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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
www.eota.eu

# European Technical Assessment

# ETA 22/0584
## of 20/10/2023

General Part

| | |
|---|---|
| **Technical Assessment Body issuing the European Technical Assessment**<br>Technický a zkušební ústav stavební Praha, s.p. | |
| **Trade name of the construction product** | Wood construction screw (timber screw) |
| **Product family to which the construction product belongs** | Product area code: 13<br>Screws for use in timber constructions |
| **Manufacturer** | HISENER INDUSTRIAL CO., LTD<br>No. 1, Gushan Road, Changqiangshan Industrial Park, Ganpu, Haiyan City, Zhejiang, China |
| **Manufacturing plant** | HISENER INDUSTRIAL CO., LTD<br>No. 1, Gushan Road, Changqiangshan Industrial Park, Ganpu, Haiyan City, Zhejiang, China |
| **This European Technical Assessment contains** | 37 pages including 3 Annexes, which form an integral part of this European Technical Assessment |
| **This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of** | EAD 130118-01-0603 Screws and threaded rods for use in timber constructions |

# 1 Technical description of the product

Wood construction screws are timber screws made from carbon steel grade 10B21 and stainless steel A2-304. Surface treatment of the carbon screws is Zinc Plating 3-5 µm. Type of head is Wafer or Countersunk. The screws are fully or partially threaded. Dimensions, tolerances, shapes and other description is shown in Annex 1. All screws fulfill the requirement for a minimum bending angle of $\alpha = (45/d^{0.7} + 20)$. The screws are used for connections in load bearing timber structures between wood-based members.

## 1.1 Shape and dimensions

The outer thread diameter is 3.0, 3.5, 4.0, 4.5, 5.0, 6.0, 8.0 and 10.0 mm. The overall length of the screws is ranging from 16 mm to 400 mm. Further dimensions are shown in Annex 1.

The ratio of inner thread diameter to outer thread diameter $d_1/d$ ranges for all screws from 0.60 to 0.72.

The screws are threaded over a minimum length $l_g \geq 4 \cdot d$.

## 2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The screws are used for connections in timber constructions.

The screws are intended to be used for connecting wood-based members where requirements for mechanical resistance and stability and safety in use shall be fulfilled. The screws are used for connections in load bearing timber structures between steel plates or wood-based members:

- Solid timber (softwood) of strength classes C14 - C 40 according to EN 338[1] / EN 14081-1+A1[2]
- Glued laminated timber (softwood) of at least strength class GL24c/GL24h according to EN 14080[3]
- Laminated veneer lumber LVL according to EN 14374[4], arrangement of the screws only perpendicular to the plane of the veneers
- Glued laminated solid timber according to EN 14080[3]
- Cross laminated timber according to European Technical Assessments or national provisions that apply at the installation site

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636+A1[5] and EN 13986+A1[6]
- Oriented Strand Board, OSB according to EN 300[7] and EN 13986+A1[6]
- Particleboard according to EN 312[8] and EN 13986+A1[6]
- Fibreboards according to EN 622-2[9], EN 622-3[10] and EN 13986+A1[6]
- Cement-bonded particle boards according to national provisions that apply at the building site
- Solid-wood panels according to national provisions that apply at the building site

Wood-based panels shall only be arranged on the side of the screw head.
According to EN 1995-1-1[11] the screws made from special stainless or carbon steel with $d > 4$ mm may be used in timber structures subject to climate conditions defined by service classes 1 and 2.
According to EN 1995-1-1 the screws made from special stainless or carbon steel with $d \leq 4$ mm may be used in timber structures subject to climate conditions defined by service class 1.
Regarding environmental conditions national provisions shall apply at the building site.

Corrosive categories according to EN ISO 12944-2 shall be taken into account.
The use of the screws shall be limited to static and quasi/static actions.

The provisions made in this European Technical Assessment are based on an assumed minimum working life of 50 years, provided that the screws are subject to appropriate use and maintenance.

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1 EN 338 Timber structures - Strength classes
2 EN 14081-1+A1 Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements
3 EN 14080 Timber structures - Glued laminated timber and glued solid timber - Requirements
4 EN 14374 Timber structures - Structural laminated veneer lumber - Requirements
5 EN 636+A1 Plywood - Specification
6 EN 13986+A1 Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
7 EN 300 Oriented strand boards (OSB) - Definition, classification and specifications
8 EN 312 Particleboards - Specifications
9 EN 622-2 Fibreboards - Specifications - Part 2: Requirements for hardboards
10 EN 622-3 Fibreboards - Specifications - Part 3: Requirements for medium boards
11 EN 1995-1-1 Design of timber structures - Part 1-1: General - Common rules and rules for buildings

The indications given as to the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body but are regarded only as a mean 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

The assessment of the fitness for use of the Wood construction screws (timber screws) according to the Basic Work Requirements (BWR) were carried out in compliance with EAD 130118-01-0603.

The European Technical Assessment is issued for the screws on the basis of agreed data and information, deposited at Technický a zkušební ústav stavební Praha, s.p., which identifies screws that has been assessed and judged. Changes to the screws or production process which could result in this deposited data and information being incorrect should be notified to Technický a zkušební ústav stavební Praha, s.p. before the changes are introduced. Technický a zkušební ústav stavební Praha, s.p. will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alternations to the ETA shall be necessary.

**Table 1** Essential characteristics of the product

| | Essential characteristic | Performance |
|---|---|---|
| 3.1 BWR 1: Mechanical resistance and stability | | |
| 3.1.1 | Dimensions | See Annex 1 and Annex 2 |
| 3.1.2 | Characteristic yield moment | See Annex 2 |
| 3.1.3 | Characteristic withdrawal parameter | See Annex 2 |
| 3.1.4 | Characteristic head pull-through parameter | See Annex 2 |
| 3.1.5 | Characteristic tensile strength | See Annex 2 |
| 3.1.6 | Characteristic yield strength | See Annex 2 |
| 3.1.7 | Characteristic torsional strength | See Annex 2 |
| 3.1.8 | Insertion moment | See Annex 2 |
| 3.1.9 | Bending angle | See Annex 2 |
| 3.1.10 | Durability against corrosion | Surface treatment of the screws is Zinc Plating 3-5 µm. |
| 3.1.11 | Spacing, end and edge distances of the screws and minimum thickness of the wood-based material | Point 3.1.11<br>No performance assessed |
| 3.1.12 | Slip modulus for mainly axially loaded screws | No performance assessed |
| 3.2 BWR 2: Safety in case of fire | | |
| 3.2.1 | Reaction to fire | All screws are made from carbon steel grade 10B21 or stainless steel A2-304 classified as Euroclass A in accordance with EC Decision 1996/603/EC, as amended by EC |
| BWR 4: Safety and accessibility in use | | |
| Same as BWR 1 | | |

## 3.1 Mechanical resistance and stability (BWR 1)

Annex 2 contains essential characteristics for all screws. The design and construction shall be carried out according to national provisions that apply at the installation site in line with the partial safety factor format, e.g. in accordance with EN 1995-1-1.

### 3.1.1 Dimensions

The dimensions have been measured according to provisions in EN 14592+A1. The dimensions are stated in tables at Annex 1 and measured values in tables at Annex 2.

### 3.1.2 Characteristic yield moment

The characteristic yield moment $M_{y,k}$ has been determined by tests according to EN 409. The test results are stated in tables at Annex 2.

### 3.1.3 Characteristic withdrawal parameter

The characteristic withdrawal parameter $f_{ax,90,k}$ has been determined by tests according to EN 1382. Density of used timber is mentioned under tables at Annex 2. The test results are stated in tables at Annex 2.

