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Bautechnisches Prüfamt

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European Technical Assessment

ETA-12/0280
of 18 November 2022

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Trade name of the construction product

Product family
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment
contains

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

This version replaces

Deutsches Institut für Bautechnik

EASYfast, EASYtop and BULLET screws

Screws for use in timber constructions

Berner Omnichannel Trading
Holding SE
Bernerstraße 6
74653 Künzelsau
DEUTSCHLAND

Herstellwerk 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16, 17, 18, 19 und 20
plant 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,
18, 19 and 20

35 pages including 4 annexes which form an integral part
of this assessment

EAD 130118-01-0603 – SCREWS AND THREADED
RODS FOR USE IN TIMBER CONSTRUCTIONS

ETA-12/0280 issued on 9 October 2020

European Technical Assessment

ETA-12/0280

English translation prepared by DIBt

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Specific Part

1 Technical description of the product

Berner EASYfast, EASYtop and BULLET screws are self-tapping screws made from special carbon or martensitic stainless steel. The screws are hardened. Screws made from carbon steel have a corrosion protection in accordance with Annex A.2.6. The outer thread diameter d is not less than 3.0 mm and not greater than 10.0 mm. The overall length of the screws is ranging from 17 mm to 600 mm. Further dimensions are shown in Annex 4. The washers are made from carbon steel. The dimensions of the washers are given in Annex A.4.9.

Berner EASYfast, EASYtop and BULLET screws achieve a bending angle α of at least $45/d^{0.7} + 20$, where d is the outer thread diameter of the screws.

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 screws are used in compliance with the specifications and conditions given in Annex 1 to 3.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the screws 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
Dimensions	See Annex 4
Characteristic yield moment	See Annex 2
Bending angle	See Annex 2
Characteristic withdrawal parameter	See Annex 2
Characteristic head pull-through parameter	See Annex 2
Characteristic tensile strength	See Annex 2
Characteristic yield strength	No performance assessed
Characteristic torsional strength	See Annex 2
Insertion moment	See Annex 2
Spacings, end and edge distances of the screws and minimum thickness of the wood-based material	See Annex 2
Slip modulus for mainly axially loaded screws	See Annex 2
Durability against corrosion	See Annex 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.3 Safety and accessibility in use (BWR 4)

Same as BWR 1.

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

In accordance with EAD No. 130118-01-0603 the applicable European legal act is: 97/176/EC.
The system to be applied is: 3

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 with Deutsches Institut für Bautechnik.

Issued in Berlin on 18 November 2022 by Deutsches Institut für Bautechnik

Anja Dewitt
Head of Section

beglaubigt:
Blümel

Annex 1 Specifications of intended use

A.1.1 Use of the Berner EASYfast, EASYtop and BULLET screws only for:

- Static and quasi-static loads

A.1.2 Connection material

The self-tapping screws are used for connections in load-bearing timber structures between wood-based members or between wood-based members and steel members:

- Solid timber (softwood) in accordance with EN 14081-1¹,
- Glued laminated timber in accordance with EN 14080²,
- Glued solid timber in accordance with EN 14080,
- Laminated veneer lumber LVL (softwood) in accordance with EN 14374³, arrangement of the screws only perpendicular to the plane of the veneers,
- Cross laminated timber (softwood) in accordance with European Technical Assessments.

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

- Oriented strand boards (OSB) in accordance with EN 300⁴ and EN 13986,
- Plywood in accordance with EN 636⁵ and EN 13986⁶,
- Particleboards in accordance with EN 312⁷ and EN 13986,
- Cement-bonded particleboards in accordance with EN 634-2⁸ and EN 13986,
- Fibreboards in accordance with EN 622-2⁹, EN 622-3¹⁰ and EN 13986,
- Solid wood panels (SWP) in accordance with EN 13353¹¹ and EN 13986.

Wood-based panels are only arranged on the side of the screw head.

Berner EASYfast, EASYtop and BULLET screws with an outer thread diameter of at least 6 mm are also used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical façades.

1	EN 14081-1:2005+A1:2011	Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements
2	EN 14080:2013	Timber structures – Glued laminated timber and glued solid timber – Requirements
3	EN 14374:2004	Timber structures – Structural laminated veneer lumber – Requirements
4	EN 300:2006	Oriented strand boards (OSB) – Definition, classification and specifications
5	EN 636:2012+A1:2015	Plywood – Specifications
6	EN 13986:2004+A1:2015	Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking
7	EN 312:2010	Particleboards – Specifications
8	EN 634-2:2007	Cement-bonded particleboards – Specifications – Part 2: Requirements for OPC bonded particleboards for use in dry, humid and external conditions
9	EN 622-2:2004/AC:2005	Fibreboards – Specifications – Part 2: Requirements for hardboards
10	EN 622-3:2004	Fibreboards – Specifications – Part 3: Requirements for medium boards
11	EN 13353:2022	Solid wood panels (SWP) – Requirements

EASYfast, EASYtop and BULLET screws	Annex 1
Specifications of intended use	

A.1.3 Use Conditions (environmental conditions)

The corrosion protection of the Berner EASYfast, EASYtop and BULLET screws is specified in Annex A.2.6.

A.1.4 Installation provisions

EN 1995-1-1¹² applies for the installation of Berner EASYfast, EASYtop and BULLET screws.

A minimum of two screws is used for connections in load-bearing timber structures.

The screws are either driven into the wood-based member made of softwood without pre-drilling or in pre-drilled holes with a diameter not exceeding the inner thread diameter d_1 .

The screw holes in steel members are pre-drilled with an adequate diameter greater than the outer thread diameter.

If screws with an outer thread diameter $d \geq 8$ mm are driven into the wood-based member without pre-drilling, the solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is from spruce, pine or fir.

In the case of fastening counter battens on thermal insulation material on top of rafters the screws are driven in the rafter through the counter battens and the thermal insulation material without pre-drilling in one sequence.

Countersunk head screws may be used with washers in accordance with Annex A.4.9. After inserting the screws the washers shall touch the surface of the wood-based member completely.

By fastening screws in wood-based members the head of the screws is flush with the surface of the wood-based member. For screws with pan head, small countersunk washer head, washer head and hexagonal head with or without washer the head part remains unconsidered.

¹² EN 1995-1-1: 2004/AC:2006 Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules
+A1:2008+A2:2014 for buildings

EASYfast, EASYtop and BULLET screws	Annex 1
Installation provisions	

Annex 2 Characteristic values of the load-carrying capacities

Table A.2.1 Characteristic load-carrying capacities of Berner EASYfast, EASYtop and BULLET screws

Outer thread diameter d [mm]	3.0	3.5	4.0	4.5	5.0	6.0	8.0	10.0
Characteristic yield moment $M_{y,k}$ [Nm]	1.6	2.3	3.3	4.5	5.9	9.5	20.0	36.0
Characteristic tensile strength $f_{tens,k}$ [kN]	2.8	3.8	5.0	6.4	7.9	11.0	20.0	30.0
Characteristic torsional strength $f_{tor,k}$ [Nm]	1.5	2.5	3.2	4.3	6.5	10.0	25.0	40.0

A.2.1 General

All Berner EASYfast, EASYtop and BULLET screws achieve a bending angle α of at least $45/d^{0.7} + 20$, where d is the outer thread diameter of the screws.

The minimum penetration length of the threaded part of the screws in the wood-based members l_{ef} is:

$$l_{ef} = \frac{4 \cdot d}{\sin \alpha} \quad (2.1)$$

Where

α angle between screw axis and grain direction [°],

d outer thread diameter of the screw [mm].

The inner thread diameter d_1 of the screws used in cross laminated timber is greater than the maximal width of the gaps in the layer of cross laminated timber.

A.2.2 Laterally loaded screws

A.2.2.1 General

The outer thread diameter d is used as effective diameter of the screw in accordance with EN 1995-1-1.

The embedding strength for the screws in wood-based members or in wood-based panels shall be taken from EN 1995-1-1.

A.2.2.2 Cross laminated timber

The embedding strength for screws arranged in the narrow faces parallel to the plane of cross laminated timber may be assumed in accordance with equation (2.2) independent of the angle between screw axis and grain direction, $0^\circ \leq \alpha \leq 90^\circ$:

$$f_{h,k} = 20 \cdot d^{-0.5} \quad [\text{N/mm}^2] \quad (2.2)$$

unless otherwise specified in the technical specification of the cross laminated timber.

Where d is the outer thread diameter of the screws in mm.

Equation (2.2) is only valid for softwood layers. The provisions in the European Technical Assessments of the cross laminated timber apply.

EASYfast, EASYtop and BULLET screws	Annex 2
Characteristic values of the load-carrying capacities	

The embedding strength for screws in the wide faces of cross laminated timber can be assumed as for solid timber based on the characteristic density of the outer layer. Where applicable, the angle between force and grain direction of the outer layer shall be taken into account. The direction of the lateral force shall be perpendicular to the screw axis and parallel to the wide faces of the cross laminated timber.

For angles $45^\circ \leq \alpha < 90^\circ$ between screw axis and grain direction of the outer layer the characteristic load-carrying capacity may be assumed as 2/3 of the corresponding value for $\alpha = 90^\circ$, if only the penetration depth perpendicular to the wide face is taken into account.

A.2.3 Axially loaded screws

A.2.3.1 Axial slip modulus for mainly axially loaded screws

The axial slip modulus K_{ser} of the threaded part of a screw for the serviceability limit state is taken independent of angle α to the grain as:

$$K_{ser} = 780 \cdot d^{0,2} \cdot l_{ef}^{0,4} \quad [N/mm] \quad (2.3)$$

Where

d outer thread diameter of the screw [mm],

l_{ef} penetration length of the of the threaded part of the screw in the wood-based member [mm].

A.2.3.2 Axial withdrawal capacity – Characteristic withdrawal parameter

The characteristic withdrawal parameter for Berner EASYfast, EASYtop and BULLET screws at an angle $\alpha = 90^\circ$ to the grain based on a characteristic density of the wood-based member ρ_a of 350 kg/m³ is

$f_{ax,k} = 12.0 \text{ N/mm}^2$ for EASYfast and EASYtop screws with $3 \text{ mm} \leq d \leq 8 \text{ mm}$

$f_{ax,k} = 10.0 \text{ N/mm}^2$ for EASYfast screws with $d = 10 \text{ mm}$

$f_{ax,k} = 12.6 \text{ N/mm}^2$ for BULLET screws with $d = 8 \text{ mm}$.

For LVL a maximum characteristic density of 500 kg/m³ shall be used in equation (8.40a) of EN 1995-1-1.

For screws penetrating more than one layer of cross laminated timber the different layers may be taken into account proportionally. In the narrow faces of the cross laminated timber the screws shall be fully inserted in one layer of cross laminated timber.

A.2.3.3 Head pull-through capacity – Characteristic head pull-through parameter

The characteristic value of the head pull-through parameter for Berner EASYfast, EASYtop and BULLET screws for a characteristic density ρ_a of 350 kg/m³ of the timber and for wood-based panels like

- Oriented strands boards (OSB) in accordance with EN 300 and EN 13986,
- Plywood in accordance with EN 636 and EN 13986,
- Particleboard in accordance with EN 312 and EN 13986,
- Cement-bonded particleboards in accordance with EN 634-2 and EN 13986,
- Fibreboards in accordance with EN 622-2, EN 622-3 and EN 13986,
- Solid wood panels in accordance with EN 13353 and EN 13986

with a thickness of more than 20 mm is:

$f_{head,k} = 12.0 \text{ N/mm}^2$ for EASYfast and EASYtop screws with hexagonal, washer or pan head

$f_{head,k} = 10.0 \text{ N/mm}^2$ for EASYfast and EASYtop screws for the remaining screws

$f_{head,k} = 16.0 \text{ N/mm}^2$ for BULLET screws with $d = 8 \text{ mm}$ with washer and countersunk ("COMBI") head.

EASYfast, EASYtop and BULLET screws	Annex 2
Characteristic values of the load-carrying capacities	

For wood-based panels a maximum characteristic density of 380 kg/m³ and for LVL a maximum characteristic density of 500 kg/m³ shall be used in equation (8.40b) of EN 1995-1-1.

The head diameter shall be equal to or greater than 1.8·d_s, where d_s is the smooth shank or the inner thread diameter. Otherwise the characteristic head pull-through capacity in equation (8.40b) of EN 1995-1-1 is F_{ax,α,Rk} = 0 for all wood-based materials.

For wood-based panels with a thickness 12 mm ≤ t ≤ 20 mm the characteristic value of the head pull-through parameter for the Berner EASYfast, EASYtop and BULLET screws is:

$$f_{\text{head,k}} = 8.0 \text{ N/mm}^2.$$

For wood-based panels with a thickness of less than 12 mm the characteristic head pull-through capacity for screws shall be based on a characteristic value of the head pull-through parameter of 8.0 N/mm². The characteristic head pull-through capacity shall be limited to 400 N. A minimum thickness of the wood-based panels of 1.2·d, where d is the outer thread diameter, and the values in Table A.2.2 shall be complied.

Table A.2.2 Minimum thickness of wood-based panels

Wood-based panel	Minimum thickness [mm]
Plywood	6
Fibreboards (hardboards and medium boards)	6
Oriented strand boards (OSB)	8
Particleboards	8
Cement-bonded particleboards	8
Solid wood panels (SWP)	12

In steel-to-timber connections the head pull-through capacity is not governing.

A.2.4 Spacings, end and edge distances of the screws and minimum thickness of the wood-based material

A.2.4.1 Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For Berner EASYfast, EASYtop and BULLET screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

Minimum thickness for structural members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with d ≤ 6 mm, t = 30 mm for screws with d = 8 mm and t = 40 mm for screws with d = 10 mm.

