Designated according to Article29 of Regulation (EU) Nº 305/2011

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# European Technical Assessment ETA 18/0018 of 29/06/2020

English translation prepared by IETcc. Original version in Spanish language

## General Part

| | |
|---|---|
| **Technical Assessment Body issuing the ETA designated according to Art. 29 of Regulation (EU) 305/2011:** | Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc) |
| **Trade name of the construction product:** | **CH / CH-A2 sleeve anchor** |
| **Product family to which the construction product belongs:** | Torque controlled expansion anchor made of galvanised steel and stainless steel of diameters 8, 10, 12, 16 and 20 for use in non-cracked concrete. |
| **Manufacturer:** | **Index - Técnicas Expansivas S.L.**<br>Segador 13<br>26006 Logroño (La Rioja) Spain.<br>website: www.indexfix.com |
| **Manufacturing plant:** | Index plant 2<br>Index plant 3F |
| **This European Technical Assessment contains:** | 12 pages including 3 annexes which form an integral part of this assessment. |
| **This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of:** | European Assessment Document EAD 330232-00-0601 “Mechanical Fasteners for use in concrete”, ed. October 2016 |
| **This ETA replaces:** | ETA 18/0018 issued 27/06/2018 |

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission according to article 25 (3) of Regulation (EU) No 305/2011.

# SPECIFIC PART

## 1. Technical description of the product

The Index CH sleeve anchor in the range of diameters 8, 10, 12, 16 and 20 is an anchor made of galvanised steel. The Index CH-A2 sleeve anchor in the range of diameters 8, 10, 12, 16 and 20 is an anchor made of stainless steel. The anchor is installed into a predrilled cylindrical hole and anchored by torque-controlled expansion. The anchorage is characterised by friction between the expansion sleeve and the concrete.

Product and installation descriptions are given in annexes A1 and A2.

## 2. Specification of the intended use in accordance with the applicable European Assessment Document.

The performances given in section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means to choosing the right products in relation to the expected economically reasonable working life of the works.

## 3. Performance of the product and references to the methods used for its assessment

### 3.1 Mechanical resistance and stability (BWR 1)

| Essential characteristic | Performance |
|---|---|
| Product performance for static or quasi static actions | See annex C |

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

| Essential characteristic | Performance |
|---|---|
| Reaction to fire | Anchorages satisfy requirements for class A1 according to EN 13501-7 |
| Resistance to fire | No performance assessed |

## 4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

The applicable European legal act for the system of Assessment and Verification of Constancy of Performances (see annex V to Regulation (EU) No 305/2011) is 96/582/EC.

The system to be applied is 1.

## 5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document.

The technical details necessary for the implementation of the AVCP system are laid down in the quality plan deposited at Instituto de Ciencias de la Construcción Eduardo Torroja.

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On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja
Madrid, 29th of June 2020

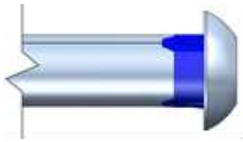
**Firmado por CASTILLO TALAVERA ANGEL - DNI 52507605P el día 02/07/2020 con un certificado emitido por AC Administracion**

Director IETcc-CSIC

## Product and identification

CH sleeve anchor


**Hexagonal head classes 6.8 or 8.8; A2-70**



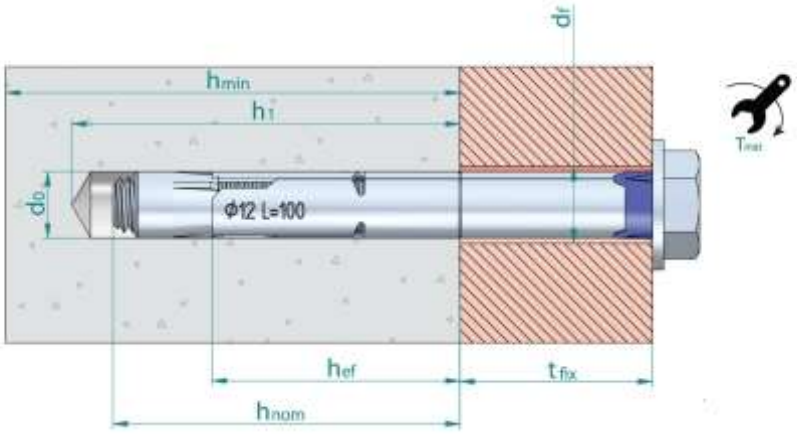
**Round head, class 5.6**

**Countersunk head, class 10.9; A2-70**

Identification on anchor:

