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European Technical Assessment

ETA-11/0219 of 13.10.2016

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 and Uso Trieste of softwood
Product family to which the construction product belongs	Strength graded structural timber – Square edged logs with wane – Softwood
Manufacturer	Consorzio Servizi Legno-Sughero Foro Buonaparte 12 20121 Milano Italy
Manufacturing plants	See Annex 1
This European Technical Assessment contains	21 pages including Annexes 1 to 8, 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	EAD 130167-00-0304, European Assessment Document for Strength graded structural timber – Square edged logs with wane – Softwood, edition June 2016.
This European Technical Assessment replaces	European technical approval ETA-11/0219 with validity from 28.06.2013 to 23.06.2016.

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Remarks

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Specific parts

1 Technical description of the product

1.1 General

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

Uso Fiume and Uso Trieste of softwood.

The square edged logs with wane are full logs,

- square edged on four sides according to Annex 3,
- maintaining boxed heart,
- visually strength graded according to Annex 4 and Annex 5,
- 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 arris, but maintain the wane on all four sides along the entire length of the logs. Wane is the original rounded surface of the logs that connects two adjacent faces of the square edged logs with wane. Wane is without bark or with restricted residual parts of bark and may be machined for barked and basted pieces with the removal of no more than 5 mm under the bark.

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 Machining of timber with rectangular cross section or machining of unsuitable logs to timber with similar cross section and shape as in Annex 3 is not to be considered as manufacturing of square edged logs with wane according to the European Technical Assessment.

There are two kinds of square edged logs with wane, for structural use.

- Uso Fiume with constant external dimensions of the cross section along the entire length
- Uso Trieste with external dimensions of the cross section following the log tapering along its entire length

1.2 Wood and source of wood

Wood species are spruce (Picea abies (L.) Karst.), fir (Abies alba Mill.), and larch (Larix Mill.). Sources of wood are Northern Italy, Central Europe, and the Ardennes in Belgium.

[1] ETA-11/0219 was firstly issued in 2011 as European technical approval with validity from 24.06.2011, amended in 2011 with validity from 15.12.2011, and in 2013 with validity from 28.06.2013, and converted in 2016 to European Technical Assessment ETA-11/0219 of 13.10.2016.

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

2.1 Intended use

Strength graded structural timber – square edged logs with wane of spruce, fir, and larch is intended to be used

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

2.2 Assumptions

2.2.1 General

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 transport, storage, maintenance, replacement, and repair of the product as he considers necessary.

2.2.2 Manufacturing

Manufacturing of the square edged logs with wane of spruce, fir, and larch is by machining suitable logs with defined methods. The logs are of defined raw material and the tolerances are according to Annex 6.

Square edged logs with wane of spruce, fir, and larch are either dry-graded or not. Moisture content is, if required, determined according to EAD 130167-00-0304.

2.2.3 Packaging, transport, and storage

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

The square edged logs with wane of spruce, fir, and larch are packed and shipped in packages as defined in Annex 2.

2.2.4 Installation

2.2.4.1 General

It is assumed that the square edged logs with wane of spruce, fir, and larch will be installed according to the manufacturer's instructions or – in absence of such instructions – according to the usual practice of the building professionals.

2.2.4.2 Design

The European Technical Assessment only applies to specification, intended use, and performance of the square edged logs with wane of spruce, fir, and larch. Verification of stability of the works including application of load on timber structures is not subject of the European Technical Assessment.

Items considered in design of works with square edged logs with wane of spruce, fir, and larch.

- Design of the works with square edged logs with wane of spruce, fir, and larch 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 spruce, fir, and larch.

[2] Standards, Guidelines, and other documents referred to in the European Technical Assessment, are listed in Annex 8.

- The square edged logs with wane of spruce, fir, and larch are installed correctly.
- Design of the square edged logs with wane of spruce, fir, and larch 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 face between the wanes.
- 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 considered.

2.2.4.3 Installation of square edged logs with wane of spruce, fir, and larch

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

The fasteners, see Annex 7, are installed only in the plane parts of the faces between the wanes. In execution an appropriate piece of timber is selected. Edge distances according to EN 1995-1-1 are taken from the plane parts of the faces.