Screws in non pre-drilled holes

For Berner EASYfast, EASYtop and BULLET screws in non-predrilled holes the minimum spacings, end and edge distances and dimensions are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.

Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d ≥ 8 mm and timber thickness t < 5·d.

Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

EASYfast, EASYtop and BULLET screws	Annex 2
Characteristic values of the load-carrying capacities Spacings, end and edge distances and dimensions	

A.2.4.2 Only axially loaded screws

For Berner EASYfast, EASYtop and BULLET screws the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

A.2.4.3 Cross laminated timber

The minimum requirements for spacings, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definitions of spacings, end and edge distances are shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

- Minimum thickness of cross laminated timber: 10·d
- Minimum penetration depth in the narrow face of the cross laminated timber: 10·d

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

Table A.2.3 Minimum spacings, end and edge distances of screws in the wide or narrow faces of cross laminated timber

	a_1	$a_{3,t}$	$a_{3,c}$	a_2	$a_{4,t}$	$a_{4,c}$
Wide faces (see Figure A.2.1)	$4 \cdot d$	$6 \cdot d$	$6 \cdot d$	$2.5 \cdot d$	$6 \cdot d$	$2.5 \cdot d$
Narrow faces (see Figure A.2.2)	$10 \cdot d$	$12 \cdot d$	$7 \cdot d$	$4 \cdot d$	$6 \cdot d$	$3 \cdot d$

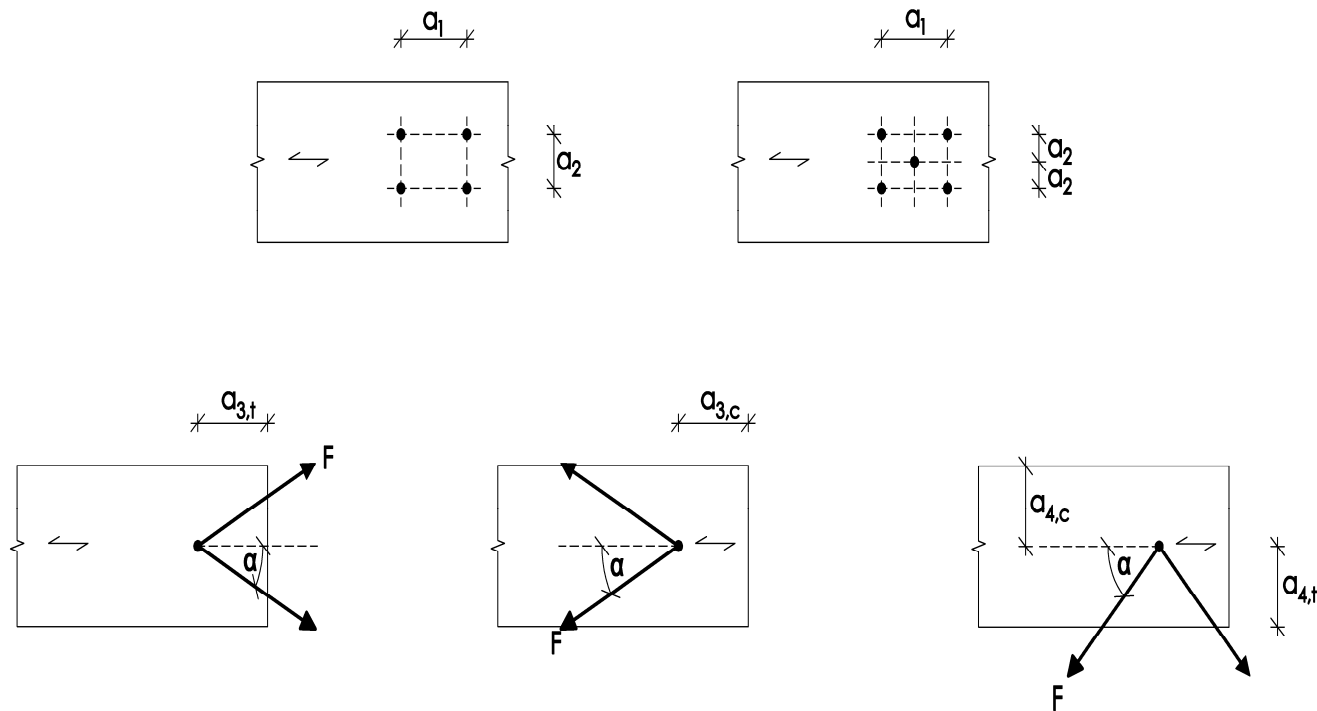


Figure A.2.1 Definition of spacings, end and edge distances in the wide faces

EASYfast, EASYtop and BULLET screws	Annex 2
Spacings, end and edge distances and dimensions	

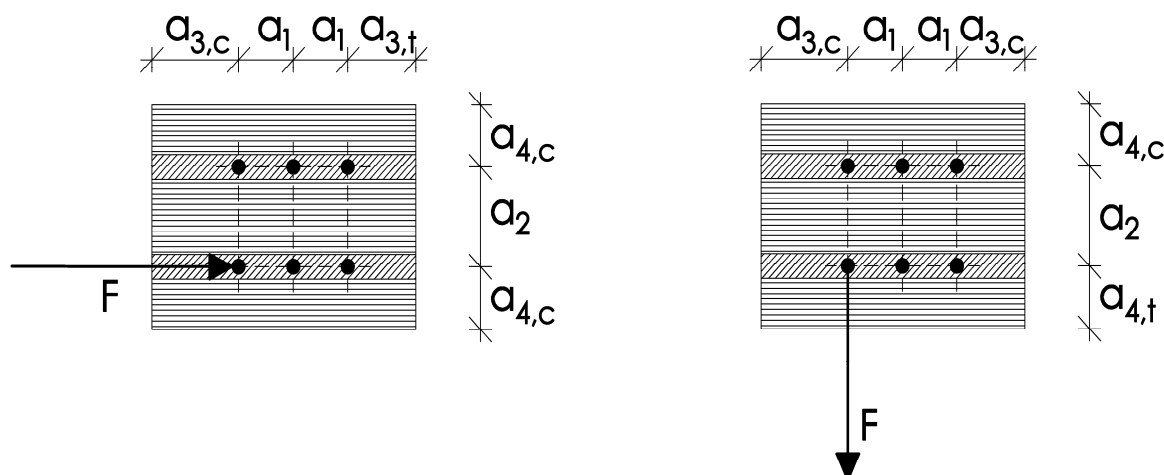


Figure A.2.2 Definition of spacings, end and edge distances in the narrow faces

A.2.5 Insertion moment

The ratio between the characteristic torsional strength $f_{tor,k}$ and the mean value of insertion moment $R_{tor,mean}$ fulfills the requirement for all screws.

A.2.6 Durability against corrosion

Berner EASYfast, EASYtop and BULLET screws made from carbon steel have the coatings given in Table A.2.4.

Table A.2.4 Coatings of the Berner EASYfast, EASYtop and BULLET screws

Coating EASYfast, EASYtop screw		Thickness of the coating [μm]
electrogalvanised	blue chromated	3 - 5
	yellow chromated	
Aluminium-zinc-flake coating		5 - 8
Coating BULLET screw		
electrogalvanised	blue passivated	5 - 8

Steel no. 1.4006 is used for screws made from martensitic stainless steel. For the BULLET screws steel no. 1.5506 is used.

Contact corrosion shall be avoided.

EASYfast, EASYtop and BULLET screws	Annex 2
Insertion moment and durability against corrosion	

Annex 3 Fastening of thermal insulation material on top of rafters (informative)

A.3.1 General

Berner EASYfast, EASYtop and BULLET screws with an outer thread diameter of at least 6 mm may be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical façades. In the following, the meaning of the word rafter includes wood-based members with inclinations between 0° and 90°.

The thickness of the thermal insulation material is up to 300 mm. The thermal insulation material used is applicable as insulation on top of rafters or on wood-based members in vertical façades.

The counter battens are from solid timber in accordance with EN 14081-1. The minimum thickness t and the minimum width b of the counter battens are given in Table A.3.1.

Table A.3.1 Minimum thickness and minimum width of the counter battens

Outer thread diameter [mm]	Minimum thickness t [mm]	Minimum width b [mm]
6 and 8	30	50
10	40	60

Instead of battens the wood-based panels specified in chapter A.3.2.1 may be used. Only screws with countersunk head are used for fixing wood-based panels on rafters with thermal insulation material as interlayer.

The minimum width of the rafters is 60 mm.

The spacing between screws e_s is not more than 1.75 m.

Friction forces are not considered for the design of the characteristic axial withdrawal capacity of the screws.

The anchorage of wind suction forces counter battens shall be considered for design. Screws perpendicular to the grain of the rafter may be arranged where required.

A.3.2 Parallel inclined screws and thermal insulation material in compression

A.3.2.1 Mechanical model

The system of rafter, thermal insulation material on top of rafter and counter battens parallel to the rafter can be considered as a beam on elastic foundation. The counter batten represents the beam, and the thermal insulation material on top of the rafter the elastic foundation. The minimum compressive stress of the thermal insulation material at 10 % deformation, measured in accordance with EN 826¹³, shall be $\sigma_{10\%} = 0.05 \text{ N/mm}^2$. The counter batten is loaded perpendicular to the axis by point loads F_b transferred by regularly spaced counter battens. Further point loads F_s are caused by the shear load of the roof due to dead and snow load, which are transferred from the screw heads into the counter battens.

Instead of battens the following wood-based panels may be used to cover the thermal insulation material if they are suitable for that use:

- Oriented strand boards (OSB) in accordance with EN 300 and EN 13986,
- Plywood in accordance with EN 636 and EN 13986,
- Particleboards in accordance with EN 312 and EN 13986,
- Fibreboards in accordance with EN 622-2, EN 622-3 and EN 13986.

The minimum thickness of the wood-based panels is 22 mm.

The word counter batten includes the meaning of the wood-based panels mentioned above in the following.

¹³ EN 826:2013 Thermal insulating products for building applications – Determination of compression behaviour

EASYfast, EASYtop and BULLET screws	Annex 3
Fastening of thermal insulation material on top of rafters	

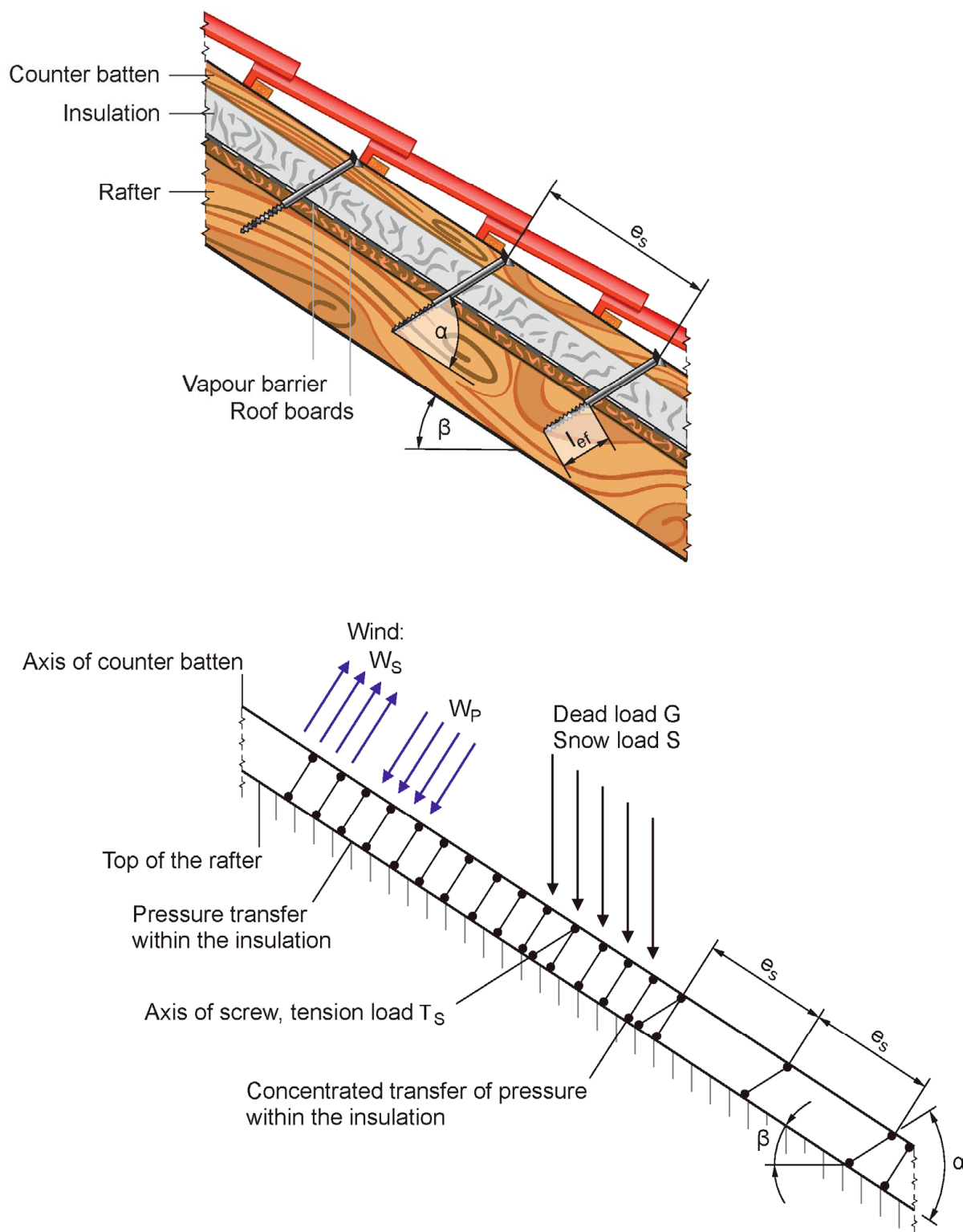


Figure A.3.1 Fastening of the thermal insulation material on top of rafters – Structural system of the parallel arranged screws