For angles α between screw axis and grain direction $15° \leq \alpha < 45°$ the characteristic withdrawal capacity $F_{ax,\alpha,Rk}$ shall be determined according to equation:

$$F_{ax,\alpha,Rk} = k_{ax} \cdot f_{ax,90,k} \cdot d \cdot l_{ef} \cdot (\rho_k/350)^{0,8}$$

where

$k_{ax}$ factor to consider the influence of the angle between screw axis and grain direction and the long term behaviour
$k_{ax} = 0,3+(0,7 \cdot \alpha)/45°$

$f_{ax,90,k}$ short-term characteristic withdrawal parameter for an angle α between screw axis and grain direction of 90° in N/mm²

$d$ outer thread diameter of the screw in mm

$l_{ef}$ penetration length of the threaded part of the screw in the timber member in mm

$\rho_k$ characteristic density of the wood-based member in kg/m³

For angle α between screw axis and grain direction $0° \leq \alpha < 15°$ the following requirements were fulfilled and relevant equations can be used:

1. $f_{ax,0,k} / f_{ax,90,k} \geq 0.6$
2. The penetration length of the screws in the timber member shall be

$$l_{pen,req} = \min \begin{cases} \dfrac{4 \cdot d}{\sin \alpha} \\ 20 \cdot d \end{cases}$$

3. At least four screws shall be used in a connection with screws inserted in the timber member with an angle between screw axis and grain direction of less than 15°.

### 3.1.4 Characteristic head pull-through parameter

The characteristic head pull-through parameter $f_{head,k}$ has been determined by tests according to EN 1383. Density of used timber is mentioned under tables at Annex 2. The test results are stated in tables at Annex 2.

### 3.1.5 Characteristic tensile strength

The characteristic tensile strength $f_{tens,k}$ has been determined by tests according to EN 1383. The test results are stated in tables at Annex 2.

### 3.1.6 Characteristic yield strength

The characteristic yield strength has been determined by tests according to EN 1383. The test results are stated in tables at Annex 2.

### 3.1.7 Characteristic torsional strength

The characteristic torsional strength $f_{tor,k}$ has been determined by tests according to EN ISO 10666. The test results are stated in tables at Annex 2.

### 3.1.8 Insertion moment

The mean insertion moment $R_{tor,mean}$ has been determined by tests according to EN 15737. The test results are stated in tables at Annex 2.

### 3.1.9 Bending angle

The bending angle α has been determined for each diameter of the screw. All screws fulfill the requirement for a minimum bending angle $\alpha = (45/d^{0.7} + 20)$. The test results are stated in table at point 4.1.9 of Evaluation Report.

### 3.1.10 Durability against corrosion

The screws are made from carbon steel grade 10B21 with corrosion protection layer or stainless steel A2-304. Surface treatment of the carbon screws is Zinc Plating 3-5 µm. The test results are stated in tables at Annex 2.

### 3.1.11 Spacing, end and edge distances of the screws and minimum thickness of the wood-based material

No performance assessed.

Laterally loaded screws
For screws the minimum spacing, end and edge distances are given in EN 1995-1-1, clause 8.7.1.

Axially loaded screws
For screws the minimum spacing, end and edge distances are given in EN 1995-1-1, clause 8.7.2 and Table 8.6.

### 3.1.12 Slip modulus for mainly axially loaded screws

No performance assessed.

The axial slip modulus $K_{ser}$ of the threaded part of a screw for the serviceability limit state shall be taken independent of angle α to the grain as:
$K_{ser} = 25 \cdot d \cdot l_{ef}$ [N/mm] for screws in members made from softwood
$K_{ser} = 30 \cdot d \cdot l_{ef}$ [N/mm] for screws in members made from hardwood

where
$d$ outer thread diameter of the screw [mm]
$l_{ef}$ penetration length of the threaded part of the screw in the wood-based member [mm]

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

### 3.2.1 Reaction to fire

All screws are made from carbon steel grade 10B21 or stainless steel A2-304 classified as Euroclass A in accordance with EC Decision 1996/603/EC, as amended by EC.

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

According to the Decision 1997/0176/EC [12], of the European Commission the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011 and Commission delegated Regulation (EU) No 568/2014) given in the following table applies:

| Product(s) | Intended use(s) | Level(s) or class(es) | Attestation of conformity system(s) |
|---|---|---|---|
| Fasteners for structural timber products | Structural timber products | | 3 |

[12] 1997/0176/EC - European Commission decision of 17/2/1997, published in the Official Journal of the European Communities No L 73/19

## 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at the Technický a zkušební ústav stavební Praha, s.p.

Issued in Prague on 20/10/2023

By

Ing. Jiří Studnička, Ph.D.
Head of the TAB

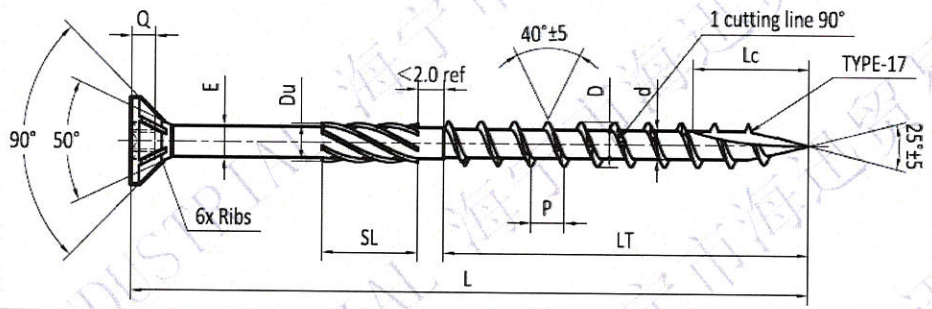
TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague, SOE
ZÚS
Czech Republic
Technical Assessment Body
Subjekt pro technické posuzování

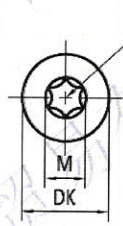
Annexes:

| | |
|---|---|
| Annex 1 | Dimensions, tolerances and description of Wood construction screws (timber screws) |
| Annex 2 | Essential characteristics of Wood construction screws (timber screws) |
| Annex 3 | Reference documents |

## Annex 1 Dimensions, tolerances and description of Wood construction screws (timber screws)

| Description | Torx Drive Double Flat Head Timber Screw, Head with 6 Ribs, with U-Thread+1 Slot Thread, Type #17 Cutting Point | Drawing# | HS-001 |
|---|---|---|---|
| 产品名称 | 梅花槽双沉头草绳螺丝，头下带6筋，杆部草绳纹，螺纹带1条拉线纹，尾部Type #17 割尾 | 图纸编号 | HS-001 |




| 规格 ITEM | 头部直径 DK | 槽深 Q | 槽型 TORX | 槽宽 M(ref) | 牙外径 D | 牙底径 d | 牙距 P±10% | 波花外径 Du | 光杆径 E(±0.1) | 波花长度 SL | 割尾长度 Lc | 破坏扭矩 Torque(N.m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 5.60-6.00 | 1.10-1.40 | T10 | 2.82 | 2.80-3.10 | 1.70-1.90 | 1.45 | 2.5-2.8 | 2.15 | Ref 4 | 5.00-6.00 | 1.50 |
| 3.5 | 6.60-7.00 | 1.30-1.60 | T15 | 3.35 | 3.30-3.60 | 1.90-2.20 | 2.20 | 2.8-3.2 | 2.45 | Ref 5 | 6.00-7.00 | 2.00 |
| 4.0 | 7.50-8.00 | 1.70-2.00 | T20 | 3.94 | 3.80-4.10 | 2.30-2.60 | 2.60 | 3.4-3.8 | 2.80 | Ref 5 | 7.00-8.00 | 3.00 |
| 4.5 | 8.50-9.00 | 1.70-2.00 | T25 | 4.50 | 4.20-4.60 | 2.70-3.00 | 2.80 | 3.8-4.2 | 3.20 | Ref 6 | 8.00-9.00 | 4.40 |
| 5.0 | 9.50-10.00 | 2.00-2.40 | T25 | 4.50 | 4.70-5.10 | 3.10-3.40 | 3.20 | 4.0-4.4 | 3.60 | Ref 8 | 10.00-12.00 | 7.00 |
| 6.0 | 11.50-12.00 | 2.40-2.85 | T30 | 5.60 | 5.80-6.20 | 3.60-4.00 | 4.50 | 4.7-5.1 | 4.30 | Ref 12 | 12.00-14.00 | 11.00 |
| 8.0 | 14.30-15.20 | 3.00-3.45 | T40 | 6.75 | 7.80-8.30 | 5.15-5.50 | 5.50 | 6.7-7.1 | 5.80 | Ref 12 | 14.00-16.00 | 28.00 |
| 10.0 | 17.40-18.20 | 3.40-3.85 | T40 | 6.75 | 9.70-10.30 | 6.00-6.50 | 6.60 | 7.7-8.1 | 6.95 | Ref 12 | 16.00-18.00 | 44.00 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | L | 16 | 20 | 25 | 30 | 35 | 40 | 45 | | | | | |
| | LT±2 | Full | Full | Full | 15 | 15 | 25 | 25 | | | | | |
| 3.5 | L | 16 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | | | | |
| | LT±2 | Full | Full | Full | 15 | 15 | 25 | 25 | 25 | | | | |
| 4.0 | L | 16 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 70 | |
| | LT±2 | Full | Full | Full | 15 | 15 | 25 | 25 | 25 | 35 | 35 | 40 | |
| 4.5 | L | 25 | 30 | 35 | 40 | 45 | 50 | 60 | 70 | 80 | | | |
| | LT±2 | Full | 15 | 15 | 25 | 25 | 25 | 35 | 40 | 50 | | | |
| 5.0 | L | 25 | 30 | 35 | 40-50 | | 60 | 70 | 80-100 | | 110 | 120 | |
| | LT±2 | Full | 15 | 15 | 25 | | 35 | 40 | 50 | | 60 | 70 | |
| 6.0 | L | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120-300 | | | |
| | LT±2 | 25 | 25 | 35 | 40 | 50 | 50 | 50 | 50 | 80 | | | |
| 8.0 | L | 80 | 90 | 100 | 110 | 120-360 | | | | | | | |
| | LT±2 | 50 | 50 | 50 | 50 | 80 | | | | | | | |
| 10.0 | L | 80 | 90 | 100 | 110 | 120-360 | | | | | | | |
| | LT±2 | 50 | 50 | 50 | 50 | 80 | | | | | | | |

