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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

MEMBER OF EOTA

European Technical Approval No. ETA-04/0040

This version replace original version valid from 23.11.2004 to 23.11.2009

Trade name:	K-beams
Holder of approval:	Kjeldstad Trelast AS N-7580 Selbu Norway Tel. + 47 73 81 01 00 Fax+ 47 73 81 01 01
Generic type and use of construction product:	Glued laminated wood-based beams and columns for structural purposes
Valid from:	23.11.2004
to:	23.11.2009
extended from:	04.11.2010
to:	04.11.2015
Manufacturing plant:	Kjeldstad Trelast AS N-7580 Selbu Norway Tel. + 47 73 81 01 00 Fax+ 47 73 81 01 01
This European Technical Approval contains:	10 pages including 2 Annexes which form an integral part of the document



European Organisation for Technical Approvals

I LEGAL BASIS AND GENERAL CONDITIONS

- 1 This European Technical Approval is issued by SINTEF Building and Infrastructure, in the following called SINTEF, in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by the Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex of Commission Decision 94/23/EC⁴.
 - Guideline No. 011 for European Technical Approval of “Light Composite Wood-based Beams and Columns”.
- 2 SINTEF 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 manufacturers other than those indicated on page 1 of this European Technical Approval.
- 4 This European Technical Approval may be withdrawn by SINTEF in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
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- 6 The European Technical Approval is issued by the approval body in its official language. This version corresponds fully to the version circulated in EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities N° L40, 11.2.1989, p. 12

² Official Journal of the European Communities N° L 220, 30.08.1993, p. 1

³ Official Journal of the European Union N° L 284, 31.10.2003, p. 1

⁴ Official Journal of the European Communities N° L17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

K-beams are glued laminated timber made of laminations from Nordic spruce or pine. The beams are produced in rectangular cross sections, with three standard heights from 200 mm to 300 mm and three standard widths from 36 mm to 70 mm. Outer laminations are finger-jointed structural timber graded to class C24 according to EN 338. Inner laminations are fingerjointed and specially graded. The beams are delivered in one standard strength class only. Standard cross section built-up, dimensions, tolerances and material specifications are shown in [Annex 1](#).

K-beams are intended to be used as load-bearing beams and columns in building structures. The application is limited to service class 1 and 2 regarding moisture conditions as specified in EN 1995-1-1:2004 (Eurocode 5).

The beams are not intended to be used in areas where resistance against termites is required, nor in places where national regulations require declaration of special properties related to seismic actions.

The provisions made in this European Technical Approval are based on an assumed intended working life of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of product and methods of verification

ER 1 Mechanical resistance and stability

Characteristic strength and mean stiffness values for K-beams are given in [Annex 2](#).

ER 2 Safety in case of fire

Reaction to fire classification according to EN 13501-1 is class D-s2, d0.

Resistance to fire depends primarily on beam size, and may be calculated according to EN1995-1-2:2004 (Eurocode 5 – Design of timber structures - Part 1-2: General – Structural fire design) for glued laminated timber.

ER 3 Hygiene, health and environment

K-beams are classified in formaldehyde class E1 according to EN 14080. The beams do not contain harmful or dangerous substances as defined in the EU database, except for a small content of isocyanate in the glue hardner.

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

ER 4 Safety in use

Not relevant

ER 5 Protection against noise

Not relevant⁵

ER 6 Energy economy and heat retention

The design thermal conductivity λ for the timber material of the beams, given in EN 12524, is 0.13 W/(m·K).

Aspects of durability, serviceability and identification

K-beams can be used in service class 1 and 2 according to EN 1995-1-1:2004, and hazard class 1 and 2 as specified in EN 335. The product may be exposed directly to the weather for a short time during installation.

Durability may be reduced by attack from insects such as long horn beetle, dry wood termites and anobium in regions where these may be found.

The normal temperature of the beams shall be $\leq 50^{\circ}\text{C}$.

Identification of the product is cross-section lay-up, dimensions and timber grading as shown in [Annex 1](#).

