

X-RAD

X-RAD CONNECTION SYSTEM



VIDEO



MY PROJECT SOFTWARE



PATENTED

SERVICE CLASS

SC1

SC2

EXTERNAL LOADS

REVOLUTIONARY

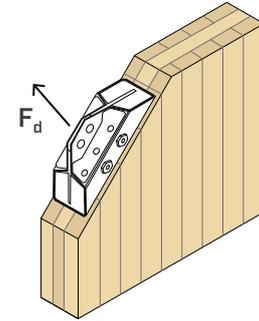
A radical innovation in timber constructions, It redefines the standard for shear, resistance, transportation the assembling and resistance of CLT panels. X-RAD offers excellent static and seismic performance.

PATENTED

Handling and assembly of ultra-rapid CLT walls and floors. Drastic reduction of assembly time, construction site errors and risk of injury.

STRUCTURAL SAFETY

Ideal connection system for seismic design with tested and certified ductility values.



VIDEO

Scan the QR Code and watch the video on our YouTube channel

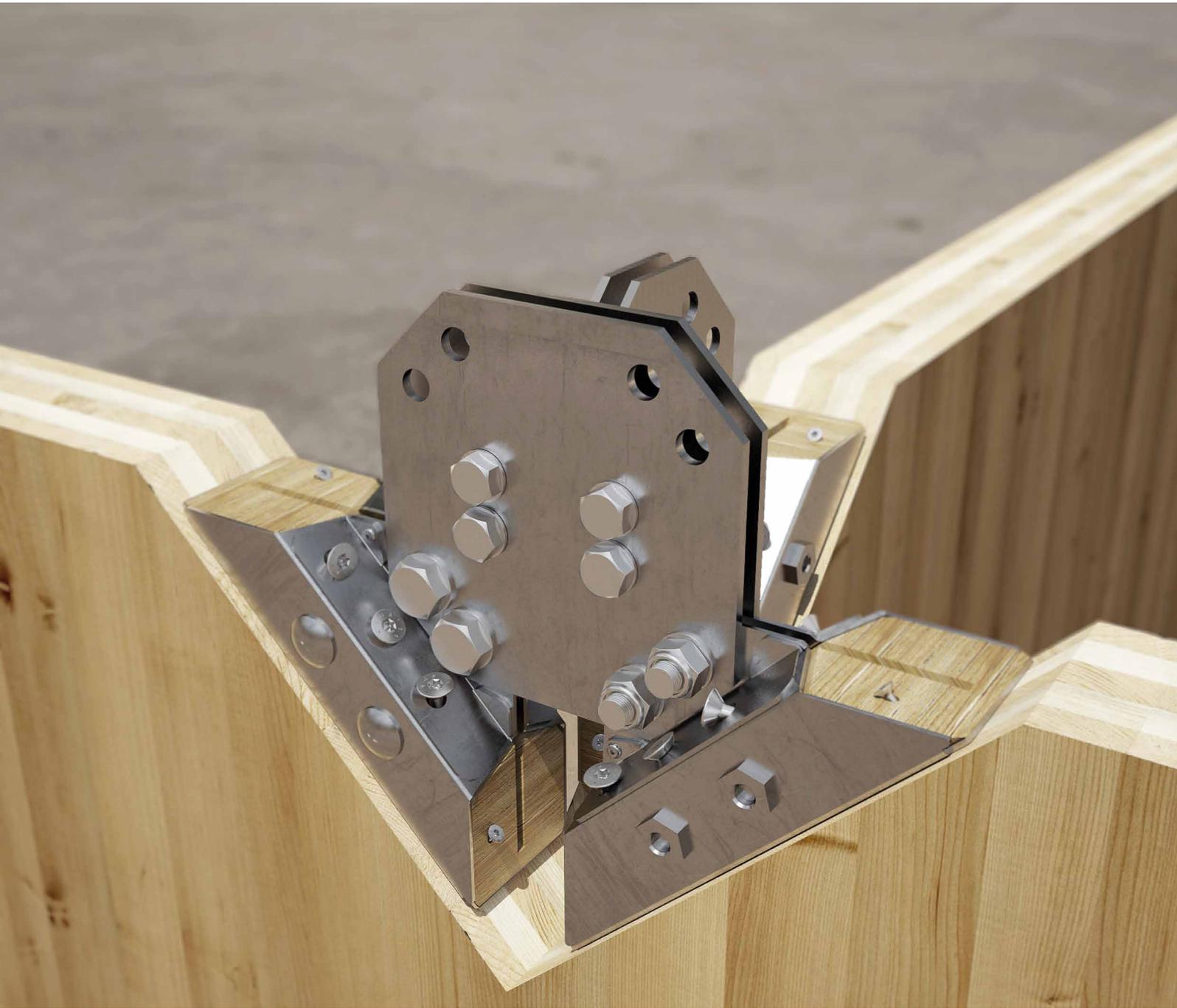


The complete **technical data sheet** is available at www.rothoblaas.com



FIELDS OF USE

Transportation, assembling and realization of timber buildings with CLT (Cross Laminated Timber) structure.



INNOVATION

The metal box element incorporates a multi-layer beechwood profile which is connected to the angles of the CLT walls with full thread screws.

PROTECTION

The use of insulating panels and self-adhesive protection membranes for CLT walls at the ground connection ensures the structure durability.

X-ONE

CODES AND DIMENSIONS

X-ONE

CODE	L	B	H	L	B	H	pcs
	[mm]	[mm]	[mm]	[in]	[in]	[in]	
XONE	273	90	113	10 3/4	3 1/2	4 1/2	1