EASYfast, EASYtop and BULLET screws	Annex 3
Fastening of thermal insulation material on top of rafters	

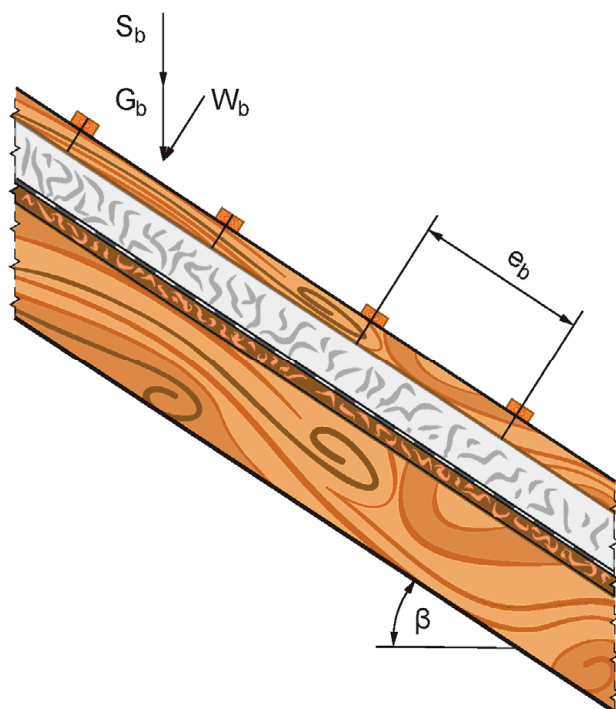


Figure A.3.2 Point loads F_b perpendicular to the counter battens

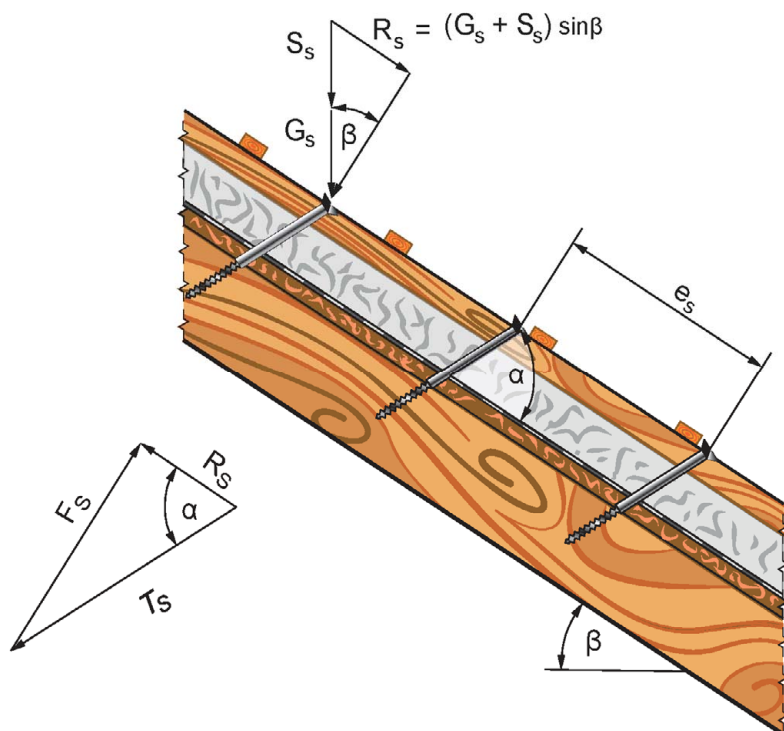


Figure A.3.3 Point loads F_s perpendicular to the counter battens, load application in the area of the screw heads

EASYfast, EASYtop and BULLET screws	Annex 3
Fastening of thermal insulation material on top of rafters	

A.3.2.2 Design of the counter battens

It's assumed that the spacing between the counter battens exceeds the characteristic length l_{char} .

The characteristic values of the bending stresses may be calculated as:

$$M_k = \frac{(F_{b,k} + F_{s,k}) \cdot l_{char}}{4} \quad (3.1)$$

Where

$$l_{char} \quad \text{characteristic length } l_{char} = \sqrt[4]{\frac{4 \cdot EI}{w_{ef} \cdot K}} \quad (3.2)$$

EI ending stiffness of the counter batten,

K modulus of subgrade reaction,

w_{ef} effective width of the thermal insulation material,

$F_{b,k}$ point loads perpendicular to the counter battens,

$F_{s,k}$ point loads perpendicular to the counter battens, load application in the area of the screw heads.

The modulus of subgrade reaction K may be calculated from the modulus of elasticity E_{HI} and the thickness t_{HI} of the thermal insulation material if the effective width w_{ef} of the thermal insulation material under compression is known. Due to the load extension in the thermal insulation material the effective width w_{ef} is greater than the width of the counter batten or rafter, respectively. For further calculations, the effective width w_{ef} of the thermal insulation material may be determined in accordance with:

$$w_{ef} = w + t_{HI} / 2 \quad (3.3)$$

Where

w minimum from width of the counter batten or rafter, respectively,

t_{HI} thickness of the thermal insulation material,

$$K = \frac{E_{HI}}{t_{HI}} \quad (3.4)$$

The following condition shall be satisfied:

$$\frac{\sigma_{m,d}}{f_{m,d}} = \frac{M_d}{W \cdot f_{m,d}} \leq 1 \quad (3.5)$$

For the calculation of the section modulus W the net cross section shall be considered.

The characteristic values of the shear stresses shall be calculated as:

$$V_k = \frac{(F_{b,k} + F_{s,k})}{2} \quad (3.6)$$

The following condition shall be satisfied:

$$\frac{\tau_d}{f_{v,d}} = \frac{1.5 \cdot V_d}{A \cdot f_{v,d}} \leq 1 \quad (3.7)$$

For the calculation of the cross section area the net cross section shall be considered.

EASYfast, EASYtop and BULLET screws	Annex 3
Fastening of thermal insulation material on top of rafters	

A.3.2.3 Design of the thermal insulation material

The characteristic value of the compressive stresses in the thermal insulation material may be calculated as:

$$\sigma_k = \frac{1.5 \cdot F_{b,k} + F_{s,k}}{2 \cdot l_{\text{char}} \cdot w} \quad (3.8)$$

The design value of the compressive stress shall not be greater than 110 % of the compressive strength at 10 % deformation calculated in accordance with EN 826.

A.3.2.4 Design of the screws

The screws are loaded predominantly axial. The characteristic value of the axial tension force in the screw may be calculated from the shear loads of the roof R_s :

$$T_{S,k} = \frac{R_{S,k}}{\cos \alpha} \quad (3.9)$$

The load-carrying capacity of axially loaded screws is the minimum design value of the axial withdrawal capacity of the threaded part of the screw, the head pull-through capacity of the screw and the tensile strength of the screw in accordance with Annex 2.

In order to limit the deformation of the screw head for thermal insulation material with thickness over 220 mm or with compressive strength below 0.12 N/mm², respectively, the axial withdrawal capacity of the screws shall be reduced by the factors k_1 and k_2 :

$$F_{ax,\alpha,Rd} = \min \left\{ \frac{f_{ax,d} \cdot d \cdot l_{ef} \cdot k_1 \cdot k_2}{1.2 \cdot \cos^2 \alpha + \sin^2 \alpha} \cdot \left(\frac{\rho_k}{350} \right)^{0.8}; f_{head,d} \cdot d_h^2 \cdot \left(\frac{\rho_k}{350} \right)^{0.8}; \frac{f_{tens,k}}{\gamma_{M2}} \right\} \quad (3.10)$$

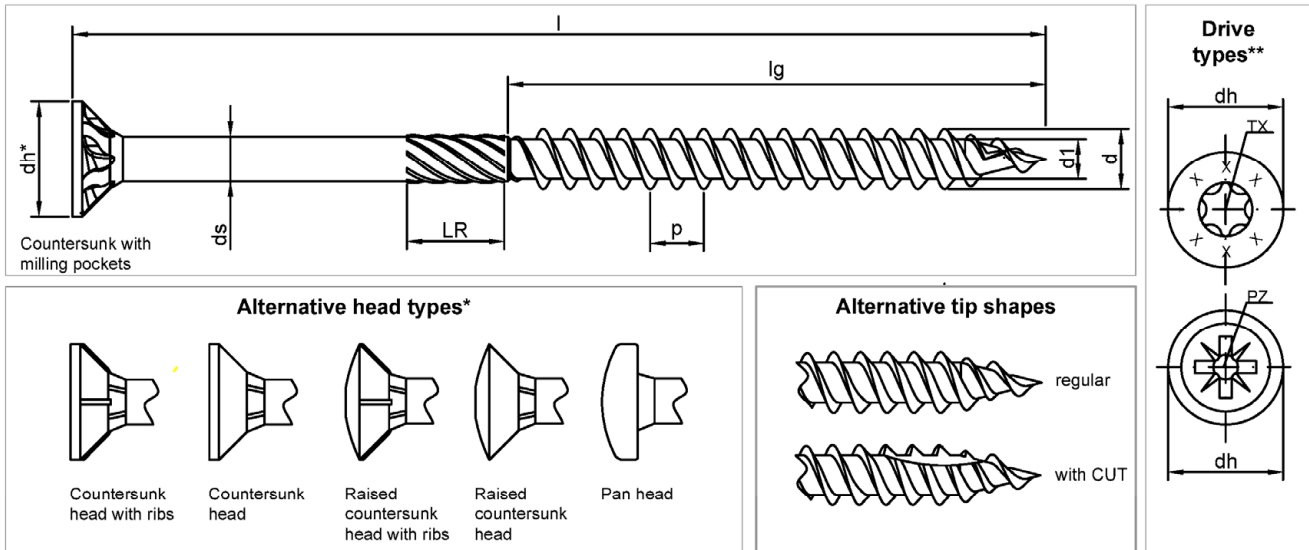
Where

- $f_{ax,d}$ design value of the axial withdrawal parameter of the threaded part of the screw in the rafter [N/mm²],
- d outer thread diameter of the screw [mm],
- l_{ef} penetration length of the threaded part of the screw in the rafter [mm], $l_{ef} \geq 40$ mm,
- ρ_k characteristic density of the wood-based member [kg/m³], for LVL $\rho_k \leq 500$ kg/m³,
- α angle α between screw axis and grain direction, $30^\circ \leq \alpha \leq 90^\circ$,
- $f_{head,d}$ design value of the head pull-through parameter of the screw [N/mm²],
- d_h head diameter of the screw [mm],
- $f_{tens,k}$ characteristic tensile strength of the screw in accordance with Annex 2 [N],
- γ_{M2} partial factor in accordance with EN 1993-1-1¹⁴,
- k_1 $\min \{1; 220/t_{HI}\}$,
- k_2 $\min \{1; \sigma_{10 \%}/0.12\}$,
- t_{HI} thickness of the thermal insulation material [mm],
- $\sigma_{10 \%}$ compressive stress of the thermal insulation material under 10 % deformation [N/mm²].

If equation (3.10) is fulfilled, the deflection of the counter battens does not need to be considered when designing the load-carrying capacity of the screws.

¹⁴ EN 1993-1-1:2005/AC:2009 Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings
+A1:2014

EASYfast, EASYtop and BULLET screws	Annex 3
Fastening of thermal insulation material on top of rafters	



Nominal diameter [mm]		3.0	3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.0 ±0.3	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d ₁	Inner diameter (thread)	2.0 ±0.3	2.2 ±0.3	2.5 ±0.3	2.9 ±0.3	3.3 ±0.3	3.9 ±0.3
d _s	Shank diameter	2.2 ±0.3	2.6 ±0.3	3.0 ±0.3	3.3 ±0.3	3.7 ±0.3	4.5 ±0.3
d _h	Head diameter	5.7 ±0.5	7.0 ±0.6	7.5 ±0.5	8.5 ±0.6	9.5 ±0.6	11.5 ±0.6
p	Thread pitch (double thread)	2.7 ±10%	3.2 ±10%	3.6 ±10%	4.0 ±10%	4.4 ±10%	5.2 ±10%
TX	Size (alternatives)	10	15 / 20	15 / 20	20 / 25	20 / 25	25 / 30
PZ	Size	1	2	2	2	2	3
Nominal length [mm]							
l	Tolerance	Secondary rough thread LR (optional)	l _g	l _g	l _g	l _g	l _g
20	±1.7	4	12 ±1.5				
25			17 ±1.5	17 ±1.5	17 ±1.5		
30			18 ±1.5	18 ±1.5	18 ±1.5	20 ±1.7	20 ±1.7
35	±2.0		21 ±1.7	21 ±1.7	21 ±1.7	21 ±1.7	21 ±1.7
40			24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	25 ±1.7
45			25 ±1.7	25 ±1.7	25 ±1.7	25 ±1.7	28 ±1.7
50	±2.3	8		30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7
55				34 ±2.0	34 ±2.0	34 ±2.0	34 ±2.0
60				38 ±2.0	38 ±2.0	38 ±2.0	38 ±2.0
70-80	±2.7	12			44 ±2.0	44 ±2.0	44 ±2.0
90-100						54 ±2.3	54 ±2.3
110-120						70 ±2.3	70 ±2.3
130-180							70 ±2.3
200-240							70 ±2.3
260-300	±4.1						70 ±2.3

