

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

**ETA-08/0033
of 15 August 2022**

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Zahn Flat Roof Fasteners

Product family
to which the construction product belongs

Fasteners for flexible roof waterproofing systems

Manufacturer

Harald Zahn GmbH
Ludwig-Wagner-Str. 10
69168 Wiesloch
DEUTSCHLAND

Manufacturing plant

Factories of Harald Zahn GmbH

This European Technical Assessment
contains

221 pages including 216 pages with annexes which form
an integral part of this assessment

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

EAD 030351-00-0402

This version replaces

ETA-08/0033 issued on 13 March 2018

European Technical Assessment

ETA-08/0033

English translation prepared by DIBt

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Specific Part

1 Technical description of the product

The construction products are mechanical fasteners.

The fasteners comprise a screw made of coated carbon or stainless steel and a steel bar or a washer made of metal or plastic materials (polyamide). The washers without integrated sleeve are made of coated steel or plastic materials.

The washers made of plastic materials partially have a formed or adaptable sleeve. In conjunction with the steel bar a sleeve, which has a collar, will each be inserted into a hole prepared in the bar's ground and sits with its collar on the bar's ground.

The sleeve is designed either as a hollow shaft receiving the screw, from whose shaft tip the screw emerges or as an anchor sleeve expandable by the screw. Such a dowel sleeve can also be adapted to the sleeve formed as a hollow shaft. Likewise, a dowel sleeve may be formed as a cavity anchor.

The washer with sleeve can be composited from individual components beyond.

The plastic washers are probably provided with additional sealing washers.

The fasteners shall correspond to the information given in Annexes 1 to 169 of this ETA.

The material properties, dimensions and tolerances not indicated in Annexes 1 to 169 shall correspond to the information laid down in the technical information¹ to this European technical assessment.

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

The fasteners are intended to be used for the fastening of flexible roof waterproofing membranes according to EAD 030351-00-0402. The possible substructures are steel decks, concrete, aerated and light weight concrete, timber, thin plates of steel or aluminium and sandwich panels.

The performances given in Section 3 are only valid if the fasteners are used in compliance with the specifications and conditions given in the Annexes to this ETA and if the installation is carried out according to the manufacturer's assembly instructions.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fasteners of at least 10 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.

In order to use the fasteners for systems of mechanically fastened flexible roof waterproofing membranes according to EAD 030351-00-0402 a separate ETA is necessary for the entire roof waterproofing system. The system ETA covers the wind uplift resistance of the entire system as well as the product characteristics of the components of the system.

¹ The technical documentation is deposited with Deutsches Institut für Bautechnik and as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure is handed over to the approved bodies.

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

3.1 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Characteristic tensile loading	See Annexes 170 to 180
Resistance to unwinding	pass
Resistance to corrosion of metallic fasteners	pass; ≤ 15 % surface corrosion
Impact resistance and brittleness of plastic fasteners (before and after heat ageing)	pass; drop height > 1.0 m
Requirements for results of Charpy tests for plastic materials (before and after heat ageing)	pass; not any significant decline compared to the results before heat ageing

The thickness and strengths of the materials listed in the tables of characteristic tensile loads (Annexes 170 to 180) are minimum requirements. The values given are also applicable for materials with higher thickness and strengths. The values of axial loading shown in Annexes 170 to 180 were determined by axial loading tests according to EAD 030351-00-0402.

The fasteners are deemed to satisfy the requirements of EAD 030351-00-0402 concerning unwinding. This was evaluated on the basis of the existing field experience of the manufacturer.

The durability requirements of EAD 030351-00-0402 (resistance to corrosion of metallic fasteners, impact resistance and brittleness of plastic fasteners before and after heat ageing, requirements for results of Charpy tests for plastic materials before and after heat ageing) are satisfied for the coated carbon steel, stainless steel and polyamide components of the fasteners.

All coated carbon steel components resisted to 15 cycles of the test procedure described in EAD 030351-00-0402 (Kesternich test) and did not show more than 15 % surface corrosion.

The test results of the tests to check the impact resistance and brittleness of the polyamide components showed a drop height of more than 1.0 m before and after heat ageing of these components. Furthermore, the results of the corresponding Charpy tests after heat ageing did not show any significant decline compared to the results before heat ageing.

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

In accordance with EAD 030351-00-0402 the applicable European legal act is: 1998/143/EC.
The system to be applied is: 2+

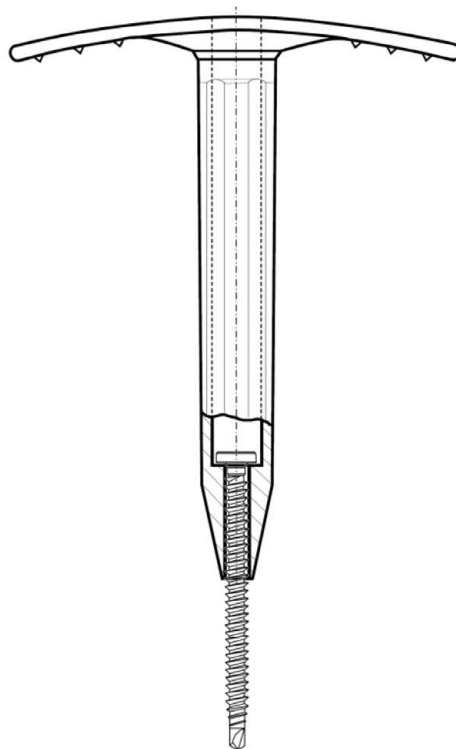
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

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

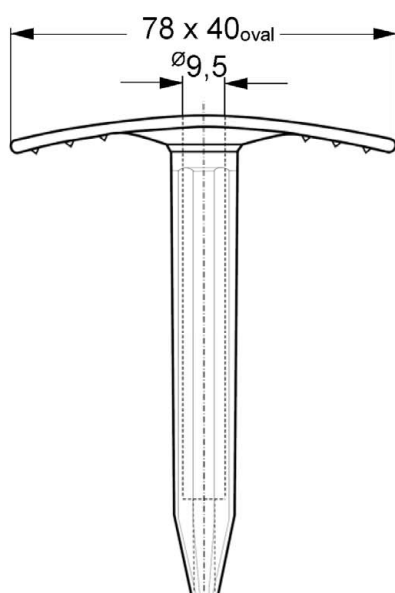
Issued in Berlin on 15 August 2022 by Deutsches Institut für Bautechnik

Andreas Schult
Head of Section

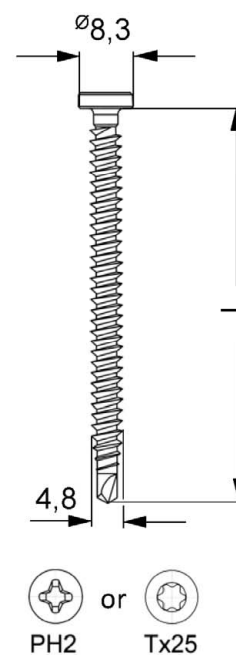
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Zahn ZKSH oval



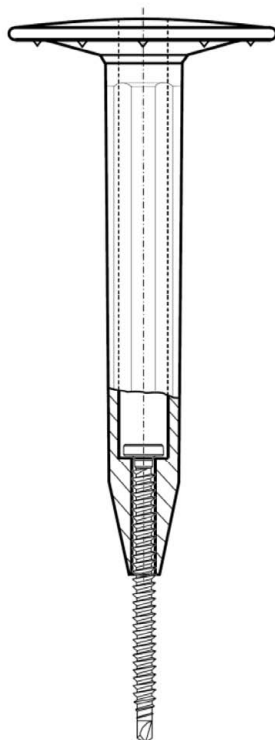
Zahn ZDBK 4,8 x L



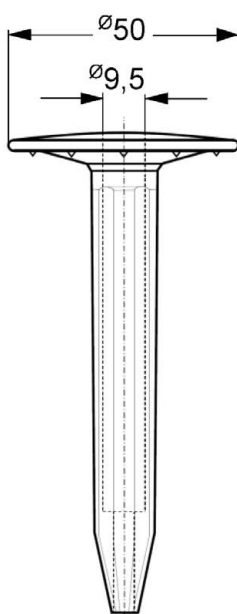
Zahn Flat Roof Fasteners

Combination 1
ZKSK consisting of ZDBK / ZKSH oval

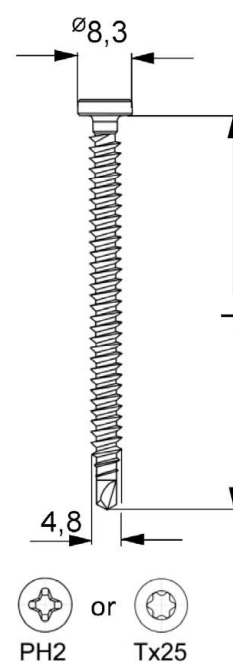
Annex 1



Zahn ZKSH round



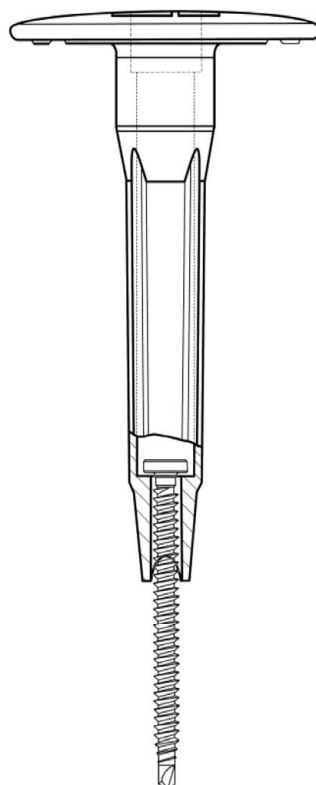
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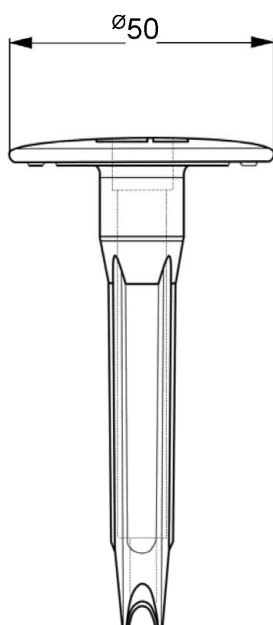
Zahn Flat Roof Fasteners

Combination 2
ZKSK-R consisting of ZDBK / ZKSH round

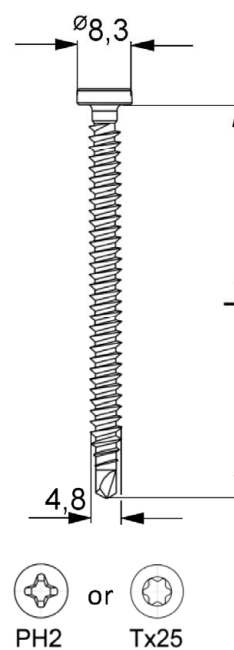
Annex 2



Zahn ZKSH-Rplus



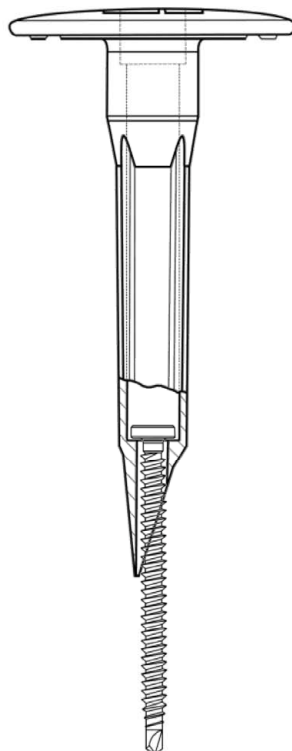
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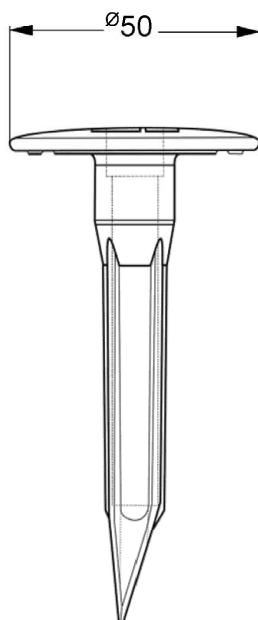
Zahn Flat Roof Fasteners

Combination 3
ZKSK-Rplus consisting of ZDBK / ZKSH-Rplus

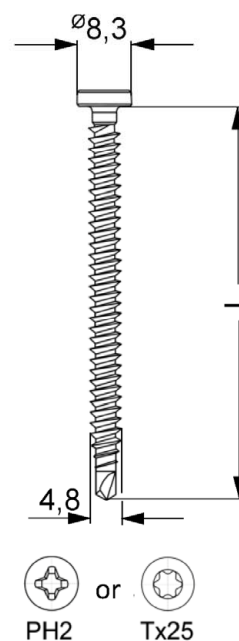
Annex 3



Zahn ZKSH-Rplus pile tip



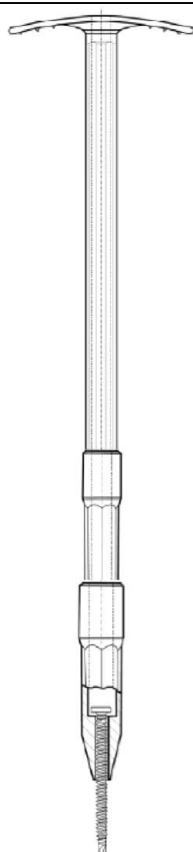
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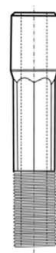
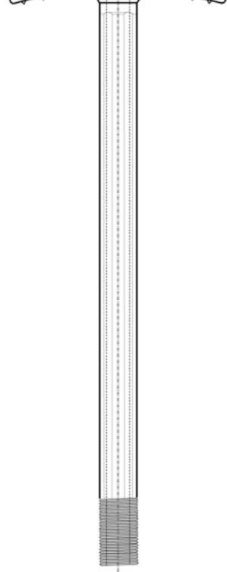
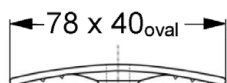
Zahn Flat Roof Fasteners

Combination 4
ZKSK-Rplus with pile tip consisting of ZDBK / ZKSH-Rplus with pile tip

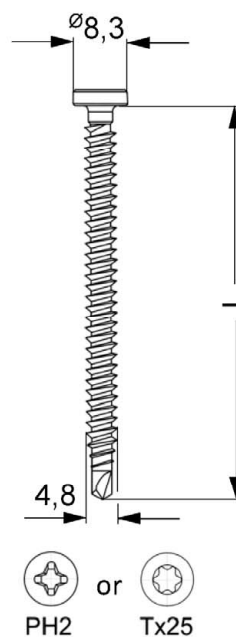
Annex 4



Zahn ZKSH oval module 4,8



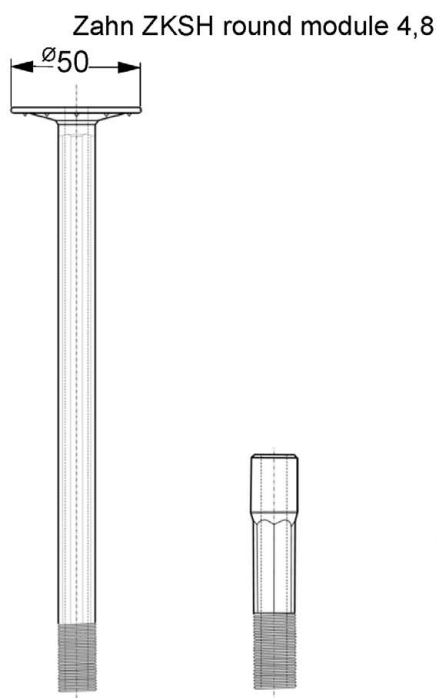
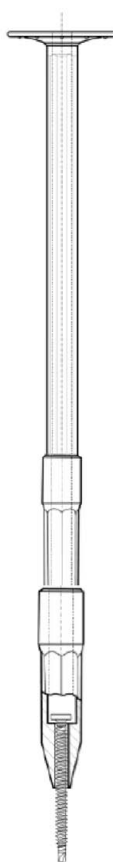
Zahn ZDBK 4,8 x L



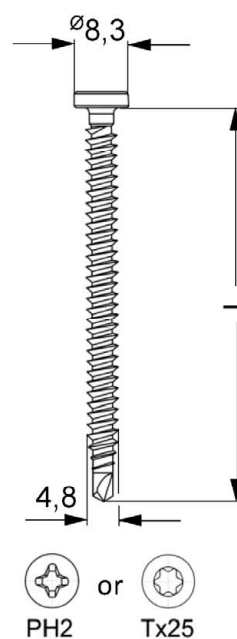
Zahn Flat Roof Fasteners

Combination 5
ZKSK Modul 4,8 consisting of ZDBK/ZKSH oval module with module middle piece
and spike 4,8

Annex 5



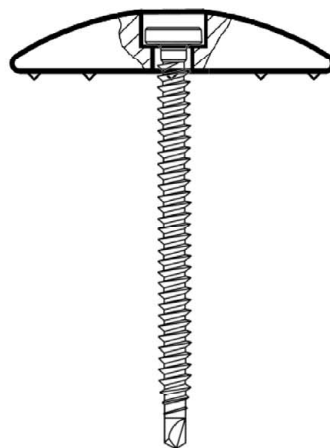
Zahn ZDBK 4,8 x L



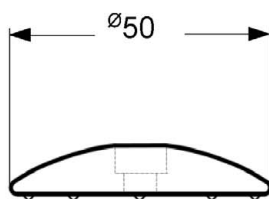
Zahn Flat Roof Fasteners

Combination 6
ZKSK-R-Modul 4,8 consisting of ZDBK / ZKSH round modul with module middle piece
and spike 4,8

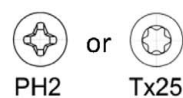
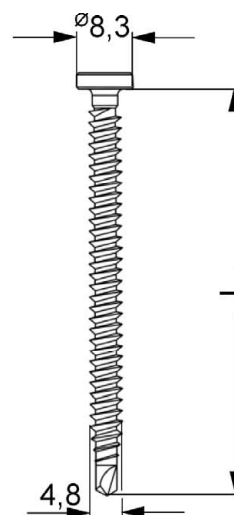
Annex 6



Zahn ZTSK 4,8



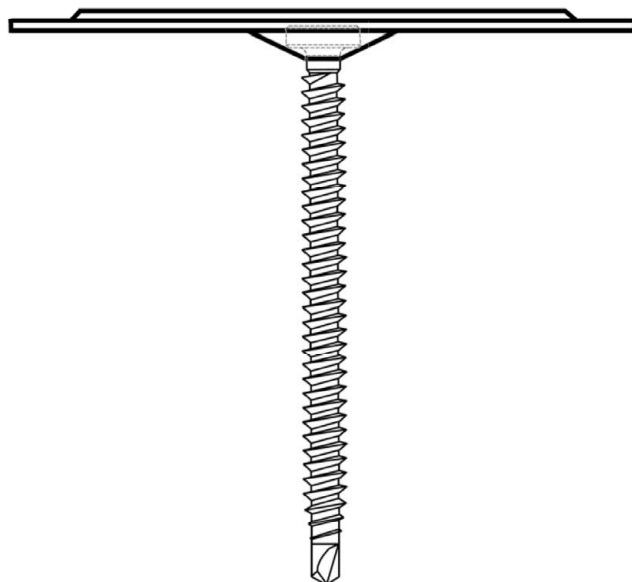
Zahn ZDBK 4,8 x L



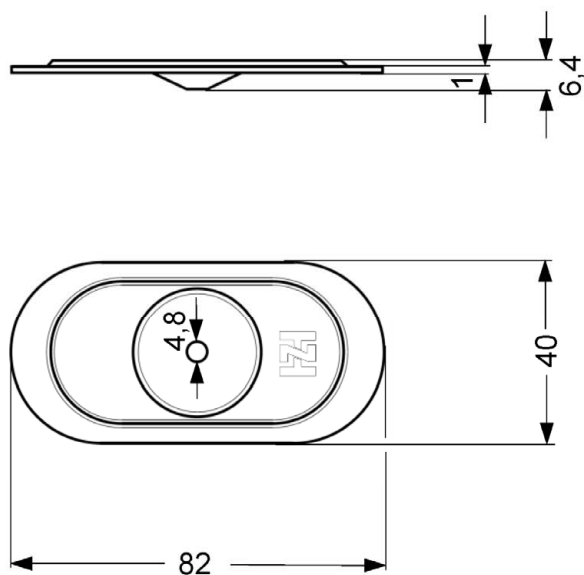
Zahn Flat Roof Fasteners

Combination 7
ZTSK 4,8 consisting of ZDBK / ZTSK 4,8

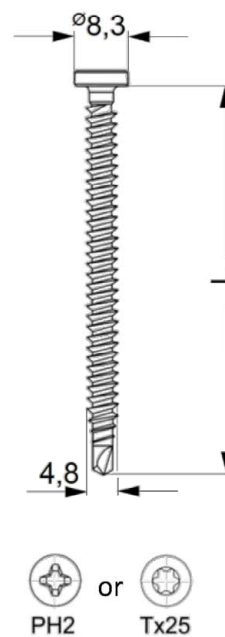
Annex 7



Zahn ZLVT 0001



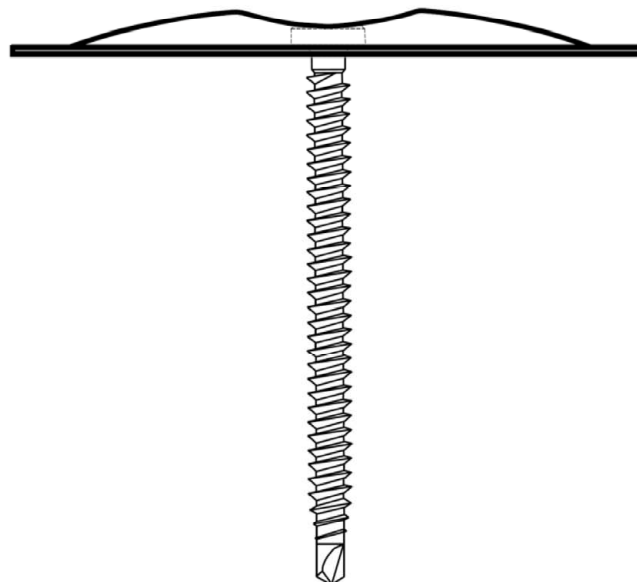
Zahn ZDBK 4,8 x L



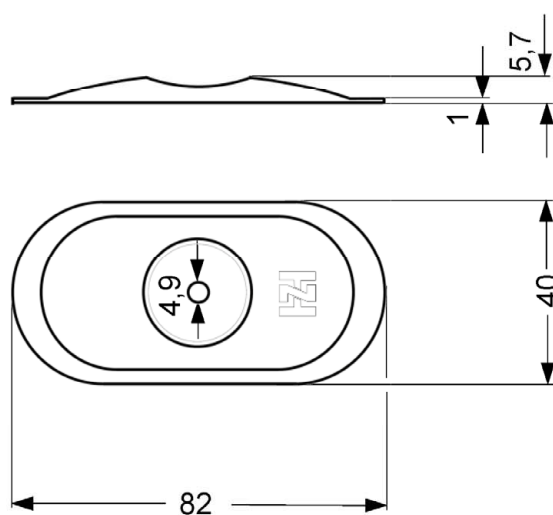
Zahn Flat Roof Fasteners

Combination 8
ZDBK / ZLVT 0001

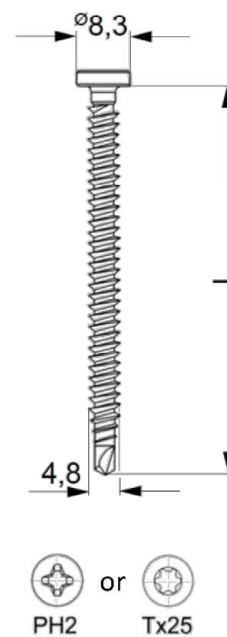
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Zahn ZLVT 0005



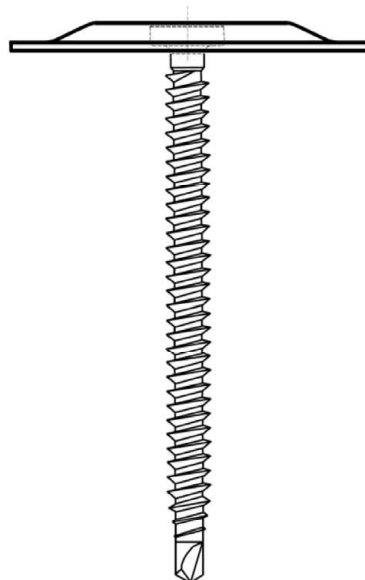
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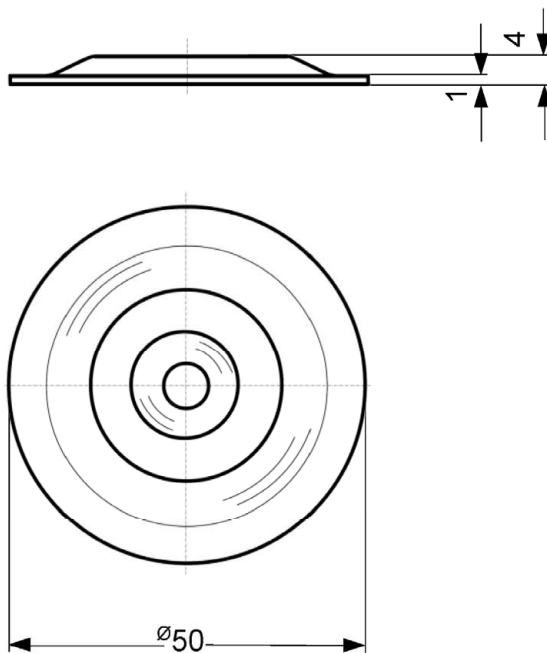
Zahn Flat Roof Fasteners

Combination 9
ZDBK / ZLVT 0005

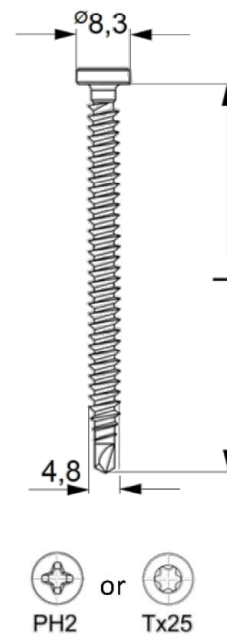
Annex 9



Zahn ZLVT 0015



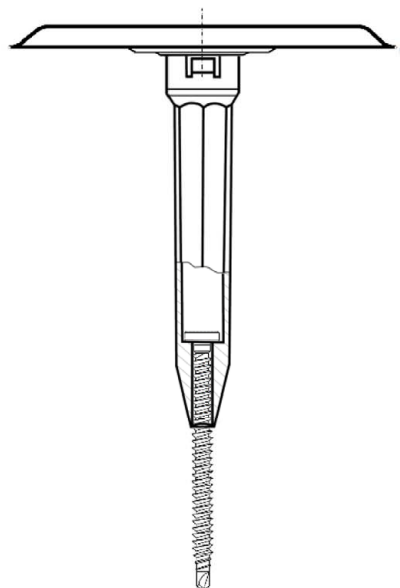
Zahn ZDBK 4,8 x L



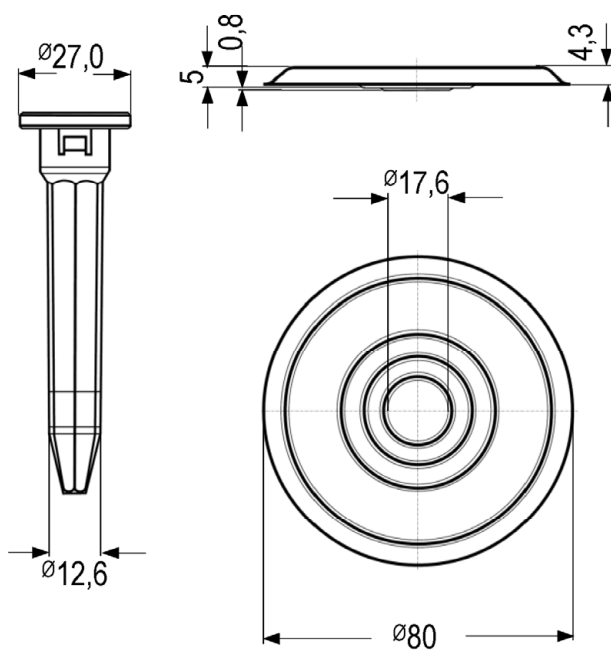
Zahn Flat Roof Fasteners

Combination 10
ZDBK / ZLVT 0015

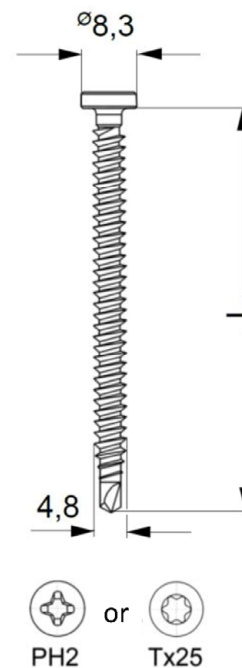
Annex 10



Zahn ZCTS-pipe 4,8 with ZCTS-plate



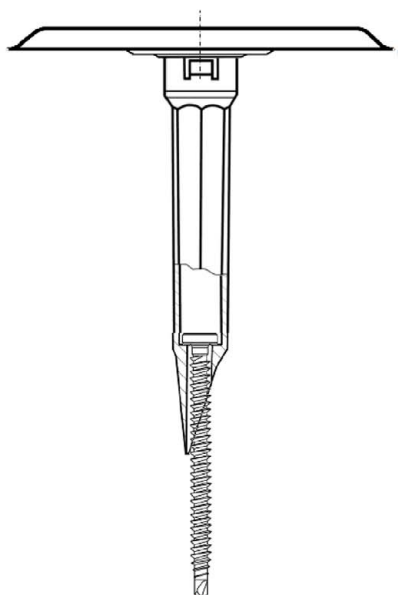
Zahn ZDBK 4,8 x L



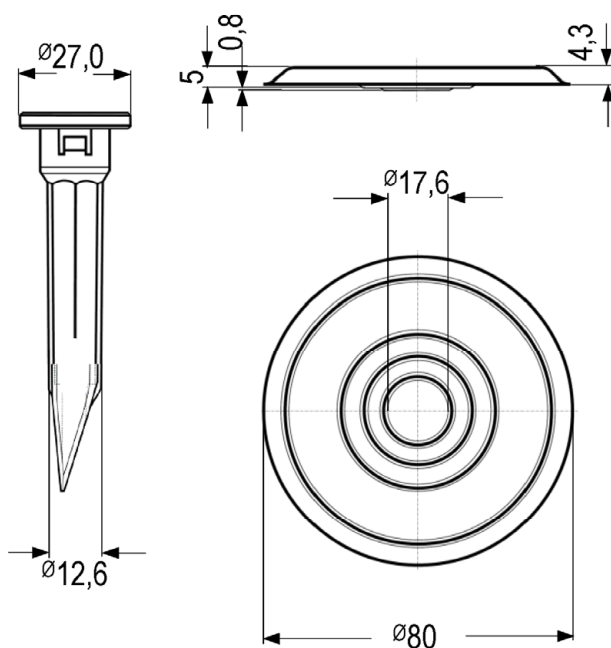
Zahn Flat Roof Fasteners

Combination 10a
ZCTS 4,8 consisting of ZDBK / ZCTS-pipe 4,8 and ZCTS-plate

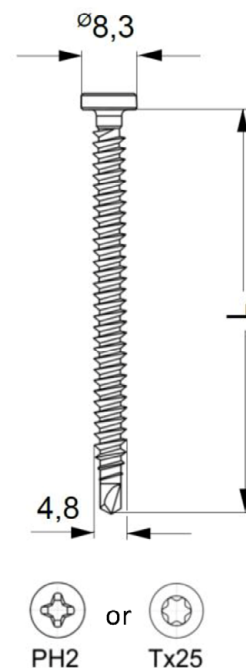
Annex 10a



Zahn ZCTSplus pipe with pile tip 4,8 with ZCTS-plate



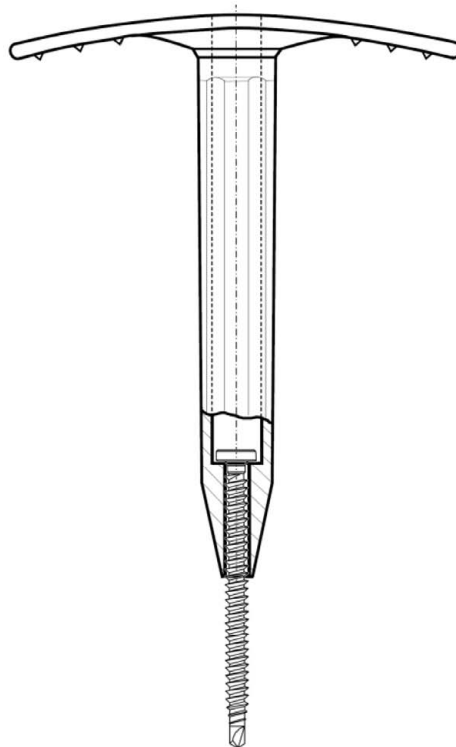
Zahn ZDBK 4,8 x L



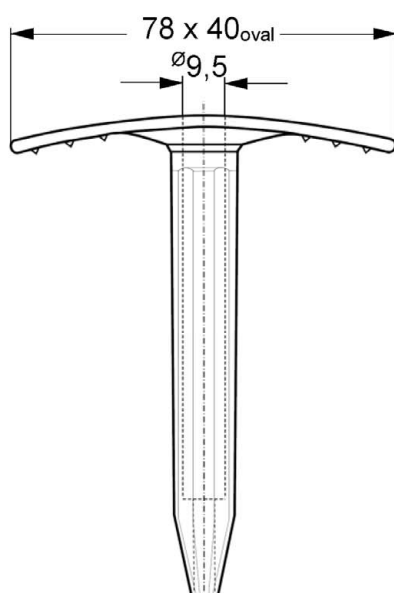
Zahn Flat Roof Fasteners

Combination 10b
ZCTSplus pipe with pile tip 4,8 consisting of ZDBK / ZCTSplus pipe
with pile tip 4,8 und ZCTS-plate

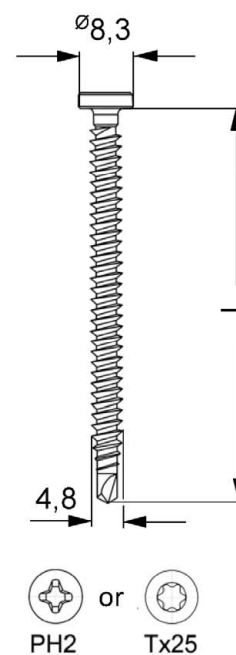
Annex 10b



Zahn ZKSH oval



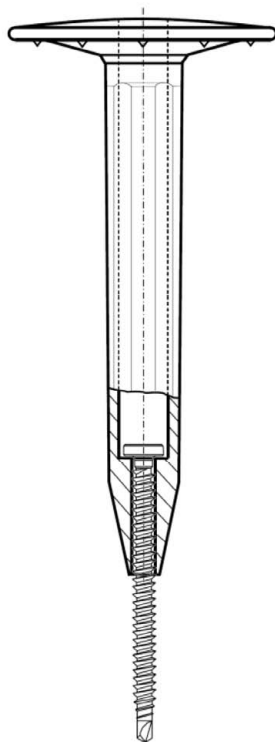
Zahn ZDBK-E 4,8 x L



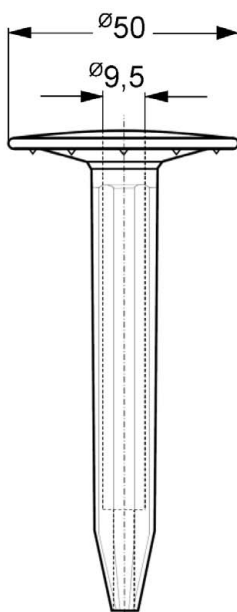
Zahn Flat Roof Fasteners

Combination 11
ZKSK-E consisting of ZDBK-E / ZKSH oval

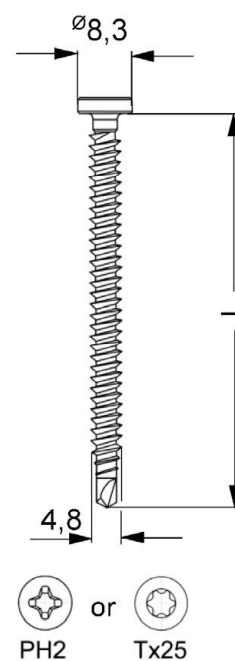
Annex 11



Zahn ZKSH round



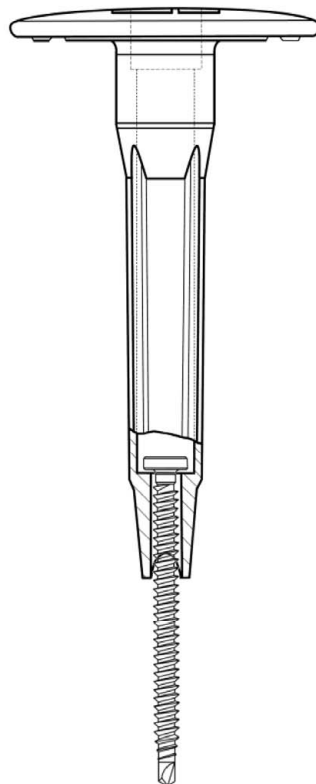
Zahn ZDBK-E 4,8 x L



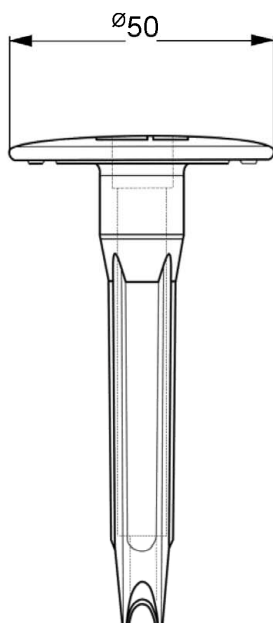
Zahn Flat Roof Fasteners

Combination 12
ZKSK-E/R consisting of ZDBK-E / ZKSH round

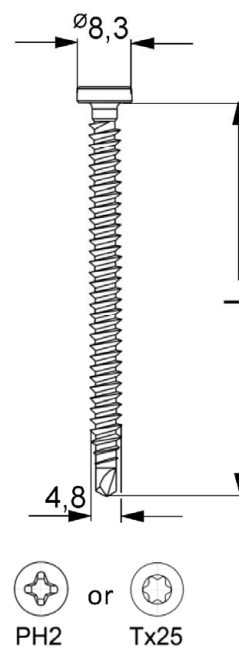
Annex 12



Zahn ZKSH-Rplus



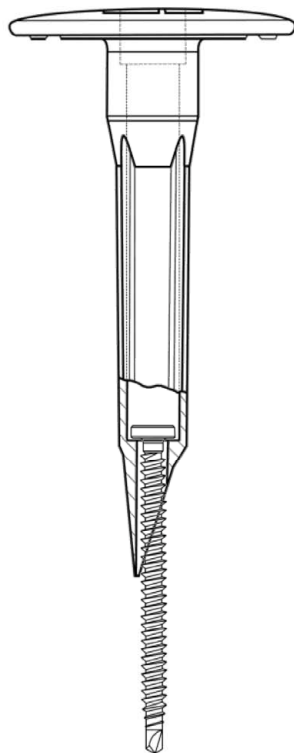
Zahn ZDBK-E 4,8 x L



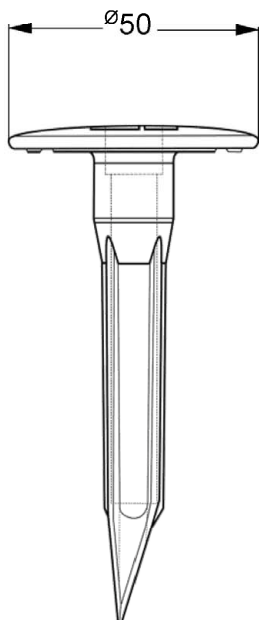
Zahn Flat Roof Fasteners

Combination 13
ZKSK-E/Rplus consisting of ZDBK-E / ZKSH-Rplus

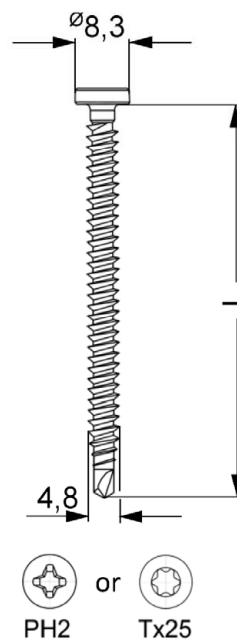
Annex 13



Zahn ZKSH-Rplus with pile tip



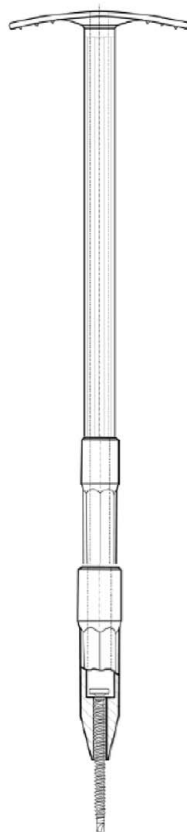
Zahn ZDBK-E 4,8 x L



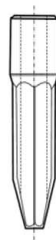
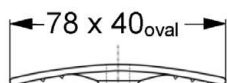
Zahn Flat Roof Fasteners

Combination 14
ZKSK-E/Rplus with pile tip consisting of ZDBK-E / ZKSH-Rplus with pile tip

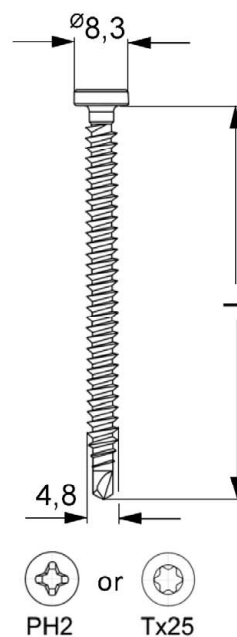
Annex 14



Zahn ZKSH oval module 4,8



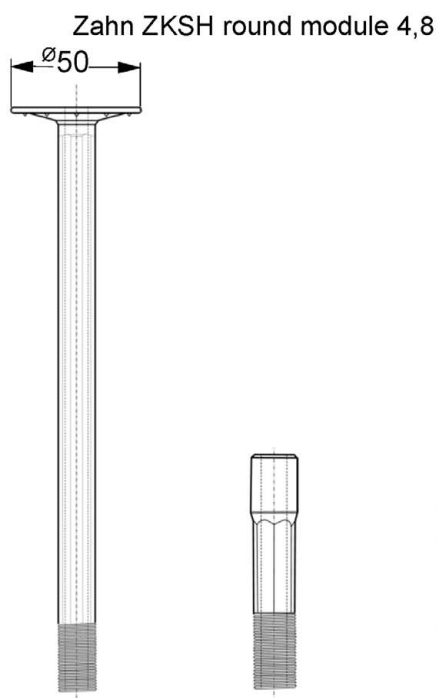
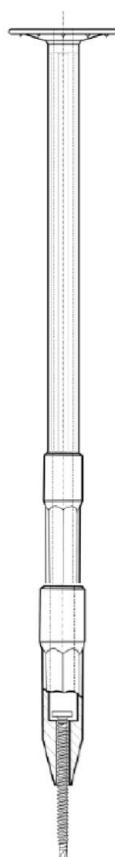
Zahn ZDBK-E 4,8 x L



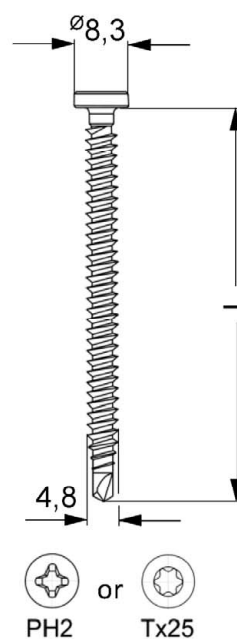
Zahn Flat Roof Fasteners

Combination 15
ZKSK-E-Modul 4,8 consisting of ZDBK-E / ZKSH oval module with module middle piece
and spike 4,8

Annex 15



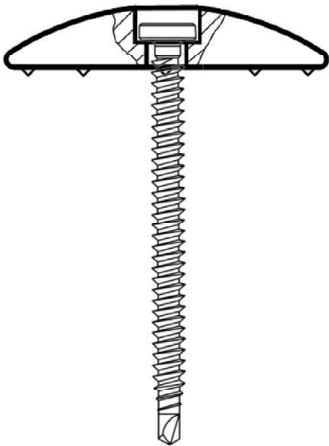
Zahn ZDBK-E 4,8 x L



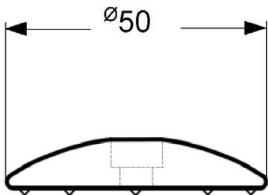
Zahn Flat Roof Fasteners

Combination 16
ZKSK-E/R-Modul 4,8 consisting of ZDBK-E/ZKSH round module with module middle piece
and spike 4,8

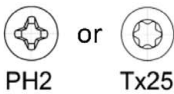
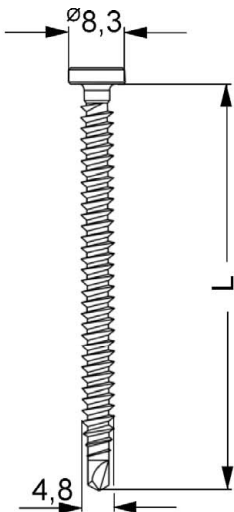
Annex 16



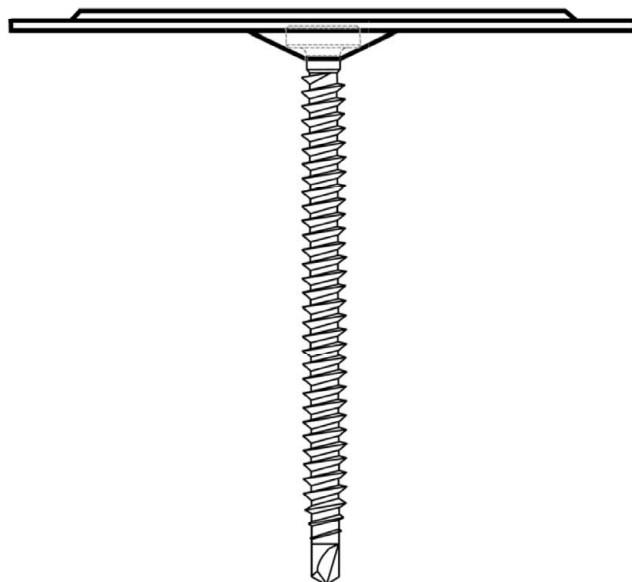
Zahn ZTSK 4,8



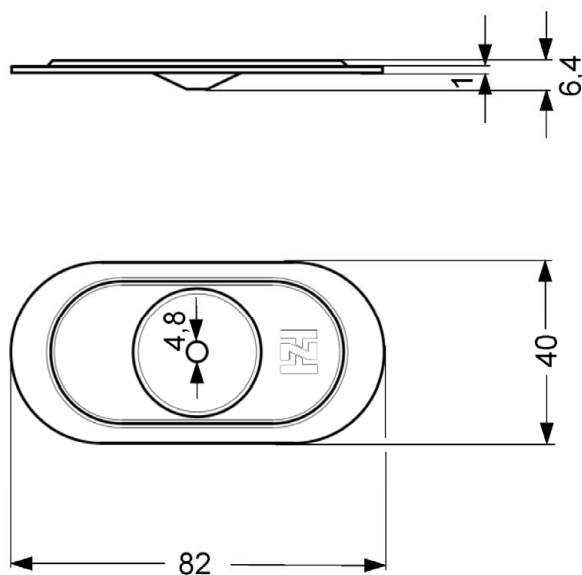
Zahn ZDBK-E 4,8 x L



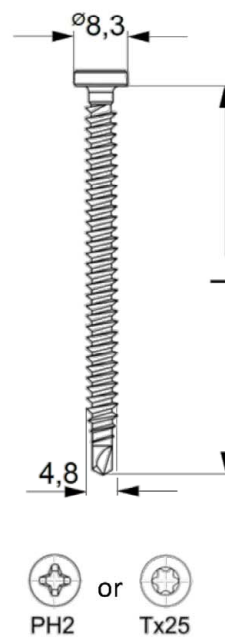
Zahn Flat Roof Fasteners	Annex 17
Combination 17 ZTSK-E 4,8 consisting of ZDBK-E / ZTSK 4,8	



Zahn ZLVT 0001



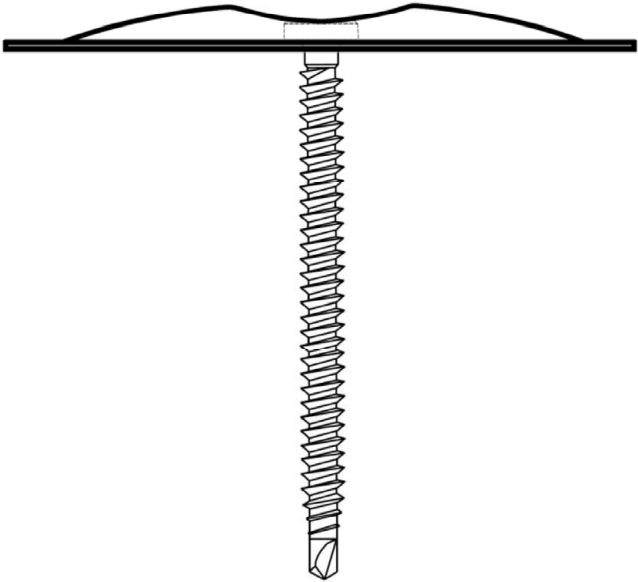
Zahn ZDBK-E 4,8 x L



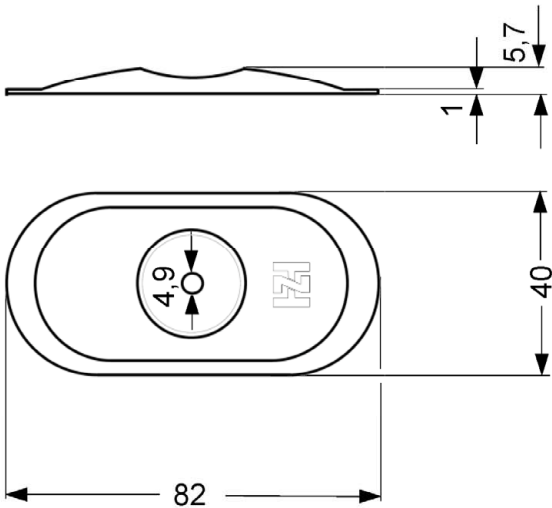
Zahn Flat Roof Fasteners

Combination 18
ZDBK-E / ZLVT 0001

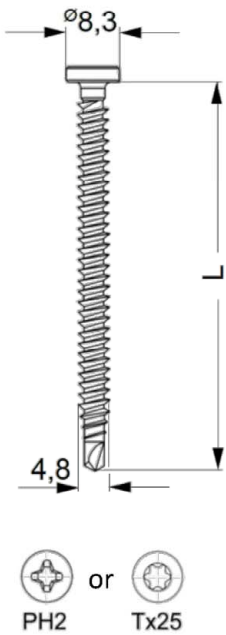
Annex 18



Zahn ZLVT 0005



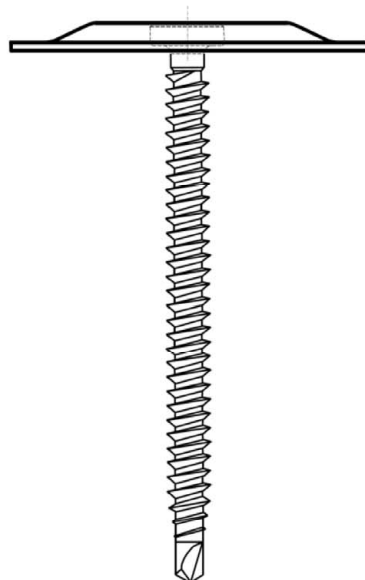
Zahn ZDBK-E 4,8 x L



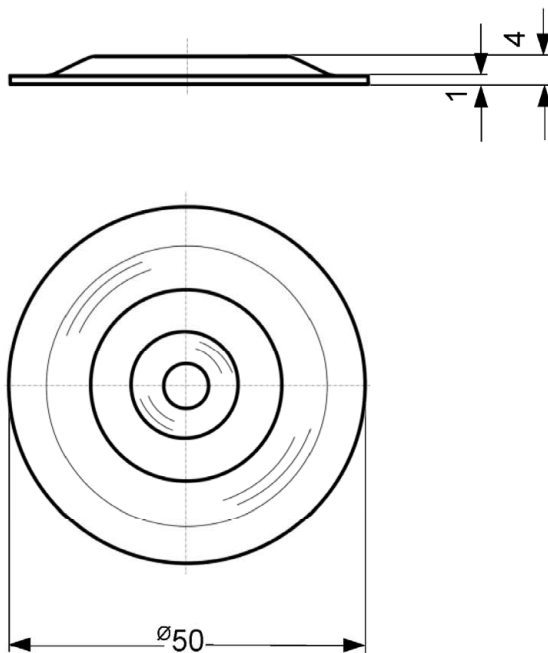
Zahn Flat Roof Fasteners

Combination 19
ZDBK-E / ZLVT 0005

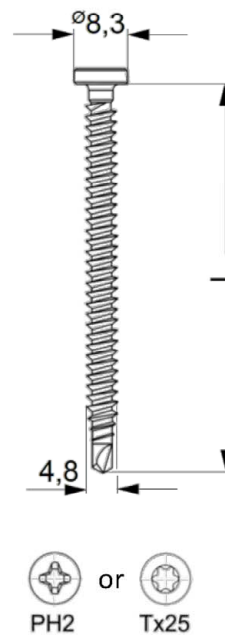
Annex 19



Zahn ZLVT 0015



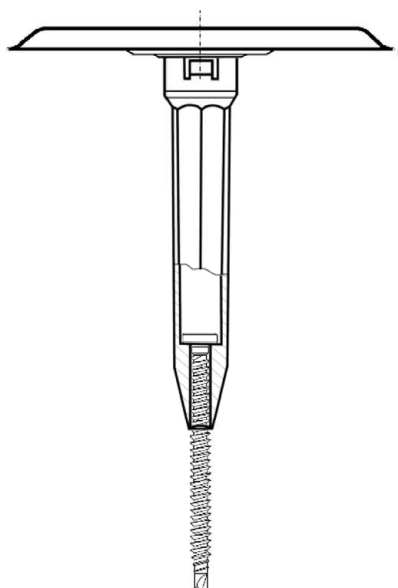
Zahn ZDBK-E 4,8 x L



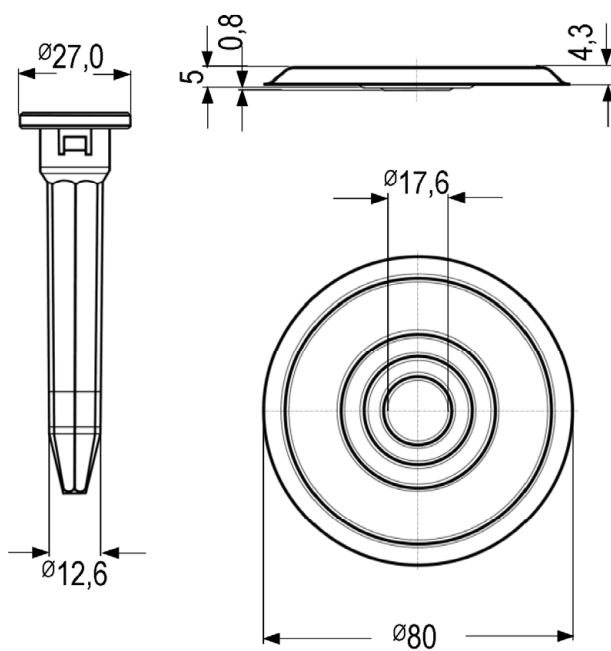
Zahn Flat Roof Fasteners

Combination 20
ZDBK-E / ZLVT 0015

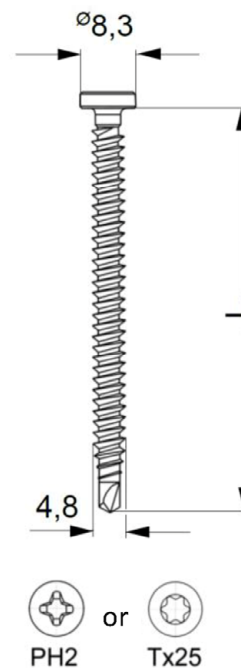
Annex 20



Zahn ZCTS-pipe 4,8 with ZCTS-plate



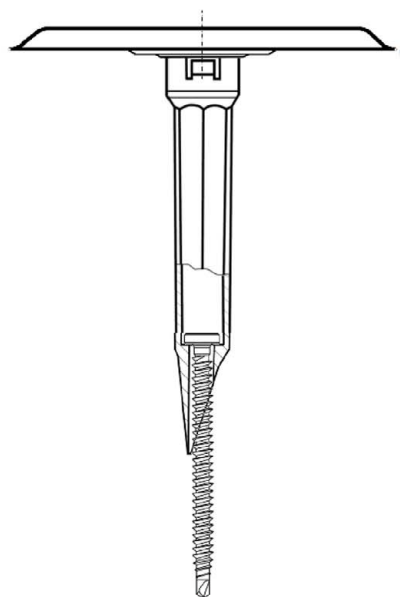
Zahn ZDBK-E 4,8 x L



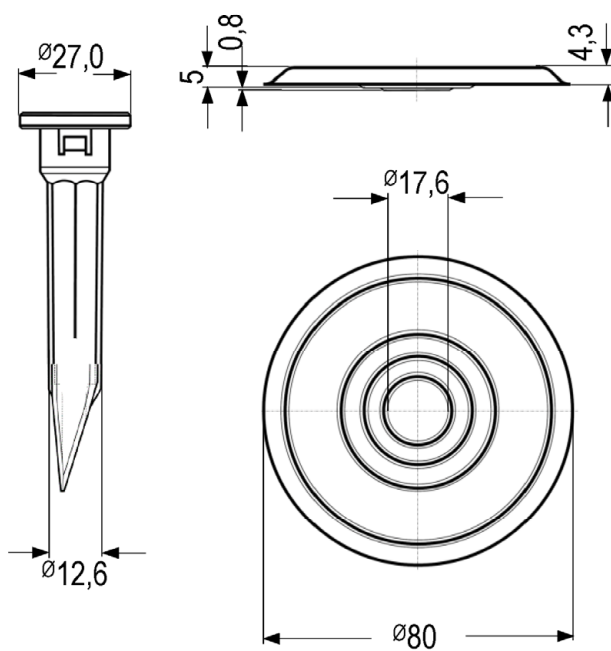
Zahn Flat Roof Fasteners

Combination 20a
ZCTS-E 4,8 consisting of ZDBK-E / ZCTS-pipe 4,8 and ZCTS-plate

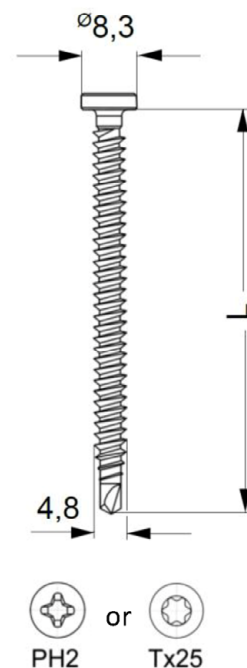
Annex 20a



Zahn ZCTSplus pipe with pile tip 4,8 mit ZCTS-plate



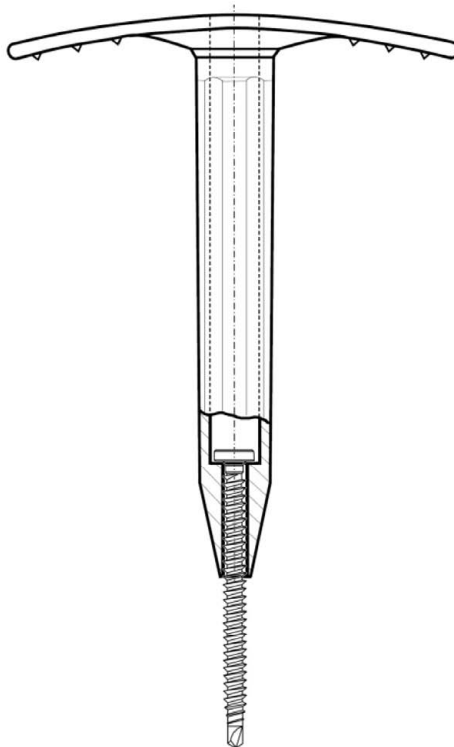
Zahn ZDBK-E 4,8 x L



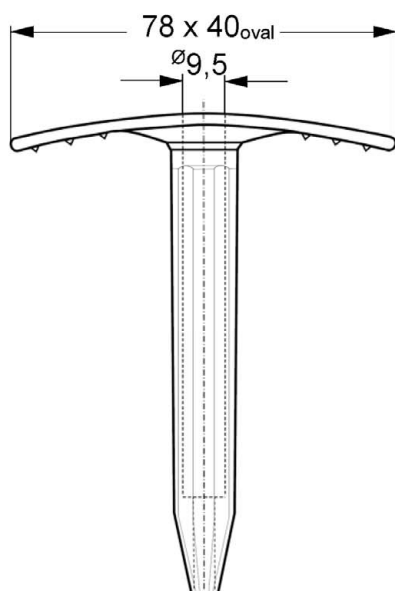
Zahn Flat Roof Fasteners

Combination 20b
ZCTSplus-E pipe with pile tip 4,8 consisting of ZDBK-E / ZCTSplus pipe with pile tip 4,8
and ZCTS-plate