- Expansion sleeve: Company logo + diameter / length
- Hexagonal bolt: Bolt class (6.8, 8.8, A2-70)
- Countersunk bolt: Bolt class (10.9, A2-70)

## Installed condition




$d_0$: Nominal diameter of drill bit
$d_f$: Fixture clearance hole diameter
$h_{ef}$: Effective anchorage depth
$h_1$: Depth of drilled hole
$h_{nom}$: Overall anchor embedment depth in the concrete
$h_{min}$: Minimum thickness of concrete member
$t_{fix}$: Fixture thickness
$T_{ins}$: Installation torque

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| **CH, CH-A2 sleeve anchor** | |
| **Product description and installed condition**<br><br>Identification | **Annex A1** |

## Table A1: CH materials

| Item | Component | Rounded version, class 5.6 | Hexagonal version, class 6.8 | Hexagonal version, class 8.8 | Countersunk version, class 10.9 |
|---|---|---|---|---|---|
| 1 | Bolt | Round head bolt, class 5.6 ISO 898-1, galvanised ≥ 5 µm ISO 4042 A2 | DIN 931 bolt, class 6.8 ISO 898-1, galvanised ≥ 5 µm ISO 4042 A2 | DIN 931 bolt, class 8.8 ISO 898-1, galvanised ≥ 5 µm ISO 4042 A2 | DIN 7991, class 10.9 ISO 898-1, galvanised ≥ 5 µm ISO 4042 A2 |
| 2 | Washer | Carbon steel, galvanised ≥ 5 µm ISO 4042 A2 | | | |
| 3 | Collar | POM plastic element | | | |
| 4 | Sleeve | Carbon steel, galvanised ≥ 5 µm ISO 4042 A2 | | | |
| 5 | Cone | Carbon steel, galvanised ≥ 5 µm ISO 4042 A2 | | | |

## Table A2: CH-A2 materials

| Item | Component | Hexagonal version, class A2-70 | Countersunk version, class A4-70 |
|---|---|---|---|
| 1 | Bolt | DIN 931 bolt, class A2-70 ISO 3506-1 | DIN 7991, class A2-70 ISO 3506-1 |
| 2 | Washer | Stainless steel, grade A2 | |
| 3 | Collar | POM plastic element | |
| 4 | Sleeve | Stainless steel, grade A2 | |
| 5 | Cone | Stainless steel, grade A2 | |

**Intended use**

**Anchorages subjected to:**

- Static or quasi static loads, all sizes and embedment depths

**Base materials:**

- Reinforced and unreinforced concrete according to EN 206:2013
- Strength classes C20/25 to C50/60 according to EN 206:2013
- Uncracked concrete

**Use conditions (environmental conditions):**

- CH: structures subjected to dry internal conditions.
- CH-A2: structures subjected to dry internal conditions or to atmospheres under Corrosion Resistance Class CRC II according to EN 1993-1-4:2006+A1-2015 annex A.

**Design:**

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete.
- Verifiable calculation rules and drawings are prepared taking into account of the loads to be attached. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorages under static or quasi-static are designed for design Method A in accordance with EN 1992-4:2018
- Diameter 8 / M6 sleeve anchor: use restricted to anchoring of structural components which are statically indeterminate, when in case of failure, the load can be distributed to other fasteners..

**Installation:**

- Hammer drilling only.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.

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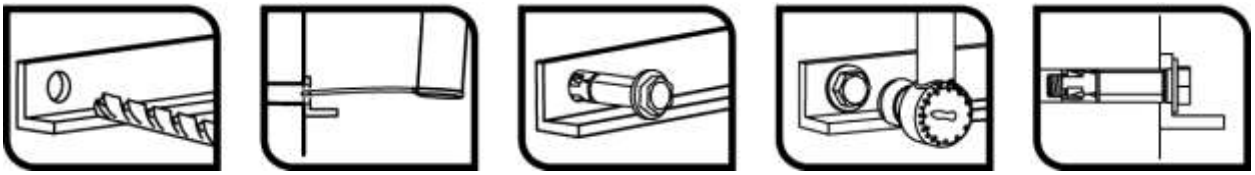
| **CH, CH-A2 sleeve anchor** | **Annex B1** |
| **Intended use**<br><br>Specifications | |

