано за и от името на производителя от:

Dr. Jens Weber

(Име)

Bad Laasphe, 17.10.2024

(Място и Дата)

(Подпис)

Č. 4 - 043 - 240647 - 2024/01

CZ



- 6.) Deklarovaná vlastnosť/Deklarované vlastnosti:
- a) Mechanická odolnosť a stabilita (BWR 1) a bezpečnosť a dostupnosť (BWR 4)

[illegible]



# PROHLÁŠENÍ O VLASTNOSTECH

č. 4 - 043 - 240647 - 2024/01

CZ

**EJOT®**

## b) Bezpečnost při požáru (BWR 2)

| základní charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
| Reakce na oheň           | Třída A1           |
|                          |                    |
|                          |                    |

## c) Hygiena, zdraví a životní prostředí (BWR 3)

| základní charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |

## d) Ochrana proti hluku (BWR 5)

| základní charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |

## e) Úspora energie a zadržování tepla (BWR 6)

| základní charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |
|                          |                    |
|                          |                    |

## f) Udržitelné využívání přírodních zdrojů (BWR 7)

| základní charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |

Vlastnosti výše uvedeného výrobku jsou ve shodě se souborem deklarovaných vlastností. Toto prohlášení o vlastnostech se v souladu s nařízením (EU) č. 305/2011 vydává na výhradní odpovědnost výrobce uvedeného výše.

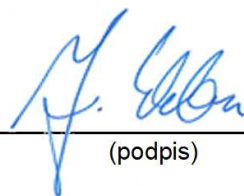
Podepsáno za výrobce a jeho jménem:

**Dr. Jens Weber**

(jméno)

**Bad Laasphe, 17.10.2024**

(místo a datum vydání)



(podpis)

Nr.: 4 - 043 - 240647 - 2024/01

DK



- 6.) Deklareret ydeevne/deklarerede ydeevner:
- a) Mekanisk modstand og stabilitet (BWR 1) og sikkerhed og tilgængelighed (BWR 4)

[illegible]

# YDEEVNEDEKLARATION

Nr.: 4 - 043 - 240647 - 2024/01

DK

**EJOT®**

## b) Sikkerhed ved brand (BWR 2)

| Væsentlige egenskaber | Ydelse    |
|-----------------------|-----------|
| Reaktioner på brand   | Klasse A1 |
|                       |           |
|                       |           |

## c) Hygiejne, sundhed og miljø (BWR 3)

| Væsentlige egenskaber | Ydelse |
|-----------------------|--------|
|                       |        |

## d) Beskyttelse mod støj (BWR 5)

| Væsentlige egenskaber | Ydelse |
|-----------------------|--------|
|                       |        |

## e) Energibesparelser og varmebinding (BWR 6)

| Væsentlige egenskaber | Ydelse |
|-----------------------|--------|
|                       |        |
|                       |        |
|                       |        |

## f) Bæredygtig udnyttelse af naturressourcer (BWR 7)

| Væsentlige egenskaber | Ydelse |
|-----------------------|--------|
|                       |        |

Ydeevnen for den vare, der er anført ovenfor, er i overensstemmelse med den deklarerede ydeevne. Denne ydeevnedeklaration er udarbejdet i overensstemmelse med forordning (EU) nr. 305/2011 på eneansvar af den fabrikant, der er anført ovenfor.

Underskrevet for fabrikanten og på dennes vegne af:

**Dr. Jens Weber**

(navn)

**Bad Laasphe, 17.10.2024**

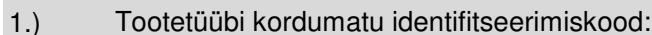
(sted og dato for udstedelse)



(underskrift)

## nr 4 - 043 - 240647 - 2024/01

EE



2.) Kavandatud kasutusala(d):

3.) Tootja:

4.) Toimivuse püsivuse hindamise ja kontrolli süsteem:

5.) Euroopa hindamisdokument:

Euroopa tehniline hinnang:

Tehnilise hindamise asutus:

Teavitatud asutus(ed):

6.) Deklareeritud toimivus:

a) Mehaaniline vastupidavus ja stabiilsus (BWR 1) ning ohutus ja juurdepääsetavus (BWR 4)

[illegible]

# TOIMIVUSDEKLARATSIOON

nr 4 - 043 - 240647 - 2024/01

EE



## b) Ohutus tulekahju korral (BWR 2)

| Põhiomadused           | Toimivus |
|------------------------|----------|
| Reaktsioon tulekahjule | Klass A1 |
|                        |          |
|                        |          |

## c) Hügieen, tervis ja keskkond (BWR 3)

| Põhiomadused | Toimivus |
|--------------|----------|
|              |          |

## d) Kaitse müra eest (BWR 5)

| Põhiomadused | Toimivus |
|--------------|----------|
|              |          |

## e) Energiasääst ja soojapidavus (BWR 6)

| Põhiomadused | Toimivus |
|--------------|----------|
|              |          |
|              |          |
|              |          |

## f) Loodusvarade säästev kasutamine (BWR 7)

| Põhiomadused | Toimivus |
|--------------|----------|
|              |          |

Eespool kirjeldatud toote toimivus vastab deklareeritud toimivusele. Käesolev toimivusdeklaratsioon on välja antud kooskõlas määrusega (EL) nr 305/2011 eespool nimetatud tootja ainuvastutusel.

Tootja poolt ja nimel allkirjastanud:

Dr. Jens Weber

(Nimi)

Bad Laasphe, 17.10.2024

(Koht ja kuupäev)

(Allkiri)

## ES

# EJOT®

[illegible]

# DECLARACIÓN DE PRESTACIONES

no 4 - 043 - 240647 - 2024/01

ES



## b) Seguridad en caso de incendio (BWR 2)

| Características esenciales | Prestaciones |
|----------------------------|--------------|
| Reacción al fuego          | Clase A1     |
|                            |              |
|                            |              |

## c) Higiene, salud y medio ambiente (BWR 3)

| Características esenciales | Prestaciones |
|----------------------------|--------------|
|                            |              |

## d) Protección contra el ruido (BWR 5)

| Características esenciales | Prestaciones |
|----------------------------|--------------|
|                            |              |

## e) Ahorro de energía y retención del calor (BWR 6)

| Características esenciales | Prestaciones |
|----------------------------|--------------|
|                            |              |
|                            |              |
|                            |              |

## f) Uso sostenible de los recursos naturales (BWR 7)

| Características esenciales | Prestaciones |
|----------------------------|--------------|
|                            |              |

Las prestaciones del producto identificado anteriormente son conformes con el conjunto de prestaciones declaradas. La presente declaración de prestaciones se emite, de conformidad con el Reglamento (UE) no 305/2011, bajo la sola responsabilidad del fabricante arriba identificado.

Firmado por y en nombre del fabricante por:

Dr. Jens Weber

(nombre)

Bad Laasphe, 17.10.2024

(lugar y fecha de emisión)

(firma)

Nro **4 - 043 - 240647 - 2024/01**

F



2.) Aiottu käyttötarkoitus (aiotut käyttötarkoitukset):  
(033) Jälkiasennettu raudoitustankoliitos, jossa on parannettu liitoksen halkeamiskäyttäytymistä staattisessa kuormituksessa.

3.) Valmistaja:  
EJOT SE & Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany

4.) Suoritusason pysyvyyden arvioinnissa ja varmentamisessa käytetty järjestelmä/käytetyt järjestelmät:

|     |                                          |                                                  |
|-----|------------------------------------------|--------------------------------------------------|
| 5.) | Eurooppalainen arviointiasiakirja:       | EAD 332402-00-0601                               |
|     | Eurooppalainen tekninen arviointi:       | ETA-24/0647                                      |
|     | Teknisestä arvioinnista vastaava laitos: | DIBt - Deutsches Institut für Bautechnik, Berlin |
|     | Ilmoitettu laitos/ilmoitetut laitokset:  | 2873 - IFSW - Technische Universität Darmstadt   |

6.) Ilmoitettu suoritustaso/ilmoitetut suoritustasot:

a) Mekaaninen kestävyys ja vakavuus (BWR 1) sekä turvallisuus ja saavutettavuus (BWR 4)

[illegible]



# SUORITUSTASOILMOITUS

Nro 4 - 043 - 240647 - 2024/01

FI



b) Turvallisuus tulipalon sattuessa (BWR 2)

| Perusominaisuudet    | Tuotteen suoritustaso |
|----------------------|-----------------------|
| Reagointi tulipaloon | Luokka A1             |
|                      |                       |
|                      |                       |

c) Hygienia, terveys ja ympäristö (BWR 3)

| Perusominaisuudet | Tuotteen suoritustaso |
|-------------------|-----------------------|
|                   |                       |

d) Suojaus melua vastaan (BWR 5)

| Perusominaisuudet | Tuotteen suoritustaso |
|-------------------|-----------------------|
|                   |                       |

e) Energiansäästö ja lämmöntalteenotto (BWR 6)

| Perusominaisuudet | Tuotteen suoritustaso |
|-------------------|-----------------------|
|                   |                       |
|                   |                       |
|                   |                       |

f) Luonnonvarojen kestävä käyttö (BWR 7)

| Perusominaisuudet | Tuotteen suoritustaso |
|-------------------|-----------------------|
|                   |                       |

Edellä yksilöidyn tuotteen suoritustaso on ilmoitettujen suoritustasojen joukon mukainen. Tämä suoritustasoilmoitus on asetuksen (EU) N:o 305/2011 mukaisesti annettu edellä ilmoitetun valmistajan yksinomaisella vastuulla.

Valmistajan puolesta allekirjoittanut:

Dr. Jens Weber

(nimi)

Bad Laasphe, 17.10.2024

(paikka ja päivämäärä)

(allekirjoitus)

No 4 - 043 - 240647 - 2024/01

FR



- |     |                                                                                                                                                                                                                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.) | Code d'identification unique du produit type:<br><b>Injection System EJOT Multifix Hybrid / SORMAT ITH Hybrid for rebar connection</b>                                                                                                                                                          |
| 2.) | Usage(s) prévu(s):<br><b>(033) Assemblage de barres d'armature post-installées avec un meilleur comportement de rupture d'adhérence sous charge statique</b>                                                                                                                                    |
| 3.) | Fabricant:<br><b>EJOT SE &amp; Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany</b>                                                                                                                                                                          |
| 4.) | Système(s) d'évaluation et de vérification de la constance des performances:<br><b>Système 1</b>                                                                                                                                                                                                |
| 5.) | Document d'évaluation européen: <b>EAD 332402-00-0601</b><br>Évaluation technique européenne: <b>ETA-24/0647</b><br>Organisme d'évaluation technique: <b>DIBt - Deutsches Institut für Bautechnik, Berlin</b><br>Organisme(s) notifié(s): <b>2873 - IFSW - Technische Universität Darmstadt</b> |

- 6.) Performance(s) déclarée(s):
- a) Résistance mécanique et stabilité (BWR 1) et sécurité et accessibilité (BWR 4)

[illegible]

# DÉCLARATION DES PERFORMANCES

No 4 - 043 - 240647 - 2024/01

FR



## b) Sécurité en cas d'incendie (REB 2)

| Caractéristiques essentielles | Performances du produit |
|-------------------------------|-------------------------|
| Réaction au feu               | Classe A1               |
|                               |                         |
|                               |                         |

## c) Hygiène, santé et environnement (REB 3)

| Caractéristiques essentielles | Performances du produit |
|-------------------------------|-------------------------|
|                               |                         |

## d) Protection contre le bruit (REB 5)

| Caractéristiques essentielles | Performances du produit |
|-------------------------------|-------------------------|
|                               |                         |

## e) Économie d'énergie et rétention de la chaleur (REB 6)

| Caractéristiques essentielles | Performances du produit |
|-------------------------------|-------------------------|
|                               |                         |
|                               |                         |
|                               |                         |

## f) Utilisation durable des ressources naturelles (REB 7)

| Caractéristiques essentielles | Performances du produit |
|-------------------------------|-------------------------|
|                               |                         |

Les performances du produit identifié ci-dessus sont conformes aux performances déclarées. Conformément au règlement (UE) no 305/2011, la présente déclaration des performances est établie sous la seule responsabilité du fabricant mentionné ci-dessus.

Signé pour le fabricant et en son nom par:

Dr. Jens Weber

(Nom)

Bad Laasphe, 17.10.2024

(Lieu et date)

(Signature)

Αριθ. 4 - 043 - 240647 - 2024/01

GR



- |     |                                                                                                                                                                                                                                                                                                        |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.) | Μοναδικός κωδικός ταυτοποίησης του τύπου του προϊόντος:<br><b>Injection System EJOT Multifix Hybrid / SORMAT ITH Hybrid for rebar connection</b>                                                                                                                                                       |
| 2.) | Προβλεπόμενη(-ες) χρήση(-εις):<br><b>(033) Σύνδεση ράβδων οπλισμού μετά την τοποθέτηση με βελτιωμένη συμπεριφορά διάσπασης του δεσμού υπό στατική φόρτιση</b>                                                                                                                                          |
| 3.) | Κατασκευαστής:<br><b>EJOT SE &amp; Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany</b>                                                                                                                                                                             |
| 4.) | Σύστημα/συστήματα AVCP (αξιολόγηση και επαλήθευση της σταθερότητας της επίδοσης):<br><b>σύστημα 1</b>                                                                                                                                                                                                  |
| 5.) | Ευρωπαϊκό έγγραφο αξιολόγησης: <b>EAD 332402-00-0601</b><br>Ευρωπαϊκή τεχνική αξιολόγηση: <b>ETA-24/0647</b><br>Οργανισμός τεχνικής αξιολόγησης: <b>DIBt - Deutsches Institut für Bautechnik, Berlin</b><br>Κοινοποιημένος(-οι) οργανισμός(-οι): <b>2873 - IFSW - Technische Universität Darmstadt</b> |

- 6.) Δηλωθείσα(-ες) επίδοση(-εις):
- a) Μηχανική αντίσταση και σταθερότητα (BWR 1) και ασφάλεια και προσβασιμότητα (BWR 4)

[illegible]

# ΔΗΛΩΣΗ ΕΠΙΔΟΣΕΩΝ

Αριθ. 4 - 043 - 240647 - 2024/01

GR



## b) Ασφάλεια σε περίπτωση πυρκαγιάς (BWR 2)

| Ουσιώδη χαρακτηριστικά | Απόδοση      |
|------------------------|--------------|
| Αντίδραση στη φωτιά    | Κατηγορία A1 |
|                        |              |
|                        |              |

## c) Υγιεινή, υγεία και περιβάλλον (BWR 3)

| Ουσιώδη χαρακτηριστικά | Απόδοση |
|------------------------|---------|
|                        |         |

## d) Προστασία από θόρυβο (BWR 5)

| Ουσιώδη χαρακτηριστικά | Απόδοση |
|------------------------|---------|
|                        |         |

## e) Εξοικονόμηση ενέργειας και συγκράτηση θερμότητας (BWR 6)

| Ουσιώδη χαρακτηριστικά | Απόδοση |
|------------------------|---------|
|                        |         |
|                        |         |
|                        |         |

## f) Εξοικονόμηση ενέργειας και συγκράτηση θερμότητας (BWR 7)

| Ουσιώδη χαρακτηριστικά | Απόδοση |
|------------------------|---------|
|                        |         |

Η επίδοση του προϊόντος που ταυτοποιείται ανωτέρω είναι σύμφωνη με τη (τις) δηλωθείσα(-ες) επίδοση(-εις). Η δήλωση αυτή των επιδόσεων συντάσσεται, σύμφωνα με τον κανονισμό (ΕΕ) αριθ. 305/2011, με αποκλειστική ευθύνη του κατασκευαστή που ταυτοποιείται ανωτέρω.

Υπογραφή για λογαριασμό και εξ ονόματος του κατασκευαστή από:

Dr. Jens Weber

(όνομα)

Bad Laasphe, 17.10.2024

(τόπος και ημερομηνία έκδοσης)

(υπογραφή)

Br. 4 - 043 - 240647 - 2024/01

HR



- 6.) Objavljena svojstva:
- a) Mehanička otpornost i stabilnost (BWR 1) i sigurnost i pristupačnost (BWR 4)

[illegible]

# IZJAVA O SVOJSTVIMA

Br. 4 - 043 - 240647 - 2024/01

HR



## b) Sigurnost u slučaju požara (BWR 2)

| Bitne karakteristike | Svojstva  |
|----------------------|-----------|
| Reakcija na vatru    | Razred A1 |
|                      |           |
|                      |           |

## c) Higijena, zdravlje i okoliš (BWR 3)

| Bitne karakteristike | Svojstva |
|----------------------|----------|
|                      |          |

## d) Zaštita od buke (BWR 5)

| Bitne karakteristike | Svojstva |
|----------------------|----------|
|                      |          |

## e) Ušteda energije i zadržavanje topline (BWR 6)

| Bitne karakteristike | Svojstva |
|----------------------|----------|
|                      |          |
|                      |          |
|                      |          |

## f) Održivo korištenje prirodnih resursa (BWR 7)

| Bitne karakteristike | Svojstva |
|----------------------|----------|
|                      |          |

Prije utvrđeno svojstvo proizvoda u skladu je s objavljenim svojstvima. Ova izjava o svojstvima izdaje se, u skladu s Uredbom (EU) br. 305/2011, pod isključivom odgovornošću prethodno utvrđenog proizvođača.

Za proizvođača i u njegovo ime potpisao:

Dr. Jens Weber

(ime)

Bad Laasphe, 17.10.2024

(Mjesto i datum izdavanja)

(potpis)

## Száma: 4 - 043 - 240647 - 2024/01

HU



- 6.) A nyilatkozatban szereplő teljesítmény(ek):
- a) Mechanikai ellenállás és stabilitás (BWR 1), biztonság és elérhetőség (BWR 4)

[illegible]



# TELJESÍTMÉNYNYILATKOZAT

Száma: 4 - 043 - 240647 - 2024/01

HU



## b) Biztonság tűz esetén (BWR 2)

| Lényeges termékjellemzők | Termék teljesítménye |
|--------------------------|----------------------|
| Tűzre adott reakció      | A1 osztály           |
|                          |                      |
|                          |                      |

## c) Higiénia, egészség és környezet (BWR 3)

| Lényeges termékjellemzők | Termék teljesítménye |
|--------------------------|----------------------|
|                          |                      |

## d) Zaj elleni védelem (BWR 5)

| Lényeges termékjellemzők | Termék teljesítménye |
|--------------------------|----------------------|
|                          |                      |

## e) Energiatakarékosság és hővisszatartás (BWR 6)

| Lényeges termékjellemzők | Termék teljesítménye |
|--------------------------|----------------------|
|                          |                      |
|                          |                      |
|                          |                      |

## f) A természeti erőforrások fenntartható használata (BWR 7)

| Lényeges termékjellemzők | Termék teljesítménye |
|--------------------------|----------------------|
|                          |                      |

A fent azonosított termék teljesítménye megfelel a bejelentett teljesítmény(ek)nek. A 305/2011/EU rendeletnek megfelelően e teljesítménynyilatkozat kiadásáért kizárólag a fent meghatározott gyártó a felelős.

A gyártó nevében és részéről aláíró személy:

Dr. Jens Weber

(név)

Bad Laasphe, 17.10.2024

(hely és kiállítás dátuma)

(aláírás)

N. 4 - 043 - 240647 - 2024/01

IT



- 6.) Prestazioni dichiarate:
- a) Resistenza meccanica e stabilità (BWR 1) e sicurezza e accessibilità (BWR 4)

[illegible]

# DICHIARAZIONE DI PRESTAZIONE

N. 4 - 043 - 240647 - 2024/01

IT



b) Sicurezza in caso di incendio (BWR 2)

| Caratteristiche essenziali | Prestazione |
|----------------------------|-------------|
| Reazione al fuoco          | Classe A1   |
|                            |             |
|                            |             |

c) Igiene, salute e ambiente (BWR 3)

| Caratteristiche essenziali | Prestazione |
|----------------------------|-------------|
|                            |             |

d) Protezione contro il rumore (BWR 5)

| Caratteristiche essenziali | Prestazione |
|----------------------------|-------------|
|                            |             |

e) Economia energetica e ritenzione di calore (BWR 6)

| Caratteristiche essenziali | Prestazione |
|----------------------------|-------------|
|                            |             |
|                            |             |
|                            |             |

f) Uso sostenibile delle risorse naturali (BWR 7)

| Caratteristiche essenziali | Prestazione |
|----------------------------|-------------|
|                            |             |

La prestazione del prodotto sopra identificato è conforme all'insieme delle prestazioni dichiarate. La presente dichiarazione di responsabilità viene emessa, in conformità al regolamento (UE) n. 305/2011, sotto la sola responsabilità del fabbricante sopra identificato.

Firmato a nome e per conto del fabbricante da:

Dr. Jens Weber

(nome)

Bad Laasphe, 17.10.2024

(luogo e data del rilascio)

(firma)

[illegible]

# EKSPLOATACINIŲ SAVYBIŲ DEKLARACIJA

Nr. 4 - 043 - 240647 - 2024/01

LT



## b) Sauga gaisro atveju (BWR 2)

| Esminės charakteristikos | Eksploatacinės savybės |
|--------------------------|------------------------|
| Reakcija į ugnį          | A1 klasė               |
|                          |                        |
|                          |                        |

## c) Higiena, sveikata ir aplinka (BWR 3)

| Esminės charakteristikos | Eksploatacinės savybės |
|--------------------------|------------------------|
|                          |                        |

## d) Apsauga nuo triukšmo (BWR 5)

| Esminės charakteristikos | Eksploatacinės savybės |
|--------------------------|------------------------|
|                          |                        |

## e) Energijos taupymas ir šilumos išsaugojimas (BWR 6)

| Esminės charakteristikos | Eksploatacinės savybės |
|--------------------------|------------------------|
|                          |                        |
|                          |                        |
|                          |                        |

## f) Tvarus gamtos išteklių naudojimas (BWR 7)

| Esminės charakteristikos | Eksploatacinės savybės |
|--------------------------|------------------------|
|                          |                        |

Nurodyto produkto eksploatacinės savybės atitinka visas deklaruotas eksploatacines savybes. Ši eksploatacinių savybių deklaracija pateikiama vadovaujantis Reglamentu (ES) Nr. 305/2011, atsakomybė už jos turinį tenka tik joje nurodytam gamintojui.

