Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment

ETA-13/0816 of 3 November 2016

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	TOB screws
Product family to which the construction product belongs	TOB screws for use in timber constructions
Manufacturer	Tobsteel GmbH Rudolf-Diesel-Straße 8 74613 Öhringen DEUTSCHLAND
Manufacturing plant	Werk 3, Werk 4, Werk 5, Werk 8, Werk 9, Werk 10, Werk 11, Werk 12, Werk 13, Werk 14, Werk 15, Werk 16
This European Technical Assessment contains	50 pages including 4 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 130118-00-0603

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Specific Part

1 Technical description of the product

TOB-HBS, TOB-Drill, TOB-Fast-Drill, TOB-TBS Quadra-Speed and TOB-TBS-Drill screws are self-tapping screws made from special stainless steel. They have an antifriction coating. Screws made from stainless steel no. 1.4006 are hardened. The outer thread diameter is not less than 3.0 mm and not greater than 10.0 mm. The overall length of the screws is ranging from 12 mm to 375 mm. Further dimensions are shown in Annex 4. The washers are made from stainless steel. The dimensions of the washers are given in Annex 4.

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.

Durability is only ensured if the specifications of intended use according to Annex 1 to 3 are taken into account.

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
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 determined
Characteristic torsional strength	See Annex 2
Insertion moment	See Annex 2
Spacing, 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

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	The screws are made of stainless steel classified as Euroclass A1 in accordance with EC decision 96/603/EC, as amended by EC decision 2000/605/EC.

3.3 Hygiene, health and the environment (BWR 3)

Not applicable

3.4 Safety and accessibility in use (BWR 4)

Same as BWR 1

3.5 Protection against noise (BWR 5)

Not applicable

3.6 Energy economy and heat retention (BWR 6)

Not applicable

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was investigated for this product.

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

In accordance with EAD No. 130118-00-0603 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 3 November 2016 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

beglaubigt:
Dewitt

Deutsches Institut für Bautechnik DIBt

Annex 1 Specifications of intended use

A.1.1 Use of the TOB screws only for:

– Static and quasi-static loads

A.1.2 Base materials

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

– Solid timber (softwood) according to EN 14081-1[1],
– Glued laminated timber (softwood) according to EN 14080[2],
– Laminated veneer lumber LVL (softwood) according to EN 14374[3], arrangement of the screws only perpendicular to the plane of the veneers,
– Glued solid timber (softwood) according to EN 14080 or national provisions that apply at the installation site,
– Cross-laminated timber (softwood) according to European Technical Approvals/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[4] and EN 13986[5],
– Oriented Strand Board, OSB according to EN 300[6] and EN 13986,
– Particleboard according to EN 312[7] and EN 13986,
– Fibreboards according to EN 622-2[8], EN 622-3[9] and EN 13986,
– Cement-bonded particle boards according to EN 634-2[10] and EN 13986,
– Solid-wood panels according to EN 13353[11] and EN 13986.

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

TOB-HBS and TOB-Drill 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.

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 636:2012+A1:2015	Plywood - Specifications
5	EN 13986:2004+A1:2015	Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
6	EN 300:2006	Oriented strand boards (OSB) – Definition, classification and specifications
7	EN 312:2010	Particleboards - Specifications
8	EN 622-2:2004	Fibreboards – Specifications – Part 2: Requirements for hardboards
9	EN 622-3:2004	Fibreboards - Specifications - Part 3: Requirements for medium boards
10	EN 634-2:2007	Cement-bonded particleboards – Specifications – Part 2: Requirements for OPC bonded particleboards for use in dry, humid and external conditions
11	EN 13353:2008+A1:2011	Solid wood panels (SWP) – Requirements

TOB screws	Annex 1
Specifications of intended use	

A.1.3 Use Conditions (environmental conditions)

The corrosion protection of the TOB screws is specified in Annex A.2.6. With regards to the use and the environmental conditions, the national provisions of the place of installation apply.

A.1.4 Installation provisions

EN 1995-1-1[12] in conjunction with the respective national annex applies for the installation.

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.

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

A minimum of two screws shall be used for connections in load bearing timber structures. This does not apply for special situations specified in National Annexes to EN 1995-1-1.

If screws with an outer thread diameter $d \geq 8$ mm are used in load-bearing timber structures, the structural solid or glued laminated timber, laminated veneer lumber and similar glued members shall be from spruce, pine or fir.

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

Countersunk head screws may be used with washers according to Annex 4. After inserting the screw the washers shall touch the surface of the wood-based member completely. Screws made from stainless steel shall be used with washers made from stainless steel.

By fastening screws in wood-based members the head of the screws shall be flush with the surface of the wood-based member. For screws with a pan washer or hexagon head the head part remains unconsidered.

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

TOB screws	Annex 1
Installation provisions	

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ANNEX 2 – Characteristic values of the load-carrying capacities

Table A.2.1 Characteristic load-carrying capacities of TOB self-tapping screws

Outer thread diameter [mm]		**3.0**	**3.2**	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**	**8.0**	**10.0**
Characteristic yield moment $M_{y,k}$ [Nm]	TOB-HBS and TOB-Drill	0.9	1.2	1.5	1.7	3.0	3.9	-	6.3	13.0	24.0
	TOB-HBS and TOB-Drill hardened	1.5	2.0	2.8	3.3	3.8	5.0	-	9.0	13.0	24.0
	TOB-Fast-Drill	-	-	-	3.9	5.2	6.9	-	11.1	-	-
	TOB-TBS-Drill	-	-	-	-	-	-	6.0	-	-	-
	TOB-TBS Quadra-Speed and TOB-TBS-Drill hardened	-	-	-	-	-	10.0	12.0	-	-	-
Characteristic tensile strength $f_{tens,k}$ [kN]	TOB-HBS and TOB-Drill	1.7	2.0	2.4	3.1	4.0	4.4	-	7.1	13.0	20.0
	TOB-HBS and TOB-Drill hardened	2.8	3.2	3.8	5.0	6.4	7.9	-	11.0	13.0	20.0
	TOB-Fast-Drill	-	-	-	5.0	5.9	7.9	-	11.0	-	-
	TOB-TBS-Drill	-	-	-	-	-	-	7.1	-	-	-
	TOB-TBS Quadra-Speed and TOB-TBS-Drill hardened	-	-	-	-	-	7.9	9.5	-	-	-
Characteristic torsional strength $f_{tor,k}$ [Nm]	TOB-HBS and TOB-Drill	0.8	1.3	1.4	2.2	2.7	3.8	-	6.0	15.0	30.0
	TOB-HBS and TOB-Drill hardened	1.4	1.9	2.7	3.5	4.3	5.9	-	11.5	15.0	30.0
	TOB-Fast-Drill	-	-	-	3.5	5.0	8.0	-	14.0	-	-
	TOB-TBS-Drill	-	-	-	-	-	-	8.0	-	-	-
	TOB-TBS Quadra-Speed and TOB-TBS-Drill hardened	-	-	-	-	-	9.5	11.5	-	-	-

A.2.1 General

The minimum penetration length of the threaded part of the screw l_{ef} shall be

$$l_{ef} = \frac{4 \cdot d}{\sin \alpha}$$

where

α angle between screw axis and grain direction

d outer thread diameter of the screw.

The outer thread diameter of screws inserted in cross-laminated timber shall be at least 6 mm.
To connect cross-laminated timber the inner thread diameter d_1 of the screws shall be greater than the maximal width of the gaps in the layer.

TOB screws	Annex 2
Characteristic values of the load-carrying capacities	

A.2.2 Laterally loaded screws

The outer thread diameter d shall be used as effective diameter of the screw according to EN 1995-1-1.

A.2.3 Axially loaded screws

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

$$K_{ser} = 780 \cdot d^{0,2} \cdot l_{ef}^{0,4} \quad [N/mm] \qquad (2.1)$$

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.2.3.1 Axial withdrawal capacity

The characteristic withdrawal parameter at an angle of α = 90° to the grain based on a characteristic density of the wood-based member of 350 kg/m³ is

$f_{ax,k}$ = 13.7 N/mm² for TOB-HBS and TOB-Fast-Drill screws

$f_{ax,k}$ = 10.0 N/mm² for TOB-Drill, TOB-HBS hardened, TOB-TBS Quadra-Speed and TOB-TBS-Drill screws.

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 lateral surfaces of the cross-laminated timber the screws shall be fully inserted in one layer.

A.2.3.2 Head pull-through capacity

The characteristic value of the head pull-through parameter for TOB screws for a characteristic density of 350 kg/m³ of the timber and for wood-based panels like

- Plywood according to EN 636 and EN 13986
- Oriented Strand Board, OSB according to EN 300 and EN 13986
- Particleboard according to EN 312 and EN 13986
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986
- Cement-bonded particle board according to EN 634-2 and EN 13986
- Solid wood panel according to EN 13353 and EN 13986

with a thickness of more than 20 mm is

$f_{head,k}$ = 9.4 N/mm².

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

For wood based panels with a thickness 12 mm ≤ t ≤ 20 mm the characteristic value of the head pull-through parameter for TOB screws is:

$f_{head,k}$ = 8 N/mm²

For wood based panels with a thickness of less than 12 mm the characteristic head pull-through capacity for TOB screws shall be based on a characteristic value of the head pull-through parameter of 8 N/mm², and limited to 400 N complying with the minimum thickness of the wood based panels of 1,2·d, with d as outer thread diameter and the values in Table A.2.2.

TOB screws	Annex 2
Characteristic values of the load-carrying capacities	

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 particle board	8
Solid wood Panels	12

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

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

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

A.2.4.1 Laterally and/or axially loaded screws

Screws in pre-drilled holes

For TOB screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1:2004 +AC:2006+A1:2008+A2:2014, 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.

Screws in non pre-drilled holes
For TOB screws minimum spacing and distances are given in EN 1995-1-1:2004+AC:2006+A1:2008+A2:2014, 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 spacing and distances parallel to the grain shall be increased by 50 %.

Minimum distances from loaded or unloaded ends 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.

A.2.4.2 Only axially loaded screws

For TOB screws the minimum spacings, end and edge distances are given in EN 1995-1-1:2004+AC:2006+A1:2008+A2:2014, 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.2.5 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

Steel no. 1.4006, 1.4301, 1.4567, 1.4401, 1.4571, 1.4539 and 1.4529 is used for screws made from stainless steel.
Washers are made from steel no. 1.4301.
Contact corrosion shall be avoided.

TOB screws	Annex 2
Spacing, end and edge distances and durability against corrosion	

Annex 3 – Fastening of thermal insulation material on top of rafters

A.3.1 General

TOB-HBS and TOB-Drill 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.

The thickness of the thermal insulation material may be up to 300 mm. The thermal insulation material shall be applicable as insulation on top of rafters according to national provisions that apply at the installation site.

The battens have to be from solid timber (softwood) according to EN 14081-1. The minimum thickness t and the minimum width b of the battens are given as follows:

Table A.3.1 Minimum thickness and minimum width of the 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 following wood-based panels may be used to cover the thermal insulation material if they are suitable for that use:

- Plywood according to EN 636 and EN 13986,
- Oriented Strand Board, OSB according to EN 300 and EN 13986,
- Particleboard according to EN 312 and EN 13986
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986.

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

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

The spacing between screws e shall be not more than 1.75 m.

Friction forces shall not be considered for the design of the characteristic axial load of the screws.

The anchorage of wind suction forces as well as the bending stresses of the battens, respectively, shall be considered for design. Screws perpendicular to the grain of the rafter (angle α = 90 °) may be arranged if necessary.

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 battens parallel to the rafter may be considered as a beam on elastic foundation. The batten represents the beam, and the thermal insulation material on top of the rafter the elastic foundation. The minimum compression stress of the thermal insulation material at 10 % deformation, measured according to EN 826[13], shall be $\sigma_{(10\,\%)}$ = 0,05 N/mm². The batten is loaded perpendicular to the axis by point loads F_b. Further point loads F_s are from the shear load of the roof due to dead and snow load, which are transferred from the screw heads into the battens.

[13] EN 826:2013 Thermal insulating products for building applications - Determination of compression behaviour

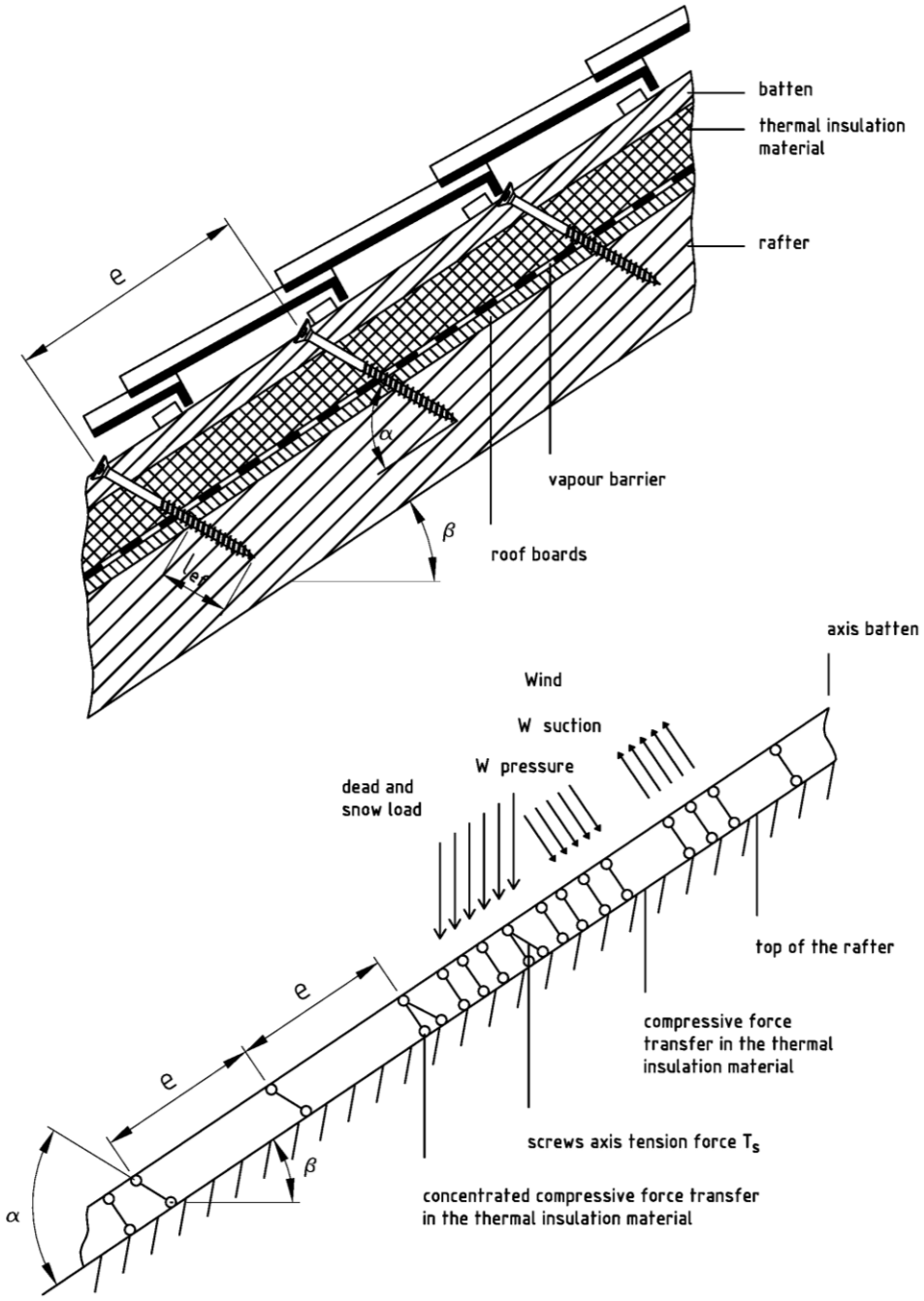

Figure 3.1 Fastening of the thermal insulation material on top of rafters - structural system for parallel inclined screws

TOB screws	Annex 3
Fastening of the thermal insulation material on top of rafters	

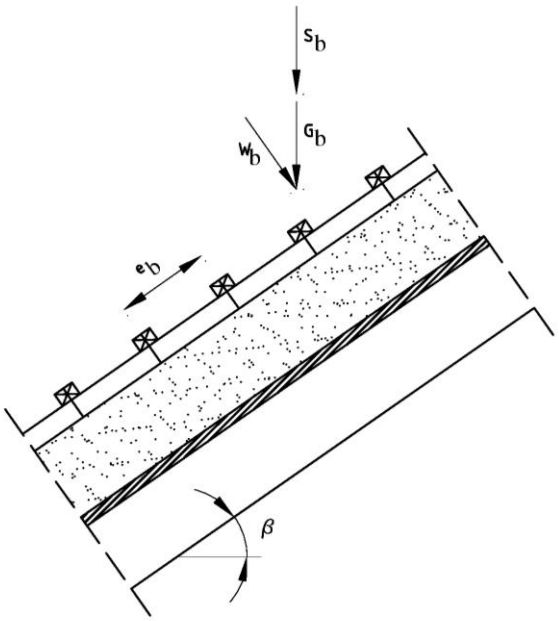

Figure 3.2 Point loads F_b perpendicular to the battens

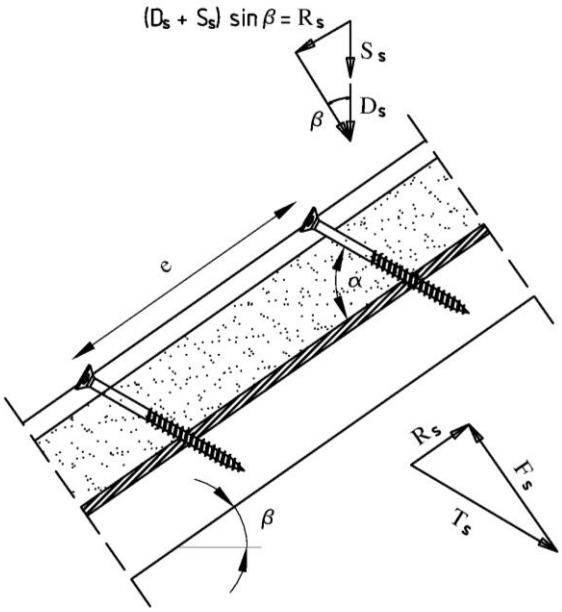

Figure 3.3 Point loads F_s perpendicular to the battens, load application in the area of the screw heads

TOB screws	Annex 3
Fastening of the thermal insulation material on top of rafters	

A.3.2.2 Design of the battens

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

The characteristic values of the bending stresses are calculated as:

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

where

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

EI = bending stiffness of the batten
K = coefficient of subgrade
w_{ef} = effective width of the thermal insulation material
$F_{b,k}$ = characteristic value of the point loads perpendicular to the battens
$F_{s,k}$ = characteristic value of the point loads perpendicular to the battens, load application in the area of the screw heads

The coefficient of subgrade 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 batten or rafter, respectively. For further calculations, the effective width w_{ef} of the thermal insulation material may be determined according to:

$$w_{ef} = w + t_{HI}/2 \tag{3.3}$$

where
w = minimum from width of the batten or rafter, respectively
t_{HI} = thickness of the thermal insulation material

$$K = \frac{E_{HI}}{t_{HI}} \tag{3.4}$$

The following condition shall be satisfied:

$$\frac{\sigma_{m,d}}{f_{m,d}} = \frac{M_d}{W \cdot f_{m,d}} \le 1 \tag{3.5}$$

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

The characteristic value of the shear stresses shall be calculated according to:

$$V_k = \frac{\left(F_{b,k} + F_{S,k}\right)}{2} \tag{3.6}$$

The following condition need to be satisfied:

$$\frac{\tau_d}{f_{v,d}} = \frac{1.5 \cdot V_d}{A \cdot f_{v,d}} \le 1 \tag{3.7}$$

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

TOB screws	Annex 3
Fastening of the 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 shall be calculated according to:

$$\sigma_k = \frac{1{,}5 \cdot F_{b,k} + F_{s,k}}{2 \cdot l_{char} \cdot w} \qquad (3.8)$$

The design value of the compressive stress shall not be greater than 110 % of the compressive stress at 10 % deformation calculated according to 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:

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

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 capacity of the screw according to 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:

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

where:

$f_{ax,d}$	design value of the axial withdrawal parameter of the threaded part of the screw [N/mm²]
d	outer thread diameter of the screw according to Annex 4 [mm]
l_{ef}	penetration length of the threaded part of the screw in the batten, $l_{ef} \geq 40$ 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, $30° \leq \alpha \leq 90°$
$f_{head,d}$	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 capacity of the screw according to Annex 2 [N]
γ_{M2}	partial factor according to EN 1993-1-1 in conjunction with the particular national annex
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 battens does not need to be considered when designing the load-carrying capacity of the screws.

TOB screws	Annex 3
Fastening of the thermal insulation material on top of rafters	

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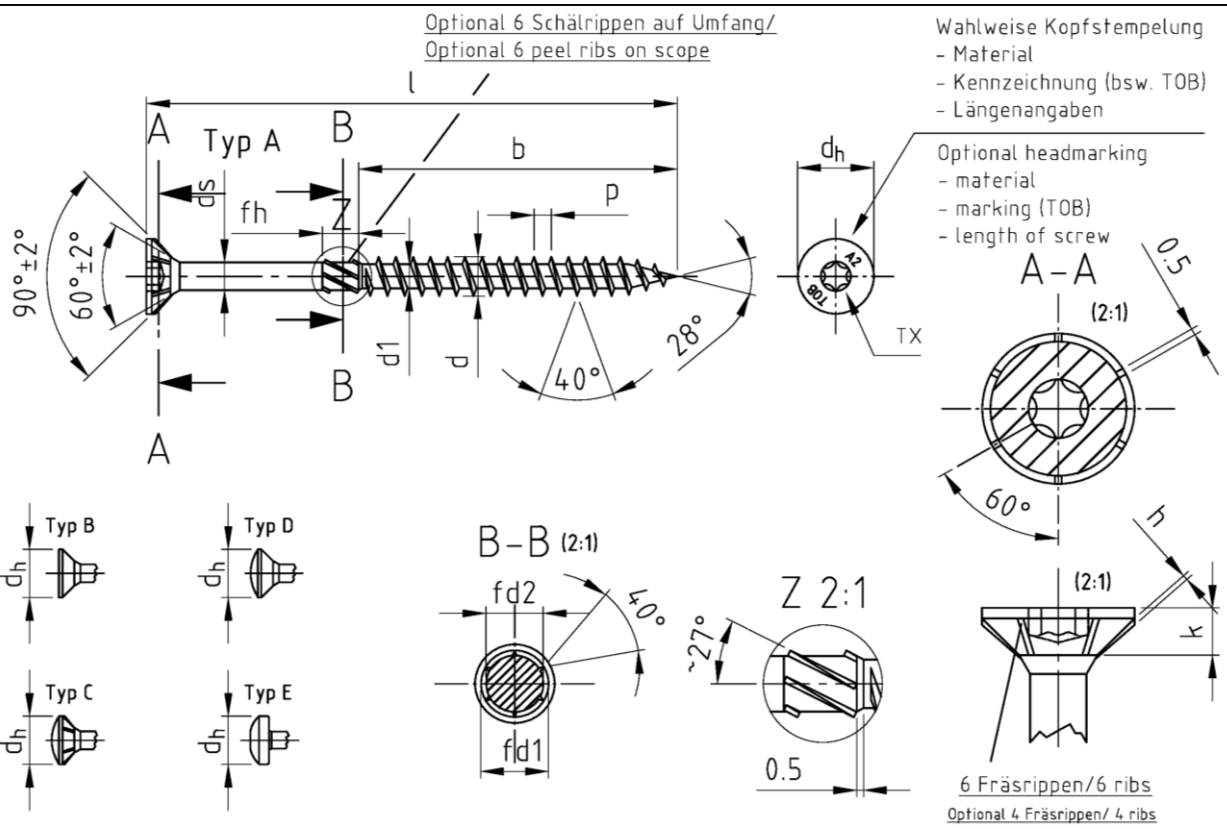


Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Senkkopf 90°, Teilgewinde										
Description	TOB–HBS/ TOB–HBS screws with countersunk head 90° Partially threaded										
Nennmaß/ Nominal dia.	d	d1	d_h	ds	k	p	pz	TX	h	fd1	fd2
ø 3,0	3,0 –0,15	2,0 –0,15	6,0 –0,4	2,15 ±0,05	1,9 –0,3	1,35 ±10%	1	10	0,3	2,90 –0,15	1,75 –0,15
ø 3,2	3,2 –0,15	2,1 –0,15	6,5 –0,4	2,3 ±0,05	2,0 –0,3	1,45 ±10%	1	10	0,3	3,15 –0,15	1,85 –0,15
ø 3,5	3,5 –0,3	2,4 –0,3	7,0 –0,4	2,5 ±0,05	2,1 –0,3	1,6 ±10%	2	10/15	0,3	3,45 –0,25	2,4 –0,15
ø 4,0	4,0 –0,3	2,6 –0,3	8,0 –0,5	2,84 ±0,05	2,5 –0,4	1,8 ±10%	2	15/20	0,5	3,70 –0,25	2,7 –0,15
ø 4,5	4,5 –0,3	2,8 –0,3	9,0 –0,5	3,11 ±0,05	2,7 –0,4	2,0 ±10%	2	20/25	0,5	3,95 –0,25	2,9 –0,15
ø 5,0	5,0 –0,3	3,0 –0,3	10,0 –0,5	3,54 ±0,05	3,0 –0,5	2,2 ±10%	2	20/25	0,5	4,2 –0,3	3,5 –0,15
ø 6,0	6,0 –0,3	3,7 –0,3	12,0 –0,5	4,25 ±0,05	3,6 –0,5	2,6 ±10%	3	25/30	0,5	5,1 –0,3	4,3 –0,25
ø 8,0	8,0 +0,2/–0,3	5,5 –0,5	15,0 –1,0	6,0 ±0,1	4,1 –0,5	3,6 ±10%	–	40	0,5	7,3 –0,3	5,75 –0,25
ø 10,0	10,0 +0,2/–0,4	6,5 –0,5	19,0 –1,0	7,0 ±0,1	4,7 –0,5	4,6 ±10%	–	40	0,5	8,8 –0,3	6,75 –0,25

