Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Member of EOTA

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Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

# European Technical Assessment

# ETA-22/0364 of 9 June 2022

English translation prepared by DIBt - Original version in German language

**General Part**

| | |
|---|---|
| Technical Assessment Body issuing the European Technical Assessment: | Deutsches Institut für Bautechnik |
| Trade name of the construction product | SPIT TAPCON XTREM LT A4 |
| Product family to which the construction product belongs | Mechanical fasteners for use in concrete |
| Manufacturer | SPIT<br>Route de Lyon<br>26500 BOURG-LÉS-VALENCE<br>FRANKREICH |
| Manufacturing plant | Plant 1 |
| This European Technical Assessment contains | 19 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 | EAD 330232-01-0601, Edition 05/2021 |

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## Specific Part

### 1 Technical description of the product

The concrete screw SPIT TAPCON XTREM LT A4 is an anchor in size 6, 8 and 10 mm made of stainless steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and product description are given in Annex A.

### 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 for 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 |
|---|---|
| Characteristic resistance to tension load (static and quasi-static loading) | See Annex B4, C1 and C2 |
| Characteristic resistance to shear load (static and quasi-static loading) | See Annex C1 and C2 |
| Displacements (static and quasi-static loading) | See Annex C5 |
| Characteristic resistance and displacements for seismic performance categorie C1 | See Annex C3 |

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

| Essential characteristic | Performance |
|---|---|
| Reaction to fire | Class A1 |
| Resistance to fire | See Annex C4 |

#### 3.3 Aspects of durability linked with the Basic Works Requirements

| Essential characteristic | Performance |
|---|---|
| Durability | See Annex B1 |

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

In accordance with European Assessment Document EAD No. 330232-01-0601 the applicable European legal act 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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 9 June 2022 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

*beglaubigt:*
Tempel

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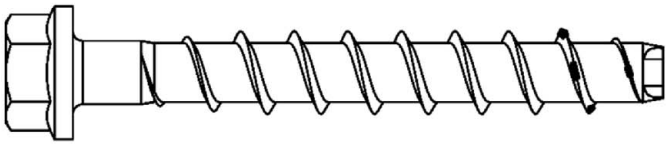
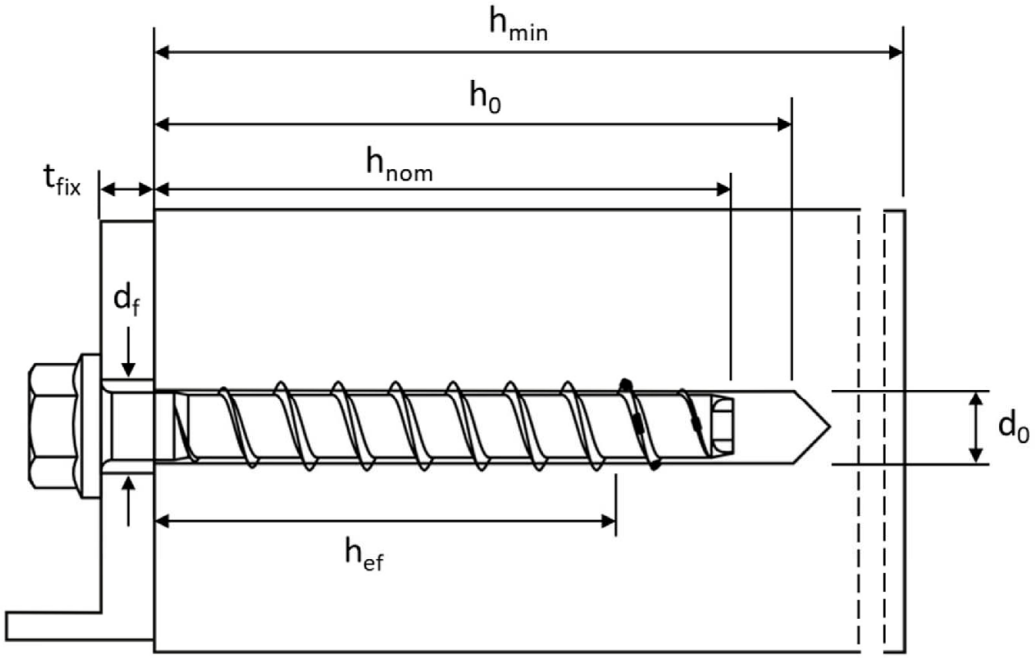
# Product in installed condition

## SPIT concrete screw TAPCON XTREM LT A4

- stainless steel A4
- high corrosion resistant steel HCR



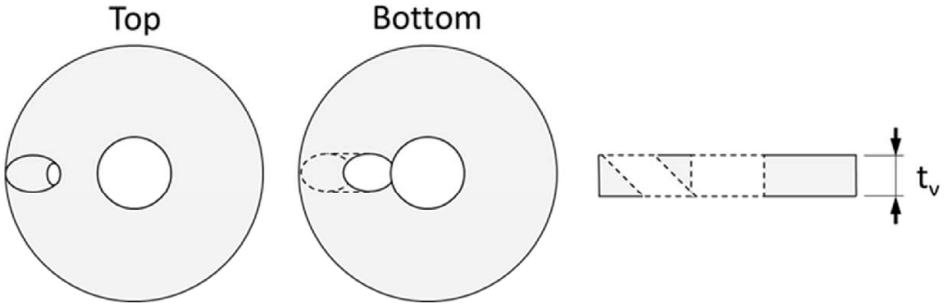
e.g. SPIT concrete screw with hexagon head and fixture




$d_0$ = nominal diameter of drill hole
$t_{fix}$ = thickness of fixture
$d_f$ = diameter of clearance hole

$h_{min}$ = minimum thickness of member
$h_{nom}$ = nominal embedment depth
$h_0$ = depth of drill hole
$h_{ef}$ = effective embedment depth

