



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:

verlängert
extended

vom
from
bis
to
vom
from
bis
to

22 February 2008
22 February 2013
23 February 2013
23 February 2018

Herstellwerk
Manufacturing plant

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

Diese Zulassung umfasst
This Approval contains

64 Seiten einschließlich 58 Anhänge
64 pages including 58 annexes

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 product/ products and intended use

1.1 Definition of the construction product

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. The washers without integrated sleeve are made of coated carbon steel whereas the washers with integrated sleeve are made of plastic materials (polyamide). The sleeve of the plastic washers with integrated sleeve, which are intended to be used for fastenings to concrete, aerated concrete or light weight concrete, is either an anchor sleeve or a combination with integrated anchor sleeve. 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.

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 52.

The material properties, dimensions and tolerances not indicated in Annexes 1 to 52 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 53 to 58. 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 99/92/EC of the European Commission⁸ the 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 products by the manufacturer on the basis of:

(a) Tasks for the manufacturer:

- (1) initial type-testing of the products;
- (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 products are 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 80.of 18.03.1998

The factory production control shall be in accordance with the control plan of 22 February 2008 relating to this European technical approval, 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 of 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 products are 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 products on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the products that have been assessed and judged. Changes to the products 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.

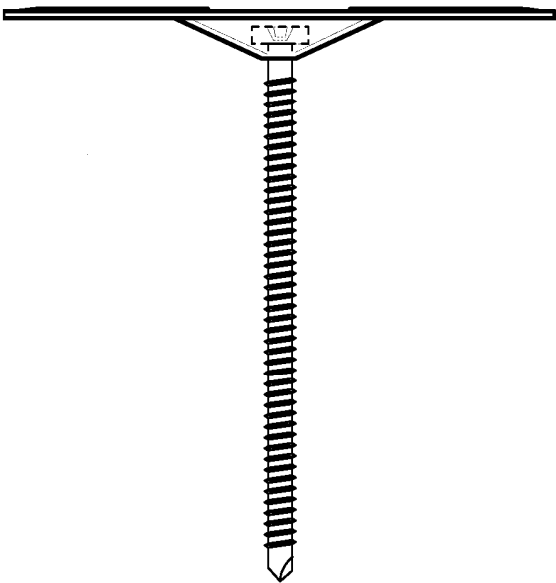
The conformity of the installed fastener with this ETA is attested by the executing company.

5 Indications to the manufacturer

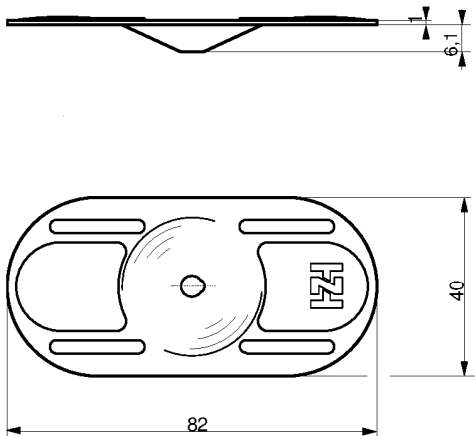
It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2 and 4 is given to those who are concerned. The information may be given by reproduction of the respective parts of the European technical approval. In addition all installation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

Georg Feistel
Head of Department

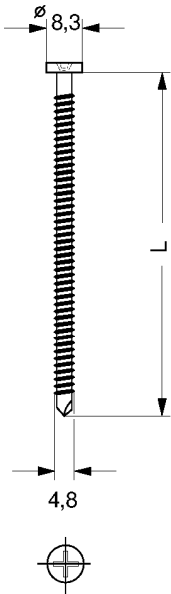
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Zahn ZLVT 0001



Zahn ZDBK 4,8 x L

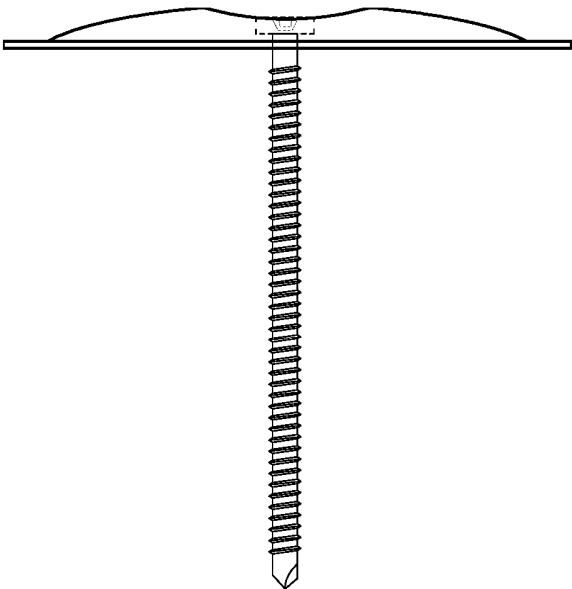


Zahn Flat Roof Fasteners

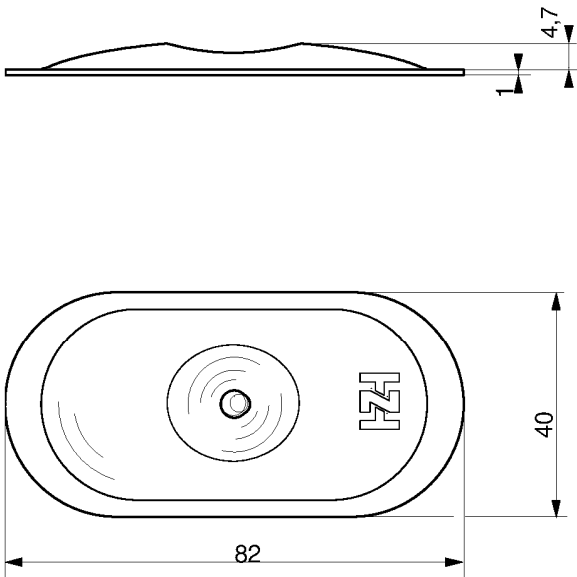
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ZDBK® / ZLVT®0001

Annex 1

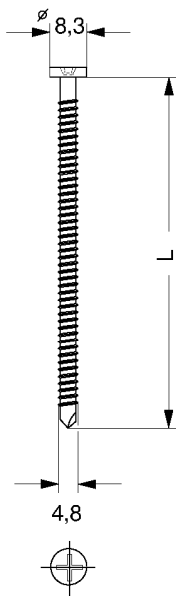
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Zahn ZLVT 0005



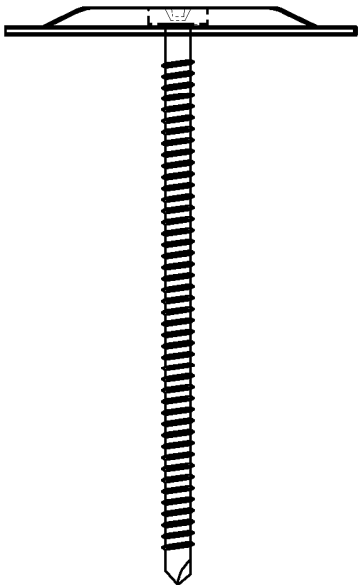
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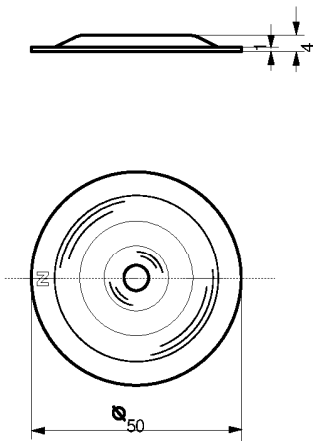
Zahn Flat Roof Fasteners

Combination 2
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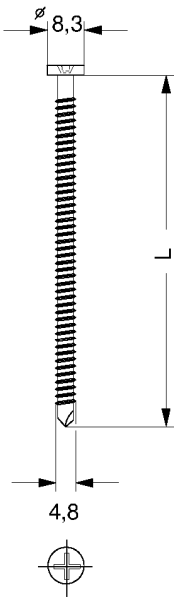
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Zahn ZLVT 0015



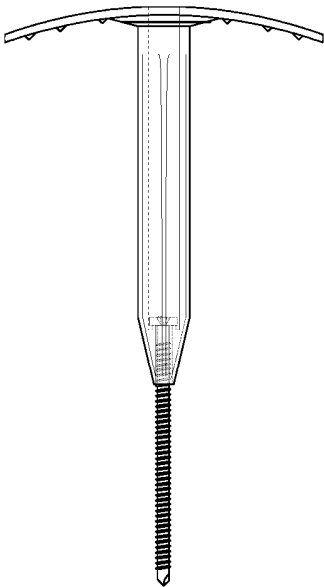
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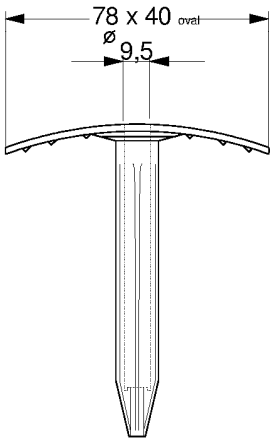
Zahn Flat Roof Fasteners

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ZDBK® / ZLVT®0015

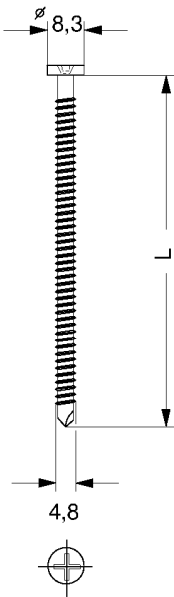
Annex 3



Zahn ZKSH oval



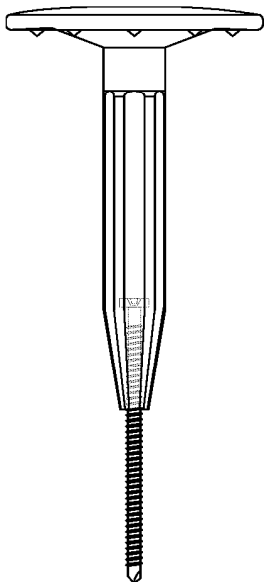
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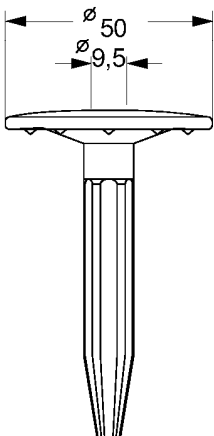
Zahn Flat Roof Fasteners

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

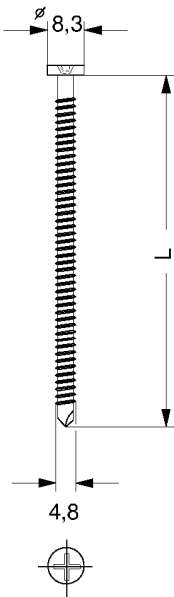
Annex 4



Zahn ZKSH round



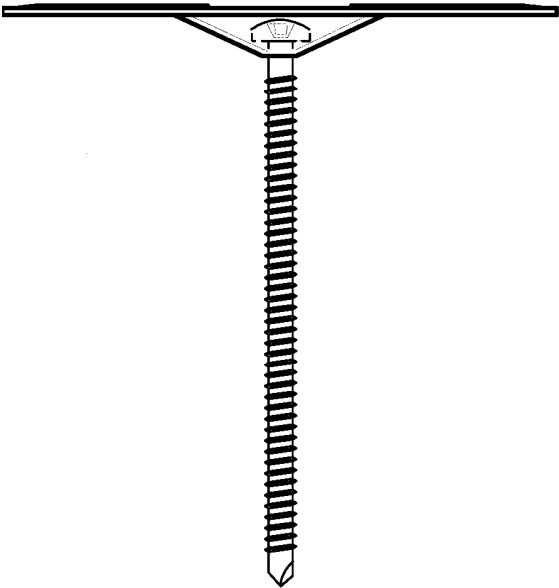
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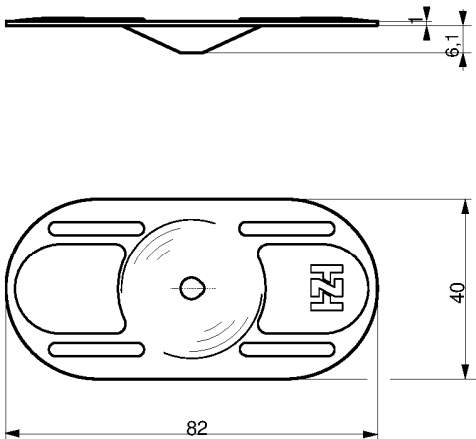
Zahn Flat Roof Fasteners

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

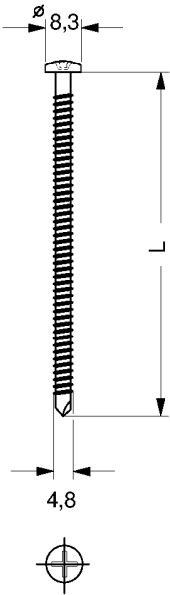
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Zahn ZLVT 0001



