



European Technical Approval ETA-10/0047

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

Aztec Farmer Screw AFS 4,8 x L, Sharp Point Screw AFS 4,8 x L

Zulassungsinhaber
Holder of approval

Aztec International S.A.
ul. Bulgarska 63/65
60-320 POZNAN
POLEN

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

Bohrschraube zur Befestigung von Bauteilen und Blechen aus Metall
Self drilling fastening screw for metal members and sheeting

Geltungsdauer:
Validity: vom
from
bis
to

13 June 2013
13 June 2018

Herstellwerk
Manufacturing plant

Aztec International S.A.
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Diese Zulassung umfasst
This Approval contains

11 Seiten einschließlich 3 Anhänge
11 pages including 3 annexes

Diese Zulassung ersetzt
This Approval replaces

ETA-10/0047 mit Geltungsdauer vom 29.04.2010 bis 29.04.2015
ETA-10/0047 with validity from 29.04.2010 to 29.04.2015

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.
- 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.
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- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
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- 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 and intended use

1.1 Definition of the construction product

The fastening screw Aztec Farmer Screw AFS 4,8 x L is a self drilling screw and the fastening screw Aztec Sharp Point Screw AFS 4,8 x L is a flow drilling screw. The screws are made of galvanised case hardened carbon steel. They are supplied with a metallic washer and an EPDM sealing ring. For details see Annex 2 and Annex 3.

Examples of fastening screws and the corresponding connections are shown in Annex 1.

The screws and the corresponding connections are subject to tension and shear forces.

1.2 Intended use

The fastening screws are intended to be used for fastening steel sheeting to steel and timber supporting structures. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element.

The fastening screws can also be used for the fastening of other thin gauge steel members.

The component to be fastened is component I and the supporting structure is component II.

The intended use comprises connections for indoor and outdoor applications. Fastening screws which are intended to be used in external environments shall be protected against corrosion.

Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads).

The provisions made in this European technical approval are based on an assumed working life of the fastening screws of 25 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.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The fastening screws shall correspond to the drawing given in the Annex 2 and Annex 3.

The characteristic material values, dimensions and tolerances of the fastening screws neither indicated in this section nor in Annex 2 and Annex 3 shall correspond to the respective values laid down in the technical documentation⁷ to this European technical approval.

The characteristic values of the shear and tension resistance of the connections made with the fastening screws are given in the Annex 2 and Annex 3 or in section 4.2.

The fastening screws are considered to satisfy the requirements of performance class A1 of the characteristic reaction to fire.

⁷ The technical documentation to this European technical approval is deposited at 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.

2.2 Methods of verification

The assessment of the fitness of the fastening screws for the intended use in relation to the Essential Requirements ER 1 (Mechanical resistance and stability), ER 2 (Safety in case of fire), ER 4 (Safety in use) and additional aspects of durability has been made in accordance with section 3.2 of the Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶.

The assessment of the resistance to fire performance is only relevant to the assembled system (fastening screws, sheeting, supporting structure) which is not part of the ETA.

The fastening screws is considered to satisfy the requirements of performance class A 1 of the characteristic reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

Concerning Essential Requirements No. 1 (Mechanical resistance and stability) and No. 4 (Safety in use) the following applies:

The characteristic values of resistance given in Annex 2 and Annex 3 were determined by shear and tension tests.

The formulas to calculate the design resistance are given in clause 4.2.1.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 99/92 of the European Commission⁸ system 3 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
 - (1) factory production control;
- (b) Tasks for the approved body:
 - (2) initial type-testing of the product.

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 80 of 18.03.1998.

The factory production control shall be in accordance with the "control plan 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 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 fastening screws 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 type-testing of the product,

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 written reports.

3.3 CE marking

The CE marking shall be affixed on each packaging of fastening screws. 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 European technical approval,
- the name of the product.

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

4.1 Manufacturing

The fastening screws are manufactured in accordance with the provisions of the European technical approval using the manufacturing process as laid down in the technical documentation.

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.

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.

4.2 Design

4.2.1 General

Fastening screws completely or partly exposed to external weather or similar conditions are protected against corrosion. For the corrosion protection the rules given in EN 1090-2:2008 + A1:2011 and in EN 1993-1-3:2006 + AC:2009 are taken into account.

For the types of connection (a, b, c, d) listed in the Annexes it is not necessary to take into account the effect of constraints due to temperature. For other types of connection it shall be considered for design as long as constraining forces due to temperature do not occur or are not significant (e. g. sufficient flexibility of the structure).

The loading is predominantly static. (Remark: Wind loads are regarded as predominantly static.)

Dimensions, material properties, torque moments $M_{t,norm}$, minimum effective screw-in length l_{ef} and nominal material thicknesses t_N as stated in the ETA or in the Annexes are observed.

The verification concept stated in EN 1990:2002 + A1:2005 + A1:2005/AC:2010 is used for the design of the connections made with the fastening screws. The characteristic values (shear and tension resistance) stated in the Annexes are used for the design of the entire connections.

