EAD 331846-00-0603

www.eota.eu

October 2019

European Assessment Document for

Anchor devices for fastening personal fall protection systems to timber substructures

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).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD covers anchor devices for fastening personal fall protection systems to timber substructures (in the following referred to as anchor devices). Those various devices are specially designed and engineered to be fastened to, or in some cases inserted into, timber.

They feature a metal structure that gives the device the stability and connection to the timber substructure. An eye or fastening ring is fastened to its head either by a bolted or welded connection.

The anchor devices are made of stainless steel in accordance with EN ISO 1127[1], EN 10088-4 or EN 10088-5, EN 10216-5, EN 10296-2 or non-alloyed steel in accordance with EN 10025-1, EN 10025-2, EN 10216-1, EN 10296-1. They are not treated with an organic surface coating.

This EAD covers two types of anchor devices:

- Type 1: The anchor device itself is fixed to the substructure, see figure 1.1.1, B.
- Type 2: The anchor device is fixed to the substructure with fasteners (wood screws), see figure 1.1.1, C, and figure 1.1.2.

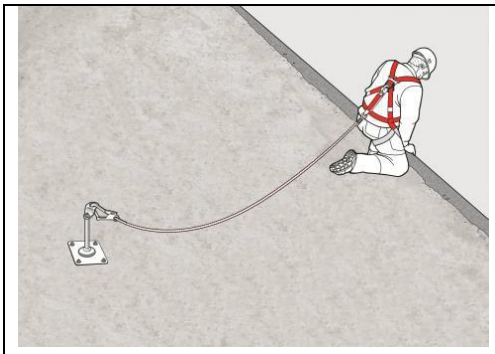
In case of type 2, the EAD comprises the fasteners (wood screws) that are made of stainless steel of at least grade A2 according to EN ISO 3506-4 and that shall be specified in the ETA as given in clause 2.2.1.4.

The product is not covered by a harmonised European standard (hEN).

The product cannot be assessed based on EAD 331072-00-0601 as the said EAD covers only anchor devices for fastening personal fall protection systems to concrete structures as well as includes assessment methods that are concepted for concrete substructures, while this EAD, as given above, deals with anchor devices that are to be fastened to/inserted into timber structures.

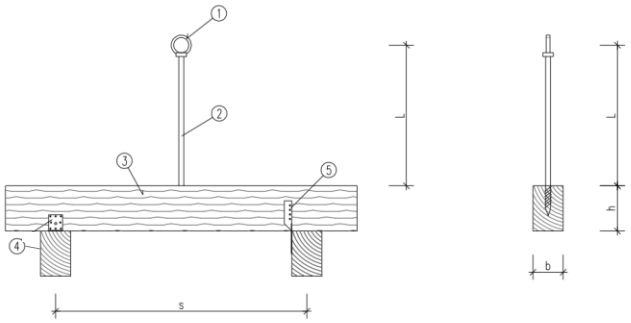
Figures 1.1.1, 1.1.2 and 1.3.1.1 show some examples of the anchor devices fastened to/inserted into timber structures.

1 All undated references to standards or to EADs in this EAD are to be understood as references to the dated versions listed in chapter 4

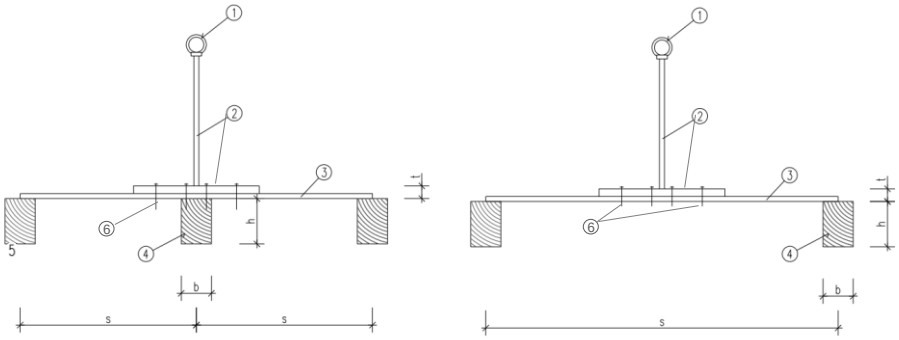


Legend:
1 – Anchor point (eye or fastening ring for the attachment of the personal protective equipment)
2 – Metal structure (body) of the anchor device
3 – Timber substructure (timber beams or planking)
4 – Timber substructure/supporting structure (timber beams)
5 – Rafter-to-purlin connector / elbow connector
6 – Fasteners (wood screws)