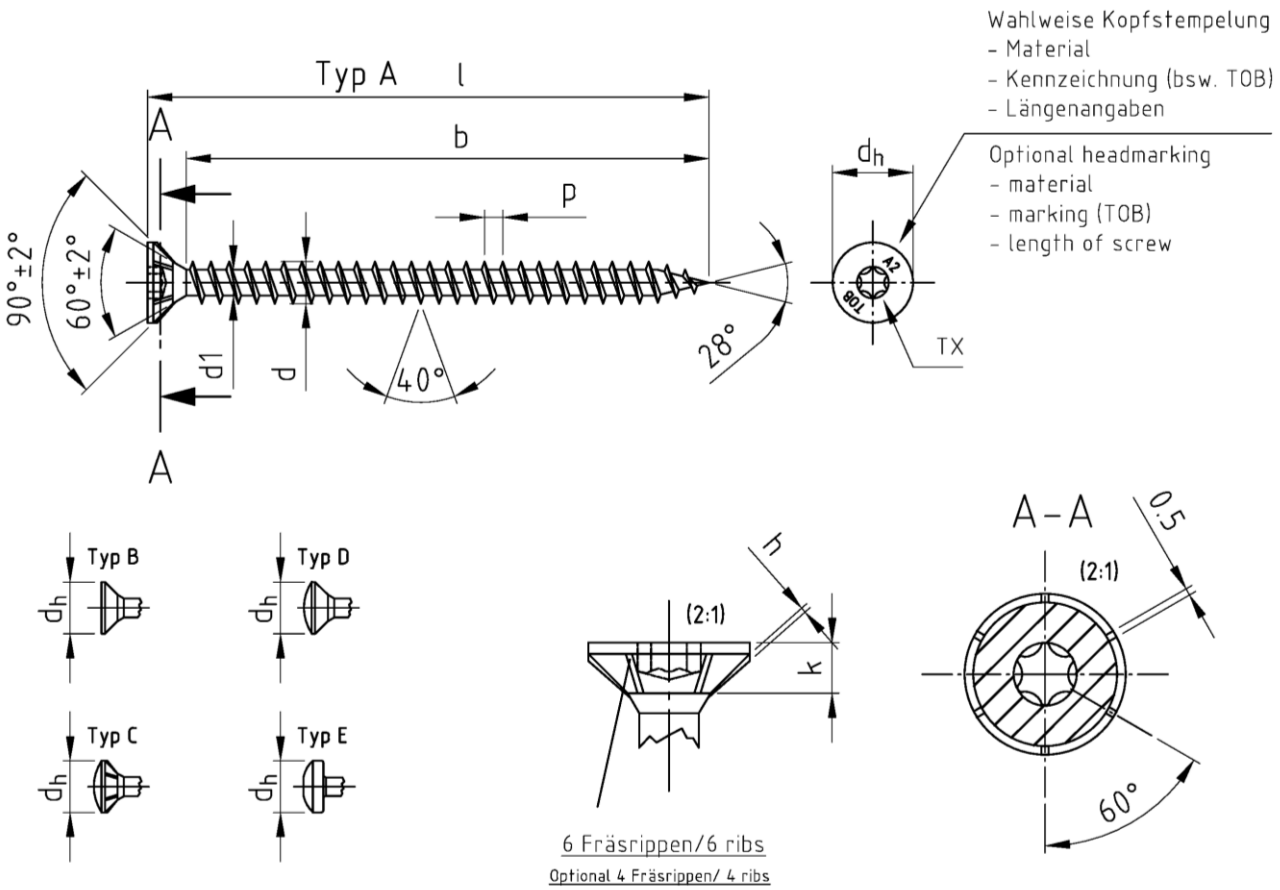
l –1/2 IT17	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160	180–300	300–375
ø 3,0 b ±1	12	18	18	24	24	30	30	–	–	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	12	18	18	24	24	30	30	36	36	–	–	–	–	–	–	–	–	–
ø 3,5 b ±1	12	18	18	24	24	30	30	36	–	–	–	–	–	–	–	–	–	–
ø 4,0 b ±1	–	18	18	24	24	30	30	36	36	42	42	–	–	–	–	–	–	–
ø 4,5 b ±1	–	–	18	24	24	30	30	36	36	42	42	48	48	–	–	–	–	–
ø 5,0 b ±1	–	–	20	24	24	30	30	36	36	42	42	48	48	54	60	–	–	–
ø 6,0 b ±1	–	–	–	24	24	30	30	36	36	42	42	48	48	54	70	70	70	–
ø 8,0 b ±1	–	–	–	–	32	37	47	50	50	50	50	50	50	60	80	80	80	80
ø 10,0 b ±1	–	–	–	–	–	–	–	–	50	55	55	55	55	55	55	80	105	105
fh	4,0 –0,2						6,0 –0,2						12,0 –0,6					

TOB screws

TOB-HBS screws with countersunk head 90°
Partially threaded

Annex 4.1

Deutsches Institut für Bautechnik DIBt



Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Senkkopf 90°, Vollgewinde							
Description	TOB–HBS/ TOB–HBS screws with countersunk head 90°, Fully threaded							
Nennmaß/ Nominal dia.	d	d1	dh	k	p	pz	TX	h
ø 3,0	3,0 –0,15	2,0 –0,15	6,0 –0,4	1,9 –0,3	1,35 ±10%	1	10	0,3
ø 3,2	3,2 –0,15	2,1 –0,15	6,5 –0,4	2,0 –0,3	1,45 ±10%	1	10	0,3
ø 3,5	3,5 –0,3	2,4 –0,3	7,0 –0,4	2,1 –0,3	1,6 ±10%	2	10/15	0,3
ø 4,0	4,0 –0,3	2,6 –0,3	8,0 –0,5	2,5 –0,4	1,8 ±10%	2	15/20	0,5
ø 4,5	4,5 –0,3	2,8 –0,3	9,0 –0,5	2,7 –0,4	2,0 ±10%	2	20/25	0,5
ø 5,0	5,0 –0,3	3,0 –0,3	10,0 –0,5	3,0 –0,5	2,2 ±10%	2	20/25	0,5
ø 6,0	6,0 –0,3	3,7 –0,3	12,0 –0,5	3,6 –0,5	2,6 ±10%	3	25/30	0,5

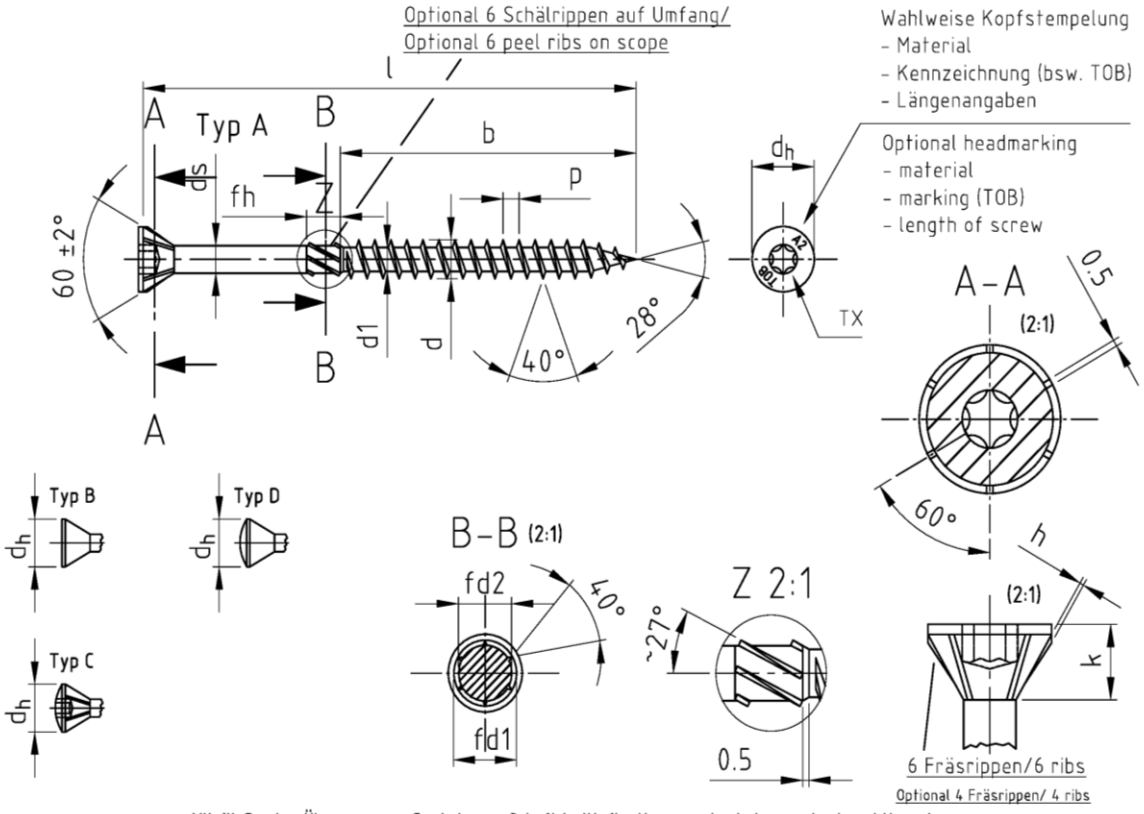
Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed								

TOB screws

TOB-HBS screws with countersunk head 90°
Fully threaded

Annex 4.2

Deutsches Institut für Bautechnik DIBt



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–HBS–60°/ TOB–HBS Schrauben mit Senkkopf 60°, Teilgewinde									
Description	TOB–HBS–60°/ TOB–HBS screws with countersunk head 60° head, Partially threaded									
Nennmaß/ Nominal dia.	d	d1	dh	ds	k	p	TX	h	fd1	fd2
ø 3,0	3,0 –0,15	2,0 –0,15	4,5 –0,4	2,15 ±0,05	1,8 ±0,5	1,35 ±10%	10	0,3	2,90 –0,15	1,75 –0,15
ø 3,2	3,2 –0,15	2,1 –0,15	5,0 –0,4	2,3 ±0,05	2,0 ±0,5	1,45 ±10%	10	0,3	3,15 –0,15	1,85 –0,15
ø 3,5	3,5 –0,3	2,4 –0,3	5,5 –0,4	2,5 ±0,05	2,2 ±0,5	1,6 ±10%	10	0,3	3,45 –0,25	2,4 –0,15
ø 4,0	4,0 –0,3	2,6 –0,3	6,0 –0,5	2,84 ±0,05	2,75 ±0,5	1,8 ±10%	15/20	0,5	3,70 –0,25	2,7 –0,15
ø 4,5	4,5 –0,3	2,8 –0,3	7,0 –0,5	3,11 ±0,05	3,35 ±0,5	2,0 ±10%	20/25	0,5	3,95 –0,25	2,9 –0,15
ø 5,0	5,0 –0,3	3,0 –0,3	7,5 –0,5	3,54 ±0,05	3,45 ±0,5	2,2 ±10%	20/25	0,5	4,2 –0,3	3,5 –0,15
ø 6,0	6,0 –0,3	3,7 –0,3	11,0 –0,5	4,25 ±0,05	5,85 ±0,5	2,6 ±10%	25/30	0,5	5,1 –0,3	4,3 –0,25
ø 8,0	8,0 +0,2/–0,3	5,5 –0,5	14,0 –1,0	6,0 ±0,1	6,95 ±0,5	3,6 ±10%	40	0,5	7,3 –0,3	5,75 –0,25
ø 10,0	10,0 +0,2/–0,4	6,5 –0,5	16,0 –1,0	7,0 ±0,1	7,8 ±0,5	4,6 ±10%	40	0,5	8,8 –0,3	6,75 –0,25

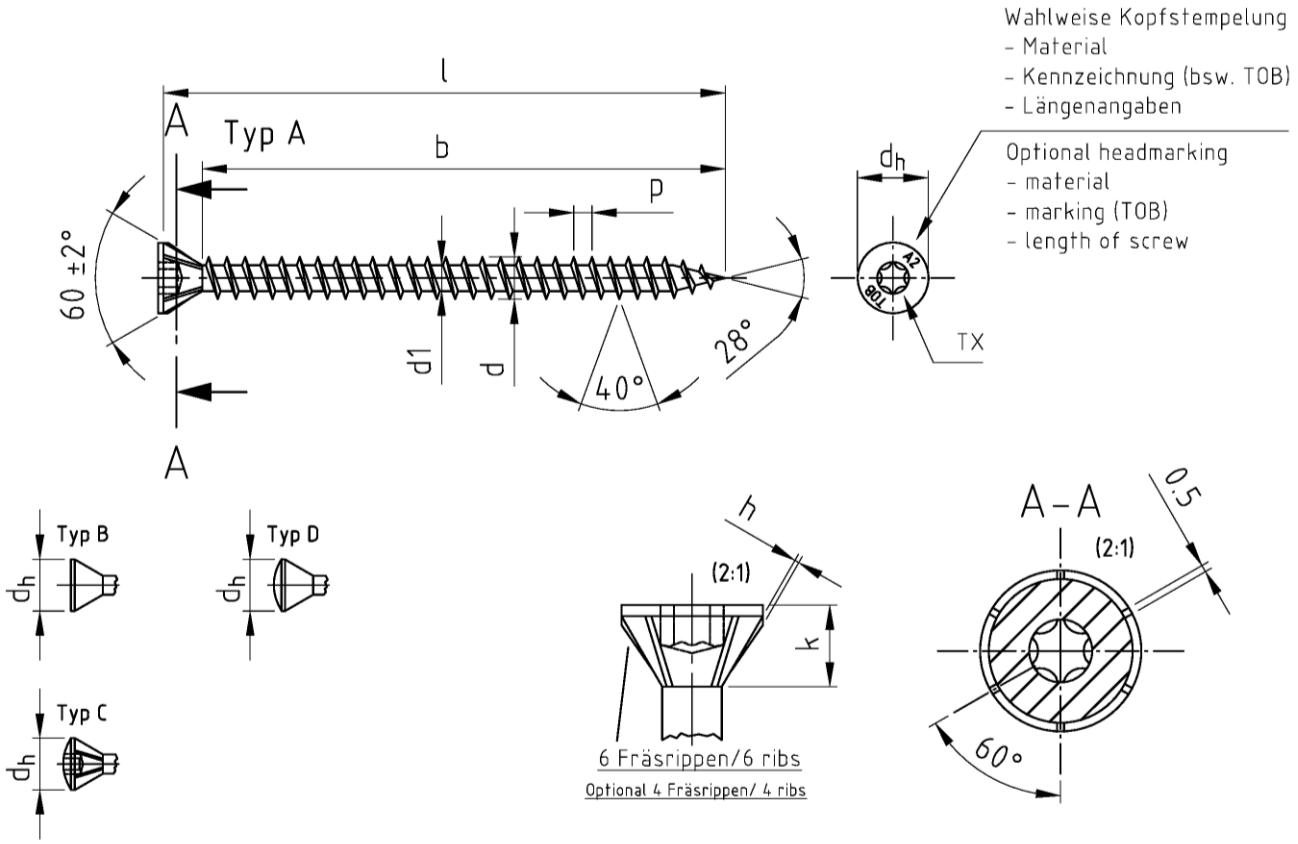
l –1/2 IT17	25	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160	180–300	300–375
ø 3,0 b ±1	18	18	24	24	30	30	–	–	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	18	24	24	30	30	36	36	–	–	–	–	–	–	–	–	–
ø 3,5 b ±1	18	18	24	24	30	30	36	–	–	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	18	24	24	30	30	36	36	42	42	–	–	–	–	–	–	–
ø 4,5 b ±1	–	18	24	24	30	30	36	36	42	42	48	48	–	–	–	–	–
ø 5,0 b ±1	–	20	24	24	30	30	36	36	42	42	48	48	54	60	–	–	–
ø 6,0 b ±1	–	–	24	24	30	30	36	36	42	42	48	48	54	70	70	70	–
ø 8,0 b ±1	–	–	–	32	37	47	50	50	50	50	50	50	60	80	80	80	80
ø 10,0 b ±1	–	–	–	–	–	–	–	50	55	55	55	55	55	55	80	105	105
fh	4,0 –0,2					6,0 –0,2						12,0 –0,6					

TOB screws

TOB-HBS screws with countersunk head 60°
Partially threaded

Annex 4.3

Deutsches Institut für Bautechnik DIBt



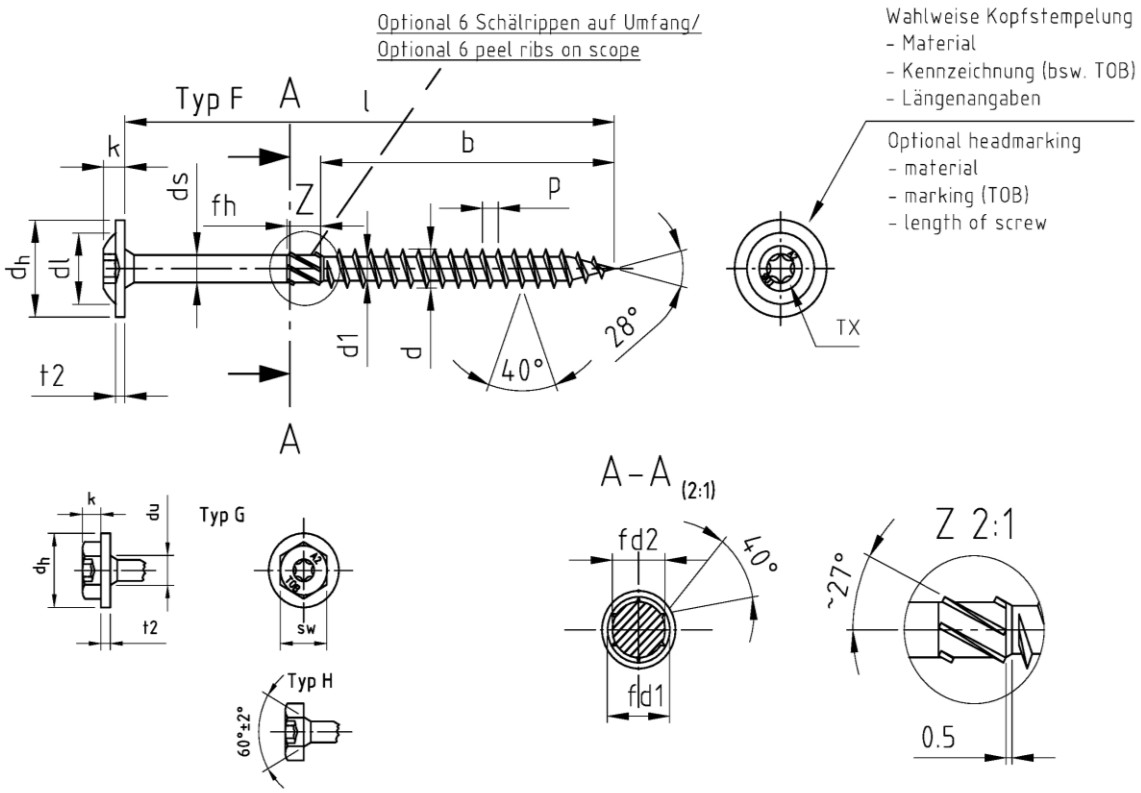
Bezeichnung	TOB–HBS–60°/ TOB–HBS Schrauben mit Senkkopf 60°, Vollgewinde						
Description	TOB–HBS–60°/ TOB–HBS screws with countersunk head 60° head, Fully threaded						
Nennmaß/ Nominal dia.	d	d1	dh	k	p	TX	h
ø 3,0	3,0 –0,15	2,0 –0,15	4,5 –0,4	1,8 ±0,5	1,35 ±10%	10	0,3
ø 3,2	3,2 –0,15	2,1 –0,15	5,0 –0,4	2,0 ±0,5	1,45 ±10%	10	0,3
ø 3,5	3,5 –0,3	2,4 –0,3	5,5 –0,4	2,2 ±0,5	1,6 ±10%	10	0,3
ø 4,0	4,0 –0,3	2,6 –0,3	6,0 –0,5	2,75 ±0,5	1,8 ±10%	15/20	0,5
ø 4,5	4,5 –0,3	2,8 –0,3	7,0 –0,5	3,35 ±0,5	2,0 ±10%	20/25	0,5
ø 5,0	5,0 –0,3	3,0 –0,3	7,5 –0,5	3,45 ±0,5	2,2 ±10%	20/25	0,5
ø 6,0	6,0 –0,3	3,7 –0,3	11,0 –0,5	5,85 ±0,5	2,6 ±10%	25/30	0,5

Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed								

TOB screws

TOB-HBS screws with countersunk head 60°
Fully threaded

Annex 4.4



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

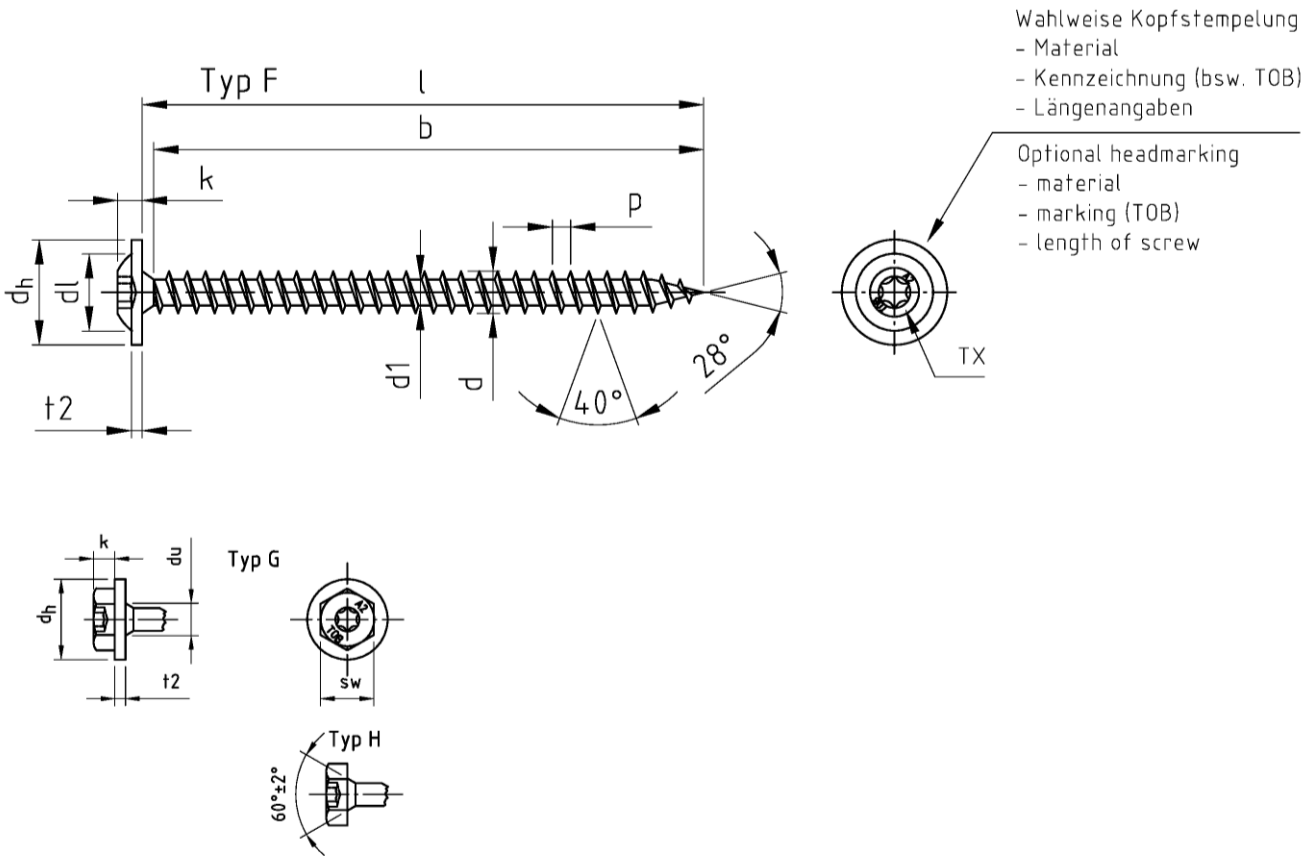
Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Tellerkopf oder Sechskantkopf, Teilgewinde											
Description	TOB–HBS/ TOB–HBS screws with pan washer head or hexagonal head, Partially threaded											
Nennmaß/ Nominal dia.	d	d1	dh	dl	ds	k	p	t2	TX	sw	fd1	fd2
ø 3,0	3,0 –0,15	2,0 –0,15	9,0 ±1,0	4,5	2,15 ±0,05	2,2 ±0,4	1,35 ±10%	1,3 –0,5	10	3	2,90 –0,15	1,75 –0,15
ø 3,2	3,2 –0,15	2,1 –0,15	10,0 ±1,0	5,0	2,3 ±0,05	2,5 ±0,4	1,45 ±10%	1,4 –0,5	10	4	3,15 –0,15	1,85 –0,15
ø 3,5	3,5 –0,3	2,4 –0,3	11,0 ±1,0	6,0	2,5 ±0,05	2,7 ±0,4	1,6 ±10%	1,5 –0,5	10/15	5	3,45 –0,25	2,4 –0,15
ø 4,0	4,0 –0,3	2,6 –0,3	12,0 ±1,0	7,0	2,84 ±0,05	3,0 ±0,4	1,8 ±10%	1,5 –0,5	15/20	6	3,70 –0,25	2,7 –0,15
ø 4,5	4,5 –0,3	2,8 –0,3	13,0 ±1,0	8,0	3,11 ±0,05	3,2 ±0,4	2,0 ±10%	1,5 –0,5	20/25	7	3,95 –0,25	2,9 –0,15
ø 5,0	5,0 –0,3	3,0 –0,3	14,0 ±1,0	9,0	3,54 ±0,05	3,5 ±0,4	2,2 ±10%	1,5 –0,5	20/25	8	4,2 –0,3	3,5 –0,15
ø 6,0	6,0 –0,3	3,7 –0,3	15,0 ±1,0	11,0	4,25 ±0,05	3,8 ±0,4	2,6 ±10%	2,0 –0,5	25/30	10	5,1 –0,3	4,3 –0,25
ø 8,0	8,0 +0,2/–0,3	5,5 –0,5	20,0 –1,0	15,0	6,0 ±0,1	4,6 ±0,4	3,6 ±10%	2,0 –0,5	40	12	7,3 –0,3	5,75 –0,25
ø 10,0	10,0 +0,2/–0,4	6,5 –0,5	25,0 –1,0	20,0	7,0 ±0,1	5,0 ±0,4	4,6 ±10%	2,0 –0,5	40	15	8,8 –0,3	6,75 –0,25

l –1/2 IT17	25	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160	180–300	300–375
ø 3,0 b ±1	18	18	24	24	30	30	–	–	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	18	24	24	30	30	36	36	–	–	–	–	–	–	–	–	–
ø 3,5 b ±1	18	18	24	24	30	30	36	–	–	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	18	24	24	30	30	36	36	42	42	–	–	–	–	–	–	–
ø 4,5 b ±1	–	18	24	24	30	30	36	36	42	42	48	48	–	–	–	–	–
ø 5,0 b ±1	–	20	24	24	30	30	36	36	42	42	48	48	54	60	–	–	–
ø 6,0 b ±1	–	–	24	24	30	30	36	36	42	42	48	48	54	70	70	70	–
ø 8,0 b ±1	–	–	–	32	37	47	50	50	50	50	50	72	80	80	80	80	80
ø 10,0 b ±1	–	–	–	–	–	–	–	50	55	55	55	55	55	55	80	105	105
fh	4,0 –0,2					6,0 –0,2						12,0 –0,6					