MANUAL TEMPLATE

CODE	description	pcs
ATXONE	manual template for X-ONE assembly	1

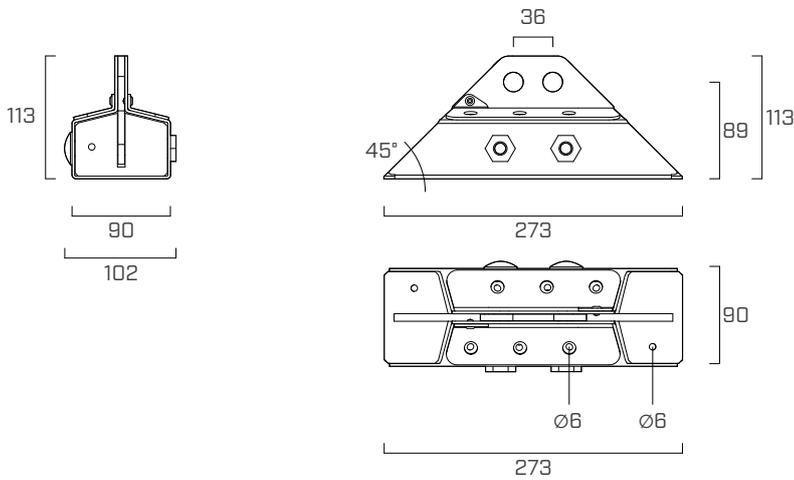
X-VGS SCREW

CODE	L	b	d ₁	TX	pcs
	[mm]	[mm]	[mm]		
XVGS11350	350	340	11	TX50	25

AUTOMATIC TEMPLATE

CODE	description	pcs
JIGONE	automatic template for X-ONE assembly	1

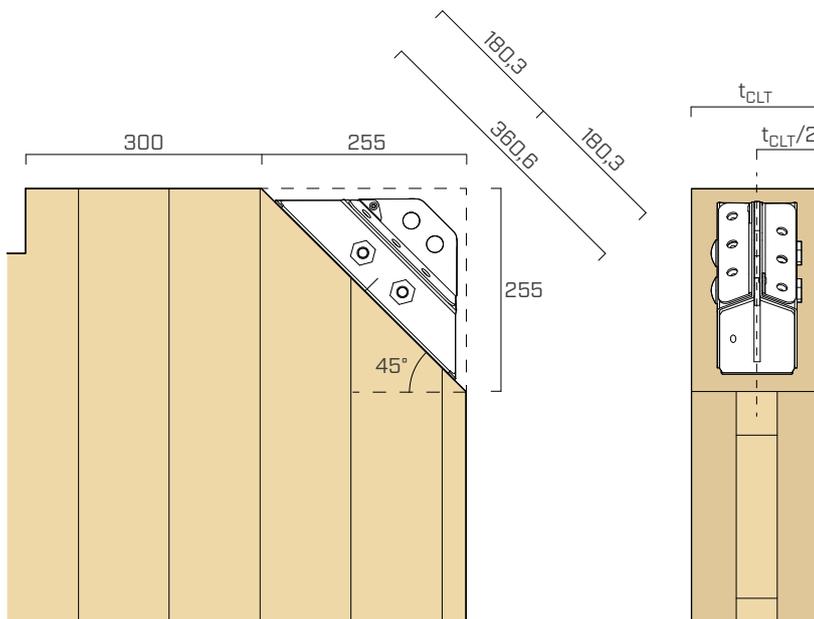
GEOMETRY



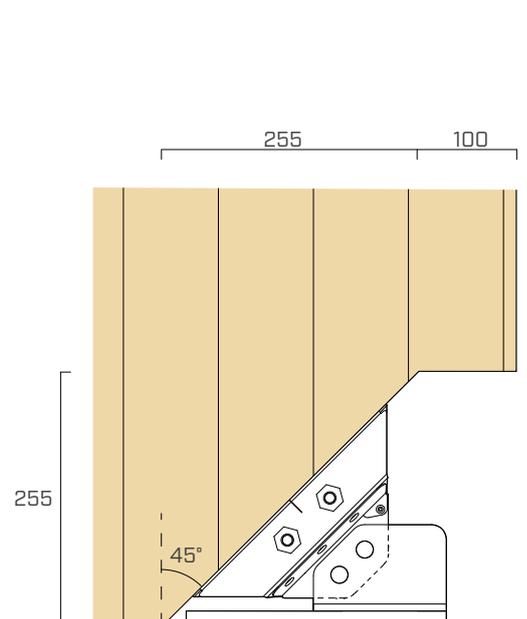
POSITIONING

Regardless of the panel thickness and its location on the construction site, the shear for fastening X-ONE is made at the top of the walls at 45°, and has a length of 360,6 mm.