Pasirašyta (gamintojo ir jo vardu):

Dr. Jens Weber

(vardas)

Bad Laasphe, 17.10.2024

(išdavimo vieta ir data)

(parašas)



# EKSPLUATĀCIJAS ĪPAŠĪBU DEKLARĀCIJA

Nr. 4 - 043 - 240647 - 2024/01

LV



## b) Drošība ugunsgrēka gadījumā (BWR 2)

| Būtiskie raksturlielumi | Ekspluatācijas īpašības |
|-------------------------|-------------------------|
| Reakcija uz ugunsgrēku  | A1 klase                |
|                         |                         |
|                         |                         |

## c) Higiēna, veselība un vide (BWR 3)

| Būtiskie raksturlielumi | Ekspluatācijas īpašības |
|-------------------------|-------------------------|
|                         |                         |

## d) Aizsardzība pret troksni (BWR 5)

| Būtiskie raksturlielumi | Ekspluatācijas īpašības |
|-------------------------|-------------------------|
|                         |                         |

## e) Enerģijas ekonomija un siltuma saglabāšana (BWR 6)

| Būtiskie raksturlielumi | Ekspluatācijas īpašības |
|-------------------------|-------------------------|
|                         |                         |
|                         |                         |
|                         |                         |

## f) Dabas resursu ilgtspējīga izmantošana (BWR 7)

| Būtiskie raksturlielumi | Ekspluatācijas īpašības |
|-------------------------|-------------------------|
|                         |                         |

Iepriekš norādītā izstrādājuma ekspluatācijas īpašības atbilst deklarēto ekspluatācijas īpašību kopumam. Šī ekspluatācijas īpašību deklarācija izdota saskaņā ar Regulu (ES) Nr. 305/2011, un par to ir atbildīgs vienīgi iepriekš norādītais ražotājs.

Parakstīts ražotāja vārdā:

Dr. Jens Weber

(Vārds)

Bad Laasphe, 17.10.2024

(Izsniegšanas vieta un datums)

(Paraksts)

[illegible]



# DIKJARAZZJONI TA' PRESTAZZJONI

Nru. 4 - 043 - 240647 - 2024/01

MT



| b) Sigurtà fil-każ ta 'nar (BWR 2) |              |
|------------------------------------|--------------|
| Karatteristiċi essenzjali          | Prestazzjoni |
| Reazzjoni għan-nar                 | Klassi A1    |
|                                    |              |
|                                    |              |

| c) Iġjene, saħħa u ambjent (BWR 3) |              |
|------------------------------------|--------------|
| Karatteristiċi essenzjali          | Prestazzjoni |
|                                    |              |

| d) Protezzjoni kontra l-istorbju (BWR 5) |              |
|------------------------------------------|--------------|
| Karatteristiċi essenzjali                | Prestazzjoni |
|                                          |              |

| e) Ekonomija tal-enerġija u żamma tas-sħana (BWR 6) |              |
|-----------------------------------------------------|--------------|
| Karatteristiċi essenzjali                           | Prestazzjoni |
|                                                     |              |
|                                                     |              |
|                                                     |              |

| f) Użu sostenibbli tar-riżorsi naturali (BWR 7) |              |
|-------------------------------------------------|--------------|
| Karatteristiċi essenzjali                       | Prestazzjoni |
|                                                 |              |

Il-prestazzjoni tal-prodott identifikat hawn fuq hija konformi mal-prestazzjonijiet iddikjarati. Din id-dikjarazzjoni ta' prestazzjoni hija maħruġa, skont ir-Regolament (UE) Nru 305/2011, taħt ir-responsabbiltà unika tal-manifattur identifikat hawn fuq.

Iffirmat għal u f'isem il-manifattur minn:

Dr. Jens Weber  
(isem)

Bad Laasphe, 17.10.2024  
(post u data tal-ħruġ)

(firma)

Nr. 4 - 043 - 240647 - 2024/01

NL



- 6.) Aangegeven prestatie(s):
- a) Mehāniskā izturība un stabilitāte (BWR 1) un drošība un pieejamība (BWR 4)

[illegible]

# PRESTATIEVERKLARING

Nr. 4 - 043 - 240647 - 2024/01

NL

**EJOT®**

## b) Veiligheid in geval van brand (BWR 2)

| Essentiële kenmerken | Prestaties |
|----------------------|------------|
| Reactie op vuur      | Klasse A1  |
|                      |            |
|                      |            |

## c) Hygiëne, gezondheid en het milieu (BWR 3)

| Essentiële kenmerken | Prestaties |
|----------------------|------------|
|                      |            |

## d) Bescherming tegen lawaai (BWR 5)

| Essentiële kenmerken | Prestaties |
|----------------------|------------|
|                      |            |

## e) Energiebesparing en warmtebehoud (BWR 6)

| Essentiële kenmerken | Prestaties |
|----------------------|------------|
|                      |            |
|                      |            |
|                      |            |

## f) Duurzaam gebruik van natuurlijke hulpbronnen (BWR 7)

| Essentiële kenmerken | Prestaties |
|----------------------|------------|
|                      |            |

De prestaties van het hierboven omschreven product zijn conform de aangegeven prestaties. Deze prestatieverklaring wordt in overeenstemming met Verordening (EU) nr. 305/2011 onder de exclusieve verantwoordelijkheid van de hierboven vermelde fabrikant verstrekt.

Ondertekend voor en namens de fabrikant door:

**Dr. Jens Weber**

(naam)

**Bad Laasphe, 17.10.2024**

(plaats en datum van afgifte)



(handtekening)

Nr 4 - 043 - 240647 - 2024/01

PL



- [illegible]

# DEKLARACJA WŁAŚCIWOŚCI UŻYTKOWYCH

Nr 4 - 043 - 240647 - 2024/01

PL

**EJOT®**

## b) Bezpieczeństwo pożarowe (BWR 2)

| Zasadnicze charakterystyki | Właściwości użytkowe |
|----------------------------|----------------------|
| Reakcja na ogień           | Klasa A1             |
|                            |                      |
|                            |                      |

## c) Higiena, zdrowie i środowisko (BWR 3)

| Zasadnicze charakterystyki | Właściwości użytkowe |
|----------------------------|----------------------|
|                            |                      |

## d) Ochrona przed hałasem (BWR 5)

| Zasadnicze charakterystyki | Właściwości użytkowe |
|----------------------------|----------------------|
|                            |                      |

## e) Oszczędność energii i zatrzymywanie ciepła (BWR 6)

| Zasadnicze charakterystyki | Właściwości użytkowe |
|----------------------------|----------------------|
|                            |                      |
|                            |                      |
|                            |                      |

## f) Zrównoważone wykorzystanie zasobów naturalnych (BWR 7)

| Zasadnicze charakterystyki | Właściwości użytkowe |
|----------------------------|----------------------|
|                            |                      |

Właściwości użytkowe określonego powyżej wyrobu są zgodne z zestawem deklarowanych właściwości użytkowych. Niniejsza deklaracja właściwości użytkowych wydana zostaje zgodnie z Rozporządzeniem (UE) nr 305/2011 na wyłączną odpowiedzialność producenta określonego powyżej.

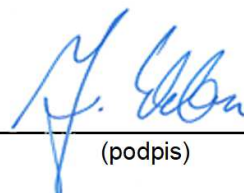
W imieniu producenta podpisał(-a):

**dr Jens Weber**

(nazwisko)

**Bad Laasphe, 17.10.2024**

(miejsce i data wydania)



(podpis)

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PT



2.) Utilização(ões) prevista(s)  
**(033) Ligação de varão de reforço pós-instalado com comportamento melhorado de rutura da ligação sob carga estática**

3.) Fabricante:  
**EJOT SE & Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany**

4.) Sistema(s) de avaliação e verificação da regularidade do desempenho (AVCP):

**Sistema 1**

|     |                                 |                                                         |
|-----|---------------------------------|---------------------------------------------------------|
| 5.) | Documento de Avaliação Europeu: | <b>EAD 332402-00-0601</b>                               |
|     | Avaliação Técnica Europeia      | <b>ETA-24/0647</b>                                      |
|     | Organismo de Avaliação Técnica: | <b>DIBt - Deutsches Institut für Bautechnik, Berlin</b> |
|     | Organismo(s) notificado (s):    | <b>2873 - IFSW - Technische Universität Darmstadt</b>   |

6.) Desempenho(s) declarado(s):

a) Resistência mecânica e estabilidade (BWR 1) e segurança e acessibilidade (BWR 4)

[illegible]

# DECLARAÇÃO DE DESEMPENHO

N.º 4 - 043 - 240647 - 2024/01

PT



## b) Segurança em caso de incêndio (BWR 2)

| Características essenciais | Desempenho |
|----------------------------|------------|
| Reacção ao fogo            | Classe A1  |
|                            |            |
|                            |            |

## c) Higiene, saúde e meio ambiente (BWR 3)

| Características essenciais | Desempenho |
|----------------------------|------------|
|                            |            |

## d) Protecção contra o ruído (BWR 5)

| Características essenciais | Desempenho |
|----------------------------|------------|
|                            |            |

## e) Economia de energia e retenção de calor (BWR 6)

| Características essenciais | Desempenho |
|----------------------------|------------|
|                            |            |
|                            |            |
|                            |            |

## f) Utilização sustentável dos recursos naturais (BWR 7)

| Características essenciais | Desempenho |
|----------------------------|------------|
|                            |            |

O desempenho do produto identificado acima está em conformidade com o conjunto de desempenhos declarados. A presente declaração de desempenho é emitida, em conformidade com o Regulamento (UE) n.º 305/2011, sob a exclusiva responsabilidade do fabricante identificado acima.

Assinado por e em nome do fabricante por:

Dr. Jens Weber

(nome)

Bad Laasphe, 17.10.2024

(local e data de emissão)

(assinatura)

Nr. 4 - 043 - 240647 - 2024/01

RO



- 6.) Performanța (performanțe) declarată (declarate):
- a) Rezistența mecanică și stabilitatea (BWR 1) și siguranța și accesibilitatea (BWR 4)

[illegible]



# DECLARAȚIA DE PERFORMANȚĂ

Nr, 4 - 043 - 240647 - 2024/01

RO



## b) Siguranța în caz de incendiu (BWR 2)

| Caracteristici esențiale | Performanța produsului |
|--------------------------|------------------------|
| Reacția la foc           | Clasa A1               |
|                          |                        |
|                          |                        |

## c) Igiena, sănătatea și mediul (BWR 3)

| Caracteristici esențiale | Performanța produsului |
|--------------------------|------------------------|
|                          |                        |

## d) Protecție împotriva zgomotului (BWR 5)

| Caracteristici esențiale | Performanța produsului |
|--------------------------|------------------------|
|                          |                        |

## e) Economie de energie și păstrarea căldurii (BWR 6)

| Caracteristici esențiale | Performanța produsului |
|--------------------------|------------------------|
|                          |                        |
|                          |                        |
|                          |                        |

## f) Utilizarea durabilă a resurselor naturale (BWR 7)

| Caracteristici esențiale | Performanța produsului |
|--------------------------|------------------------|
|                          |                        |

Performanța produsului identificat mai sus este în conformitate cu setul de performanțe declarate. Această declarație de performanță este eliberată în conformitate cu Regulamentul (UE) nr. 305/2011, pe răspunderea exclusivă a fabricantului identificat mai sus.

Semnată pentru și în numele fabricantului de către:

Dr. Jens Weber

(numele)

Bad Laasphe, 17.10.2024

(locul și data emiterii)

(semnătură)

[illegible]

# PRESTANDEDEKLARATION

Nr 4 - 043 - 240647 - 2024/01

SE



| b) Säkerhet vid brand (BWR 2) |           |
|-------------------------------|-----------|
| Väsentliga egenskaper         | Prestanda |
| Reaktion på brand             | Klass A1  |
|                               |           |
|                               |           |

| c) Hygien, hälsa och miljö (BWR 3) |           |
|------------------------------------|-----------|
| Väsentliga egenskaper              | Prestanda |
|                                    |           |

| d) Skydd mot buller (BWR 5) |           |
|-----------------------------|-----------|
| Väsentliga egenskaper       | Prestanda |
|                             |           |

| e) Energihushållning och värmehållning (BWR 6) |           |
|------------------------------------------------|-----------|
| Väsentliga egenskaper                          | Prestanda |
|                                                |           |
|                                                |           |
|                                                |           |

| f) Hållbar användning av naturresurser (BWR 7) |           |
|------------------------------------------------|-----------|
| Väsentliga egenskaper                          | Prestanda |
|                                                |           |

Prestandan för ovanstående produkt överensstämmer med den angivna prestandan. Denna prestandadeklaration har utfärdats i enlighet med förordning (EU) nr 305/2011 på eget ansvar av den tillverkare som anges ovan.

Undertecknad på tillverkarens vägnar av:

Dr. Jens Weber  
(namn)

Bad Laasphe, 17.10.2024  
(plats and datum)

(signatur)

Č. 4 - 043 - 240647 - 2024/01

SK



- ## Injection System EJOT Multifix Hybrid / SORMAT ITH Hybrid for rebar connection

- (033) Spojenie s dodatočne inštalovanou výstužou (armatúrou) so zlepšeným správaním pri statickom zaťažení**

- EJOT SE & Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany**

- ## System 1

- EAD 332402-00-0601

**ETA-24/0647**

**DIBt - Deutsches Institut für Bautechnik, Berlin**

2873 - IFSW - Technische Universität Darmstadt

- a) Mechanická odolnosť a stabilita (BWR 1) a bezpečnosť a dostupnosť (BWR 4)

[illegible]

# VYHLÁSENIE O PARAMETROCH

č. 4 - 043 - 240647 - 2024/01

SK

**EJOT®**

## b) Bezpečnosť v prípade požiaru (BWR 2)

| základné charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
| Reakcia na požiar        | Trieda A1          |
|                          |                    |
|                          |                    |

## c) Hygiena, zdravie a životné prostredie (BWR 3)

| základné charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |

## d) Ochrana proti hluku (BWR 5)

| základné charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |

## e) Úspora energie a zadržiavanie tepla (BWR 6)

| základné charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |
|                          |                    |
|                          |                    |

## f) Udržateľné využívanie prírodných zdrojov (BWR 7)

| základné charakteristiky | vlastnosti výrobku |
|--------------------------|--------------------|
|                          |                    |

Uvedené parametre výrobku sú v zhode so súborom deklarovaných parametrov. Toto vyhlásenie o parametroch sa v súlade s nariadením (EÚ) č. 305/2011 vydáva na výhradnú zodpovednosť uvedeného výrobcu.

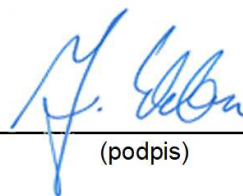
Podpísal(-a) za a v mene výrobcu:

**Dr. Jens Weber**

(meno)

**Bad Laasphe, 17.10.2024**

(miesto a dátum na výstava)



(podpis)

## Št. 4 - 043 - 240647 - 2024/01

SLO



- 1.) Enotna identifikacijska oznaka tipa proizvoda:  
**Injection System EJOT Multifix Hybrid / SORMAT ITH Hybrid for rebar connection**
- 2.) Predvidena uporaba:  
**(033) Spoj z naknadno vgrajeno armaturno palico (armatura) z izboljšanim obnašanjem pri statični obremenitvi**
- 3.) Proizvajalec:  
**EJOT SE & Co. KG, Market Unit Construction, In der Stockwiese 35, 57334 Bad Laasphe - Germany**
- 4.) Sistemi ocenjevanja in preverjanja nespremenljivosti lastnosti:  
**Sistem 1**
- 5.) Evropski ocenjevalni dokument: **EAD 332402-00-0601**  
Evropska tehnična ocena: **ETA-24/0647**  
Organ za tehnično ocenjevanje: **DIBt - Deutsches Institut für Bautechnik, Berlin**  
Priglašeni organi: **2873 - IFSW - Technische Universität Darmstadt**

- 6.) Navedene lastnosti:
- a) Mehanska odpornost in stabilnost (BWR 1) ter varnost in dostopnost (BWR 4)

[illegible]

# IZJAVA O LASTNOSTIH

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## b) Varnost v primeru požara (BWR 2)

| Glavne značilnosti | Zmogljivost proizvoda |
|--------------------|-----------------------|
| Odziv na ogenj     | Razred A1             |
|                    |                       |
|                    |                       |

## c) Higiena, zdravje in okolje (BWR 3) \ t

| Glavne značilnosti | Zmogljivost proizvoda |
|--------------------|-----------------------|
|                    |                       |

## d) Zaščita pred hrupom (BWR 5) \ t

| Glavne značilnosti | Zmogljivost proizvoda |
|--------------------|-----------------------|
|                    |                       |

## e) Varčevanje z energijo in ohranjanje toplote (BWR 6) \ t

| Glavne značilnosti | Zmogljivost proizvoda |
|--------------------|-----------------------|
|                    |                       |
|                    |                       |
|                    |                       |

## f) Trajnostna raba naravnih virov (BWR 7) \ t

| Glavne značilnosti | Zmogljivost proizvoda |
|--------------------|-----------------------|
|                    |                       |

Lastnosti proizvoda, navedenega zgoraj, so v skladu z navedenimi lastnostmi. Za izdajo te izjave o lastnostih je v skladu z Uredbo (EU) št. 305/2011 odgovoren izključno proizvajalec, naveden zgoraj.

Podpisal za in v imenu proizvajalca:

Dr. Jens Weber

(Ime)

Bad Laasphe, 17.10.2024

(Kraj in datum izstavitve)

(Podpis)

**Table B1: Installation parameters for threaded rod**

| Threaded rod                              |                                       |      | M8                                           | M10 | M12              | M16             | M20 | M24 | M27 | M30 |
|-------------------------------------------|---------------------------------------|------|----------------------------------------------|-----|------------------|-----------------|-----|-----|-----|-----|
| Diameter of element                       | $d = d_{nom}$                         | [mm] | 8                                            | 10  | 12               | 16              | 20  | 24  | 27  | 30  |
| Nominal drill hole diameter               | $d_0$                                 | [mm] | 10                                           | 12  | 14               | 18              | 22  | 28  | 30  | 35  |
| Effective embedment depth                 | $h_{ef,min}$                          | [mm] | 60                                           | 60  | 70               | 80              | 90  | 96  | 108 | 120 |
|                                           | $h_{ef,max}$                          | [mm] | 160                                          | 200 | 240              | 320             | 400 | 480 | 540 | 600 |
| Diameter of clearance hole in the fixture | Prepositioned installation $d_f \leq$ | [mm] | 9                                            | 12  | 14               | 18              | 22  | 26  | 30  | 33  |
|                                           | Push through installation $d_f$       | [mm] | 12                                           | 14  | 16               | 20              | 24  | 30  | 33  | 40  |
| Maximum installation torque               | $\max T_{inst}$                       | [Nm] | 10                                           | 20  | 40 <sup>1)</sup> | 60              | 100 | 170 | 250 | 300 |
| Minimum thickness of member               | $h_{min}$                             | [mm] | $h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$ |     |                  | $h_{ef} + 2d_0$ |     |     |     |     |
| Minimum spacing                           | $s_{min}$                             | [mm] | 40                                           | 50  | 60               | 75              | 95  | 115 | 125 | 140 |
| Minimum edge distance                     | $c_{min}$                             | [mm] | 35                                           | 40  | 45               | 50              | 60  | 65  | 75  | 80  |

<sup>1)</sup> Maximum installation torque for M12 with steel Grade 4.6 is 35 Nm

**Table B2: Installation parameters for reinforcing bar**

| Reinforcing bar             |                         |      | Ø 8 <sup>1)</sup>                | Ø 10 <sup>1)</sup> | Ø 12 <sup>1)</sup> | Ø 14 | Ø 16 | Ø 20                              | Ø 24 <sup>1)</sup> | Ø 25 <sup>1)</sup> | Ø 28 | Ø 32 | Ø 36 | Ø 40 |    |    |    |    |       |
|-----------------------------|-------------------------|------|----------------------------------|--------------------|--------------------|------|------|-----------------------------------|--------------------|--------------------|------|------|------|------|----|----|----|----|-------|
| Diameter of element         | d =<br>d <sub>nom</sub> | [mm] | 8                                | 10                 | 12                 | 14   | 16   | 20                                | 24                 | 25                 | 28   | 32   | 36   | 40   |    |    |    |    |       |
| Nominal drill hole diameter | d <sub>0</sub>          | [mm] | 10                               | 12                 | 12                 | 14   | 14   | 16                                | 18                 | 20                 | 25   | 30   | 32   | 30   | 32 | 35 | 40 | 45 | 52/55 |
| Effective embedment depth   | h <sub>ef,min</sub>     | [mm] | 60                               | 60                 | 70                 | 75   | 80   | 90                                | 96                 | 100                | 112  | 128  | 144  | 160  |    |    |    |    |       |
|                             | h <sub>ef,max</sub>     | [mm] | 160                              | 200                | 240                | 280  | 320  | 400                               | 480                | 500                | 560  | 640  | 720  | 800  |    |    |    |    |       |
| Minimum thickness of member | h <sub>min</sub>        | [mm] | h <sub>ef</sub> + 30 mm ≥ 100 mm |                    |                    |      |      | h <sub>ef</sub> + 2d <sub>0</sub> |                    |                    |      |      |      |      |    |    |    |    |       |
| Minimum spacing             | s <sub>min</sub>        | [mm] | 40                               | 50                 | 60                 | 70   | 75   | 95                                | 120                | 120                | 130  | 150  | 180  | 200  |    |    |    |    |       |
| Minimum edge distance       | c <sub>min</sub>        | [mm] | 35                               | 40                 | 45                 | 50   | 50   | 60                                | 70                 | 70                 | 75   | 85   | 180  | 200  |    |    |    |    |       |

