

Technical characteristics

Essepi CLT/Xlam panel

specification description and item	Cross-layered laminated solid timber panel made of European spruce with class 5 durability according to EN 350. Each panel consists of 3, 4, 5, 7 or 9 layers positioned perpendicularly to one another: the individual layers consist of parallel oriented lamellas made of solid wood boards. All boards making up the panel are of soft wood classified as C24 for mechanical resistance. Only top quality dried wooden boards are used, planed and calibrated on both sides, finger-jointed and glued at specific points, including laterally to each other.
dimensions	thickness: from 60 to 300 mm height: up to 3150 mm length: up to 12700 mm
type of wood	PEFC-certified spruce
number of layers	$3 \leq n \leq 9$
	ETA no. 12/0362
	PEFC no. 2019-SKMPEFC-309-13

Technical characteristics

thickness of boards making up panel	longitudinal layers 20–40 mm transverse layers 20–40 mm	
mini-finger joints for connecting boards	according to EN 14080	
wood resistance class according to EN 33813	CLT/Xlam panels are 100% made of boards meeting resistance class C24	
adhesive	Adhesives comply with EN 15425. Polyurethane-based adhesives are used both for gluing boards and for finger joints.	
emissions of hazardous substances	class E1 – formaldehyde emissions less than or equal to 0.124 mg/m3 air, measured with method UNI EN 717-1 (panels are formaldehyde-free)	
reaction to fire	performance of solid wood board with regard to reaction to fire is D-s2, d0	
resistance to fire	resistance is calculated based upon EN 1995-1-2: the carbonisation rate under standard exposure to fire b0 is 0.65 mm/min and the theoretical designed carbonisation rate under standard exposure to fire bn is 0.7 mm/min	
thermal conductivity	the value to be used in design calculations for the solid wood slab is $\lambda = 0.12 \text{ W (mK)}$	
mechanical characteristics	mean elastic modulus parallel to the grain $E_{0,\text{mean}}$	12500 N/mm ²
	bending strength $f_{m,k}$	24 N/mm ²
	compressive strength parallel to the grain $f_{c,0,k}$	24 N/mm ²
	compressive strength perpendicular to the grain $f_{c,90,k}$	2,5 N/mm ²
	tensile strength parallel to the grain $f_{t,0,k}$	19,2 N/mm ²
	tensile strength perpendicular to the grain $f_{t,90,k}$	0,5 N/mm ²
	shear strength $f_{v,k}$	3,5 N/mm ²
	shear strength “rolling shear” $F_{R,k}$	1,10 N/mm ²
	mean elastic modulus perpendicular to the grain $E_{90,\text{mean}}$	370 N/mm ²
	mean shear modulus parallel to the grain G_{mean}	690 N/mm ²
wood durability	use only in service class 1 or 2, EN 1995-1-1	
air permeability	practically hermetic at pressures below 150 Pa (air flow $\leq 0.01 \text{ m}^3 / (\text{h m}^2)$)	

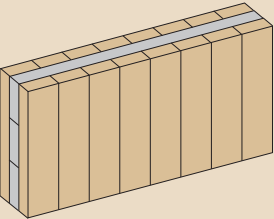
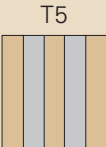
Types and build-ups

Wall panel

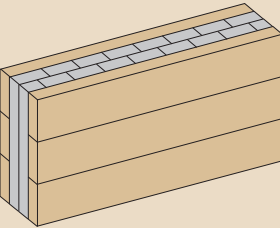
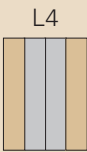
	layers	build-ups			thickness mm
		T	L	T	
CLT/Xlam T3-60	3	20	20	20	60
CLT/Xlam T3-80	3	30	20	30	80
CLT/Xlam T3-90	3	30	30	30	90
CLT/Xlam T3-100	3	30	40	30	100
CLT/Xlam T3-120	3	40	40	40	120



	layers	build-ups					thickness mm
		T	L	T	L	T	
CLT/Xlam T5-100	5	20	20	20	20	20	100
CLT/Xlam T5-120	5	30	20	20	20	30	120
CLT/Xlam T5-130	5	30	20	30	20	30	130
CLT/Xlam T5-140	5	40	20	20	20	40	140
CLT/Xlam T5-160	5	40	20	40	20	40	160



	layers	build-ups				thickness mm
		L	T	T	L	
CLT/Xlam L4-100	4	20	30	30	20	100
CLT/Xlam L4-120	4	20	40	40	20	120

