



## European Technical Assessment

ETA 17/0911  
of 2018/2/12

### I General Part

<b>Technical Assessment Body issuing the ETA</b>	<b>VTT Expert Services LTD</b>
<b>Trade name of the construction product</b>	<b>CLT Rib Panels by Stora Enso</b>
<b>Product family to which the construction product belongs</b>	Prefabricated wood-based loadbearing stressed skin panels
<b>Manufacturer</b>	<b>Stora Enso Wood Products Oyj</b> Kanavaranta 1 FI-00160 Helsinki
<b>Manufacturing plant</b>	Annex N
<b>This European Technical Assessment contains</b>	9 pages
<b>This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of</b>	ETAG 019 used as EAD

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## II Specific Part

### 1. Technical description of the product

CLT Rib Panels by Stora Enso are composite slab elements made of Stora Enso Cross Laminated Timber panels (ETA-14/0349) and glued laminated beams according to (EN 14080). The adhesive shall conform to type I according to EN 15425 or EN 301. CLT Rib Panels by Stora Enso contain screws to create gluing pressure or to fix secondary construction elements, but they do not have an influence on the composite effect. Glued laminated timber, CLT and LVL may be used for blockings at supports. The materials, dimensions and tolerances are given in Annex 1.

In plan view, CLT Rib Panels are rectangular. Typical length of the products is 5 m to 16 m. The thickness of the CLT slabs is 60 mm to 200 mm. The geometry of the glulam rib is rectangular; minimum cross section dimensions are depth 100 mm and width 60 mm.

### 2. Specification of the intended uses in accordance with the applicable EAD

#### 2.1. Intended uses

CLT Rib Panels by Stora Enso are intended to be used as structural or non-structural elements in buildings. The panels shall have single span supported at the ends as described in Annex 1. The panels are intended to be used subject to static or quasi-static actions only. In seismic areas the behavior factor of CLT rib panels used for the design is limited to non-dissipative or low-dissipative structures ( $q \leq 1,5$ ), defined according to Eurocode 8 (EN 1998-1:2004 clauses 1.5.2 and 8.1.3 b) and applicable national rules on construction works.

With regard to moisture behavior of the product, the product shall be used in service classes 1 and 2, according to EN 1995-1-1. The product shall not be used in use class 3 (3.1 exterior, above ground, protected; occasionally wet).

The provisions made in this European Technical Assessment are based on an assumed intended working life of CLT Rib Panels by Stora Enso of 50 years<sup>1</sup>.

#### 2.2. Design of works

For each individual building project, a specific structural design shall be made according to the instructions of the ETA holder, by a person responsible for the task, according to the laws of the Member States (MS). Structural design instructions are based on EN 1995-1-1. Verification of the stability of works, including application of loading on the product, is not subject to this European Technical Assessment.

#### 2.3. Manufacturing

Gluing of CLT panels to ribs shall be performed according to the ETA holder's instructions, assessed by VTT Expert Services Ltd.

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<sup>1</sup> This means that it is expected that when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the essential requirements of the works. The indications given as to the working life of a building kit cannot be interpreted as a guarantee given by the producer or the assessment body. They should only be regarded as a means for the specifiers to choose the appropriate criteria for building kits in relation to the expected, economically reasonable working life of the works.

## 2.4. Installation

CLT Rib Panels by Stora Enso shall be installed by appropriately qualified personnel, following the installation plan for each project.

The completed building (the works) shall comply with the building regulations (regulations on the works) applicable in the Member States in which the building is to be constructed. The procedures foreseen in the Member State for demonstrating compliance with the building regulations shall also be followed by the entity held responsible for this act. An ETA for CLT Rib Panels by Stora Enso does not amend this process in any way.

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

*Table 1. Basic requirements for construction works and essential characteristics.*

Basic requirement and essential characteristics	Performance
<b>BWR 1. Mechanical resistance and stability</b>	
Mechanical resistance and stiffness	Clause 3.1.1
Dimensional stability	Clause 3.1.2
Durability	Clause 3.1.3
<b>BWR 2. Safety in case of fire</b>	
Reaction to fire	Clause 3.2.1
Resistance to fire	Clause 3.2.2
External fire performance	No performance assessed
<b>BWR 3. Hygiene, health and the environment</b>	
Water vapor permeability and moisture resistance	No performance assessed
Watertightness	No performance assessed
Content, emission and/or release of dangerous substances	Clause 3.3.1
<b>BWR 4 Safety and accessibility in use</b>	
Impact resistance	No performance assessed
<b>BWR 5 Protection against noise</b>	
Airborne sound insulation	No performance assessed
Impact sound insulation	No performance assessed
Sound absorption	No performance assessed
<b>BWR 6 Energy economy and heat retention</b>	
Thermal resistance	Clause 3.4.1
Air permeability	Clause 3.4.2

### 3.1. Mechanical resistance and stability, BWR 1

#### 3.1.1. Mechanical resistance and stiffness as well as serviceability

Mechanical resistance and deformations for CLT Rib Panels by Stora Enso is given by one of the following methods:

Method 3a Reference to design documents of the customer

Method 3b Reference to design documents produced and held by the manufacturer according to the order for the works

The structural performance of CLT Rib Panels by Stora Enso shall be considered in accordance with the limit state design principles specified in Eurocodes. Both ultimate limit state and serviceability limit state (comprising vibrations when relevant) shall be considered. Calculation methods shall follow EN 1995-1-1. Material properties to be used in design are specified in Annex 1. Structural design shall be documented.