<sup>1)</sup> both nominal drill hole diameter can be used

**Table B3: Installation parameters for Internal threaded anchor rod**

| Internal threaded anchor rod               |                 |      | IG-M6                                        | IG-M8 | IG-M10 | IG-M12          | IG-M16 | IG-M20 |
|--------------------------------------------|-----------------|------|----------------------------------------------|-------|--------|-----------------|--------|--------|
| Internal diameter of anchor rod            | $d_2$           | [mm] | 6                                            | 8     | 10     | 12              | 16     | 20     |
| Outer diameter of anchor rod <sup>1)</sup> | $d = d_{nom}$   | [mm] | 10                                           | 12    | 16     | 20              | 24     | 30     |
| Nominal drill hole diameter                | $d_0$           | [mm] | 12                                           | 14    | 18     | 22              | 28     | 35     |
| Effective embedment depth                  | $h_{ef,min}$    | [mm] | 60                                           | 70    | 80     | 90              | 96     | 120    |
|                                            | $h_{ef,max}$    | [mm] | 200                                          | 240   | 320    | 400             | 480    | 600    |
| Diameter of clearance hole in the fixture  | $d_f \leq$      | [mm] | 7                                            | 9     | 12     | 14              | 18     | 22     |
| Maximum installation torque                | $\max T_{inst}$ | [Nm] | 10                                           | 10    | 20     | 40              | 60     | 100    |
| Thread engagement length min/max           | $l_{IG}$        | [mm] | 8/20                                         | 8/20  | 10/25  | 12/30           | 16/32  | 20/40  |
| Minimum thickness of member                | $h_{min}$       | [mm] | $h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$ |       |        | $h_{ef} + 2d_0$ |        |        |
| Minimum spacing                            | $s_{min}$       | [mm] | 50                                           | 60    | 75     | 95              | 115    | 140    |
| Minimum edge distance                      | $c_{min}$       | [mm] | 40                                           | 45    | 50     | 60              | 65     | 80     |

<sup>1)</sup> With metric threads

Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete

Intended use  
Installation parameters

**Annex B 3**



**Table C1: Characteristic values for steel tension resistance and steel shear resistance of threaded rods**

| Threaded rod                                         |                                          |                                | M8      | M10     | M12     | M16 | M20 | M24 | M27 | M30  |      |
|------------------------------------------------------|------------------------------------------|--------------------------------|---------|---------|---------|-----|-----|-----|-----|------|------|
| Cross section area                                   | A <sub>S</sub>                           | [mm²]                          | 36,6    | 58      | 84,3    | 157 | 245 | 353 | 459 | 561  |      |
| Characteristic tension resistance, Steel failure 1)  |                                          |                                |         |         |         |     |     |     |     |      |      |
| Steel, Property class 4.6 and 4.8                    | N <sub>Rk,S</sub>                        | [kN]                           | 15 (13) | 23 (21) | 34      | 63  | 98  | 141 | 184 | 224  |      |
| Steel, Property class 5.6 and 5.8                    | N <sub>Rk,S</sub>                        | [kN]                           | 18 (17) | 29 (27) | 42      | 78  | 122 | 176 | 230 | 280  |      |
| Steel, Property class 8.8                            | N <sub>Rk,S</sub>                        | [kN]                           | 29 (27) | 46 (43) | 67      | 125 | 196 | 282 | 368 | 449  |      |
| Stainless steel A2, A4 and HCR, class 50             | N <sub>Rk,S</sub>                        | [kN]                           | 18      | 29      | 42      | 79  | 123 | 177 | 230 | 28   |      |
| Stainless steel A2, A4 and HCR, class 70             | N <sub>Rk,S</sub>                        | [kN]                           | 26      | 41      | 59      | 110 | 171 | 247 | .3) | .3)  |      |
| Stainless steel A4 and HCR, class 80                 | N <sub>Rk,S</sub>                        | [kN]                           | 29      | 46      | 67      | 126 | 196 | 282 | .3) | .3)  |      |
| Characteristic tension resistance, Partial factor 2) |                                          |                                |         |         |         |     |     |     |     |      |      |
| Steel, Property class 4.6 and 5.6                    | γ <sub>Ms,N</sub>                        | [-]                            | 2,0     |         |         |     |     |     |     |      |      |
| Steel, Property class 4.8, 5.8 and 8.8               | γ <sub>Ms,N</sub>                        | [-]                            | 1,5     |         |         |     |     |     |     |      |      |
| Stainless steel A2, A4 and HCR, class 50             | γ <sub>Ms,N</sub>                        | [-]                            | 2,86    |         |         |     |     |     |     |      |      |
| Stainless steel A2, A4 and HCR, class 70             | γ <sub>Ms,N</sub>                        | [-]                            | 1,87    |         |         |     |     |     |     |      |      |
| Stainless steel A4 and HCR, class 80                 | γ <sub>Ms,N</sub>                        | [-]                            | 1,6     |         |         |     |     |     |     |      |      |
| Characteristic shear resistance, Steel failure 1)    |                                          |                                |         |         |         |     |     |     |     |      |      |
| Without lever arm                                    | Steel, Property class 4.6 and 4.8        | V <sup>0</sup> <sub>Rk,S</sub> | [kN]    | 9 (8)   | 14 (13) | 20  | 38  | 59  | 85  | 110  | 135  |
|                                                      | Steel, Property class 5.6 and 5.8        | V <sup>0</sup> <sub>Rk,S</sub> | [kN]    | 11 (10) | 17 (16) | 25  | 47  | 74  | 106 | 138  | 168  |
|                                                      | Steel, Property class 8.8                | V <sup>0</sup> <sub>Rk,S</sub> | [kN]    | 15 (13) | 23 (21) | 34  | 63  | 98  | 141 | 184  | 224  |
|                                                      | Stainless steel A2, A4 and HCR, class 50 | V <sup>0</sup> <sub>Rk,S</sub> | [kN]    | 9       | 15      | 21  | 39  | 61  | 88  | 115  | 140  |
|                                                      | Stainless steel A2, A4 and HCR, class 70 | V <sup>0</sup> <sub>Rk,S</sub> | [kN]    | 13      | 20      | 30  | 55  | 86  | 124 | .3)  | .3)  |
|                                                      | Stainless steel A4 and HCR, class 80     | V <sup>0</sup> <sub>Rk,S</sub> | [kN]    | 15      | 23      | 34  | 63  | 98  | 141 | .3)  | .3)  |
| With lever arm                                       | Steel, Property class 4.6 and 4.8        | M <sup>0</sup> <sub>Rk,S</sub> | [Nm]    | 15 (13) | 30 (27) | 52  | 133 | 260 | 449 | 666  | 900  |
|                                                      | Steel, Property class 5.6 and 5.8        | M <sup>0</sup> <sub>Rk,S</sub> | [Nm]    | 19 (16) | 37 (33) | 65  | 166 | 324 | 560 | 833  | 1123 |
|                                                      | Steel, Property class 8.8                | M <sup>0</sup> <sub>Rk,S</sub> | [Nm]    | 30 (26) | 60 (53) | 105 | 266 | 519 | 896 | 1333 | 1797 |
|                                                      | Stainless steel A2, A4 and HCR, class 50 | M <sup>0</sup> <sub>Rk,S</sub> | [Nm]    | 19      | 37      | 66  | 167 | 325 | 561 | 832  | 1125 |
|                                                      | Stainless steel A2, A4 and HCR, class 70 | M <sup>0</sup> <sub>Rk,S</sub> | [Nm]    | 26      | 52      | 92  | 232 | 454 | 784 | .3)  | .3)  |
|                                                      | Stainless steel A4 and HCR, class 80     | M <sup>0</sup> <sub>Rk,S</sub> | [Nm]    | 30      | 59      | 105 | 266 | 519 | 896 | .3)  | .3)  |
| Characteristic shear resistance, Partial factor 2)   |                                          |                                |         |         |         |     |     |     |     |      |      |
| Steel, Property class 4.6 and 5.6                    | γ <sub>Ms,V</sub>                        | [-]                            | 1,67    |         |         |     |     |     |     |      |      |
| Steel, Property class 4.8, 5.8 and 8.8               | γ <sub>Ms,V</sub>                        | [-]                            | 1,25    |         |         |     |     |     |     |      |      |
| Stainless steel A2, A4 and HCR, class 50             | γ <sub>Ms,V</sub>                        | [-]                            | 2,38    |         |         |     |     |     |     |      |      |
| Stainless steel A2, A4 and HCR, class 70             | γ <sub>Ms,V</sub>                        | [-]                            | 1,56    |         |         |     |     |     |     |      |      |
| Stainless steel A4 and HCR, class 80                 | γ <sub>Ms,V</sub>                        | [-]                            | 1,33    |         |         |     |     |     |     |      |      |

1) Values are only valid for the given stress area A<sub>S</sub>. Values in brackets are valid for undersized threaded rods with smaller stress area A<sub>S</sub> for hot-dip galvanised threaded rods according to EN ISO 10684:2004+AC:2009.

2) In absence of national regulation

3) Fastener type not part of the ETA

### Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete

### Performances

Characteristic values for steel tension resistance and steel shear resistance of threaded rods

## Annex C 1

| Table C2: Characteristic values of tension loads under static and quasi-static action for a working life of 50 and 100 years |                        |             |                             |                                                        |
|------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|-----------------------------|--------------------------------------------------------|
| Fastener                                                                                                                     |                        |             | All Fastener type and sizes |                                                        |
| Concrete cone failure                                                                                                        |                        |             |                             |                                                        |
| Uncracked concrete                                                                                                           | $k_{ucr,N}$            | [-]         | 11,0                        |                                                        |
| Cracked concrete                                                                                                             | $k_{cr,N}$             | [-]         | 7,7                         |                                                        |
| Edge distance                                                                                                                | $c_{cr,N}$             | [mm]        | $1,5 h_{ef}$                |                                                        |
| Axial distance                                                                                                               | $s_{cr,N}$             | [mm]        | $2 c_{cr,N}$                |                                                        |
| Splitting                                                                                                                    |                        |             |                             |                                                        |
| Edge distance                                                                                                                | $h/h_{ef} \geq 2,0$    | $c_{cr,sp}$ | [mm]                        | $1,0 h_{ef}$                                           |
|                                                                                                                              | $2,0 > h/h_{ef} > 1,3$ |             |                             | $2 \cdot h_{ef} \left( 2,5 - \frac{h}{h_{ef}} \right)$ |
|                                                                                                                              | $h/h_{ef} \leq 1,3$    |             |                             | $2,4 h_{ef}$                                           |
| Axial distance                                                                                                               | $s_{cr,sp}$            | [mm]        | $2 c_{cr,sp}$               |                                                        |
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**Table C3: Characteristic values of tension loads under static and quasi-static action for a working life of 50 years**

| Threaded rod                                                                                                                                                                                     |                |                                         |                 | M8                | M10                                   | M12                                  | M16 | M20 | M24 | M27       | M30 |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|-----------------|-------------------|---------------------------------------|--------------------------------------|-----|-----|-----|-----------|-----|-----|
| Steel failure                                                                                                                                                                                    |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Characteristic tension resistance                                                                                                                                                                |                |                                         |                 | $N_{Rk,s}$        | [kN]                                  | $A_s \cdot f_{tk}$ (or see Table C1) |     |     |     |           |     |     |
| Partial factor                                                                                                                                                                                   |                |                                         |                 | $\gamma_{Ms,N}$   | [-]                                   | see Table C1                         |     |     |     |           |     |     |
| Combined pull-out and concrete failure                                                                                                                                                           |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes (HD) and compressed air drilled holes (CD)                                                                   |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr}$ | [N/mm²]           | 20                                    | 20                                   | 19  | 19  | 18  | 17        | 16  | 16  |
|                                                                                                                                                                                                  | II: 50°C/72°C  |                                         |                 |                   | 15                                    | 15                                   | 15  | 14  | 13  | 13        | 12  | 12  |
|                                                                                                                                                                                                  | III: 60°C/80°C | 6,5                                     |                 |                   | 6,5                                   | 6,5                                  | 6,0 | 6,0 | 5,5 | 5,5       | 5,5 |     |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes with hollow drill bit (HDB)                                                                                  |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                | I: 24°C/40°C   | Dry, wet concrete                       | $\tau_{Rk,ucr}$ | [N/mm²]           | 17                                    | 16                                   | 16  | 16  | 15  | 14        | 14  | 13  |
|                                                                                                                                                                                                  | II: 50°C/72°C  |                                         |                 |                   | 14                                    | 14                                   | 14  | 13  | 13  | 12        | 12  | 11  |
|                                                                                                                                                                                                  | III: 60°C/80°C | 6,5                                     |                 |                   | 6,5                                   | 6,5                                  | 6,0 | 6,0 | 5,5 | 5,5       | 5,5 |     |
|                                                                                                                                                                                                  | II: 50°C/72°C  | flooded bore hole                       |                 |                   | 16                                    | 16                                   | 16  | 15  | 15  | 14        | 14  | 13  |
|                                                                                                                                                                                                  | III: 60°C/80°C |                                         |                 |                   | 14                                    | 14                                   | 14  | 13  | 13  | 12        | 12  | 11  |
|                                                                                                                                                                                                  |                |                                         |                 | 6,5               | 6,5                                   | 6,5                                  | 6,0 | 6,0 | 5,5 | 5,5       | 5,5 |     |
| Characteristic bond resistance in cracked concrete C20/25 in hammer drilled holes (HD) , compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)               |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,cr}$  | [N/mm²]           | 7,0                                   | 7,0                                  | 8,5 | 8,5 | 8,5 | 8,5       | 8,5 | 8,5 |
|                                                                                                                                                                                                  | II: 50°C/72°C  |                                         |                 |                   | 6,0                                   | 6,0                                  | 7,0 | 7,0 | 7,0 | 7,0       | 7,0 | 7,0 |
|                                                                                                                                                                                                  | III: 60°C/80°C |                                         |                 |                   | 5,0                                   | 5,0                                  | 5,0 | 4,5 | 4,5 | 4,5       | 4,5 | 4,5 |
| Reduction factor $\psi^0_{sus}$ in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB) |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\psi^0_{sus}$  | [-]               | 0,80                                  |                                      |     |     |     |           |     |     |
|                                                                                                                                                                                                  | II: 50°C/72°C  |                                         |                 |                   | 0,68                                  |                                      |     |     |     |           |     |     |
|                                                                                                                                                                                                  | III: 60°C/80°C |                                         |                 |                   | 0,70                                  |                                      |     |     |     |           |     |     |
| Increasing factors for concrete                                                                                                                                                                  |                |                                         |                 | $\psi_c$          | [-]                                   | $(f_{ck} / 20)^{0,1}$                |     |     |     |           |     |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                          |                |                                         |                 | $\tau_{Rk,ucr} =$ | $\psi_c \cdot \tau_{Rk,ucr,(C20/25)}$ |                                      |     |     |     |           |     |     |
|                                                                                                                                                                                                  |                |                                         |                 | $\tau_{Rk,cr} =$  | $\psi_c \cdot \tau_{Rk,cr,(C20/25)}$  |                                      |     |     |     |           |     |     |
| Concrete cone failure                                                                                                                                                                            |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Relevant parameter                                                                                                                                                                               |                |                                         |                 |                   | see Table C2                          |                                      |     |     |     |           |     |     |
| Splitting                                                                                                                                                                                        |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Relevant parameter                                                                                                                                                                               |                |                                         |                 |                   | see Table C2                          |                                      |     |     |     |           |     |     |
| Installation factor                                                                                                                                                                              |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| for dry and wet concrete (HD; HDB, CD)                                                                                                                                                           |                |                                         |                 | $\gamma_{inst}$   | [-]                                   | 1,0                                  |     |     |     |           |     |     |
| for flooded bore hole (HD; HDB, CD)                                                                                                                                                              |                |                                         |                 |                   |                                       | 1,2                                  |     |     |     |           |     |     |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                                                             |                |                                         |                 |                   |                                       |                                      |     |     |     | Annex C 3 |     |     |
| Performances                                                                                                                                                                                     |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |
| Characteristic values of tension loads under static and quasi-static action for a working life of 50 years (threaded rod)                                                                        |                |                                         |                 |                   |                                       |                                      |     |     |     |           |     |     |

**Table C4: Characteristic values of tension loads under static and quasi-static action for a working life of 100 years**

| Threaded rod                                                                                                                                                                                         |                |                                         |                     | M8                    | M10                                       | M12                                  | M16 | M20 | M24 | M27       | M30 |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|---------------------|-----------------------|-------------------------------------------|--------------------------------------|-----|-----|-----|-----------|-----|-----|
| Steel failure                                                                                                                                                                                        |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Characteristic tension resistance                                                                                                                                                                    |                |                                         |                     | $R_{Rk,s}$            | [kN]                                      | $A_s \cdot f_{uk}$ (or see Table C1) |     |     |     |           |     |     |
| Partial factor                                                                                                                                                                                       |                |                                         |                     | $\gamma_{Ms,N}$       | [-]                                       | see Table C1                         |     |     |     |           |     |     |
| Combined pull-out and concrete failure                                                                                                                                                               |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes (HD) and compressed air drilled holes (CD)                                                                       |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                    | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr,100}$ | [N/mm <sup>2</sup> ]  | 20                                        | 20                                   | 19  | 19  | 18  | 17        | 16  | 16  |
|                                                                                                                                                                                                      | II: 50°C/72°C  |                                         |                     |                       | 15                                        | 15                                   | 15  | 14  | 13  | 13        | 12  | 12  |
|                                                                                                                                                                                                      | III: 60°C/80°C |                                         |                     |                       | 6,5                                       | 6,5                                  | 6,5 | 6,0 | 6,0 | 5,5       | 5,5 | 5,5 |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes with hollow drill bit (HDB)                                                                                      |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                    | I: 24°C/40°C   | Dry, wet concrete                       | $\tau_{Rk,ucr,100}$ | [N/mm <sup>2</sup> ]  | 17                                        | 16                                   | 16  | 16  | 15  | 14        | 14  | 13  |
|                                                                                                                                                                                                      | II: 50°C/72°C  |                                         |                     |                       | 14                                        | 14                                   | 14  | 13  | 13  | 12        | 12  | 11  |
|                                                                                                                                                                                                      | III: 60°C/80°C |                                         |                     |                       | 6,5                                       | 6,5                                  | 6,5 | 6,0 | 6,0 | 5,5       | 5,5 | 5,5 |
|                                                                                                                                                                                                      | I: 24°C/40°C   | flooded bore hole                       |                     |                       | 16                                        | 16                                   | 16  | 15  | 15  | 14        | 14  | 13  |
|                                                                                                                                                                                                      | II: 50°C/72°C  |                                         |                     |                       | 14                                        | 14                                   | 14  | 13  | 13  | 12        | 12  | 11  |
|                                                                                                                                                                                                      | III: 60°C/80°C |                                         |                     |                       | 6,5                                       | 6,5                                  | 6,5 | 6,0 | 6,0 | 5,5       | 5,5 | 5,5 |
| Characteristic bond resistance in cracked concrete C20/25 in hammer drilled holes (HD) , compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)                   |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                    | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,cr,100}$  | [N/mm <sup>2</sup> ]  | 6,5                                       | 6,5                                  | 7,5 | 7,5 | 7,5 | 7,5       | 7,5 | 7,5 |
|                                                                                                                                                                                                      | II: 50°C/72°C  |                                         |                     |                       | 5,5                                       | 5,5                                  | 6,5 | 6,5 | 6,5 | 6,5       | 6,5 | 6,5 |
|                                                                                                                                                                                                      | III: 60°C/80°C |                                         |                     |                       | 5,0                                       | 5,0                                  | 5,0 | 4,5 | 4,5 | 4,5       | 4,5 | 4,5 |
| Reduction factor $\psi^0_{sus,100}$ in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB) |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Temperature range                                                                                                                                                                                    | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\psi^0_{sus,100}$  | [-]                   | 0,80                                      |                                      |     |     |     |           |     |     |
|                                                                                                                                                                                                      | II: 50°C/72°C  |                                         |                     |                       | 0,68                                      |                                      |     |     |     |           |     |     |
|                                                                                                                                                                                                      | III: 60°C/80°C |                                         |                     |                       | 0,70                                      |                                      |     |     |     |           |     |     |
| Increasing factors for concrete                                                                                                                                                                      |                |                                         |                     | $\psi_c$              | [-]                                       | $(f_{ck} / 20)^{0,1}$                |     |     |     |           |     |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                              |                |                                         |                     | $\tau_{Rk,ucr,100} =$ | $\psi_c \cdot \tau_{Rk,ucr,100,(C20/25)}$ |                                      |     |     |     |           |     |     |
|                                                                                                                                                                                                      |                |                                         |                     | $\tau_{Rk,cr,100} =$  | $\psi_c \cdot \tau_{Rk,cr,100,(C20/25)}$  |                                      |     |     |     |           |     |     |
| Concrete cone failure                                                                                                                                                                                |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Relevant parameter                                                                                                                                                                                   |                |                                         |                     |                       | see Table C2                              |                                      |     |     |     |           |     |     |
| Splitting                                                                                                                                                                                            |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Relevant parameter                                                                                                                                                                                   |                |                                         |                     |                       | see Table C2                              |                                      |     |     |     |           |     |     |
| Installation factor                                                                                                                                                                                  |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| for dry and wet concrete (HD; HDB, CD)                                                                                                                                                               |                |                                         |                     | $\gamma_{inst}$       | [-]                                       | 1,0                                  |     |     |     |           |     |     |
| for flooded bore hole (HD; HDB, CD)                                                                                                                                                                  |                |                                         |                     |                       |                                           | 1,2                                  |     |     |     |           |     |     |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                                                                 |                |                                         |                     |                       |                                           |                                      |     |     |     | Annex C 4 |     |     |
| Performances                                                                                                                                                                                         |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |
| Characteristic values of tension loads under static and quasi-static action for a working life of 100 years (threaded rod)                                                                           |                |                                         |                     |                       |                                           |                                      |     |     |     |           |     |     |

