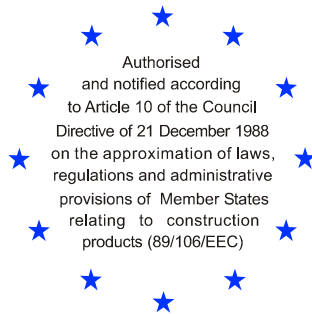




European Technical Approval ETA-08/0033

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

ZAHN Flachdachbefestigungselemente
ZAHN Flat Roof Fasteners

Zulassungsinhaber
Holder of approval

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

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Befestigungselemente für Dachabdichtungssysteme
Fasteners for flexible roof waterproofing systems

Geltungsdauer:
Validity: vom
from
bis
to

24 May 2013
23 February 2018

Herstellwerk
Manufacturing plant

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

Diese Zulassung umfasst
This Approval contains

127 Seiten einschließlich 121 Anhänge
127 pages including 121 annexes

Diese Zulassung ersetzt
This Approval replaces

ETA-08/0033 mit Geltungsdauer vom 23.02.2013 bis 23.02.2018
ETA-08/0033 with validity from 23.02.2013 to 23.02.2018

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by Article 2 of the law of 8 November 2011⁵;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "Mechanically fastened flexible roof waterproofing membranes", ETAG 006.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities L 40, 11 February 1989, p. 12
² Official Journal of the European Communities L 220, 30 August 1993, p. 1
³ Official Journal of the European Union L 284, 31 October 2003, p. 25
⁴ *Bundesgesetzblatt Teil I 1998*, p. 812
⁵ *Bundesgesetzblatt Teil I 2011*, p. 2178
⁶ Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the products and intended use

1.1 Definition of the construction products

The construction products are mechanical fasteners. The fasteners comprise a screw made of coated carbon steel or stainless steel and a washer with or without integrated sleeve or a steel bar in combination with sleeve with small washer. The washers without integrated sleeve are made of coated carbon steel or plastic (polyamide). The washers with integrated sleeve and the sleeves with small washer are made of plastic materials (polyamide). The sleeve of the plastic washers with integrated sleeve or sleeve with small washer, which are intended to be used for fastenings to concrete, aerated concrete, light weight concrete or thin plates of steel or aluminium and sandwich panels, is either an anchor sleeve or a combination with integrated anchor sleeve, which can also be designed as a cavity anchor. The washer with sleeve and the small washer can be composited from individual components beyond. The plastic washers are probably provided with additional sealing washers.

1.2 Intended use

The fasteners are intended to be used for the fastening of flexible roof waterproofing membranes according to ETAG 006. The possible substructures are steel decks, concrete, aerated concrete, light weight concrete or timber, thin plates of steel or aluminium and sandwich panels.

The provisions made in this European technical approval are based on an assumed working life of the fasteners of 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 a separate ETA according to ETAG 006 is necessary for the entire roof waterproofing system.

2 Characteristics of the products and methods of verification

2.1 Characteristics of the products

The fasteners shall correspond to the information given in Annexes 1 to 112.

The material properties, dimensions and tolerances not indicated in Annexes 1 to 112 shall correspond to the information laid down in the technical information⁷ to this European technical approval.

2.2 Safety in use (ER 4)

The characteristic values and mean values of the axial load resistance of the fasteners are given in Annexes 113 to 121. The values were determined by axial loading tests according to ETAG 006.

The fasteners are deemed to satisfy the requirements of ETAG 006 concerning unwinding. This was evaluated on the basis of the existing field experience of the manufacturer.

⁷ 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.

2.3 Aspects of durability

The durability requirements of ETAG 006 (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 ETAG 006 (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.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 98/143/EC of the European Commission⁸ system 2+ of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:

- (1) initial type-testing of the product;
- (2) factory production control;
- (3) testing of samples taken at the factory in accordance with a prescribed test plan.

(b) Tasks for the approved body:

- (4) certification of factory production control on the basis of:
 - initial inspection of factory and of factory production control;
 - continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial materials stated in the technical documentation of this European technical approval.

⁸ Official Journal of the European Communities L 42 of 14 February 1998

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.⁹

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of "Fasteners for flexible roof waterproofing membranes" in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on each packaging of fasteners. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European technical approval,
- the name of the product.

⁹

The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

4 Assumptions under which the fitness of the products for the intended use was favourably assessed

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Installation

The installation is carried out according to the manufacturer's instructions. The manufacturer hands over the assembly instructions to the assembler.

In order to use the fasteners for systems of mechanically fastened flexible roof waterproofing membranes a valid ETA according to ETAG 006 is issued for the entire roof waterproofing system. The ETA according to ETAG 006 covers the wind uplift resistance of the entire system as well as the product characteristics of the components of the system.

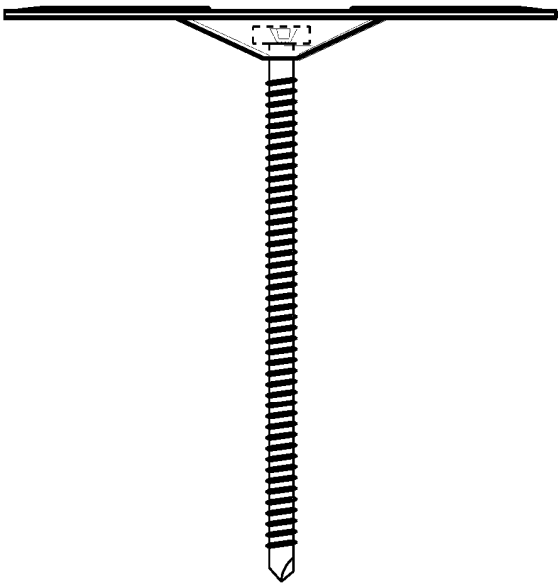
The conformity of the installed fastener with this ETA is attested by the executing company.

5 Indications to the manufacturer

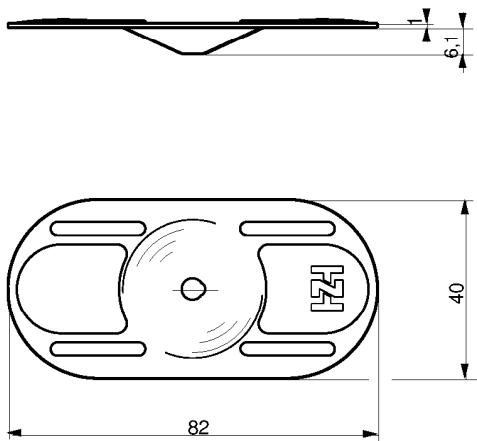
It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2 and 4 is given to those who are concerned. The information may be given by reproduction of the European technical approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

Uwe Bender
Head of Department

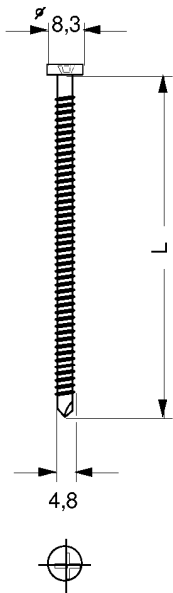
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Zahn ZLVT 0001



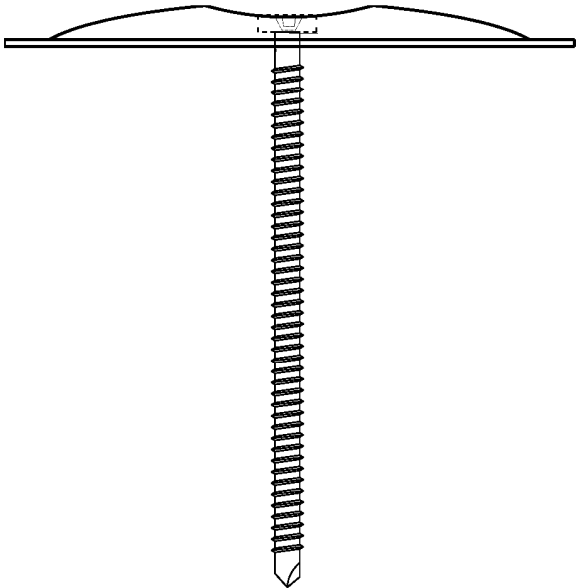
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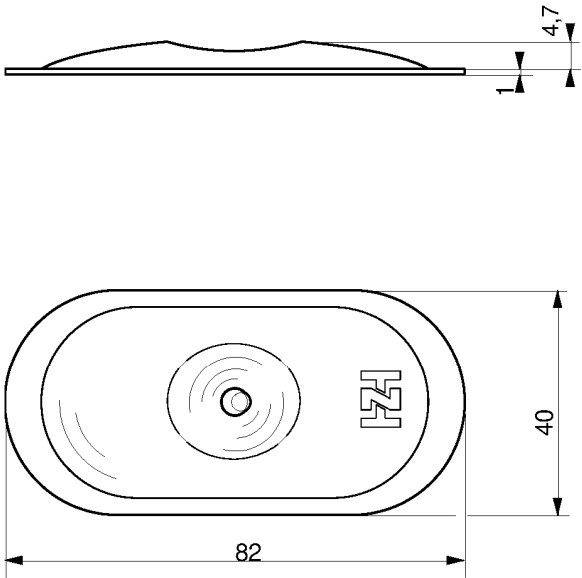
Zahn Flat Roof Fasteners

Combination 1
ZDBK® / ZLVT®0001

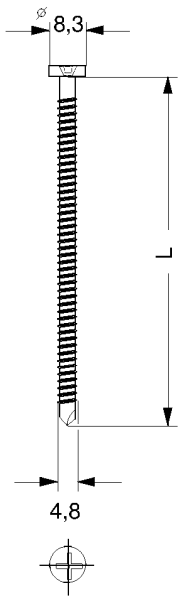
Annex 1



Zahn ZLVT 0005



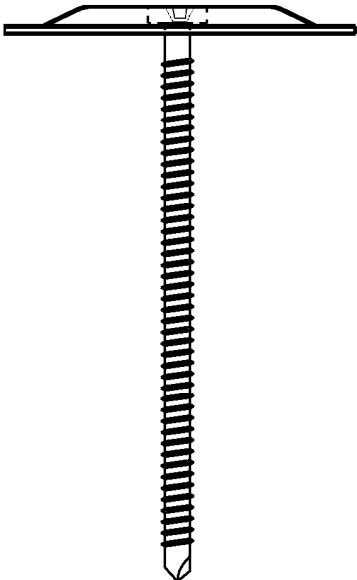
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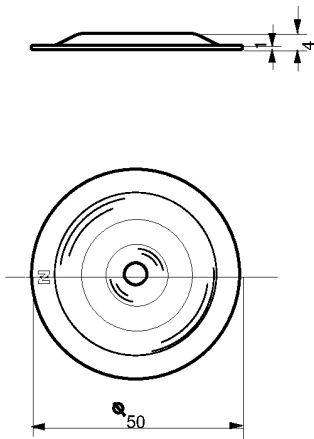
Zahn Flat Roof Fasteners

Combination 2
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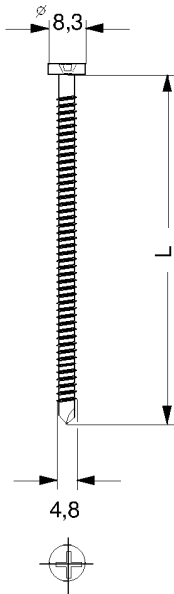
Annex 2



Zahn ZLVT 0015



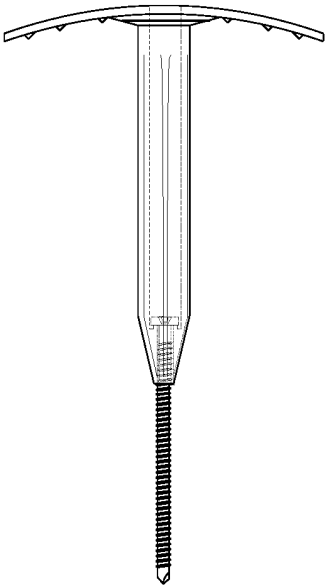
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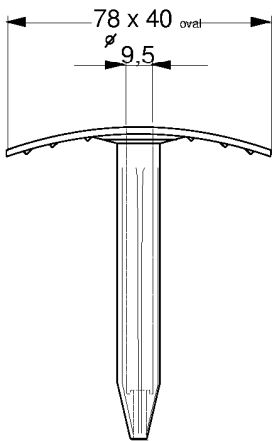
Zahn Flat Roof Fasteners

Combination 3
ZDBK® / ZLVT®0015

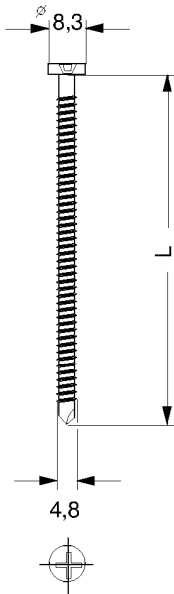
Annex 3



Zahn ZKSH oval



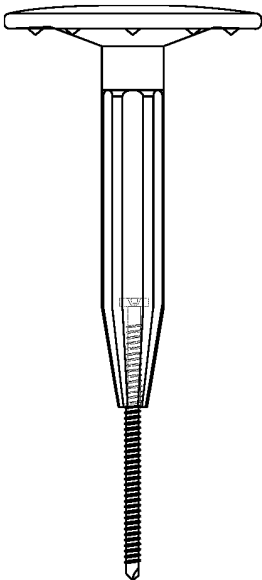
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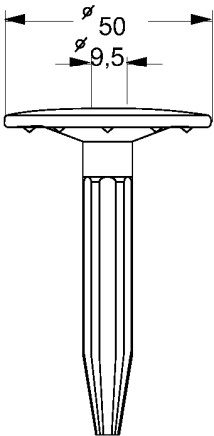
Zahn Flat Roof Fasteners

Combination 4
ZKSK[®] consisting of ZDBK[®] / ZKSH[®] oval

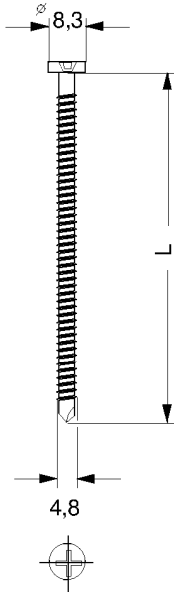
Annex 4



Zahn ZKSH round



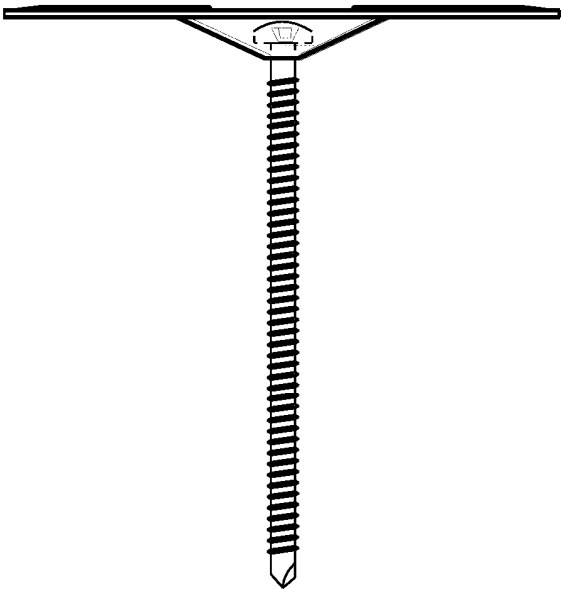
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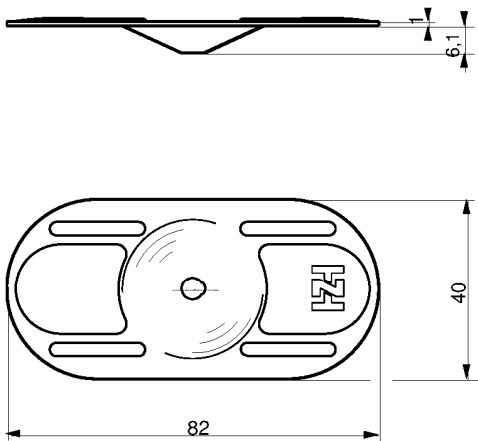
Zahn Flat Roof Fasteners

Combination 5
ZKSK®-R consisting of ZDBK® / ZKSH® round

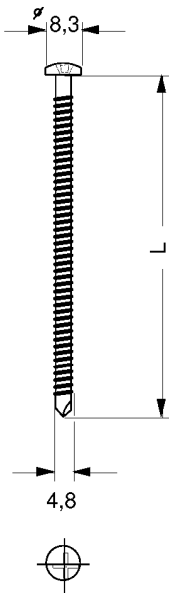
Annex 5



Zahn ZLVT 0001



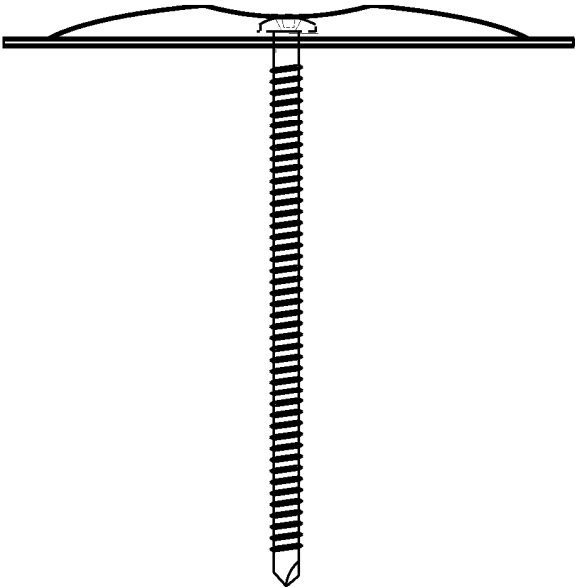
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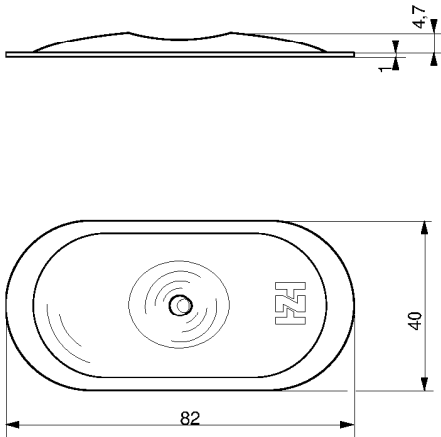
Zahn Flat Roof Fasteners

Combination 6
ZDBK®-E / ZLVT®0001

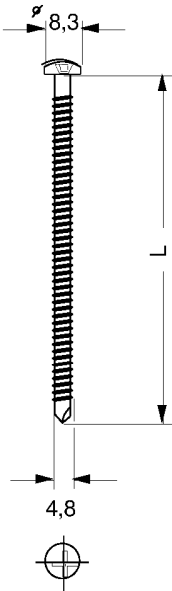
Annex 6



Zahn ZLVT 0005



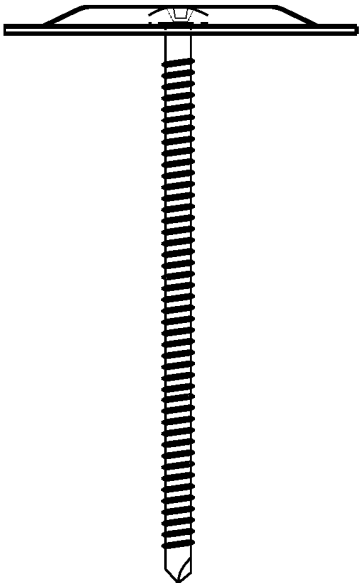
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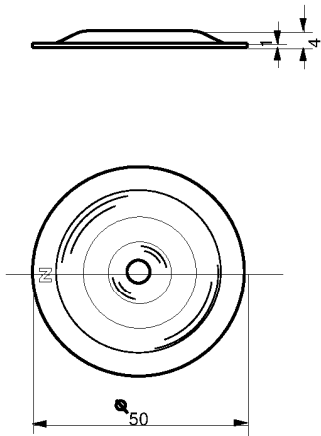
Zahn Flat Roof Fasteners

Combination 7
ZDBK®-E / ZLVT®0005

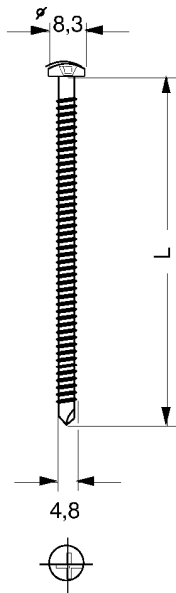
Annex 7



Zahn ZLVT 0015



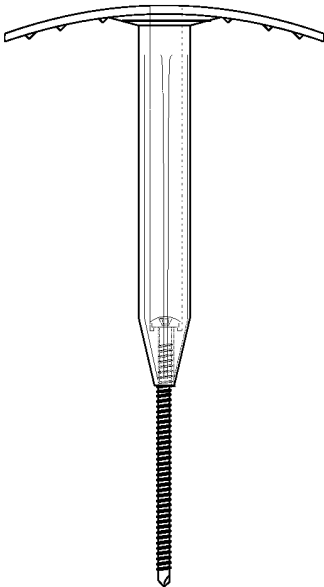
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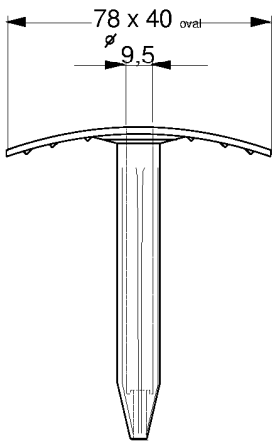
Zahn Flat Roof Fasteners

Combination 8
ZDBK®-E / ZLVT®0015

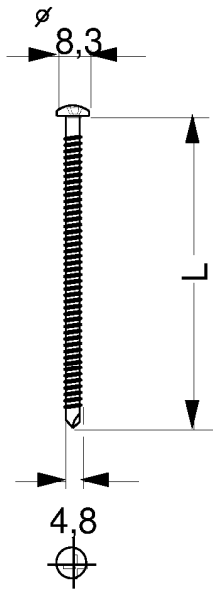
Annex 8



Zahn ZKSH oval



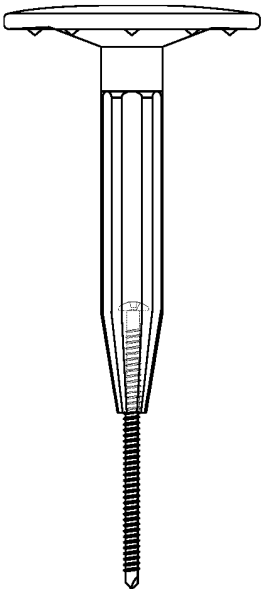
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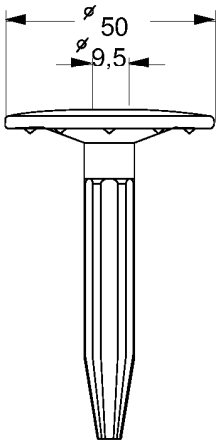
Zahn Flat Roof Fasteners

Combination 9
ZKSK®-E consisting of ZDBK®-E / ZKSH® oval

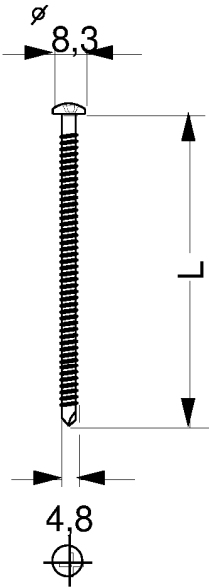
Annex 9



Zahn ZKSH round



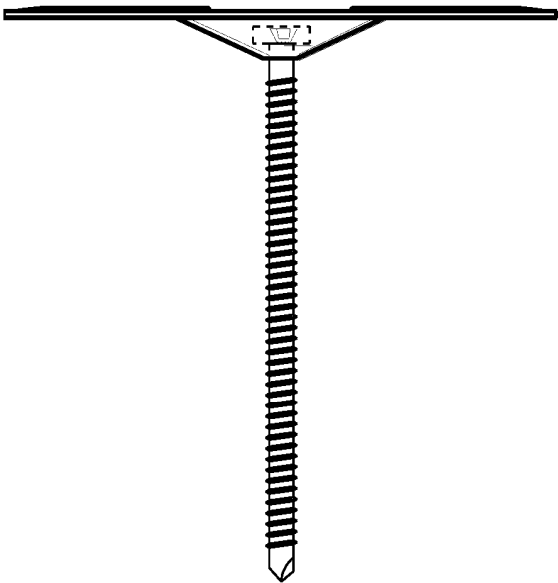
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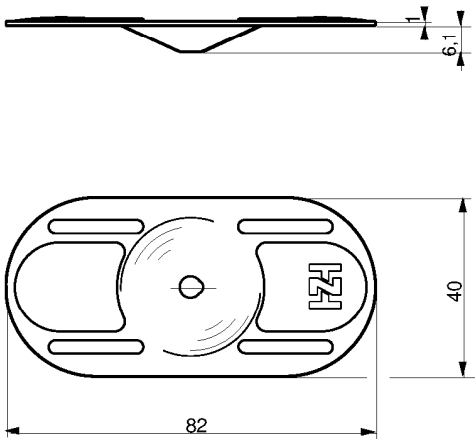
Zahn Flat Roof Fasteners

Combination 10
ZKSK®-E/R consisting of ZDBK®-E / ZKSH® round

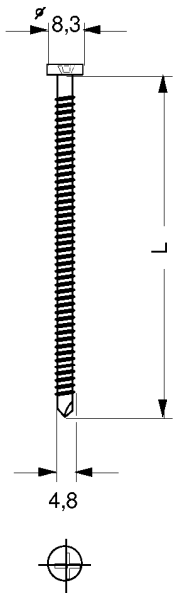
Annex 10



Zahn ZLVT 0001



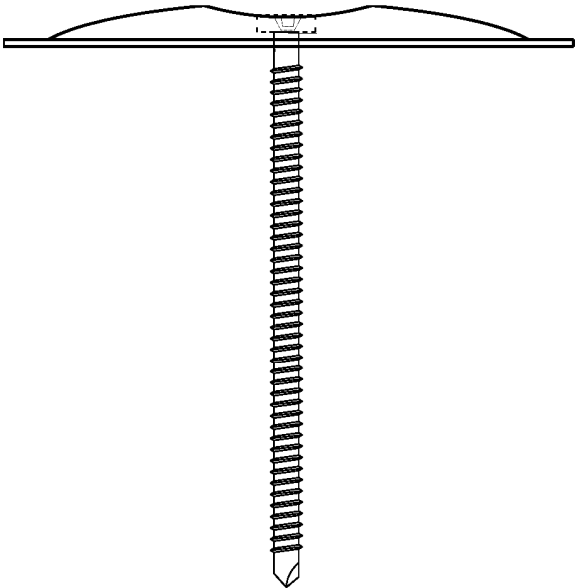
Zahn ZDBK-F1 4,8 x L



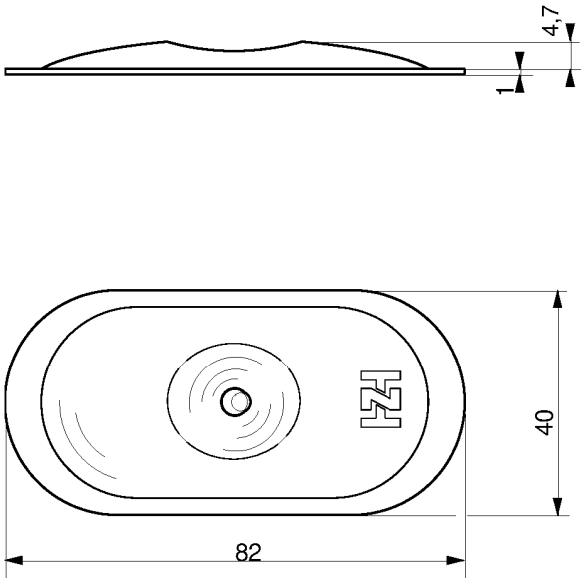
Zahn Flat Roof Fasteners

Combination 11
ZDBK®-F1 / ZLVT®0001

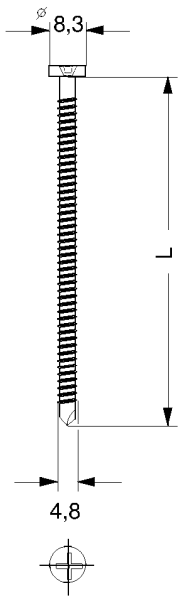
Annex 11



Zahn ZLVT 0005



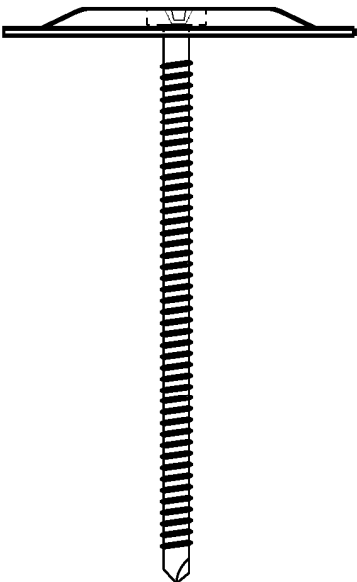
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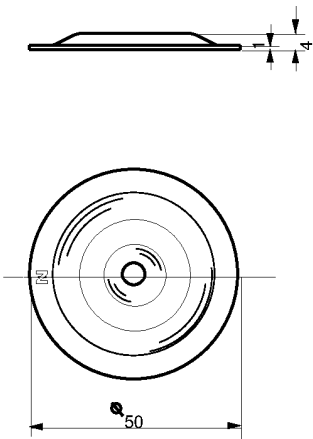
Zahn Flat Roof Fasteners