The safety-at-work and health protection regulations have to be observed.

2.2.4.4 Use, maintenance and repair of the works

The assessment is based on the assumption that maintenance is not required during the assumed working life. Severe damage of square edged logs with wane of spruce, fir, and larch require immediate actions regarding the mechanical resistance and stability of the works to be initiated.

If repair deems necessary it is generally done by replacement.

2.3 Assumed working life

The European Technical Assessment is based on an assumed working life of 50 years and the intended use for the square edged logs with wane of spruce, fir, and larch, when installed in the works, provided that the square edged logs with wane of spruce, fir, and larch 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.

In normal use conditions the real working life may be considerably longer without major degradation affecting the basic requirements for works[3].

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 expressing the expected economically reasonable working life of the product.

[3] The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works are subject, as well as on the particular conditions of 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 indicated above.

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

3.1 Essential characteristics

The performance of the square edged logs with wane of spruce, fir, and larch for the essential characteristics is given in Table 1.

The performance of the square edged logs with wane of spruce, fir, and larch for the essential characteristics of Table 1 is only applicable to products visually strength graded according to the European Assessment Document EAD 130167-00-0304, see also Annex 4 and Annex 5.

Table 1: Essential characteristics and performance of the product

№	Essential characteristic	Product performance
Basic requirement for construction works 1: Mechanical resistance and stability		
1	Shape	See Annex 3.
2	Dimensions	See Annex 3.
3	Bending strength	See Annex 6.
4	Tension strength parallel	See Annex 6.
5	Tension strength perpendicular	See Annex 6.
6	Compression strength parallel	See Annex 6.
7	Compression strength perpendicular	See Annex 6.
8	Shear strength	See Annex 6.
9	Modulus of elasticity parallel	See Annex 6.
10	Modulus of elasticity perpendicular	See Annex 6.
11	Shear modulus	See Annex 6.
12	Density	See Annex 6.
13	Dimensional stability	See Annex 6.
14	Durability of timber	See Annex 6.
Basic requirement for construction works 2: Safety in case of fire		
15	Reaction to fire	See Annex 6.
16	Resistance to fire	See Annex 6.
Basic requirement for construction works 3: Hygiene, health, and the environment		
—	No characteristic assessed.	—

№	Essential characteristic	Product performance
Basic requirement for construction works 4: Safety and accessibility in use		
17	Same as basic requirement for construction works 1	—
Basic requirement for construction works 5: Protection against noise		
—	Not relevant. No characteristic assessed.	—
Basic requirement for construction works 6: Energy economy and heat retention		
—	Not relevant. No characteristic assessed.	—
Basic requirement for construction works 7: Sustainable use of natural resources		
—	No characteristic assessed.	—

3.2 Assessment methods

The assessment of the essential characteristics in Clause 3.1 of the square edged logs with wane of spruce, fir, and larch for the intended uses and in relation to the requirements for mechanical resistance and stability, for safety in case of fire, and for hygiene, health, and the environment in the sense of the basic requirements for construction works № 1 to 3 of Regulation (EU) № 305/2011 has been made in accordance with the European Assessment Document EAD 130167-00-0304, Strength graded structural timber – Square edged logs with wane – Softwood, edition June 2016.

3.3 Identification

The European Technical Assessment for the square edged logs with wane of spruce, fir, and larch is issued on the basis of agreed data that identify the assessed product[4]. Changes to materials, to composition, to characteristics, or to the production process of the square edged logs with wane of spruce, fir, and larch 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 spruce, fir, and larch is System 2+. System 2+ is detailed in Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, 1.3, and provides for the following items.

(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;

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

(ii) factory production control;

(iii) testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan[5].

(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 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 establishes and continuously maintains a factory production control. All procedures and specifications adopted by the manufacturer are documented in a systematic manner. Purpose of factory production control is to ensure the constancy of performances of the square edged logs with wane of spruce, fir, and larch with regard to the essential characteristics.