**Table C5: Characteristic values of tension loads under static and quasi-static action for a working life of 50 years**

| Threaded rod                                                                                                              |                |                                         |                                       | M8                                   | M10  | M12 | M16 | M20 | M24 | M27       | M30 |     |
|---------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|---------------------------------------|--------------------------------------|------|-----|-----|-----|-----|-----------|-----|-----|
| <b>Steel failure</b>                                                                                                      |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Characteristic tension resistance                                                                                         |                | $N_{Rk,s}$                              | [kN]                                  | $A_s \cdot f_{yk}$ (or see Table C1) |      |     |     |     |     |           |     |     |
| Partial factor                                                                                                            |                | $\gamma_{Ms,N}$                         | [-]                                   | see Table C1                         |      |     |     |     |     |           |     |     |
| <b>Combined pull-out and concrete failure</b>                                                                             |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Characteristic bond resistance in uncracked concrete C20/25 in diamond drilled holes (DD)                                 |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Temperature range                                                                                                         | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr}$                       | [N/mm²]                              | 15   | 14  | 14  | 13  | 12  | 12        | 11  | 11  |
|                                                                                                                           | II: 50°C/72°C  |                                         |                                       |                                      | 12   | 12  | 11  | 10  | 9,5 | 9,5       | 9,0 | 9,0 |
|                                                                                                                           | III: 60°C/80°C |                                         |                                       |                                      | 5,5  | 5,5 | 5,0 | 4,5 | 4,5 | 4,5       | 4,0 | 4,0 |
| Reduction factor $\psi_{sus}^0$ in uncracked concrete C20/25 in diamond drilled holes (DD)                                |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Temperature range                                                                                                         | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\psi_{sus}^0$                        | [-]                                  | 0,77 |     |     |     |     |           |     |     |
|                                                                                                                           | II: 50°C/72°C  |                                         |                                       |                                      | 0,72 |     |     |     |     |           |     |     |
|                                                                                                                           | III: 60°C/80°C |                                         |                                       |                                      | 0,72 |     |     |     |     |           |     |     |
| Increasing factors for concrete                                                                                           |                | $\psi_c$                                | [-]                                   | $(f_{ck} / 20)^{0,2}$                |      |     |     |     |     |           |     |     |
| Characteristic bond resistance depending on the concrete strength class                                                   |                | $\tau_{Rk,ucr} =$                       | $\psi_c \cdot \tau_{Rk,ucr,(C20/25)}$ |                                      |      |     |     |     |     |           |     |     |
| <b>Concrete cone failure</b>                                                                                              |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Relevant parameter                                                                                                        |                |                                         |                                       | see Table C2                         |      |     |     |     |     |           |     |     |
| <b>Splitting</b>                                                                                                          |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Relevant parameter                                                                                                        |                |                                         |                                       | see Table C2                         |      |     |     |     |     |           |     |     |
| <b>Installation factor</b>                                                                                                |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| for dry and wet concrete (DD)                                                                                             |                | $\gamma_{inst}$                         | [-]                                   | 1,0                                  |      |     |     |     |     |           |     |     |
| for flooded bore hole (DD)                                                                                                |                |                                         |                                       | 1,2                                  |      | 1,4 |     |     |     |           |     |     |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                      |                |                                         |                                       |                                      |      |     |     |     |     | Annex C 5 |     |     |
| <b>Performances</b>                                                                                                       |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |
| Characteristic values of tension loads under static and quasi-static action for a working life of 50 years (threaded rod) |                |                                         |                                       |                                      |      |     |     |     |     |           |     |     |

**Table C6: Characteristic values of tension loads under static and quasi-static action for a working life of 100 years**

| Threaded rod                                                                                   |                |                                         |                     | M8                                        | M10  | M12 | M16 | M20 | M24 | M27 | M30 |     |
|------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|---------------------|-------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|
| Steel failure                                                                                  |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| Characteristic tension resistance                                                              |                | $R_{k,s}$                               | [kN]                | $A_s \cdot f_{uk}$ (or see Table C1)      |      |     |     |     |     |     |     |     |
| Partial factor                                                                                 |                | $\gamma_{Ms,N}$                         | [-]                 | see Table C1                              |      |     |     |     |     |     |     |     |
| Combined pull-out and concrete failure                                                         |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| Characteristic bond resistance in uncracked concrete C20/25 in diamond drilled holes (DD)      |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| Temperature range                                                                              | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr,100}$ | [N/mm²]                                   | 15   | 14  | 14  | 13  | 12  | 12  | 11  | 11  |
|                                                                                                | II: 50°C/72°C  |                                         |                     |                                           | 11   | 11  | 10  | 10  | 9,5 | 9,0 | 8,5 | 8,3 |
|                                                                                                | III: 60°C/80°C |                                         |                     |                                           | 5,5  | 5,5 | 5,0 | 4,5 | 4,5 | 4,0 | 4,0 |     |
| Reduction factor $\psi^0_{sus,100}$ in uncracked concrete C20/25 in diamond drilled holes (DD) |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| Temperature range                                                                              | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\psi^0_{sus,100}$  | [-]                                       | 0,73 |     |     |     |     |     |     |     |
|                                                                                                | II: 50°C/72°C  |                                         |                     |                                           | 0,70 |     |     |     |     |     |     |     |
|                                                                                                | III: 60°C/80°C |                                         |                     |                                           | 0,72 |     |     |     |     |     |     |     |
| Increasing factors for concrete                                                                |                | $\psi_c$                                | [-]                 | $(f_{ck} / 20)^{0,2}$                     |      |     |     |     |     |     |     |     |
| Characteristic bond resistance depending on the concrete strength class                        |                | $\tau_{Rk,ucr,100} =$                   |                     | $\psi_c \cdot \tau_{Rk,ucr,100,(C20/25)}$ |      |     |     |     |     |     |     |     |
| Concrete cone failure                                                                          |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| Relevant parameter                                                                             |                |                                         |                     | see Table C2                              |      |     |     |     |     |     |     |     |
| Splitting                                                                                      |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| Relevant parameter                                                                             |                |                                         |                     | see Table C2                              |      |     |     |     |     |     |     |     |
| Installation factor                                                                            |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
| for dry and wet concrete (DD)                                                                  |                | $\gamma_{inst}$                         | [-]                 | 1,0                                       |      |     |     |     |     |     |     |     |
| for flooded bore hole (DD)                                                                     |                |                                         |                     | 1,2                                       | 1,4  |     |     |     |     |     |     |     |
|                                                                                                |                |                                         |                     |                                           |      |     |     |     |     |     |     |     |
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**Table C7: Characteristic values of shear loads under static and quasi-static action for a working life of 50 and 100 years**

| Threaded rod                                                                                                                                           |                 |                    | M8                                                | M10 | M12 | M16 | M20 | M24              | M27  | M30                          |
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| <b>Steel failure without lever arm</b>                                                                                                                 |                 |                    |                                                   |     |     |     |     |                  |      |                              |
| Characteristic shear resistance<br>Steel, strength class 4.6, 4.8 and 5.6, 5.8                                                                         | $V_{Rk,s}^0$    | [kN]               | $0,6 \cdot A_s \cdot f_{uk}$ (or see Table C1)    |     |     |     |     |                  |      |                              |
| Characteristic shear resistance<br>Steel, strength class 8.8<br>Stainless Steel A2, A4 and HCR, all strength classes                                   | $V_{Rk,s}^0$    | [kN]               | $0,5 \cdot A_s \cdot f_{uk}$ (or see Table C1)    |     |     |     |     |                  |      |                              |
| Partial factor                                                                                                                                         | $\gamma_{Ms,V}$ | [-]                | see Table C1                                      |     |     |     |     |                  |      |                              |
| Ductility factor                                                                                                                                       | $k_7$           | [-]                | 1,0                                               |     |     |     |     |                  |      |                              |
| <b>Steel failure with lever arm</b>                                                                                                                    |                 |                    |                                                   |     |     |     |     |                  |      |                              |
| Characteristic bending moment                                                                                                                          | $M_{Rk,s}^0$    | [Nm]               | $1,2 \cdot W_{el} \cdot f_{uk}$ (or see Table C1) |     |     |     |     |                  |      |                              |
| Elastic section modulus                                                                                                                                | $W_{el}$        | [mm <sup>3</sup> ] | 31                                                | 62  | 109 | 277 | 541 | 935              | 1387 | 1874                         |
| Partial factor                                                                                                                                         | $\gamma_{Ms,V}$ | [-]                | see Table C1                                      |     |     |     |     |                  |      |                              |
| <b>Concrete pry-out failure</b>                                                                                                                        |                 |                    |                                                   |     |     |     |     |                  |      |                              |
| Factor                                                                                                                                                 | $k_8$           | [-]                | 2,0                                               |     |     |     |     |                  |      |                              |
| Installation factor                                                                                                                                    | $\gamma_{inst}$ | [-]                | 1,0                                               |     |     |     |     |                  |      |                              |
| <b>Concrete edge failure</b>                                                                                                                           |                 |                    |                                                   |     |     |     |     |                  |      |                              |
| Effective length of fastener                                                                                                                           | $l_f$           | [mm]               | $\min(h_{ef}; 12 \cdot d_{nom})$                  |     |     |     |     |                  |      | $\min(h_{ef}; 300\text{mm})$ |
| Outside diameter of fastener                                                                                                                           | $d_{nom}$       | [mm]               | 8                                                 | 10  | 12  | 16  | 20  | 24               | 27   | 30                           |
| Installation factor                                                                                                                                    | $\gamma_{inst}$ | [-]                | 1,0                                               |     |     |     |     |                  |      |                              |
|                                                                                                                                                        |                 |                    |                                                   |     |     |     |     |                  |      |                              |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                            |                 |                    |                                                   |     |     |     |     | <b>Annex C 7</b> |      |                              |
| <b>Performances</b><br>Characteristic values of shear loads under static and quasi-static action for a working life of 50 and 100 years (threaded rod) |                 |                    |                                                   |     |     |     |     |                  |      |                              |

**Table C8: Characteristic values of tension loads under static and quasi-static action for a working life of 50 years**

| Internal threaded anchor rods                                                                                                                                                                                                                                |                 |                                         |                   | IG-M6                                   | IG-M8                 | IG-M10 | IG-M12 | IG-M16 | IG-M20 |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|-------------------|-----------------------------------------|-----------------------|--------|--------|--------|--------|-----|
| <b>Steel failure<sup>1)</sup></b>                                                                                                                                                                                                                            |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Characteristic tension resistance,                                                                                                                                                                                                                           | 5.8             | $N_{Rk,s}$                              | [kN]              | 10                                      | 17                    | 29     | 42     | 76     | 123    |     |
| Steel, strength class                                                                                                                                                                                                                                        | 8.8             | $N_{Rk,s}$                              | [kN]              | 16                                      | 27                    | 46     | 67     | 121    | 196    |     |
| Partial factor, strength class 5.8 and 8.8                                                                                                                                                                                                                   | $\gamma_{Ms,N}$ |                                         | [-]               | 1,5                                     |                       |        |        |        |        |     |
| Characteristic tension resistance, Stainless Steel A4 and HCR, Strength class 70 <sup>2)</sup>                                                                                                                                                               |                 | $N_{Rk,s}$                              | [kN]              | 14                                      | 26                    | 41     | 59     | 110    | 124    |     |
| Partial factor                                                                                                                                                                                                                                               | $\gamma_{Ms,N}$ |                                         | [-]               | 1,87                                    |                       |        |        |        |        |     |
| <b>Combined pull-out and concrete cone failure</b>                                                                                                                                                                                                           |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes (HD) and compressed air drilled holes (CD)                                                                                                                               |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Temperature range                                                                                                                                                                                                                                            | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr}$   | [N/mm <sup>2</sup> ]                    | 20                    | 19     | 19     | 18     | 17     | 16  |
|                                                                                                                                                                                                                                                              | II: 50°C/72°C   |                                         |                   |                                         | 15                    | 15     | 14     | 13     | 13     | 12  |
|                                                                                                                                                                                                                                                              | III: 60°C/80°C  |                                         |                   |                                         | 6,5                   | 6,5    | 6,0    | 6,0    | 5,5    | 5,5 |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes with hollow drill bit (HDB)                                                                                                                                              |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Temperature range                                                                                                                                                                                                                                            | I: 24°C/40°C    | Dry, wet concrete                       | $\tau_{Rk,ucr}$   | [N/mm <sup>2</sup> ]                    | 16                    | 16     | 16     | 15     | 14     | 13  |
|                                                                                                                                                                                                                                                              | II: 50°C/72°C   |                                         |                   |                                         | 14                    | 14     | 13     | 13     | 12     | 11  |
|                                                                                                                                                                                                                                                              | III: 60°C/80°C  |                                         |                   |                                         | 6,5                   | 6,5    | 6,0    | 6,0    | 5,5    | 5,5 |
|                                                                                                                                                                                                                                                              | I: 24°C/40°C    | flooded bore hole                       |                   |                                         | 16                    | 16     | 15     | 15     | 14     | 13  |
|                                                                                                                                                                                                                                                              | II: 50°C/72°C   |                                         |                   |                                         | 14                    | 14     | 13     | 13     | 12     | 11  |
|                                                                                                                                                                                                                                                              | III: 60°C/80°C  |                                         |                   |                                         | 6,5                   | 6,5    | 6,0    | 6,0    | 5,5    | 5,5 |
| Characteristic bond resistance in cracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)                                                                            |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Temperature range                                                                                                                                                                                                                                            | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\tau_{Rk,cr}$    | [N/mm <sup>2</sup> ]                    | 7,0                   | 8,5    | 8,5    | 8,5    | 8,5    | 8,5 |
|                                                                                                                                                                                                                                                              | II: 50°C/72°C   |                                         |                   |                                         | 6,0                   | 7,0    | 7,0    | 7,0    | 7,0    | 7,0 |
|                                                                                                                                                                                                                                                              | III: 60°C/80°C  |                                         |                   |                                         | 5,0                   | 5,0    | 4,5    | 4,5    | 4,5    | 4,5 |
| Reduction factor $\psi^0_{sus}$ in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)                                                             |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Temperature range                                                                                                                                                                                                                                            | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\psi^0_{sus}$    | [-]                                     | 0,80                  |        |        |        |        |     |
|                                                                                                                                                                                                                                                              | II: 50°C/72°C   |                                         |                   |                                         | 0,68                  |        |        |        |        |     |
|                                                                                                                                                                                                                                                              | III: 60°C/80°C  |                                         |                   |                                         | 0,70                  |        |        |        |        |     |
| Increasing factors for concrete                                                                                                                                                                                                                              |                 |                                         | $\psi_c$          | [-]                                     | $(f_{ck} / 20)^{0,1}$ |        |        |        |        |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                                                                                      |                 |                                         | $\tau_{Rk,ucr} =$ | $\psi^0_c \cdot \tau_{Rk,ucr,(C20/25)}$ |                       |        |        |        |        |     |
|                                                                                                                                                                                                                                                              |                 |                                         | $\tau_{Rk,cr} =$  | $\psi^0_c \cdot \tau_{Rk,cr,(C20/25)}$  |                       |        |        |        |        |     |
| <b>Concrete cone failure</b>                                                                                                                                                                                                                                 |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Relevant parameter                                                                                                                                                                                                                                           |                 |                                         |                   | see Table C2                            |                       |        |        |        |        |     |
| <b>Splitting failure</b>                                                                                                                                                                                                                                     |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Relevant parameter                                                                                                                                                                                                                                           |                 |                                         |                   | see Table C2                            |                       |        |        |        |        |     |
| <b>Installation factor</b>                                                                                                                                                                                                                                   |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| for dry and wet concrete (HD; HDB, CD)                                                                                                                                                                                                                       |                 |                                         | $\gamma_{inst}$   | [-]                                     | 1,0                   |        |        |        |        |     |
| for flooded bore hole (HD; HDB, CD)                                                                                                                                                                                                                          |                 |                                         |                   |                                         | 1,2                   |        |        |        |        |     |
| 1) Fastenings (incl. nut and washer) must comply with the appropriate material and property class of the internal threaded rod.<br>The characteristic tension resistance for steel failure is valid for the internal threaded rod and the fastening element. |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| 2) For IG-M20 strength class 50 is valid                                                                                                                                                                                                                     |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                                                                                                                                  |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| <b>Performances</b>                                                                                                                                                                                                                                          |                 |                                         |                   |                                         |                       |        |        |        |        |     |
| Characteristic values of tension loads under static and quasi-static action for a working life of 50 years (Internal threaded anchor rod)                                                                                                                    |                 |                                         |                   |                                         |                       |        |        |        |        |     |

Annex C 8



**Table C9: Characteristic values of tension loads under static and quasi-static action for a working life of 100 years**

| Internal threaded anchor rods                                                                                                                                                                                                                               |                 |                                         |                       | IG-M6                                    | IG-M8                 | IG-M10 | IG-M12 | IG-M16           | IG-M20 |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|-----------------------|------------------------------------------|-----------------------|--------|--------|------------------|--------|-----|
| <b>Steel failure<sup>1)</sup></b>                                                                                                                                                                                                                           |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Characteristic tension resistance,                                                                                                                                                                                                                          | 5.8             | $N_{Rk,s}$                              | [kN]                  | 10                                       | 17                    | 29     | 42     | 76               | 123    |     |
| Steel, strength class                                                                                                                                                                                                                                       | 8.8             | $N_{Rk,s}$                              | [kN]                  | 16                                       | 27                    | 46     | 67     | 121              | 196    |     |
| Partial factor, strength class 5.8 and 8.8                                                                                                                                                                                                                  | $\gamma_{Ms,N}$ |                                         | [-]                   | 1,5                                      |                       |        |        |                  |        |     |
| Characteristic tension resistance, Stainless Steel A4 and HCR, Strength class 70 <sup>2)</sup>                                                                                                                                                              |                 | $N_{Rk,s}$                              | [kN]                  | 14                                       | 26                    | 41     | 59     | 110              | 124    |     |
| Partial factor                                                                                                                                                                                                                                              | $\gamma_{Ms,N}$ |                                         | [-]                   | 1,87                                     |                       |        |        |                  |        |     |
| <b>Combined pull-out and concrete cone failure</b>                                                                                                                                                                                                          |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes (HD) and compressed air drilled holes (CD)                                                                                                                              |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Temperature range                                                                                                                                                                                                                                           | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr,100}$   | [N/mm <sup>2</sup> ]                     | 20                    | 19     | 19     | 18               | 17     | 16  |
|                                                                                                                                                                                                                                                             | II: 50°C/72°C   |                                         |                       |                                          | 15                    | 15     | 14     | 13               | 13     | 12  |
|                                                                                                                                                                                                                                                             | III: 60°C/80°C  |                                         |                       |                                          | 6,5                   | 6,5    | 6,0    | 6,0              | 5,5    | 5,5 |
| Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes with hollow drill bit (HDB)                                                                                                                                             |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Temperature range                                                                                                                                                                                                                                           | I: 24°C/40°C    | Dry, wet concrete                       | $\tau_{Rk,ucr,100}$   | [N/mm <sup>2</sup> ]                     | 16                    | 16     | 16     | 15               | 14     | 13  |
|                                                                                                                                                                                                                                                             | II: 50°C/72°C   |                                         |                       |                                          | 14                    | 14     | 13     | 13               | 12     | 11  |
|                                                                                                                                                                                                                                                             | III: 60°C/80°C  |                                         |                       |                                          | 6,5                   | 6,5    | 6,0    | 6,0              | 5,5    | 5,5 |
|                                                                                                                                                                                                                                                             | I: 24°C/40°C    | flooded bore hole                       |                       |                                          | 16                    | 16     | 15     | 15               | 14     | 13  |
|                                                                                                                                                                                                                                                             | II: 50°C/72°C   |                                         |                       |                                          | 14                    | 14     | 13     | 13               | 12     | 11  |
|                                                                                                                                                                                                                                                             | III: 60°C/80°C  |                                         |                       |                                          | 6,5                   | 6,5    | 6,0    | 6,0              | 5,5    | 5,5 |
| Characteristic bond resistance in cracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)                                                                           |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Temperature range                                                                                                                                                                                                                                           | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\tau_{Rk,cr,100}$    | [N/mm <sup>2</sup> ]                     | 6,5                   | 7,5    | 7,5    | 7,5              | 7,5    | 7,5 |
|                                                                                                                                                                                                                                                             | II: 50°C/72°C   |                                         |                       |                                          | 5,5                   | 6,5    | 6,5    | 6,5              | 6,5    | 6,5 |
|                                                                                                                                                                                                                                                             | III: 60°C/80°C  |                                         |                       |                                          | 5,0                   | 5,0    | 4,5    | 4,5              | 4,5    | 4,5 |
| Reduction factor $\psi_{sus,100}$ in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)                                                          |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Temperature range                                                                                                                                                                                                                                           | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\psi_{sus,100}$      | [-]                                      | 0,80                  |        |        |                  |        |     |
|                                                                                                                                                                                                                                                             | II: 50°C/72°C   |                                         |                       |                                          | 0,68                  |        |        |                  |        |     |
|                                                                                                                                                                                                                                                             | III: 60°C/80°C  |                                         |                       |                                          | 0,70                  |        |        |                  |        |     |
| Increasing factors for concrete                                                                                                                                                                                                                             |                 |                                         | $\psi_c$              | [-]                                      | $(f_{ck} / 20)^{0,1}$ |        |        |                  |        |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                                                                                     |                 |                                         | $\tau_{Rk,ucr,100} =$ | $\psi_c \cdot \tau_{Rk,ucr,100}(C20/25)$ |                       |        |        |                  |        |     |
|                                                                                                                                                                                                                                                             |                 |                                         | $\tau_{Rk,cr,100} =$  | $\psi_c \cdot \tau_{Rk,cr,100}(C20/25)$  |                       |        |        |                  |        |     |
| <b>Concrete cone failure</b>                                                                                                                                                                                                                                |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Relevant parameter                                                                                                                                                                                                                                          |                 |                                         |                       | see Table C2                             |                       |        |        |                  |        |     |
| <b>Splitting failure</b>                                                                                                                                                                                                                                    |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Relevant parameter                                                                                                                                                                                                                                          |                 |                                         |                       | see Table C2                             |                       |        |        |                  |        |     |
| <b>Installation factor</b>                                                                                                                                                                                                                                  |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| for dry and wet concrete (HD; HDB, CD)                                                                                                                                                                                                                      |                 |                                         | $\gamma_{inst}$       | [-]                                      | 1,0                   |        |        |                  |        |     |
| for flooded bore hole (HD; HDB, CD)                                                                                                                                                                                                                         |                 |                                         |                       |                                          | 1,2                   |        |        |                  |        |     |
| 1) Fasteners (incl. nut and washer) must comply with the appropriate material and property class of the internal threaded rod.<br>The characteristic tension resistance for steel failure is valid for the internal threaded rod and the fastening element. |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| 2) For IG-M20 strength class 50 is valid                                                                                                                                                                                                                    |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                                                                                                                                 |                 |                                         |                       |                                          |                       |        |        | <b>Annex C 9</b> |        |     |
| <b>Performances</b>                                                                                                                                                                                                                                         |                 |                                         |                       |                                          |                       |        |        |                  |        |     |
| Characteristic values of tension loads under static and quasi-static action for a working life of 100 years (Internal threaded anchor rod)                                                                                                                  |                 |                                         |                       |                                          |                       |        |        |                  |        |     |