Combination 12
ZDBK®-F1 / ZLVT®0005

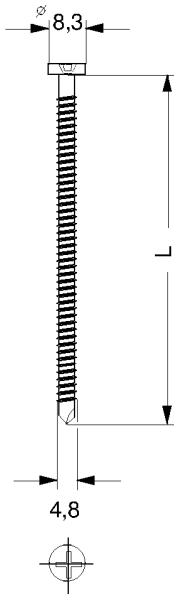
Annex 12



Zahn ZLVT 0015



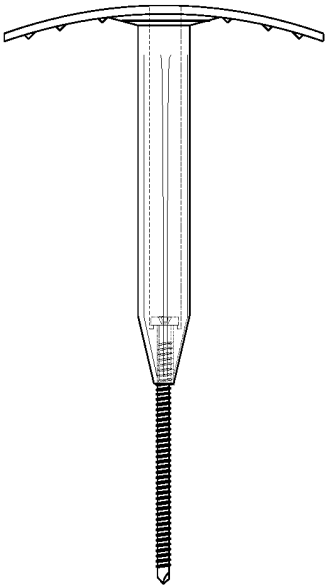
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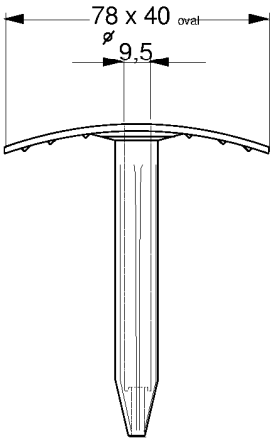
Zahn Flat Roof Fasteners

