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European Technical Assessment

ETA-12/0540 of 18.03.2021

General part

Technical Assessment Body issuing the European Technical Assessment	Österreichisches Institut für Bautechnik (OIB) Austrian Institute of Construction Engineering
Trade name of the construction product	Uso Fiume of chestnut
Product family to which the construction product belongs	Strength graded structural timber – Square edged logs with wane – Chestnut
Manufacturer	Consorzio Servizi Legno-Sughero Foro Buonaparte 12 20121 Milano Italy
Manufacturing plant	See Annex 1
This European Technical Assessment contains	20 pages including 7 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 130012-00-0304 “Strength graded structural timber – Square edged logs with wane – Chestnut”.
This European Technical Assessment replaces	European Technical Assessment ETA-12/0540 of 31.07.2015.

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Remarks

Translations of the European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Specific parts

1 Technical description of the product

1.1 Description of product

The European Technical Assessment[1] – ETA – applies to the square edged logs with wane

Uso Fiume of chestnut.

The square edged logs with wane are full logs

- square edged on four sides according to Annex 3,
- maintaining boxed heart according to the grading rules of Annex 4,
- visually strength graded according to Annex 4,
- without preservative treatment,
- without flame retardant, and
- exclusively made of virgin wood; no recycled wood is used.

Square edged logs with wane do not feature a full square cross section with four sharp arises, but maintain the wane on all four sides along the length of the logs, i.e.

- Sum of lengths with $s \geq 1/3$.....along at least 1/3 of the length of the product
- Local sections with $s \geq 9/10$.....along a length not exceeding 0.5 m each section

Where

s..... ratio of the wane projections, see Annex 3 and Annex 4

NOTE 1 The cross sections of the square edged logs with wane are virtually squares, i.e. $h \approx b$ according to Annex 3.

NOTE 2 Wane is the original rounded surface of the logs that connects two adjacent faces of the square edged logs. Machining of timber with rectangular cross section or machining of unsuitable logs to timber with similar cross section and shape as in Annex 3 are not to be considered as square edged logs with wane according to the European Technical Assessment.

There is one kind of square edged logs with wane,

Uso Fiume, with constant external dimensions of the cross section along the entire length.

1.2 Wood and source of wood

Wood species is chestnut (*Castanea sativa* MILL.).

Sources are Italy and France.

[1] ETA-12/0540 was firstly issued in 2013 as European technical approval with validity from 31.01.2013, amended in 2013 with validity from 12.06.2013, converted in 2014 to European Technical Assessment ETA-12/0540 of 08.09.2014, amended in 2015 to European Technical Assessment ETA-12/0540 of 31.07.2015, and amended in 2021 to European Technical Assessment ETA-12/0540 of 18.03.2021.

2 Specification of the intended uses in accordance with the applicable European Assessment Document (hereinafter EAD)

2.1 Intended uses

Strength graded structural timber – square edged logs with wane of chestnut are intended to be used

- as structural elements in building and civil engineering works,
- in service classes 1, 2, and 3 according to EN 1995-1-1[2].

2.2 General assumptions

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.

2.2.1 Manufacturing

Manufacturing of the square edged logs with wane of chestnut is by machining suitable logs with defined methods. The logs are of defined raw material and the tolerances are according to Annex 5.

Square edged logs with wane of chestnut are either dry-graded[3] or not. Moisture content is determined according to EAD 130012-00-0304.

2.2.2 Packaging, transport and storage

The square edged logs with wane of chestnut shall be protected during transport and storage against any damage, dirt and detrimental moisture effects. The manufacturer's instruction for packaging, transport and storage shall be observed.

The square edged logs with wane of chestnut are packed and shipped in packages as defined in Annex 2.

2.2.3 Installation

2.2.3.1 Design of square edged logs with wane of chestnut

The European Technical Assessment only applies to the assessment of the performance of square edged logs with wane of chestnut. Verification of stability of the works including application of load on timber structures is not subject of the European Technical Assessment.

Items to be considered in design of works with square edged logs with wane of chestnut are

- Design of the works with square edged logs with wane of chestnut is carried out under the responsibility of an engineer experienced in timber structures.
- Design of the works take account of the protection of square edged logs with wane of chestnut.
- Design of the square edged logs with wane of chestnut is according to EN 1995-1-1 and EN 1995-1-2.
  - Verification is carried out by applying the nominal cross section.
  - According to Clause 6.1.5 of EN 1995-1-1, the contact area is considered as the plane part of the surface between the wanes.