**---Alternative T20
**---LT=FULL, without SL

| L | Tolerance |
|---|---|
| L≤25 | -1.0 |
| 25<L≤50 | -1.25 |
| 50<L≤80 | -1.5 |
| 80<L≤120 | -1.75 |
| L>120 | -2 |

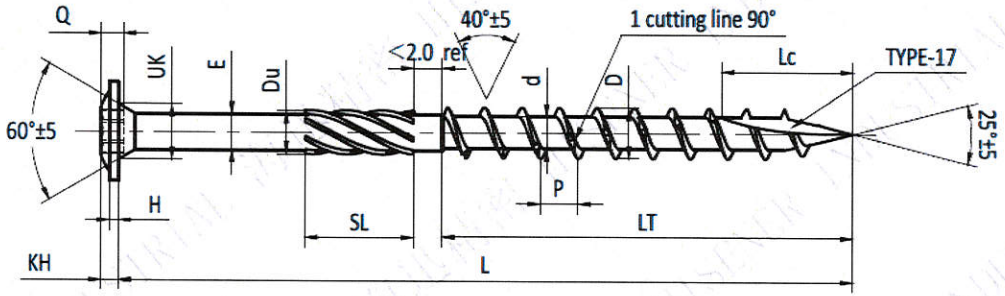
| MACHANICAL 机械性能 | 1, Material( 材质 ): SAE C 10B21 STEEL;<br>2, Surface Hardness ( 表面硬度 ):560-700 HV0.3;<br>3, Core Hardness( 芯部硬度 ):300-450 HV0.3;<br>4, Benging angle(弯曲度):≥45°; |
|---|---|

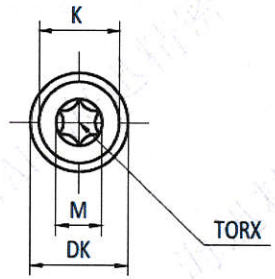
| | | | |
|---|---|---|---|
| UNIT | 单 位 | mm | Revision 修改 |
| DATE | 日 期 | | |
| DESIGN | 设 计 | HISENER | |
| DWG | 制 图 | Leo | |
| CHECK BY | 校 对 | Loyd | |

HISENER

HISENER INDUSTRIAL CO LTD

| Description | Torx Drive Wafer Head Timber Screw, with U-Thread+1 Slot Thread, Type #17 Cutting Point | Drawing# | HS-002 |
|---|---|---|---|
| 产品名称 | 梅花槽威华头草绳螺丝，杆部草绳纹，螺纹带1条拉线纹，尾部Type #17 割尾 | 图纸编号 | HS-002 |




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5.0 | L | 40** | 45 | 50 | 60 | 70 | 80 |
| | LT±2 | 25 | 25 | 25 | 35 | 40 | 50 |
| 6.0 | L | 50** | 60 | 70 | 80-100 | 120-300 | |
| | LT±2 | 30 | 35 | 40 | 50 | 80 | |
| 8.0 | L | 80** | 100 | 120-360 | | | |
| | LT±2 | 50 | 50 | 80 | | | |
| 10.0 | L | 80** | 100 | 120-360 | | | |
| | LT±2 | 50 | 50 | 80 | | | |

| L | Tolerance |
|---|---|
| L≤50 | -1.25 |
| 50<L≤80 | -1.5 |
| 80<L≤120 | -1.75 |
| L>120 | -2 |

**Shorter length available without SL(Full thread)

| 规格 ITEM | 头部直径 DK | 圆帽直径 K | 华司厚度 H | 头部高度 KH | 槽深 Q | 底锥直径 UK | 槽型 TORX | 槽宽 M(ref) | 牙外径 D | 牙底径 d | 牙距 P±10% | 滚花外径 Du | 光杆径 E(±0.1) | 滚花长度 SL | 割尾长度 Lc | 破坏扭矩 Torque(N.m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | 11.50-13.20 | 6.50-8.50 | 1.05-1.35 | 2.50-3.30 | 2.10-2.55 | 5.00-6.00 | T25 | 4.50 | 4.75-5.15 | 3.10-3.40 | 3.20 | 4.0-4.3 | 3.60 | 8-11 | 10.00-12.00 | 7 |
| 6.0 | 14.50-16.10 | 10.00-12.00 | 1.35-1.65 | 2.70-3.50 | 2.40-2.85 | 7.30-8.50 | T30 | 5.60 | 5.80-6.20 | 3.60-4.00 | 4.50 | 4.7-5.1 | 4.30 | 11-13 | 12.00-14.00 | 11 |
| 8.0 | 20.50-22.50 | 15.00-17.00 | 1.65-2.15 | 3.35-3.75 | 3.00-3.45 | 9.00-10.00 | T40 | 6.75 | 7.80-8.20 | 5.15-5.50 | 5.50 | 6.7-7.1 | 5.80 | 11-13 | 14.00-16.00 | 28 |
| 10.0 | 23.50-26.50 | 19.00-21.00 | 1.95-2.35 | 3.80-4.20 | 3.40-3.85 | 11.30-12.50 | T40 | 6.75 | 9.60-10.25 | 6.00-6.50 | 6.60 | 7.7-8.1 | 6.95 | 11-13 | 16.00-18.00 | 44 |

MACHANICAL 机械性能

1, Material( 材质 ): SAE C 10B21 STEEL;
2, Surface Hardness ( 表面硬度 ):560-700 HV0.3;
3, Core Hardness( 芯部硬度 ):300-450 HV0.3;
4, Benging angle(弯曲度)

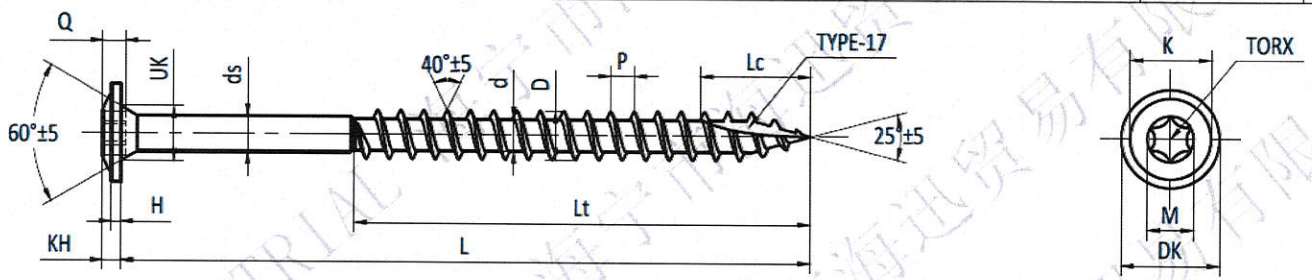
| | | |
|---|---|---|
| UNIT | 单 位 | mm |
| DATE | 日 期 | |
| DESIGN | 设 计 | HISENER |
| DWG | 制 图 | Leo |
| CHECK BY | 校 对 | Loyd |