Combination 13
ZDBK®-F1 / ZLVT®0015

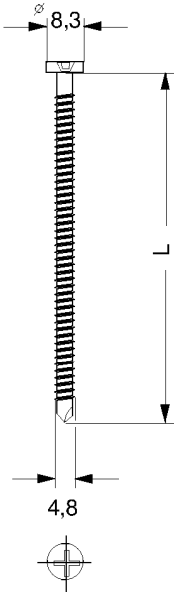
Annex 13



Zahn ZKSH oval



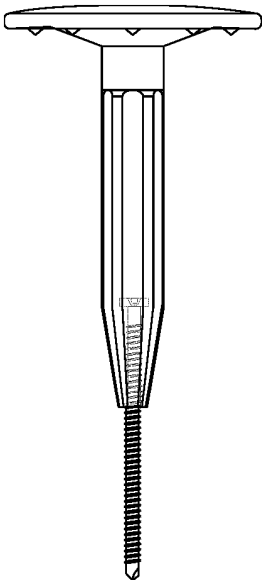
Zahn ZDBK-F1 4,8 x L



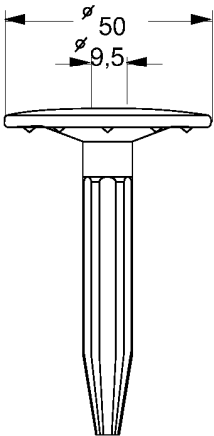
Zahn Flat Roof Fasteners

Combination 14
ZKSK®-F1 consisting of ZDBK®-F1 / ZKSH® oval

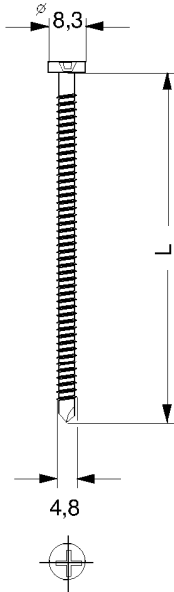
Annex 14



Zahn ZKSH round



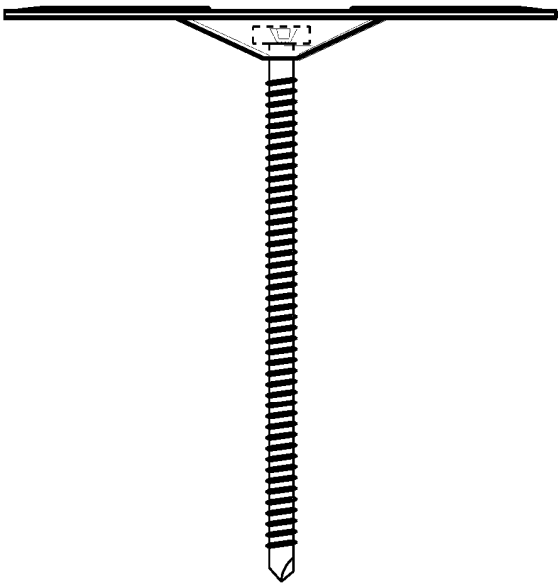
Zahn ZDBK-F1 4,8 x L



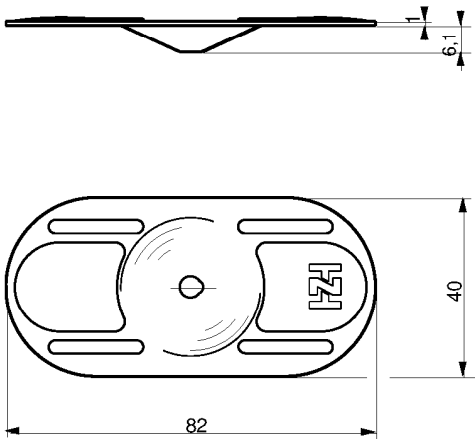
Zahn Flat Roof Fasteners

Combination 15
ZKSK[®]-R-F1 consisting of ZDBK[®]-F1 / ZKSH[®] round

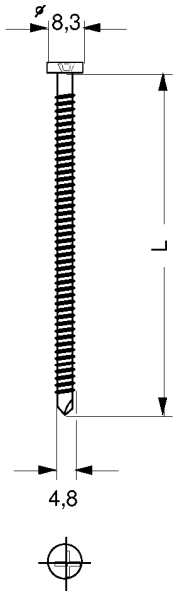
Annex 15



Zahn ZLVT 0001



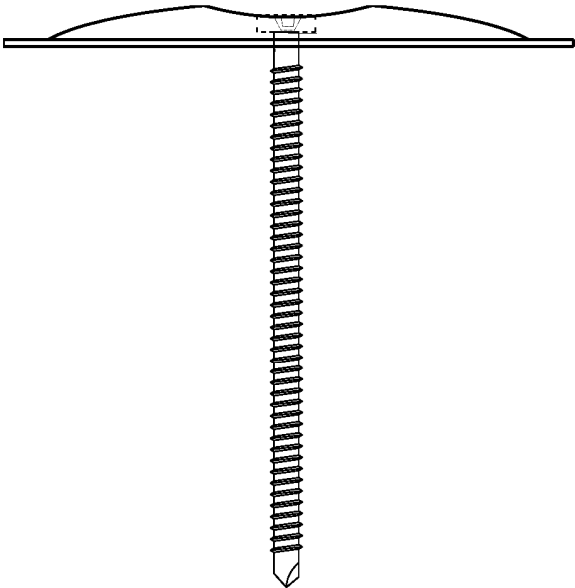
Zahn ZDBK-F2 4,8 x L



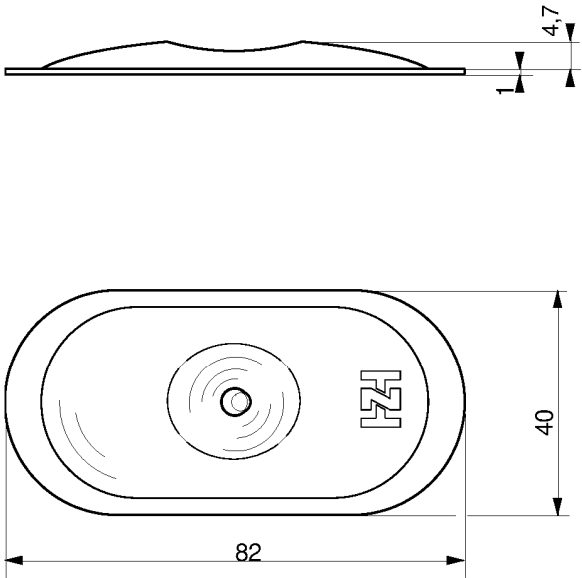
Zahn Flat Roof Fasteners

Combination 16
ZDBK®-F2 / ZLVT®0001

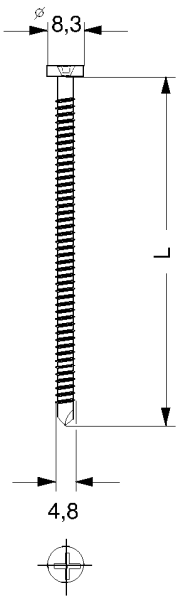
Annex 16



Zahn ZLVT 0005



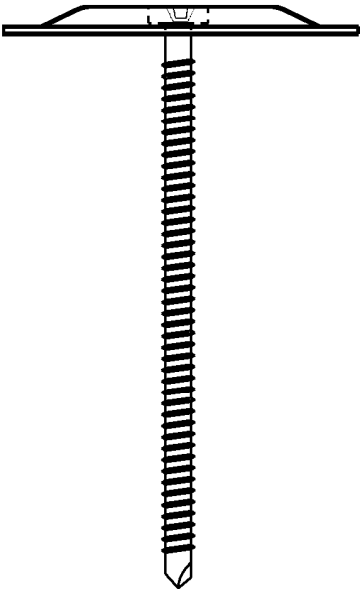
Zahn ZDBK-F2 4,8 x L



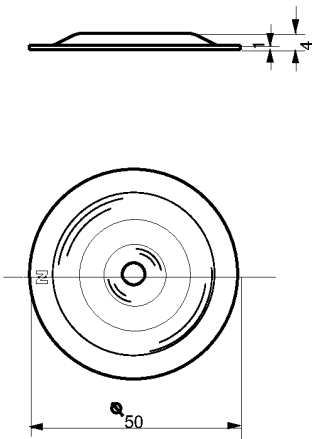
Zahn Flat Roof Fasteners

Combination 17
ZDBK®-F2 / ZLVT®0005

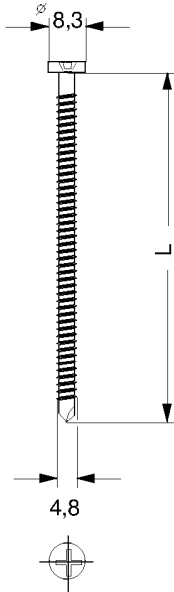
Annex 17



Zahn ZLVT 0015



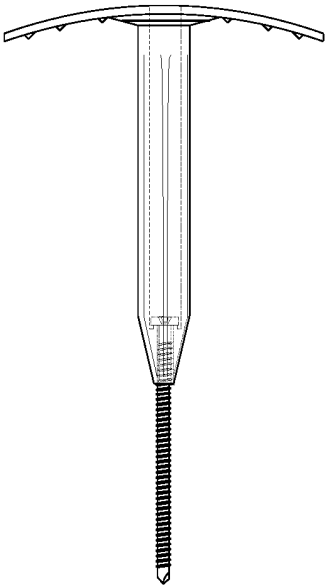
Zahn ZDBK-F2 4,8 x L



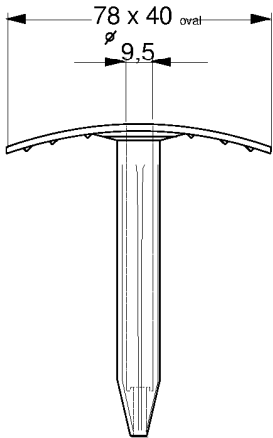
Zahn Flat Roof Fasteners

Combination 18
ZDBK®-F2/ ZLVT®0015

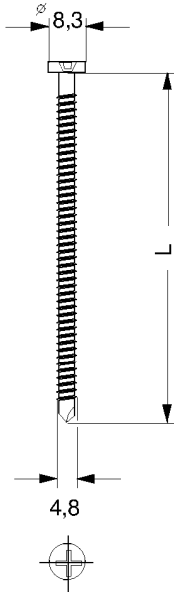
Annex 18



Zahn ZKSH oval



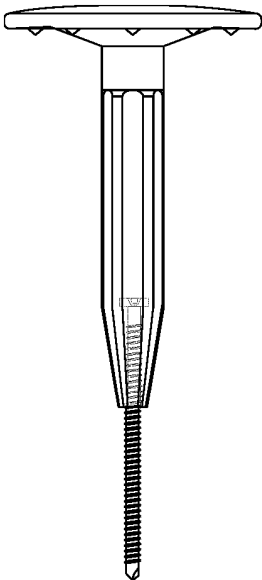
Zahn ZDBK-F2 4,8 x L



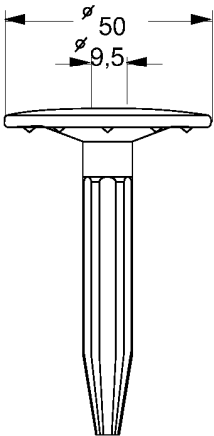
Zahn Flat Roof Fasteners

Combination 19
ZKSK®-F2 consisting of ZDBK®-F2 / ZKSH® oval

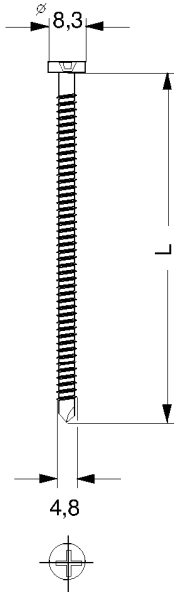
Annex 19



Zahn ZKSH round



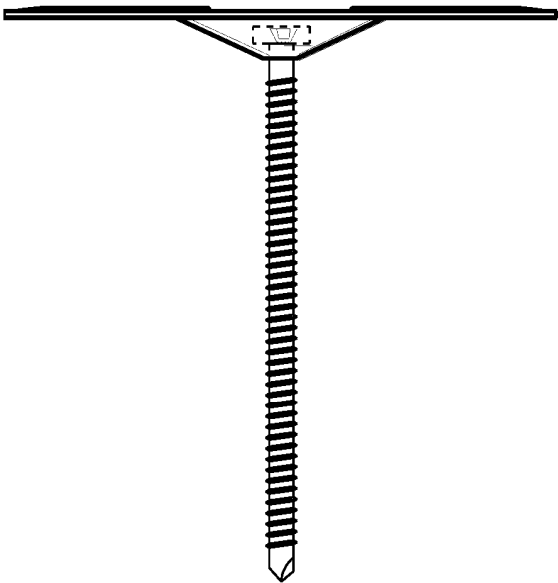
Zahn ZDBK-F2 4,8 x L



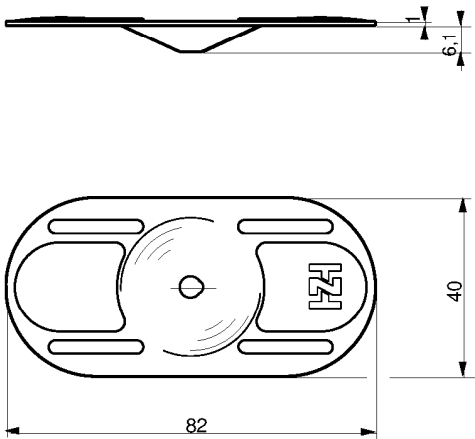
Zahn Flat Roof Fasteners

Combination 20
ZKSK®-R-F2 consisting of ZDBK®-F2 / ZKSH® round

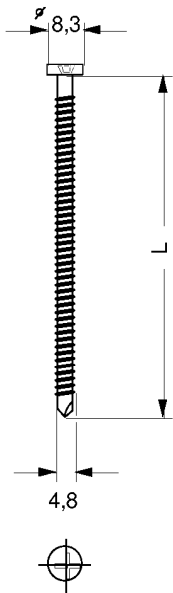
Annex 20



Zahn ZLVT 0001



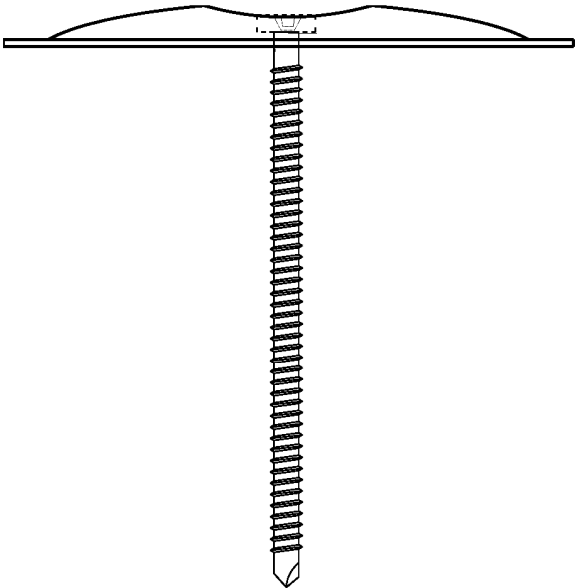
Zahn ZDBK-F3 4,8 x L



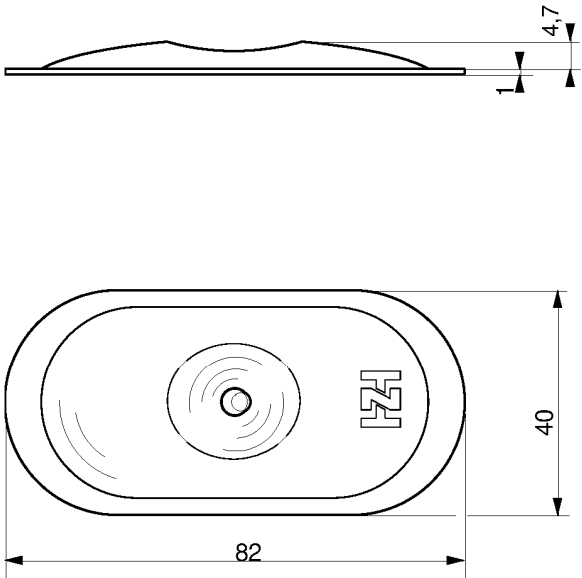
Zahn Flat Roof Fasteners

Combination 21
ZDBK®-F3 / ZLVT®0001

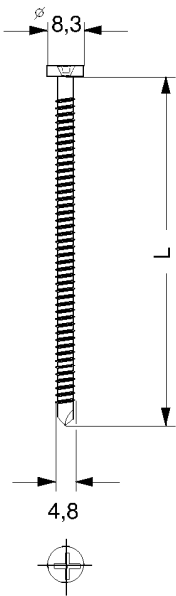
Annex 21



Zahn ZLVT 0005



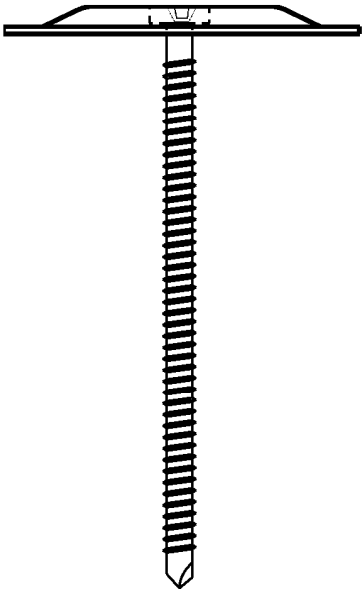
Zahn ZDBK-F3 4,8 x L



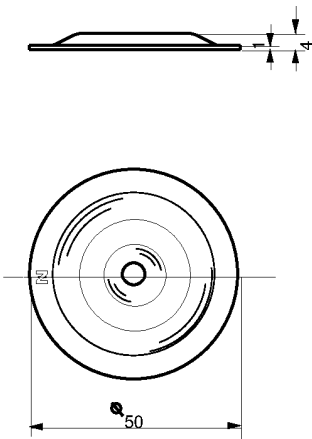
Zahn Flat Roof Fasteners

Combination 22
ZDBK®-F3 / ZLVT®0005

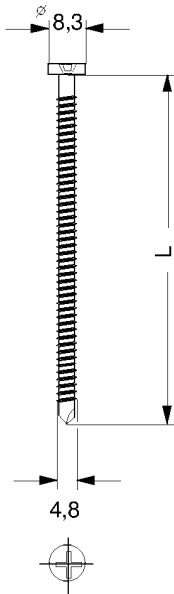
Annex 22



Zahn ZLVT 0015



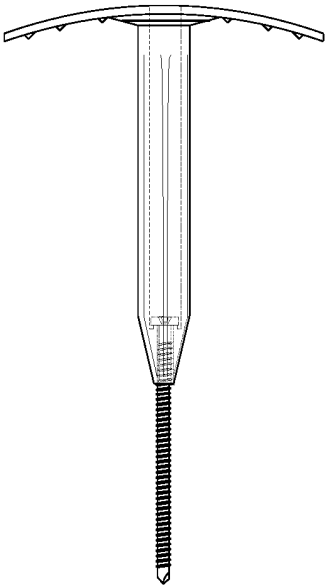
Zahn ZDBK-F3 4,8 x L



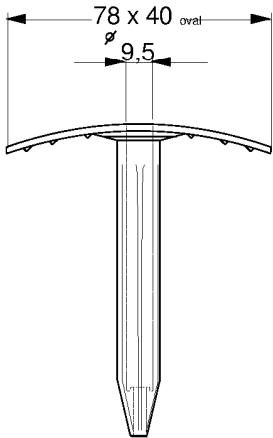
Zahn Flat Roof Fasteners

Combination 23
ZDBK®-F3 / ZLVT®0015

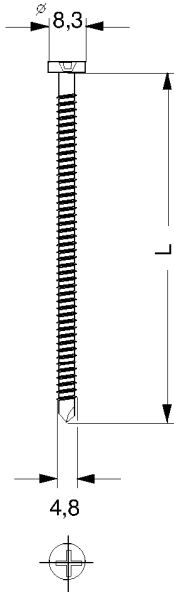
Annex 23



Zahn ZKSH oval



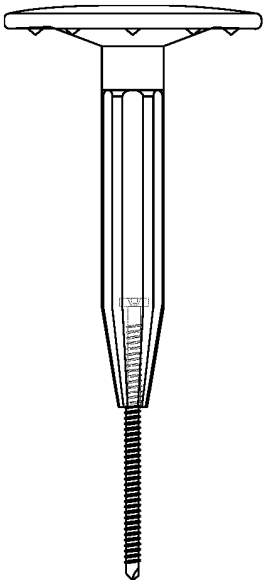
Zahn ZDBK-F3 4,8 x L



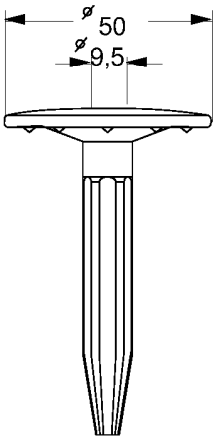
Zahn Flat Roof Fasteners

Combination 24
ZKSK®-F3 consisting ZDBK®-F3 / ZKSH® oval

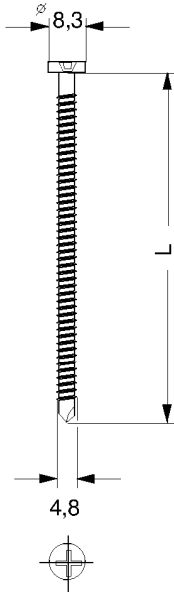
Annex 24



Zahn ZKSH round



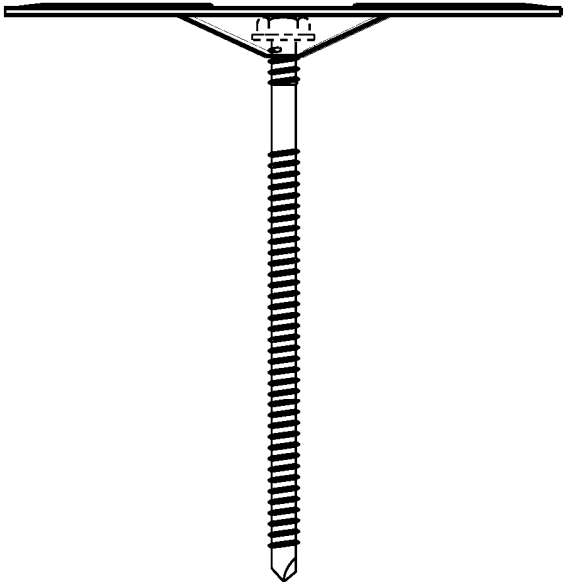
Zahn ZDBK-F3 4,8 x L



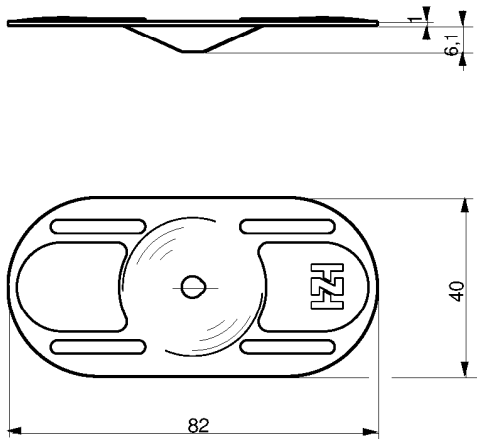
Zahn Flat Roof Fasteners

Combination 25
ZKSK®-R-F3 consisting of ZDBK®-F3 / ZKSH® round

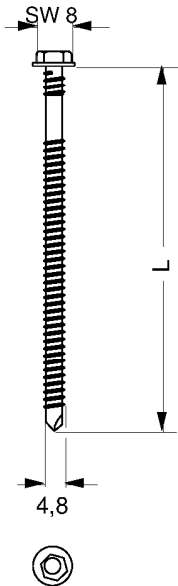
Annex 25



Zahn ZLVT 0001



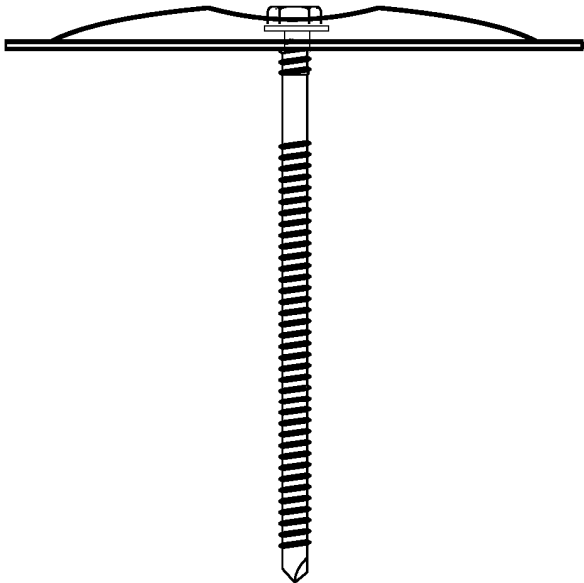
Zahn ZDBS 4,8 x L



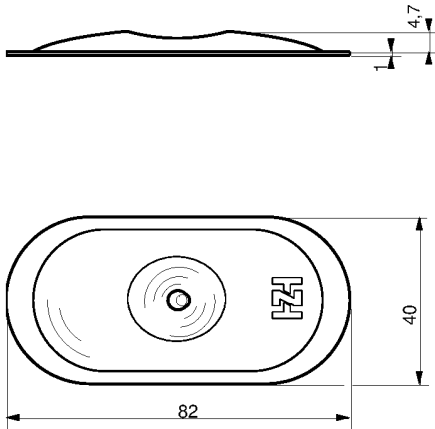
Zahn Flat Roof Fasteners

Combination 26
ZDBS® / ZLVT®0001

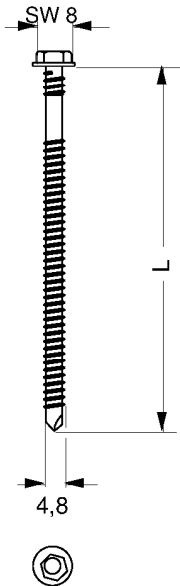
Annex 26



Zahn ZLVT 0005



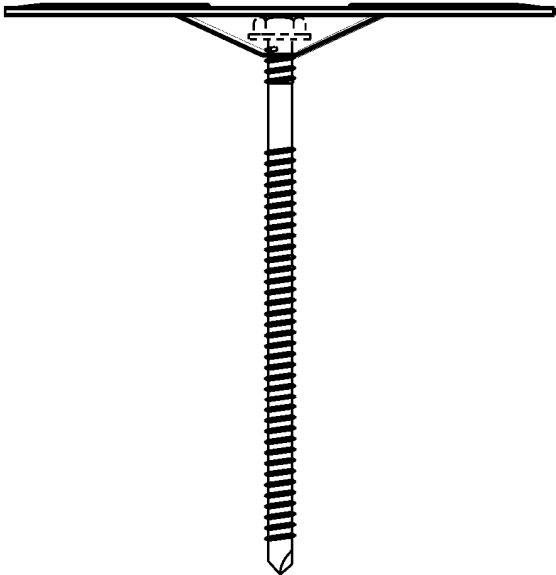
Zahn ZDBS 4,8 x L



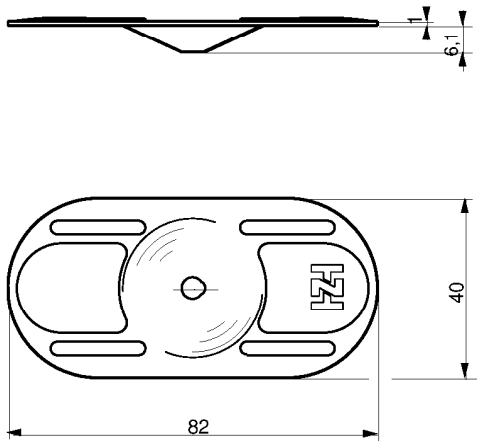
Zahn Flat Roof Fasteners

Combination 27
ZDBS® / ZLVT®0005

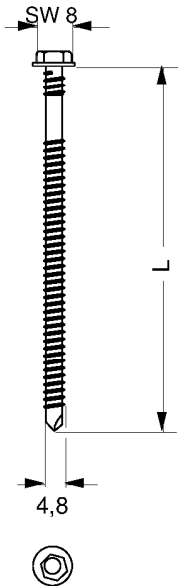
Annex 27



Zahn ZLVT 0012



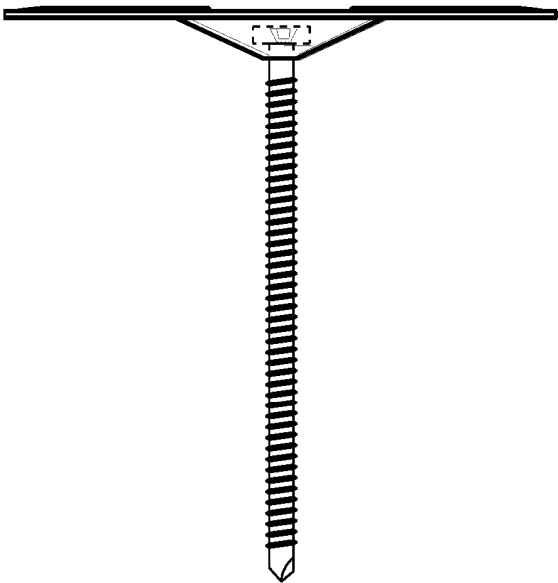
Zahn ZDBS 4,8 x L



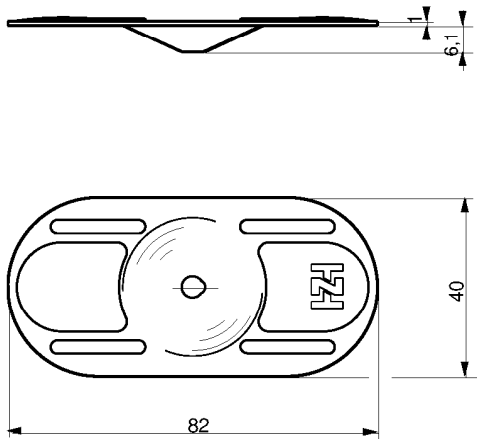
Zahn Flat Roof Fasteners

Combination 28
ZDBS® / ZLVT®0012

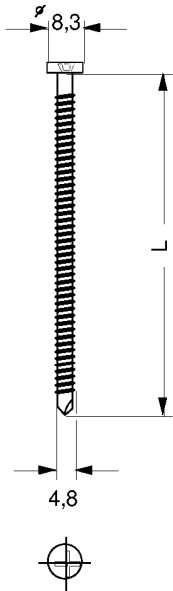
Annex 28



Zahn ZLVT 0001



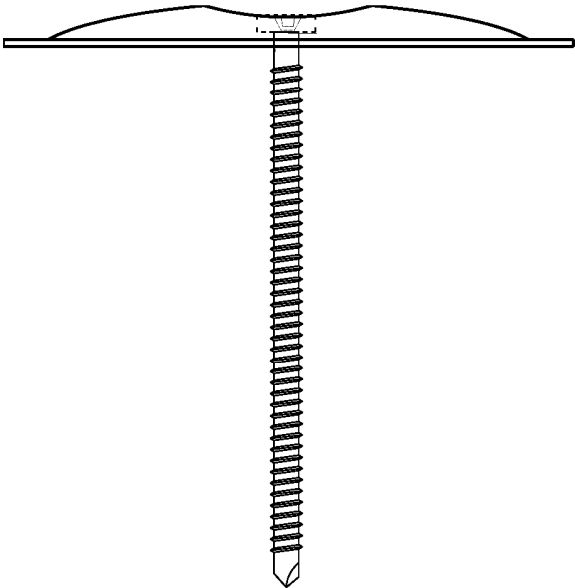
Zahn ZDBK-VB 4,8 x L



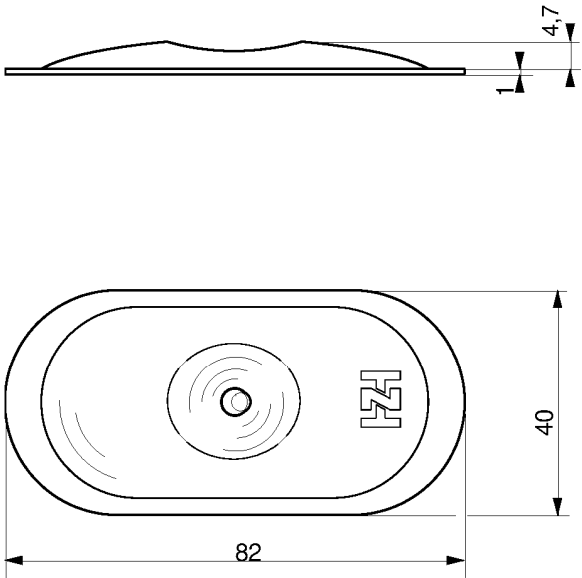
Zahn Flat Roof Fasteners

Combination 29
ZDBK®-VB / ZLVT®0001

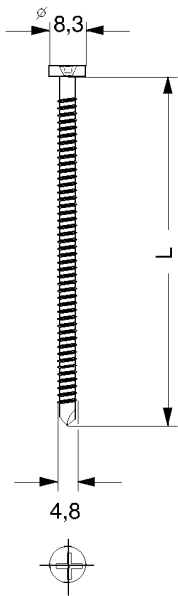
Annex 29



Zahn ZLVT 0005



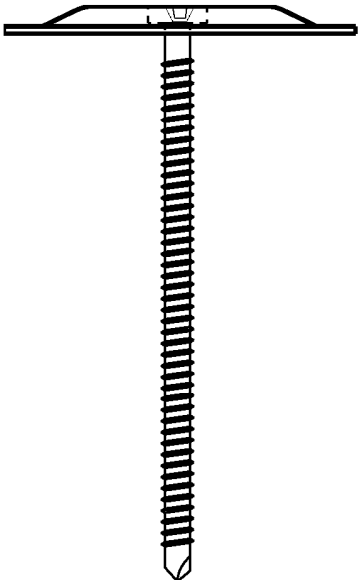
Zahn ZDBK-VB 4,8 x L



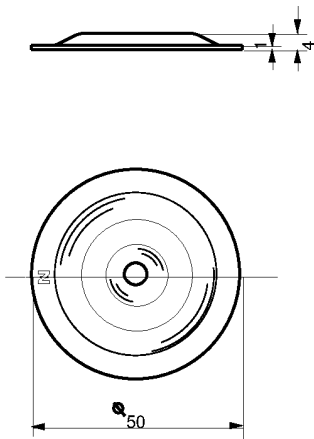
Zahn Flat Roof Fasteners

Combination 30
ZDBK®-VB / ZLVT®0005

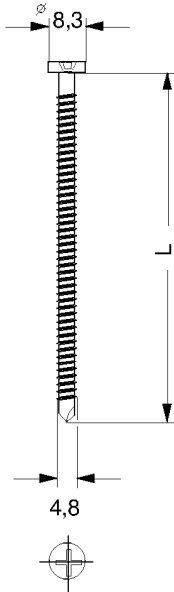
Annex 30



Zahn ZLVT 0015



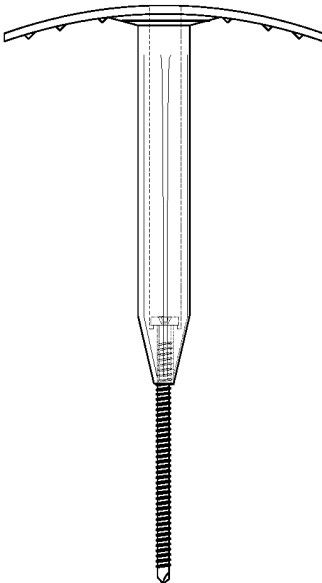
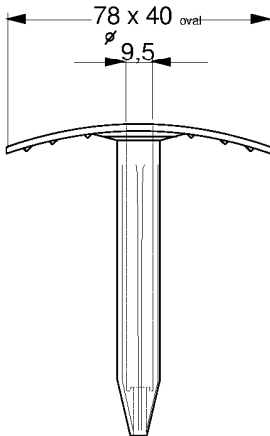
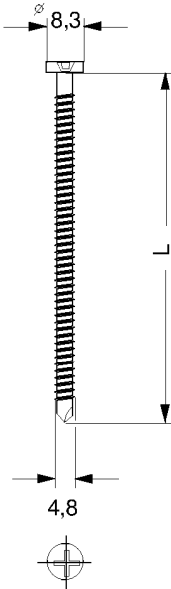
Zahn ZDBK-VB 4,8 x L



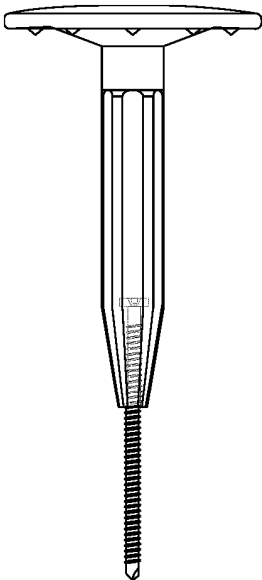
Zahn Flat Roof Fasteners

Combination 31
ZDBK®-VB / ZLVT®0015

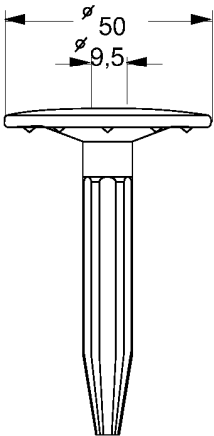
Annex 31

		
Zahn ZKSH oval 	Zahn ZDBK-VB 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 32
Combination 32 ZKSK®-VB consisting of ZDBK®-VB / ZKSH® oval		

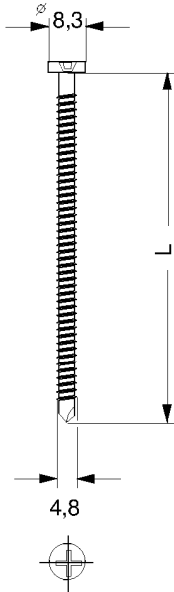
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH round