[2] Reference documents are listed in Annex 7.

[3] For definition of terms see Annex 2.

- According to Clause 6.1.6 of EN 1995-1-1, the factor k_m = 1.0.

Standards and regulations in force at the place of use are to be considered.

2.2.3.2 Installation of square edged logs with wane of chestnut

Installation of square edged logs with wane of chestnut shall be carried out by appropriately qualified personnel under the supervision of the person responsible for technical matters on site. An assembly plan shall be prepared for each structure, which contains the square edged logs with wane of chestnut to be installed and the designation of those products. The assembly plan shall be available at the construction site.

The fasteners, see Annex 6, shall be installed only in the plane parts of the faces between the wanes. In execution an appropriate piece of timber has to be selected. Edge distances according to EN 1995-1-1 shall be taken from the plane parts of the faces.

2.2.3.3 Use, maintenance and repair of the works

The assessment is based on the assumption that maintenance is not required during the assumed working life. In case of severe damage of square edged logs with wane of chestnut, immediate actions regarding the mechanical resistance and stability of the works shall be initiated.

If repair deems necessary it is generally done by replacement.

2.3 Assumed working life

The provisions made in the European Technical Assessment (ETA) are based on an assumed intended working life of the square edged logs with wane of chestnut of 50 years, when installed in the works, provided that the cross laminated timber elements are subject to appropriate installation, use and maintenance (see Clause 2.2). These provisions are based upon the current state of the art and the available knowledge and experience[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 nor by the Technical Assessment Body, but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Essential characteristics

The performances of the square edged logs with wane of chestnut for the essential characteristics of Table 1 are only applicable to products visually strength graded according to the European Assessment Document EAD 130012-00-0304 and Annex 4.

[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 can also be shorter than the assumed working life.

Table 1: Essential characteristics and performances of the product

№	Essential characteristic	Product performance
Basic requirement for construction works 1: Mechanical resistance and stability		
1	Shape	Annex 3
2	Dimensions	Annex 3
3	Bending strength	Annex 5
4	Tension strength parallel	Annex 5
5	Tension strength perpendicular	Annex 5
6	Compression strength parallel	Annex 5
7	Compression strength perpendicular	Annex 5
8	Shear strength	Annex 5
9	Modulus of elasticity parallel	Annex 5
10	Modulus of elasticity perpendicular	Annex 5
11	Shear modulus	Annex 5
12	Density	Annex 5
13	Dimensional stability	Annex 5
14	Durability of timber	Annex 5
Basic requirement for construction works 2: Safety in case of fire		
15	Reaction to fire	Annex 5
16	Resistance to fire	Annex 5
Basic requirement for construction works 3: Hygiene, health and the environment		
17	Content and/or release of dangerous substances	Annex 5
Basic requirement for construction works 4: Safety and accessibility in use		
18	Same as basic requirement for construction works 1	—

3.2 Assessment methods

The assessment of the essential characteristics in Clause 3.1 of the square edged logs with wane of chestnut for the intended use and in relation to the requirements for mechanical resistance and stability, for safety in case of fire, for hygiene, health and the environment, and for safety and accessibility in use in the sense of the basic requirements for construction works № 1 to 4 of Regulation (EU) № 305/2011 has been made in accordance with the European Assessment Document EAD 130012-00-0304, Strength graded structural timber – Square edged logs with wane – Chestnut.

3.3 Identification

The European Technical Assessment for the square edged logs with wane of chestnut is issued on the basis of agreed data[5] that identify the assessed product. Changes to materials, to composition or characteristics of the product, or to the production process could result in these deposited data being incorrect. Österreichisches Institut für Bautechnik should be notified before the changes are introduced, as an amendment of the European Technical Assessment is possibly necessary.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 System of assessment and verification of constancy of performance

According to Commission Decision 97/176/EC the system of assessment and verification of constancy of performance to be applied to the square edged logs with wane of chestnut is System 2+. As laid down in Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, point 1.3., under System 2+ the manufacturer shall draw up the declaration of performance and determine the product-type on the basis of

(a) The manufacturer shall carry out

  (i) an assessment of the performance of the construction product on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of that product;

  (ii) factory production control;

  (iii) testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan[6].

(b) The notified factory production control certification body shall decide on the issuing, restriction, suspension or withdrawal of the certificate of conformity of the factory production control on the basis of the outcome of the following assessments and verifications carried out by that body

  (i) initial inspection of the manufacturing plant and of factory production control;

  (ii) continuing surveillance, assessment and evaluation of factory production control.