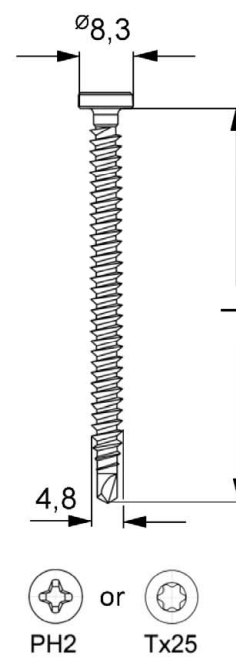
Annex 20b



Zahn ZKSH oval



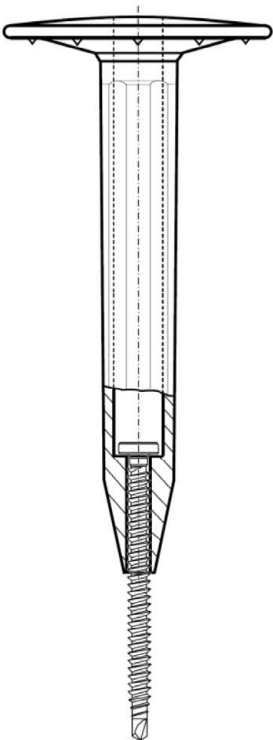
Zahn ZDBK-VB 4,8 x L



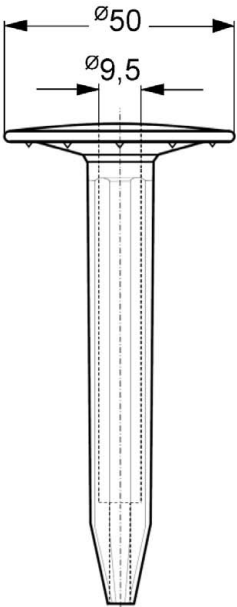
Zahn Flat Roof Fasteners

Combination 21
ZKSK-VB consisting of ZDBK-VB / ZKSH oval

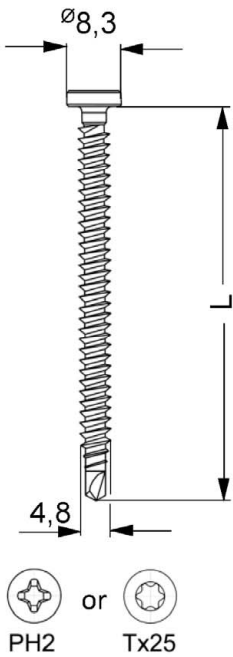
Annex 21



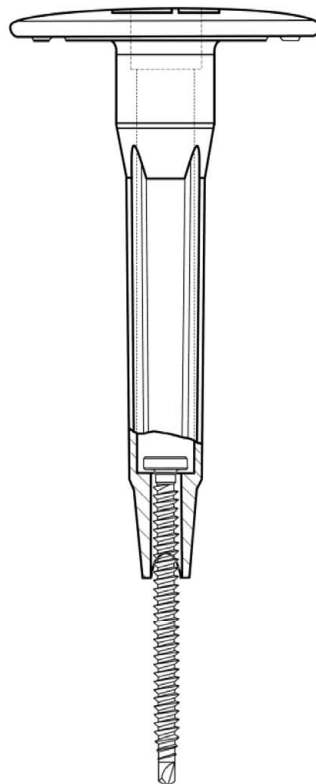
Zahn ZKSH round



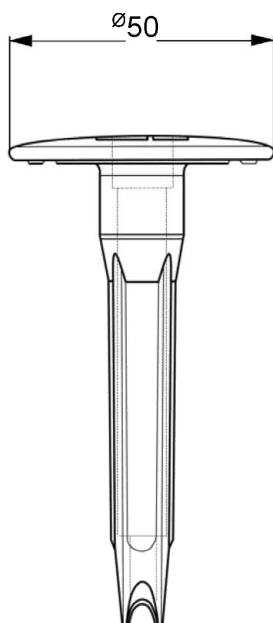
Zahn ZDBK-VB 4,8 x L



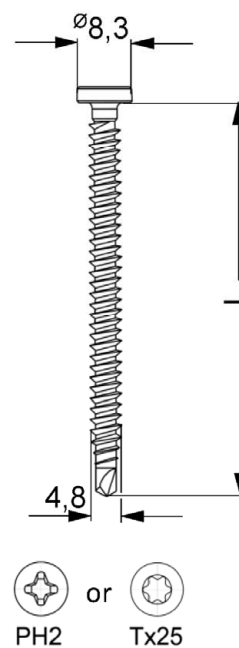
Zahn Flat Roof Fasteners	Annex 22
Combination 22 ZKSK-VB/R consisting of ZDBK-VB / ZKSH round	



Zahn ZKSH-Rplus



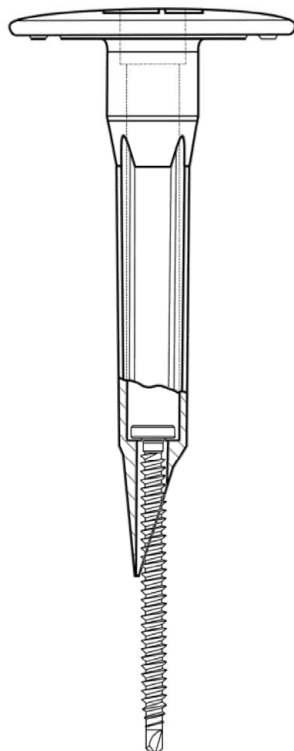
Zahn ZDBK-VB 4,8 x L



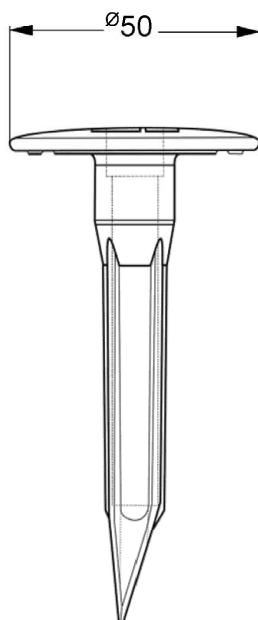
Zahn Flat Roof Fasteners

Combination 23
ZKSK-VB/Rplus consisting of ZDBK-VB / ZKSH-Rplus

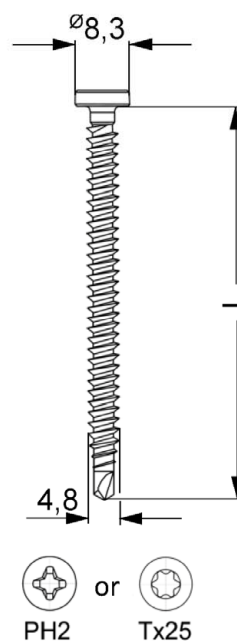
Annex 23



Zahn ZKSH-Rplus with pile tip



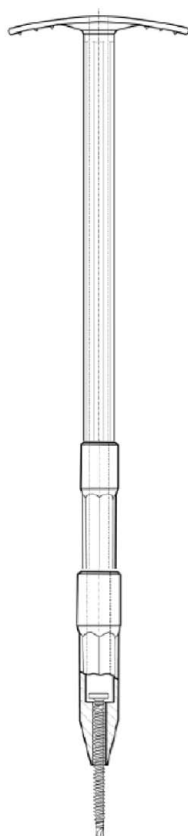
Zahn ZDBK-VB 4,8 x L



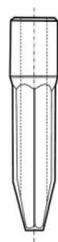
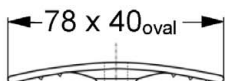
Zahn Flat Roof Fasteners

Combination 24
ZKSK-VB/Rplus with pile tip consisting of ZDBK-VB / ZKSH-Rplus with pile tip

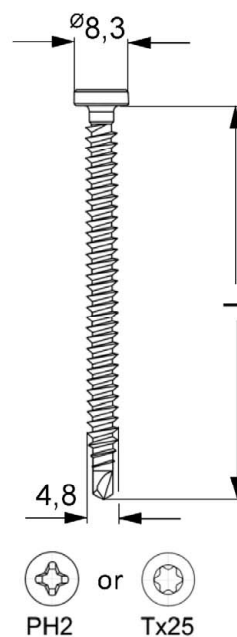
Annex 24



Zahn ZKSH oval module 4,8



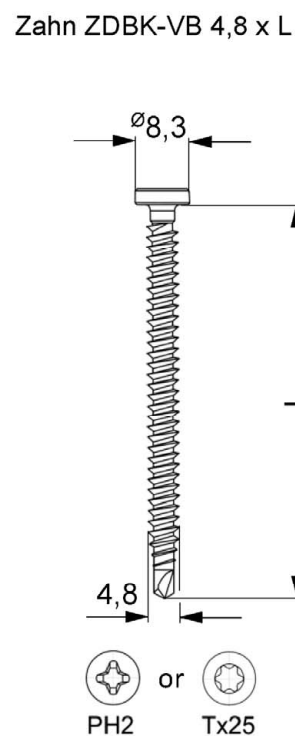
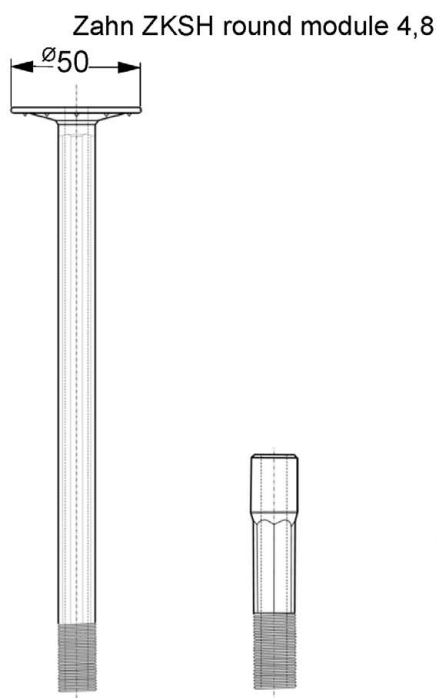
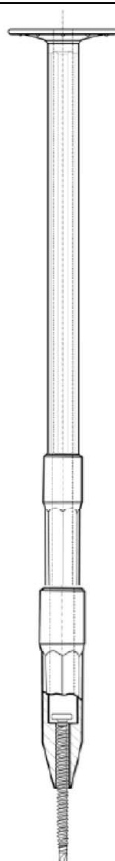
Zahn ZDBK-VB 4,8 x L



Zahn Flat Roof Fasteners

Combination 25
ZKSK-VB-Modul 4,8 consisting of ZDBK-VB / ZKSH oval module
with module middle piece and spike 4,8

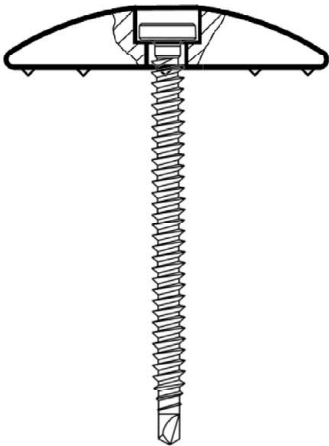
Annex 25



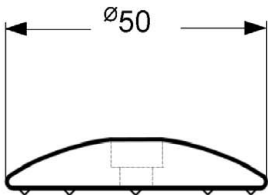
Zahn Flat Roof Fasteners

Combination 26
ZKSK-VB/R-Modul 4,8 consisting of ZDBK-VB/ZKSH round module
with module middle piece and spike 4,8

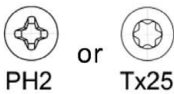
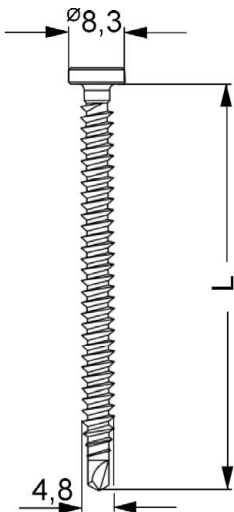
Annex 26



Zahn ZTSK 4,8



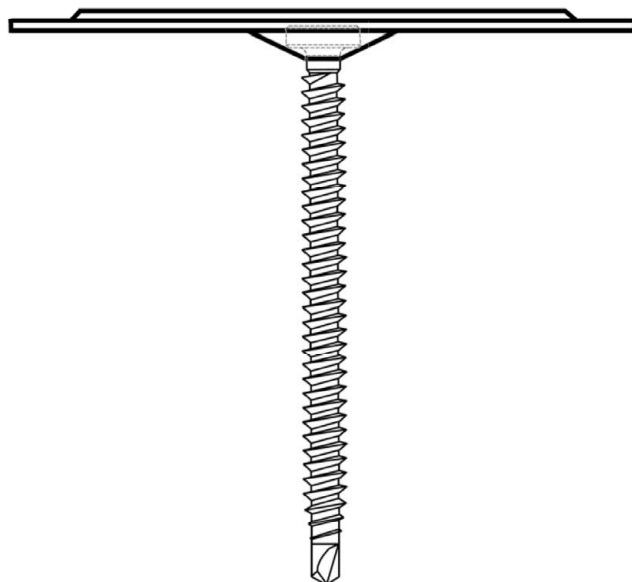
Zahn ZDBK-VB 4,8 x L



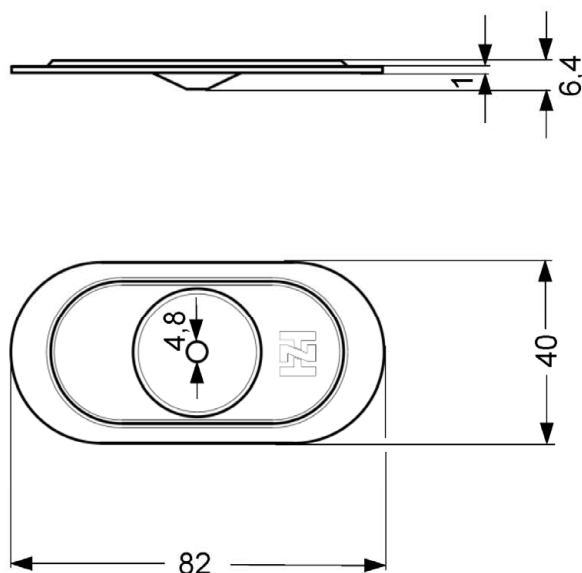
Zahn Flat Roof Fasteners

Combination 27
ZTSK-VB 4,8 consisting of ZDBK-VB / ZTSK 4,8

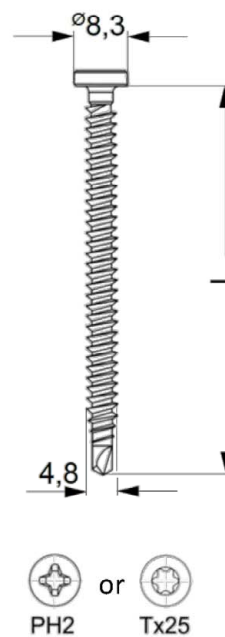
Annex 27



Zahn ZLVT 0001



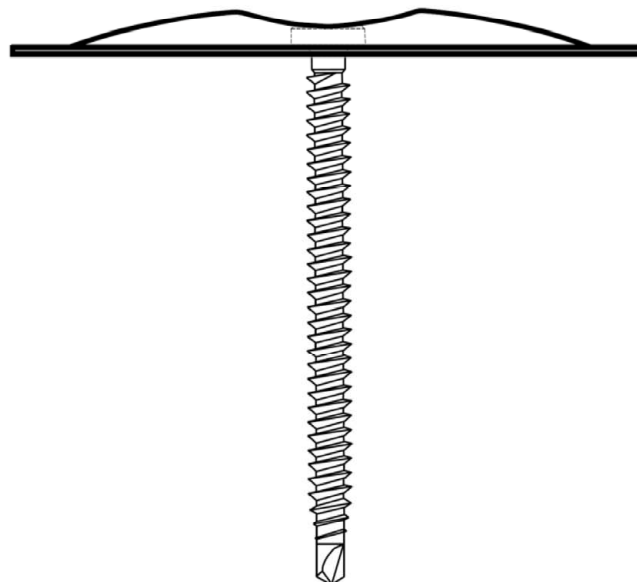
Zahn ZDBK-VB 4,8 x L



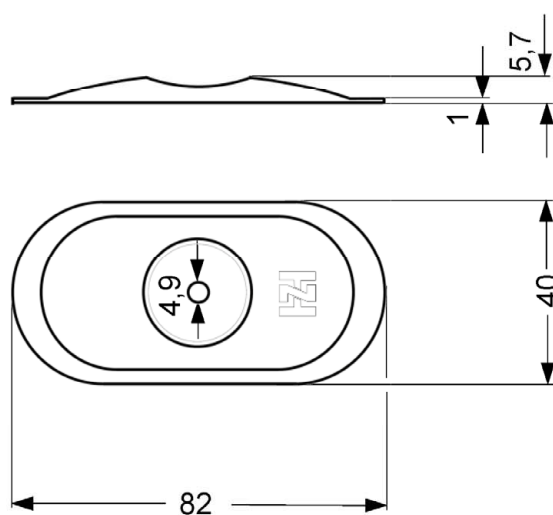
Zahn Flat Roof Fasteners

Combination 28
ZDBK-VB / ZLVT 0001

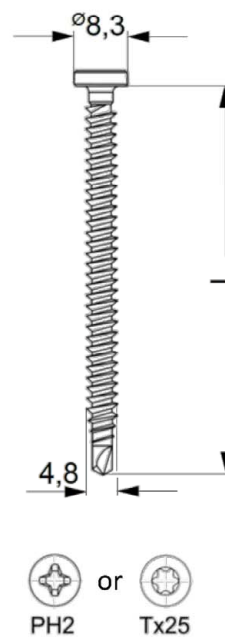
Annex 28



Zahn ZLVT 0005



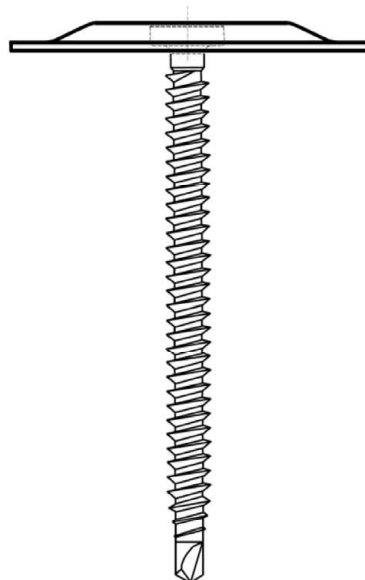
Zahn ZDBK-VB 4,8 x L



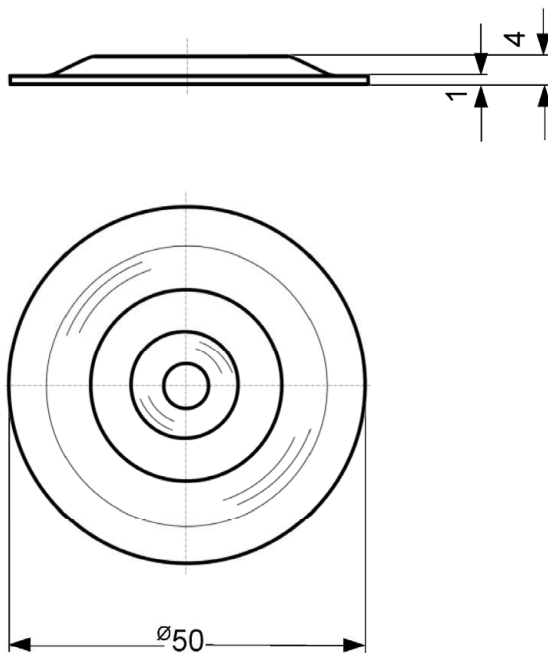
Zahn Flat Roof Fasteners

Combination 29
ZDBK-VB / ZLVT 0005

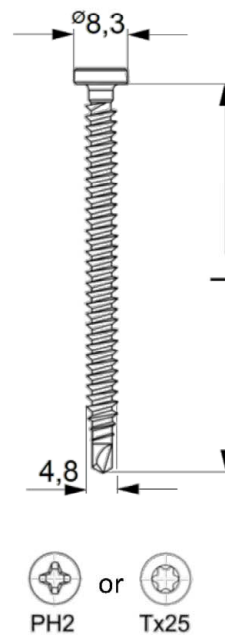
Annex 29



Zahn ZLVT 0015



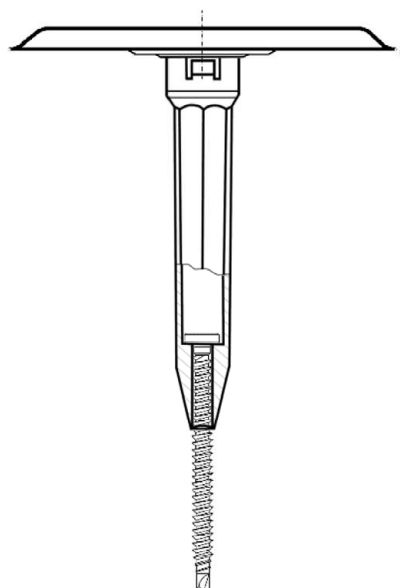
Zahn ZDBK-VB 4,8 x L



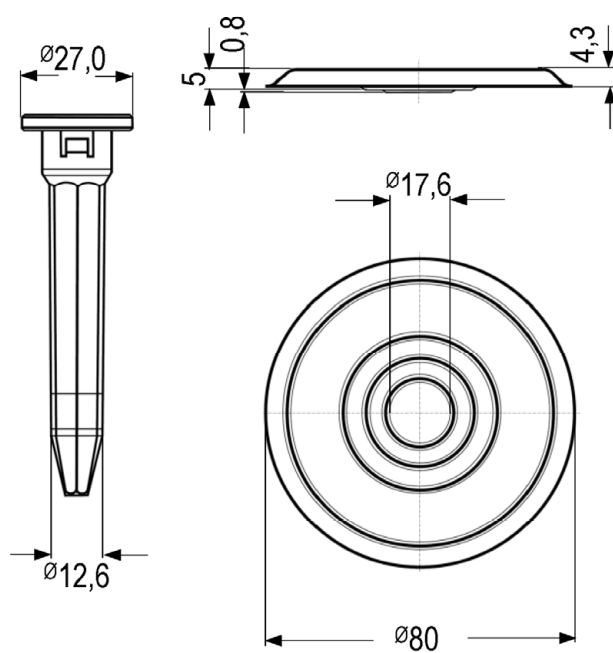
Zahn Flat Roof Fasteners

Combination 30
ZDBK-VB / ZLVT 0015

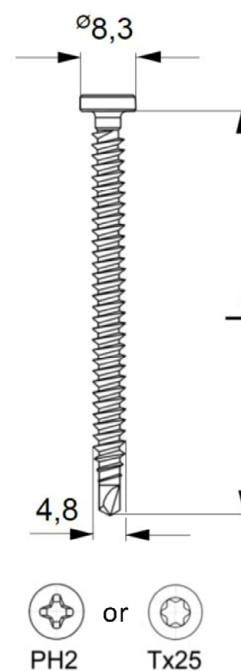
Annex 30



Zahn ZCTS-pipe 4,8 with ZCTS-plate



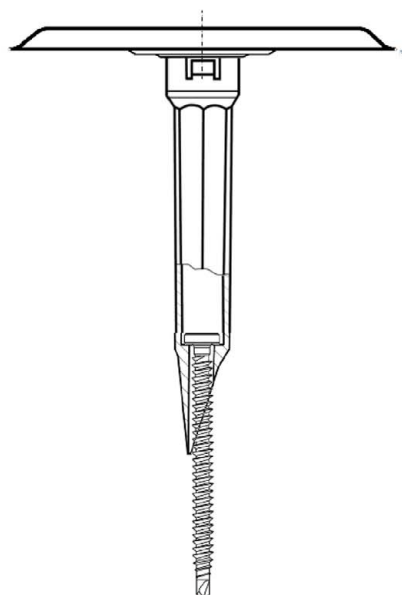
Zahn ZDBK-VB 4,8 x L



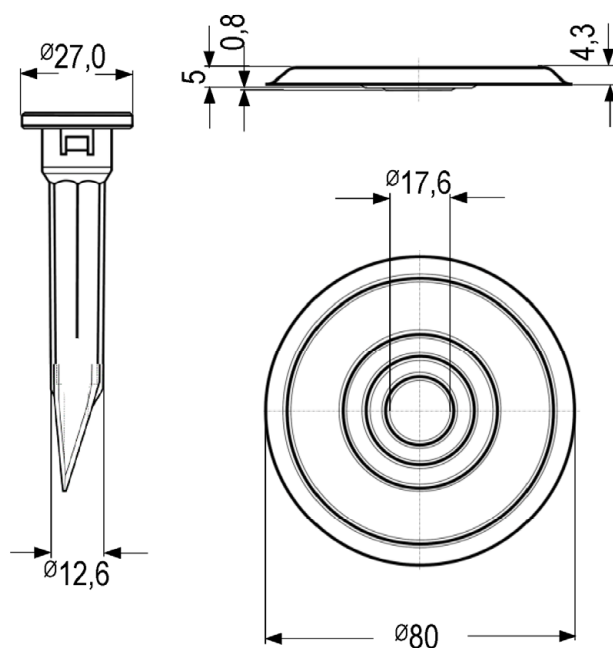
Zahn Flat Roof Fasteners

Combination 30a
ZCTS-VB 4,8 consisting of ZDBK-VB / ZCTS- pipe 4,8 and ZCTS-plate

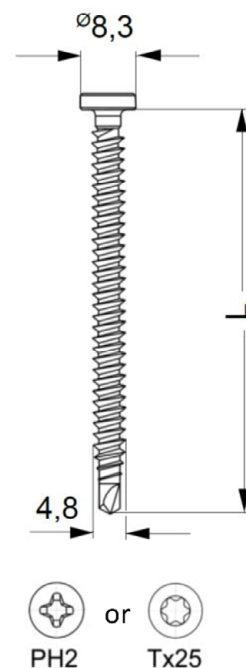
Annex 30a



Zahn ZCTSplus-VB pipe with pile tip 4,8 with ZCTS-plate



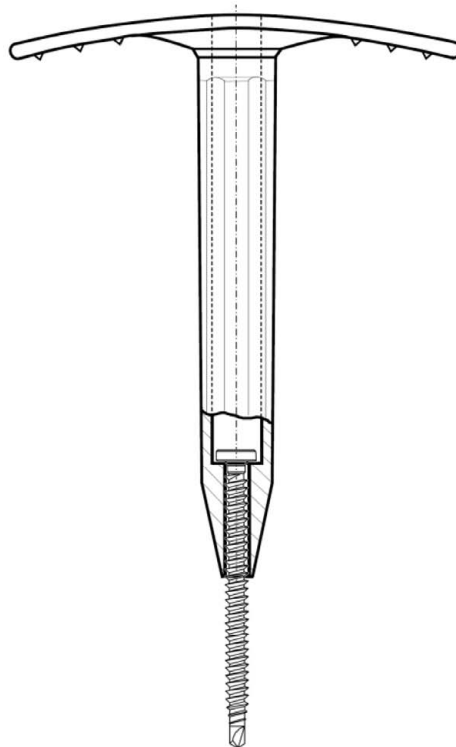
Zahn ZDBK-VB 4,8 x L



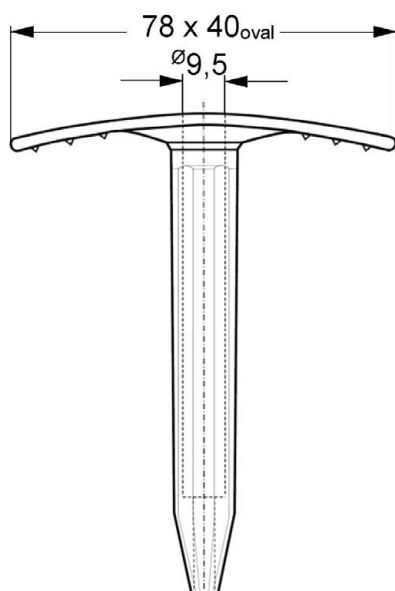
Zahn Flat Roof Fasteners

Combination 30b
ZCTSplus-VB pipe with pile tip 4,8 consisting of ZDBK-VB / ZCTSplus pipe
with pile tip 4,8 and ZCTS-plate

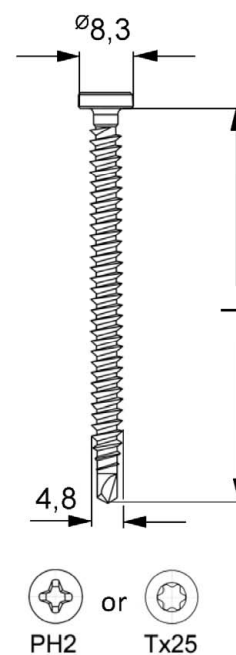
Annex 30b



Zahn ZKSH oval



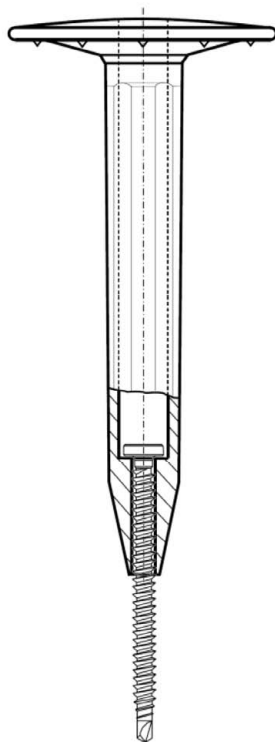
Zahn ZDBK-VB-E 4,8 x L



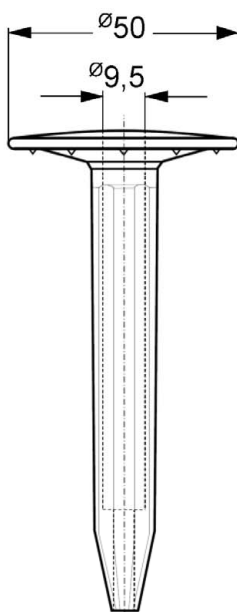
Zahn Flat Roof Fasteners

Combination 31
ZKSK-VB-E consisting of ZDBK-VB-E / ZKSH oval

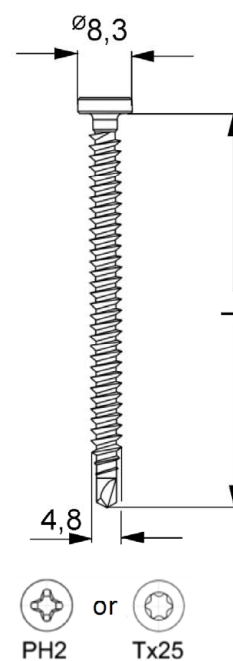
Annex 31



Zahn ZKSH round



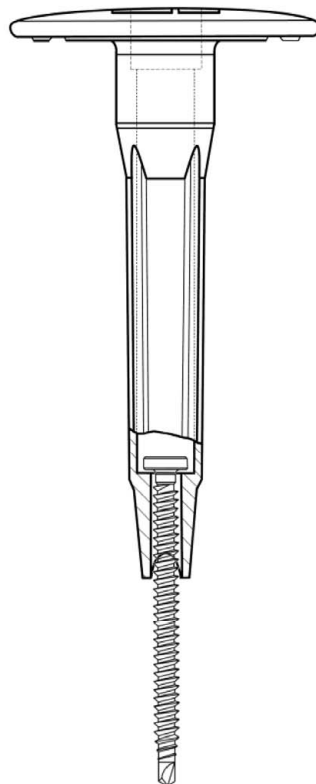
Zahn ZDBK-VB-E 4,8 x L



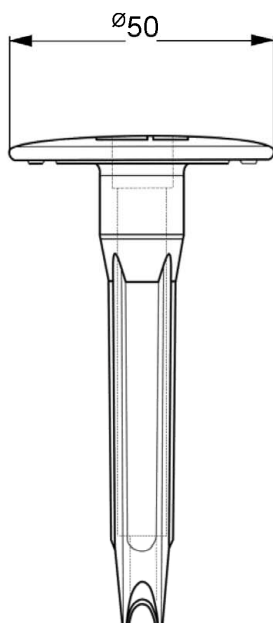
Zahn Flat Roof Fasteners

Combination 32
ZKSK-VB-E/R consisting of ZDBK-VB-E / ZKSH round

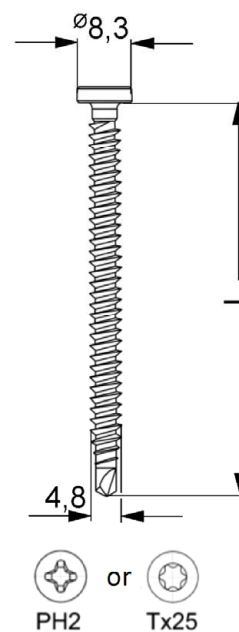
Annex 32



Zahn ZKSH-Rplus



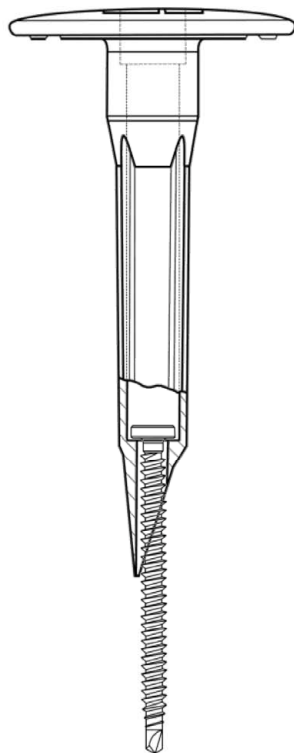
Zahn ZDBK-VB-E 4,8 x L



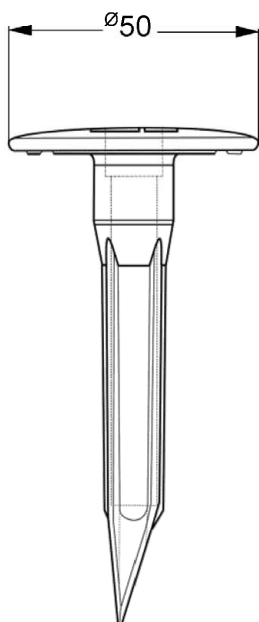
Zahn Flat Roof Fasteners

Combination 33
ZKSK-VB-E/Rplus consisting of ZDBK-VB-E / ZKSH-Rplus

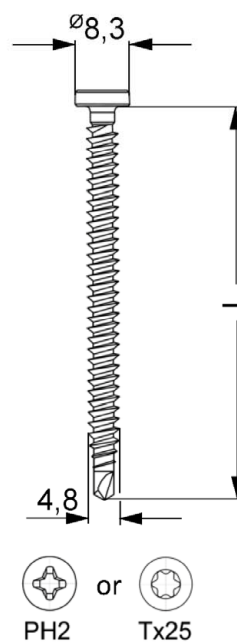
Annex 33



Zahn ZKSH-Rplus with pile tip



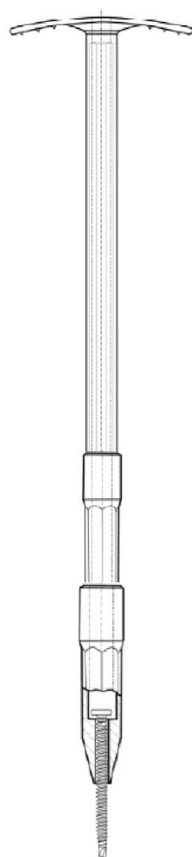
Zahn ZDBK-VB-E 4,8 x L



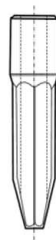
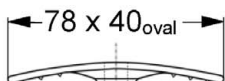
Zahn Flat Roof Fasteners

Combination 34
ZKSK-VB-E/Rplus with pile tip consisting of ZDBK-VB-E / ZKSH-Rplus with pile tip

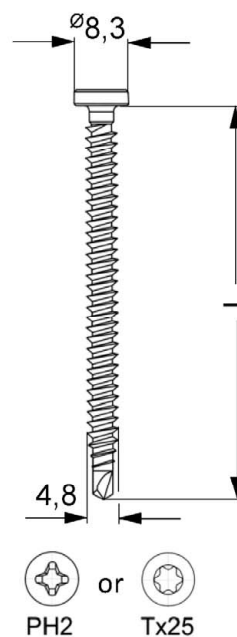
Annex 34



Zahn ZKSH oval module 4,8



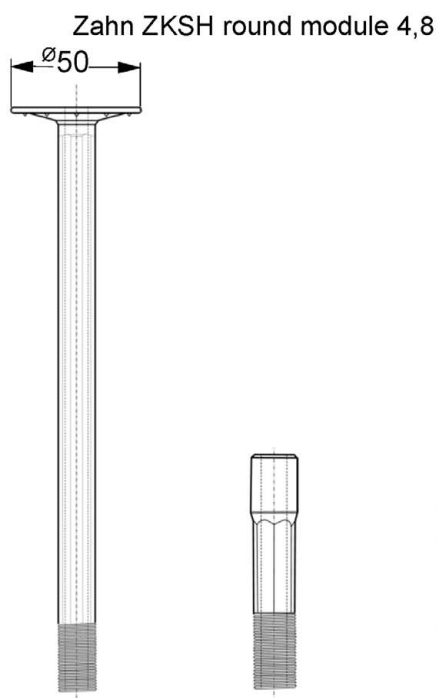
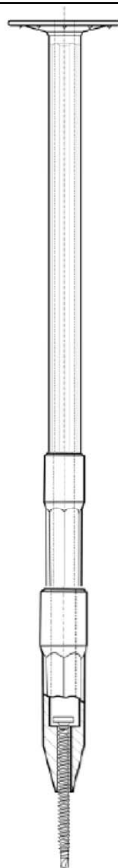
Zahn ZDBK-VB-E 4,8 x L



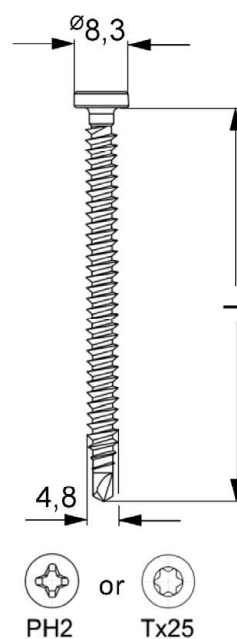
Zahn Flat Roof Fasteners

Combination 35
ZKSK-VB-E-Modul 4,8 consisting of ZDBK-VB-E/ZKSH oval module
with module middle piece and spike 4,8

Annex 35



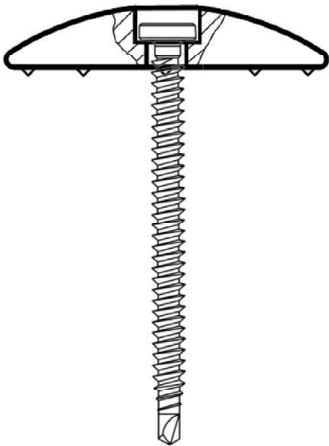
Zahn ZDBK-VB-E 4,8 x L



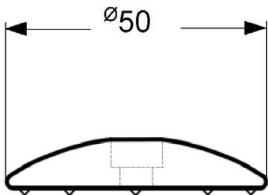
Zahn Flat Roof Fasteners

Combination 36
ZKSK-VB-E/R-Modul 4,8 consisting of ZDBK-VB-E/ZKSH round module
with module middle piece and spike 4,8

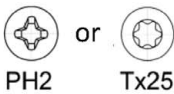
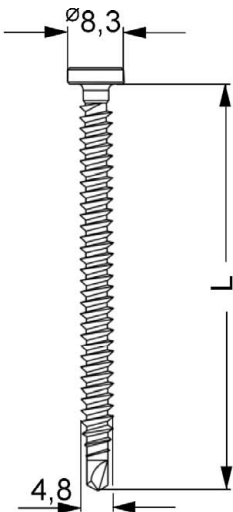
Annex 36



Zahn ZTSK 4,8



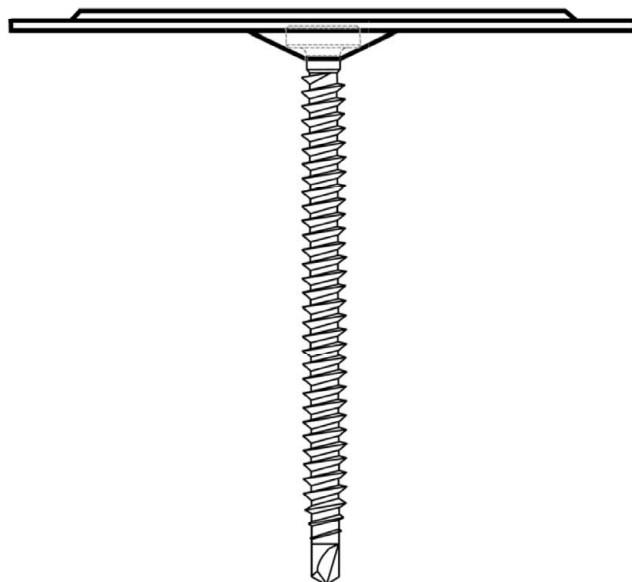
Zahn ZDBK-VB-E 4,8 x L



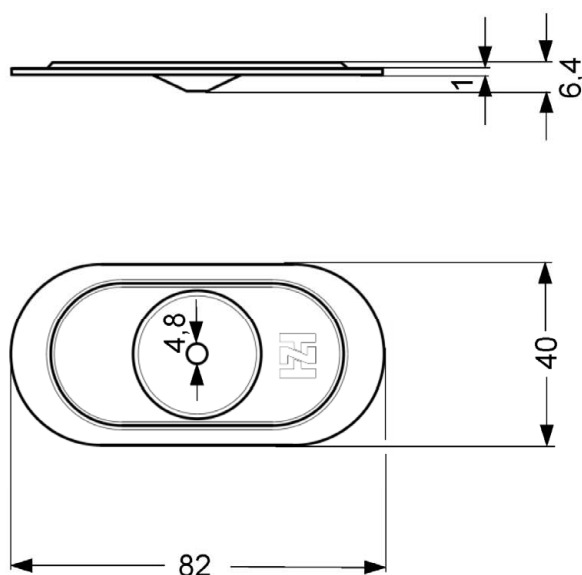
Zahn Flat Roof Fasteners

Combination 37
ZTSK-VB-E 4,8 consisting of ZDBK-VB-E / ZTSK 4,8

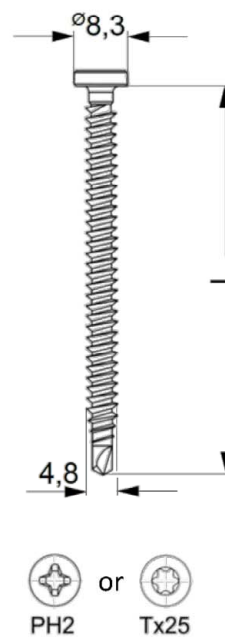
Annex 37



Zahn ZLVT 0001



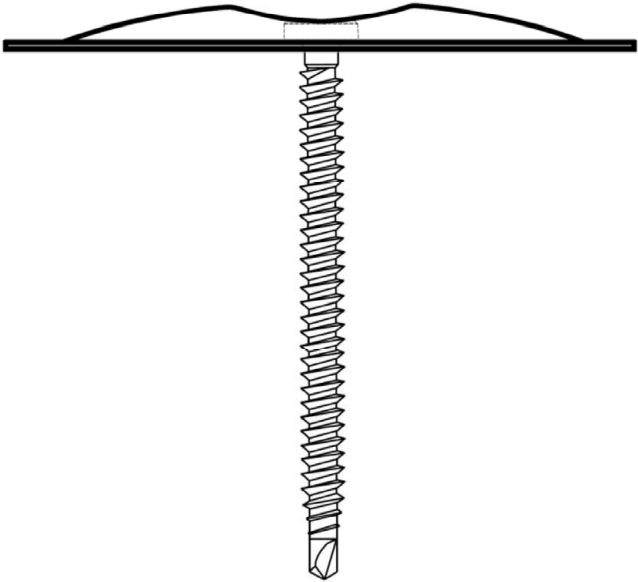
Zahn ZDBK-VB-E 4,8 x L



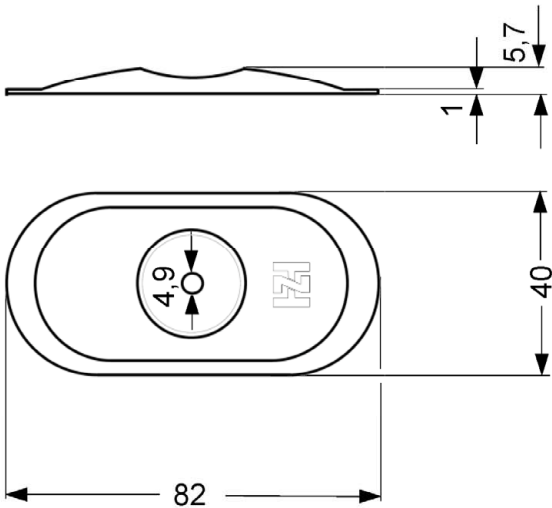
Zahn Flat Roof Fasteners

Combination 38
ZDBK-VB-E / ZLVT 0001

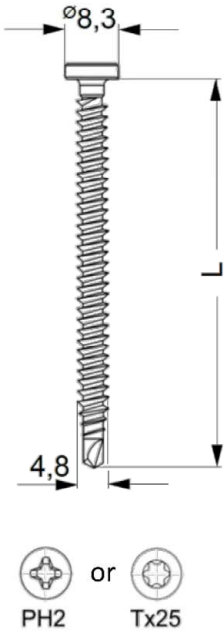
Annex 38



Zahn ZLVT 0005



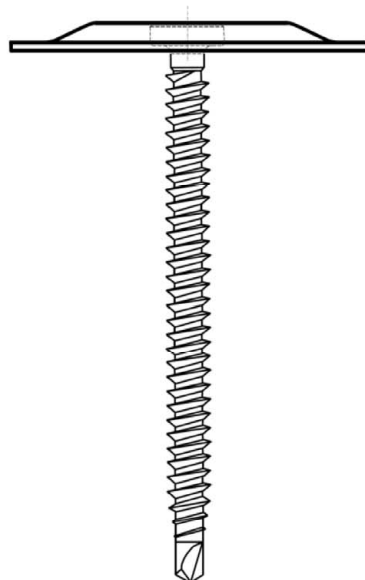
Zahn ZDBK-VB-E 4,8 x L



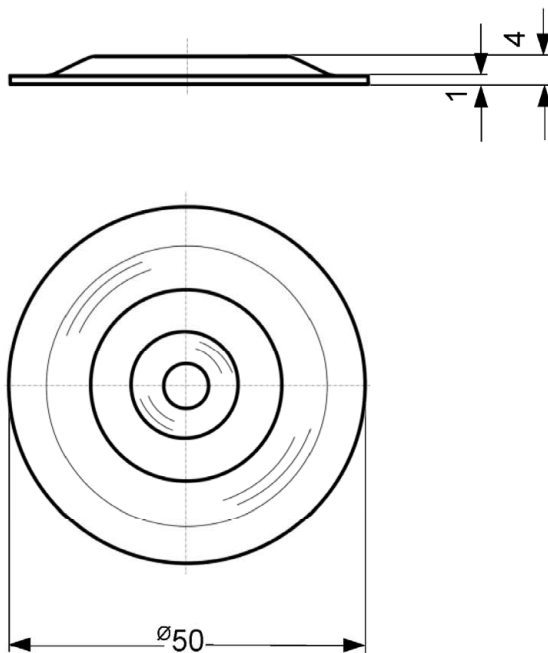
Zahn Flat Roof Fasteners

Combination 39
ZDBK-VB-E / ZLVT 0005

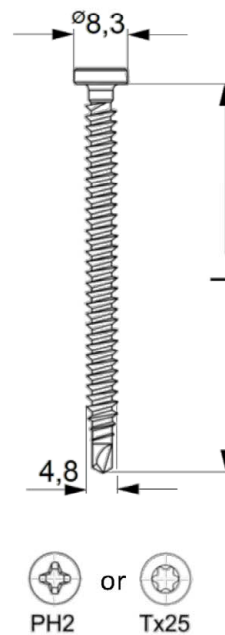
Annex 39



Zahn ZLVT 0015



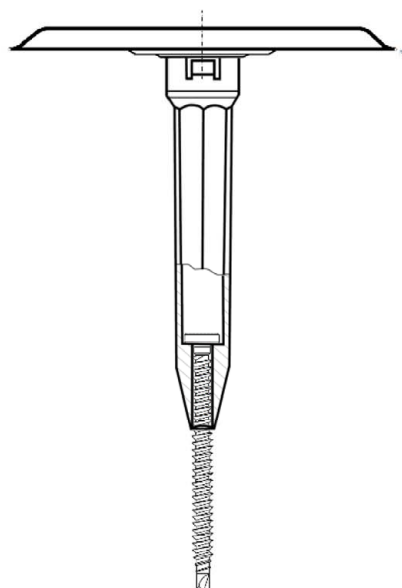
Zahn ZDBK-VB-E 4,8 x L



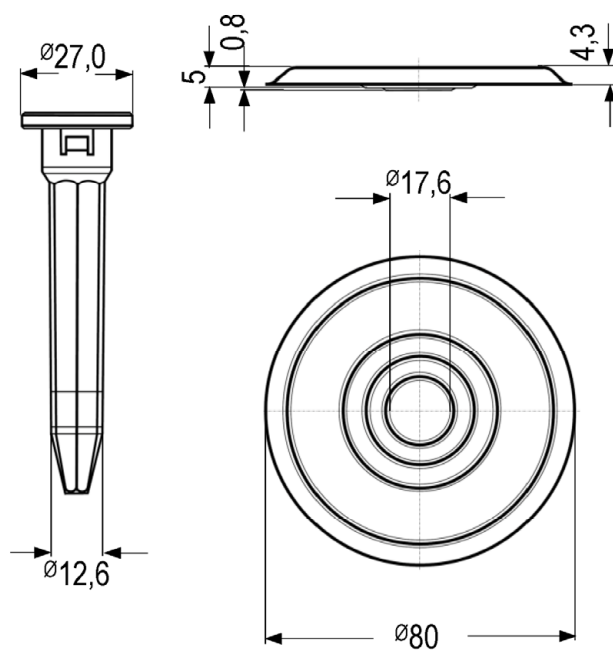
Zahn Flat Roof Fasteners

Combination 40
ZDBK-VB-E / ZLVT 0015

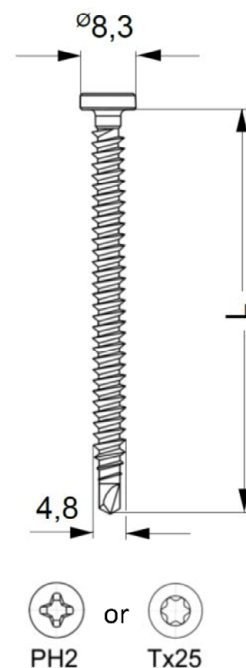
Annex 40



Zahn ZCTS-pipe 4,8 with ZCTS-plate



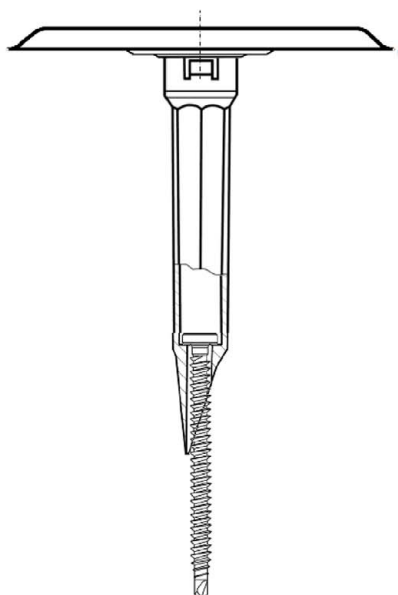
Zahn ZDBK-VB-E 4,8 x L



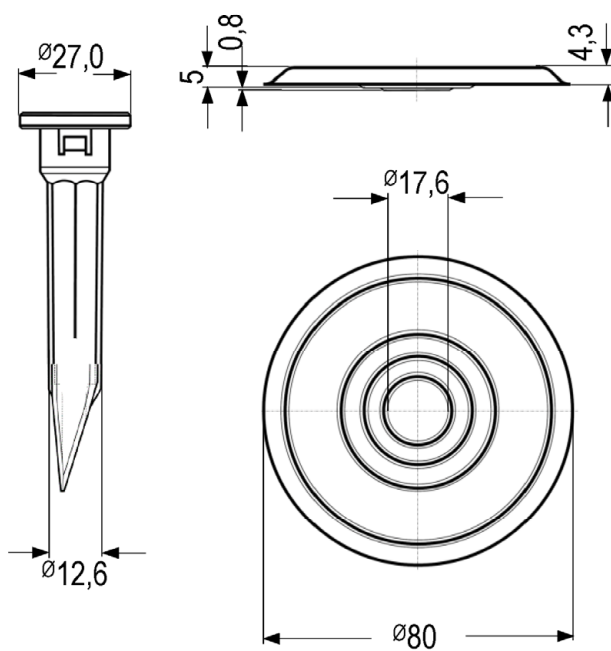
Zahn Flat Roof Fasteners

Combination 40a
ZCTS-VB-E 4,8 consisting of ZDBK-VB-E / ZCTS-pipe 4,8 and ZCTS-plate

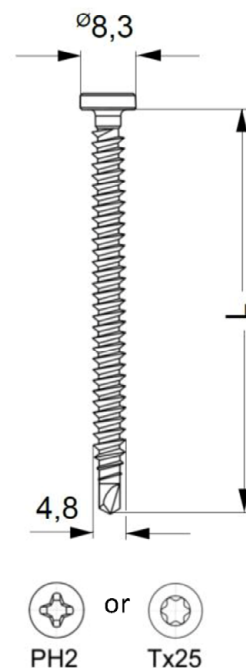
Annex 40a



Zahn ZCTSplus pipe with pile tip 4,8 with ZCTS-plate



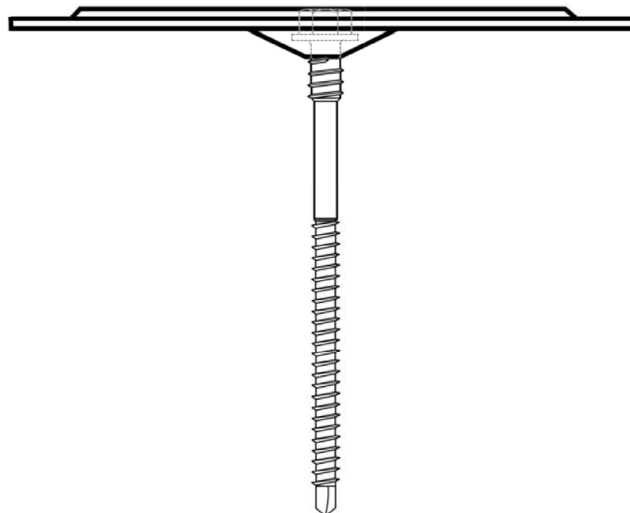
Zahn ZDBK-VB-E 4,8 x L



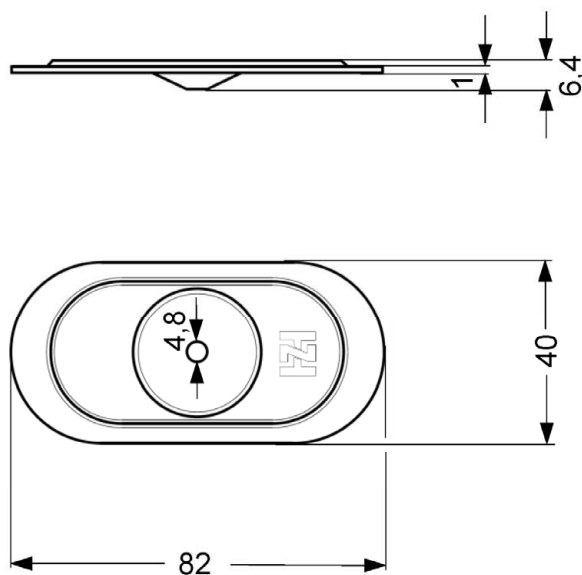
Zahn Flat Roof Fasteners

Combination 40b
ZCTSplus-VB-E pipe with pile tip 4,8 consisting of ZDBK-VB-E / ZCTSplus pipe
with pile tip 4,8 and ZCTS-plate