A - Example of an anchor device in use



B - Example of an anchor device which is fixed itself to the substructure



C- Examples of anchor devices which are fixed to the substructure with fasteners

Figure 1.1.1: Examples of anchor devices

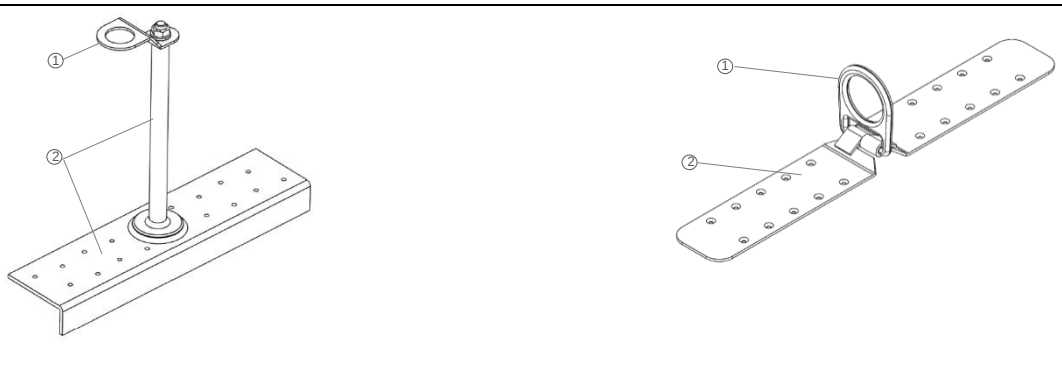


Figure 1.1.2: Additional examples of anchor devices (which are fixed to the substructure with fasteners, fasteners are not illustrated)

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 purpose of the anchor devices is providing anchor points for fastening (attachment of) personal fall protection systems[2] that arrest persons during a fall from heights. The operators attach themselves to the eye or fastening ring using, e.g., ropes and carabiners.

The anchor devices are intended to be used, fastened or inserted on horizontal timber beams made of solid timber or glued laminated timber or on flat roofs with planking made of solid timber, laminated veneer lumber, or wood-based panels (like oriented strand board, particleboards or plywood, etc.). The description of the specific timber substructure which is relevant for the intended use shall be given in the ETA in accordance with clause 2.2.1 and considered in the assessment of the performance.

The anchor devices are intended to be loaded only once[3] (see also 1.3.1). The direction of fall can be either parallel to the roof or also in other directions (perpendicular to the roof and overhead installation). The forces which are generated in the fastening element can be in any direction regarding to fastening's axis.

This EAD covers the following specifications of the intended use:

- The performance of the static loading (according to clause 2.2.3) is the characteristic value of the assessed type of anchor devices and shall only be used as input for calculations of the design value, e.g., by applying the applicable partial factors and modification factor of EN 1993-1-3, EN 1993-1-4, EN 1995-1-1 and/or their national annexes, based on the type of material, failure mode, failed part of the anchor device or its supporting structure and service class (load-duration class: instantaneous action) as well as based on target market.
- When the anchor devices are used as part of a fall arrest system, the user shall be equipped with a means of limiting the maximum dynamic forces exerted on the user during the arrest of a fall to a maximum of 6 kN.

The products are intended to be used in all areas of industry, construction and in case of maintenance.

The anchor devices are not intended to be used in case of fire, therefore, resistance to fire performance is not relevant for the anchor devices.

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 anchor devices for the intended use of 25 years when installed in the works (provided that the anchor devices are subject to appropriate installation (see 1.1)). These provisions are based upon the current state of the art and the available knowledge and experience.

2 In the case of a fall, the personal protection equipment that is attached to the anchor devices prevents physical damage to the operator, assuming the correct usage.

3 If an anchor device has been loaded once (i.e., someone has fallen/almost fell and loaded the anchor device), it will be taken out of operation or replaced by a new one.