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity System

According to Decision 99/92/EC by the European Commission the system 1 of attestation of conformity applies. This system of attestation of conformity is defined as follows:

- (a) Tasks of the manufacturer:
- Factory production control;
 - Further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks of the notified body:
- Initial type testing of the product;
 - Initial inspection of factory and factory production control;
 - Continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

Factory production control

The manufacturer shall exercise permanent internal control of the production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies, procedures and a control plan, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval. The factory production control includes checking of incoming materials and process controls like timber grading, fingerjointing of laminations and beams, glue laminating procedures and curing, and shall be in accordance with the production requirements given in EN 385, EN 386 and EN 387.

⁵ Sound insulating properties for structures where K-beams are incorporated must be determined for the complete construction

The manufacturer may only use constituent materials stated in the technical documentation of this European technical approval.

Testing of samples taken at the factory

Testing of samples taken at the factory according to a prescribed test plan is part of the manufacturer's control plan. The test plan shall be in accordance with EN 385 and EN 387 for fingerjointing, and EN 386 for glued laminated timber. The test plan is deposited at SINTEF Building and Infrastructure, and is available to notified bodies involved in the attestation of conformity to this ETA.

3.2.2 Tasks of notified bodies

Initial type-testing of the product

Approval tests have been conducted by Norwegian Institute of Wood Technology in accordance with ETA Guideline N° 011 under the responsibility of SINTEF as approval body. SINTEF has assessed the results of these tests in accordance with the guideline, and the product characteristics determined by the initial test programme have been found acceptable to serve as initial type-testing.

Initial inspection and continuous surveillance, assessment and approval of the factory and the factory production control

The notified inspection body shall conduct initial inspection of the factory in order to ensure that the manufacturer has acceptable premises, technical equipment, qualified personnel and a factory production control system which is in accordance with the provisions in the ETA Guideline N° 011 and in this ETA. The initial inspection shall include an approval of the manufacturer's control plan and prescribed test plan according to EN 385, EN 386 and EN 387.

The notified body shall visit the factory at least twice a year for regular inspection. It must be verified that the factory production control is performed in conformity with the manufacturer's quality manual, including tests of samples according to the prescribed test plan.

Certification


The notified body shall issue a certification of conformity with this European Technical Approval when the provisions of the approval is fulfilled.

3.3 CE marking

CE marking shall be affixed on each beam. The symbol "CE" shall be followed by the identification number of the notified certification body, and be accompanied by the following additional information:

- product name
- name and address of the producer
- last two digits of the year in which the CE marking was affixed
- number of the EC certificate of conformity for the product
- identification number of notified certification body involved
- ETA number
- production time, number or identification

Example of CE marking and accompanying information for K-beams:

 xxxx	Identification number of notified certification body
Kjeldstad Trelast AS NO-7580 Selbu, Norway 04 xxxx-CPD	Name and address of the producer Two last digits of year of affixing the CE marking Number of EC certificate of conformity
ETA-04/0040 ETAG 011	Number of European technical approval Number of guideline for European technical approval
yyyyyy	Product name, production time, number or identification etc.

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

4.1 Manufacturing

K-beams are assembled in the factory with hydraulic presses, using fingerjointed machinegraded laminations. Before assembly the laminations are additionally graded visually according to specific grading rules endorsed by the approval body.

4.2 Design

For structural calculations according to Eurocode 5, or equivalent national structural design codes for timber structures, the necessary values for calculation are given in Annex 2.

4.3 Installation

K-beams shall be installed on the basis of a specific structural design for each installation, and in an environment respecting the limitations given in chap.1.

The beams shall be installed by appropriate qualified personnel, following an installation plan and relevant construction details worked out for each individual building project.

4.4 Holes in beams

Holes in the beams to provide openings for ducts, pipes etc. must only be made after the load bearing capacity has been checked.

5 Recommendations for the manufacturer

5.1 Recommendations on packaging, transport and storage

The beams must be protected against harmful wetting during transport and storage.

The beams must not be lifted or stored in such a way that bending around the weak axis may cause damage to the beams.