TOB screws

TOB-HBS screws with pan washer head or hexagonal head
Partially threaded

Annex 4.5



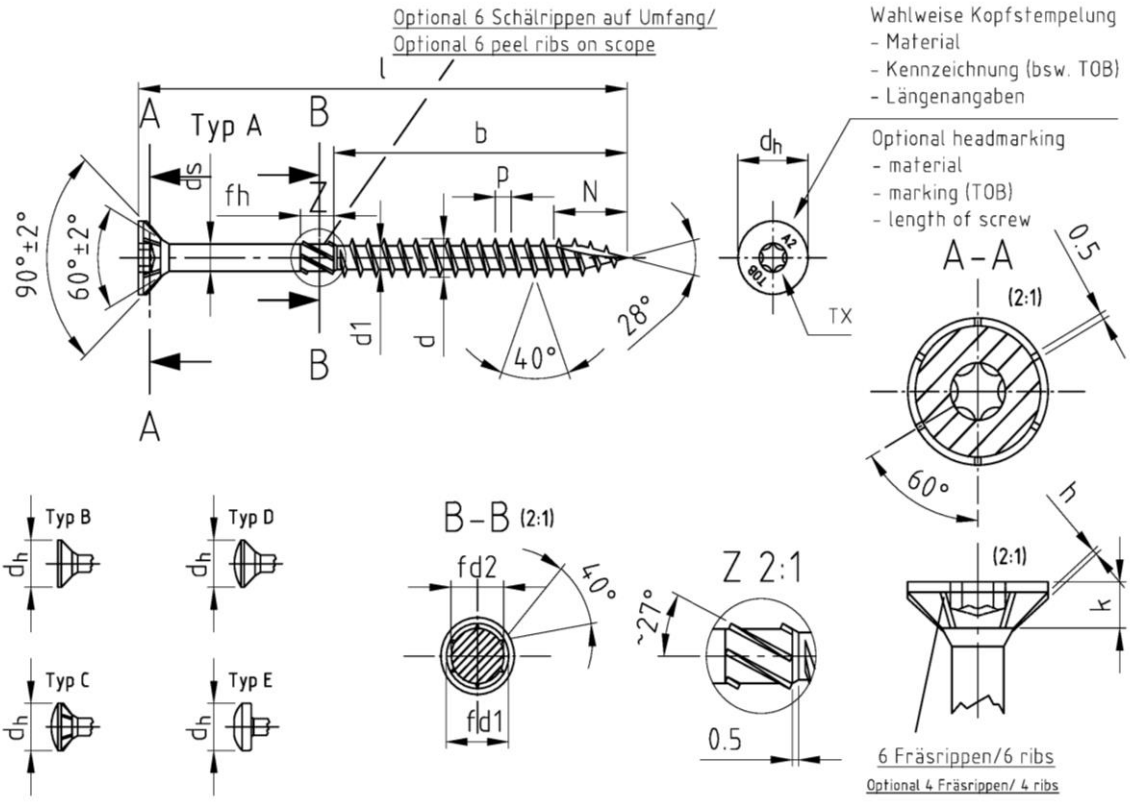
Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Tellerkopf oder Sechskantkopf, Vollgewinde								
Description	TOB–HBS/ TOB–HBS screws with pan washer head or hexagonal head, Fully threaded								
Nennmaß/ Nominal dia.	d	d1	dh	dl	k	p	t2	TX	sw
ø 3,0	3,0 –0,15	2,0 –0,15	9,0 ±1,0	4,5	2,2 ±0,4	1,35 ±10%	1,3 –0,5	10	3
ø 3,2	3,2 –0,15	2,1 –0,15	10,0 ±1,0	5,0	2,5 ±0,4	1,45 ±10%	1,4 –0,5	10	4
ø 3,5	3,5 –0,3	2,4 –0,3	11,0 ±1,0	6,0	2,7 ±0,4	1,6 ±10%	1,5 –0,5	10/15	5
ø 4,0	4,0 –0,3	2,6 –0,3	12,0 ±1,0	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	15/20	6
ø 4,5	4,5 –0,3	2,8 –0,3	13,0 ±1,0	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	20/25	7
ø 5,0	5,0 –0,3	3,0 –0,3	14,0 ±1,0	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	20/25	8
ø 6,0	6,0 –0,3	3,7 –0,3	15,0 ±1,0	11,0	3,8 ±0,4	2,6 ±10%	2,0 –0,5	25/30	10

Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≤ L ≤ Lmax sind zulässig / Others screws lenghts with Lmin ≤ L ≤ max are allowed								

TOB screws

TOB-HBS screws with pan washer head or hexagonal head
Fully threaded

Annex 4.6



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Senkkopf 90°, Teilgewinde, CUT Bohrspitze											
Description	TOB–HBS/ TOB–HBS screws with countersunk head 90°, Partially threaded, Cutting point											
Nennmaß/ Nominal dia.	d	d1	dh	ds	k	p	pz	TX	h	fd1	fd2	N
ø 3,0	3,0 –0,15	2,0 –0,15	6,0 –0,4	2,15 ±0,05	1,9 –0,3	1,35 ±10%	1	10	0,3	2,90 –0,15	1,75 –0,15	5,5 ±0,5
ø 3,2	3,2 –0,15	2,1 –0,15	6,5 –0,4	2,3 ±0,05	2,0 –0,3	1,45 ±10%	1	10	0,3	3,15 –0,15	1,85 –0,15	6,5 ±0,5
ø 3,5	3,5 –0,3	2,4 –0,3	7,0 –0,4	2,5 ±0,05	2,1 –0,3	1,6 ±10%	2	10/15	0,3	3,45 –0,25	2,4 –0,15	7,0 ±0,5
ø 4,0	4,0 –0,3	2,6 –0,3	8,0 –0,5	2,84 ±0,05	2,5 –0,4	1,8 ±10%	2	15/20	0,5	3,70 –0,25	2,7 –0,15	7,5 ±0,5
ø 4,5	4,5 –0,3	2,8 –0,3	9,0 –0,5	3,11 ±0,05	2,7 –0,4	2,0 ±10%	2	20/25	0,5	3,95 –0,25	2,9 –0,15	8,5 ±0,5
ø 5,0	5,0 –0,3	3,0 –0,3	10,0 –0,5	3,54 ±0,05	3,0 –0,5	2,2 ±10%	2	20/25	0,5	4,2 –0,3	3,5 –0,15	9,5 ±0,5
ø 6,0	6,0 –0,3	3,7 –0,3	12,0 –0,5	4,25 ±0,05	3,6 –0,5	2,6 ±10%	3	25/30	0,5	5,1 –0,3	4,3 –0,25	11,0 ±1,0
ø 8,0	8,0 +0,2/–0,3	5,5 –0,5	15,0 –1,0	6,0 ±0,1	4,1 –0,5	3,6 ±10%	–	40	0,5	7,3 –0,3	5,75 –0,25	13,0 ±1,0
ø 10,0	10,0 +0,2/–0,4	6,5 –0,5	19,0 –1,0	7,0 ±0,1	4,7 –0,5	4,6 ±10%	–	40	0,5	8,8 –0,3	6,75 –0,25	15,0 ±1,0

l –1/2 IT17	25	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160	180–300	300–375
ø 3,0 b ±1	18	18	24	24	30	30	–	–	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	18	24	24	30	30	36	36	–	–	–	–	–	–	–	–	–
ø 3,5 b ±1	18	18	24	24	30	30	36	–	–	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	18	24	24	30	30	36	36	36	42	–	–	–	–	–	–	–
ø 4,5 b ±1	–	18	24	24	30	30	36	36	36	42	48	48	–	–	–	–	–
ø 5,0 b ±1	–	20	24	24	30	30	36	36	36	42	48	48	54	60	–	–	–
ø 6,0 b ±1	–	–	24	24	30	30	36	36	36	42	48	48	54	70	70	70	–
ø 8,0 b ±1	–	–	–	32	37	47	50	50	50	50	50	50	60	80	80	80	80
ø 10,0 b ±1	–	–	–	–	–	–	–	50	55	55	55	55	55	55	80	105	105
fh	4,0 –0,2					6,0 –0,2						12,0 –0,6					

TOB screws

TOB-HBS screws with countersunk head 90°
Partially threaded
Cutting point

Annex 4.7

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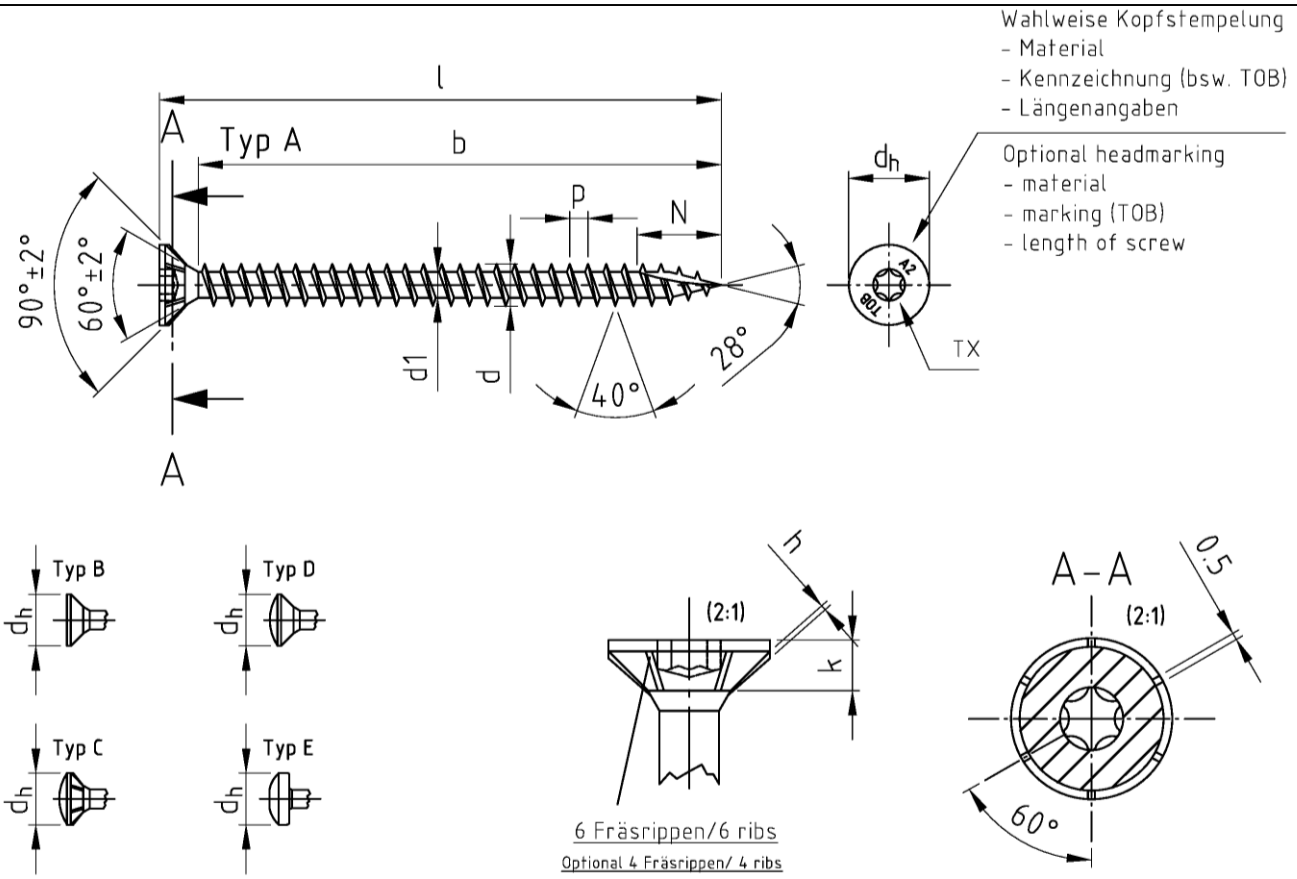


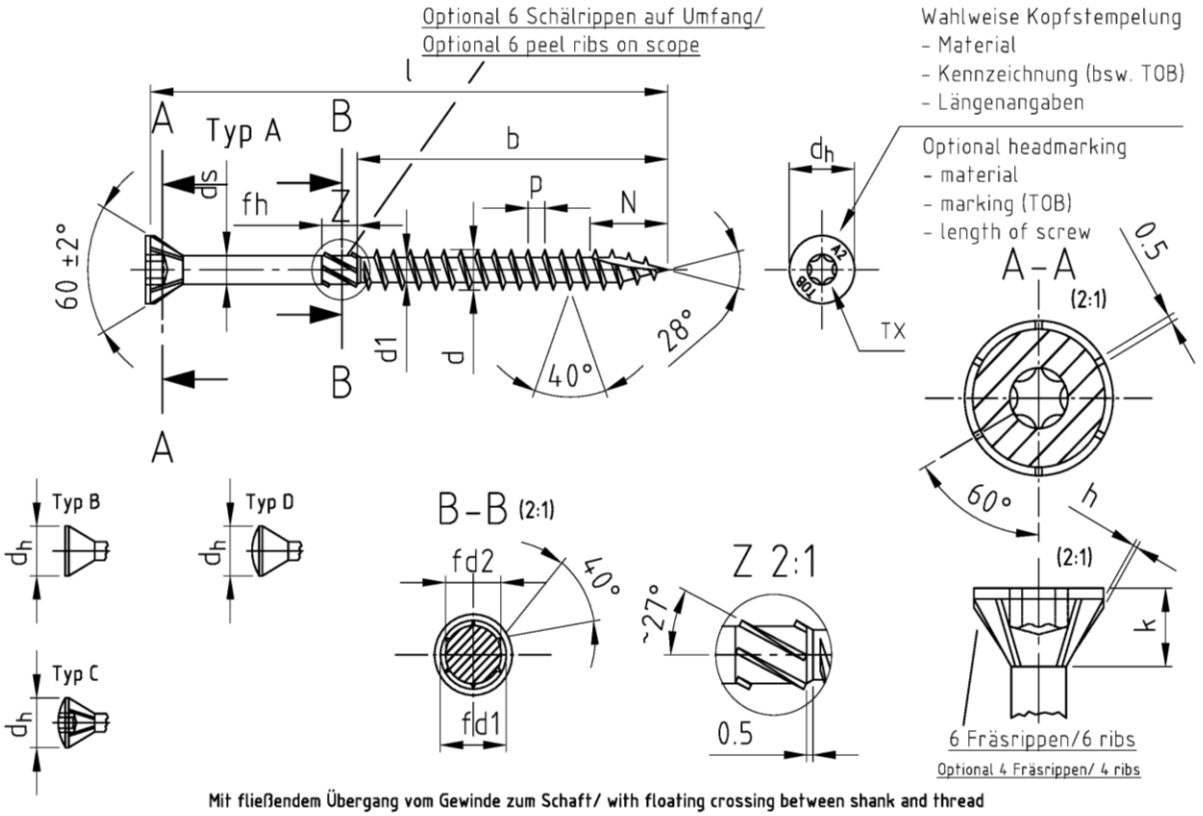
Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Senkkopf 90°, Vollgewinde, CUT Bohrspitze								
Description	TOB–HBS/ TOB–HBS screws with countersunk head 90°, Fully threaded, Cutting point								
Nennmaß/ Nominal dia.	d	d1	dh	k	p	pz	TX	h	N
ø 3,0	3,0 –0,15	2,0 –0,15	6,0 –0,4	1,9 –0,3	1,35 ±10%	1	10	0,3	5,5 ±0,5
ø 3,2	3,2 –0,15	2,1 –0,15	6,5 –0,4	2,0 –0,3	1,45 ±10%	1	10	0,3	6,5 ±0,5
ø 3,5	3,5 –0,3	2,4 –0,3	7,0 –0,4	2,1 –0,3	1,6 ±10%	2	10/15	0,3	7,0 ±0,5
ø 4,0	4,0 –0,3	2,6 –0,3	8,0 –0,5	2,5 –0,4	1,8 ±10%	2	15/20	0,5	7,5 ±0,5
ø 4,5	4,5 –0,3	2,8 –0,3	9,0 –0,5	2,7 –0,4	2,0 ±10%	2	20/25	0,5	8,5 ±0,5
ø 5,0	5,0 –0,3	3,0 –0,3	10,0 –0,5	3,0 –0,5	2,2 ±10%	2	20/25	0,5	9,5 ±0,5
ø 6,0	6,0 –0,3	3,7 –0,3	12,0 –0,5	3,6 –0,5	2,6 ±10%	3	25/30	0,5	11,0 ±1,0

Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed								

TOB screws

TOB-HBS screws with countersunk head 90°
Fully threaded
Cutting point

Annex 4.8



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–HBS–60°/ TOB–HBS Schrauben mit Senkkopf 60°, Teilgewinde, CUT Bohrspitze										
Description	TOB–HBS–60°/ TOB–HBS screws with countersunk head 60°, Partially threaded, Cutting point										
Nennmaß/ Nominal dia.	d	d1	dh	ds	k	p	TX	h	fd1	fd2	N
ø 3,0	3,0 –0,15	2,0 –0,15	4,5 –0,4	2,15 ±0,05	1,8 ±0,5	1,35 ±10%	10	0,3	2,90 –0,15	1,75 –0,15	5,5 ±0,5
ø 3,2	3,2 –0,15	2,1 –0,15	5,0 –0,4	2,3 ±0,05	2,0 ±0,5	1,45 ±10%	10	0,3	3,15 –0,15	1,85 –0,15	6,5 ±0,5
ø 3,5	3,5 –0,3	2,4 –0,3	5,5 –0,4	2,5 ±0,05	2,2 ±0,5	1,6 ±10%	10	0,3	3,45 –0,25	2,4 –0,15	7,0 ±0,5
ø 4,0	4,0 –0,3	2,6 –0,3	6,0 –0,5	2,84 ±0,05	2,75 ±0,5	1,8 ±10%	15/20	0,5	3,70 –0,25	2,7 –0,15	7,5 ±0,5
ø 4,5	4,5 –0,3	2,8 –0,3	7,0 –0,5	3,11 ±0,05	3,35 ±0,5	2,0 ±10%	20/25	0,5	3,95 –0,25	2,9 –0,15	8,5 ±0,5
ø 5,0	5,0 –0,3	3,0 –0,3	7,5 –0,5	3,54 ±0,05	3,45 ±0,5	2,2 ±10%	20/25	0,5	4,2 –0,3	3,5 –0,15	9,5 ±0,5
ø 6,0	6,0 –0,3	3,7 –0,3	11,0 –0,5	4,25 ±0,05	5,85 ±0,5	2,6 ±10%	25/30	0,5	5,1 –0,3	4,3 –0,25	11,0 ±1,0
ø 8,0	8,0 +0,2/–0,3	5,5 –0,5	14,0 –1,0	6,0 ±0,1	6,95 ±0,5	3,6 ±10%	40	0,5	7,3 –0,3	5,75 –0,25	13,0 ±1,0
ø 10,0	10,0 +0,2/–0,4	6,5 –0,5	16,0 –1,0	7,0 ±0,1	7,8 ±0,5	4,6 ±10%	40	0,5	8,8 –0,3	6,75 –0,25	15,0 ±1,0

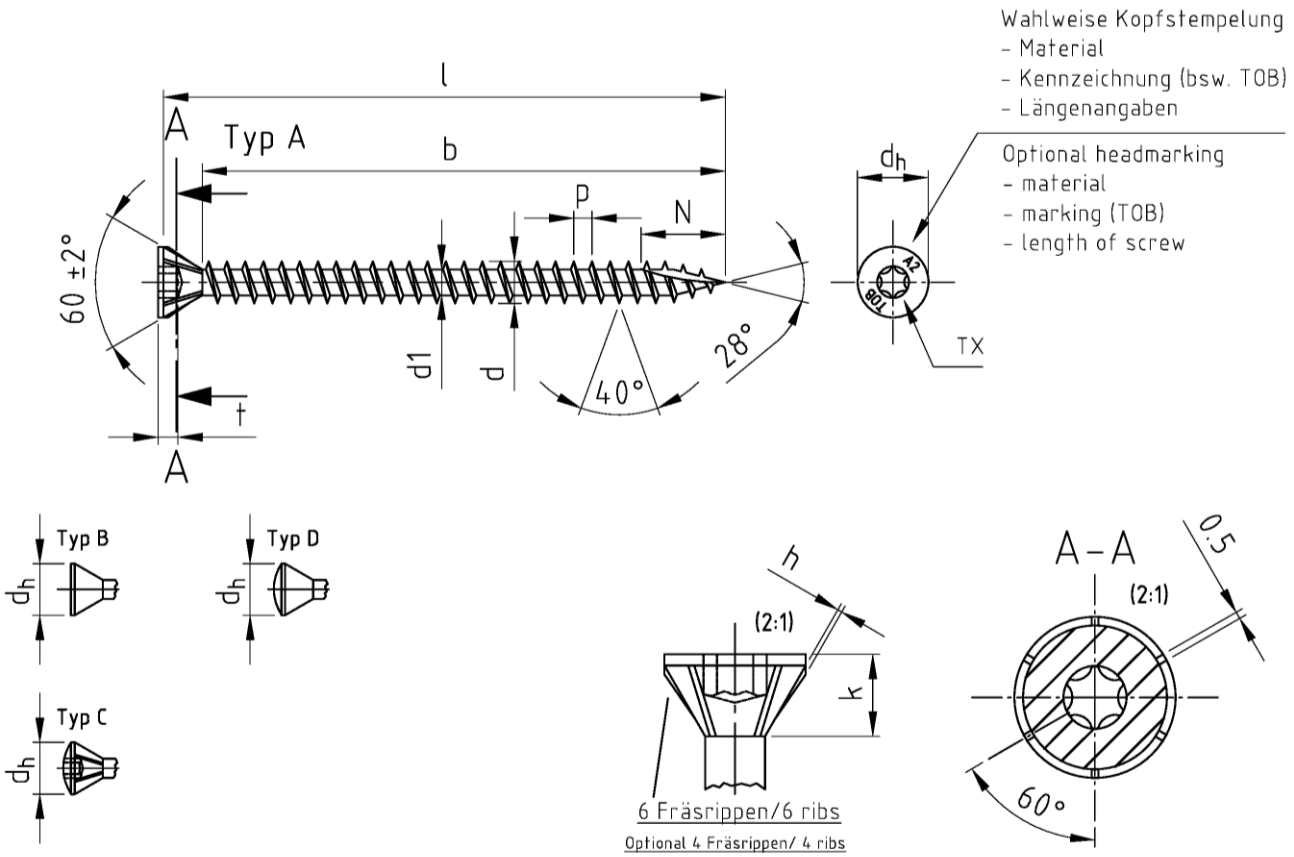
l –1/2 IT17	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110–160	180–300	300–375
ø 3,0 b ±1	18	18	24	24	30	30	–	–	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	18	24	24	30	30	36	36	–	–	–	–	–	–	–	–	–
ø 3,5 b ±1	18	18	24	24	30	30	36	–	–	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	18	24	24	30	30	36	36	36	42	–	–	–	–	–	–	–
ø 4,5 b ±1	–	18	24	24	30	30	36	36	36	42	48	48	–	–	–	–	–
ø 5,0 b ±1	–	20	24	24	30	30	36	36	36	42	48	48	54	60	–	–	–
ø 6,0 b ±1	–	–	24	24	30	30	36	36	36	42	48	48	54	70	70	70	–
ø 8,0 b ±1	–	–	–	32	37	47	50	50	50	50	50	50	60	80	80	80	80
ø 10,0 b ±1	–	–	–	–	–	–	–	50	55	55	55	55	55	55	80	105	105
fh	4,0 –0,2					6,0 –0,2						12,0 –6,0					