**Table C10: Characteristic values of tension loads under static and quasi-static action for a working life of 50 years**

| Internal threaded anchor rods                                                                                                                                                                                                                                                                                                 |                 |                                         |                   | IG-M6        | IG-M8                                 | IG-M10 | IG-M12 | IG-M16 | IG-M20 |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|-------------------|--------------|---------------------------------------|--------|--------|--------|--------|-----|
| Steel failure <sup>1)</sup>                                                                                                                                                                                                                                                                                                   |                 |                                         |                   |              |                                       |        |        |        |        |     |
| Characteristic tension resistance,                                                                                                                                                                                                                                                                                            | 5.8             | $N_{Rk,s}$                              | [kN]              | 10           | 17                                    | 29     | 42     | 76     | 123    |     |
| Steel, strength class                                                                                                                                                                                                                                                                                                         | 8.8             | $N_{Rk,s}$                              | [kN]              | 16           | 27                                    | 46     | 67     | 121    | 196    |     |
| Partial factor, strength class 5.8 and 8.8                                                                                                                                                                                                                                                                                    | $\gamma_{Ms,N}$ |                                         | [-]               | 1,5          |                                       |        |        |        |        |     |
| Characteristic tension resistance, Stainless Steel A4 and HCR, Strength class 70 <sup>2)</sup>                                                                                                                                                                                                                                |                 | $N_{Rk,s}$                              | [kN]              | 14           | 26                                    | 41     | 59     | 110    | 124    |     |
| Partial factor                                                                                                                                                                                                                                                                                                                | $\gamma_{Ms,N}$ |                                         | [-]               | 1,87         |                                       |        |        |        |        |     |
| Combined pull-out and concrete cone failure                                                                                                                                                                                                                                                                                   |                 |                                         |                   |              |                                       |        |        |        |        |     |
| Characteristic bond resistance in uncracked concrete C20/25 in diamond drilled holes (DD)                                                                                                                                                                                                                                     |                 |                                         |                   |              |                                       |        |        |        |        |     |
| Temperature range                                                                                                                                                                                                                                                                                                             | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr}$   | [N/mm²]      | 14                                    | 14     | 13     | 12     | 12     | 11  |
|                                                                                                                                                                                                                                                                                                                               | II: 50°C/72°C   |                                         |                   |              | 12                                    | 11     | 10     | 9,5    | 9,5    | 9,0 |
|                                                                                                                                                                                                                                                                                                                               | III: 60°C/80°C  |                                         |                   |              | 5,5                                   | 5,0    | 4,5    | 4,5    | 4,5    | 4,0 |
| Reduction factor $\psi^0_{sus}$ in uncracked concrete C20/25 in diamond drilled holes (DD)                                                                                                                                                                                                                                    |                 |                                         |                   |              |                                       |        |        |        |        |     |
| Temperature range                                                                                                                                                                                                                                                                                                             | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\psi^0_{sus}$    | [-]          | 0,77                                  |        |        |        |        |     |
|                                                                                                                                                                                                                                                                                                                               | II: 50°C/72°C   |                                         |                   |              | 0,72                                  |        |        |        |        |     |
|                                                                                                                                                                                                                                                                                                                               | III: 60°C/80°C  |                                         |                   |              | 0,72                                  |        |        |        |        |     |
| Increasing factors for concrete                                                                                                                                                                                                                                                                                               |                 |                                         | $\psi_c$          | [-]          | $(f_{ck} / 20)^{0,2}$                 |        |        |        |        |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                                                                                                                                                       |                 |                                         | $\tau_{Rk,ucr} =$ |              | $\psi_c \cdot \tau_{Rk,ucr,(C20/25)}$ |        |        |        |        |     |
| Concrete cone failure                                                                                                                                                                                                                                                                                                         |                 |                                         |                   |              |                                       |        |        |        |        |     |
| Relevant parameter                                                                                                                                                                                                                                                                                                            |                 |                                         |                   | see Table C2 |                                       |        |        |        |        |     |
| Splitting failure                                                                                                                                                                                                                                                                                                             |                 |                                         |                   |              |                                       |        |        |        |        |     |
| Relevant parameter                                                                                                                                                                                                                                                                                                            |                 |                                         |                   | see Table C2 |                                       |        |        |        |        |     |
| Installation factor                                                                                                                                                                                                                                                                                                           |                 |                                         |                   |              |                                       |        |        |        |        |     |
| for dry and wet concrete (DD)                                                                                                                                                                                                                                                                                                 |                 |                                         | $\gamma_{inst}$   | [-]          | 1,0                                   |        |        |        |        |     |
| for flooded bore hole (DD)                                                                                                                                                                                                                                                                                                    |                 |                                         |                   |              | 1,2                                   | 1,4    |        |        |        |     |
| <sup>1)</sup> Fasteners (incl. nut and washer) must comply with the appropriate material and property class of the internal threaded rod.<br>The characteristic tension resistance for steel failure is valid for the internal threaded rod and the fastening element.<br><sup>2)</sup> For IG-M20 strength class 50 is valid |                 |                                         |                   |              |                                       |        |        |        |        |     |

|                                                                                                                                           |  |            |
|-------------------------------------------------------------------------------------------------------------------------------------------|--|------------|
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                      |  | Annex C 10 |
| Performances                                                                                                                              |  |            |
| Characteristic values of tension loads under static and quasi-static action for a working life of 50 years (Internal threaded anchor rod) |  |            |

**Table C11: Characteristic values of tension loads under static and quasi-static action for a working life of 100 years**

| Internal threaded anchor rods                                                                                                                                                                                                                                                                                                 |                 |                                         |                       | IG-M6                                     | IG-M8                 | IG-M10 | IG-M12 | IG-M16            | IG-M20 |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|-----------------------|-------------------------------------------|-----------------------|--------|--------|-------------------|--------|-----|
| <b>Steel failure<sup>1)</sup></b>                                                                                                                                                                                                                                                                                             |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Characteristic tension resistance,                                                                                                                                                                                                                                                                                            | 5.8             | $N_{Rk,s}$                              | [kN]                  | 10                                        | 17                    | 29     | 42     | 76                | 123    |     |
| Steel, strength class                                                                                                                                                                                                                                                                                                         | 8.8             | $N_{Rk,s}$                              | [kN]                  | 16                                        | 27                    | 46     | 67     | 121               | 196    |     |
| Partial factor, strength class 5.8 and 8.8                                                                                                                                                                                                                                                                                    | $\gamma_{Ms,N}$ | [-]                                     | 1,5                   |                                           |                       |        |        |                   |        |     |
| Characteristic tension resistance, Stainless Steel A4 and HCR, Strength class 70 <sup>2)</sup>                                                                                                                                                                                                                                |                 | $N_{Rk,s}$                              | [kN]                  | 14                                        | 26                    | 41     | 59     | 110               | 124    |     |
| Partial factor                                                                                                                                                                                                                                                                                                                | $\gamma_{Ms,N}$ | [-]                                     | 1,87                  |                                           |                       |        |        |                   |        |     |
| <b>Combined pull-out and concrete cone failure</b>                                                                                                                                                                                                                                                                            |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Characteristic bond resistance in uncracked concrete C20/25 in diamond drilled holes (DD)                                                                                                                                                                                                                                     |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Temperature range                                                                                                                                                                                                                                                                                                             | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr,100}$   | [N/mm²]                                   | 14                    | 14     | 13     | 12                | 12     | 11  |
|                                                                                                                                                                                                                                                                                                                               | II: 50°C/72°C   |                                         |                       |                                           | 11                    | 10     | 10     | 9,5               | 9,0    | 8,5 |
|                                                                                                                                                                                                                                                                                                                               | III: 60°C/80°C  |                                         |                       |                                           | 5,5                   | 5,0    | 4,5    | 4,5               | 4,5    | 4,0 |
| Reduction factor $\psi_{sus,100}^0$ in uncracked concrete C20/25 in diamond drilled holes (DD)                                                                                                                                                                                                                                |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Temperature range                                                                                                                                                                                                                                                                                                             | I: 24°C/40°C    | Dry, wet concrete and flooded bore hole | $\psi_{sus,100}^0$    | [-]                                       | 0,73                  |        |        |                   |        |     |
|                                                                                                                                                                                                                                                                                                                               | II: 50°C/72°C   |                                         |                       |                                           | 0,70                  |        |        |                   |        |     |
|                                                                                                                                                                                                                                                                                                                               | III: 60°C/80°C  |                                         |                       |                                           | 0,72                  |        |        |                   |        |     |
| Increasing factors for concrete                                                                                                                                                                                                                                                                                               |                 |                                         | $\psi_c$              | [-]                                       | $(f_{ck} / 20)^{0,2}$ |        |        |                   |        |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                                                                                                                                                       |                 |                                         | $\tau_{Rk,ucr,100} =$ | $\psi_c \cdot \tau_{Rk,ucr,100,(C20/25)}$ |                       |        |        |                   |        |     |
| <b>Concrete cone failure</b>                                                                                                                                                                                                                                                                                                  |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Relevant parameter                                                                                                                                                                                                                                                                                                            |                 |                                         |                       | see Table C2                              |                       |        |        |                   |        |     |
| <b>Splitting failure</b>                                                                                                                                                                                                                                                                                                      |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Relevant parameter                                                                                                                                                                                                                                                                                                            |                 |                                         |                       | see Table C2                              |                       |        |        |                   |        |     |
| <b>Installation factor</b>                                                                                                                                                                                                                                                                                                    |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| for dry and wet concrete (DD)                                                                                                                                                                                                                                                                                                 |                 | $\gamma_{inst}$                         | [-]                   | 1,0                                       |                       |        |        |                   |        |     |
| for flooded bore hole (DD)                                                                                                                                                                                                                                                                                                    |                 |                                         |                       | 1,2                                       | 1,4                   |        |        |                   |        |     |
| <sup>1)</sup> Fasteners (incl. nut and washer) must comply with the appropriate material and property class of the internal threaded rod.<br>The characteristic tension resistance for steel failure is valid for the internal threaded rod and the fastening element.<br><sup>2)</sup> For IG-M20 strength class 50 is valid |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                                                                                                                                                                                                   |                 |                                         |                       |                                           |                       |        |        | <b>Annex C 11</b> |        |     |
| <b>Performances</b>                                                                                                                                                                                                                                                                                                           |                 |                                         |                       |                                           |                       |        |        |                   |        |     |
| Characteristic values of tension loads under static and quasi-static action for a working life of 100 years (Internal threaded anchor rod)                                                                                                                                                                                    |                 |                                         |                       |                                           |                       |        |        |                   |        |     |

**Table C12: Characteristic values of shear loads under static and quasi-static action for a working life of 50 and 100 years**

| Internal threaded anchor rods                                                                                                                                                                                                                                                                                                  |     |                 |      | IG-M6                            | IG-M8 | IG-M10 | IG-M12 | IG-M16            | IG-M20                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------|------|----------------------------------|-------|--------|--------|-------------------|-----------------------|
| <b>Steel failure without lever arm<sup>1)</sup></b>                                                                                                                                                                                                                                                                            |     |                 |      |                                  |       |        |        |                   |                       |
| Characteristic shear resistance,<br>Steel, strength class                                                                                                                                                                                                                                                                      | 5.8 | $V_{Rk,s}^0$    | [kN] | 5                                | 9     | 15     | 21     | 38                | 61                    |
|                                                                                                                                                                                                                                                                                                                                | 8.8 | $V_{Rk,s}^0$    | [kN] | 8                                | 14    | 23     | 34     | 60                | 98                    |
| Partial factor, strength class 5.8 and 8.8                                                                                                                                                                                                                                                                                     |     | $\gamma_{Ms,V}$ | [-]  | 1,25                             |       |        |        |                   |                       |
| Characteristic shear resistance,<br>Stainless Steel A4 and HCR,<br>Strength class 70 <sup>2)</sup>                                                                                                                                                                                                                             |     | $V_{Rk,s}^0$    | [kN] | 7                                | 13    | 20     | 30     | 55                | 40                    |
| Partial factor                                                                                                                                                                                                                                                                                                                 |     | $\gamma_{Ms,V}$ | [-]  | 1,56                             |       |        |        |                   | 2,38                  |
| Ductility factor                                                                                                                                                                                                                                                                                                               |     | $k_7$           | [-]  | 1,0                              |       |        |        |                   |                       |
| <b>Steel failure with lever arm<sup>1)</sup></b>                                                                                                                                                                                                                                                                               |     |                 |      |                                  |       |        |        |                   |                       |
| Characteristic bending moment,<br>Steel, strength class                                                                                                                                                                                                                                                                        | 5.8 | $M_{Rk,s}^0$    | [Nm] | 8                                | 19    | 37     | 66     | 167               | 325                   |
|                                                                                                                                                                                                                                                                                                                                | 8.8 | $M_{Rk,s}^0$    | [Nm] | 12                               | 30    | 60     | 105    | 267               | 519                   |
| Partial factor, strength class 5.8 and 8.8                                                                                                                                                                                                                                                                                     |     | $\gamma_{Ms,V}$ | [-]  | 1,25                             |       |        |        |                   |                       |
| Characteristic bending moment,<br>Stainless Steel A4 and HCR,<br>Strength class 70 <sup>2)</sup>                                                                                                                                                                                                                               |     | $M_{Rk,s}^0$    | [Nm] | 11                               | 26    | 52     | 92     | 233               | 456                   |
| Partial factor                                                                                                                                                                                                                                                                                                                 |     | $\gamma_{Ms,V}$ | [-]  | 1,56                             |       |        |        |                   | 2,38                  |
| <b>Concrete pry-out failure</b>                                                                                                                                                                                                                                                                                                |     |                 |      |                                  |       |        |        |                   |                       |
| Factor                                                                                                                                                                                                                                                                                                                         |     | $k_8$           | [-]  | 2,0                              |       |        |        |                   |                       |
| Installation factor                                                                                                                                                                                                                                                                                                            |     | $\gamma_{inst}$ | [-]  | 1,0                              |       |        |        |                   |                       |
| <b>Concrete edge failure</b>                                                                                                                                                                                                                                                                                                   |     |                 |      |                                  |       |        |        |                   |                       |
| Effective length of fastener                                                                                                                                                                                                                                                                                                   |     | $l_f$           | [mm] | $\min(h_{ef}; 12 \cdot d_{nom})$ |       |        |        |                   | $\min(h_{ef}; 300mm)$ |
| Outside diameter of fastener                                                                                                                                                                                                                                                                                                   |     | $d_{nom}$       | [mm] | 10                               | 12    | 16     | 20     | 24                | 30                    |
| Installation factor                                                                                                                                                                                                                                                                                                            |     | $\gamma_{inst}$ | [-]  | 1,0                              |       |        |        |                   |                       |
| <sup>1)</sup> Fastenings (incl. nut and washer) must comply with the appropriate material and property class of the internal threaded rod.<br>The characteristic tension resistance for steel failure is valid for the internal threaded rod and the fastening element.<br><sup>2)</sup> For IG-M20 strength class 50 is valid |     |                 |      |                                  |       |        |        |                   |                       |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                                                                                                                                                                                                    |     |                 |      |                                  |       |        |        | <b>Annex C 12</b> |                       |
| <b>Performances</b><br>Characteristic values of shear loads under static and quasi-static action for a working life of 50 and 100 years (Internal threaded anchor rod)                                                                                                                                                         |     |                 |      |                                  |       |        |        |                   |                       |

**Table C13: Characteristic values of tension loads under static and quasi-static action for a working life of 50 years**

## Reinforcing bar

### Steel failure

Characteristic tension resistance

$N_{Rk,s}$

$[kN]$

$A_s \cdot f_{yk}^{1)}$

Cross section area

$A_s$

$[mm^2]$

50

79

113

154

201

314

452

491

616

804

1018

1256

Partial factor

$\gamma_{Ms,N}$

$[-]$

1,4<sup>2)</sup>

### Combined pull-out and concrete failure

Characteristic bond resistance in uncracked concrete C20/25 in hammer (HD) and compressed air drilled holes (CD)

|                                                                      |                                         |                 |            |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------------------------------------------------------------|-----------------------------------------|-----------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Temperature range<br>I: 24°C/40°C<br>II: 50°C/72°C<br>III: 60°C/80°C | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr}$ | $[N/mm^2]$ | 16  | 16  | 16  | 16  | 16  | 16  | 15  | 15  | 15  | 15  | 15  | 15  |
|                                                                      |                                         |                 |            | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 11  | 11  | 11  | 11  |
|                                                                      |                                         |                 |            | 5,5 | 5,5 | 5,5 | 5,5 | 5,5 | 5,5 | 5,0 | 5,0 | 5,0 | 5,0 | 4,5 | 4,5 |

Characteristic bond resistance in uncracked concrete C20/25 in hammer drilled holes with hollow drill bit (HDB)

|                                                                      |                   |                 |            |     |     |     |     |     |     |     |     |     |     |    |  |    |
|----------------------------------------------------------------------|-------------------|-----------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|--|----|
| Temperature range<br>I: 24°C/40°C<br>II: 50°C/72°C<br>III: 60°C/80°C | Dry, wet concrete | $\tau_{Rk,ucr}$ | $[N/mm^2]$ | 14  | 14  | 13  | 13  | 13  | 13  | 13  | 13  | 13  | 13  | 3) |  |    |
|                                                                      |                   |                 |            | 12  | 12  | 12  | 11  | 11  | 11  | 11  | 11  | 11  | 11  |    |  |    |
|                                                                      |                   |                 |            | 5,5 | 5,5 | 5,5 | 5,5 | 5,5 | 5,5 | 5,0 | 5,0 | 5,0 | 5,0 |    |  |    |
|                                                                      | flooded bore hole |                 |            | 13  | 13  | 13  | 13  | 13  | 13  | 13  | 13  | 13  | 13  |    |  | 13 |
|                                                                      |                   |                 |            | 11  | 11  | 11  | 11  | 11  | 11  | 11  | 11  | 11  | 11  |    |  | 11 |
| 5,5                                                                  | 5,5               | 5,5             | 5,5        | 5,5 | 5,5 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |     |     |    |  |    |

Characteristic bond resistance in cracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)

|                                                                      |                                         |                |            |     |     |     |     |     |     |     |     |     |     |    |  |
|----------------------------------------------------------------------|-----------------------------------------|----------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|--|
| Temperature range<br>I: 24°C/40°C<br>II: 50°C/72°C<br>III: 60°C/80°C | Dry, wet concrete and flooded bore hole | $\tau_{Rk,cr}$ | $[N/mm^2]$ | 7,0 | 7,0 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 3) |  |
|                                                                      |                                         |                |            | 6,0 | 6,0 | 7,0 | 7,0 | 7,0 | 7,0 | 7,0 | 7,0 | 7,0 | 7,0 |    |  |
|                                                                      |                                         |                |            | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 |    |  |