5.2 Recommendations on use, maintenance, repair

It is the responsibility of the manufacturer to ensure that proper information for the use of K-beams is available at each delivery, including general guidance on the basis of this ETA.

On behalf of
SINTEF Building and Infrastructure
Oslo, 04.11.2010



Tore H. Erichsen
Approval Manager

Annex 1

Product description of K-beams

Cross sections, sizes and moisture content

K-beams are manufactured in three standard widths and three standard heights as shown in Fig. 1, using 47 mm thick outer laminations and 17 mm or 19 mm inner laminations.

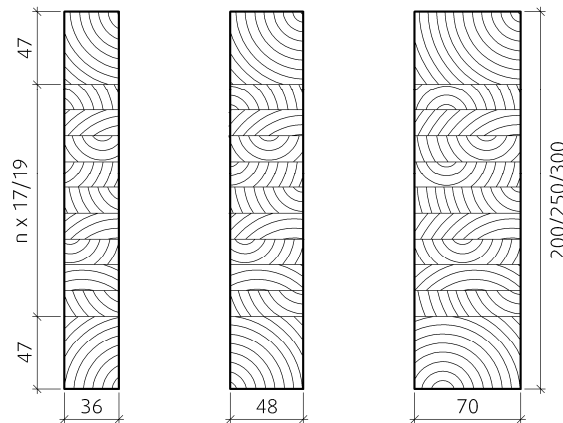


Fig. 1

Standard cross sections of K-beams.

Size tolerances of cross section dimensions are ± 1 mm at 14 ± 2 % moisture content.

The beams are produced in lengths from 3.0 m to 6.0 m, plus in lengths up to 12.0 m when the beams are fingerjointed over the full section.

The beams are delivered from the manufacturer with 14 ± 2 % moisture content. The beams are delivered in packages which are wrapped in polyethylene foil.

Mean density is approx. 500 kg/m³.

Material specifications

Outer laminations

Fingerjointed structural timber class C24 according to EN 338, machine graded with additional visual grading according to specific, internal grading rules approved by SINTEF. The fingerjointing is made with fenol-resorcinol formaldehyde adhesive type I according to EN 301. Standard length of the laminations is 4800 mm.

Inner laminations

Fingerjointed structural timber class LT20 according to NS-INSTA 142, machine graded (Wood-Eye). The fingerjointing is made with an emulsion polymerized isocyanate adhesive (EPI) tested and approved for applications equivalent to service class 1 and 2 given in EN 1995-1-1:2004 (Eurocode 5) and service conditions specified for adhesive type II according to EN 301. Lengths of laminations are 150 mm - 900 mm.

Beam assembly

The laminations are glued together with the same EPI adhesive as specified for inner laminations. Full cross sections for beam lengths over 6.0 m are fingerjointed with phenol-resorcinol formaldehyde adhesive as specified for outer laminations.

General

More detailed specifications of timber grading and glueing are given in the manufacturer's internal quality manual and control plan which has been approved by SINTEF.

Annex 2**Mechanical properties**

Table 1 shows the characteristic strength and stiffness material properties to be used for structural design of K-beams.

The same strength and deformation modification factors given for glued laminated timber in EN 1995-1-1:2004, or national determined factors, applies also to K-beams for the calculation of design values.

Table 1
Characteristic strength and mean stiffness
values for K-beams

Property		Value N/mm ²
<i>Strength</i>		
Bending strength, - both directions *	f_{mk}	24
Tensile strength, - parallel to grain	f_{t0k}	14
- perpendicular to grain	f_{t90k}	0.5
Compression strength, - parallel to grain	f_{c0k}	21
- perpendicular to grain	f_{c90k}	2.5
Shear strength	f_{vk}	2.5
<i>Stiffness for stability calculations</i>		
Modulus of elasticity, - parallel to grain	E_{0k}	7400
<i>Stiffness for deformation calculations</i>		
Modulus of elasticity*, - parallel to grain	E_{0m}	11000
Modulus of elasticity*, - perpendicular to grain	E_{90m}	370
Shear modulus	G_{0m}	690

* Parallel to grain, with load parallel or perpendicular to beam height