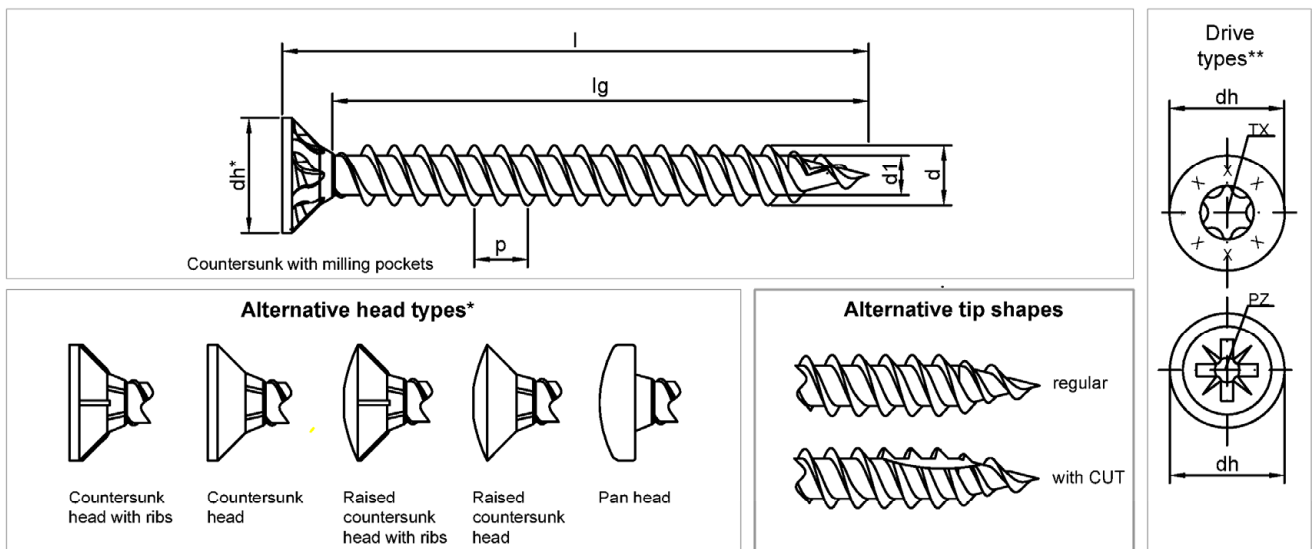
* For all head shapes, the same head diameter apply.

** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast WAVE, EASYfast CW
with partial and double thread and different head and tip shapes

Annex 4.1



Nominal diameter [mm]		3.0	3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.0 ±0.3	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.0 ±0.3	2.2 ±0.3	2.5 ±0.3	2.9 ±0.3	3.3 ±0.3	3.9 ±0.3
d_h	Head diameter	5.7 ±0.5	7.0 ±0.6	7.5 ±0.5	8.5 ±0.6	9.5 ±0.6	11.5 ±0.6
p	Thread pitch (double thread)	2.7 ±10%	3.2 ±10%	3.6 ±10%	4.0 ±10%	4.4 ±10%	5.2 ±10%
TX	Size (alternatives)	10	15 / 20	15 / 20	20 / 25	20 / 25	25 / 30
PZ	Size	1	2	2	2	2	3
Nominal length [mm]							
l	Tolerance	l_g	l_g	l_g	l_g	l_g	l_g
17	±1.5	13 ±1.5					
20	±1.7	16 ±1.5	16 ±1.5	16 ±1.5			
25		21 ±1.7	20 ±1.7	20 ±1.7	19 ±1.7		
30		26 ±1.7	25 ±1.7	25 ±1.7	24 ±1.7	24 ±1.7	
35	±2.0	30 ±2.0	30 ±1.7	30 ±2.0	29 ±1.7	29 ±1.7	
40		35 ±2.0	35 ±2.0	35 ±2.0	34 ±2.0	34 ±2.0	32 ±2.0
45		40 ±2.0	40 ±2.0	40 ±2.0	39 ±2.0	39 ±2.0	37 ±2.0
50		45 ±2.0	45 ±2.0	45 ±2.0	44 ±2.0	44 ±2.0	42 ±2.0
55	±2.3			50 ±2.0	49 ±2.0	49 ±2.0	47 ±2.0
60				55 ±2.3	54 ±2.3	54 ±2.3	52 ±2.3
70						64 ±2.3	62 ±2.3
80						72 ±2.3	72 ±2.3
90	±2.7					84 ±2.7	82 ±2.7
100							92 ±2.7
120							112 ±2.7

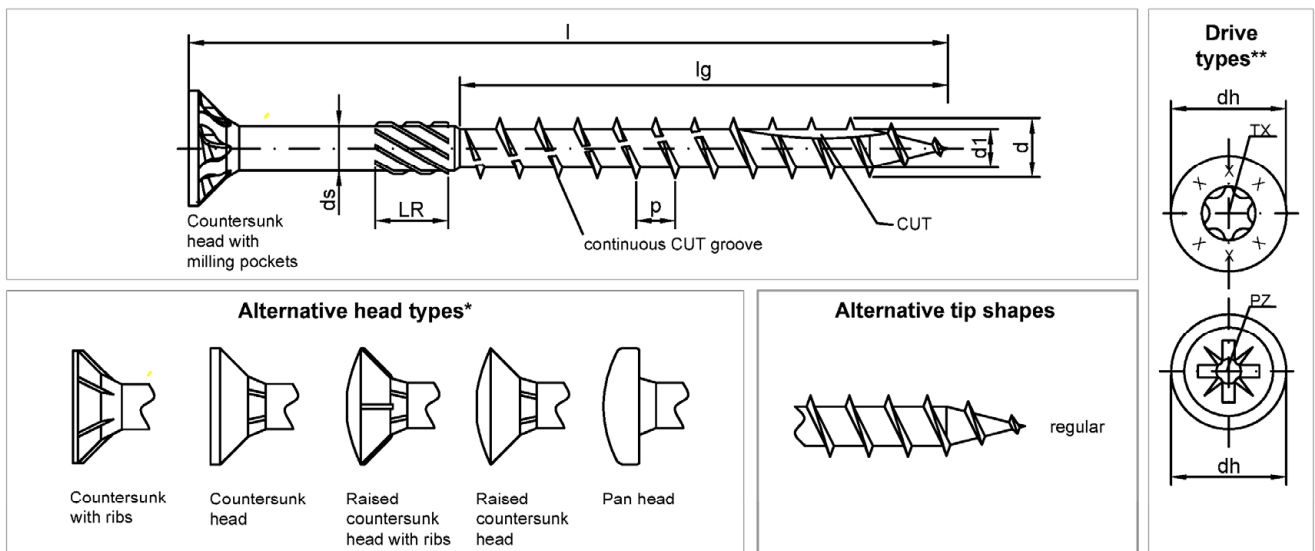
* For all head shapes, the same head diameter apply.

** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast WAVE, EASYfast CW
with full and double thread and different head and tip shapes

Annex 4.2



Nominal diameter [mm]			8.0	8.0	10.0	10.0
d	Outer diameter (thread)		8.0 ±5%	8.0 ±5%	10.0 ±5%	10.0 ±5%
d ₁	Inner diameter (thread)		5.4 ±0.3	5.4 ±0.3	6.4 ±5%	6.4 ±5%
d _s	Shank diameter		5.8 ±0.3	5.8 ±0.3	7.0 ±5%	7.0 ±5%
d _h	Head diameter		15.0 ±5%	15.0 ±5%	18.4 ±5%	18.4 ±5%
p	Thread pitch (single thread)		5.2 ±10%	5.2 ±10%	5.6 ±10%	5.6 ±10%
TX	Size		40	40	40	40
PZ	Size		3	3	4	4
Nominal length [mm]		Secondary rough thread LR (optional)	Thread length [mm]			
l	Tolerance		l _g	l _g (alternative)	l _g	l _g (alternative)
80	±2.3	12	52 ±2.3		52 ±2.3	
90	±2.7		52 ±2.3		52 ±2.3	
100-120			80 ±2.3	52 ±2.3	80 ±2.3	52 ±2.3
130-180	±3.2		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
200-240	±3.6		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
260-300	±4.1		80 ±2.3	100 ±2,7	80 ±2.3	100 ±2.7
320-400	±4.5		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
420-500	±4.9		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
520-600	±5.5		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7

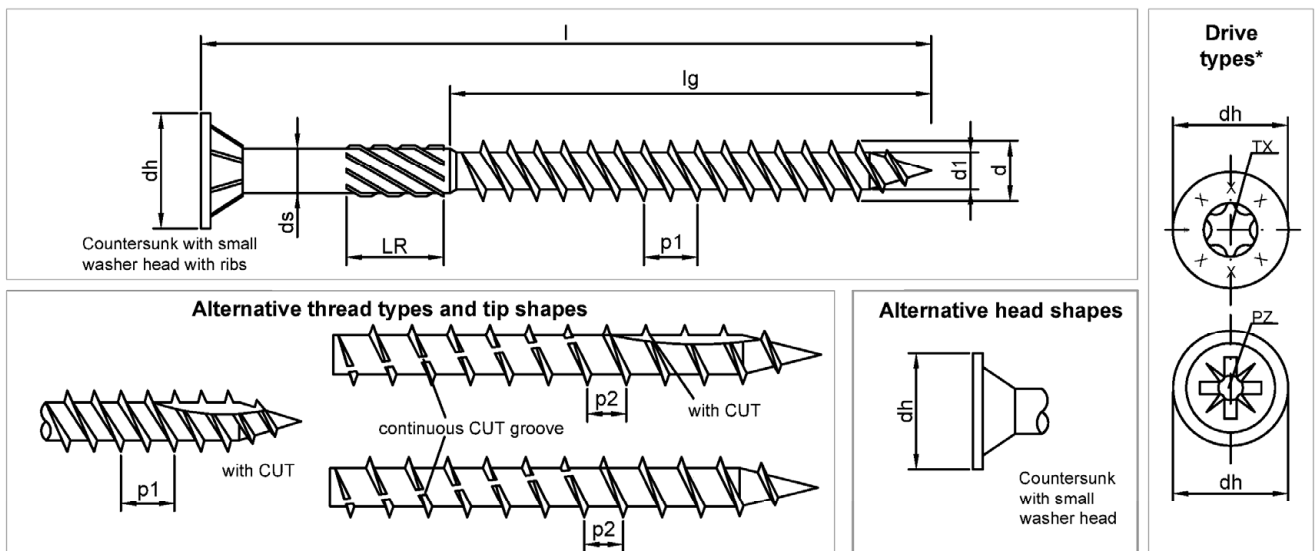
* For all head shapes, the same head diameter apply.

** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast
with partial thread and different head and tip shapes

Annex 4.3



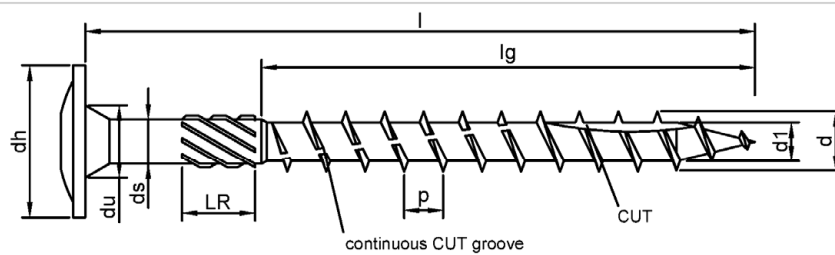
Nominal diameter [mm]		4.0	4.5	5.0	6.0	8.0	10.0	
d	Outer diameter (thread)	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3	8.0 ±5%	10.0 ±5%	
d ₁	Inner diameter (thread)	2.6 ±0.3	2.9 ±0.3	3.3 ±0.3	3.9 ±0.3	5.4 ±0.3	6.4 ±5%	
d _s	Shank diameter	3.0 ±0.3	3.3 ±0.3	3.7 ±0.3	4.5 ±0.3	5.8 ±0.3	7.0 ±5%	
d _h	Head diameter	8.3 ±0.6	9.3 ±0.6	10.5 ±0.6	12.5 ±5%	14.5 ±5%	18.5 ±5%	
p ₁	Thread pitch (double thread)	3.6 ±10%	4.0 ±10%	4.4 ±10%	5.2 ±10%	-	-	
p ₂	Thread pitch (single thread)	-	-	-	-	5.2 ±10%	5.6 ±10%	
TX	Size (alternatives)	15 / 20	20 / 25	20 / 25	25 / 30	30 / 40	40 / 50	
PZ	Size	2	2	2	3	3 / 4	4	
Nominal length [mm]		Secondary rough thread LR (optional)	Thread length [mm]					
I	Tolerance		I _g	I _g	I _g	I _g	I _g	I _g
30	±1.7	4	18 ±1.5					
40	±2.0		24 ±1.7	24 ±1.7				
45			25 ±1.7	25 ±1.7				
50	±2.3	8	30 ±1.7	30 ±1.7	30 ±1.7			
60			38 ±2.0	38 ±2.0	38 ±2.0	38 ±2.0		
70			44 ±2.0	44 ±2.0	44 ±2.0	44 ±2.0		
80	±2.7	12		44 ±2.0	44 ±2.0	44 ±2.0	52 ±2.3	52 ±2.3
90					54 ±2.3	54 ±2.3	52 ±2.3	52 ±2.3
100					54 ±2.3	54 ±2.3	52 ±2.3	52 ±2.3
120					70 ±2.3	70 ±2.3	80 ±2.3	80 ±2.3
140						70 ±2.3	80 ±2.3	80 ±2.3
150-180	±3.2					70 ±2.3	80 ±2.3	80 ±2.3
200-240	±3.6					70 ±2.3	80 ±2.3	80 ±2.3
260-300	±4.1					70 ±2.3	80 ±2.3	80 ±2.3
320-400	±4.5						80 ±2.3	80 ±2.3
420-440	±4.9						80 ±2.3	80 ±2.3

* Alternative head markings with clear reference to the respective manufacturing plant are possible.