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 works[4].

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.

1.3 Specific terms used in this EAD

1.3.1 Anchor/Anchor Device

Based on the intended use (as given in clause 1.2.1), the resistance of the anchor device is not relevant for permanent load but instead for the ultimate load under instantaneous actions (see figure 1.3.1.1).

The direction of fall can be either parallel to the roof or also in other directions (perpendicular to the roof and overhead installation.

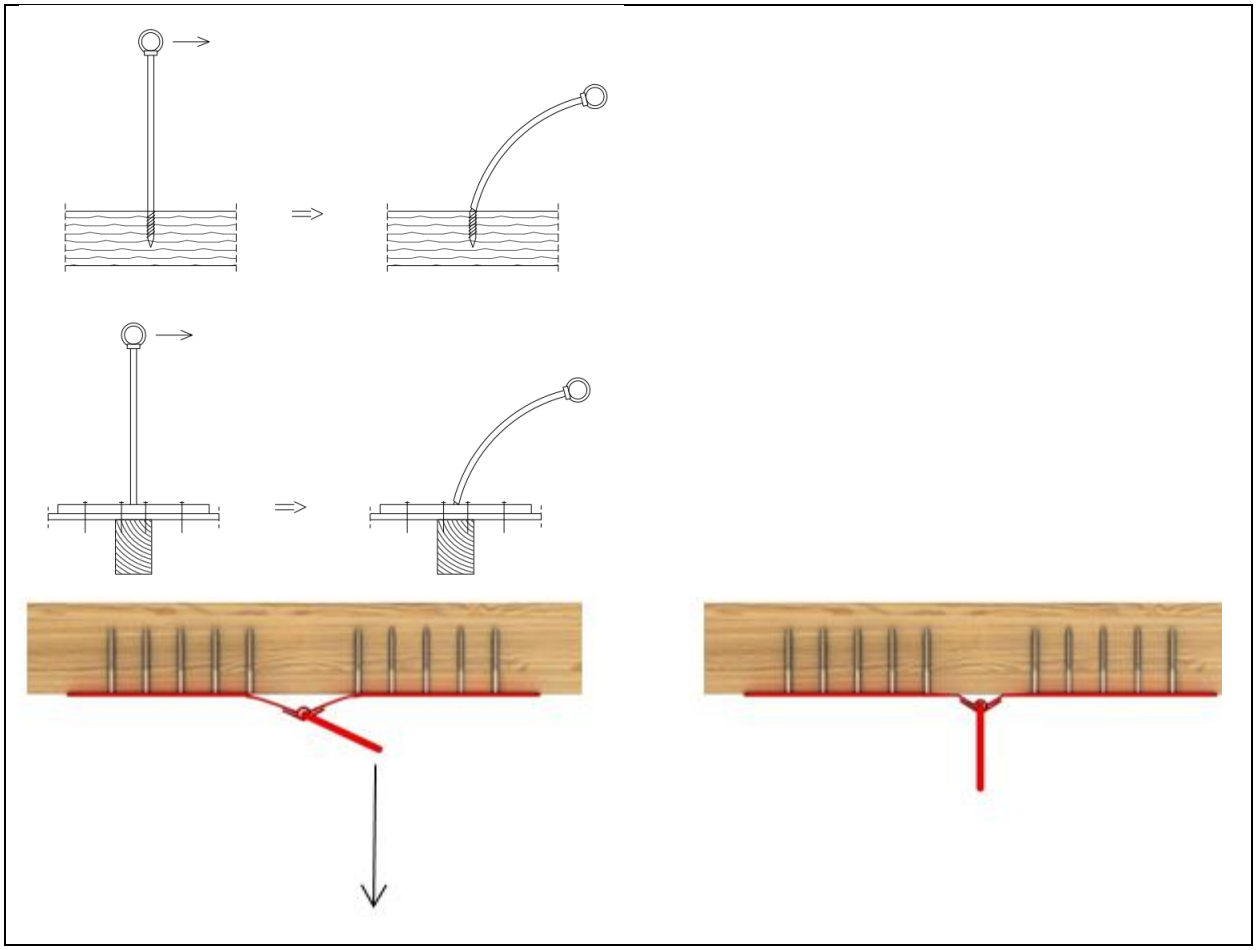


Figure 1.3.1.1: Depiction of an anchor device before and after ultimate load (Fall occurred; examples)

As the anchor devices are intended to be loaded only once (see clause 1.2.1) an assessment under permanent load or application of modification factors for the load duration is, therefore, not expedient.