Revision 修改:

HISENER

HISENER INDUSTRIAL CO LTD

| Description | Torx Pan Wafter Head Timber Screw, Partial Thread, Type #17 Cutting Point | Drawing# | HS-081S |
|---|---|---|---|
| 产品名称 | 梅花槽威华头纤维板钉, 半牙, Type #17 割尾 | 图纸编号 | HS-081S |







| 规格 ITEM | 头部直径 DK | 圆帽直径 K(ref.) | 华司厚度 H | 头部高度 KH | 槽深 Q | 底锥直径 UK(ref.) | 槽型 TORX | 槽宽 M(ref) | 牙外径 D | 牙底径 d | 牙距 P±10% | 杆径 ds | 割尾长度 Lc | A2/A4破坏扭矩 Torque(N.m) | 410破坏扭矩 Torque(N.m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.0 | 11.0-13.0 | 7.0 | 1.0-1.5 | 2.6-3.4 | 1.6-1.9 | 6.0 | T20 | 3.9 | 3.7-4.0 | 2.3-2.6 | 1.8 | 2.80-2.85 | 7.0-8.0 | 2.2 | 3.5 |
| 4.5 | 12.0-14.0 | 8.0 | 1.0-1.5 | 2.8-3.6 | 1.8-2.1 | 6.5 | T20 | 3.9 | 4.2-4.5 | 2.5-2.8 | 2.0 | 3.10-3.15 | 8.0-9.0 | 2.7 | 4.3 |
| 5.0 | 13.0-16.0 | 9.0 | 1.0-1.5 | 3.1-3.9 | 2.4-2.8 | 7.0 | T25 | 4.5 | 4.7-5.0 | 2.9-3.2 | 2.2 | 3.50-3.55 | 9.0-10.0 | 3.8 | 5.9 |
| 6.0 | 14.0-16.0 | 11.0 | 1.5-2.0 | 3.4-4.2 | 3.0-3.5 | 8.0 | T25 | 4.5 | 5.7-6.0 | 3.4-3.7 | 2.6 | 4.20-4.25 | 10.0-12.0 | 6.0 | 11.5 |
| 8.0 | 19.0-20.0 | 15.0 | 1.5-2.0 | 4.2-5.0 | 3.4-3.9 | 10.0 | T40 | 6.8 | 7.7-8.2 | 5.0-5.5 | 3.6 | 5.90-5.95 | 12.0-14.0 | 18.0 | 22.0 |
| 10.0 | 24.0-25.0 | 20.0 | 1.5-2.0 | 4.6-5.4 | 3.4-3.9 | 12.0 | T40 | 6.8 | 9.6-10.2 | 6.0-6.5 | 4.6 | 6.95-7.00 | 14.0-16.0 | 30.0 | 30.0 |

| Lt (±1.0) \ L ($\pm^{1.0}_{2.0}$) | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 | 120-160 | 180-300 | 300-375 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.0 | 18 | 18 | 24 | 24 | 30 | 30 | 36 | 36 | 36 | 42 | - | - | - | - | - | - | - |
| 4.5 | - | 18 | 24 | 24 | 30 | 30 | 36 | 36 | 36 | 42 | 48 | 48 | - | - | - | - | - |
| 5.0 | - | 20 | 24 | 24 | 30 | 30 | 36 | 36 | 36 | 42 | 48 | 48 | 54 | 60 | - | - | - |
| 6.0 | - | - | 24 | 24 | 30 | 30 | 36 | 36 | 36 | 42 | 48 | 48 | 54 | 70 | 70 | 70 | 70 |
| 8.0 | - | - | - | 32 | 37 | 47 | 50 | 50 | 50 | 50 | 50 | 72 | 80 | 80 | 80 | 80 | 80 |
| 10.0 | - | - | - | - | - | - | - | 50 | 55 | 55 | 55 | 55 | 55 | 55 | 80 | 105 | 105 |

MACHANICAL 机械性能

1, Material( 材质 ): A2 / A4 / 410 ;
2, A2/A4 Core Hardness ( 芯部硬度 A2/A4 ) : 200-250 HV10 ;
3, 410 Surface Hardness ( 表面硬度 410 ): 420-450 HV0.3 ;
4, 410 Bending Angle(折弯角度 410): ≥45° ;
5, Surface finish (表面处理): Passivated/Gleitmo 615 (钝化+615蜡)

| UNIT | 单 位 | mm |
|---|---|---|
| DATE | 日 期 | |
| DESIGN | 设 计 | HISENER |
| DWG | 制 图 | Leo |
| CHECK BY | 校 对 | Loyd |

Revision 修改:

HISENER

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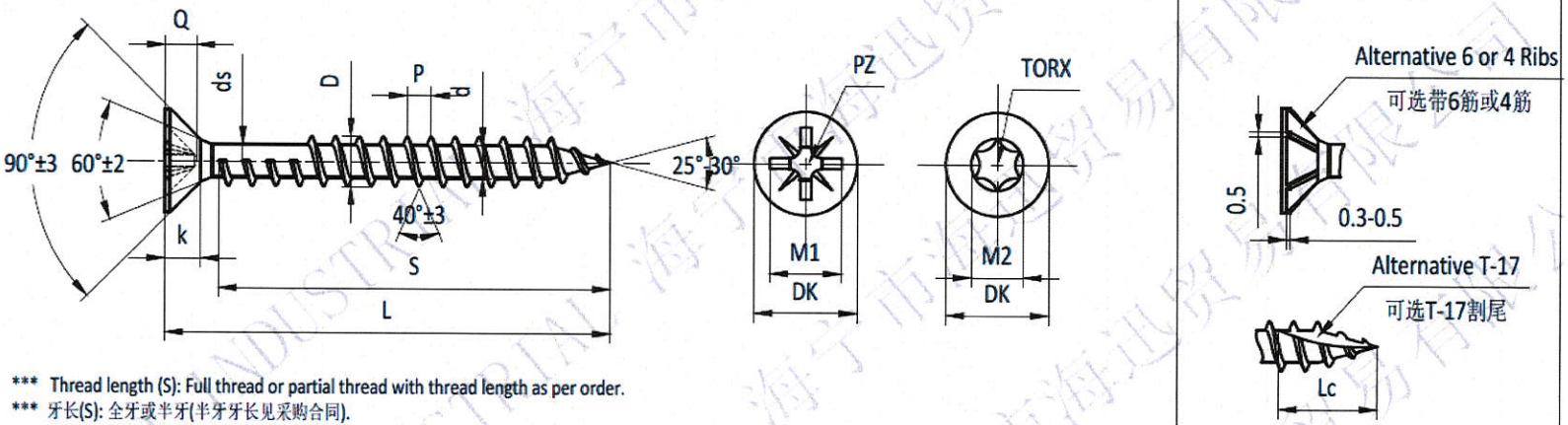
| Description | PZ/TX Double Cuntersunk Head Timber Screw, Head with/without Ribs,With/without T-17 cutting point | Drawing# | HS-082S |
|---|---|---|---|
| 产品名称 | 米字槽梅花槽双沉头纤维板钉，头带/不带筋，半牙/全牙，带/不带 Type 17割尾，不锈钢 | 图纸编号 | HS-082S |