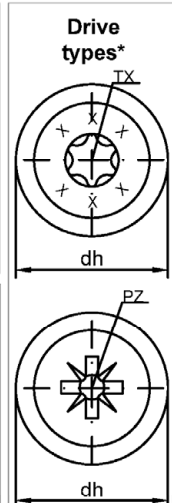
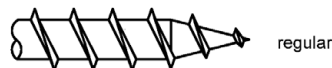
EASYfast, EASYtop and BULLET screws

EASYfast and EASYfast CUT
with different thread types, countersunk washer heads and tip shapes

Annex 4.4



Alternative tip shapes



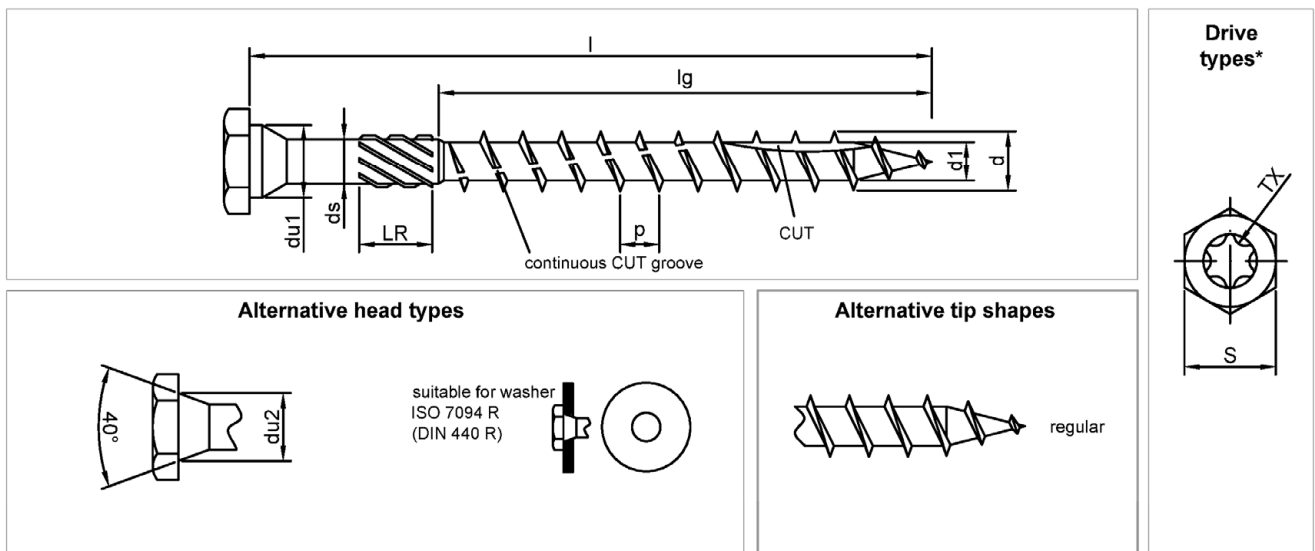
Nominal diameter [mm]		6.0	8.0	8.0	10.0	10.0
d	Outer diameter (thread)	6.0 ±0.3	8.0 ±5%	8.0 ±5%	10.0 ±5%	10.0 ±5%
d ₁	Inner diameter (thread)	3.9 ±0.3	5.4 ±0.3	5.4 ±0.3	6.4 ±5%	6.4 ±5%
d _s	Shank diameter	4.5 ±0.3	5.8 ±0.3	5.8 ±0.3	7.0 ±5%	7.0 ±5%
d _h	Head diameter	15.5 ±5%	22.0 ±5%	22.0 ±5%	25 ±5%	25 ±5%
du	Transition diameter (head side)	7.5 ±0.5	10.0 ±0.5	10.0 ±0.5	12.0 ±0.6	12.0 ±0.6
p	Thread pitch (single thread)	4.5 ±10%	5.2 ±10%	5.2 ±10%	5.6 ±10%	5.6 ±10%
TX	Size (alternatives)	25 / 30	30 / 40	30 / 40	40 / 50	40 / 50
PZ	Size	3	3	3	4	4
Nominal length [mm]		Thread length [mm]				
l	Tolerance	Secondary rough thread LR (optional)	l _g			
			l _g		l _g (alternative)	
60	±2.3	8	30 ±1.7			
70			30 ±1.7			
80			40 ±2.0	52 ±2.3		52 ±2.3
90	±2.7	12	40 ±2.0	52 ±2.3		52 ±2.3
100-120			50 ±2.0	80 ±2.3	52 ±2.3	80 ±2.3
140-180			75 ±2.3	80 ±2.3	100 ±2.7	80 ±2.3
200-240			75 ±2.3	80 ±2.3	100 ±2.7	80 ±2.3
260-300			75 ±2.3	80 ±2.3	100 ±2.7	80 ±2.3
320-400				80 ±2.3	100 ±2.7	80 ±2.3
420-500				80 ±2.3	100 ±2.7	80 ±2.3
520-600	±5.5			80 ±2.3	100 ±2.7	80 ±2.3

* Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast
with partial thread, washer head and different tip shapes

Annex 4.5



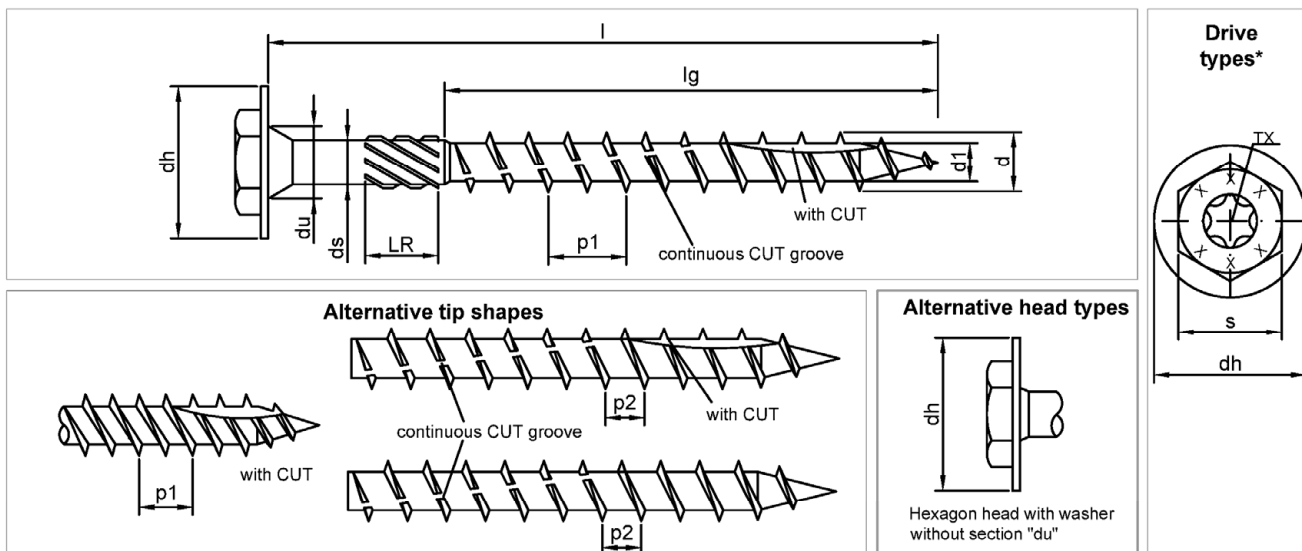
Nominal diameter [mm]		8.0	8.0	10.0	10.0	
d	Outer diameter (thread)	8.0 ±5%	8.0 ±5%	10.0 ±5%	10.0 ±5%	
d ₁	Inner diameter (thread)	5.4 ±0.3	5.4 ±0.3	6.4 ±5%	6.4 ±5%	
d _s	Shank diameter	5.8 ±0.3	5.8 ±0.3	7.0 ±5%	7.0 ±5%	
p	Thread pitch	5.2 ±10%	5.2 ±10%	5.6 ±10%	5.6 ±10%	
du ₁	Transition diameter (head side)	10.0 ±0.5	10.0 ±0.5	12.0 ±0.6	12.0 ±0.6	
du ₂	Transition diameter (head side)	9.0 ±0.4	9.0 ±0.4	11.0 ±0.5	11.0 ±0.5	
S	Hexagon	12	12	15	15	
TX	Size	40	40	40	40	
Nominal length [mm]		Secondary rough thread LR (optional)	Thread length [mm]			
l	Tolerance		l _g	l _g (alternative)	l _g	l _g (alternative)
80	±2.3	12	52 ±2.3		52 ±2.3	
90	±2.7		52 ±2.3		52 ±2.3	
100-120			80 ±2.3		80 ±2.3	
130-180	±3.2		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
200-240	±3.6		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
260-300	±4.1		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
320-400	±4.5		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
420-500	±4.9		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7
520-600	±5.5		80 ±2.3	100 ±2.7	80 ±2.3	100 ±2.7

* Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast
with partial thread, different hexagon heads and tip shapes

Annex 4.6



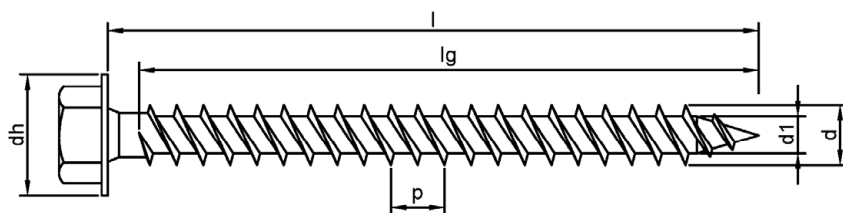
Nominal diameter [mm]		4.0	4.5	5.0	6.0	8.0	10.0
d	Outer diameter (thread)	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3	8.0 ±5%	10.0 ±5%
d_i	Inner diameter (thread)	2.6 ±0.3	2.9 ±0.3	3.3 ±0.3	3.9 ±0.3	5.4 ±0.3	6.4 ±5%
d_s	Shank diameter	3.0 ±0.3	3.3 ±0.3	3.7 ±0.3	4.5 ±0.3	5.8 ±0.3	7.0 ±5%
d_h	Head diameter	7.5 ±0.5	8.5 ±0.6	9.5 ±0.6	11.5 ±0.6	22.0 ±5%	25.0 ±5%
p₁	Thread pitch (double thread)	3.6 ±10%	4.0 ±10%	4.4 ±10%	5.2 ±10%	-	-
p₂	Thread pitch (single thread)	-	-	-	-	5.2 ±10%	5.6 ±10%
du	Transition diameter (head side)	-	-	-	-	10.0 ±0.5	12.0 ±0.6
S	Hexagon	7	7	8	10	12	15
TX	Size (alternatives)	15 / 20	20 / 25	20 / 25	25 / 30	30 / 40	40 / 50
Nominal length [mm]		Thread length [mm]					
l	Tolerance	Secondary rough thread LR (optional)	l_g	l_g	l_g	l_g	l_g
25	±1.7	4	17 ±1.5				
30			18 ±1.5	20 ±1.7	20 ±1.7		
35			21 ±1.7	21 ±1.7	21 ±1.7		
40	±2.0	4	24 ±1.7	24 ±1.7	24 ±1.7	25 ±1.7	
45			25 ±1.7	25 ±1.7	25 ±1.7	28 ±1.7	
50			30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	
55	±2.3	8	34 ±2.0	34 ±2.0	34 ±2.0	34 ±2.0	
60			38 ±2.0	38 ±2.0	38 ±2.0	38 ±2.0	
70			44 ±2.0	44 ±2.0	44 ±2.0	44 ±2.0	
80	±2.7	12		44 ±2.0	44 ±2.0	44 ±2.0	52 ±2.3
90					54 ±2.3	54 ±2.3	52 ±2.3
100					54 ±2.3	54 ±2.3	80 ±2.3
110-120	±3.2	12			70 ±2.3	70 ±2.3	80 ±2.3
130-180						70 ±2.3	80 ±2.3
200-240						70 ±2.3	80 ±2.3
260-300	±4.1	12				70 ±2.3	80 ±2.3
320-400							80 ±2.3
420-440							80 ±2.3

* Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast
with different thread types, different hexagon washer heads and tip shapes

Annex 4.7



Alternative tip shapes



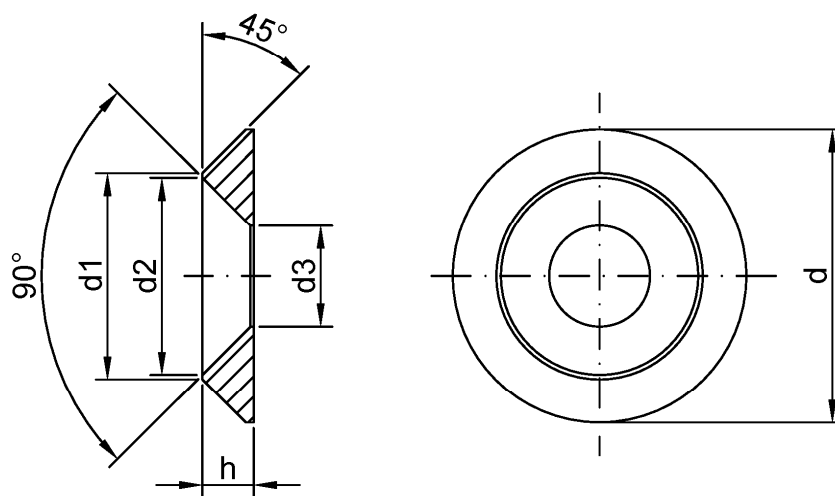
Nominal diameter [mm]		4.0	4.5	5.0	6.0
d	Outer diameter (thread)	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.6 ±0.3	2.9 ±0.3	3.3 ±0.3	3.9 ±0.3
d_h	Head diameter	7.5 ±0.5	8.5 ±0.6	9.5 ±0.6	11.5 ±0.6
p	Thread pitch (double thread)	3.6 ±10%	4.0 ±10%	4.4 ±10%	5.2 ±10%
S	Hexagon	6.0	7.0	8.0	10.0
TX	Size (alternatives)	15 / 20	20 / 25	20 / 25	25 / 30
Nominal length [mm]		Thread length [mm]			
l	Tolerance	l_g	l_g	l_g	l_g
20	±1.7	16 ±1.5			
25		20 ±1.7			
30		25 ±1.7	24 ±1.7	24 ±1.7	
35	±2.0	30 ±1.7	29 ±1.7	29 ±1.7	
40		35 ±2.0	34 ±2.0	34 ±2.0	32 ±2.0
45		40 ±2.0	39 ±2.0	39 ±2.0	37 ±2.0
50	±2.3	45 ±2.0	44 ±2.0	44 ±2.0	42 ±2.0
55		50 ±2.0	49 ±2.0	49 ±2.0	47 ±2.0
60		55 ±2.3	54 ±2.3	54 ±2.3	52 ±2.3
70				64 ±2.3	62 ±2.3
80				72 ±2.3	72 ±2.3

* Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYfast
with full and double thread, hexagon washer head and different tip shapes

Annex 4.8

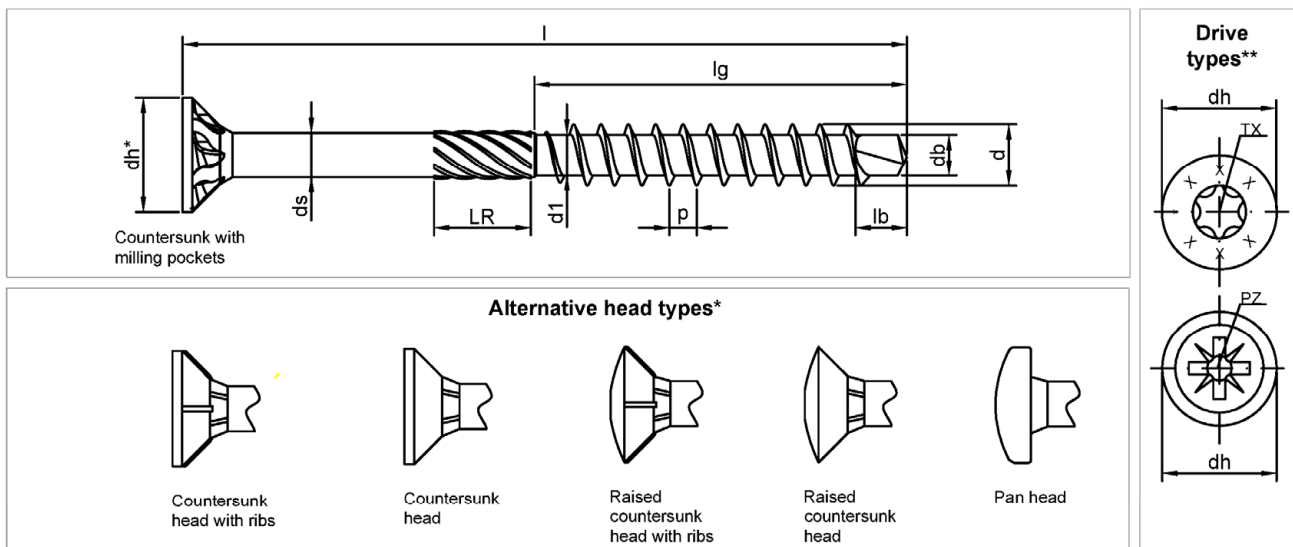


Nominal diameter (screw) [mm]		8.0	10.0
d	Outer diameter	25.0 ±0.5	32.0 ±0.5
d₁	Diameter chamfer edge (outer)	17.5 ±0.5	22.5 ±0.5
d₂	Diameter chamfer edge (inner)	16.5 ±0.5	21.5 ±0.5
d₃	Inner diameter	8.5 ±0.3	11.0 ±0.3
h	Height	5.0 ±0.3	5.6 ±0.3

EASYfast, EASYtop and BULLET screws

EASYfast
Washer (for timber constructions screws with countersunk head)

Annex 4.9



Nominal diameter [mm]		3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.2 ±0.3	2.5 ±0.3	2.7 ±0.3	3.1 ±0.3	3.7 ±0.3
d_s	Shank diameter	2.5 ±0.3	2.8 ±0.3	3.1 ±0.3	3.5 ±0.3	4.2 ±0.3
d_h	Head diameter	6.7 ±0.5	7.5 ±0.5	8.5 ±0.6	9.5 ±0.6	11.5 ±0.6
p	Thread pitch	1.6 ±10%	1.8 ±10%	2.0 ±10%	2.2 ±10%	2.6 ±10%
l_b	Drillbit length	3.5 ±5%	4.0 ±5%	4.5 ±5%	5.0 ±5%	5.1 ±5%
d_b	Drillbit diameter	2.1 ±5%	2.4 ±5%	2.6 ±5%	3.0 ±5%	3.6 ±5%
TX	Size (alternatives)	10 / 20	15 / 20	20 / 25	20 / 25	25 / 30
PZ	Size	2	2	2	2	3
Nominal length [mm]		Secondary rough thread LR (optional)				
l	Tolerance	l_g	l_g	l_g	l_g	l_g
25	±1.7	18 ±1.5	18 ±1.5	18 ±1.5		
30		21 ±1.7	21 ±1.7	21 ±1.7	21 ±1.7	24 ±1.7
35	±2.0	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7
40		26 ±1.7	26 ±1.7	26 ±1.7	26 ±1.7	26 ±1.7
45		28 ±1.7	28 ±1.7	28 ±1.7	28 ±1.7	28 ±1.7
50		30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7
60	±2.3	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0
70		42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0
80	±2.7	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0
90-100		54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3
110-120		60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3
130-180				70 ±2.3	70 ±2.3	70 ±2.3
200-240						70 ±2.3
260-300						70 ±2.3

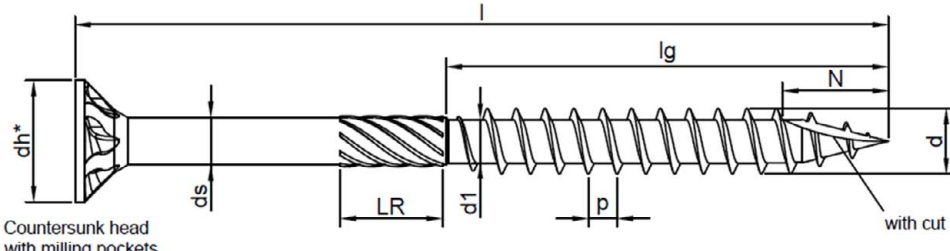
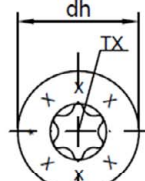

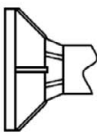
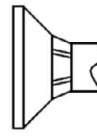
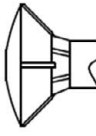
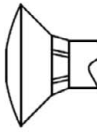

* For all head shapes, the same head diameter apply.

** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYtop
with partial thread, drill bit and different head shapes

Annex 4.10

 <p>Countersunk head with milling pockets</p>	<p>Drive types**</p>   <p>TX</p> <p>PZ</p>									
<p>Alternative head shapes *</p>      <p>Countersunk head with ribs</p> <p>Countersunk head</p> <p>Raised countersunk head with ribs</p> <p>Raised countersunk head</p> <p>pan head</p>										
nominal diameter [mm]		Ø 3,5		Ø 4,0		Ø 4,5		Ø 5,0		Ø 6,0
d	Outer diameter (thread)	3,5	± 0,3	4,0	± 0,3	4,5	± 0,3	5,0	± 0,3	6,0
d1	Inner diameter (thread)	2,2	± 0,3	2,6	± 0,3	2,8	± 0,3	3,3	± 0,3	3,7
ds	Shank diameter	2,5	± 0,3	2,9	± 0,3	3,2	± 0,3	3,6	± 0,3	4,2
dh	head diameter	7,0	± 0,5	8,0	± 0,5	9,0	± 0,6	10,0	± 0,6	12,0
p	Thread pitch (single thread)	1,6	± 10%	1,8	± 10%	2,0	± 10%	2,2	± 10%	2,6
N	Cut length	7,0	± 5 %	8,0	± 5 %	9,0	± 5 %	10,0	± 5 %	11,0
TX	Size (alternatives)	10 / 15 / 20		15 / 20		20 / 25		20 / 25		25 / 30
PZ	Size	2		2		2		2		3
LR	Secondary rough thread LR (optional)	4,0		5,0		7,0		8,5		10,5
Nominal length [mm]										
l	Tolerance	lg		lg		lg		lg		lg
25	± 1,7	16	± 1,5	16	± 1,5					
30	± 2,0	18	± 1,5	18	± 1,5	18	± 1,5	20	± 1,7	24
35	± 2,0		± 1,7	21	± 1,7				± 1,7	
40	± 2,0	24	± 1,7	24	± 1,7	24	± 1,7	24	± 1,7	24
45	± 2,0		± 1,7	27	± 1,7	27	± 1,7		± 1,7	
50	± 2,3	30	± 1,7	30	± 1,7	30	± 1,7	30	± 1,7	30
60	± 2,3	36	± 2,0	36	± 2,0	36	± 2,0	36	± 2,0	36
70	± 2,3	42	± 2,0	42	± 2,0	42	± 2,0	42	± 2,0	42
80	± 2,3	48	± 2,0	48	± 2,0	48	± 2,0	48	± 2,0	48
90	± 2,7	54	± 2,3	54	± 2,3	54	± 2,3	54	± 2,3	54
100-110	± 2,7	60	± 2,3	60	± 2,3	60	± 2,3	60	± 2,3	60
120	± 3,2			70	± 2,3	70	± 2,3	70	± 2,3	70
130-180	± 3,2					70	± 2,3	70	± 2,3	70
200-240	± 3,6									70
260-300	± 4,1									70

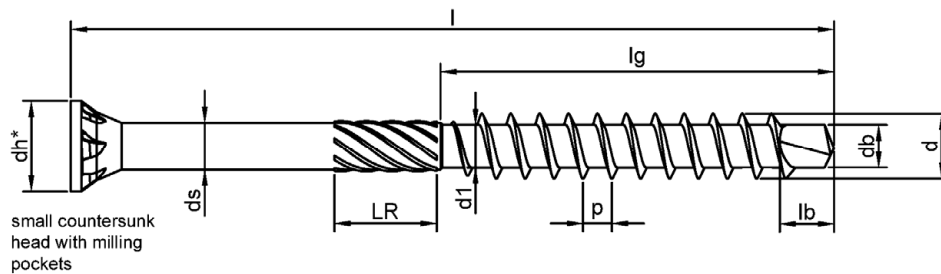
<p>* For all head shapes, the same diameter apply. ** Alternative head markings with clear reference to the respective manufacturing plant are possible.</p>	Annex 4.11
EASYfast, EASYtop and BULLET screws	
EASYtop CUT with partial thread, CUT and different head shapes	

* For all head shapes, the same diameter apply. ** Alternative head markings with clear reference to the respective manufacturing plant are possible.

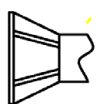
EASYfast, EASYtop and BULLET screws

EASYtop CUT
with partial thread, CUT and different head shapes

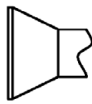
Annex 4.11



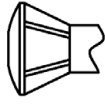
Alternative head types*



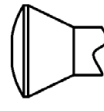
small
countersunk
head with ribs



small
countersunk
head



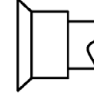
small raised
countersunk
head with ribs



small raised
countersunk
head

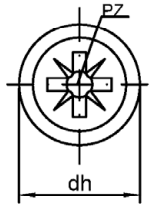
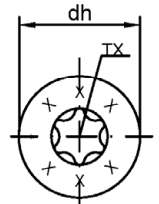


small pan
head



cylinder with
small
countersunk
head

Drive
types**



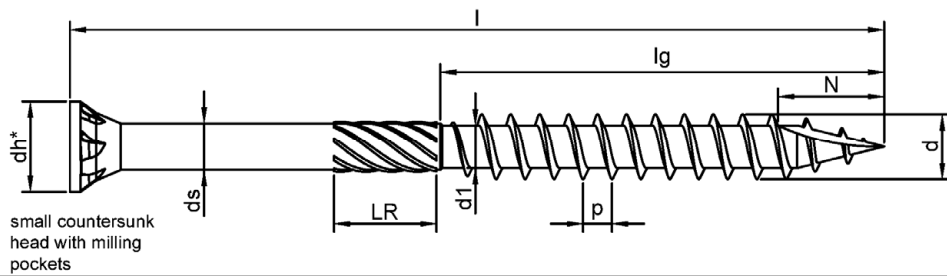
Nominal diameter [mm]		3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.2 ±0.3	2.5 ±0.3	2.7 ±0.3	3.1 ±0.3	3.7 ±0.3
d_s	Shank diameter	2.5 ±0.3	2.8 ±0.3	3.1 ±0.3	3.5 ±0.3	4.2 ±0.3
d_h	Head diameter	5.0 ±0.5	6.0 ±0.5	7.0 ±0.5	7.5 ±0.5	11.0 ±0.6
p	Thread pitch	1.6 ±10%	1.8 ±10%	2.0 ±10%	2.2 ±10%	2.6 ±10%
l_b	Drillbit length	3.5 ±5%	4.0 ±5%	4.5 ±5%	5.0 ±5%	5.1 ±5%
d_b	Drillbit diameter	2.1 ±5%	2.4 ±5%	2.6 ±5%	3.0 ±5%	3.6 ±5%
TX	Size (alternatives)	10 / 20	15 / 20	20 / 25	20 / 25	25 / 30
PZ	Size	2	2	2	2	3
Nominal length [mm]		Secondary rough thread LR (optional)				
l	Tolerance	l_g	l_g	l_g	l_g	l_g
25	±1.7	18 ±1.5	18 ±1.5	18 ±1.5		
30		21 ±1.7	21 ±1.7	21 ±1.7	21 ±1.7	24 ±1.7
35	±2.0	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7
40		26 ±1.7	26 ±1.7	26 ±1.7	26 ±1.7	26 ±1.7
45		28 ±1.7	28 ±1.7	28 ±1.7	28 ±1.7	28 ±1.7
50	±2.3	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7
60		36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0
70		42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0
80	±2.7	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0
90-100		54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3
110-120		60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3
130-180				70 ±2.3	70 ±2.3	70 ±2.3
200-240						70 ±2.3
260-300	±4.1					70 ±2.3

* For all head shapes, the same head diameter apply. ** Alternative head markings with clear reference to the respective manufacturing plant are possible.