4 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 the working life referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of the anchor devices is assessed in relation to the essential characteristics.

Table 2.1.1: Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.2	Class
Basic Works Requirement 4: Safety and accessibility in use			
2	Static loading	2.2.3	Level ($N_{R,k}$ [kN]), description
3	Dynamic loading	2.2.4	Level (Number of users)
4	Check of deformation capacity in case of constraining forces	2.2.5	Level, description
5	Durability	2.2.6	Level and service class

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

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

If for any components (including the components of the test arrangement, see clause 2.2.1) covered by harmonised standards or European Technical Assessments the manufacturer of the component has included the performance regarding the relevant essential characteristic in the Declaration of Performance, retesting of that component for issuing the ETA under the current EAD is not required.

2.2.1 General

The following provisions apply to all the tests carried out in accordance with clauses 2.2.2, 2.2.3, 2.2.4, 2.2.5 and 2.2.6.

The test arrangement (that means the structure made of timber beams and/or wood-based panels) shall be customized to the specific substructure the product is intended to be fixed to in compliance with manufacturer’s product installation instructions taking the following provisions in consideration. The test arrangement considered in the tests (type of material, spans, dimensions, number and spacing of fasteners, reinforcements etc.) including all following aspects shall be given in the ETA as part of the description of the product/intended use.

2.2.1.1 Timber and wood-based panels

Timber and wood-based panels shall comply with the relevant delivery conditions. Dimensions, spans and static system (single span system, multi span system) shall be given in the ETA. For wood-based panels spanning over timber beams, deviations from the tested span of less than 10 cm may be allowed.

2.2.1.2 Conditioning

Timber and wood-based panels used in the tests shall be conditioned at (20 ± 2) °C and (65 ± 5) % relative humidity until a constant mass is measured.

2.2.1.3 Density and moisture content

Both density and moisture content of the timber and wood-based panels shall be determined according to EN 323, EN 408 and EN 384.

2.2.1.4 Fasteners

The fasteners used to fasten the anchor devices to the timber substructure shall be specified in the ETA following EN 14592 or EAD 130118-01-0603, whichever is applicable. At least, the type, geometry, withdrawal parameter (for the type of timber or wood-based panels intended and used in the tests) and number of fasteners and their spacings shall be given in the ETA.

2.2.1.5 Reinforcements

Reinforcements (e.g., nailing plates according to EAD 130186-00-0603) and corresponding fasteners applied in the tests shall be specified. Same applies for fasteners used to fasten wood-based panels to timber beams (supporting structure). Type, number of reinforcements/fasteners and their dimensions shall be given in the ETA.

2.2.2 Reaction to fire

The anchor devices are considered to satisfy the requirements for performance Class A1 of the characteristic reaction to fire in accordance with the Commission Decision 96/603/EC, as amended by Commission Decisions 2000/605/EC and 2003/424/EC, without the need for testing on the basis of it fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

Therefore, the performance of the product is class A1.

2.2.3 Static loading

The purpose of this test is the assessment of the load-bearing capacity (maximum mechanical resistance) of the anchor devices under intended use conditions (fastened to/inserted into the timber structures).

A centric tension load test shall be performed in the direction of fall. If the load is perpendicular to the middle axis of the anchor device, the load-bearing capacity shall be tested in the most unfavourable load direction (see figure 2.2.3.1). The tests shall be performed without any propping up (e.g., without insulation material that laid over the timber substructures). For the supporting structure (timber substructure) see clause 2.2.1. The supporting structure in the test (see figure 2.2.3.1) shall correspond with the one in the intended use (type of material, spans, dimensions, number and spacing of fasteners, reinforcements etc.), see clause 1.2.1 in connection with clause 2.2.1. The test arrangements shall be adjusted for situations when directions of falls are not parallel to roof (e.g., as of the clause 1.3.1) by adjusting the load direction.