Reduction factor  $\psi_{sus}^0$  in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)

|                                                                      |                                         |                |       |      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------|-----------------------------------------|----------------|-------|------|--|--|--|--|--|--|--|--|--|--|--|--|
| Temperature range<br>I: 24°C/40°C<br>II: 50°C/72°C<br>III: 60°C/80°C | Dry, wet concrete and flooded bore hole | $\psi_{sus}^0$ | $[-]$ | 0,80 |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                      |                                         |                |       | 0,68 |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                      |                                         |                |       | 0,70 |  |  |  |  |  |  |  |  |  |  |  |  |

Increasing factors for concrete

$\psi_c$

$[-]$

$(f_{ck} / 20)^{0,1}$

Characteristic bond resistance depending on the concrete strength class

$\tau_{Rk,ucr} =$

$\psi_c \cdot \tau_{Rk,ucr,(C20/25)}$

$\tau_{Rk,cr} =$

$\psi_c \cdot \tau_{Rk,cr,(C20/25)}$

### Concrete cone failure

Relevant parameter

see Table C2

### Splitting

Relevant parameter

see Table C2

### Installation factor (HD; HDB, CD)

for dry and wet concrete

$\gamma_{inst}$

$[-]$

1,0

for flooded bore hole

1,2

1,2

3)

<sup>1)</sup>  $f_{yk}$  shall be taken from the specifications of reinforcing bars

<sup>2)</sup> in absence of national regulation

<sup>3)</sup> no performance assessed

## Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete

### Performances

Characteristic values of tension loads under static and quasi-static action for a working life of 50 years (reinforcing bar)

Annex C 13

**Table C14: Characteristic values of tension loads under static and quasi-static action for a working life of 100 years**

[illegible]

**Table C15: Characteristic values of tension loads under static and quasi-static action for a working life of 50 years**

| Reinforcing bar                                                                                                                              |                |                       |                 | Ø 8                                  | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24 | Ø 25 | Ø 28 | Ø 32       | Ø 36 | Ø 40 |     |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|-----------------|--------------------------------------|------|------|------|------|------|------|------|------|------------|------|------|-----|
| <b>Steel failure</b>                                                                                                                         |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Characteristic tension resistance                                                                                                            |                | $N_{Rk,s}$            | [kN]            | $A_s \cdot f_{uk}^{1)}$              |      |      |      |      |      |      |      |      |            |      |      |     |
| Cross section area                                                                                                                           |                | $A_s$                 | [mm²]           | 50                                   | 79   | 113  | 154  | 201  | 314  | 452  | 491  | 616  | 804        | 1018 | 1256 |     |
| Partial factor                                                                                                                               |                | $\gamma_{Ms,N}$       | [-]             | 1,4 <sup>2)</sup>                    |      |      |      |      |      |      |      |      |            |      |      |     |
| <b>Combined pull-out and concrete failure</b>                                                                                                |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Characteristic bond resistance in uncracked concrete C20/25 in diamond drilled holes (DD)                                                    |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Temperature range                                                                                                                            | I: 24°C/40°C   | Dry, wet concrete     | $\tau_{Rk,ucr}$ | [N/mm²]                              | 14   | 13   | 13   | 13   | 12   | 12   | 11   | 11   | 11         | 11   | 11   | 10  |
|                                                                                                                                              | II: 50°C/72°C  | and flooded bore hole |                 |                                      | 11   | 11   | 10   | 10   | 10   | 9,5  | 9,5  | 9,5  | 9,0        | 9,0  | 8,5  | 8,5 |
|                                                                                                                                              | III: 60°C/80°C |                       |                 |                                      | 5,0  | 5,0  | 5,0  | 4,5  | 4,5  | 4,5  | 4,0  | 4,0  | 4,0        | 4,0  | 4,0  | 4,0 |
| Reduction factor $\psi_{sus}^0$ in uncracked concrete C20/25 in diamond drilled holes (DD)                                                   |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Temperature range                                                                                                                            | I: 24°C/40°C   | Dry, wet concrete     | $\psi_{sus}^0$  | [-]                                  | 0,77 |      |      |      |      |      |      |      |            |      |      |     |
|                                                                                                                                              | II: 50°C/72°C  | and flooded bore hole |                 |                                      | 0,72 |      |      |      |      |      |      |      |            |      |      |     |
|                                                                                                                                              | III: 60°C/80°C |                       |                 |                                      | 0,72 |      |      |      |      |      |      |      |            |      |      |     |
| Increasing factors for concrete                                                                                                              |                | $\psi_c$              | [-]             | $(f_{ck} / 20)^{0,2}$                |      |      |      |      |      |      |      |      |            |      |      |     |
| Characteristic bond resistance depending on the concrete strength class                                                                      |                | $\tau_{Rk,ucr} =$     |                 | $\psi_c \cdot \tau_{Rk,ucr}(C20/25)$ |      |      |      |      |      |      |      |      |            |      |      |     |
| <b>Concrete cone failure</b>                                                                                                                 |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Relevant parameter                                                                                                                           |                | see Table C2          |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| <b>Splitting</b>                                                                                                                             |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Relevant parameter                                                                                                                           |                | see Table C2          |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| <b>Installation factor (DD)</b>                                                                                                              |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| for dry and wet concrete                                                                                                                     |                | $\gamma_{inst}$       | [-]             | 1,0                                  |      |      |      |      |      |      |      |      |            | 1,2  |      |     |
| for flooded bore hole                                                                                                                        |                |                       |                 | 1,2                                  |      |      |      |      | 1,4  |      |      |      |            | 3)   |      |     |
| 1) $f_{uk}$ shall be taken from the specifications of reinforcing bars<br>2) in absence of national regulation<br>3) no performance assessed |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                         |                |                       |                 |                                      |      |      |      |      |      |      |      |      | Annex C 15 |      |      |     |
| Performances<br>Characteristic values of tension loads under static and quasi-static action for a working life of 50 years (reinforcing bar) |                |                       |                 |                                      |      |      |      |      |      |      |      |      |            |      |      |     |

**Table C16: Characteristic values of tension loads under static and quasi-static action for a working life of 100 years**

| Reinforcing bar                                                                                                                                                               |                |                                         |                     | Ø 8   Ø 10   Ø 12   Ø 14   Ø 16   Ø 20   Ø 24   Ø 25   Ø 28   Ø 32   Ø 36   Ø 40 |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|---------------------|----------------------------------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------------|--|--|--|
| Steel failure                                                                                                                                                                 |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Characteristic tension resistance                                                                                                                                             |                | $N_{Rk,s}$                              | [kN]                | $A_s \cdot f_{yk}^{(1)}$                                                         |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Cross section area                                                                                                                                                            |                | $A_s$                                   | [mm²]               | 50                                                                               | 79   | 113 | 154 | 201 | 314 | 452 | 491 | 616 | 804 | 1018 | 1256 |            |  |  |  |
| Partial factor                                                                                                                                                                |                | $\gamma_{Ms,N}$                         | [-]                 | 1,4 <sup>(2)</sup>                                                               |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Combined pull-out and concrete failure                                                                                                                                        |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Characteristic bond resistance in uncracked concrete C20/25 in diamond drilled holes (DD)                                                                                     |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Temperature range                                                                                                                                                             | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,ucr,100}$ | [N/mm²]                                                                          | 14   | 13  | 13  | 13  | 12  | 12  | 11  | 11  | 11  | 11   | 11   | 10         |  |  |  |
|                                                                                                                                                                               | II: 50°C/72°C  |                                         |                     |                                                                                  | 11   | 10  | 10  | 10  | 9,5 | 9,0 | 9,0 | 9,0 | 8,5 | 8,5  | 8,0  | 8,0        |  |  |  |
|                                                                                                                                                                               | III: 60°C/80°C |                                         |                     |                                                                                  | 5,0  | 5,0 | 5,0 | 4,5 | 4,5 | 4,0 | 4,0 | 4,0 | 4,0 | 4,0  | 4,0  | 4,0        |  |  |  |
| Reduction factor $\psi_{sus,100}^0$ in uncracked concrete C20/25 in diamond drilled holes (DD)                                                                                |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Temperature range                                                                                                                                                             | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\psi_{sus,100}^0$  | [-]                                                                              | 0,73 |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
|                                                                                                                                                                               | II: 50°C/72°C  |                                         |                     |                                                                                  | 0,70 |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
|                                                                                                                                                                               | III: 60°C/80°C |                                         |                     |                                                                                  | 0,72 |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Increasing factors for concrete                                                                                                                                               |                | $\psi_c$                                | [-]                 | $(f_{ck} / 20)^{0,2}$                                                            |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Characteristic bond resistance depending on the concrete strength class                                                                                                       |                | $\tau_{Rk,ucr,100} =$                   |                     | $\psi_c \cdot \tau_{Rk,ucr,100}(C20/25)$                                         |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Concrete cone failure                                                                                                                                                         |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Relevant parameter                                                                                                                                                            |                |                                         |                     | see Table C2                                                                     |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Splitting                                                                                                                                                                     |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Relevant parameter                                                                                                                                                            |                |                                         |                     | see Table C2                                                                     |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Installation factor (DD)                                                                                                                                                      |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| for dry and wet concrete                                                                                                                                                      |                | $\gamma_{inst}$                         | [-]                 | 1,0                                                                              |      |     |     |     |     |     |     |     |     |      |      | 1,2        |  |  |  |
| for flooded bore hole                                                                                                                                                         |                |                                         |                     | 1,2                                                                              | 1,4  |     |     |     |     |     |     |     |     |      | 3)   |            |  |  |  |
| <sup>1)</sup> $f_{yk}$ shall be taken from the specifications of reinforcing bars<br><sup>2)</sup> in absence of national regulation<br><sup>3)</sup> no performance assessed |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                                          |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      | Annex C 16 |  |  |  |
| Performances<br>Characteristic values of tension loads under static and quasi-static action for a working life of 100 years (reinforcing bar)                                 |                |                                         |                     |                                                                                  |      |     |     |     |     |     |     |     |     |      |      |            |  |  |  |



**Table C17: Characteristic values of shear loads under static and quasi-static action for a working life of 50 and 100 years**

|                                                                                                                                                           |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------|--------------------------------------|------|------|------|------|------|-----------------------|-------------------|------|------|------|------|
| <b>Reinforcing bar</b>                                                                                                                                    |                 |                    | Ø 8                                  | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24                  | Ø 25              | Ø 28 | Ø 32 | Ø 36 | Ø 40 |
| <b>Steel failure without lever arm</b>                                                                                                                    |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |
| Characteristic shear resistance                                                                                                                           | $V_{Rk,s}^0$    | [kN]               | $0,5 \cdot A_s \cdot f_{uk}^{1)}$    |      |      |      |      |      |                       |                   |      |      |      |      |
| Cross section area                                                                                                                                        | $A_s$           | [mm <sup>2</sup> ] | 50                                   | 79   | 113  | 154  | 201  | 314  | 452                   | 491               | 616  | 804  | 1018 | 1256 |
| Partial factor                                                                                                                                            | $\gamma_{Ms,V}$ | [-]                | $1,5^{2)}$                           |      |      |      |      |      |                       |                   |      |      |      |      |
| Ductility factor                                                                                                                                          | $k_7$           | [-]                | 1,0                                  |      |      |      |      |      |                       |                   |      |      |      |      |
| <b>Steel failure with lever arm</b>                                                                                                                       |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |
| Characteristic bending moment                                                                                                                             | $M_{Rk,s}^0$    | [Nm]               | $1,2 \cdot W_{el} \cdot f_{uk}^{1)}$ |      |      |      |      |      |                       |                   |      |      |      |      |
| Elastic section modulus                                                                                                                                   | $W_{el}$        | [mm <sup>3</sup> ] | 50                                   | 98   | 170  | 269  | 402  | 785  | 1357                  | 1534              | 2155 | 3217 | 4580 | 6283 |
| Partial factor                                                                                                                                            | $\gamma_{Ms,V}$ | [-]                | $1,5^{2)}$                           |      |      |      |      |      |                       |                   |      |      |      |      |
| <b>Concrete pry-out failure</b>                                                                                                                           |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |
| Factor                                                                                                                                                    | $k_8$           | [-]                | 2,0                                  |      |      |      |      |      |                       |                   |      |      |      |      |
| Installation factor                                                                                                                                       | $\gamma_{inst}$ | [-]                | 1,0                                  |      |      |      |      |      |                       |                   |      |      |      |      |
| <b>Concrete edge failure</b>                                                                                                                              |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |
| Effective length of fastener                                                                                                                              | $l_f$           | [mm]               | $\min(h_{ef}; 12 \cdot d_{nom})$     |      |      |      |      |      | $\min(h_{ef}; 300mm)$ |                   |      |      |      |      |
| Outside diameter of fastener                                                                                                                              | $d_{nom}$       | [mm]               | 8                                    | 10   | 12   | 14   | 16   | 20   | 24                    | 25                | 28   | 32   | 36   | 40   |
| Installation factor                                                                                                                                       | $\gamma_{inst}$ | [-]                | 1,0                                  |      |      |      |      |      |                       |                   |      |      |      |      |
| <sup>1)</sup> $f_{uk}$ shall be taken from the specifications of reinforcing bars<br><sup>2)</sup> in absence of national regulation                      |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                               |                 |                    |                                      |      |      |      |      |      |                       | <b>Annex C 17</b> |      |      |      |      |
| <b>Performances</b><br>Characteristic values of shear loads under static and quasi-static action for a working life of 50 and 100 years (reinforcing bar) |                 |                    |                                      |      |      |      |      |      |                       |                   |      |      |      |      |

**Table C20: Displacements under tension load<sup>1)</sup> in hammer drilled holes (HD), comp. air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)**

| Threaded rod                                                                                   |                       |                           | M8    | M10   | M12   | M16   | M20   | M24   | M27   | M30   |
|------------------------------------------------------------------------------------------------|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Uncracked concrete under static and quasi-static action for a working life of 50 and 100 years |                       |                           |       |       |       |       |       |       |       |       |
| Temperature range I:<br>24°C/40°C                                                              | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,028 | 0,029 | 0,030 | 0,033 | 0,035 | 0,038 | 0,039 | 0,041 |
|                                                                                                | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,028 | 0,029 | 0,030 | 0,033 | 0,035 | 0,038 | 0,039 | 0,041 |
| Temperature range II:<br>50°C/72°C                                                             | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,038 | 0,039 | 0,040 | 0,044 | 0,047 | 0,051 | 0,052 | 0,055 |
|                                                                                                | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,047 | 0,049 | 0,051 | 0,055 | 0,059 | 0,064 | 0,067 | 0,070 |
| Temperature range III:<br>60°C/80°C                                                            | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,038 | 0,039 | 0,040 | 0,044 | 0,047 | 0,051 | 0,052 | 0,055 |
|                                                                                                | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,047 | 0,049 | 0,051 | 0,055 | 0,059 | 0,064 | 0,067 | 0,070 |
| Cracked concrete under static and quasi-static action for a working life of 50 and 100 years   |                       |                           |       |       |       |       |       |       |       |       |
| Temperature range I:<br>24°C/40°C                                                              | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,069 | 0,071 | 0,072 | 0,074 | 0,076 | 0,079 | 0,081 | 0,082 |
|                                                                                                | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,100 | 0,115 | 0,122 | 0,128 | 0,135 | 0,142 | 0,155 | 0,171 |
| Temperature range II:<br>50°C/72°C                                                             | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,092 | 0,095 | 0,096 | 0,099 | 0,102 | 0,106 | 0,109 | 0,110 |
|                                                                                                | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,134 | 0,154 | 0,163 | 0,172 | 0,181 | 0,189 | 0,207 | 0,229 |
| Temperature range III:<br>60°C/80°C                                                            | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,092 | 0,095 | 0,096 | 0,099 | 0,102 | 0,106 | 0,109 | 0,110 |
|                                                                                                | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,134 | 0,154 | 0,163 | 0,172 | 0,181 | 0,189 | 0,207 | 0,229 |

<sup>1)</sup> Calculation of the displacement:  $\delta_{ND} = \delta_{ND}$ -factor  $\cdot \tau$ ;  $\delta_{NE} = \delta_{NE}$ -factor  $\cdot \tau$ ;  $\tau$ : action bond stress for tension

**Table C18: Displacements under tension load<sup>1)</sup> in diamond drilled holes (DD)**

| Threaded rod                                                                            |                       |                           | M8    | M10   | M12   | M16   | M20   | M24   | M27   | M30   |
|-----------------------------------------------------------------------------------------|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Uncracked concrete under static and quasi-static action for a working life of 50 years  |                       |                           |       |       |       |       |       |       |       |       |
| Temperature range I:<br>24°C/40°C                                                       | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,011 | 0,012 | 0,012 | 0,013 | 0,014 | 0,014 | 0,015 | 0,015 |
|                                                                                         | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,018 | 0,019 | 0,019 | 0,020 | 0,022 | 0,023 | 0,024 | 0,025 |
| Temperature range II:<br>50°C/72°C                                                      | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,013 | 0,014 | 0,014 | 0,015 | 0,016 | 0,016 | 0,018 | 0,018 |
|                                                                                         | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,052 | 0,053 | 0,055 | 0,058 | 0,062 | 0,065 | 0,068 | 0,070 |
| Temperature range III:<br>60°C/80°C                                                     | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,013 | 0,014 | 0,014 | 0,015 | 0,016 | 0,016 | 0,018 | 0,018 |
|                                                                                         | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,052 | 0,053 | 0,055 | 0,058 | 0,062 | 0,065 | 0,068 | 0,070 |
| Uncracked concrete under static and quasi-static action for a working life of 100 years |                       |                           |       |       |       |       |       |       |       |       |
| Temperature range I:<br>24°C/40°C                                                       | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,011 | 0,012 | 0,012 | 0,013 | 0,014 | 0,014 | 0,015 | 0,015 |
|                                                                                         | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,020 | 0,021 | 0,021 | 0,023 | 0,024 | 0,025 | 0,026 | 0,027 |
| Temperature range II:<br>50°C/72°C                                                      | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,013 | 0,014 | 0,014 | 0,015 | 0,016 | 0,016 | 0,018 | 0,018 |
|                                                                                         | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,038 | 0,039 | 0,040 | 0,043 | 0,045 | 0,047 | 0,049 | 0,051 |
| Temperature range III:<br>60°C/80°C                                                     | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,013 | 0,014 | 0,014 | 0,015 | 0,016 | 0,016 | 0,018 | 0,018 |
|                                                                                         | $\delta_{NE}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,038 | 0,039 | 0,040 | 0,043 | 0,045 | 0,047 | 0,049 | 0,051 |

<sup>1)</sup> Calculation of the displacement:  $\delta_{ND} = \delta_{ND}$ -factor  $\cdot \tau$ ;  $\delta_{NE} = \delta_{NE}$ -factor  $\cdot \tau$ ;  $\tau$ : action bond stress for tension

**Table C19: Displacements under shear load<sup>1)</sup> for all drilling methods**

| Threaded rod                                                                                               |                        |         | M8   | M10  | M12  | M16  | M20  | M24  | M27  | M30  |
|------------------------------------------------------------------------------------------------------------|------------------------|---------|------|------|------|------|------|------|------|------|
| Uncracked and cracked concrete under static and quasi-static action for a working life of 50 and 100 years |                        |         |      |      |      |      |      |      |      |      |
| All temperature ranges                                                                                     | $\delta_{VD}$ -factor  | [mm/kN] | 0,06 | 0,06 | 0,05 | 0,04 | 0,04 | 0,03 | 0,03 | 0,03 |
|                                                                                                            | $\delta_{V,c}$ -factor | [mm/kN] | 0,09 | 0,08 | 0,08 | 0,06 | 0,06 | 0,05 | 0,05 | 0,05 |

<sup>1)</sup> Calculation of the displacement  $\delta_{VD} = \delta_{VD}$ -factor  $\cdot V$ ;  $\delta_{V,c} = \delta_{V,c}$ -factor  $\cdot V$ ;  $V$ : action shear load

**Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete**

**Performances**

Displacements under static and quasi-static action for a working life of 50 and 100 years (threaded rod)

**Annex C 18**

**Table C21: Displacements under tension load<sup>1)</sup> in hammer drilled holes (HD), comp. air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)**

| Internal threaded anchor rods                                                                  |                        | IG-M6        | IG-M8 | IG-M10 | IG-M12 | IG-M16 | IG-M20 |       |
|------------------------------------------------------------------------------------------------|------------------------|--------------|-------|--------|--------|--------|--------|-------|
| Uncracked concrete under static and quasi-static action for a working life of 50 and 100 years |                        |              |       |        |        |        |        |       |
| Temperature range I:<br>24°C/40°C                                                              | $\delta_{NO}$ -factor  | [mm/(N/mm²)] | 0,029 | 0,030  | 0,033  | 0,035  | 0,038  | 0,041 |
|                                                                                                | $\delta_{Ncr}$ -factor | [mm/(N/mm²)] | 0,029 | 0,030  | 0,033  | 0,035  | 0,038  | 0,041 |
| Temperature range II:<br>50°C/72°C                                                             | $\delta_{NO}$ -factor  | [mm/(N/mm²)] | 0,039 | 0,040  | 0,044  | 0,047  | 0,051  | 0,055 |
|                                                                                                | $\delta_{Ncr}$ -factor | [mm/(N/mm²)] | 0,049 | 0,051  | 0,055  | 0,059  | 0,064  | 0,070 |
| Temperature range III:<br>60°C/80°C                                                            | $\delta_{NO}$ -factor  | [mm/(N/mm²)] | 0,039 | 0,040  | 0,044  | 0,047  | 0,051  | 0,055 |
|                                                                                                | $\delta_{Ncr}$ -factor | [mm/(N/mm²)] | 0,049 | 0,051  | 0,055  | 0,059  | 0,064  | 0,070 |
| Cracked concrete under static and quasi-static action for a working life of 50 and 100 years   |                        |              |       |        |        |        |        |       |
| Temperature range I:<br>24°C/40°C                                                              | $\delta_{NO}$ -factor  | [mm/(N/mm²)] | 0,071 | 0,072  | 0,074  | 0,076  | 0,079  | 0,082 |
|                                                                                                | $\delta_{Ncr}$ -factor | [mm/(N/mm²)] | 0,115 | 0,122  | 0,128  | 0,135  | 0,142  | 0,171 |
| Temperature range II:<br>50°C/72°C                                                             | $\delta_{NO}$ -factor  | [mm/(N/mm²)] | 0,095 | 0,096  | 0,099  | 0,102  | 0,106  | 0,110 |
|                                                                                                | $\delta_{Ncr}$ -factor | [mm/(N/mm²)] | 0,154 | 0,163  | 0,172  | 0,181  | 0,189  | 0,229 |
| Temperature range III:<br>60°C/80°C                                                            | $\delta_{NO}$ -factor  | [mm/(N/mm²)] | 0,095 | 0,096  | 0,099  | 0,102  | 0,106  | 0,110 |
|                                                                                                | $\delta_{Ncr}$ -factor | [mm/(N/mm²)] | 0,154 | 0,163  | 0,172  | 0,181  | 0,189  | 0,229 |