4.2 AVCP for construction products for which a European Technical Assessment has been issued

Manufacturers undertaking tasks under System 2+ shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Manufacturers shall therefore not undertake the tasks referred to in Clause 4.1, point (a) (i).

[5] The technical file of the European Technical Assessment is deposited at Österreichisches Institut für Bautechnik.

[6] The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the notified factory production control certification body involved in the procedure for the assessment and verification of constancy of performance. The prescribed test plan is also referred to as control plan.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

5.1 Tasks for the manufacturer

5.1.1 Factory production control

In the manufacturing plant the manufacturer shall establish and continuously maintain a factory production control. All procedures and specification adopted by the manufacturer shall be documented in a systematic manner. The factory production control shall ensure the constancy of performances of the square edged logs with wane of chestnut with regard to the essential characteristics.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan. The incoming raw materials shall be subject to controls by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents presented by the manufacturer of the raw materials and by verifying the geometrical properties of the logs.

The procedures of the manufacturer shall incorporate the specifications of EN 14081-1 for visually strength graded timber regarding factory production control including record-keeping.

The records shall be presented to the notified factory production control certification body involved in continuous surveillance. On request the records shall be presented to Österreichisches Institut für Bautechnik.

5.1.2 Declaration of performance

The manufacturer is responsible for preparing the declaration of performance. When all the criteria of the assessment and verification of constancy of performance are met, including the certificate of conformity of the factory production control issued by the notified factory production control certification body, the manufacturer shall draw up a declaration of performance.

Square edged logs with wane of chestnut that have been dry-graded according to Annex 2 indicate dry-graded within the product-type.

5.2 Tasks for the notified factory production control certification body

5.2.1 Initial inspection of the manufacturing plant and of factory production control

The notified factory production control certification body shall verify the ability of the manufacturer for a continuous and orderly manufacturing of the square edged logs with wane of chestnut according to the European Technical Assessment. In particular the following items shall be appropriately considered.

- Personnel and equipment
- The suitability of the factory production control established by the manufacturer
- Full implementation of the control plan

5.2.2 Continuing surveillance, assessment and evaluation of factory production control

The notified factory production control certification body shall visit the factory at least once a year for routine inspection. In particular the following items shall be appropriately considered.

- The manufacturing process including personnel and equipment
- The factory production control
- The implementation of the control plan

The results of continuous surveillance shall be made available on demand by the notified factory production control certification body to Österreichisches Institut für Bautechnik. When the provisions of the European Technical Assessment and the control plan are no longer fulfilled, the certificate of conformity of the factory production control shall be withdrawn.

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by Österreichisches Institut für Bautechnik

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Definition of terms

Dry-graded timber

Timber that is part of a batch that has intentionally been graded at a mean moisture content of 20 % or less, without any measurement exceeding 24 %.

Nominal cross section

Cross section defined by the rectangle circumscribing the piece of timber at mid-length.

Batch

Quantity of timber of one species, one population and one size graded in one working shift. An order of a combination of different sizes of one customer may be considered as a batch as well.

Package

Timber of one grade, one species, and one nominal size of the cross section or – where the timber is to be used for one structure – of multiple sizes, graded in one working shift and to be delivered to one customer.

Species population

Timber from an identifiable source and of a species that is, or is intended to be, strength graded and marketed as a commercially defined product.

Wane

Original rounded surface of a log, without bark or with restricted residual part of bark, also regularized by machining with the removal of not more than 5 mm under the bark, which connects two adjacent faces of the piece of timber.

Visual strength grading

Process by which a piece of timber can be sorted, by means of visual inspection, into a grade to which characteristic values of strength, stiffness and density may be allocated.

Shape

Figure 1: Wane (example)

Maximum wane admitted $s \leq 9/10$, i.e.