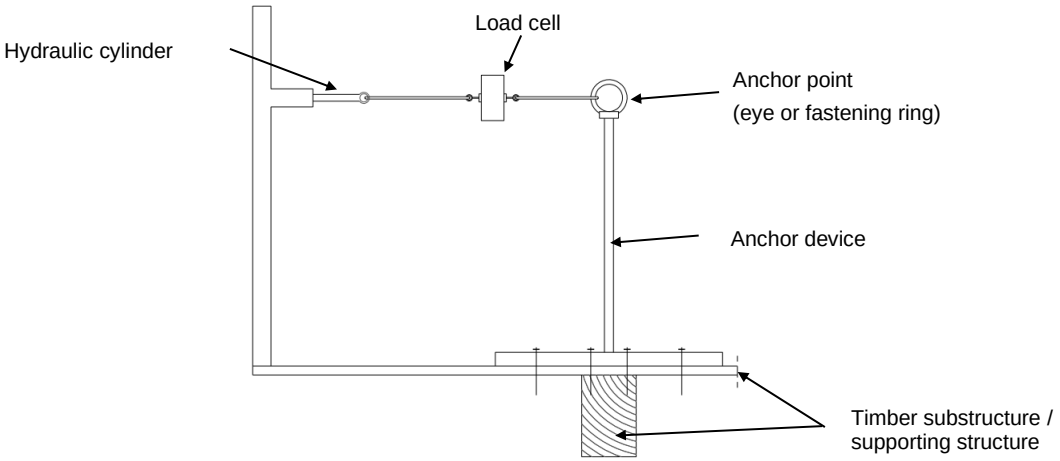


Figure 2.2.3.1: Example of a test arrangement of anchor devices for testing static loading

Tests with at least 3 specimens per arrangement shall be performed.

The failure loads and failure modes shall be documented. The maximum load shall be reached after 1 minute but within 3 minutes. If this criterion is not met (time to failure < 1 minute or > 3 minutes) then new test(s) shall be performed with adjusted loading speed(s).

Tests shall be carried out using standardised (for this purpose) measuring equipment having calibration. The load application equipment shall be designed to avoid sudden increases in load, especially at the beginning of the test. The permissible measuring error is 2 % of the maximal measuring value.

Tests with different configurations (for example different heights of the anchor point) may be treated as a family of test series and evaluated as one sample if justified by mechanical behaviour and/or failure mode (have the same failure mode), provided that the test is performed with the most unfavourable configurations (for example with largest height of the anchor device).

Depending on where the failure occurs, the assessment shall be made according to clause 2.2.3.1 (failure of the metallic components) or 2.2.3.2 (failure of the timber fastener).

2.2.3.1 Assessment – failure of the metallic components

The test results (failure loads) shall be evaluated statistically (determination of 5 % fractiles, confidence level of 75 %) according to EN 1990, Annex D, clause D7.2, assuming an unknown variance V_x, (failure of the metallic components of the anchor device). Generally, a normal distribution shall be assumed.

The statistically evaluated results (5 % fractiles) shall be adjusted (corrected) in respect of the actual measured values of the dimensions and strength properties. They shall be multiplied by

- a correction factor (≤ 1.0) which takes account of the ratio of guaranteed minimum tensile/yield strength and the tensile/yield strength of the building components, and by
- a correction factor (≤ 1.0) which takes account of the ratio of guaranteed minimum thickness to measured thickness of the components made of metal used in the tests.

The adjustment of test results shall be done according to EN 1993-1-3, Annex A, clause A.6.2, for metallic components of the anchor device.

The corrected and statistically evaluated test results (5 % fractiles) are the characteristic values of the tested types which shall be given in the ETA together with a description of the failure mode.

2.2.3.2 Assessment – Failure of the timber fastener

The test results (failure loads) shall be evaluated statistically (determination of 5 % fractiles, confidence level of 75 %) according to EN 1990, Annex D, clause D7.2 or EN 1058, Annex A, and EN 14358 assuming an unknown Variance Vx (failure of timber at connections with dowel-type fasteners).

