



Product information

Product information

CLT CHARACTERISTICS

04/2012

Use	Primarily as a wall, ceiling and roof panel in homes and other buildings
Maximum width	2.95 m
Maximum length	16.00 m
Maximum thickness	40 cm
Layer structure	at least three bonded single-layer panels arranged at right angles to each other
Wood species	Spruce (middle layers can contain pine; larch and pine as cover layer on request)
Grade of lamellas	C24 (in accordance with the technical approval 10 % to strength class C16 allowed; other grades on request)
Moisture content	12% ± 2%
Bonding adhesive	Formaldehyde-free adhesives for edge bonding, finger jointing and surface bonding
Surface quality	Non-visible quality, industrial visible quality and visible quality; the surface is always sanded
Weight	5.0 kN/m ³ in accordance with DIN 1055-1:2002, for structural analyses; for ascertaining transport weight: approx. 470 kg/m ³

Change in shape with change in moisture content	Swelling and shrinkage in accordance with DIN 1052:2008 below the fibre saturation level: <ul style="list-style-type: none"> ▪ In the panel layer: 0.02% change in length for each 1% change in timber moisture content ▪ Perpendicular to the panel layer: 0.24% change in length for each 1% change in timber moisture content
Fire rating	In accordance with Commission Decision 2003/43/EC: <ul style="list-style-type: none"> ▪ Timber components apart from floors → Euroclass D-s2, d0 ▪ Floors → Euroclass Dfl-s1
Water vapour diffusion resistance μ	According to EN 12524 → 20 to 50
Thermal conductivity λ	According to the SP Technical Research Institute of Sweden's expert opinion of 10.07.2009 → 0.11 W/(mK)
Specific heat capacity c_p	According to EN 12524 → 1600 j/(kgK)
Airtightness	CLT panels are made up of at least three single-layer panels and are therefore extremely airtight. The airtightness of a 3-layer CLT panel and of panel joints has been tested to EN 12 114 where it was found that that the volumetric rates of flow were outside the measurable range.
Service class/usability	According to EN 1995-1-1, can be used in service classes 1 and 2



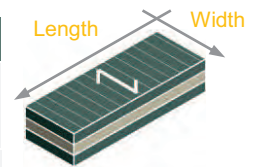
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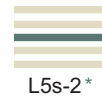
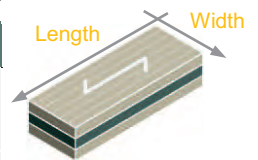
CLT STANDARD DESIGNS

04/2012

C panels									
Nominal thickness [mm]	Designation [—]	Layers [—]	Lamella structure [mm]						
			C	L	C	L	C	L	C
60	C3s	3	20	20	20				
80	C3s	3	30	20	30				
90	C3s	3	30	30	30				
100	C3s	3	30	40	30				
120	C3s	3	40	40	40				
100	C5s	5	20	20	20	20	20		
120	C5s	5	30	20	20	20	30		
140	C5s	5	40	20	20	20	40		
160	C5s	5	40	20	40	20	40		



L panels									
Nominal thickness [mm]	Designation [—]	Layers [—]	Lamella structure [mm]						
			L	C	L	C	L	C	L
60	L3s	3	20	20	20				
80	L3s	3	30	20	30				
90	L3s	3	30	30	30				
100	L3s	3	30	40	30				
120	L3s	3	40	40	40				
100	L5s	5	20	20	20	20	20		
120	L5s	5	30	20	20	20	30		
140	L5s	5	40	20	20	20	40		
160	L5s	5	40	20	40	20	40		
180	L5s	5	40	30	40	30	40		
200	L5s	5	40	40	40	40	40		
160	L5s-2*	5	60	40	60				
180	L7s	7	30	20	30	20	30	20	30
200	L7s	7	20	40	20	40	20	40	20
240	L7s	7	30	40	30	40	30	40	30
220	L7s-2*	7	60	30	40	30	60		
240	L7s-2*	7	80	20	40	20	80		
260	L7s-2*	7	80	30	40	30	80		
280	L7s-2*	7	80	40	40	40	80		
300	L8s-2**	8	80	30	80	30	80		
320	L8s-2**	8	80	40	80	40	80		



* Cover layers consisting of 2 lengthwise layers
 ** Cover layers and inner layer consisting of 2 lengthwise layers

Status: 04/2012

Width (Charged widths): 245 cm, 275 cm, 295 cm
 Length (Production lengths): From minimum production length of 8.00 m per charged width up to max. 16.00 m (in 10 cm increments).