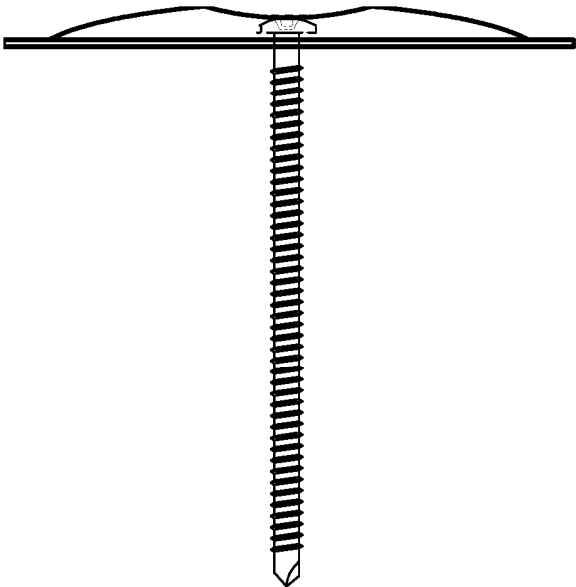
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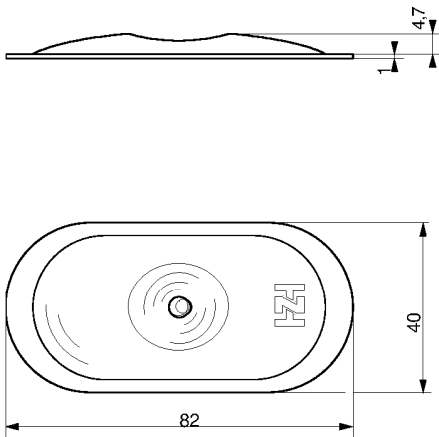
Zahn Flat Roof Fasteners

Combination 6
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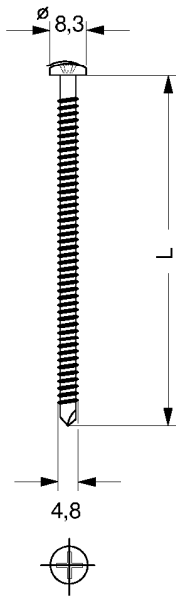
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Zahn ZLVT 0005



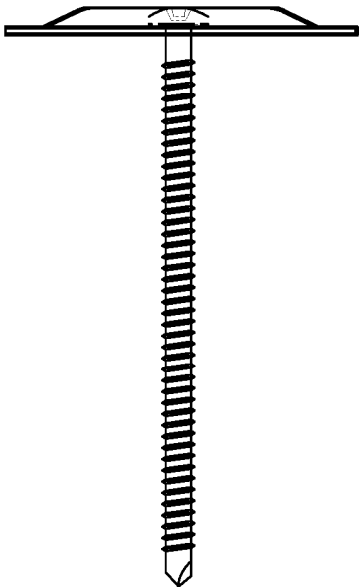
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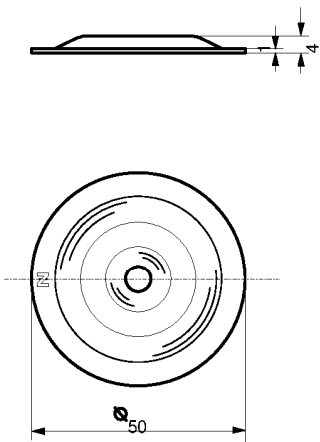
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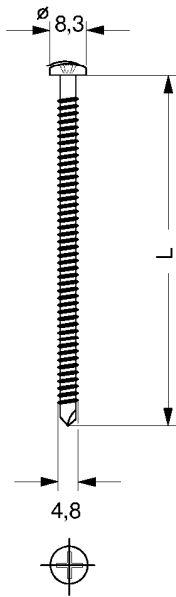
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Zahn ZLVT 0015



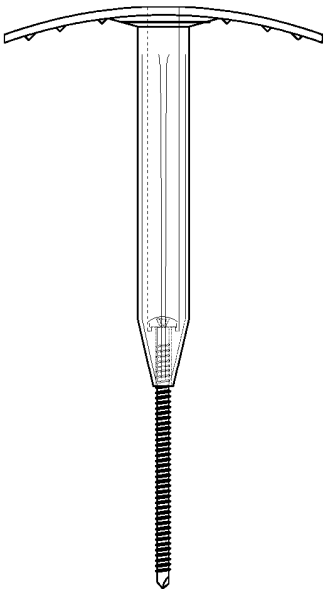
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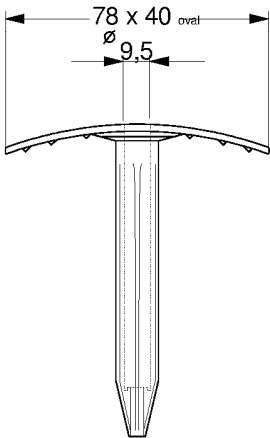
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Combination 8
ZDBK®-E / ZLVT®0015

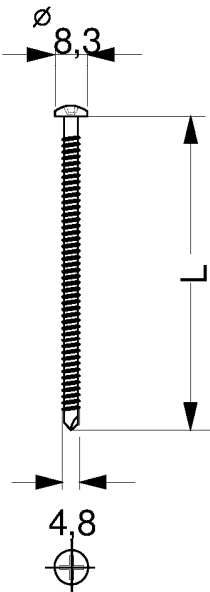
Annex 8



Zahn ZKSH oval



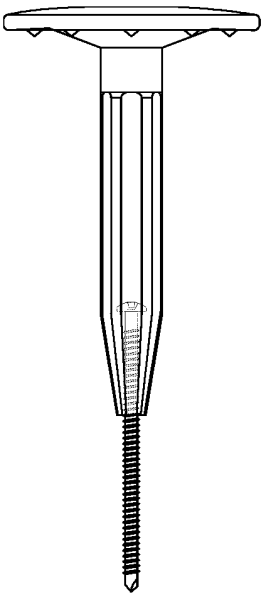
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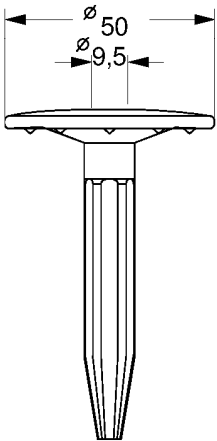
Zahn Flat Roof Fasteners

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

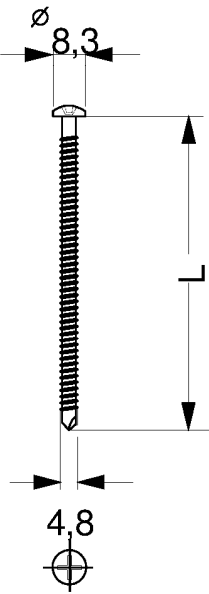
Annex 9



Zahn ZKSH round



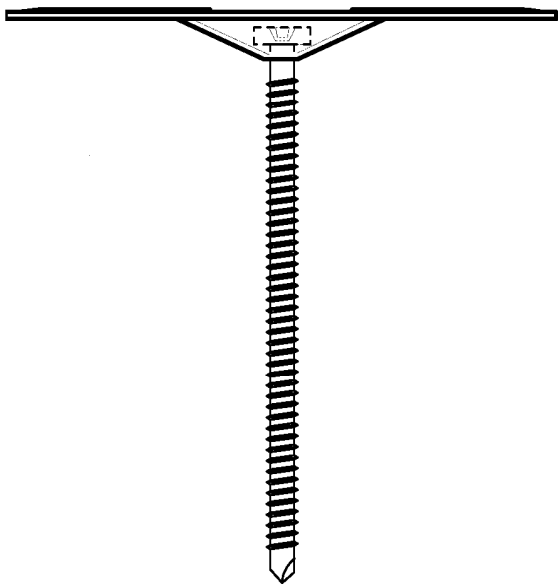
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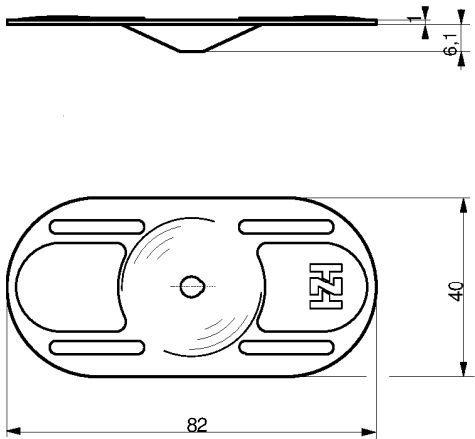
Zahn Flat Roof Fasteners

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

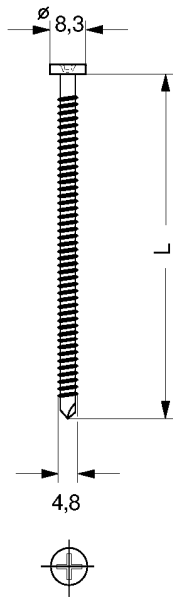
Annex 10



Zahn ZLVT 0001



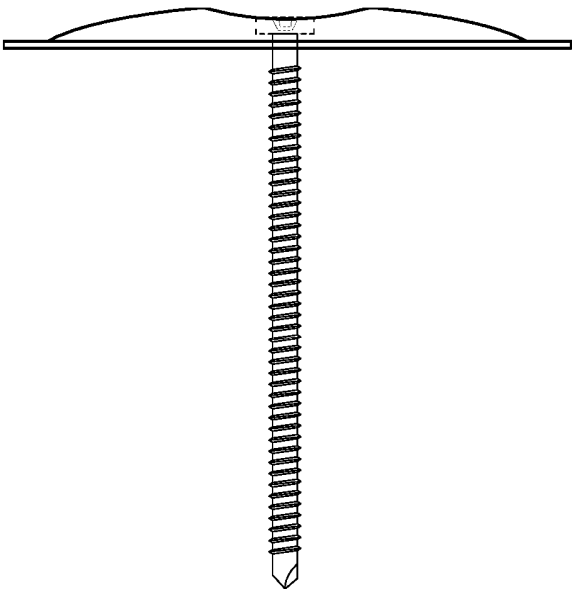
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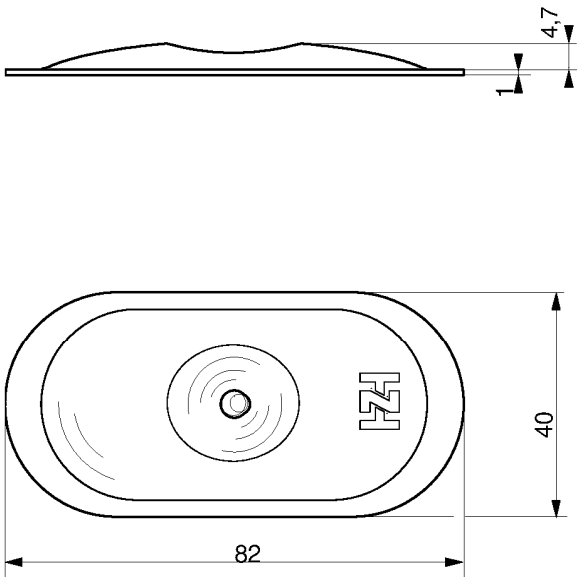
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Combination 11
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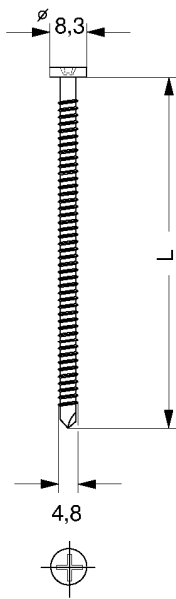
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Zahn ZLVT 0005



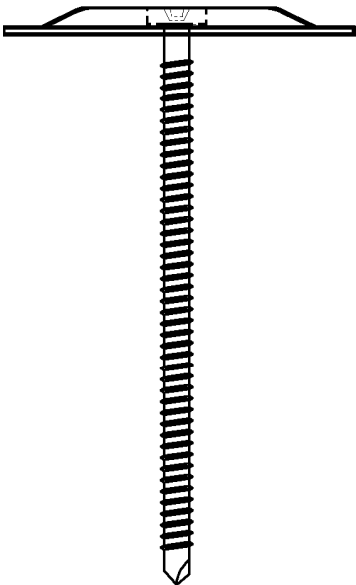
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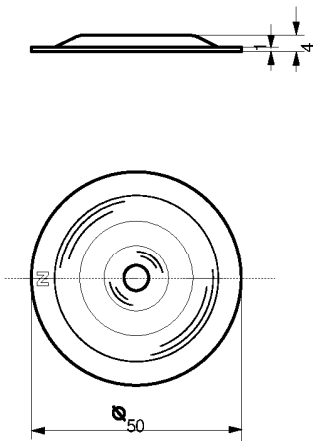
Zahn Flat Roof Fasteners

Combination 12
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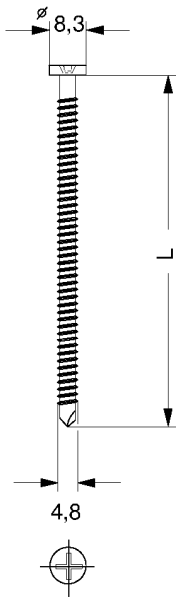
Annex 12