The statistically evaluated results (5 % fractiles) shall be normalized to the characteristic density of timber or wood-based panels (whichever applies). They shall be multiplied by a correction factor μ_ρ which takes

account of the actual density ρ_a on the basis of the characteristic value of density ρ_k of the components made of timber or wood-based panels used in the tests (for determination of density see clause 2.2.1.3). The correction factor μ_ρ shall be calculated in accordance with equation 2.2.3.2.1:

$$\mu_\rho = \left(\frac{\rho_k}{\rho_a}\right)^{0,8} \leq 1.0 \qquad \text{(Equation 2.2.3.2.1)}$$

Only in case of anchor device of type 2 as defined in clause 1.1, additional withdrawal tests are to be performed according to EN 1382 to determine the actual withdrawal parameter with both fasteners and timber or wood-based panels used in the tests (see 2.2.1.4) with test specimens according to EN 1382, clause 6.3. At least 10 withdrawal tests shall be performed for each combination of fastener and timber or wood-based panels. If a declaration of performance has been drawn up for the fasteners (based on EN 14592 or EAD 130118-00-0603) and a performance for the characteristics withdrawal parameter has been declared, the statistically evaluated results (5 % fractiles) shall also be normalized to the characteristic withdrawal parameter of the individual fastener based on EAD 130118-01-0603 or EN 14592 (whichever applies). They shall be multiplied by a correction factor μ_f which takes account of the ratio of the characteristics withdrawal parameter $f_{ax,k}$ and the actual withdrawal parameter $f_{ax,a}$ of the individual fastener used in the tests (see equation 2.2.3.2.2):

$$\mu_f = \frac{f_{ax,k}}{f_{ax,a}} \leq 1.0 \qquad \text{(Equation 2.2.3.2.2)}$$

As the actual density of timber or wood-based panel is already considered in the results of the actual withdrawal parameter (test with the actual density), only one of the correction factors (either μ_ρ or μ_f) which leads to the most correction (namely the lowest correction factor)[5] shall be applied in this case.

The corrected and statistically evaluated test results (5 % fractiles) are the characteristic values of the tested types which shall be given in the ETA together with a description of the failure mode.

2.2.4 Dynamic loading

The purpose of this test is the assessment of the resistance to dynamic loading of the anchor devices under intended use conditions (fastened to/inserted into the timber structures).

The test method described in this clause is in analogy to the tests described in clauses 5.2 and 5.3.3 of EN 795, using a test setup in analogy to EN 795, clause 5.2.4 but with the anchor device fixed on a supporting structure (timber substructure) according to clause 2.2.1 of this EAD. The supporting structure in the test (see figure 2.2.3.1) shall correspond with the one in the intended use (type of material, spans, dimensions, number and spacing of fasteners, reinforcements etc., as of manufacturer's product installation instructions), see clause 1.2.1 in connection with clause 2.2.1. figure 2.2.4.1 shows schematically the test arrangement to be used. Test arrangement shall be similar with the condition, that load shall be introduced in the direction of fall and without any propping up. The test arrangements shall be adjusted for situations when directions of falls are not parallel to roof (e.g., as of the clause 1.3.1) by adjusting the load direction; for overhead application the test lanyard is connected directly to the load cell (no need for a connecting line and pulleys).

The test arrangement shall be calibrated in accordance with EN 795, clause 5.2.1.4, by connecting the rope to a rigid anchor point and by determining the free fall distance of the rigid test mass (100 ± 1) kg in such way that a fall arrest load of $(9\ ^{+0.5}_{0})$ kN is created. Three consecutive tests at the same anchor shall be conducted and only one of the tests shall fit the fall arrest load of $(9\ ^{+0.5}_{0})$ kN for calibration. After successful calibration, the rope shall be connected to the anchor point. If the anchor devices are used at the same time by multiple users, each user shall be taken into account by adding a (100 ± 1) kg load to the anchor device. The initial rigid test mass continues to be applied to the anchor device.

It shall be ensured that the energy released by the fall of the weight is absorbed only by the anchor device. The permissible measuring error is 2 % of the maximal measured value. The weight shall not touch the ground after fall, otherwise, the test is considered not valid and shall be repeated after adjusting the test arrangement (e.g., by adjusting the height of the upper pulleys) and repeating the calibration/determination of free fall distance.