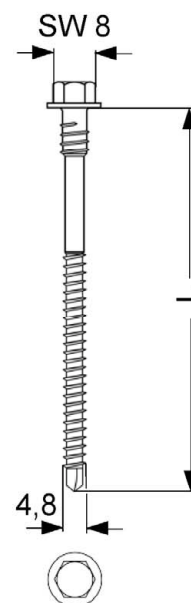
Annex 40b



Zahn ZLVT 0001



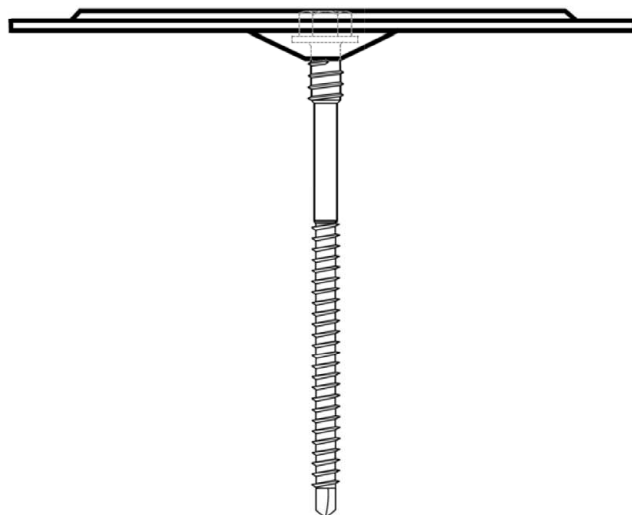
Zahn ZDBS 4,8 x L



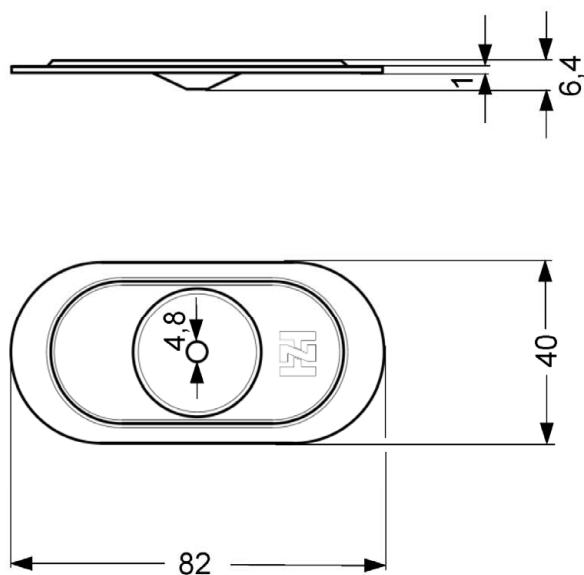
Zahn Flat Roof Fasteners

Combination 41
ZDBS / ZLVT 0001

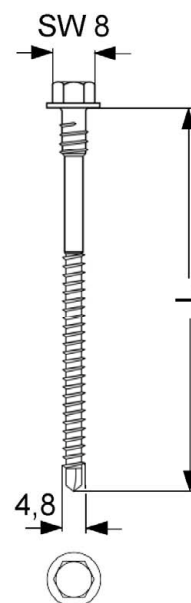
Annex 41



Zahn ZLVT 0001



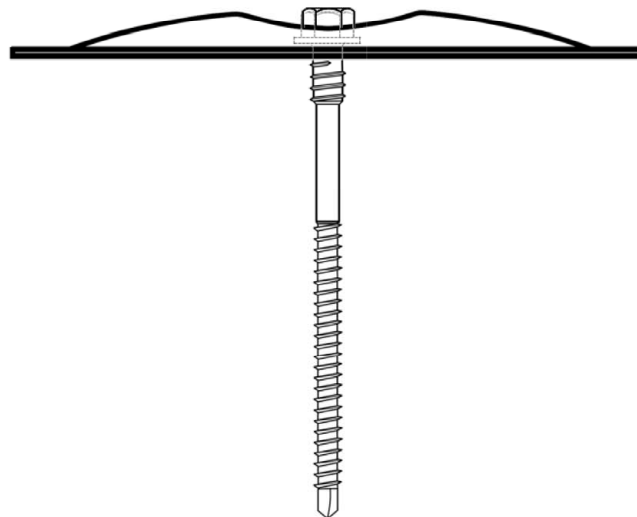
Zahn ZDBS-VB 4,8 x L



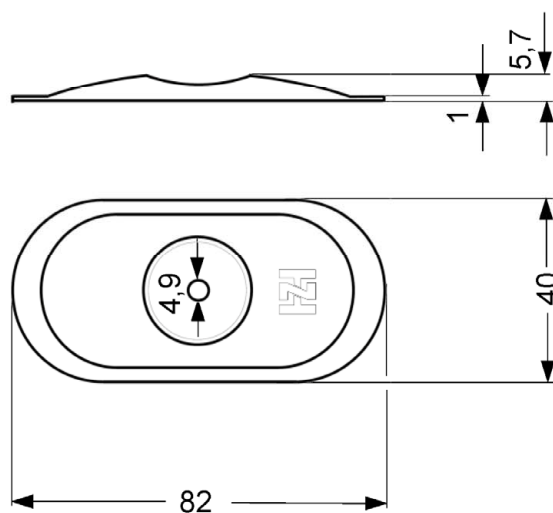
Zahn Flat Roof Fasteners

Combination 41a
ZDBS-VB / ZLVT 0001

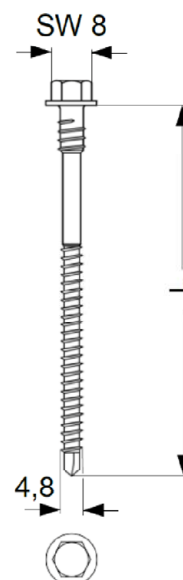
Annex 41a



Zahn ZLVT 0005



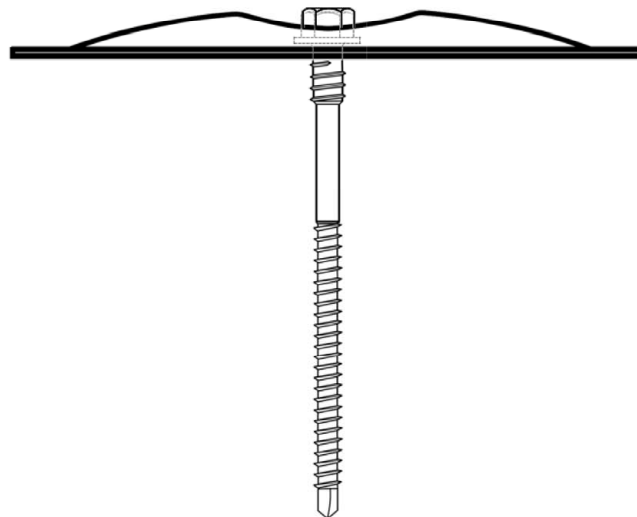
Zahn ZDBS 4,8 x L



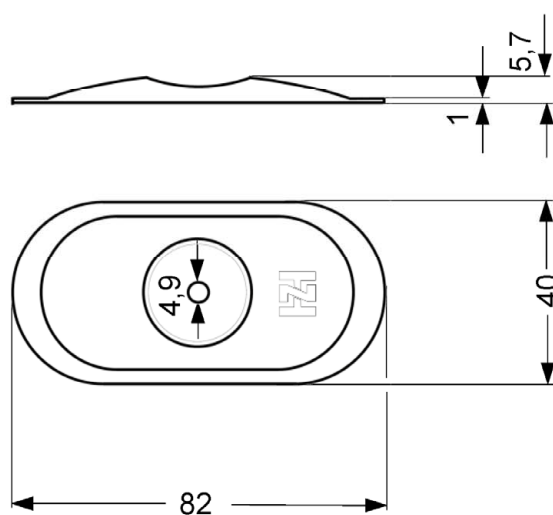
Zahn Flat Roof Fasteners

Combination 42
ZDBS / ZLVT 0005

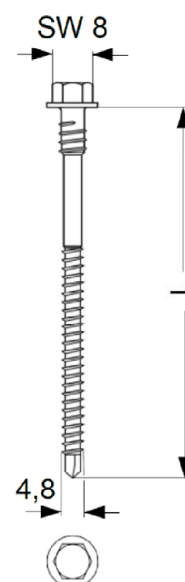
Annex 42



Zahn ZLVT 0005



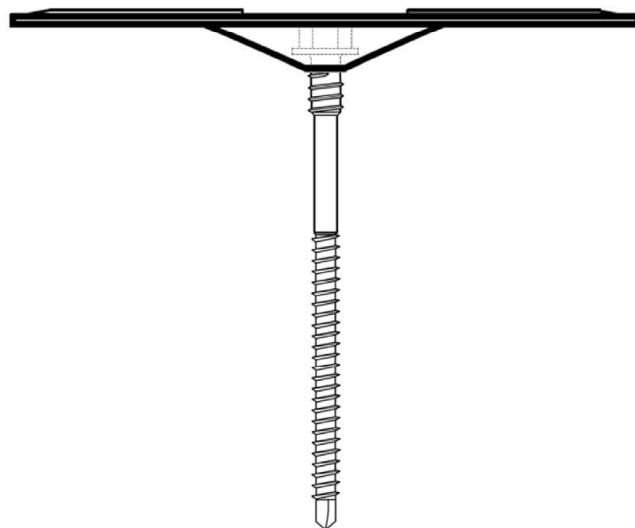
Zahn ZDBS-VB 4,8 x L



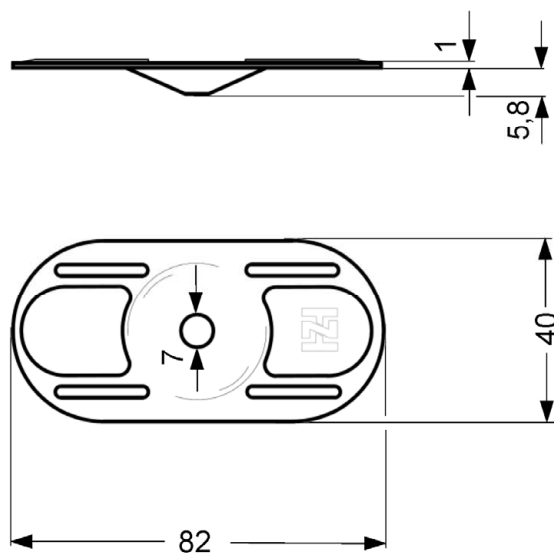
Zahn Flat Roof Fasteners

Combination 42a
ZDBS-VB / ZLVT 0005

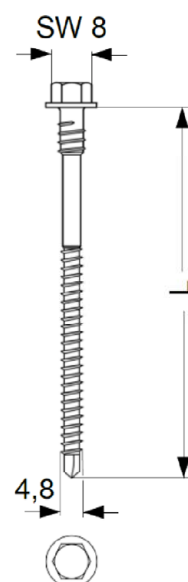
Annex 42a



Zahn ZLVT 0012



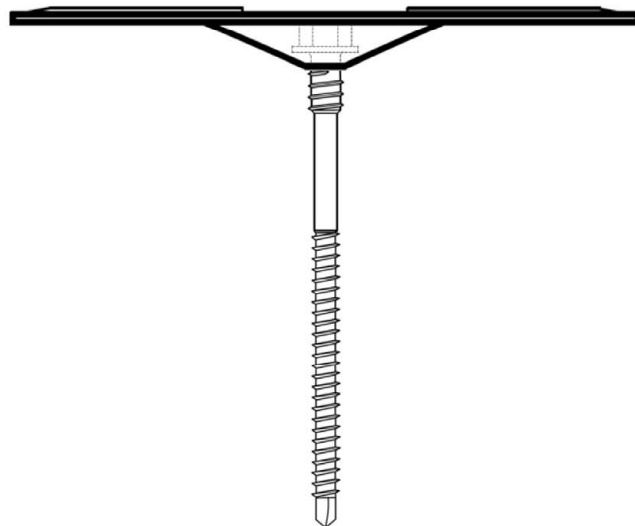
Zahn ZDBS 4,8 x L



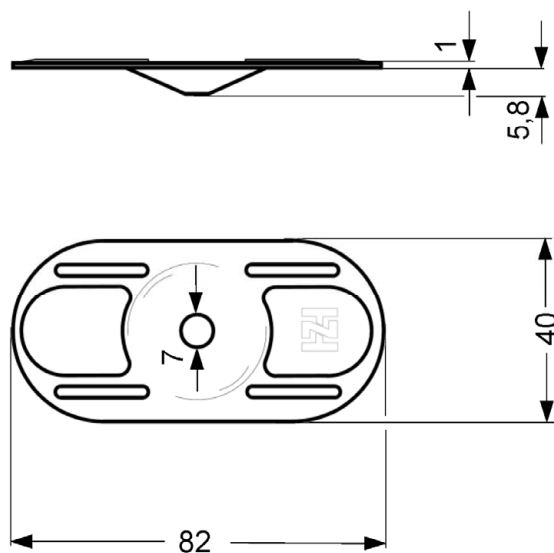
Zahn Flat Roof Fasteners

Combination 43
ZDBS / ZLVT 0012

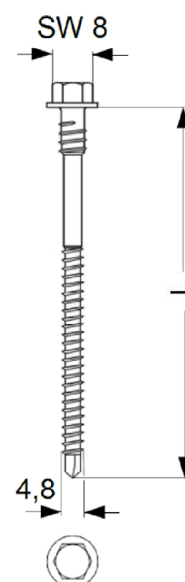
Annex 43



Zahn ZLVT 0012



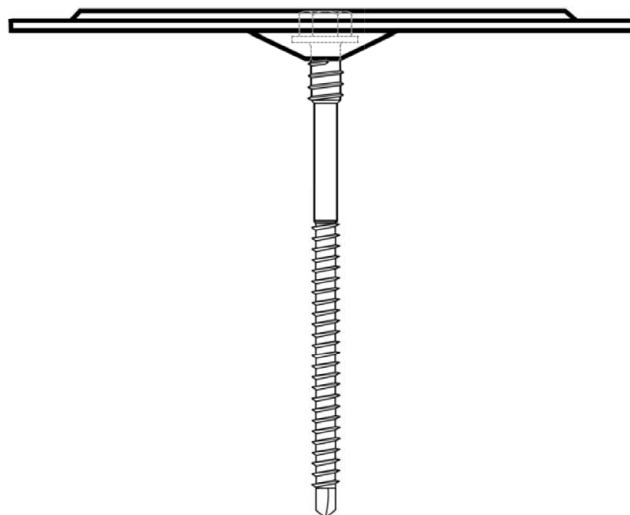
Zahn ZDBS-VB 4,8 x L



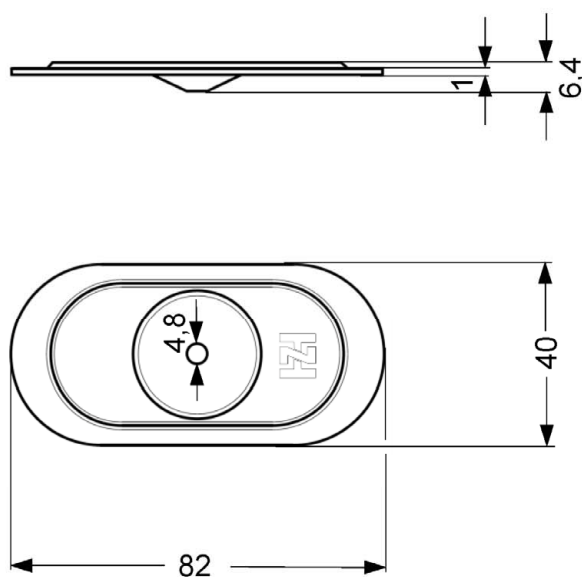
Zahn Flat Roof Fasteners

Combination 43a
ZDBS-VB / ZLVT 0012

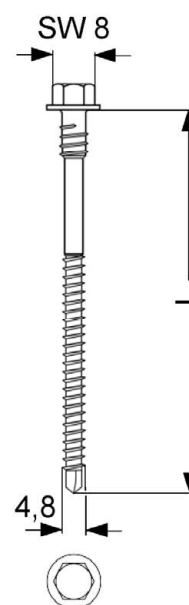
Annex 43a



Zahn ZLVT 0001



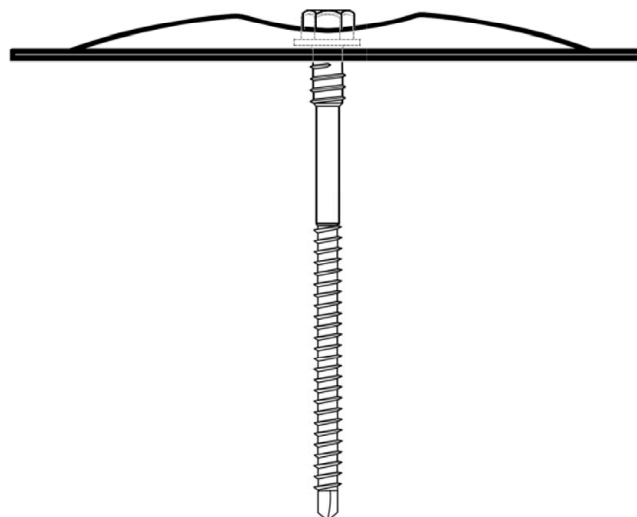
Zahn ZDBS-E 4,8 x L



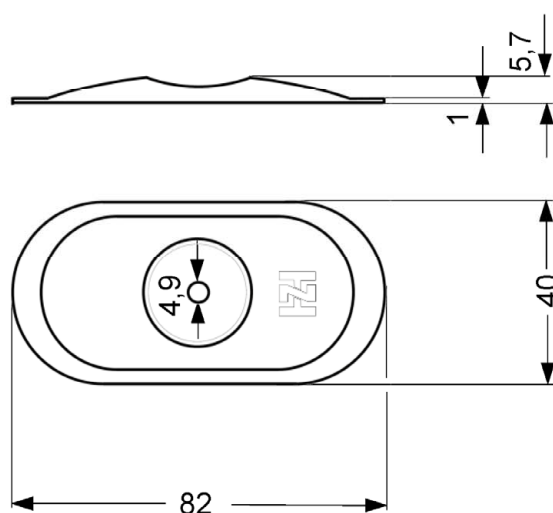
Zahn Flat Roof Fasteners

Combination 44
ZDBS-E / ZLVT 0001

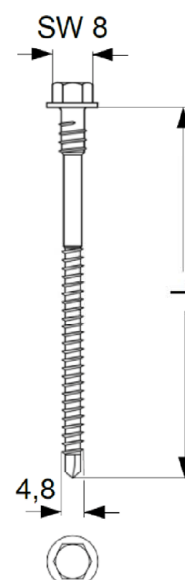
Annex 44



Zahn ZLVT 0005



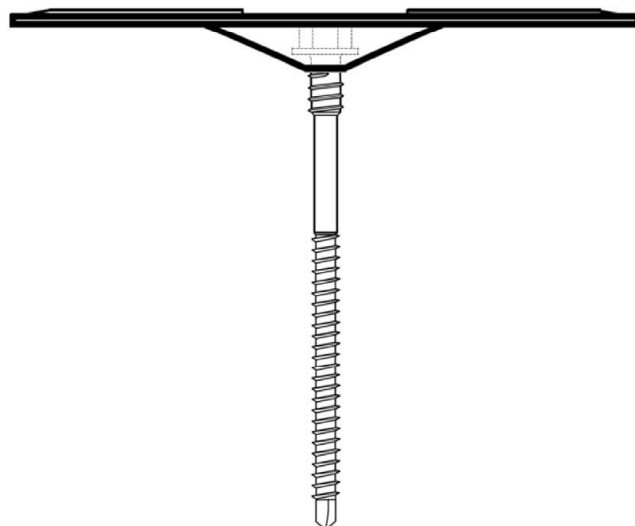
Zahn ZDBS-E 4,8 x L



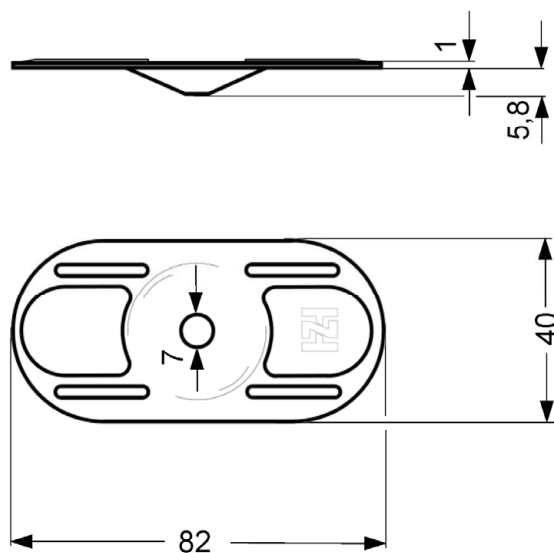
Zahn Flat Roof Fasteners

Combination 45
ZDBS-E / ZLVT 0005

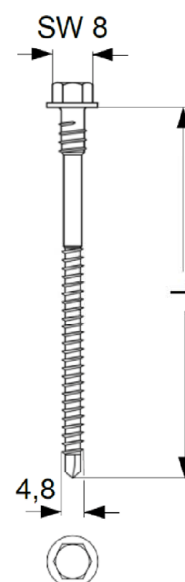
Annex 45



Zahn ZLVT 0012



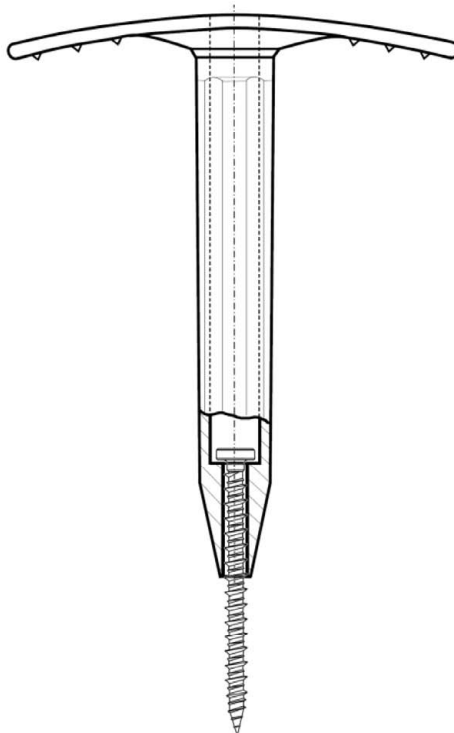
Zahn ZDBS-E 4,8 x L



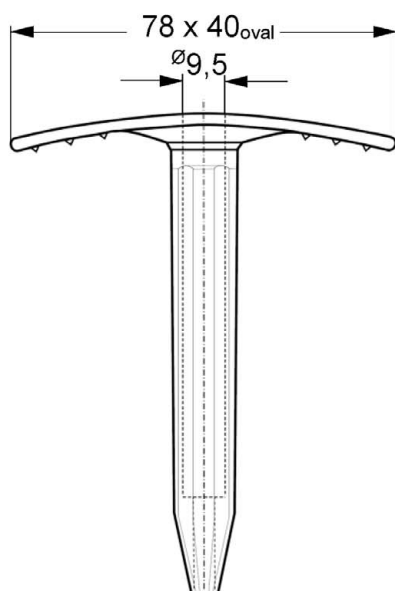
Zahn Flat Roof Fasteners

Combination 46
ZDBS-E / ZLVT 0012

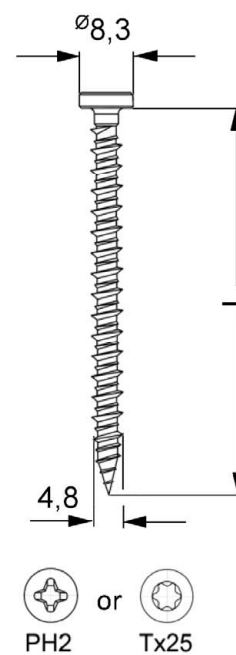
Annex 46



Zahn ZKSH oval



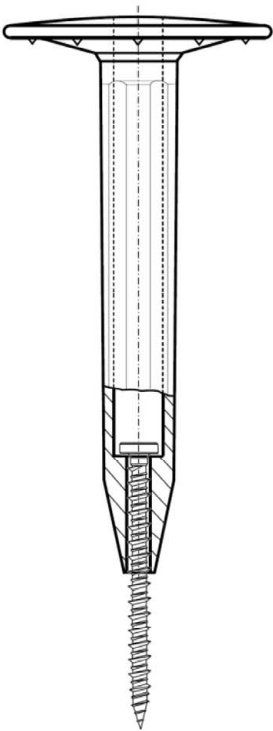
Zahn ZHBK 4,8 x L



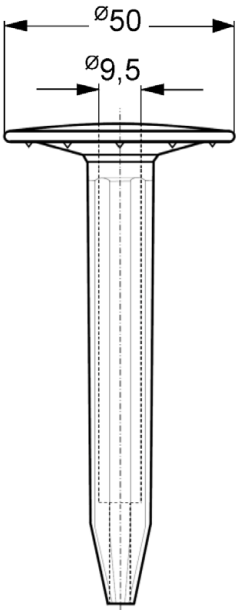
Zahn Flat Roof Fasteners

Combination 47
ZHSK consisting of ZHBK / ZKSH oval

Annex 47



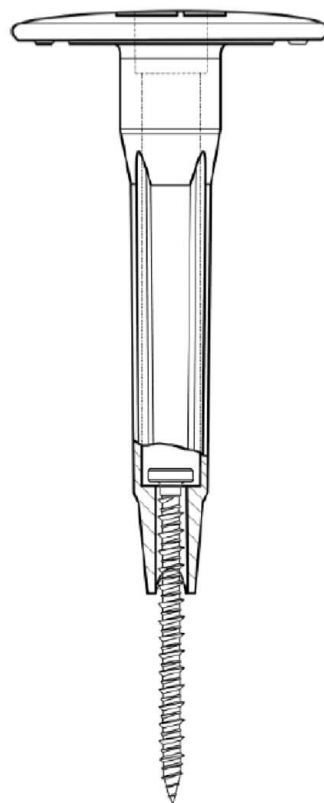
Zahn ZKSH round



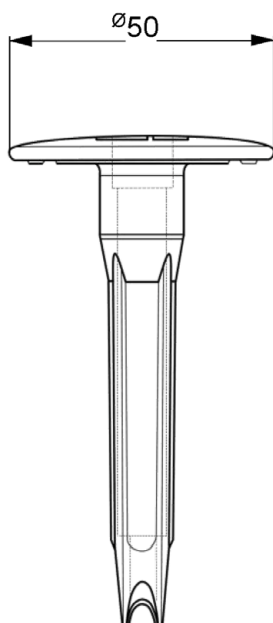
Zahn ZHBK 4,8 x L



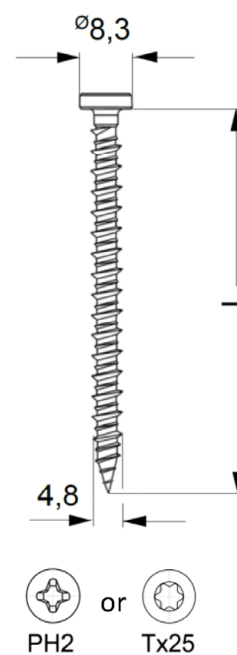
Zahn Flat Roof Fasteners	Annex 48
Combination 48 ZHSK-R consisting of ZHBK / ZKSH round	



Zahn ZKSH-Rplus



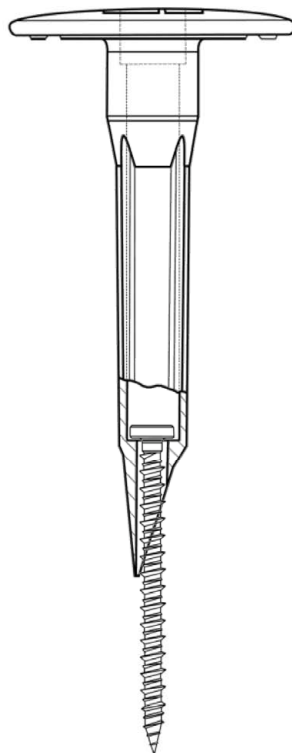
Zahn ZHBK 4,8 x L



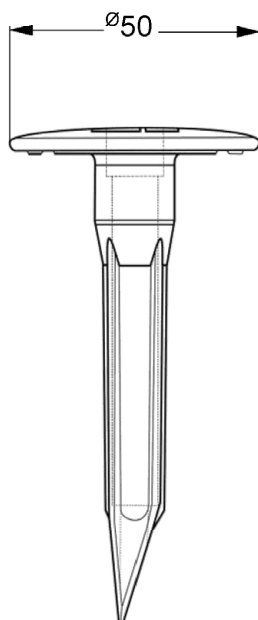
Zahn Flat Roof Fasteners

Combination 49
ZHSK-Rplus consisting of ZHBK / ZKSH-Rplus

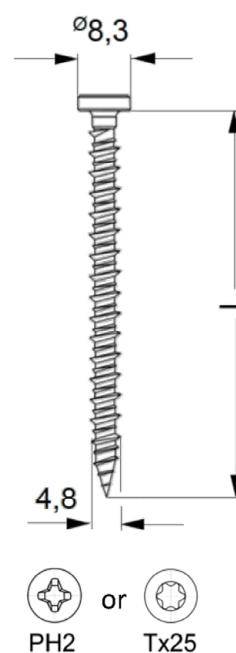
Annex 49



Zahn ZKSH-Rplus with pile tip



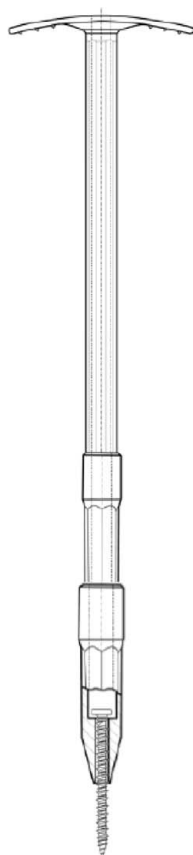
Zahn ZHBK 4,8 x L



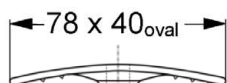
Zahn Flat Roof Fasteners

Combination 50
ZHSK-Rplus with pile tip consisting of ZHBK / ZKSH-Rplus with pile tip

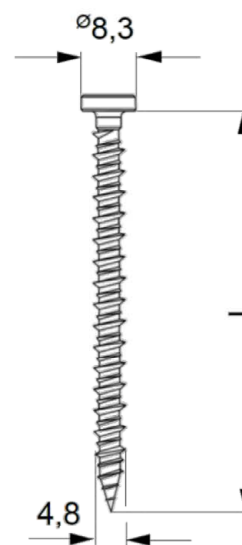
Annex 50



Zahn ZKSH oval module 4,8



Zahn ZHBK 4,8 x L



or



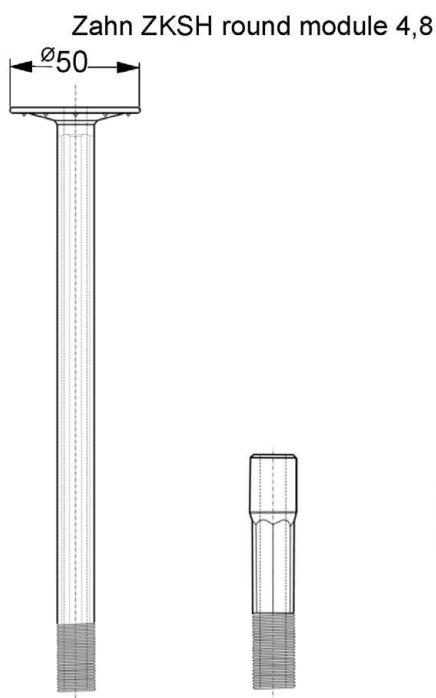
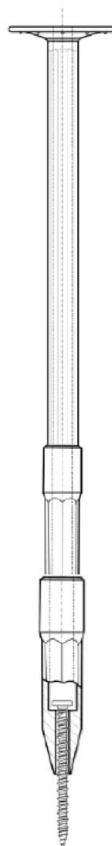
PH2

Tx25

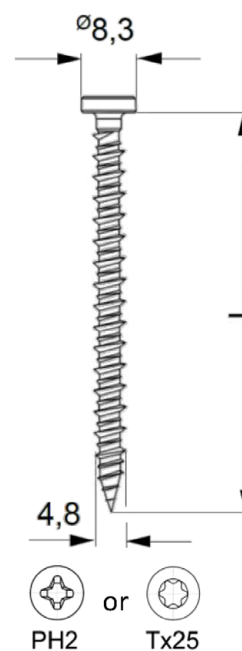
Zahn Flat Roof Fasteners

Combination 51
ZHSK Modul 4,8 consisting of ZHBK / ZKSH oval module with module middle piece
and spike 4,8

Annex 51



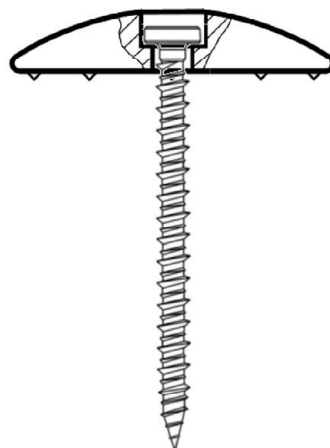
Zahn ZHBK 4,8 x L



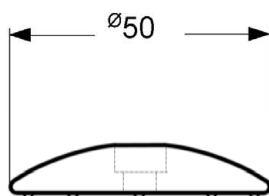
Zahn Flat Roof Fasteners

Combination 52
ZHSK-R-Modul 4,8 consisting of ZHBK / ZKSH round with module middle piece
and spike 4,8

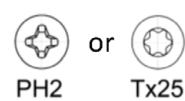
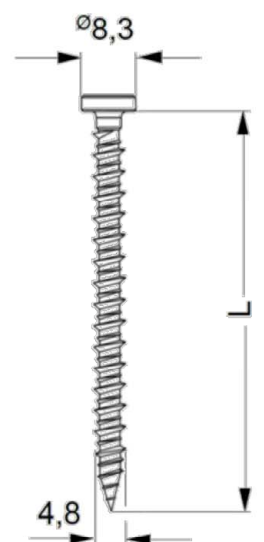
Annex 52



Zahn ZTSK 4,8



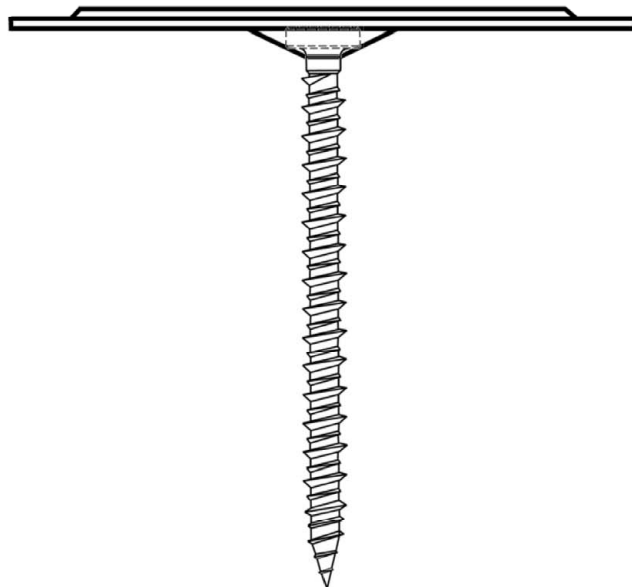
Zahn ZHBK 4,8 x L



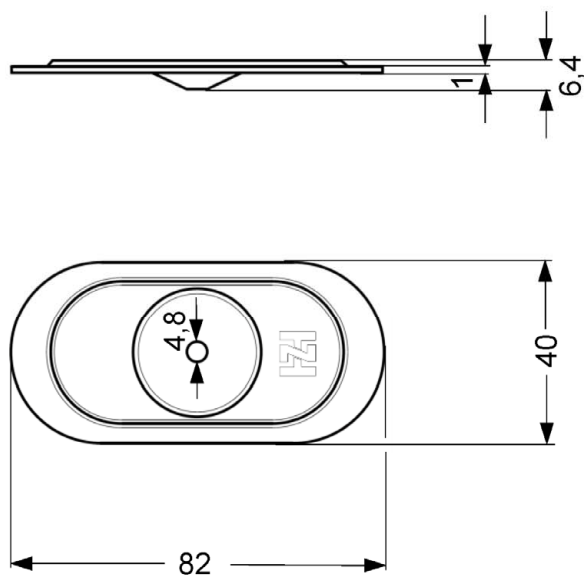
Zahn Flat Roof Fasteners

Combination 53
ZTSK Wood consisting of ZHBK / ZTSK 4,8

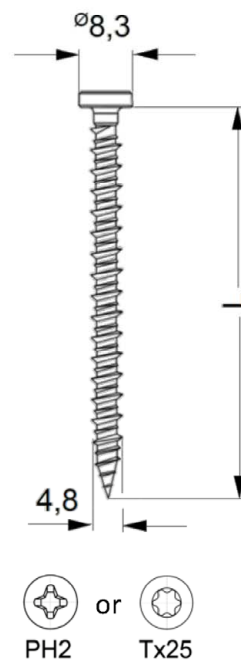
Annex 53



Zahn ZLVT 0001



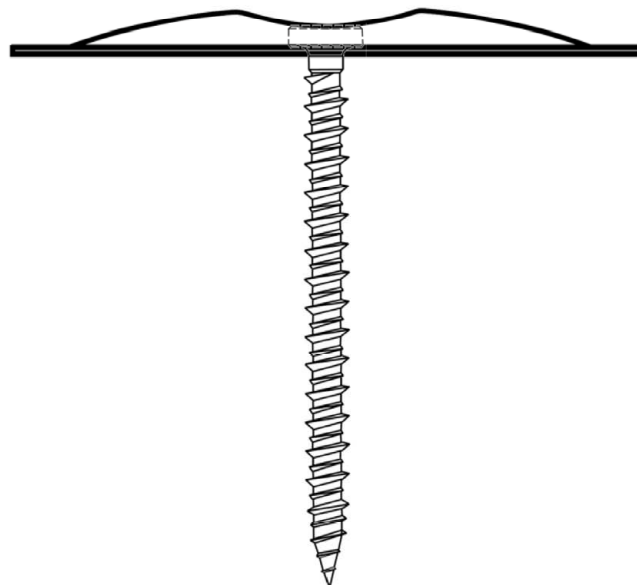
Zahn ZHBK 4,8 x L



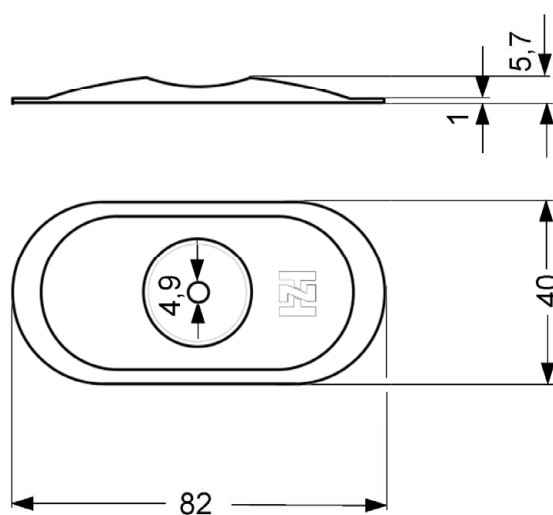
Zahn Flat Roof Fasteners

Combination 54
ZHBK / ZLVT 0001

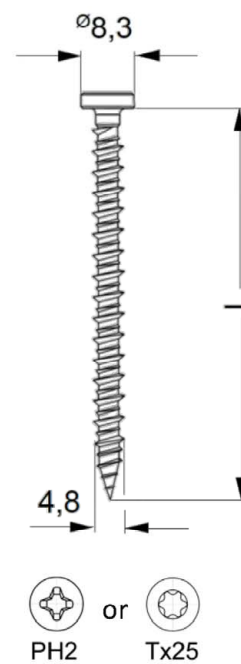
Annex 54



Zahn ZLVT 0005



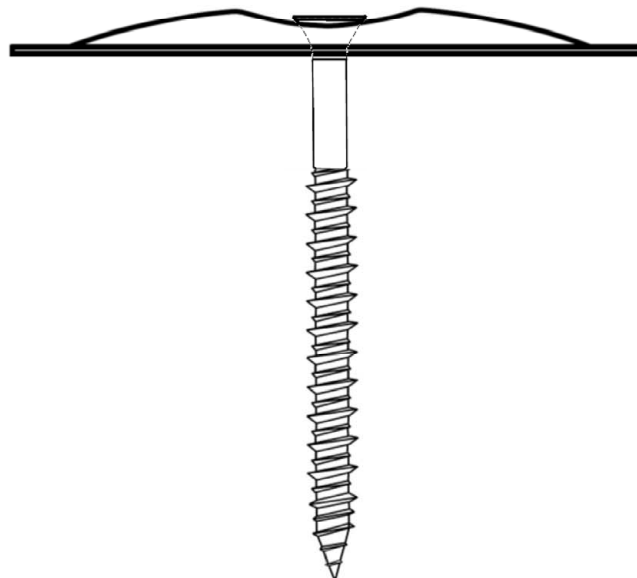
Zahn ZHBK 4,8 x L



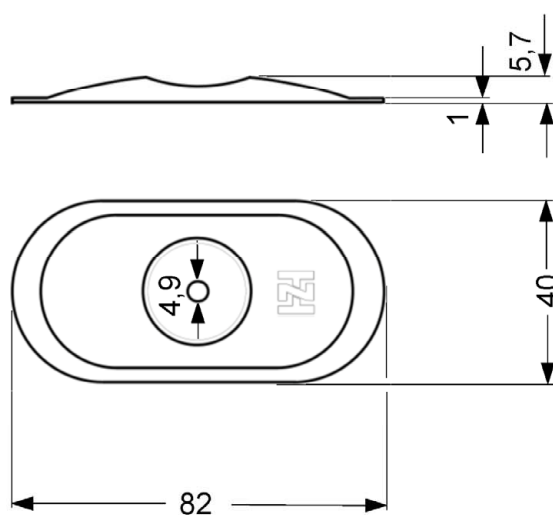
Zahn Flat Roof Fasteners

Combination 55
ZHBK / ZLVT 0005

Annex 55



Zahn ZLVT 0005



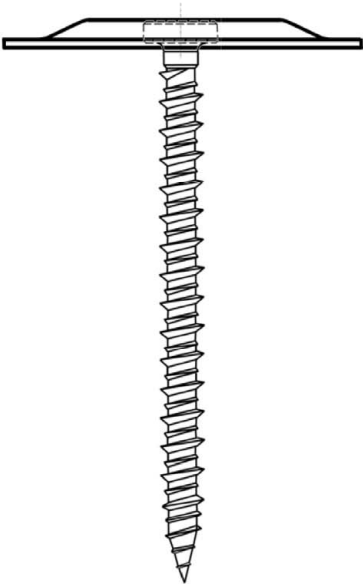
Zahn ZHBK_{TK} 4,8 x L



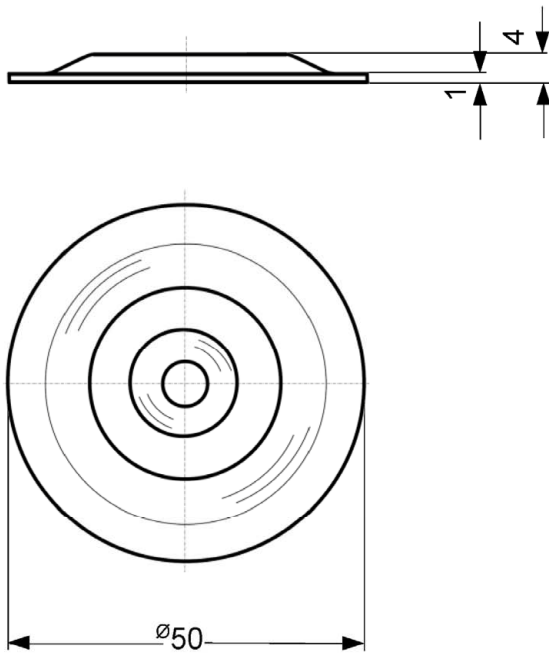
Zahn Flat Roof Fasteners

Combination 55a
ZHBK_{TK} / ZLVT 0005

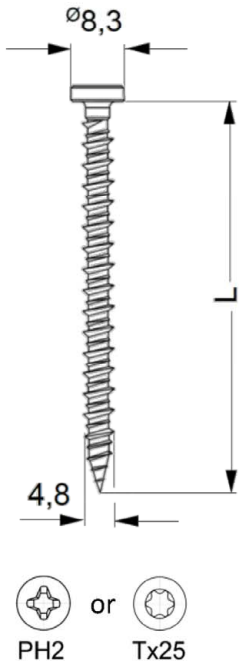
Annex 55a



Zahn ZLVT 0015



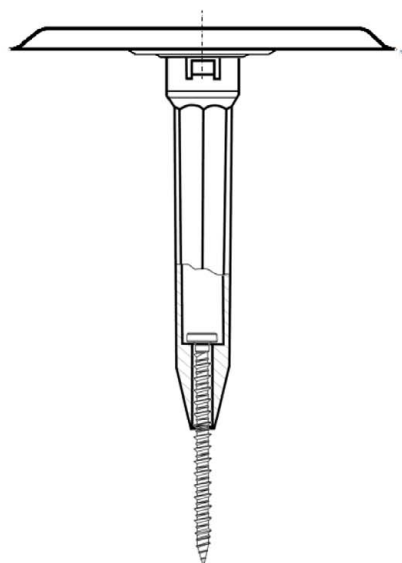
Zahn ZHBK 4,8 x L



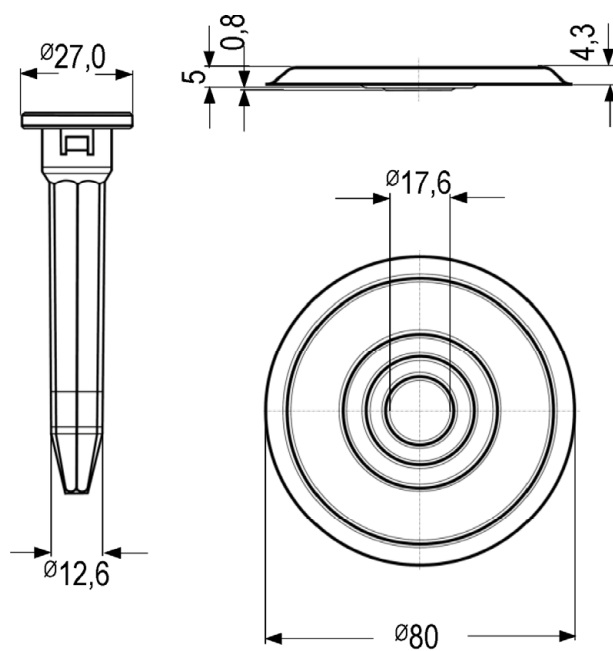
Zahn Flat Roof Fasteners

Combination 56
ZHBK / ZLVT 0015

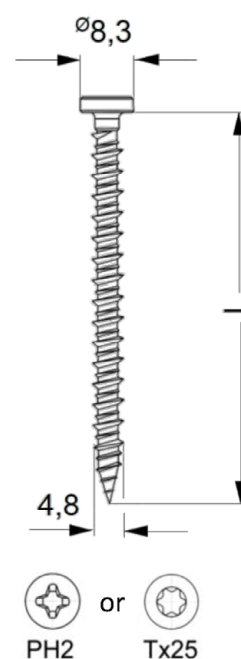
Annex 56



Zahn ZCTS-pipe 4,8 with ZCTS-plate



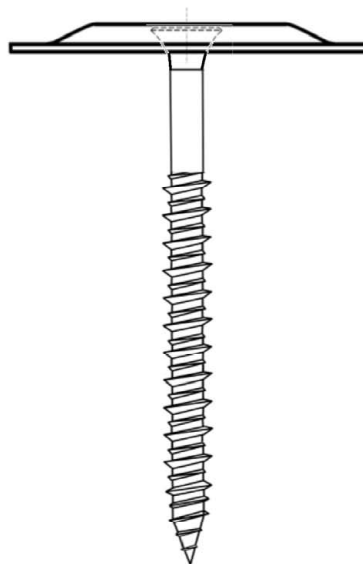
Zahn ZHBK 4,8 x L



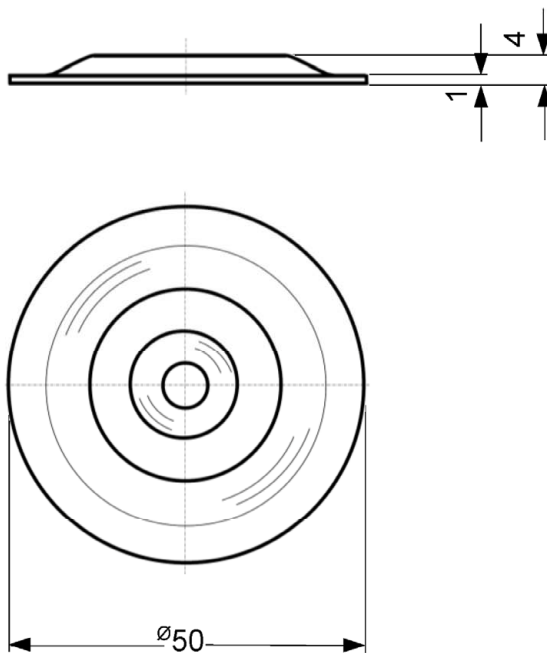
Zahn Flat Roof Fasteners

Combination 56a
ZCTS-H 4,8 consisting of ZHBK / ZCTS-pipe 4,8 and ZCTS-plate

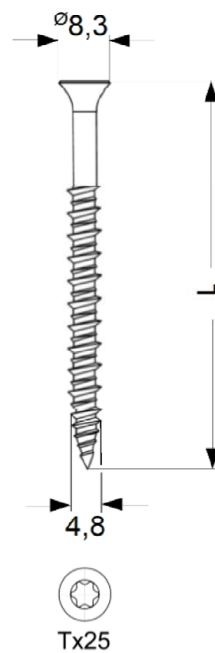
Annex 56a



Zahn ZLVT 0015



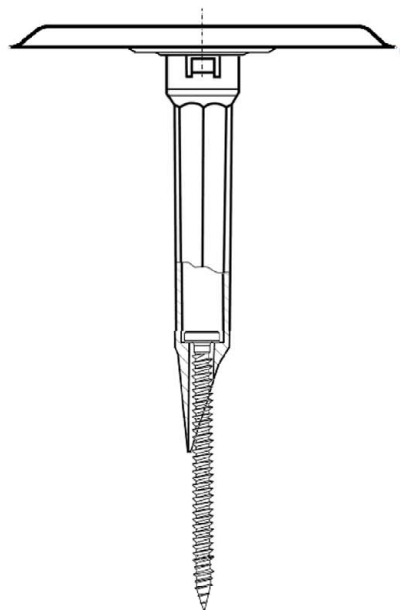
Zahn ZHBK_{TK} 4,8 x L



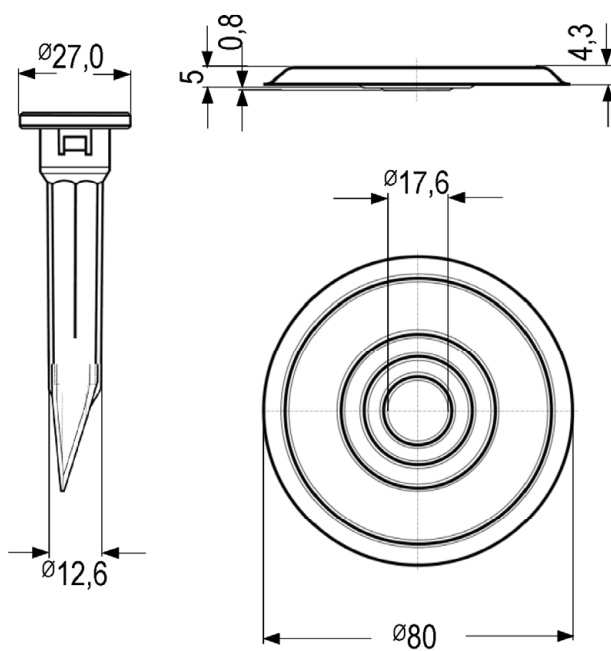
Zahn Flat Roof Fasteners

Combination 56b
ZHBK_{TK} / ZLVT 0015

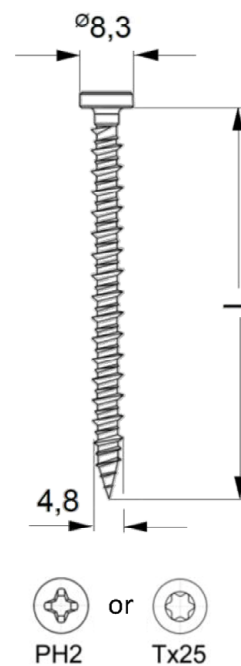
Annex 56b



Zahn ZCTSplus pipe with pile tip 4,8 with ZCTS-plate



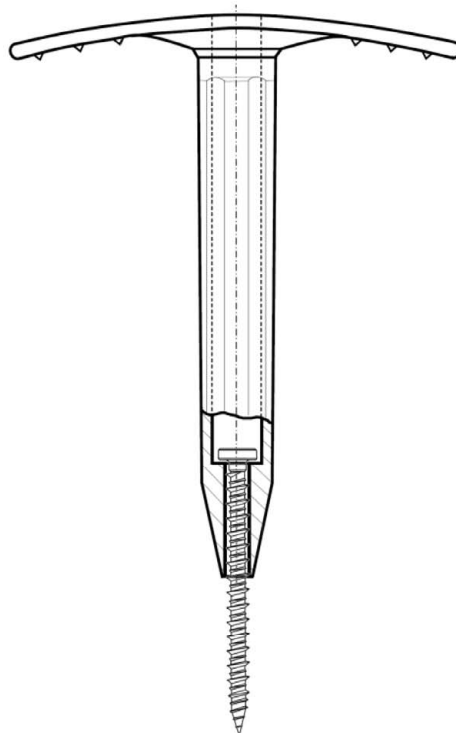
Zahn ZHBK 4,8 x L



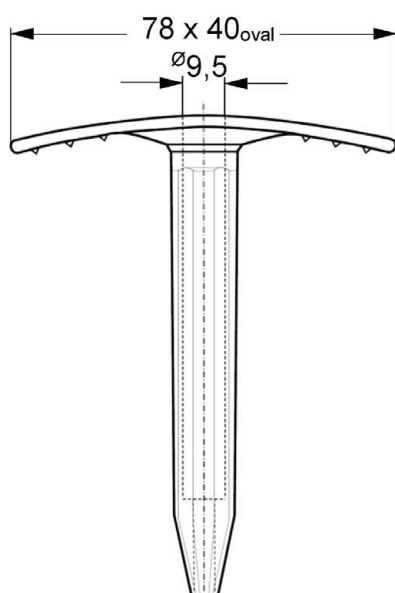
Zahn Flat Roof Fasteners

Combination 56c
ZCTS-Hplus pipe with pile tip 4,8 consisting of ZHBK / ZCTSplus pipe
with pile tip 4,8 and ZCTS-Teller

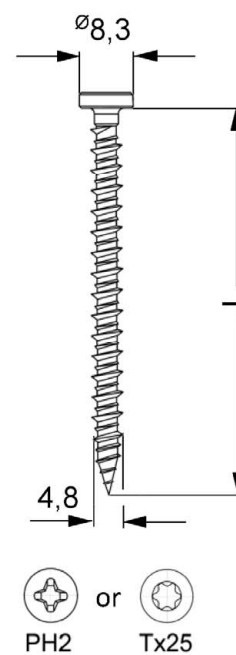
Annex 56c



Zahn ZKSH oval



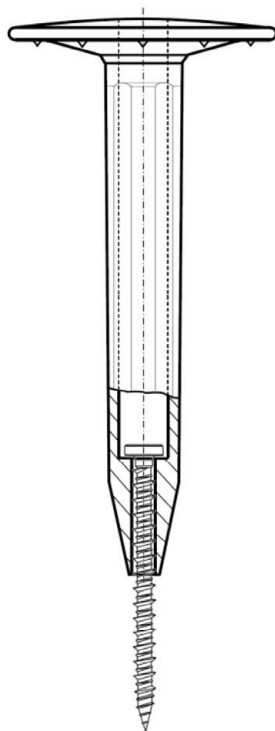
Zahn ZHBK-E 4,8 x L



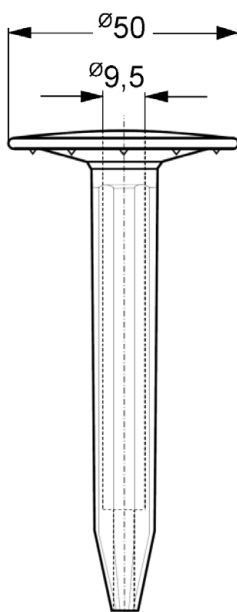
Zahn Flat Roof Fasteners

Combination 57
ZHSK-E consisting of ZHBK-E / ZKSH oval

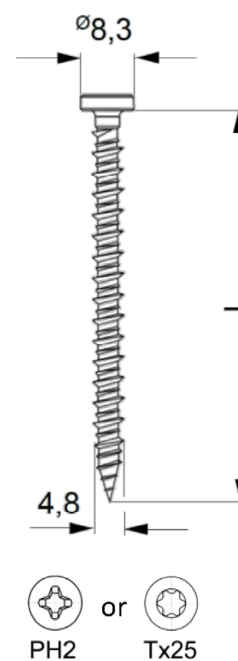
Annex 57



Zahn ZKSH round



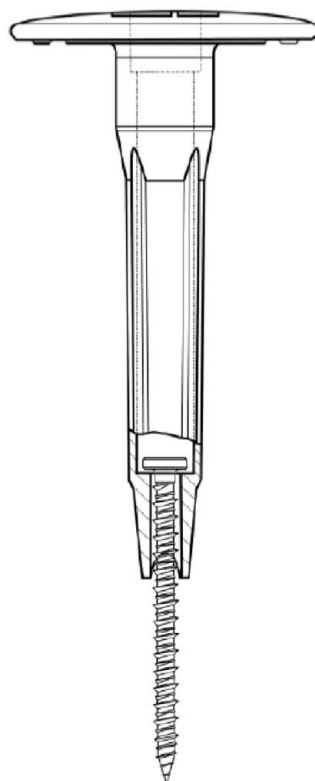
Zahn ZHBK-E 4,8 x L



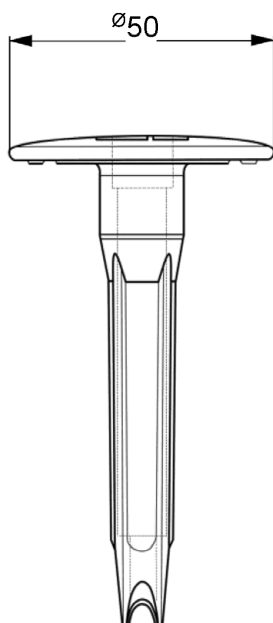
Zahn Flat Roof Fasteners

Combination 58
ZHSK-E/R consisting of ZHBK-E / ZKSH round

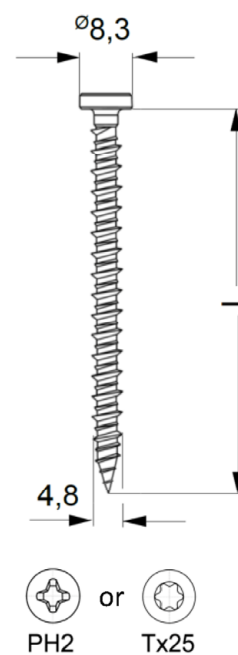
Annex 58



Zahn ZKSH-Rplus



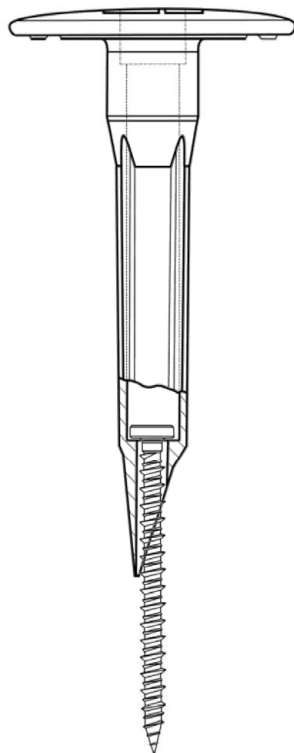
Zahn ZHBK-E 4,8 x L



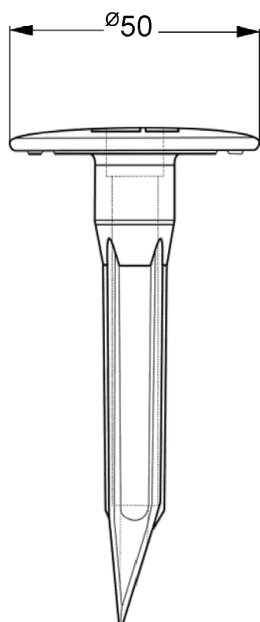
Zahn Flat Roof Fasteners

Combination 59
ZHSK-E/Rplus consisting of ZHBK-E / ZKSH-Rplus

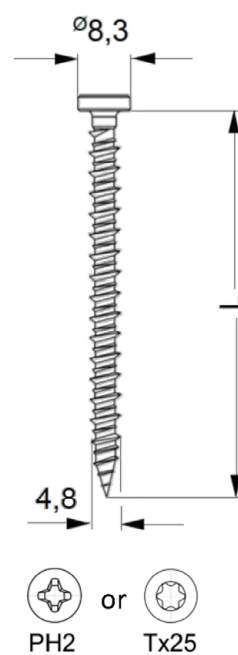
Annex 59



Zahn ZKSH-Rplus pile tip



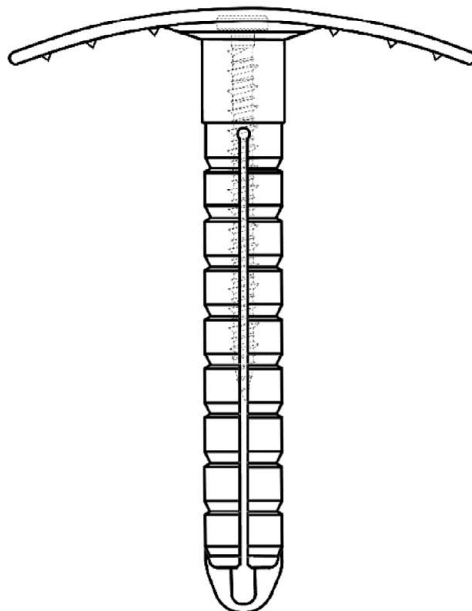
Zahn ZHBK-E 4,8 x L



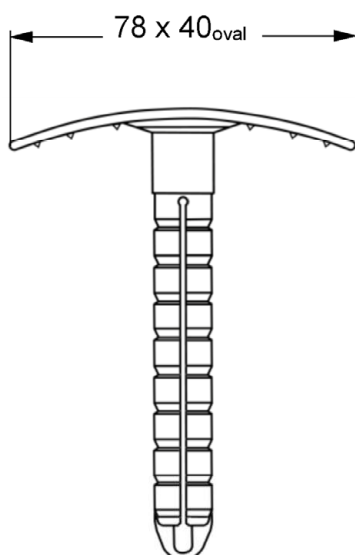
Zahn Flat Roof Fasteners

Combination 60
ZHSK-E/Rplus with pile tip consisting of ZHBK-E / ZKSH-Rplus with pile tip

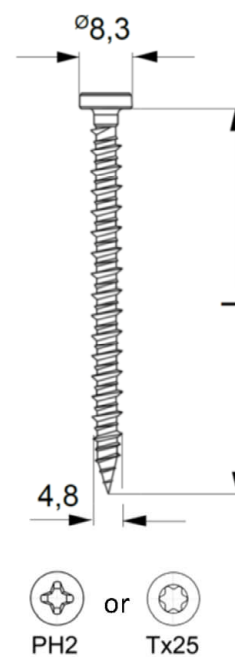
Annex 60



Zahn ZTSD oval



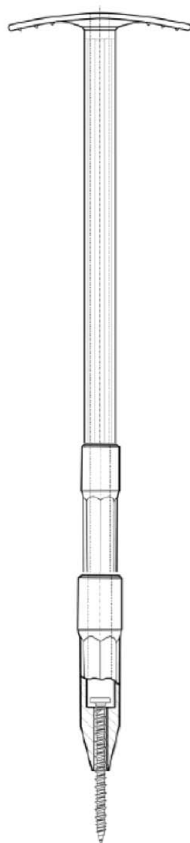
Zahn ZHBK-E 4,8 x L



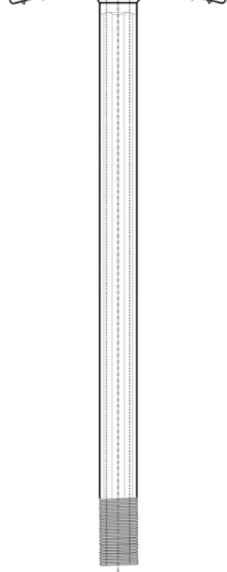
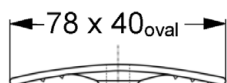
Zahn Flat Roof Fasteners

Combination 60a
ZTSD-E consisting of ZHBK-E / ZTSD oval

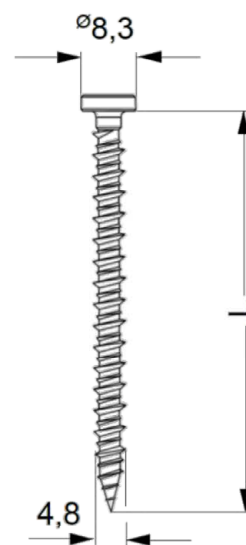
Annex 60a



Zahn ZKSH oval module 4,8



Zahn ZHBK-E 4,8 x L



or



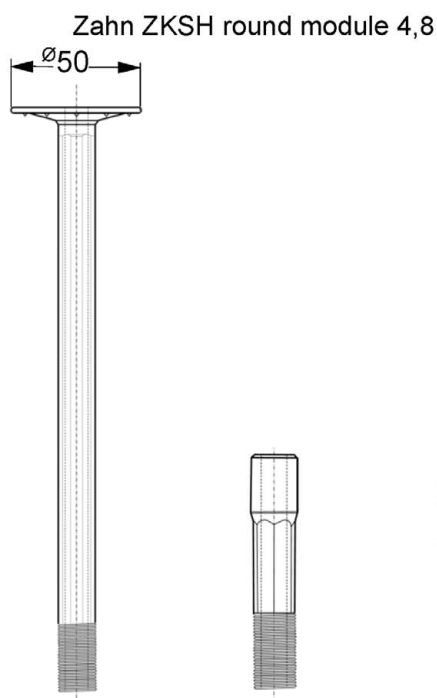
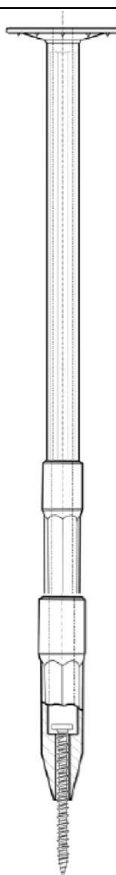
PH2