1) Calculation of the displacement:  $\delta_{NO} = \delta_{NO\text{-factor}} \cdot \tau$ ;  $\delta_{Ne} = \delta_{Ne\text{-factor}} \cdot \tau$ ;  $\tau$ : action bond stress for tension

**Table C22: Displacements under tension load<sup>1)</sup> in diamond drilled holes (DD)**

| Internal threaded anchor rods                                                                  |                        | IG-M6                     | IG-M8 | IG-M10 | IG-M12 | IG-M16 | IG-M20 |
|------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------|--------|--------|--------|--------|
| <b>Uncracked concrete under static and quasi-static action for a working life of 50 years</b>  |                        |                           |       |        |        |        |        |
| Temperature range I:<br>24°C/40°C                                                              | $\delta_{NO}$ -factor  | [mm/(N/mm <sup>2</sup> )] | 0,012 | 0,012  | 0,013  | 0,014  | 0,015  |
|                                                                                                | $\delta_{Nsc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,019 | 0,019  | 0,020  | 0,022  | 0,025  |
| Temperature range II:<br>50°C/72°C                                                             | $\delta_{NO}$ -factor  | [mm/(N/mm <sup>2</sup> )] | 0,014 | 0,014  | 0,015  | 0,016  | 0,018  |
|                                                                                                | $\delta_{Nsc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,053 | 0,055  | 0,058  | 0,062  | 0,070  |
| Temperature range III:<br>60°C/80°C                                                            | $\delta_{NO}$ -factor  | [mm/(N/mm <sup>2</sup> )] | 0,014 | 0,014  | 0,015  | 0,016  | 0,018  |
|                                                                                                | $\delta_{Nsc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,053 | 0,055  | 0,058  | 0,062  | 0,070  |
| <b>Uncracked concrete under static and quasi-static action for a working life of 100 years</b> |                        |                           |       |        |        |        |        |
| Temperature range I:<br>24°C/40°C                                                              | $\delta_{NO}$ -factor  | [mm/(N/mm <sup>2</sup> )] | 0,012 | 0,012  | 0,013  | 0,014  | 0,015  |
|                                                                                                | $\delta_{Nsc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,021 | 0,021  | 0,023  | 0,024  | 0,027  |
| Temperature range II:<br>50°C/72°C                                                             | $\delta_{NO}$ -factor  | [mm/(N/mm <sup>2</sup> )] | 0,014 | 0,014  | 0,015  | 0,016  | 0,018  |
|                                                                                                | $\delta_{Nsc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,039 | 0,040  | 0,043  | 0,045  | 0,051  |
| Temperature range III:<br>60°C/80°C                                                            | $\delta_{NO}$ -factor  | [mm/(N/mm <sup>2</sup> )] | 0,014 | 0,014  | 0,015  | 0,016  | 0,018  |
|                                                                                                | $\delta_{Nsc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0,039 | 0,040  | 0,043  | 0,045  | 0,051  |

1) Calculation of the displacement:  $\delta_{N0} = \delta_{N0\text{-factor}} \cdot \tau$ ;  $\delta_{N40} = \delta_{N40\text{-factor}} \cdot \tau$ ;  $\tau$ : action bond stress for tension

**Table C23: Displacements under shear load<sup>1)</sup> for all drilling methods**

| Internal threaded anchor rods                                                                                     |                       | IG-M6   | IG-M8 | IG-M10 | IG-M12 | IG-M16 | IG-M20 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------|---------|-------|--------|--------|--------|--------|
| <b>Uncracked and cracked concrete under static and quasi-static action for a working life of 50 and 100 years</b> |                       |         |       |        |        |        |        |
| All temperature ranges                                                                                            | $\delta_{y0}$ -factor | [mm/kN] | 0,07  | 0,06   | 0,06   | 0,05   | 0,04   |
|                                                                                                                   | $\delta_{yL}$ -factor | [mm/kN] | 0,10  | 0,09   | 0,08   | 0,08   | 0,06   |

|                                    | $V_{Ed}$                                            | $\gamma_{RE}$                                       | 0.75                 | 0.85 | 0.95 | 1.05 |
|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|----------------------|------|------|------|
| 1) Calculation of the displacement | $\delta_{VEd} = \delta_{VEd}\text{-factor} \cdot V$ | $\delta_{VEd} = \delta_{VEd}\text{-factor} \cdot V$ | V: action shear load |      |      |      |

|                                                                                                                                                                               |                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <p><b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b></p>                                                                                            | <p><b>Annex C 19</b></p> |
| <p><b>Performances</b><br/>         Displacements under static and quasi-static action<br/>         for a working life of 50 and 100 years (Internal threaded anchor rod)</p> |                          |

**Table C24:** Displacements under tension load<sup>1)</sup> in hammer drilled holes (HD), comp. air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)

| Reinforcing bar                                                                                |                       | Ø 8          | Ø 10  | Ø 12  | Ø 14  | Ø 16  | Ø 20  | Ø 24  | Ø 25  | Ø 28  | Ø 32  | Ø 36  | Ø 40  |       |
|------------------------------------------------------------------------------------------------|-----------------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Uncracked concrete under static and quasi-static action for a working life of 50 and 100 years |                       |              |       |       |       |       |       |       |       |       |       |       |       |       |
| Temp.- range<br>I: 24°C/40°C                                                                   | $\sigma_{ND}$ -factor | [mm/(N/mm²)] | 0,028 | 0,029 | 0,030 | 0,031 | 0,033 | 0,035 | 0,038 | 0,038 | 0,040 | 0,043 | 0,045 | 0,047 |
|                                                                                                | $\sigma_{NS}$ -factor | [mm/(N/mm²)] | 0,028 | 0,029 | 0,030 | 0,031 | 0,033 | 0,035 | 0,038 | 0,038 | 0,040 | 0,043 | 0,045 | 0,047 |
| Temp.- range<br>II: 50°C/72°C                                                                  | $\sigma_{ND}$ -factor | [mm/(N/mm²)] | 0,038 | 0,039 | 0,040 | 0,042 | 0,044 | 0,047 | 0,051 | 0,051 | 0,054 | 0,058 | 0,060 | 0,063 |
|                                                                                                | $\sigma_{NS}$ -factor | [mm/(N/mm²)] | 0,047 | 0,049 | 0,051 | 0,053 | 0,055 | 0,059 | 0,065 | 0,065 | 0,068 | 0,072 | 0,074 | 0,079 |
| Temp.- range<br>III: 60°C/80°C                                                                 | $\sigma_{ND}$ -factor | [mm/(N/mm²)] | 0,038 | 0,039 | 0,040 | 0,042 | 0,044 | 0,047 | 0,051 | 0,051 | 0,054 | 0,058 | 0,060 | 0,063 |
|                                                                                                | $\sigma_{NS}$ -factor | [mm/(N/mm²)] | 0,047 | 0,049 | 0,051 | 0,053 | 0,055 | 0,059 | 0,065 | 0,065 | 0,068 | 0,072 | 0,074 | 0,079 |
| Cracked concrete under static and quasi-static action for a working life of 50 and 100 years   |                       |              |       |       |       |       |       |       |       |       |       |       |       |       |
| Temp.- range<br>I: 24°C/40°C                                                                   | $\sigma_{ND}$ -factor | [mm/(N/mm²)] | 0,069 | 0,070 | 0,071 | 0,072 | 0,073 | 0,074 | 0,076 | 0,079 | 0,079 | 0,081 | 0,084 |       |
|                                                                                                | $\sigma_{NS}$ -factor | [mm/(N/mm²)] | 0,115 | 0,122 | 0,128 | 0,135 | 0,142 | 0,155 | 0,171 | 0,171 | 0,181 | 0,194 |       |       |
| Temp.- range<br>II: 50°C/72°C                                                                  | $\sigma_{ND}$ -factor | [mm/(N/mm²)] | 0,092 | 0,095 | 0,096 | 0,098 | 0,099 | 0,102 | 0,106 | 0,106 | 0,109 | 0,113 |       |       |
|                                                                                                | $\sigma_{NS}$ -factor | [mm/(N/mm²)] | 0,154 | 0,163 | 0,172 | 0,181 | 0,189 | 0,207 | 0,229 | 0,229 | 0,242 | 0,260 |       |       |
| Temp.- range<br>III: 60°C/80°C                                                                 | $\sigma_{ND}$ -factor | [mm/(N/mm²)] | 0,092 | 0,095 | 0,096 | 0,098 | 0,099 | 0,102 | 0,106 | 0,106 | 0,109 | 0,113 |       |       |
|                                                                                                | $\sigma_{NS}$ -factor | [mm/(N/mm²)] | 0,154 | 0,163 | 0,172 | 0,181 | 0,189 | 0,207 | 0,229 | 0,229 | 0,242 | 0,260 |       |       |

1) Calculation of the displacement:  $\delta_{ND} = \delta_{ND} \cdot \text{factor} \cdot \tau$ ;  $\delta_{NE} = \delta_{NE} \cdot \text{factor} \cdot \tau$ ;  $\tau$ : action bond stress for tension

**Table C25: Displacements under tension load<sup>1)</sup> in diamond drilled holes (DD)**

| Reinforcing bar                                                                                |                       | Ø 8                       | Ø 10  | Ø 12  | Ø 14  | Ø 16  | Ø 20  | Ø 24  | Ø 25  | Ø 28  | Ø 32  | Ø 36  | Ø 40  |
|------------------------------------------------------------------------------------------------|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Uncracked concrete under static and quasi-static action for a working life of 50 years</b>  |                       |                           |       |       |       |       |       |       |       |       |       |       |       |
| Temp.- range<br>I: 24°C/40°C                                                                   | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.008 | 0.009 | 0.009 | 0.01  | 0.011 | 0.012 | 0.013 | 0.013 | 0.014 | 0.015 | 0.016 |
|                                                                                                | $\delta_{Nc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.018 | 0.018 | 0.019 | 0.020 | 0.021 | 0.024 | 0.027 | 0.028 | 0.031 | 0.032 | 0.034 |
| Temp.- range<br>II: 50°C/72°C                                                                  | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.009 | 0.011 | 0.011 | 0.012 | 0.013 | 0.014 | 0.015 | 0.015 | 0.016 | 0.018 | 0.019 |
|                                                                                                | $\delta_{Nc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.048 | 0.051 | 0.054 | 0.058 | 0.061 | 0.068 | 0.076 | 0.081 | 0.088 | 0.090 | 0.097 |
| Temp.- range<br>III: 60°C/80°C                                                                 | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.009 | 0.011 | 0.011 | 0.012 | 0.013 | 0.014 | 0.015 | 0.015 | 0.016 | 0.018 | 0.019 |
|                                                                                                | $\delta_{Nc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.048 | 0.051 | 0.054 | 0.058 | 0.061 | 0.068 | 0.076 | 0.081 | 0.088 | 0.090 | 0.097 |
| <b>Uncracked concrete under static and quasi-static action for a working life of 100 years</b> |                       |                           |       |       |       |       |       |       |       |       |       |       |       |
| Temp.- range<br>I: 24°C/40°C                                                                   | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.008 | 0.009 | 0.009 | 0.010 | 0.011 | 0.012 | 0.013 | 0.013 | 0.014 | 0.015 | 0.016 |
|                                                                                                | $\delta_{Nc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.018 | 0.020 | 0.021 | 0.022 | 0.024 | 0.026 | 0.029 | 0.029 | 0.031 | 0.034 | 0.037 |
| Temp.- range<br>II: 50°C/72°C                                                                  | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.009 | 0.011 | 0.011 | 0.012 | 0.013 | 0.014 | 0.015 | 0.015 | 0.016 | 0.018 | 0.019 |
|                                                                                                | $\delta_{Nc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.035 | 0.037 | 0.040 | 0.042 | 0.045 | 0.049 | 0.055 | 0.055 | 0.059 | 0.064 | 0.066 |
| Temp.- range<br>III: 60°C/80°C                                                                 | $\delta_{ND}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.009 | 0.011 | 0.011 | 0.012 | 0.013 | 0.014 | 0.015 | 0.015 | 0.016 | 0.018 | 0.019 |
|                                                                                                | $\delta_{Nc}$ -factor | [mm/(N/mm <sup>2</sup> )] | 0.035 | 0.037 | 0.040 | 0.042 | 0.045 | 0.049 | 0.055 | 0.055 | 0.059 | 0.064 | 0.066 |

1) Calculation of the displacement:  $\delta_{N0} = \delta_{N0} \cdot \text{factor} \cdot \tau$ ;  $\delta_{Nac} = \delta_{Nac} \cdot \text{factor} \cdot \tau$ ;  $\tau$ : action bond stress for tension

**Table C26: Displacements under shear load<sup>1)</sup> for all drilling methods**

| Reinforcing bar                                                                                            |                           |         | Ø 8  | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24 | Ø 25 | Ø 28 | Ø 32 | Ø 36 | Ø 40 |
|------------------------------------------------------------------------------------------------------------|---------------------------|---------|------|------|------|------|------|------|------|------|------|------|------|------|
| Uncracked and cracked concrete under static and quasi-static action for a working life of 50 and 100 years |                           |         |      |      |      |      |      |      |      |      |      |      |      |      |
| All temperature ranges                                                                                     | $\delta_{V_{pr}}$ -factor | [mm/kN] | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
|                                                                                                            | $\delta_{V_{cr}}$ -factor | [mm/kN] | 0.09 | 0.08 | 0.08 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 |

1) Calculation of the displacement  $\delta_{V0} = \delta_{V0\text{-factor}} \cdot V$ ;  $\delta_{V\infty} = \delta_{V\infty\text{-factor}} \cdot V$ ;  $V$ : action shear load

|                                                                                                                                       |            |
|---------------------------------------------------------------------------------------------------------------------------------------|------------|
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                  | Annex C 20 |
| <b>Performances</b><br>Displacements under static and quasi-static action<br>for a working life of 50 and 100 years (reinforcing bar) |            |

**Table C27: Characteristic values of tension loads under seismic action (performance category C1) for a working life of 50 years**

[illegible]

**Table C28: Characteristic values of tension loads under seismic action (performance category C1) for a working life of 100 years**

[illegible]

**Table C29: Characteristic values of shear loads under seismic action (performance category C1) for a working life of 50 and 100 years**

| Threaded rod                                                                                                                                                             |                  |      | M8                      | M10 | M12 | M16 | M20 | M24 | M27 | M30               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------|-------------------------|-----|-----|-----|-----|-----|-----|-------------------|
| <b>Steel failure</b>                                                                                                                                                     |                  |      |                         |     |     |     |     |     |     |                   |
| Characteristic shear resistance<br>(Seismic C1)                                                                                                                          | $V_{Rk,s,eq,C1}$ | [kN] | $0,70 \cdot V_{Rk,s}^0$ |     |     |     |     |     |     |                   |
| Partial factor                                                                                                                                                           | $\gamma_{Ms,V}$  | [-]  | see Table C1            |     |     |     |     |     |     |                   |
| <b>Factor for annular gap</b>                                                                                                                                            | $\alpha_{gap}$   | [-]  | $0,5 (1,0)^{1)}$        |     |     |     |     |     |     |                   |
| <sup>1)</sup> Value in brackets valid for filled annular gap between fastener and clearance hole in the fixture. Use of special filling washer Annex A 3 is recommended. |                  |      |                         |     |     |     |     |     |     |                   |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                                              |                  |      |                         |     |     |     |     |     |     | <b>Annex C 23</b> |
| <b>Performances</b><br>Characteristic values of shear loads under seismic action (performance category C1)<br>for a working life of 50 and 100 years (threaded rod)      |                  |      |                         |     |     |     |     |     |     |                   |

**Table C30: Characteristic values of tension loads under seismic action (performance category C1) for a working life of 50 years**

| Reinforcing bar                                                                                                                                                                                 |                |                                         |                     | Ø 8                                     | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24 | Ø 25       | Ø 28 | Ø 32 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|---------------------|-----------------------------------------|------|------|------|------|------|------|------------|------|------|
| Steel failure                                                                                                                                                                                   |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |
| Characteristic tension resistance                                                                                                                                                               |                | $N_{Rk,s,eq,C1}$                        | [kN]                | $1,0 \cdot A_s \cdot f_{yk}^{1)}$       |      |      |      |      |      |      |            |      |      |
| Cross section area                                                                                                                                                                              |                | $A_s$                                   | [mm <sup>2</sup> ]  | 50                                      | 79   | 113  | 154  | 201  | 314  | 452  | 491        | 616  | 804  |
| Partial factor                                                                                                                                                                                  |                | $\gamma_{Ms,N}$                         | [-]                 | $1,4^{2)}$                              |      |      |      |      |      |      |            |      |      |
| Combined pull-out and concrete failure                                                                                                                                                          |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |
| Characteristic bond resistance in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB) |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |
| Temperature range                                                                                                                                                                               | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,eq,C1}$   | [N/mm <sup>2</sup> ]                    | 7,0  | 7,0  | 8,5  | 8,5  | 8,5  | 8,5  | 8,5        | 8,5  | 8,5  |
|                                                                                                                                                                                                 | II: 50°C/72°C  |                                         | $\tau_{Rk,eq,C1}$   | [N/mm <sup>2</sup> ]                    | 6,0  | 6,0  | 7,0  | 7,0  | 7,0  | 7,0  | 7,0        | 7,0  | 7,0  |
|                                                                                                                                                                                                 | III: 60°C/80°C |                                         | $\tau_{Rk,eq,C1}$   | [N/mm <sup>2</sup> ]                    | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5        | 4,5  | 4,5  |
| Increasing factors for concrete                                                                                                                                                                 |                |                                         | $\psi_c$            | [-]                                     | 1,0  |      |      |      |      |      |            |      |      |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                         |                |                                         | $\tau_{Rk,eq,C1} =$ | $\psi_c \cdot \tau_{Rk,eq,C1,(C20/25)}$ |      |      |      |      |      |      |            |      |      |
| Installation factor                                                                                                                                                                             |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |
| for dry and wet concrete (HD; HDB, CD)                                                                                                                                                          |                |                                         | $\gamma_{inst}$     | [-]                                     | 1,0  |      |      |      |      |      |            |      |      |
| for flooded bore hole (HD; HDB, CD)                                                                                                                                                             |                |                                         |                     |                                         | 1,2  |      |      |      |      |      |            |      |      |
| 1) $f_{yk}$ shall be taken from the specifications of reinforcing bars                                                                                                                          |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |
| 2) in absence of national regulation                                                                                                                                                            |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                                                            |                |                                         |                     |                                         |      |      |      |      |      |      | Annex C 24 |      |      |
| Performances<br>Characteristic values of tension loads under seismic action (performance category C1) for a working life of 50 years (reinforcing bar)                                          |                |                                         |                     |                                         |      |      |      |      |      |      |            |      |      |