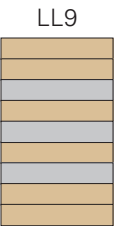
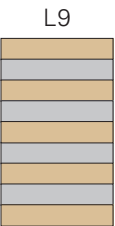
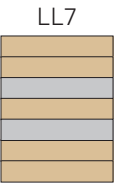
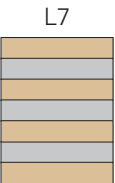
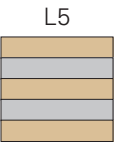
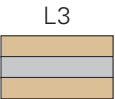
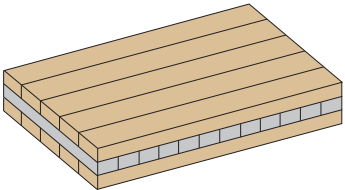


- T Transverse layers
- L Longitudinal layers

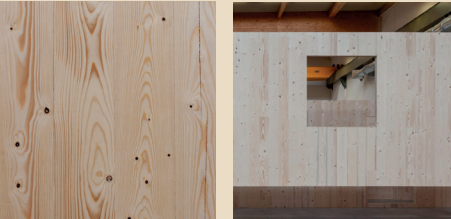
In addition to the solutions offered, other build-ups can be produced with the grain direction customised according to structural requirements.

Floor panel

		layers	build-ups					thickness mm	
			L	T	L				
CLT/Xlam L3-60	3		20	20	20			60	
CLT/Xlam L3-80	3		30	20	30			80	
CLT/Xlam L3-90	3		30	30	30			90	
CLT/Xlam L3-100	3		30	40	30			100	
CLT/Xlam L3-120	3		40	40	40			120	
			L	T	L	T	L		
CLT/Xlam L5-100	5		20	20	20	20	20	100	
CLT/Xlam L5-120	5		30	20	20	20	30	120	
CLT/Xlam L5-140	5		40	20	20	20	40	140	
CLT/Xlam L5-150	5		30	30	30	30	30	150	
CLT/Xlam L5-160	5		40	20	40	20	40	160	
CLT/Xlam L5-180	5		40	30	40	30	40	180	
CLT/Xlam L5-200	5		40	40	40	40	40	200	
			L	T	L	T	L		
CLT/Xlam L7-210	7		30	30	30	30	30	210	
CLT/Xlam L7-220	7		40	40	20	20	40	220	
CLT/Xlam L7-240	7		40	40	20	40	40	240	
CLT/Xlam L7-260	7		40	40	30	40	40	260	
CLT/Xlam L7-280	7		40	40	40	40	40	280	
			L	L	T	L	T	L	
CLT/Xlam LL7-210	7		30	30	30	30	30	210	
CLT/Xlam LL7-220	7		40	40	20	20	40	220	
CLT/Xlam LL7-240	7		40	40	20	40	40	240	
CLT/Xlam LL7-260	7		40	40	30	40	40	260	
CLT/Xlam LL7-280	7		40	40	40	40	40	280	
			L	T	L	T	L	T	L
CLT/Xlam L9-270	9		30	30	30	30	30	30	270
CLT/Xlam L9-300	9		40	40	20	40	20	40	300
			L	L	T	L	T	L	L
CLT/Xlam LL9-270			30	30	30	30	30	30	270
CLT/Xlam LL9-300			40	40	20	40	20	40	300