*** Thread length (S): Full thread or partial thread with thread length as per order.
*** 牙长(S): 全牙或半牙(半牙牙长见采购合同).

| 规格 ITEM | 头部直径 DK | 上沉头高度 k | PZ | | | TORX | | | | 牙距 P(±10%) | 牙外径 D | 牙底径 d | 割尾长度 Lc | 杆径丝胚 ds | A2/A4扭矩min Torque(N.m) | 410扭矩min Torque(N.m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 针型 | 槽深 Q | M1 (Ref) | A2针型 | A4针型 | 槽深 Q | M2(Ref) | | | | | | | |
| 3.0 | 5.6-6.0 | 1.60-1.90 | 1 | 1.60-2.10 | 3.00 | T10 | T10 | 1.30-1.60 | 2.82 | 1.35 | 2.85-3.00 | 1.85-2.00 | 5.5-6.5 | 2.15-2.20 | 0.8 | 1.4 |
| 3.5 | 6.6-7.0 | 1.80-2.10 | 2 | 1.60-2.10 | 4.00 | T10 | T15 | 1.50-1.80 | 3.35 | 1.60 | 3.20-3.50 | 2.10-2.40 | 6.5-7.5 | 2.50-2.55 | 1.4 | 2.7 |
| 4.0 | 7.5-8.0 | 2.10-2.50 | 2 | 2.00-2.50 | 4.40 | T20 | T20 | 1.60-1.90 | 3.94 | 1.80 | 3.70-4.00 | 2.30-2.60 | 7.0-8.0 | 2.80-2.85 | 2.2 | 3.5 |
| 4.5 | 8.5-9.0 | 2.30-2.70 | 2 | 2.60-3.10 | 4.80 | T20 | T20 | 1.80-2.10 | 3.94 | 2.00 | 4.20-4.50 | 2.50-2.80 | 8.0-9.0 | 3.10-3.15 | 2.7 | 4.3 |
| 5.0 | 9.5-10.0 | 2.50-3.00 | 2 | 3.00-3.50 | 5.30 | T25 | T25 | 2.40-2.80 | 4.52 | 2.20 | 4.70-5.00 | 2.90-3.20 | 9.0-10.0 | 3.50-3.55 | 3.8 | 5.9 |
| 6.0 | 11.5-12.0 | 3.10-3.60 | 3 | 3.00-3.50 | 6.60 | T25 | T25 | 3.00-3.50 | 4.52 | 2.60 | 5.70-6.00 | 3.40-3.70 | 10.0-12.0 | 4.20-4.25 | 6.0 | 11.5 |
| 8.0 | 14.0-15.0 | 3.60-4.10 | / | / | / | T40 | T40 | 3.40-3.90 | 6.75 | 3.60 | 7.70-8.00 | 5.00-5.50 | 12.0-14.0 | 5.90-5.95 | 18.0 | 22 |
| 10.0 | 18.0-19.0 | 4.20-4.70 | / | / | / | T40 | T40 | 3.40-3.90 | 6.75 | 4.60 | 9.60-10.00 | 6.00-6.50 | 14.0-16.0 | 6.95-7.00 | 30.0 | 30 |

| 总长 L | 长度公差 1/2 IT17 |
|---|---|
| 10≤L≤20 | -0.90 |
| 20<L≤30 | -1.05 |
| 30<L≤50 | -1.25 |
| 50<L≤80 | -1.50 |
| 80<L≤120 | -1.75 |
| 120<L≤180 | -2.00 |
| 180<L≤250 | -2.30 |
| 250<L≤315 | -2.60 |
| 315<L≤400 | -2.85 |

MACHANICAL 机械性能

1, Material( 材质 ): A2 / A4 / 410 ;
2, A2/A4 Core Hardness ( 芯部硬度 A2/A4 ) : 200-250 HV10 ;
3, 410 Surface Hardness ( 表面硬度 410 ): 420-450 HV0.3 ;
4, 410 Bending Angle(折弯角度 410): ≥45° ;
5, Surface finish (表面处理): Passivated/Gleitmo 615 (钝化+615蜡)

| UNIT | 单 位 | mm |
|---|---|---|
| DATE | 日 期 | |
| DESIGN | 设 计 | HISENER |
| DWG | 制 图 | Leo |
| CHECK BY | 校 对 | Loyd |

Revision 修改

HISENER

HISENER INDUSTRIAL CO LTD

## Annex 2 Essential characteristics of Wood construction screws (timber screws)

Mechanical resistance and stability (BWR 1)

**Table 2** Wood construction screw, diameter 3.0, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 3.0 | 2.90 | |
| $d_1$ (mm) | | 1.97 | |
| $d_h$ (mm) | | 5.83 | |
| $d_s$(mm) | | 2.12 | |
| $p$ pitch thread (mm) | | 1.97 | |
| $l_g$ (mm) | | 26.04 | |
| $l$ (mm) | | 39.22 | |
| 3.1.2 | Characteristic yield moment at 20° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 3.0 | 1669 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 3.0 | 17.35* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 3.0 | 27.88* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 3.0 | 3.21 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 3.0 | 1169 | |
| $R_{p0.2}$ (MPa) | | 1159 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$<br>(Nm) / (Nm) | d [mm] | | |
| | 3.0 | 1.2/0.8 = 1.5** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 3.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| *Protective layer thickness* (µm) | d [mm] | | |
| | 3.0 | 9.4 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 3** Wood construction screw, diameter 3.5, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 3.5 | 3.47 | |
| $d_1$ (mm) | | 2.18 | |
| $d_h$ (mm) | | 6.95 | |
| $d_s$(mm) | | 2.41 | |
| $p$ pitch thread (mm) | | 2.28 | |
| $l_g$ (mm) | | 25.43 (24.23) | |
| $l$ (mm) | | 39.39 (49.69) | |
| 3.1.2 | Characteristic yield moment at 18° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 3.5 | 1895 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 3.5 | 17.27* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 3.5 | 27.62* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 3.5 | 3.70 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 3.5 | 1100 | |
| $R_{p0.2}$ (MPa) | | 1093 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 3.5 | 2.0/1.2 = 1.7** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 3.5 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| *Protective layer thickness* (µm) | d [mm] | | |
| | 3.5 | 8.8 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 4** Wood construction screw, diameter 4.0, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 4.0 | 3.98 | |
| $d_1$ (mm) | | 2.54 | |
| $d_h$ (mm) | | 7.96 | |
| $d_s$(mm) | | 2.84 | |
| $p$ pitch thread (mm) | | 2.37 | |
| $l_g$ (mm) | | 23.56 (40.90) | |
| $l$ (mm) | | 39.17 (69.48) | |
| 3.1.2 | Characteristic yield moment at 17° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 4.0 | 3046 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 4.0 | 16.71* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 4.0 | 26.26* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 4.0 | 5.47 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 4.0 | 1255 | |
| $R_{p0.2}$ (MPa) | | 1203 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$<br>(Nm) / (Nm) | d [mm] | | |
| | 4.0 | 3.5/2.0 = 1.8** | |
| 3.1.9 | Bending angle | | |
| Bending angle (°) | d [mm] | | |
| | 4.04.0 | > (45/d$^{0.7}$ + 20) | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| Protective layer thickness (µm) | d [mm] | | |
| | 4.0 | 9.58 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 5** Wood construction screw, diameter 4.5, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 4.5 | 4.46 | |
| $d_1$ (mm) | | 2.92 | |
| $d_h$ (mm) | | 8.79 | |
| $d_s$(mm) | | 3.10 | |
| $p$ pitch thread (mm) | | 2.57 | |
| $l_g$ (mm) | | 24.59 (48.92) | |
| $l$ (mm) | | 39.60 (79.40) | |
| 3.1.2 | Characteristic yield moment at 15° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 4.5 | 4044 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 4.5 | 16.34* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 4.5 | 25.53* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 4.5 | 7.87 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 4.5 | 1297 | |
| $R_{p0.2}$ (MPa) | | 1232 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 4.5 | 5.4/2.1 = 2.6** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 4.5 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| *Protective layer thickness* (µm) | d [mm] | | |
| | 4.5 | 9.74 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 6** Wood construction screw, diameter 5.0, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 5.0 | 5.04 | |
| $d_1$ (mm) | | 3.03 | |
| $d_h$ (mm) | | 9.83 | |
| $d_s$(mm) | | 3.48 | |
| $p$ pitch thread (mm) | | 3.21 | |
| $l_g$ (mm) | | 26.05 (48.99) | |
| $l$ (mm) | | 49.48 (89.27) | |
| 3.1.2 | Characteristic yield moment at 14° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 5.0 | 4417 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 5.0 | 16.07* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 5.0 | 24.57* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 5.0 | 7.84 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 5.0 | 1208 | |
| $R_{p0.2}$ (MPa) | | 1163 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 5.0 | 6.7/3.4 = 2.0** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 5.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| *Protective layer thickness* (µm) | d [mm] | | |
| | 5.0 | 11.75 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 7** Wood construction screw, diameter 6.0, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 6.0 | 5.96 | |
| $d_1$ (mm) | | 3.97 | |
| $d_h$ (mm) | | 11.79 | |
| $d_s$(mm) | | 4.24 | |
| $p$ pitch thread (mm) | | 4.18 | |
| $l_g$ (mm) | | 49.33(77.53) | |
| $l$ (mm) | | 99.80 (238.56) | |
| 3.1.2 | Characteristic yield moment at 12° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 6.0 | 10764 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 6.0 | 15.98* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 6.0 | 22.86* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 6.0 | 12.52 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 6.0 | 1121 | |
| $R_{p0.2}$ (MPa) | | 1118 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 6.0 | 10.9/7.2 = 1.5** | |
| 3.1.9 | Bending angle | | |
| Bending angle (°) | d [mm] | | |
| | 6.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| Protective layer thickness (µm) | d [mm] | | |
| | 6.0 | 12.44 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 8** Wood construction screw, diameter 8.0, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 8.0 | 8.07 | |
| $d_1$ (mm) | | 5.36 | |
| $d_h$ (mm) | | 14.94 | |
| $d_s$(mm) | | 5.76 | |
| $p$ pitch thread (mm) | | 5.16 | |
| $l_g$ (mm) | | 79.49 (78.94) | |
| $l$ (mm) | | 119.96 (298.33) | |
| 3.1.2 | Characteristic yield moment at 10° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 8.0 | 17729 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 8.0 | 15.92* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 8.0 | 21.45* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 8.0 | 25.37 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 8.0 | 1237 | |
| $R_{p0.2}$ (MPa) | | 1214 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 8.0 | 28.8/10.8 = 2.7** | |
| 3.1.9 | Bending angle | | |
| Bending angle (°) | d [mm] | | |
| | 8.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| Protective layer thickness (µm) | d [mm] | | |
| | 8.0 | 12.81 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 9** Wood construction screw, diameter 10.0, CSK head, torx recess, partial thread, carbon steel 10B21