Tx25

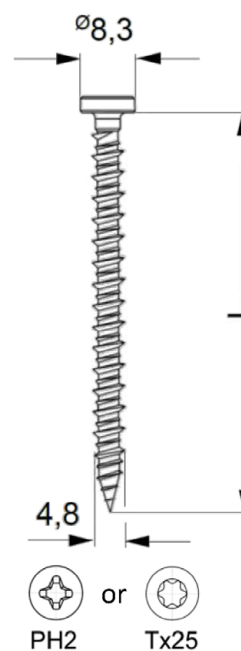
Zahn Flat Roof Fasteners

Combination 61
ZHSK-E-Modul 4,8 consisting of ZHBK-E / ZKSH oval module with module middle piece
and spike 4,8

Annex 61



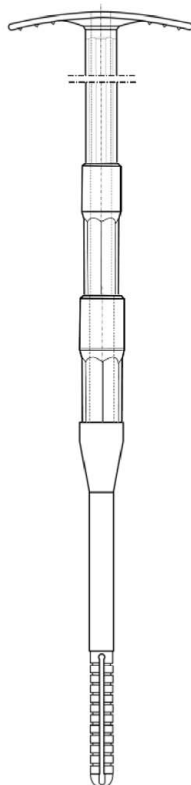
Zahn ZHBK-E 4,8 x L



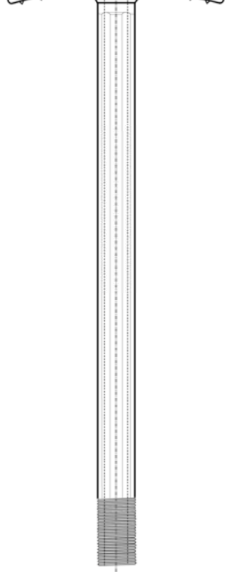
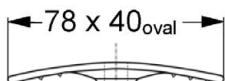
Zahn Flat Roof Fasteners

Combination 62
ZHSK-E/R-Modul 4,8 consisting of ZHBK-E/ZKSH round module with module middle piece
and spike 4,8

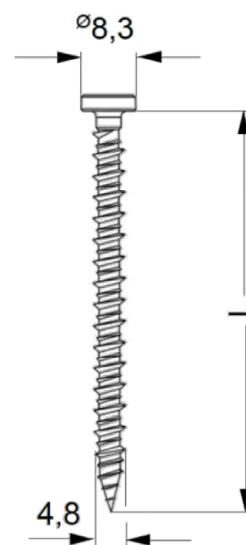
Annex 62



Zahn ZKSH oval module 4,8 with dowel extension



Zahn ZHBK-E 4,8 x L



or



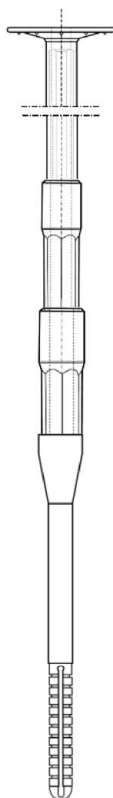
PH2

Tx25

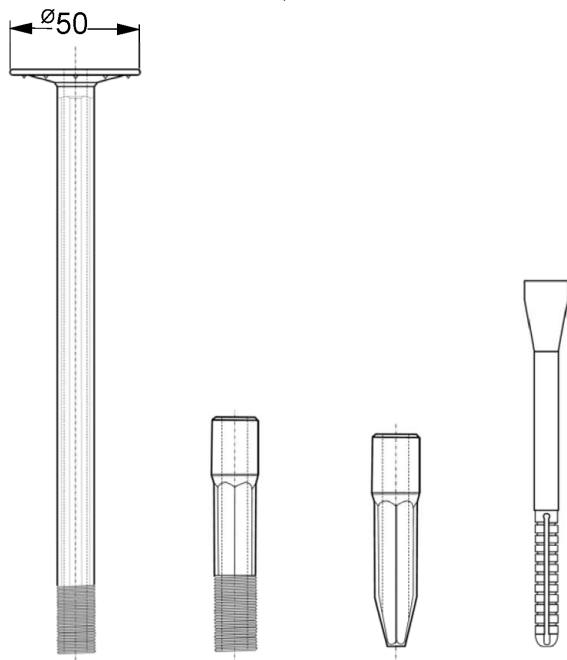
Zahn Flat Roof Fasteners

Combination 63
ZSDK-E-Modul 4,8 consisting of ZHBK-E / ZKSH oval module with module middle piece,
spike 4,8 and dowel extension

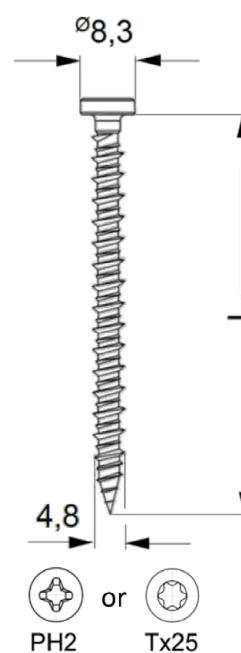
Annex 63



Zahn ZKSH round module 4,8 with dowel extension



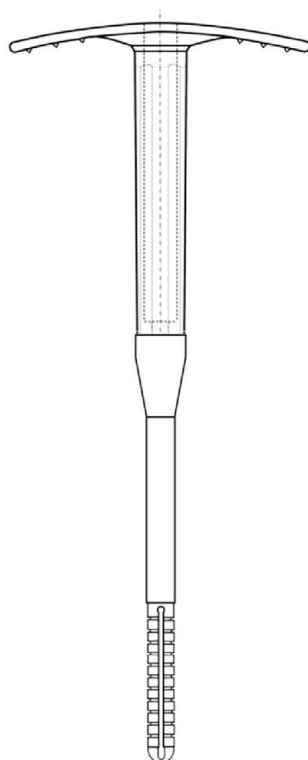
Zahn ZHBK-E 4,8 x L



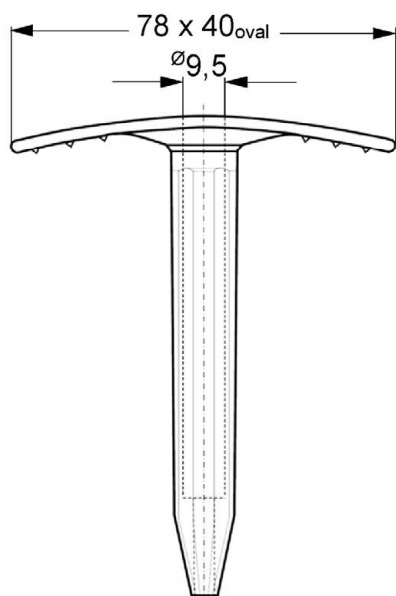
Zahn Flat Roof Fasteners

Combination 64
ZSDK-E/R-Modul 4,8 consisting of ZHBK-E / ZKSH round module
with module middle piece, spike 4,8 and dowel extension

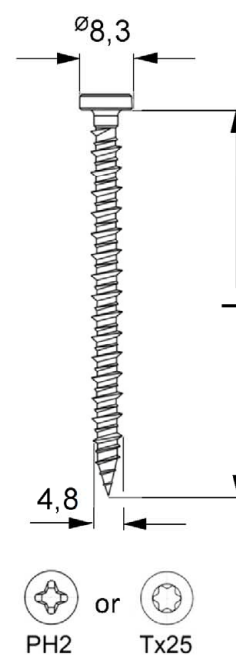
Annex 64



Zahn ZKSH oval with dowel extension



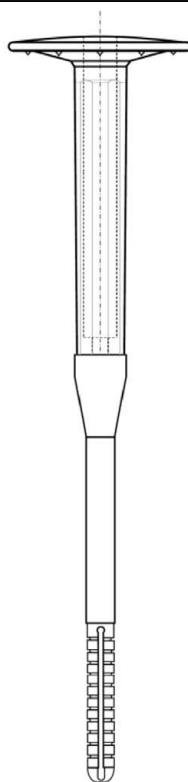
Zahn ZHBK-E 4,8 x L



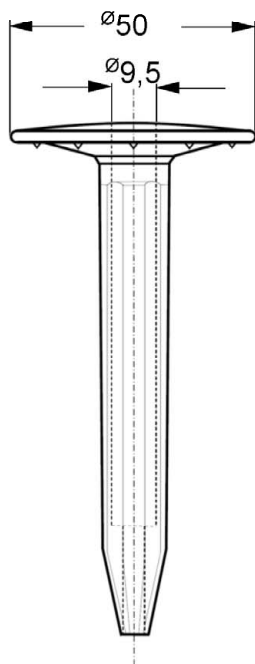
Zahn Flat Roof Fasteners

Combination 65
ZSDK-E consisting of ZHBK-E / ZKSH oval with dowel extension

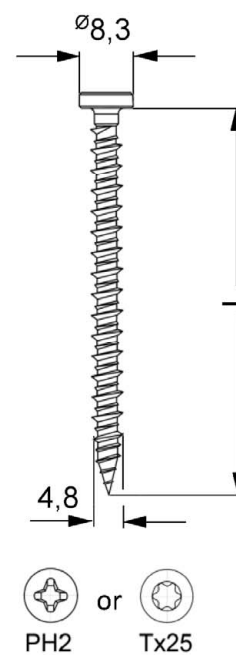
Annex 65



Zahn ZKSH round with dowel extension



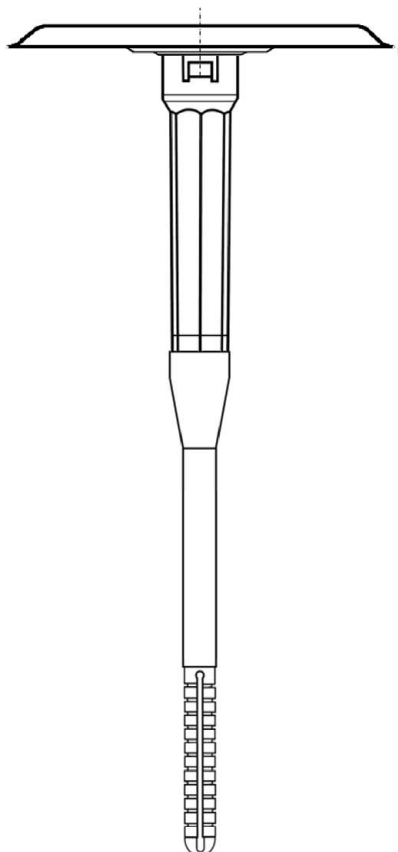
Zahn ZHBK-E 4,8 x L



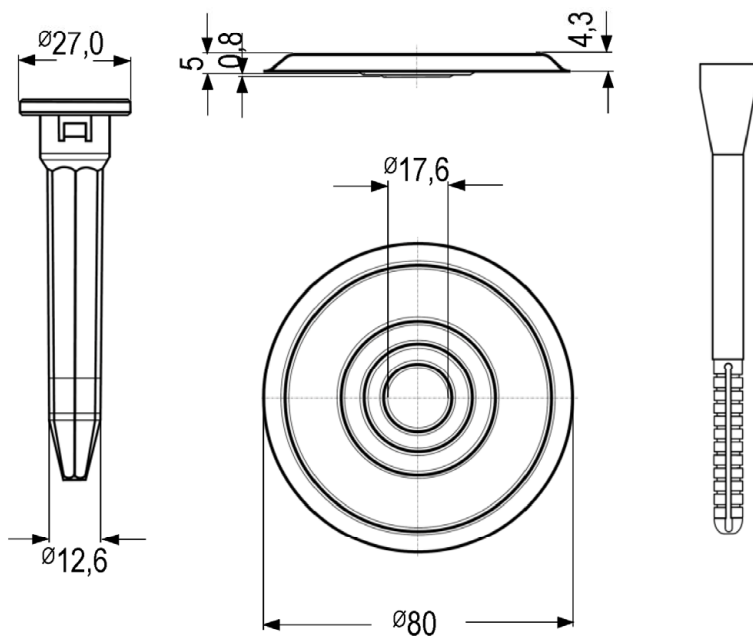
Zahn Flat Roof Fasteners

Combination 66
ZSDK-E/R consisting of ZHBK-E / ZKSH round with dowel extension

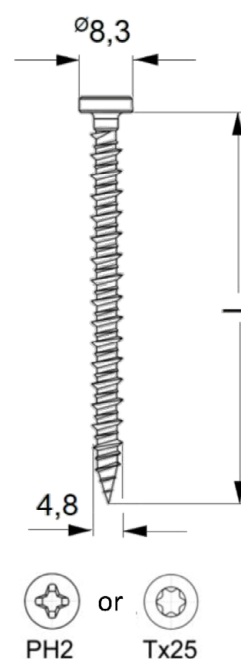
Annex 66



Zahn ZCTS-pipe 4,8 with ZCTS-plate and dowel extension



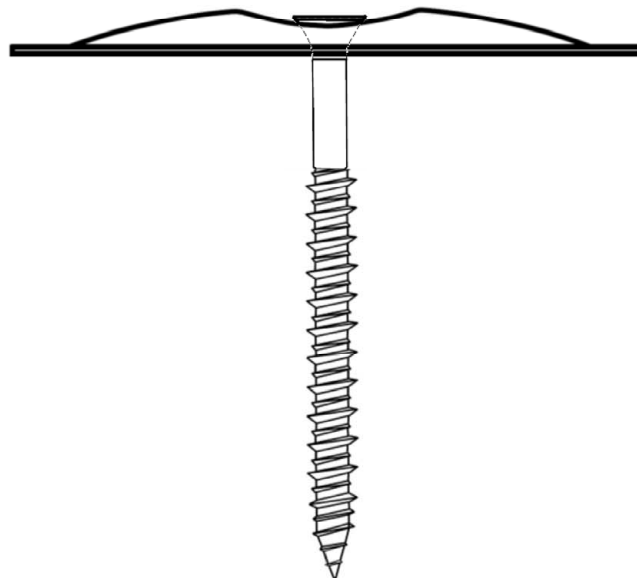
Zahn ZHBK-E 4,8 x L



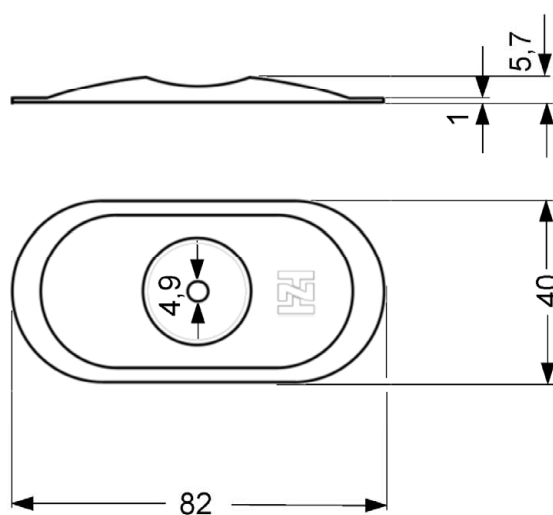
Zahn Flat Roof Fasteners

Combination 66a
ZCTS-H-E dowel extension 4,8 consisting of ZHBK-E / ZCTS-pipe 4,8,
ZCTS-plate and dowel extension

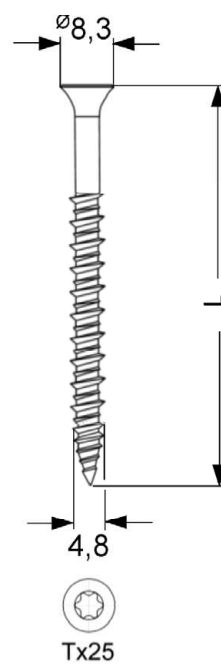
Annex 66a



Zahn ZLVT 0005



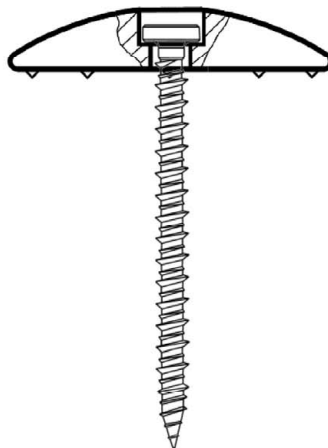
Zahn ZHBK-E_{TK} 4,8 x L



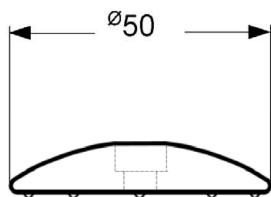
Zahn Flat Roof Fasteners

Combination 66b
ZHBK-E_{TK} / ZLVT 0005

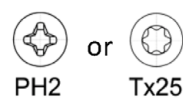
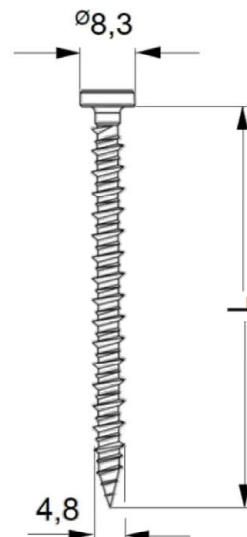
Annex 66b



Zahn ZTSK 4,8



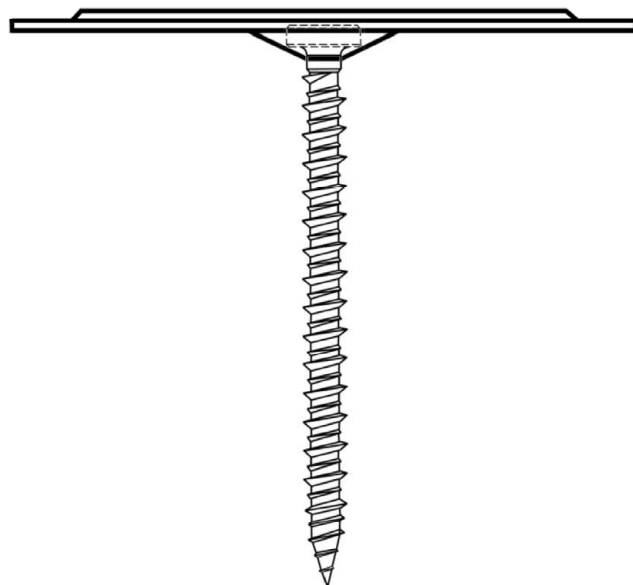
Zahn ZHBK-E 4,8 x L



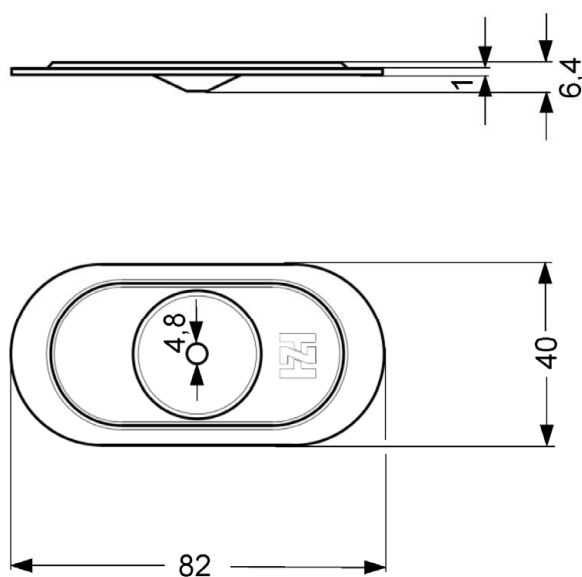
Zahn Flat Roof Fasteners

Combination 67
ZTSK-E-Timber 4,8 consisting of ZHBK-E / ZTSK 4,8

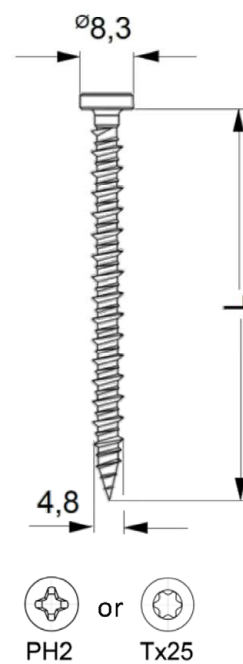
Annex 67



Zahn ZLVT 0001



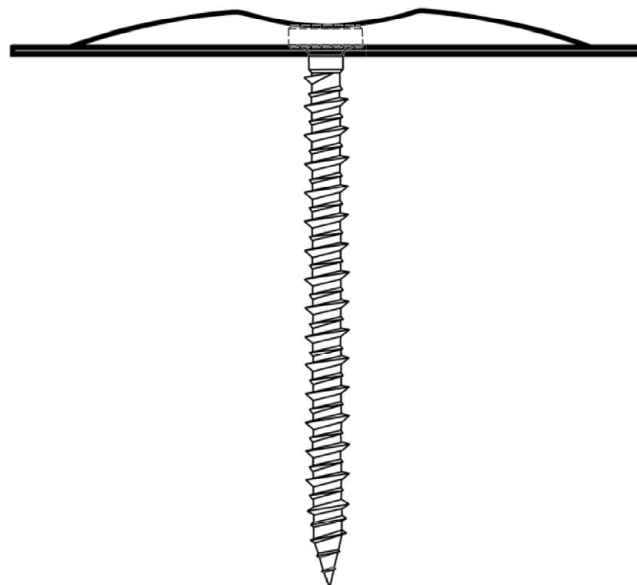
Zahn ZHBK-E 4,8 x L



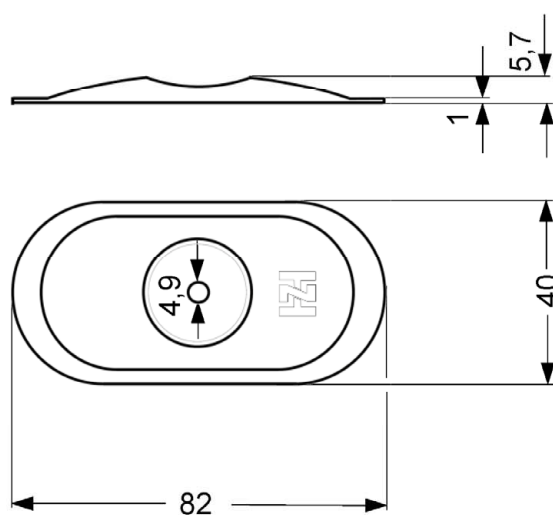
Zahn Flat Roof Fasteners

Combination 68
ZHBK-E / ZLVT 0001

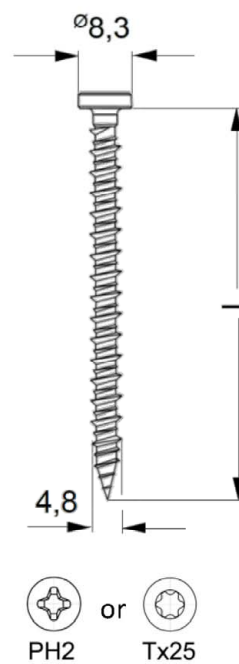
Annex 68



Zahn ZLVT 0005



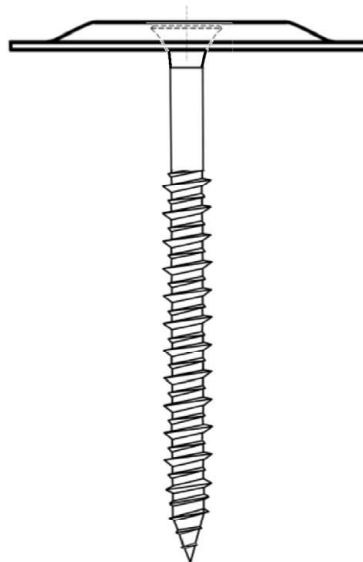
Zahn ZHBK-E 4,8 x L



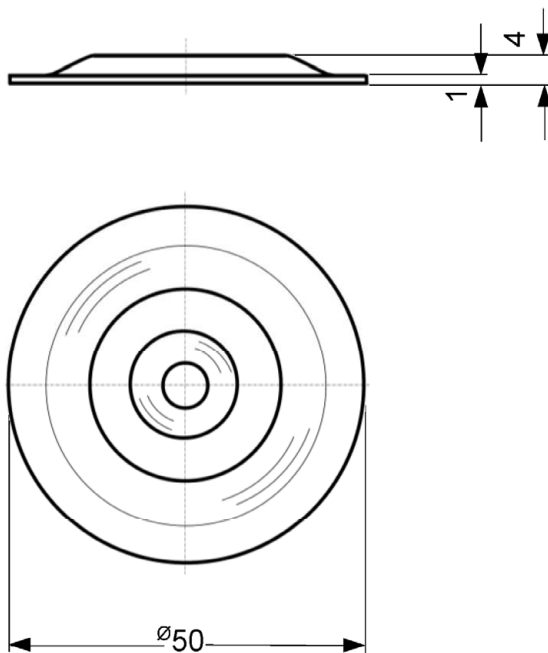
Zahn Flat Roof Fasteners

Combination 69
ZHBK-E / ZLVT 0005

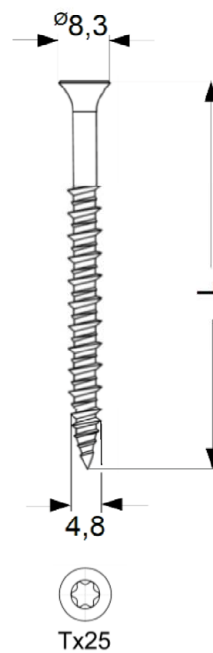
Annex 69



Zahn ZLVT 0015



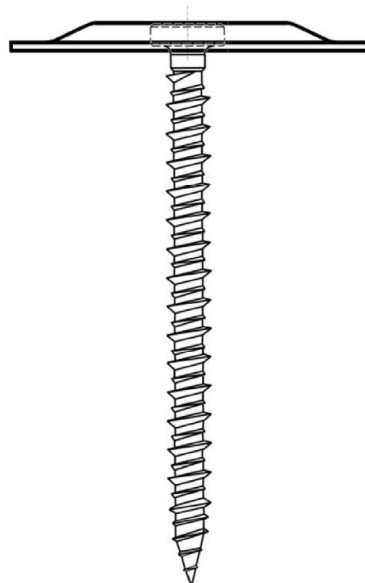
Zahn ZHBK-ETK 4,8 x L



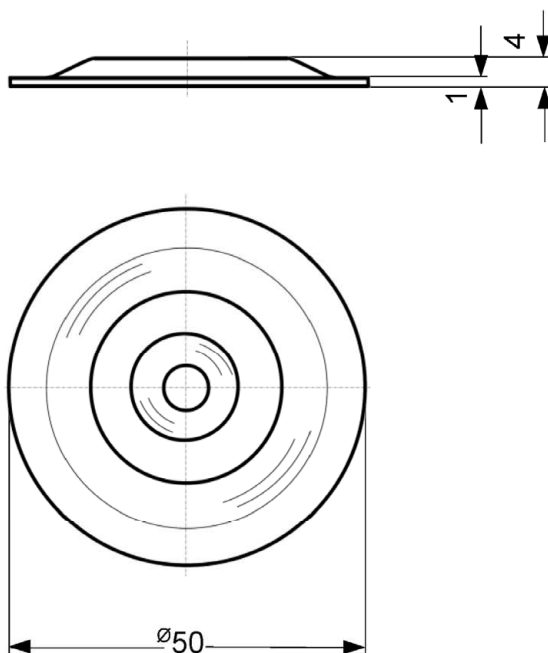
Zahn Flat Roof Fasteners

Combination 69a
ZHBK-ETK / ZLVT 0015

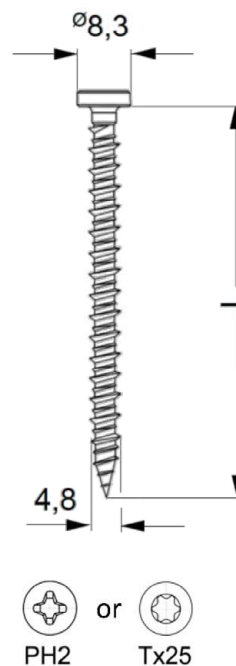
Annex 69a



Zahn ZLVT 0015



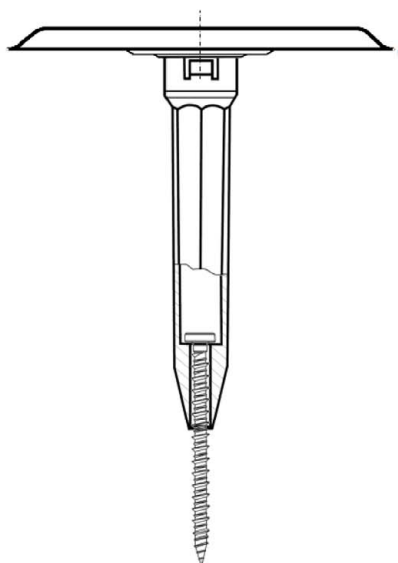
Zahn ZHBK-E 4,8 x L



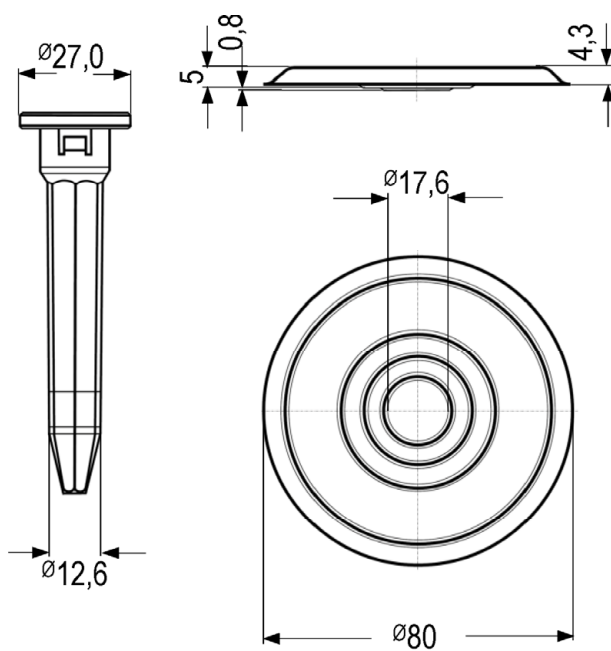
Zahn Flat Roof Fasteners

Combination 70
ZHBK-E / ZLVT 0015

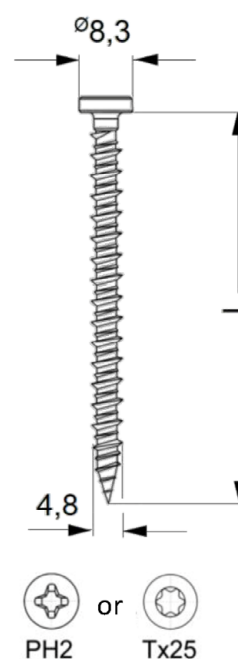
Annex 70



Zahn ZCTS-pipe 4,8 with ZCTS-plate



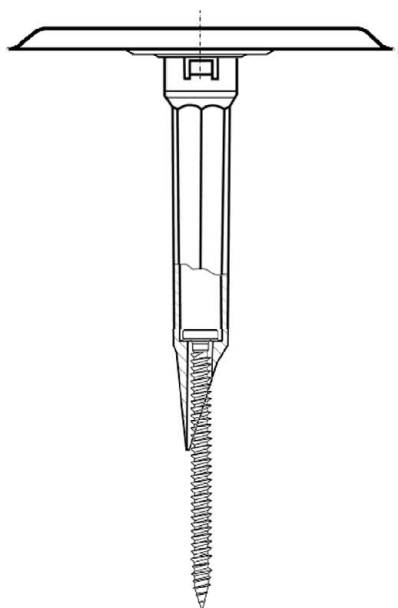
Zahn ZHBK-E 4,8 x L



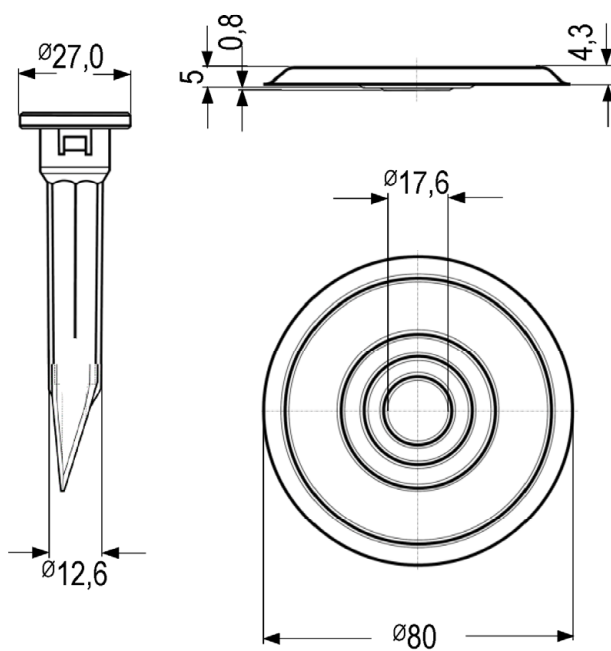
Zahn Flat Roof Fasteners

Combination 70a
ZCTS-H-E 4,8 consisting of ZHBK-E / ZCTS- pipe 4,8 and ZCTS-plate

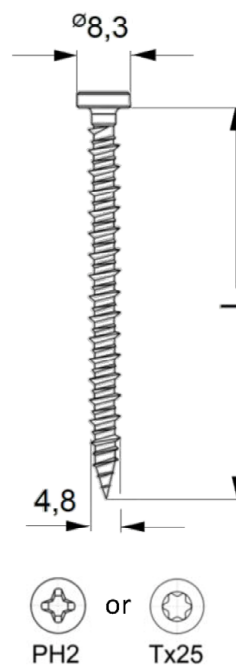
Annex 70a



Zahn ZCTSplus pipe with pile tip 4,8 with ZCTS-plate



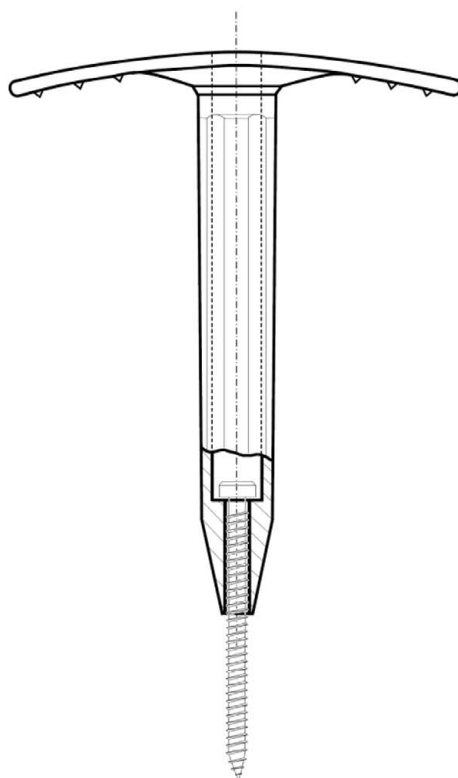
Zahn ZHBK-E 4,8 x L



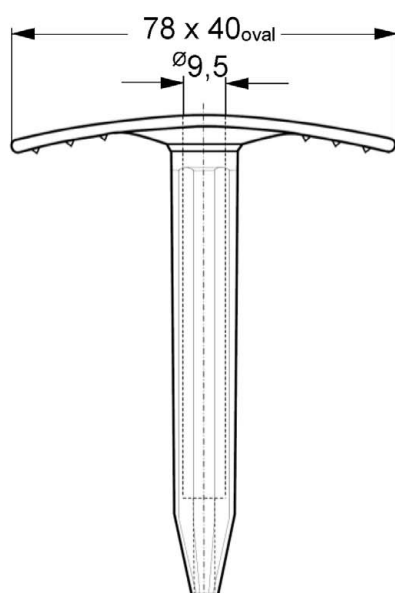
Zahn Flat Roof Fasteners

Combination 70b
ZCTS-H-Eplus pipe with pile tip 4,8 consisting of ZHBK-E / ZCTSplus pipe
with pile tip 4,8 and ZCTS-plate

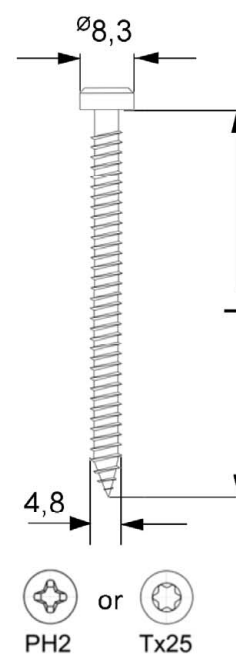
Annex 70b



Zahn ZKSH oval



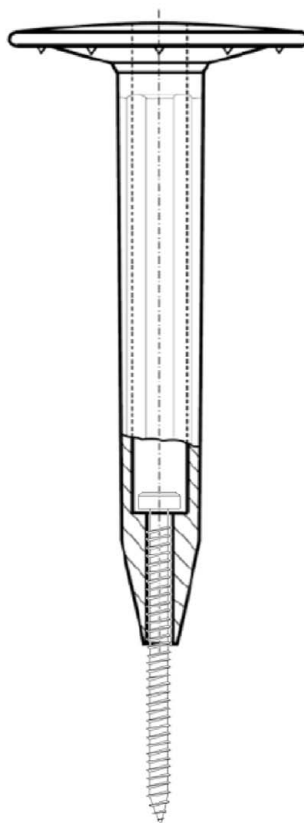
Zahn ZDBK_{dowel} 4,8 x L



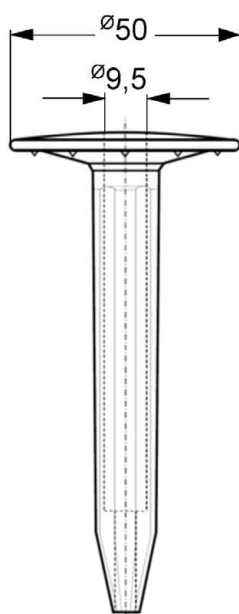
Zahn Flat Roof Fasteners

Combination 71
ZDBK-Dowel / ZKSH oval

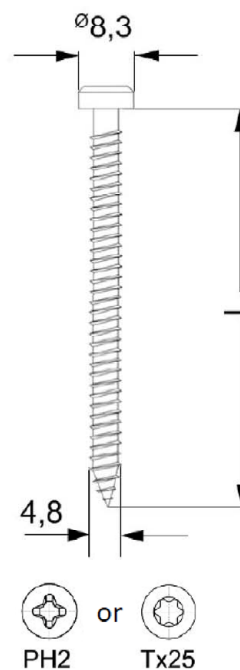
Annex 71



Zahn ZKSH round



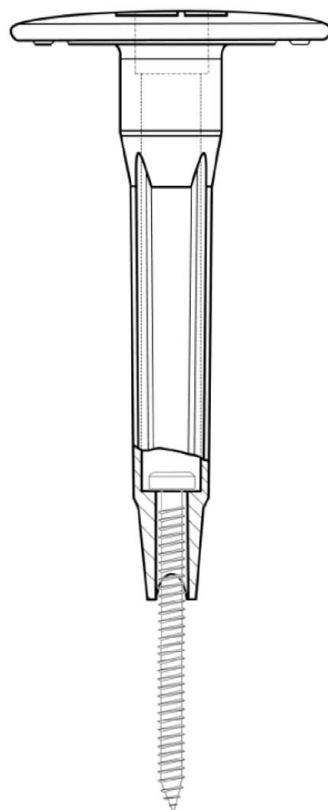
Zahn ZDBK_{dowel} 4,8 x L



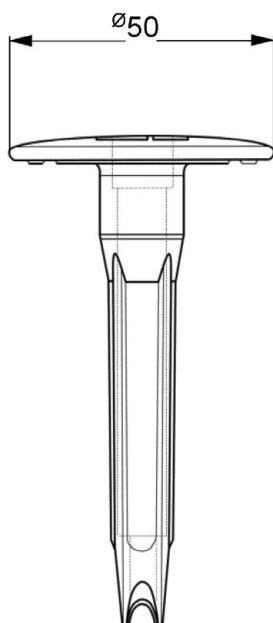
Zahn Flat Roof Fasteners

Combination 72
ZDBK-Dowel / R / ZKSH round

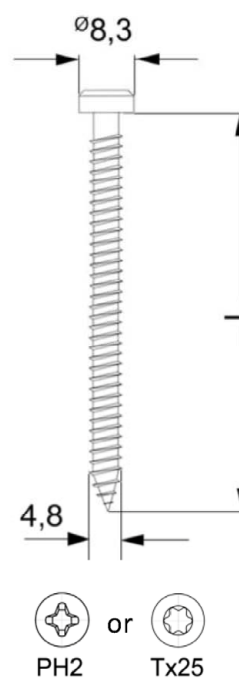
Annex 72



Zahn ZKSH-Rplus



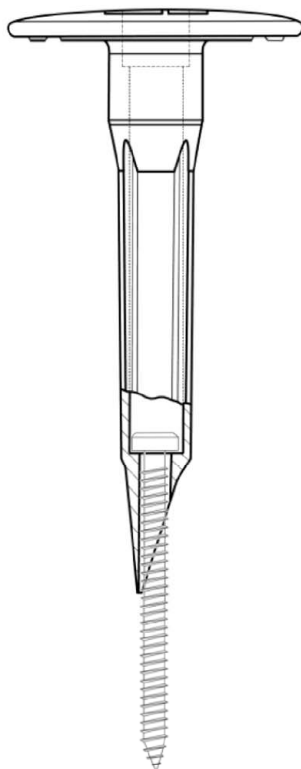
Zahn ZDBK_{dowel} 4,8 x L



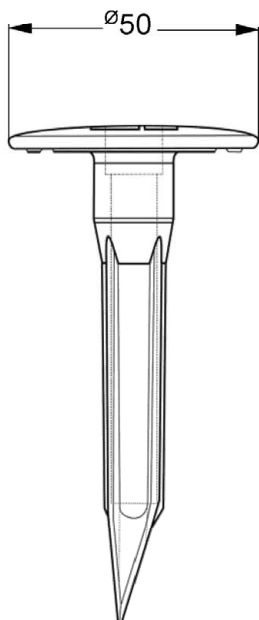
Zahn Flat Roof Fasteners

Combination 73
ZKSK-Dowel / Rplus consisting of ZDBK_{dowel} / ZKSH-Rplus

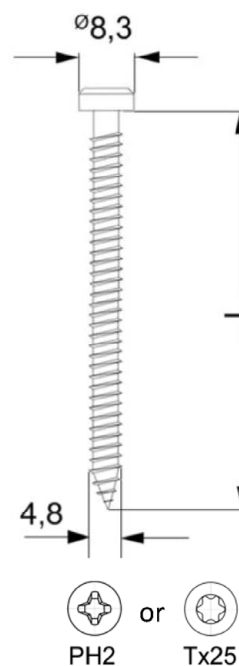
Annex 73



Zahn ZKSH-Rplus pile tip



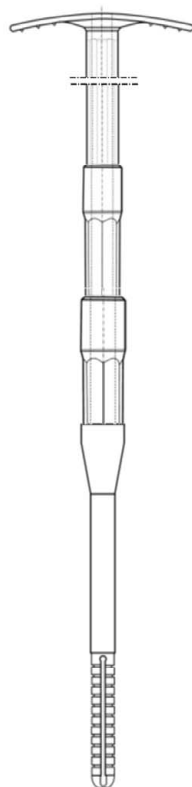
Zahn ZDBK_{dowel} 4,8 x L



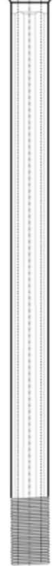
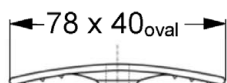
Zahn Flat Roof Fasteners

Combination 74
ZKSK-Dowel / Rplus with pile tip consisting of ZDBK_{dowel} / ZKSH-Rplus with pile tip

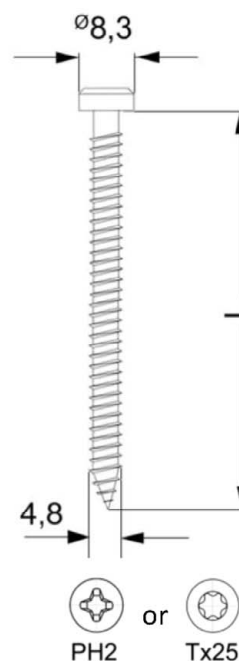
Annex 74



Zahn ZKSH oval module 4,8 with dowel extension



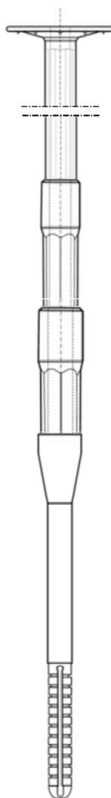
Zahn ZDBK_{dowel} 4,8 x L



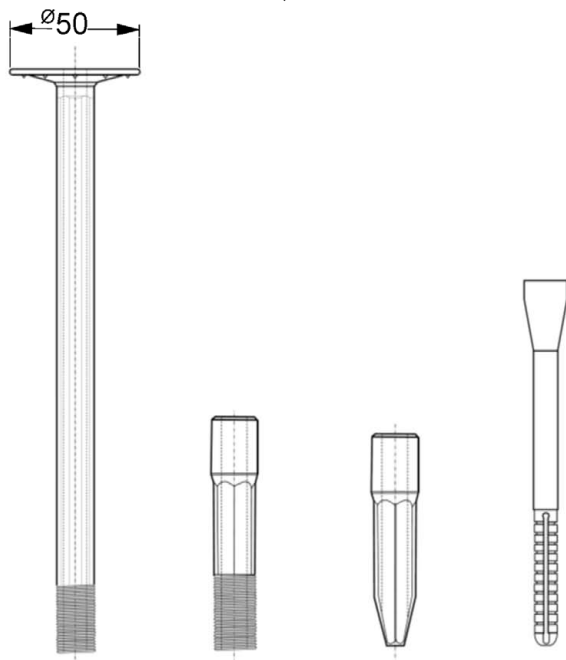
Zahn Flat Roof Fasteners

Combination 75
ZSDK-Modul 4,8 consisting of ZDBK_{dowel} / ZKSH oval module
with module middle piece, spike 4,8 and dowel extension

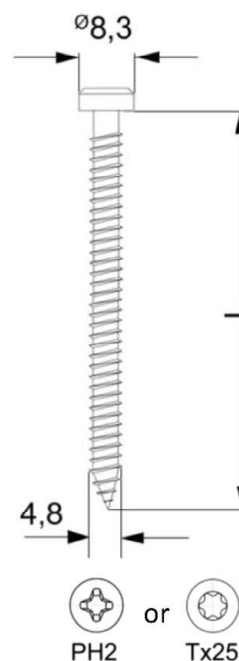
Annex 75



Zahn ZKSH round module 4,8 with dowel extension



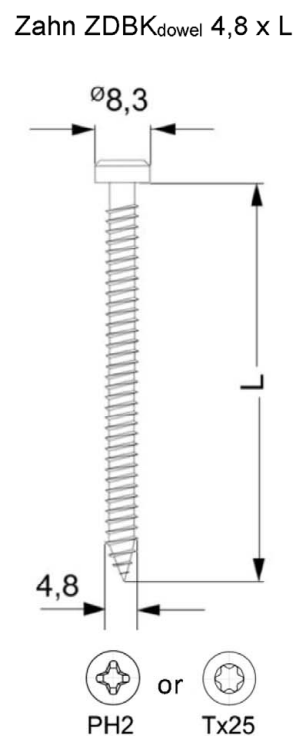
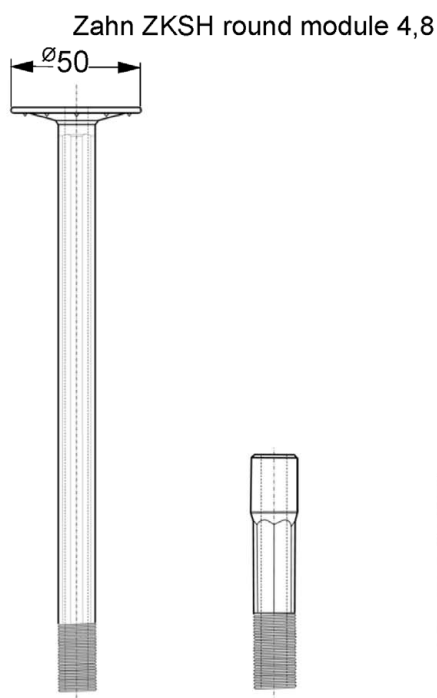
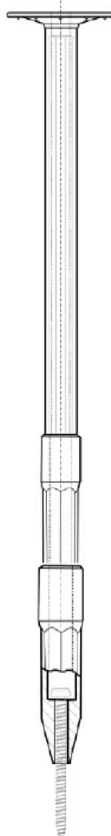
Zahn ZDBK_{dowel} 4,8 x L



Zahn Flat Roof Fasteners

Combination 76
ZSDK-R-Modul 4,8 consisting of ZDBK_{dowel} / ZKSH round module
with module middle piece, spike 4,8 and dowel extension

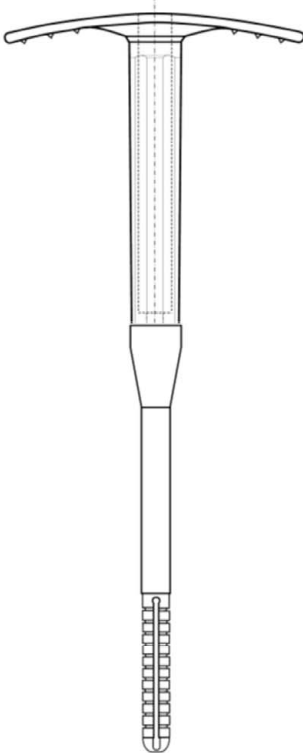
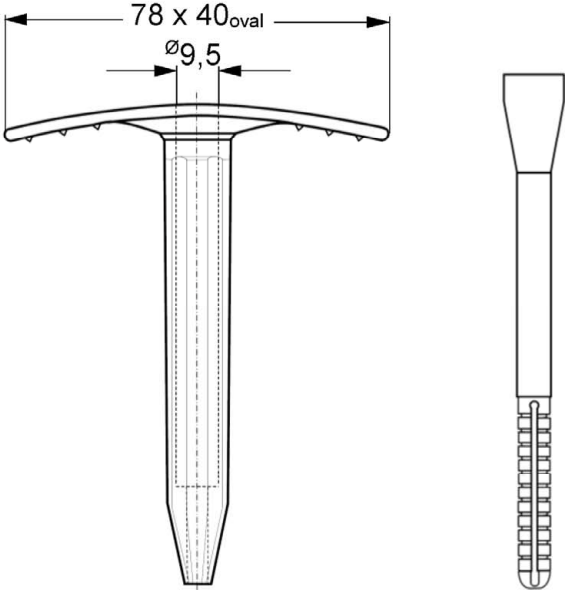
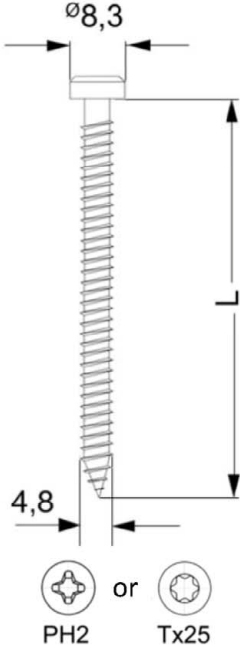
Annex 76

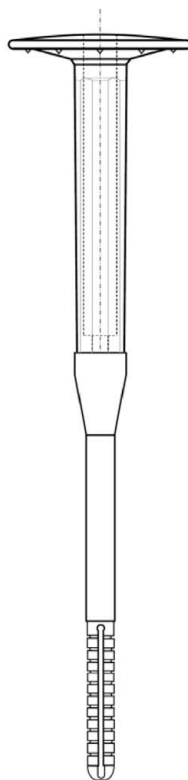


Zahn Flat Roof Fasteners

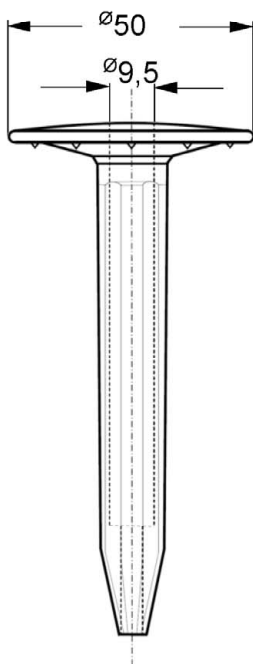
Combination 76a
ZHSK-R-Modul 4,8_{dowel} consisting of ZDBK_{dowel} / ZKSH round module
with module middle piece, spike 4,8

Annex 76a

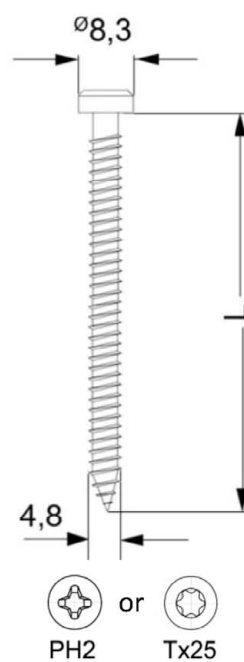
	
Zahn ZKSH oval 	Zahn ZDBK_{dowel} 4,8 x L 
Zahn Flat Roof Fasteners	
Combination 77 ZSDK consisting of ZDBK _{dowel} / ZKSH oval with dowel extension	
Annex 77	



Zahn ZKSH round



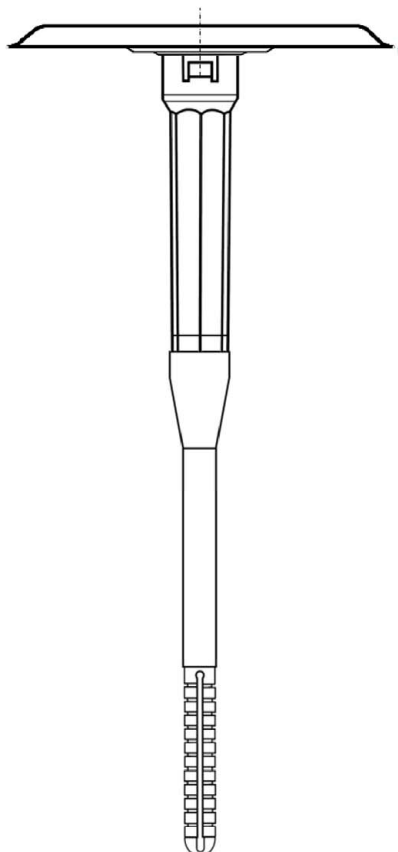
Zahn ZDBK_{dowel} 4,8 x L



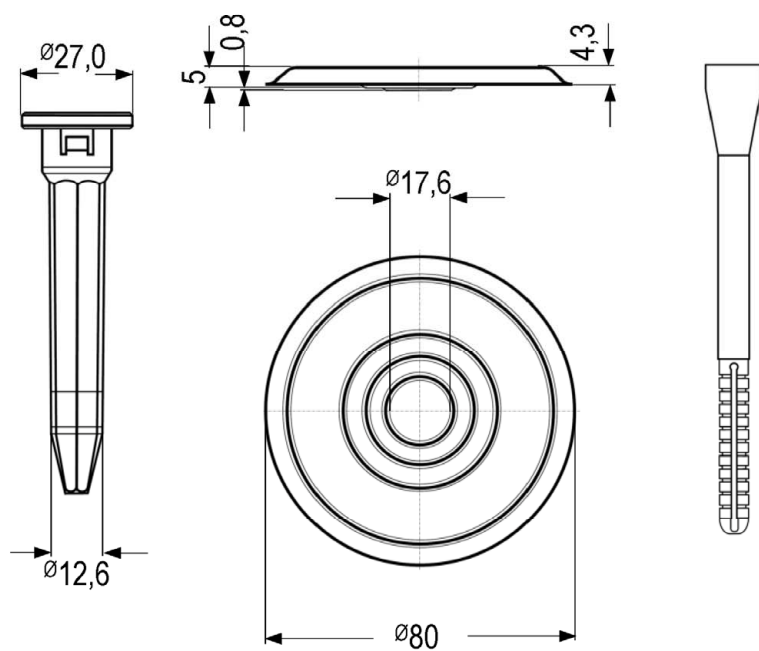
Zahn Flat Roof Fasteners

Combination 78
ZSDK-R consisting of ZDBK_{dowel} / ZKSH round with dowel extension

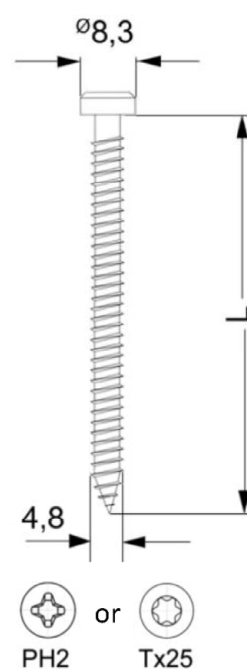
Annex 78



Zahn ZCTS-pipe 4,8 with ZCTS-plate and dowel extension



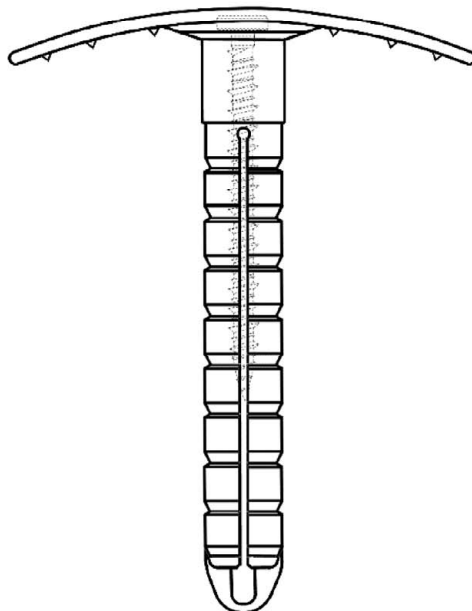
Zahn ZDBK_{dowel} 4,8 x L



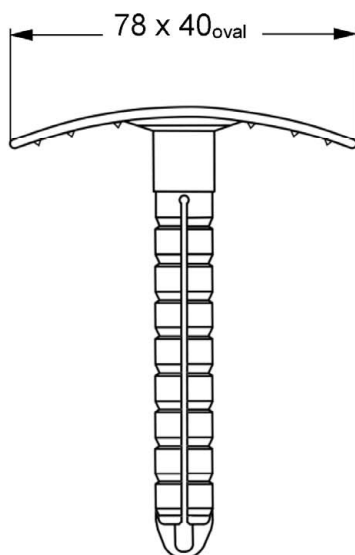
Zahn Flat Roof Fasteners

Combination 78a
ZCTS 4,8 dowel extension consisting of ZDBK_{dowel} / ZCTS-pipe 4,8, ZCTS-plate
and dowel extension