5 Example: μ_ρ = 0.97; μ_f = 0.95 → The test results (failure loads) shall be multiplied by μ_f (by 0.95)

Assessment of test results: The number of users (persons) that corresponds to the load at which no failure occurs shall be stated in the ETA as level of performance (each 100 kg load = 1 user (person)).

.

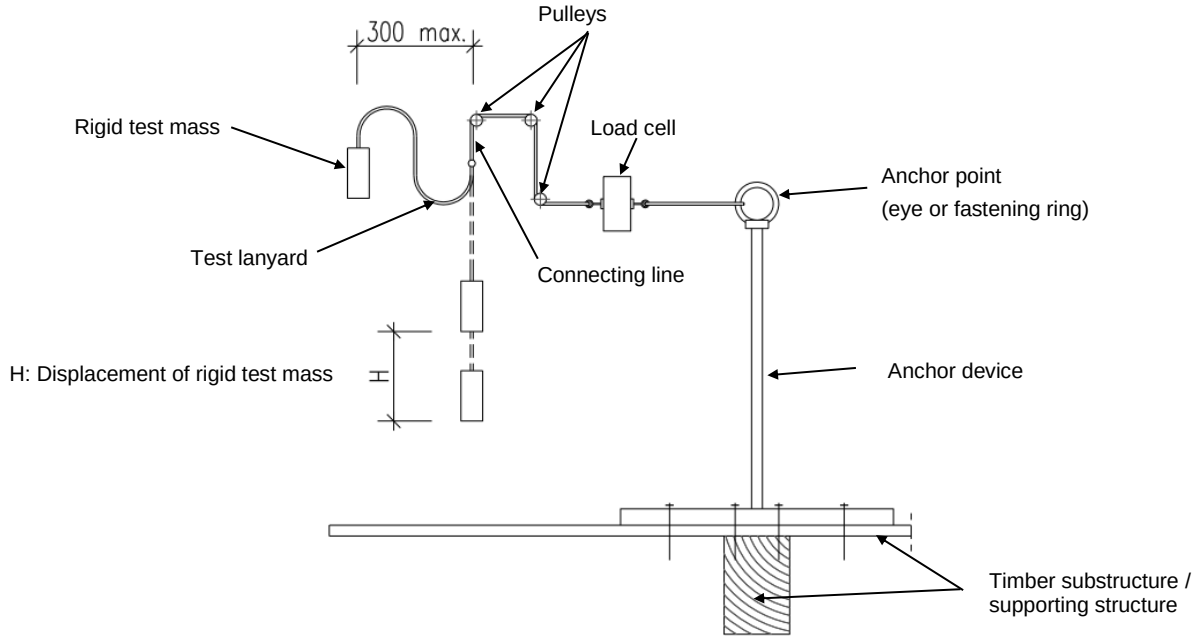


Figure 2.2.4.1: Example of a test arrangement of anchor devices for testing dynamic loads

2.2.5 Check of deformation capacity in case of constraining forces

The test method described in this clause is in analogy to the tests described in clauses 5.3.2 of EN 795. The static load shall be increased up to ($0.7\ ^{+0.1}_{0}$) kN and applied for ($1\ ^{+0.25}_{0}$) min and the corresponding displacement perpendicular to the middle axis in direction of the load shall be recorded. If the anchor device is deformable, the permanent deformation after unloading the anchor device shall be determined. The mean deformation of at least three tests shall be equal to or lower than 10 mm according to clause 4.4.1.1 of EN 795. The mean permanent deformation shall be given in the ETA.
If the anchor device is asymmetric, the direction to be tested shall be the direction in which the biggest deformation forces are to be expected. If this direction cannot be determined, multiple directions shall be tested to be able to determine the direction with the biggest deformation. Anchor device can be considered as rigid if no deformation occurs at a load of ($0.7\ ^{+0.1}_{0}$) kN applied for ($1\ ^{+0.25}_{0}$) min; otherwise, it is considered as flexible. The tests shall be performed without any propping up (e.g., without insulation material that laid over the timber substructures).

Tests shall be carried out using standardised (for this purpose) measuring equipment having calibration. The load application equipment shall be designed to avoid sudden increases in load, especially at the beginning of the test. The permissible measuring error shall be 2 % of the maximal measured value.