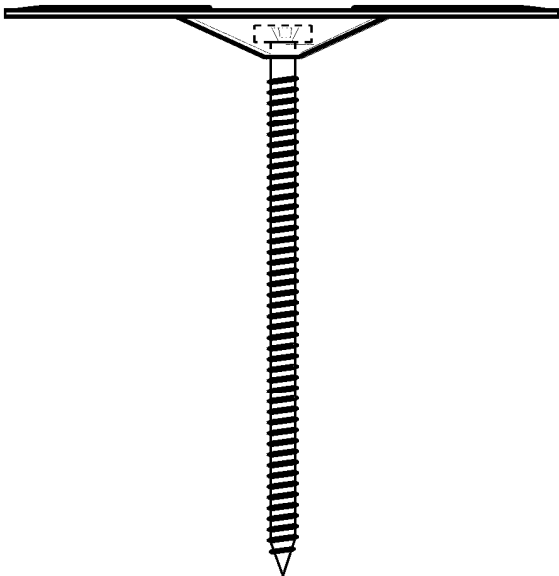
Zahn ZDBK-VB 4,8 x L



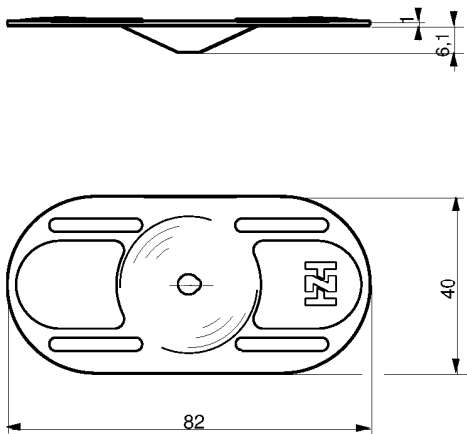
Zahn Flat Roof Fasteners

Combination 33
ZKSK®-VB-R consisting of ZDBK®-VB / ZKSH® round

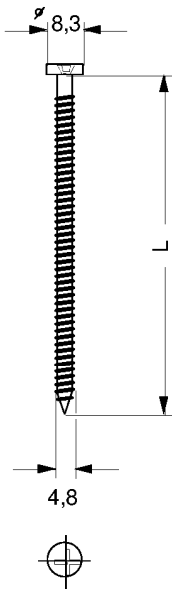
Annex 33



Zahn ZLVT 0001



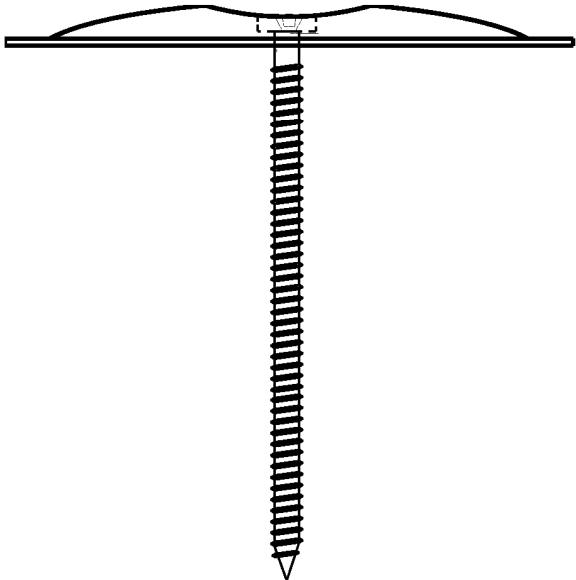
Zahn ZHBK 4,8 x L



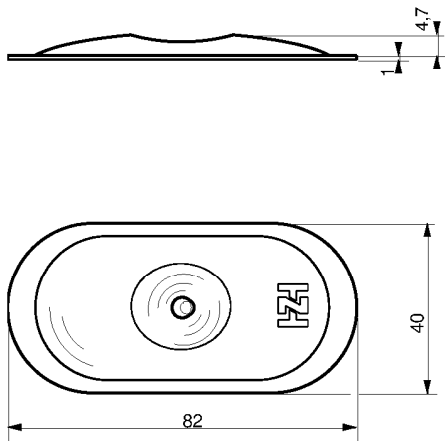
Zahn Flat Roof Fasteners

Combination 34
ZHBK® / ZLVT®0001

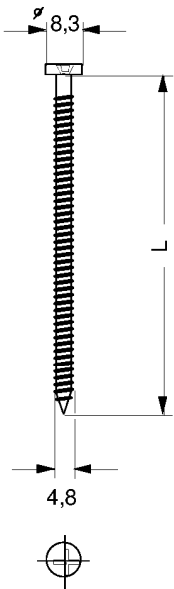
Annex 34



Zahn ZLVT 0005



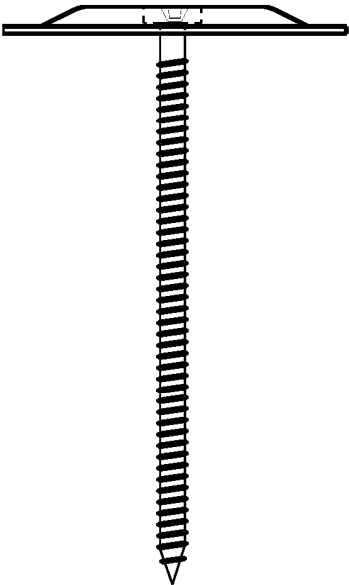
Zahn ZHBK 4,8 x L



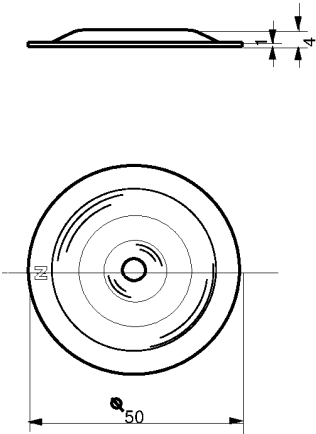
Zahn Flat Roof Fasteners

Combination 35
ZHBK® / ZLVT®0005

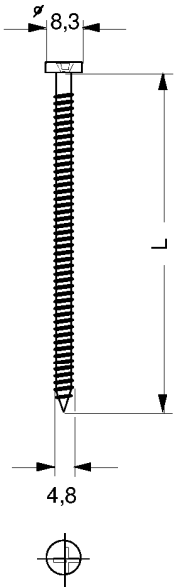
Annex 35



Zahn ZLVT 0015



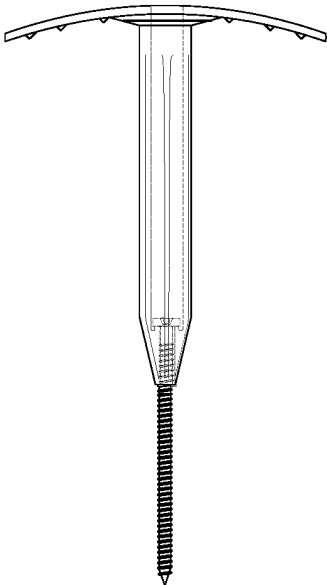
Zahn ZHBK 4,8 x L



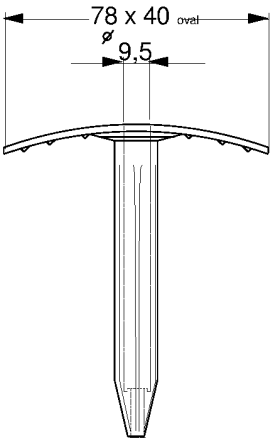
Zahn Flat Roof Fasteners

Combination 36
ZHBK® / ZLVT®0015

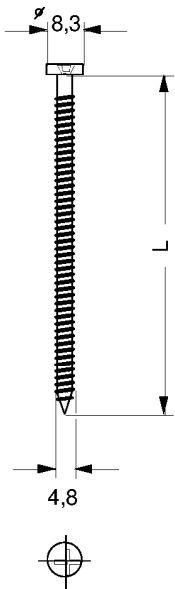
Annex 36



Zahn ZKSH oval



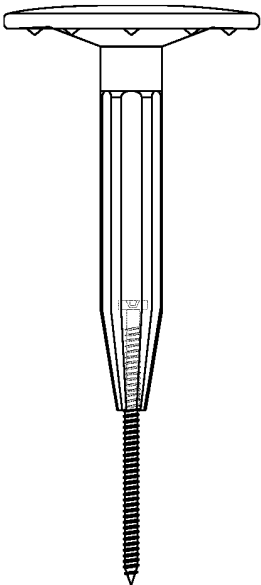
Zahn ZHBK 4,8 x L



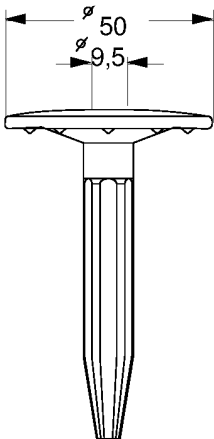
Zahn Flat Roof Fasteners

Combination 37
ZHSK[®] consisting of ZHBK[®] / ZKSH[®] oval

Annex 37



Zahn ZKSH round



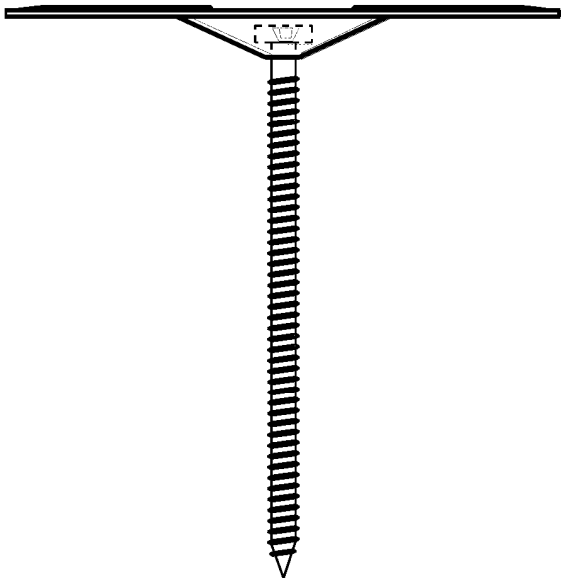
Zahn ZHBK 4,8 x L



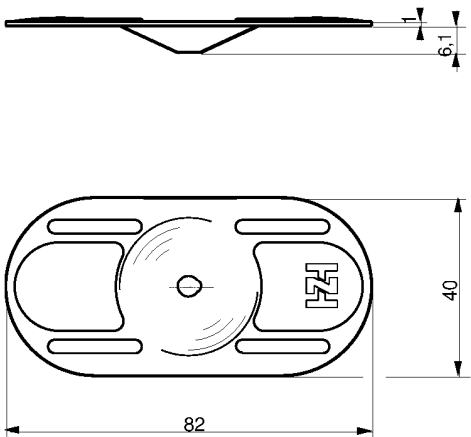
Zahn Flat Roof Fasteners

Combination 38
ZHSK®-R consisting of ZHBK® / ZKSH® round

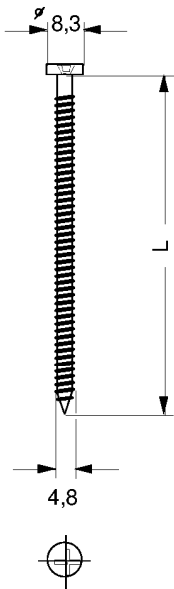
Annex 38



Zahn ZLVT 0001



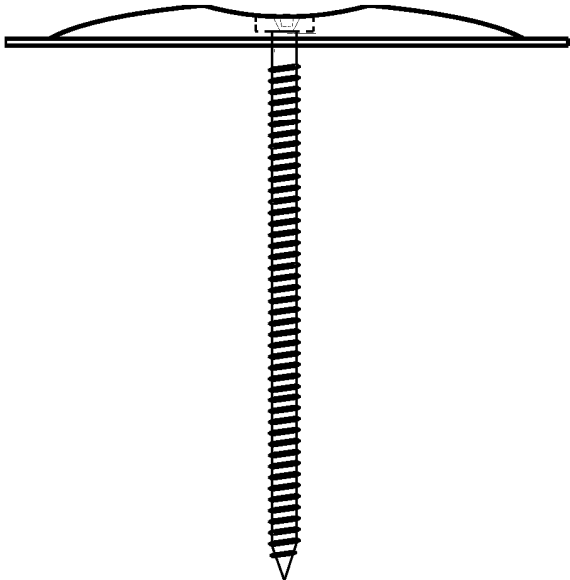
Zahn ZHBK-E 4,8 x L



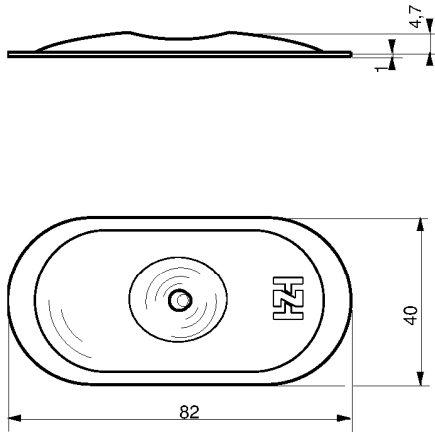
Zahn Flat Roof Fasteners

Combination 39
ZHBK®-E / ZLVT® 0001

Annex 39



Zahn ZLVT 0005



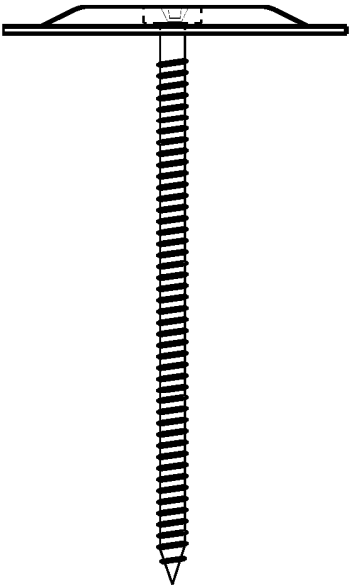
Zahn ZHBK-E 4,8 x L



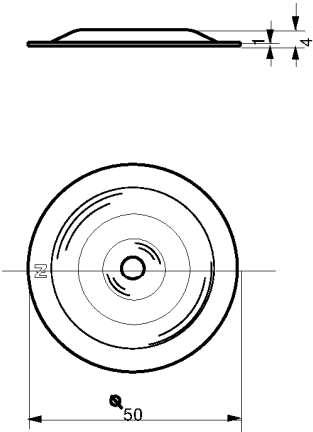
Zahn Flat Roof Fasteners

Combination 40
ZHBK®-E / ZLVT® 0005

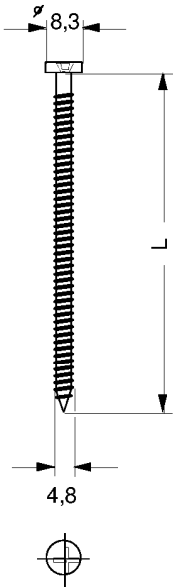
Annex 40



Zahn ZLVT 0015



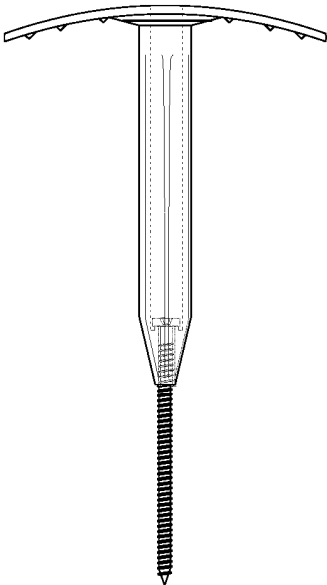
Zahn ZHBK-E 4,8 x L



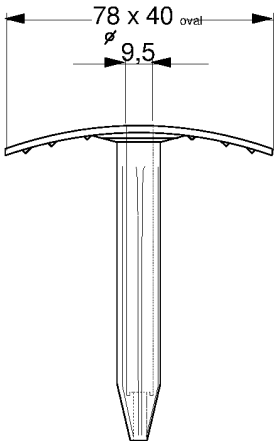
Zahn Flat Roof Fasteners

Combination 41
ZHBK®-E / ZLVT® 0015

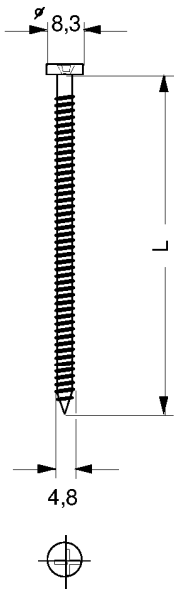
Annex 41



Zahn ZKSH oval



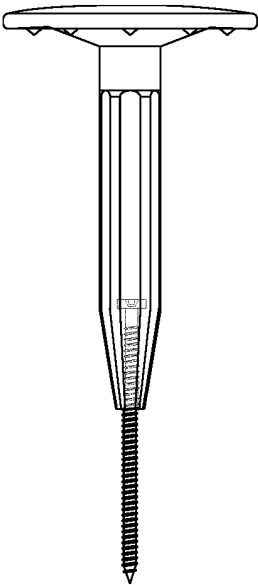
Zahn ZHBK-E 4,8 x L



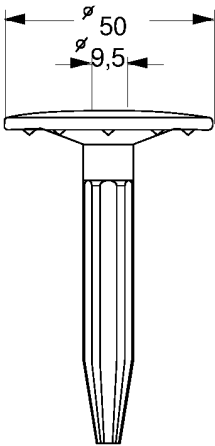
Zahn Flat Roof Fasteners

Combination 42
ZHSK®-E consisting of ZHBK®-E / ZKSH® oval

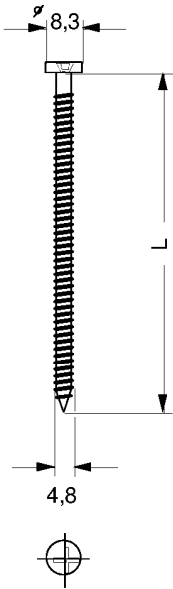
Annex 42



Zahn ZKSH round



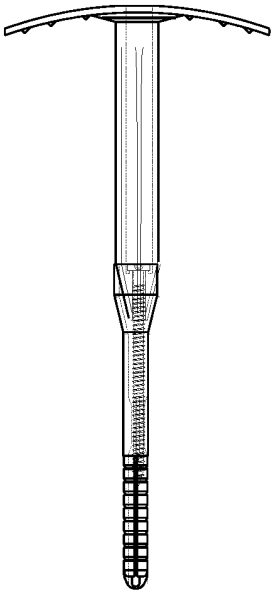
Zahn ZHBK-E 4,8 x L



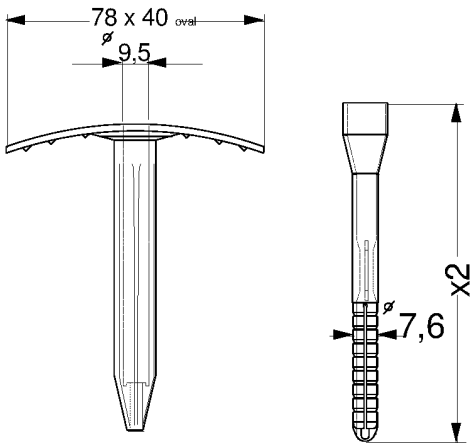
Zahn Flat Roof Fasteners

Combination 43
ZHBK®-E-R consisting of ZHBK®-E / ZKSH® round

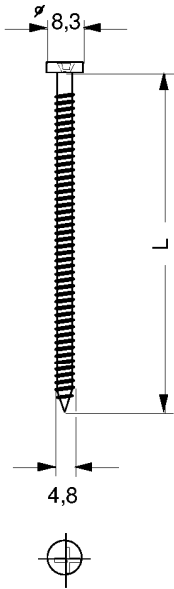
Annex 43



Zahn ZKSH oval with dowel extension



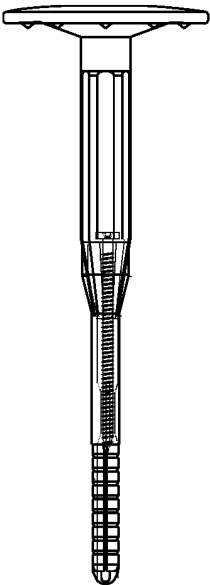
Zahn ZDBK_{dowel} 4,8 x L



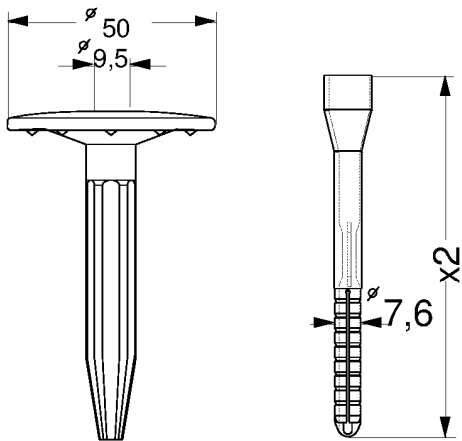
Zahn Flat Roof Fasteners

Combination 44
ZSDK[®] consisting of ZDBK[®]_{dowel} / ZKSH[®] oval with dowel extension

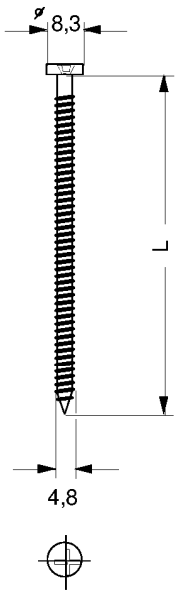
Annex 44



Zahn ZKSH round with dowel extension



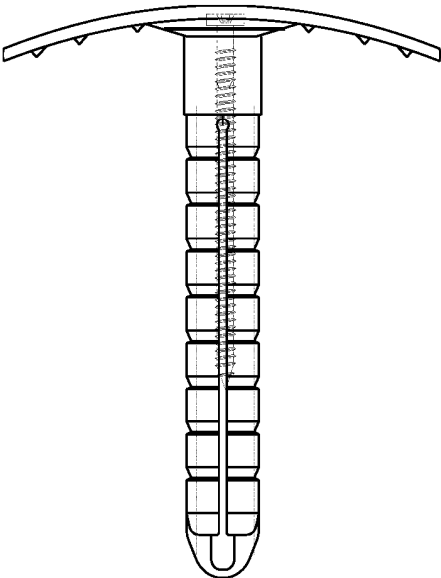
Zahn ZDBK_{dowel} 4,8 x L



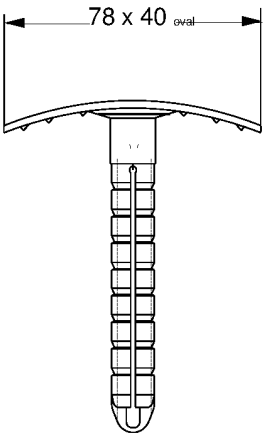
Zahn Flat Roof Fasteners

Combination 45
ZSDK[®]-R consisting of ZDBK[®]_{dowel} / ZKSH[®] round mit dowel extension

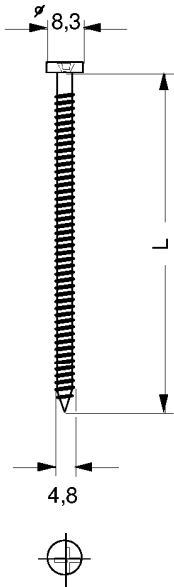
Annex 45



Zahn ZTSD oval



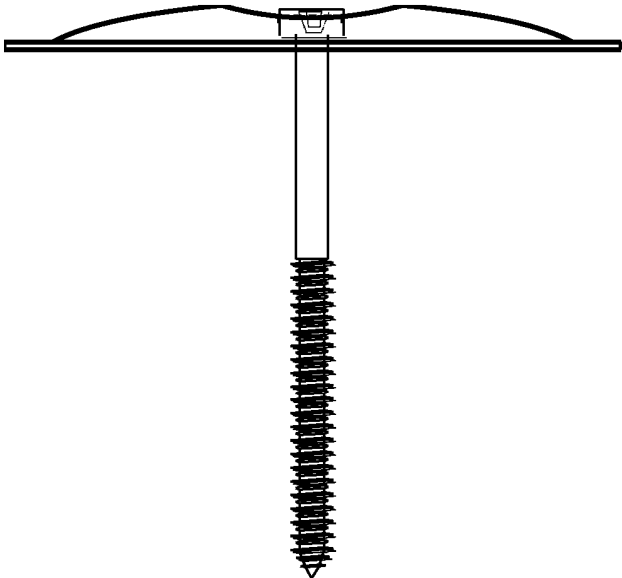
Zahn ZDBK_{dowel} 4,8 x L



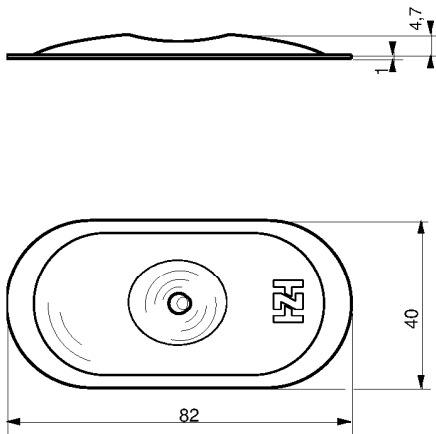
Zahn Flat Roof Fasteners

Combination 46
ZTSD[®] consisting of ZDBK[®]_{dowel} / ZTSD[®] oval

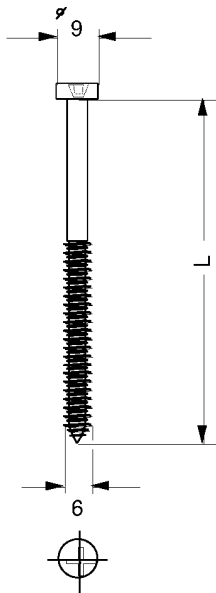
Annex 46



Zahn ZLVT 0008



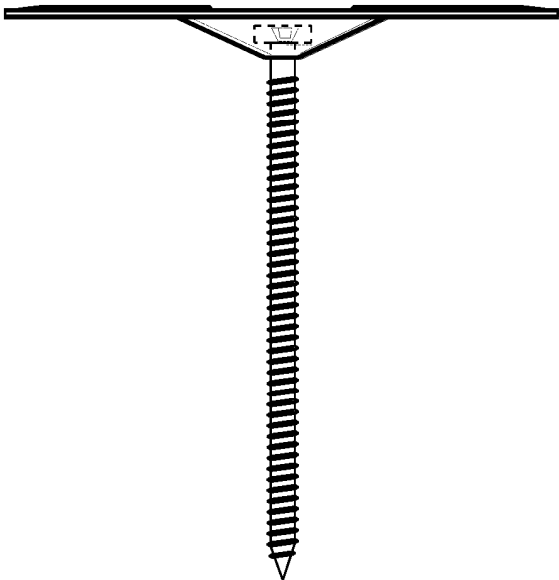
Zahn ZGBK-E 6,0 x L



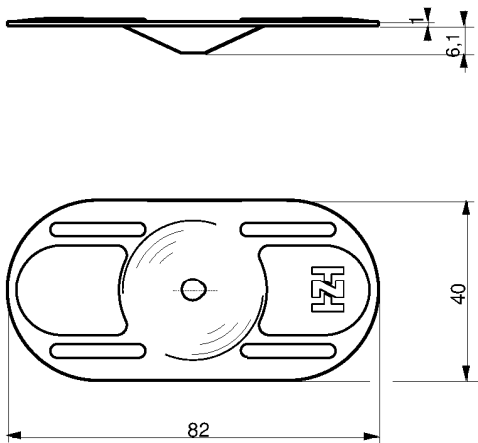
Zahn Flat Roof Fasteners

Combination 47
ZGBK®-E / ZLVT® 0008

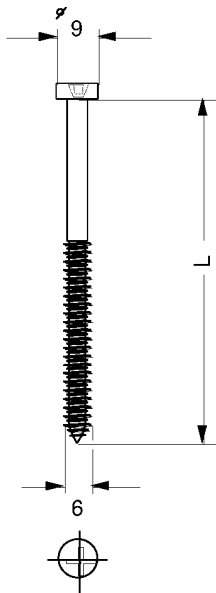
Annex 47



Zahn ZLVT 0012



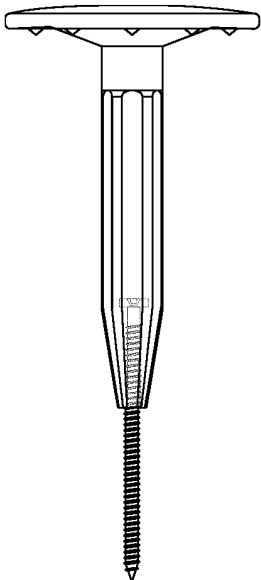
Zahn ZGBK-E 6,0 x L



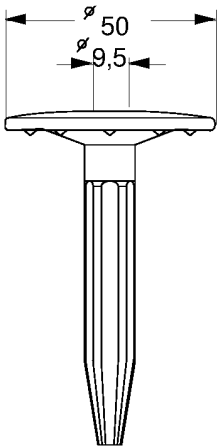
Zahn Flat Roof Fasteners

Combination 48
ZGBK®-E / ZLVT® 0012

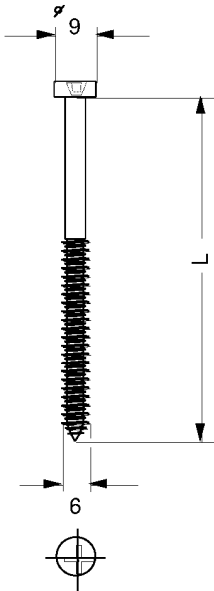
Annex 48



Zahn ZKSH gray / round



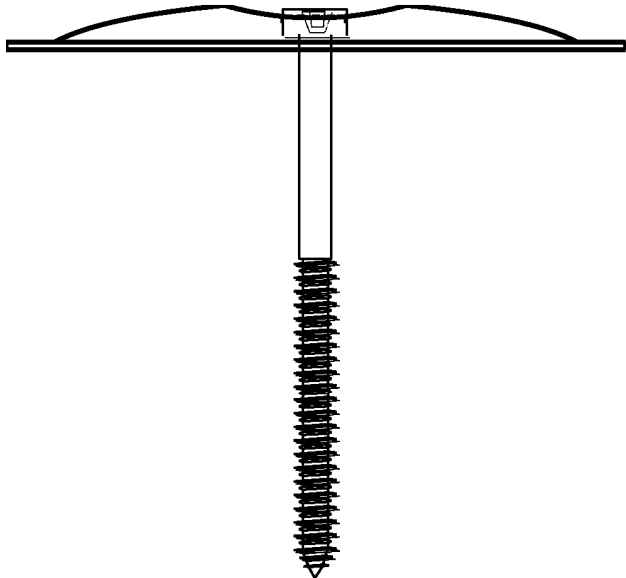
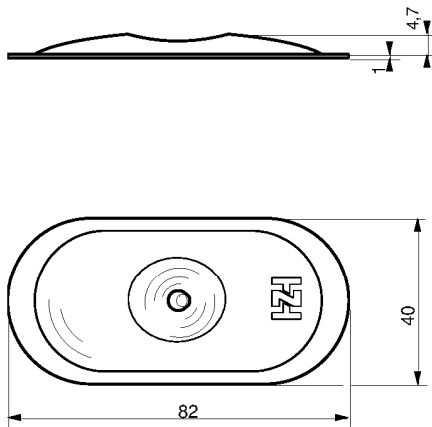
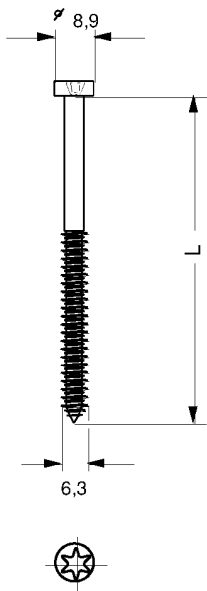
Zahn ZGBK-E 6,0 x L



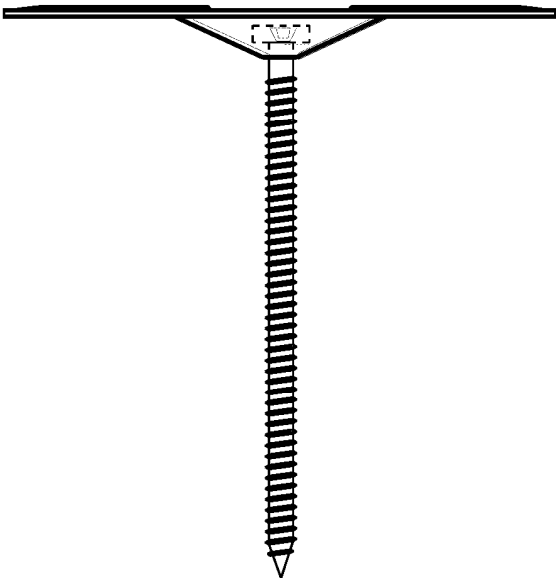
Zahn Flat Roof Fasteners

Combination 49
ZGBK®-E-R consisting of ZGBK®-E / ZKSH® gray / round

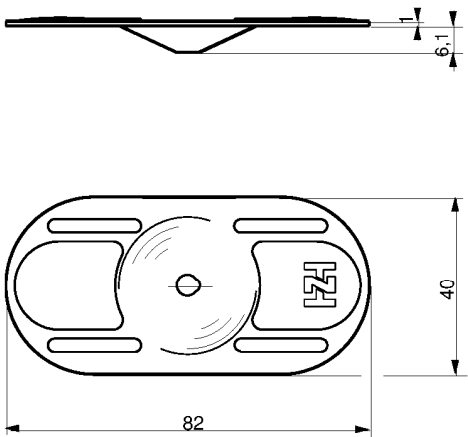
Annex 49

		
Zahn ZLVT 0008 	Zahn ZBST 6,3 x L 	
Zahn Flat Roof Fasteners		Annex 50
Combination 50 ZBST® / ZLVT® 0008		

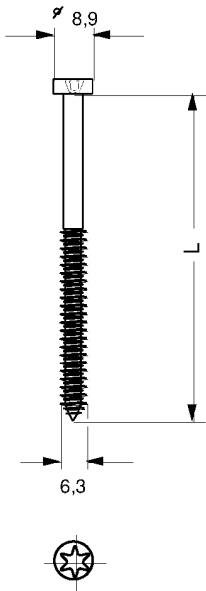
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Zahn ZLVT 0012



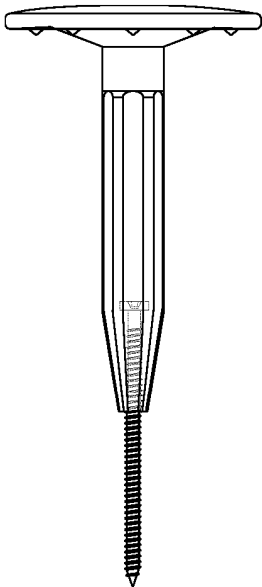
Zahn ZBST 6,3 x L



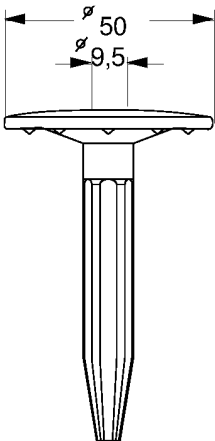
Zahn Flat Roof Fasteners

Combination 51
ZBST® / ZLVT® 0012

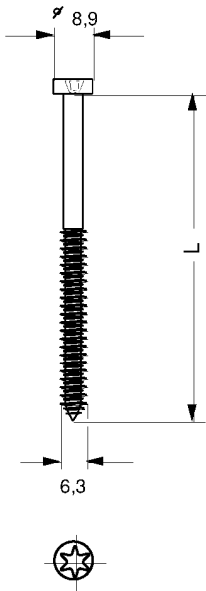
Annex 51



Zahn ZKSK gray / round



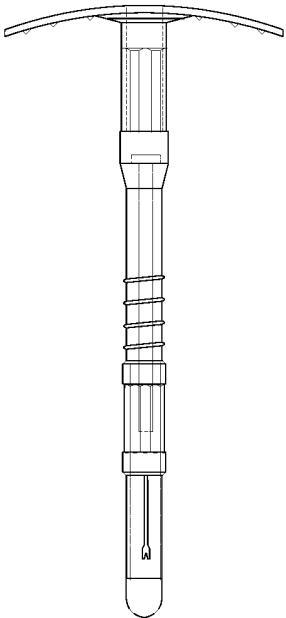
Zahn ZBST 6,3 x L



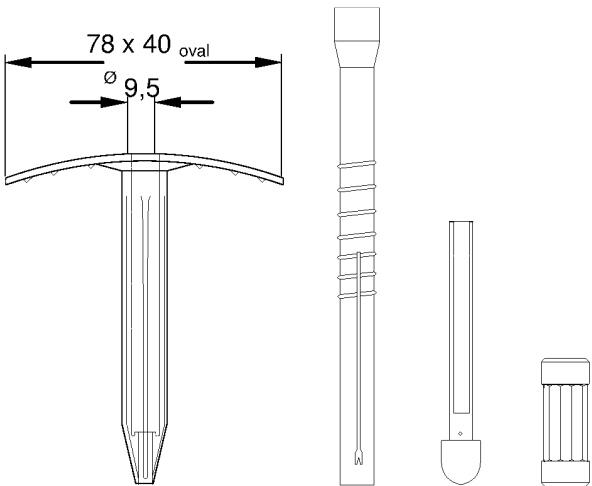
Zahn Flat Roof Fasteners

Combination 52
ZBSK®-R consisting of ZBST® / ZKSH® gray / round

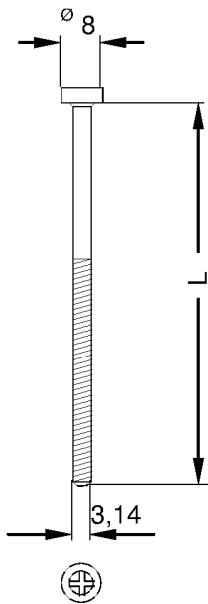
Annex 52



Zahn ZHRD oval with expanding dowel extension



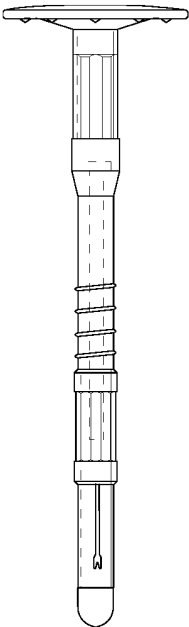
Zahn metric screw 3,14 x L



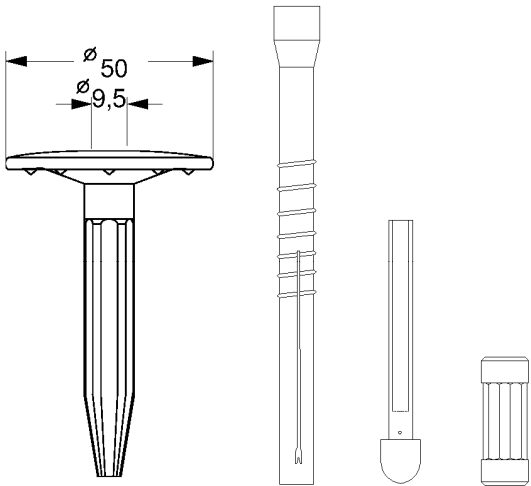
Zahn Flat Roof Fasteners

Combination 53
ZHRD® consisting of metr. screw / ZKSH® oval with expanding dowel extension

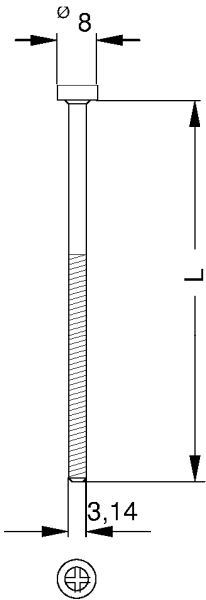
Annex 53



Zahn ZHRD round with expanding dowel extension



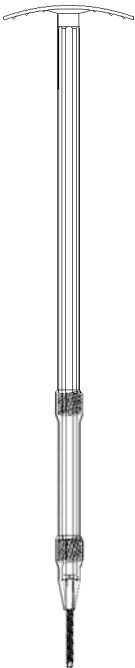
Zahn metric screw 3,14 x L



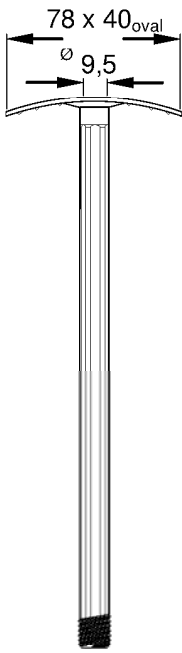
Zahn Flat Roof Fasteners

Combination 54
ZHRD®-R consisting of metr. screw / ZKSH® round with expanding dowel extension