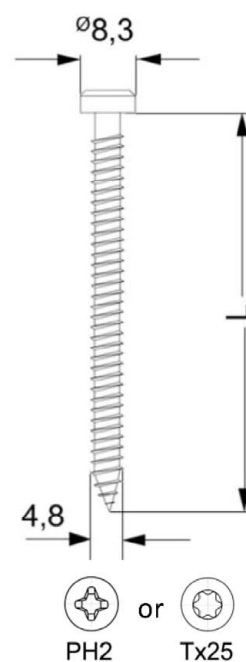
Annex 78a



Zahn ZTSD oval



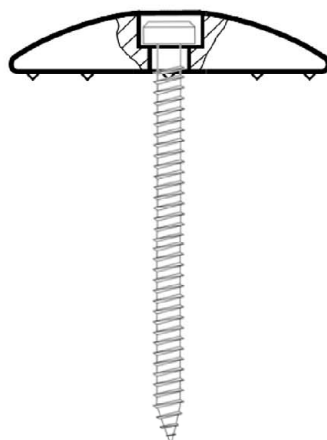
Zahn ZDBK_{dowel} 4,8 x L



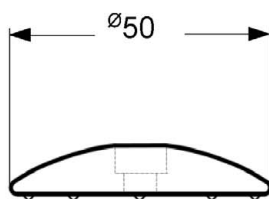
Zahn Flat Roof Fasteners

Combination 79
ZTSD consisting of ZDBK_{dowel} / ZTSD oval

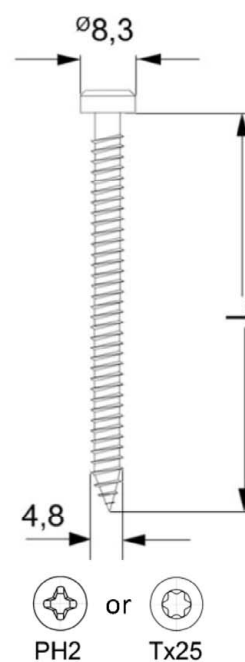
Annex 79



Zahn ZTSK 4,8



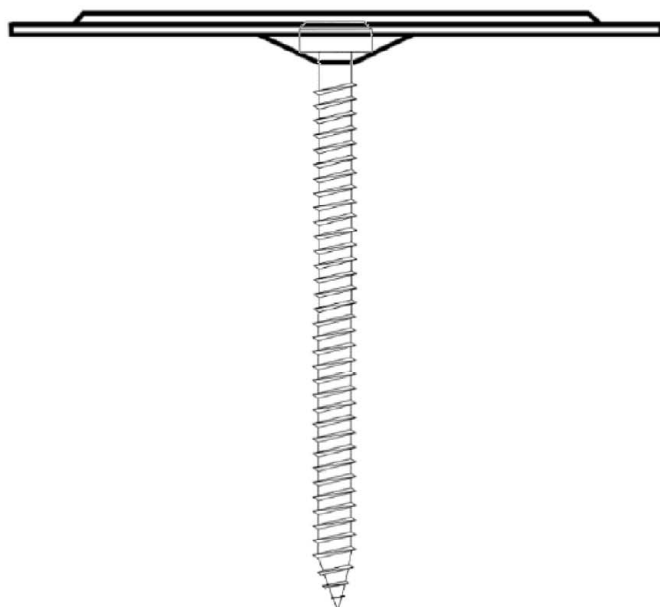
Zahn ZDBK_{dowel} 4,8 x L



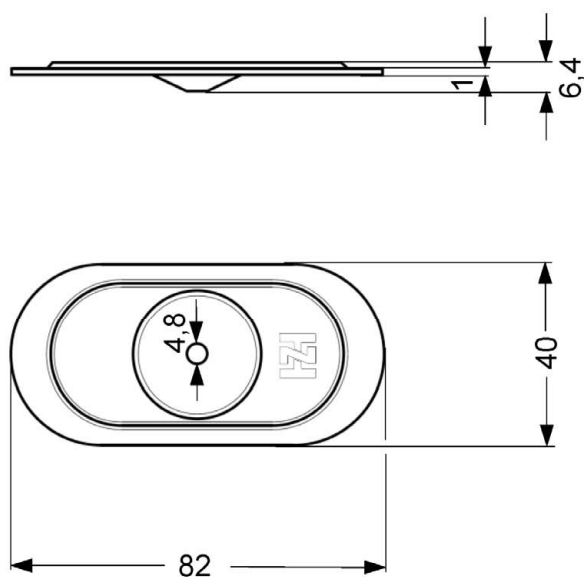
Zahn Flat Roof Fasteners

Combination 80
ZTSK-Dowel 4,8 consisting of ZDBK_{dowel} / ZTSK 4,8

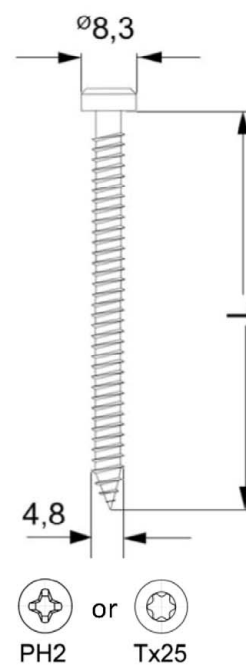
Annex 80



Zahn ZLVT 0001



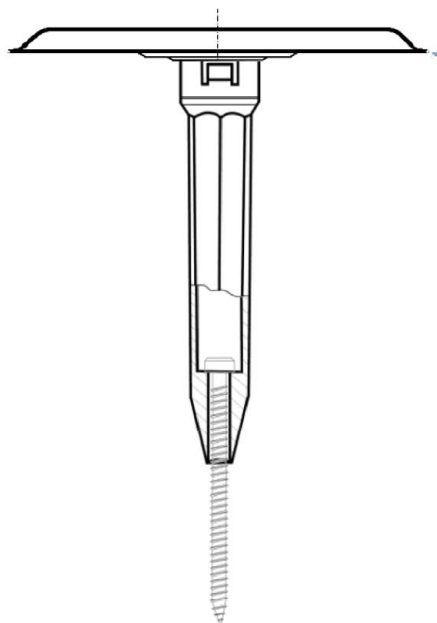
Zahn ZDBK_{dowel} 4,8 x L



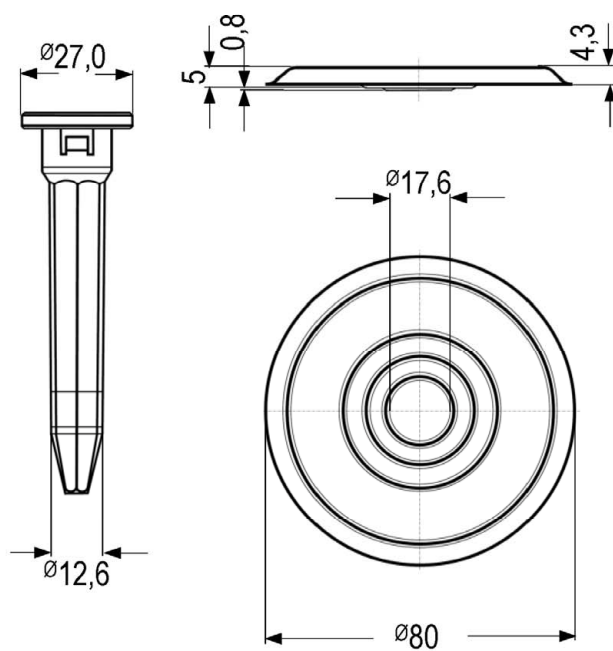
Zahn Flat Roof Fasteners

Combination 81
ZDBK_{dowel} / ZLVT 0001

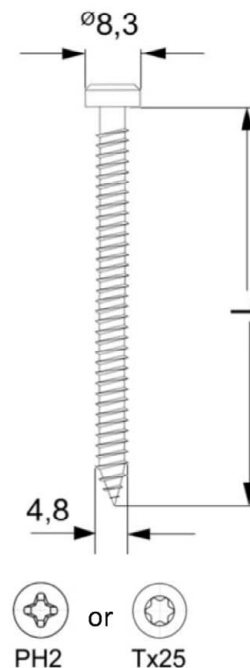
Annex 81



Zahn ZCTS-pipe 4,8 with ZCTS-plate



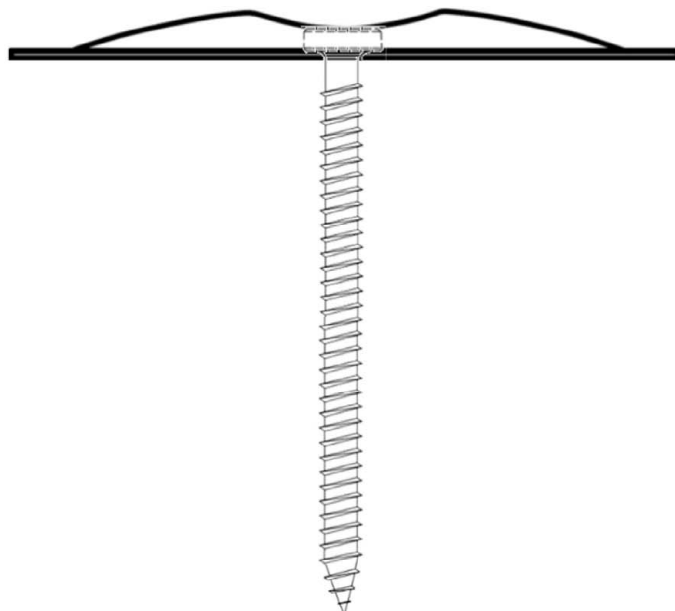
Zahn ZDBK_{dowel} 4,8 x L



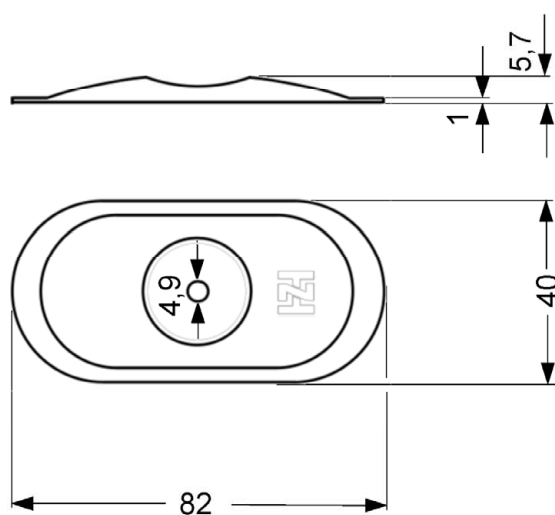
Zahn Flat Roof Fasteners

Combination 81a
ZCTS 4,8_{dowel} consisting of ZDBK_{dowel} / ZCTS-pipe 4,8 and ZCTS-plate

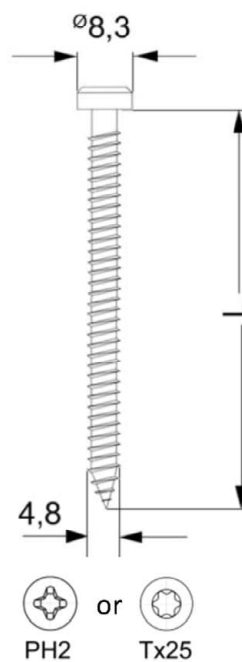
Annex 81a



Zahn ZLVT 0005



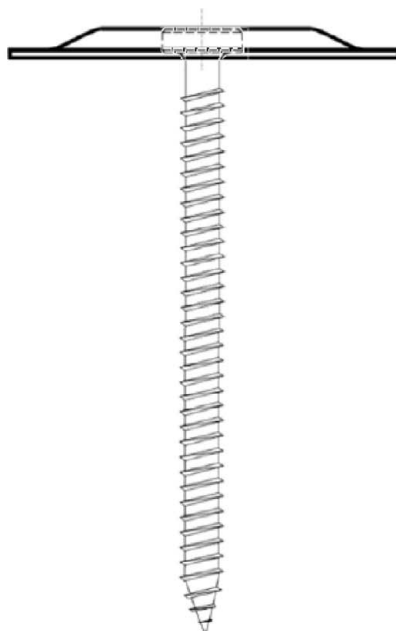
Zahn ZDBK_{dowel} 4,8 x L



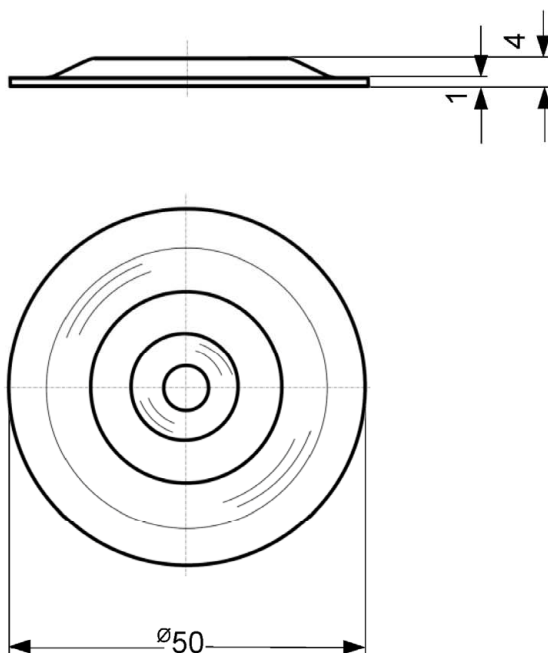
Zahn Flat Roof Fasteners

Combination 81b
ZDBK_{dowel} / ZLVT 0005

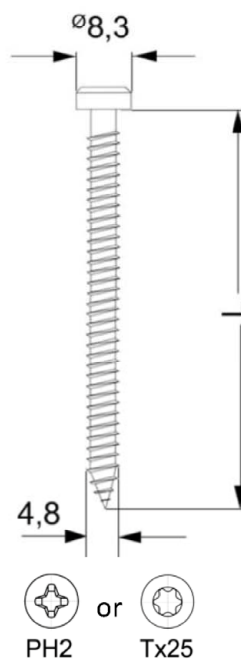
Annex 81b



Zahn ZLVT 0015



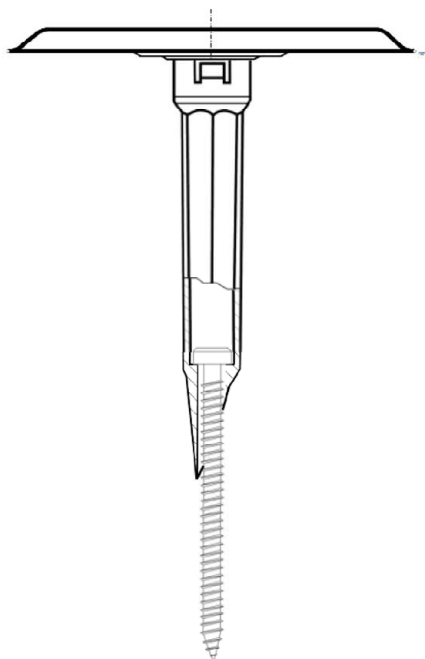
Zahn ZDBK_{dowel} 4,8 x L



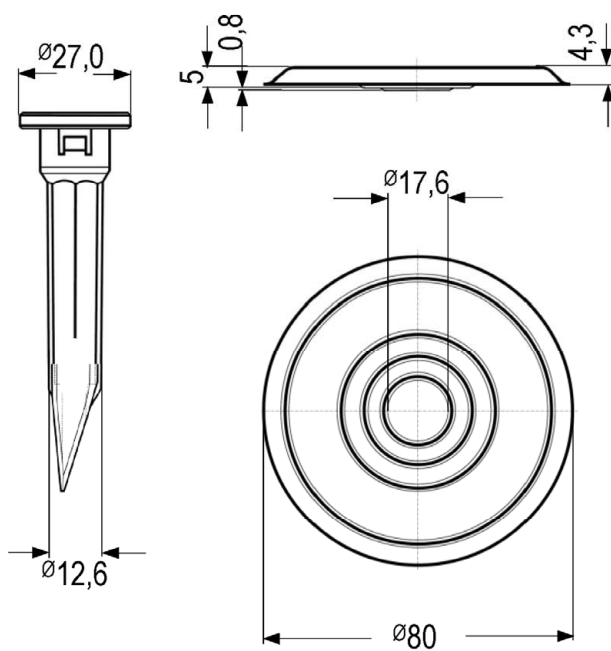
Zahn Flat Roof Fasteners

Combination 81c
ZDBK_{dowel} / ZLVT 0015

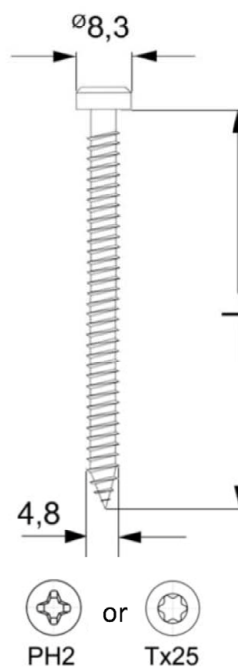
Annex 81c



Zahn ZCTSplus pipe with pile tip 4,8 with ZCTS-plate



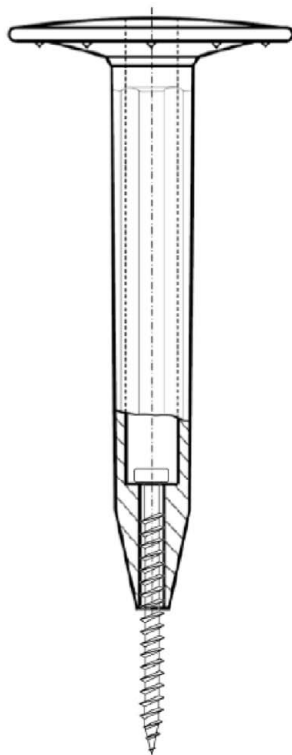
Zahn ZDBK_{dowel} 4,8 x L



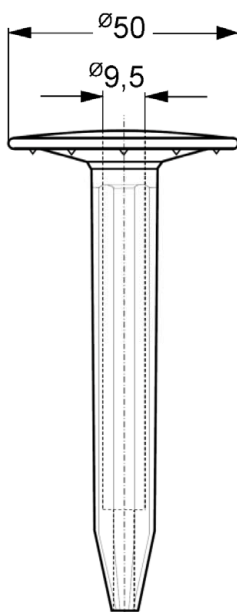
Zahn Flat Roof Fasteners

Combination 81d
ZCTS-H_{plus}dowel pipe with pile tip 4,8 consisting of ZDBK_{dowel} / ZCTSplus pipe
with pile tip 4,8 and ZCTS-plate

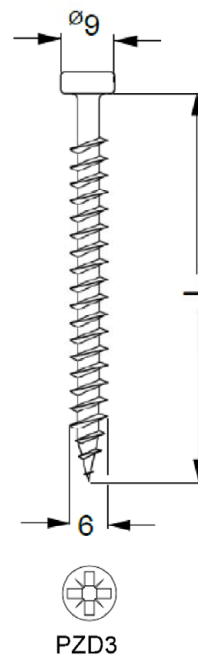
Annex 81d



Zahn ZKSH gray / round



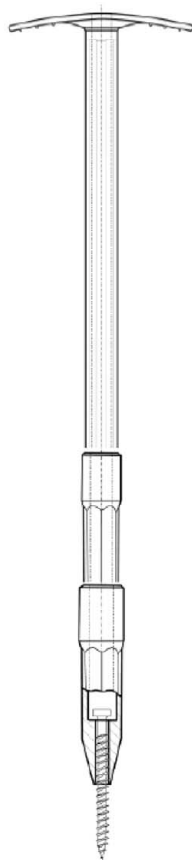
Zahn ZGBK-E 6,0 x L



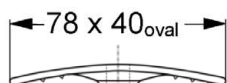
Zahn Flat Roof Fasteners

Combination 82
ZKGK-E/R consisting of ZGBK-E / ZKSH gray / round

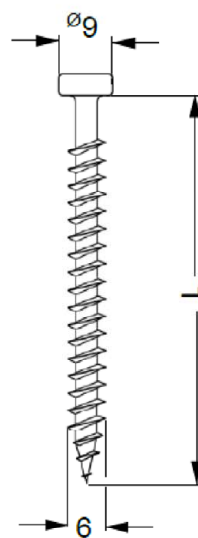
Annex 82



Zahn ZKSH oval module 6,0



Zahn ZGBK-E 6,0 x L

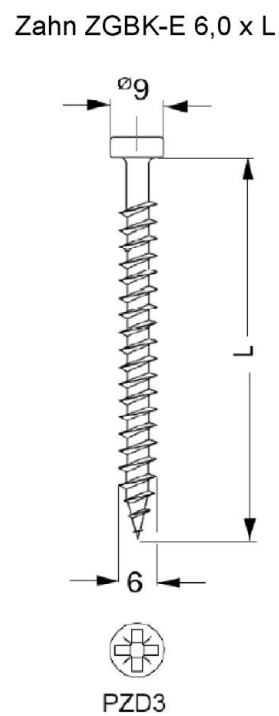
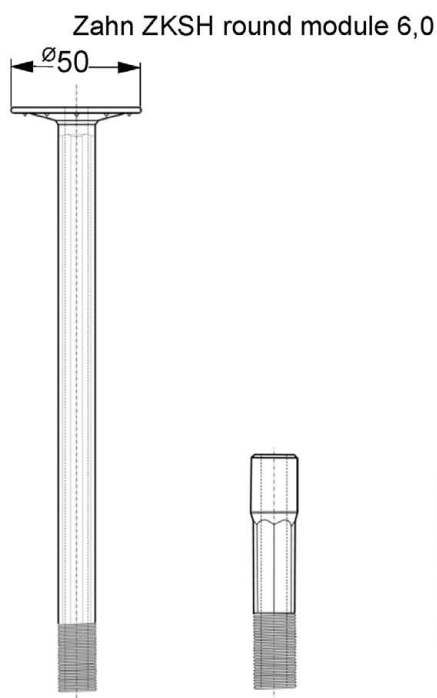
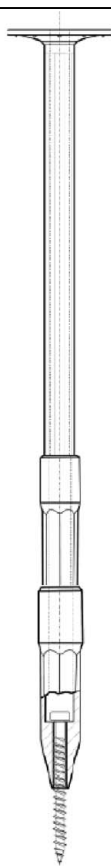


PZD3

Zahn Flat Roof Fasteners

Combination 83
ZKGK-E-Modul 6,0 consisting of ZGBK-E / ZKSH oval module
with module middle piece and spike 6,0

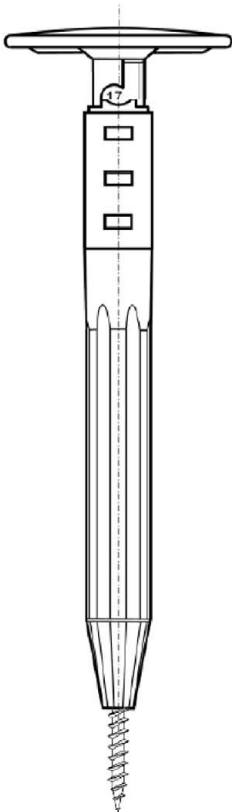
Annex 83



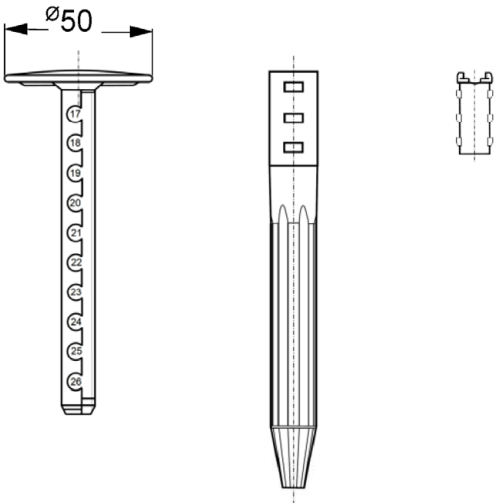
Zahn Flat Roof Fasteners

Combination 84
ZKGK-E/R-Modul 6,0 consisting ZGBK-E / ZKSH round module
with module middle piece and spike 6,0

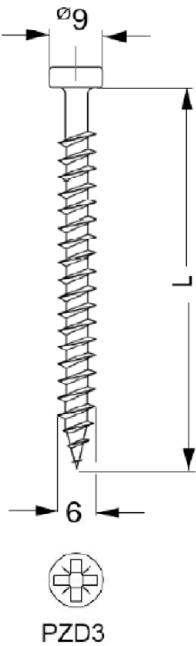
Annex 84



Zahn ZHVM



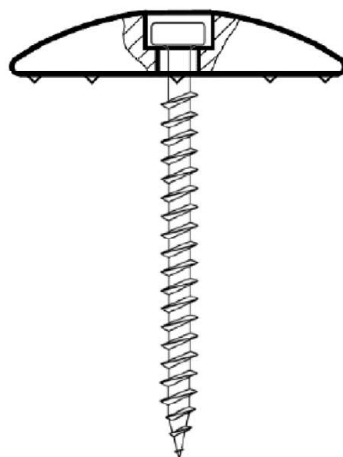
Zahn ZGBK-E 6,0 x L



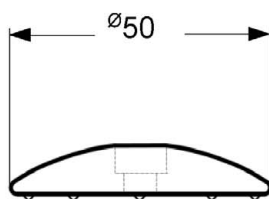
Zahn Flat Roof Fasteners

Combination 85
ZHVM-E-HPB consisting of ZGBK-E / ZHVM with headboard, shaft and locking sleeve

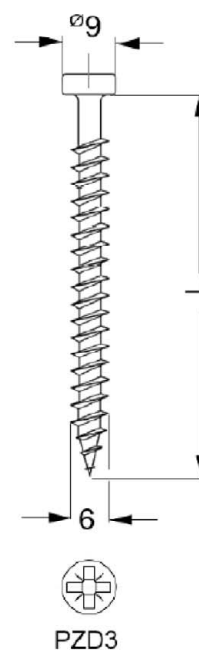
Annex 85



Zahn ZTSK 6,0



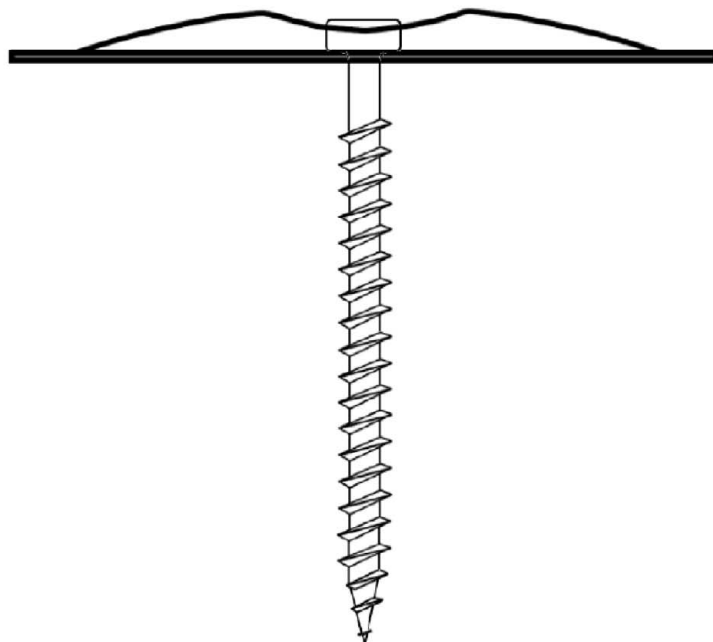
Zahn ZGBK-E 6,0 x L



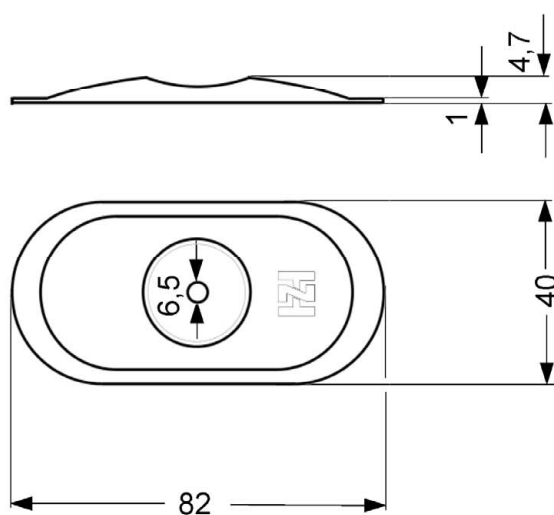
Zahn Flat Roof Fasteners

Combination 86
ZTSK-E-Pumice 6,0 consisting of ZGBK-E / ZTSK 6,0

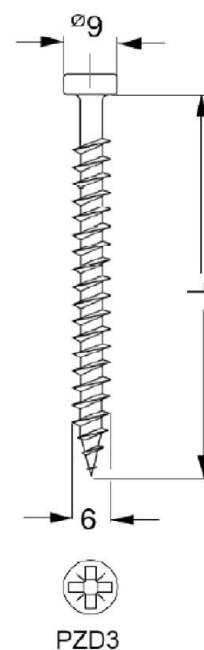
Annex 86



Zahn ZLVT 0008



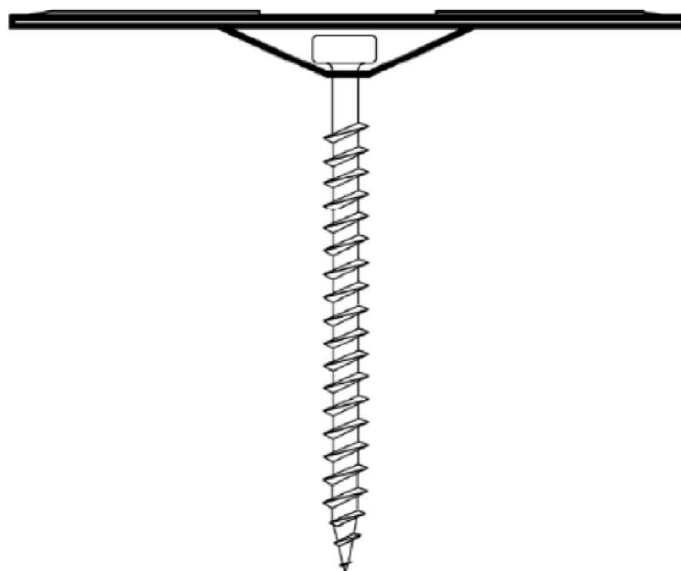
Zahn ZGBK-E 6,0 x L



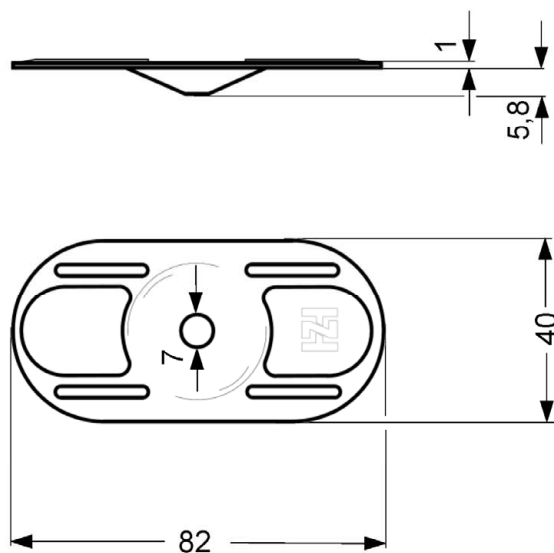
Zahn Flat Roof Fasteners

Combination 87
ZGBK-E / ZLVT 0008

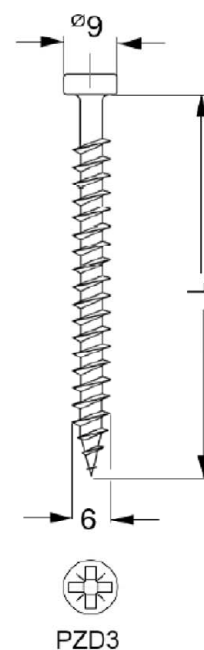
Annex 87



Zahn ZLVT 0012



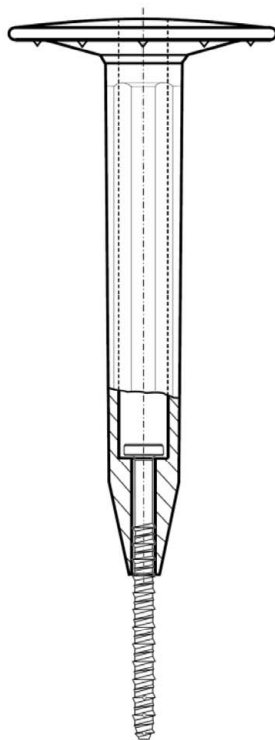
Zahn ZGBK-E 6,0 x L



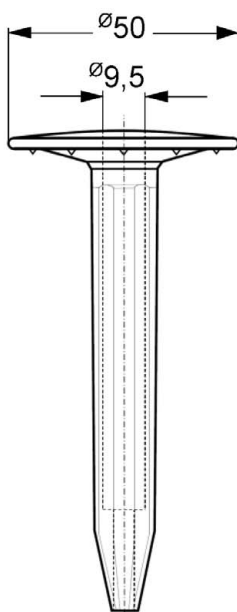
Zahn Flat Roof Fasteners

Combination 88
ZGBK-E / ZLVT 0012

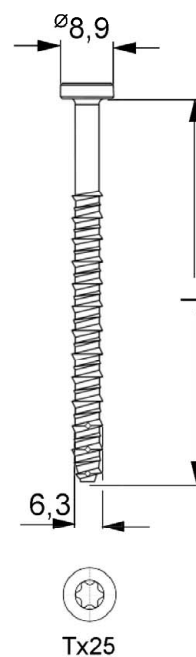
Annex 88



Zahn ZKSH gray / round



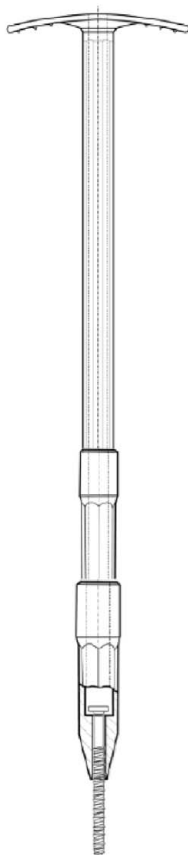
Zahn ZBST 6,3 x L



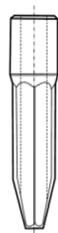
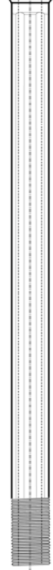
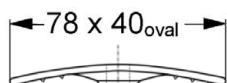
Zahn Flat Roof Fasteners

Combination 89
ZBSK-R consisting of ZBST / ZKSH gray / round

Annex 89



Zahn ZKSH oval module 6,0



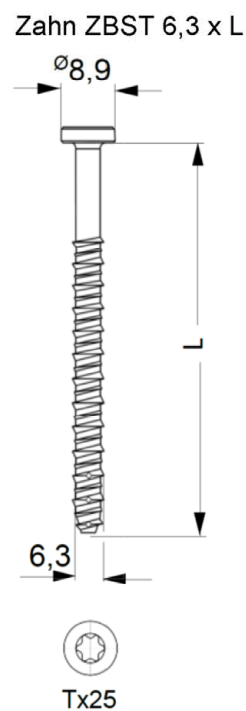
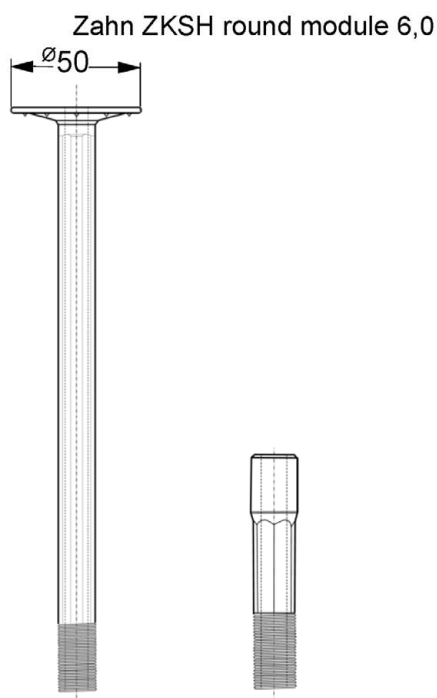
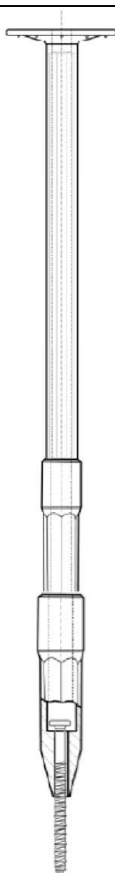
Zahn ZBST 6,3 x L



Zahn Flat Roof Fasteners

Combination 90
ZBSK-Modul 6,0 consisting of ZBST / ZKSH oval module
with module middle piece and spike 6,0

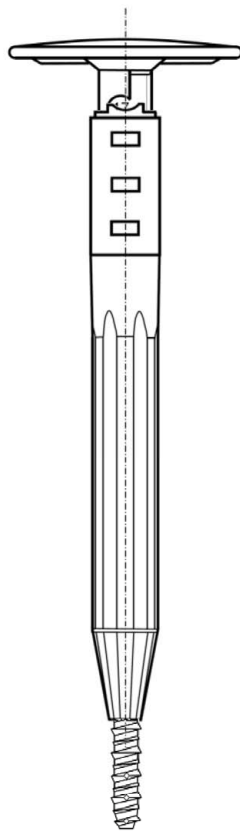
Annex 90



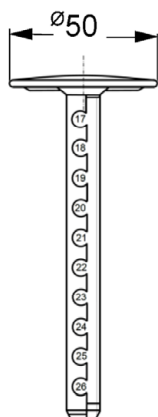
Zahn Flat Roof Fasteners

Combination 91
ZBSK-R-Modul 6,0 consisting of ZBST / ZKSH round module
with module middle piece and spike 6,0

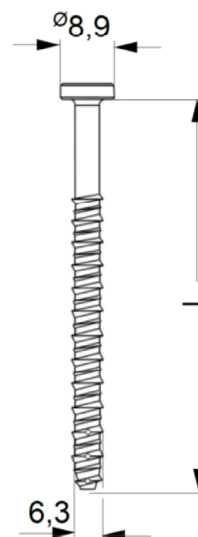
Annex 91



Zahn ZHVM



Zahn ZBST 6,3 x L

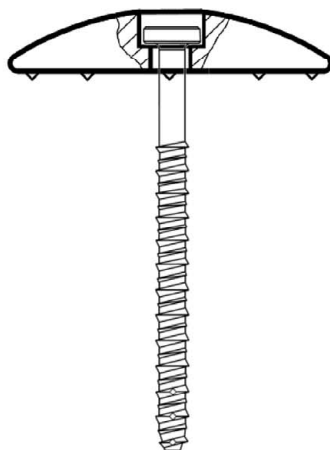


Tx25

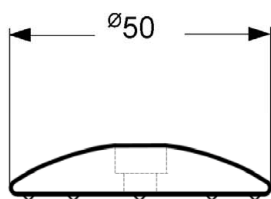
Zahn Flat Roof Fasteners

Combination 92
ZHVM-Concrete consisting of ZBST / ZHVM with headboard, shaft and locking sleeve

Annex 92



Zahn ZTSK 6,0



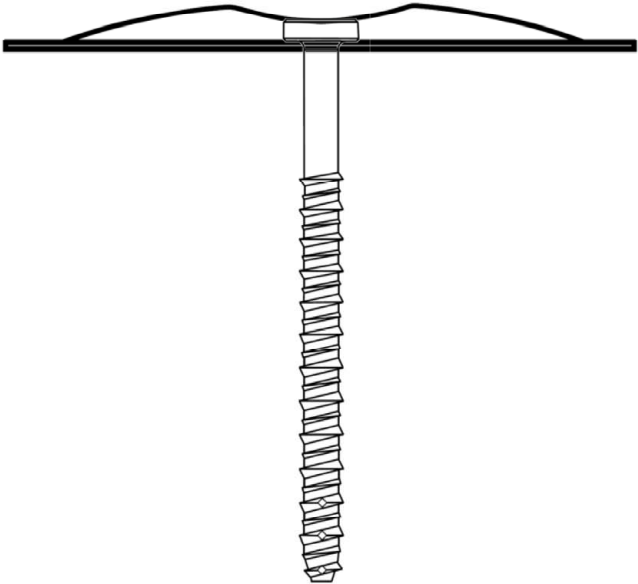
Zahn ZBST 6,3 x L



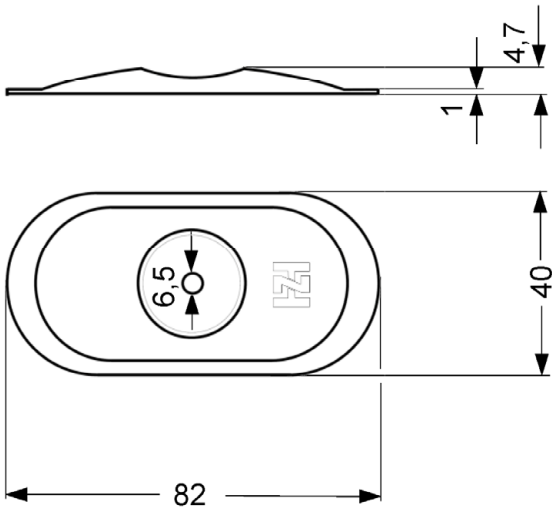
Zahn Flat Roof Fasteners

Combination 93
ZTSK-Concrete 6,0 consisting of ZBST / ZTSK 6,0

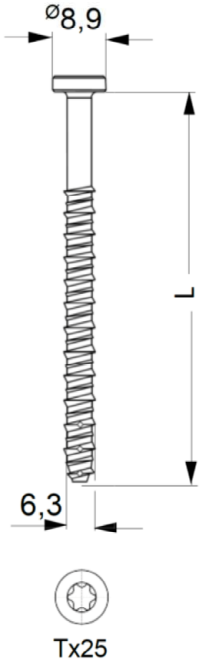
Annex 93



Zahn ZLVT 0008



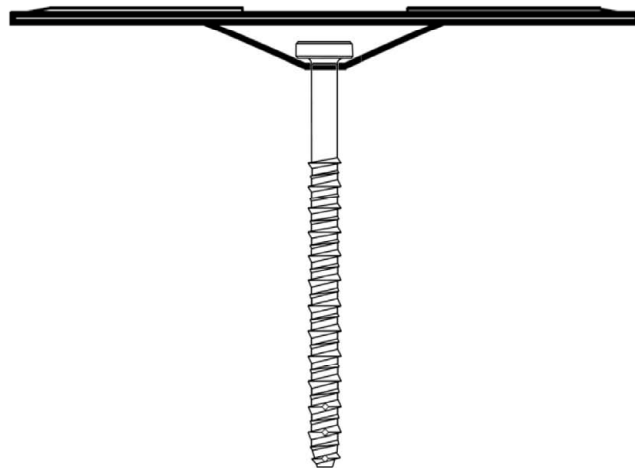
Zahn ZBST 6,3 x L



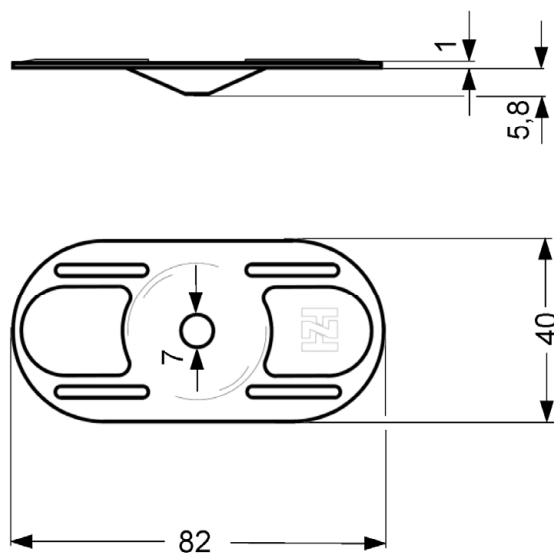
Zahn Flat Roof Fasteners

Combination 94
ZBST / ZLVT 0008

Annex 94



Zahn ZLVT 0012



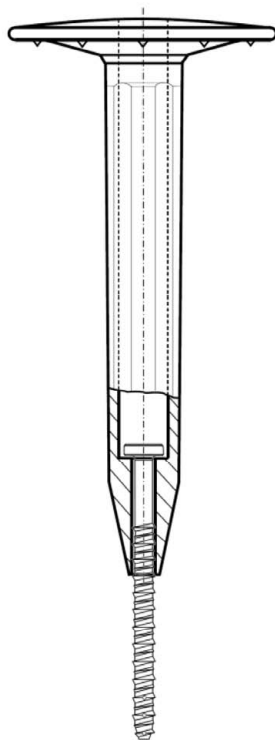
Zahn ZBST 6,3 x L



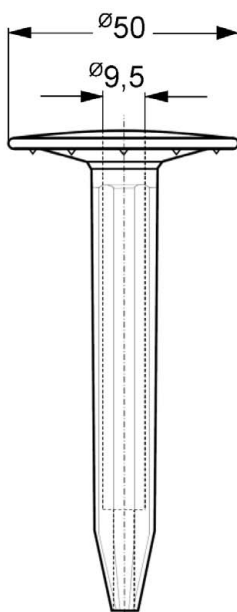
Zahn Flat Roof Fasteners

Combination 95
ZBST / ZLVT 0012

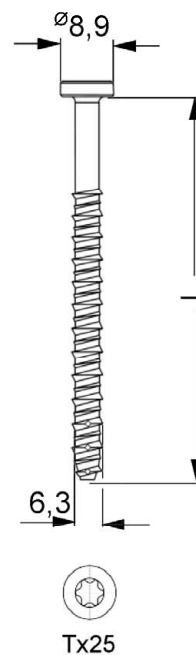
Annex 95



Zahn ZKSH gray / round



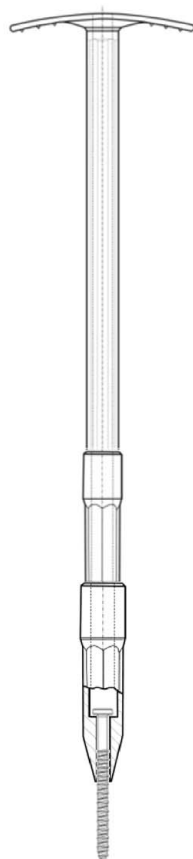
Zahn ZBST-E 6,3 x L



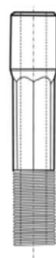
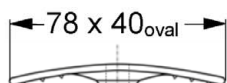
Zahn Flat Roof Fasteners

Combination 96
ZBSK-E/R consisting of ZBST-E / ZKSH gray / round

Annex 96



Zahn ZKSH oval module 6,0



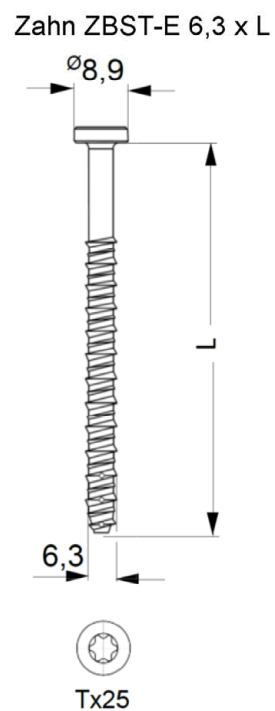
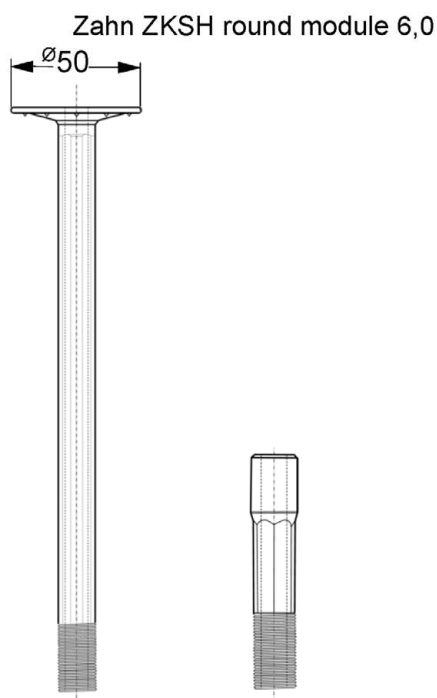
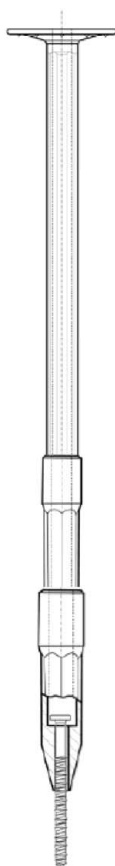
Zahn ZBST-E 6,3 x L



Zahn Flat Roof Fasteners

Combination 97
ZBSK-E-Modul 6,0 consisting of ZBST-E / ZKSH oval module
with module middle piece and spike 6,0

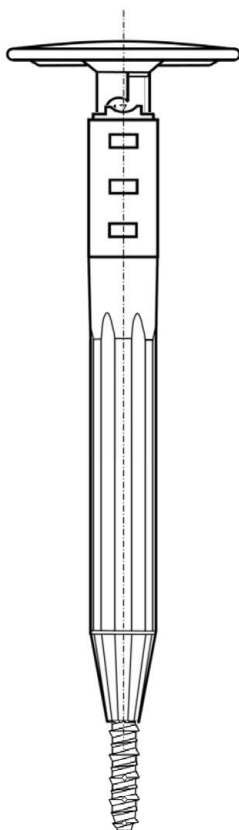
Annex 97



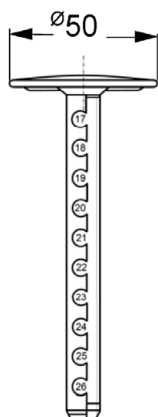
Zahn Flat Roof Fasteners

Combination 98
ZBSK-E/R-Modul 6,0 consisting of ZBST-E/ZKSH round module
with module middle piece and spike 6,0

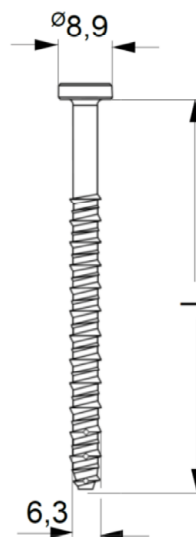
Annex 98



Zahn ZHVM



Zahn ZBST-E 6,3 x L

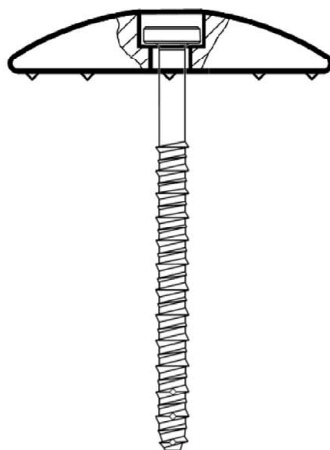


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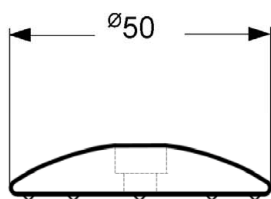
Zahn Flat Roof Fasteners

Combination 99
ZHVM-E-Concrete consisting of ZBST-E / ZHVM with headboard, shaft and locking sleeve

Annex 99



Zahn ZTSK 6,0



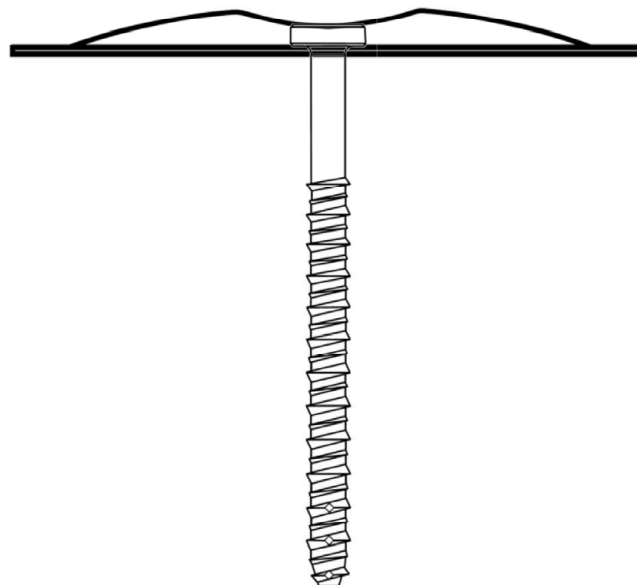
Zahn ZBST-E 6,3 x L



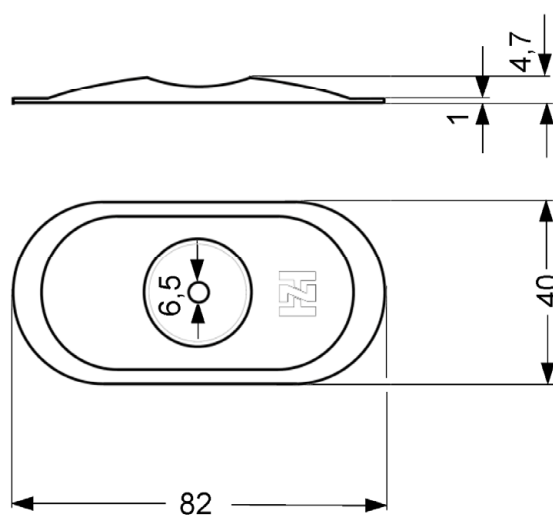
Zahn Flat Roof Fasteners

Combination 100
ZTSK-E-Concrete 6,0 consisting of ZBST-E / ZTSK 6,0

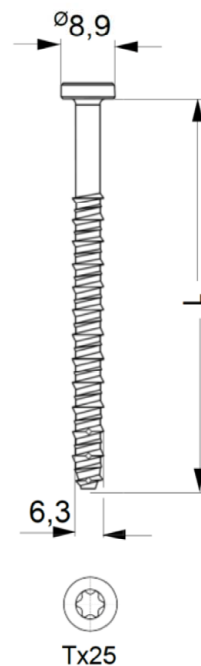
Annex 100



Zahn ZLVT 0008



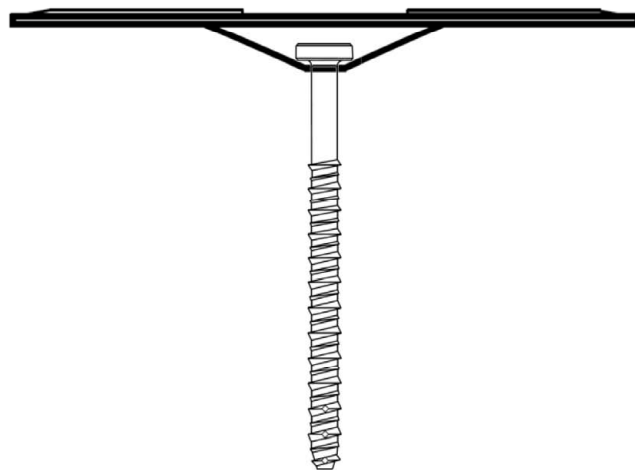
Zahn ZBST-E 6,3 x L



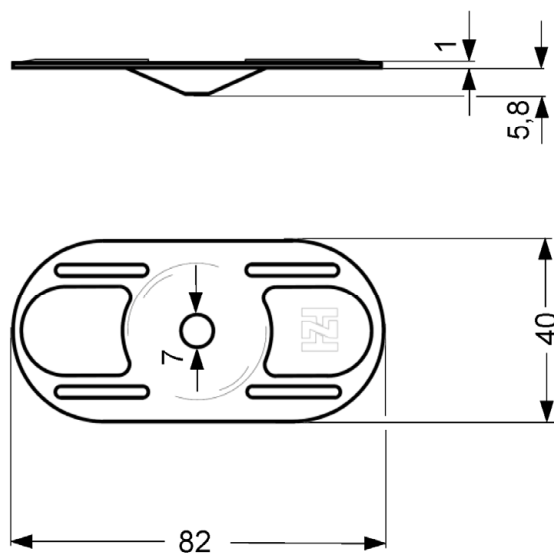
Zahn Flat Roof Fasteners

Combination 101
ZBST-E / ZLVT 0008

Annex 101



Zahn ZLVT 0012



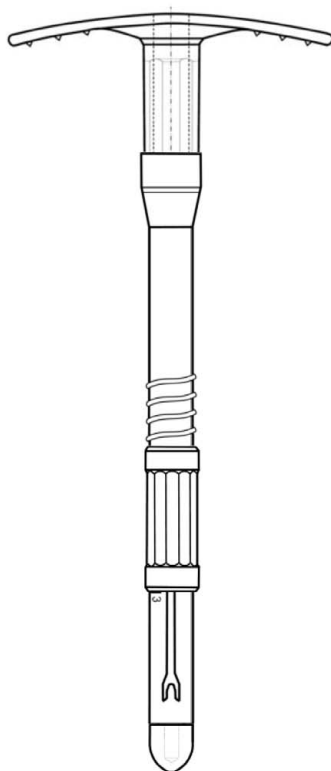
Zahn ZBST-E 6,3 x L



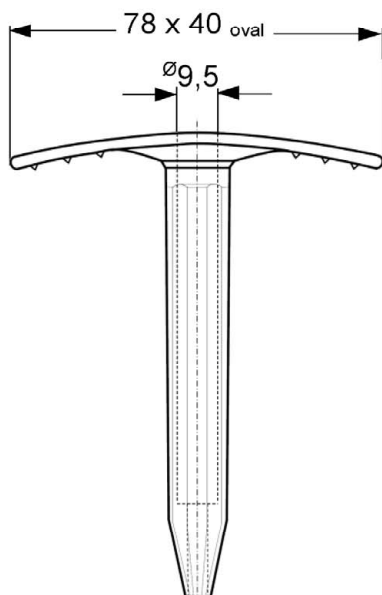
Zahn Flat Roof Fasteners

Combination 102
ZBST-E / ZLVT 0012

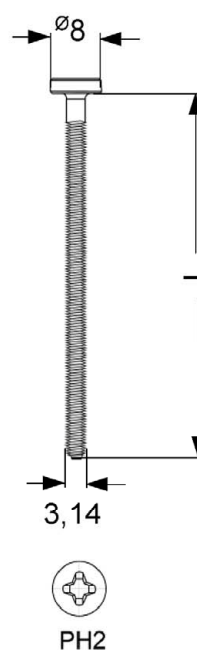
Annex 102



Zahn ZHRD oval with expanding dowel extension



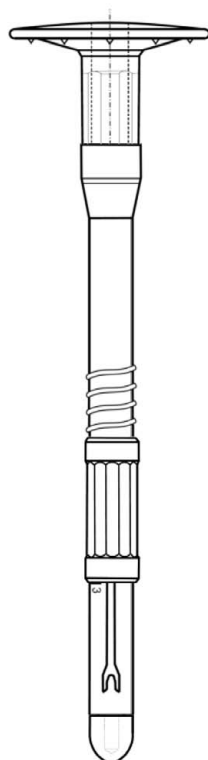
Zahn metric screw E 3,14 x L



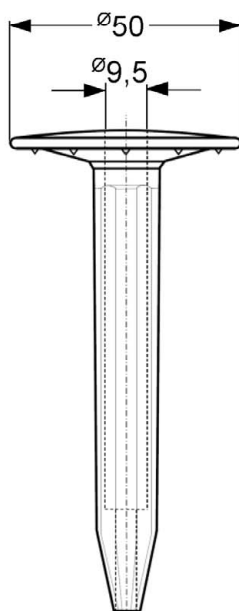
Zahn Flat Roof Fasteners

Combination 103
ZHRD consisting of metric screw-E/ZKSH oval with expanding dowel extension

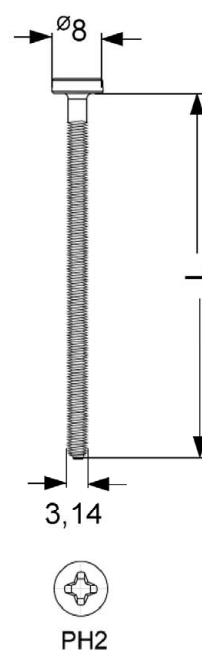
Annex 103



Zahn ZHRD round with expanding dowel extension



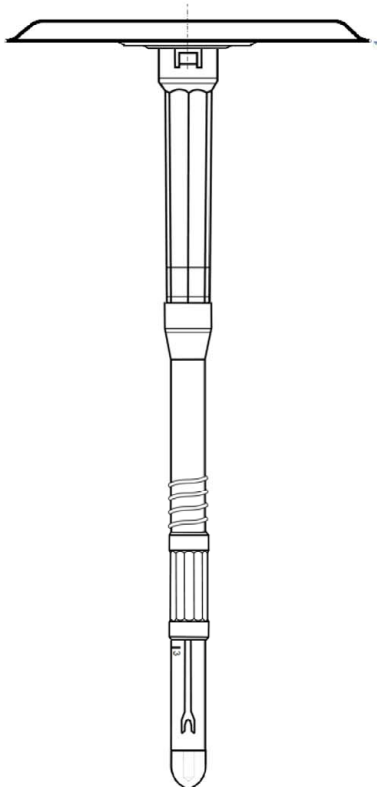
Zahn metric screw E 3,14 x L



Zahn Flat Roof Fasteners

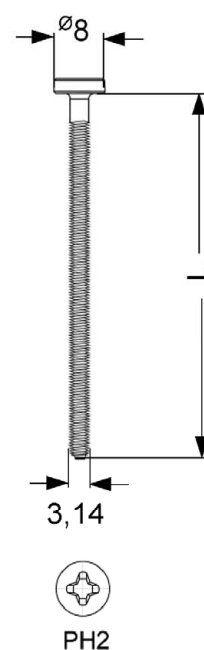
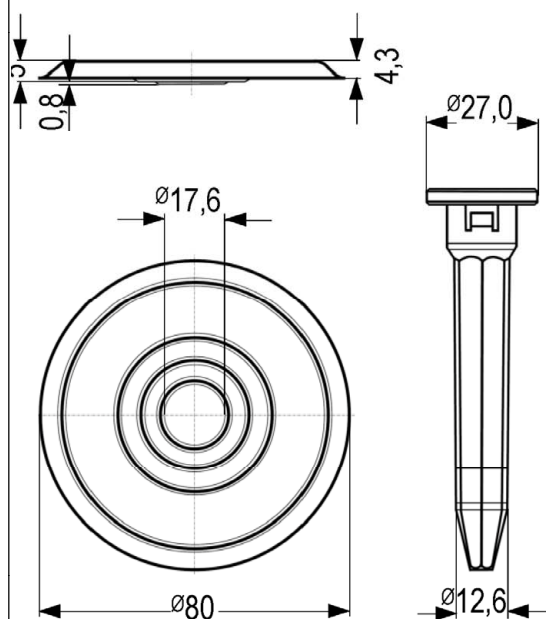
Combination 104
ZHRD-R consisting of metric screw-E / ZKSH round with expanding dowel extension