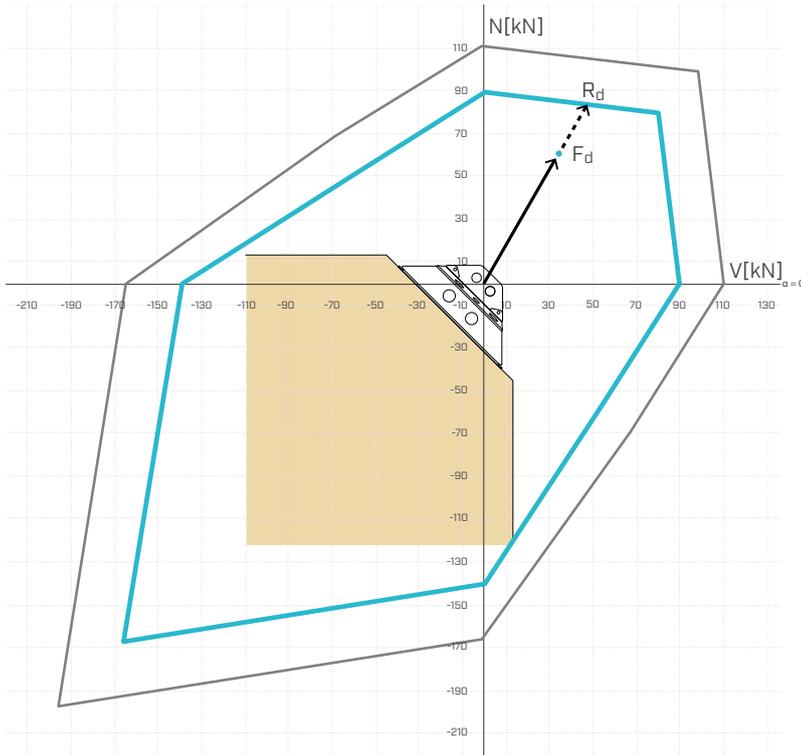
INTER-STOREY AND TOP NODES SPECIAL STANDARD SHEAR



BOTTOM NODES SPECIAL STANDARD SHEAR



DESIGN STRENGTHS



Design strength domain according to EN1995-1-1 and EN1993-1-8

The verification of the X-ONE connection is considered successful when the representative point of the F_d stress falls within the design strength domain:

$$F_d \leq R_d$$

The X-ONE design domain refers to the strength values and γ_M coefficients shown in the table and for loads with instantaneous life class (earthquake and wind).

LEGEND:

- R_k
- R_d EN 1995-1-1

A table summarizing the **characteristic strengths** in the various stress configurations and a reference to the relative safety coefficient according to the failure mode (steel or timber) is shown.

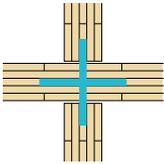
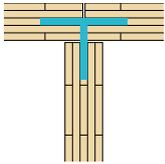
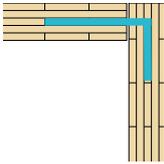
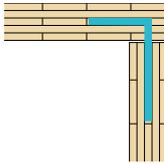
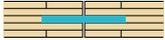
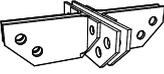
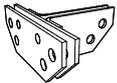
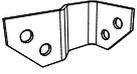
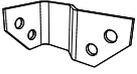
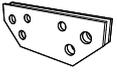
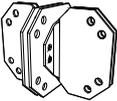
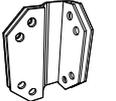
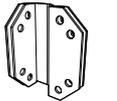
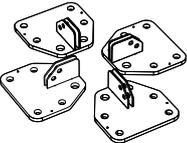
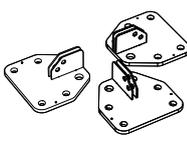
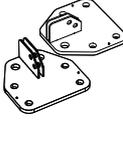
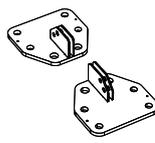
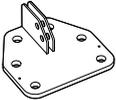
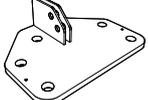
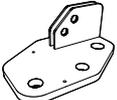
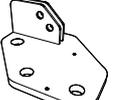
α	GLOBAL STRENGTH	STRENGTH COMPONENTS		FAILURE MODES	PARTIAL SAFETY COEFFICIENTS ⁽¹⁾
	R_k [kN]	V_k [kN]	N_k [kN]		
0°	111.6	111.6	0	VGS tension	$\gamma_{M2} = 1,25$
45°	141,0	99,7	99,7	block tearing on M16 holes	$\gamma_{M2} = 1,25$
90°	111.6	0,0	111.6	VGS tension	$\gamma_{M2} = 1,25$
135°	97,0	-68.6	68,6	VGS tension	$\gamma_{M2} = 1,25$
180°	165.9	-165.9	0	VGS thread extract	$\gamma_{M,timber} = 1,3$
225°	279.6	-197.7	-197.7	timber compression	$\gamma_{M,timber} = 1,3$
270°	165.9	0,0	-165.9	thread withdrawal VGS	$\gamma_{M,timber} = 1,3$
315°	97,0	68,6	-68.6	VGS tension	$\gamma_{M2} = 1,25$
360°	111.6	111.6	0	VGS tension	$\gamma_{M2} = 1,25$

NOTES

⁽¹⁾ The partial safety coefficients should be taken according to the current regulations used for the calculation. The table shows the values on steel side according to EN1993-1-8 and on the timber side according to EN1995-1-1.