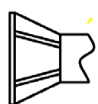
EASYfast, EASYtop and BULLET screws

EASYtop OH
with partial thread, drill bit and different ornamental head shapes

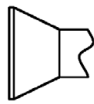
Annex 4.12



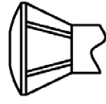
Alternative head types*



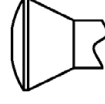
small
countersunk
head with ribs



small
countersunk
head



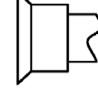
small raised
countersunk
head with ribs



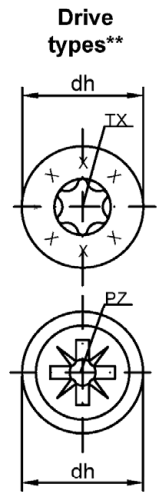
small raised
countersunk
head



small pan
head



cylinder with
small
countersunk
head



Drive
types**

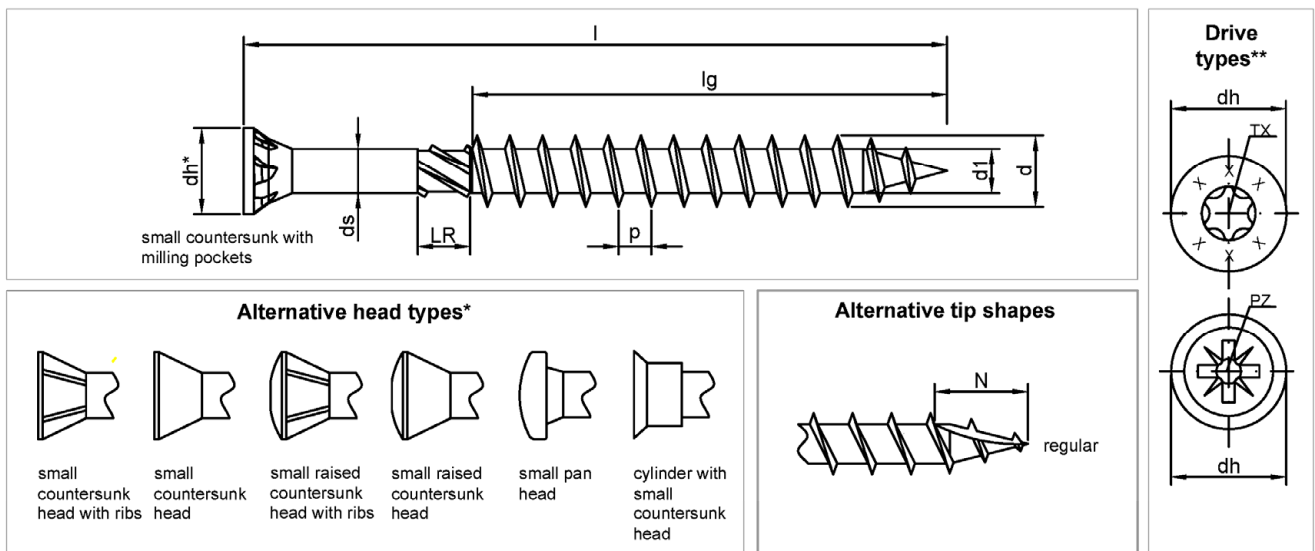
Nominal diameter [mm]		3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.2 ±0.3	2.6 ±0.3	2.8 ±0.3	3.3 ±0.3	3.7 ±0.3
d_s	Shank diameter	2.5 ±0.3	2.9 ±0.3	3.2 ±0.3	3.6 ±0.3	4.2 ±0.3
d_h	Head diameter	5.0 ±0.5	6.0 ±0.5	7.0 ±0.5	7.5 ±0.5	11.0 ±0.6
p	Thread pitch	1.6 ±10%	1.8 ±10%	2.0 ±10%	2.2 ±10%	2.6 ±10%
N	CUT length	7.0 ±5%	8.0 ±5%	9.0 ±5%	10.0 ±5%	11.0 ±5%
TX	Size (alternatives)	10 / 20	15 / 20	20 / 25	20 / 25	25 / 30
PZ	Size	2	2	2	2	3
LR	Secondary rough thread (optional)	4.0	5.0	7.0	8.5	10.5
Nominal length [mm]						
l	Tolerance	l_g	l_g	l_g	l_g	l_g
25	±1.7	16 ±1.5	16 ±1.5			
30		18 ±1.5	18 ±1.5	18 ±1.5	20 ±1.7	24 ±1.7
40	±2.0	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7
50		30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7
60	±2.3	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0
70		42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0
80		48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0
90	±2.7	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3
100-110		60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3
120			70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3
130-180	±3.2			70 ±2.3	70 ±2.3	70 ±2.3
200-240	±3.6					70 ±2.3
260-300	±4.1					70 ±2.3

* For all head shapes, the same head diameter apply. ** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYtop OH CUT
with partial thread, CUT and different ornamental head shapes

Annex 4.13



Nominal diameter [mm]		3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.1 ±0.3	2.3 ±0.3	2.5 ±0.3	2.9 ±0.3	3.5 ±0.3
d_s	Shank diameter	2.2 ±0.3	2.5 ±0.3	2.7 ±0.3	3.1 ±0.3	3.6 ±0.3
d_h	Head diameter	5.0 ±0.5	6.0 ±0.5	7.0 ±0.5	7.5 ±0.5	11.0 ±0.6
N	CUT length	6.5 ±5%	7.5 ±5%	8.5 ±5%	9.5 ±5%	11.0 ±5%
p	Thread pitch	1.6 ±10%	1.8 ±10%	2.0 ±10%	2.2 ±10%	2.6 ±10%
TX	Size (alternatives)	10 / 20	15 / 20	15 / 20	20 / 25	25 / 30
PZ	Size	2	2	2	2	3
LR	Secondary rough thread LR (optional)	4.0	5.0	7.0	8.5	10.5
Nominal length [mm]						
l	Tolerance	l_g	l_g	l_g	l_g	l_g
25	±1.7	16 ±1.5	16 ±1.5			
30		18 ±1.5	18 ±1.5	18 ±1.5	20 ±1.7	24 ±1.7
40	±2.0	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7
50		30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7
60	±2.3	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0
70		42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0
80	±2.7	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0
90		54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3
100-110		60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3
120-180		70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3
200-240	±3.6					70 ±2.3
260-300	±4.1					70 ±2.3

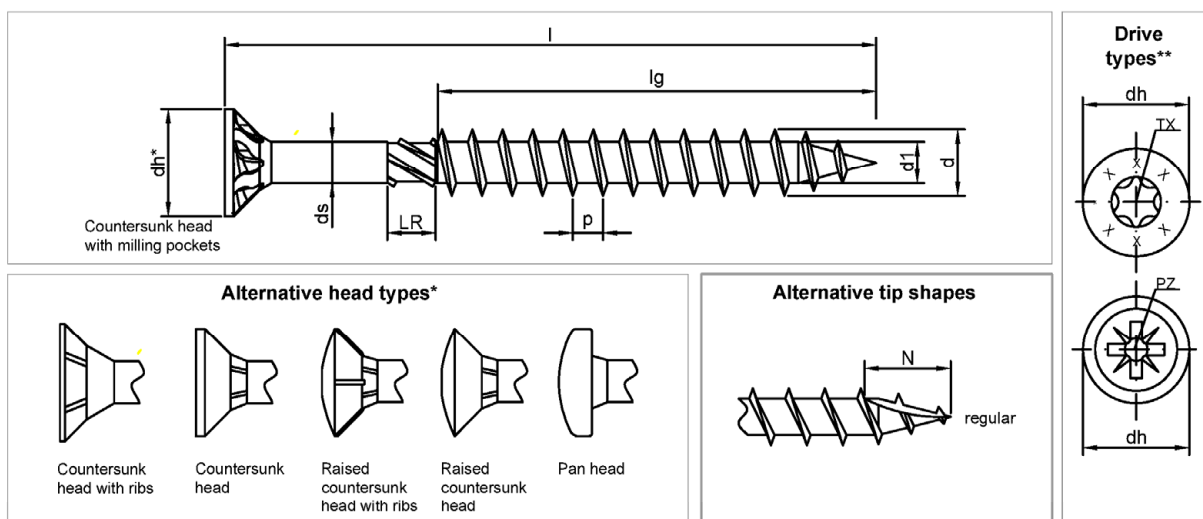
* For all head shapes, the same head diameter apply.

** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYtop OH "S", EASYtop OH CUT "S"
with partial thread and different ornamental head and tip shapes

Annex 4.14



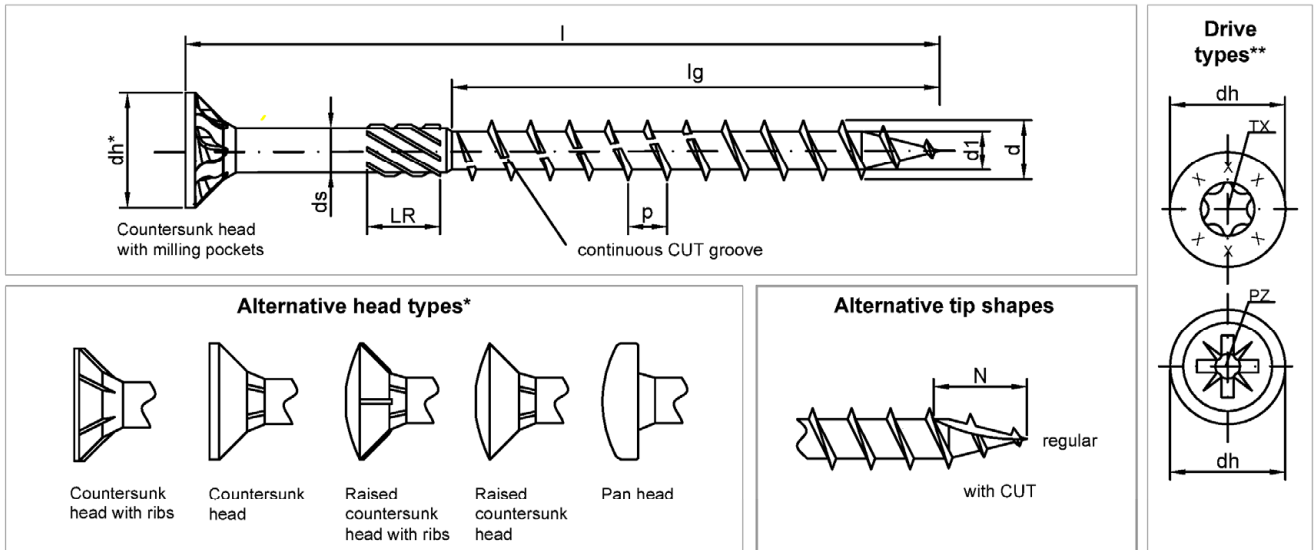
Nominal diameter [mm]		3.5	4.0	4.5	5.0	6.0
d	Outer diameter (thread)	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3
d₁	Inner diameter (thread)	2.1 ±0.3	2.3 ±0.3	2.5 ±0.3	2.9 ±0.3	3.5 ±0.3
d_s	Shank diameter	2.2 ±0.3	2.5 ±0.3	2.7 ±0.3	3.1 ±0.3	3.6 ±0.3
d_h	Head diameter	7.3 ±0.5	8.3 ±0.6	9.3 ±0.6	10.3 ±0.6	11.8 ±0.6
N	CUT length	6.5 ±5%	7.5 ±5%	8.5 ±5%	9.5 ±5%	11.0 ±5%
p	Thread pitch	1.6 ±10%	1.8 ±10%	2.0 ±10%	2.2 ±10%	2.6 ±10%
TX	Size (alternatives)	10 / 20	15 / 20	20 / 25	20 / 25	25 / 30
PZ	Size	2	2	2	2	3
LR	Secondary rough thread (optional)	4.0	5.0	7.0	8.5	10.5
Nominal length [mm]						
l	Tolerance	l_g	l_g	l_g	l_g	l_g
25	±1.7	16 ±1.5	16 ±1.5			
30		18 ±1.5	18 ±1.5	18 ±1.5	20 ±1.7	24 ±1.7
40	±2.0	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7
50		30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7
60	±2.3	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0
70		42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0
80		48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0
90	±2.7	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3
100-110		60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3
120			70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3
130-140	±3.2		70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3
150-180				70 ±2.3	70 ±2.3	70 ±2.3
200-240	±3.6					70 ±2.3
260-300	±4.1					70 ±2.3

* For all head shapes, the same head diameter apply. ** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYtop ST "S", EASYtop CUT "S"
with partial thread and different head and tip shapes