TOB screws

TOB-HBS screws with countersunk head 60°
Partially threaded
Cutting point

Annex 4.9

Deutsches Institut für Bautechnik DIBt



Bezeichnung	TOB–HBS–60°/ TOB–HBS Schrauben mit Senkkopf 60°, Vollgewinde, CUT Bohrspitze							
Description	TOB–HBS–60°/ TOB–HBS screws with countersunk head 60°, Fully threaded, Cutting point							
Nennmaß/ Nominal dia.	d	d1	dh	k	p	TX	h	N
ø 3,0	3,0 –0,15	2,0 –0,15	4,5 –0,4	1,8 ±0,5	1,35 ±10%	10	0,3	5,5 ±0,5
ø 3,2	3,2 –0,15	2,1 –0,15	5,0 –0,4	2,0 ±0,5	1,45 ±10%	10	0,3	6,5 ±0,5
ø 3,5	3,5 –0,3	2,4 –0,3	5,5 –0,4	2,2 ±0,5	1,6 ±10%	10	0,3	7,0 ±0,5
ø 4,0	4,0 –0,3	2,6 –0,3	6,0 –0,5	2,75 ±0,5	1,8 ±10%	15/20	0,5	7,5 ±0,5
ø 4,5	4,5 –0,3	2,8 –0,3	7,0 –0,5	3,35 ±0,5	2,0 ±10%	20/25	0,5	8,5 ±0,5
ø 5,0	5,0 –0,3	3,0 –0,3	7,5 –0,5	3,45 ±0,5	2,2 ±10%	20/25	0,5	9,5 ±0,5
ø 6,0	6,0 –0,3	3,7 –0,3	11,0 –0,5	5,85 ±0,5	2,6 ±10%	25/30	0,5	11,0 ±1,0

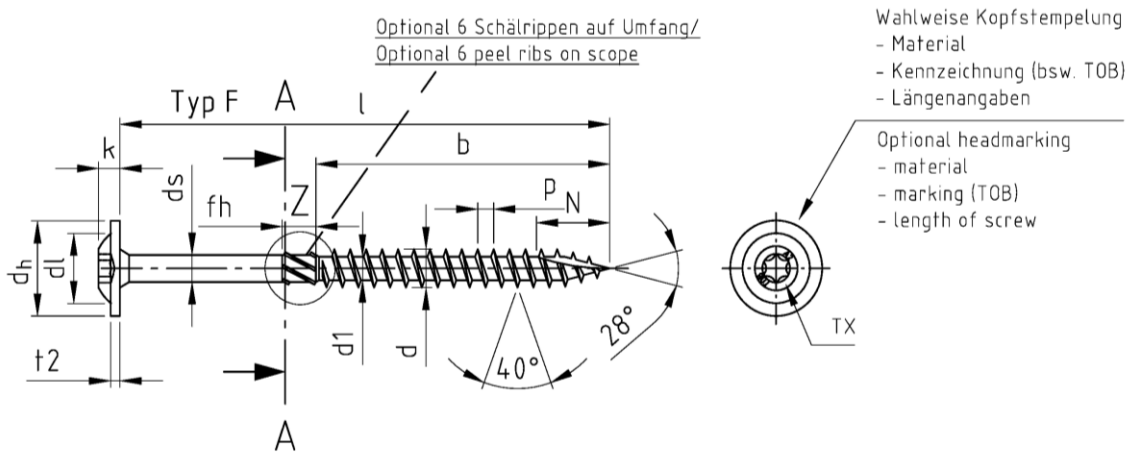
Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≤ L ≤ Lmax sind zulässig / Others screws lenghts with Lmin ≤ L ≤ max are allowed								

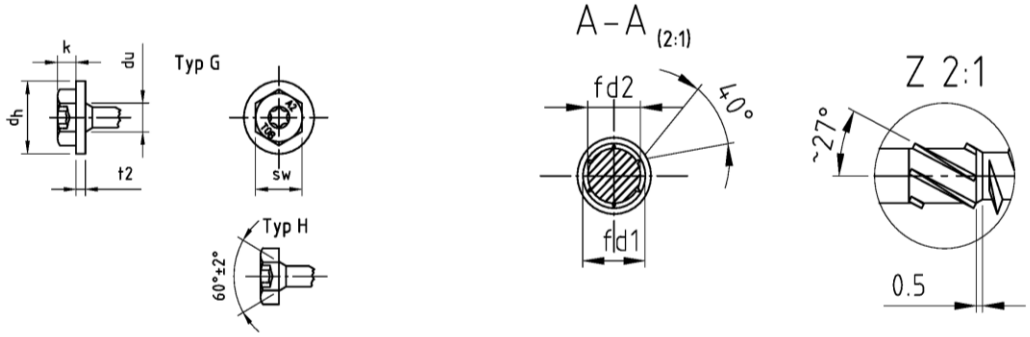
TOB screws

TOB-HBS screws with countersunk head 60°
Fully threaded
Cutting point

Annex 4.10

Deutsches Institut für Bautechnik DIBt





Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Tellerkopf oder Sechskantkopf, Teilgewinde, CUT Bohrspitze												
Description	TOB–HBS/ TOB–HBS screws with pan washer head or hexagonal head, Partially threaded, Cutting point												
Nennmaß/ Nominal dia.	d	d1	dh	dl	ds	k	p	t2	TX	sw	fd1	fd2	N
ø 3,0	3,0 –0,15	2,0 –0,15	9,0 ±1,0	4,5	2,15 ±0,05	2,2 ±0,4	1,35 ±10%	1,3 –0,5	10	3	2,90 –0,15	1,75 –0,15	5,5 ±0,5
ø 3,2	3,2 –0,15	2,1 –0,15	10,0 ±1,0	5,0	2,3 ±0,05	2,5 ±0,4	1,45 ±10%	1,4 –0,5	10	4	3,15 –0,15	1,85 –0,15	6,5 ±0,5
ø 3,5	3,5 –0,3	2,4 –0,3	11,0 ±1,0	6,0	2,5 ±0,05	2,7 ±0,4	1,6 ±10%	1,5 –0,5	10/15	5	3,45 –0,25	2,4 –0,15	7,0 ±0,5
ø 4,0	4,0 –0,3	2,6 –0,3	12,0 ±1,0	7,0	2,84 ±0,05	3,0 ±0,4	1,8 ±10%	1,5 –0,5	15/20	6	3,70 –0,25	2,7 –0,15	7,5 ±0,5
ø 4,5	4,5 –0,3	2,8 –0,3	13,0 ±1,0	8,0	3,11 ±0,05	3,2 ±0,4	2,0 ±10%	1,5 –0,5	20/25	7	3,95 –0,25	2,9 –0,15	8,5 ±0,5
ø 5,0	5,0 –0,3	3,0 –0,3	14,0 ±1,0	9,0	3,54 ±0,05	3,5 ±0,4	2,2 ±10%	1,5 –0,5	20/25	8	4,2 –0,3	3,5 –0,15	9,5 ±0,5
ø 6,0	6,0 –0,3	3,7 –0,3	15,0 ±1,0	11,0	4,25 ±0,05	3,8 ±0,4	2,6 ±10%	2,0 –0,5	25/30	10	5,1 –0,3	4,3 –0,25	11,0 ±1
ø 8,0	8,0 +0,2/–0,3	5,5 –0,5	20,0 –1,0	15,0	6,0 ±0,1	4,6 ±0,4	3,6 ±10%	2,0 –0,5	40	12	7,3 –0,3	5,75 –0,25	13,0 ±1
ø 10,0	10,0 +0,2/–0,4	6,5 –0,5	25,0 –1,0	20,0	7,0 ±0,1	5,0 ±0,4	4,6 ±10%	2,0 –0,5	40	15	8,8 –0,3	6,75 –0,25	15,0 ±1

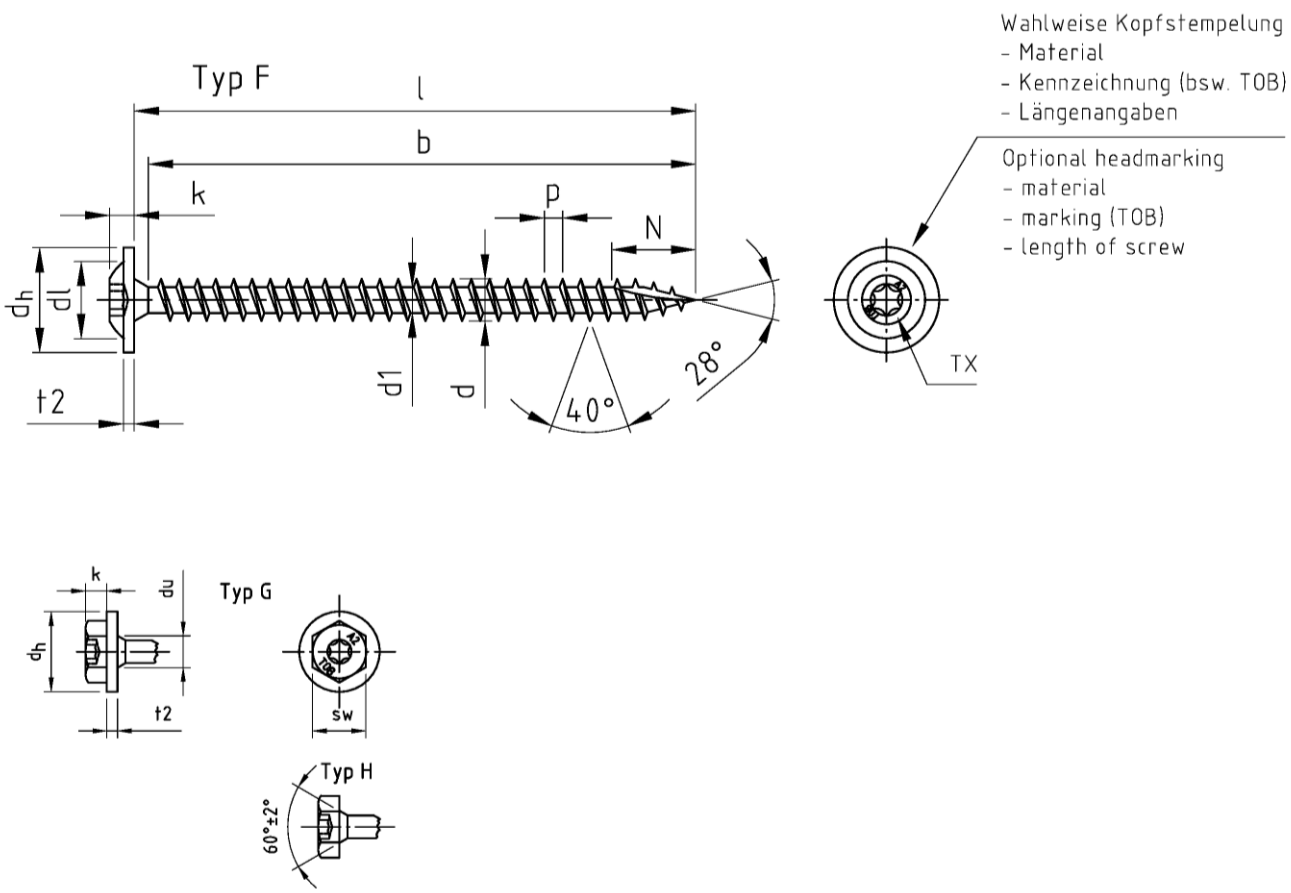
l –1/2 IT17	10	12	16	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160	180–300	300–375
ø 3,0 b ±1	–	–	–	–	18	18	24	24	30	30	–	–	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	–	–	–	–	18	18	24	24	30	30	36	36	–	–	–	–	–	–	–	–	–
ø 3,5 b ±1	–	–	–	–	18	18	24	24	30	30	36	–	–	–	–	–	–	–	–	–	–
ø 4,0 b ±1	–	–	–	–	18	18	24	24	30	30	36	36	36	42	–	–	–	–	–	–	–
ø 4,5 b ±1	–	–	–	–	–	18	24	24	30	30	36	36	36	42	48	48	–	–	–	–	–
ø 5,0 b ±1	–	–	–	–	–	20	24	24	30	30	36	36	36	42	48	48	54	60	–	–	–
ø 6,0 b ±1	–	–	–	–	–	–	24	24	30	30	36	36	36	42	48	48	54	70	70	70	–
ø 8,0 b ±1	–	–	–	–	–	–	–	32	37	47	50	50	50	50	50	72	80	80	80	80	80
ø 10,0 b ±1	–	–	–	–	–	–	–	–	–	–	–	50	55	55	55	55	55	55	80	105	105
fh	4,0 –0,2									6,0 –0,2						12,0 –0,6					

TOB screws

TOB-HBS screws with pan washer head or hexagonal head
Partially threaded
Cutting point

Annex 4.11

Deutsches Institut für Bautechnik DIBt



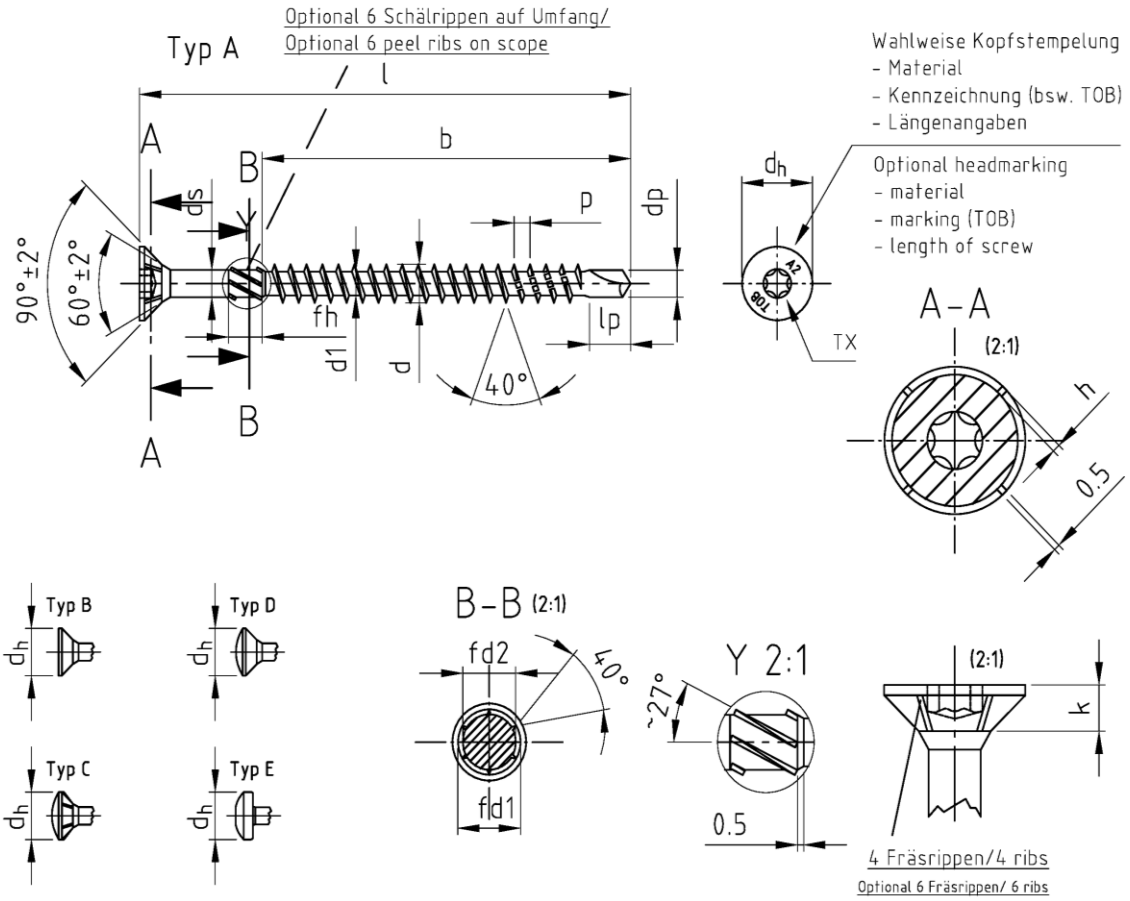
Bezeichnung	TOB–HBS/ TOB–HBS Schrauben mit Tellerkopf oder Sechskantkopf, Vollgewinde, CUT Bohrspitze									
Description	TOB–HBS/ TOB–HBS screws with pan washer head or hexagonal head with or without washer, Fully threaded, Cutting point									
Nennmaß/ Nominal dia.	d	d1	dh	dl	k	p	t2	TX	sw	N
ø 3,0	3,0 –0,15	2,0 –0,15	9,0 ±1,0	4,5	2,2 ±0,4	1,35 ±10%	1,3 –0,5	10	3	5,5 ±0,5
ø 3,2	3,2 –0,15	2,1 –0,15	10,0 ±1,0	5,0	2,5 ±0,4	1,45 ±10%	1,4 –0,5	10	4	6,5 ±0,5
ø 3,5	3,5 –0,3	2,4 –0,3	11,0 ±1,0	6,0	2,7 ±0,4	1,6 ±10%	1,5 –0,5	10/15	5	7,0 ±0,5
ø 4,0	4,0 –0,3	2,8 –0,3	12,0 ±1,0	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	15/20	6	7,5 ±0,5
ø 4,5	4,5 –0,3	2,8 –0,3	13,0 ±1,0	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	20/25	7	8,5 ±0,5
ø 5,0	5,0 –0,3	3,0 –0,3	14,0 ±1,0	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	20/25	8	9,5 ±0,5
ø 6,0	6,0 –0,3	3,7 –0,3	15,0 ±1,0	11,0	3,8 ±0,4	2,6 ±10%	2,0 –0,5	25/30	10	11,0 ±1

Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≤ L ≤ Lmax sind zulässig / Others screws lenghts with Lmin ≤ L ≤ max are allowed								

TOB screws

TOB-HBS screws with pan washer head or hexagonal head
Fully threaded
Cutting point

Annex 4.12



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

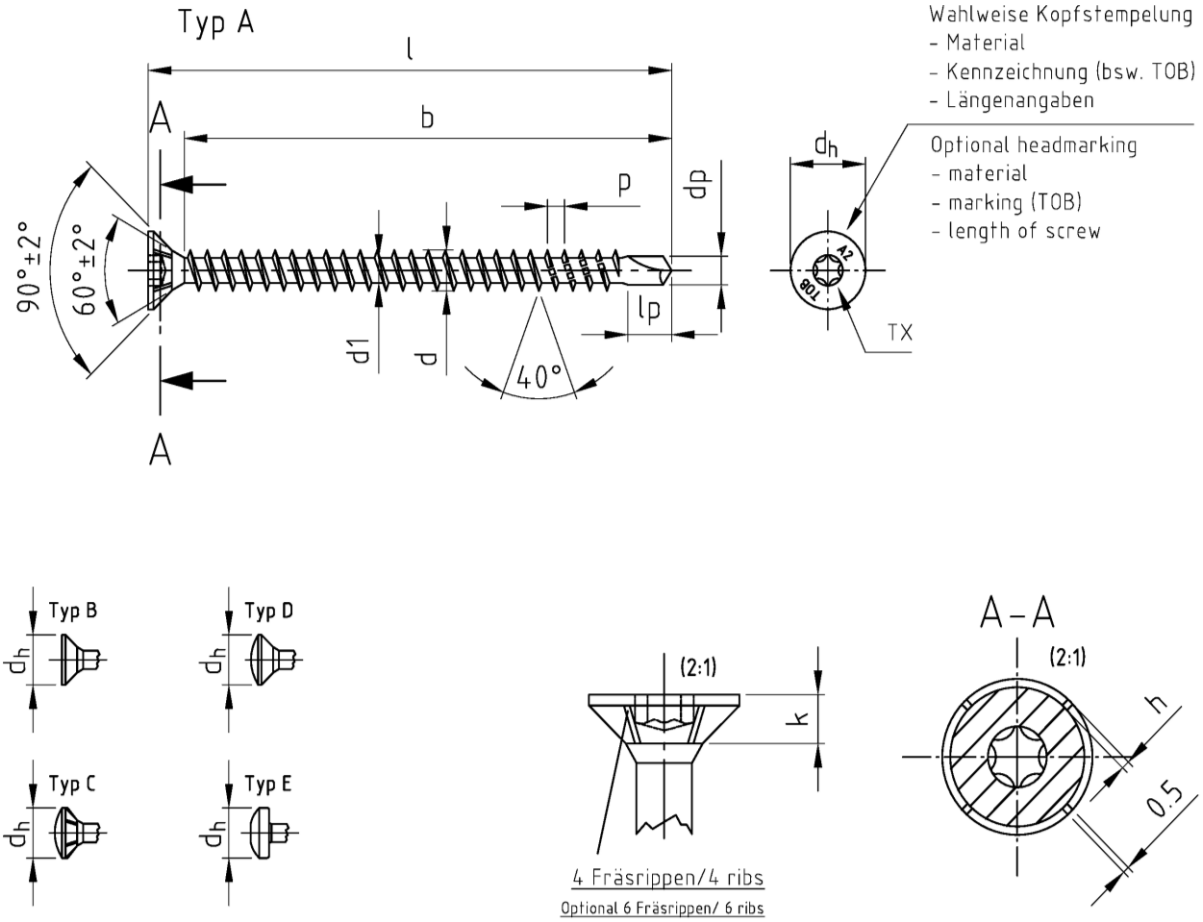
Bezeichnung	TOB–Drill/ TOB–Drill Schrauben mit Senkkopf 90°, Teilgewinde, Bohrspitze											
Description	TOB–Drill/ TOB–Drill screws with countersunk head 90°, Partially threaded, Drilling point											
Nennmaß/ Nominal dia.	d	d1	dp	dh	ds	k	p	lp	TX	h	fd1	fd2
ø 3,0	3,0 –0,15	2,0 –0,15	2,3 –0,1	6,0 –0,4	2,15 ±0,05	1,9 –0,3	1,35 ±10%	3,0	10	0,3	2,90 –0,15	1,75 –0,15
ø 3,2	3,2 –0,15	2,1 –0,15	2,4 –0,4	6,5 –0,4	2,3 ±0,05	2,0 –0,3	1,45 ±10%	3,1	10	0,3	3,15 –0,15	1,85 –0,15
ø 3,5	3,5 –0,3	2,4 –0,3	2,8 –0,5	7,0 –0,4	2,5 ±0,05	2,1 –0,3	1,6 ±10%	3,5	10/15	0,3	3,45 –0,25	2,4 –0,15
ø 4,0	4,0 –0,3	2,6 –0,3	3,0 –0,5	8,0 –0,5	2,84 ±0,05	2,5 –0,4	1,8 ±10%	3,7	15/20	0,5	3,70 –0,25	2,7 –0,15
ø 4,5	4,5 –0,3	2,8 –0,3	3,3 –0,5	9,0 –0,5	3,11 ±0,05	2,7 –0,4	2,0 ±10%	4,7	20/25	0,5	3,95 –0,25	2,9 –0,15
ø 5,0	5,0 –0,3	3,0 –0,3	3,6 –0,5	10,0 –0,5	3,54 ±0,05	3,0 –0,5	2,2 ±10%	5,2	20/25	0,5	4,2 –0,3	3,5 –0,15
ø 6,0	6,0 –0,3	3,7 –0,3	4,4 –0,6	12,0 –0,5	4,25 ±0,05	3,6 –0,5	2,6 ±10%	5,8	25/30	0,5	5,1 –0,3	4,3 –0,25

l –1/2 IT17	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160
ø 3,0 b ±1	18	24	24	30	30	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	24	24	30	30	35	35	–	–	–	–	–	–	–
ø 3,5 b ±1	18	24	24	30	30	35	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	24	24	30	30	36	36	42	42	48	54	60	60	70
ø 4,5 b ±1	18	24	24	30	30	36	36	42	42	48	54	54	60	70
ø 5,0 b ±1	–	24	24	30	30	36	36	42	42	48	54	54	60	70
ø 6,0 b ±1	–	24	24	30	30	36	36	42	42	48	54	54	60	70
fh	4,0 –0,2				6,0 –0,2						12,0 –0,6			

TOB screws

TOB-Drill screws with countersunk head 90°
Partially threaded
Drilling point

Annex 4.13



Bezeichnung	TOB–Drill/ TOB–Drill Schrauben mit Senkkopf 90°, Vollgewinde, Bohrspitze								
Description	TOB–Drill/ TOB–Drill screws with countersunk head 90°, Fully threaded, Drilling point								
Nennmaß/ Nominal dia.	d	d1	dp	dh	k	p	lp	TX	h
ø 3,0	3,0 –0,15	2,0 –0,15	2,3 –0,1	6,0 –0,4	1,9 –0,3	1,35 ±10%	3,0	10	0,3
ø 3,2	3,2 –0,15	2,1 –0,15	2,4 –0,4	6,5 –0,4	2,0 –0,3	1,45 ±10%	3,1	10	0,3
ø 3,5	3,5 –0,3	2,4 –0,3	2,8 –0,5	7,0 –0,4	2,1 –0,3	1,6 ±10%	3,5	10/15	0,3
ø 4,0	4,0 –0,3	2,6 –0,3	3,0 –0,5	8,0 –0,5	2,5 –0,4	1,8 ±10%	3,7	15/20	0,5
ø 4,5	4,5 –0,3	2,8 –0,3	3,3 –0,5	9,0 –0,5	2,7 –0,4	2,0 ±10%	4,7	20/25	0,5
ø 5,0	5,0 –0,3	3,0 –0,3	3,6 –0,5	10,0 –0,5	3,0 –0,5	2,2 ±10%	5,2	20/25	0,5
ø 6,0	6,0 –0,3	3,7 –0,3	4,4 –0,6	12,0 –0,5	3,6 –0,5	2,6 ±10%	5,8	25/30	0,5