## Table C1: Installation parameters

| Installation parameters | | | | Performances | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| $d_0$ | Nominal diameter of drill bit: | | [mm] | 8 | 10 | 12 | 16 | 20 |
| $d_f$ | Fixture clearance hole diameter ≤ | | [mm] | 9 | 12 | 14 | 18 | 22 |
| $T_{inst}$ | Nominal installation torque: | | [Nm] | 10 | 20 | 35 | 50 | 140 |
| L | Total anchor length: | | [mm] | 45 \| 60 | 60 \| 80 | 70 \| 100 | 80 \| 110 | 110 |
| $h_{min}$ | Minimum thickness of concrete member: | | [mm] | 100 | 100 | 100 | 110 | 145 |
| $h_1$ | Depth of drilled hole ≥ | | [mm] | 45 | 60 | 75 | 80 | 105 |
| $h_{nom}$ | Overall anchor embedment depth in concrete ≥ | | [mm] | 39 | 51 | 65 | 70 | 92 |
| $h_{ef}$ | Effective anchorage depth: | | [mm] | 30 | 40 | 48 | 55 | 72 |
| $t_{fix}$ | Thickness of fixture ≤ | | [mm] | 5 \| 20 | 5 \| 27 | 5 \| 32 | 5 \| 37 | 15 |
| | Socket | Hex head: | [-] | 10 | 13 | 17 | 19 | 24 |
| | | Countersunk head: | [-] | #4 | #5 | #6 | -- | -- |
| | | Round head: | [-] | TX 40 | TX 40 | -- | -- | -- |
| $s_{min}$ | Minimum allowable spacing: | | [mm] | 41 | 54 | 65 | 74 | 97 |
| $c_{min}$ | Minimum allowable edge distance: | | [mm] | 41 | 54 | 65 | 74 | 97 |

## Installation process



## Table C2: CH characteristic resistance values to tension loads of design method A according to EN 1992-4

| CH: characteristic resistances under tension loads | | | | Performances | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| **STEEL FAILURE** | | | | | | | | |
| $N_{Rk.s}$ | Characteristic resistance class 5.6: | | [kN] | 10.05 | 18.30 | 29.00 | 42.15 | 78.50 |
| $\gamma_{M,s}$ | Partial safety factor class 5.6: | | [-] | | | 2.00 | | |
| $N_{Rk.s}$ | Characteristic resistance class 6.8: | | [kN] | 12.06 | 21.96 | 34.80 | 50.58 | 94.20 |
| $\gamma_{M,s}$ | Partial safety factor class 6.8: | | [-] | | | 1.50 | | |
| $N_{Rk.s}$ | Characteristic resistance class 8.8: | | [kN] | 16.08 | 29.28 | 46.40 | 67.44 | 125.60 |
| $\gamma_{M,s}$ | Partial safety factor class 8.8: | | [-] | | | 1.50 | | |
| $N_{Rk.s}$ | Characteristic resistance class 10.9: | | [kN] | 20.10 | 36.60 | 58.00 | 84.30 | 157.00 |
| $\gamma_{M,s}$ | Partial safety factor class 10.9: | | [-] | | | 1.50 | | |
| **PULL OUT FAILURE** | | | | | | | | |
| $N_{Rk,p}$ | Characteristic resistance in C20/25 uncracked concrete: | | [kN] | 5.5 | 10.0 | ---[1)] | ---[1)] | ---[1)] |
| $\gamma_{ins}$ | Installation safety factor: | | [-] | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 |
| $\Psi_c$ | Increasing factors for $N^0_{Rk,c}$: | C30/37 | | | | 1.22 | | |
| | | C40/50 | | | | 1.41 | | |
| | | C50/60 | | | | 1.55 | | |
| **CONCRETE CONE FAILURE AND SPLITTING FAILURE** | | | | | | | | |
| $h_{ef}$ | Effective anchorage depth: | | [mm] | 30 | 40 | 48 | 55 | 72 |
| $k_{ucr,N}$ | Factor for uncracked concrete: | | [-] | | | 11,0 | | |
| $\gamma_{ins}$ | Installation safety factor: | | [-] | 1.0 | 1.0 | 1.2 | 1.2 | 1.2 |
| $s_{cr,N}$ | Concrete cone failure: | Spacing: | [mm] | | | $3 \times h_{ef}$ | | |
| $c_{cr,N}$ | | Edge distance: | [mm] | | | $1.5 \times h_{ef}$ | | |
| $s_{cr,sp}$ | Splitting failure: | Spacing: | [mm] | 150 | 200 | 240 | 275 | 360 |
| $c_{cr,sp}$ | | Edge distance: | [mm] | 75 | 100 | 120 | 138 | 180 |

[1)] Pull out not decisive

## Table C3: CH displacements under tension loads

| CH: displacements under tension loads | | | Performances | | | | |
|---|---|---|---|---|---|---|---|
| | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| Tension service load in non cracked concrete: | | [kN] | 2.6 | 4.7 | 6.7 | 8.2 | 14.7 |
| $\delta_{N0}$ | Displacement: | [mm] | 1.8 | 1.9 | 2.3 | 1.8 | 1.7 |
| $\delta_{N\infty}$ | | [mm] | 2.5 | 2.6 | 3.0 | 2.5 | 2.4 |