Filling washer (optional) to fill annular gap




| | |
|---|---|
| **SPIT TAPCON XTREM LT A4** | |
| **Product description**<br>Product in installed condition | **Annex A1** |

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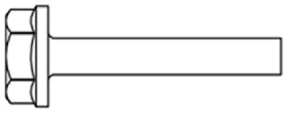
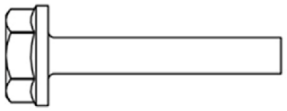
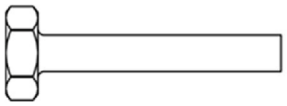
Version with metric connection thread and hexagon drive e.g. TAPCON XTREM LT A4 8x105 M10 SW7; Type ST



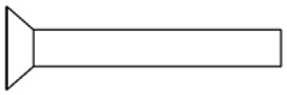

Version with washer and hexagon head e.g. TAPCON XTREM LT A4 8x80 SW13 VZ 40; Type S




Version with washer, hexagon head and TORX drive e.g. TAPCON XTREM LT A4 8x80 SW13; Type S

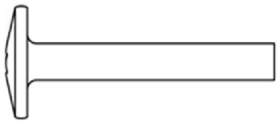



Version with hexagon head e.g. TAPCON XTREM LT A4 8x80 SW13 OS; Type S

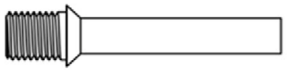



Version with countersunk head and TORX drive e.g. TAPCON XTREM LT A4 8x80 C VZ 40; Type SK

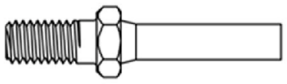

Version with pan head and TORX drive e.g. TAPCON XTREM LT A4 8x80 P VZ 40; Type P



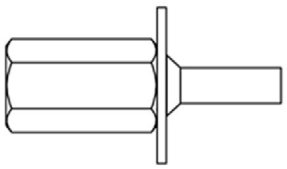

Version with large pan head and TORX drive e.g. TAPCON XTREM LT A4 8x80 LP VZ 40; Type P




Version with countersunk head and connection thread e.g. TAPCON XTREM LT A4 6x55 AG M8; Type ST-6




Version with hexagon drive and connection thread e.g. TAPCON XTREM LT A4 6x55 M8 SW10; Type ST-6




Version with internal thread and hexagon drive e.g. TAPCON XTREM LT A4 6x55 IM M8/10; Type I



| SPIT TAPCON XTREM LT A4 | |
|---|---|
| **Product description**<br>Screw types | **Annex A2** |

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## Table 1: Material

| Part | Product name | Material |
|---|---|---|
| all types | TAPCON XTREM LT A4 | 1.4401; 1.4404; 1.4571; 1.4578 |
| | TAPCON XTREM LT HCR | 1.4529 |

| Part | Product name | Nominal characteristic steel | | Rupture elongation $A_5$ [%] |
|---|---|---|---|---|
| | | Yield strength $f_{yk}$ [N/mm²] | Ultimate strength $f_{uk}$ [N/mm²] | |
| all types | TAPCON XTREM LT A4 | 560 | 700 | ≤ 8 |
| | TAPCON XTREM LT HCR | | | |

## Table 2: Dimensions

| Anchor size | | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | $h_{nom}$ | 1[1)] | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Screw length | ≤ L | [mm] | 500 | | | | | | | | |
| Core diameter | $d_K$ | [mm] | 5,1 | | | 7,2 | | | 9,2 | | |
| Thread outer diameter | $d_s$ | [mm] | 7,6 | | | 10,5 | | | 12,5 | | |
| Thickness of filling washer | $t_v$ | [mm] | - | | | 5 | | | 5 | | |

1) only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

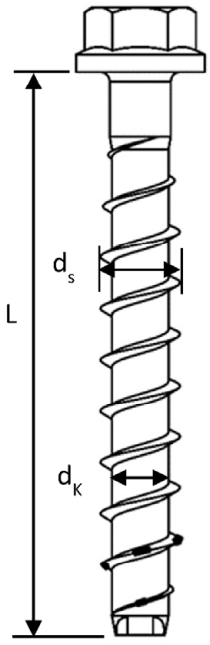
**Marking:**

**TAPCON XTREM LT A4**

| | |
|---|---|
| Screw type: | TSM LT |
| Screw size: | 10 |
| Screw length: | 100 |
| Material: | A4 |


**TAPCON XTREM LT HCR**

| | |
|---|---|
| Screw type: | TSM LT |
| Screw size: | 10 |
| Screw length: | 100 |
| Material: | HCR |


**SPIT TAPCON XTREM LT A4**

**Product description**
Material, dimensions and markings

**Annex A3**

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# Specification of Intended use

## Table 3: Anchorages subject to

| TAPCON XTREM LT size | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | $h_{nom}$ | $h_{nom1}$ [1)] | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Static and quasi-static loads | | All sizes and all embedment depths | | | | | | | | |
| Fire exposure | | | | | | | | | | |
| C1 category - seismic | | x | ok | ok | ok | x | ok | ok | x | ok |

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

x no performance assessed

## Base materials:

- Compacted reinforced and unreinforced concrete without fibers according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Cracked and uncracked concrete.

## Use conditions (Environmental conditions):

- Concrete screws subject to dry internal conditions: all screw types.
- For all other conditions corresponding to corrosion resistance classes CRC according to EN 1993-1-4:2006 + A1:2015
  - Stainless steel according to Annex A3, screw with marking A4: CRC III
  - High corrosion resistant steel according to Annex A3, screw with marking HCR: CRC V



| SPIT TAPCON XTREM LT A4 | |
|---|---|
| **Intended use**<br>Specification | **Annex B1** |

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# Specification of Intended use - continuation

## Design:

- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. 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 are designed according to EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.

  The design for shear load according to EN 1992-4:2018, Section 6.2.2 applies for all specified diameters $d_f$ of clearance hole in the fixture in Annex B3, Table 4.

