

EUROPEAN ASSESSMENT DOCUMENT

EAD 130033-00-0603

March 2015

NAILS AND SCREWS FOR USE IN
NAILING PLATES IN TIMBER
STRUCTURES

The reference title and language for this EAD is English. The applicable rules of copyright refer to the document elaborated in and published by EOTA.

This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Reference of this EAD is published in the Official Journal of the European Union (OJEU) 2015/C 226/05.

Table of Contents

1	Scope of the EAD	4
1.1	Description of the construction product	4
1.2	Information on the intended use(s) of the construction product	5
1.2.1	Intended use(s)	5
1.2.2	Working life/Durability.....	5
2	Essential characteristics and relevant assessment methods and criteria	6
2.1	Essential characteristics of the product	6
2.2	Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product	7
2.2.1	Withdrawal load-carrying capacity	7
2.2.2	Lateral load-carrying capacity	7
2.2.3	Tensile capacity of nails and screws.....	7
2.2.4	Torsional strength	7
2.2.5	Reaction to fire.....	7
2.2.6	Content, emission and/or release of dangerous substances	8
2.2.7	Durability (corrosion resistance)	8
3	Assessment and verification of constancy of performance	9
3.1	System(s) of assessment and verification of constancy of performance	9
3.2	Tasks of the manufacturer	9
3.3	Tasks of the notified body	10
4	Reference documents	11
Annex A	Description of the construction product	12

1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD covers the assessment of annular ringed shank nails, square twist nails and screws for use in nailing plates and three dimensional nailing plates in timber structures.

Type

Annular ringed shank nails are shown in Annex A, drawing 1 with a cylindrical shank and with ribs on part of the shank. The shank has a special conical part under the head. The nail head is cylindrical and the tip is pyramid shaped.

Square twist nails are nails where the shank is squared and twisted as shown in annex A, drawing 2.

The screws are threaded almost over the total length. The shank just below the head has a cylindrical and a conical part. See annex A, drawing 3.

Annular ringed shank nails, square twist nails and screws are made from drawn steel wire.

Range

The dimensions of the nails, $d \times L$, are for d ranging from 2,5 to 6,0 mm and for L ranging from 20 mm to 100 mm.

The dimensions of the screws, $d \times L$, are for d ranging from 4,0 to 5,0 mm and for L ranging from 25 mm to 80 mm.

The product is not fully covered by the harmonised European standard (hEN) 14592.

The nails and screws covered by the EAD for the particular intended use has a geometry, which is specifically developed for use with three dimensional nailing plates. In addition, the nails and screws covered by the ETAs issued on the basis of this EAD are assessed with three dimensional nailing plates as a kit, in the sense that the ETA for the three dimensional nailing plates gives either load bearing capacities or formulas for the calculation of load bearing capacities, which are based on the assessment of the nails and screws for this particular intended use covered by the EAD in order to obtain the optimum capacities for the connection.

Hence, the EAD provides the basis for an assessment of the nails and screws for a particular intended use and consequently the capacities indicated in the ETA's for the three dimensional nailing plates are based on the assumption that the nailing plates and nails and screws can be regarded as a kit.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

The nails and screws are used for nailing plates and three-dimensional nailing plates in timber structures.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the nails and screws for the intended use of 50 years when installed in the works. These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works¹.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

¹ The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of connector nails and connector screws is established in relation to the essential characteristics.

Table 1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

Nr	Essential characteristic	Method of verification and assessment	Type of expression of product performance
Basic Works Requirement 1: Mechanical resistance and stability			
1	Withdrawal load-carrying capacity	2.2.1	Level
2	Lateral load-carrying capacity	2.2.2	Level
3	Tensile capacity of nails and screws	2.2.3	Level
4	Torsional strength of screws	2.2.4	Level
5	Corrosion	2.2.7	Description
Basic Works Requirement 2: Safety in case of fire			
6	Reaction to fire	2.2.5	Class
Basic Works Requirement 3: Hygiene, health and the environment			
7	Content, emission and/or release of dangerous substances	2.2.6	Description

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

Characterisation of products to be assessed shall be done in accordance with available specifications, notably the parameters given in Annex A.

2.2.1 Withdrawal load-carrying capacity

The withdrawal capacity of the connector nails and screws shall be determined by either of the following methods:

- Calculated using the relevant parts of EN 1995-1-1 as applicable.
- Tests in accordance with EN1382

The resulting withdrawal capacity shall be declared in the ETA.

If determined by testing, the characteristic capacity shall be determined in accordance with EN 14358

2.2.2 Lateral load-carrying capacity

The lateral capacity of the connector nails and screws shall be determined by either of the following methods:

- Calculated using the relevant parts of EN 1995-1-1 as applicable
- Calculation assisted by testing, verification of a static model by testing in accordance with EN1380
- Tests in accordance with EN1380

The resulting withdrawal capacity shall be declared in the ETA.

If determined by testing, the characteristic capacity shall be determined in accordance with EN 14358.