X-PLATE

CODES AND DIMENSIONS

X-SHAPE	T-SHAPE	G-SHAPE	J-SHAPE	I-SHAPE	O-SHAPE
					
X-PLATE TOP					
					
TX100 TX120 TX140 4 XONE 24 XVGS11350 8 XBOLT1660 2 XBOLT1260	TT100 TT120 TT140 3 XONE 18 XVGS11350 6 XBOLT1660 2 XBOLT1260	TG100 TG120 TG140 2 XONE 12 XVGS11350 4 XBOLT1660	TJ100 TJ120 TJ140 2 XONE 12 XVGS11350 4 XBOLT1660	TI100 TI120 TI140 2 XONE 12 XVGS11350 4XBOLT1660	
X-PLATE MID					
					
MX100 MX120 MX140 8 XONE 48 XVGS11350 8 XBOLT1665 8 XBOLT1660 4 XBOLT1260	MT100 MT120 MT140 6 XONE 36 XVGS11350 8 XBOLT1665 4 XBOLT1660 4 XBOLT1260	MG100 MG120 MG140 4 XONE 24 XVGS11350 8 XBOLT1660	MJ100 MJ120 MJ140 4 XONE 24 XVGS11350 8 XBOLT1660	MI100 MI120 MI140 4 XONE 24 XVGS11350 8 XBOLT1665	MO100 MO120 MO140 2 XONE 12 XVGS11350 4 XBOLT1660
X-PLATE BASE					
					
4x	3x	2x	2x	2x	1x
					
BMINI 1 XONE 6 XVGS11350 2 XBOLT1660	BMAXI 1 XONE 6 XVGS11350 2 XBOLT1660	BMINIL 1 XONE 6 XVGS11350 2 XBOLT1660	BMINIR 1 XONE 6 XVGS11350 2 XBOLT1660	BMAXIL 1 XONE 6 XVGS11350 2 XBOLT1660	BMAXIR 1 XONE 6 XVGS11350 2 XBOLT1660

INTELLECTUAL PROPERTY

- X-RAD is protected by the following patents:
 - EP2.687.645;
 - EP2.687.651;
 - US9809972.

X-PLATE SYSTEM

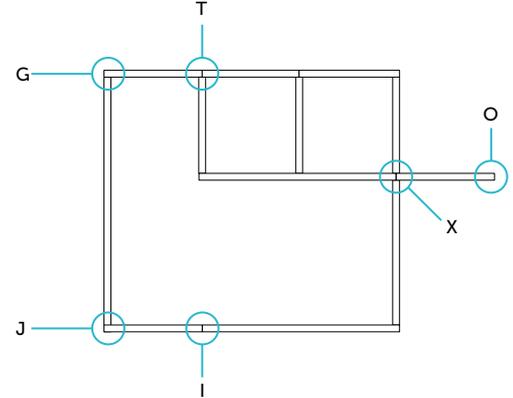
X-ONE makes the CLT panel a module with specific connections for fastening. X-PLATE allows modules to become buildings. Panels with thickness between 100 and 200 mm can be connected.

X-PLATE plates are the ideal solution for every construction site situation, developed for all geometric configurations. The X-PLATE plates are identified according to their positioning on the building level (X-BASE, X-MID, X-TOP) and according to the geometric configuration of the node and the thickness of the connected panels.

