Authorised and notified according to Article 10 of the Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products

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# European technical approval ETA-13/0644

English translation, the original version is in German

| | |
|---|---|
| Handelsbezeichnung<br>*Trade name* | **Festigkeitssortiertes keilgezinktes Bauholz GLT®**<br>*Strength graded finger jointed structural timber GLT®* |
| Zulassungsinhaber<br>*Holder of approval* | **Hasslacher Holding GmbH**<br>**Feistritz 1**<br>**9751 Sachsenburg**<br>**Österreich** |
| Zulassungsgegenstand und Verwendungszweck<br>*Generic type and use of construction product* | **Festigkeitssortiertes keilgezinktes Bauholz – Im Zug-Prüflastverfahren geprüftes Konstruktionsvollholz und Balkenschichtholz bis zu 4 Lagen**<br>*Strength graded finger jointed structural timber – Solid, tension proof loaded, structural timber beams and, used as laminations, flatwise laminated beams with up to 4 laminations* |
| Geltungsdauer vom<br>*Validity from*<br>bis zum<br>*to* | **28.06.2013**<br><br>**27.06.2018** |
| Herstellwerk<br>*Manufacturing plant* | **Holzindustrie Preding GbmH**<br>**Preding 225**<br>**8504 Preding**<br>**Österreich** |
| Diese Europäische technische Zulassung umfasst<br>*This European technical approval contains* | **13 Seiten einschließlich 3 Anhängen**<br>*13 Pages including 3 Annexes* |

## I LEGAL BASIS AND GENERAL CONDITIONS

1 This European technical approval is issued by Österreichisches Institut für Bautechnik in accordance with:

1. Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1] – Construction Products Directive (CPD) –, amended by the Council Directive 93/68/EEC of 22 July 1993[2], and Regulation (EC) 1882/2003 of the European Parliament and of the Council of 29 September 2003[3];

2. *dem Gesetz vom 20. März 2001 über das Inverkehrbringen und die Verwendbarkeit von Bauprodukten (Steiermärkisches Bauproduktegesetz 2000), LGBl. Nr. 50/2001, in der Fassung LGBl. Nr. 85/2005 und LGBl. Nr. 13/2010;*

   the law of 20 March 2001 on the placing on the market and use of construction products (Styrian Construction Products Law), LGBl. № 50/2001, as amended by LGBl. № 85/2005 and LGBL № 13/2010;

3. Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex of Commission Decision 94/23/EC[4].

2 Österreichisches Institut für Bautechnik is authorised to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of the manufacturers other than those indicated on Page 1, or manufacturing plants other than those indicated on Page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Österreichisches Institut für Bautechnik, in particular pursuant to information by the Commission on the basis of Article 5 (1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction may be made with the written consent of Österreichisches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the Approval Body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities № L 40, 11.02.1989, page 12
2 Official Journal of the European Communities № L 220, 30.08.1993, page 1
3 Official Journal of the European Union № L 284, 31.10.2003, page 1
4 Official Journal of the European Communities № L 17, 20.01.1994, page 34

# II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

## 1 Definition of product and intended use

### 1.1 Definition of product

1.1.1 General

Finger jointed and proof loaded structural timber (GLT®) is comprised of finger jointed timber made of softwood. It is either a strength graded finger jointed structural timber beam and tension proof-loaded ($GLT®_{MONO}$) or, using the timber beams as laminations, a flat wise bonded cross section made of 2 to 4 laminations ($GLT®_{DUO}$, $GLT®_{TRIO}$ and $GLT®_{QUATTRO}$) a strength graded glued solid timber. Surfaces are planed.

During tension proof loading the specimens, with a free span l ≥ 9 x the biggest cross section dimension are subjected to a defined short-term mechanical loading according to Figure 1, up to a certain stress below its characteristic strength. Parameters for tension proof loading are given in Annex 1, Table 1. Damage at the clamping unit (e.g. through high lateral pressure or sliding) shall be avoided. All pieces not reaching a preset proof level due to premature failure are separated.