## Installation:

- Hammer drilling or hollow drilling. Hollow drilling only for size 8-10.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling must be drilled at a minimum distance of twice the depth of aborted hole or closer, if the aborted hole is filled with high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- After installation further turning of the anchor must not be possible. The head of the anchor is supported in the fixture and is not damaged.
- The borehole may be filled with injection mortar SPIT VIPER XTREM or EPCON C8 XTREM
- Adjustability according to Annex B6 for sizes 6-10 except for applications with filled borehole and not for seismic applications.
- Cleaning of borehole is not necessary, if using a hollow drill.



| SPIT TAPCON XTREM LT A4 | |
|---|---|
| **Intended use**<br>Specification continuation | **Annex B2** |

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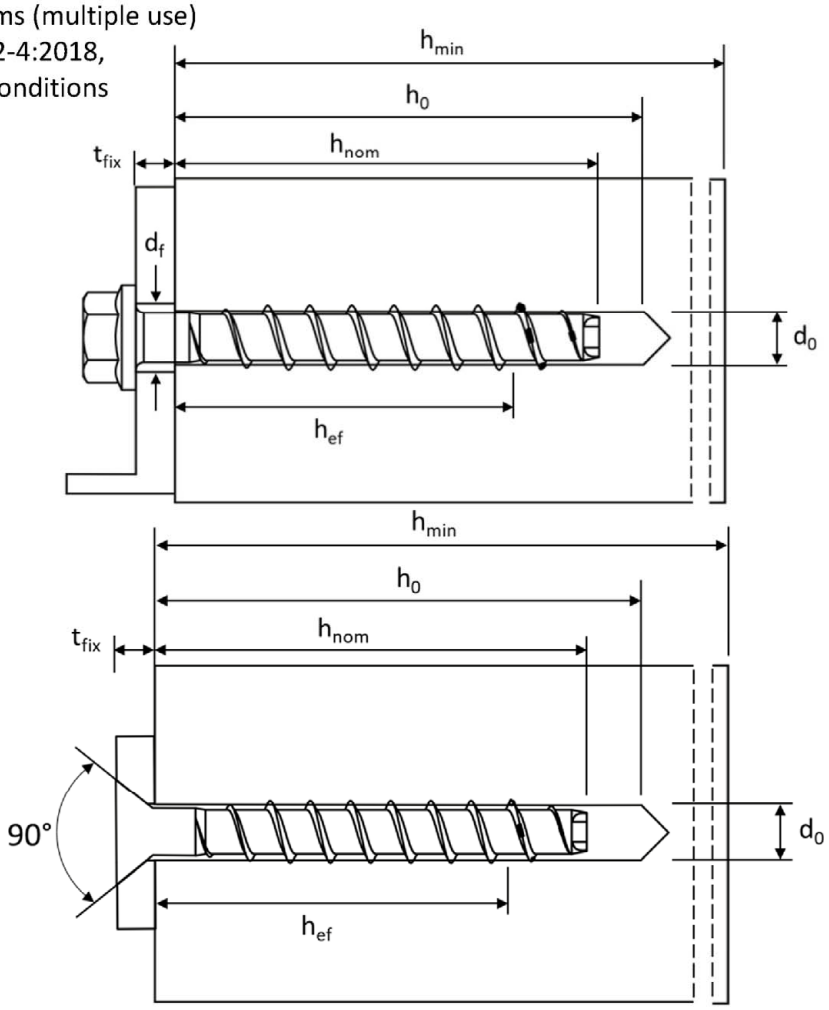
## Table 4: Installation parameters

| TAPCON XTREM LT size | | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | $h_{nom}$ | $h_{nom1}$ [1)] | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Nominal drill hole diameter | $d_0$ | [mm] | 6 | | | 8 | | | 10 | | |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 6,40 | | | 8,45 | | | 10,45 | | |
| Depth of drill hole | $h_0 \geq$ | [mm] | 40 | 50 | 60 | 55 | 65 | 75 | 65 | 85 | 95 |
| Clearance hole diameter | $d_f \leq$ | [mm] | 8 | | | 12 | | | 14 | | |
| Installation torque (version with connection thread) | $T_{inst}$ | [Nm] | 10 | | | 20 | | | 40 | | |
| Torque impact screw driver | | [-] | Max. torque according to manufacturer's instructions | | | | | | | | |
| | | | 160 | | | 300 | | | 450 | | |

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions




**SPIT TAPCON XTREM LT A4**

**Intended use**
Installation parameters

**Annex B3**

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## Table 5: Minimum thickness of member, minimum edge distance and minimum spacing

| TAPCON XTREM LT size | | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | $h_{nom}$ | $h_{nom1}$ [1)] | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Minimum thickness of member | $h_{min}$ | [mm] | 80 | 80 | 100 | 80 | 100 | 120 | 100 | 130 | 130 |
| Minimum edge distance | $c_{min}$ | [mm] | 35 | 35 | 35 | 35 | 35 | 35 | 40 | 40 | 40 |
| Minimum spacing | $s_{min}$ | [mm] | 35 | 35 | 35 | 35 | 35 | 35 | 40 | 40 | 40 |

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions



| | |
|---|---|
| **SPIT TAPCON XTREM LT A4** | **Annex B4** |
| **Intended use**<br>Minimum thickness of member, minimum edge distance and minimum spacing | |