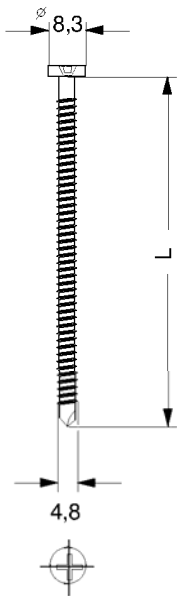
Annex 54



Zahn ZKSH oval module



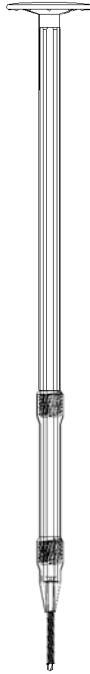
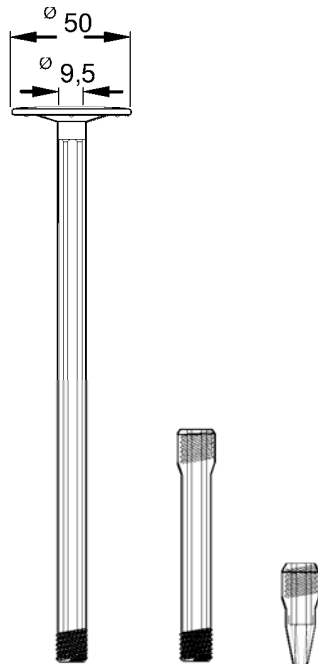
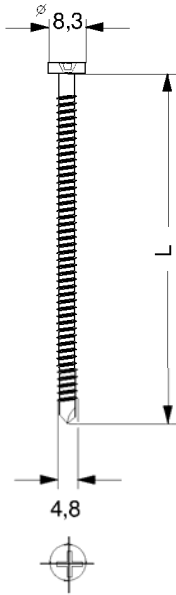
Zahn ZDBK-E 4,8 x L



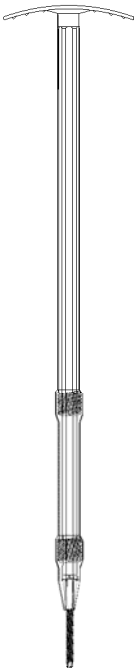
Zahn Flat Roof Fasteners

Combination 55
ZKSK®-E-module consisting of ZDBK®-E / ZKSH® oval module with modular middle piece and spike

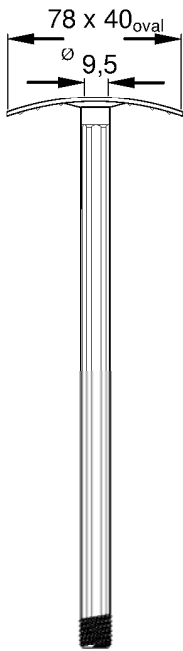
Annex 55

		
Zahn ZKSH round module 	Zahn ZDBK-E 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 56
Combination 56 ZKSK®-E/R-module consisting of ZDBK®-E / ZKSH® round module with module middle piece and spike		

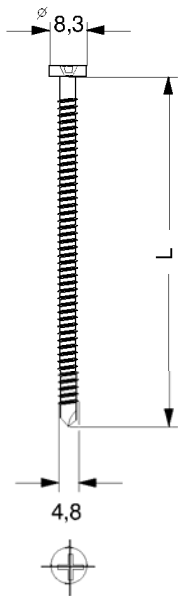
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Zahn ZKSH oval module



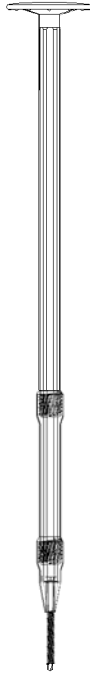
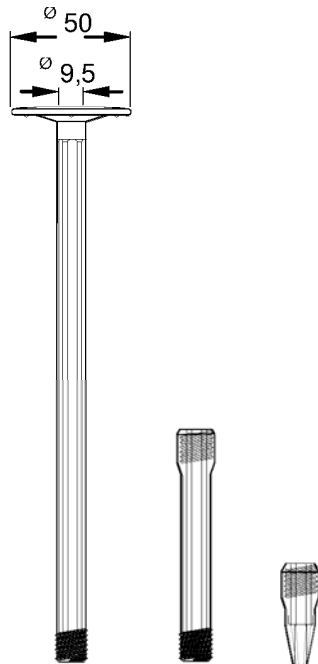
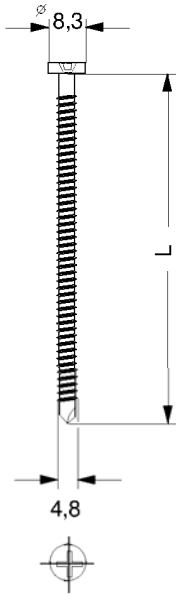
Zahn ZDBK-VB 4,8 x L



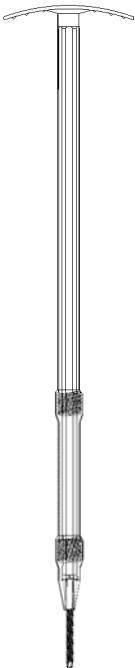
Zahn Flat Roof Fasteners

Combination 57
ZKSK®-VB-module consisting of ZDBK®-VB / ZKSH® oval module with module middle piece and spike

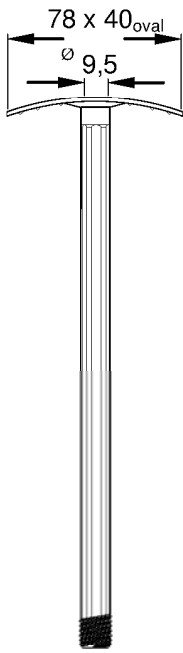
Annex 57

		
Zahn ZKSH round module 	Zahn ZDBK-VB 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 58
Combination 58 ZKSK®-VB/R-module consisting of ZDBK®-VB/ZKSH® round module with module middle piece and spike		

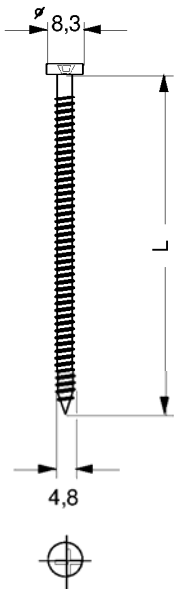
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH oval module



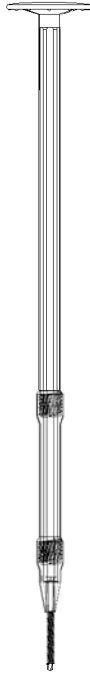
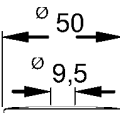
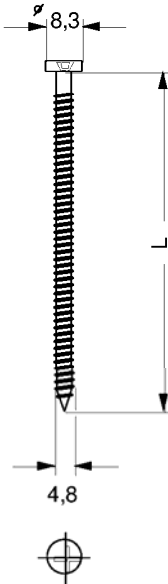
Zahn ZHBK 4,8 x L



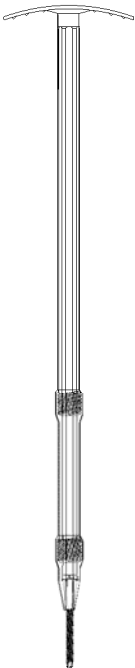
Zahn Flat Roof Fasteners

Combination 59
ZHSK®-module consisting of ZHBK® / ZKSH® oval module with module middle piece and spike

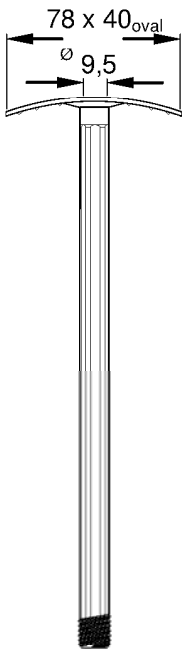
Annex 59

		
Zahn ZKSH round module  	Zahn ZHBK 4,8 x L	
Zahn Flat Roof Fasteners		Annex 60
Combination 60 ZHSK®-R-module consisting of ZHBK® / ZKSH® round module with module middle piece and spike		

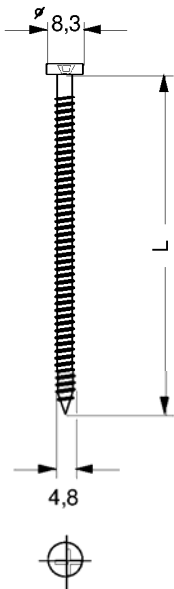
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH oval module



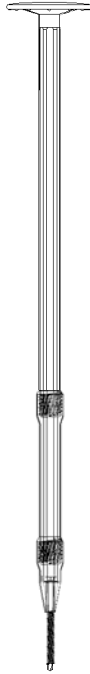
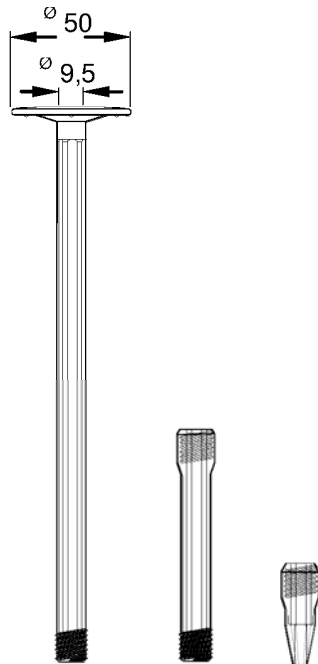
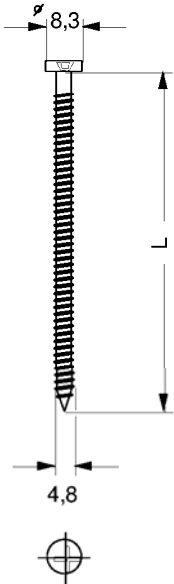
Zahn ZHBK-E 4,8 x L



Zahn Flat Roof Fasteners

Combination 61
ZHSK®-module consisting of ZHBK®-E / ZKSH® oval module with module middle piece and spike

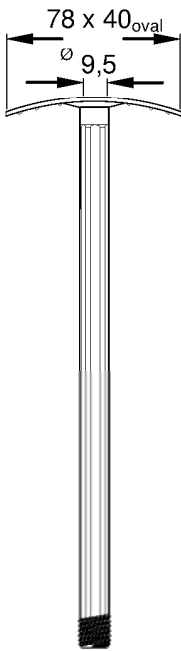
Annex 61

		
Zahn ZKSH round module 	Zahn ZHBK-E 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 62
Combination 62 ZHSK®-E/R-module consisting of ZHBK®-E / ZKSH® round module with module middle piece and spike		

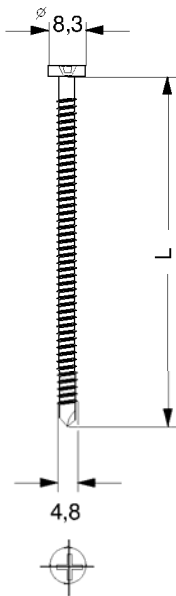
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH oval module



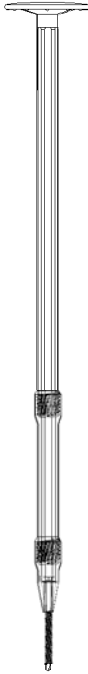
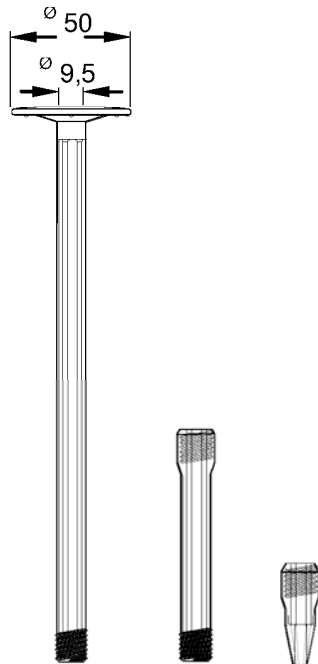
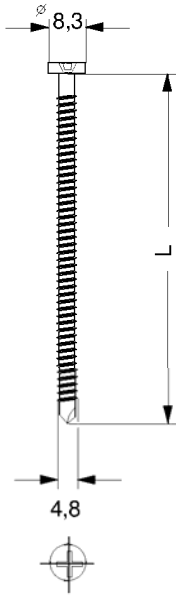
Zahn ZDBK-F1 4,8 x L



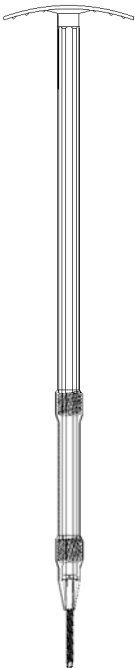
Zahn Flat Roof Fasteners

Combination 63
ZKSK®-F1-module consisting of ZDBK®-F1 / ZKSH® oval module with module middle piece and spike

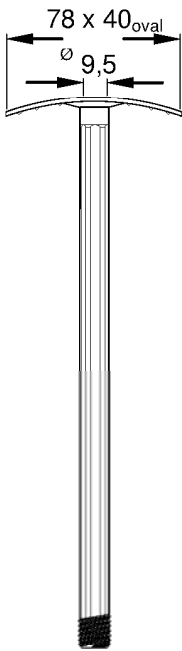
Annex 63

		
Zahn ZKSH round module 	Zahn ZDBK-F1 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 64
Combination 64 ZKSK®-F1-module consisting of ZDBK®-F1 / ZKSH® round module with module middle piece and spike		

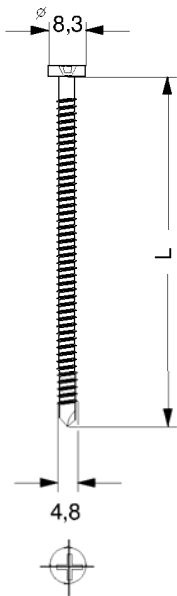
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Zahn ZKSH oval module



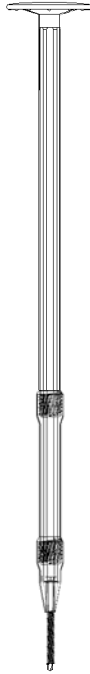
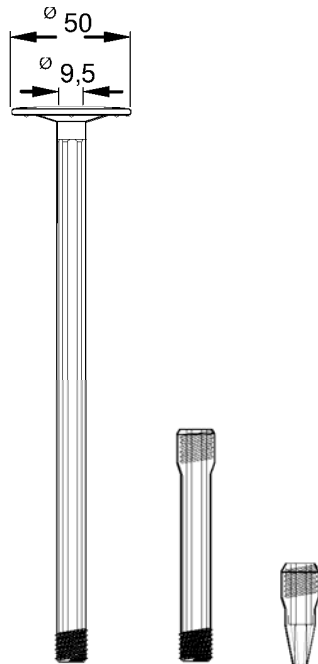
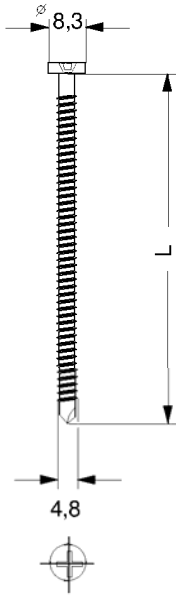
Zahn ZDBK-F2 4,8 x L



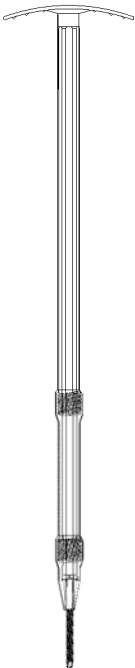
Zahn Flat Roof Fasteners

Combination 65
ZKSK®-F2-module consisting of ZDBK®-F2 / ZKSH® oval module with module middle piece and spike

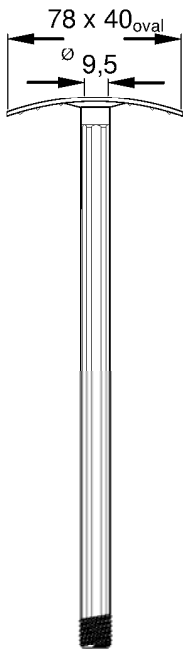
Annex 65

		
Zahn ZKSH round module 	Zahn ZDBK-F2 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 66
Combination 66 ZKSK®-F2-module consisting of ZDBK®-F2 / ZKSH® round module with module middle piece and spike		

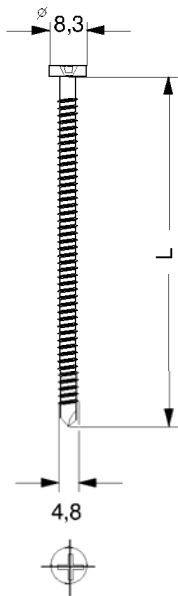
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH oval module



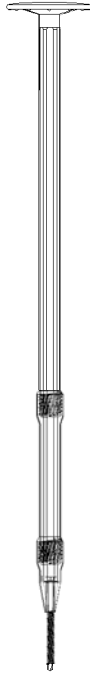
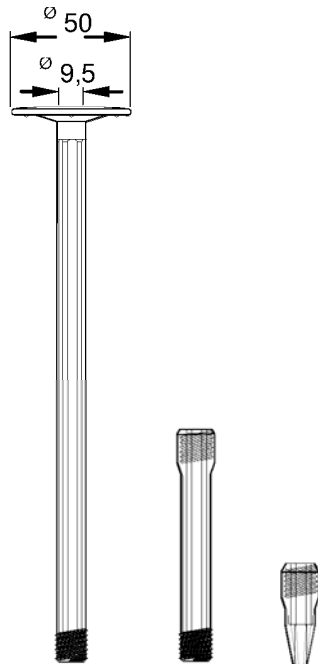
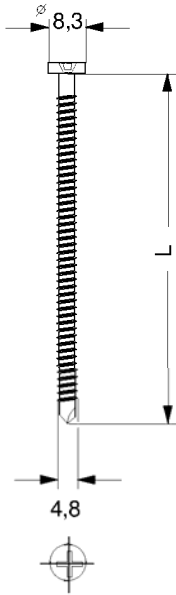
Zahn ZDBK-F3 4,8 x L



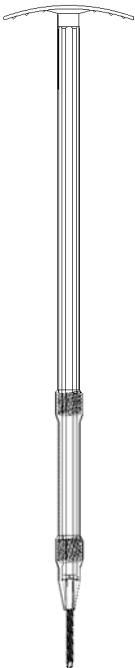
Zahn Flat Roof Fasteners

Combination 67
ZKSK®-F3-module consisting of ZDBK®-F3 / ZKSH® oval module with module middle piece and spike

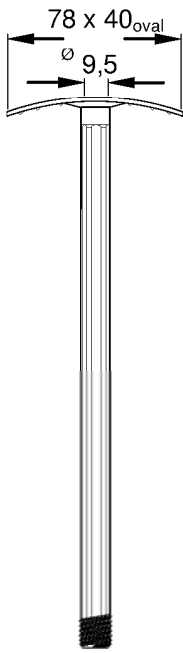
Annex 67

		
Zahn ZKSH round modul 	Zahn ZDBK-F3 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 68
Combination 68 ZKSK®-F3-module consisting of ZDBK®-F3 / ZKSH® round module with module middle piece and spike		

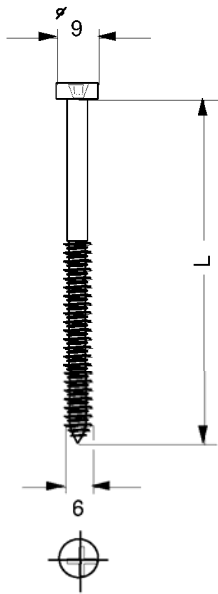
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH oval module



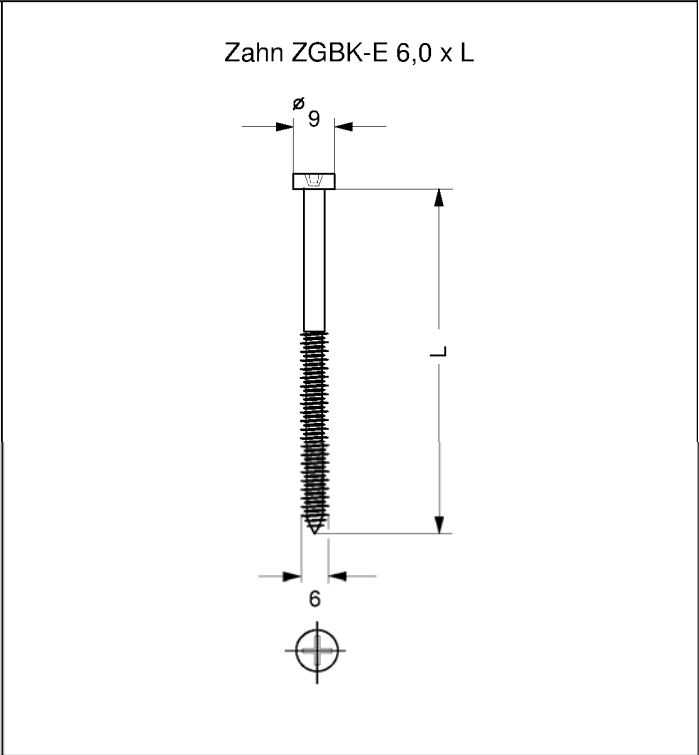
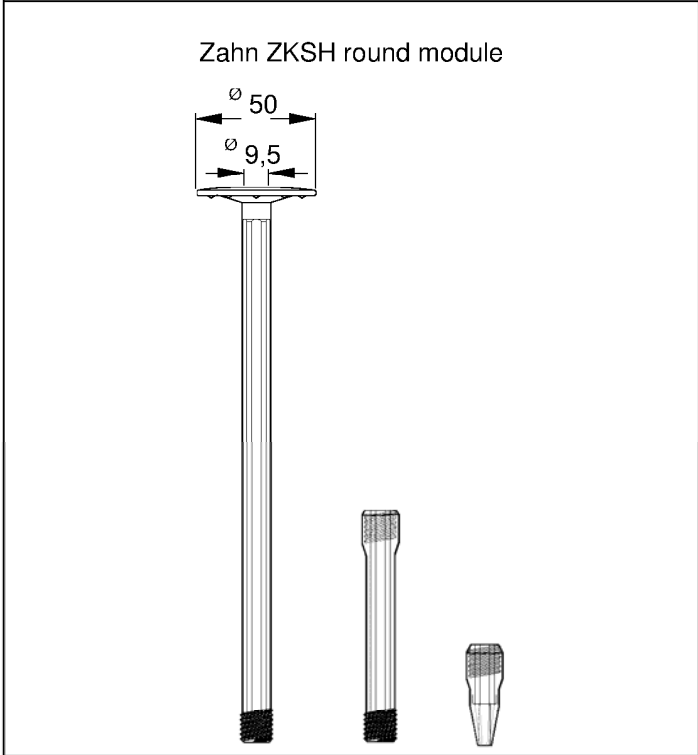
Zahn ZGBK-E 6,0 x L



Zahn Flat Roof Fasteners

Combination 69
ZKGK®-E-module consisting of ZGBK®-E / ZKSH® oval module with module middle piece and spike

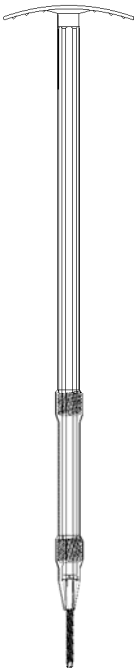
Annex 69



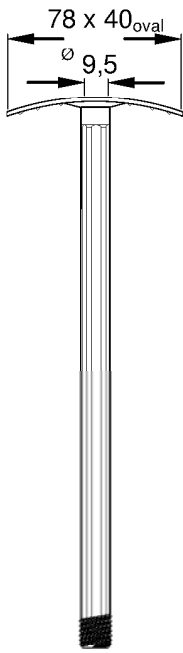
Zahn Flat Roof Fasteners
Combination 70 ZKGK®-E-module consisting of ZGBK®-E / ZKSH® round module with module middle piece and spike

Annex 70

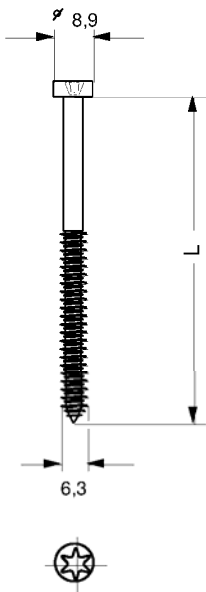
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH oval module



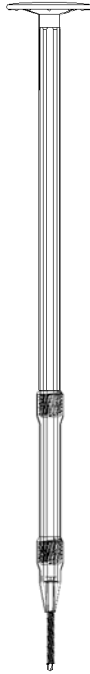
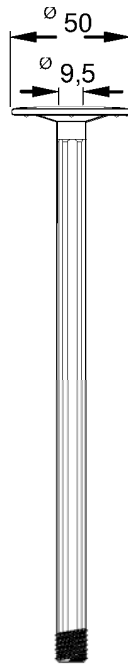
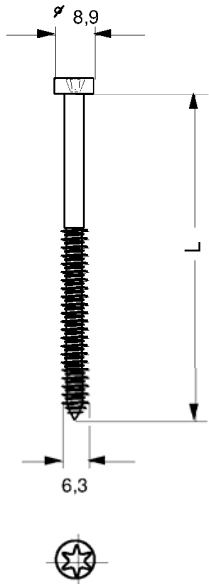
Zahn ZBST 6,3 x L



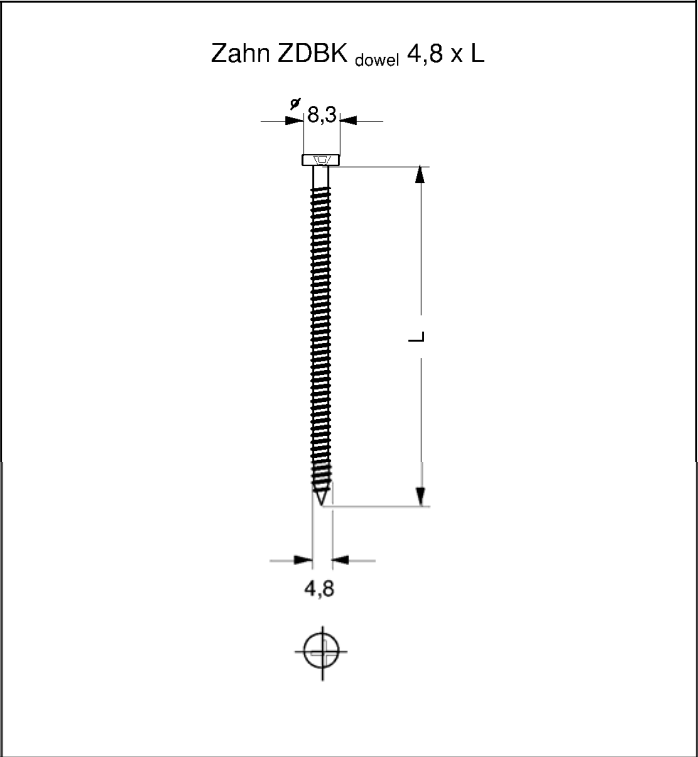
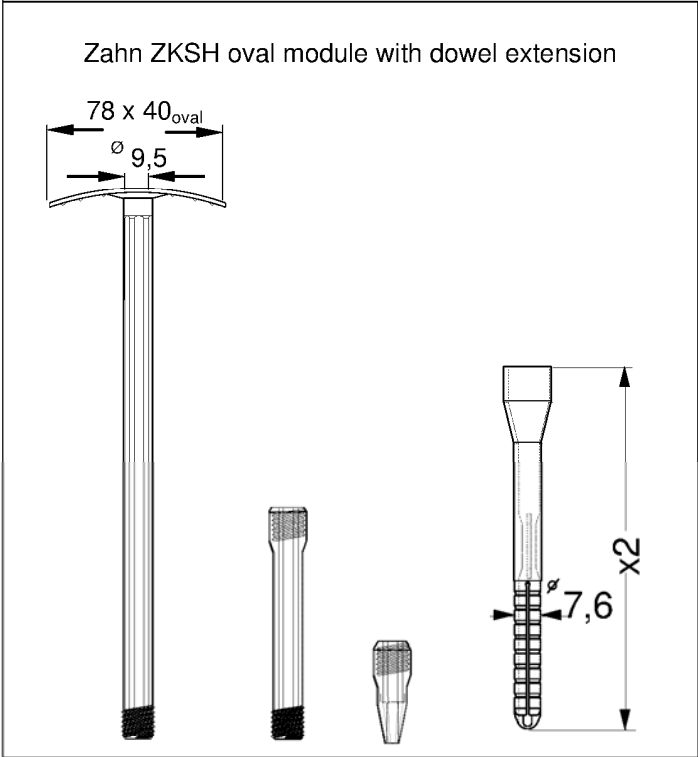
Zahn Flat Roof Fasteners