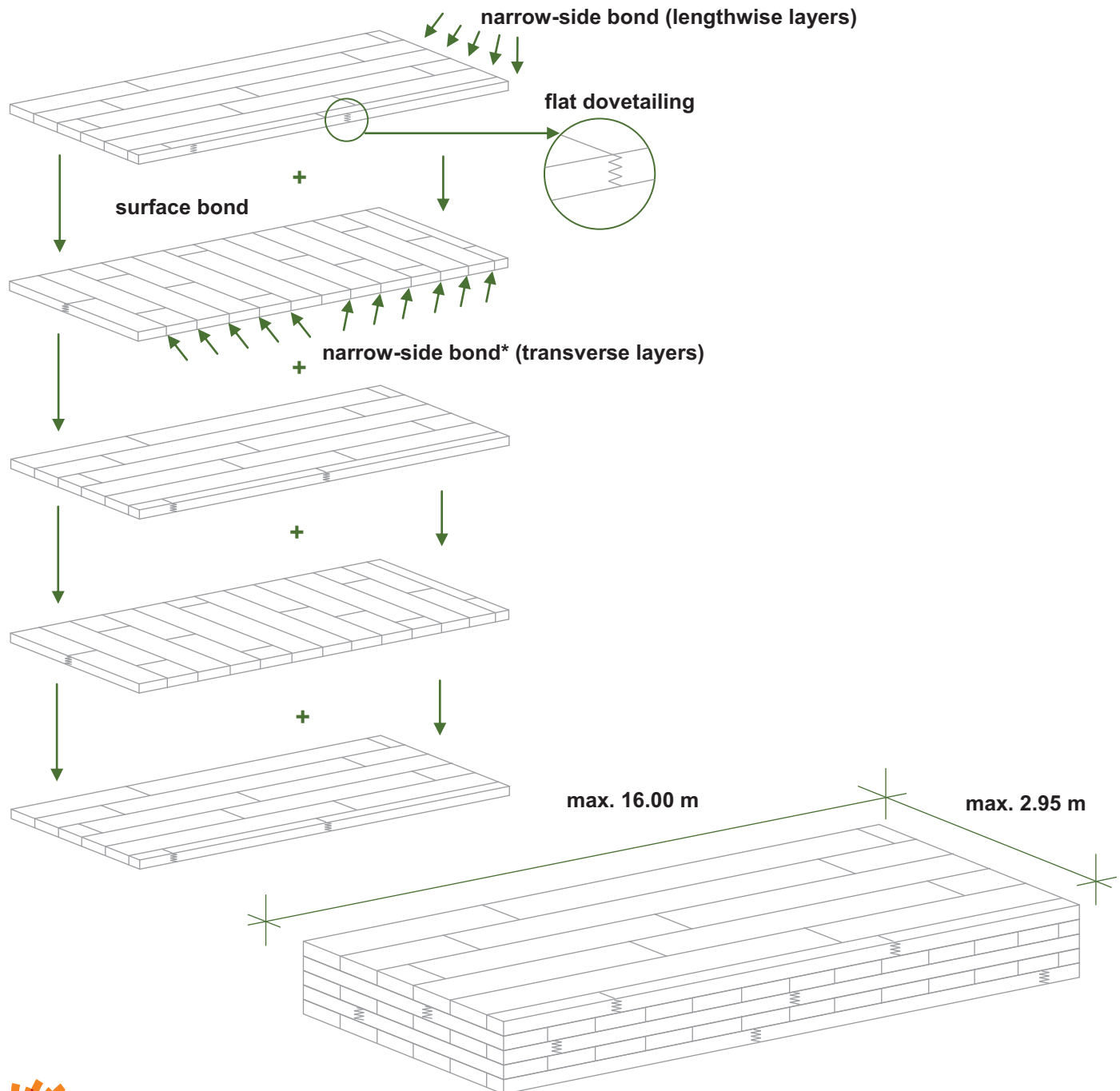


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CLT solid wood panels are made up of at least three bonded single-layer panels arranged at right angles to each another. From five layers, CLT can also include middle layers (transverse layers) without narrow side bonding. It currently measures up to 2.95×16 m.