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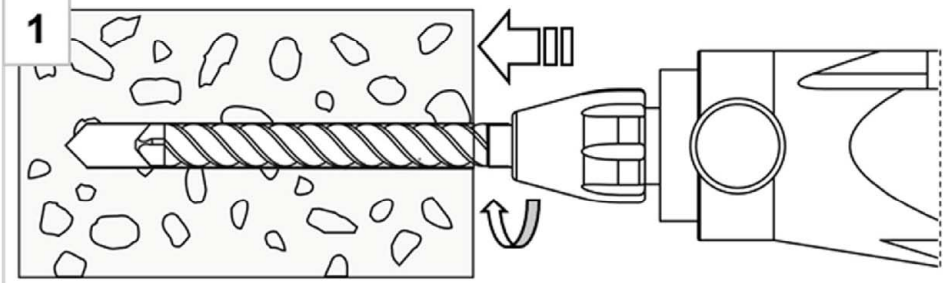
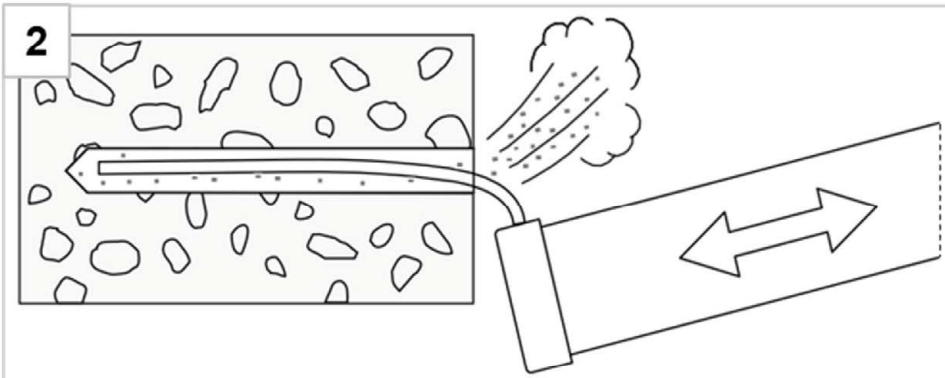
## Installation Instructions

1



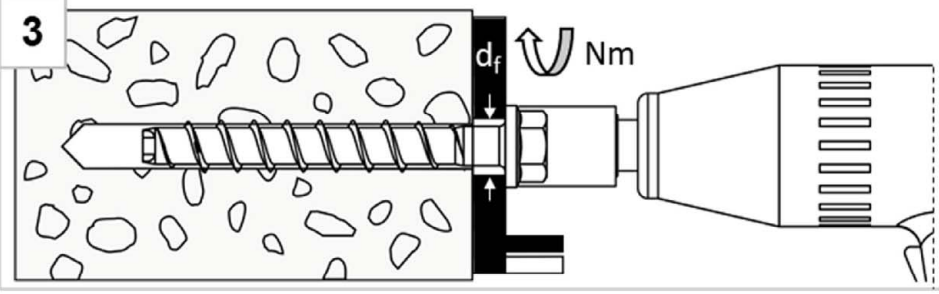
Create hammer drilled or hollow drilled borehole

2



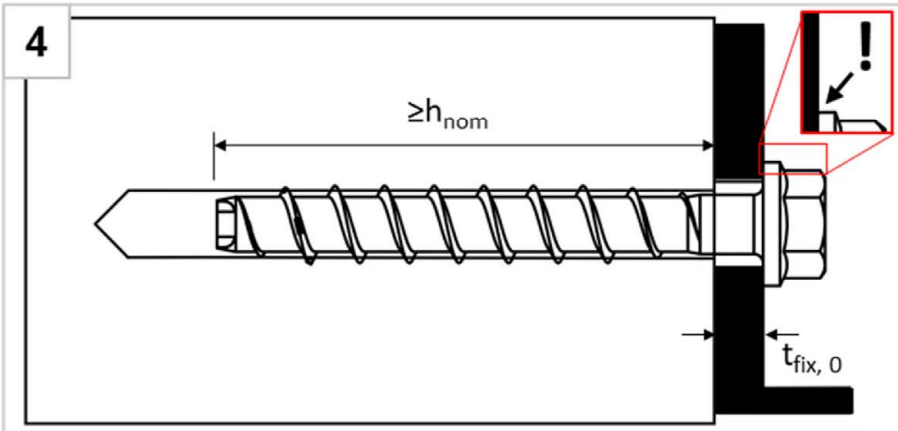
Remove drill dust by vacuuming or blowing of

3




Install with torque impact screw driver or torque wrench

4




The head must be undamaged and in contact with the fixture

For screw size 6 with $h_{nom}$ = 35mm, installation only with impact screw drivers.

| SPIT TAPCON XTREM LT A4 | Annex B5 |
|---|---|
| **Intended use**<br>Installation instructions | |

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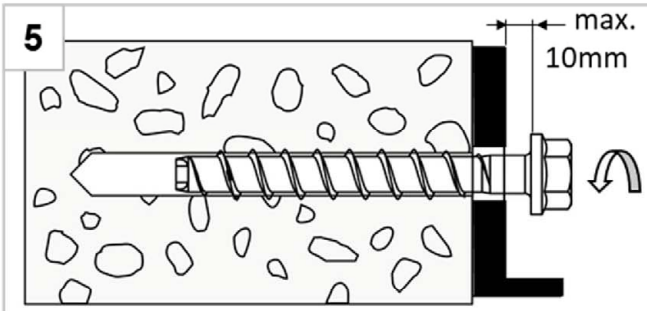
## Installation Instructions – Adjustment