Combination 71
ZBSK[®]-module consisting of ZBST[®] / ZKSH[®] oval module with module middle piece and spike

Annex 71

		
Zahn ZKSH round module  $\varnothing 50$ $\varnothing 9,5$	Zahn ZBST 6,3 x L  $\varnothing 8,9$ 6,3 L	
Zahn Flat Roof Fasteners		Annex 72
Combination 72 ZBSK [®] -R-module consisting of ZBST [®] / ZKSH [®] round module with module middle piece and spike		

Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn Flat Roof Fasteners

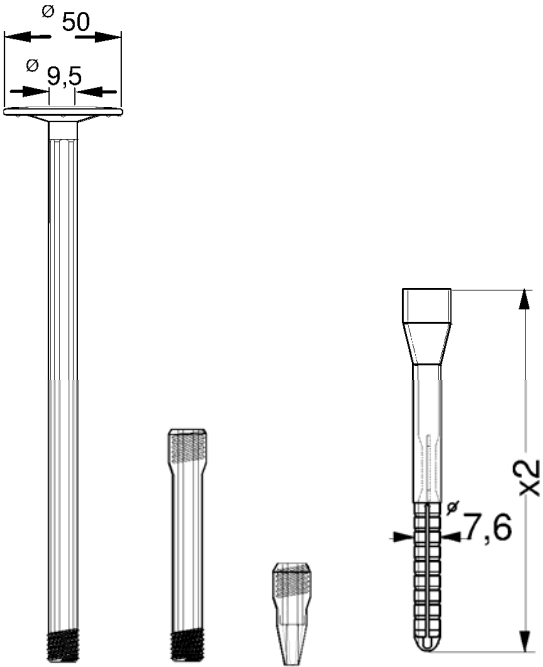
Combination 73
ZSDK[®]-module consisting of ZDBK[®]_{dowel} / ZKSH[®] oval module with middle piece, spike and dowel extension

Annex 73

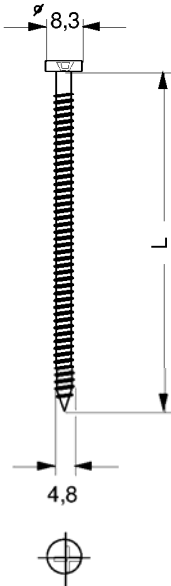
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZKSH round module with dowel extension



Zahn ZDBK_{dowel} 4,8 x L



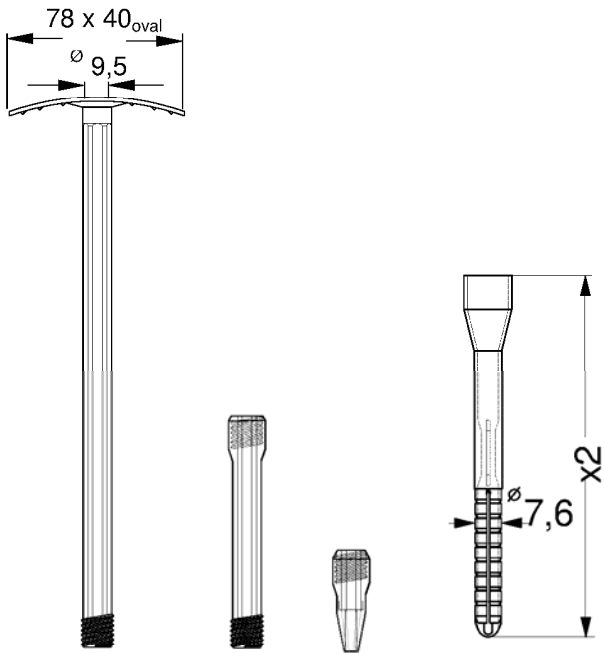
Zahn Flat Roof Fasteners

Combination 74
ZDSK[®]-R-module consisting of ZDBK[®]_{dowel} / ZKSH[®] round module with middle piece, spike and dowel extension

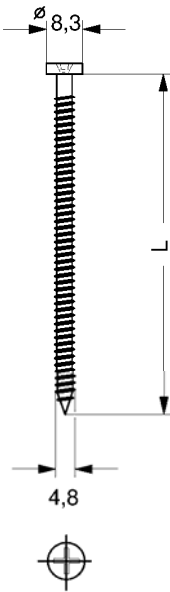
Annex 74



Zahn ZKSH oval module with dowel extension



Zahn ZDBK-E_dowel 4,8 x L



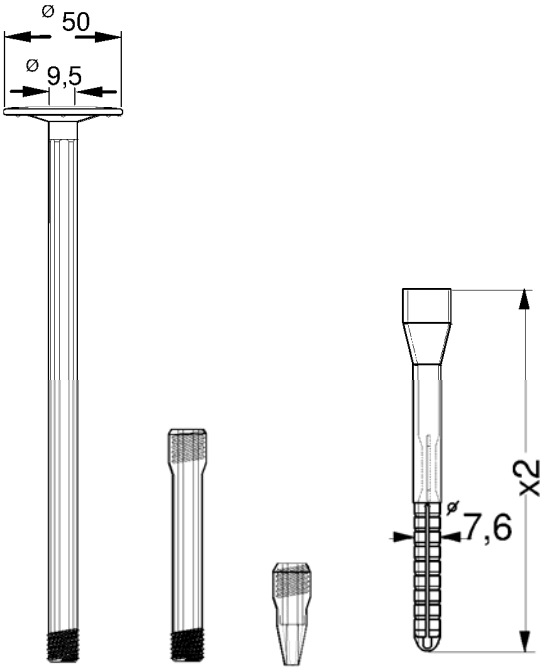
Zahn Flat Roof Fasteners

Combination 75
ZDSK®-R-module consisting of ZDBK®-E_dowel / ZKSH® oval module with middle piece, spike and dowel extension

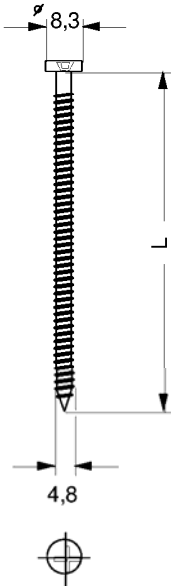
Annex 75



Zahn ZKSH round module with dowel extension



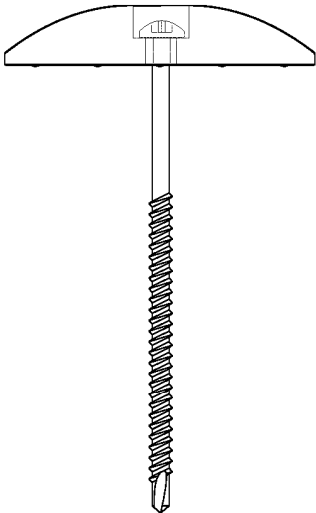
Zahn ZDBK-E_{dowel} 4,8 x L



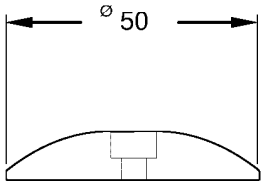
Zahn Flat Roof Fasteners

Combination 76
ZDSK[®]-E-R-module consisting of ZDBK[®]_{dowel} / ZKSH[®] round module with middle piece, spike and dowel extension

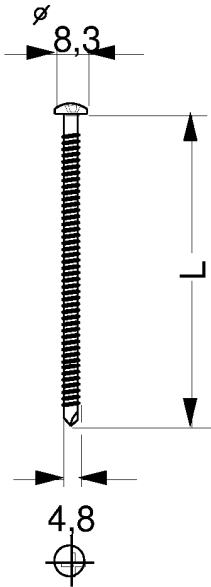
Annex 76



Zahn ZTSK



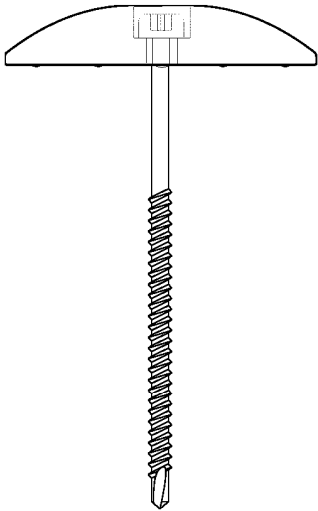
Zahn ZDBK-E 4,8 x L



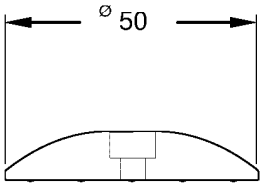
Zahn Flat Roof Fasteners

Combination 77
ZTSK[®]-E consisting of ZDBK[®]-E / ZTSK[®]

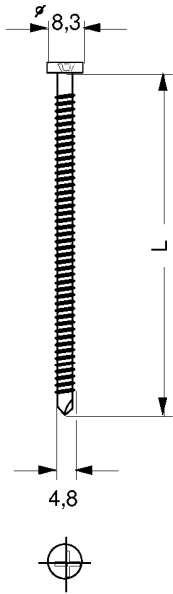
Annex 77



Zahn ZTSK



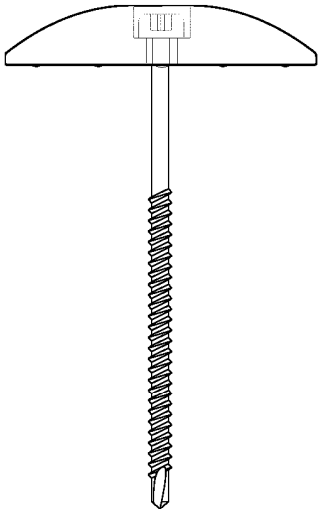
Zahn ZDBK-F1 4,8 x L



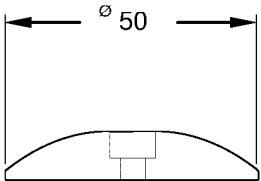
Zahn Flat Roof Fasteners

Combination 78
ZTSK[®]-F1 consisting of ZDBK[®]-F1 / ZTSK[®]

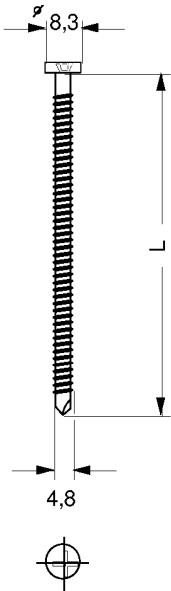
Annex 78



Zahn ZTSK



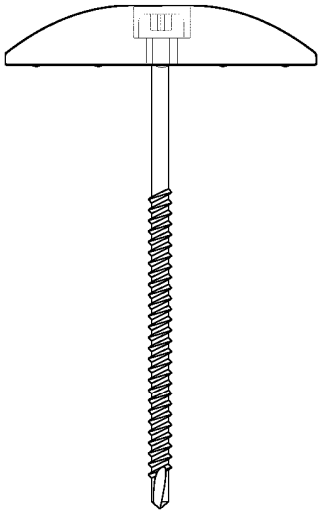
Zahn ZDBK-F2 4,8 x L



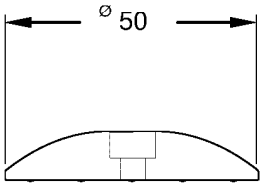
Zahn Flat Roof Fasteners

Combination 79
ZTSK®-F2 consisting of ZDBK®-F2 / ZTSK®

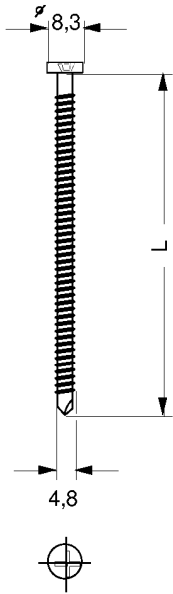
Annex 79



Zahn ZTSK



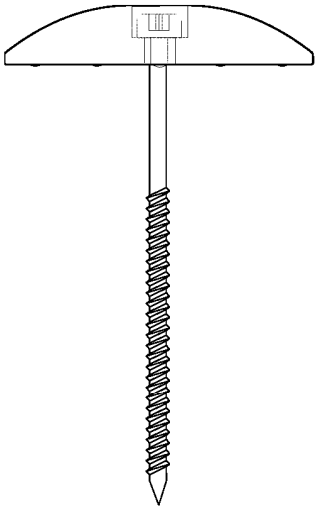
Zahn ZDBK-F3 4,8 x L



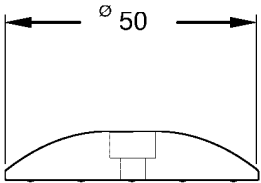
Zahn Flat Roof Fasteners

Combination 80
ZTSK[®]-F3 consisting of ZDBK[®]-F3 / ZTSK[®]

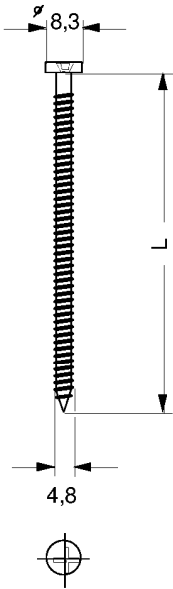
Annex 80



Zahn ZTSK



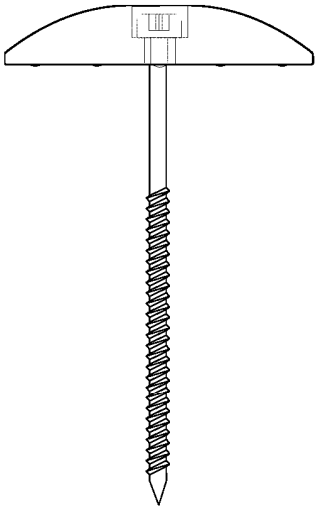
Zahn ZHBK 4,8 x L



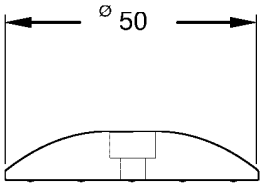
Zahn Flat Roof Fasteners

Combination 81
ZTSK[®]-wood consisting of ZHBK[®] / ZTSK[®]

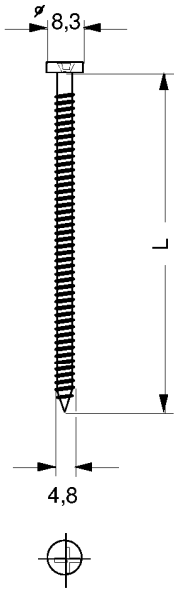
Annex 81



Zahn ZTSK



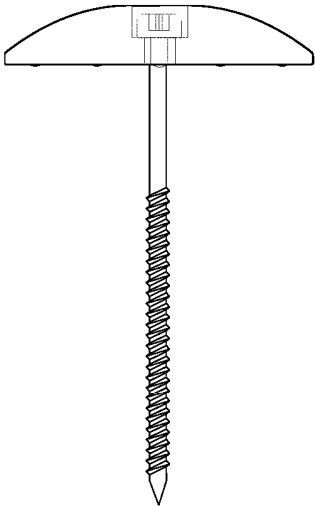
Zahn ZHBK-E 4,8 x L



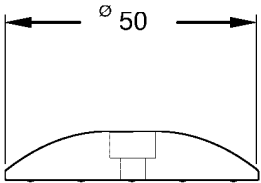
Zahn Flat Roof Fasteners

Combination 82
ZTSK®-E-wood consisting of ZHBK®-E / ZTSK®

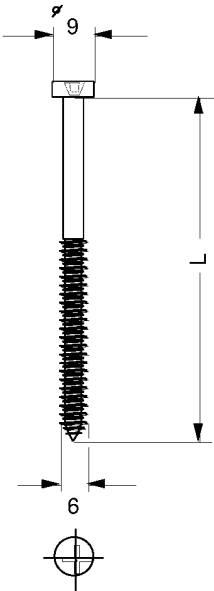
Annex 82



Zahn ZTSK



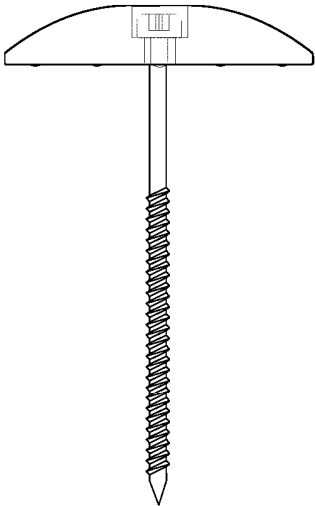
Zahn ZGBK-E 6,0 x L



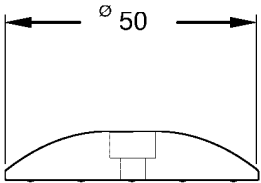
Zahn Flat Roof Fasteners

Combination 83
ZTSK[®]-E-pumice consisting of ZGBK[®]-E / ZTSK[®]

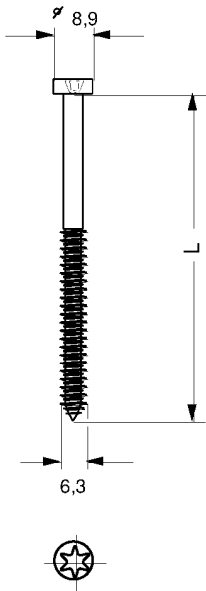
Annex 83



Zahn ZTSK



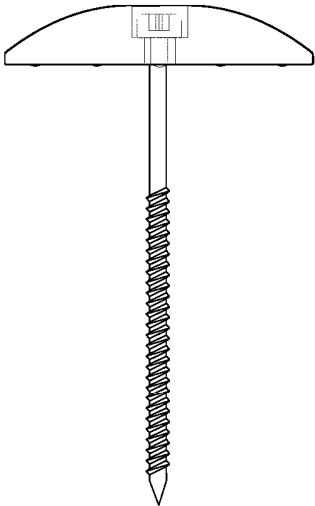
Zahn ZBST 6,3 x L



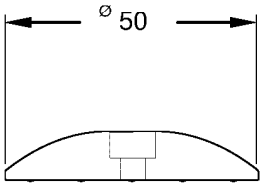
Zahn Flat Roof Fasteners

Combination 84
ZTSK®-concrete consisting of ZBST® / ZTSK®

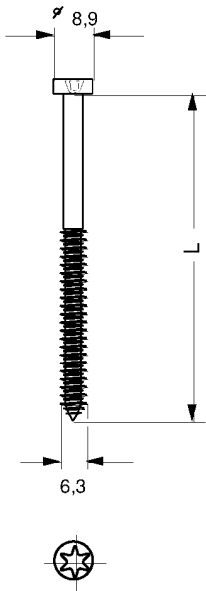
Annex 84



Zahn ZTSK



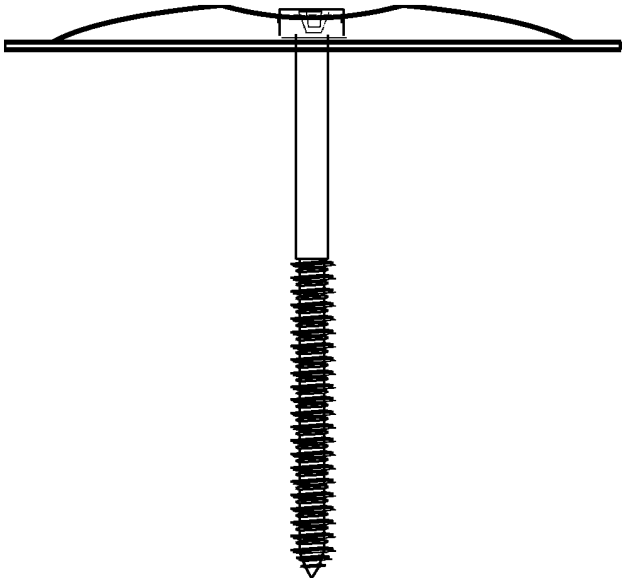
Zahn ZBST-E 6,3 x L



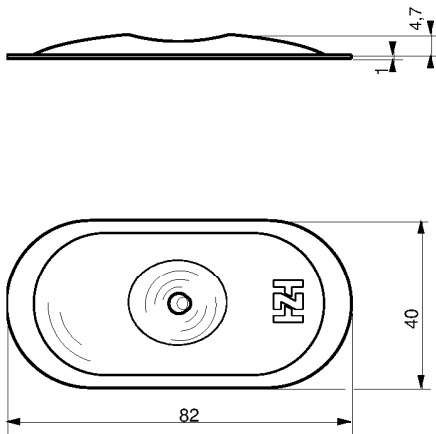
Zahn Flat Roof Fasteners

Combination 85
ZTSK®-E-concrete consisting of ZBST®-E / ZTSK®

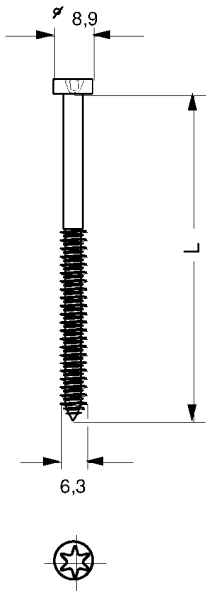
Annex 85



Zahn ZLVT 0008



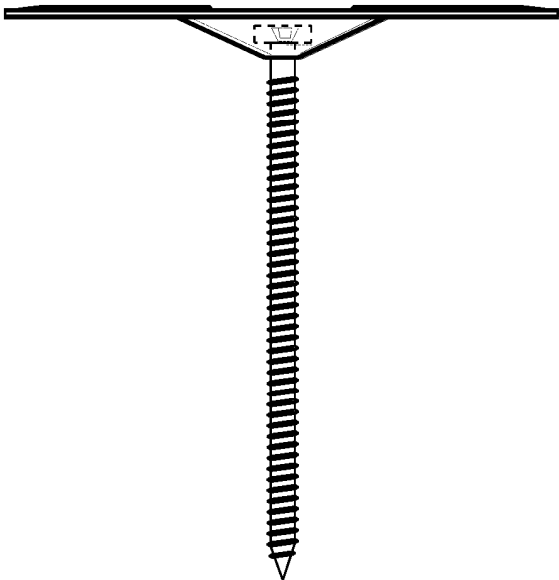
Zahn ZBST-E 6,3 x L



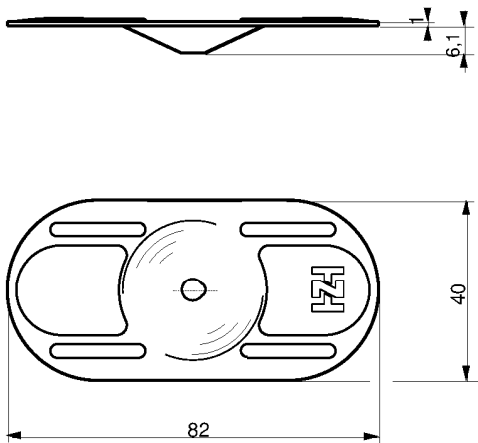
Zahn Flat Roof Fasteners

Combination 86
ZBST®-E / ZLVT® 0008

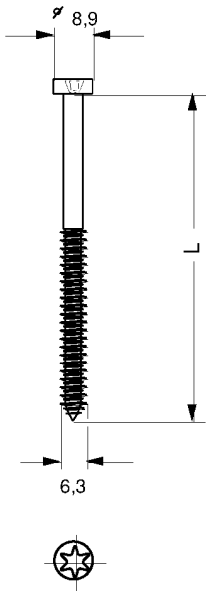
Annex 86



Zahn ZLVT 0012



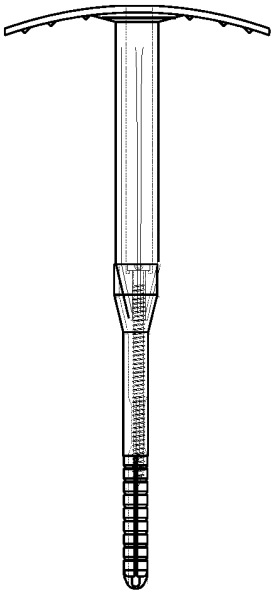
Zahn ZBST-E 6,3 x L



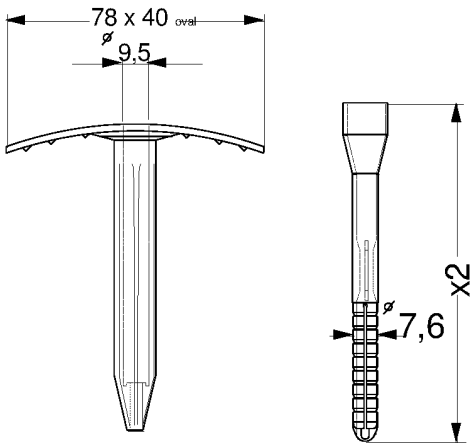
Zahn Flat Roof Fasteners

Combination 87
ZBST®-E / ZLVT® 0012

Annex 87



Zahn ZKSH oval mit dowel extension



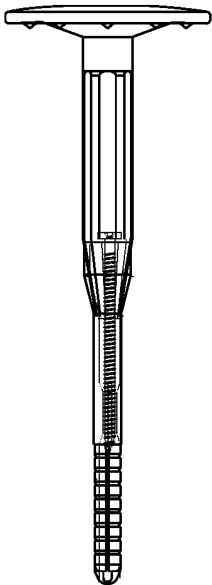
Zahn ZDBK-E_{dowel} 4,8 x L



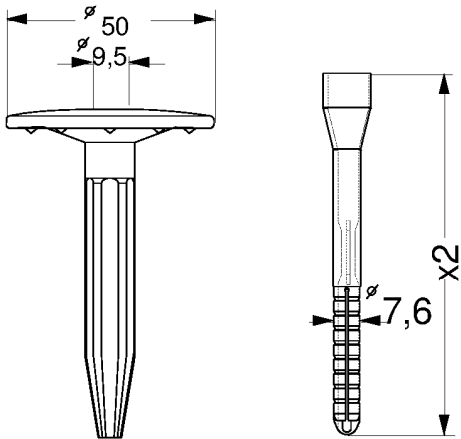
Zahn Flat Roof Fasteners

Combination 88
ZSDK®-E consisting of ZDBK®-E_{dowel} / ZKSH® oval with dowel extension

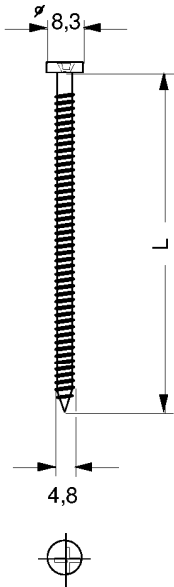
Annex 88



Zahn ZKSH round with dowel extension



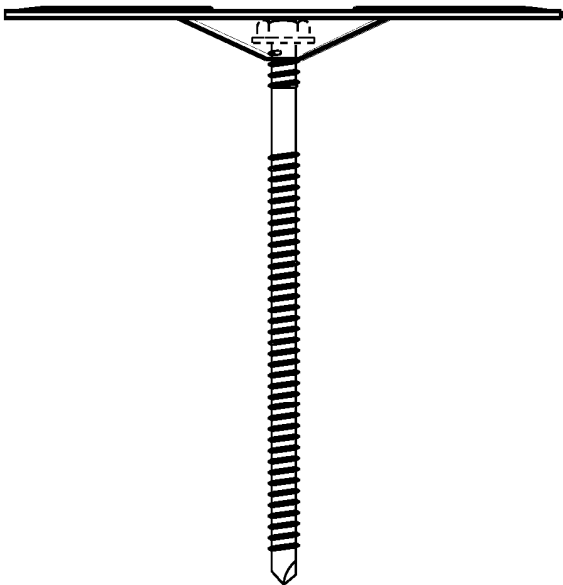
Zahn ZDBK-E dowel 4,8 x L



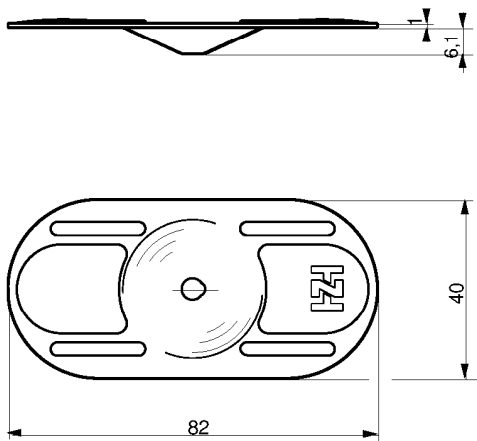
Zahn Flat Roof Fasteners

Combination 89
ZSDK®-E-R consisting of ZDBK®-E dowel / ZKSH® round with dowel extension