| | | | | |
|---|---|---|---|---|
| 3.1.1 | Average value of geometry | | | |
| | d [mm] | Partial thread | | |
| $d$ (mm) | 10.0 | 10.0 | | |
| $d_1$ (mm) | | 6.23 | | |
| $d_h$ (mm) | | 17.52 | | |
| $d_s$(mm) | | 6.98 | | |
| $p$ pitch thread (mm) | | 6.52 | | |
| $l_g$ (mm) | | 79.18 (79.35) | | |
| $l$ (mm) | | 197.23 (359.61) | | |
| 3.1.2 | Characteristic yield moment at 9° | | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section | Smooth section |
| | | 10.0 | 29576 | 50570 |
| 3.1.3 | Characteristic withdrawal parameter | | | |
| | | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | | 10.0 | 15.64* | |
| 3.1.4 | Characteristic head pull-through parameter | | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | | |
| | | 10.0 | 22.86* | |
| 3.1.5 | Characteristic tensile capacity | | | |
| $f_{tens,k}$ (kN) | | d [mm] | | |
| | | 10.0 | 30.89 | |
| 3.1.6 | Characteristic yield strength | | | |
| | | d [mm] | | |
| $R_m$ (MPa) | | 10.0 | 1127 | |
| $R_{p0.2}$ (MPa) | | | 1051 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | | |
| | | 10.0 | 43.9/13.7 = 3.2** | |
| 3.1.9 | Bending angle | | | |
| Bending angle (°) | | d [mm] | | |
| | | 10.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | | |
| Protective layer thickness (µm) | | d [mm] | | |
| | | 10.0 | 14.31 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 10** Wood construction screw, diameter 5.0, wafer head, torx recess, partial thread, carbon steel 10B21, zinc plated

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 5.0 | 5.08 | |
| $d_1$ (mm) | | 3.22 | |
| $d_h$ (mm) | | 12.03 | |
| $d_s$(mm) | | 3.51 | |
| $p$ pitch thread (mm) | | 3.10 | |
| $l_g$ (mm) | | 53.08 | |
| $l$ (mm) | | 88.62 | |
| 3.1.2 | Characteristic yield moment at 14° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 5.0 | 6932 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 5.0 | 15.64* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 5.0 | 25.92* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 5.0 | 8.66 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 5.0 | 1184 | |
| $R_{p0.2}$ (MPa) | | 1152 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 5.0 | 7.2/3.5 = 2.1** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 5.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| *Protective layer thickness* (µm) | d [mm] | | |
| | 5.0 | 7.88 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 11** Wood construction screw, diameter 6.0, wafer head, torx recess, partial thread, carbon steel 10B21

| | | | | |
|---|---|---|---|---|
| 3.1.1 | Average value of geometry | | | |
| | d [mm] | Partial thread | | |
| $d$ (mm) | 6.0 | 5.91 | | |
| $d_1$ (mm) | | 3.80 | | |
| $d_h$ (mm) | | 14.98 | | |
| $d_s$(mm) | | 4.26 | | |
| $p$ pitch thread (mm) | | 3.93 | | |
| $l_g$ (mm) | | 30.61 (78.35) | | |
| $l$ (mm) | | 49.35 (279.63) | | |
| 3.1.2 | Characteristic yield moment at 12° | | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section | Smooth section |
| | | 6.0 | 11241 | 16567 |
| 3.1.3 | Characteristic withdrawal parameter | | | |
| | | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | | 6.0 | 15.36* | |
| 3.1.4 | Characteristic head pull-through parameter | | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | | |
| | | 6.0 | 24.10* | |
| 3.1.5 | Characteristic tensile capacity | | | |
| $f_{tens,k}$ (kN) | | d [mm] | | |
| | | 6.0 | 11.84 | |
| 3.1.6 | Characteristic yield strength | | | |
| | | d [mm] | | |
| $R_m$ (MPa) | | 6.0 | 1169 | |
| $R_{p0.2}$ (MPa) | | | 1079 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | | |
| | | 6.0 | 10.6/6.8 = 1.6** | |
| 3.1.9 | Bending angle | | | |
| *Bending angle* (°) | | d [mm] | | |
| | | 6.0 | > $(45/d^{0.7} + 20)$ | |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | | |
| *Protective layer thickness* (µm) | | d [mm] | | |
| | | 6.0 | 8.31 | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 12** Wood construction screw, diameter 8.0, wafer head, torx recess, partial thread, carbon steel 10B21

| 3.1.1 | Average value of geometry | | |
|---|---|---|---|
| | d [mm] | Partial thread | |
| $d$ (mm) | 8.0 | 8.04 | |
| $d_1$ (mm) | | 5.38 | |
| $d_h$ (mm) | | 21.41 | |
| $d_s$(mm) | | 5.72 | |
| $p$ pitch thread (mm) | | 5.51 | |
| $l_g$ (mm) | | 79.29 (79.82) | |
| $l$ (mm) | | 199.32 (318.31) | |
| 3.1.2 | Characteristic yield moment at 10° | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section |
| | | 8.0 | 21549 |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | | d [mm] | |
| $f_{ax,90,k}$ (N/mm²) | | 8.0 | 13.59* |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | |
| | | 8.0 | 23.96* |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | | d [mm] | |
| | | 8.0 | 24.57 |
| 3.1.6 | Characteristic yield strength | | |
| | | d [mm] | |
| $R_m$ (MPa) | | 8.0 | 1198 |
| $R_{p0.2}$ (MPa) | | | 1096 |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | |
| | | 8.0 | 29.5/12.7 = 2.3** |
| 3.1.9 | Bending angle | | |
| Bending angle (°) | | d [mm] | |
| | | 8.0 | > (45/d$^{0.7}$ + 20) |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| Protective layer thickness (µm) | | d [mm] | |
| | | 8.0 | 14.89 |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 13** Wood construction screw, diameter 10.0, wafer head, torx recess, partial thread, carbon steel 10B21