2.2.3 Tensile capacity of nails and screws

The tensile capacity of the connector nail or screw shall be determined by testing in accordance with the relevant parts of EN 14592 as applicable

The characteristic tensile capacity of the fastener shall be determined in accordance with EN14358 and stated in the ETA.

2.2.4 Torsional strength

The torsional resistance of insertion into wood with the density of the grade declared shall be determined by testing in accordance with EN 15737 and the torsional strength of the screws shall be determined by testing in accordance with EN 10666

The characteristic torsional strength of the screws shall be determined in accordance with EN14358

The ratio of the characteristic torsional strength to the mean torsional resistance has to be at least 1.5

2.2.5 Reaction to fire

The nails and screws covered by this EAD are considered to satisfy the requirements for performance Class A1 of the characteristic reaction to fire, in accordance with the provisions of EC Decision 96/603/EC, as amended by EC Decision 2000/605/EC, without the need for testing on the basis of its listing in that Decision.

The nails and screws covered by this EAD shall be classified according to EN 13501-1: 2002. According to EC Decision 96/603/EC, amended by EC Decision 2000/605/EC, they are classified in class A1.

2.2.6 Content, emission and/or release of dangerous substances

The performance of the product related to the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer using the following methods and criteria in EOTA TR 034: "General Checklist for EADs/ETAs – Content, emission and/or release of dangerous substances in products" March 2013,

According to the chemical composition of the product, the Technical Assessment Body has to verify, that no cadmium is used.

According to the chemical composition of the product, the Technical Assessment Body has to verify, that no arsenic or arsenic compounds are used.

According to the chemical composition of the product, the Technical Assessment Body has to verify, that no lead or lead compounds are used.

2.2.7 Durability (corrosion resistance)

The product specification shall be examined and an assessment or appropriate test and evaluation shall be carried out, to determine the thickness of corrosion protection or the material specification.

If a zinc coating is used its thickness shall be determined by:

- hot-dip galvanized coating to EN ISO 1461 – using the methods described in the standard, preferably using the non-destructive magnetic method of EN ISO 2178, or using the gravimetric method of EN ISO 1460 as a reference method in case of dispute
- electroplated zinc coating to ISO 2081 — using the methods described in the standard, or using Annex B of ISO 2081 as a reference method in case of dispute.

If stainless steel is used it should be designated in accordance with EN 10088-1.

The declaration of material specification or minimum corrosion protection for different service classes shall be given in accordance with Eurocode 5. Alternative materials shall have equivalent properties/performance.

When verifying the equivalence of alternative corrosion protection coatings with the corrosion protection given in EN 1995-1-1, the methods used in EN 14592 shall be used.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance

For the products covered by this EAD the applicable European legal act is: 1997/638/EC

The system to be applied is: 2+

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the nails and screws in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

Table 2 Control plan for the manufacturer; cornerstones

No	Subject/type of control	Test or control method	Minimum frequency of control
Factory production control (FPC)			
Connector screws			
1	Raw material specification	Certificate of compliance/Mill certificate	Daily
2	Nominal diameter, d		Daily
3	Length, l		Daily
4	Characteristic Torsional strength, $f_{tor,k}$	EN ISO 10666	Daily
5	Corrosion protection	Visual	Daily
6	Mean Torsional resistance, $R_{tor,m}$	EN 15737	Every 6 months
Connector nails			
7	Raw material specification	Certificate of compliance/Mill certificate	Daily
8	Minimum characteristic tensile strength of wire	Certificate of compliance/Mill certificate	Daily
9	Nominal diameter, d		Daily
10	Length, l		Daily
11	Corrosion protection	Visual	Daily
12	Characteristic withdrawal parameter	EN 1382	Every 6 months

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for nails and screws are laid down in Table 3.

Table 3 Control plan for the notified body; cornerstones

No	Subject/type of control <i>(product, raw/constituent material, component - indicating characteristic concerned)</i>	Test or control method <i>(refer to 2.2 or 3.4)</i>	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control <i>(for systems 1+, 1 and 2+ only)</i>					
1	Inspection of the factory and the factory production control of the manufacturer as described in the control plan	Control of devices and equipment and the documentation of the FPC	see control plan		When starting the production process or when starting a new production line
Continuous surveillance, assessment and evaluation of factory production control <i>(for systems 1+, 1 and 2+ only)</i>					
2	Surveillance, assessment and approval of the factory production control of the manufacturer as described in the control plan including an annual inspection of the factory	Control of the documentation of the FPC			Twice a year

4 REFERENCE DOCUMENTS

As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment, is of relevance.