**Table C31: Characteristic values of tension loads under seismic action (performance category C1) for a working life of 100 years**

| Reinforcing bar                                                                                                                                                                                 |                |                                         |                     | Ø 8                                     | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24 | Ø 25 | Ø 28 | Ø 32 |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|---------------------|-----------------------------------------|------|------|------|------|------|------|------|------|------|-----|
| Steel failure                                                                                                                                                                                   |                |                                         |                     |                                         |      |      |      |      |      |      |      |      |      |     |
| Characteristic tension resistance                                                                                                                                                               |                | $N_{Rk,s,eq,C1}$                        | [kN]                | $1,0 \cdot A_s \cdot f_{uk}^{1)}$       |      |      |      |      |      |      |      |      |      |     |
| Cross section area                                                                                                                                                                              |                | $A_s$                                   | [mm²]               | 50                                      | 79   | 113  | 154  | 201  | 314  | 452  | 491  | 616  | 804  |     |
| Partial factor                                                                                                                                                                                  |                | $\gamma_{Ms,N}$                         | [-]                 | $1,4^{2)}$                              |      |      |      |      |      |      |      |      |      |     |
| Combined pull-out and concrete failure                                                                                                                                                          |                |                                         |                     |                                         |      |      |      |      |      |      |      |      |      |     |
| Characteristic bond resistance in cracked and uncracked concrete C20/25 in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB) |                |                                         |                     |                                         |      |      |      |      |      |      |      |      |      |     |
| Temperature range                                                                                                                                                                               | I: 24°C/40°C   | Dry, wet concrete and flooded bore hole | $\tau_{Rk,eq,C1}$   | [N/mm²]                                 | 6,5  | 6,5  | 7,5  | 7,5  | 7,5  | 7,5  | 7,5  | 7,5  | 7,5  | 7,5 |
|                                                                                                                                                                                                 | II: 50°C/72°C  |                                         | $\tau_{Rk,eq,C1}$   | [N/mm²]                                 | 5,5  | 5,5  | 6,5  | 6,5  | 6,5  | 6,5  | 6,5  | 6,5  | 6,5  | 6,5 |
|                                                                                                                                                                                                 | III: 60°C/80°C |                                         | $\tau_{Rk,eq,C1}$   | [N/mm²]                                 | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5  | 4,5 |
| Increasing factors for concrete                                                                                                                                                                 |                |                                         | $\psi_c$            | [-]                                     | 1,0  |      |      |      |      |      |      |      |      |     |
| Characteristic bond resistance depending on the concrete strength class                                                                                                                         |                |                                         | $\tau_{Rk,eq,C1} =$ | $\psi_c \cdot \tau_{Rk,eq,C1,(C20/25)}$ |      |      |      |      |      |      |      |      |      |     |
| Installation factor                                                                                                                                                                             |                |                                         |                     |                                         |      |      |      |      |      |      |      |      |      |     |
| for dry and wet concrete (HD; HDB, CD)                                                                                                                                                          |                |                                         | $\gamma_{inst}$     | [-]                                     | 1,0  |      |      |      |      |      |      |      |      |     |
| for flooded bore hole (HD; HDB, CD)                                                                                                                                                             |                |                                         |                     |                                         | 1,2  |      |      |      |      |      |      |      |      |     |
| 1) $f_{uk}$ shall be taken from the specifications of reinforcing bars<br>2) in absence of national regulation                                                                                  |                |                                         |                     |                                         |      |      |      |      |      |      |      |      |      |     |

|                                                                                                                                                         |  |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------|
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                    |  | Annex C 25 |
| Performances<br>Characteristic values of tension loads under seismic action (performance category C1) for a working life of 100 years (reinforcing bar) |  |            |

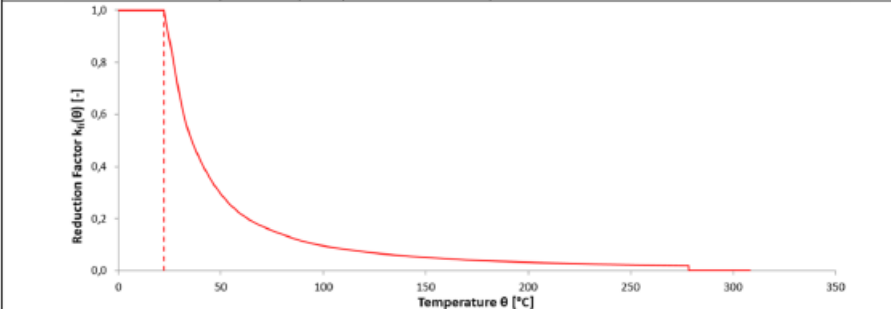
**Table C32: Characteristic values of shear loads under seismic action (performance category C1) for a working life of 50 and 100 years**

| Reinforcing bar                                                                                                                                                                                                                                                                 |                  |                    | Ø 8                                | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24 | Ø 25       | Ø 28 | Ø 32 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|------------------------------------|------|------|------|------|------|------|------------|------|------|
| Steel failure                                                                                                                                                                                                                                                                   |                  |                    |                                    |      |      |      |      |      |      |            |      |      |
| Characteristic shear resistance                                                                                                                                                                                                                                                 | $V_{Rk,s,eq,C1}$ | [kN]               | $0,35 \cdot A_s \cdot f_{uk}^{1)}$ |      |      |      |      |      |      |            |      |      |
| Cross section area                                                                                                                                                                                                                                                              | $A_s$            | [mm <sup>2</sup> ] | 50                                 | 79   | 113  | 154  | 201  | 314  | 452  | 491        | 616  | 804  |
| Partial factor                                                                                                                                                                                                                                                                  | $\gamma_{Ms,V}$  | [-]                | $1,5^{2)}$                         |      |      |      |      |      |      |            |      |      |
| Factor for annular gap                                                                                                                                                                                                                                                          | $\alpha_{gap}$   | [-]                | $0,5 (1,0)^{3)}$                   |      |      |      |      |      |      |            |      |      |
| 1) $f_{uk}$ shall be taken from the specifications of reinforcing bars<br>2) in absence of national regulation<br>3) Value in brackets valid for filled annular gap between fastener and clearance hole in the fixture. Use of special filling washer Annex A 3 is recommended. |                  |                    |                                    |      |      |      |      |      |      |            |      |      |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                                                                                                                                            |                  |                    |                                    |      |      |      |      |      |      | Annex C 26 |      |      |
| Performances<br>Characteristic values of shear loads under seismic action (performance category C1) for a working life of 50 and 100 years (reinforcing bar)                                                                                                                    |                  |                    |                                    |      |      |      |      |      |      |            |      |      |

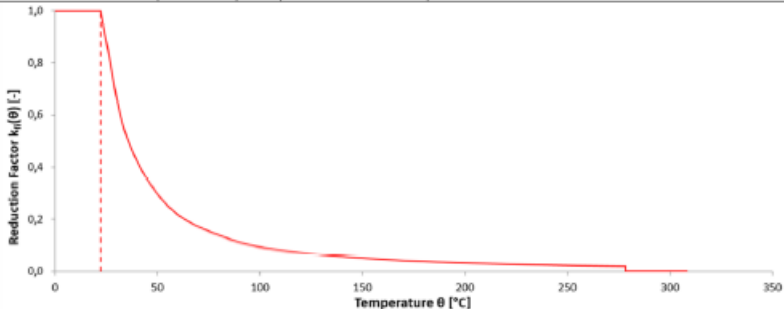




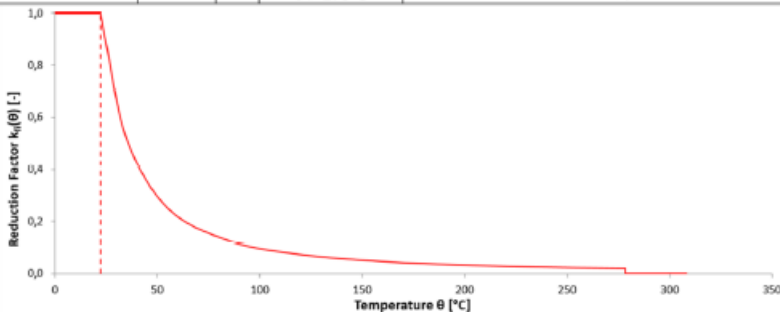
**Table C37: Characteristic values of tension and shear loads under fire exposure in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)**

| Threaded rod                                                                                                                                         |                        |                      |                                                           | M8                                      | M10 | M12 | M16 | M20  | M24  | M27        | M30  |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|-----------------------------------------------------------|-----------------------------------------|-----|-----|-----|------|------|------------|------|------|
| Steel failure                                                                                                                                        |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Characteristic tension resistance; Steel, Stainless Steel A2, A4 and HCR, strength class 5.8 resp. 50 and higher                                     | $N_{Rk,s,fi}$          | [kN]                 | Fire exposure time [min]                                  | 30                                      | 1,1 | 1,7 | 3,0 | 5,7  | 8,8  | 12,7       | 16,5 | 20,2 |
|                                                                                                                                                      |                        |                      |                                                           | 60                                      | 0,9 | 1,4 | 2,3 | 4,2  | 6,6  | 9,5        | 12,4 | 15,1 |
|                                                                                                                                                      |                        |                      |                                                           | 90                                      | 0,7 | 1,0 | 1,6 | 3,0  | 4,7  | 6,7        | 8,7  | 10,7 |
|                                                                                                                                                      |                        |                      |                                                           | 120                                     | 0,5 | 0,8 | 1,2 | 2,2  | 3,4  | 4,9        | 6,4  | 7,9  |
| Characteristic bond resistance in cracked and uncracked concrete C20/25 up to C50/60 under fire conditions for a given temperature $\theta$          |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Temperature reduction factor                                                                                                                         | $k_{fi,p}(\theta)$     | [-]                  | $\theta < 23^{\circ}\text{C}$                             | 1,0                                     |     |     |     |      |      |            |      |      |
|                                                                                                                                                      |                        |                      | $23^{\circ}\text{C} \leq \theta \leq 278^{\circ}\text{C}$ | $150,28 \cdot \theta^{-1,598} \leq 1,0$ |     |     |     |      |      |            |      |      |
|                                                                                                                                                      |                        |                      | $\theta > 278^{\circ}\text{C}$                            | 0,0                                     |     |     |     |      |      |            |      |      |
|                                                                    |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Characteristic bond resistance for a given temperature ( $\theta$ )                                                                                  | $\tau_{Rk,fi}(\theta)$ | [N/mm <sup>2</sup> ] | $k_{fi,p}(\theta) \cdot \tau_{Rk,cr,(C20/25)}^{1)}$       |                                         |     |     |     |      |      |            |      |      |
| Steel failure without lever arm                                                                                                                      |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Characteristic shear resistance; Steel, Stainless Steel A2, A4 and HCR, strength class 5.8 resp. 50 and higher                                       | $V_{Rk,s,fi}$          | [kN]                 | Fire exposure time [min]                                  | 30                                      | 1,1 | 1,7 | 3,0 | 5,7  | 8,8  | 12,7       | 16,5 | 20,2 |
|                                                                                                                                                      |                        |                      |                                                           | 60                                      | 0,9 | 1,4 | 2,3 | 4,2  | 6,6  | 9,5        | 12,4 | 15,1 |
|                                                                                                                                                      |                        |                      |                                                           | 90                                      | 0,7 | 1,0 | 1,6 | 3,0  | 4,7  | 6,7        | 8,7  | 10,7 |
|                                                                                                                                                      |                        |                      |                                                           | 120                                     | 0,5 | 0,8 | 1,2 | 2,2  | 3,4  | 4,9        | 6,4  | 7,9  |
| Steel failure with lever arm                                                                                                                         |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Characteristic bending moment; Steel, Stainless Steel A2, A4 and HCR, strength class 5.8 resp. 50 and higher                                         | $M^0_{Rk,s,fi}$        | [Nm]                 | Fire exposure time [min]                                  | 30                                      | 1,1 | 2,2 | 4,7 | 12,0 | 23,4 | 40,4       | 59,9 | 81,0 |
|                                                                                                                                                      |                        |                      |                                                           | 60                                      | 0,9 | 1,8 | 3,5 | 9,0  | 17,5 | 30,3       | 44,9 | 60,7 |
|                                                                                                                                                      |                        |                      |                                                           | 90                                      | 0,7 | 1,3 | 2,5 | 6,3  | 12,3 | 21,3       | 31,6 | 42,7 |
|                                                                                                                                                      |                        |                      |                                                           | 120                                     | 0,5 | 1,0 | 1,8 | 4,7  | 9,1  | 15,7       | 23,3 | 31,5 |
| 1) $\tau_{Rk,cr,(C20/25)}$ characteristic bond resistance for cracked concrete for concrete strength class C20/25 for the relevant temperature range |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                 |                        |                      |                                                           |                                         |     |     |     |      |      | Annex C 29 |      |      |
| Performances                                                                                                                                         |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |
| Characteristic values of tension and shear loads under fire exposure (threaded rod)                                                                  |                        |                      |                                                           |                                         |     |     |     |      |      |            |      |      |

**Table C38: Characteristic values of tension and shear loads under fire exposure in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)**

| Internal threaded anchor rods                                                                                                                                 |                    |                        |                                                           | IG-M6                                   | IG-M8                                            | IG-M10 | IG-M12 | IG-M16 | IG-M20            |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------|-----------------------------------------------------------|-----------------------------------------|--------------------------------------------------|--------|--------|--------|-------------------|------|
| <b>Steel failure</b>                                                                                                                                          |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |
| Characteristic tension resistance; Steel, Stainless Steel A4 and HCR, strength class 5.8 and 8.8 resp. 70                                                     | $N_{Rk,s,fi}$      | [kN]                   | Fire exposure time [min]                                  | 30                                      | 0,3                                              | 1,1    | 1,7    | 3,0    | 5,7               | 8,8  |
|                                                                                                                                                               |                    |                        |                                                           | 60                                      | 0,2                                              | 0,9    | 1,4    | 2,3    | 4,2               | 6,6  |
|                                                                                                                                                               |                    |                        |                                                           | 90                                      | 0,2                                              | 0,7    | 1,0    | 1,6    | 3,0               | 4,7  |
|                                                                                                                                                               |                    |                        |                                                           | 120                                     | 0,1                                              | 0,5    | 0,8    | 1,2    | 2,2               | 3,4  |
| <b>Characteristic bond resistance in cracked and uncracked concrete C20/25 up to C50/60 under fire conditions for a given temperature <math>\theta</math></b> |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |
| Temperature reduction factor                                                                                                                                  | $k_{fi,p}(\theta)$ | [-]                    | $\theta < 23^{\circ}\text{C}$                             | 1,0                                     |                                                  |        |        |        |                   |      |
|                                                                                                                                                               |                    |                        | $23^{\circ}\text{C} \leq \theta \leq 278^{\circ}\text{C}$ | $150,28 \cdot \theta^{-1,598} \leq 1,0$ |                                                  |        |        |        |                   |      |
|                                                                                                                                                               |                    |                        | $\theta > 278^{\circ}\text{C}$                            | 0,0                                     |                                                  |        |        |        |                   |      |
|                                                                             |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |
| Characteristic bond resistance for a given temperature ( $\theta$ )                                                                                           |                    | $\tau_{Rk,fi}(\theta)$ | [N/mm <sup>2</sup> ]                                      |                                         | $k_{fi,p}(\theta) \cdot \tau_{Rk,cr,(C20/25)}^1$ |        |        |        |                   |      |
| <b>Steel failure without lever arm</b>                                                                                                                        |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |
| Characteristic shear resistance; Steel, Stainless Steel A4 and HCR, strength class 5.8 and 8.8 resp. 70                                                       | $V_{Rk,s,fi}$      | [kN]                   | Fire exposure time [min]                                  | 30                                      | 0,3                                              | 1,1    | 1,7    | 3,0    | 5,7               | 8,8  |
|                                                                                                                                                               |                    |                        |                                                           | 60                                      | 0,2                                              | 0,9    | 1,4    | 2,3    | 4,2               | 6,6  |
|                                                                                                                                                               |                    |                        |                                                           | 90                                      | 0,2                                              | 0,7    | 1,0    | 1,6    | 3,0               | 4,7  |
|                                                                                                                                                               |                    |                        |                                                           | 120                                     | 0,1                                              | 0,5    | 0,8    | 1,2    | 2,2               | 3,4  |
| <b>Steel failure with lever arm</b>                                                                                                                           |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |
| Characteristic bending moment; Steel, Stainless Steel A4 and HCR, strength class 5.8 and 8.8 resp. 70                                                         | $M^0_{Rk,s,fi}$    | [Nm]                   | Fire exposure time [min]                                  | 30                                      | 0,2                                              | 1,1    | 2,2    | 4,7    | 12,0              | 23,4 |
|                                                                                                                                                               |                    |                        |                                                           | 60                                      | 0,2                                              | 0,9    | 1,8    | 3,5    | 9,0               | 17,5 |
|                                                                                                                                                               |                    |                        |                                                           | 90                                      | 0,1                                              | 0,7    | 1,3    | 2,5    | 6,3               | 12,3 |
|                                                                                                                                                               |                    |                        |                                                           | 120                                     | 0,1                                              | 0,5    | 1,0    | 1,8    | 4,7               | 9,1  |
| 1) $\tau_{Rk,cr,(C20/25)}$ characteristic bond resistance for cracked concrete for concrete strength class C20/25 for the relevant temperature range          |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |
| <b>Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete</b>                                                                                   |                    |                        |                                                           |                                         |                                                  |        |        |        | <b>Annex C 30</b> |      |
| <b>Performances</b><br>Characteristic values of tension and shear loads under fire exposure (internal threaded anchor rod )                                   |                    |                        |                                                           |                                         |                                                  |        |        |        |                   |      |

**Table C39: Characteristic values of tension and shear loads under fire exposure in hammer drilled holes (HD), compressed air drilled holes (CD) and in hammer drilled holes with hollow drill bit (HDB)**

| Reinforcing bar                                                                                                                                     |                    |                        |                                                           | Ø 8                                     | Ø 10                                             | Ø 12 | Ø 14 | Ø 16 | Ø 20 | Ø 24 | Ø 25       | Ø 28 | Ø 32 |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------|-----------------------------------------------------------|-----------------------------------------|--------------------------------------------------|------|------|------|------|------|------------|------|------|------|
| Steel failure                                                                                                                                       |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Characteristic tension resistance; BS 500                                                                                                           | $N_{Rk,s,fi}$      | [kN]                   | Fire exposure time [min]                                  | 30                                      | 0,5                                              | 1,2  | 2,3  | 3,1  | 4,0  | 6,3  | 9,0        | 9,8  | 12,3 | 16,1 |
|                                                                                                                                                     |                    |                        |                                                           | 60                                      | 0,5                                              | 1,0  | 1,7  | 2,3  | 3,0  | 4,7  | 6,8        | 7,4  | 9,2  | 12,1 |
|                                                                                                                                                     |                    |                        |                                                           | 90                                      | 0,4                                              | 0,8  | 1,5  | 2,0  | 2,6  | 4,1  | 5,9        | 6,4  | 8,0  | 10,5 |
|                                                                                                                                                     |                    |                        |                                                           | 120                                     | 0,3                                              | 0,6  | 1,1  | 1,5  | 2,0  | 3,1  | 4,5        | 4,9  | 6,2  | 8,0  |
| Characteristic bond resistance in cracked and uncracked concrete C20/25 up to C50/60 under fire conditions for a given temperature $\theta$         |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Temperature reduction factor                                                                                                                        | $k_{fi,p}(\theta)$ | [-]                    | $\theta \leq 25^{\circ}\text{C}$                          | 1,0                                     |                                                  |      |      |      |      |      |            |      |      |      |
|                                                                                                                                                     |                    |                        | $25^{\circ}\text{C} \leq \theta \leq 278^{\circ}\text{C}$ | $176,37 \cdot \theta^{-1,596} \leq 1,0$ |                                                  |      |      |      |      |      |            |      |      |      |
|                                                                                                                                                     |                    |                        | $\theta > 278^{\circ}\text{C}$                            | 0,0                                     |                                                  |      |      |      |      |      |            |      |      |      |
|                                                                   |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Characteristic bond resistance for a given temperature ( $\theta$ )                                                                                 |                    | $\tau_{Rk,fi}(\theta)$ | [N/mm <sup>2</sup> ]                                      |                                         | $k_{fi,p}(\theta) \cdot \tau_{Rk,cr}(C20/25)^1)$ |      |      |      |      |      |            |      |      |      |
| Steel failure without lever arm                                                                                                                     |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Characteristic shear resistance; BS 500                                                                                                             | $V_{Rk,s,fi}$      | [kN]                   | Fire exposure time [min]                                  | 30                                      | 0,5                                              | 1,2  | 2,3  | 3,1  | 4,0  | 6,3  | 9,0        | 9,8  | 12,3 | 16,1 |
|                                                                                                                                                     |                    |                        |                                                           | 60                                      | 0,5                                              | 1,0  | 1,7  | 2,3  | 3,0  | 4,7  | 6,8        | 7,4  | 9,2  | 12,1 |
|                                                                                                                                                     |                    |                        |                                                           | 90                                      | 0,4                                              | 0,8  | 1,5  | 2,0  | 2,6  | 4,1  | 5,9        | 6,4  | 8,0  | 10,5 |
|                                                                                                                                                     |                    |                        |                                                           | 120                                     | 0,3                                              | 0,6  | 1,1  | 1,5  | 2,0  | 3,1  | 4,5        | 4,9  | 6,2  | 8,0  |
| Steel failure with lever arm                                                                                                                        |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Characteristic bending moment; BS 500                                                                                                               | $M^0_{Rk,s,fi}$    | [Nm]                   | Fire exposure time [min]                                  | 30                                      | 0,6                                              | 1,8  | 4,1  | 6,5  | 9,7  | 18,8 | 32,6       | 36,8 | 51,7 | 77,2 |
|                                                                                                                                                     |                    |                        |                                                           | 60                                      | 0,5                                              | 1,5  | 3,1  | 4,8  | 7,2  | 14,1 | 24,4       | 27,6 | 38,8 | 57,9 |
|                                                                                                                                                     |                    |                        |                                                           | 90                                      | 0,4                                              | 1,2  | 2,6  | 4,2  | 6,3  | 12,3 | 21,2       | 23,9 | 33,6 | 50,2 |
|                                                                                                                                                     |                    |                        |                                                           | 120                                     | 0,3                                              | 0,9  | 2,0  | 3,2  | 4,8  | 9,4  | 16,3       | 18,4 | 25,9 | 38,6 |
| 1) $\tau_{Rk,cr}(C20/25)$ characteristic bond resistance for cracked concrete for concrete strength class C20/25 for the relevant temperature range |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Injection System EJOT MULTIFIX Epoxy / Sormat ITH Epoxy for concrete                                                                                |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      | Annex C 31 |      |      |      |
| Performances                                                                                                                                        |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |
| Characteristic values of tension and shear loads under fire exposure (reinforcing bar)                                                              |                    |                        |                                                           |                                         |                                                  |      |      |      |      |      |            |      |      |      |