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 10.0 | 10.02 | |
| $d_1$ (mm) | | 6.44 | |
| $d_h$ (mm) | | 24.17 | |
| $d_s$(mm) | | 7.00 | |
| $p$ pitch thread (mm) | | 6.61 | |
| $l_g$ (mm) | | 79.27 (79.88) | |
| $l$ (mm) | | 157.987 (399.16) | |
| 3.1.2 | Characteristic yield moment at 9° | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section |
| | | 10.0 | 33059 |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | | d [mm] | |
| $f_{ax,90,k}$ (N/mm²) | | 10.0 | 13.07* |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | |
| | | 10.0 | 22.01* |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | | d [mm] | |
| | | 10.0 | 36.37 |
| 3.1.6 | Characteristic yield strength | | |
| | | d [mm] | |
| $R_m$ (MPa) | | 10.0 | 1238 |
| $R_{p0.2}$ (MPa) | | | 1208 |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | |
| | | 10.0 | 58.0/19.4 = 3.0** |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | | d [mm] | |
| | | 10.0 | > (45/$d^{0.7}$ + 20) |
| 3.1.10 | Average value of durability against corrosion (protective layer thickness) | | |
| *Protective layer thickness* (µm) | | d [mm] | |
| | | 10.0 | 15.41 |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 14** Wood construction screw, diameter 3.0, CSK head, torx recess, full thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Full thread | |
| $d$ (mm) | 3.0 | 2.98 | |
| $d_1$ (mm) | | 2.14 | |
| $d_h$ (mm) | | 5.82 | |
| $d_s$(mm) | | -- | |
| $p$ pitch thread (mm) | | 1.37 | |
| $l_g$ (mm) | | 12.47 | |
| $l$ (mm) | | 15.71 | |
| 3.1.2 | Characteristic yield moment at 20° | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section |
| | | 3.0 | 1210 |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | | d [mm] | |
| $f_{ax,90,k}$ (N/mm²) | | 3.0 | 16.97* |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | |
| | | 3.0 | 27.63* |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | | d [mm] | |
| | | 3.0 | 2.22 |
| 3.1.6 | Characteristic yield strength | | |
| | | d [mm] | |
| $R_m$ (MPa) | | 3.0 | 716 |
| $R_{p0.2}$ (MPa) | | | 662 |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$<br>(Nm) / (Nm) | | d [mm] | |
| | | 3.0 | 1.1/0.5 = 2.2** |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | | d [mm] | |
| | | 3.0 | > (45/$d^{0.7}$ + 20) |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 15** Wood construction screw, diameter 3.5, CSK head, torx recess, full thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Full thread | |
| $d$ (mm) | 3.5 | 3.44 | |
| $d_1$ (mm) | | 2.33 | |
| $d_h$ (mm) | | 6.84 | |
| $d_s$(mm) | | 2.51 | |
| $p$ pitch thread (mm) | | 1.62 | |
| $l_g$ (mm) | | 15.66 | |
| $l$ (mm) | | 19.75 | |
| 3.1.2 | Characteristic yield moment at 18° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 3.5 | 1783 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 3.5 | 16.80* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 3.5 | 26.25* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 3.5 | 3.35 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 3.5 | 868 | |
| $R_{p0.2}$ (MPa) | | 835 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 3.5 | 1.6/0.7 = 2.3** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 3.5 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 16** Wood construction screw, diameter 4.0, CSK head, torx recess, full or partial thread, stainless steel A2-304

| 3.1.1 | Average value of geometry | | |
|---|---|---|---|
| | d [mm] | Full or Partial thread | |
| $d$ (mm) | 4.0 | 3.85 | |
| $d_1$ (mm) | | 2.57 | |
| $d_h$ (mm) | | 7.80 | |
| $d_s$(mm) | | 2.81 | |
| $p$ pitch thread (mm) | | 1.83 | |
| $l_g$ (mm) | | 20.57 | |
| $l$ (mm) | | 24.52 | |
| 3.1.2 | Characteristic yield moment at 17° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 4.0 | 1945 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 4.0 | 16.77* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 4.0 | 24.95* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 4.0 | 4.13 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 4.0 | 883 | |
| $R_{p0.2}$ (MPa) | | 849 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 4.0 | 2.2/1.0 = 2.2** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 4.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 17** Wood construction screw, diameter 4.5, CSK head, torx recess, full or partial thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Full or Partial thread | |
| $d$ (mm) | 4.5 | 4.40 | |
| $d_1$ (mm) | | 2.82 | |
| $d_h$ (mm) | | 8.95 | |
| $d_s$(mm) | | 3.16 | |
| $p$ pitch thread (mm) | | 2.03 | |
| $l_g$ (mm) | | 29.93 | |
| $l$ (mm) | | 44.11 | |
| 3.1.2 | Characteristic yield moment at 15° | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section |
| | | 4.5 | 2415 |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | | d [mm] | |
| $f_{ax,90,k}$ (N/mm²) | | 4.5 | 16.84* |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | |
| | | 4.5 | 23.66* |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | | d [mm] | |
| | | 4.5 | 4.43 |
| 3.1.6 | Characteristic yield strength | | |
| | | d [mm] | |
| $R_m$ (MPa) | | 4.5 | 788 |
| $R_{p0.2}$ (MPa) | | | 635 |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | |
| | | 4.5 | 2.9/2.0 = 1.5** |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | | d [mm] | |
| | | 4.5 | > (45/$d^{0.7}$ + 20) |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 18** Wood construction screw, diameter 5.0, CSK head, torx recess, full thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Full thread | |
| $d$ (mm) | 5.0 | 4.93 | |
| $d_1$ (mm) | | 3.16 | |
| $d_h$ (mm) | | 9.80 | |
| $d_s$(mm) | | -- | |
| $p$ pitch thread (mm) | | 2.23 | |
| $l_g$ (mm) | | 53.67 (93.97) | |
| $l$ (mm) | | 59.31 (98.86) | |
| 3.1.2 | Characteristic yield moment at 14° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 5.0 | 4660 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 5.0 | 16.16* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 5.0 | 22.90* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 5.0 | 5.81 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 5.0 | 825 | |
| $R_{p0.2}$ (MPa) | | 797 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 5.0 | NPA | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 5.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 19** Wood construction screw, diameter 6.0, CSK head, torx recess, full thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Full thread | |
| $d$ (mm) | 6.0 | 5.84 | |
| $d_1$ (mm) | | 3.79 | |
| $d_h$ (mm) | | 11.86 | |
| $d_s$(mm) | | -- | |
| $p$ pitch thread (mm) | | 2.64 | |
| $l_g$ (mm) | | 52.19 (91.48) | |
| $l$ (mm) | | 59.29 (98.60) | |
| 3.1.2 | Characteristic yield moment at 12° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 6.0 | 8120 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 6.0 | 15.77* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 6.0 | 22.48* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 6.0 | 8.65 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 6.0 | 847 | |
| $R_{p0.2}$ (MPa) | | 814 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 6.0 | NPA | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 6.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 20** Wood construction screw, diameter 8.0, CSK head, torx recess, partial thread, stainless steel A2-304

| | | | | |
|---|---|---|---|---|
| 3.1.1 | Average value of geometry | | | |
| | d [mm] | Partial thread | | |
| $d$ (mm) | 8.0 | 8.07 | | |
| $d_1$ (mm) | | 5.36 | | |
| $d_h$ (mm) | | 14.33 | | |
| $d_s$(mm) | | 5.92 | | |
| $p$ pitch thread (mm) | | 3.66 | | |
| $l_g$ (mm) | | 79.61 | | |
| $l$ (mm) | | 199.10 | | |
| 3.1.2 | Characteristic yield moment at 10° | | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section | Smooth section |
| | | 8.0 | 14342 | 10546 |
| 3.1.3 | Characteristic withdrawal parameter | | | |
| | | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | | 8.0 | 14.36* | |
| 3.1.4 | Characteristic head pull-through parameter | | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | | |
| | | 8.0 | 21.59* | |
| 3.1.5 | Characteristic tensile capacity | | | |
| $f_{tens,k}$ (kN) | | d [mm] | | |
| | | 8.0 | 12.90 | |
| 3.1.6 | Characteristic yield strength | | | |
| | | d [mm] | | |
| $R_m$ (MPa) | | 8.0 | 637 | |
| $R_{p0.2}$ (MPa) | | | 342 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | | |
| | | 8.0 | 18.3/6.5 = 2.8** | |
| 3.1.9 | Bending angle | | | |
| *Bending angle* (°) | | d [mm] | | |
| | | 8.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 21** Wood construction screw, diameter 10.0, CSK head, torx recess, partial thread, stainless steel A2-304