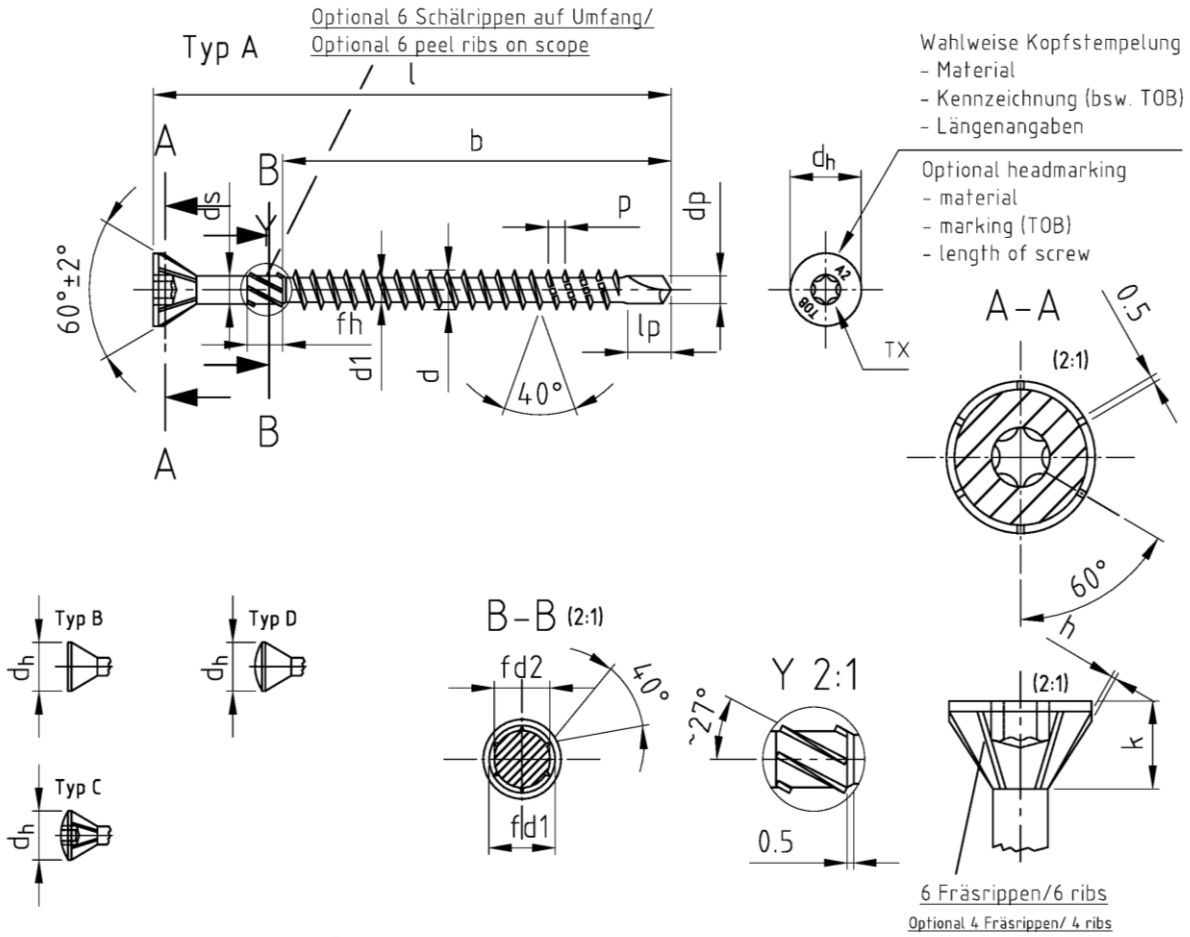
Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed								

TOB screws

TOB-Drill screws with countersunk head 90°
Fully threaded
Drilling point

Annex 4.14

Deutsches Institut für Bautechnik DIBt



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Drill–60°/ TOB–Drill Schrauben mit Senkkopf 60°, Teilgewinde, Bohrspitze											
Description	TOB–Drill–60°/ TOB–Drill screws with countersunk head 60°, Partially threaded, Drilling point											
Nennmaß/ Nominal dia.	d	d1	dp	dh	ds	k	p	lp	TX	h	fd1	fd2
ø 3,0	3,0 –0,15	2,0 –0,15	2,3 –0,1	4,5 ±0,5	2,15 ±0,05	1,8 ±0,5	1,35 ±10%	3,0	10	0,3	2,90 –0,15	1,75 –0,15
ø 3,2	3,2 –0,15	2,1 –0,15	2,4 –0,4	5,0 ±0,5	2,3 ±0,05	2,0 ±0,5	1,45 ±10%	3,1	10	0,3	3,15 –0,15	1,85 –0,15
ø 3,5	3,5 –0,3	2,4 –0,3	2,8 –0,5	5,5 ±0,5	2,5 ±0,05	2,2 ±0,5	1,6 ±10%	3,5	10	0,3	3,45 –0,25	2,4 –0,15
ø 4,0	4,0 –0,3	2,6 –0,3	3,0 –0,5	6,0 ±0,5	2,84 ±0,05	2,75 ±0,5	1,8 ±10%	3,7	15/20	0,5	3,70 –0,25	2,7 –0,15
ø 4,5	4,5 –0,3	2,8 –0,3	3,3 –0,5	7,0 ±0,5	3,11 ±0,05	3,35 ±0,5	2,0 ±10%	4,7	20/25	0,5	3,95 –0,25	2,9 –0,15
ø 5,0	5,0 –0,3	3,0 –0,3	3,6 –0,5	7,5 ±0,5	3,54 ±0,05	3,45 ±0,5	2,2 ±10%	5,2	20/25	0,5	4,2 –0,3	3,5 –0,15
ø 6,0	6,0 –0,3	3,7 –0,3	4,4 –0,6	11,0 ±0,5	4,25 ±0,05	5,85 ±0,5	2,6 ±10%	5,8	25/30	0,5	5,1 –0,3	4,3 –0,25

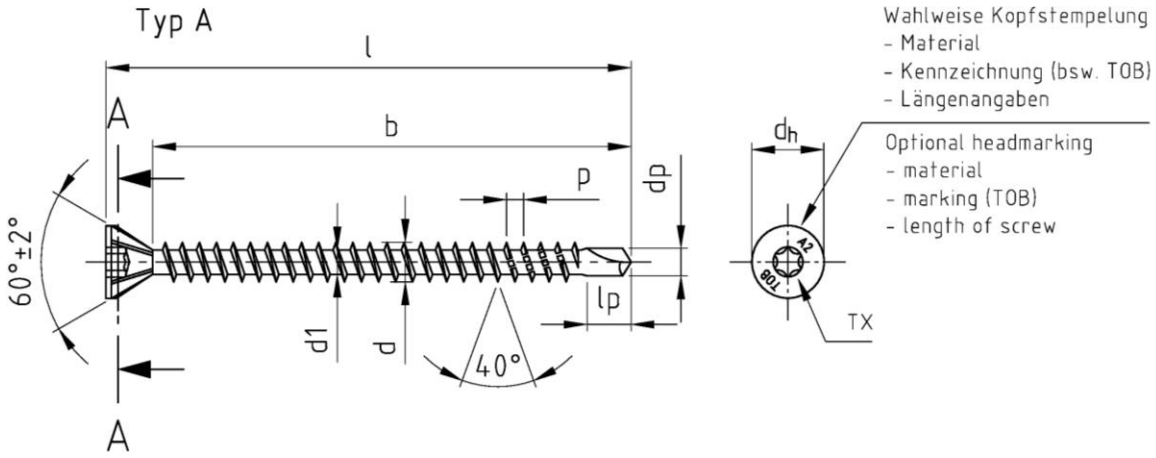
l –1/2 IT17	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160
ø 3,0 b ±1	18	24	24	30	30	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	24	24	30	30	35	35	–	–	–	–	–	–	–
ø 3,5 b ±1	18	24	24	30	30	35	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	24	24	30	30	36	36	42	42	48	54	–	–	–
ø 4,5 b ±1	18	24	24	30	30	36	36	42	42	48	54	54	60	70
ø 5,0 b ±1	–	24	24	30	30	36	36	42	42	48	54	54	60	70
ø 6,0 b ±1	–	24	24	30	30	36	36	42	42	48	54	54	60	70
fh	4,0 –0,2				6,0 –0,2						12,0 –0,6			

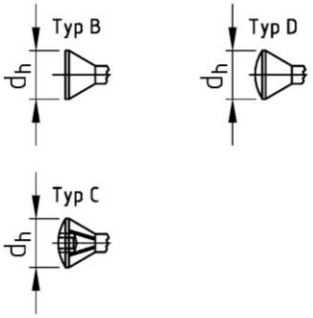
TOB screws

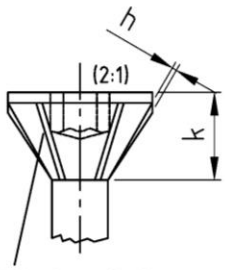
TOB-Drill screws with countersunk head 60°
Partially threaded
Drilling point

Annex 4.15

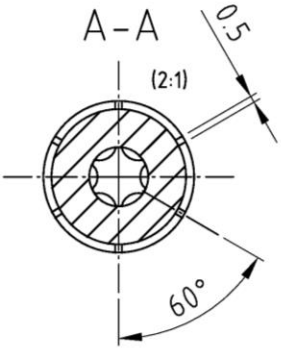
Deutsches Institut für Bautechnik DIBt







6 Fräsrippen/6 ribs
Optional 4 Fräsrippen/ 4 ribs



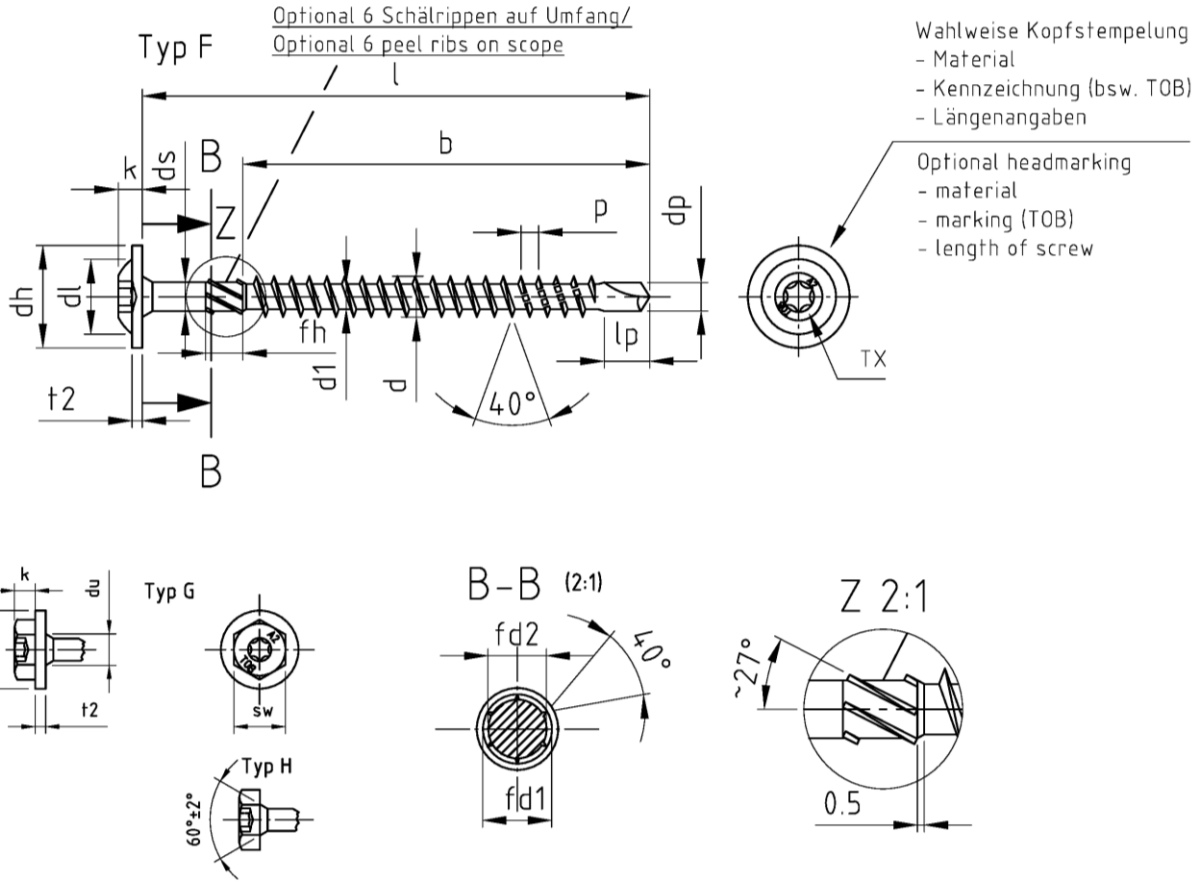
Bezeichnung	TOB–Drill–60°/ TOB–Drill Schrauben mit Senkkopf 60°, Vollgewinde, Bohrspitze								
Description	TOB–Drill–60°/ TOB–Drill screws with countersunk head 60°, Fully threaded, Drilling point								
Nennmaß/ Nominal dia.	d	d1	dp	dh	k	p	lp	TX	h
ø 3,0	3,0 –0,15	2,0 –0,15	2,3 –0,1	4,5 ±0,5	1,8 ±0,5	1,35 ±10%	3,0	10	0,3
ø 3,2	3,2 –0,15	2,1 –0,15	2,4 –0,4	5,0 ±0,5	2,0 ±0,5	1,45 ±10%	3,1	10	0,3
ø 3,5	3,5 –0,3	2,4 –0,3	2,8 –0,5	5,5 ±0,5	2,2 ±0,5	1,6 ±10%	3,5	10	0,3
ø 4,0	4,0 –0,3	2,6 –0,3	3,0 –0,5	6,0 ±0,5	2,75 ±0,5	1,8 ±10%	3,7	15/20	0,5
ø 4,5	4,5 –0,3	2,8 –0,3	3,3 –0,5	7,0 ±0,5	3,35 ±0,5	2,0 ±10%	4,7	20/25	0,5
ø 5,0	5,0 –0,3	3,0 –0,3	3,6 –0,5	7,5 ±0,5	3,45 ±0,5	2,2 ±10%	5,2	20/25	0,5
ø 6,0	6,0 –0,3	3,7 –0,3	4,4 –0,6	11,0 ±0,5	5,85 ±0,5	2,6 ±10%	5,8	25/30	0,5

Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed								

TOB screws

TOB-Drill screws with countersunk head 60°
Fully threaded
Drilling point

Annex 4.16



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Drill/ TOB–Drill Schrauben mit Tellerkopf oder Sechskantkopf, Teilgewinde, Bohrspitze													
Description	TOB–Drill/ TOB–Drill screws with pan washer head or hexagonal head, Partially threaded, Drilling point													
Nennmaß/ Nominal dia.	d	d1	dp	dh	ds	dl	k	p	t2	lp	TX	sw	fd1	fd2
ø 3,0	3,0 –0,15	2,0 –0,15	2,3 –0,1	9,0 ±1,0	2,15 ±0,05	4,5	2,2 ±0,4	1,35 ±10%	1,3 –0,5	3,0	10	3	2,90 –0,15	1,75 –0,15
ø 3,2	3,2 –0,15	2,1 –0,15	2,4 –0,4	10,0 ±1,0	2,3 ±0,05	5,0	2,5 ±0,4	1,45 ±10%	1,4 –0,5	3,1	10	4	3,15 –0,15	1,85 –0,15
ø 3,5	3,5 –0,3	2,4 –0,3	2,8 –0,5	11,0 ±1,0	2,5 ±0,05	6,0	2,7 ±0,4	1,6 ±10%	1,5 –0,5	3,5	10/15	5	3,45 –0,25	2,4 –0,15
ø 4,0	4,0 –0,3	2,6 –0,3	3,0 –0,5	12,0 ±1,0	2,84 ±0,05	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	3,7	15/20	6	3,70 –0,25	2,7 –0,15
ø 4,5	4,5 –0,3	2,8 –0,3	3,3 –0,5	13,0 ±1,0	3,11 ±0,05	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	4,7	20/25	7	3,95 –0,25	2,9 –0,15
ø 5,0	5,0 –0,3	3,0 –0,3	3,6 –0,5	14,0 ±1,0	3,54 ±0,05	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	5,2	20/25	8	4,2 –0,3	3,5 –0,15
ø 6,0	6,0 –0,3	3,7 –0,3	4,4 –0,6	15,0 ±1,0	4,25 ±0,05	11,0	3,8 ±0,4	2,6 ±10%	2,0 –0,5	5,8	25/30	10	5,1 –0,3	4,3 –0,25

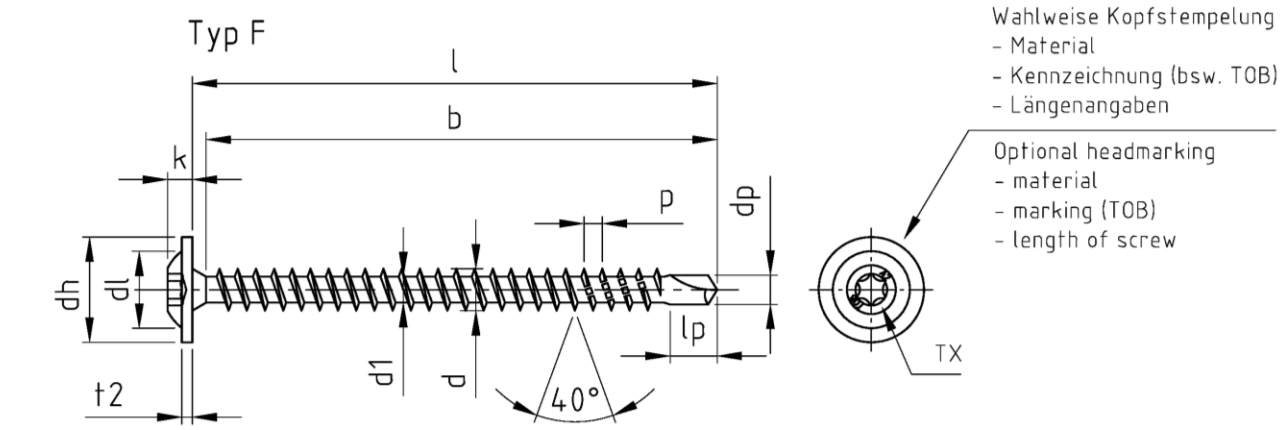
l –1/2 IT17	30	35	40	45	50	55	60	65	70	75	80	90	100	120–160
ø 3,0 b ±1	18	24	24	30	30	–	–	–	–	–	–	–	–	–
ø 3,2 b ±1	18	24	24	30	30	35	35	–	–	–	–	–	–	–
ø 3,5 b ±1	18	24	24	30	30	35	–	–	–	–	–	–	–	–
ø 4,0 b ±1	18	24	24	30	30	36	36	42	42	48	54	–	–	–
ø 4,5 b ±1	18	24	24	30	30	36	36	42	42	48	54	54	60	70
ø 5,0 b ±1	–	24	24	30	30	36	36	42	42	48	54	54	60	70
ø 6,0 b ±1	–	24	24	30	30	36	36	42	42	48	54	54	60	70
fh	4,0 –0,2				6,0 –0,2						12,0 –0,6			

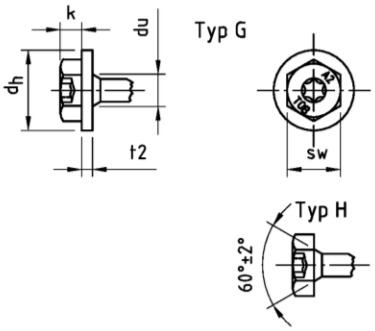
TOB screws

TOB-Drill screws with pan washer or hexagonal head
Partially threaded
Drilling point

Annex 4.17

Deutsches Institut für Bautechnik DIBt





Bezeichnung	TOB–Drill/ TOB–Drill Schrauben mit Tellerkopf oder Sechskantkopf, Vollgewinde, Bohrspitze										
Description	TOB–Drill/ TOB–Drill screws with pan washer head or hexagonal head, Fully threaded, Drilling point										
Nennmaß/ Nominal dia.	d	d1	dp	dh	dl	k	p	t2	lp	TX	sw
ø 3,0	3,0 –0,15	2,0 –0,15	2,3 –0,1	9,0 ±1,0	4,5	2,2 ±0,4	1,35 ±10%	1,3 –0,5	3,0	10	3
ø 3,2	3,2 –0,15	2,1 –0,15	2,4 –0,4	10,0 ±1,0	5,0	2,5 ±0,4	1,45 ±10%	1,4 –0,5	3,1	10	4
ø 3,5	3,5 –0,3	2,4 –0,3	2,8 –0,5	11,0 ±1,0	6,0	2,7 ±0,4	1,6 ±10%	1,5 –0,5	3,5	10/15	5
ø 4,0	4,0 –0,3	2,6 –0,3	3,0 –0,5	12,0 ±1,0	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	3,7	15/20	6
ø 4,5	4,5 –0,3	2,8 –0,3	3,3 –0,5	13,0 ±1,0	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	4,7	20/25	7
ø 5,0	5,0 –0,3	3,0 –0,3	3,6 –0,5	14,0 ±1,0	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	5,2	20/25	8
ø 6,0	6,0 –0,3	3,7 –0,3	4,4 –0,6	15,0 ±1,0	11,0	3,8 ±0,4	2,6 ±10%	2,0 –0,5	5,8	25/30	10

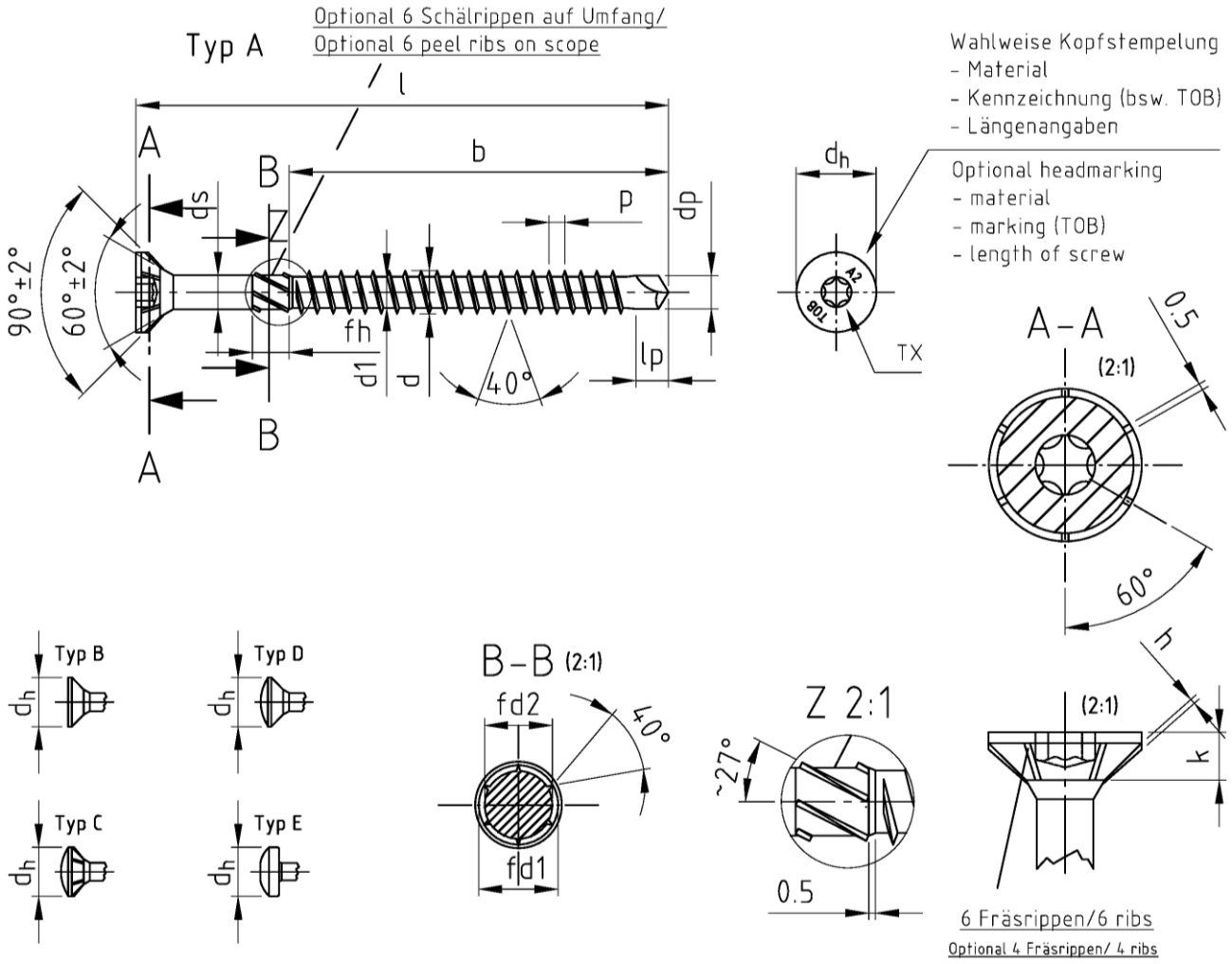
Nennmaß/ Nominal dia.		ø 3,0	ø 3,2	ø 3,5	ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		18	19	19	23	23	28	36
l max. ±1		35	40	40	70	70	90	110
b ±1	min. /+ k	16	16	16	20	25	25	30
	max. /+ k	30	36	36	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed								

TOB screws

TOB-Drill screws with pan washer head or hexagonal head
Fully threaded
Drilling point

Annex 4.18

Deutsches Institut für Bautechnik DIBt



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Senkkopf 90°, Teilgewinde, Bohrspitze											
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with countersunk head 90°, Partially threaded, Drilling point											
Nennmaß/ Nominal dia.	d	d1	dp	dh	ds	k	p	lp	TX	h	fd1	fd2
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	3,0 ±0,15	8,0 –0,5	3,2 ±0,05	2,5 –0,4	1,8 ±10%	3,5 ±0,2	15/20	0,35 ±0,1	4,06 –0,25	3,2 –0,15
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	3,4 ±0,15	9,0 –0,5	3,5 ±0,05	2,7 –0,4	2,0 ±10%	3,7 ±0,2	20/25	0,40 ±0,1	4,36 –0,3	3,5 –0,15
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	4,0 ±0,15	10,0 –0,5	4,1 ±0,05	3,0 –0,5	2,2 ±10%	4,5 ±0,2	20/25	0,45 ±0,1	5,06 –0,3	4,1 –0,25
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	5,0 ±0,15	12,0 –0,5	5,1 ±0,05	3,6 –0,5	2,4 ±10%	4,9 ±0,2	25/30	0,50 ±0,1	5,98 –0,3	5,1 –0,25