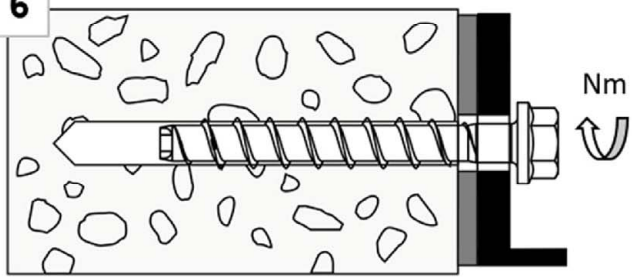
### 1. Adjustment

**5**



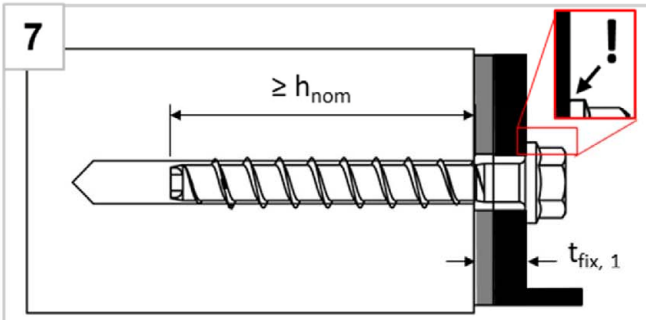

Screw may be untightened maximum 10mm

**6**




After adjustment, tighten the screw again

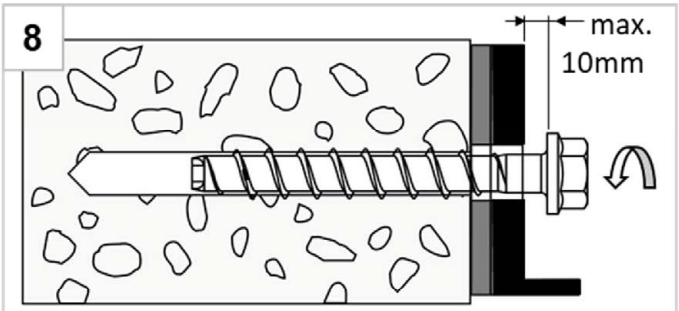
**7**




The head must be undamaged and in contact with the fixture

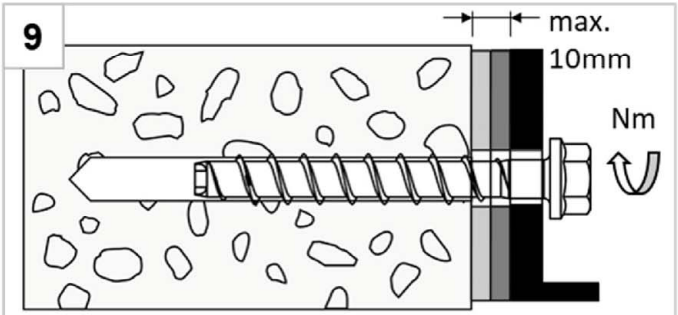
### 2. Adjustment

**8**



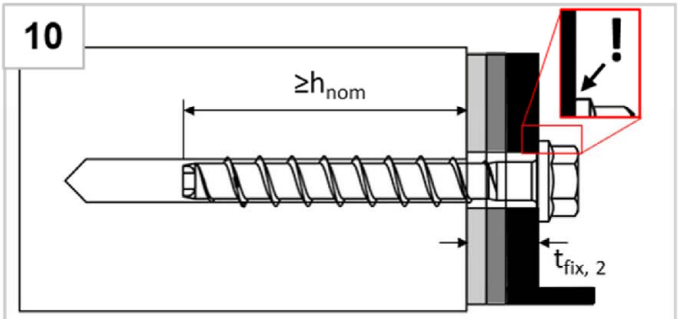

Screw may be untightened maximum 10mm

**9**




After adjustment, tighten the screw again

**10**




The head must be undamaged and in contact with the fixture

Note:
The fastener can be adjusted maximum two times. The total allowed thickness of shims added during the adjustment process is 10mm. The final embedment depth after adjustment process must be larger or equal than $h_{nom}$.

| SPIT TAPCON XTREM LT A4 | |
|---|---|
| **Intended use**<br>Installation instructions - Adjustment | **Annex B6** |

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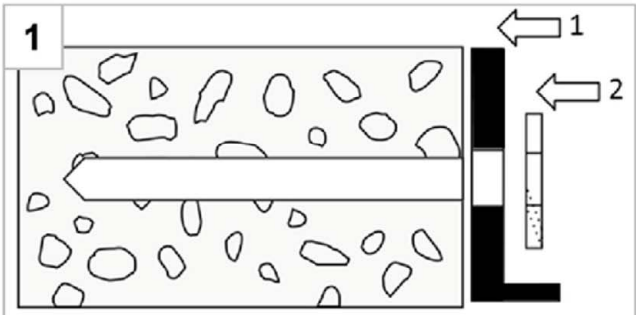
## Installation Instructions – Filling annular gap

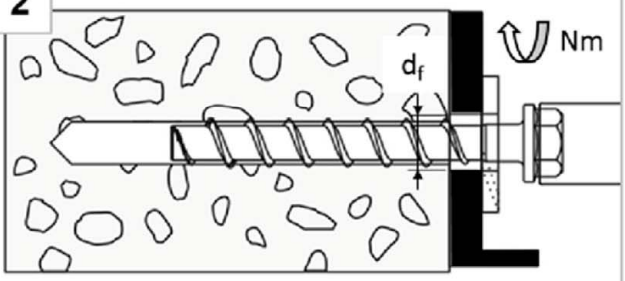
### Positioning of fixture and filling washer

**1**



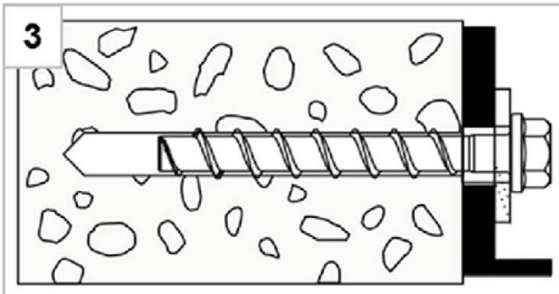

After preparing borehole (Annex B5, figure 1+2), position first fixture (1), than filling washer (2)