Example: structure of a 5-layer CLT solid wood panel



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SURFACE QUALITY

04/2012

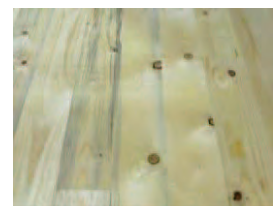
CLT SURFACE QUALITY			
Surface quality appearance grade/Product characteristics			
CHARACTERISTICS	VI	IVI	NVI
Bonding	occasional open joints up to max. 1 mm width permitted	Occasional open joints up to max. 2 mm width permitted	Occasional open joints up to max. 3 mm width permitted
Blue stains	not permitted	slight discolouration permitted	Permitted
Discolorations (brown stains, etc.)	not permitted	not permitted	permitted
Resin galls	no knot clusters, max. 5 x 50 mm	max. 10 x 90 mm	permitted
Bark ingrowth	occasional occurrences permitted	occasional occurrences permitted	permitted
Dry cracks	occasional surface cracks permitted	permitted	permitted
Core – pith	occasional, up to 40 cm long permitted	permitted	permitted
Insect damage	not permitted	not permitted	occasional small holes up to 2 mm permitted
Knots – sound	permitted	permitted	permitted
Knots – black	max. 1.5 cm Ø	max. 3 cm Ø	permitted
Knots – hole	max. 1 cm Ø	max. 2 cm Ø	permitted
Rough edges	not permitted	not permitted	max. 2 x 50 cm
Surface	100% sanded	100% sanded	max. 10% of surface rough
Quality of surface finish	occasional small faults permitted	occasional faults permitted	occasional faults permitted
Quality of narrow side bonding and face ends	occasional small faults permitted	occasional faults permitted	occasional faults permitted
Chamfer on L panels	yes	no	no
Rework edge of cut with sandpaper	yes	no	no
Machining – Chainsaw	not permitted	permitted	permitted
Lamella width	≤ 130 mm	max. 230 mm	max. 230 mm
Wood moisture	max. 11%	max. 15%	max. 15%
Timber species mixture	not permitted	not permitted	permitted with spruce/silver fir, pine
beauty treatment of the surface with dowels / blocks ...	permitted	permitted	permitted



VI Visible quality



IVI Industrial Visible quality



NVI Non-Visible quality



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Stora Enso offers three different CLT surface qualities:

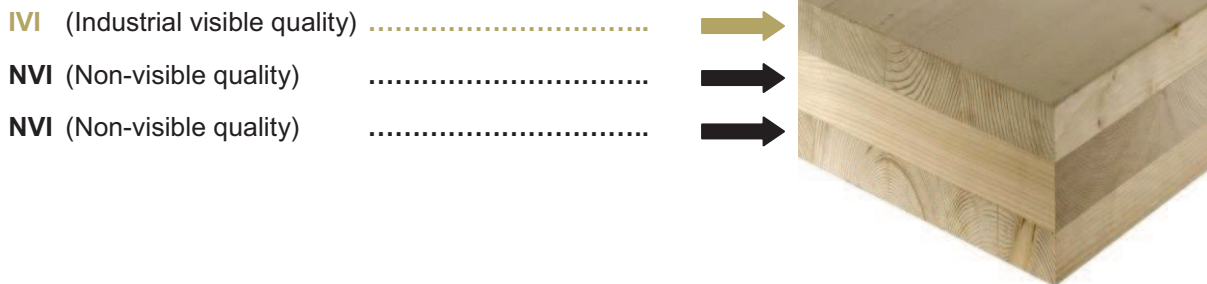
- NVI** Non-visible quality
- IVI** Industrial visible quality
- VI** Visible quality

Three different single-layer panel qualities are available with the following CLT surface qualities:

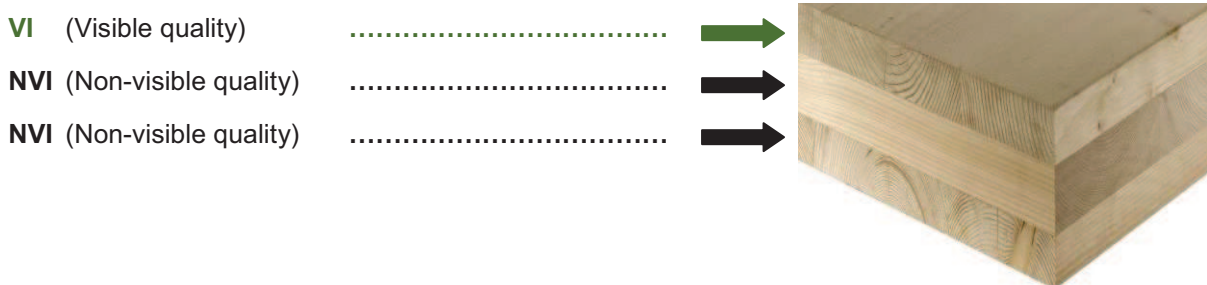
NVI quality description



INV quality description



VI quality description



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BVI quality description

- VI (Visible quality) →
- NVI (Non-visible quality) →
- VI (Visible quality) →



IBI quality description

- IVI (Industrial visible quality) →
- NVI (Non-visible quality) →
- IVI (Industrial visible quality) →



IVI quality description

- VI (Visible quality) →
- NVI (Non-visible quality) →
- IVI (Industrial visible quality) →



Overview

Cover layer	NVI	VI	VI	IVI	IVI	VI
Quality description	NVI	VI	BVI	INV	IBI	IVI
Cover layer	NVI	NVI	VI	NVI	IVI	IVI



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APPROVALS

04/2012

National technical approval (DIBt)

The German Institute for Structural Engineering (DIBt), Germany's approval body, awards national technical approvals for building products and building techniques.

The national technical approval regulates the manufacture and use of CLT and is the basis for the Ü symbol—the German mark of conformity.



European Technical Approval (ETA)

ETA regulates the manufacture and use of CLT in Europe and is the basis for the CE mark.



PEFC

PEFC—*Programme for the Endorsement of Forest Certification Schemes*—is the mark for wood and paper products from environmentally, economically and socially sustainable forestry operations along the entire processing chain.

For customers, the PEFC mark confirms that the purchase of a marked product guarantees and supports environmentally sound forestry management.

The mark guarantees that the product has been subject to monitoring in accordance with rigorous criteria, from the forest to the end product. Evidence of compliance is provided by Stora Enso and is regularly checked by independent bodies.



Assembly

To assemble the CLT product safely and without causing damage, utmost care must be taken during assembly. During assembly, pay particular attention to the following points:

- Use appropriate hoisting and rigging gear for the product.
- In the case of large cut-outs (e.g. windows), pay attention to stability/bracing requirements (danger of buckling during lifting).
- Take care not to damage sensitive areas such as edges, visible sides, etc.
- Protect from dirt (for example, cover VI/VI panels with aluminium foil or cardboard).
- Protect CLT from the effects of weather and from coming into contact with water.
- Take the necessary steps to ensure fire protection and sound insulation (standards).
- Only use CLT for service class I and II applications. It should be pointed out that directly exposing CLT to the weather or to constant, extremely high levels of humidity is not permitted or is at the user's risk.
- Instruct all other crews involved in the building project and refer them to our website: **www.clt.info**.

Swelling and shrinkage processes

Wood absorbs moisture and releases it again according to the relative humidity and temperature of the air.

- Swelling (undulating surface):
Humidity levels are too high, e.g.: due to moisture in the building from concrete, floor screeds, etc. **Should be avoided at all costs.** However, this levels out again to some extent as soon as the original equilibrium moisture content is re-established by means of dehumidification or careful heating. With CLT, which is made from the natural material of wood, the recommended optimum humidity is between 40 and 60%.
- Shrinkage cracks (cracked surface):
Humidity levels are too low, e.g. high indoor temperature during the heating period, domestic ventilation, etc. **Should be avoided.** However, this levels out again to some extent as soon as the original equilibrium moisture content can be re-established by means of air humidification. This can also be achieved by air humidifiers, indoor fountains, plants, etc.

Shrinkage cracks or open joints have no impact on CLT's load-bearing capacity or structural and physical properties. These are not defects of the solid wood product, CLT. Due to the natural properties of wood, tensions may develop in the cross-laminated timber, causing stress cracks to appear during initial periods of use.

Changes in surface colour

The UV element of natural light causes darkening and yellowing of the surface of spruce. Therefore, it is important not to wait too long before carrying out any necessary reworking (e.g. sanding) as otherwise this could result in a patchy overall finish. When assembling visible quality panels, care must be taken to ensure that they are not partially covered to prevent uneven darkening.

Surface treatment

In principle, paints and coatings suitable for wood can also be used for CLT. For more information about CLT, visit our website: **www.clt.info**.