Annex 104



Zahn ZCTS-pipe with ZCTS-plate with expanding dowel extension

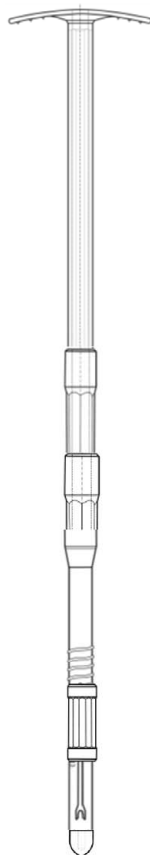
Zahn metric screw - E 3,14 x L



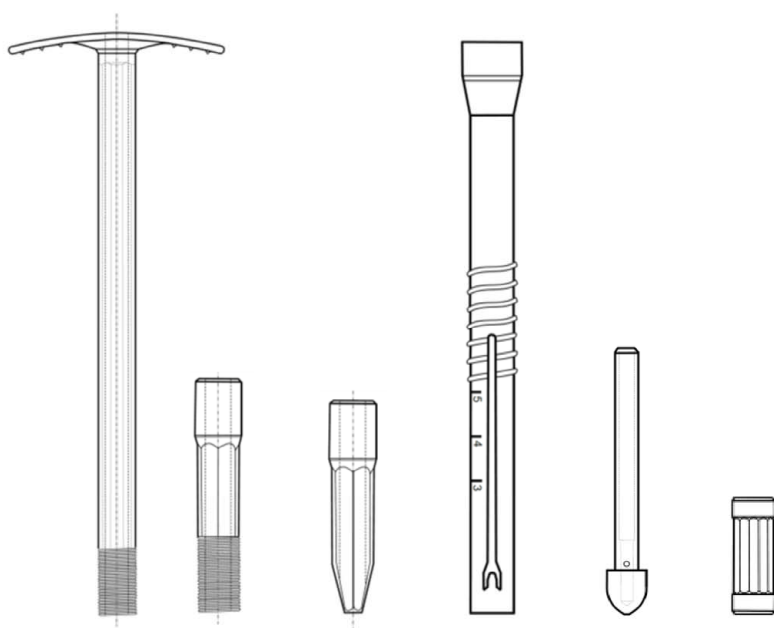
Zahn Flat Roof Fasteners

Combination 104a
ZCTS with expanding dowel extension consisting of metric screw-E / ZCTS-pipe,
ZCTS-plate and expanding dowel extension

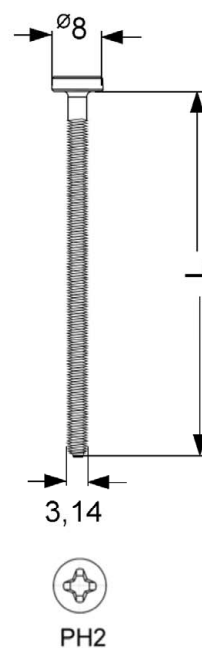
Annex 104a



Zahn ZKSK oval module 4,8 with expanding dowel extension



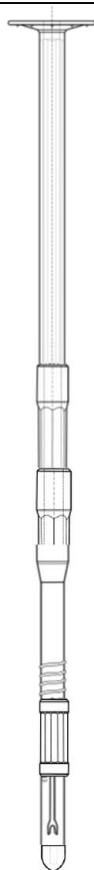
Zahn metric screw - E 3,14 x L



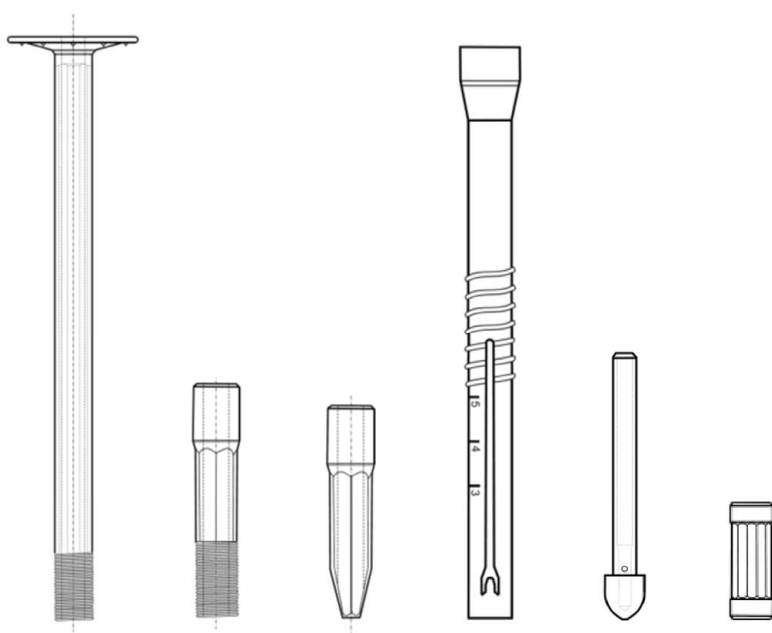
Zahn Flat Roof Fasteners

Combination 105
ZHRD on Modul oval 4,8 consisting of metric screw-E / ZKSH oval module
with middle piece, spike 4,8 and expanding dowel extension

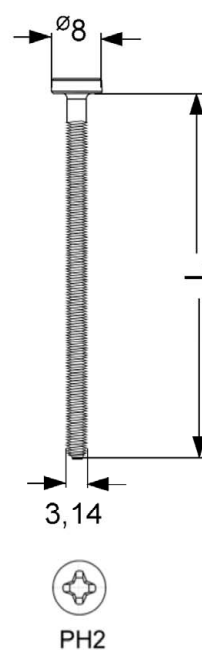
Annex 105



Zahn ZKSK round module 4,8 with expanding dowel extension



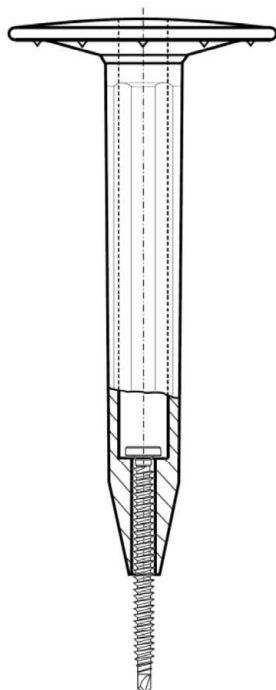
Zahn metric screw-E 3,14 x L



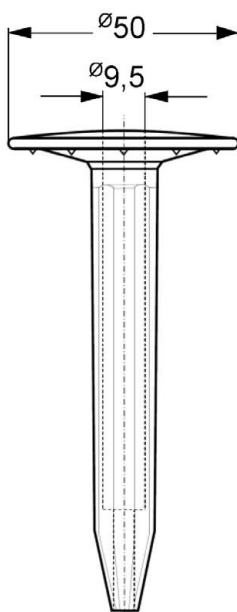
Zahn Flat Roof Fasteners

Combination 106
ZHRD-R on Modul-round 4,8 consisting of metric screw-E / ZKSH round module
with middle piece, spike 4,8 and expanding dowel extension

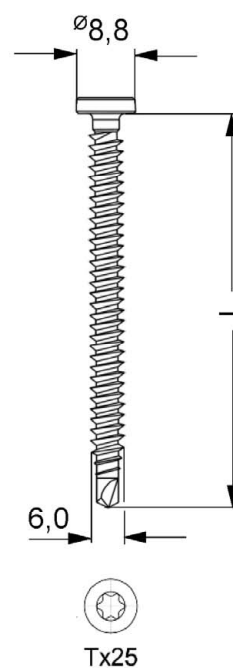
Annex 106



Zahn ZKSH gray / round



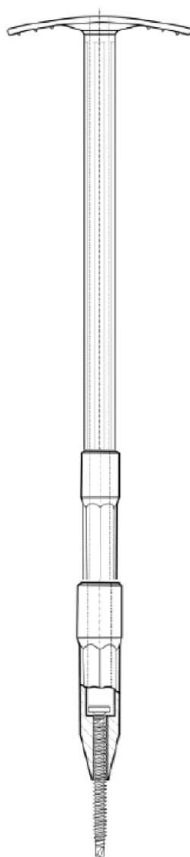
Zahn ZMDS 6,0 x L



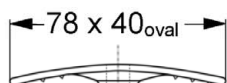
Zahn Flat Roof Fasteners

Combination 107
ZMDS-R consisting of ZMDS / ZKSH gray / round

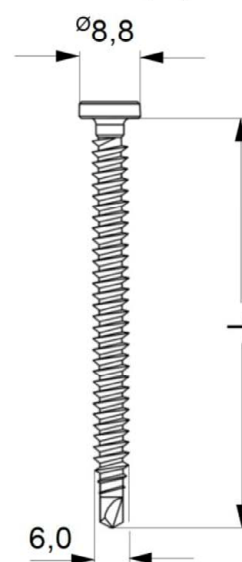
Annex 107



Zahn ZKSH oval module 6,0



Zahn ZMDS 6,0 x L

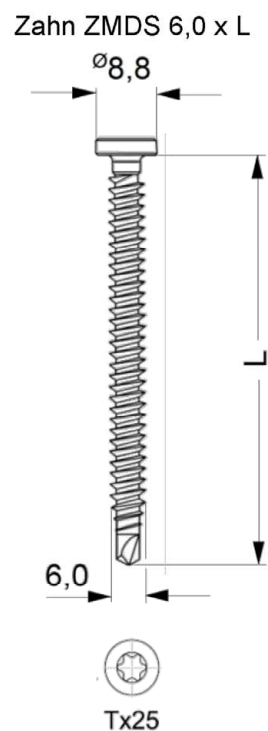
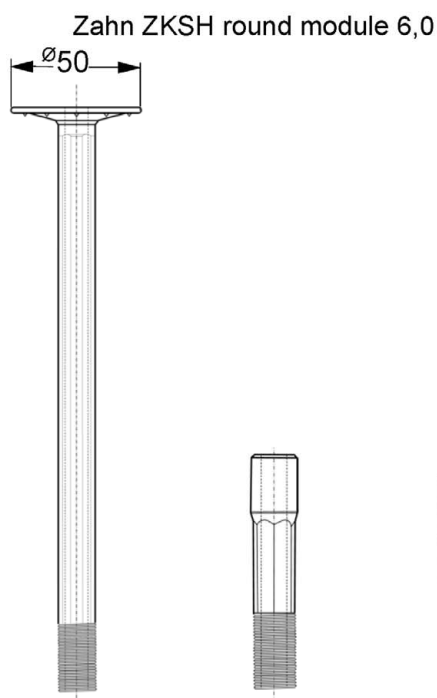
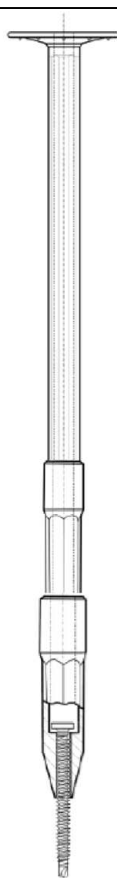


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Zahn Flat Roof Fasteners

Combination 108
ZMDS-Modul 6,0 consisting of ZMDS / ZKSH oval module
with module middle piece and spike 6,0

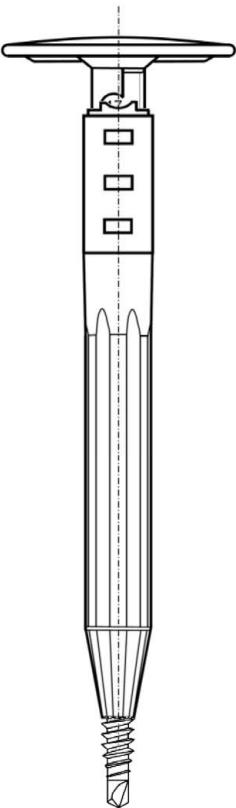
Annex 108



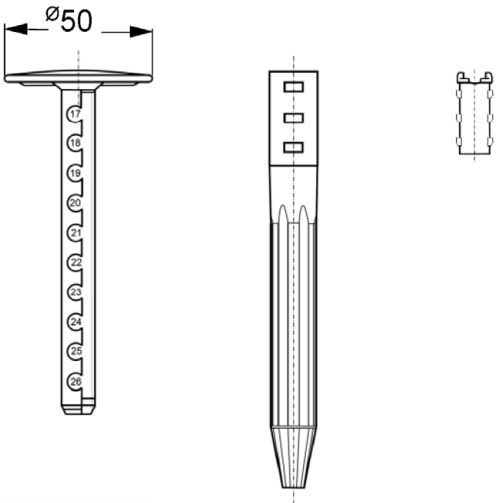
Zahn Flat Roof Fasteners

Combination 109
ZMDS-R-Modul 6,0 consisting of ZMDS / ZKSH round module
with module middle piece and spike 6,0

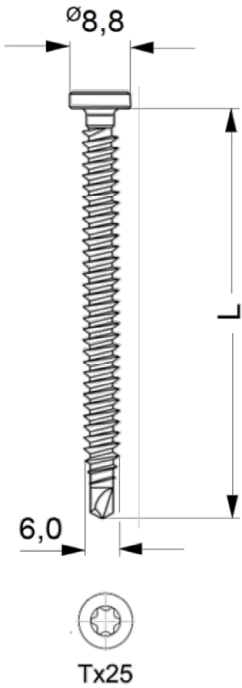
Annex 109



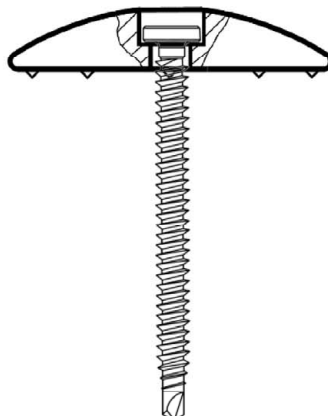
Zahn ZHVM



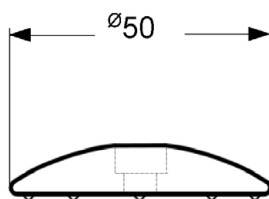
Zahn ZMDS 6,0 x L



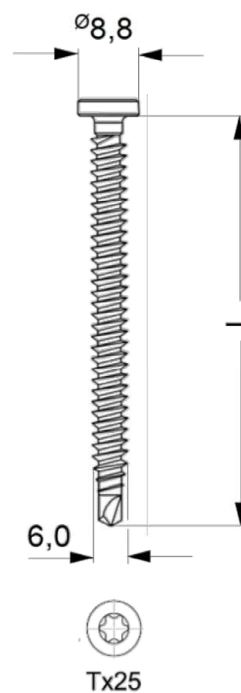
Zahn Flat Roof Fasteners	Annex 110
Combination 110 ZHVM-Multi consisting of ZMDS / ZHVM with headboard, shaft and locking sleeve	



Zahn ZTSK 6,0



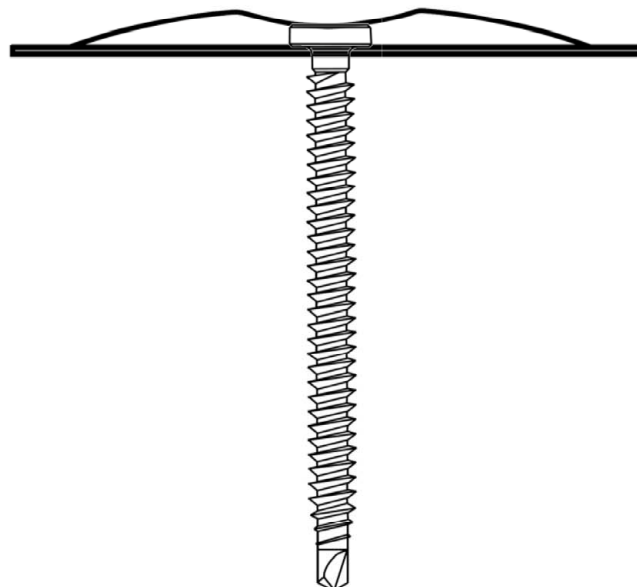
Zahn ZMDS 6,0 x L



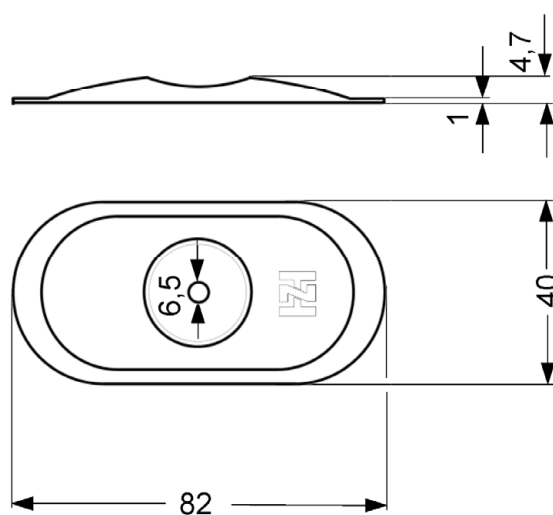
Zahn Flat Roof Fasteners

Combination 111
ZTSK-Multi 6,0 consisting of ZMDS / ZTSK 6,0

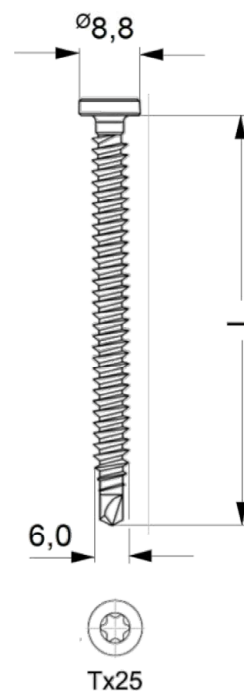
Annex 111



Zahn ZLVT 0008



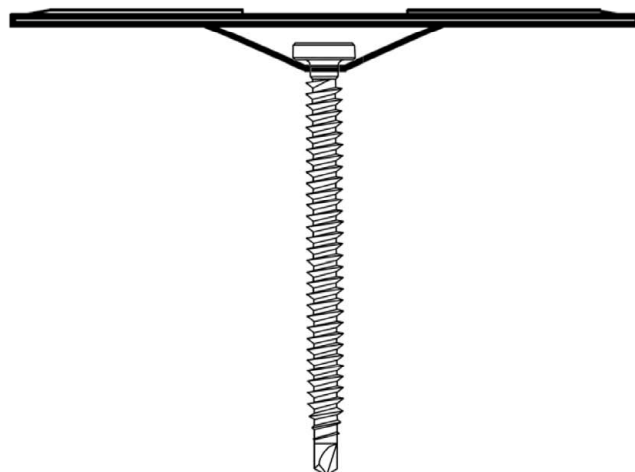
Zahn ZMDS 6,0 x L



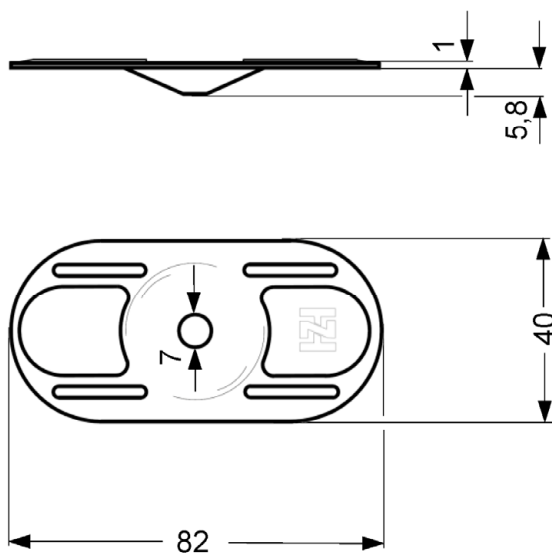
Zahn Flat Roof Fasteners

Combination 112
ZMDS / ZLVT 0008

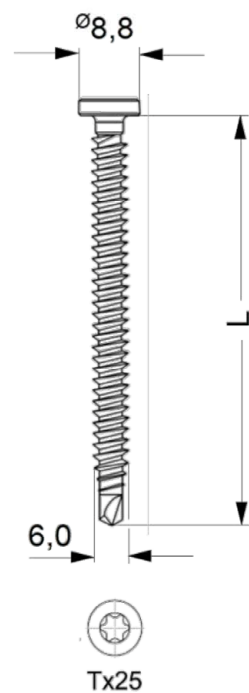
Annex 112



Zahn ZLVT 0012



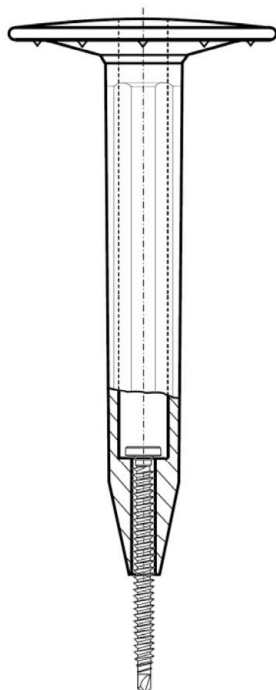
Zahn ZMDS 6,0 x L



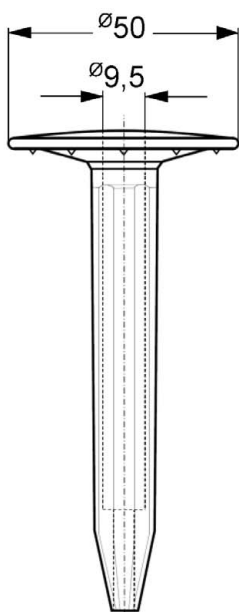
Zahn Flat Roof Fasteners

Combination 113
ZMDS / ZLVT 0012

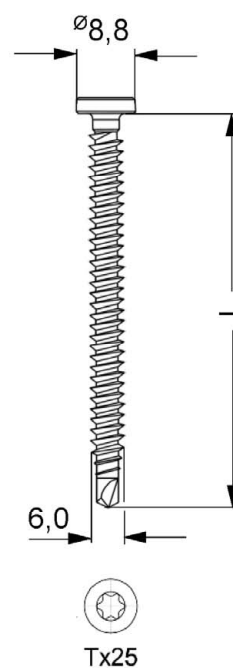
Annex 113



Zahn ZKSH gray / round



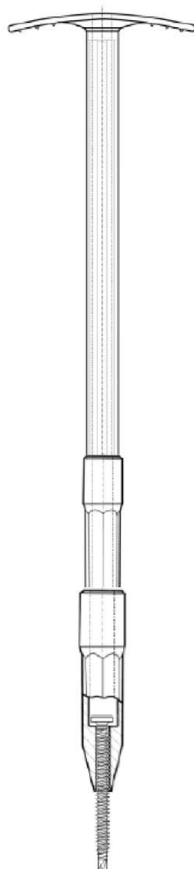
Zahn ZMDS-E 6,0 x L



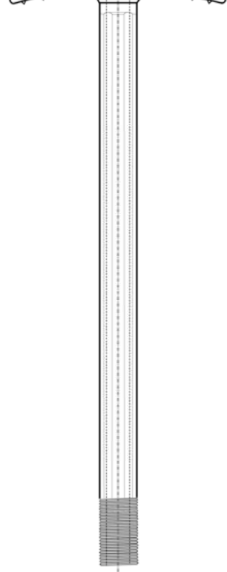
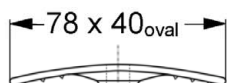
Zahn Flat Roof Fasteners

Combination 114
ZMDS-E/R consisting of ZMDS-E / ZKSH gray / round

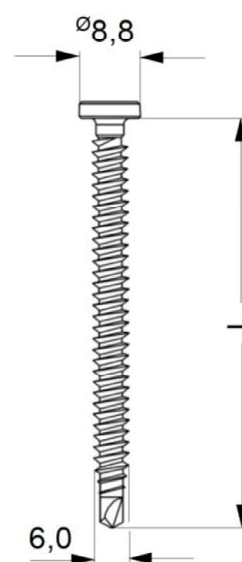
Annex 114



Zahn ZKSH oval module 6,0



Zahn ZMDS-E 6,0 x L

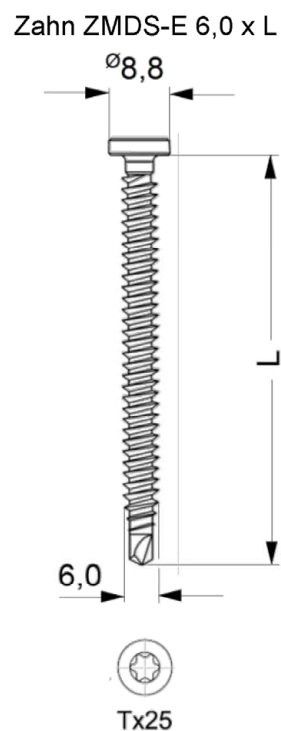
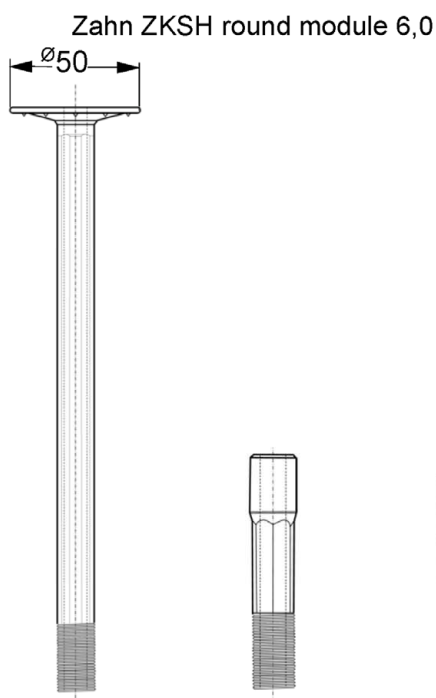
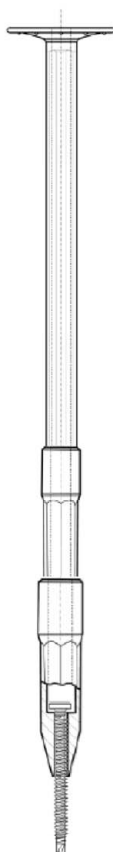


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Zahn Flat Roof Fasteners

Combination 115
ZMDS-E-Modul 6,0 consisting of ZMDS-E / ZKSH oval module
with module middle piece and spike 6,0

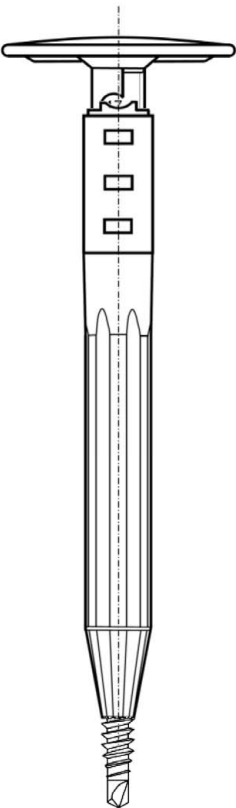
Annex 115



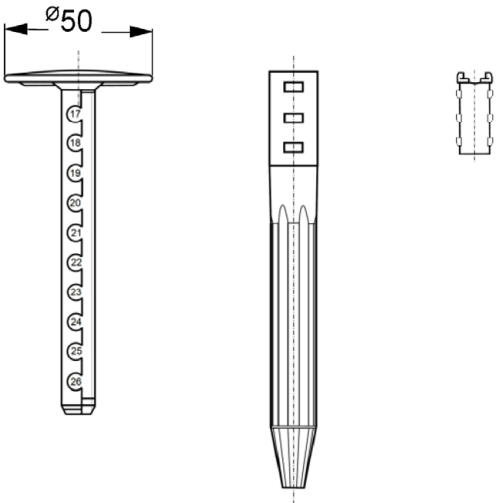
Zahn Flat Roof Fasteners

Combination 116
ZMDS-E/R-Modul 6,0 consisting of ZMDS-E / ZKSH round module
with module middle piece and spike 6,0

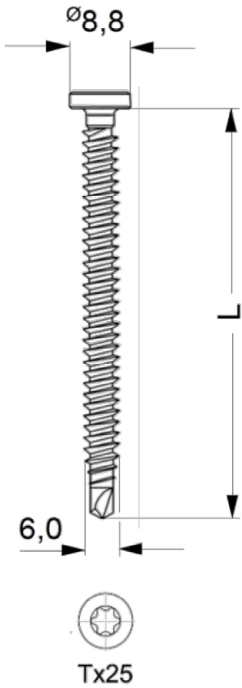
Annex 116



Zahn ZHVM



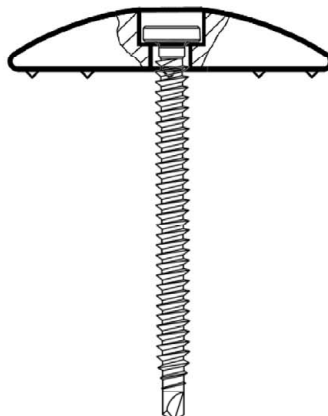
Zahn ZMDS-E 6,0 x L



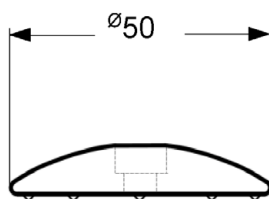
Zahn Flat Roof Fasteners

Combination 117
ZHVM-E-Multi consisting of ZMDS-E / ZHVM with headboard, shaft and locking sleeve

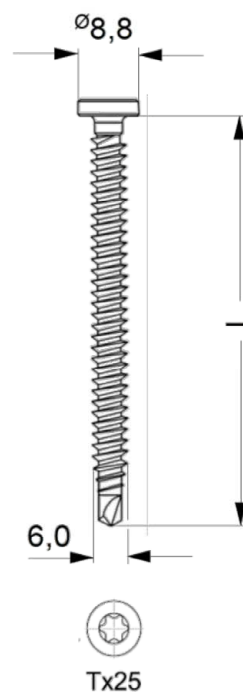
Annex 117



Zahn ZTSK 6,0



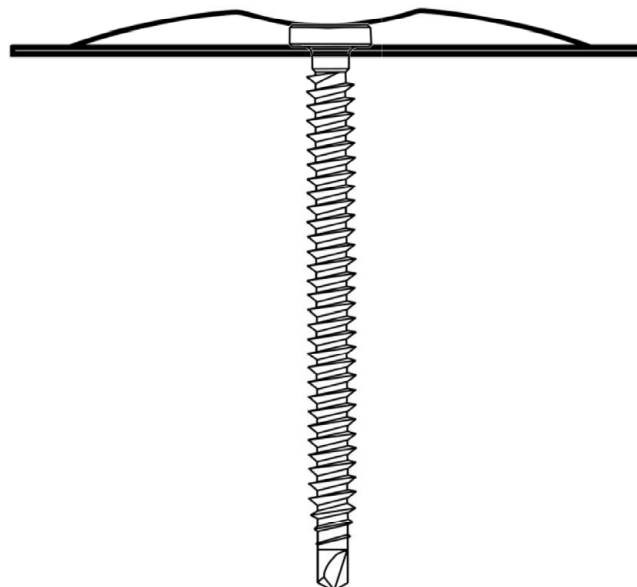
Zahn ZMDS-E 6,0 x L



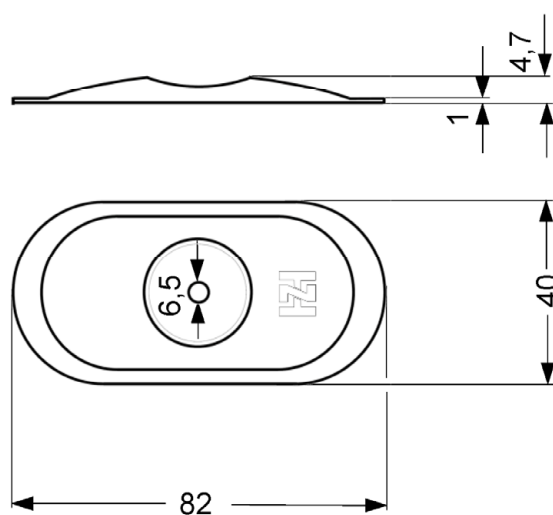
Zahn Flat Roof Fasteners

Combination 118
ZTSK-E-Multi 6,0 consisting of ZMDS-E / ZTSK 6,0

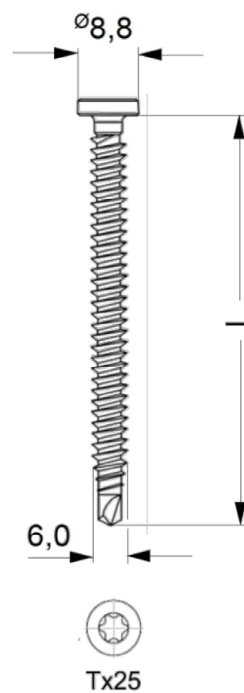
Annex 118



Zahn ZLVT 0008



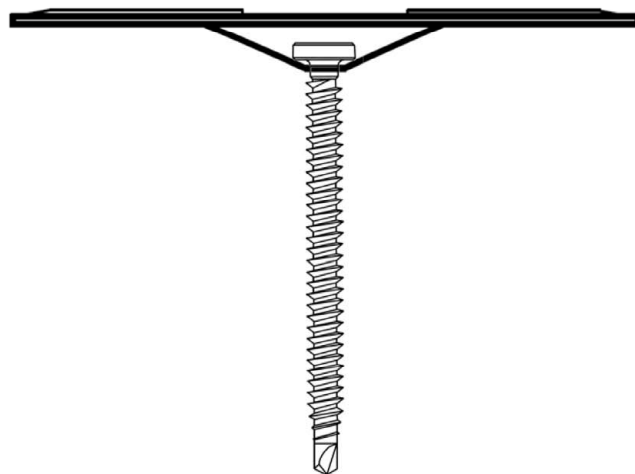
Zahn ZMDS-E 6,0 x L



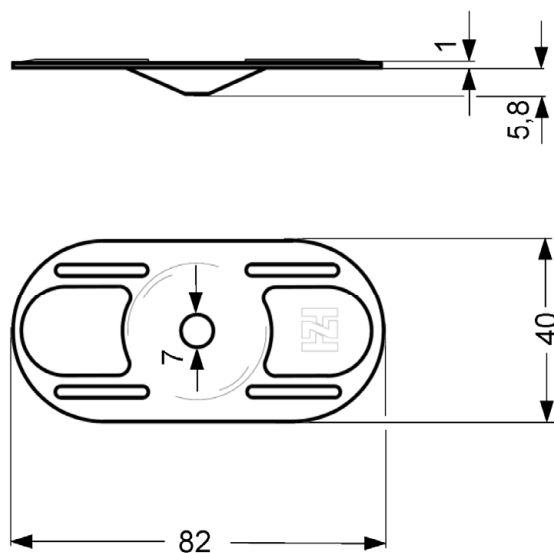
Zahn Flat Roof Fasteners

Combination 119
ZMDS-E / ZLVT 0008

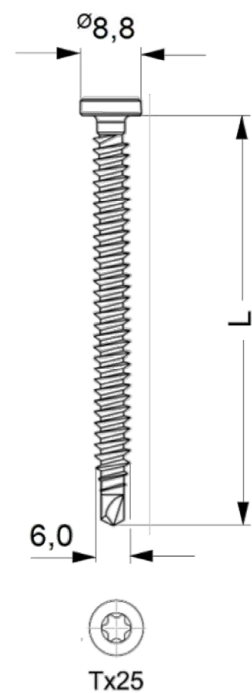
Annex 119



Zahn ZLVT 0012



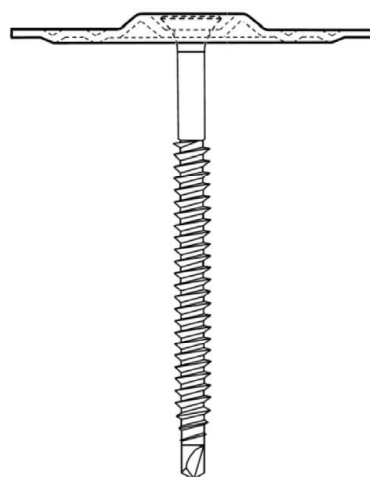
Zahn ZMDS-E 6,0 x L



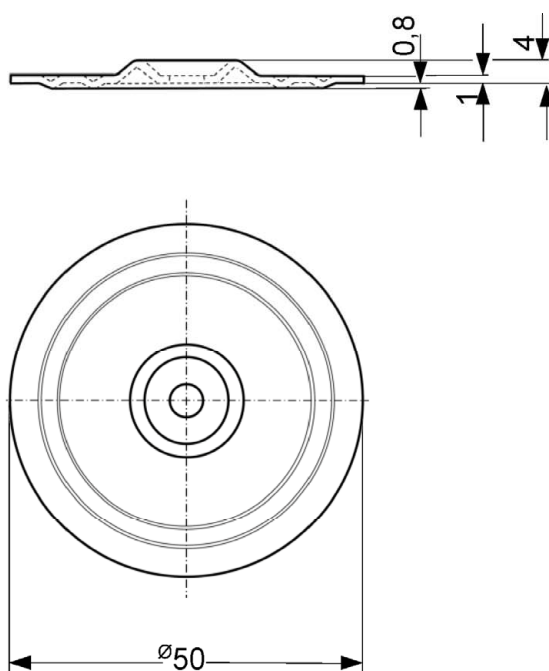
Zahn Flat Roof Fasteners

Combination 120
ZMDS-E / ZLVT 0012

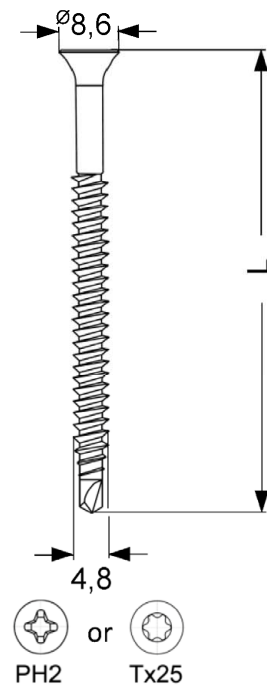
Annex 120



Zahn ZLVT 0016



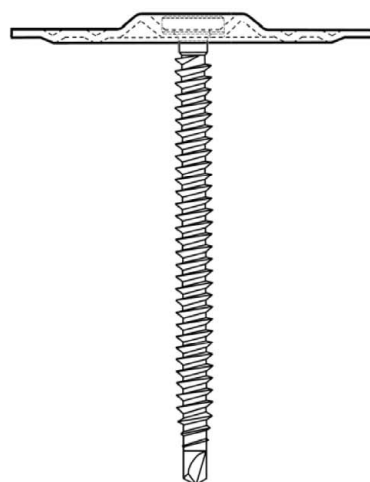
Zahn ZDBK-TK 4,8 x L



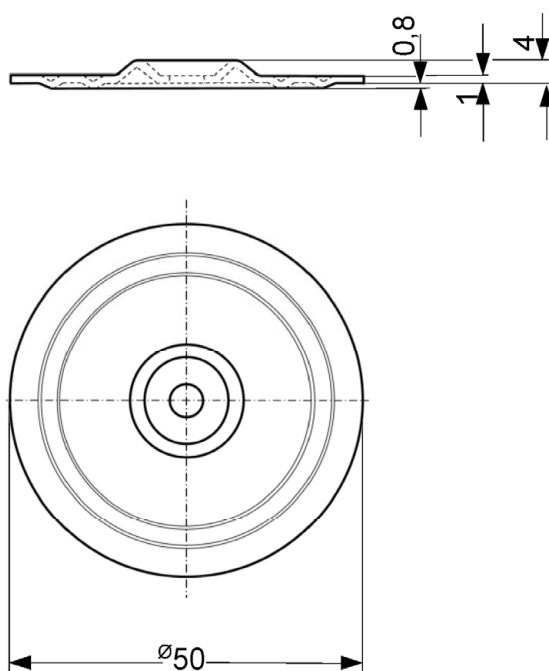
Zahn Flat Roof Fasteners

Combination 121
ZDBK-TK / ZLVT 0016

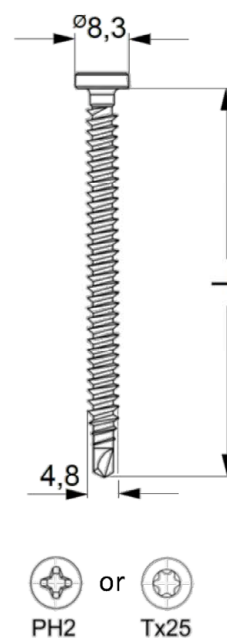
Annex 121



Zahn ZLVT 0016



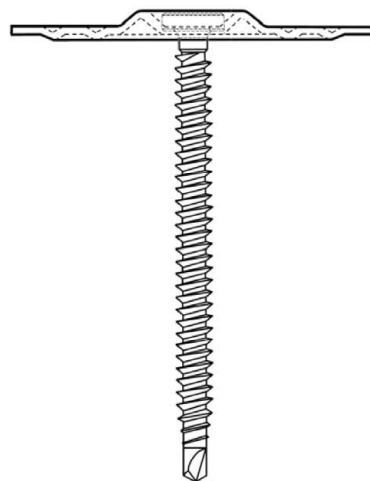
Zahn ZDBK 4,8 x L



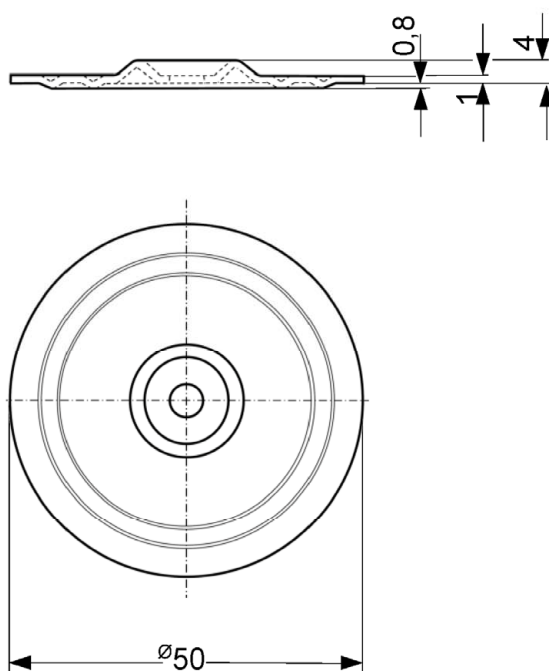
Zahn Flat Roof Fasteners

Combination 121a
ZDBK / ZLVT 0016

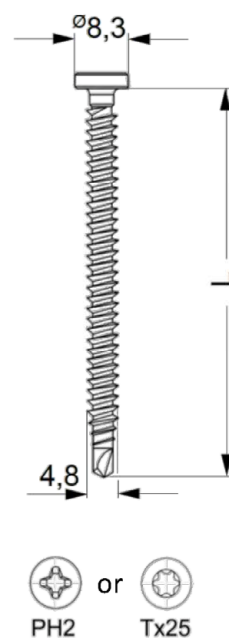
Annex 121a



Zahn ZLVT 0016



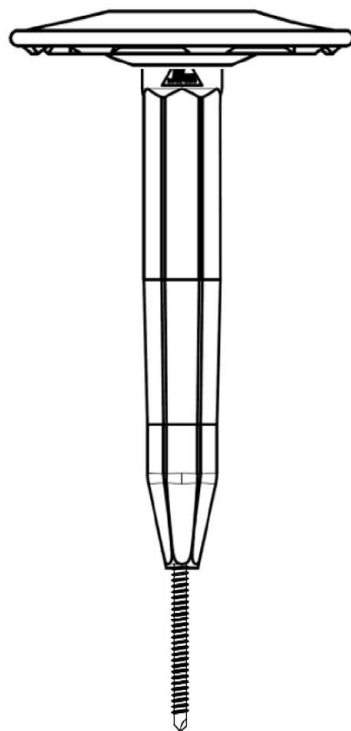
Zahn ZDBK-E 4,8 x L



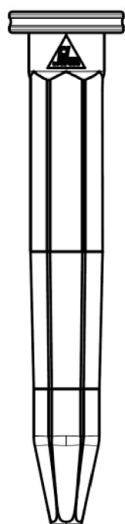
Zahn Flat Roof Fasteners

Combination 121b
ZDBK-E / ZLVT 0016

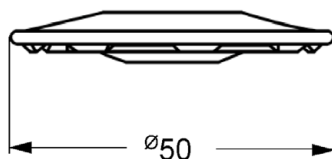
Annex 121b



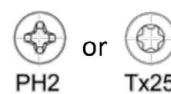
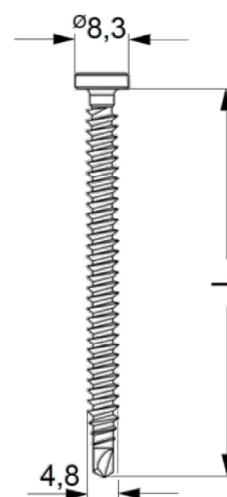
ZSSB 4,8



clickplate



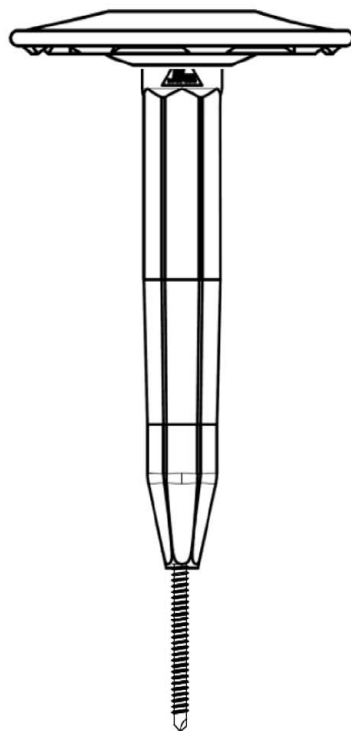
Zahn ZDBK 4,8 x L



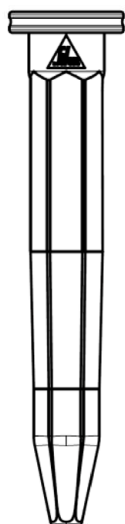
Zahn Flat Roof Fasteners

Combination 122
ZSSB 4,8 / clickplate / ZDBK 4,8

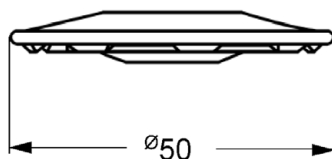
Annex 122



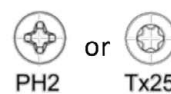
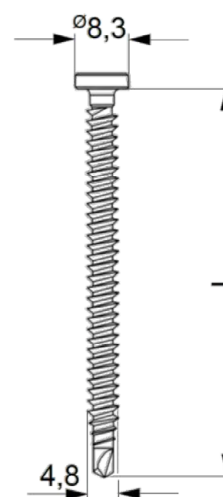
ZSSB 4,8



clickplate



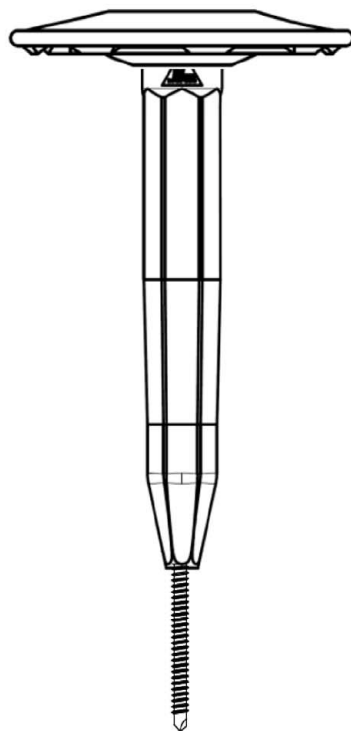
Zahn ZDBK-E 4,8 x L



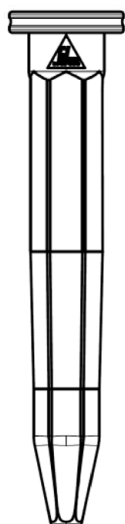
Zahn Flat Roof Fasteners

Combination 123
ZSSB 4,8 / clickplate / ZDBK-E 4,8

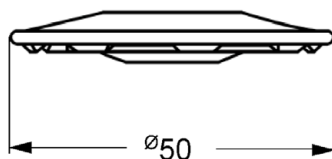
Annex 123



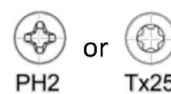
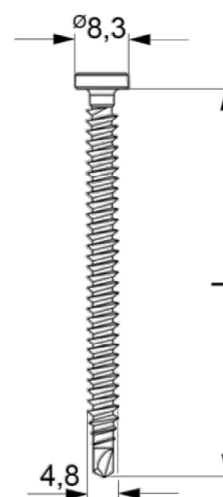
ZSSB 4,8



clickplate



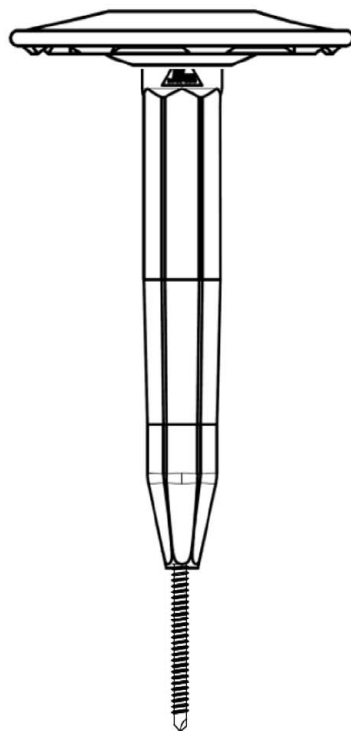
Zahn ZDBK-VB 4,8 x L



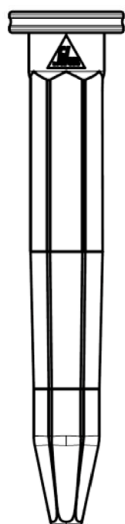
Zahn Flat Roof Fasteners

Combination 124
ZSSB 4,8 / clickplate / ZDBK-VB 4,8

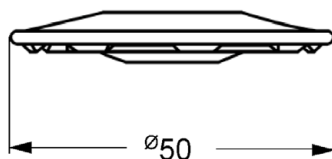
Annex 124



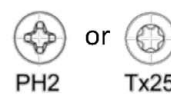
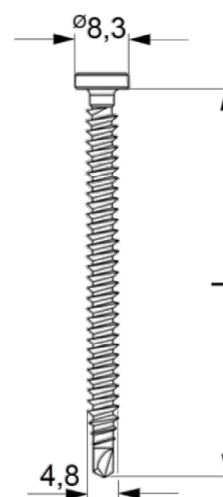
ZSSB 4,8



clickplate



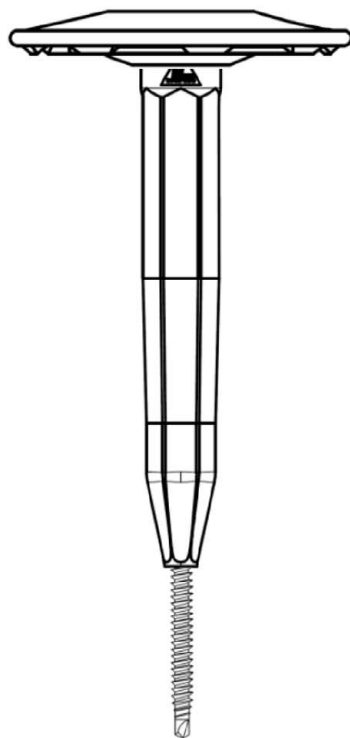
Zahn ZDBK-VB-E 4,8 x L



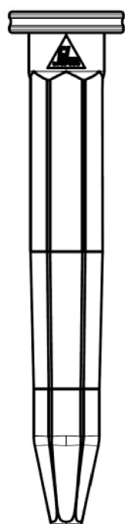
Zahn Flat Roof Fasteners

Combination 125
ZSSB 4,8 / clickplate / ZDBK-VB-E 4,8

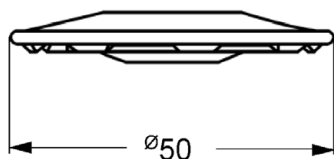
Annex 125



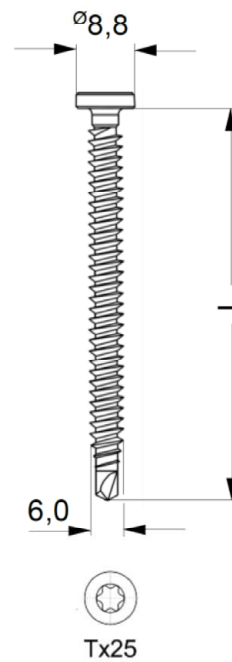
ZSSB 6,0



clickplate



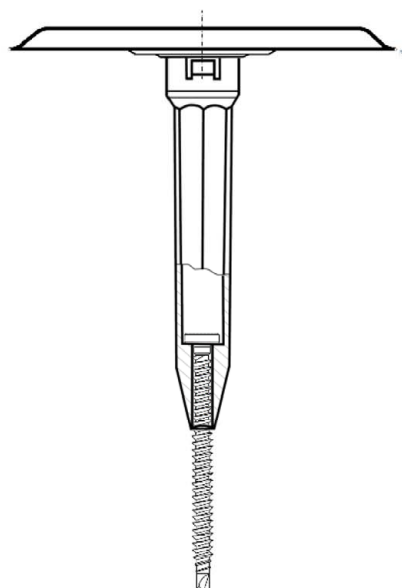
Zahn ZMDS 6,0 x L



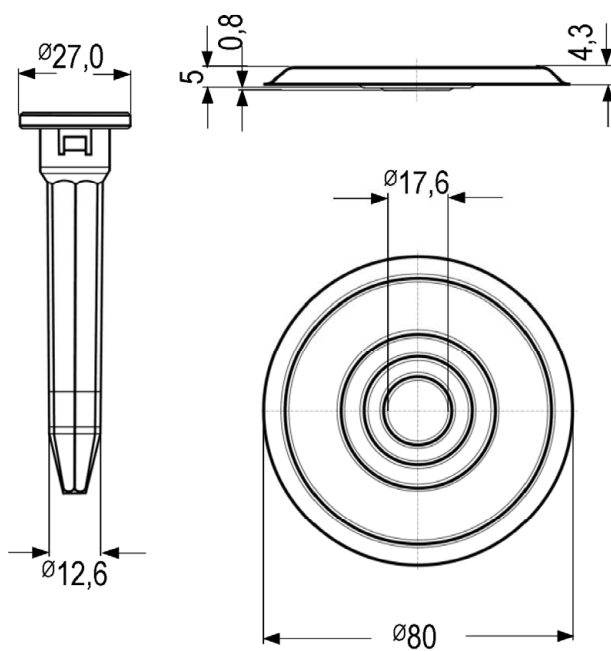
Zahn Flat Roof Fasteners

Combination 126
ZSSB 6,0 / clickplate / ZMDS 6,0

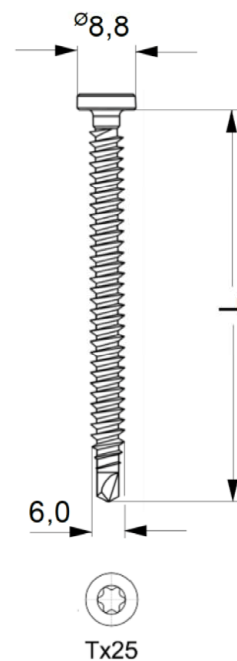
Annex 126



Zahn ZCTS-pipe 6,0 with ZCTS-plate



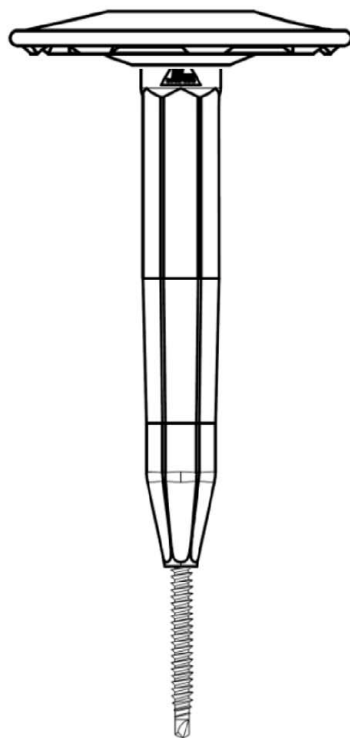
Zahn ZMDS 6,0 x L



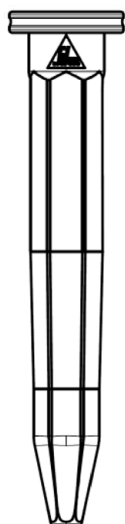
Zahn Flat Roof Fasteners

Combination 126a
ZCTS 6,0 / ZMDS consisting of ZMDS / ZCTS-pipe 6,0 und ZCTS-plate

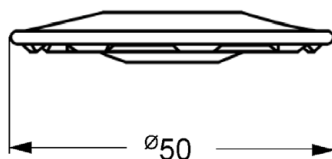
Annex 126a



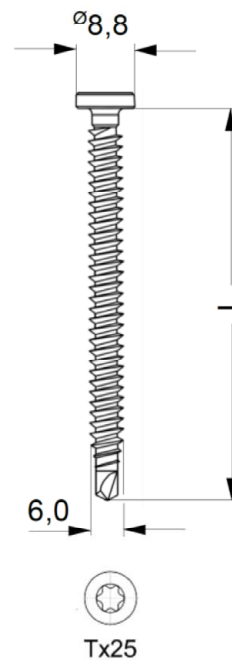
ZSSB 6,0



clickplate



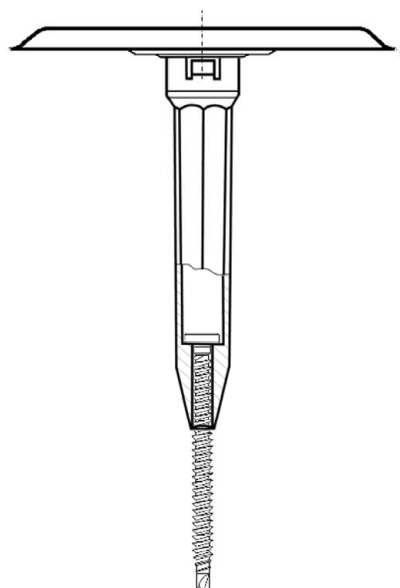
Zahn ZMDS-E 6,0 x L



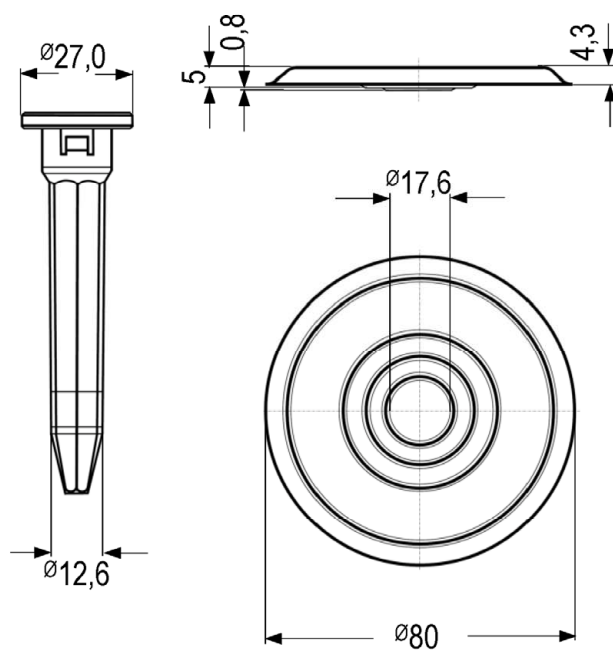
Zahn Flat Roof Fasteners

Combination 127
ZSSB 6,0 / clickplate / ZMDS-E 6,0

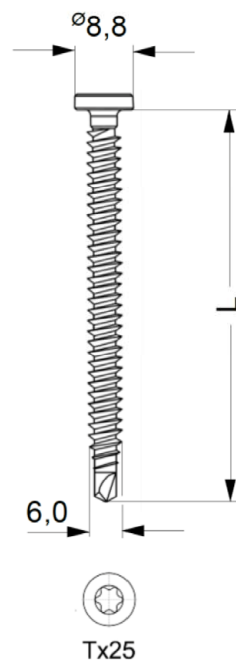
Annex 127



Zahn ZCTS-pipe 6,0 with ZCTS-plate



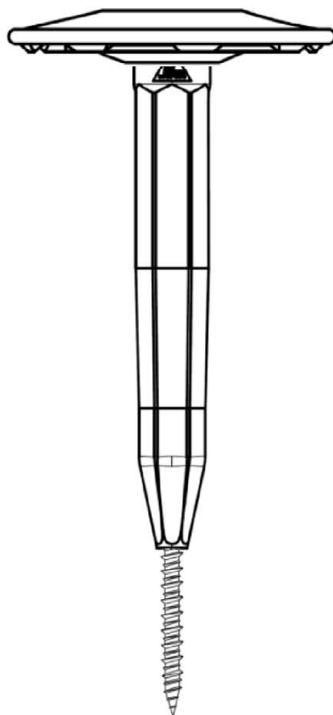
Zahn ZMDS-E 6,0 x L



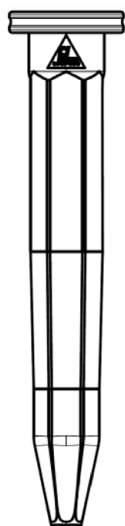
Zahn Flat Roof Fasteners

Combination 127a
ZCTS-E 6,0 / ZMDS-E consisting of ZMDS-E / ZCTS-pipe 6,0 and ZCTS-plate