Decision 1997/638/EC

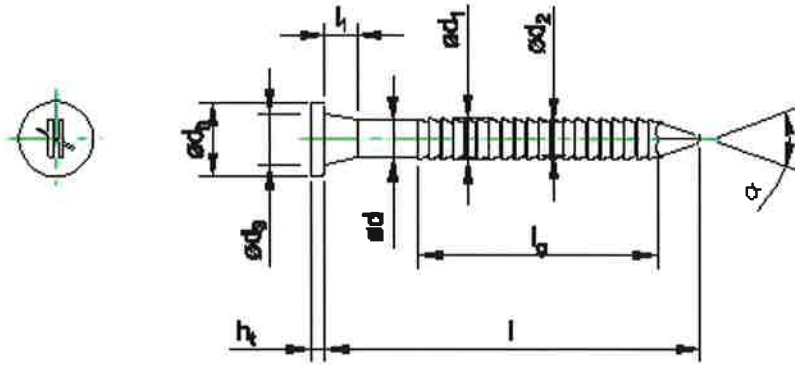
Commission mandate acc to Council Directive (89/106/EEC) for fasteners for structural timber products is system 2+.

EOTA TR 034 - General BWR 3 Checklist for EADs/ETAs

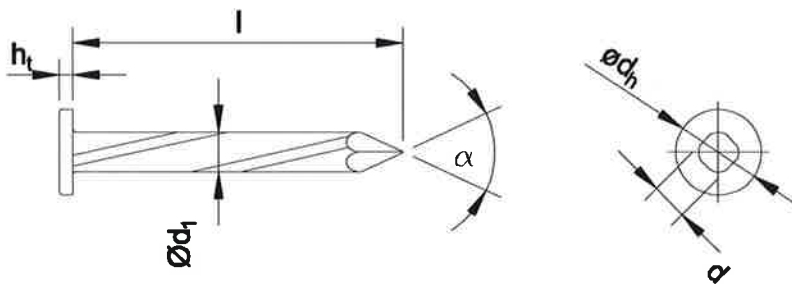
EC Decision 1996/603/EC (as amended) List of products belonging to class A1 without the need for testing

EN 10088-1	List of stainless steels
EN 10088-3	Stainless steels. Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes.
EN 10143	Continuously hot-dip metal coated steel sheet and strip. Tolerances on dimensions and shape
EN 1179	Specifications for zinc and zinc alloys. Primary zinc.
EN 13501-1	Fire classification of construction products and building element – Part 1: Classification using test data from reaction to fire tests
EN1382	Timber structures: Test methods. Withdrawal capacity of timber fasteners
EN 1383	Timber structures: Test methods. Pull-through resistance of timber fasteners
EN 14592	Timber structures – Fasteners – Requirements
EN 14358	Structural timber – Calculation of characteristic 5-percentile values
EN 1995-1-1 buildings	Eurocode 5 – Design of timber structures. Part 1-1: General rules and rules for buildings
EN ISO 1460	Metallic coatings. Hot dip galvanized coatings on ferrous materials. Gravimetric determination of the mass per unit area.
EN ISO 1461 methods	Hot dip galvanized coatings on fabricated iron and steel articles. Specification and test methods
EN ISO 2081	Metallic coatings. Electroplated coatings of zinc on iron or steel
EN ISO 2178	Non-magnetic coatings on magnetic substances. Measurements of coating thickness. Magnetic method
EN ISO 7441	Corrosion of metals and alloys. Determination of bimetallic corrosion in outdoor exposure corrosion tests
EN ISO 8970	Timber structures – Testing of joints made with mechanical fasteners – Requirements for wood density
EN 15737	Timber Structures - Test methods - Torsional resistance of driving in screws
EN 10666	Drilling screws with tapping screw thread - Mechanical and functional properties

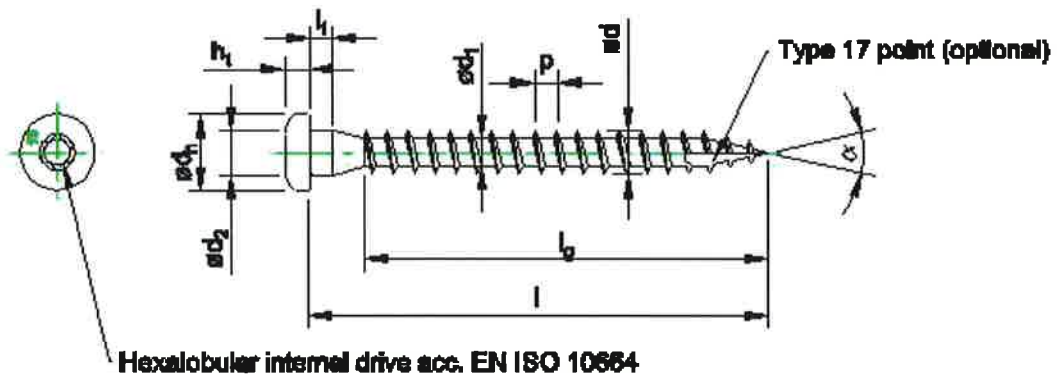
ANNEX A DESCRIPTION OF THE CONSTRUCTION PRODUCT



Drawing 1: Annual ringed shank nail



Drawing 2: Square twist nail



Drawing 3: Screw