**2**



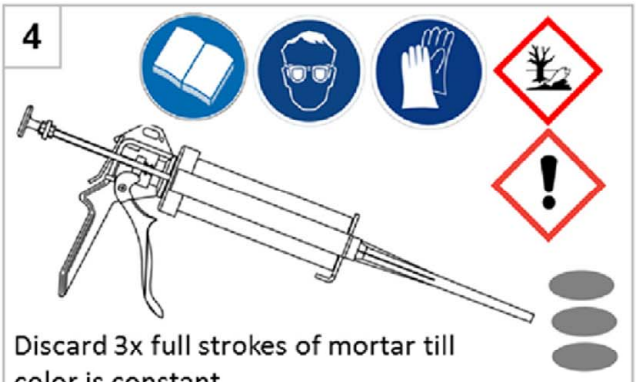

Install with torque impact screw driver or torque wrench

**3**



Installed condition without injected mortar in the filling washer

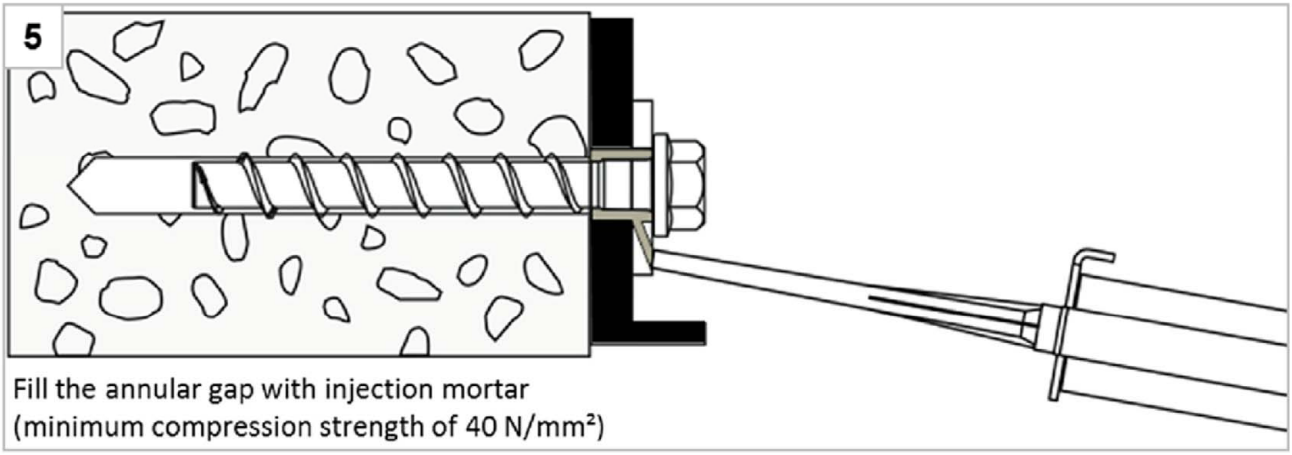
**4**



Discard 3x full strokes of mortar till color is constant

### Filling the annular gap

**5**



Fill the annular gap with injection mortar (minimum compression strength of 40 N/mm²)

Note:
For seismic loading the installation with filled and without filled annular gap is approved. Differences in performance can be found in Annex C3.

| | |
|---|---|
| **SPIT TAPCON XTREM LT A4** | |
| **Intended use**<br>Installation instructions – Filling annular gap | **Annex B7** |

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## Table 6: Characteristic values for static and quasi-static loading

| TAPCON XTREM LT size | | | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | | $h_{nom}$ | $h_{nom1}$ [1)] | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | | | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| **Steel failure for tension and shear loading** | | | | | | | | | | | | |
| Characteristic tension load | | $N_{Rk,s}$ | [kN] | 14,0 | | | 27,0 | | | 45,0 | | |
| Partial factor | | $\gamma_{Ms,N}$ | [-] | 1,5 | | | | | | | | |
| Characteristic shear load | | $V^0_{Rk,s}$ | [kN] | 7,0 | | | 13,5 | | 17,0 | 22,5 | 34,0 | |
| Partial factor | | $\gamma_{Ms,V}$ | [-] | 1,25 | | | | | | | | |
| Ductility factor | | $k_7$ | [-] | 0,8 | | | | | | | | |
| Characteristic bending load | | $M^0_{Rk,s}$ | [Nm] | 10,9 | | | 26,0 | | | 56,0 | | |
| **Pull-out failure in uncracked concrete** | | | | | | | | | | | | |
| Characteristic tension load C20/25 | | $N_{Rk,p}$ | [kN] | 3,5 | 4,0 | 8,5 | 9,0 | 12,0 | 17,0 | 11,0 | 19,0 | 25,0 |
| Increasing factor for $N_{Rk,p} = N_{Rk,p\ (C20/25)} \cdot \Psi_c$ | C25/30 | $\Psi_c$ | [-] | 1,08 | 1,22 | 1,17 | 1,22 | | 1,13 | 1,22 | | |
| | C30/37 | | | 1,15 | 1,36 | 1,26 | 1,36 | | 1,20 | 1,36 | | |
| | C40/50 | | | 1,27 | 1,41 | 1,30 | 1,41 | | 1,23 | 1,41 | | |
| | C50/60 | | | 1,38 | 1,58 | 1,42 | 1,58 | | 1,32 | 1,58 | | |
| **Pull-out failure in cracked concrete** | | | | | | | | | | | | |
| Characteristic tension load C20/25 | | $N_{Rk,p}$ | [kN] | 2,5 | 1,5 | 3,0 | 3,0 | 5,5 | 8,0 | 6,0 | 13,0 | 17,0 |
| Increasing factor for $N_{Rk,p} = N_{Rk,p\ (C20/25)} \cdot \Psi_c$ | C25/30 | $\Psi_c$ | [-] | 1,09 | 1,08 | 1,22 | 1,22 | | | 1,22 | 1,17 | |
| | C30/37 | | | 1,18 | 1,15 | 1,36 | 1,36 | | | 1,36 | 1,27 | |
| | C40/50 | | | 1,32 | 1,27 | 1,41 | 1,41 | | | 1,41 | 1,31 | |
| | C50/60 | | | 1,45 | 1,38 | 1,58 | 1,58 | | | 1,58 | 1,43 | |