Zahn ZLVT 0015



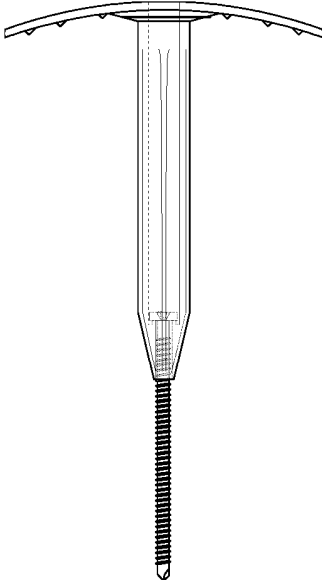
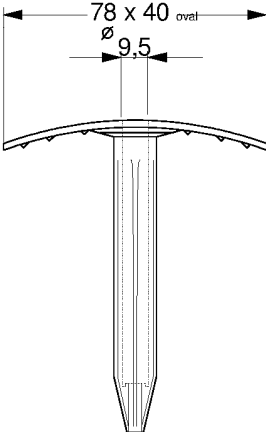
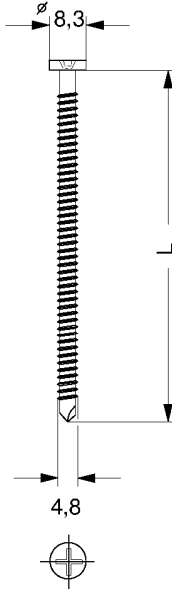
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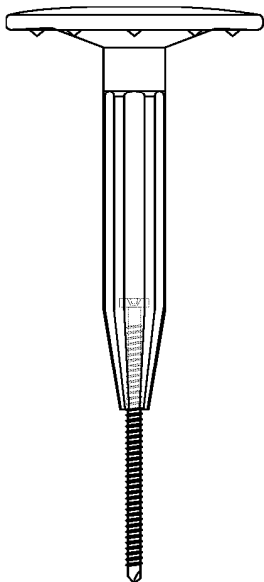
Zahn Flat Roof Fasteners

Combination 13
ZDBK®-F1 / ZLVT®0015

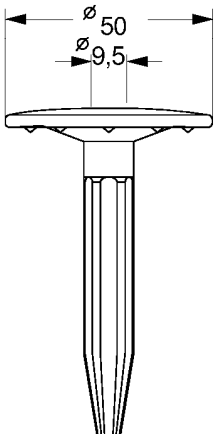
Annex 13

		
Zahn ZKSH oval 	Zahn ZDBK-F1 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 14
Combination 14 ZKSK®-F1 consisting of ZDBK®-F1 / ZKSH® oval		

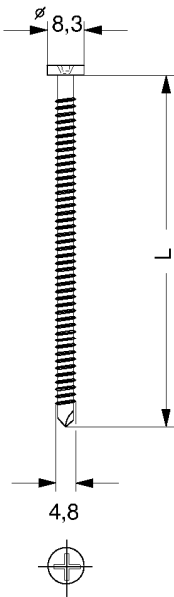
electronic copy of the eta by dibt: eta-08/0033



Zahn ZKSH round



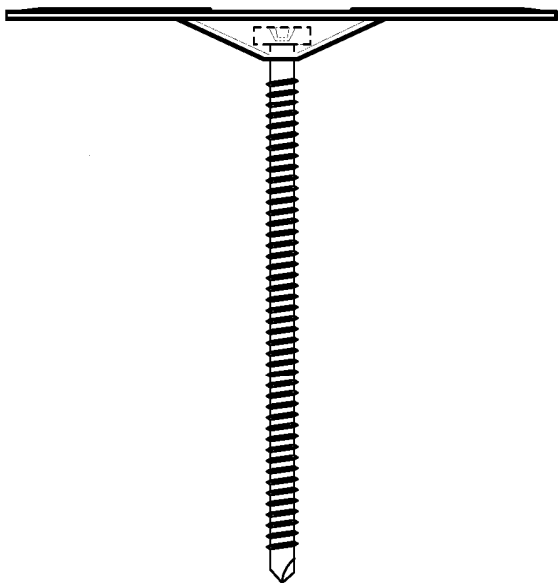
Zahn ZDBK-F1 4,8 x L



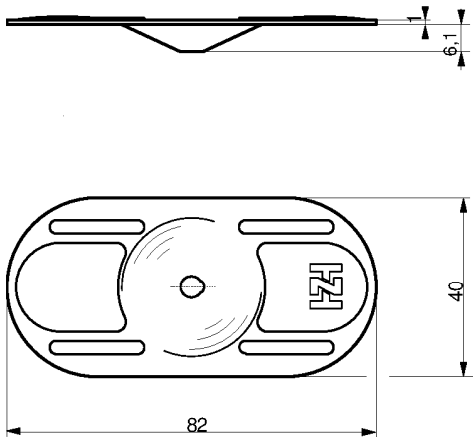
Zahn Flat Roof Fasteners

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

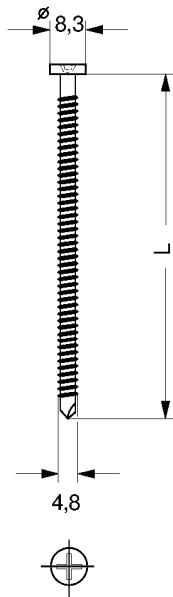
Annex 15



Zahn ZLVT 0001



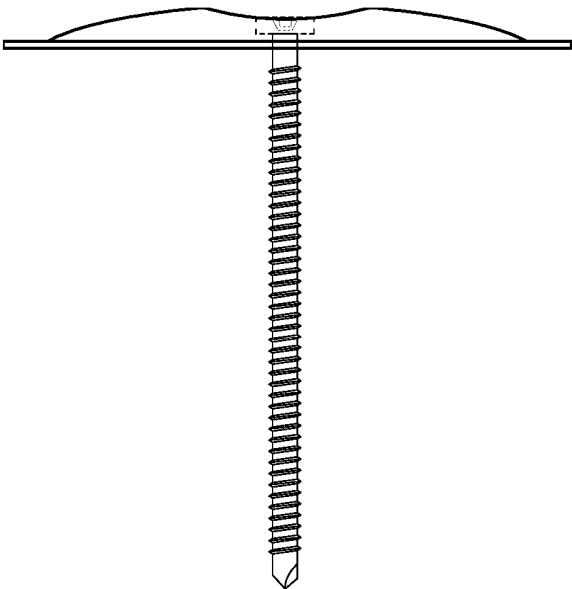
Zahn ZDBK-F2 4,8 x L



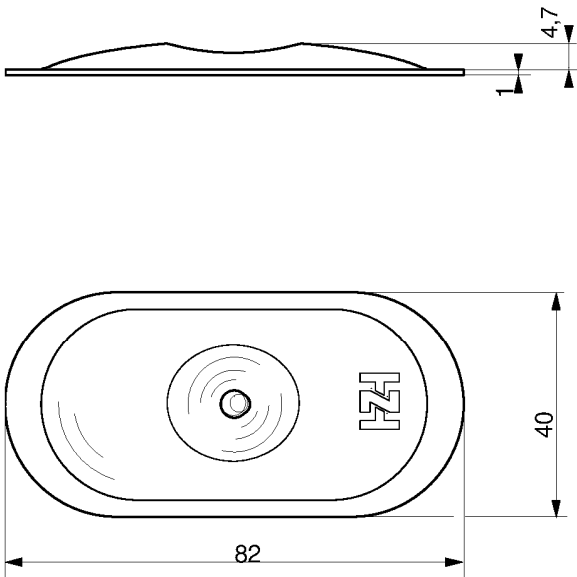
Zahn Flat Roof Fasteners

Combination 16
ZDBK®-F2 / ZLVT®0001

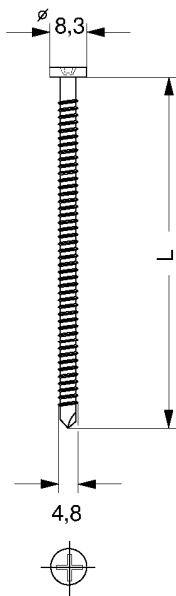
Annex 16



Zahn ZLVT 0005



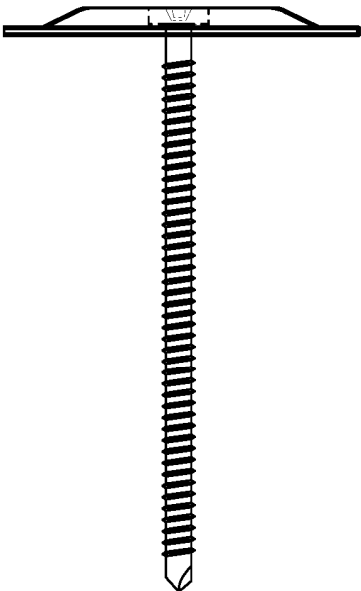
Zahn ZDBK-F2 4,8 x L



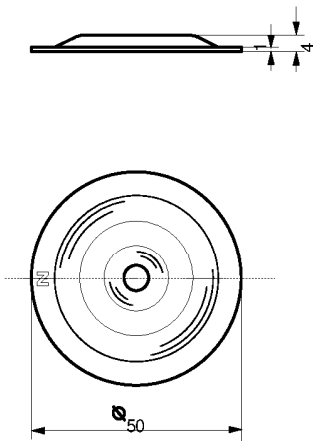
Zahn Flat Roof Fasteners

Combination 17
ZDBK®-F2 / ZLVT®0005

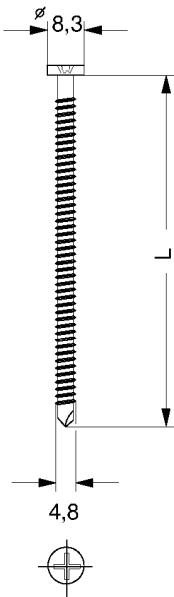
Annex 17



Zahn ZLVT 0015



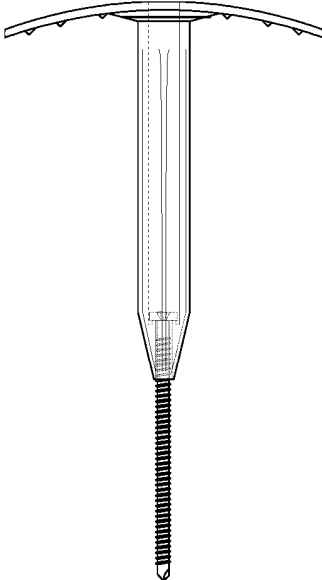
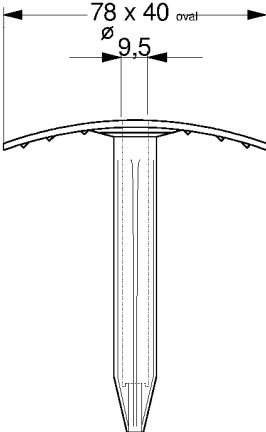
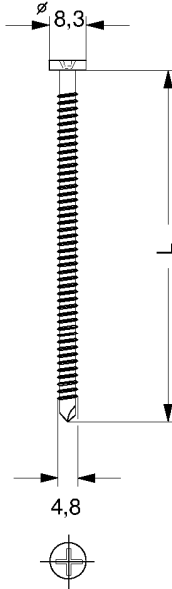
Zahn ZDBK-F2 4,8 x L



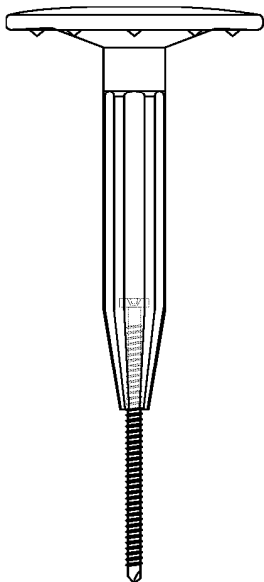
Zahn Flat Roof Fasteners

Combination 18
ZDBK®-F2/ ZLVT®0015

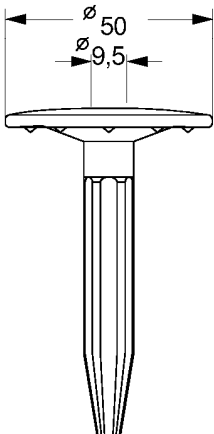
Annex 18

		
Zahn ZKSH oval 	Zahn ZDBK-F2 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 19
Combination 19 ZKSK®-F2 consisting of ZDBK®-F2 / ZKSH® oval		

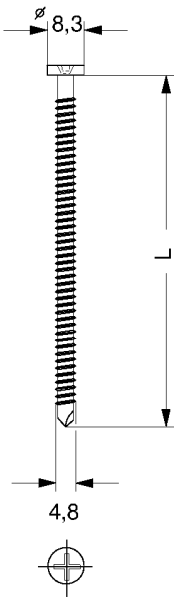
electronic copy of the eta by dibt: eta-08/0033