The manufacturer only uses raw materials supplied with the relevant inspection documents as laid down in the control plan. The incoming raw materials are subject to controls by the manufacturer before acceptance. Check of incoming materials includes 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 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 draws up the declaration of performance. Essential characteristics to be included in the declaration of performance for the corresponding intended use are given in Table 1.

[5] 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.

Square edged logs with wane of spruce, fir, and larch that have been dry-graded according to Annex 2 are 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 verifies the ability of the manufacturer for a continuous and orderly manufacturing of the square edged logs with wane of spruce, fir, and larch according to the European Technical Assessment. In particular the following items are appropriately considered.

- Personnel and equipment
- Suitability of the factory production control established by the manufacturer
- Full implementation of the prescribed test plan

5.2.2 Continuing surveillance, assessment, and evaluation of factory production control

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

- Manufacturing process including personnel and equipment
- Factory production control
- Implementation of the prescribed test plan

The results of continuous surveillance are 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 prescribed test plan are no longer fulfilled, the certificate of conformity of the factory production control is withdrawn by the notified factory production control certification body.

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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: Eccentric pith (example)
maximum eccentric pith admitted 20 %

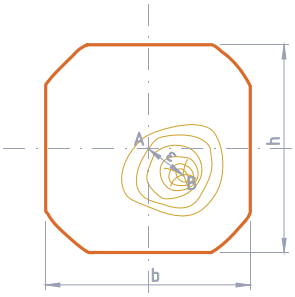


Figure 2: Wane (example)
maximum wane admitted $s \leq 9/10$

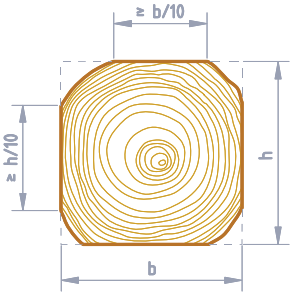
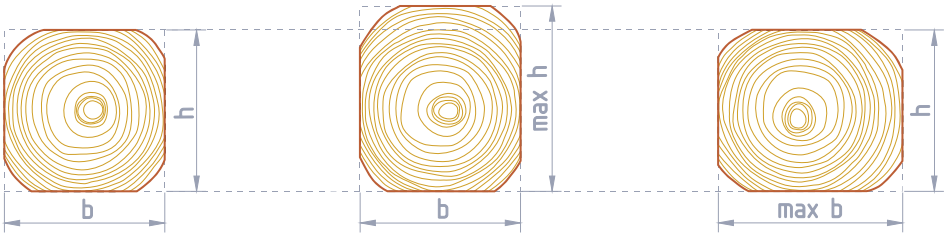
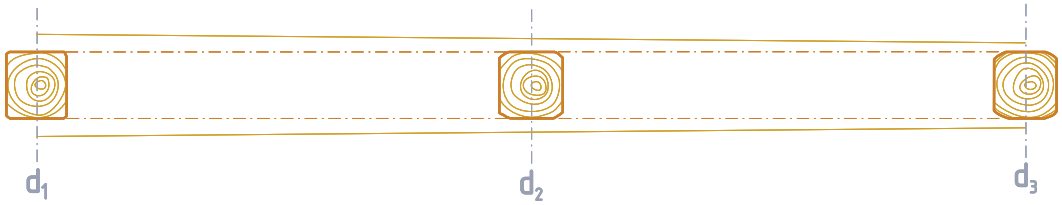


Figure 3: Regularity of cross section (example)
Maximum difference $h - b = 2$ cm



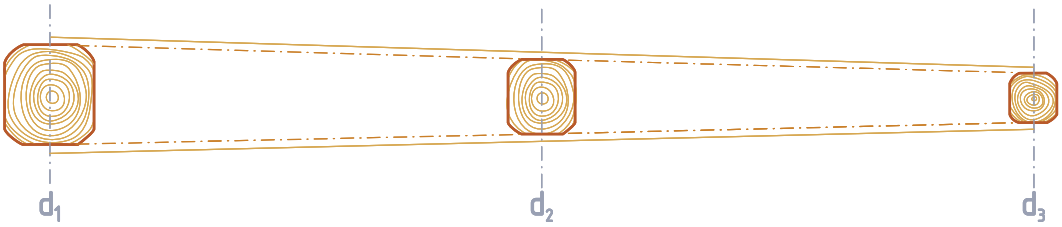
$b = h$ max $h = b + 2$ cm max $b = h + 2$ cm