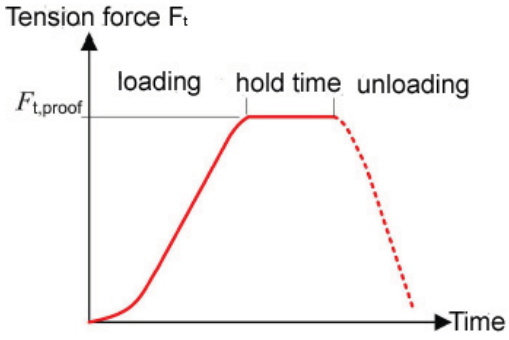


Figure 1: Qualitative force-time-plot for tension proof loading

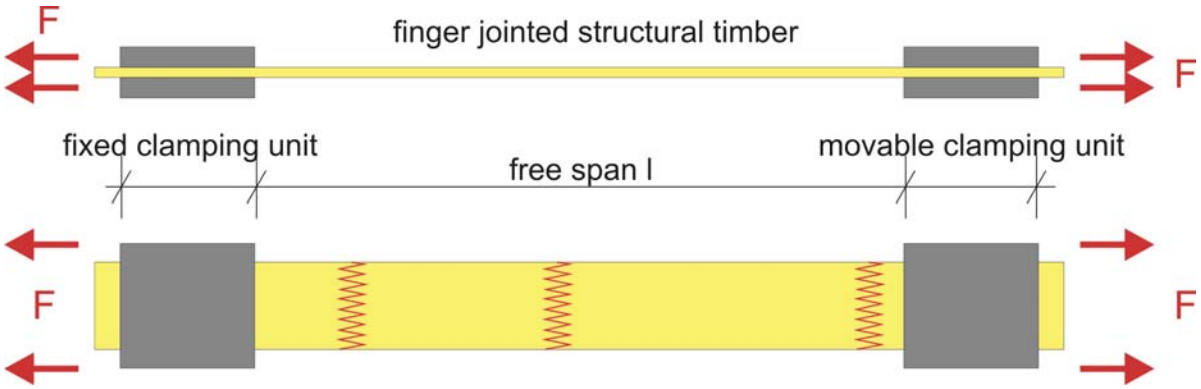


Figure 2: System sketch of a tensile proof loading device for industrial application

The application of wood preservatives and flame retardants is not subject of the European technical approval.

1.1.2 Wood

Wood species is European spruce (Picea abies).

Source is CNE Europe.

### 1.2 Intended use

GLT®is intended to be used as a structural or non structural element in buildings and timber structures.

GLT® shall be subjected to static and quasi static actions only.

GLT® is intended to be used in service classes 1 and 2 according to EN 1995-1-1[5]. The application range for the construction product may be limited further in terms of service classes by national requirements.

The provisions made in the European technical approval are based on an assumed intended working life of GLT® of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or the Approval Body, but are regarded only as a means for selecting the appropriate product in relation to the expected, economically reasonable working life of the construction works.

## 2 Characteristics of product and methods of verification

### 2.1 Characteristics of product

2.1.1 General

GLT® and the boards for its manufacturing correspond to the specifications given in Annex 1. The material characteristics, dimensions and tolerances of GLT®, not indicated in these Annex, are given in the technical documentation[6] of the European technical approval.

2.1.2 Boards or baulks

The specifications of the boards and baulks are given in Annex 1, Table 1. They are visually or machine strength graded. Only technically dried wood shall be used.

2.1.3 Adhesive

The adhesive for bonding the GLT® and the finger joints of the individual boards shall conform to EN 15425, Type I, and tested in a long-term sustained load test at cyclic climate conditions with specimens loaded perpendicular to the glue line according to CUAP 03.04/20.

2.1.4 Hygiene, health and the environment

On dangerous substances GLT® conforms to the CUAP, ETA request № 03.04/20. A manufacturer's declaration to this effect has been submitted.

In addition to the specific clauses relating to dangerous substances contained in the European technical approval, there may be other requirements applicable to the product falling within their scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.1.5 Identification

The European technical approval for GLT® is issued on the basis of agreed data, deposited with Österreichisches Institut für Bautechnik, which identifies the GLT® that has been assessed and judged. Changes of materials, of composition or characteristics, or to the manufacturing process, which could result in this deposited data being incorrect, should be immediately notified to Österreichisches Institut für Bautechnik before the changes are introduced. Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European technical ap-

[5] Reference documents are listed in Annex 4.