2.2.6 Durability

Concerning the corrosion protection of anchor devices, the rules given in EN 1993-1-3 Annex B, EN 1993-1-4, Annex A, and EN 1995-1-1, clause 4.2, shall be taken into account. The level and service class shall be given in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is Commission Decision (EU) 2018/771.

The system is **1+**.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the anchor devices for fastening personal fall protection systems in the procedure of verification of constancy of performance are laid down in Table 3.2.1.

Table 3.2.1: Control plan for the manufacturer; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Check of initial materials	Inspection document 3.1. according to EN 10204 (to be furnished by the supplier)	Laid down in control plan	1	Every manufacturing batch
2	Geometry and dimensions	Check of geometry, dimensions and tolerances			
3	Dynamic loading	See 2.2.4	Laid down in control plan	1	Every manufacturing batch
4	Static loading	See 2.2.3	Laid down in control plan	3	Every manufacturing batch

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.3.1.

Table 3.3.1 Control plan for the notified body; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control *(for systems 1+, 1 and 2+ only)*					
1	Ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the punching shear reinforcement	Verification of the complete FPC, to be implemented by the manufacturer	---	---	When starting the production or a new production line
Continuous surveillance, assessment and evaluation of factory production control *(for systems 1+, 1 and 2+ only)*					
2	Ascertain that the system of factory production control and the specified automated manufacturing process are maintained	Verification of the controls carried out by the manufacturer on the raw materials, on the process and on the product as indicated in Table 3.2.1	see control plan	---	1 per year
Audit-testing of samples taken by the notified product certification body at the manufacturing plant or at the manufacturer's storage facilities *(for system 1+ only)*					
3	Static loading	2.2.3	see control plan	3 tests	1 per year
4	Dynamic loading	2.2.4		1 test	
5	Check of deformation capacity in case of constraining forces	2.2.5		1 test	

4 REFERENCE DOCUMENTS

EN 323:1993	Wood-based panels; determination of density
EN 384:2016+A2:2022	Structural timber - Determination of characteristic values of mechanical properties and density
EN 408:2010+A1:2012	Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties
EN 795:2012	Personal fall protection equipment - Anchor devices
EN 1058:2009	Wood-based panels – Determination of characteristic 5-percentile values and characteristic mean values
EN 1382:2016	Timber structures - Test methods - Withdrawal capacity of timber fasteners
EN 1990:2002+A1:2005+ A1:2005/AC:2010	Eurocode 1 - Basis of structural design
EN 1993-1-3:2006+AC:2009	Eurocode 3 - Design of steel structures - Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting
EN 1993-1-4:2006+A1:2015	Eurocode 3 - Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels
EN 1995-1-1:2004+AC:2006+ A1:2008+A2:2014	Eurocode 5 - Design of timber structures – Part 1-1: General – Common rules and rules for buildings
EN 10025-1:2004	Hot rolled products of structural steels - Part 1: General technical delivery conditions
EN 10025-2:2019	Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels
EN 10088-4:2009	Stainless steels - Part 4: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes
EN 10088-5:2009	Stainless steels - Part 5: Technical delivery conditions for bars, rods, wire, sections and bright products of corrosion resisting steels for construction purposes
EN 10204:2004	Metallic products - Types of inspection documents
EN 10216-1:2013	Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties;
EN 10216-5:2021	Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 5: Stainless steel tubes;
EN 10296-1:2003	Welded circular steel tubes for mechanical and general engineering purposes - Technical delivery conditions – Part 1: Non-alloy and alloy steel tubes;
EN 10296-2:2005/AC:2007	Welded circular steel tubes for mechanical and general engineering purposes - Technical delivery conditions - Part 2: Stainless steel;
EN 14358:2016	Timber structures - Calculation and verification of characteristic values
EN 14592: 2008+A1:2012	Timber structures - Dowel-type fasteners - Requirements
EN ISO 1127:1996	Stainless steel tubes - Dimensions, tolerances and conventional masses per unit length
EN ISO 3506-4:2009	Mechanical properties of corrosion-resistant stainless steel fasteners Part 4: Tapping screws
EAD 130118-01-0603:2019-02	Screws and threaded rods for use in timber constructions
EAD 130186-00-0603:2018-07	Three-dimensional nailing plates