Figure 4: Uso Fiume: constant external dimensions of the cross section along the entire length



$d_1 = d_2 = d_3$

Figure 5: Uso Trieste: external dimensions of the cross section following the log tapering
maximum taper admitted ≤ 6 mm/m



$d_1 > d_2 > d_3$

Table 2: Visual strength grading – Rules for grade UFS/A of square edged logs with wane of spruce, fir, and larch with constant external dimensions of the cross section, with wane, boxed heart and approximately central pith

Characteristic	Uso Fiume of spruce, fir, and larch Grade UFS/A [1)]
Wane [2)]	$s \leq 9/10$, see Annex 3
Single knots [3)]	$A \leq 2/5$ and in any case $d \leq 70$ mm
Knot grouping [4)]	$A_g \leq 2/3$
Ring width	≤ 6 mm
Slope of grain	≤ 12.5 %
– Shrinkage fissures	Permitted. If through the thickness permitted with limitation [5)]
– Ring shake	Not permitted for larch; Permitted with limitation for spruce and fir [6)]
– Damage (lightning, frost, lesions)	Not permitted
Fungal damage	
– Blue strain	Permitted
– Brown and white rot	Not permitted
Eccentric pith	≤ 20 % [7)]
Regularity of the cross section	≤ 2 cm, see Annex 3
Compression wood	Up to 2/5 of the cross-section area
Insect damage	Permitted with limitation [8)]
Mistletoe	Not permitted
Warps	
– Spring	Not larger than 10 mm over a length of 2 m
– Twist	Not larger than 1 mm over a cross-sectional side of 25 mm over 2 m length
Taper	Not permitted

NOTES

1) The square edged logs with wane of spruce, fir, and larch 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.
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 for spruce and fir 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) The eccentric pith is measured by the percentage of the eccentricity ε and the greater side dimension of the cross section at the end of the piece of timber, see Annex 3.

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: Visual strength grading – Rules for grade UTS/A of square edged logs with wane of spruce, fir, and larch with constant external dimensions of the cross section, with wane, boxed heart and approximately central pith

Characteristic	Uso Trieste of spruce, fir, and larch Grade UTS/A [1]
Wane [2]	$s \leq 9/10$, see Annex 3
Single knots [3]	$A \leq 2/5$ and in any case $d \leq 70$ mm
Knot grouping [4]	$A_g \leq 2/5$
Ring width	≤ 6 mm
Slope of grain	≤ 12.5 %
– Shrinkage fissures	Permitted. If through the thickness permitted with limitation [5]
– Ring shake	Not permitted for larch; Permitted with limitation for spruce and fir [6]
– Damage (lightning, frost, lesions)	Not permitted
Fungal damage	
– Blue strain	Permitted
– Brown and white rot	Not permitted
Eccentric pith	≤ 20 % [7]
Regularity of the cross section	≤ 2 cm, see Annex 3
Compression wood	Up to 2/5 of the cross-sectional area
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 over 2 m length
Taper [9]	R ≤ 6 mm/m

NOTES

1) The square edged logs with wane of spruce, fir, and larch 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.
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 for spruce and fir 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) The eccentric pith is measured by the percentage of the eccentricity ε and the greater side dimension of the cross section at the end of the piece of timber, see Annex 3.

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.

9) Reduction in size permitted for each side of the cross section, along the longitudinal axis of the piece.