The following formulas are used to calculate the values of design resistance:

$$N_{Rd} = \frac{N_{Rk}}{\gamma_M}$$

$$V_{Rd} = \frac{V_{Rk}}{\gamma_M}$$

The recommended partial safety factor $\gamma_M = 1.33$ is used in order to determine the corresponding design resistances, provided no values are given in national regulations of the member state in which the fastening screws are used or in the respective National Annex to Eurocode 3.

In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3:2006 + AC:2009, section 8.3 (8) is taken into account.

$$\frac{N_{Sd}}{N_{Rd}} + \frac{V_{Sd}}{V_{Rd}} \leq 1.0$$

The possibly required reduction of the tension resistance (pull-through resistance) due to the position of the fastener is taken into account:

- in accordance with EN 1993 1 3:2006+ AC:2009, section 8.3 (7) and Fig. 8.2 (component I is made of steel) or EN 1999-1-4:2007 + A1:2011, section 8.1 (6) and Table 8.3 (component I is made of aluminium),
- of 0.7 if the supporting structure is an asymmetric profile (e.g. Z-profile) with $t_{fl} < 5$ mm

4.2.2 Additional rules for connections with timber supporting structures

As far as no other provisions are made in the following EN 1995-1-1:2004 + A1:2008 applies.

Drill points of self drilling screws or not cylindrical tips of flow drilling screws are not taken into account for the effective screw-in length.

The following terms are used:

- d - nominal diameter of the fastening screw
- l_g - Screw-in length - part of thread screwed into component II including drill point.
- l_b - Length of unthreaded part of the drill-point or $l_b = d$ for flow drilling screws
- l_{ef} - effective screw-in length $l_{ef} = l_g - l_b$

$$N_{R,k} = F_{ax,Rk} \cdot k_{mod}$$

$$V_{R,k} = F_{v,Rk} \cdot k_{mod}$$

$F_{ax,Rk}$ according to EN 1995-1-1:2004 + A1:2008, equation (8.40a)

Remark: $F_{ax,Rk} = F_{ax,\alpha,Rk}$ with $\alpha = 90^\circ$

$F_{v,Rk}$ according to EN 1995-1-1:2004 + A1:2008, clause 8.2.3

k_{mod} according to EN 1995-1-1:2004 + A1:2008, Table 3.1

$M_{y,Rk}$ in equation (8.9) of EN 1995-1-1:2004 + A1:2008 and $f_{ax,k}$ in equation (8.40a) of EN 1995-1-1:2004 + A1:2008 are given in the Annexes of this ETA.

The characteristic values for pullout and bearing resistance (timber supporting structure) calculated according to EN 1995-1-1:2004 + A1:2008 are compared with the characteristic values for component I (pull over and bearing resistance) stated in the right column of the table in the appropriate Annexes. The lower value is used for further calculations.

4.3 Installation

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

It is guaranteed by the execution that no bimetallic corrosion will occur.

For regular shear forces the components I and II are directly connected to each other so that the fastening screws do not get additional bending. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

The fastening screws are fixed rectangular to the surface of the components to guarantee a correct load bearing and if necessary rain-proof connection.

Fastening screws for steel supporting structures are screwed in with the cylindrical part of the thread at least 6 mm if the supporting structure has a thickness over 6 mm unless otherwise declared in the manufacturer's instruction. Welded drill points are not taken into account for the screw-in length.

The conformity of the installed fasteners with the provisions of the ETA is attested by the executing company.

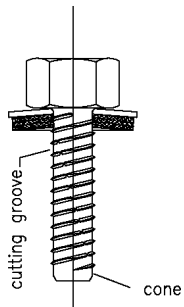
5 Indications to the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2, 4.2 and 4.3 (including Annexes referred to) is given to those who are concerned. This information may be given by reproduction of the respective parts of the European technical approval.

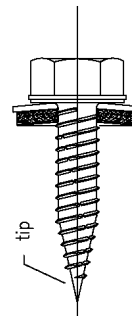
In addition all installation data (torque moment, application limits) shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

Andreas Kummerow
p. p. Head of Department

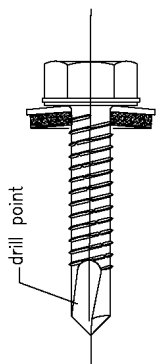
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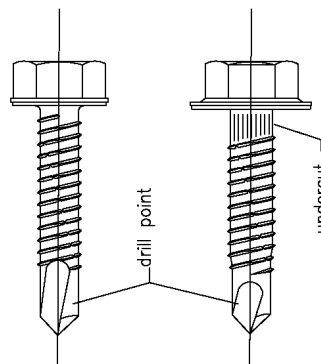
self tapping screw
with sealing washer