| | | | | |
|---|---|---|---|---|
| 3.1.1 | Average value of geometry | | | |
| | d [mm] | Partial thread | | |
| $d$ (mm) | 10.0 | 9.69 | | |
| $d_1$ (mm) | | 6.32 | | |
| $d_h$ (mm) | | 18.14 | | |
| $d_s$(mm) | | 6.96 | | |
| $p$ pitch thread (mm) | | 5.15 | | |
| $l_g$ (mm) | | 102.99 | | |
| $l_{250,\ 350}$ (mm) | | 248.43 (349.61) | | |
| 3.1.2 | Characteristic yield moment at 9° | | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section | Smooth section |
| | | 10.0 | 22303 | 17438 |
| 3.1.3 | Characteristic withdrawal parameter | | | |
| | | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | | 10.0 | 13.87* | |
| 3.1.4 | Characteristic head pull-through parameter | | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | | |
| | | 10.0 | 19.01* | |
| 3.1.5 | Characteristic tensile capacity | | | |
| $f_{tens,k}$ (kN) | | d [mm] | | |
| | | 10.0 | 17.41 | |
| 3.1.6 | Characteristic yield strength | | | |
| | | d [mm] | | |
| $R_m$ (MPa) | | 10.0 | 619 | |
| $R_{p0.2}$ (MPa) | | | 351 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | | |
| | | 10.0 | 28.6/12.1 = 2.4** | |
| 3.1.9 | Bending angle | | | |
| *Bending angle* (°) | | d [mm] | | |
| | | 10.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 22** Wood construction screw, diameter 5.0, Wafer head, torx recess, partial thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 5.0 | 4.82 | |
| $d_1$ (mm) | | 3.13 | |
| $d_h$ (mm) | | 13.40 | |
| $d_s$(mm) | | 3.52 | |
| $p$ pitch thread (mm) | | 2.23 | |
| $l_g$ (mm) | | 23.15 | |
| $l$ (mm) | | 34.63 | |
| 3.1.2 | Characteristic yield moment at 14° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 5.0 | 2613 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 5.0 | 16.45* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 5.0 | 26.66* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 5.0 | 5.06 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 5.0 | 731 | |
| $R_{p0.2}$ (MPa) | | 627 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 5.0 | 3.7/1.9 = 2.0** | |
| 3.1.9 | Bending angle | | |
| *Bending angle* (°) | d [mm] | | |
| | 5.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 23** Wood construction screw, diameter 6.0, Wafer head, torx recess, partial thread, stainless steel A2-304

| | | | | |
|---|---|---|---|---|
| 3.1.1 | Average value of geometry | | | |
| | d [mm] | Partial thread | | |
| $d$ (mm) | 6.0 | 5.89 | | |
| $d_1$ (mm) | | 3.73 | | |
| $d_h$ (mm) | | 15.07 | | |
| $d_s$(mm) | | 4.22 | | |
| $p$ pitch thread (mm) | | 2.67 | | |
| $l_g$ (mm) | | 69.57 | | |
| $l$ (mm) | | 199.45 | | |
| 3.1.2 | Characteristic yield moment at 12° | | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section | Smooth section |
| | | 6.0 | 6772 | 4278 |
| 3.1.3 | Characteristic withdrawal parameter | | | |
| | | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | | 6.0 | 15.35* | |
| 3.1.4 | Characteristic head pull-through parameter | | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | | |
| | | 6.0 | 30.76* | |
| 3.1.5 | Characteristic tensile capacity | | | |
| $f_{tens,k}$ (kN) | | d [mm] | | |
| | | 6.0 | 6.92 | |
| 3.1.6 | Characteristic yield strength | | | |
| | | d [mm] | | |
| $R_m$ (MPa) | | 6.0 | 702 | |
| $R_{p0.2}$ (MPa) | | | 566 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | | |
| | | 6.0 | 6.4/2.9 = 2.2** | |
| 3.1.9 | Bending angle | | | |
| *Bending angle* (°) | | d [mm] | | |
| | | 6.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 24** Wood construction screw, diameter 8.0, Wafer head, torx recess, partial thread, stainless steel A2-304

| | | | |
|---|---|---|---|
| 3.1.1 | Average value of geometry | | |
| | d [mm] | Partial thread | |
| $d$ (mm) | 8.0 | 7.90 | |
| $d_1$ (mm) | | 5.24 | |
| $d_h$ (mm) | | 19.47 | |
| $d_s$(mm) | | 5.98 | |
| $p$ pitch thread (mm) | | 3.66 | |
| $l_g$ (mm) | | 71.32, 79.20, 80.98 | |
| $l_{80,\ 100,\ 120}$ (mm) | | 78.61, 98.69, 119.19 | |
| 3.1.2 | Characteristic yield moment at 10° | | |
| $M_{y,k}$ (Nmm) | d [mm] | Thread section | |
| | 8.0 | 11320 | |
| 3.1.3 | Characteristic withdrawal parameter | | |
| | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | 8.0 | 15.15* | |
| 3.1.4 | Characteristic head pull-through parameter | | |
| $f_{head,k}$ (N/mm²) | d [mm] | | |
| | 8.0 | 25.71* | |
| 3.1.5 | Characteristic tensile capacity | | |
| $f_{tens,k}$ (kN) | d [mm] | | |
| | 8.0 | 13.59 | |
| 3.1.6 | Characteristic yield strength | | |
| | d [mm] | | |
| $R_m$ (MPa) | 8.0 | 696 | |
| $R_{p0.2}$ (MPa) | | 502 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | d [mm] | | |
| | 8.0 | 18.5/7.5 = 2.5** | |
| 3.1.9 | Bending angle | | |
| Bending angle (°) | d [mm] | | |
| | 8.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

**Table 25** Wood construction screw, diameter 10.0, Wafer head, torx recess, full and partial thread, stainless steel A2-304

| | | | | |
|---|---|---|---|---|
| 3.1.1 | Average value of geometry | | | |
| | d [mm] | Full and Partial thread | | |
| $d$ (mm) | 10.0 | 9.87 | | |
| $d_1$ (mm) | | 6.18 | | |
| $d_h$ (mm) | | 24.65 | | |
| $d_s$(mm) | | 6.95 | | |
| $p$ pitch thread (mm) | | 4.70 | | |
| $l_g$ (mm) | | 80.18 (105.24) | | |
| $l_{120,\ 200}$ (mm) | | 118.45 (198.81) | | |
| 3.1.2 | Characteristic yield moment at 9° | | | |
| $M_{y,k}$ (Nmm) | | d [mm] | Thread section | Smooth section |
| | | 10.0 | 18286 | 16829 |
| 3.1.3 | Characteristic withdrawal parameter | | | |
| | | d [mm] | | |
| $f_{ax,90,k}$ (N/mm²) | | 10.0 | 13.78* | |
| 3.1.4 | Characteristic head pull-through parameter | | | |
| $f_{head,k}$ (N/mm²) | | d [mm] | | |
| | | 10.0 | 22.40* | |
| 3.1.5 | Characteristic tensile capacity | | | |
| $f_{tens,k}$ (kN) | | d [mm] | | |
| | | 10.0 | 18.18 | |
| 3.1.6 | Characteristic yield strength | | | |
| | | d [mm] | | |
| $R_m$ (MPa) | | 10.0 | 670 | |
| $R_{p0.2}$ (MPa) | | | 456 | |
| 3.1.7<br>3.1.8 | Characteristic torsional ratio (Characteristic torsional strength/Characteristic torsional resistance into timber) | | | |
| $f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm) | | d [mm] | | |
| | | 10.0 | 30.5/7.8 = 3.9** | |
| 3.1.9 | Bending angle | | | |
| *Bending angle* (°) | | d [mm] | | |
| | | 10.0 | > $(45/d^{0.7} + 20)$ | |

* density of timber 350 kg/m³
** density of timber 480 kg/m³

## Annex 3 Reference documents

[1] European Assessment Document EAD 130118-01-0603 Screws and threaded rods for use in timber constructions (edition March 2019)