Table 4: Product performances of grades UFS/A and UTS/A of square edged logs with wane of spruce, fir, and larch

BRCW [1]	Essential characteristic	Assessment method	Level, class, or description		Unit
			Grade UFS/A	Grade UTS/A	
1	**Mechanical actions perpendicular to and along the grain of square edged logs with wane of spruce, fir, and larch**				
	Bending strength $f_{m,k}$	[2]	27	28	N/mm²
	Tension strength along the grain $f_{t,0,k}$	[2]	14	11	N/mm²
	Tension strength perpendicular to the grain $f_{t,90,k}$	[2]	0.4	0.4	N/mm²
	Compression strength along the grain $f_{c,0,k}$	[2]	21	18	N/mm²
	Compression strength perpendicular to the grain $f_{c,90,k}$	[2]	2.5	2.2	N/mm²
	Shear strength $f_{v,k}$	[2]	4.0	3.4	N/mm²
	Mean modulus of elasticity along the grain $E_{0,mean}$	[2]	10.5	8.8	kN/mm²
	5 % modulus of elasticity $E_{0.05}$	[2]	7.0	5.9	kN/mm²
	Mean modulus of elasticity perpendicular to the grain $E_{90,mean}$	[2]	0.37	0.29	kN/mm²
	Mean shear modulus G_{mean}	[2]	0.69	0.54	kN/mm²
	Other aspects				
	Density ρ_k	[2]	380	370	kg/m³
	Mean density ρ_{mean}	[2]	460	450	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 350-2 EN 1995-1-1	 Class 2 S M S_{Ma} 1, 2 and 3		—

NOTES

[1] Basic requirement for construction works

[2] EAD 130167-00-0304

BRCW [1)]	Essential characteristic	Assessment method	Level, class, or description		Unit
			Grade UFS/A	Grade UTS/A	
2	**Reaction to fire**				
	Square edged logs with wane of spruce, fir, and larch	Commission Decision 2003/43/EC, as amended	Euroclass D-s2, d0		—
	Resistance to fire				
	Charring rate	EN 1995-1-2			—
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 spruce, fir, and larch.

The determination of the load-bearing capacities of the fasteners for square edged logs with wane of spruce, fir, and larch is carried out according to EN 1995-1-1 and/or the European Technical Assessment that has been granted for the relevant fastener for softwood.

See also Clause 2.2.4 on installation of the product in the works.

To all fasteners applies

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

Nails

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

Wood screws

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

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

Bolts and dowels

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

Reference documents

EAD 130167-00-0304	Strength graded structural timber – Square edged logs with wane – Softwood, edition June 2016
EN 336, 10.2013	Structural timber – Sizes, permitted deviations
EN 350-2, 05.1994	Durability of wood and wood-based products – Natural durability of solid wood – Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe
EN 1995-1-1, 11.2004, EN 1995-1-1/AC, 06.2006, EN 1995-1-1/A1, 06.2008, and EN 1995-1-1/A2, 05.2014	Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for building
EN 1995-1-2, 11.2004, EN 1995-1-2/AC, 06.2006, and EN 1995-1-2/AC, 03.2009	Eurocode 5: Design of timber structures – Part 1-2: General – Structural fire design
EN 14081-1, 02.2016	Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements
97/176/EC	Commission Decision 97/176/EC of 17 February 1997 on the procedure for attesting the conformity of construction products pursuant to Article 20 (2) of Council Directive 89/106/EEC as regards structural timber products and ancillaries, OJ L 73 of 14.03.1997, p. 19, amended by Commission Decision 2001/596/EC of 8 January 2001, OJ L 209 of 02.08.2001, p. 33
2003/43/EC	Commission Decision of 17 January 2003 establishing the classes of reaction-to-fire performance for certain construction products, OJ L 13 of 18.01.2003, p. 35, amended by Commission Decision 2003/593/EC of 7 August 2003, OJ № L 201 of 08.08.2003, p. 25, Commission Decision 2006/673/EC of 5 October 2006, OJ L 276 of 07.10.2006, p. 77, Commission Decision 2007/348/EC of 15 May 2007, OJ L 131 of 23.05.2007, p. 21, and corrected by Corrigendum, OJ L 33 of 08.02.2003, p. 44
305/2011	Regulation (EU) № 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, OJ L 88 of 04.04.2011, p. 5, amended by Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, OJ L 157 of 27 May 2014, p. 76 and Commission Delegated Regulation (EU) № 574/2014 of 21 February 2014, OJ L 159 of 28 May 2014, p. 41
568/2014	Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014 amending Annex V to Regulation (EU) № 305/2011 of the European Parliament and of the Council as regards the assessment and verification of constancy of performance of construction products, OJ L 157 of 27.05.2014, p. 76