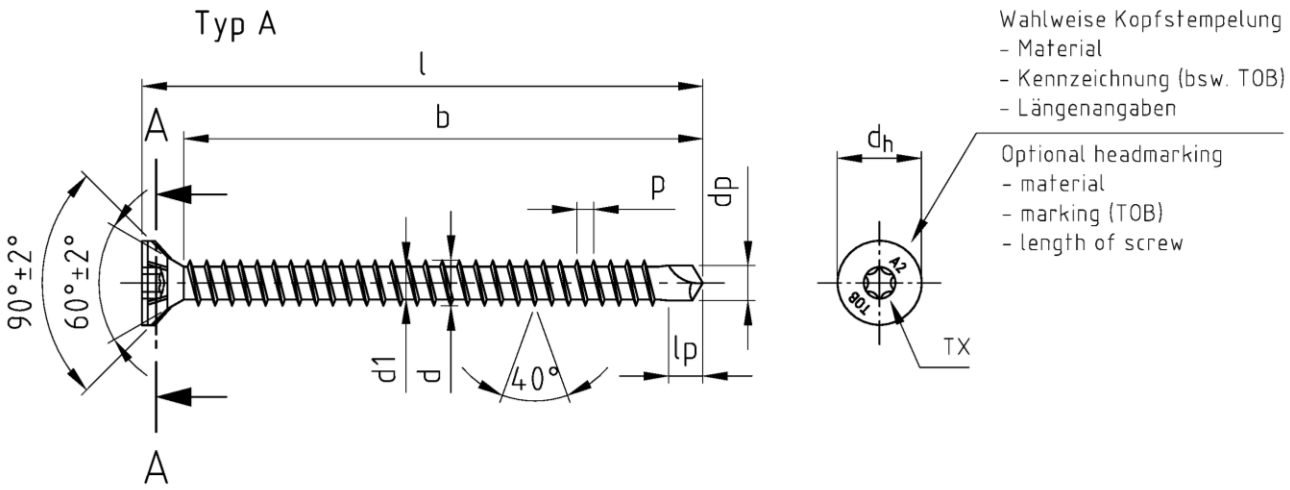
l –1/2 IT17	30	35	40	45	50	60	70	80	90	100	120	140	160
ø 4,0 b ±1	21	26	26	28	33	40	–	–	–	–	–	–	–
ø 4,5 b ±1	–	26	26	31	33	40	50	50	–	–	–	–	–
ø 5,0 b ±1	–	–	26	30	36	40	50	50	58	58	–	–	–
ø 6,0 b ±1	–	–	–	–	30	35	47	57	57	66	66	66	66
fh	4,0 –0,2				6,0 –0,2			12,0 –0,6					

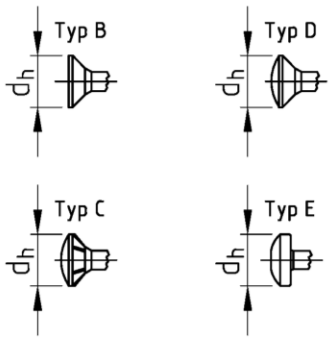
TOB screws

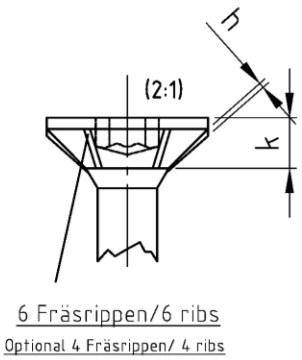
TOB-Fast-Drill screws with countersunk head 90°
Partially threaded
Drilling point

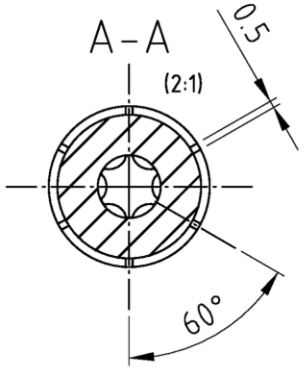
Annex 4.19

Deutsches Institut für Bautechnik DIBt









Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Senkkopf 90°, Vollgewinde, Bohrspitze								
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with countersunk head 90°, Fully threaded, Drilling point								
Nennmaß/ Nominal dia.	d	d1	dp	dh	k	p	lp	TX	h
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	3,0 ±0,15	8,0 –0,5	2,5 –0,4	1,8 ±10%	3,5 ±0,2	15/20	0,35 ±0,1
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	3,4 ±0,15	9,0 –0,5	2,7 –0,4	2,0 ±10%	3,7 ±0,2	20/25	0,40 ±0,1
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	4,0 ±0,15	10,0 –0,5	3,0 –0,5	2,2 ±10%	4,5 ±0,2	20/25	0,45 ±0,1
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	5,0 ±0,15	12,0 –0,5	3,6 –0,5	2,4 ±10%	4,9 ±0,2	25/30	0,50 ±0,1

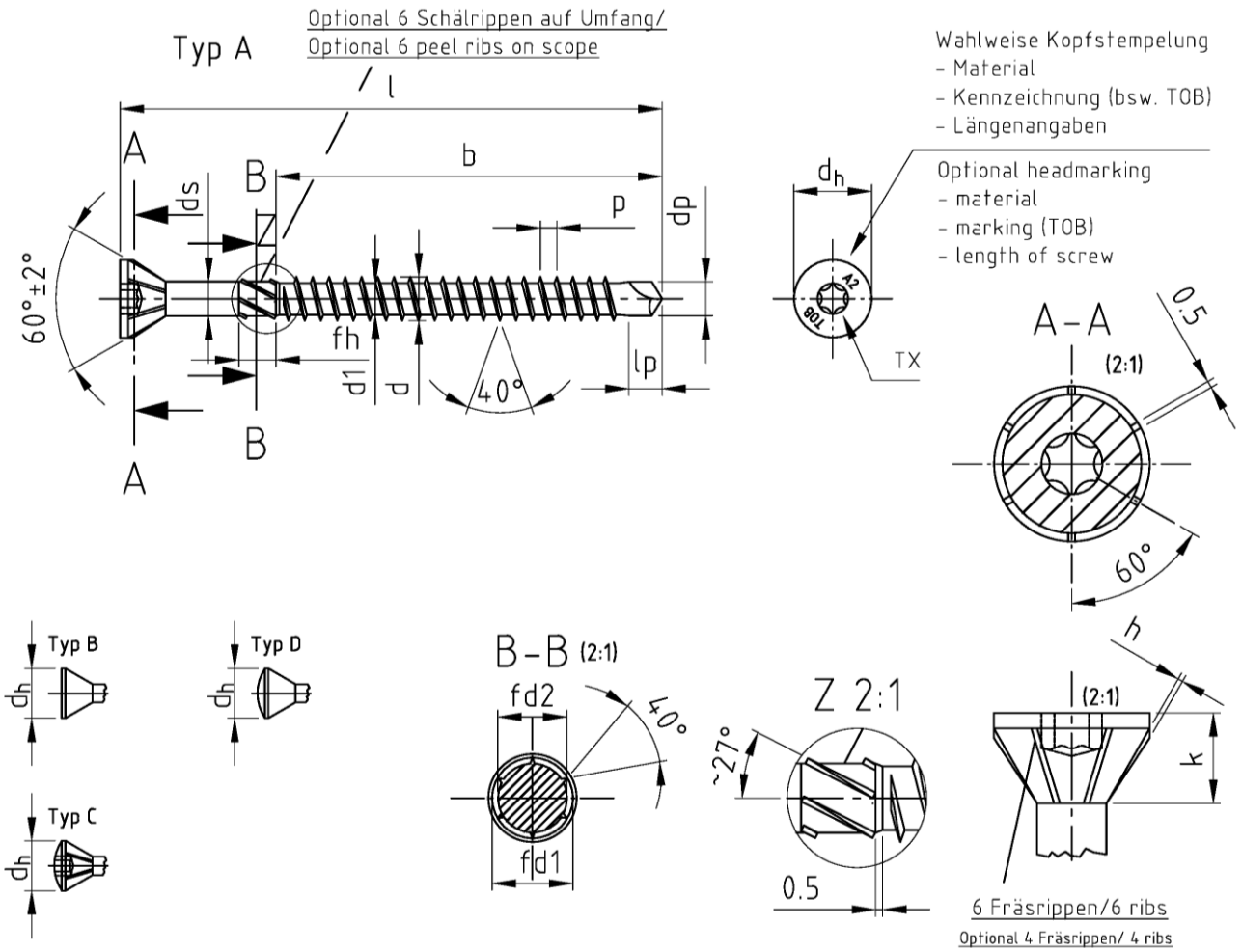
Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		23	23	28	36
l max. ±1		70	70	90	110
b ±1	min. /+ k	20	25	25	30
	max. /+ k	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed					

TOB screws

TOB-Fast-Drill screws with countersunk head 90°
Fully threaded
Drilling point

Annex 4.20

Deutsches Institut für Bautechnik DIBt



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB-Fast-Drill 60°/ TOB-Fast-Drill Schrauben mit Senkkopf 60°, Teilgewinde, Bohrspitze											
Description	TOB-Fast-Drill 60°/ TOB-Fast-Drill screws with countersunk head 60°, Partially threaded, Drilling point											
Nennmaß/ Nominal dia.	d	d1	dp	dh	ds	k	p	lp	TX	h	fd1	fd2
ø 4,0	4,1 +0,2/−0,1	3,0 ±0,1	3,0 ±0,15	7,0 −0,5	3,2 ±0,05	3,3 ±0,5	1,8 ±10%	3,5 ±0,2	15/20	0,35 ±0,1	4,06 −0,25	3,2 −0,15
ø 4,5	4,6 +0,2/−0,1	3,3 ±0,1	3,4 ±0,15	8,0 −0,5	3,5 ±0,05	3,9 ±0,5	2,0 ±10%	3,7 ±0,2	20/25	0,40 ±0,1	4,36 −0,3	3,5 −0,15
ø 5,0	5,3 +0,2/−0,1	3,7 ±0,1	4,0 ±0,15	8,5 −0,5	4,1 ±0,05	4,0 ±0,5	2,2 ±10%	4,5 ±0,2	20/25	0,45 ±0,1	5,06 −0,3	4,1 −0,25
ø 6,0	6,5 +0,2/−0,1	4,7 ±0,1	5,0 ±0,15	11,0 −0,5	5,1 ±0,05	5,1 ±0,5	2,4 ±10%	4,9 ±0,2	25/30	0,50 ±0,1	5,96 −0,3	5,1 −0,25

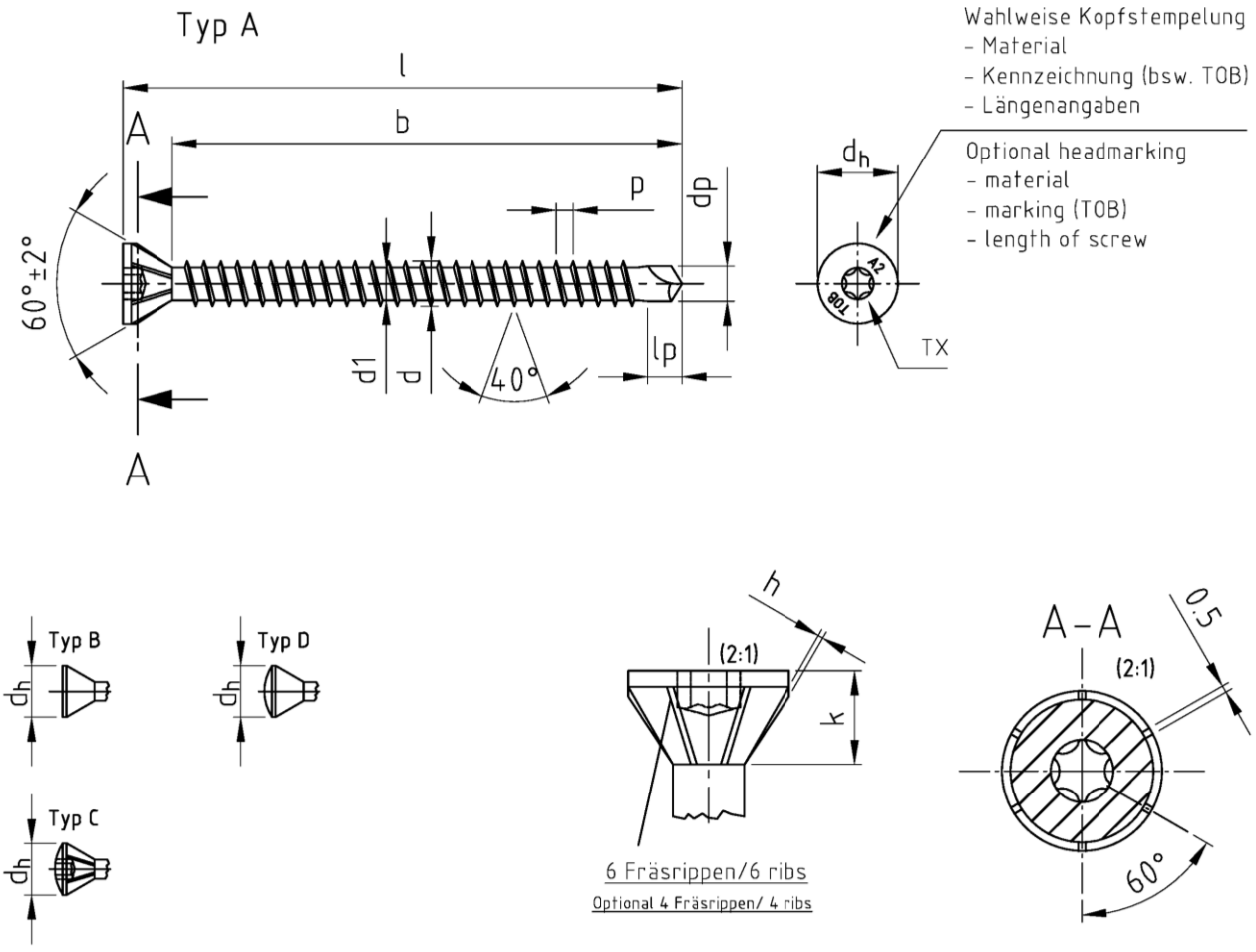
l −1/2 IT17	30	35	40	45	50	60	70	80	90	100	120	140	160
ø 4,0 b ±1	21	26	26	28	33	40	–	–	–	–	–	–	–
ø 4,5 b ±1	–	26	26	31	33	40	50	50	–	–	–	–	–
ø 5,0 b ±1	–	–	26	30	36	40	50	50	58	58	–	–	–
ø 6,0 b ±1	–	–	–	–	30	35	47	57	57	66	66	66	66
fh	4,0 −0,2				6,0 −0,2			12,0 −0,6					

TOB screws

TOB-Fast-Drill screws with countersunk head 60°
Partially threaded
Drilling point

Annex 4.21

Deutsches Institut für Bautechnik DIBt



Bezeichnung	TOB–Fast–Drill 60°/ TOB–Fast–Drill Schrauben mit Senkkopf 60°, Vollgewinde, Bohrspitze								
Description	TOB–Fast–Drill 60°/ TOB–Fast–Drill screws with countersunk head 60°, Fully threaded, Drilling point								
Nennmaß/ Nominal dia.	d	d1	dp	dh	k	p	lp	TX	h
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	3,0 ±0,15	7,0 –0,5	3,3 ±0,5	1,8 ±10%	3,5 ±0,2	15/20	0,35 ±0,1
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	3,4 ±0,15	8,0 –0,5	3,9 ±0,5	2,0 ±10%	3,7 ±0,2	20/25	0,40 ±0,1
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	4,0 ±0,15	8,5 –0,5	4,0 ±0,5	2,2 ±10%	4,5 ±0,2	20/25	0,45 ±0,1
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	5,0 ±0,15	11,0 –0,5	5,1 ±0,5	2,4 ±10%	4,9 ±0,2	25/30	0,50 ±0,1

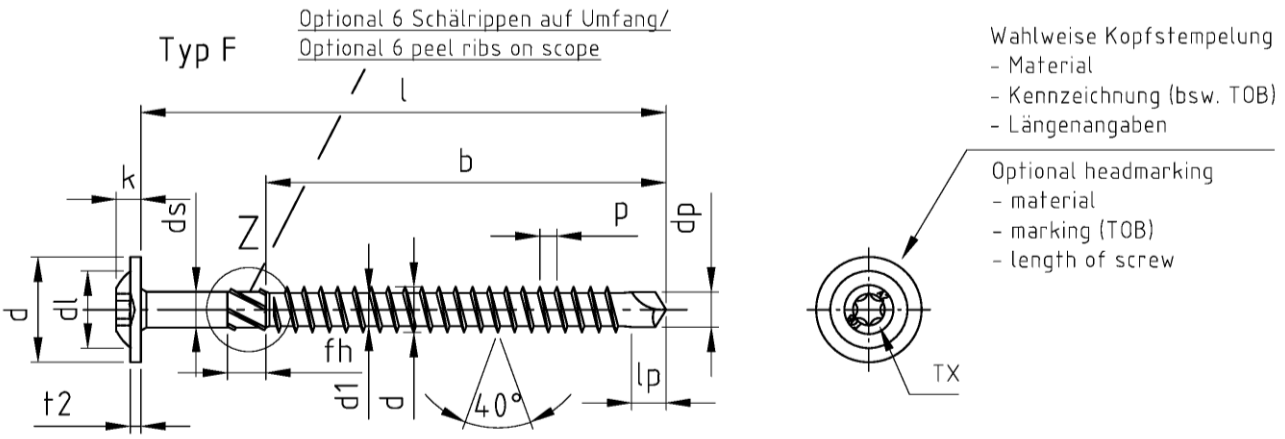
Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		23	23	28	36
l max. ±1		70	70	90	110
b ±1	min. /+ k	20	25	25	30
	max. /+ k	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed					

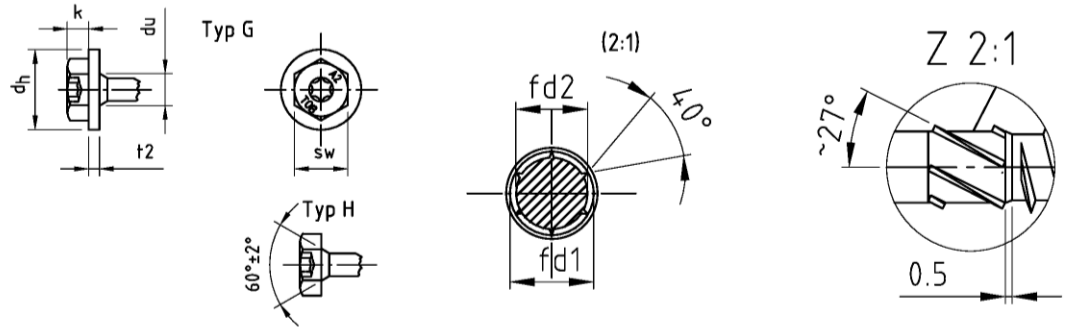
TOB screws

TOB-Fast-Drill screws with countersunk head 60°
Fully threaded
Drilling point

Annex 4.22

Deutsches Institut für Bautechnik DIBt





Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Tellerkopf oder Sechskantkopf, Teilgewinde, Bohrspitze													
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with pan washer head or hexagonal head, Partially threaded, Drilling point													
Nennmaß/ Nominal dia.	d	d1	dp	dh	ds	dl	k	p	t2	lp	TX	sw	fd1	fd2
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	3,0 ±0,15	12,0 ±1,0	3,2 ±0,05	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	3,5 ±0,2	15/20	6	4,06 –0,25	3,2 –0,15
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	3,4 ±0,15	13,0 ±1,0	3,5 ±0,05	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	3,7 ±0,2	20/25	7	4,36 –0,3	3,5 –0,15
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	4,0 ±0,15	14,0 ±1,0	4,1 ±0,05	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	4,5 ±0,2	20/25	8	5,06 –0,3	4,1 –0,25
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	5,0 ±0,15	15,0 ±1,0	5,1 ±0,05	11,0	3,8 ±0,4	2,4 ±10%	2,0 –0,5	4,9 ±0,2	25/30	10	5,96 –0,3	5,1 –0,25

l –1/2 IT17	30	35	40	45	50	60	70	80	90	100	120	140	160
ø 4,0 b ±1	21	26	26	28	33	40	–	–	–	–	–	–	–
ø 4,5 b ±1	–	26	26	31	33	40	50	50	–	–	–	–	–
ø 5,0 b ±1	–	–	26	30	36	40	50	50	58	58	–	–	–
ø 6,0 b ±1	–	–	–	–	30	35	47	57	57	66	66	66	66
fh	4,0 –0,2				6,0 –0,2			12,0 –0,6					

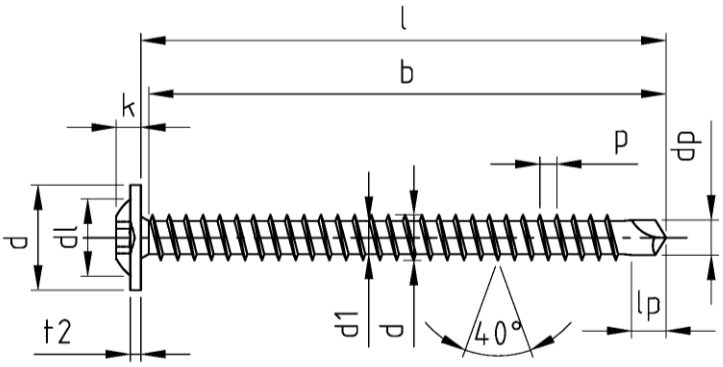
TOB screws

TOB-Fast-Drill screws with pan washer head or hexagonal head
Partially threaded
Drilling point

Annex 4.23

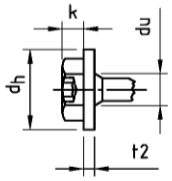
Deutsches Institut für Bautechnik DIBt

Typ F

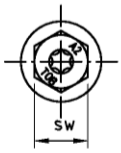


Wahlweise Kopfstempelung
- Material
- Kennzeichnung (bsw. TOB)
- Längenangaben

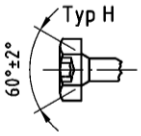
Optional headmarking
- material
- marking (TOB)
- length of screw



Typ G



Typ H



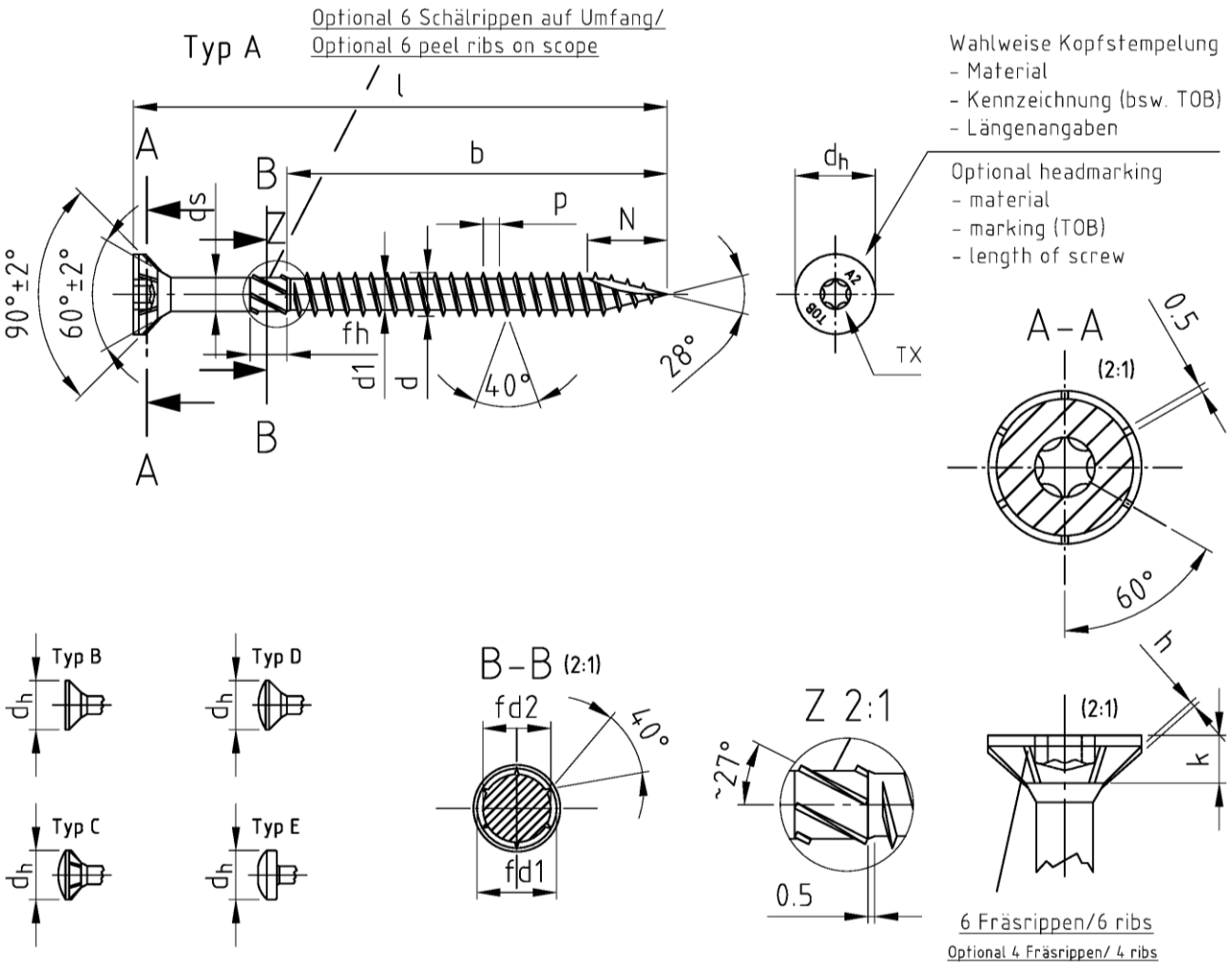
Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Tellerkopf oder Sechskantkopf, Vollgewinde, Bohrspitze										
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with pan washer head or hexagonal head, Fully threaded, Drilling point										
Nennmaß/ Nominal dia.	d	d1	dp	dh	dl	k	p	t2	lp	TX	sw
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	3,0 ±0,15	12,0 ±1,0	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	3,5 ±0,2	15/20	6
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	3,4 ±0,15	13,0 ±1,0	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	3,7 ±0,2	20/25	7
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	4,0 ±0,15	14,0 ±1,0	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	4,5 ±0,2	20/25	8
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	5,0 ±0,15	15,0 ±1,0	11,0	3,8 ±0,4	2,4 ±10%	2,0 –0,5	4,9 ±0,2	25/30	10

Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		23	23	28	36
l max. ±1		70	70	90	110
b ±1	min. /+ k	20	25	25	30
	max. /+ k	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed					

TOB screws

TOB-Fast-Drill screws with pan washer head or hexagonal head
Fully threaded
Drilling point

Annex 4.24



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Senkkopf 90°, Teilgewinde, CUT Bohrspitze										
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with countersunk head 90°, Partially threaded, Cutting point										
Nennmaß/ Nominal dia.	d	d1	dh	ds	k	p	TX	h	fd1	fd2	N
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	8,0 –0,5	3,2 ±0,05	2,5 –0,4	1,8 ±10%	15/20	0,35 ±0,1	4,06 –0,25	3,2 –0,15	7,5 ±0,5
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	9,0 –0,5	3,5 ±0,05	2,7 –0,4	2,0 ±10%	20/25	0,40 ±0,1	4,36 –0,3	3,5 –0,15	8,5 ±0,5
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	10,0 –0,5	4,1 ±0,05	3,0 –0,5	2,2 ±10%	20/25	0,45 ±0,1	5,06 –0,3	4,1 –0,25	9,5 ±0,5
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	12,0 –0,5	5,1 ±0,05	3,6 –0,5	2,4 ±10%	25/30	0,50 ±0,1	5,96 –0,3	5,1 –0,25	11,0 ±1,0

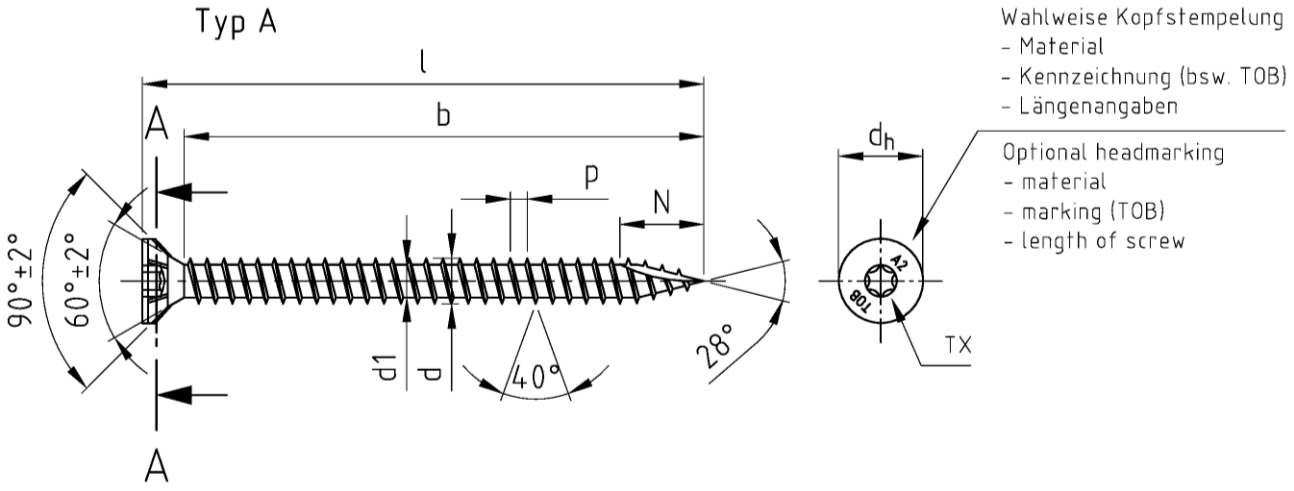
l –1/2 IT17	30	35	40	45	50	60	70	80	90	100	120	140	160
ø 4,0 b ±1	21	26	26	28	33	40	–	–	–	–	–	–	–
ø 4,5 b ±1	–	26	26	31	33	40	50	50	–	–	–	–	–
ø 5,0 b ±1	–	–	26	30	36	40	50	50	58	58	–	–	–
ø 6,0 b ±1	–	–	–	–	30	35	47	57	57	66	66	66	66
fh	4,0 –0,2				6,0 –0,2			12,0 –0,6					

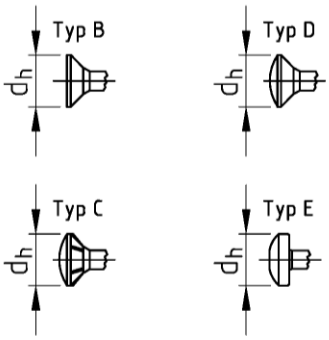
TOB screws

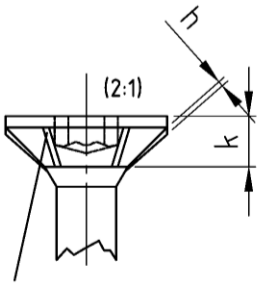
TOB-Fast-Drill screws with countersunk head 90°
Partially threaded
Cutting point

Annex 4.25

Deutsches Institut für Bautechnik DIBt

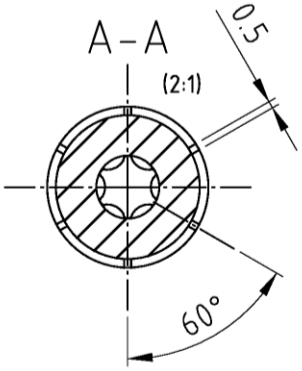






6 Fräsrippen/6 ribs

Optional 4 Fräsrippen/ 4 ribs



Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Senkkopf 90°, Vollgewinde, CUT Bohrspitze							
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with countersunk head 90°, Fully threaded, Cutting point							
Nennmaß/ Nominal dia.	d	d1	dh	k	p	TX	h	N
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	8,0 –0,5	2,5 –0,4	1,8 ±10%	15/20	0,35 ±0,1	7,5 ±0,5
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	9,0 –0,5	2,7 –0,4	2,0 ±10%	20/25	0,40 ±0,1	8,5 ±0,5
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	10,0 –0,5	3,0 –0,5	2,2 ±10%	20/25	0,45 ±0,1	9,5 ±0,5
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	12,0 –0,5	3,6 –0,5	2,4 ±10%	25/30	0,50 ±0,1	11,0 ±1,0

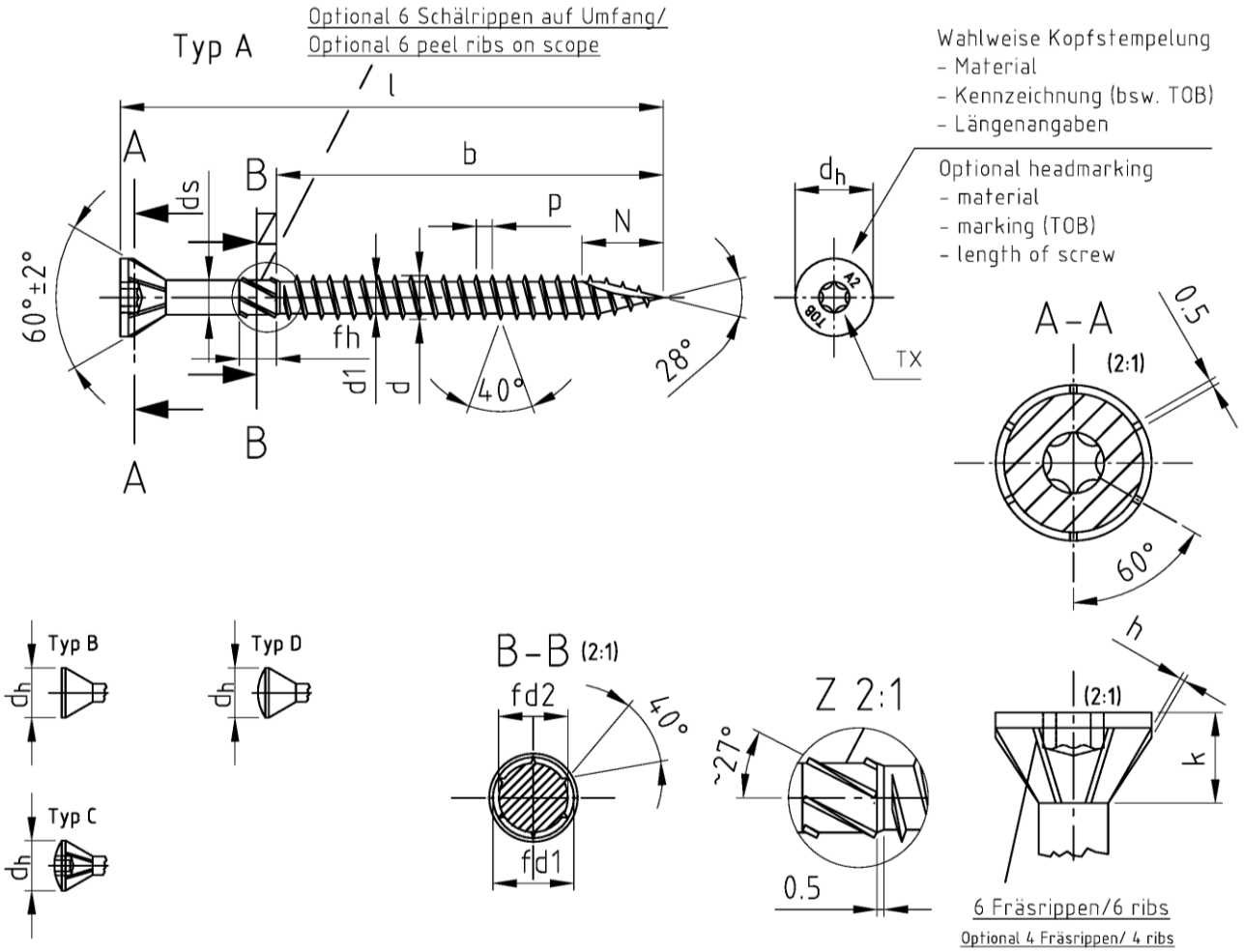
Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		23	23	28	36
l max. ±1		70	70	90	110
b ±1	min. /+ k	20	25	25	30
	max. /+ k	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed					

TOB screws

TOB-Fast-Drill screws with countersunk head 90°
Fully threaded
Cutting point

Annex 4.26

Deutsches Institut für Bautechnik DIBt



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Fast–Drill 60°/ TOB–Fast–Drill Schrauben mit Senkkopf 60°, Teilgewinde, CUT Bohrspitze										
Description	TOB–Fast–Drill 60°/ TOB–Fast–Drill screws with countersunk head 60°, Partially threaded, Cutting point										
Nennmaß/ Nominal dia.	d	d1	dh	ds	k	p	TX	h	fd1	fd2	N
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	7,0 –0,5	3,2 ±0,05	3,3 ±0,5	1,8 ±10%	15/20	0,35 ±0,1	4,06 –0,25	3,2 –0,15	7,5 ±0,5
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	8,0 –0,5	3,5 ±0,05	3,9 ±0,5	2,0 ±10%	20/25	0,40 ±0,1	4,36 –0,3	3,5 –0,15	8,5 ±0,5
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	8,5 –0,5	4,1 ±0,05	4,0 ±0,5	2,2 ±10%	20/25	0,45 ±0,1	5,06 –0,3	4,1 –0,25	9,5 ±0,5
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	11,0 –0,5	5,1 ±0,05	5,1 ±0,5	2,4 ±10%	25/30	0,50 ±0,1	5,96 –0,3	5,1 –0,25	11,0 ±1,0

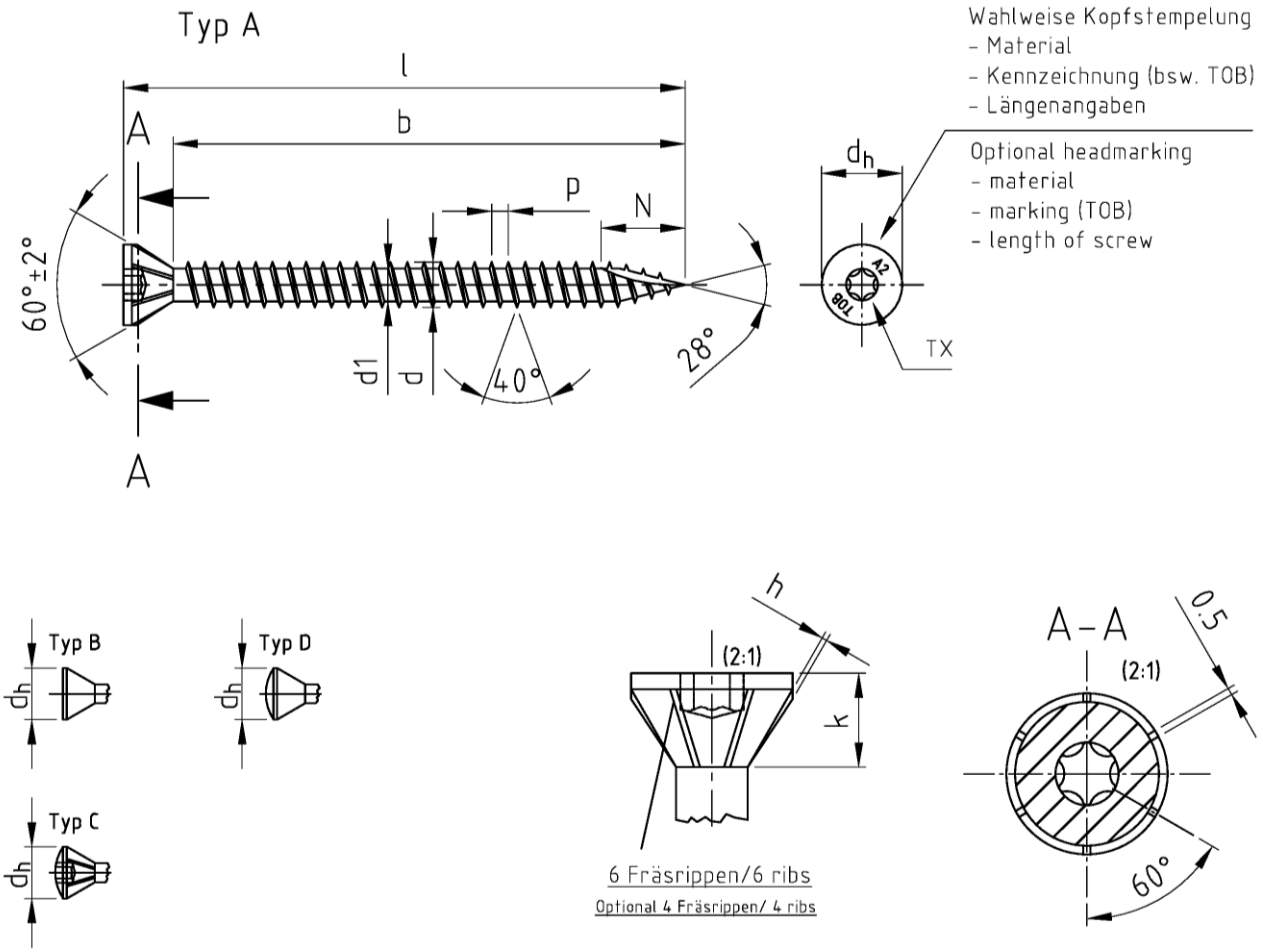
l –1/2 IT17	30	35	40	45	50	60	70	80	90	100	120	140	160
ø 4,0 b ±1	21	26	26	28	33	40	–	–	–	–	–	–	–
ø 4,5 b ±1	–	26	26	31	33	40	50	50	–	–	–	–	–
ø 5,0 b ±1	–	–	26	30	36	40	50	50	58	58	–	–	–
ø 6,0 b ±1	–	–	–	–	30	35	47	57	57	66	66	66	66
fh	4,0 –0,2				6,0 –0,2			12,0 –0,6					

TOB screws

TOB-Fast-Drill screws with countersunk head 60°
Partially threaded
Cutting point

Annex 4.27

Deutsches Institut für Bautechnik DIBt



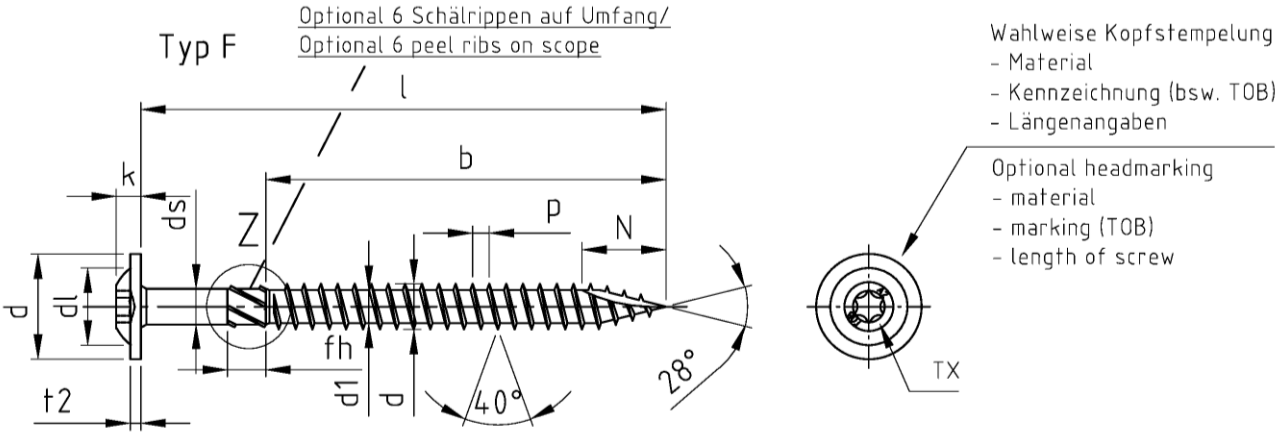
Bezeichnung	TOB–Fast–Drill 60°/ TOB–Fast–Drill Schrauben mit Senkkopf 60°, Vollgewinde, CUT Bohrspitze							
Description	TOB–Fast–Drill 60°/ TOB–Fast–Drill screws with countersunk head 60°, Fully threaded, Cutting point							
Nennmaß/ Nominal dia.	d	d1	dh	k	p	TX	h	N
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	7,0 –0,5	3,3 ±0,5	1,8 ±10%	15/20	0,35 ±0,1	7,5 ±0,5
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	8,0 –0,5	3,9 ±0,5	2,0 ±10%	20/25	0,40 ±0,1	8,5 ±0,5
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	8,5 –0,5	4,0 ±0,5	2,2 ±10%	20/25	0,45 ±0,1	9,5 ±0,5
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	11,0 –0,5	5,1 ±0,5	2,4 ±10%	25/30	0,50 ±0,1	11,0 ±1,0

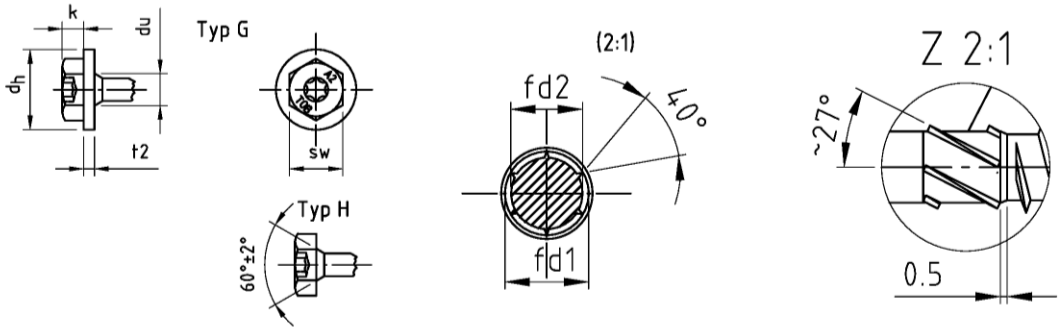
Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		23	23	28	36
l max. ±1		70	70	90	110
b ±1	min. /+ k	20	25	25	30
	max. /+ k	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed					

TOB screws

TOB-Fast-Drill screws with countersunk head 60°
Fully threaded
Cutting point

Annex 4.28





Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Tellerkopf oder Sechskantkopf, Teilgewinde, CUT Bohrspitze												
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with pan washer head or hexagonal head, Partial threaded, Cutting point												
Nennmaß/ Nominal dia.	d	d1	dh	ds	dl	k	p	t2	TX	sw	fd1	fd2	N
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	12,0 ±1,0	3,2 ±0,05	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	15/20	6	4,06 –0,25	3,2 –0,15	7,5 ±0,5
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	13,0 ±1,0	3,5 ±0,05	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	20/25	7	4,36 –0,3	3,5 –0,15	8,5 ±0,5
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	14,0 ±1,0	4,1 ±0,05	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	20/25	8	5,06 –0,3	4,1 –0,25	9,5 ±0,5
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	15,0 ±1,0	5,1 ±0,05	11,0	3,8 ±0,4	2,4 ±10%	2,0 –0,5	25/30	10	5,96 –0,3	5,1 –0,25	11,0 ±1,0

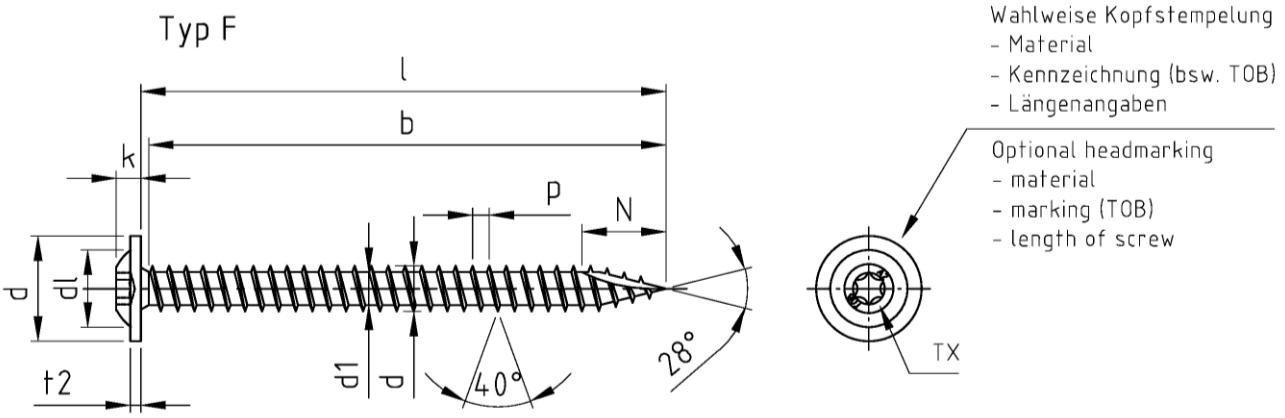
l –1/2 IT17	30	35	40	45	50	60	70	80	90	100	120	140	160
ø 4,0 b ±1	21	26	26	28	33	40	–	–	–	–	–	–	–
ø 4,5 b ±1	–	26	26	31	33	40	50	50	–	–	–	–	–
ø 5,0 b ±1	–	–	26	30	36	40	50	50	58	58	–	–	–
ø 6,0 b ±1	–	–	–	–	30	35	47	57	57	66	66	66	66
fh	4,0 –0,2				6,0 –0,2			12,0 –0,6					

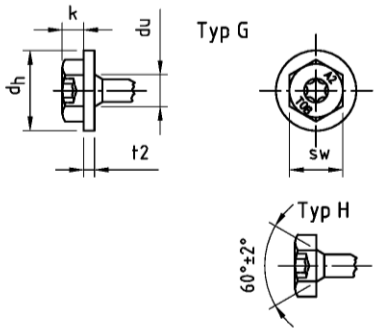
TOB screws

TOB-Fast-Drill screws with pan washer head or hexagonal head
Partially threaded
Cutting point

Annex 4.29

Deutsches Institut für Bautechnik DIBt





Bezeichnung	TOB–Fast–Drill/ TOB–Fast–Drill Schrauben mit Tellerkopf oder Sechskantkopf, Vollgewinde, CUT Bohrspitze									
Description	TOB–Fast–Drill/ TOB–Fast–Drill screws with pan washer head or hexagonal head, Fully threaded, Cutting point									
Nennmaß/ Nominal dia.	d	d1	dh	dl	k	p	t2	TX	sw	N
ø 4,0	4,1 +0,2/–0,1	3,0 ±0,1	12,0 ±1,0	7,0	3,0 ±0,4	1,8 ±10%	1,5 –0,5	15/20	6	7,5 ±0,5
ø 4,5	4,6 +0,2/–0,1	3,3 ±0,1	13,0 ±1,0	8,0	3,2 ±0,4	2,0 ±10%	1,5 –0,5	20/25	7	8,5 ±0,5
ø 5,0	5,3 +0,2/–0,1	3,7 ±0,1	14,0 ±1,0	9,0	3,5 ±0,4	2,2 ±10%	1,5 –0,5	20/25	8	9,5 ±0,5
ø 6,0	6,5 +0,2/–0,1	4,7 ±0,1	15,0 ±1,0	11,0	3,8 ±0,4	2,4 ±10%	2,0 –0,5	25/30	10	11,0 ±1,0

Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0	ø 6,0
l min. ±1		23	23	28	36
l max. ±1		70	70	90	110
b ±1	min. /+ k	20	25	25	30
	max. /+ k	65	65	80	100
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed					