[6] The technical documentation of the European technical approval is deposited at Österreichisches Institut für Bautechnik and, in so far as is relevant to the tasks of the approved body involved in the attestation of conformity procedure, is handed over to the approved body.

proval, and, if so, whether further assessment or alterations to the European technical approval are considered necessary.

### 2.2 Methods of verification

The assessment of the fitness of GLT® for the intended use in relation to the requirements for mechanical resistance and stability, for safety in case of fire, for hygiene, health and the environment and safety in use as well as for durability in the sense of the Essential Requirements 1, 2, 3 and 4 of Council Directive 89/106/EEC has been made according to the CUAP *„ Strength graded finger jointed structural timber – Solid, tension proof loaded, structural timber beams and, used as laminations, flatwise laminated beams with up to 4 laminations", version March 2013*, ETA request № 03.04/20.

## 3 Evaluation of conformity and CE marking

### 3.1 System of conformity attestation

The system of conformity attestation applied to this product shall be that laid down in the Council Directive 89/106/EEC of 21 December 1988, Annex III (2) (i), referred to as System 1. This system provides for:

Certification of the conformity of the product by an approved certification body on the basis of

(a) Tasks for the manufacturer

(1) Factory production control;

(2) Further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan[7].

(b) Tasks for the approved body

(3) Initial type testing of the product;

(4) Initial inspection of the factory and of factory production control;

(5) Continuous surveillance, assessment and approval of factory production control.

### 3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

At the manufacturing plant the manufacturer has implemented and continuously maintains a factory production control system. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. The factory production control system ensures that the product is in conformity with the European technical approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Checking of incoming materials shall include control of inspection documents (comparison with nominal values) presented by the manufacturer of the raw materials by verifying the dimensions and determining the material properties.

The frequencies of controls and tests conducted during manufacturing and on the assembled GLT® elements are defined by taking account of the manufacturing process of GLT® and are laid down in the prescribed test plan.

[7] The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the approved body involved in the attestation of conformity procedure. The prescribed test plan is also referred to as control plan.

The results of factory production control are recorded and evaluated. The records include at least:

- Designation of the product, basic materials and components
- Type of control or testing
- Date of manufacture of the product and date of testing of the product or basic materials or components
- Results of control and testing and, if appropriate, comparison with requirements
- Name and signature of person responsible for factory production control

The records shall be kept at least for five years time and shall be presented to the approved body involved in continuous surveillance. On request they shall be presented to Österreichisches Institut für Bautechnik.

3.2.2 Tasks for the approved body

3.2.2.1 Initial type testing of the product

For initial type-testing, the results of the tests performed as part of the assessment for the European technical approval may be used unless there are changes in the manufacturing process or manufacturing plant. In the case of changes, the necessary initial type-testing shall be agreed between Österreichisches Institut für Bautechnik and the approved body involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular personnel and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of GLT® according to the specifications mentioned in Section II as well as in the Annexes of the European technical approval.

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least once a year for surveillance. It shall be verified that the system of factory production control and the specified manufacturing process are maintained, taking account of the prescribed test plan. On demand the results of continuous surveillance shall be made available by the approved body to Österreichisches Institut für Bautechnik. When the provisions of the European technical approval and the prescribed test plan are no longer fulfilled, the certificate of conformity shall be withdrawn.

## 3.3 CE marking

The CE marking shall be affixed on the accompanying commercial documents. The symbol “CE” shall be followed by the identification number of the certification body and shall be accompanied by the following additional information:

- Name or identifying mark and address of manufacturer
- Number of the certificate of conformity
- Last two digits of the year in which the CE marking was affixed
- Number of the European technical approval
- Designation of GLT®
- Wood species
- Strength class
- Number of layers
- Adhesive family and type

- Nominal thickness of GLT®
- Proof load level [N/mm²]

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

### 4.1 Manufacturing

GLT® is manufactured in accordance with the provisions of the European technical approval using the manufacturing process as identified in the inspection of the manufacturing plant by Österreichisches Institut für Bautechnik and laid down in the technical documentation.

For GLT®$_{DUO}$, GLT®$_{TRIO}$ and GLT®$_{QUATTRO}$, layers of planed boards shall be bonded together to the required thickness of the GLT® according to FprEN 14080. The individual boards of GLT® shall be jointed in longitudinal direction by means of finger joints according to FprEN 15497, there shall be no butt joints. Adhesive shall be applied on one face of each board.