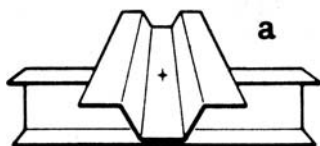
self tapping screw
with sealing washer



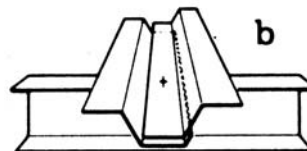
self-drilling screw
with sealing washer



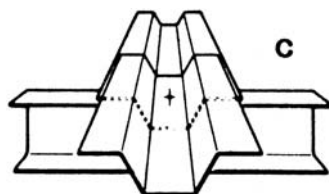
self-drilling screw
with integrated washer



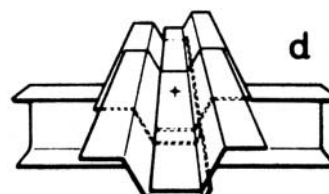
Single connection



Side lap connection



End overlap connection



Side lap + end overlap connection

Aztec Farmer Screw AFS 4,8 x L, Sharp Point Screw AFS 4,8 x L

Examples for screws
Types of connection

Annex 1

Material:

Fastener: carbon steel (1.0501) - EN 10083-2
case hardened and galvanized

Washer: carbon steel (1.0501) - EN 10083-2

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S280GD, S320GD, S350GD - EN 10346
Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 1,50$ mm

Timber substructures:
performance determined with

$M_{y,Rk} = 4,429$ Nm
 $f_{ax,k} = 7,912$ N/mm² for $l_{ef} \geq 20,0$ mm

t_i [mm]	t_{ii} [mm]								$V_{i,R,k}$ $N_{i,R,k}$
	0,50	0,55	0,63	0,75	0,88	1,00	1,13	1,25	
$V_{R,k}$ [kN]	0,50	0,55	0,63	0,75	0,88	1,00	1,13	1,25	2,00
$N_{R,k}$ [kN]	0,50	0,55	0,63	0,75	0,88	1,00	1,13	1,25	2,00
$M_{t,nom}$ [Nm]	3 Nm								—

If both components I and II are made of S320GD the values $N_{R,k}$ and $V_{R,k}$ may be increased by 8,3%.
If both components I and II are made of S350GD the values $N_{R,k}$ and $V_{R,k}$ may be increased by 16,6%.
The values listed above in dependence on the screw-in length l_{ef} are valid for $k_{mod} = 0,90$ and timber strength grade C24 ($\rho_a = 350$ kg/m³). For other combinations of k_{mod} and timber strength grades see section 4.2.2.

Aztec Farmer Screw AFS 4,8 x L, Sharp Point Screw AFS 4,8 x L	Annex 2
Aztec AFS 4,8 x L with hexagon head and sealing washer $\varnothing 14$ mm	

	<p>Materials</p> <p>Fastener: carbon steel – SAE1022 case hardened and galvanized</p> <p>Washer: EPDM sealing washer with metal top made of aluminium</p> <p>Component I: S280GD to S350GD – EN 10346</p> <p>Component II: structural timber – EN 14081</p>
	<p>Drilling capacity $t_1 \leq 0,88$ mm</p>
	<p>Timber structures</p> <p>For timber structures performance determined with</p> <p>$M_{y,Rk} = 8,48$ Nm</p> <p>$f_{ax,k} = 9,80$ N/mm² for $l_g \geq 22$ mm</p>

Table 1

Characteristic values of resistance of screws in **component I** made of steel grade S280GD according to EN 10346

Characteristic values of resistance [kN]* ¹⁾	Thickness component I [mm]			
	0,55	0,63	0,75	0,88
Shear load $V_{R,k}$ (Bearing resistance comp. I)	1,78	2,02	2,34	2,76
Tension load $N_{R,k}$ (Pull-through)	-	1,76	1,76	1,76

*¹⁾ If component I is made of S320GD the values $V_{R,k}$ and $N_{R,k}$ may be increased by 8,3%.
If component I is made of S350GD the values $V_{R,k}$ and $N_{R,k}$ may be increased by 16,6%.

Table 2

Characteristic values of resistance of screws in **component II** made of timber, strength class C24 for $k_{mod} \geq 0,90$

Characteristic values of resistance [kN]	Screw-in length of threaded screw part l_g * ²⁾ [mm]				
	22	30	40	50	60
Shear load $V_{R,k}$ (Bearing resistance comp. II)	0,81	1,19	1,66	2,02	2,13
Tension load $N_{R,k}$ (Pull-out from component II)	0,73	1,07	1,49	1,91	2,34

*²⁾ screw-in length with tip included

The values listed above in dependence on the screw-in length l_g are valid for $k_{mod} = 0,90$ and timber strength class C24 ($\rho_k = 350$ kg/m³). For other combinations of k_{mod} and timber strength classes see section 4.2.2.

Aztec Farmer Screw AFS 4,8 x L, Sharp Point Screw AFS 4,8 x L	Annex 3
Aztec Sharp Point Screw ASP 4,8 x L with hexagon head and sealing washer Ø14 mm	