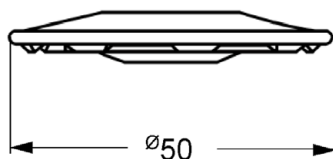
Annex 127a



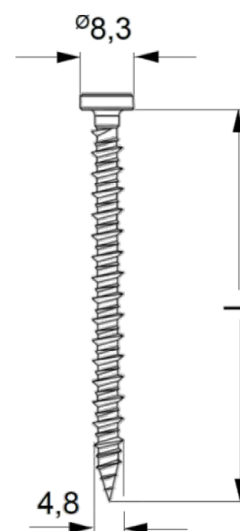
ZSSB 4,8



clickplate



Zahn ZHBK 4,8 x L



PH2



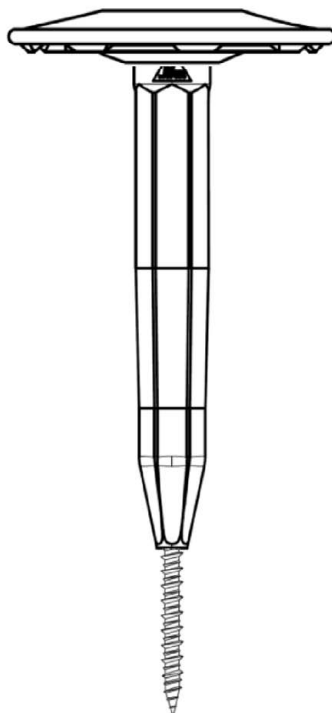
Tx25

or

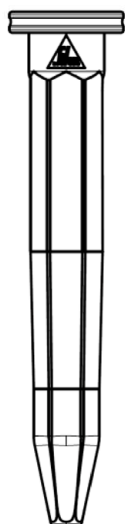
Zahn Flat Roof Fasteners

Combination 128
ZSSB 4,8 / clickplate / ZHBK 4,8

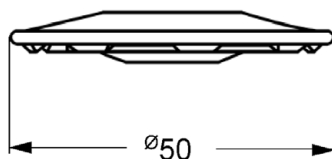
Annex 128



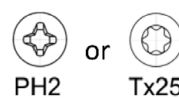
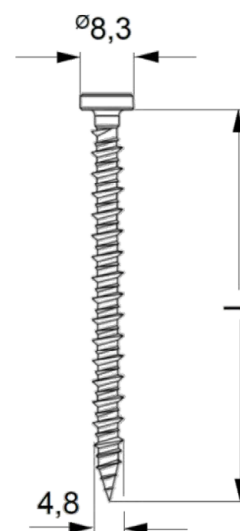
ZSSB 4,8



clickplate



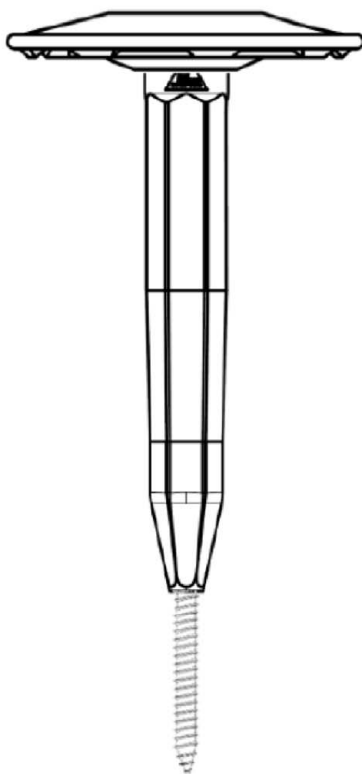
Zahn ZHBK-E 4,8 x L



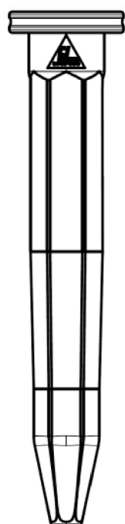
Zahn Flat Roof Fasteners

Combination 129
ZSSB 4,8 / clickplate / ZHBK-E 4,8

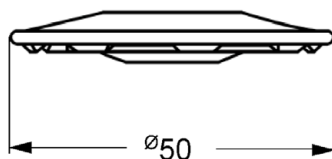
Annex 129



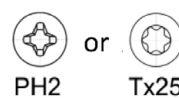
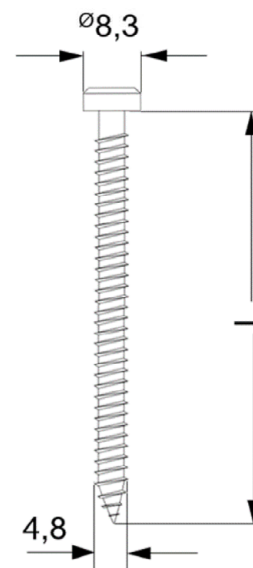
ZSSB 4,8



clickplate



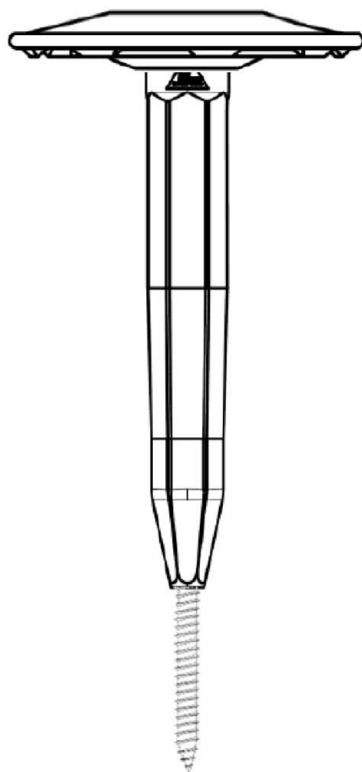
Zahn ZDBK_{dowel} 4,8 x L



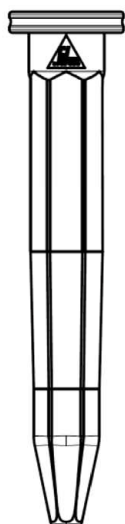
Zahn Flat Roof Fasteners

Combination 130
ZSSB 4,8 / clickplate / ZDBK-Dowel 4,8

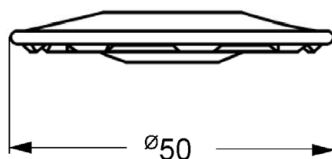
Annex 130



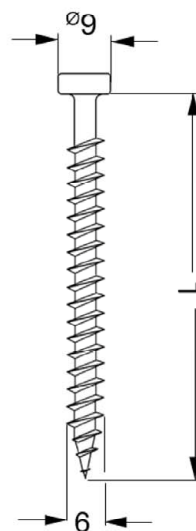
ZSSB 6,0



clickplate



Zahn ZGBK-E 6,0 x L

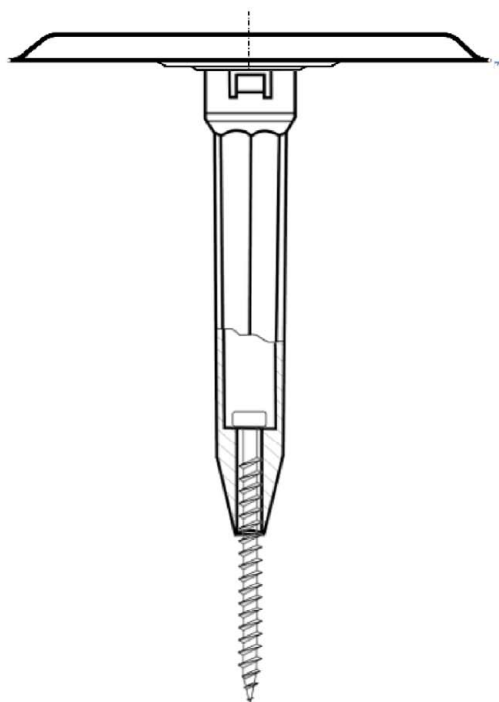


PZD3

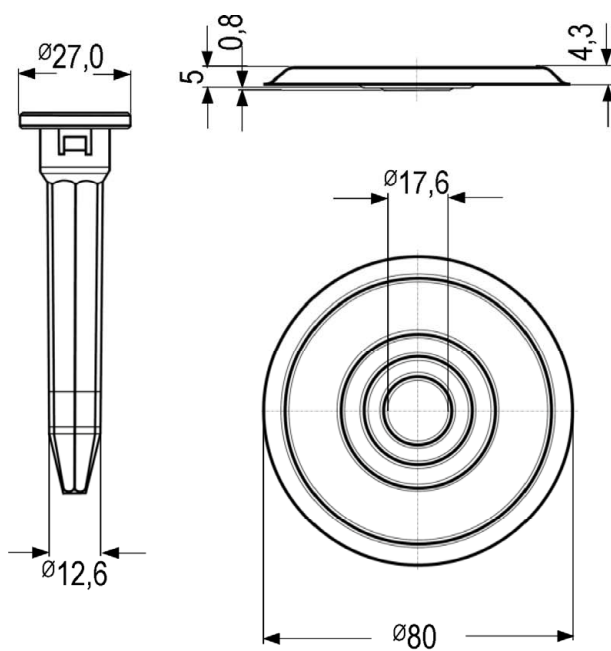
Zahn Flat Roof Fasteners

Combination 131
ZSSB 6,0 / clickplate / ZGBK-E 6,0

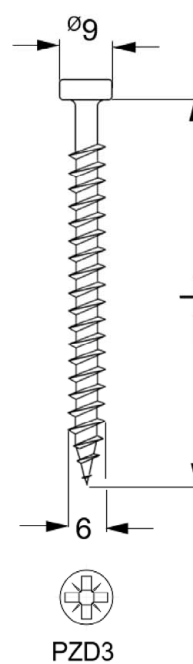
Annex 131



Zahn ZCTS-pipe 6,0 with ZCTS-plate



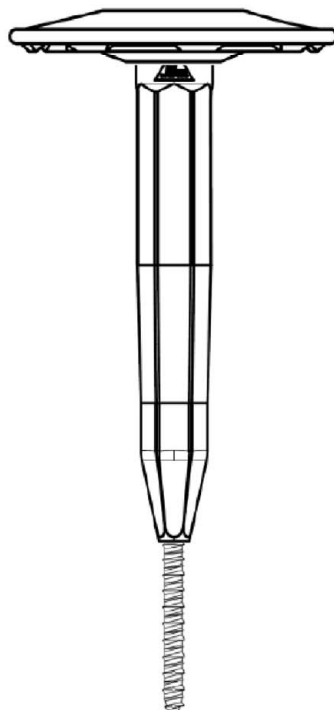
Zahn ZGBK-E 6,0 x L



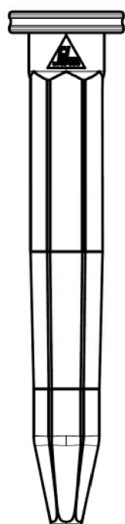
Zahn Flat Roof Fasteners

Combination 131a
ZCTS 6,0 / ZGBK-E consisting of ZGBK-E / ZCTS-pipe 6,0 and ZCTS-plate

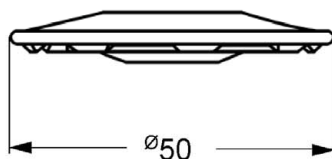
Annex 131a



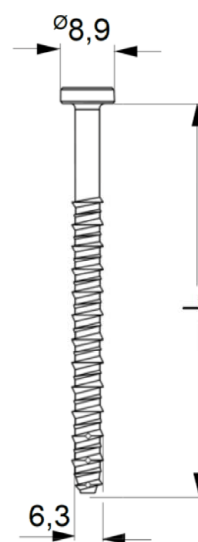
ZSSB 6,0



clickplate



Zahn ZBST 6,3 x L

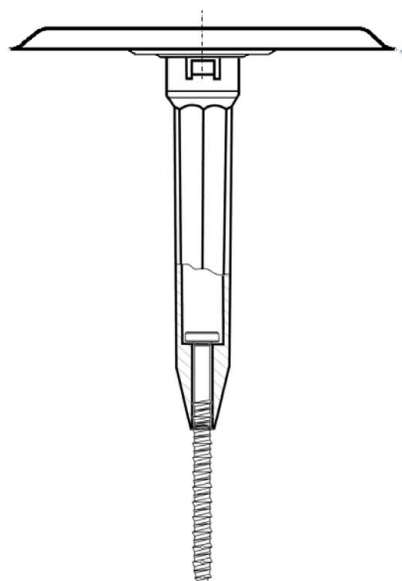


Tx25

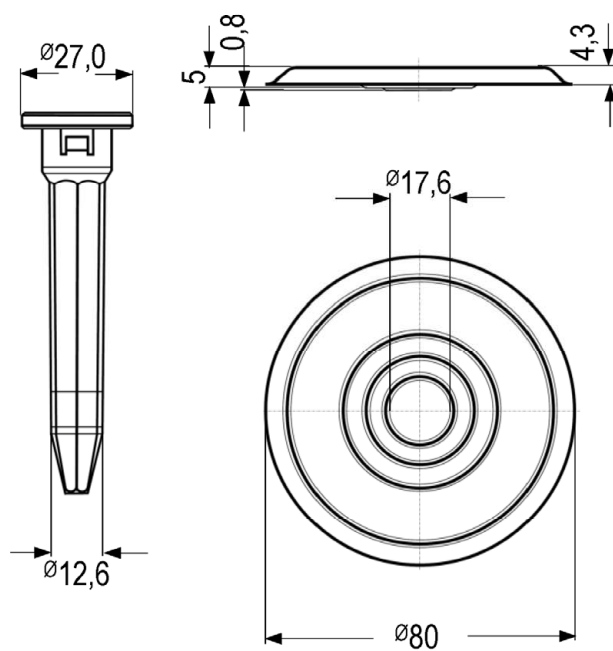
Zahn Flat Roof Fasteners

Combination 132
ZSSB 6,0 / clickplate / ZBST 6,3

Annex 132



Zahn ZCTS-pipe 6,0 with ZCTS-plate



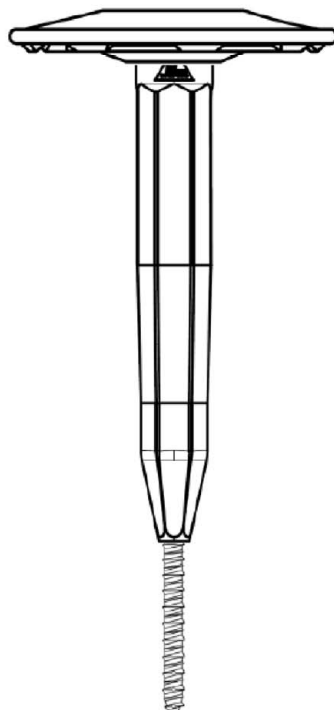
Zahn ZBST 6,3 x L



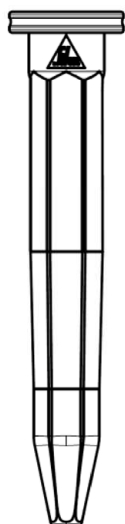
Zahn Flat Roof Fasteners

Combination 132a
ZCTS 6,0 / ZBST 6,3 consisting of ZBST 6,3 / ZCTS-pipe 6,0 and ZCTS-plate

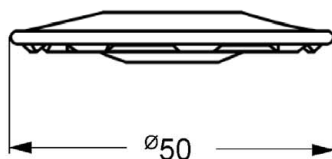
Annex 132a



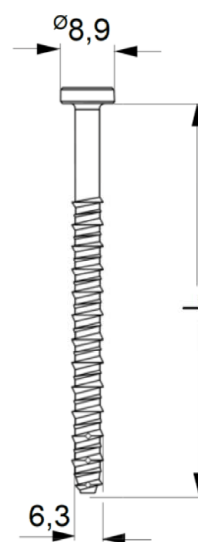
ZSSB 6,0



clickplate



Zahn ZBST-E 6,3 x L

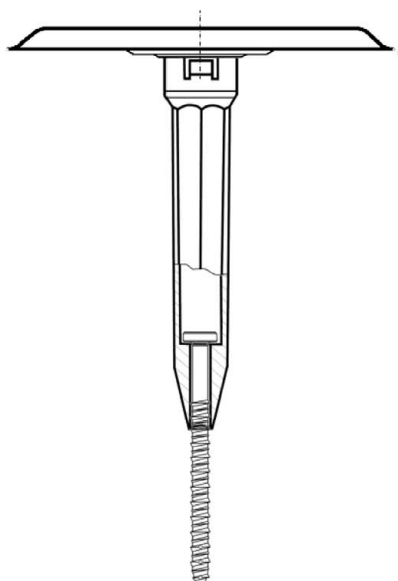


Tx25

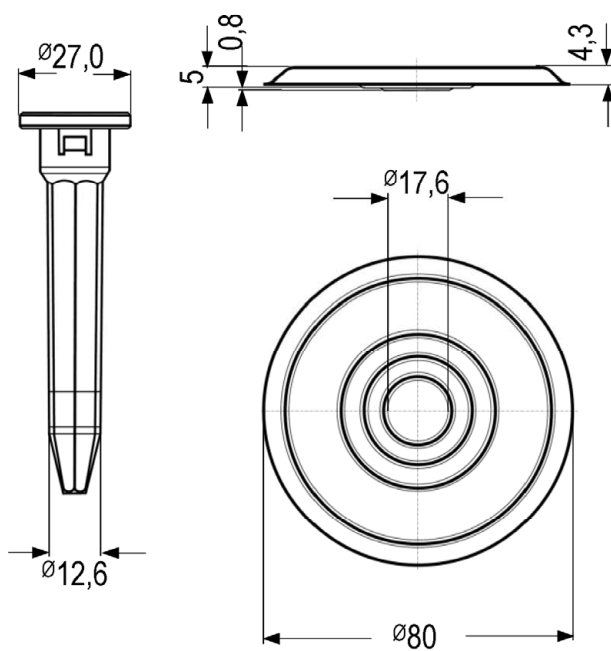
Zahn Flat Roof Fasteners

Combination 133
ZSSB 6,0 / clickplate / ZBST-E 6,3

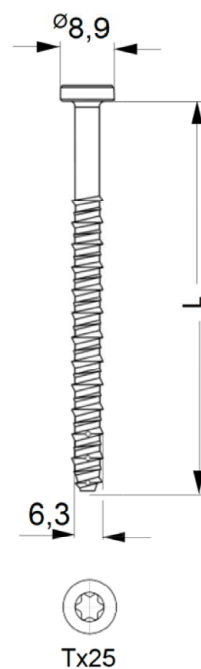
Annex 133



Zahn ZCTS-pipe 6,0 with ZCTS-plate



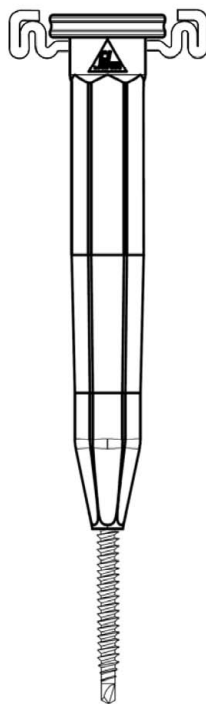
Zahn ZBST-E 6,3 x L



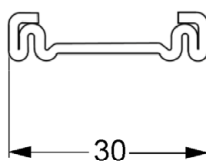
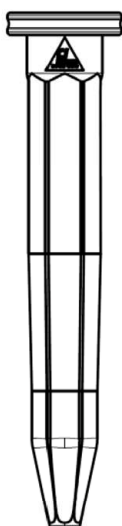
Zahn Flat Roof Fasteners

Combination 133a
ZCTS-E 6,0 / ZBST-E 6,3 consisting of ZBST-E 6,3 / ZCTS-pipe 6,0 and ZCTS-plate

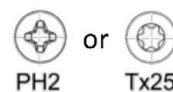
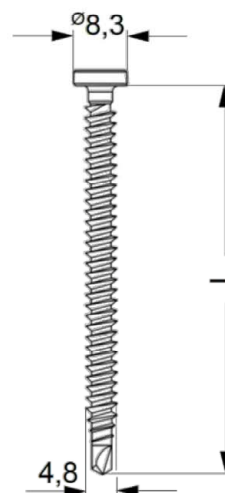
Annex 133a



Zahn ZSSB-pipe 4,8 with bar



Zahn ZDBK 4,8 x L

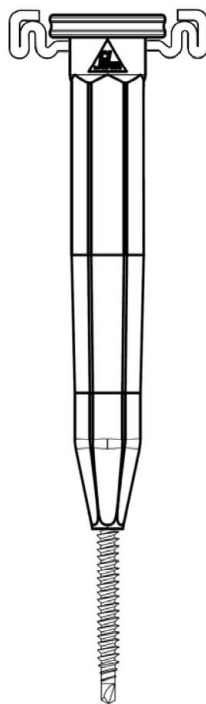


PH2 or Tx25

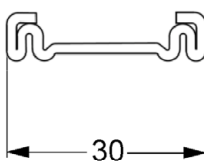
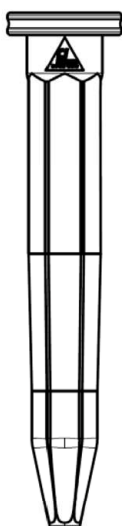
Zahn Flat Roof Fasteners

Combination 134
ZSSB 4,8 consisting of ZDBK/ ZSSB-pipe 4,8 and bar

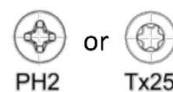
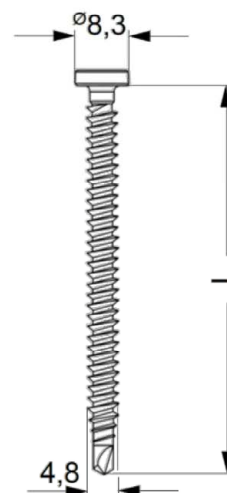
Annex 134



Zahn ZSSB-pipe 4,8 with bar



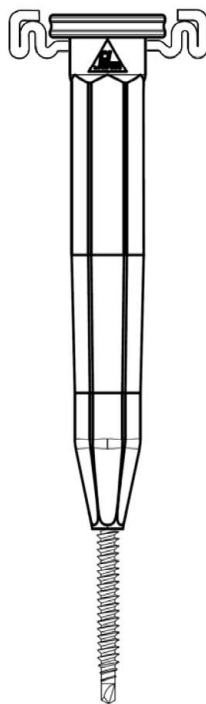
Zahn ZDBK-E 4,8 x L



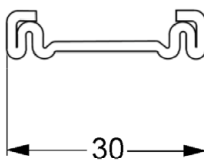
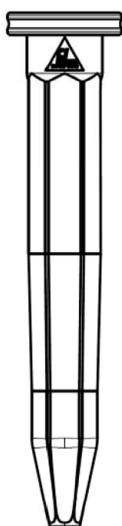
Zahn Flat Roof Fasteners

Combination 135
ZSSB-E 4,8 consisting of ZDBK-E / ZSSB-pipe 4,8 and bar

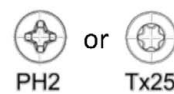
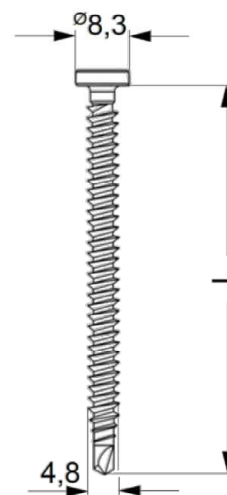
Annex 135



Zahn ZSSB-pipe 4,8 with bar



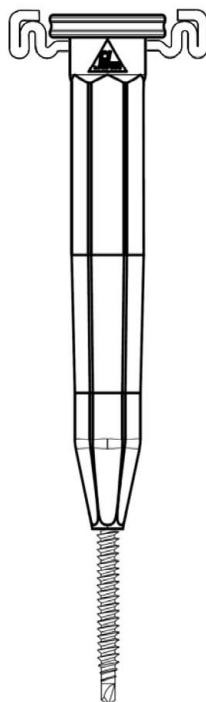
Zahn ZDBK-VB 4,8 x L



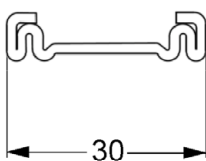
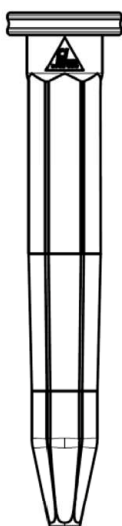
Zahn Flat Roof Fasteners

Combination 136
ZSSB-VB 4,8 consisting of ZDBK-VB / ZSSB-pipe 4,8 and bar

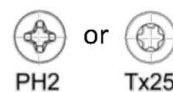
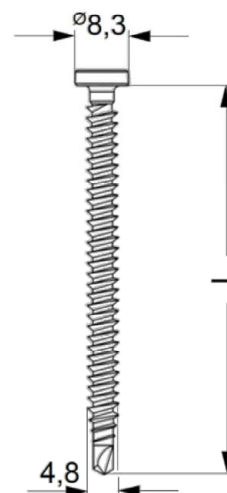
Annex 136



Zahn ZSSB-pipe 4,8 with bar



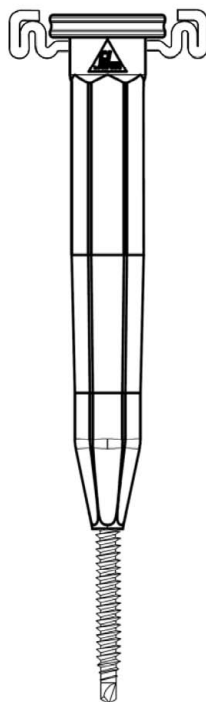
Zahn ZDBK-VB-E 4,8 x L



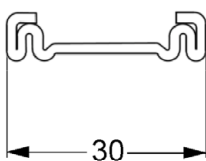
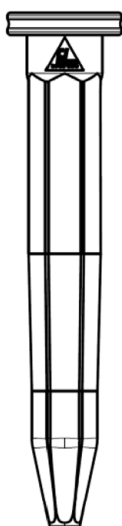
Zahn Flat Roof Fasteners

Combination 137
ZSSB-VB-E 4,8 consisting of ZDBK-VB-E / ZSSB-pipe 4,8 and bar

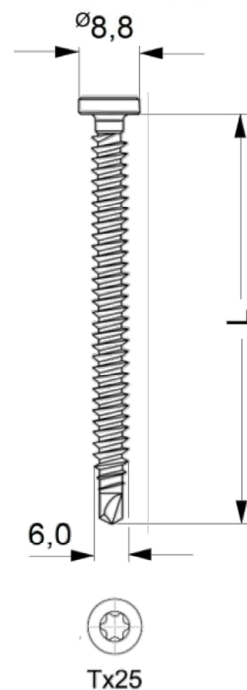
Annex 137



Zahn ZSSB-pipe 6,0 with bar



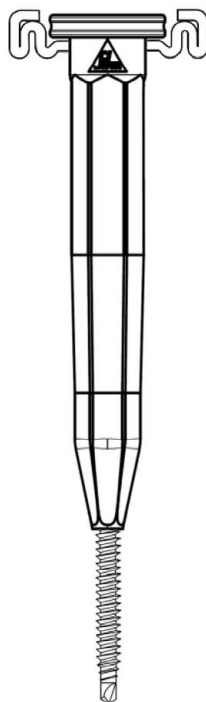
Zahn ZMDS 6,0 x L



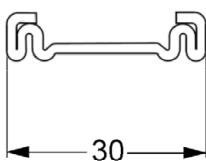
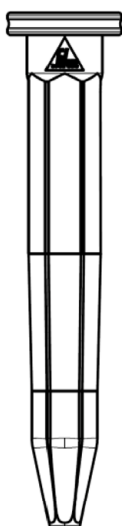
Zahn Flat Roof Fasteners

Combination 138
ZSSB 6,0 consisting of ZMDS / ZSSB-pipe 6,0 and bar

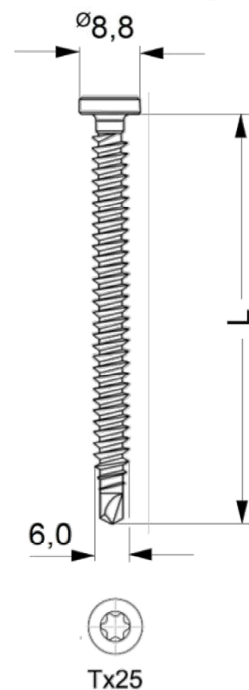
Annex 138



Zahn ZSSB-pipe 6,0 with bar



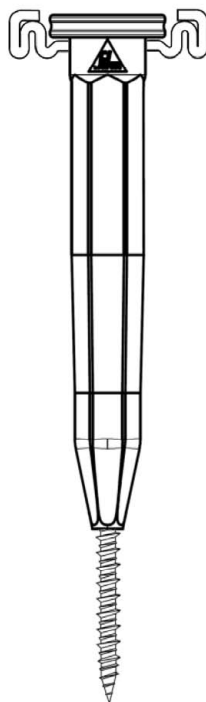
Zahn ZMDS-E 6,0 x L



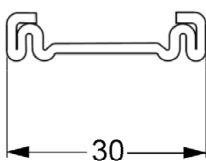
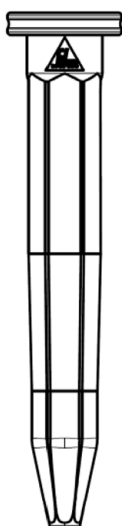
Zahn Flat Roof Fasteners

Combination 139
ZSSB-E 6,0 consisting of ZMDS-E / ZSSB-pipe 6,0 and bar

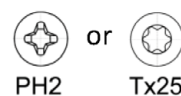
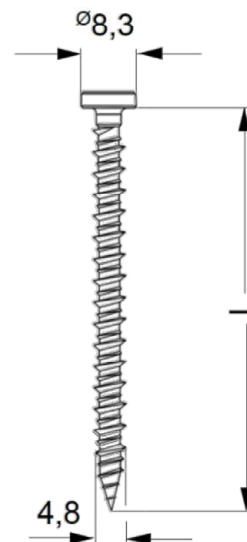
Annex 139



Zahn ZSSB-pipe 4,8 with bar



Zahn ZHBK 4,8 x L

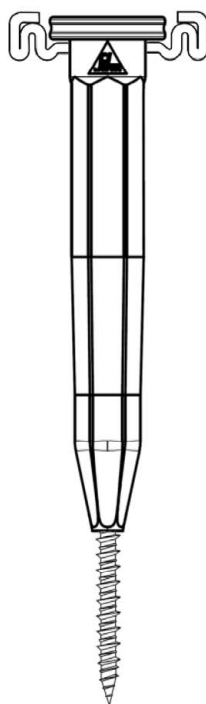


PH2 or Tx25

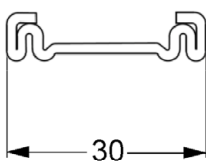
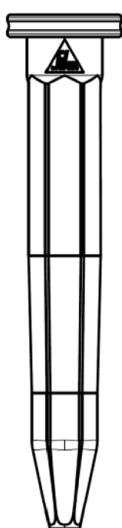
Zahn Flat Roof Fasteners

Combination 140
ZSSB-Timber 4,8 consisting of ZHBK / ZSSB-pipe 4,8 and bar

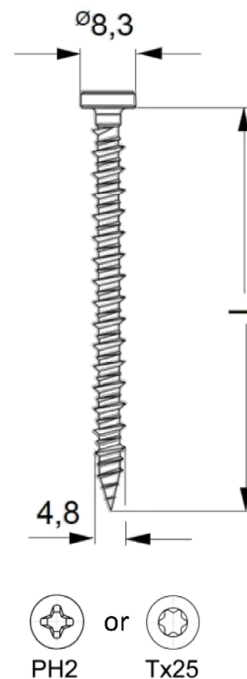
Annex 140



Zahn ZSSB-pipe 4,8 with bar



Zahn ZHBK-E 4,8 x L



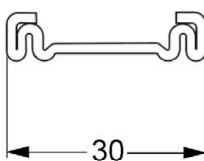
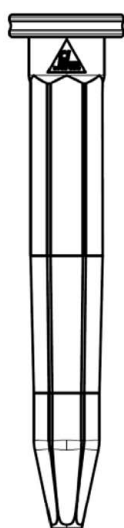
Zahn Flat Roof Fasteners

Combination 141
ZSSB-E-Timber 4,8 consisting of ZHBK-E / ZSSB-pipe 4,8 and bar

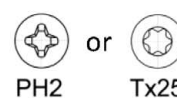
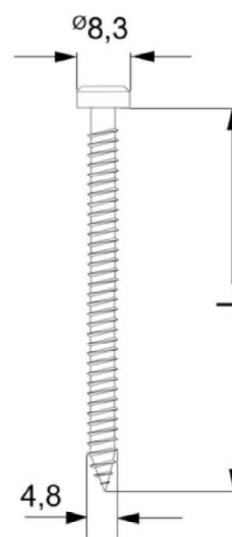
Annex 141



Zahn ZSSB-pipe 4,8 with bar



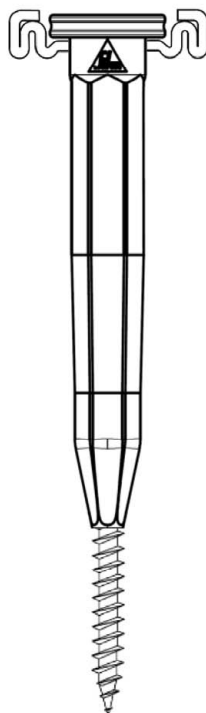
Zahn ZDBK_{dowel} 4,8 x L



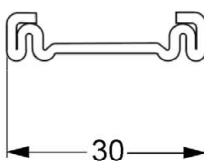
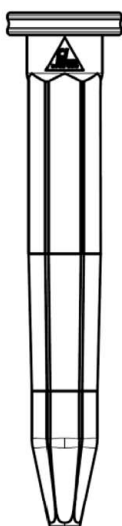
Zahn Flat Roof Fasteners

Combination 142
ZSSB-Dowel 4,8 consisting of ZDBK_{dowel} / ZSSB-pipe 4,8 and bar

Annex 142

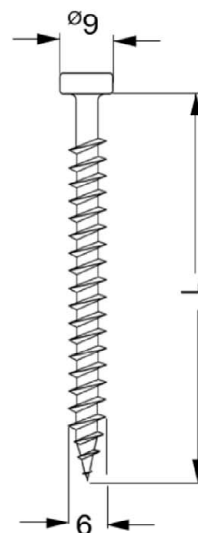


Zahn ZSSB-pipe 6,0 with bar



30

Zahn ZGBK-E 6,0 x L

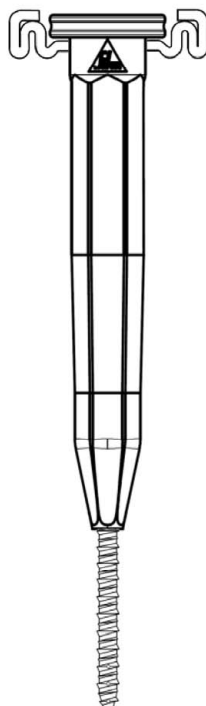


PZD3

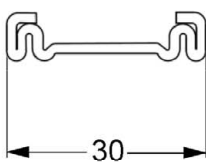
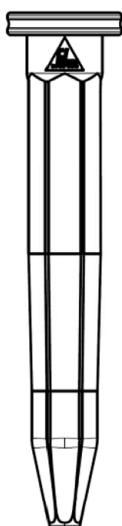
Zahn Flat Roof Fasteners

Combination 143
ZSSB-HPB 6,0 consisting of ZGBK-E / ZSSB-pipe 6,0 and bar

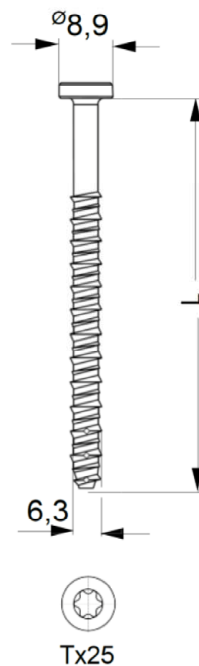
Annex 143



Zahn ZSSB-pipe 6,0 with bar



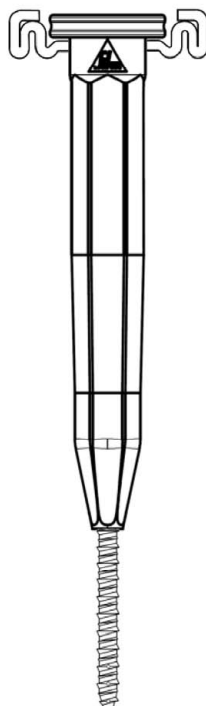
Zahn ZBST 6,3 x L



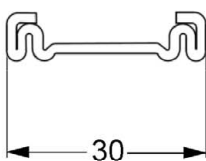
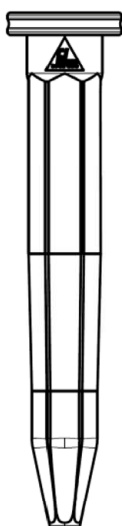
Zahn Flat Roof Fasteners

Combination 144
ZSSB-Concrete 6,0 consisting of ZBST / ZSSB-pipe 6,0 and bar

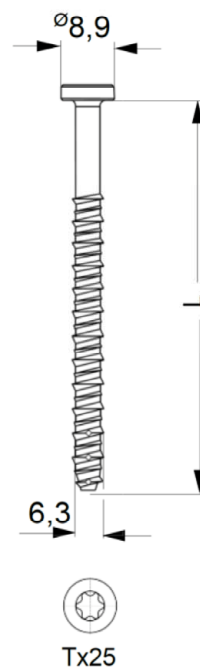
Annex 144



Zahn ZSSB-pipe 6,0 with bar



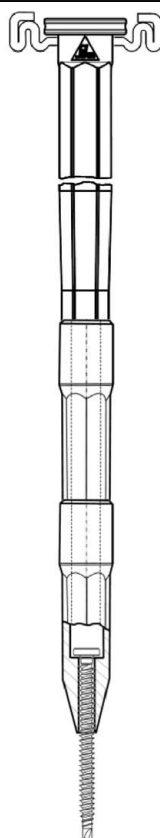
Zahn ZBST-E 6,3 x L



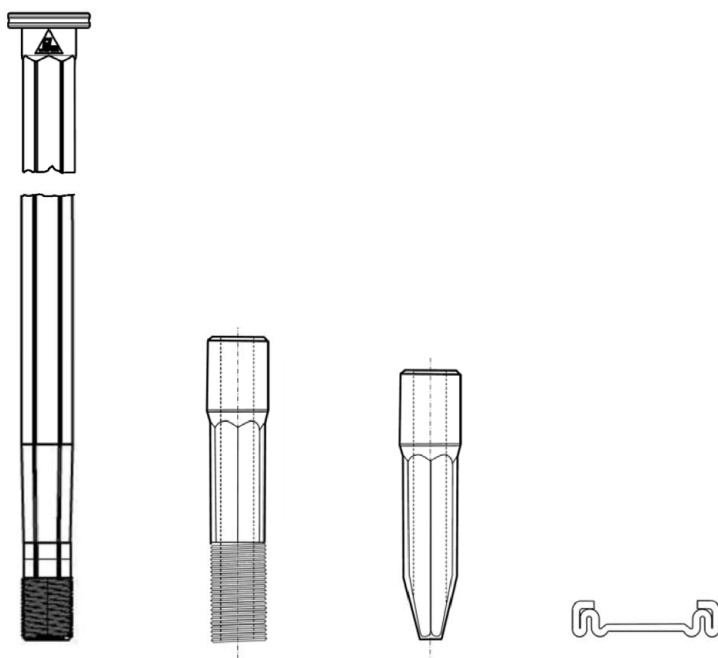
Zahn Flat Roof Fasteners

Combination 145
ZSSB-E-Concrete 6,0 consisting of ZBST-E / ZSSB-pipe 6,0 and bar

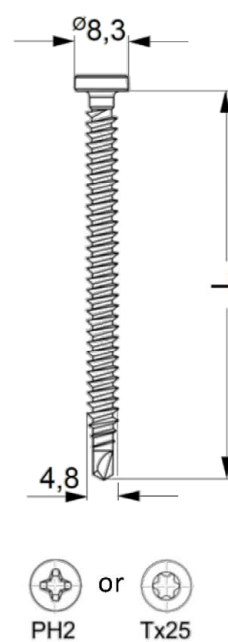
Annex 145



Zahn ZSSB-module-pipe with module 4,8 and bar



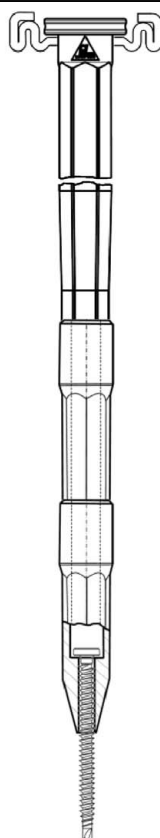
Zahn ZDBK 4,8 x L



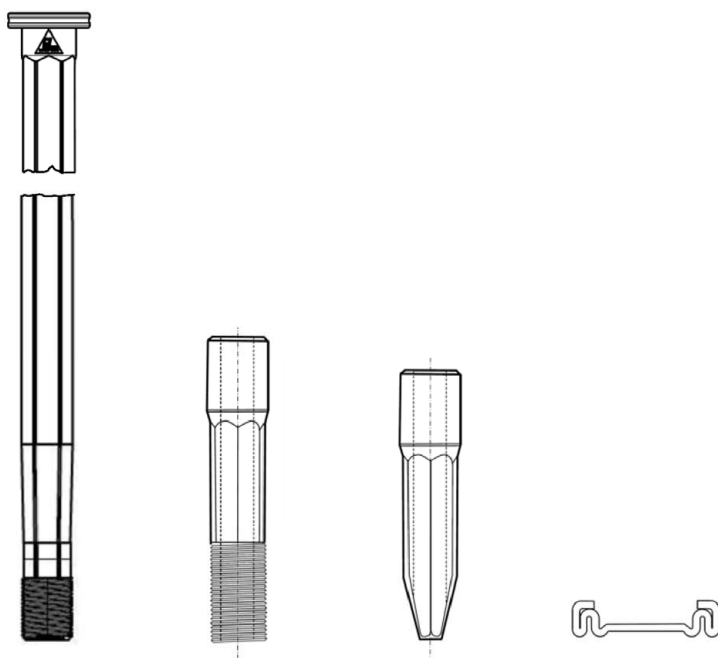
Zahn Flat Roof Fasteners

Combination 146
ZSSB-Modul 4,8 consisting of ZDBK / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

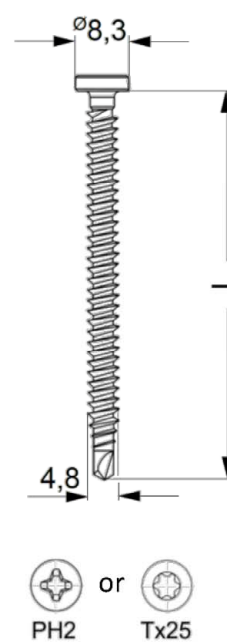
Annex 146



Zahn ZSSB-module-pipe with module 4,8 and bar



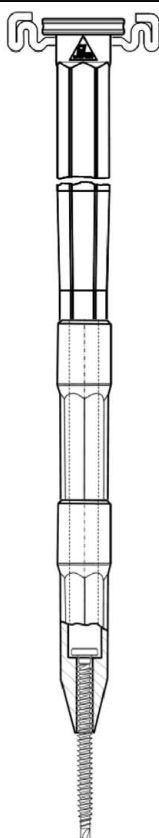
Zahn ZDBK-E 4,8 x L



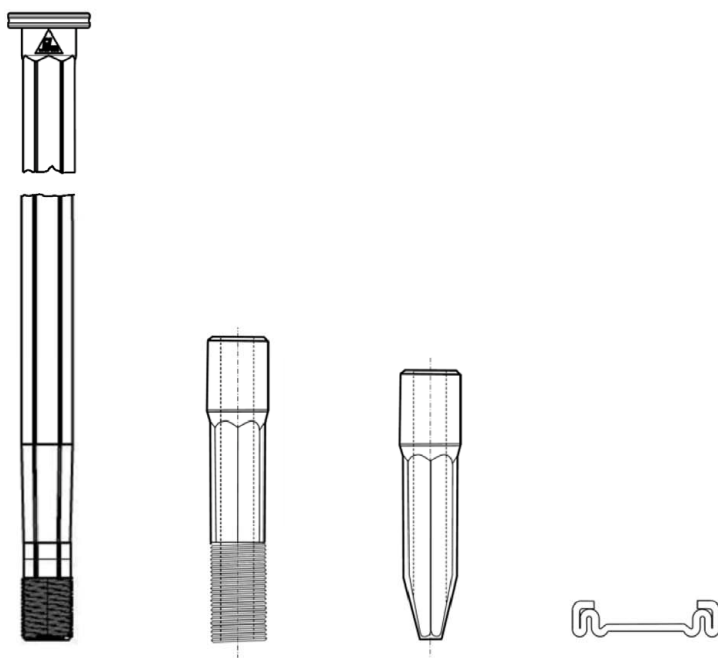
Zahn Flat Roof Fasteners

Combination 147
ZSSB-E-Modul 4,8 consisting of ZDBK-E / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

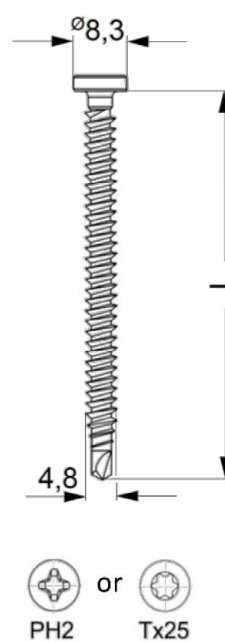
Annex 147



Zahn ZSSB-module-pipe with module 4,8 and bar



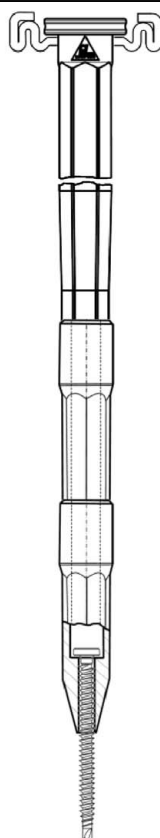
Zahn ZDBK-VB 4,8 x L



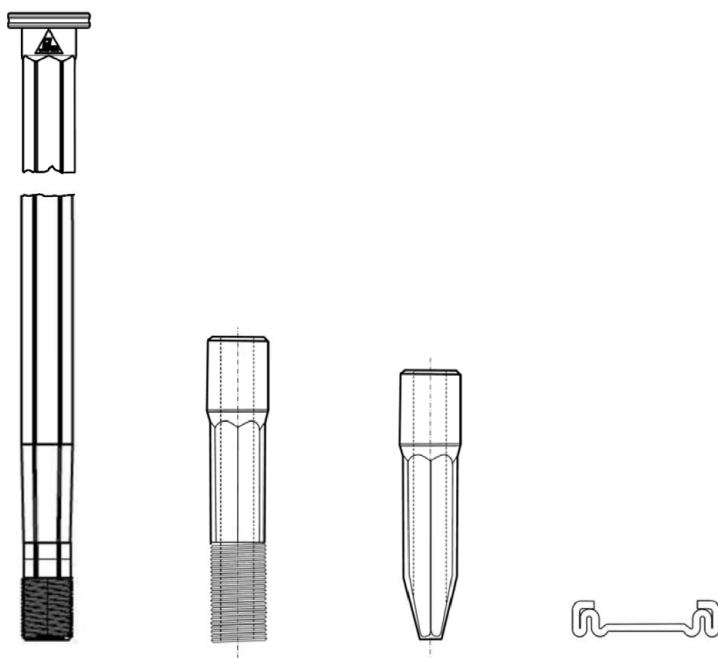
Zahn Flat Roof Fasteners

Combination 148
ZSSB-VB-Modul 4,8 consisting of ZDBK-VB / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

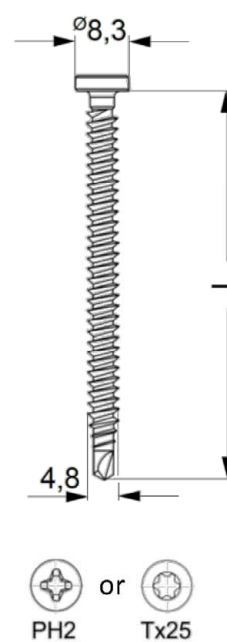
Annex 148



Zahn ZSSB-module-pipe with module 4,8 and bar



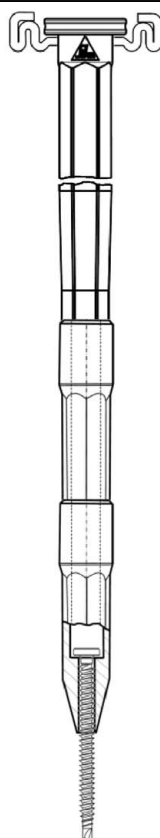
Zahn ZDBK-VB-E 4,8 x L



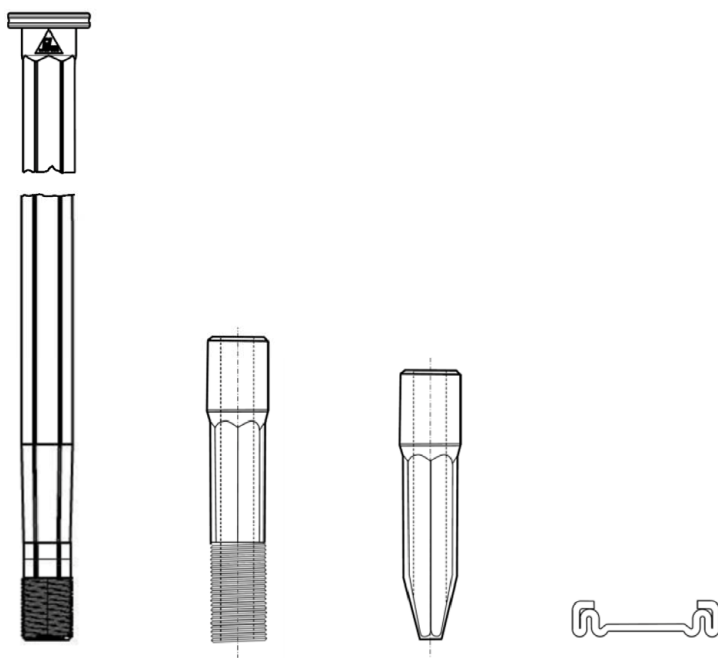
Zahn Flat Roof Fasteners

Combination 149
ZSSB-VB-E-Modul 4,8 consisting of ZDBK-VB-E / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

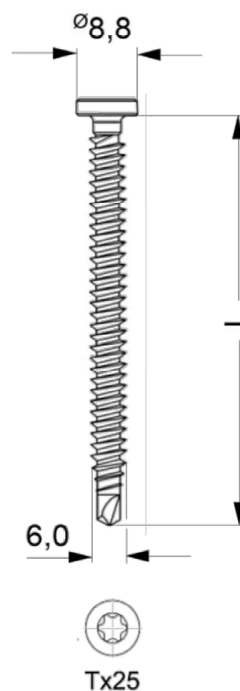
Annex 149



Zahn ZSSB-module-pipe with module 6,0 and bar



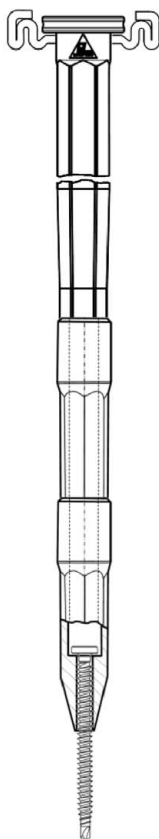
Zahn ZMDS 6,0 x L



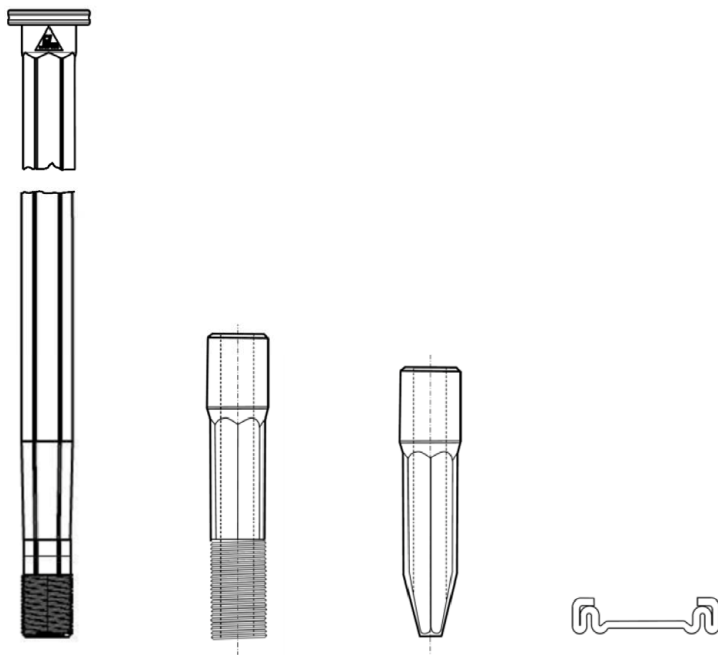
Zahn Flat Roof Fasteners

Combination 150
ZSSB-Multi-Modul 6,0 consisting of ZMDS / ZSSB-module-pipe,
module middle piece, module spike 6,0 and ZSSB bar

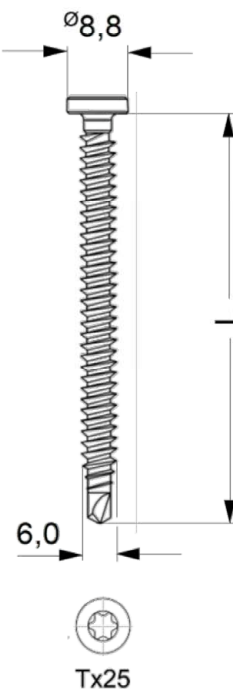
Annex 150



Zahn ZSSB-module-pipe with module 6,0 and bar



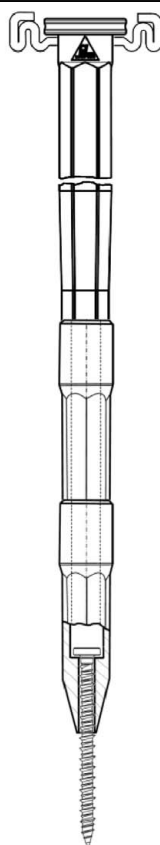
Zahn ZMDS-E 6,0 x L



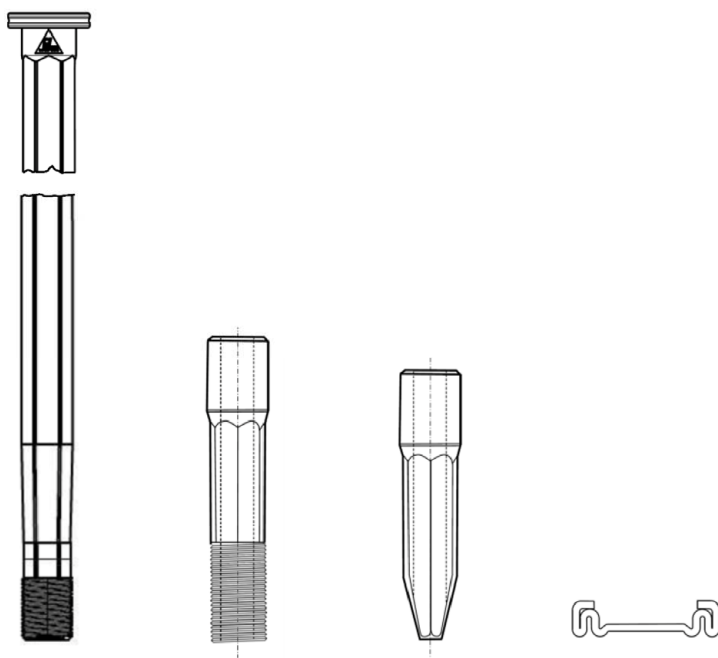
Zahn Flat Roof Fasteners

Combination 151
ZSSB-E-Multi-Modul 6,0 consisting of ZMDS-E / ZSSB-module-pipe,
module middle piece, module spike 6,0 and ZSSB bar

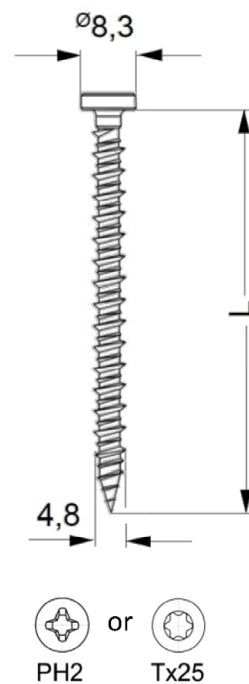
Annex 151



Zahn ZSSB-module-pipe with module 4,8 and bar



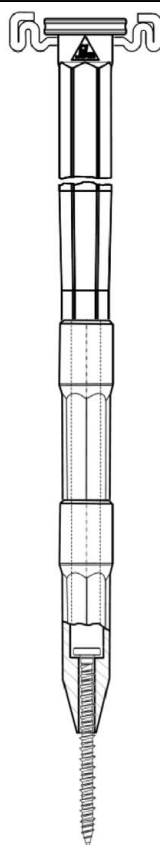
Zahn ZHBK 4,8 x L



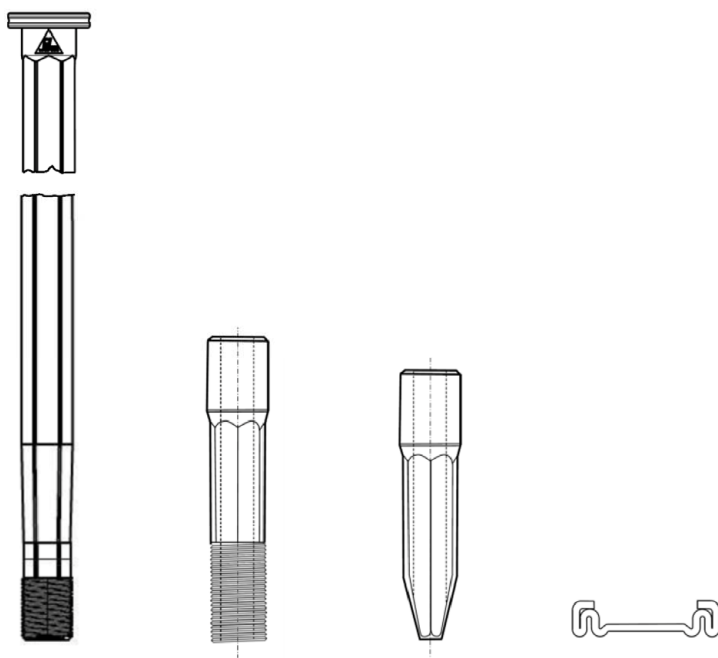
Zahn Flat Roof Fasteners

Combination 152
ZSSB-Timber-Modul 4,8 consisting of ZHBK / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

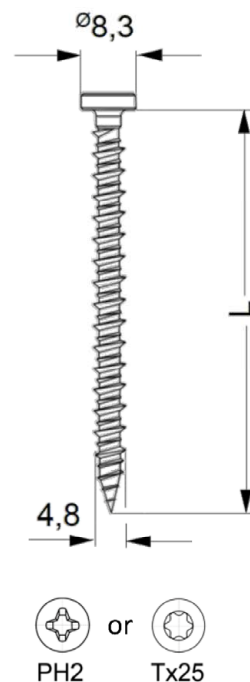
Annex 152



Zahn ZSSB-module-pipe with module 4,8 and bar



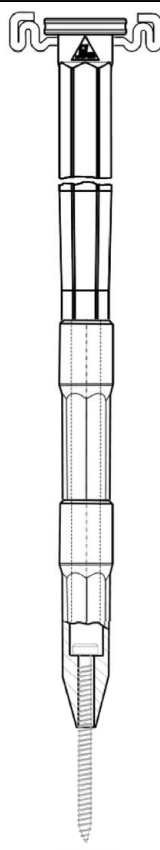
Zahn ZHBK-E 4,8 x L



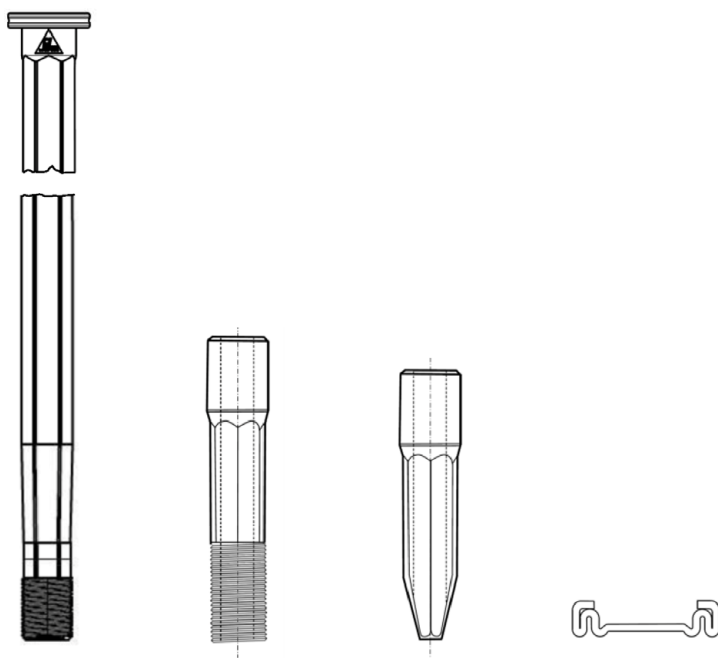
Zahn Flat Roof Fasteners

Combination 153
ZSSB-E-Timber-Modul 4,8 consisting of ZHBK-E / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