Annex 4.15



Nominal diameter [mm]		3.5	4.0	4.5	5.0	6.0	8.0	10.0
d	Outer diameter (thread)	3.5 ±0.3	4.0 ±0.3	4.5 ±0.3	5.0 ±0.3	6.0 ±0.3	8.0 ±5%	10.0 ±5%
d ₁	Inner diameter (thread)	2.1 ±0.3	2.5 ±0.3	2.7 ±0.3	3.2 ±0.3	4.0 ±0.3	5.3 ±0.3	6.3 ±5%
d _s	Shank diameter	2.3 ±0.3	2.7 ±0.3	3.0 ±0.3	3.7 ±0.3	4.2 ±0.3	5.8 ±0.3	7.0 ±5%
d _h	Head diameter	6.8 ±0.5	7.8 ±0.5	8.8 ±0.6	9.8 ±0.6	11.8 ±0.6	14.5 ±5%	17.8 ±5%
N	CUT length	6.5 ±5%	7.5 ±5%	8.5 ±5%	9.5 ±5%	11.0 ±5%	12.0 ±5%	14.0 ±5%
p	Thread pitch (coarse thread)	2.2 ±10%	2.5 ±10%	2.8 ±10%	3.1 ±10%	3.6 ±10%	5.2 ±10%	5.6 ±10%
TX	Size (alternatives)	15 / 20	15 / 20	20 / 25	20 / 25	25 / 30	30 / 40	40 / 50
PZ	Size	2	2	2	2	3	3	4
LR	Secondary rough thread LR (optional)	4.0	5.0	7.0	7.9	4.9 (l up to 100) 9.9 (l from 110)	9.9	9.9
Nominal length [mm]								
l	Tolerance	l _g	l _g	l _g	l _g	l _g	l _g	l _g
30	±1.7	18 ±1.5	18 ±1.5	18 ±1.5	20 ±1.7	24 ±1.7		
40	±2.0	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7	24 ±1.7		
50		30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7	30 ±1.7		
60	±2.3	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0	36 ±2.0		
70		42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	42 ±2.0	
80		48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	48 ±2.0	
90	±2.7	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	54 ±2.3	
100		60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	60 ±2.3	80 ±2.3	
110		66 ±2.3	66 ±2.3	66 ±2.3	66 ±2.3	66 ±2.3	80 ±2.3	
120		70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3	80 ±2.3	
130-140	±3.2	70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3	70 ±2.3	80 ±2.3	
150-180						70 ±2.3	80 ±2.3	80 ±2.3
200-240	±3.6					70 ±2.3	80 ±2.3	80 ±2.3
260-300	±4.1					70 ±2.3	80 ±2.3	80 ±2.3
320-400	±4.5					70 ±2.3	80 ±2.3	80 ±2.3

* For all head shapes, the same head diameter apply. ** Alternative head markings with clear reference to the respective manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

EASYtop ST CT, EASYtop CUT CT
with partial and coarse thread and different head and tip shapes

Annex 4.16

Drive types **

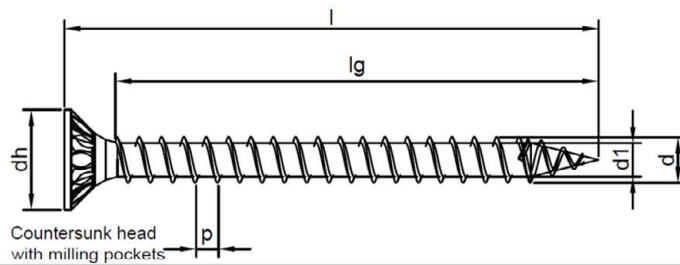
Alternative head types *

Nominal diameter [mm]		Ø 3.0		Ø 3.5		Ø 4.0		Ø 4.5		Ø 5.0		Ø 6.0	
d	Outer diameter (thread)	3.0	± 0.3	3.5	± 0.3	4.0	± 0.3	4.5	± 0.3	5.0	± 0.3	6.0	± 0.3
d1	Inner diameter (thread)	2.0	± 0.3	2.2	± 0.3	2.5	± 0.3	2.9	± 0.3	3.3	± 0.3	3.8	± 0.3
ds	shank diameter	2.2	± 0.3	2.5	± 0.3	2.8	± 0.3	3.2	± 0.3	3.6	± 0.3	4.2	± 0.3
dh	head diameter	5.7	± 0.5	6.7	± 0.5	7.5	± 0.5	8.5	± 0.6	9.5	± 0.6	11.5	± 0.6
p	Thread pitch (single thread)	1.5	± 10%	2.0	± 10%	2.25	± 10%	2.5	± 10%	2.8	± 10%	3.6	± 10%
TX	Size (alternatives)	10		10 / 20		20		20 / 25		20 / 25		25 / 30	
PZ	size	1		2		2		2		2		3	

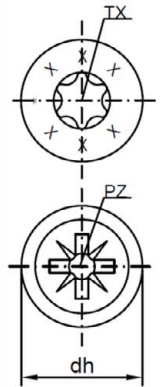
nominal length [mm]															
l	tolerance	secondary rough thread LR (optional)		lg		lg		lg		lg		lg			
25	± 1.7	4		17	± 1.5	17	± 1.5								
30				18	± 1.5	18	± 1.7	18	± 1.5	20	± 1.7	20	± 1.7		
35	± 2.0			21	± 1.7	21	± 1.7	21	± 1.7	21	± 1.7	21	± 1.7		
40				24	± 1.7	24	± 1.7	24	± 1.7	24	± 1.7	24	± 1.7		
45				25	± 1.7	25	± 1.7	25	± 1.7	25	± 1.7	25	± 1.7		
50	± 2.3	8				30	± 1.7	30	± 1.7	30	± 1.7	30	± 1.7		
55						34	± 2.0	34	± 2.0	34	± 2.0	34	± 2.0		
60						38	± 2.0	38	± 2.0	38	± 2.0	38	± 2.0		
70 - 80	± 2.7	12						44	± 2.0	44	± 2.0	44	± 2.0		
90 - 100										54	± 2.3	54	± 2.3		
110 - 120												70	± 2.3		
130 - 180	± 3.2											70	± 2.3		
200 - 240	± 3.6											70	± 2.3		
260 - 300	± 4.1											70	± 2.3		

* For all head shapes, the same head diameter apply. ** Alternative head markings with clear reference manufacturing plant are possible.

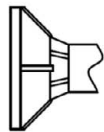
EASYfast, EASYtop and BULLET screws	Annex 4.17
EASYfast WAVE PLUS with partial and single thread and different head and tip shapes	



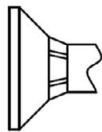
Drive
types **



Alternative head types *



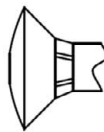
Countersunk
head with ribs



Countersunk
head



Raised
countersunk
head with ribs



Raised
countersunk
head



pan head

nominal diameter [mm]		Ø 3.0		Ø 3.5		Ø 4.0		Ø 4.5		Ø 5.0		Ø 6.0	
d	Outer diameter (thread)	3.0	± 0.3	3.5	± 0.3	4.0	± 0.3	4.5	± 0.3	5.0	± 0.3	6.0	± 0.3
d1	Inner diameter (thread)	2.0	± 0.3	2.2	± 0.3	2.5	± 0.3	2.9	± 0.3	3.3	± 0.3	3.8	± 0.3
dh	Head diameter	5.7	± 0.5	6.7	± 0.5	7.5	± 0.5	8.5	± 0.6	9.5	± 0.6	11.5	± 0.6
p	Thread pitch (single thread)	1.5	± 10%	2.0	± 10%	2.25	± 10%	2.5	± 10%	2.8	± 10%	3.6	± 10%
TX	Size (alternatives)	10		10 / 20		20		20 / 25		20 / 25		25 / 30	
PZ	Size	1		2		2		2		2		3	
nominal length [mm]													
l	Tolerance	lg		lg		lg		lg		lg		lg	
20	± 1.7	16	± 1.5										
25		21	± 1.5	20	± 1.7	20	± 1.7						
30		26	± 1.7	25	± 1.7	25	± 1.7	24	± 1.7	24	± 1.7		
35	± 2.0	30	± 1.7	30	± 1.7	30	± 1.7	29	± 1.7	29	± 1.7		
40		35	± 1.7	35	± 1.7	35	± 1.7	34	± 1.7	34	± 1.7	32	± 1.7
45		40	± 1.7	40	± 1.7	40	± 1.7	39	± 1.7	39	± 1.7	37	± 1.7
50	± 2.3			45	± 2.0	45	± 2.0	44	± 2.0	44	± 2.0	42	± 2.0
55				-		50	± 2.0	-	-	49	± 2.0	-	-
60				55	± 2.0	55	± 2.0	54	± 2.0	54	± 2.0	52	± 2.0
70	± 2.7									64	± 2.3	62	± 2.3
80										74	± 2.3	72	± 2.3
90										84	± 2.3	82	± 2.3
100	± 2.7											92	± 2.3
120												92	± 2.3

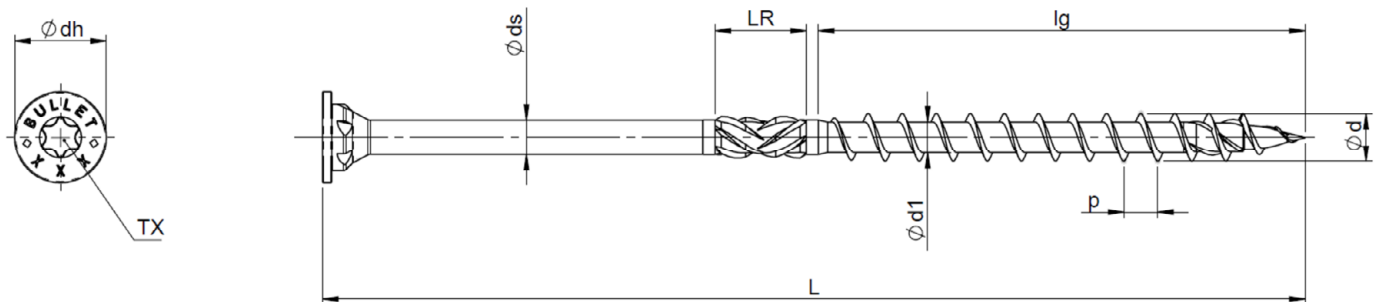
* For all head shapes, the same head diameter apply. ** Alternative head markings with clear reference manufacturing plant are possible.

EASYfast, EASYtop and BULLET screws

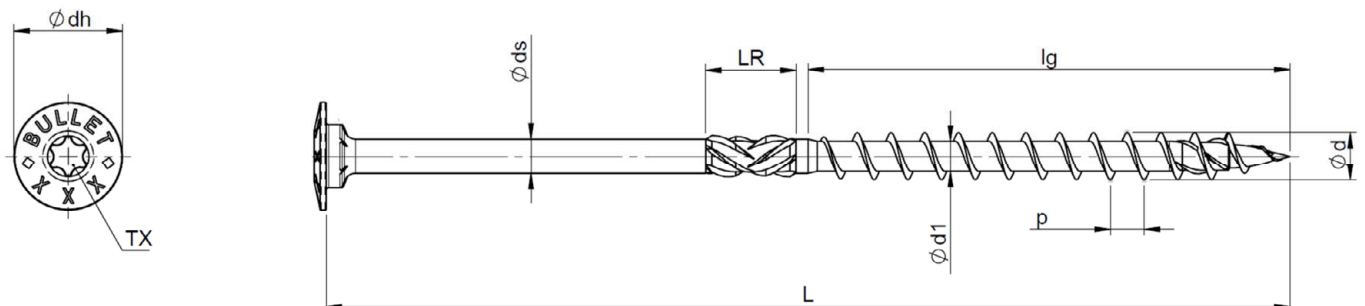
EASYfast WAVE PLUS
with full and single thread and different head and tip shapes

Annex 4.18

BULLET COMBI (countersunk head)



BULLET (washer head)



BULLET COMBI (countersunk head)							BULLET (washer head)						
nominal diameter [mm]		Ø8,0					nominal diameter [mm]		Ø8,0				
d	Outer diameter (thread)	8,0 ±0,4					d	Outer diameter (thread)	8,0 ±0,4				
d1	Inner diameter (thread)	5,3 ±0,3					d1	Inner diameter (thread)	5,3 ±0,3				
ds	shank diameter	5,8 ±0,3					ds	shank diameter	5,8 ±0,3				
dh	head diameter	15,0 ±0,75					dh	head diameter	18,4 ±0,92				
p	Thread pitch (single thread)	5,6 ±10%					p	Thread pitch (single thread)	5,6 ±10%				
TX	Size	40					TX	Size	40				
nominal length [mm]			thread length [mm]				nominal length [mm]			thread length [mm]			
L	tolerance	LR (optional)	lg	tolerance	lg (Alternativ)	tolerance	L	tolerance	LR (optional)	lg	tolerance	lg (Alternativ)	tolerance
80	± 2,3	15 ±1,5	52	± 2,3	52	± 2,3	80	± 2,3	15 ±1,5	52	± 2,3	52	± 2,3
90	± 2,7		52				90	± 2,7		52			
100-120	± 3,2		80				100-120	± 3,2		80			
130-180	± 3,6		80				130-180	± 3,6		80			
200-240	± 4,1		80				200-240	± 4,1		80			
260-300	± 4,5		80				260-300	± 4,5		80			
320-400	± 4,9		80				320-400	± 4,9		80			
420-500	± 5,5		80				420-500	± 5,5		80			
520-600			80				520-600			80			

EASYfast, EASYtop and BULLET screws

BULLET COMBI, BULLET
with partial thread and different head shapes

Annex 4.19