### 4.2 Installation

4.2.1 Design of GLT®

The European technical approval only applies to the manufacture and use of GLT®. Verification of stability of the works including application of loads on GLT® is not subject to the European technical approval.

Fitness for the intended use of GLT® is given under the following conditions.

- Design of GLT® members is carried under the responsibility of an engineer experienced in timber elements.
- Design of the works shall account for the protection of GLT®.
- The GLT® members are installed correctly.

Design of GLT® may be according to EN 1995-1-1 and EN 1995-1-2, taking into account the Annexes 1 and 2 of the European technical approval.

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

4.2.2 Installation of GLT®

The manufacturer shall prepare installation instructions in which the product-specific characteristics and the most important measures to be taken into consideration for installation are described. The installation instructions shall be available at every construction site and shall be deposited at Österreichisches Institut für Bautechnik.

GLT® installation 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 sequence in which the individual members of GLT® shall be installed and the designation of the members of GLT®. The assembly plan shall be available at the construction site.

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

## 5 Recommendations for the manufacturer

### 5.1 General

It is the responsibility of the ETA holder to ensure that all necessary information on design and installation is submitted to those responsible for design and execution of the works constructed with GLT®.

## 5.2 Recommendations on packaging, transport and storage

GLT® shall be protected during transport and storage against any damage and detrimental moisture effects. The manufacturer's instruction for packaging, transport and storage shall be observed.

## 5.3 Recommendations for use, maintenance and repair of the works

The assessment of the fitness for use is based on the assumption that maintenance is not required during the assumed intended working life. In case of a severe damage of a member of GLT® immediate actions regarding the mechanical resistance and stability of the works shall be initiated.

On behalf of Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits

Managing Director

## ANNEX 1

## Characteristic data of GLT® structural timber

### Table 1: Dimensions and specifications

| Characteristic | | Dimension / Specification |
|---|---|---|
| **GLT®: GLT®$_{DUO}$, GLT®$_{TRIO}$, GLT®$_{QUATTRO}$** | | |
| Width | mm | 60 to 400 |
| Height | mm | ≤ 300 |
| Length | m | ≤ 20 |
| Number of layers | — | 2 to 4 |
| **Board and GLT®$_{MONO}$** | | |
| Surface | — | planed, regularized |
| Width (planed dimension) | mm | 30 to 160 for GLT®$_{MONO}$<br>30 to 85 for GLT®$_{DUO}$, GLT®$_{TRIO}$, GLT®$_{QUATTRO}$ |
| Hight | mm | 60 to 300 |
| Boards shall be graded according to EN 14081-1+A1 to be able to assign them to a strength class according to EN 338. | — | |
| Moisture of wood according to EN 13183-2 | % | 15 ± 3 |
| Finger joints | — | FprEN 15497 and EN 385 |
| Minimum pressure time for finger joints | sec | 1 sec for width ≤ 80 mm<br>2 sec for width > 80 mm |
| **Proof loading** | | |
| Curing time of finger joints before proof loading | min | ≥ 120 |
| Proof load level | % | 50%-75% of $f_{t,0,k}$ |
| Proof load duration (hold time) | sec | ≥ 1.5 |

**Table 2: Product characteristics of the KVH® structural timber**

| ER | Requirement | Verification method | Class / Use category / Numeric value |
|---|---|---|---|
| 1 | **Mechanical resistance and stability** | | |
| | Strength class of boards | EN 338 | C 24 to C40 |
| | Mechanical strength properties<br>– bending strength $f_{m,k}$<br>– tensile strength in direction of grain $f_{t,0,k}$<br>– tensile strength perpendicular to the grain $f_{t,90,k}$<br>– compression strength in direction of grain $f_{c,0,k}$<br>– compression strength perpendicular to the grain $f_{c,90,k}$<br>– shear strength $f_{v,k}$ | EN 338 | acc. to respective strength class [2] |
| | Stiffness Properties<br>– Modulus of elasticity parallel to the grain $E_{0,mean}$<br>– Modulus of elasticity parallel to the grain $E_{0,05}$<br>– Modulus of elasticity perpendicular to the grain $E_{90,mean}$<br>– Modulus of elasticity perpendicular to the grain $E_{90,05}$<br>– shear modulus $G_{mean}$<br>– shear modulus $G_{0.05}$ | EN 338 | acc. to respective strength class [1] [2] |
| | Characteristic density<br>– characteristic density $\rho_k$ | EN 338 | acc. to respective strength class [2] |
| | Proof load factor $k_{pl}$ | CUAP 03.04/20 4.3.2 | Annex 2 |
| | **3. Other mechanical actions** | | |
| | Creep and duration of load | EN 1995-1-1 | |
| | Dimensional stability<br>Moisture content during service shall not change to such an extend that adverse deformation will occur. | | |
| | Fasteners | EN 1995-1-1 | |

