



**TECHNICKÝ A ZKUŠEBNÍ ÚSTAV
STAVEBNÍ PRAHA, s.p.**

Technical and Test Institute for Construction Prague, SOE

The background of the lower half of the page is a collage of various timber fasteners, including metal brackets, screws, and bolts, arranged in a geometric pattern. The image is tinted with a blue color scheme.

TESTING AND CERTIFICATION

Timber fasteners for structural use

Technical and Test Institute for Construction Prague, SOE (hereinafter: TZÚS Praha) - in the Czech Republic it is the only company that is notified for verifying the **complete range of fasteners and connectors for timber structures**.

According to European Parliament and Council Regulation (EU) No 305/2011, most fasteners and connectors for timber structures shall be provided with CE marking including information on essential characteristics in accordance with the requirements of the pertaining harmonized European Standard (hEN). The manufacturer is obliged to declare the levels of these characteristics in the so-called „Declaration of Performance” (DoP). The data from DoP is then used as a basis for designing connections of timber structures according to the relevant Eurocodes.

In addition to testing and certification of fasteners and connectors for their legal marketing, TZÚS Praha also carries out a number of verification tests for customers and investors with the aim of quality control of delivered components for load-bearing timber structures.

1) Screws, nails, staples, dowels, bolts and nuts

according **EN 14592+A1** Timber structures – Dowel – type fasteners - Requirements

The basis for CE marking and manufacturer's declaration of performance (DoP) is type testing or in other words “assessment of performance”. Tests, including statistical evaluation, must be carried out by a Notified Body (NB)/laboratory using wood of specific density. Mandatory assessments for a particular type of fastener are prescribed by the harmonized European standard (hEN): EN 14592.

Characteristics of screws

- characteristic yield moment $M_{y,k}$ (v Nmm)
- characteristic withdrawal parameter $f_{ax,k}$ (v N/mm²)
- characteristic head pull-through parameter $f_{head,k}$ (v N/mm²)
- characteristic tensile capacity $f_{tens,k}$ (v N/mm²) a
- characteristic torsional strength $f_{tor,k}$ (v N/mm²)

Characteristics of nails

- characteristic yield moment $M_{y,k}$ (v Nmm)
- characteristic withdrawal parameter $f_{ax,k}$ (v N/mm²)
- characteristic head pull-through parameter $f_{head,k}$ (v N/mm²)
- characteristic torsional strength $f_{tens,k}$ (v N/mm²)

Characteristics of staples

- characteristic yield moment $M_{y,k}$ (v Nmm)
- characteristic withdrawal parameter $f_{ax,k}$ (v N/mm²)
- characteristic head pull-through parameter $f_{head,k}$ (v N/mm²)

Characteristics of bolts & nuts

- characteristic yield moment $M_{y,k}$ (v Nmm)
- characteristic torsional strength $f_{tens,k}$ (v N/mm²)



Screws after the test

The necessary part of the type testing is to verify the accuracy of the fasteners geometry.

Type Testing (TT) and/or Type Calculations (TC) must be carried out not only at the starting production of a new product type but should be repeated whenever the product, material or supplier of parts for the product or the production process change so that this could significantly affect one or more performances. The manufacturer is responsible for compliance with the declared values.

2) Punched metal plate fasteners, nailing plates, shear plate, split ring and toothed plate connectors according to EN 14545 Timber structures - Connectors – Requirements

Basis for CE marking and Declaration of Performance on split ring connectors is as in the case of nails and wood screws the type testing of specific characteristics (assessment of performance) that has to be carried out by a notified laboratory.

The basis for CE marking and Declaration of Performance on punched metal plate fasteners, nailing plates and split ring and toothed plate connectors is certificate of conformity of the factory production control issued by a notified production control certification body and the results of type testing as prescribed by harmonized EN 14545.

The characteristics pertaining to shear plate, split ring and toothed plate connectors are as follows:

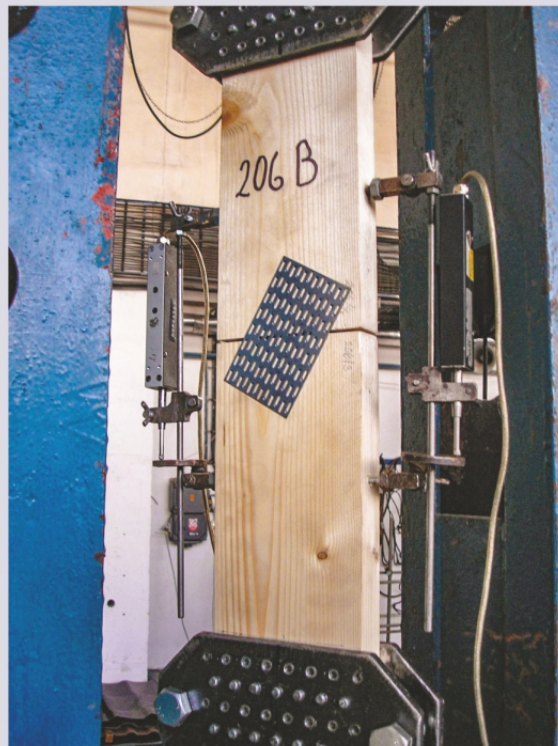
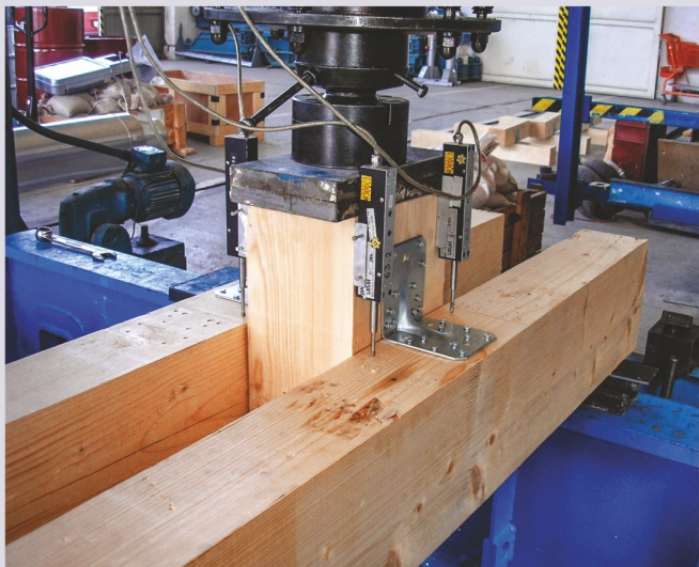
- characteristic load-bearing capacity
- slip modulus

For punched metal plate fasteners:

- characteristic plate anchorage capacity
- characteristic plate tension, compression and shear capacity
- plate slip modulus
- nail root ductility

For nailing plates:

- characteristic yield strength
- minimum percentage elongation after fracture



3) Three-dimensional nailing plates according to EAD (formerly ETAG 015)

There is no harmonized European standard available for three-dimensional nailing plates but only the so called European Assessment Document (EAD, formerly ETAG 015). On the basis of physical testing or combination of testing and

calculation a European Technical Assessment (ETA) is issued for individual types of the plates. Among others the ETA shall comprise values of load-bearing capacities of the plates. For CE marking moreover assessment of conformity of the factory production control is necessary to be carried out by a notified production control certification body. If the factory production control as performed by the manufacturer ensures constancy of performance of the products the certificate of conformity of the factory production control can be issued.

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