TOB screws

TOB-Fast-Drill screws with pan washer head or hexagonal head
Fully threaded
Cutting point

Annex 4.30

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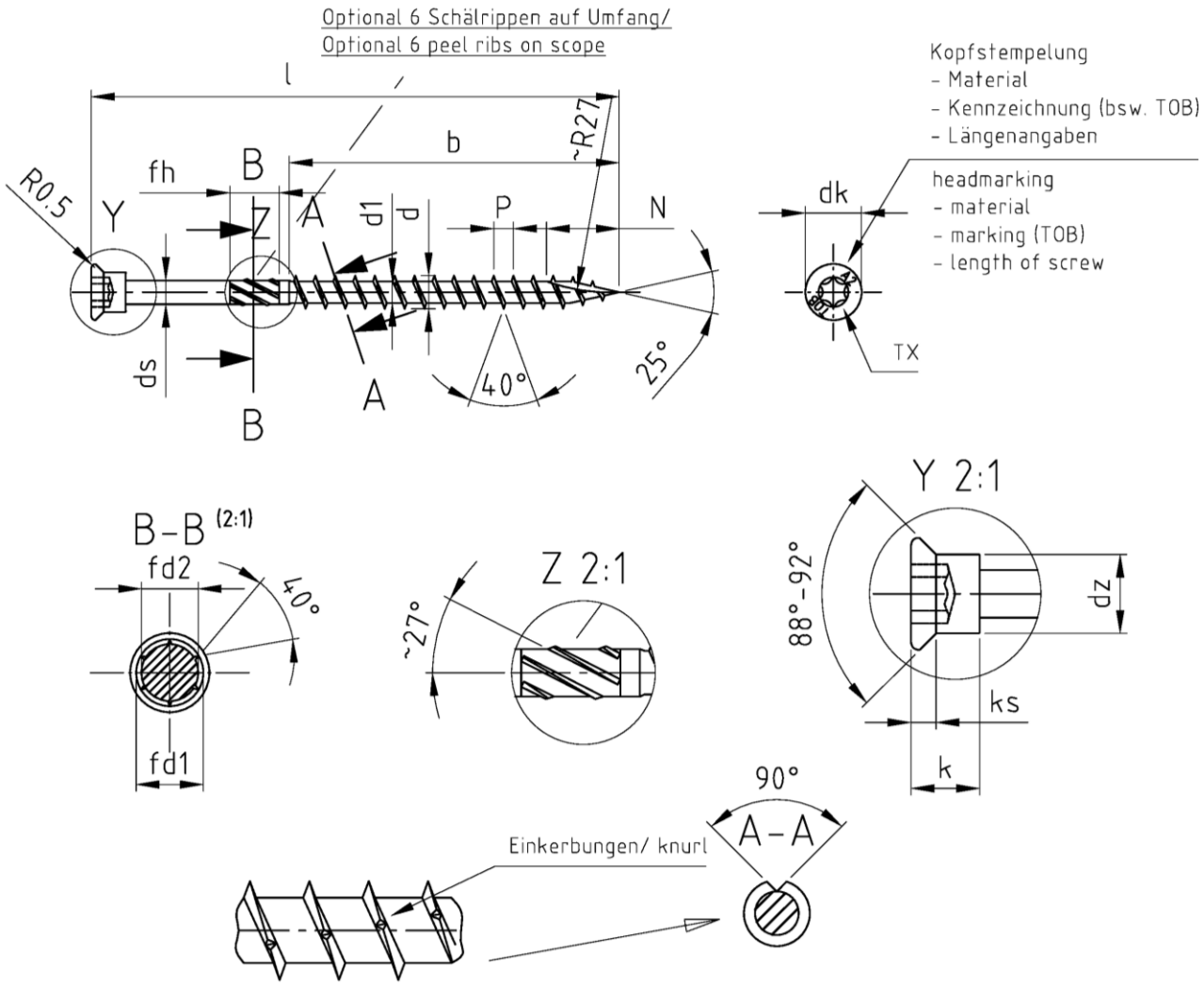


Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

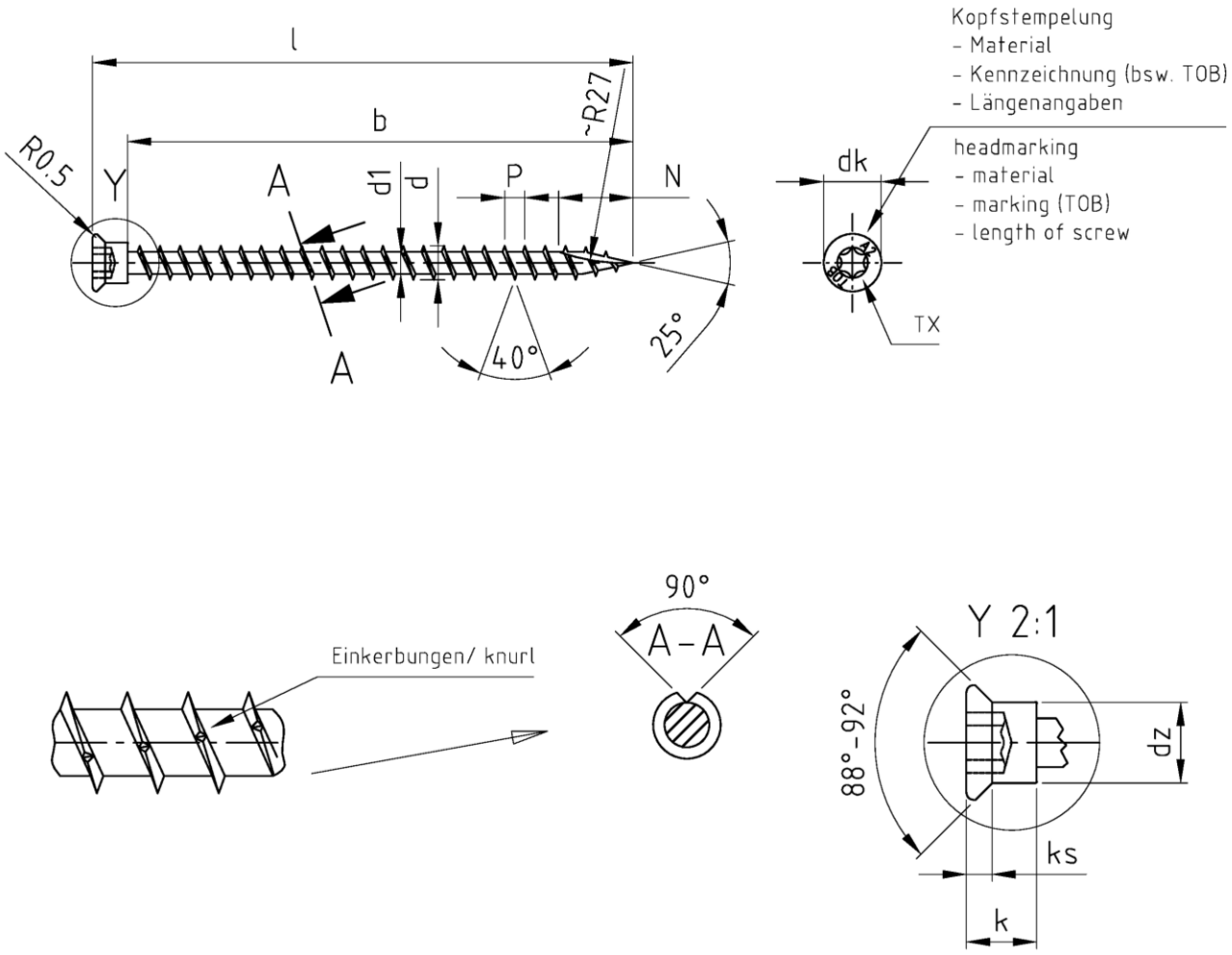
Bezeichnung	TOB-Drill/ TOB-Drill Terrassenbauschrauben mit Zylinderkopf, Teilgewinde, CUT Bohrspitze											
Description	TOB-Drill/ TOB-Drill terrace screws with cylinder head, Partial threaded, Cutting point											
Nennmaß/ Nominal dia.	d	d1	dh	dz	ds	k	ks	p	TX	fd1	fd2	N
ø 4,0	4,0 ±0,15	2,55 ±0,1	5,70 −0,3	3,95 ±0,1	2,8 ±0,05	4,35 −0,25	0,90 −0,3	2,5 ±0,1	15/20	3,4 −0,25	2,7 −0,15	8,7 ±0,5
ø 4,5	4,5 ±0,15	2,9 ±0,1	7,05 −0,3	5,35 ±0,1	3,15 ±0,05	4,8 −0,3	1,10 −0,3	2,8 ±0,1	20/25	3,7 −0,25	2,9 −0,15	9,8 ±0,5
ø 5,0	5,0 ±0,15	3,3 ±0,1	8,75 −0,3	6,15 ±0,15	3,55 ±0,05	5,45 −0,3	1,30 −0,3	3,2 ±0,1	20/25	4,35 −0,3	3,5 −0,15	11,2 ±0,5

l ±1	40	45	50	60	70	80	90	100
ø 4,0 b ±1	24	24	30	36	42	–	–	–
ø 4,5 b ±1	–	24	30	36	42	48	–	–
ø 5,0 b ±1	–	24	30	36	42	48	54	60
fh	4,0 −0,2		6,0 −0,2			12,0 −0,6		

TOB screws

TOB-Drill terrace screws with cylinder head
Partially threaded
Cutting point

Annex 4.31



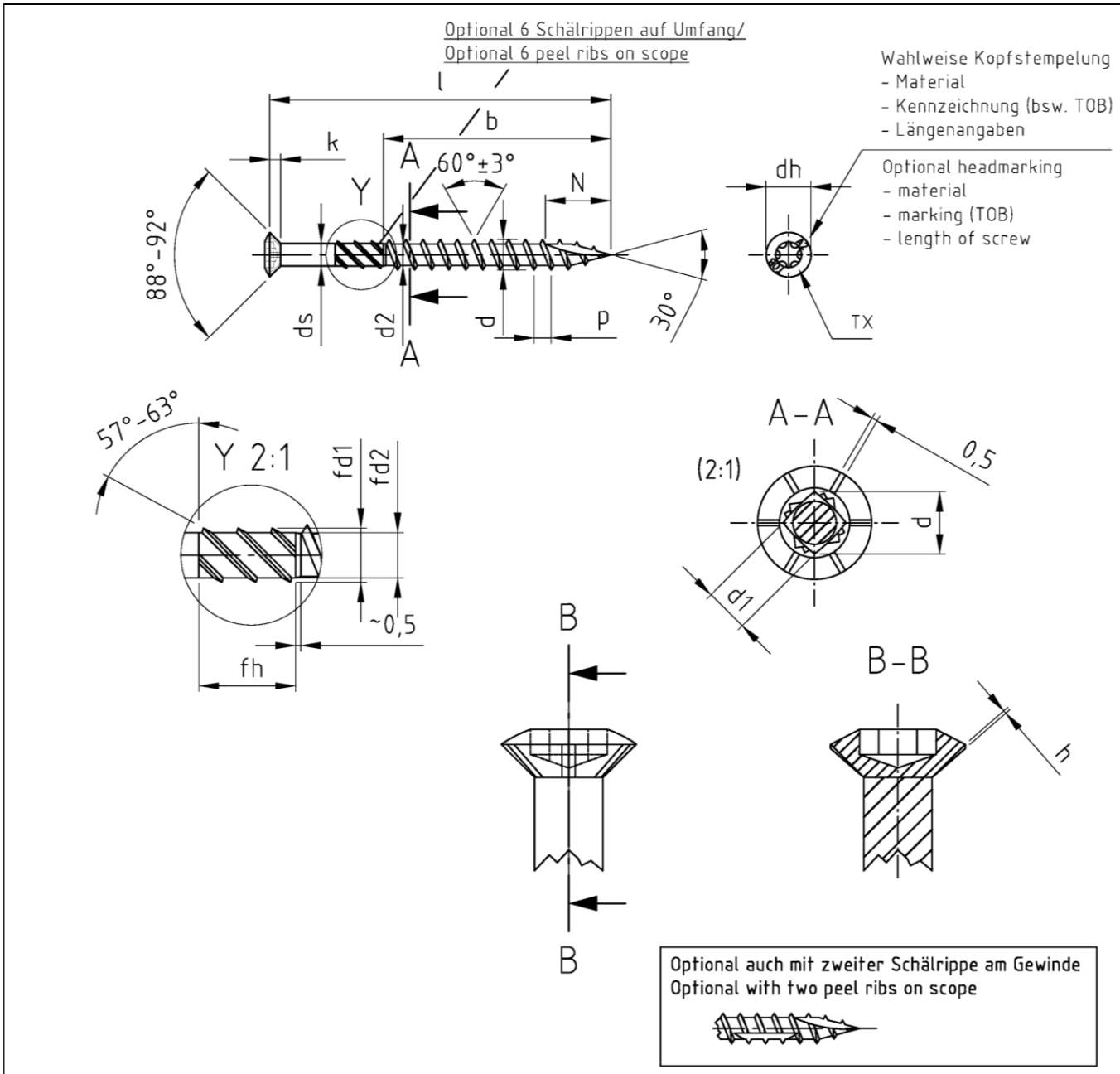
Bezeichnung	TOB–Drill/ TOB–Drill Terrassenbauschrauben mit Zylinderkopf, Vollgewinde, CUT Bohrspitze								
Description	TOB–Drill/ TOB–Drill terrace screws with cylinder head, Partial threaded, Cutting point								
Nennmaß/ Nominal dia.	d	d1	dh	dz	k	ks	p	TX	N
ø 4,0	4,0 ±0,15	2,55 ±0,1	5,70 –0,3	3,95 ±0,1	4,35 –0,25	0,90 –0,3	2,5 ±0,1	15/20	8,7 ±0,5
ø 4,5	4,5 ±0,15	2,9 ±0,1	7,05 –0,3	5,35 ±0,1	4,8 –0,3	1,10 –0,3	2,8 ±0,1	20/25	9,8 ±0,5
ø 5,0	5,0 ±0,15	3,3 ±0,1	8,75 –0,3	6,15 ±0,15	5,45 –0,3	1,30 –0,3	3,2 ±0,1	20/25	11,2 ±0,5

Nennmaß/ Nominal dia.		ø 4,0	ø 4,5	ø 5,0
l min. ±1		23	23	28
l max. ±1		70	70	90
b ±1	min. /+ k	20	25	25
	max. /+ k	65	65	80
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed				

TOB screws

TOB-Drill terrace screws with cylinder head
Fully threaded
Cutting point

Annex 4.32



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

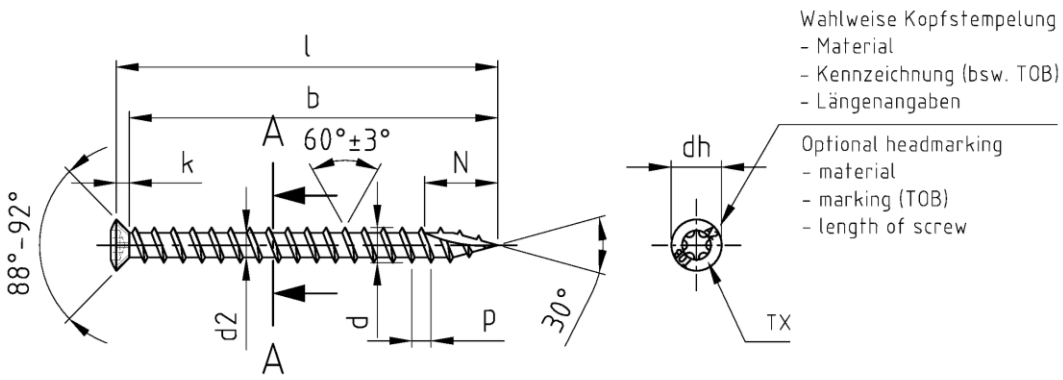
Bezeichnung	TOB–TBS–Quadra–Speed/ TOB–TBS Quadra–Speed Terrassenbauschrauben mit Liseko, Teilgewinde, CUT Bohrspitze												
Description	TOB–TBS–Quadra–Speed/ TOB–TBS Quadra–Speed terrace screws with RSD CSK head, Partial threaded, Cutting point												
Nennmaß/ Nominal dia.	d	d1	d2	d_h	ds	k	p	TX	h	N	fd1	fd2	fh
ø 5,0	5,5 –0,4	4,9 –0,3	3,8 –0,2	7,95 –0,45	4,15 –0,18	max. 3,0	3,10 –0,2	20/25	0,5	11,5 ±0,5	4,8 –0,3	4,15 –0,18	9,0 –0,5

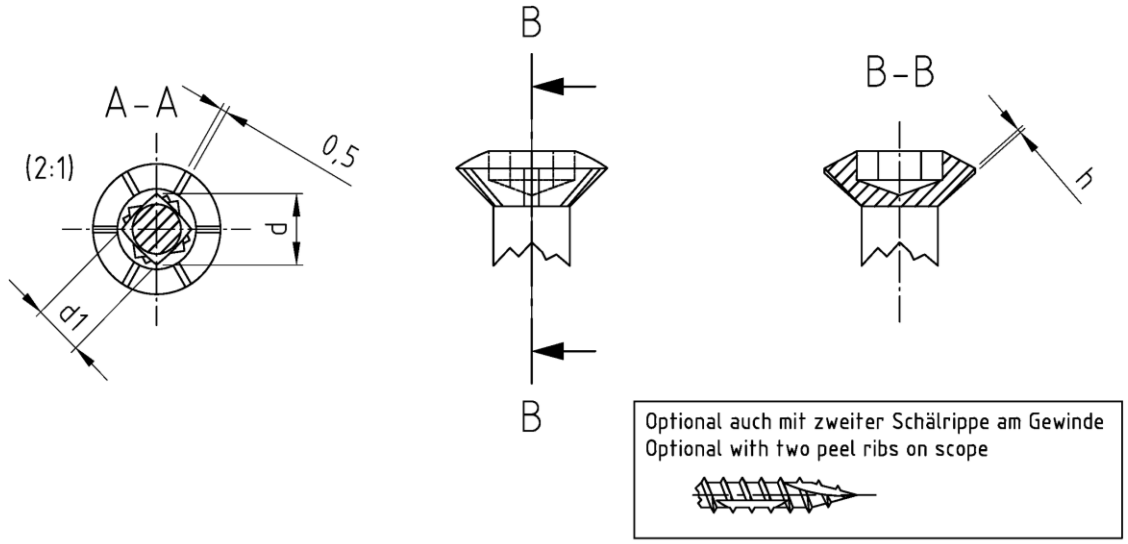
l	40 –1,75	50– 1,75	60 –1,75	70 –1,75	80 –2.28
b +1,0	26	32	39	46	52

TOB screws

TOB-TBS Quadra-Speed terrace screws with RSD CSK head
Partially threaded
Cutting point

Annex 4.33





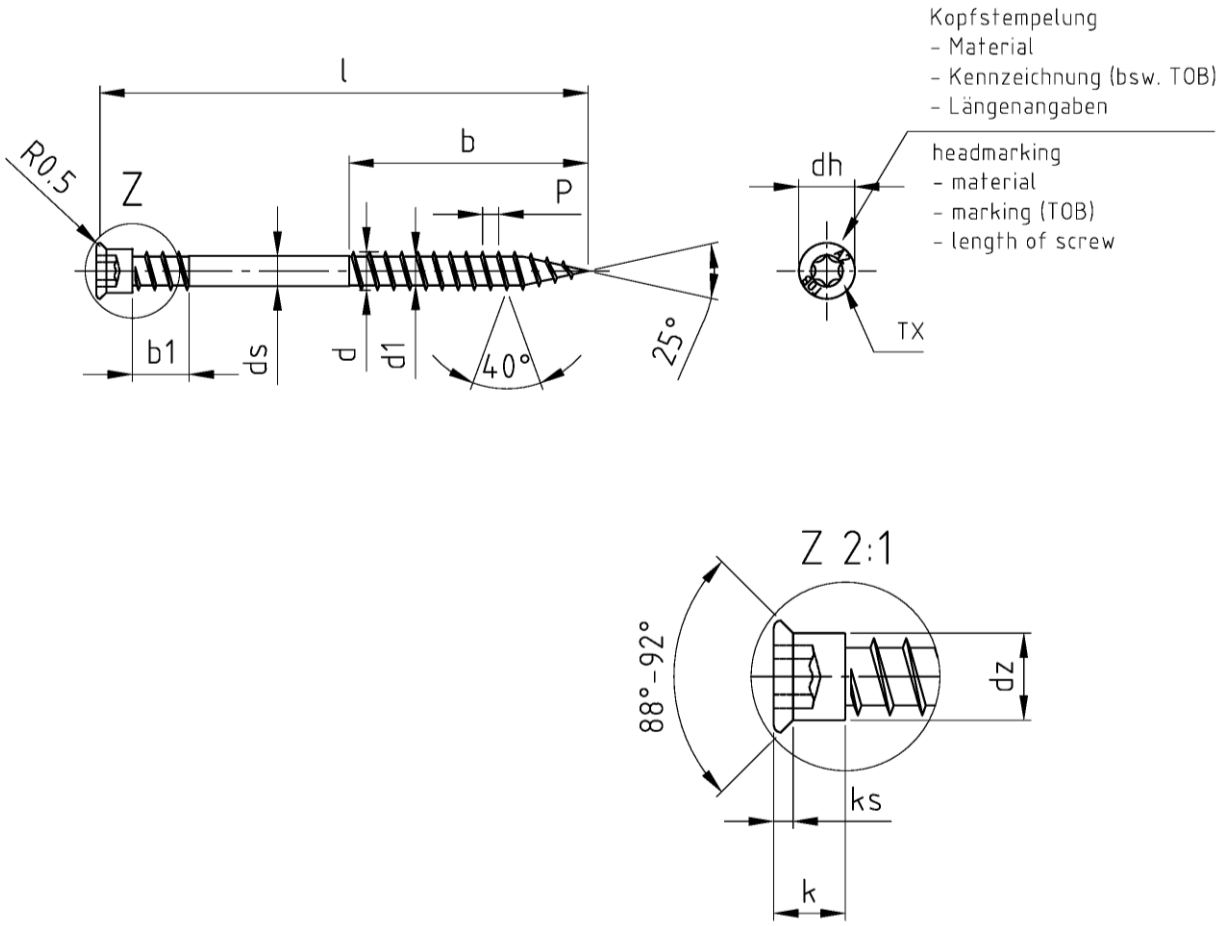
Bezeichnung	TOB–TBS–Quadra–Speed/ TOB–TBS Quadra–Speed Terrassenbauschrauben mit Liseko, Vollgewinde, CUT Bohrspitze								
Description	TOB–TBS–Quadra–Speed/ TOB–TBS Quadra–Speed terrace screws with RSD CSK head, Fully threaded, Cutting point								
Nennmaß/ Nominal dia.	d	d1	d2	dh	k	p	TX	h	N
ø 5,0	5,5 –0,4	4,9 –0,3	3,8 –0,2	7,95 –0,45	max. 3,0	3,10 –0,2	20/25	0,5	11,5 ±0,5

Nennmaß/ Nominal dia.		ø 5,0
l min. ±1		28
l max. ±1		90
b ±1	min. /+ k	25
	max. /+ k	80
Andere Schraubenlängen im Bereich Lmin ≦ L ≦ Lmax sind zulässig / Others screws lenghts with Lmin ≦ L ≦ max are allowed		

TOB screws

TOB-TBS Quadra-Speed terrace screws with RSD CSK head
Fully threaded
Cutting point

Annex 4.34



Mit fließendem Übergang vom Gewinde zum Schaft/ with floating crossing between shank and thread

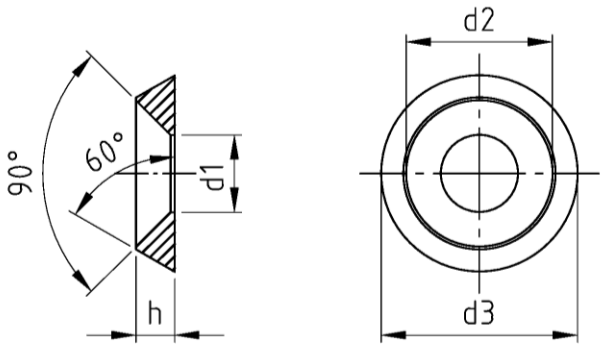
Bezeichnung	TOB–TBS–Drill/ TOB–TBS–Drill Terrassenbauschrauben mit Zylinderkopf und Unterkopfgewinde									
Description	TOB–TBS–Drill/ TOB–TBS–Drill terrace screws with cylinder head and double thread									
Nennmaß/ Nominal dia.	d	d1	dh	dz	ds	k	ks	p	TX	b1
ø 5,5	5,5 –0,3	4,1 –0,3	8,0 –0,3	6,15 ±0,15	4,26 ±0,05	5,1 –0,3	1,4 –0,3	2,3 ±0,1	20/25	8,0 ±0,5

l ±1	40	50	60	70	80	90	100
ø 5,5 b ±1	18	18	24	34	36	36	36

TOB screws

TOB-TBS-Drill terrace screws with cylinder head
Double thread

Annex 4.35



Bezeichnung	TOB–Rosette Unterlegscheiben			
Description	TOB–Rosette Washer			
Nennmaß/ Nominal dia.	d3	d2	d1	h
ø 4,0	11,0 +0,3	8,0 +0,3	4,5 +0,3	2,5 ±0,2
ø 5,0	14,0 +0,3	10,0 +0,3	5,5 +0,3	3,0 ±0,2
ø 6,0	16,0 +0,3	12,0 +0,3	7,0 +0,3	3,5 ±0,2
ø 8,0	22,0 +0,3	16,0 +03	9,0 +0,3	4,5 ±0,2
ø 10,0	28,0 +0,3	20,0 +03	11,0 +0,3	5,5 ±0,2

TOB screws

TOB-Rosette
Washer

Annex 4.36