X-PLATE MID-TOP CODE COMPOSITION

LEVEL + NODE + THICKNESS

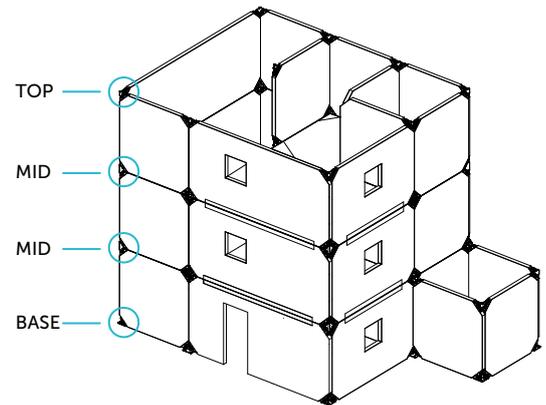
- **LEVEL:** indicates that they are MID (M) and TOP (T) inter-storey plates
- **NODE:** indicates the type of node (X, T, G, J, I, O)
- **THICKNESS:** indicates the thickness of the panel that can be used with that plate. There are three families of standard thickness values, 100 mm - 120 mm - 140 mm. All panel thickness values between 100 and 200 mm can be used, using universal plates for G, J, T and X nodes, in combination with specially developed SPACER shimming plates. The universal plates are available in the MID-S and TOP-S versions for panels with thickness between 100 and 140 mm and in the MID-SS and TOP-SS versions for panels with thickness between 140 and 200 mm.



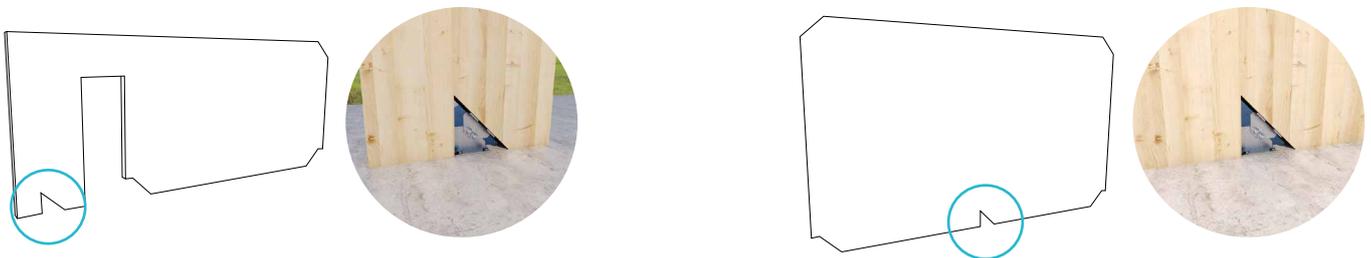
BASE X-PLATE CODE COMPOSITION

LEVEL + THICKNESS + ORIENTATION

- **LEVEL:** B indicates that they are base plates.
- **THICKNESS:** indicates the thickness interval of the panel that can be used with that plate. There are two families of plates, the first designed for thickness values from 100 to 130 mm (BMINI code), the second for thickness values from 130 to 200 mm (BMAXI code).
- **ORIENTATION:** indicates the orientation of the plate with respect to the wall, right/left (R/L), indication present only for asymmetrical plates.



ACCESSORIES: X-PLATE BASE EASY PLATES FOR NON-STRUCTURAL FASTENINGS



Where a foundation fastening is required for non-structural walls or temporary fastening for correct wall alignment (e.g. walls with very long length), it is possible to install the BEASYT plate (as an alternative to the X-ONE plate) on the bottom corner of the CLT panel (with simplified 45° shear without horizontal sawing) and the BEASYC plate (as an alternative to X-PLATE BASE plates) on the foundation slab.

CODES AND DIMENSIONS

CODE	s [mm]	Ø _{SUP} [mm]	n. Ø _{SUP}	Ø _{INT} [mm]	n. Ø _{INT}	pcs
BEASYT	5	9	3	17	2	1
BEASYC	5	17	2	13	2	1