Zahn ZKSH round



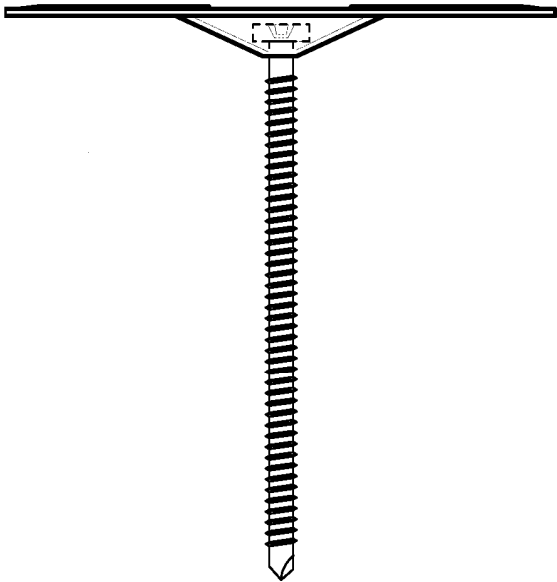
Zahn ZDBK-F2 4,8 x L



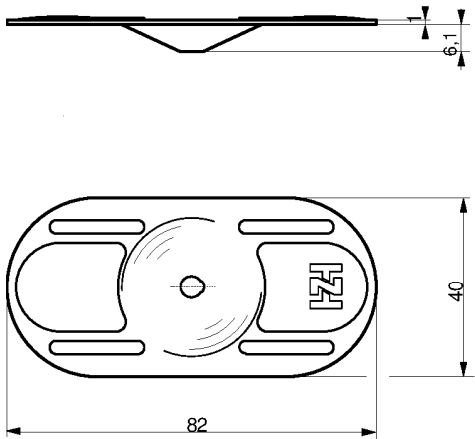
Zahn Flat Roof Fasteners

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

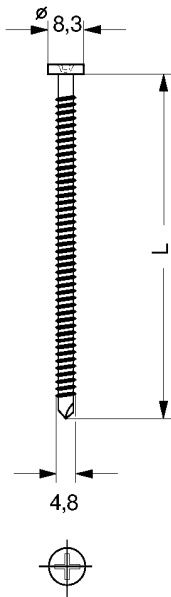
Annex 20



Zahn ZLVT 0001



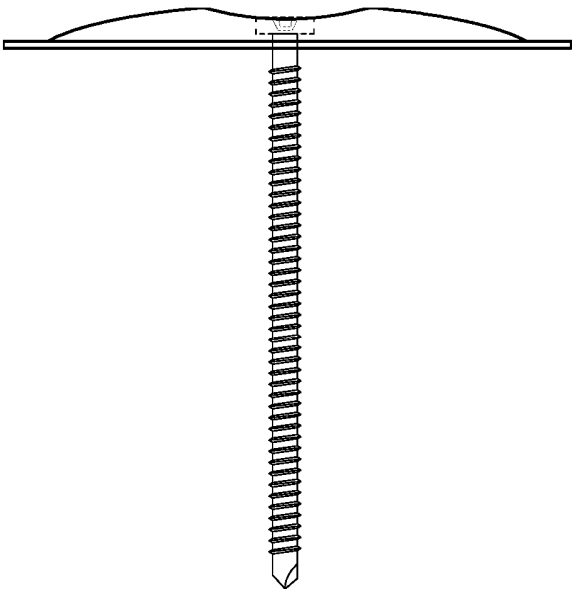
Zahn ZDBK-F3 4,8 x L



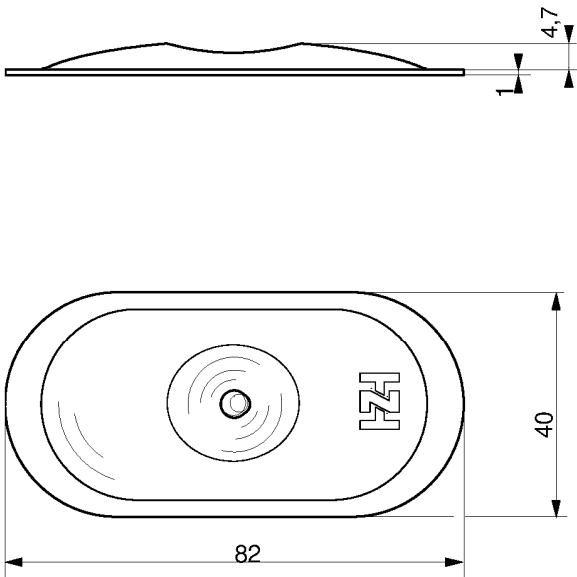
Zahn Flat Roof Fasteners

Combination 21
ZDBK®-F3 / ZLVT®0001

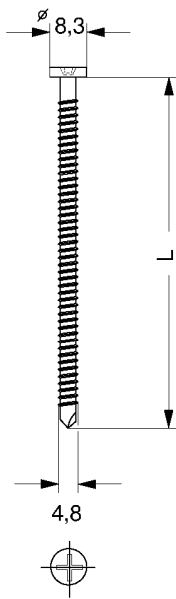
Annex 21



Zahn ZLVT 0005



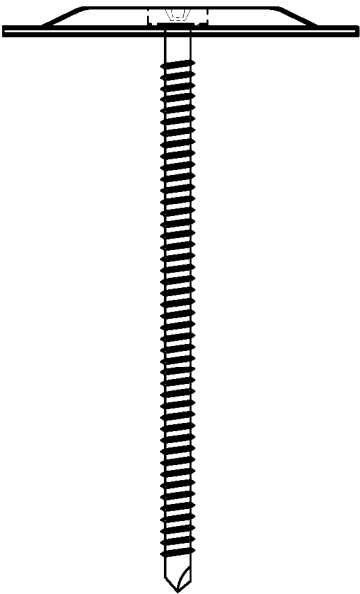
Zahn ZDBK-F3 4,8 x L



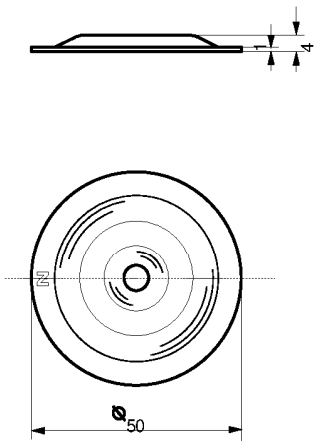
Zahn Flat Roof Fasteners

Combination 22
ZDBK®-F3 / ZLVT®0005

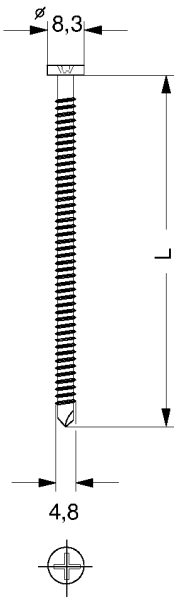
Annex 22



Zahn ZLVT 0015



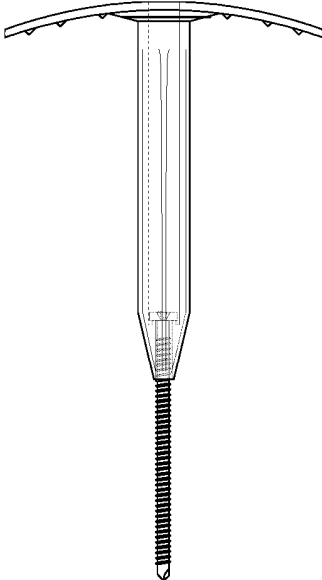
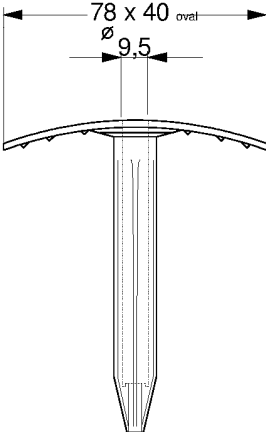
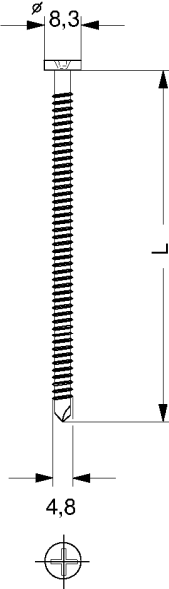
Zahn ZDBK-F3 4,8 x L



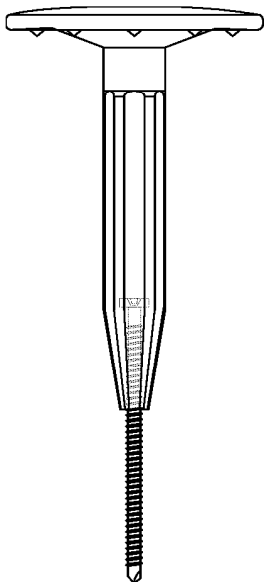
Zahn Flat Roof Fasteners

Combination 23
ZDBK®-F3 / ZLVT®0015

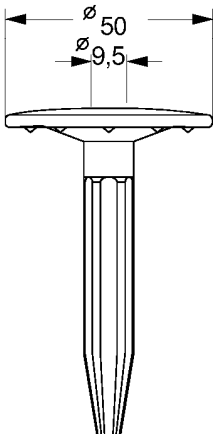
Annex 23

		
Zahn ZKSH oval 	Zahn ZDBK-F3 4,8 x L 	
Zahn Flat Roof Fasteners		Annex 24
Combination 24 ZKSK [®] -F3 consisting ZDBK [®] -F3 / ZKSH [®] oval		

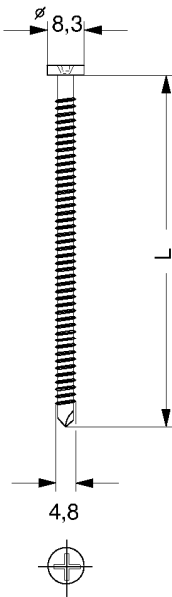
electronic copy of the eta by dibt: eta-08/0033