[1] $E_{0,mean}$ for C24+= 11.600 N/mm² and for C30+: 12.600 N/mm²
[2] The lamination with the lowest strength class is decisive.

| ER | Requirement | Verification method | Class / Use category / Numeric value |
|---|---|---|---|
| 2 | **Reaction to fire** | | |
| | Glued laminated timber ($\rho_{min}$=380 kg/m³) | EN 14080 | Euroclass D-s2, d0 |
| | **Resistance to fire** | | |
| | Charring rate<br>– Cover layer<br>– Charring of more layers than the cover layer | EN 1995-1-2 | <br>$\beta_0$ = 0.65 mm/min<br>$\beta_n$ = 0.8 mm/min |
| – | **Durability** | | |
| | Durability of timber<br>Service classes | EN 1995-1-1 | Natural durability acc. to EN 350-2<br>1 and 2 |

## ANNEX 2

### Proof load factor $k_{pl}$

**Table 3: Proof load factor $k_{pl}$ for different proof levels**

| Proof level $\sigma_{t,proof}$ % of $f_{t,0,k}$ | Proof load factor $k_{pl}$ |
|---|---|
| 50 | 1.0 |
| $60 \leq \sigma_{t,proof} < 75$ | 1.05 |
| $\sigma_{t,proof} \geq 75$ | 1.10 |

As part of the design according to EN 1995-1-1 a reduced partial safety factor $\gamma_{M,PL}$ for GLT® can be considered due to the reduction of the probability of failure of tension proof loaded timber. This happens by application of the proof load factor $k_{pl}$. The proof load factor $k_{pl}$ can be applied on following design values:

- Tension parallel to grain $f_{t,0,d}$
- Compression parallel to grain $f_{c,0,d}$
- Bending $f_{m,d}$

The design values are calculated as follows:

$$f_d = \frac{k_{\mathrm{mod}} \cdot f_k}{\gamma_M} \cdot k_{pl}$$

## ANNEX 3

## Reference documents

CUAP (Common Understanding of Assessment Procedure), ETA request № 03.04/20, Version March 2013: Strength graded finger jointed structural timber – Solid, tension proof loaded, structural timber beams and, used as laminations, flatwise laminated beams with up to 4 laminations

EN 338 (10.2009): Structural timber – Strength classes

EN 350-2 (05.2004): 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 385 (10.2001): Finger jointed structural timber – Performance requirements and minimum production requirements

FprEN 15497 (08.2011): Structural finger jointed solid timber — Performance requirements and minimum production requirements

FprEN 14080 (01.2011): Timber structures — Glued laminated timber and glued solid timber

EN 14081-1+A1 (02.2011): Timber structures — Strength graded structural timber with rectangular cross section — Part 1: General requirements

EN 1995-1-1 (11.2004), AC (06.2006) and A1 (06.2008): Eurocode 5 – Design of timber structures – Part 1-1: General – Common rules and rules for buildings

EN 1995-1-2 (11.2004) and AC (03.2009): Eurocode 5 – Design of timber structures – Part 1-2: General – Structural fire design

EN 13183-2 (04.2002) and AC (09.2003): Moisture content of a piece of sawn timber – Part 2: Estimation by electrical resistance method

EN 15425 (02.2008): Adhesives – One component polyurethane for load bearing timber structures – Classification and performance requirements

2003/43/EC, Commission Decision of 17 January 2003 establishing the classes of reaction-to-fire performance for certain construction products, OJ. L 013 from 18.1.2003, page 35; as amended by OJ. L 201 from 8.8.2003, page 25, OJ. L 276 from 7.10.2006, page 77 and OJ. L 131 from 23.5.2007, page 21