**Table C4: CH characteristic resistance values to shear loads of design method A according EN 1992-4**

| CH: characteristic resistances under shear loads | | | Performances | | | | |
|---|---|---|---|---|---|---|---|
| | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| **STEEL FAILURE WITHOUT LEVER ARM** | | | | | | | |
| $V_{Rk,s}$ | Characteristic resistance class 5.6: | [kN] | 5.03 | 9.15 | 14.50 | 21.08 | 39.25 |
| $\gamma_{M,s}$ | Partial safety factor class 5.6: | [-] | 1.67 | | | | |
| $V_{Rk,s}$ | Characteristic resistance class 6.8: | [kN] | 6.03 | 10.98 | 17.40 | 25.29 | 47.10 |
| $\gamma_{M,s}$ | Partial safety factor class 6.8: | [-] | 1.25 | | | | |
| $V_{Rk,s}$ | Characteristic resistance class 8.8: | [kN] | 8.04 | 14.64 | 23.20 | 33.72 | 62.80 |
| $\gamma_{M,s}$ | Partial safety factor class 8.8: | [-] | 1.25 | | | | |
| $V_{Rk,s}$ | Characteristic resistance class 10.9: | [kN] | 10.05 | 18.30 | 29.00 | 42.15 | 78.50 |
| $\gamma_{M,s}$ | Partial safety factor class 10.9: | [-] | 1.50 | | | | |
| $k_7$ | Ductility factor: | [-] | 1.0 | | | | |
| **STEEL FAILURE WITH LEVER ARM** | | | | | | | |
| $M^0_{Rk,s}$ | Characteristic bending moment 5.6: | [Nm] | 7.63 | 18.75 | 37.41 | 65.55 | 166.61 |
| $\gamma_{M,s}$ | Partial safety factor 5.6: | [-] | 1.67 | | | | |
| $M^0_{Rk,s}$ | Characteristic bending moment 6.8: | [Nm] | 9.16 | 22.50 | 44.89 | 78.66 | 199.93 |
| $\gamma_{M,s}$ | Partial safety factor 6.8: | [-] | 1.25 | | | | |
| $M^0_{Rk,s}$ | Characteristic bending moment 8.8: | [Nm] | 12.21 | 30.00 | 59.86 | 104.88 | 266.57 |
| $\gamma_{M,s}$ | Partial safety factor 8.8: | [-] | 1.25 | | | | |
| $M^0_{Rk,s}$ | Characteristic bending moment 10.9 | [Nm] | 15.26 | 37.51 | 74.82 | 131.10 | 333.22 |
| $\gamma_{M,s}$ | Partial safety factor 10.9: | [-] | 1.50 | | | | |
| **CONCRETE PRYOUT FAILURE** | | | | | | | |
| $k_8$ | Pryout factor: | [-] | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 |
| $\gamma_{ins}$ | Installation safety factor: | [-] | 1.0 | | | | |
| **CONCRETE EDGE FAILURE** | | | | | | | |
| $\ell_f$ | Effective length of anchor: | [mm] | 30 | 40 | 48 | 55 | 72 |
| $d_{nom}$ | Outside diameter of anchor: | [mm] | 8 | 10 | 12 | 16 | 20 |
| $\gamma_{ins}$ | Installation safety factor: | [-] | 1.0 | | | | |

**Table C5: CH displacements under shear loads**

| CH: displacements under shear loads | | | Performances | | | | |
|---|---|---|---|---|---|---|---|
| | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| Shear service load in non cracked concrete: | | [kN] | 3.5 | 6.3 | 9.9 | 14.5 | 26.9 |
| $\delta_{V0}$ | Displacement: | [mm] | 1.9 | 2.8 | 2.8 | 2.9 | 3.8 |
| $\delta_{V\infty}$ | | [mm] | 2.9 | 3.8 | 4.2 | 4.4 | 6.7 |