Zahn ZKSH round



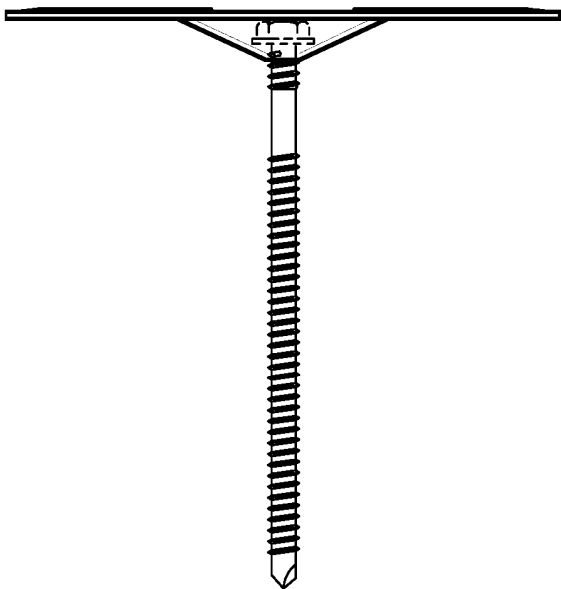
Zahn ZDBK-F3 4,8 x L



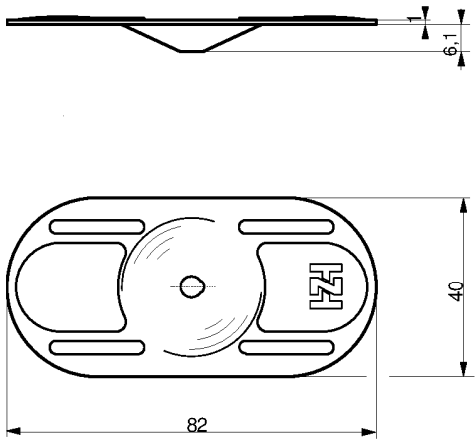
Zahn Flat Roof Fasteners

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

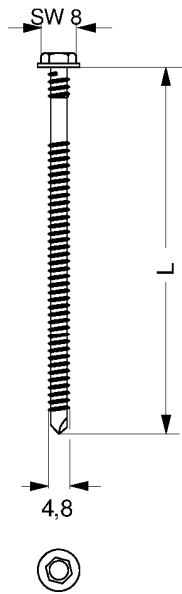
Annex 25



Zahn ZLVT 0001



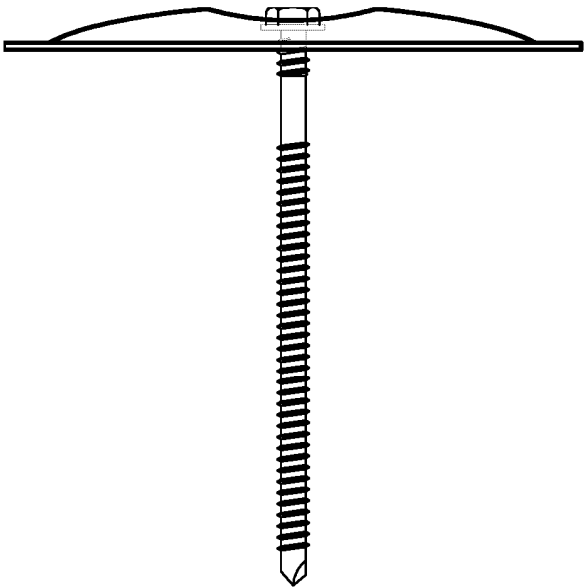
Zahn ZDBS 4,8 x L



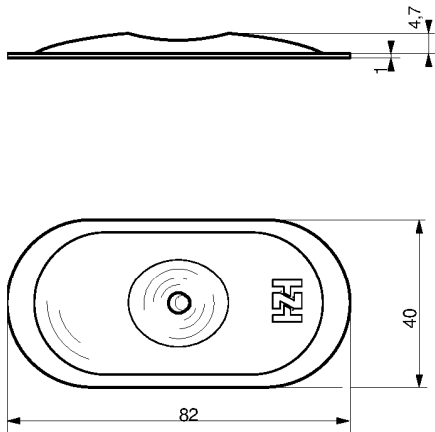
Zahn Flat Roof Fasteners

Combination 26
ZDBS® / ZLVT®0001

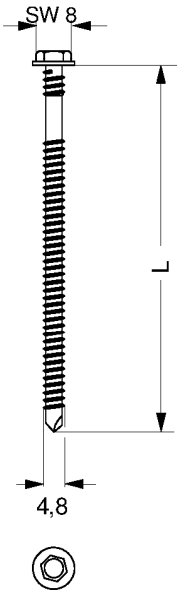
Annex 26



Zahn ZLVT 0005



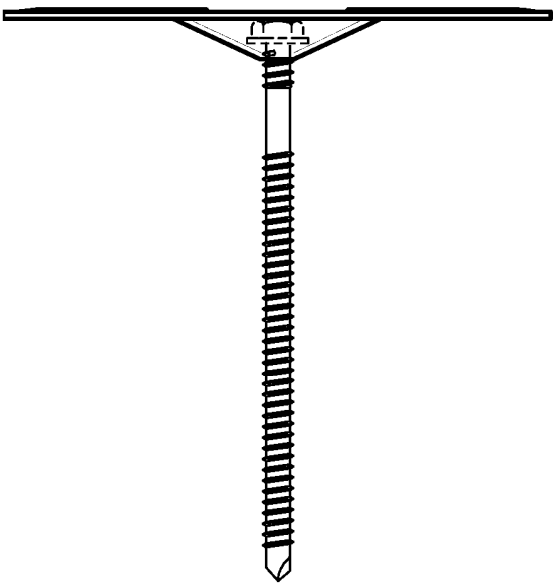
Zahn ZDBS 4,8 x L



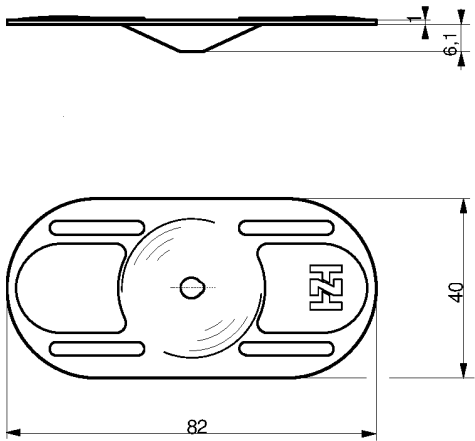
Zahn Flat Roof Fasteners

Combination 27
ZDBS® / ZLVT®0005

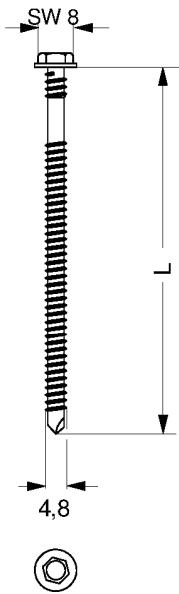
Annex 27



Zahn ZLVT 0012



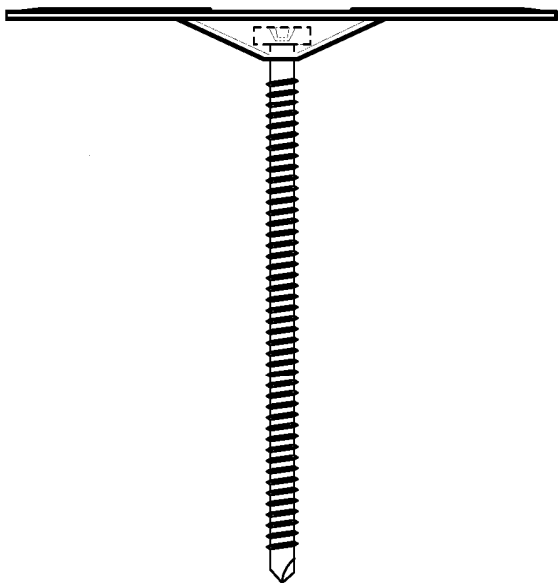
Zahn ZDBS 4,8 x L



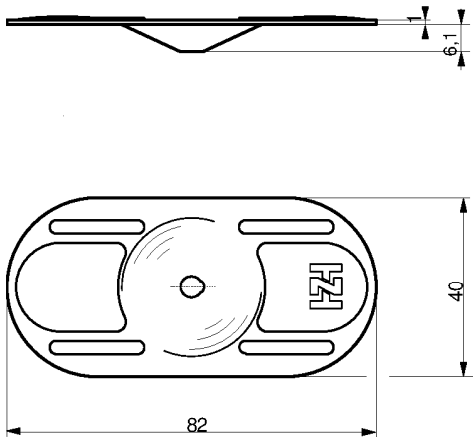
Zahn Flat Roof Fasteners

Combination 28
ZDBS® / ZLVT®0012

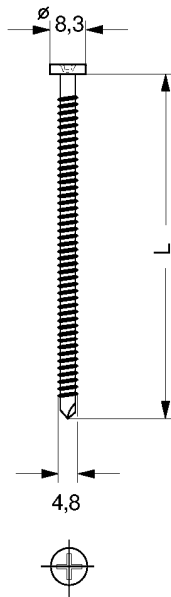
Annex 28



Zahn ZLVT 0001



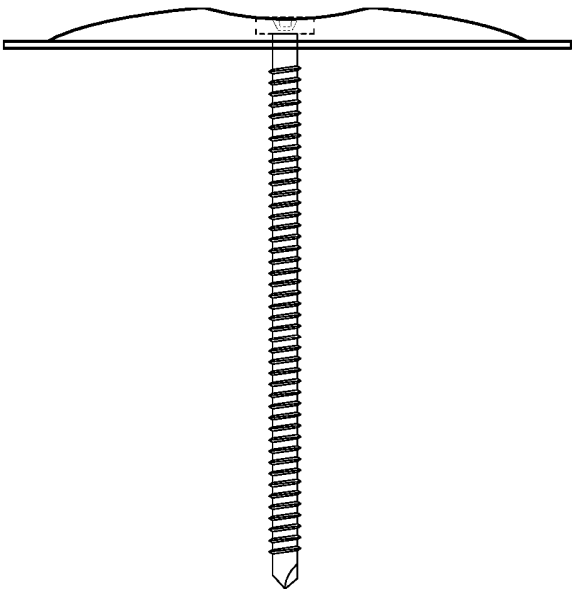
Zahn ZDBK-VB 4,8 x L



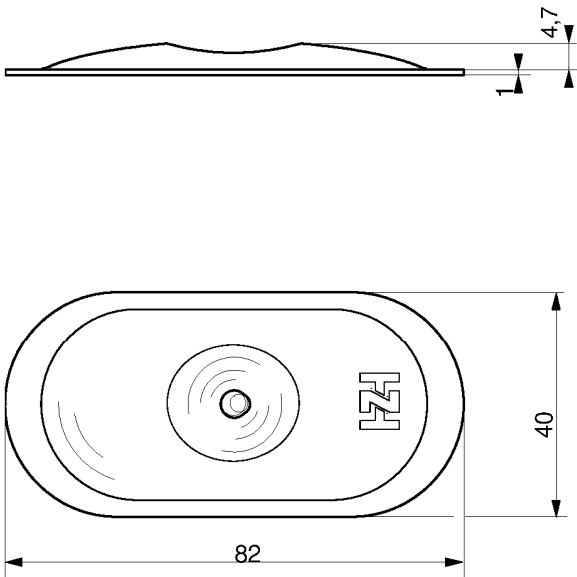
Zahn Flat Roof Fasteners

Combination 29
ZDBK®-VB / ZLVT®0001

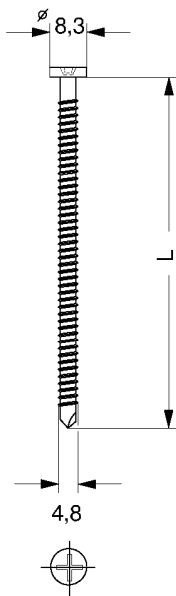
Annex 29



Zahn ZLVT 0005



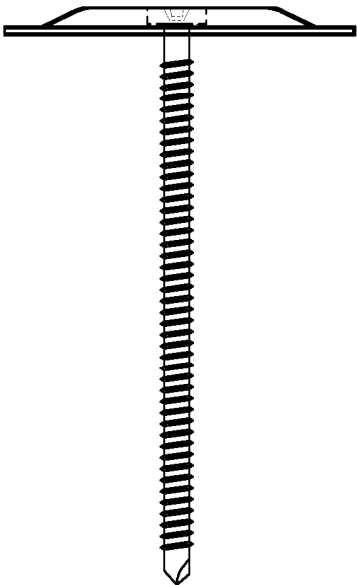
Zahn ZDBK-VB 4,8 x L



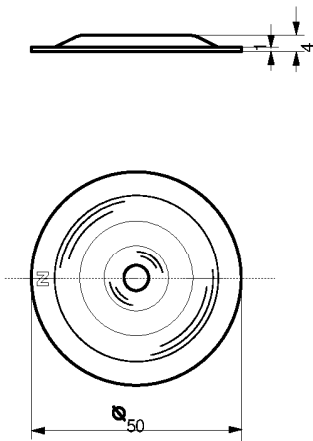
Zahn Flat Roof Fasteners

Combination 30
ZDBK®-VB / ZLVT®0005

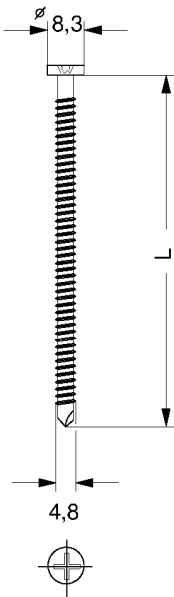
Annex 30



Zahn ZLVT 0015



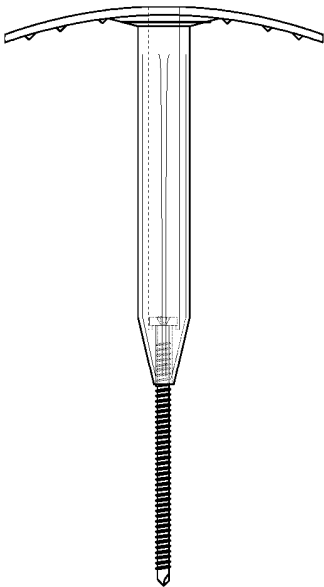
Zahn ZDBK-VB 4,8 x L



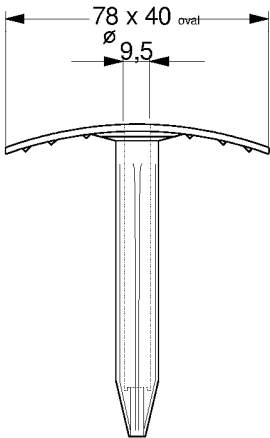
Zahn Flat Roof Fasteners

Combination 31
ZDBK®-VB / ZLVT®0015

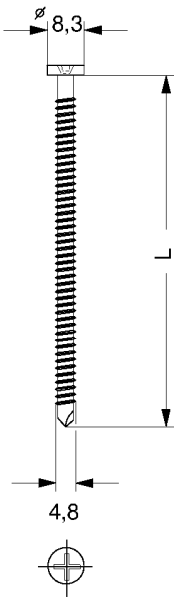
Annex 31



Zahn ZKSH oval



Zahn ZDBK-VB 4,8 x L

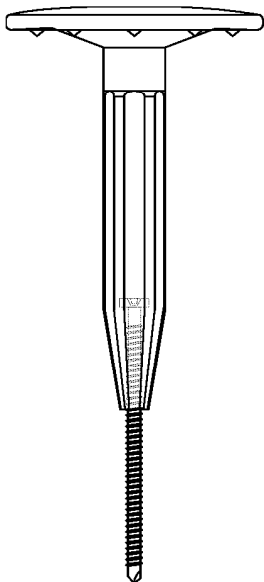


Zahn Flat Roof Fasteners

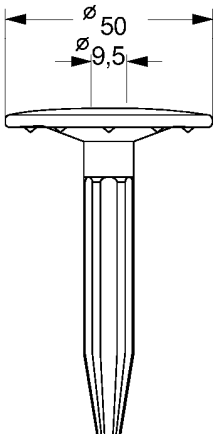
Combination 32
ZKSK®-VB consisting of ZDBK®-VB / ZKSH® oval

Annex 32

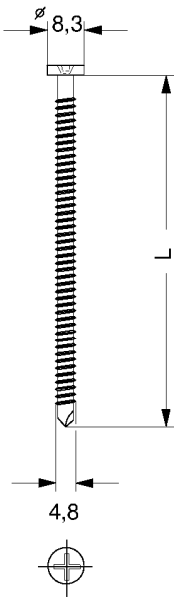
electronic copy of the eta by dibt: eta-08/0033