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions



**SPIT TAPCON XTREM LT A4**

**Performances**
Characteristic values for static and quasi-static loading

**Annex C1**

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## Table 7: Characteristic values for static and quasi-static loading continuation

| TAPCON XTREM LT size | | | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | | $h_{nom}$ | $h_{nom1}$ [1)] | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | | | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| **Concrete failure: concrete cone failure and splitting failure** | | | | | | | | | | | | |
| Effective embedment depth | | $h_{ef}$ | [mm] | 25 | 34 | 42 | 32 | 41 | 49 | 40 | 57 | 65 |
| k-factor | cracked | $k_{cr}$ | [-] | 7,7 | | | | | | | | |
| | uncracked | $k_{ucr}$ | [-] | 11,0 | | | | | | | | |
| Concrete cone failure | spacing | $s_{cr,N}$ | [mm] | 3 x $h_{ef}$ | | | | | | | | |
| | edge distance | $c_{cr,N}$ | [mm] | 1,5 x $h_{ef}$ | | | | | | | | |
| Splitting failure case 1 | resistance | $N^0_{Rk,sp}$ | [kN] | 3,5 | 4,0 | 8,5 | 9,0 | 12,0 | 17,0 | 11,0 | 19,0 | 25,0 |
| | spacing | $s_{cr,sp}$ | [mm] | 120 | 160 | 240 | 200 | 240 | 290 | 230 | 280 | 320 |
| | edge distance | $c_{cr,sp}$ | [mm] | 60 | 80 | 120 | 100 | 120 | 145 | 115 | 140 | 160 |
| Splitting failure case 2 | resistance | $N^0_{Rk,sp}$ | [kN] | [2)] | 2,5 | 5,5 | 5,5 | 8,0 | 11,0 | 7,0 | 15,0 | 20,0 |
| | spacing | $s_{cr,sp}$ | [mm] | [2)] | 116 | 168 | 128 | 164 | 196 | 160 | 224 | 260 |
| | edge distance | $c_{cr,sp}$ | [mm] | [2)] | 58 | 84 | 64 | 82 | 98 | 80 | 114 | 130 |
| **Pry-out failure** | | | | | | | | | | | | |
| Factor for pry-out failure | | $k_8$ | [-] | 1,0 | 1,6 | | 2,1 | 2,8 | | 2,5 | | |
| Installation factor | | $\gamma_{inst}$ | [-] | 1,0 | | | | | | | | |
| **Concrete edge failure** | | | | | | | | | | | | |
| Effective length in concrete | | $l_f$ | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Nominal outer diameter of screw | | $d_{nom}$ | [mm] | 6 | | | 8 | | | 10 | | |

1) only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

2) no performance assessed



**SPIT TAPCON XTREM LT A4**

**Performances**
Characteristic values for static and quasi-static loading continuation

**Annex C2**

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## Table 8: Seismic category C1 – Characteristic load values (only type S, type SK, type ST, type ST-6[1)], type P and type I[1)])

| TAPCON XTREM LT size | | | 6 | | 8 | | 10 | |
|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | $h_{nom}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom3}$ |
| | | [mm] | 45 | 55 | 45 | 65 | 55 | 85 |
| **Steel failure for tension and shear load** (version **type S, type SK, type ST, type ST-6[1)], type P and type I[1)]**) | | | | | | | | |
| Characteristic tension load | $N_{Rk,s,C1}$ | [kN] | 14,0 | | 27,0 | | 45,0 | |
| Partial factor | $\gamma_{Ms,N}$ | [-] | 1,5 | | | | | |
| Characteristic shear load **Type S, Type ST, Type P** | $V_{Rk,s,C1}$ | [kN] | 3,5 | 4,0 | 8,0 | 10,0 | 14,0 | 16,0 |
| Characteristic shear load **Type SK** | $V_{Rk,s,C1}$ | [kN] | 2,5 | [2)] | 4,5 | 7,0 | 14,0 | 10,0 |
| Partial factor | $\gamma_{Ms,V}$ | [-] | 1,25 | | | | | |
| Without filling of the annular gap [3)] | $\alpha_{gap}$ | [-] | 0,5 | | | | | |
| With filling of the annular gap [4)] | $\alpha_{gap}$ | [-] | 1,0 | | | | | |
| **Pull-out failure** (version **type S, type SK, type ST, type ST-6[1)], type P and type I[1)]**) | | | | | | | | |
| Characteristic tension load in cracked concrete C20/25 | $N_{Rk,p,C1}$ | [kN] | 1,5 | 3,0 | 3,0 | 8,5 | 6,0 | 17,0 |
| **Concrete cone failure** (version **type S, type SK, type ST, type ST-6[1)], type P and type I[1)]**) | | | | | | | | |
| Effective embedment depth | $h_{ef}$ | [mm] | 34 | 42 | 32 | 49 | 40 | 65 |
| Edge distance | $c_{cr,N}$ | [mm] | 1,5 x $h_{ef}$ | | | | | |
| Spacing | $s_{cr,N}$ | [mm] | 3 x $h_{ef}$ | | | | | |
| Installation safety factor | $\gamma_{inst}$ | [-] | 1,0 | | | | | |
| **Concrete pry-out failure** (version **type S, type SK, type ST and type P**) | | | | | | | | |
| Factor for pry-out failure | $k_8$ | [-] | 1,6 | | 2,1 | 2,8 | 2,5 | |
| **Concrete edge failure** (version **type S, type SK, type ST and type P**) | | | | | | | | |
| Effective length in concrete | $l_f$ | [mm] | 45 | 55 | 45 | 65 | 55 | 85 |
| Nominal outer diameter of screw | $d_{nom}$ | [mm] | 6 | | 8 | | 10 | |

[1)] only tension load
[2)] no performance assessed
[3)] without filling of the annular gap according to annex B5
[4)] with filling of the annular gap according to annex B7