## Table C6: CH-A2 characteristic resistance values to tension loads of design method A according to EN 1992-4

| CH-A2: characteristic resistances under tension loads | | | | Performances | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| **STEEL FAILURE** | | | | | | | | |
| $N_{Rk.s}$ | Characteristic resistance class A2-70: | | [kN] | 14.07 | 25.62 | 40.60 | 59.01 | 109.90 |
| $\gamma_{M,s}$ | Partial safety factor class: | | [-] | 1.87 | | | | |
| **PULL OUT FAILURE** | | | | | | | | |
| $N_{Rk,p}$ | Characteristic resistance in C20/25 uncracked concrete: | | [kN] | ---[1)] | 9,5 | 14 | 16 | 20 |
| $\gamma_{ins}$ | Installation safety factor: | | [-] | 1.0 | 1.2 | 1.2 | 1.2 | 1.0 |
| $\Psi_c$ | Increasing factors for $N^0_{Rk,c}$: | C30/37 | | 1.01 | 1.01 | 1.04 | 1.04 | 1.04 |
| | | C40/50 | | 1.01 | 1.02 | 1.06 | 1.06 | 1.06 |
| | | C50/60 | | 1.02 | 1.03 | 1.09 | 1.09 | 1.09 |
| **CONCRETE CONE FAILURE AND SPLITTING FAILURE** | | | | | | | | |
| $h_{ef}$ | Effective anchorage depth: | | [mm] | 30 | 40 | 48 | 55 | 72 |
| $k_{ucr,N}$ | Factor for uncracked concrete: | | [-] | 11.0 | | | | |
| $\gamma_{ins}$ | Installation safety factor: | | [-] | 1.0 | 1.2 | 1.2 | 1.2 | 1.2 |
| $s_{cr,N}$ | Concrete cone failure: | Spacing: | [mm] | 3 x $h_{ef}$ | | | | |
| $c_{cr,N}$ | | Edge distance: | [mm] | 1.5 x $h_{ef}$ | | | | |
| $s_{cr,sp}$ | Splitting failure: | Spacing: | [mm] | 150 | 200 | 240 | 275 | 360 |
| $c_{cr,sp}$ | | Edge distance: | [mm] | 75 | 100 | 120 | 138 | 180 |

[1)] Pull out is not decisive

## Table C7: CH-A2 displacements under tension loads

| CH-A2: displacements under tension loads | | | Performances | | | | |
|---|---|---|---|---|---|---|---|
| | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| Tension service load in non cracked concrete: | | [kN] | 3.9 | 3.8 | 5.6 | 6.3 | 9.5 |
| $\delta_{N0}$ | Displacement: | [mm] | 1.0 | 0.6 | 1.6 | 0.5 | 0.7 |
| $\delta_{N\infty}$ | | [mm] | 2.1 | | | | |

**Table C8: CH-A2 characteristic resistance values to shear loads of design method A according EN 1992-4**

| CH-A2: characteristic resistances under shear loads | | | Performances | | | | |
|---|---|---|---|---|---|---|---|
| | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| **STEEL FAILURE WITHOUT LEVER ARM** | | | | | | | |
| $V_{Rk,s}$ | Characteristic resistance class A2-70: | [kN] | 7.04 | 12.81 | 20.30 | 29.51 | 54.95 |
| $\gamma_{M,s}$ | Partial safety factor class: | [-] | 1.56 | | | | |
| $k_7$ | Ductility factor: | [-] | 1.0 | | | | |
| **STEEL FAILURE WITH LEVER ARM** | | | | | | | |
| $M^0_{Rk,s}$ | Characteristic bending moment A2-70: | [Nm] | 10.7 | 22.5 | 44.9 | 78.6 | 199.8 |
| $\gamma_{M,s}$ | Partial safety factor: | [-] | 1.56 | | | | |
| **CONCRETE PRYOUT FAILURE** | | | | | | | |
| $k_8$ | Pryout factor: | [-] | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 |
| $\gamma_{ins}$ | Installation safety factor: | [-] | 1.0 | | | | |
| **CONCRETE EDGE FAILURE** | | | | | | | |
| $l_f$ | Effective length of anchor: | [mm] | 30 | 40 | 48 | 55 | 72 |
| $d_{nom}$ | Outside diameter of anchor: | [mm] | 8 | 10 | 12 | 16 | 20 |
| $\gamma_{ins}$ | Installation safety factor: | [-] | 1.0 | | | | |

**Table C9: CH-A2 displacements under shear loads**

| CH: displacements under shear loads | | | Performances | | | | |
|---|---|---|---|---|---|---|---|
| | | | Ø8 M6 | Ø10 M8 | Ø12 M10 | Ø16 M12 | Ø20 M16 |
| Shear service load in non cracked concrete: | | [kN] | 3.2 | 5.9 | 9.3 | 13.5 | 25.2 |
| $\delta_{V0}$ | Displacement: | [mm] | 1.7 | 1.8 | 1.7 | 1.3 | 1.6 |
| $\delta_{V\infty}$ | | [mm] | 2.6 | 2.7 | 2.5 | 1.9 | 2.4 |