Zahn ZKSH round



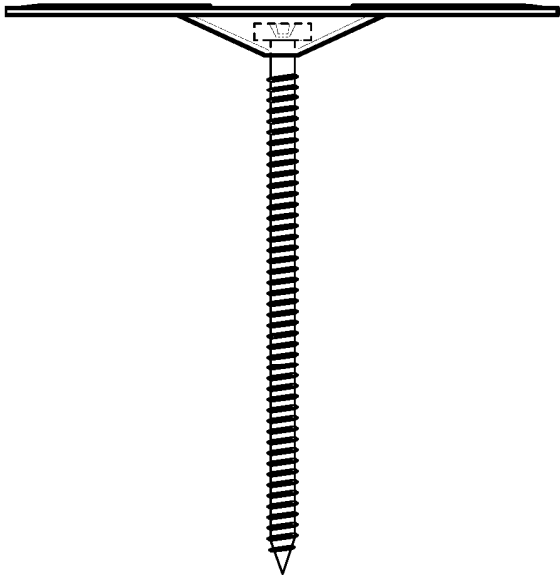
Zahn ZDBK-VB 4,8 x L



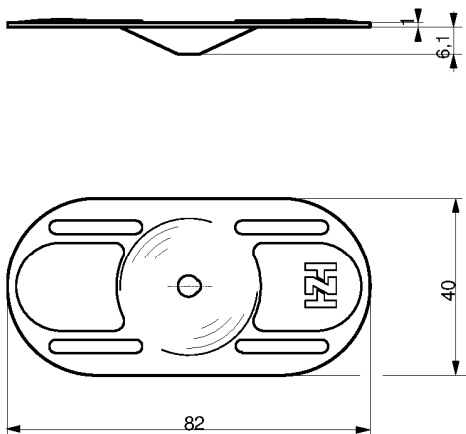
Zahn Flat Roof Fasteners

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

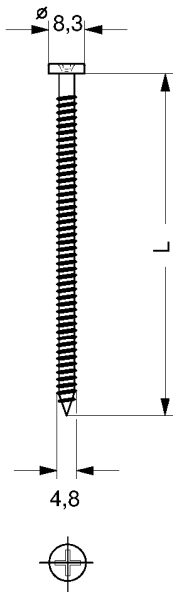
Annex 33



Zahn ZLVT 0001



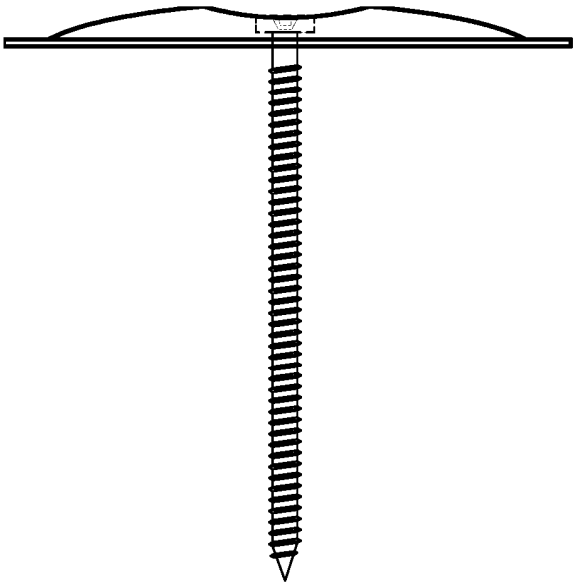
Zahn ZHBK 4,8 x L



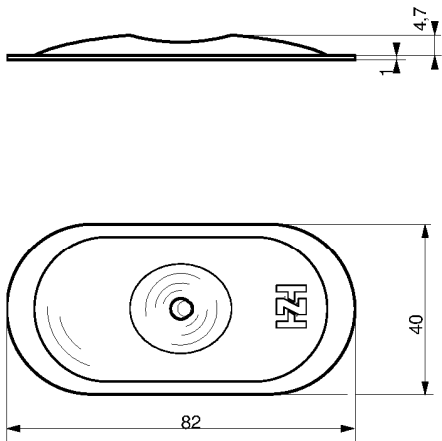
Zahn Flat Roof Fasteners

Combination 34
ZHBK® / ZLVT®0001

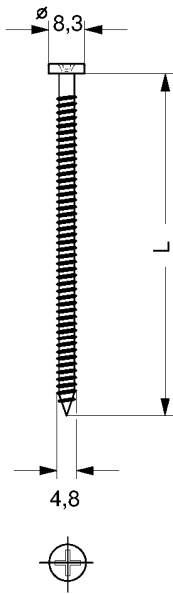
Annex 34



Zahn ZLVT 0005



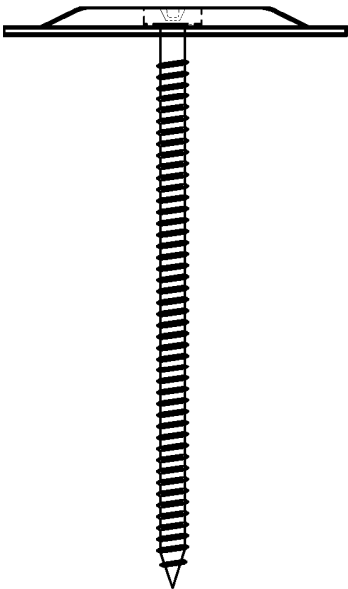
Zahn ZHBK 4,8 x L



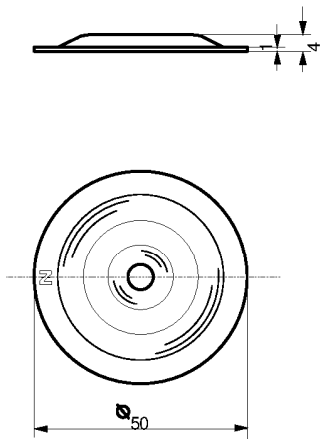
Zahn Flat Roof Fasteners

Combination 35
ZHBK® / ZLVT®0005

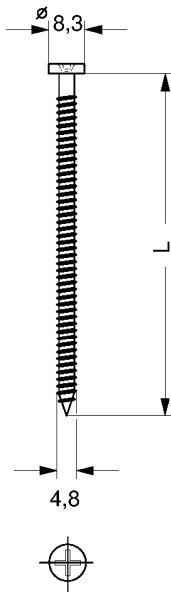
Annex 35



Zahn ZLVT 0015



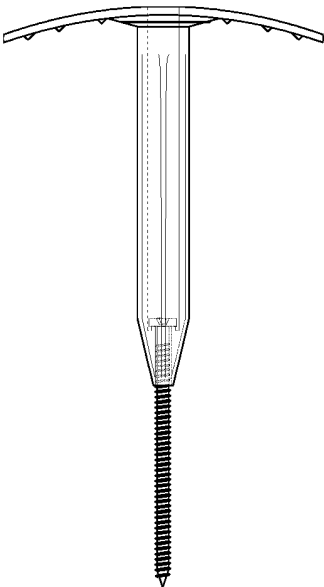
Zahn ZHBK 4,8 x L



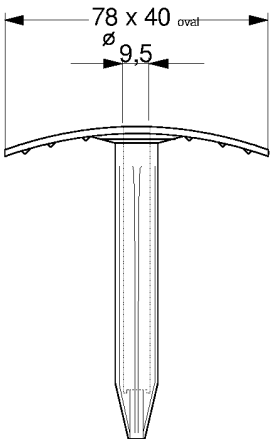
Zahn Flat Roof Fasteners

Combination 36
ZHBK® / ZLVT®0015

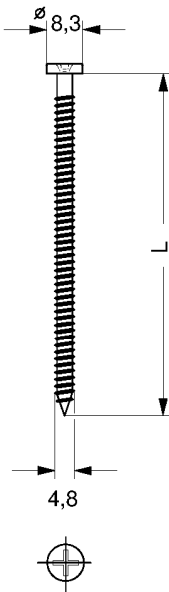
Annex 36



Zahn ZKSH oval



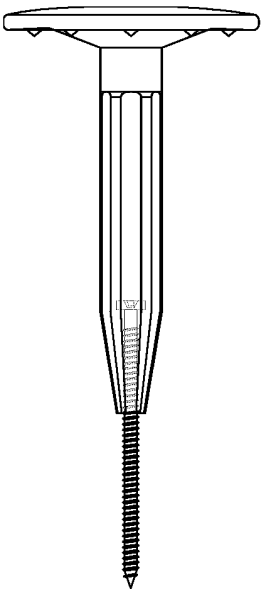
Zahn ZHBK 4,8 x L



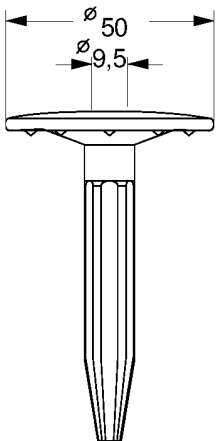
Zahn Flat Roof Fasteners

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

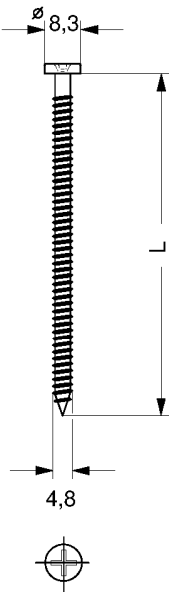
Annex 37



Zahn ZKSH round



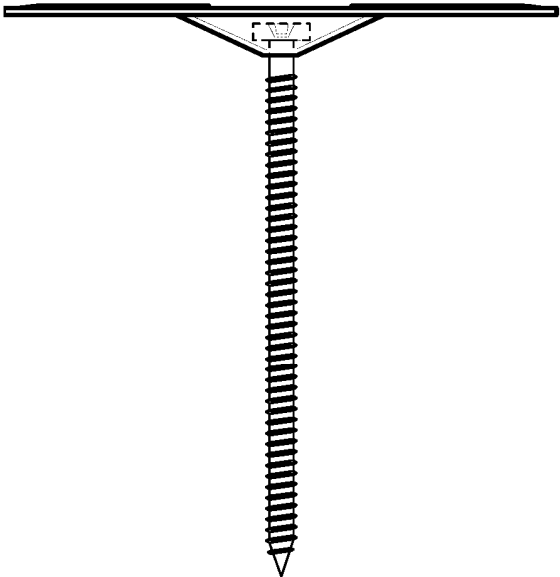
Zahn ZHBK 4,8 x L



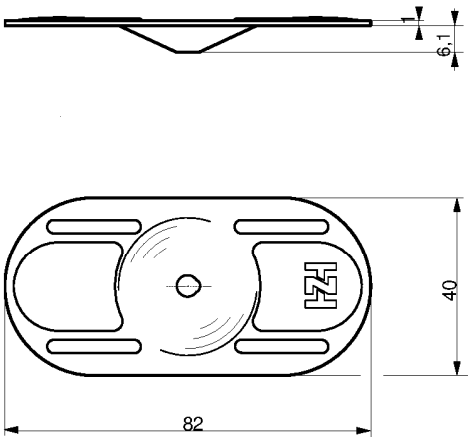
Zahn Flat Roof Fasteners

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

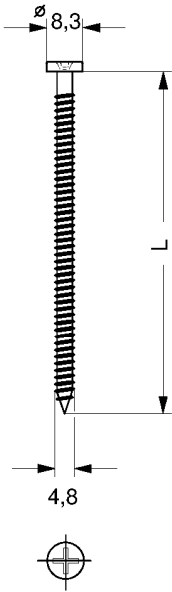
Annex 38



Zahn ZLVT 0001



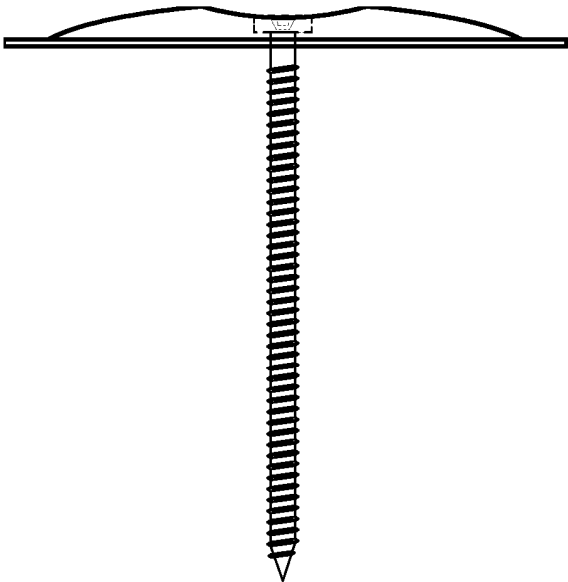
Zahn ZHBK-E 4,8 x L



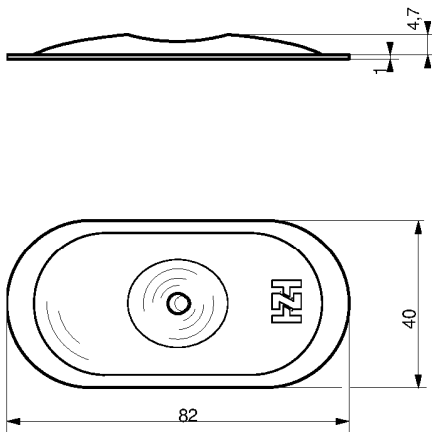
Zahn Flat Roof Fasteners

Combination 39
ZHBK®-E / ZLVT® 0001

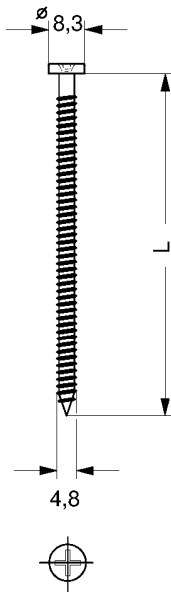
Annex 39



Zahn ZLVT 0005



Zahn ZHBK-E 4,8 x L

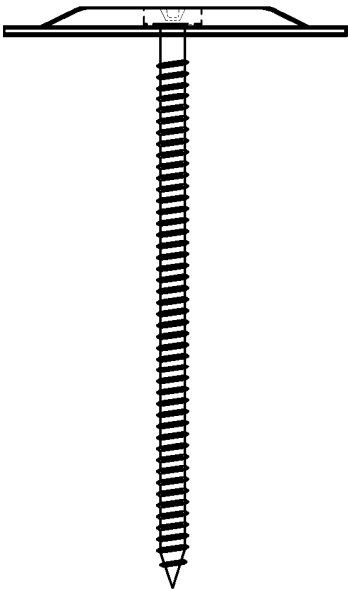


Zahn Flat Roof Fasteners

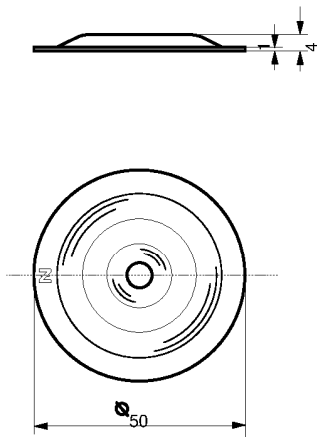
Combination 40
ZHBK®-E / ZLVT® 0005

Annex 40

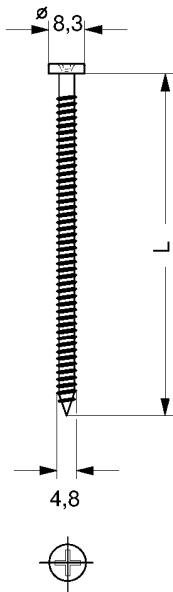
electronic copy of the eta by dibt: eta-08/0033