Design methods described in Stora Enso CLT Rib Panels design manual have been assessed by VTT as part of the ETA issuing process.

#### 3.1.2. Dimensional stability

In normal conditions, harmful deformations due to moisture changes of the CLT Rib Panels by Stora Enso are not expected.

#### 3.1.3. Durability

The adhesive of type I can be used in service classes 1, 2 and 3. Natural durability class of CLT is 5 according to EN 350-2. Thus, CLT Rib Panels by Stora Enso can be used in service classes 1 and 2 according to EN 1995-1-1.

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

When necessary and required by the local authorities, CLT Rib Panels by Stora Enso may be treated against biological attack according to the rules valid within the region. Any adverse effects of the treatment on other properties shall be taken into account. These kinds of treatments are not covered by this ETA.

### 3.2. Safety in case of fire, BWR 2

#### 3.2.1. Reaction to fire

Untreated products are classified to have reaction to fire class D-s2, d0. CLT Rib Panels by Stora Enso treated against fire are not covered by this ETA.

#### 3.2.2. Resistance to fire

Fire design of CLT Rib Panels shall be performed according to standards EN 1995-1-2:2004/AC:2009 and EN 1995-1-1:2004. National determined parameters valid in the relevant Member State shall be used. Composite effect of the glue bond must not be taken into account.

As long as charring rate of CLT is not given in EN 1995-1-2:2004/AC:2009 it is only possible to calculate resistance to fire class for constructions that contain uncharred CLT layers. Charring rate for the glued laminated ribs shall be taken from EN1995-1-2, table 3.1.

### 3.3. Hygiene, health and environment, BWR 3

#### 3.3.1. Content, emission and/or release of dangerous substances

##### Dangerous substances

Based on the assessment of the Assessment Body, CLT Rib Panels by Stora Enso do not contain harmful or dangerous substances as defined in the EU database, with exception of formaldehyde. CLT glued with polyurethane adhesive according to EN 15425 does not contain any added formaldehyde. Glued laminated timber used in ribs is either classified to be of class E1 or to have no formaldehyde at all, if glued with polyurethane adhesive according to EN 15425. The adhesive used in gluing the CLT slabs to glulam ribs may contain minor amounts of formaldehyde, so the overall class of the product is E1.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products 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 to also be complied with, when and where they apply.

### 3.4. Energy economy and heat retention, BWR 6

#### 3.4.1. Thermal resistance

The thermal conductivity  $\lambda$  for both rib and CLT panel material is 0.13 W/(m K) according to EN ISO 10456. The natural density variation of the materials is taken into account in this value.

#### 3.4.2. Air permeability

A construction with CLT Rib Panels by Stora Enso, including the joints between the elements, will provide adequate airtightness in relation to the intended use, taking into account both energy economy and heat retention, risk of cold draughts and risk of condensation within the construction. The joints of the panels shall be tightened with a gasket.

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

According to the Decision 2000/447/EC of the European Commission, the system of assessment and verification of constancy of performance (see Annex V to the regulation (EU) No 305/2011) is System 1.

## **5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD. ETAG 019 is being used as EAD.**

Assessment and verification of constancy of performance shall focus on glue bond quality that is provision for the performances given in the ETA.

#### 5.1. Tasks of the manufacturer

The manufacturer shall have instructions for manufacturing and factory production control for the screw press manufacturing method. Test type and requirements shall be included in the control plan. Glue line thickness and amount of wood failure shall be considered.

#### 5.1. Tasks of the notified body

Under continuous production, the notified body shall visit the factory twice a year. Products may not be manufactured continuously.