Sum of lengths of sections along the product with $s \geq 1/3$ ..... At least 1/3 of the length of the product

Local sections along the product with $s \geq 9/10$ ..... Along a length not exceeding 0.5 m each section

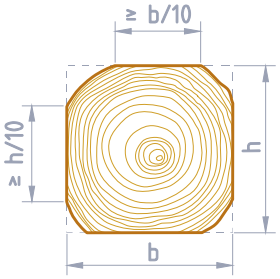
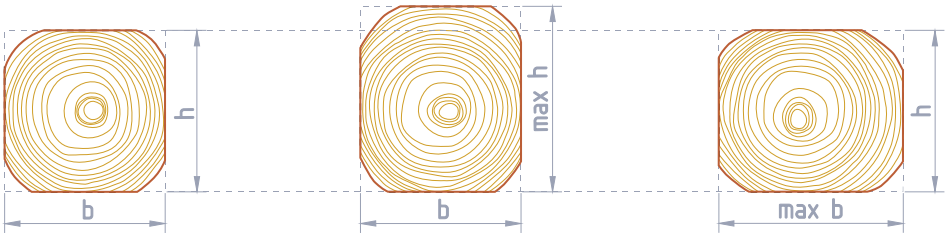


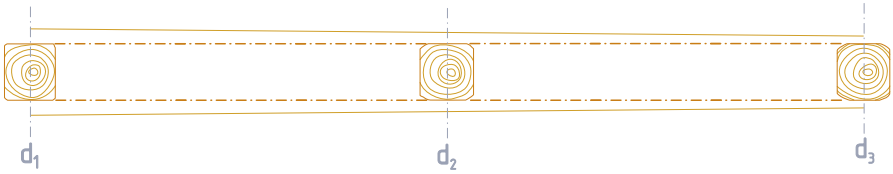
Figure 2: Regularity of cross section (example)

Maximum difference $h - b = 2$ cm



$b = h$ max $h = b + 2$ cm max $b = h + 2$ cm

Figure 3: Uso Fiume, square edged log with wane of chestnut with constant external dimensions of the cross section along the entire length



$d_1 = d_2 = d_3$

Table 2: Visual strength grading – Rules for grade UFS/C of square edged logs with wane of chestnut with constant external dimensions of the cross section along the entire length

Characteristic	Uso Fiume of chestnut Grade UFS/C [1]
Wane [2]	$s \leq 9/10$, see Annex 3
Single knots [2]	$A \leq 2/5$ and in any case $d \leq 70$ mm D { ≤ 120 mm; and; ≤ minimum dimension of cross section
Knot grouping [4]	$A_g \leq 1/2$ and in any case $t \leq 70$ mm
Ring width	No limitation
Slope of grain	≤ 1 : 6 = 16.5 %
– Shrinkage fissures	Permitted with limitation [5]
– Ring shake	Permitted with limitation [6]
– Damage (lightning, frost, lesions)	Not permitted
Fungal damage	
– Brown and white rot	Not permitted
Eccentric pith [7]	No limitation
Regularity of the cross section	≤ 2 cm
Tension wood	No limitation
Insect damage	Permitted with limitation [8]
Mistletoe	Not permitted
Warps	
– Spring	Not larger than 8 mm over a length of 2 m
– Twist	Not larger than 1 mm over a cross-sectional side of 25 mm
Taper	Not permitted

NOTES

1) The square edged logs with wane of chestnut are either dry-grades or not.

2) s is the ratio of the wane projections on a side of the cross section to the side dimension.

3) A is the ratio of the knot minimum diameter d to the side dimension of the cross section on which the knot is measured.

For the knots at the wane, the ratio A of the minimum knot diameter d to the minimum side dimension of the cross section is calculated.

D is the maximum knot diameter.

4) t is the sum of the minimum diameters of the knots within 150 mm. A_g is the ratio of the sum t to the side of the cross section on which the knots are measured.

5) Fissure through the thickness is only permitted at the ends, with a length not greater than twice the width of the piece.

6) Generally not permitted; only the visible or probable ring shake is permitted if $r_{max} \leq \frac{b}{3}$ and $\varepsilon \leq \frac{b}{6}$

Where:

r_{max} .... maximum radius of the ring shake

b ..... smaller side of the cross section

ε..... eccentricity, that is the maximum distance between the pith and the geometrical centre of the cross section

7) Double pith at the ends is not permitted.

8) Only holes with a blackish ring, or round holes without a blackish ring, with a diameter between 1.5 and 2.5 mm (Anobiidae) are permitted, as long as the infestation is actually terminated. A maximum of 10 holes, uniformly distributed, per metre of length (the sum of all faces) is permitted.