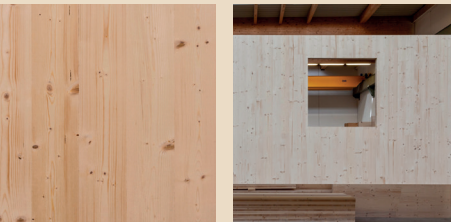
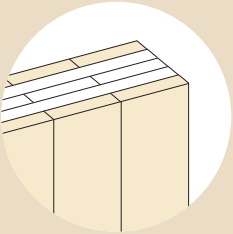


Surface quality



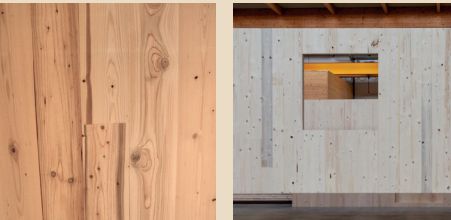
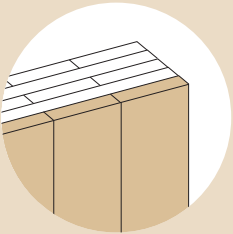
Essepi Standard Surface (B)

Essepi has always been renowned on the market for the aesthetic quality of its own panels. Essepi Standard quality is the best compromise between industrial surface and visual quality surface panels and is perfect for those who want to avoid typical imperfections of industrial quality.



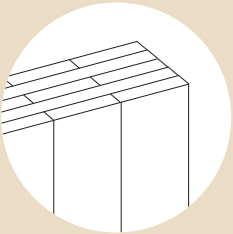
Visual Quality Surface (A)

For special architectural choices, with exposed finishes or specific requests, the last layer of the CLT/Xlam panel is made of superior quality spruce (according to EN 13017-1) while minimizing the amount of knots and the natural defects of wood.



Industrial Surface (C)

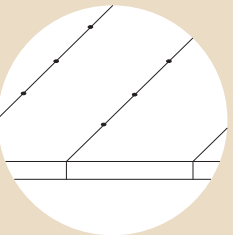
This solution has been designed for worksites where they need to minimize costs and the aesthetics of panels is not essential.



Characteristics

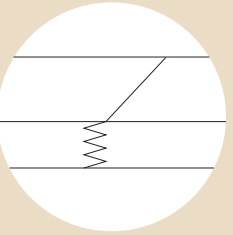
Gluing of board edges

Hot gluing between boards on a point-to-point basis to maintain a certain elasticity between the “shrinkage stress” and the glue seal to avoid the formation of cracks.



Finger joint

“Finger joints” junction is made in the thickness direction in order to avoid imperfections.



Pre-dimensioning

Floor panels

permanent load	live load	span of elements (simply supported panels)									
		q _k	3,0 m	3,5 m	4,0 m	4,5 m	5,0 m	5,5 m	6,0 m	6,5 m	7,0 m
1,00	2,00	L3-90	L5-120	L5-120	L5-140	L5-160	L5-200	LL7-210	LL7-240	LL7-260	
	3,00	L5-100	L5-120	L5-140	L5-150	L5-160	L5-200	LL7-210	LL7-240	LL7-260	
	4,00	L5-120	L5-140	L5-140	L5-160	L5-180	LL7-210	LL7-220	LL7-240	LL7-260	
1,50	2,00	L3-90	L5-120	L5-140	L5-160	L5-180	LL7-210	LL7-220	LL7-240	LL7-260	
	3,00	L5-120	L5-120	L5-140	L5-160	L5-180	LL7-210	LL7-220	LL7-240	LL7-260	
	4,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
2,00	2,00	L5-100	L5-120	L5-140	L5-160	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
	3,00	L5-120	L5-120	L5-140	L5-160	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
	4,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-280	
2,50	2,00	L5-120	L5-120	L5-140	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
	3,00	L5-120	L5-140	L5-150	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
	4,00	L5-120	L5-140	L5-160	L5-180	L5-210	LL7-220	LL7-240	LL7-260	LL7-280	
3,00	2,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
	3,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	
	4,00	L5-120	L5-140	L5-160	L5-200	L5-210	LL7-220	LL7-240	LL7-260	LL7-280	
3,50	2,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-260	LL7-280	
	3,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-240	LL7-260	LL7-280	
	4,00	L5-140	L5-140	L5-160	L5-200	L5-210	LL7-220	LL7-240	LL7-280	LL9-300	

* at the delivery of the product
** with wood moisture content =12% ± 2% for edges and all surfaces pro-
cessed with CNC machines only industrial quality criteria apply

Validity

The information given here applies to panels produced in the factory ready to be shipped and is valid only for the outer layers. The quality criteria for exposed sur-
faces cannot be applied to the edges of the panels or to any surfaces finished
using numerical control machinery.