**SPIT TAPCON XTREM LT A4**

**Performances**
Seismic category C1 – Characteristic load values

**Annex C3**

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## Table 9: Fire exposure – characteristic values of resistance

| TAPCON XTREM LT size | | | | 6 | | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | | $h_{nom}$ | 1[1)] | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | | [mm] | 35 | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Steel failure for tension and shear load | | | | | | | | | | | | |
| characteristic Resistance | R30 | $N_{Rk,s,fi30}$ | [kN] | 0,9 | | | 2,4 | | | 4,4 | | |
| | R60 | $N_{Rk,s,fi60}$ | [kN] | 0,8 | | | 1,7 | | | 3,3 | | |
| | R90 | $N_{Rk,s,fi90}$ | [kN] | 0,6 | | | 1,1 | | | 2,3 | | |
| | R120 | $N_{Rk,s,fi120}$ | [kN] | 0,4 | | | 0,7 | | | 1,7 | | |
| | R30 | $V_{Rk,s,fi30}$ | [kN] | 0,9 | | | 2,4 | | | 4,4 | | |
| | R60 | $V_{Rk,s,fi60}$ | [kN] | 0,8 | | | 1,7 | | | 3,3 | | |
| | R90 | $V_{Rk,s,fi90}$ | [kN] | 0,6 | | | 1,1 | | | 2,3 | | |
| | R120 | $V_{Rk,s,fi120}$ | [kN] | 0,4 | | | 0,7 | | | 1,7 | | |
| | R30 | $M^0_{Rk,s,fi30}$ | [Nm] | 0,7 | | | 2,4 | | | 5,9 | | |
| | R60 | $M^0_{Rk,s,fi60}$ | [Nm] | 0,6 | | | 1,8 | | | 4,5 | | |
| | R90 | $M^0_{Rk,s,fi90}$ | [Nm] | 0,5 | | | 1,2 | | | 3,0 | | |
| | R120 | $M^0_{Rk,s,fi120}$ | [Nm] | 0,3 | | | 0,9 | | | 2,3 | | |
| Pull-out failure | | | | | | | | | | | | |
| characteristic Resistance | R30-90 | $N_{Rk,p,fi}$ | [kN] | 0,6 | 0,4 | 0,8 | 0,8 | 1,4 | 2,0 | 1,5 | 3,3 | 4,3 |
| | R120 | $N_{Rk,p,fi}$ | [kN] | 0,5 | 0,3 | 0,6 | 0,6 | 1,1 | 1,6 | 1,2 | 2,6 | 3,4 |
| Concrete cone failure | | | | | | | | | | | | |
| characteristic Resistance | R30-90 | $N^0_{Rk,c,fi}$ | [kN] | 0,5 | 1,2 | 2,0 | 1,0 | 1,9 | 2,9 | 1,7 | 4,2 | 5,9 |
| | R120 | $N^0_{Rk,c,fi}$ | [kN] | 0,4 | 0,9 | 1,6 | 0,8 | 1,5 | 2,3 | 1,4 | 3,4 | 4,7 |
| Edge distance | | | | | | | | | | | | |
| R30 - R120 | | $c_{cr,fi}$ | [mm] | $2 \times h_{ef}$ | | | | | | | | |
| In case of fire attack from more than one side, the minimum edge distance shall be ≥300mm. | | | | | | | | | | | | |
| Spacing | | | | | | | | | | | | |
| R30 bis R120 | | $s_{cr,fi}$ | [mm] | $4 \times h_{ef}$ | | | | | | | | |
| Pry-out failure | | | | | | | | | | | | |
| R30 bis R120 | | $k_8$ | [-] | 1,0 | 1,6 | | 2,1 | 2,8 | | 2,5 | | |
| The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value. | | | | | | | | | | | | |

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions



**SPIT TAPCON XTREM LT A4**

**Performances**
Fire exposure – characteristic values of resistance

**Annex C4**

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## Table 10: Displacements under static and quasi-static tension load

| TAPCON XTREM LT size | | | | 6 | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | | $h_{nom}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | | | [mm] | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Cracked concrete | tension load | N | [kN] | 0,72 | 1,45 | 1,63 | 2,74 | 4,06 | 3,04 | 6,22 | 8,46 |
| | displacement | $\delta_{N0}$ | [mm] | 0,19 | 0,27 | 0,27 | 0,53 | 0,45 | 0,26 | 0,58 | 0,61 |
| | | $\delta_{N\infty}$ | [mm] | 0,55 | 0,84 | 0,49 | 0,66 | 0,61 | 0,69 | 0,92 | 1,1 |
| Uncracked concrete | tension load | N | [kN] | 2,11 | 4,07 | 4,24 | 5,97 | 8,03 | 5,42 | 9,17 | 12,28 |
| | displacement | $\delta_{N0}$ | [mm] | 0,42 | 0,43 | 0,33 | 0,49 | 0,58 | 0,84 | 0,62 | 0,79 |
| | | $\delta_{N\infty}$ | [mm] | 0,42 | 0,43 | 0,58 | | | 0,79 | | |

## Table 11: Displacements under static and quasi-static shear load

| TAPCON XTREM LT size | | | | 6 | | 8 | | | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal embedment depth | | | $h_{nom}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ | $h_{nom1}$ | $h_{nom2}$ | $h_{nom3}$ |
| | | | [mm] | 45 | 55 | 45 | 55 | 65 | 55 | 75 | 85 |
| Cracked and uncracked concrete | shear load | V | [kN] | 3,3 | | 8,6 | | | 16,2 | | |
| | displacement | $\delta_{V0}$ | [mm] | 1,55 | | 2,7 | | | 2,7 | | |
| | | $\delta_{V\infty}$ | [mm] | 3,1 | | 4,1 | | | 4,3 | | |



**SPIT TAPCON XTREM LT A4**

**Performances**
Displacements under static and quasi-static loads

**Annex C5**