Zahn ZLVT 0015



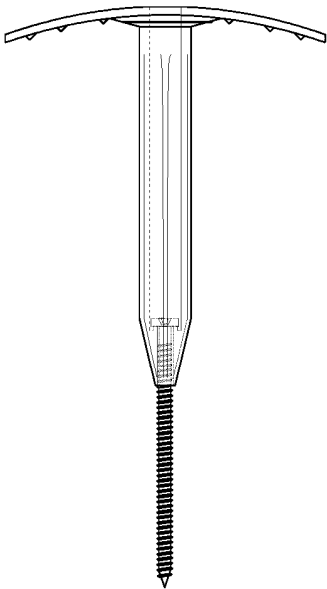
Zahn ZHBK-E 4,8 x L



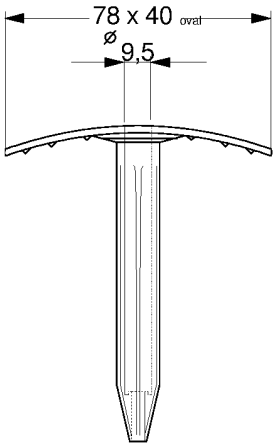
Zahn Flat Roof Fasteners

Combination 41
ZHBK®-E / ZLVT® 0015

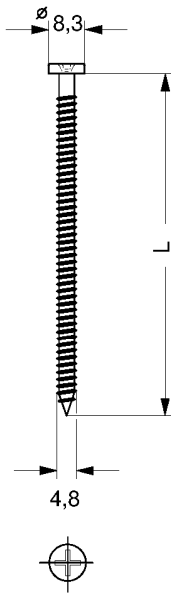
Annex 41



Zahn ZKSH oval



Zahn ZHBK-E 4,8 x L

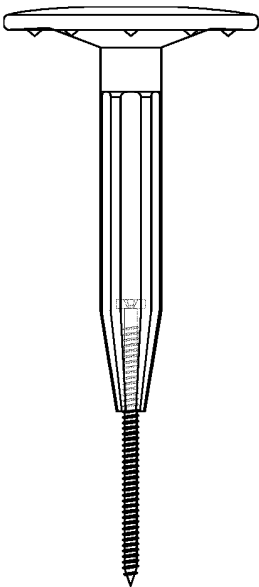


Zahn Flat Roof Fasteners

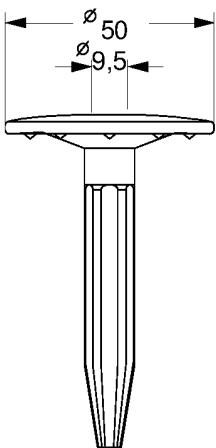
Combination 42
ZHSK®-E consisting of ZHBK®-E / ZKSH® oval

Annex 42

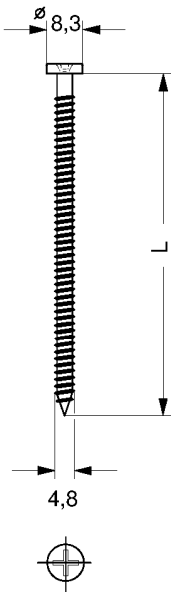
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Zahn ZKSH round