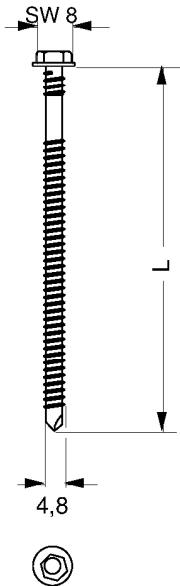
Annex 89



Zahn ZLVT 0001



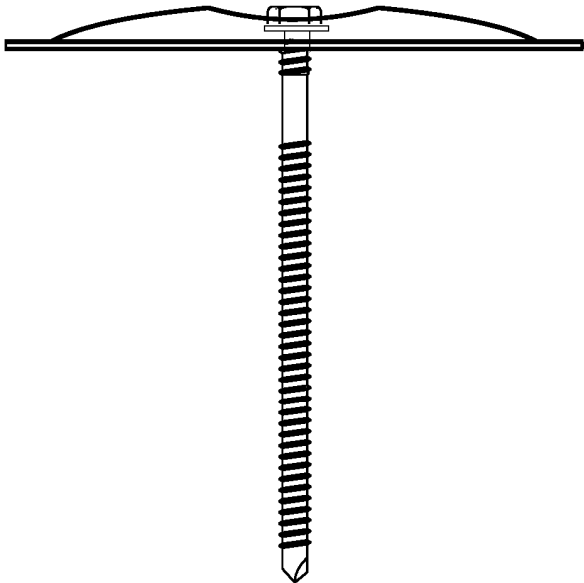
Zahn ZDBS-E 4,8 x L



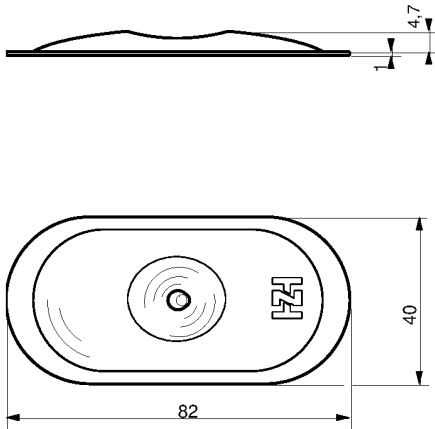
Zahn Flat Roof Fasteners

Combination 90
ZDBS®-E / ZLVT®0001

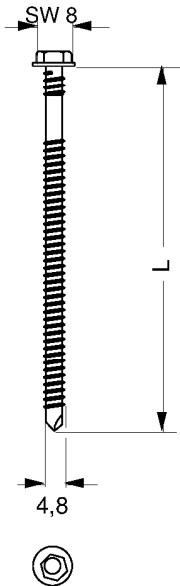
Annex 90



Zahn ZLVT 0005



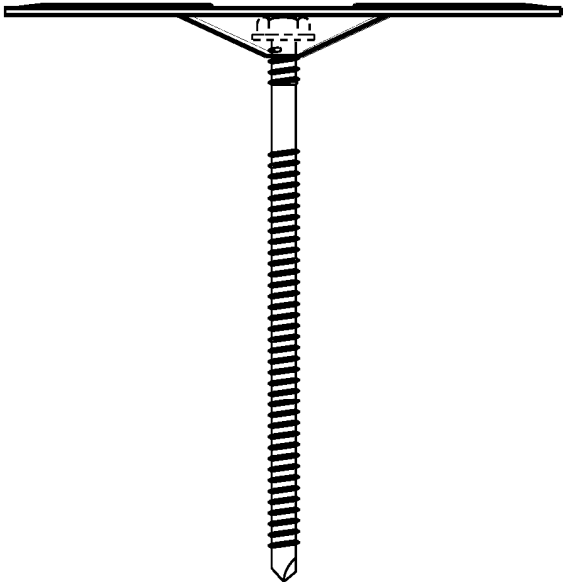
Zahn ZDBS-E 4,8 x L



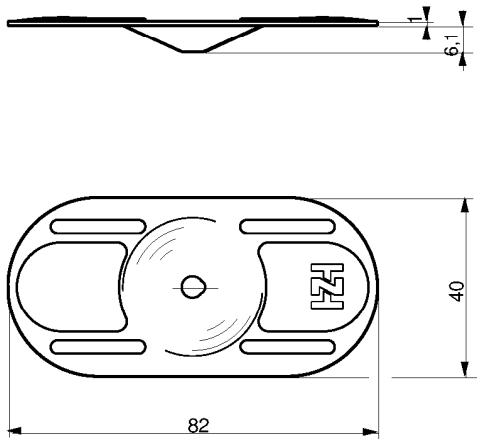
Zahn Flat Roof Fasteners

Combination 91
ZDBS®-E / ZLVT®0005

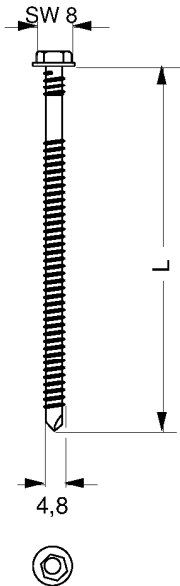
Annex 91



Zahn ZLVT 0001



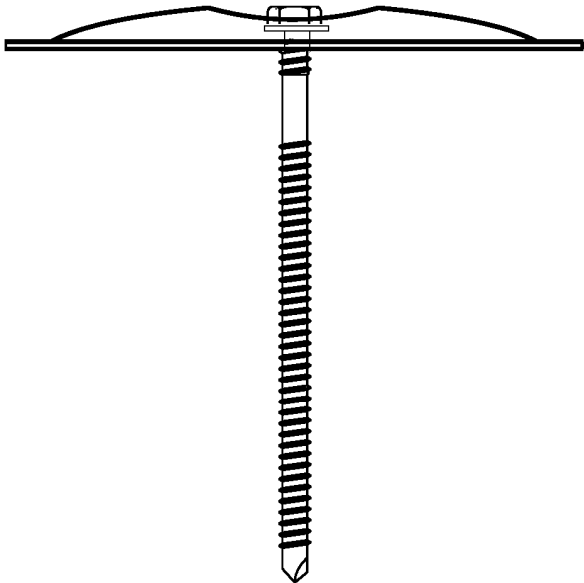
Zahn ZDBS 4,8 x L



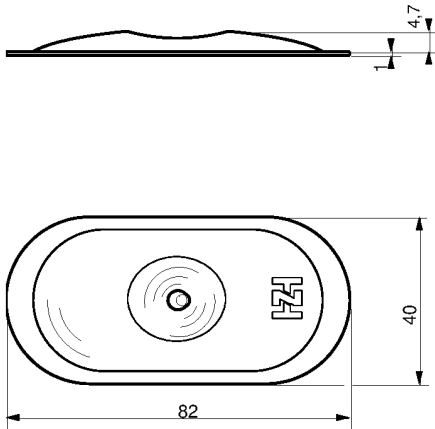
Zahn Flat Roof Fasteners

Combination 92
ZDBS® / ZLVT®0001 H

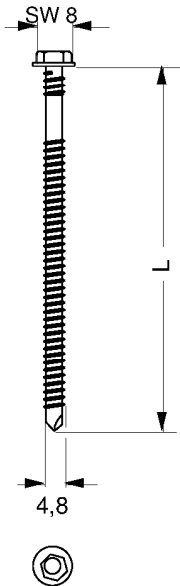
Annex 92



Zahn ZLVT 0005



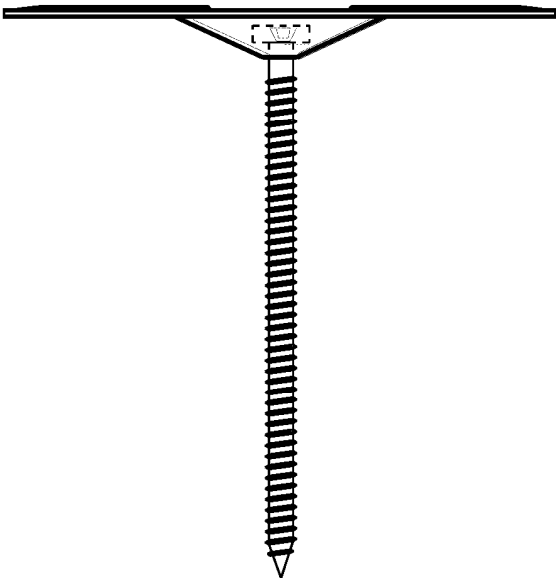
Zahn ZDBS 4,8 x L



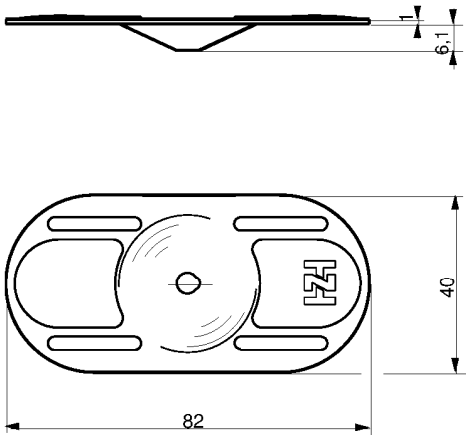
Zahn Flat Roof Fasteners

Combination 93
ZDBS® / ZLVT®0005 H

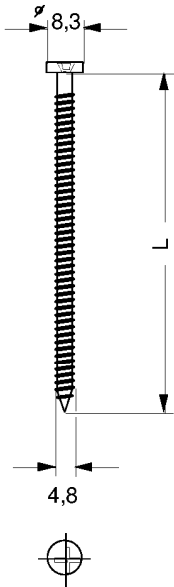
Annex 93



Zahn ZLVT 0001



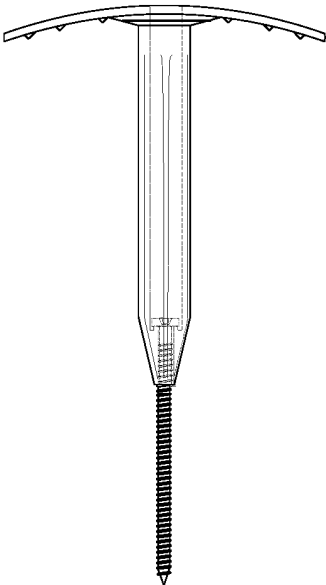
Zahn ZDBK_{dowel} 4,8 x L



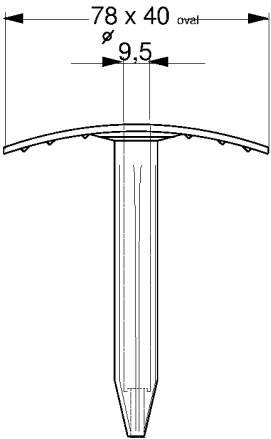
Zahn Flat Roof Fasteners

Combination 94
ZDBK_{dowel} / ZLVT[®] 0001

Annex 94



Zahn ZKSH oval



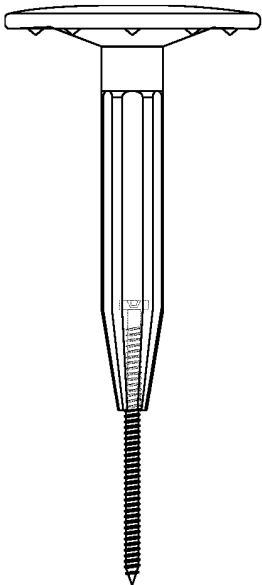
Zahn ZDBK_{dowel} 4,8 x L



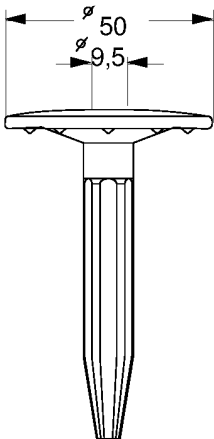
Zahn Flat Roof Fasteners

Combination 95
ZDBK[®]_{dowel} / ZKSH[®] oval

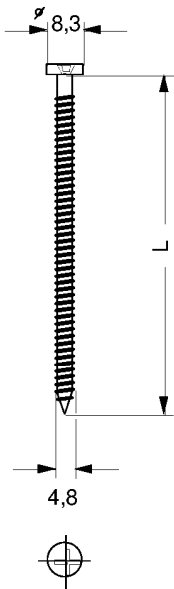
Annex 95



Zahn ZKSH round



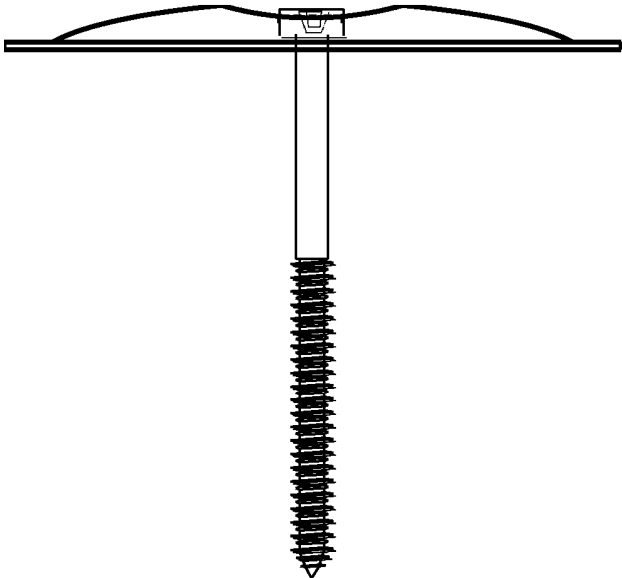
Zahn ZDBK dowel 4,8 x L



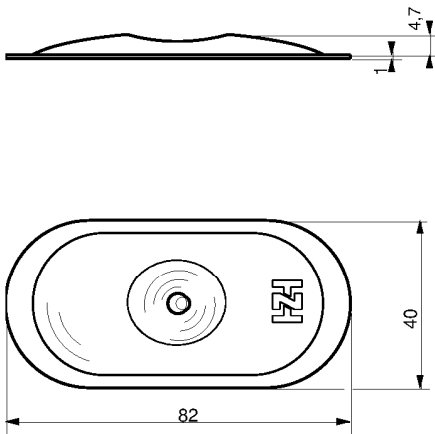
Zahn Flat Roof Fasteners

Combination 96
ZHBK[®] dowel / ZKSH[®] round

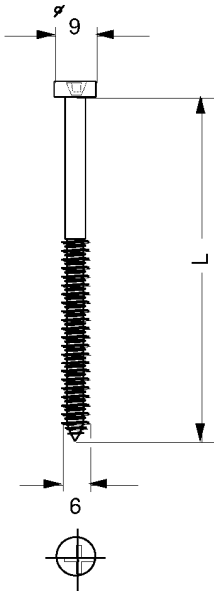
Annex 96



Zahn ZLVT 0008



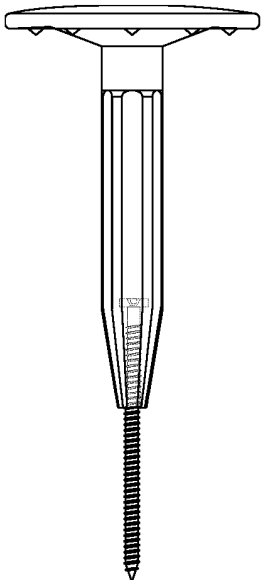
Zahn ZGBK-E 6,0 x L



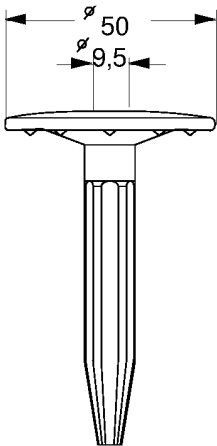
Zahn Flat Roof Fasteners

Combination 97
ZGBK®-E / ZLVT® 0008 H

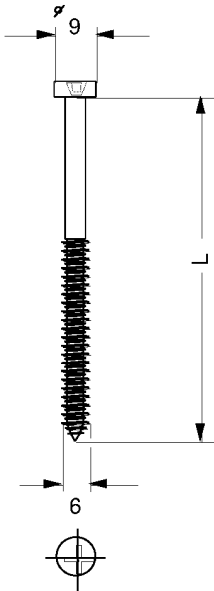
Annex 97



Zahn ZKSH gray / round



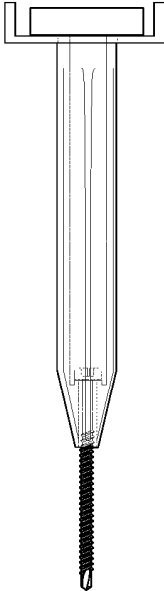
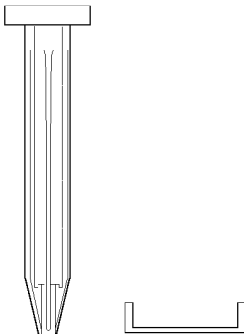
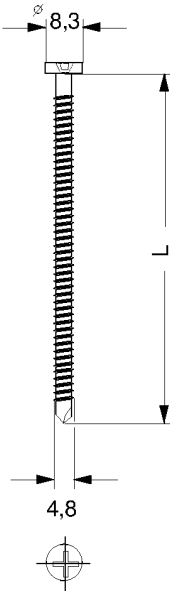
Zahn ZGBK-E 6,0 x L



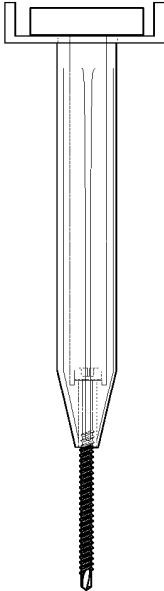
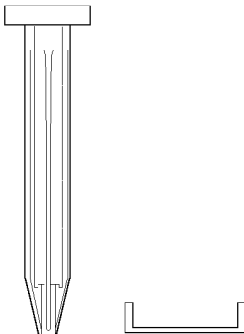
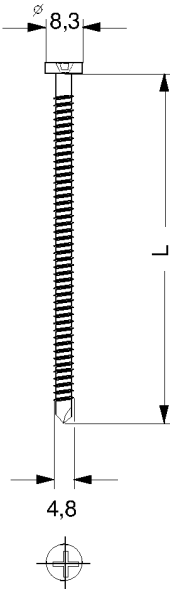
Zahn Flat Roof Fasteners

Combination 98
ZGBK®-E-R consisting of ZGBK®-E / ZKSH® gray / round H

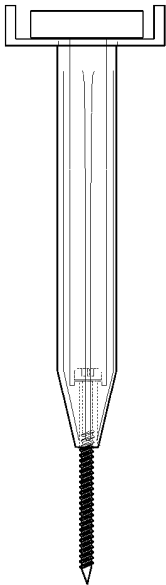
Annex 98

		
Zahn ZSSB-pipe with bar 	Zahn ZDBK-F1 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 99
Combination 99 ZSSB consisting of ZDBK®-F1 / ZSSB-pipe and bar		

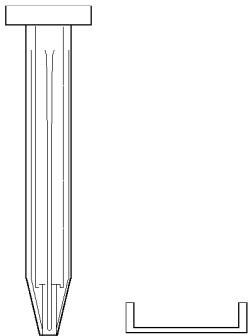
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Zahn ZSSB-pipe with bar 	Zahn ZDBK-E 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 100
Combination 100 ZSSB consisting of ZDBK®-E / ZSSB-pipe and bar		

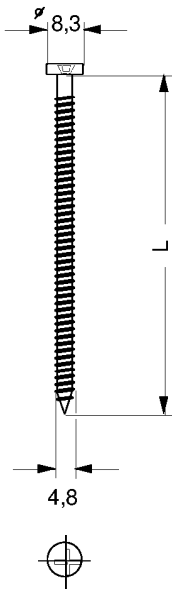
Electronic copy of the ETA by DIBt: ETA-08/0033



Zahn ZSSB-pipe with bar



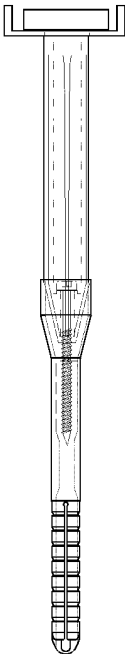
Zahn ZHBK 4,8 x L



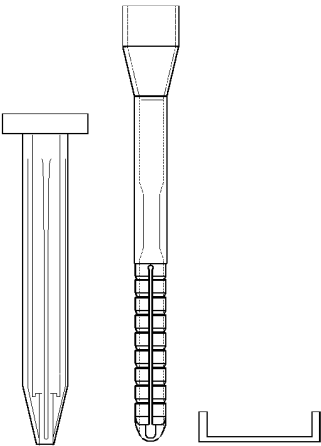
Zahn Flat Roof Fasteners

Combination 101
ZSSB consisting of ZHBK® / ZSSB-pipe and bar

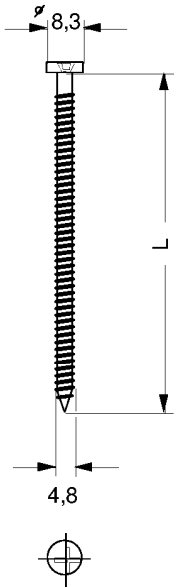
Annex 101



Zahn ZSSB-pipe dowel extension and bar



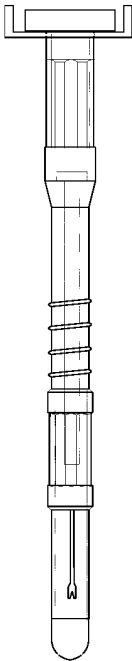
Zahn ZDBK_{dowel} 4,8 x L



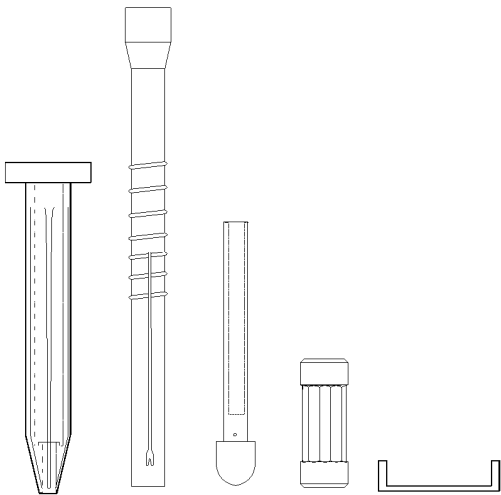
Zahn Flat Roof Fasteners

Combination 102
ZSSB consisting of ZDBK_{dowel}® / ZSSB-pipe, ZSSB bar and dowel extension

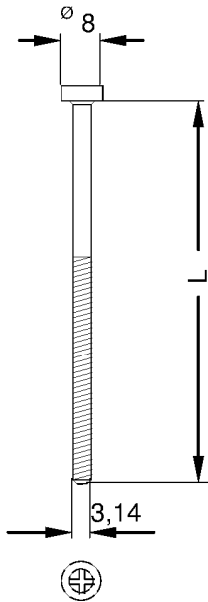
Annex 102



Zahn ZSSB-pipe with expanding dowel extension and bar



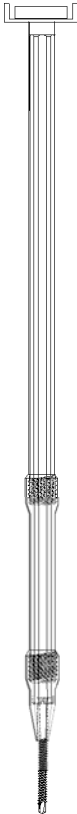
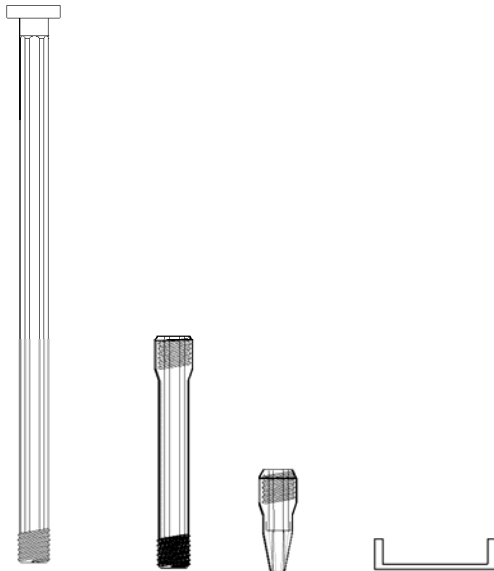
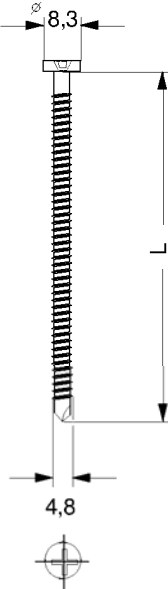
Zahn metric screw 3,14 x L



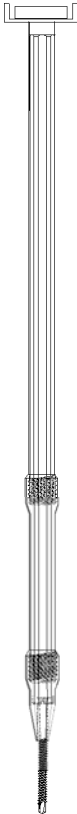
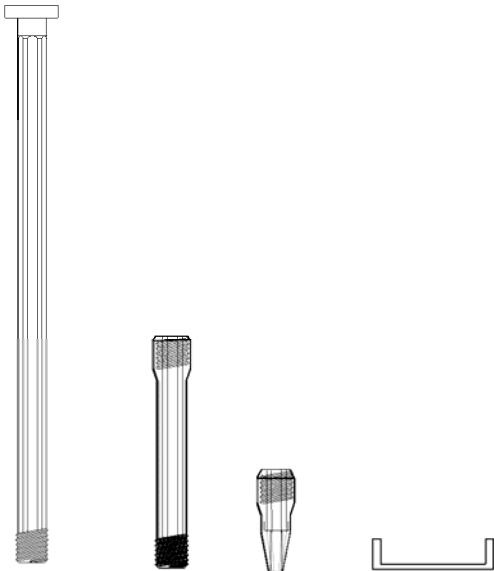
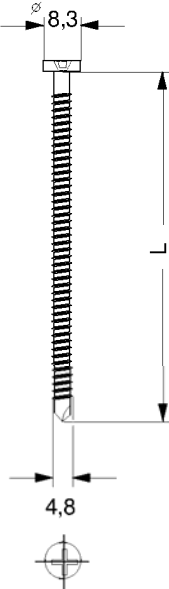
Zahn Flat Roof Fasteners

Combination 103
ZSSB consisting of metric screw / ZSSB-pipe, ZSSB bar and expanding dowel extension