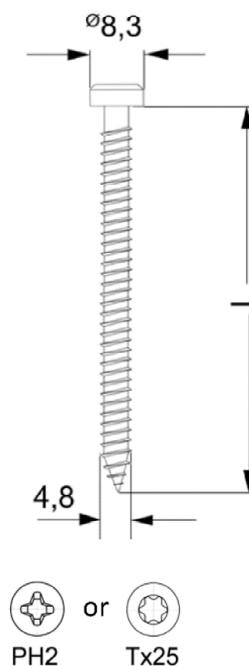
Annex 153



Zahn ZSSB-module-pipe with module 4,8 and bar



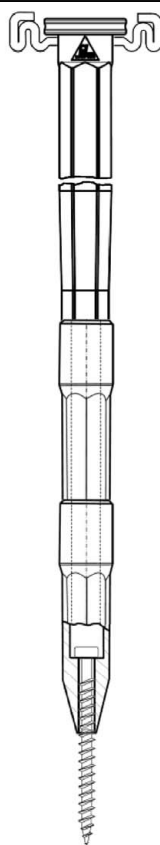
Zahn ZDBK_{dowel} 4,8 x L



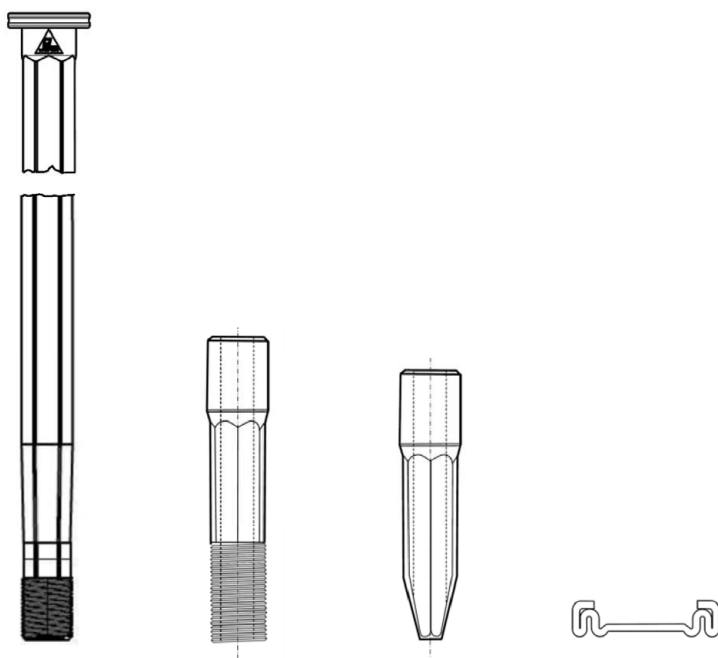
Zahn Flat Roof Fasteners

Combination 154
ZSSB-Dowel-Modul 4,8 consisting of ZDBK_{dowel} / ZSSB-module-pipe,
module middle piece, module spike 4,8 and ZSSB bar

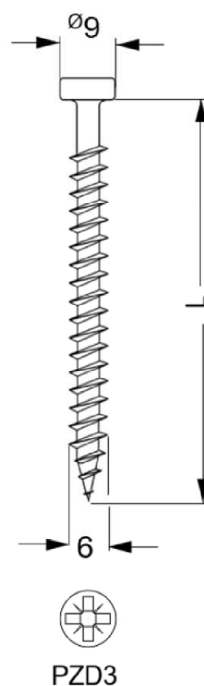
Annex 154



Zahn ZSSB-module-pipe with module 6,0 and bar



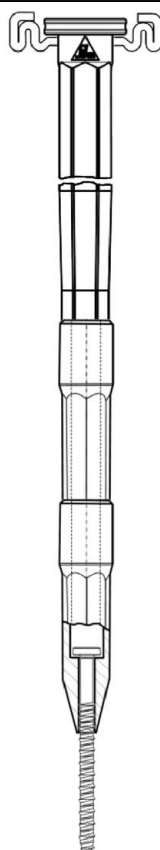
Zahn ZGBK-E 6,0 x L



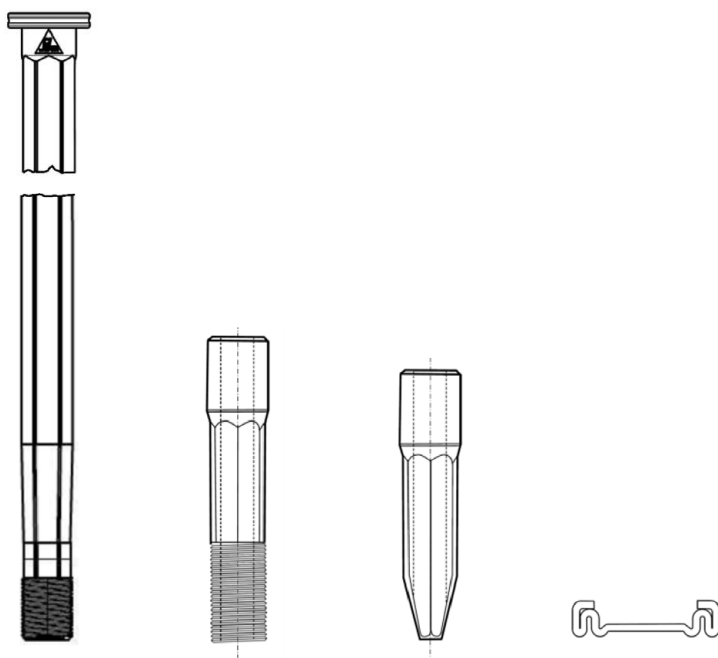
Zahn Flat Roof Fasteners

Combination 155
ZSSB-HPB-Modul 6,0 consisting of ZGBK-E / ZSSB-modul-pipe,
module middle piece, module spike 6,0 and ZSSB bar

Annex 155



Zahn ZSSB-module-pipe with module 6,0 and bar



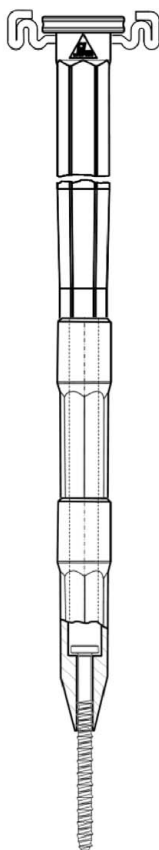
Zahn ZBST 6,3 x L



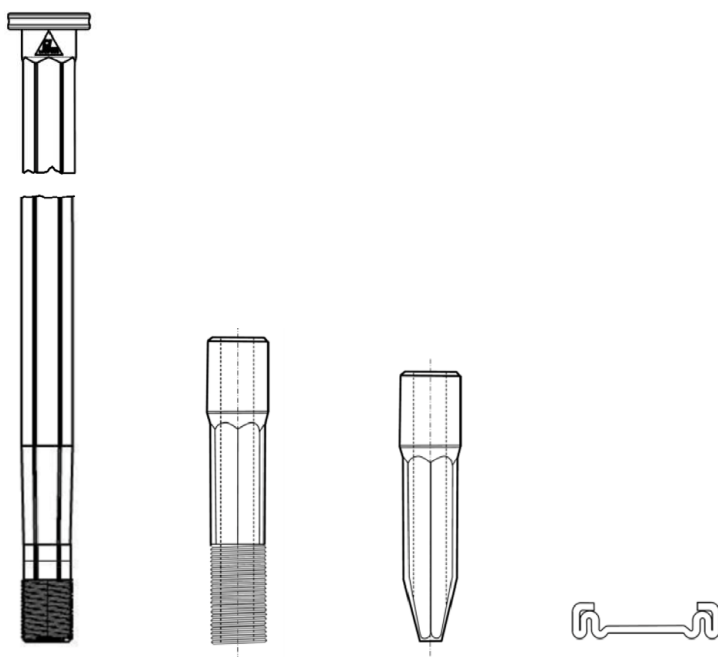
Zahn Flat Roof Fasteners

Combination 156
ZSSB-Concrete-Modul 6,0 consisting of ZBST / ZSSB-module-pipe,
module middle piece, module spike 6,0 and ZSSB bar

Annex 156



Zahn ZSSB-module-pipe with module 6,0 and bar



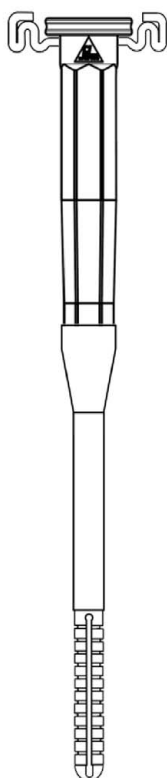
Zahn ZBST-E 6,3 x L



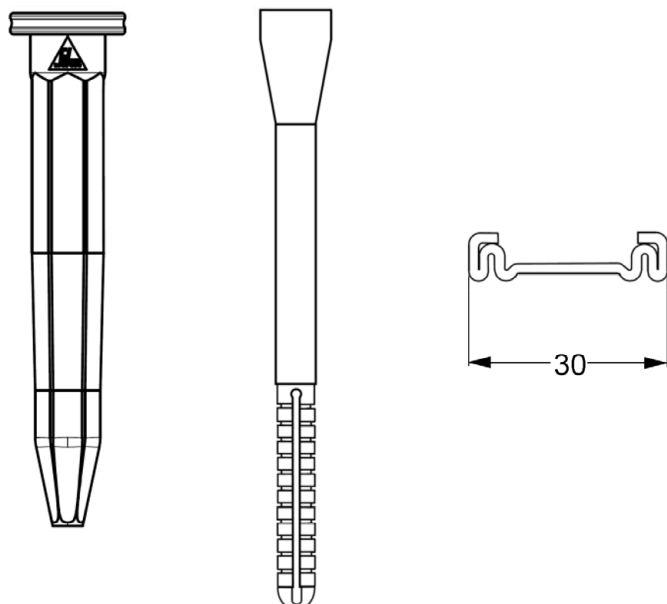
Zahn Flat Roof Fasteners

Combination 157
ZSSB-E-Concrete-Modul 6,0 consisting of ZBST-E / ZSSB-module-pipe,
module middle piece, module spike 6,0 and ZSSB bar

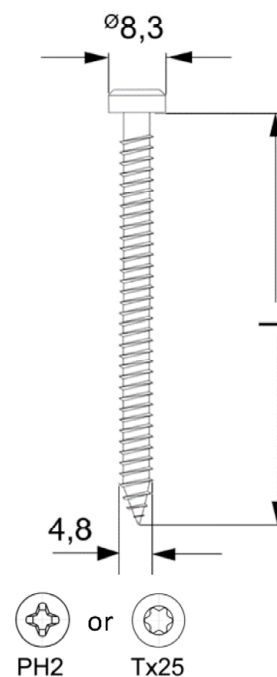
Annex 157



Zahn ZSSB-pipe 4,8 dowel extension and bar



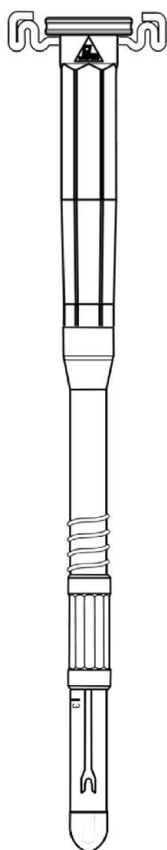
Zahn ZDBK_{dowel} 4,8 x L



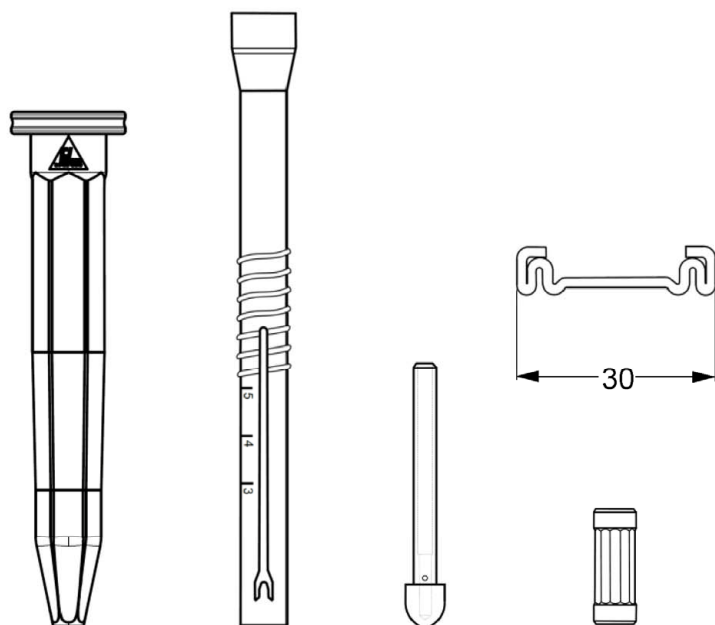
Zahn Flat Roof Fasteners

Combination 158
ZSSB-Dowel-Extension 4,8 consisting of ZDBK_{dowel} / ZSSB-pipe 4,8, ZSSB bar
and dowel extension

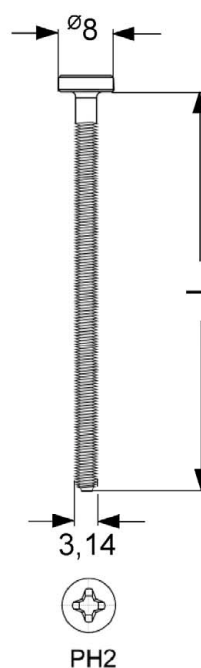
Annex 158



Zahn ZSSB-pipe 4,8 with expanding dowel extension and bar



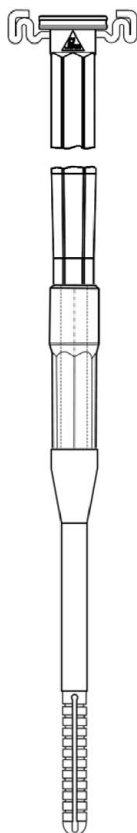
Zahn metric screw – E 3,14 x L



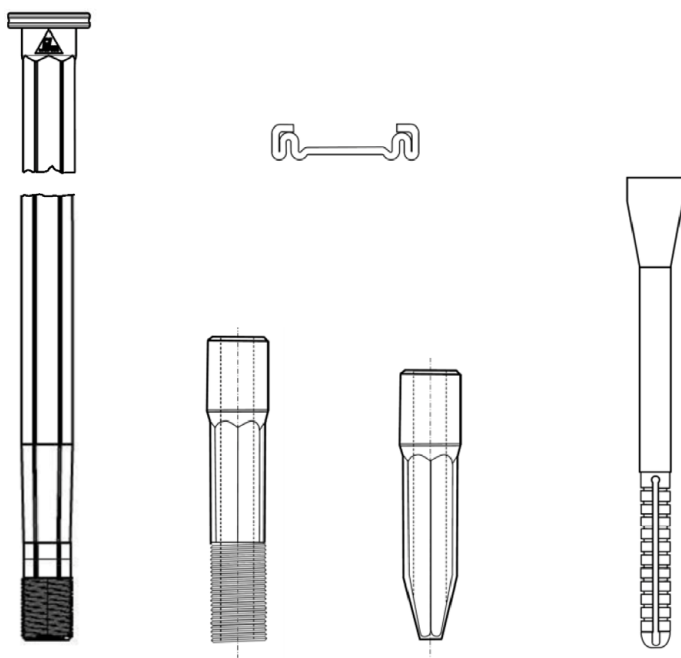
Zahn Flat Roof Fasteners

Combination 159
ZSSB-ZHRD consisting of metric screw-E / ZSSB-pipe 4,8, ZSSB bar
and expanding dowel extension

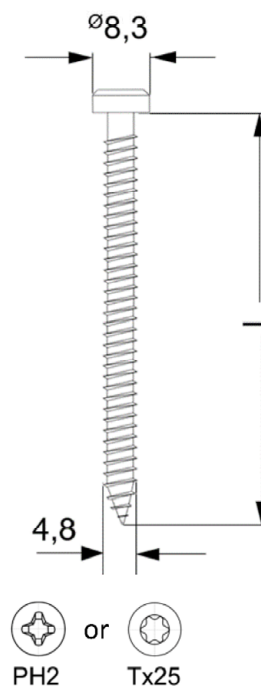
Annex 159



Zahn ZSSB-module-pipe 4,8 with module, dowel extension and bar



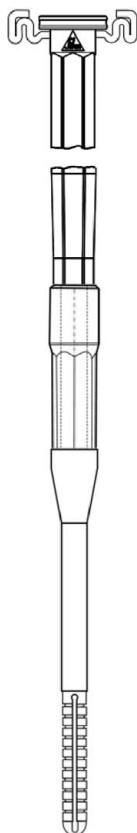
Zahn ZDBK_{dowel} 4,8 x L



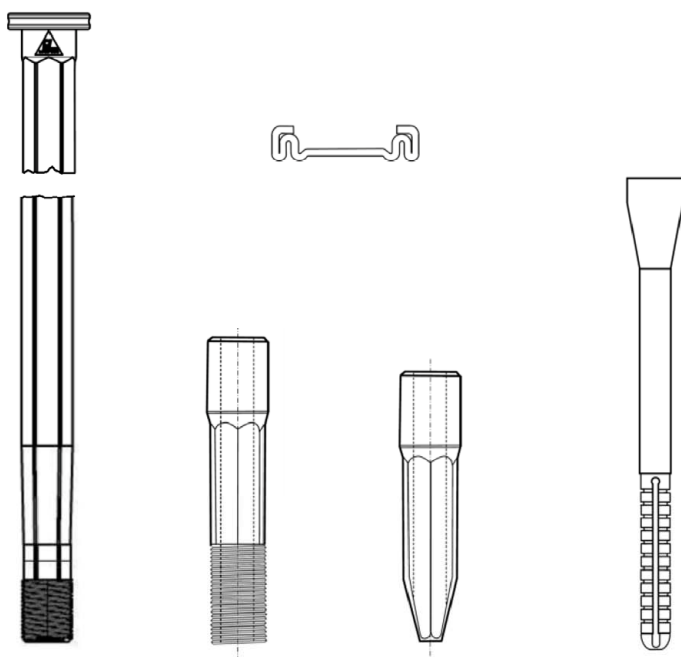
Zahn Flat Roof Fasteners

Combination 160
ZSSB-Dowel-Extension-Modul 4,8 consisting of ZDBK_{dowel} / ZSSB-module-pipe,
-middle piece, -spike 4,8, dowel extension and ZSSB bar

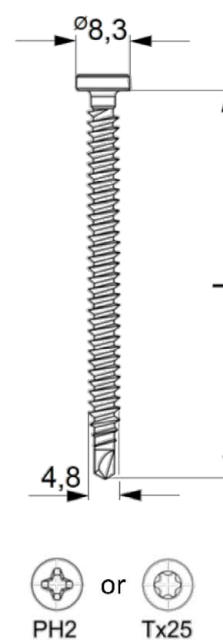
Annex 160



Zahn ZSSB-module-pipe 4,8 with module, dowel extension and bar



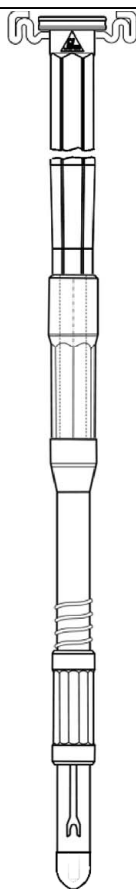
Zahn ZDBK-E 4,8 x L



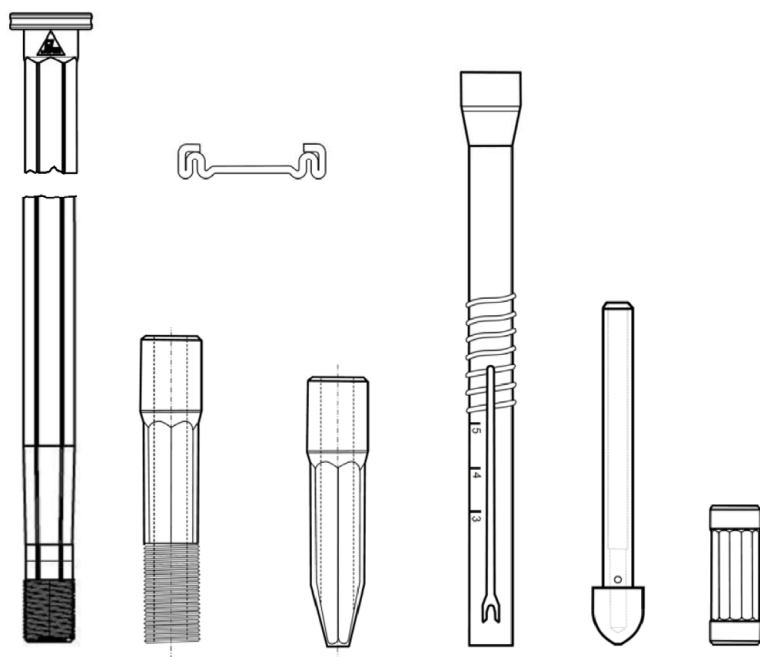
Zahn Flat Roof Fasteners

Combination 161
ZSSB-E-Dowel-Modul 4,8 consisting of ZDBK-E / ZSSB-module-pipe,
-middle piece, -spike 4,8, dowel extension and ZSSB bar

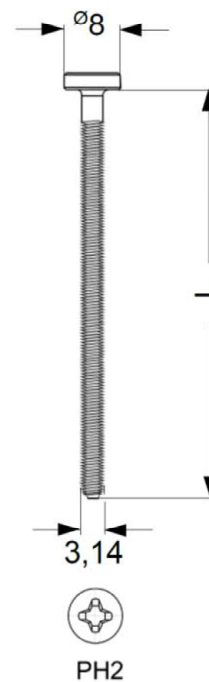
Annex 161



Zahn ZSSB-module-pipe 4,8 with module and expanding dowel extension and bar



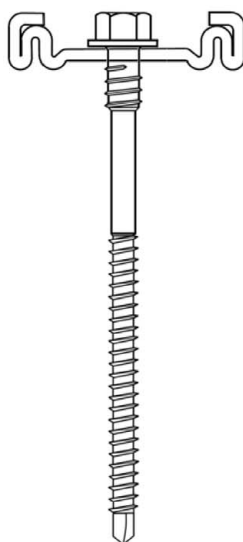
Zahn metric screw-E 3,14 x L



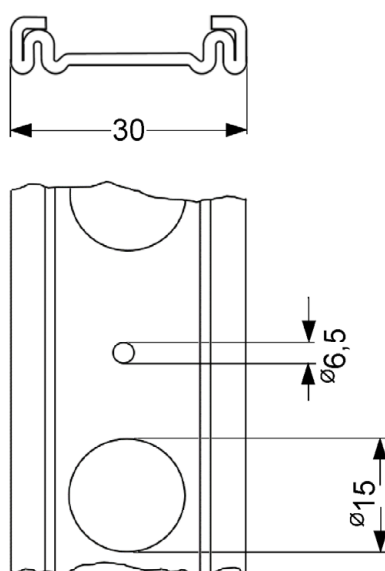
Zahn Flat Roof Fasteners

Combination 162
ZSSB-ZHRD-Modul 4,8 consisting of metric screw-E / ZSSB-module-pipe,
-middle piece, -spike 4,8, ZSSB bar and expanding dowel extension

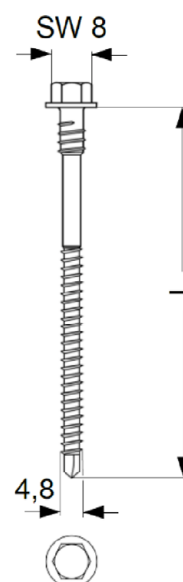
Annex 162



ZSSB bar



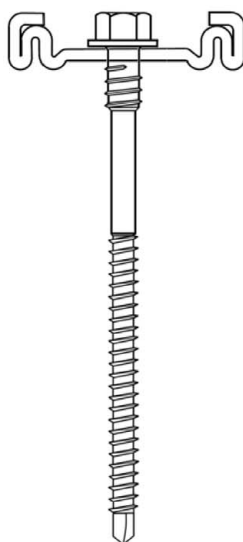
Zahn ZDBS 4,8 x L



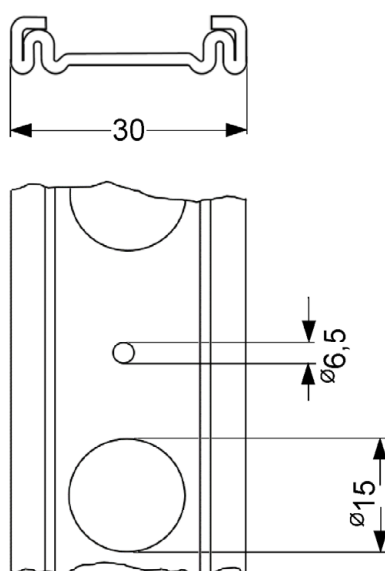
Zahn Flat Roof Fasteners

Combination 163
ZSSB / ZDBS

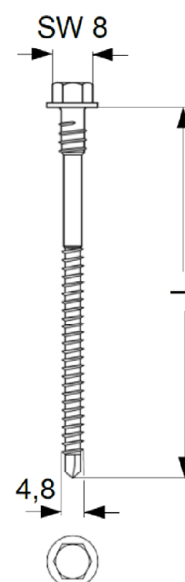
Annex 163



ZSSB bar



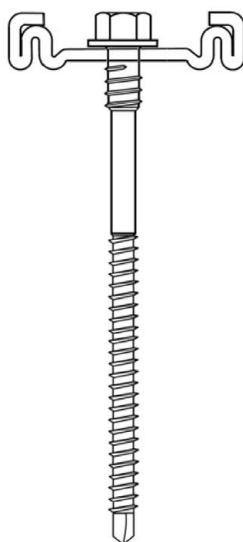
Zahn ZDBS-VB 4,8 x L



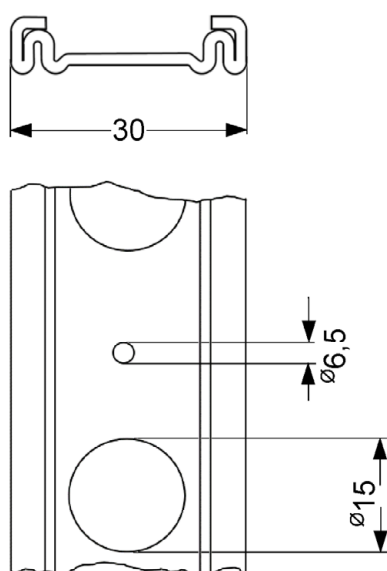
Zahn Flat Roof Fasteners

Combination 163a
ZSSB / ZDBS-VB

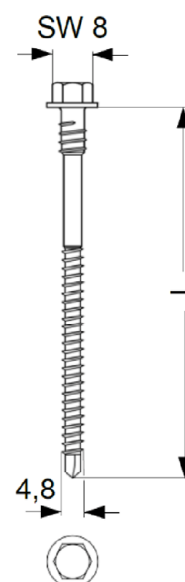
Annex 163a



ZSSB bar



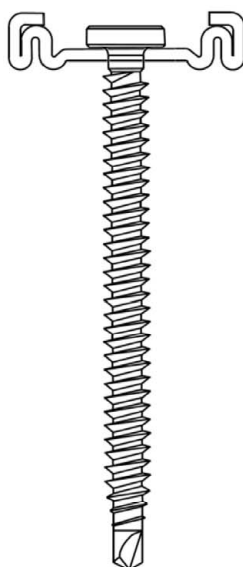
Zahn ZDBS-E 4,8 x L



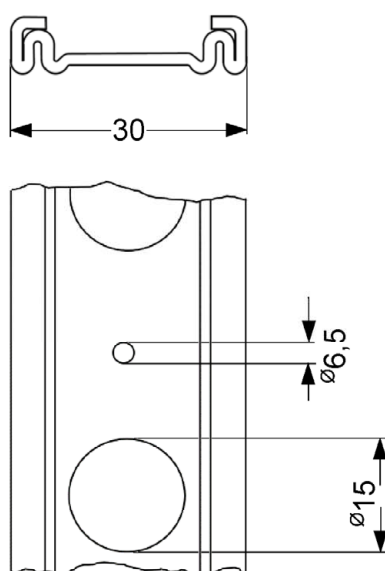
Zahn Flat Roof Fasteners

Combination 164
ZSSB / ZDBS-E

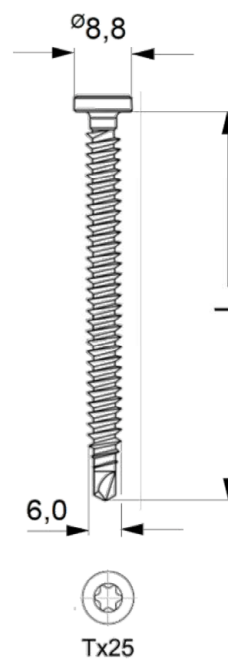
Annex 164



ZSSB bar



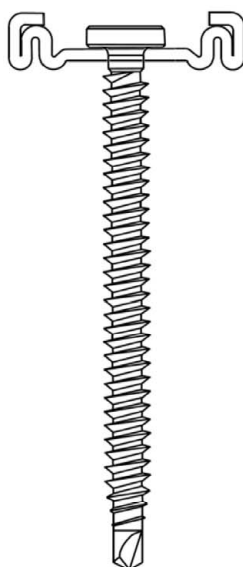
Zahn ZMDS 6,0 x L



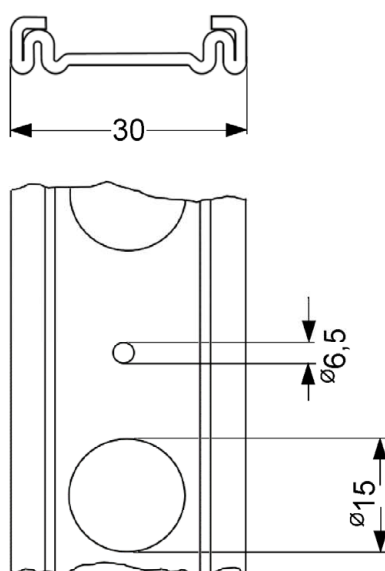
Zahn Flat Roof Fasteners

Combination 165
ZSSB / ZMDS

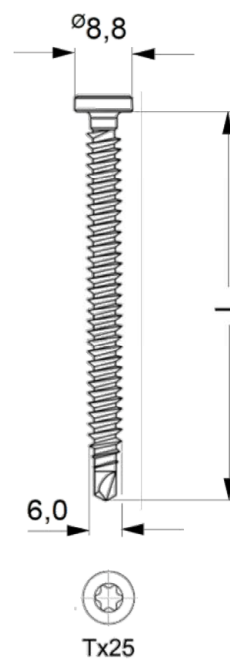
Annex 165



ZSSB bar



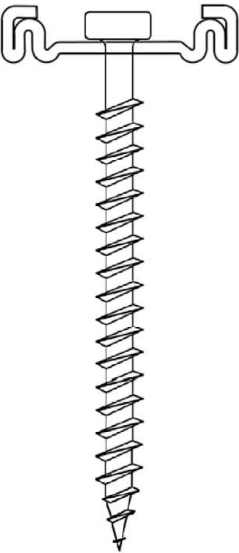
Zahn ZMDS-E 6,0 x L



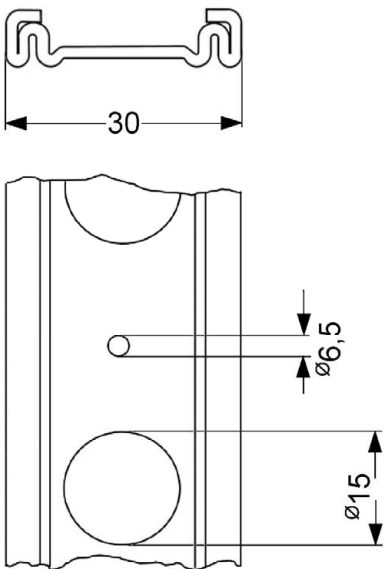
Zahn Flat Roof Fasteners

Combination 166
ZSSB / ZMDS-E

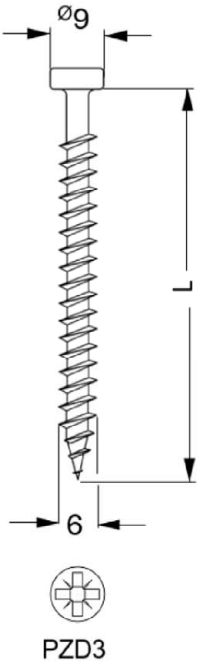
Annex 166



ZSSB bar



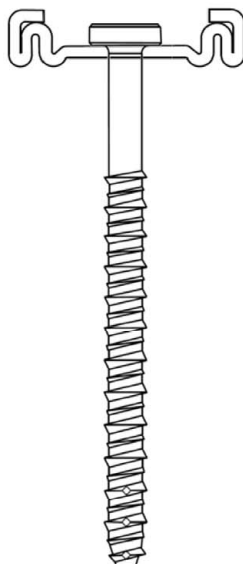
Zahn ZGBK-E 6,0 x L



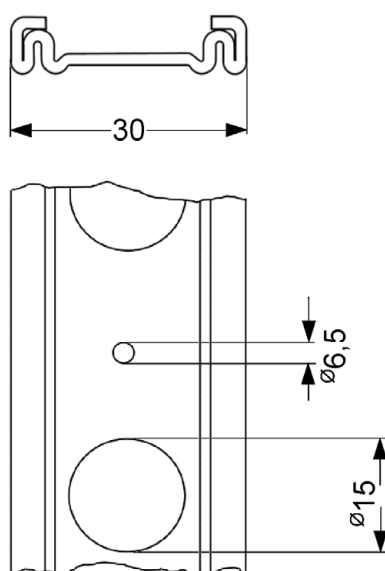
Zahn Flat Roof Fasteners

Combination 167
ZSSB / ZGBK-E

Annex 167



ZSSB bar



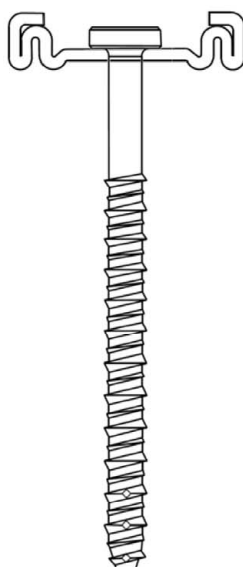
Zahn ZBST 6,3 x L



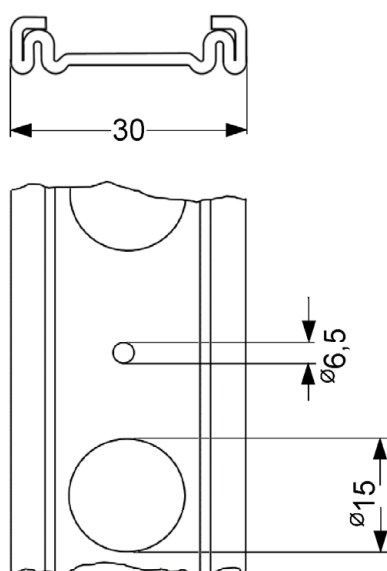
Zahn Flat Roof Fasteners

Combination 168
ZSSB / ZBST

Annex 168



ZSSB bar



Zahn ZBST-E 6,3 x L



Zahn Flat Roof Fasteners

Combination 169
ZSSB / ZBST-E

Annex 169

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure							
		Steelsheet			Timber*)				
		S280GD - EN 10346			C24	OSB3	P5	Ply-wood	
		t [mm] ≥			t [mm] ≥				
		0,50	0,75	1,50	22	18	19	19	
1	ZKSK	-	1,07	-	1,04	0,98	0,97	1,60	
2	ZKSK-R	-	1,07	-	1,04	0,98	0,97	1,60	
3	ZKSK-R plus	-	1,07	-	1,04	0,98	0,97	1,60	
4	ZKSK-Rplus with pile tip	-	1,07	-	1,04	0,98	0,97	1,60	
5	ZKSK Modul 4,8	-	1,07	-	-	-	-	-	
6	ZKSK-R-Modul 4,8	-	1,07	-	1,04	0,98	0,97	1,16	
7	ZTSK 4,8	-	1,07	-	1,04	0,98	0,97	1,60	
8	ZDBK / ZLVT 0001	-	1,07	-	1,04	0,98	0,97	1,60	
9	ZDBK / ZLVT 0005	-	1,07	-	1,04	0,98	0,97	1,60	
10	ZDBK / ZLVT 0015	-	1,07	-	1,04	0,98	0,97	1,37	
10a	ZCTS 4,8	-	1,07	-	1,04	0,98	0,97	1,60	
10b	ZCTSplus 4,8 with pile tip	-	1,07	-	1,04	0,98	0,97	1,60	
11	ZKSK-E 4,8	-	1,11	-	1,04	0,98	0,97	1,60	
12	ZKSK-E/R	-	1,11	-	1,04	0,98	0,97	1,60	
13	ZKSK-E/Rplus	-	1,11	-	1,04	0,98	0,97	1,60	
14	ZKSK-E/Rplus with pile tip	-	1,11	-	1,04	0,98	0,97	1,60	
15	ZKSK-E-Modul 4,8	-	1,11	-	1,04	0,98	0,97	1,16	
16	ZKSK-E/R-Modul 4,8	-	1,11	-	1,04	0,98	0,97	1,16	
17	ZTSK-E 4,8	-	1,11	-	1,04	0,98	0,97	1,60	
18	ZDBK-E / ZLVT 0001	-	1,11	-	1,04	0,98	0,97	1,60	
19	ZDBK-E / ZLVT 0005	-	1,11	-	1,04	0,98	0,97	1,60	
20	ZDBK-E / ZLVT 0015	-	1,11	-	1,04	0,98	0,97	1,37	
20a	ZCTS-E 4,8	-	1,11	-	1,04	0,98	0,97	1,60	
20b	ZCTSplus-E 4,8 with pile tip	-	1,11	-	1,04	0,98	0,97	1,60	
*) C24 EN 338 ρ _{min} = 350kg/m³ OSB3 EN 300 ρ _{min} = 550kg/m³ Particleboard / P5 EN 312 ρ _{min} = 500kg/m³ Plywood EN 636 ρ _{min} = 400kg/m³ For timber substructures thickness "t" also represents the minimum of effective embedmend depth (= penetration length of threaded part)									

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 170

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure		
		Steelsheet		
		S280GD - EN 10346		
		t [mm] ≥		
		0,50	0,75	1,50
21	ZKSK-VB	-	-	1,57
22	ZKSK-VB/R	-	-	1,57
23	ZKSK-VB/Rplus	-	-	1,57
24	ZKSK-VB/Rplus with pile tip	-	-	1,57
25	ZKSK-VB Modul 4,8	-	-	1,16
26	ZKSK-VB/R Modul 4,8	-	-	1,16
27	ZTSK-VB 4,8	-	-	1,57
28	ZDBK-VB / ZLVT 0001	-	-	1,57
29	ZDBK-VB / ZLVT 0005	-	-	1,57
30	ZDBK-VB / ZLVT 0015	-	-	1,37
30a	ZCTS-VB 4,8	-	-	1,57
30b	ZCTSplus-VB 4,8 with pile tip	-	-	1,57
31	ZKSK-VB-E	-	-	1,57
32	ZKSK-VB-E/R	-	-	1,57
33	ZKSK-VB-E/Rplus	-	-	1,57
34	ZKSK-VB-E/Rplus with pile tip	-	-	1,57
35	ZKSK-VB-E Modul 4,8	-	-	1,16
36	ZKSK-VB-E/R Modul 4,8	-	-	1,16
37	ZTSK-VB-E 4,8	-	-	1,57
38	ZDBK-VB-E / ZLVT 0001	-	-	1,57
39	ZDBK-VB-E / ZLVT 0005	-	-	1,57
40	ZDBK-VB-E / ZLVZ 0015	-	-	1,37
40a	ZCTS-VB-E 4,8	-	-	1,57
40b	ZCTSplus-VB-E 4,8 with pile tip	-	-	1,57

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 171

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure						
		Steelsheet			Timber ^{*)}			
		S280GD - EN 10346			C24	OSB3	P5	Ply-wood
		t [mm] ≥			t [mm] ≥			
		0,50	0,75	1,50	22	18	19	19
41	ZDBS / ZLVT 0001	-	1,07	-	1,04	1,21	0,97	2,34
41a	ZDBS-VB / ZLVT 0001	-	-	1,57	-	-	-	-
42	ZDBS / ZLVT 0005	-	1,07	-	1,04	1,21	0,97	2,34
42a	ZDBS-VB / ZLVT 0005	-	-	1,57	-	-	-	-
43	ZDBS / ZLVT 0012	-	1,07	-	1,04	1,21	0,97	2,34
43a	ZDBS-VB / ZLVT 0012	-	-	1,57	-	-	-	-
44	ZDBS-E / ZLVT 0001	-	1,09	-	1,04	1,21	0,97	2,34
45	ZDBS-E / ZLVT 0005	-	1,09	-	1,04	1,21	0,97	2,34
46	ZDBS-E / ZLVT 0012	-	1,09	-	1,04	1,21	0,97	2,34
47	ZHSK	-	-	-	1,60	1,18	1,51	1,25
48	ZHSK-R	-	-	-	1,60	1,18	1,51	1,25
49	ZHSK-Rplus	-	-	-	1,60	1,18	1,51	1,25
50	ZHSK-Rplus with pile tip	-	-	-	1,60	1,18	1,51	1,25
51	ZHSK-Modul 4,8	-	-	-	1,16	1,16	1,16	1,16
52	ZHSK-R-Modul 4,8	-	-	-	1,16	1,16	1,16	1,16
53	ZTSK Wood 4,8	-	-	-	1,58	1,18	1,51	1,25
54	ZHBK / ZLVT 0001	-	-	-	1,60	1,18	1,51	1,25
55	ZHBK / ZLVT 0005	-	-	-	1,60	1,18	1,51	1,25
55a	ZHBK _{TK} / ZLVT 0005	-	-	-	1,47	1,18	1,47	1,25
56	ZHBK / ZLVT 0015	-	-	-	1,38	1,18	1,38	1,25
56a	ZCTS-H 4,8	-	-	-	1,60	1,18	1,51	1,25
56b	ZHBK _{TK} / ZLVT 0015	-	-	-	1,47	1,18	1,47	1,25
56c	ZCTS-Hplus 4,8 with pile tip	-	-	-	1,60	1,18	1,51	1,25
66b	ZHBK-E _{TK} / ZLVT 0005	-	-	-	1,47	1,18	1,47	1,25
69a	ZHBK-E _{TK} / ZLVT 0015	-	-	-	1,47	1,18	1,47	1,25

*) C24 EN 338 $\rho_{min} = 350\text{kg/m}^3$
 OSB3 EN 300 $\rho_{min} = 550\text{kg/m}^3$
 Particleboard / P5 EN 312 $\rho_{min} = 500\text{kg/m}^3$
 Plywood EN 636 $\rho_{min} = 400\text{kg/m}^3$
 For timber substructures thickness "t" also represents the minimum of effective embedment depth
 (= penetration length of threaded part)

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 172

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure								
		Steelsheet			Aluminium		Timber ^{*)}			
		S280GD - EN 10346			EN 485, t ≥ 0,5mm R _m [N/mm²] ≥		C24	OSB3	P5	Ply- wood
		t [mm] ≥			t [mm] ≥					
		0,50	0,75	1,50	165	215	22	18	19	19
57	ZHSK-E	-	-	-	-	-	1,60	1,18	1,51	1,25
58	ZHSK-E/R	-	-	-	-	-	1,60	1,18	1,51	1,25
59	ZHSK-E/Rplus	-	-	-	-	-	1,60	1,18	1,51	1,25
60	ZHSK-E/Rplus with pile tip	-	-	-	-	-	1,60	1,18	1,51	1,25
61	ZHSK-E-Modul 4,8	-	-	-	-	-	1,16	1,16	1,16	1,16
62	ZHSK-E/R-Modul 4,8	-	-	-	-	-	1,16	1,16	1,16	1,16
67	ZTSK-E-Timber 4,8	-	-	-	-	-	1,58	1,18	1,51	1,25
68	ZHBK-E / ZLVT 0001	-	-	-	-	-	1,60	1,18	1,51	1,25
69	ZHBK-E / ZLVT 0005	-	-	-	-	-	1,60	1,18	1,51	1,25
70	ZHBK-E / ZLVT 0015	-	-	-	-	-	1,38	1,18	1,38	1,25
70a	ZCTS-H-E 4,8	-	-	-	-	-	1,60	1,18	1,51	1,25
70b	ZCTS-H-Eplus 4,8 with pile tip	-	-	-	-	-	1,60	1,18	1,51	1,25
71	ZDBK-Dowel / ZKSH oval	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
72	ZDBK-Dowel /R / ZKSH round	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
73	ZKSK-Dowel / Rplus	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
74	ZKSK-Dowel / Rplus with pile tip	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
76a	ZHSK-R-Modul 4,8 _{dowel}	0,76	1,16	-	0,34	0,44	0,95	1,16	0,98	1,16
80	ZTSK-Dowel 4,8	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
81	ZDBK _{dowel} / ZLVT 0001	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
81a	ZCTS 4,8 _{dowel}	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
81b	ZDBK _{dowel} / ZLVT 0005	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
81c	ZDBK _{dowel} / ZLVT 0015	0,76	1,37	-	0,34	0,44	0,95	1,16	0,98	1,21
81d	ZCTS-H _{plus} dowel with pile tip 4,8	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21
*) C24 EN 338 ρ _{min} = 350kg/m³ OSB3 EN 300 ρ _{min} = 550kg/m³ Particleboard / P5 EN 312 ρ _{min} = 500kg/m³ Plywood EN 636 ρ _{min} = 400kg/m³ For timber substructures thickness "t" also represents the minimum of effective embedmend depth (= penetration length of threaded part)										

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 173

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure										
		Steelsheet			Aluminium		Timber ^{*)}					
		S280GD - EN 10346			EN 485, t ≥ 0,5mm R _m [N/mm²] ≥		C24	OSB3	P5	Ply- wood		
		t [mm] ≥			t [mm] ≥							
		0,50	0,75	1,50	165	215	22	18	19	19		
121	ZDBK-TK / ZLVT 0016	-	1,22	-	-	-	-	-	-	-		
121a	ZDBK / ZLVT 0016	-	1,07	-	-	-	-	-	-	-		
121b	ZDBK-E / ZLVT 0016	-	1,11	-	-	-	-	-	-	-		
122	ZSSB 4,8 / clickplate / ZDBK 4,8	-	1,07	-	-	-	1,04	0,98	0,97	1,60		
123	ZSSB 4,8 / clickplate / ZDBK-E 4,8	-	1,11	-	-	-	1,04	0,98	0,97	1,60		
124	ZSSB 4,8 / clickplate / ZDBK-VB 4,8	-	-	1,57	-	-	-	-	-	-		
125	ZSSB 4,8 / clickplate / ZDBK-VB-E 4,8	-	-	1,57	-	-	-	-	-	-		
128	ZSSB 4,8 / clickplate / ZHBK 4,8	-	-	-	-	-	1,60	1,18	1,51	1,25		
129	ZSSB 4,8 / clickplate / ZHBK-E 4,8	-	-	-	-	-	1,60	1,18	1,51	1,25		
130	ZSSB 4,8 / clickplate / ZDBK-Dowel 4,8	0,76	1,52	-	0,34	0,44	0,95	1,16	0,98	1,21		
134	ZSSB 4,8	-	1,07	-	-	-	1,04	0,98	0,97	1,41		
135	ZSSB-E 4,8	-	1,11	-	-	-	1,04	0,98	0,97	1,41		
136	ZSSB-VB 4,8	-	-	1,41	-	-	-	-	-	-		
137	ZSSB-VB-E 4,8	-	-	1,41	-	-	-	-	-	-		
140	ZSSB-Timber 4,8	-	-	-	-	-	1,41	1,18	1,41	1,25		
141	ZSSB-E-Timber 4,8	-	-	-	-	-	1,41	1,18	1,41	1,25		
142	ZSSB-Dowel 4,8	0,76	1,41	-	0,34	0,44	0,95	1,16	0,98	1,21		
146	ZSSB-Modul 4,8	-	1,07	-	-	-	1,04	0,98	0,97	1,16		
147	ZSSB-E-Modul 4,8	-	1,11	-	-	-	1,04	0,98	0,97	1,16		
148	ZSSB-VB-Modul 4,8	-	-	1,16	-	-	-	-	-	-		
149	ZSSB-VB-E-Modul 4,8	-	-	1,16	-	-	-	-	-	-		
152	ZSSB-Timber-Modul 4,8	-	-	-	-	-	1,16	1,16	1,16	1,16		
153	ZSSB-E-Timber-Modul 4,8	-	-	-	-	-	1,16	1,16	1,16	1,16		
154	ZSSB-Dowel-Modul 4,8	0,76	1,16	-	0,34	0,44	0,95	1,16	0,98	1,16		
163	ZSSB / ZDBS	-	1,11	-	-	-	1,04	1,21	0,97	2,34		
163a	ZSSB / ZDBS-VB	-	-	1,57	-	-	-	-	-	-		
164	ZSSB / ZDBS-E	-	1,09	-	-	-	1,04	1,21	0,97	2,34		
*) C24 EN 338 OSB3 EN 300 Particleboard / P5 EN 312 Plywood EN 636 For timber substructures thickness "t" also represents the minimum of effective embedment depth (= penetration length of threaded part) ρ_{min} = 350kg/m³ ρ_{min} = 550kg/m³ ρ_{min} = 500kg/m³ ρ_{min} = 400kg/m³												

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 174

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure									
		Timber ^{*)}					Aerated ^{**)} Concrete EN 12602		Pumice ^{3*)} EN 1520 LAC...		
		C24	OSB3	P5	Ply- wood						
		t [mm] ≥									
		22	18	19	19		3,5	4,5	...2a	...2b	
82	ZKGK-E/R	1,31	1,08	1,17	1,83		1,02	1,59	0,54	1,00	
83	ZKGK-E-Modul 6,0	1,16	1,08	1,16	1,16		1,02	1,16	0,54	1,00	
84	ZKGK-E/R-Modul 6,0	1,16	1,08	1,16	1,16		1,02	1,16	0,54	1,00	
85	ZHVM-E-HPB	1,31	1,08	1,17	1,61		1,02	1,59	0,54	1,00	
86	ZTSK-E-Pumice 6,0	1,31	1,08	1,17	1,33		1,02	1,33	0,54	1,00	
87	ZGBK-E / ZLVT 0008	1,31	1,08	1,17	1,34		1,02	1,34	0,54	1,00	
88	ZGBK-E / ZLVT 0012	1,28	1,08	1,17	1,28		1,02	1,28	0,54	1,00	
131	ZSSB 6,0 / clickplate / ZGBK-E 6,0	1,31	1,08	1,17	1,85		1,02	1,59	0,54	1,00	
131a	ZCTS 6,0 / ZGBK-E	1,31	1,08	1,17	1,41		1,02	1,41	0,54	1,00	
143	ZSSB-HPB 6,0	1,31	1,08	1,17	1,41		1,02	1,41	0,54	1,00	
155	ZSSB-HPB-Modul 6,0	1,16	1,08	1,16	1,16		1,02	1,16	0,54	1,00	
167	ZSSB / ZGBK-E	1,31	1,08	1,17	2,58		1,02	1,59	0,54	1,00	
							min. setting depth = 60,0mm				
^{*)} C24 EN 338 ρ _{min} = 350kg/m ³ OSB3 EN 300 ρ _{min} = 550kg/m ³ Particleboard / P5 EN 312 ρ _{min} = 500kg/m ³ Plywood EN 636 ρ _{min} = 400kg/m ³ For timber substructures thickness "t" also represents the minimum of effective embedmend depth (= penetration length of threaded part)											
^{**)} 3,5: AAC 3,5 ρ _{class} = 500 4,5: AAC 4,5 ρ _{class} = 600											
^{3*)} 2a: LAC 2 ρ _{class} = 0,5 2b: LAC 2 ρ _{class} = 1,0											

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 175

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure							
			Concrete EN 206-1		Aerated ^{**)} Concrete EN 12602		Pumice ^{3*)} EN 1520 LAC...		
			C12/15	C25/30	3,5	4,5	...2a	...2b	
75	ZSDK-Modul 4,8		1,03	1,16	0,81	1,16	0,56	1,04	
76	ZSDK-R-Modul 4,8		1,03	1,16	0,81	1,16	0,56	1,04	
77	ZSDK		1,03	1,46	0,81	1,21	0,56	1,04	
78	ZSDK-R		1,03	1,46	0,81	1,21	0,56	1,04	
78a	ZCTS 4,8 dowel extension		1,03	1,46	0,81	1,21	0,56	1,04	
79	ZTSD		0,95	1,34	0,46	0,69	0,54	0,99	
			min. setting depth	pre- drill Ø	min. setting depth	pre- drill Ø	min. setting depth	pre- drill Ø	
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
			40,0	8,0	60,0	8,0	60,0	8,0	
^{**)} 3,5: AAC 3,5 $\rho_{class} = 500$ 4,5: AAC 4,5 $\rho_{class} = 600$									
^{3*)} 2a: LAC 2 $\rho_{class} = 0,5$ 2b: LAC 2 $\rho_{class} = 1,0$									

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 176

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure				
			Concrete EN 206-1		min. setting depth	pre- drill Ø
			C12/15	C25/30	[mm]	[mm]
89	ZBSK-R		1,60	1,85	30,0	5,0
90	ZBSK-Modul 6,0		1,16	1,16	30,0	5,0
91	ZBSK-R-Modul 6,0		1,16	1,16	30,0	5,0
92	ZHVM-Concrete		1,60	1,61	30,0	5,0
93	ZTSK-Concrete 6,0		1,41	1,41	30,0	5,0
94	ZBST / ZLVT 0008		1,60	1,71	30,0	5,0
95	ZBST / ZLVT 0012		1,60	1,67	30,0	5,0
96	ZBSK-E/R		1,60	1,85	40,0	5,0
97	ZBSK-E-Modul 6,0		1,16	1,16	40,0	5,0
98	ZBSK-E/R-Modul 6,0		1,16	1,16	40,0	5,0
99	ZHVM-E-Concrete		1,60	1,61	40,0	5,0
100	ZTSK-E-Concrete 6,0		1,41	1,41	40,0	5,0
101	ZBST-E / ZLVT 0008		1,60	1,71	40,0	5,0
102	ZBST-E / ZLVT 0012		1,60	1,67	40,0	5,0
132	ZSSB 6,0 / clickplate / ZBST 6,3		1,60	1,85	30,0	5,0
132a	ZCTS 6,0 / ZBST 6,3		1,41	1,41	30,0	5,0
133	ZSSB 6,0 / clickplate / ZBST-E 6,3		1,60	1,85	40,0	5,0
133a	ZCTS-E 6,0 / ZBST-E 6,3		1,41	1,41	40,0	5,0
144	ZSSB-Concrete 6,0		1,41	1,41	30,0	5,0
145	ZSSB-E-Concrete 6,0		1,41	1,41	40,0	5,0
156	ZSSB-Concrete-Modul 6,0		1,16	1,16	30,0	5,0
157	ZSSB-E-Concrete-Modul 6,0		1,16	1,16	40,0	5,0
168	ZSSB / ZBST		1,60	2,26	30,0	5,0
169	ZSSB / ZBST-E		1,60	2,26	40,0	5,0

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 177

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure							
			Concrete EN 206-1		Aerated**) Concrete EN 12602		Pumice ^{3*)} EN 1520 LAC...		
			C12/15	C25/30	3,5	4,5	...2a	...2b	
63	ZSDK-E -Modul 4,8		1,16	1,16	0,87	1,12	-	0,37	
64	ZSDK-E/R -Modul 4,8		1,16	1,16	0,87	1,12	-	0,37	
65	ZSDK-E		1,48	1,48	0,87	1,12	-	0,37	
66	ZSDK-E/R		1,48	1,48	0,87	1,12	-	0,37	
66a	ZCTS-H-E dowel extension 4,8		1,48	1,48	0,87	1,12	-	0,37	
60a	ZTSD-E		0,89	0,89	0,52	0,67	-	0,22	
158	ZSSB-Dowel-Extension 4,8		1,03	1,41	0,81	1,21	0,56	1,04	
160	ZSSB-Dowel-Extension-Modul 4,8		1,03	1,16	0,81	1,16	0,56	1,04	
161	ZSSB-E-Dowel-Extension-Modul 4,8		1,03	1,16	0,81	1,16	0,56	1,04	
			min. setting depth	pre- drill Ø	min. setting depth	pre- drill Ø	min. setting depth	pre- drill Ø	
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
			40,0	8,0	60,0	8,0	60,0	8,0	
**) 3,5: AAC 3,5 ρ _{class} = 500 4,5: AAC 4,5 ρ _{class} = 600									
3*) 2a: LAC 2 ρ _{class} = 0,5 2b: LAC 2 ρ _{class} = 1,0									

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 178

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure							
		Steelsheet			Aluminium		Pumice ^{3*)} EN 1520 LAC...		
		S280GD - EN 10346			EN 485, t ≥ 0,5mm R _m [N/mm²] ≥				
		t [mm] ≥							
		0,50	0,75	1,50	165	215	...2a	...2b	
103	ZHRD	1,02	1,02	-	0,42	0,55	0,56	1,02	
104	ZHRD-R	1,02	1,02	-	0,42	0,55	0,56	1,02	
104a	ZCTS with expanding dowel extens.	1,02	1,02	-	0,42	0,55	0,56	1,02	
105	ZHRD on Modul oval 4,8	1,02	1,02	-	0,42	0,55	0,56	1,02	
106	ZHRD-R on Modul round 4,8	1,02	1,02	-	0,42	0,55	0,56	1,02	
159	ZSSB-ZHRD	1,02	1,02	-	0,42	0,55	0,56	1,02	
162	ZSSB-ZHRD-Modul 4,8	1,02	1,02	-	0,42	0,55	0,56	1,02	
		min. setting depth ^{*)} = 30,0mm pre-drill Ø = 10,0mm					min. setting depth	pre- drill Ø	
							[mm]	[mm]	
							80,0	10,0	
^{*)} The min. setting depth corresponds to the projection of the non-knotted spreader area under the underside of the roof substrate.									
^{3*)} 2a: LAC 2 ρ _{class} = 0,5 2b: LAC 2 ρ _{class} = 1,0									

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 179

Characteristic Axial Load Resistance N_{Rk} [kN]

Annex	Zahn Flat Roof Fasteners	Substructure										
		Steelsheet			Timber ^{*)}				Concrete EN 206-1		min. setting depth	pre- drill Ø
		S280GD - EN 10346	C24	OSB3	P5	Ply- wood						
		t [mm] ≥			t [mm] ≥							
		0,50	0,75	1,50	22	18	19	19	C12/15	C25/30	[mm]	[mm]
107	ZMDS-R	-	1,85	-	1,85	0,95	1,25	1,85	1,51	1,51	30,0	5,0
108	ZMDS-Modul 6,0	-	1,16	-	1,16	0,95	1,16	1,16	1,16	1,16	30,0	5,0
109	ZMDS-R-Modul 6,0	-	1,16	-	1,16	0,95	1,16	1,16	1,16	1,16	30,0	5,0
110	ZHVM-Multi	-	1,61	-	1,61	0,95	1,25	1,61	1,51	1,51	30,0	5,0
111	ZTSK-Multi 6,0	-	1,41	-	1,41	0,95	1,25	1,41	1,41	1,41	30,0	5,0
112	ZMDS / ZLVT 0008	-	1,71	-	1,71	0,95	1,25	1,71	1,51	1,51	30,0	5,0
113	ZMDS / ZLVT 0012	-	1,67	-	1,67	0,95	1,25	1,67	1,51	1,51	30,0	5,0
114	ZMDS-E/R	-	1,85	-	1,85	0,95	1,25	1,85	1,51	1,51	40,0	5,0
115	ZMDS-E-Modul 6,0	-	1,16	-	1,16	0,95	1,16	1,16	1,16	1,16	40,0	5,0
116	ZMDS-E/R-Modul 6,0	-	1,16	-	1,16	0,95	1,16	1,16	1,16	1,16	40,0	5,0
117	ZHVM-E-Multi	-	1,61	-	1,61	0,95	1,25	1,61	1,51	1,51	40,0	5,0
118	ZTSK-E-Multi 6,0	-	1,41	-	1,41	0,95	1,25	1,41	1,41	1,41	40,0	5,0
119	ZMDS-E / ZLVT 0008	-	1,71	-	1,71	0,95	1,25	1,71	1,51	1,51	40,0	5,0
120	ZMDS-E / ZLVT 0012	-	1,67	-	1,67	0,95	1,25	1,67	1,51	1,51	40,0	5,0
126	ZSSB 6,0 / clickplate / ZMDS 6,0	-	1,85	-	1,85	0,95	1,25	1,85	1,51	1,51	30,0	5,0
126a	ZCTS 6,0 / ZMDS	-	1,41	-	1,41	0,95	1,25	1,41	1,41	1,41	30,0	5,0
127	ZSSB 6,0 / clickplate / ZMDS-E 6,0	-	1,85	-	1,85	0,95	1,25	1,85	1,51	1,51	40,0	5,0
127a	ZCTS-E 6,0 / ZMDS-E	-	1,41	-	1,41	0,95	1,25	1,41	1,41	1,41	40,0	5,0
138	ZSSB 6,0	-	1,41	-	1,41	0,95	1,25	1,41	1,41	1,41	30,0	5,0
139	ZSSB-E 6,0	-	1,41	-	1,41	0,95	1,25	1,41	1,41	1,41	40,0	5,0
150	ZSSB-Multi-Modul 6,0	-	1,16	-	1,16	0,95	1,16	1,16	1,16	1,16	30,0	5,0
151	ZSSB-E-Multi-Modul 6,0	-	1,16	-	1,16	0,95	1,16	1,16	1,16	1,16	40,0	5,0
165	ZSSB / ZMDS	-	1,88	-	2,20	0,95	1,25	1,93	1,51	1,51	30,0	5,0
166	ZSSB / ZMDS-E	-	1,88	-	2,20	0,95	1,25	1,93	1,51	1,51	40,0	5,0

*) C24 EN 338 $\rho_{min} = 350\text{kg/m}^3$
OSB3 EN 300 $\rho_{min} = 550\text{kg/m}^3$
Particleboard / P5 EN 312 $\rho_{min} = 500\text{kg/m}^3$
Plywood EN 636 $\rho_{min} = 400\text{kg/m}^3$
For timber substructures thickness "t" also represents the minimum of effective embedment depth
(= penetration length of threaded part)

Zahn Flat Roof Fasteners

Characteristic Axial Load Resistance

Annex 180