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by VTT Expert Services Ltd

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## ANNEX 1 DESCRIPTION OF CLT RIB PANELS BY STORA ENSO

### 1. Cross sections and size

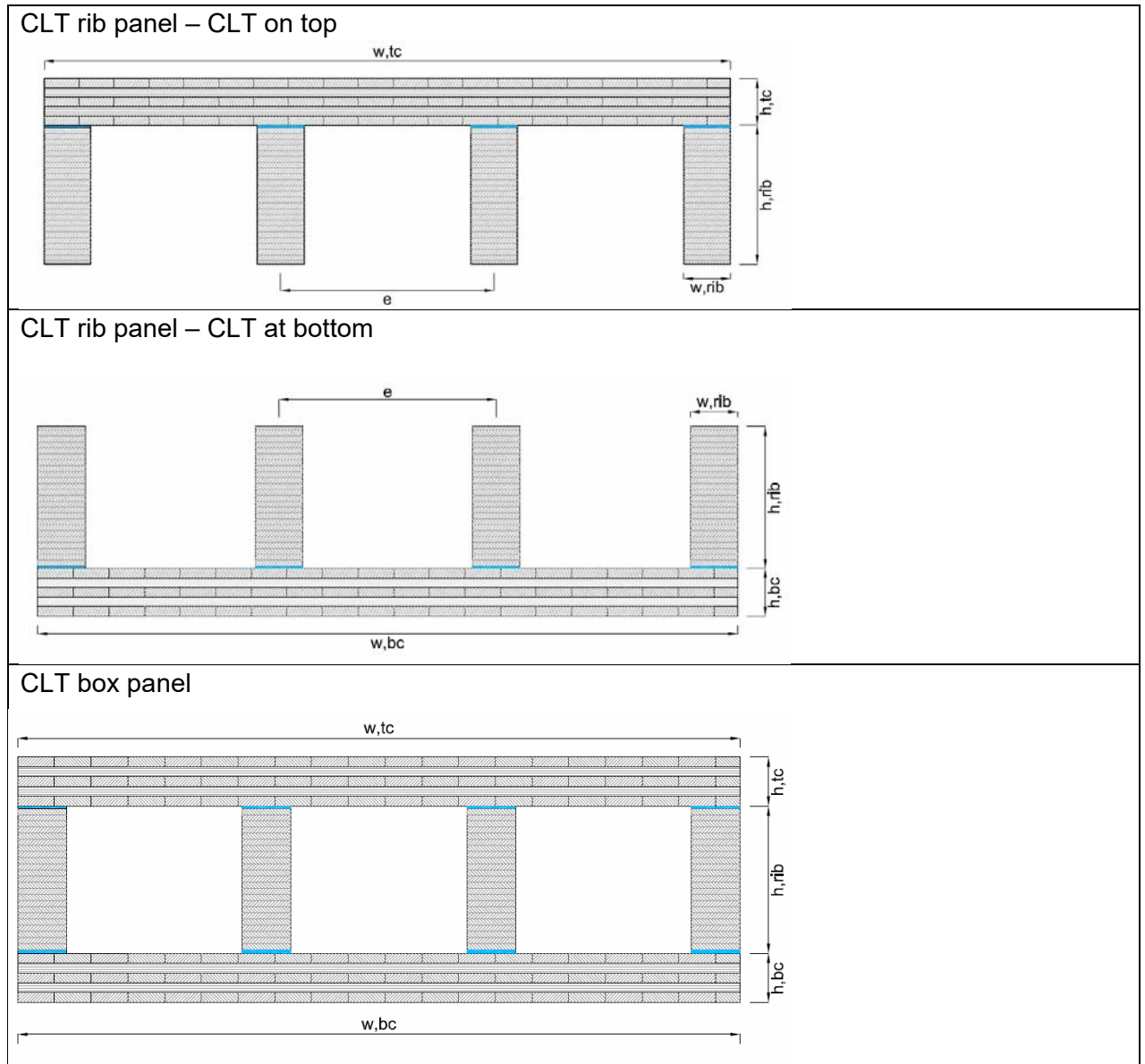


Figure 1: Cross sections of CLT Rib Panels

Width top cord, $w,tc$ / width bottom cord, $w,bc$	< 2950 mm
Height top cord, $h,tc$ / height bottom cord, $h,bc$	60 – 200 mm
Material top/bottom cord <sup>2</sup>	C16, C24, C30
Depth rib, $h,rib$	> 100 mm
Width rib, $w,rib$	> 60 mm
Material rib <sup>3</sup>	GL 20h – GL 32h and GL 20c – GL 32c
Rib spacing, $e$	variable

<sup>2</sup> According to ETA 14/0349

<sup>3</sup> According to EN 14080

The design of CLT Rib Panels by Stora Enso is shown in Figure 1.

## 2. Tolerances of dimensions

Tolerances of dimensions at the reference moisture content of  $10 \pm 2\%$  are presented in Table 1.

*Table 1. Tolerances of CLT Rib Panels by Stora Enso.*

Dimension	Tolerance, mm or %
Depth of the CLT Rib Panel	+/- 1 mm
Width of the CLT Rib Panel	-2/+0 mm
Length of the CLT Rib Panel	+/- 5 mm

## 3. Specifications of components

### **CLT slabs:**

CLT slabs are made of CLT by Stora Enso according to ETA-14/0349. The material properties and strength values according to ETA-14/0349 shall be used in design.

### **Glued laminated timber ribs:**

Glued laminated timber according to EN 14080 may be made by any manufacturer. Glulam class is to be given in the design. The material properties and strength values according to EN 14080 shall be used in design.

### **Adhesive:**

The adhesive used in manufacturing of CLT Rib Panels to attach the rib to the CLT slab, is one component polyurethane adhesive as defined in EN 15425 or a MUF adhesive according to EN 301 and shall conform to type I according to EN 15425 or EN 301. The adhesive used shall be approved for gluing of load-bearing structures.



#### 4. Typical connections between CLT Rib Panels by Stora Enso and support