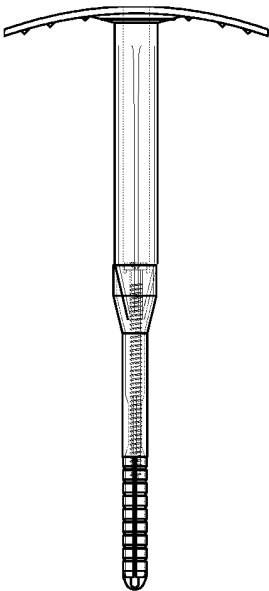
Zahn ZHBK-E 4,8 x L



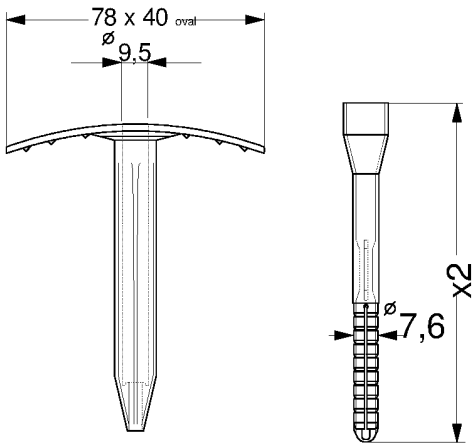
Zahn Flat Roof Fasteners

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

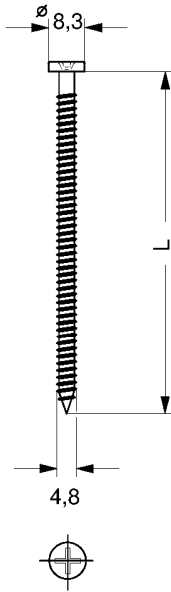
Annex 43



Zahn ZKSH oval with dowel extension



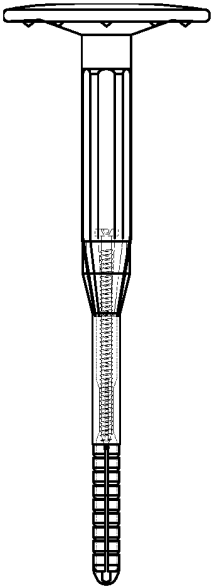
Zahn ZDBK_{dowel} 4,8 x L



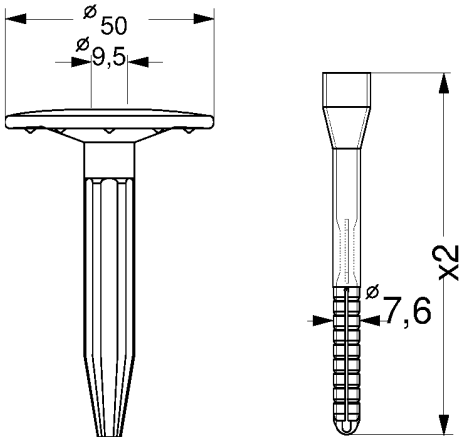
Zahn Flat Roof Fasteners

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

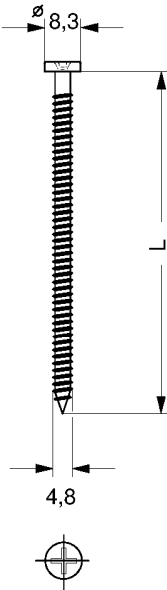
Annex 44



Zahn ZKSH round with dowel extension



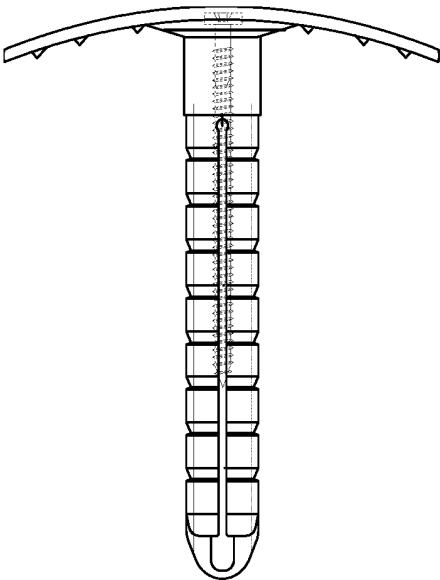
Zahn ZDBK_{dowel} 4,8 x L



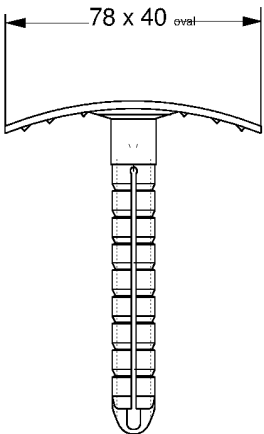
Zahn Flat Roof Fasteners

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

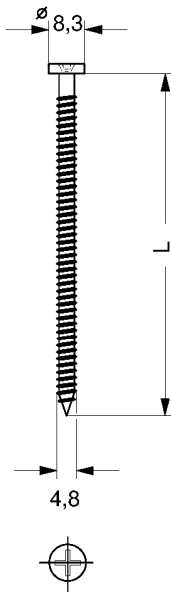
Annex 45



Zahn ZTSD oval



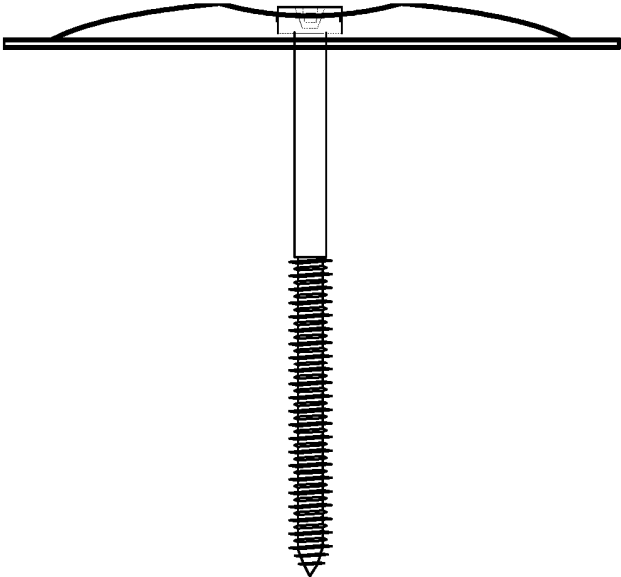
Zahn ZDBK_{dowel} 4,8 x L



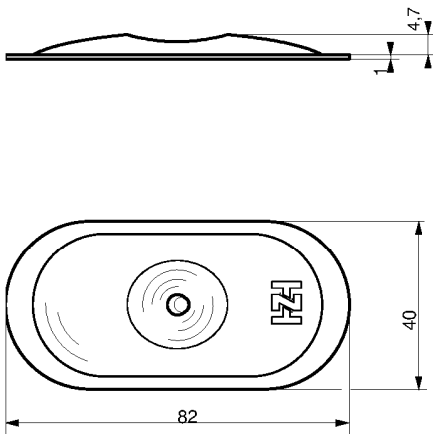
Zahn Flat Roof Fasteners

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

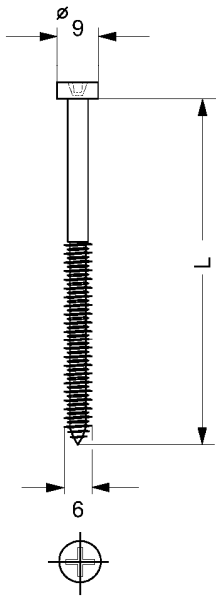
Annex 46



Zahn ZLVT 0008



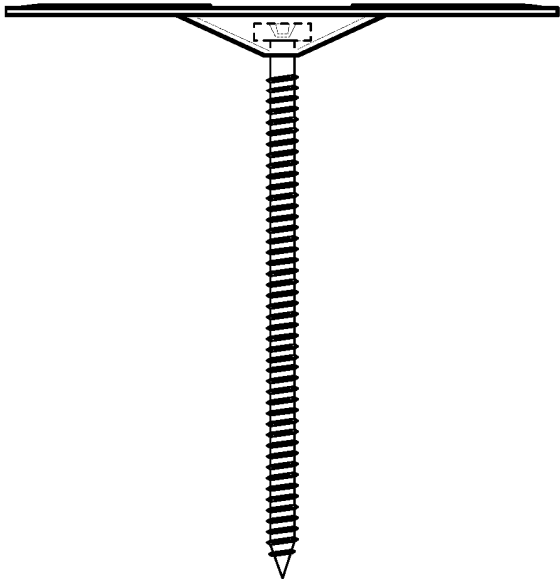
Zahn ZGBK-E 6,0 x L



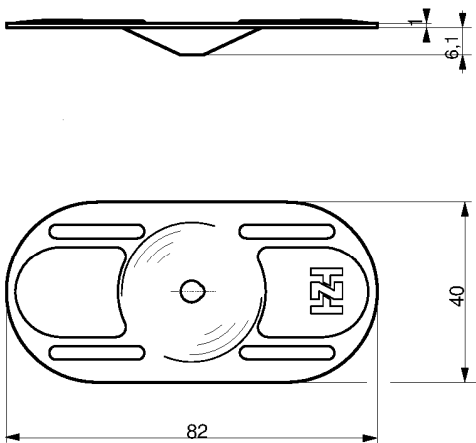
Zahn Flat Roof Fasteners

Combination 47
ZGBK®-E / ZLVT® 0008

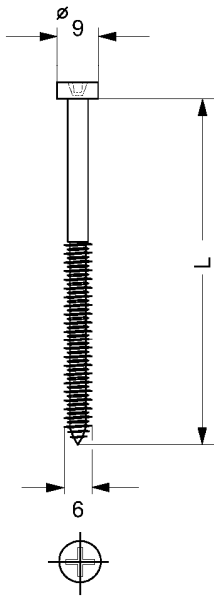
Annex 47



Zahn ZLVT 0012



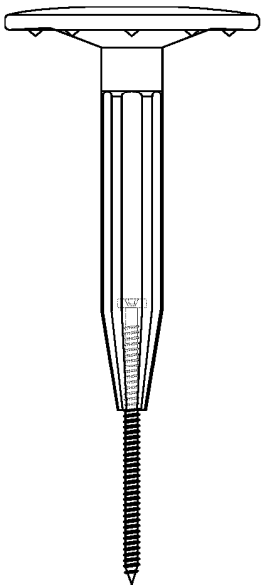
Zahn ZGBK-E 6,0 x L



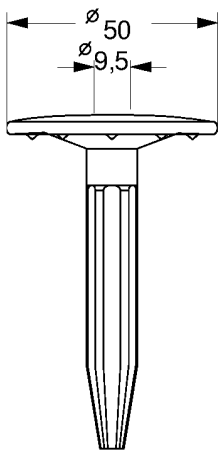
Zahn Flat Roof Fasteners

Combination 48
ZGBK®-E / ZLVT® 0012

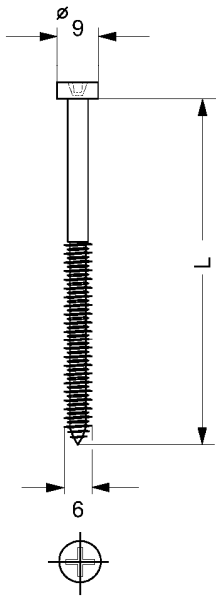
Annex 48



Zahn ZKSH gray / round



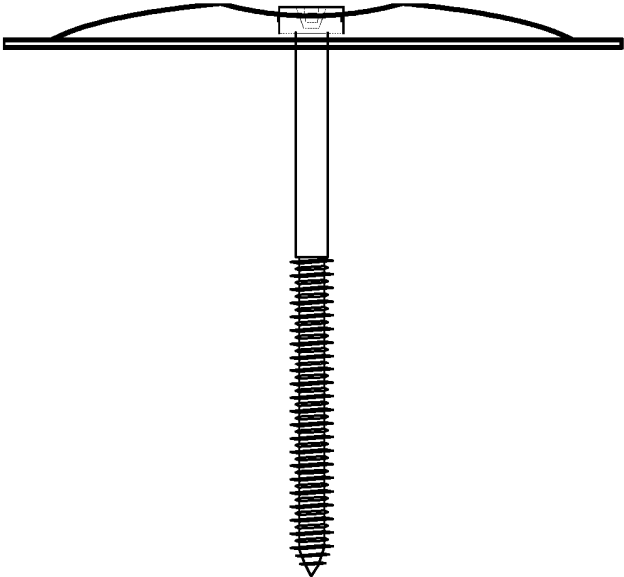
Zahn ZGBK-E 6,0 x L



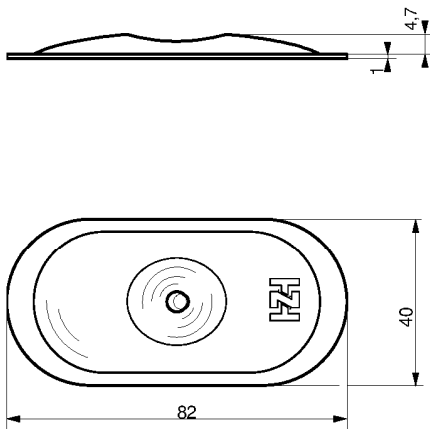
Zahn Flat Roof Fasteners

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

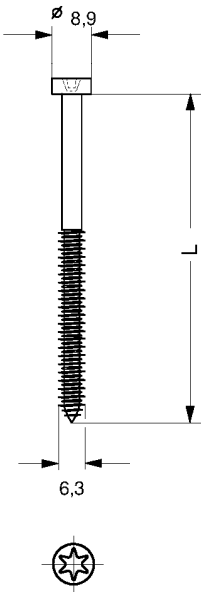
Annex 49



Zahn ZLVT 0008



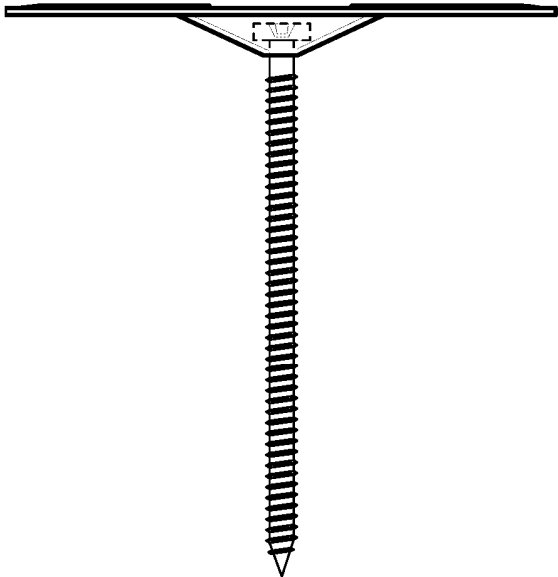
Zahn ZBST 6,3 x L



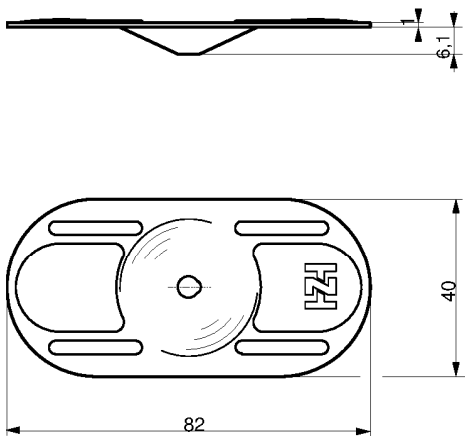
Zahn Flat Roof Fasteners

Combination 50
ZBST® / ZLVT® 0008

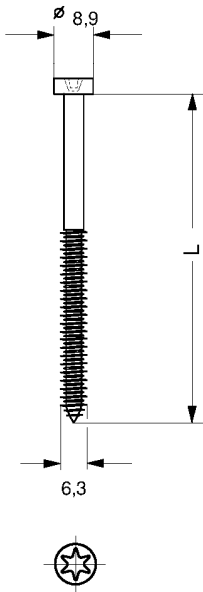
Annex 50



Zahn ZLVT 0012



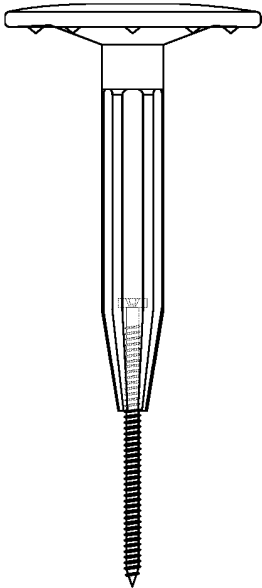
Zahn ZBST 6,3 x L



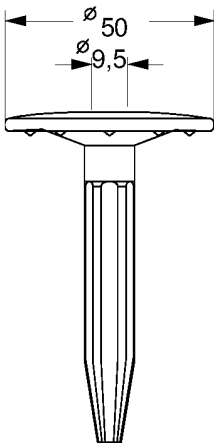
Zahn Flat Roof Fasteners

Combination 51
ZBST® / ZLVT® 0012

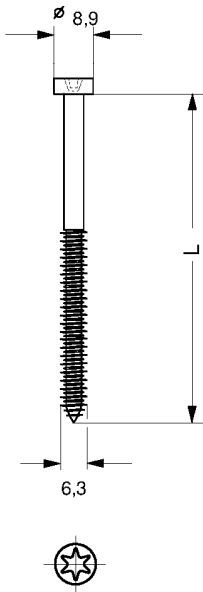
Annex 51



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

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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					Annex 53 of the European Technical Approval ETA-08/0033		
Characteristic Values of Axial Load Resistance							

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	ZKSK-VB	-	2,15	-	-	-	-
33	ZKSK-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					Annex 54		
Characteristic Values of Axial Load Resistance					of the European Technical Approval ETA-08/0033		

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					Annex 55 of the European Technical Approval ETA-08/0033		
Characteristic Values of Axial Load Resistance							

Mean 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	1,21	-	-	-	-	-
2	ZDBK / ZLVT 0005	1,21	-	-	-	-	-
3	ZDBK / ZLVT 0015	1,21	-	-	-	-	-
4	ZKSK	1,21	-	-	-	-	-
5	ZKSK-R	1,21	-	-	-	-	-
6	ZDBK-E / ZLVT 0001	1,21	-	-	-	-	-
7	ZDBK-E / ZLVT 0005	1,21	-	-	-	-	-
8	ZDBK-E / ZLVT 0015	1,21	-	-	-	-	-
9	ZKSK-E	1,21	-	-	-	-	-
10	ZKSK-E/R	1,21	-	-	-	-	-
11	ZDBK-F1 / ZLVT 0001	1,43	-	-	-	-	-
12	ZDBK-F1 / ZLVT 0005	1,43	-	-	-	-	-
13	ZDBK-F1 / ZLVT 0015	1,43	-	-	-	-	-
14	ZKSK-F1	1,43	-	-	-	-	-
15	ZKSK-R-F1	1,43	-	-	-	-	-
16	ZDBK-F2 / ZLVT 0001	1,17	-	-	-	-	-
17	ZDBK-F2 / ZLVT 0005	1,17	-	-	-	-	-
18	ZDBK-F2 / ZLVT 0015	1,17	-	-	-	-	-
19	ZKSK-F2	1,17	-	-	-	-	-
20	ZKSK-R-F2	1,17	-	-	-	-	-
21	ZDBK-F3 / ZLVT 0001	1,40	-	-	-	-	-
22	ZDBK-F3 / ZLVT 0005	1,40	-	-	-	-	-
23	ZDBK-F3 / ZLVT 0015	1,40	-	-	-	-	-
24	ZKSK-F3	1,40	-	-	-	-	-
25	ZKSK-R-F3	1,40	-	-	-	-	-
ZAHN Flat Roof Fasteners					Annex 56 of the European Technical Approval ETA-08/0033		
Mean Values of Axial Load Resistance							

Mean 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	1,23	-	-	-	-	-
27	ZDBS / ZLVT 0005	1,23	-	-	-	-	-
28	ZDBS / ZLVT 0012	1,23	-	-	-	-	-
29	ZDBK-VB / ZLVT 0001	-	2,49	-	-	-	-
30	ZDBK-VB / ZLVT 0005	-	2,49	-	-	-	-
31	ZDBK-VB / ZLVT 0015	-	2,49	-	-	-	-
32	ZKSK-VB	-	2,23	-	-	-	-
33	ZKSK-VB/R	-	2,05	-	-	-	-
34	ZHBK / ZLVT 0001	-	-	2,47	1,94	2,84	2,38
35	ZHBK / ZLVT 0005	-	-	2,47	1,94	2,84	2,38
36	ZHBK / ZLVT 0015	-	-	2,47	1,94	2,84	2,38
37	ZHSK	-	-	2,23	1,94	2,23	2,23
38	ZHSK-R	-	-	2,05	1,94	2,05	2,05
39	ZHBK-E / ZLVT 0001	-	-	2,47	1,94	2,84	2,38
40	ZHBK-E / ZLVT 0005	-	-	2,47	1,94	2,84	2,38
41	ZHBK-E / ZLVT 0015	-	-	2,47	1,94	2,84	2,38
42	ZHSK-E	-	-	2,23	1,94	2,23	2,23
43	ZHSK-E/R	-	-	2,05	1,94	2,05	2,05
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						Annex 57	
Mean Values of Axial Load Resistance						of the European Technical Approval ETA-08/0033	

Mean 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	2,23		1,57		1,83	
45	ZSDK-R	2,05		1,57		1,83	
46	ZTSD	1,85		1,11		1,44	
47	ZGBK-E / ZLVT 0008	-		1,98		2,06	
48	ZGBK-E / ZLVT 0012	-		1,98		2,06	
49	ZKGK-E/R	-		1,88		1,88	
50	ZBST / ZLVT 0008	3,74		-		-	
51	ZBST / ZLVT 0012	3,57		-		-	
52	ZBSK-R	1,97		-		-	
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						Annex 58	
Mean Values of Axial Load Resistance						of the European Technical Approval ETA-08/0033	