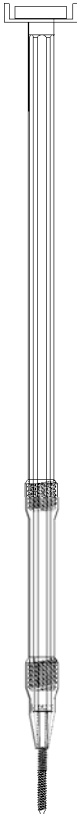
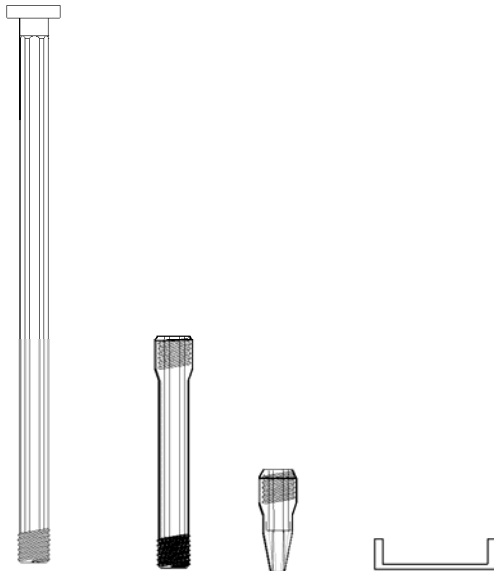
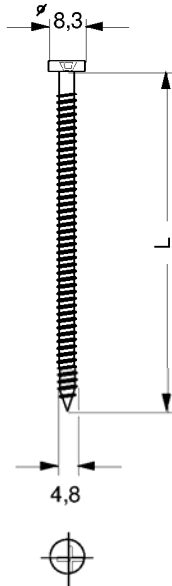
Annex 103

		
Zahn ZSSB-pipe with module and bar 	Zahn ZDBK-E 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 104
Combination 104 ZSSB consisting of ZDBK®-E / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

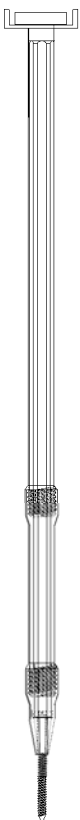
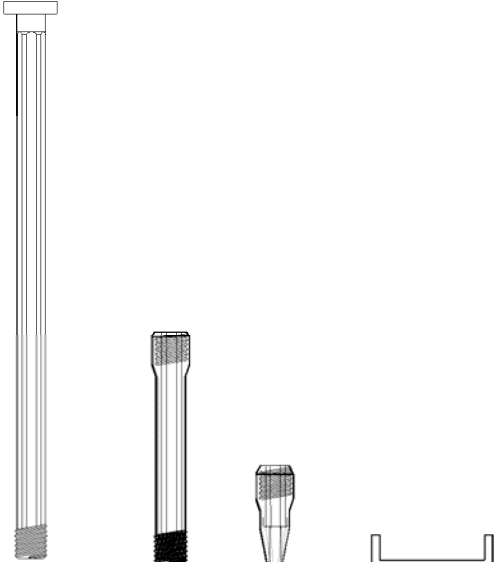
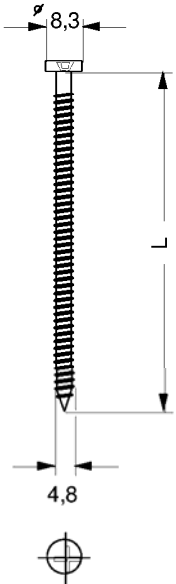
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Zahn ZSSB-pipe with module and bar 		Zahn ZDBK-VB 4,8 x L 
Zahn Flat Roof Fasteners		Annex 105
Combination 105 ZSSB consisting of ZDBK®-VB / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

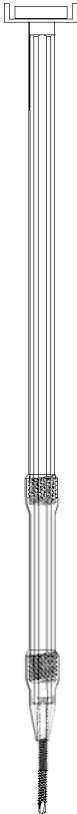
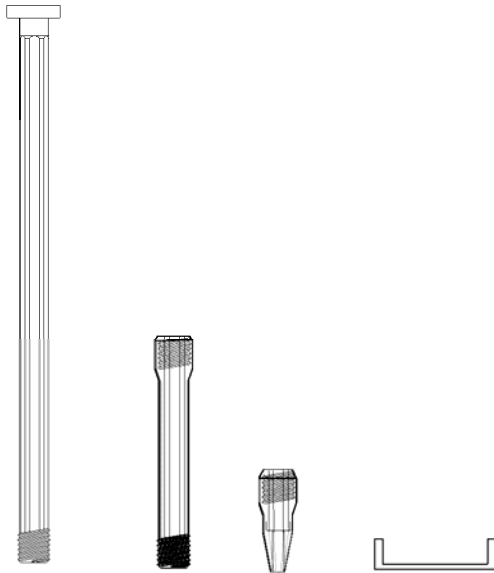
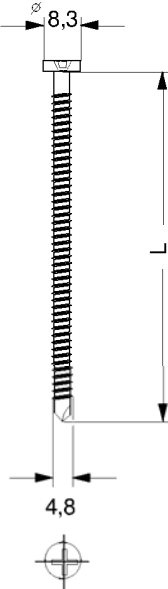
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Zahn ZSSB-pipe with module and bar 	Zahn ZHBK 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 106
Combination 106 ZSSB consisting of ZHBK® / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

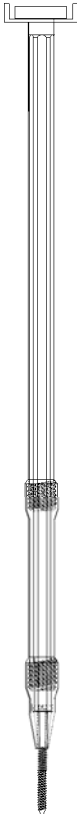
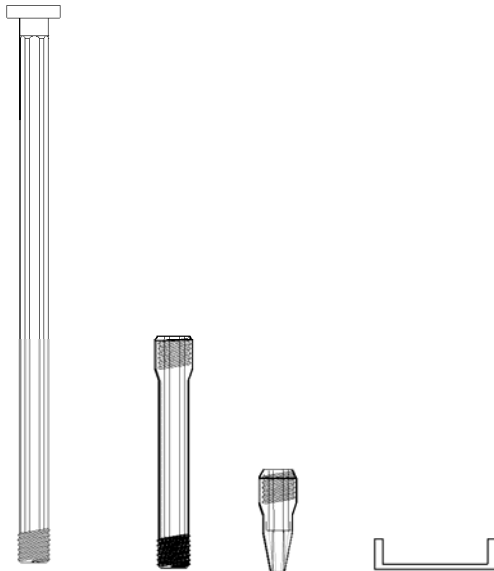
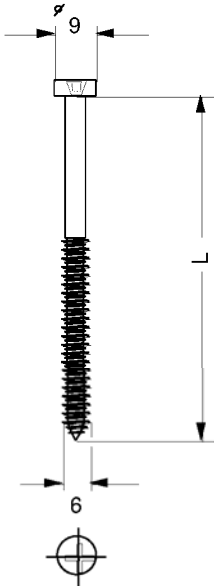
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Zahn ZSSB-pipet with module and bar 	Zahn ZHBK-E 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 107
Combination 107 ZSSB consisting of ZHBK®-E / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

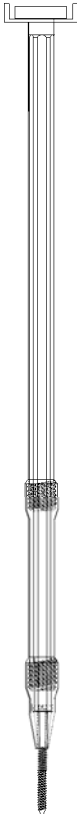
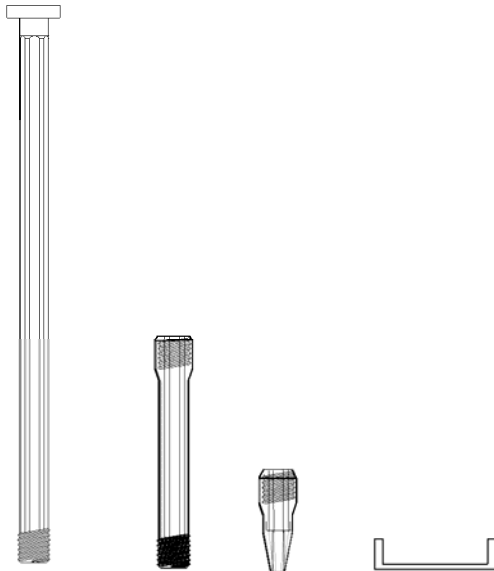
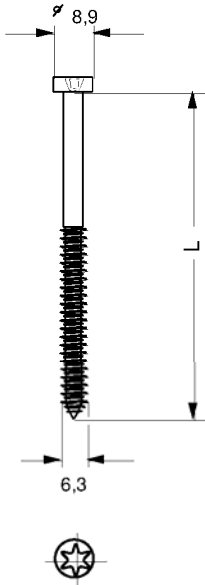
Electronic copy of the ETA by DIBt: ETA-08/0033

		
Zahn ZSSB-pipe with module and bar 	Zahn ZDBK-F1 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 108
Combination 108 ZSSB consisting of ZDBK®-F1 / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

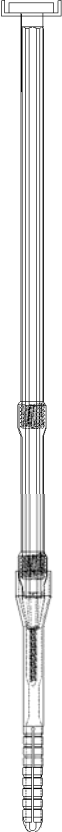
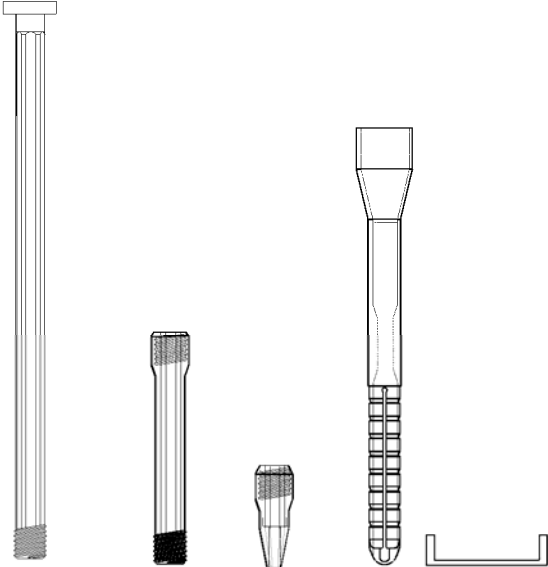
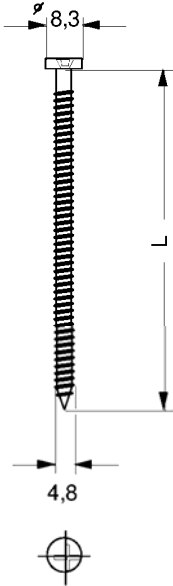
Electronic copy of the ETA by DIBt: ETA-08/0033

		
Zahn ZSSB-pipe with module and bar 	Zahn ZGBK-E 6,0 x L 	
Zahn Flat Roof Fasteners		Annex 109
Combination 109 ZSSB consisting of ZGBK®-E / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

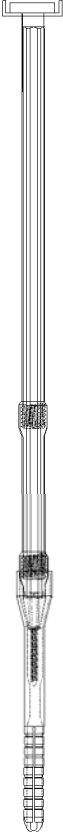
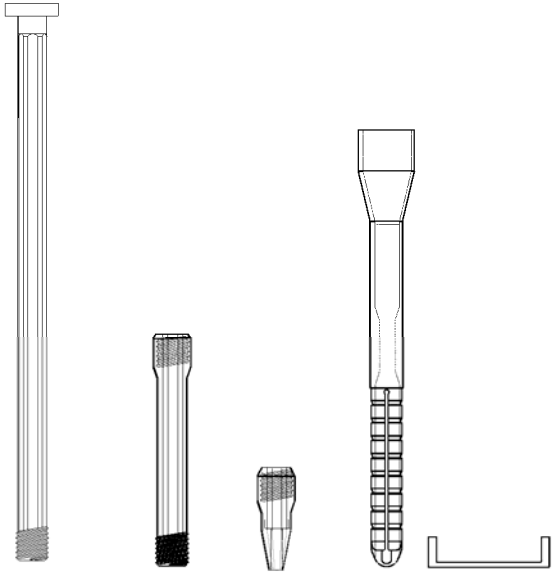
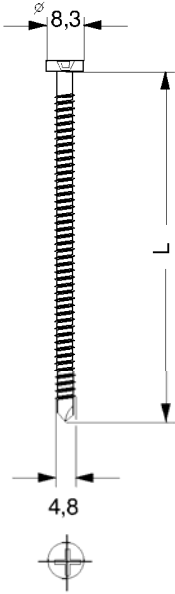
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Zahn ZSSB-pipe with module and bar 	Zahn ZBST 6,3 x L 	
Zahn Flat Roof Fasteners		Annex 110
Combination 110 ZSSB consisting of ZBST® / ZSSB-module-pipe-, module middle piece, module spike and ZSSB bar		

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Zahn ZSSB-pipe with module, dowel extension and bar 	Zahn ZDBK_{dowel} 4,8 x L 
Zahn Flat Roof Fasteners	
Combination 111 ZSSB consisting of ZDBK_{dowel} / ZSSB-mod.-pipe-, mod. middle piece, mod. spike, dowel extens. and ZSSB bar	
Annex 111	

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Zahn ZSSB-pipe with module, dowel extension and bar 	Zahn ZDBK-E 4,8 x L 
Zahn Flat Roof Fasteners	
Combination 112 ZSSB consisting of ZDBK-E / ZSSB-mod.-pipe-, mod. middle piece, mod. spike, dowel extension and ZSSB bar	
Annex 112	

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Characteristic Values of Axial Load Resistance [kN]

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Steel Deck S280GD – EN 10326		Timber			
		t ≥ 0,75 mm	t ≥ 1,50 mm	Structural Timber EN 338/C24 t ≥ 22 mm ¹⁾	OSB3 EN 300 t ≥ 18 mm ²⁾	Particle Board EN 312/P5 t ≥ 19 mm ³⁾	BFU100 EN 636 t ≥ 19 mm ⁴⁾
1	ZDBK / ZLVT 0001	0,98	-	-	-	-	-
2	ZDBK / ZLVT 0005	0,98	-	-	-	-	-
3	ZDBK / ZLVT 0015	0,98	-	-	-	-	-
4	ZKSK	0,98	-	-	-	-	-
5	ZKSK-R	0,98	-	-	-	-	-
6	ZDBK-E / ZLVT 0001	0,98	-	-	-	-	-
7	ZDBK-E / ZLVT 0005	0,98	-	-	-	-	-
8	ZDBK-E / ZLVT 0015	0,98	-	-	-	-	-
9	ZKSK-E	0,98	-	-	-	-	-
10	ZKSK-E/R	0,98	-	-	-	-	-
11	ZDBK-F1 / ZLVT 0001	1,13	-	-	-	-	-
12	ZDBK-F1 / ZLVT 0005	1,13	-	-	-	-	-
13	ZDBK-F1 / ZLVT 0015	1,13	-	-	-	-	-
14	ZKSK-F1	1,13	-	-	-	-	-
15	ZKSK-R-F1	1,13	-	-	-	-	-
16	ZDBK-F2 / ZLVT 0001	0,92	-	-	-	-	-
17	ZDBK-F2 / ZLVT 0005	0,92	-	-	-	-	-
18	ZDBK-F2 / ZLVT 0015	0,92	-	-	-	-	-
19	ZKSK-F2	0,92	-	-	-	-	-
20	ZKSK-R-F2	0,92	-	-	-	-	-
21	ZDBK-F3 / ZLVT 0001	1,19	-	-	-	-	-
22	ZDBK-F3 / ZLVT 0005	1,19	-	-	-	-	-
23	ZDBK-F3 / ZLVT 0015	1,19	-	-	-	-	-
24	ZKSK-F3	1,19	-	-	-	-	-
25	ZKSK-R-F3	1,19	-	-	-	-	-

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 113

Characteristic Values of Axial Load Resistance [kN]							
Annex	ZAHN Flat Roof Fasteners	Substructure					
		Steel Deck S280GD – EN 10326		Timber			
		t ≥ 0,75 mm	t ≥ 1,50 mm	Structural Timber EN 338/C24 t ≥ 22 mm ¹⁾	OSB3 EN 300 t ≥ 18 mm ²⁾	Particle Board EN 312/P5 t ≥ 19 mm ³⁾	BFU100 EN 636 t ≥ 19 mm ⁴⁾
26	ZDBS / ZLVT 0001	0,97	-	-	-	-	-
27	ZDBS / ZLVT 0005	0,97	-	-	-	-	-
28	ZDBS / ZLVT 0012	0,97	-	-	-	-	-
29	ZDBK-VB / ZLVT 0001	-	2,15	-	-	-	-
30	ZDBK-VB / ZLVT 0005	-	2,13	-	-	-	-
31	ZDBK-VB / ZLVT 0015	-	1,38	-	-	-	-
32	ZSKS-VB	-	2,15	-	-	-	-
33	ZSKS-VB/R	-	1,92	-	-	-	-
34	ZHBK / ZLVT 0001	-	-	1,71	1,21	1,80	1,27
35	ZHBK / ZLVT 0005	-	-	1,71	1,21	1,80	1,27
36	ZHBK / ZLVT 0015	-	-	1,38	1,21	1,38	1,27
37	ZHSK	-	-	1,71	1,21	1,80	1,27
38	ZHSK-R	-	-	1,71	1,21	1,80	1,27
39	ZHBK-E / ZLVT 0001	-	-	1,71	1,21	1,80	1,27
40	ZHBK-E / ZLVT 0005	-	-	1,71	1,21	1,80	1,27
41	ZHBK-E / ZLVT 0015	-	-	1,38	1,21	1,38	1,27
42	ZHSK-E	-	-	1,71	1,21	1,80	1,27
43	ZHSK-E/R	-	-	1,71	1,21	1,80	1,27
¹⁾ effective embedment depth (penetration length of threaded part) ≥ 22 mm ²⁾ effective embedment depth (penetration length of threaded part) ≥ 18 mm ³⁾ effective embedment depth (penetration length of threaded part) ≥ 19 mm ⁴⁾ effective embedment depth (penetration length of threaded part) ≥ 19 mm							

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 114

Characteristic Values of Axial Load Resistance

Annex	ZAHN Flat Roof Fasteners	Substructure				
		Aluminium Alloy EN 485 – $t \geq 0,50$ mm		Steel Deck S280GD – EN 10326		
		$R_m \geq 165$ N/mm ²	$R_m \geq 215$ N/mm ²	$t \geq 0,50$ mm	$t \geq 0,75$ mm	$t \geq 1,50$ mm
53	ZHRD	0,36 ^{a)}	0,47 ^{a)}	0,41 ^{a)}	-	-
54	ZHRD-R	0,36 ^{a)}	0,47 ^{a)}	0,41 ^{a)}	-	-
55	ZKSK-E-Modul	-	-	-	0,98	-
56	ZKSK-E/R-Modul	-	-	-	0,98	-
57	ZKSK-VB-Modul	-	-	-	-	1,16
58	ZKSK-VB-R-Modul	-	-	-	-	1,16
63	ZKSK-F1-Modul	-	-	-	1,13	-
64	ZKSK-R-F1-Modul	-	-	-	1,13	-
65	ZKSK-F2-Modul	-	-	-	0,92	-
66	ZKSK-R-F2-Modul	-	-	-	0,92	-
67	ZKSK-F3-Modul	-	-	-	1,16	-
68	ZKFK-R-F3-Modul	-	-	-	1,16	-
77	ZTSK-E	-	-	-	0,98	-
78	ZTSK-F1	-	-	-	1,13	-
79	ZTSK-F2	-	-	-	0,92	-
80	ZTSK-F3	-	-	-	1,19	-
90	ZLVT 0001 / ZDBS-E	-	-	-	0,97	-
91	ZLVT 0005 / ZDBS-E	-	-	-	0,97	-
94	ZLVT 0001 / ZDBK-Anchor	-	-	0,65	-	-
95	ZKSH-R / ZDBK-Anchor	-	-	0,65	-	-
96	ZKSH-R / ZDBK-Anchor	-	-	0,65	-	-
99	ZSSB / ZDBK-F1	-	-	-	1,13	-
100	ZSSB / ZDBK-E	-	-	-	0,98	-
103	ZHRD	0,36 ^{a)}	0,47 ^{a)}	0,41	-	-
104	ZSSB with Modul / ZDBK-E	-	-	-	0,98	-

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 115

Characteristic Values of Axial Load Resistance

Annex	ZAHN Flat Roof Fasteners	Substructure				
		Aluminium Alloy EN 485 – t ≥ 0,50 mm		Steel Deck S280GD – EN 10326		
		R _m ≥ 165 N/mm ²	R _m ≥ 215 N/mm ²	t ≥ 0,50 mm	t ≥ 0,75 mm	t ≥ 1,50 mm
105	ZSSB with Modul / ZDBK-VB	-	-	-	-	1,16
108	ZSSB with Modul / ZDBK-F1	-	-	-	1,13	-

^{a)} Pre-drill diameter has to be Ø 10,0 mm

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 116

Characteristic Values of Axial Load Resistance

Annex	ZAHN Flat Roof Fasteners	Substructure			
		Timber			
		Structural Timber EN 338/C24 t ≥ 22 mm	OSB3 EN 300 t ≥ 18 mm	Particle Board EN 312/P5 t ≥ 19 mm	BFU100 EN 636 t ≥ 19 mm
59	ZHSK-Modul	1,16	1,16	1,16	1,16
60	ZHSK-R-Modul	1,16	1,16	1,16	1,16
61	ZHSK-E-Modul	1,16	1,16	1,16	1,16
62	ZHSK-E-R-Modul	1,16	1,16	1,16	1,16
81	ZTSK (Timber)	1,58	1,21	1,58	1,27
82	ZTSK-E (Timber)	1,58	1,21	1,58	1,27
90	ZLVT 0001 / ZDBS-E	1,13	1,21	1,16	2,47
91	ZLVT 0005 / ZDBS-E	1,13	1,21	1,16	2,47
92	ZLVT 0001 / ZDBS H	1,13	1,21	1,16	2,47
93	ZLVT 0005 / ZDBS H	1,13	1,21	1,16	2,47
97	ZLVT 0008 / ZDBK-E H	1,34	1,08	1,34	1,34
98	ZKSH grey / ZDBK-E H	1,43	1,08	1,40	1,52
101	ZSSB / ZHBK	1,41	1,21	1,41	1,27
106	ZSSB with Modul / ZHBK	1,16	1,16	1,16	1,16
107	ZSSB with Modul / ZHBK-E	1,16	1,16	1,16	1,16

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 117

Characteristic Values of Axial Load Resistance [kN]									
Annex	ZAHN Flat Roof Fasteners	Substructure							
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520			
		C12/15	C25/30	P3,3 Density 0,45	P4,4 Density 0,55	LAC 2 Density 0,50	LAC 2 Density 1,00		
44	ZSDK	1,55		1,21		1,10			
45	ZSDK-R	1,55		1,21		1,10			
46	ZTSD	1,42		0,69		1,04			
47	ZGBK-E / ZLVT 0008	-	-	1,03	1,34	0,59	1,08		
48	ZGBK-E / ZLVT 0012	-	-	1,03	1,28	0,59	1,08		
49	ZKGK-E/R	-	-	1,03	1,60	0,59	1,08		
50	ZBST / ZLVT 0008	1,60	1,71	-	-	-	-		
51	ZBST / ZLVT 0012	1,60	1,67	-	-	-	-		
52	ZBSK-R	1,60	1,85	-	-	-	-		
Minimum Embedment Depth and Drill Hole Diameter									
Annex	ZAHN Flat Roof Fasteners	Substructure							
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520			
		Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter		
44	ZSDK	40 mm	8,0 mm	60 mm	8,0 mm	60 mm	8,0 mm		
45	ZSDK-R								
46	ZTSD								
47	ZGBK-E / ZLVT 0008	-		60 mm	-	60 mm	-		
48	ZGBK-E / ZLVT 0012								
49	ZKGK-E/R								
50	ZBST / ZLVT 0008	30 mm	5,0 mm	-		-			
51	ZBST / ZLVT 0012								
52	ZBSK-R								

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 118

Characteristic Values of Axial Load Resistance

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520	
		C12/15	C25/30	P3,3 Density 0,45	P4,4 Density 0,55	LAC 2 Density 0,50	LAC 2 Density 1,00
53	ZHRD	-	-	-	-	0,55	1,02
54	ZHRD-R	-	-	-	-	0,55	1,02
69	ZKGK-E-Modul	-	-	1,03	1,16	0,59	1,08
70	ZKGK-E/R-Modul	-	-	1,03	1,16	0,59	1,08
71	ZBSK-Modul	1,16		-	-	-	-
72	ZBSK-R-Modul	1,16		-	-	-	-
73	ZSDK-Modul	1,16		-	-	1,10	
74	ZSDK-R-Modul	1,16		-	-	1,10	
75	ZSDK-E-R-Modul	1,16		-	-	1,10	

Minimum Embedment Depth and Drill Hole Diameter

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520	
		Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter
53	ZHRD	-	-	-	-	80,0 mm	10,0 mm
54	ZHRD-R	-	-	-	-		
69	ZKGK-E-Modul	-	-	60,0 mm	-	60,0 mm	-
70	ZKGK-E/R-Modul	-	-		-		-
71	ZBSK-Modul	30,0 mm	5,0 mm	-	-	-	-
72	ZBSK-R-Modul			-	-	-	-
73	ZSDK-Modul	40,0 mm	8,0 mm	60,0 mm	8,0 mm	60,0 mm	8,0 mm
74	ZSDK-R-Modul						
75	ZSDK-E-R-Modul						

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 119

Characteristic Values of Axial Load Resistance

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520	
		C12/15	C25/30	P3,3 Density 0,45	P4,4 Density 0,55	LAC 2 Density 0,50	LAC 2 Density 1,00
76	ZSDK-E-R-Modul	1,16		-	-	1,10	
83	ZTSK-E (Pb / Bd)	-	-	1,03	1,33	0,59	1,08
84	ZTSK (Concrete)	1,41		-	-	-	-
85	ZTSK-E (Concrete)	1,41		-	-	-	-
86	ZLVT 0008 / ZBST-E	1,60	1,71	-	-	-	-
87	ZLVT 0012 / ZBST-E	1,60	1,67	-	-	-	-
88	ZSDK-E	1,55		-	-	1,10	
89	ZSDK-E/R	1,55		-	-	1,10	
102	ZSSB / ZDBK-Anchor	1,41		-	-	1,10	

Minimum Embedment Depth and Drill Hole Diameter

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520	
		Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter
76	ZSDK-E-R-Modul	40,0 mm	8,0 mm	60,0 mm	8,0 mm	60,0 mm	8,0 mm
83	ZTSK-E (Pb / Bd)			60,0 mm	-	60,0 mm	-
84	ZTSK (Concrete)	30,0 mm	5,0 mm	-	-	-	-
85	ZTSK-E (Concrete)			-	-	-	-
86	ZLVT 0008 / ZBST-E			-	-	-	-
87	ZLVT 0012 / ZBST-E			-	-	-	-
88	ZSDK-E	40,0 mm	8,0 mm	-	-	60,0 mm	8,0 mm
89	ZSDK-E/R			-	-		
102	ZSSB / ZDBK-Anchor			-	-		

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 120

Characteristic Values of Axial Load Resistance

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520	
		C12/15	C25/30	P3,3 Density 0,45	P4,4 Density 0,55	LAC 2 Density 0,50	LAC 2 Density 1,00
103	ZHRD	-	-	-	-	0,55	1,02
109	ZSSB with Modul / ZGBK-E	-	-	1,06	1,16	0,59	1,08
110	ZSSB with Modul / ZBST	1,16		-	-	-	-
111	ZSSB with Modul / ZDBK-Anchor	1,16		-	-	1,10	
112	ZSSB with Modul / ZDBK-E	1,16		-	-	1,10	
-	-	-	-	-	-	-	-

Minimum Embedment Depth and Drill Hole Diameter

Annex	ZAHN Flat Roof Fasteners	Substructure					
		Concrete EN 206-1		Aerated Concrete DIN 4223-1		Light Weight Concrete EN 1520	
		Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter	Embedment Depth	Drill Hole Diameter
103	ZHRD	-	-	-	-	80,0 mm	10,0 mm
109	ZSSB with Modul / ZGBK-E	-	-	60,0 mm	-	60,0 mm	-
110	ZSSB with Modul / ZBST	30,0 mm	5,0 mm	-	-	-	-
111	ZSSB with Modul / ZDBK-Anchor	40,0 mm	8,0 mm	-	-	60,0 mm	8,0 mm
112	ZSSB with Modul / ZDBK-E			-	-		
-	-	-	-	-	-	-	-

ZAHN Flat Roof Fasteners

Characteristic Values of Axial Load Resistance

Annex 121