Cracks

Wood is a natural material that can over time react to climate conditions and
variations in humidity. Cracks may therefore form and joints widen as a con-
sequence of the alternating drying and dampening of the product in use. Such
phenomena are not to be considered as defects.

Pre-dimensioning taking account of SLS
including vibrations.

$k_{mod} = 0,8$

$k_{def} = 0,6$

$\gamma_M = 1,35$

service class: 1

instantaneous deflection limit: L/400

final deflection limit: L/300

Self-weight of Essepi CLT/Xlam panel already included

Roof panels

permanent load	snow load	span of elements (simply supported panels)								
		qs	3,0 m	3,5 m	4,0 m	4,5 m	5,0 m	5,5 m	6,0 m	6,5 m
1,00	1,00	L3-80	L3-90	L5-120	L5-120	L5-140	L5-160	L5-160	L5-180	L5-200
	1,50	L3-80	L5-100	L5-120	L5-140	L5-140	L5-160	L5-180	L5-200	LL7-210
	2,00	L3-90	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-210
	3,00	L5-100	L5-120	L5-140	L5-150	L5-160	L5-200	LL7-210	LL7-210	LL7-220
	4,00	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240
	5,00	L5-120	L5-140	L5-150	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260
1,50	1,00	L3-80	L5-100	L5-120	L5-140	L5-140	L5-160	L5-180	L5-200	LL7-210
	1,50	L3-90	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-210
	2,00	L3-90	L5-120	L5-140	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220
	3,00	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240
	4,00	L5-120	L5-140	L5-140	L5-160	L5-180	LL7-210	LL7-220	LL7-240	LL7-260
	5,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260
2,00	1,00	L3-90	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-210
	1,50	L3-90	L5-120	L5-140	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220
	2,00	L5-100	L5-120	L5-140	L5-150	L5-160	L5-200	LL7-210	LL7-210	LL7-220
	3,00	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240
	4,00	L5-120	L5-140	L5-150	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260
	5,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-240	LL7-260	LL7-280
2,50	1,00	L3-90	L5-120	L5-140	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220
	1,50	L5-100	L5-120	L5-140	L5-150	L5-160	L5-200	LL7-210	LL7-210	LL7-220
	2,00	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240
	3,00	L5-120	L5-140	L5-140	L5-160	L5-180	LL7-210	LL7-220	LL7-240	LL7-260
	4,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260
	5,00	L5-120	L5-140	L5-160	L5-180	LL7-210	LL7-220	LL7-240	LL7-260	LL7-280
3,00	1,00	L5-100	L5-120	L5-140	L5-150	L5-160	L5-200	LL7-210	LL7-210	LL7-220
	1,50	L5-120	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240
	2,00	L5-120	L5-140	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-220	LL7-240
	3,00	L5-120	L5-140	L5-150	L5-180	L5-200	LL7-210	LL7-220	LL7-240	LL7-260
	4,00	L5-120	L5-140	L5-160	L5-180	L5-200	LL7-210	LL7-240	LL7-260	LL7-280
	5,00	L5-120	L5-140	L5-160	L5-200	LL7-210	LL7-220	LL7-240	LL7-260	LL7-280

Pre-dimensioning without taking account of vibrations on SLS.

$$k_{\text{mod}} = 0,9$$

$$k_{\text{def}} = 0,6$$

$$\gamma_M = 1,35$$

service class: 1

instantaneous deflection limit: L/400

final deflection limit: L/200

Self - weight of Essepi CLT/Xlam panel already included