Table 3: Product performances of grade UFS/C of square edged logs with wane of chestnut

BRW [1)]	Essential characteristic	Assessment method	Level, class, or description Grade UFS/C	Unit
1	**Mechanical actions perpendicular to and along the square edged logs with wane of chestnut**			
	Bending strength $f_{m,k}$	EN 408	29	N/mm²
	Tension strength parallel $f_{t,0,k}$	EN 384	16	N/mm²
	Tension strength perpendicular $f_{t,90,k}$	EN 384	0.6	N/mm²
	Compression strength parallel $f_{c,0,k}$	EN 384	23	N/mm²
	Compression strength perpendicular $f_{c,90,k}$	EN 384	7.6	N/mm²
	Shear strength $f_{v,k}$	EN 384	4.0	N/mm²
	Mean modulus of elasticity parallel $E_{0,mean}$	EN 408	11.2	kN/mm²
	5 % modulus of elasticity $E_{0.05}$	EN 384	9.4	kN/mm²
	Mean modulus of elasticity perpendicular $E_{90,mean}$	EN 384	0.74	kN/mm²
	Mean shear modulus G_{mean}	EN 384	0.70	kN/mm²
	Other aspects			
	Density ρ_k	EN 408	504	kg/m³
	Mean density ρ_{mean}	EN 408	570	kg/m³
	Dimensional stability	EN 336	Tolerance classes according to EN 336	—
	Durability of timber – wood destroying fungi – insects – termites – marine borers Service classes	EN 350 EN 1995-1-1	Class 2 S M S_{Ma} 1, 2 and 3	—

BRW [1)]	Essential characteristic	Assessment method	Level, class, or description Grade UFS/C	Unit
2	**Reaction to fire**			
	Square edged logs with wane of chestnut	Commission Decision 2003/43/EC, as amended	Euroclass D-s2, d0	—
	Resistance to fire			
	Charring rate	EN 1995-1-2		—
3	Content and/or release of dangerous substances	No dangerous substances		
4	Same as basic requirement for construction works 1			—

NOTE

[1)] Basic requirement for construction works

Fasteners

General

Fasteners are not part of the square edged logs with wane of chestnut.

The determination of the load-bearing capacities of the fasteners for square edged logs with wane of chestnut shall be carried out according to EN 1995-1-1 and/or the European Technical Assessment which has been granted for the relevant fastener for hardwood.

See also Clause 2.2.3 on installation of the product in the works.

To all fasteners applies:

Due to soluble substances of chestnut suitable fasteners shall be applied.

Only nails, wood screws, bolts, dowels and other connectors according to EN 1995-1-1 or a European Technical Assessment may be used as fasteners, observing the following particularities.

Nails

Nails shall have a diameter of minimum 4 mm. The load-bearing capacity of nails shall be determined according to EN 1995-1-1. Minimum spacing and distances shall be determined following the direction of grain. Smooth nails shall not be used for axially loading. For axially loaded nails the recommendations of the holder of the European Technical Assessment shall be observed.

Wood screws

Laterally loaded wood screws shall have a nominal diameter of minimum 4 mm. The load-bearing capacity of laterally loaded wood screws shall be determined according to EN 1995-1-1. Minimum spacing and distances shall be determined following the direction of grain.

Axially loaded wood screws shall have a nominal diameter of minimum 4 mm. Axially loaded wood screws driven in end grain shall have a nominal diameter of minimum 8 mm. The load-bearing capacity of axially loaded wood screws shall be determined according to EN 1995-1-1.

Bolts and dowels

Bolts and dowels shall have a diameter of minimum 8 mm. The load-bearing capacity of bolts and dowels shall be determined according to EN 1995-1-1. Minimum spacing and distances shall be determined following the direction of grain.

Split ring connectors, shear plate connectors and toothed-plate connectors

The load-bearing capacity of split ring connectors, shear plate connectors and toothed-plate connectors shall be determined according to EN 1995-1-1. Minimum spacing and distances shall be determined following the direction of grain.

Reference documents

EAD 130012-00-0304, Strength graded structural timber – Square edged logs with wane – Chestnut

EN 336 (2013-10), Structural timber – Sizes, permitted deviations

EN 350 (2016-08), Durability of wood and wood-based products – Testing and classification of the durability to biological agents of wood and wood-based materials

EN 384 (2010-04), Structural timber – Determination of characteristic values of mechanical properties and density

EN 408:2010+A1 (2012-07), Timber structures – Structural timber and glued laminated timber – Determination of some physical and mechanical properties

EN 1995-1-1 (2004-11), +AC (2006-06), +A1 (2008-06), and +A2 (2014-05), Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for building

EN 1995-1-2 (2004-11), +AC (2006-06), and +AC (2009-03), Eurocode 5: Design of timber structures – Part 1-2: General – Structural fire design

EN 14081-1:2016+A1 (2019-08), Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements

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