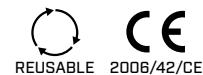


RAPTOR 31



RIGGING DEVICE FOR TIMBER ELEMENTS

UNIVERSAL

RAPTOR 31 can be configured in 3 modes making it suitable for the most common applications on the construction site:

- 6 screws: maximum strength and capacity
- 4 or 2 screws: for lifting and transporting lighter panels

The screws must be applied symmetrically.

VERSATILE

RAPTOR 31 is suitable for many different handling contexts. The lifting hook can be used for both axial and lateral loads.

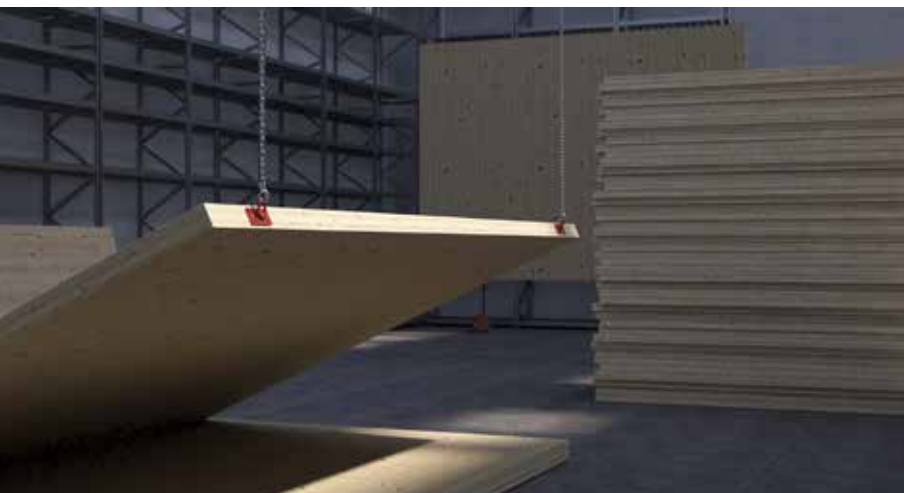
CERTIFIED

The plate is certified according to the Machinery Directive 2006/42/EC and lifts weights exceeding 3 tons.



CODE

CODE	max. capacity	suitable screws	pcs
RAP220100	3150 kg	HBS PLATE Ø10mm	1



MATERIAL

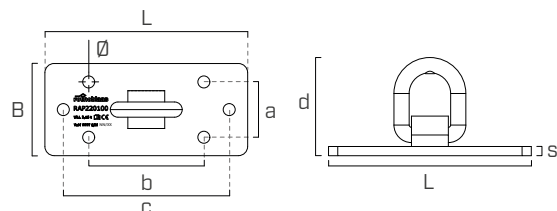
The metal plate and lifting hook are made of steel. Strong and durable, RAPTOR 31 guarantees safe lifting. The red coating that protects the device ensures good visibility and increases the safety of workers on the construction site.

CONFIGURATIONS

The plate is equipped with 6 holes. It provides 3 installation options with HBS PLATE screws of different lengths depending on the load conditions and material being transported.

DIMENSIONS

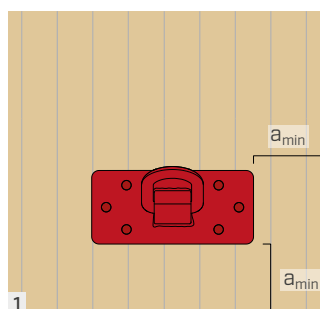
CODE	B	L	s	Ø	a	b	c	d
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
RAP220100	100	220	10	13	60	125	180	107



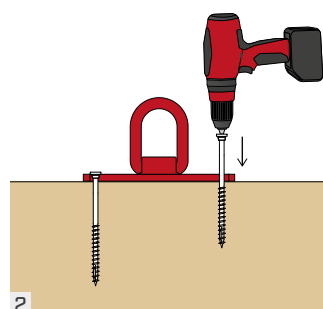
RAPTOR 31 INSTALLATION



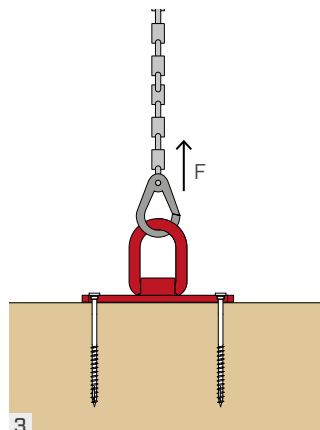

 $M_{ins,max} = 25 \text{ Nm}$



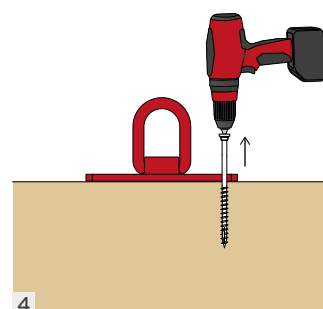
1 Read the instructions for use carefully and follow the directions. The positioning of the plate on the timber element must comply with the minimum distances.



2 Length and quantity of screws depend on the type of application. Drive the screws in the holes provided, being careful not to overtighten them.



3 Connect the crane hook and carefully lift the timber element. Be careful about the allowed lifting directions and corresponding maximum lifting capacities.

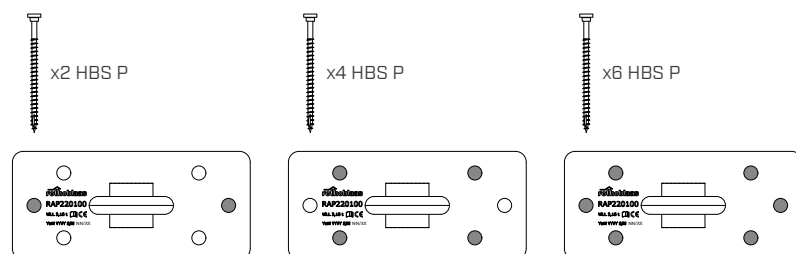


4 When lifting is complete, remove the screws and dispose of them. The screws can be used for only one handling cycle.

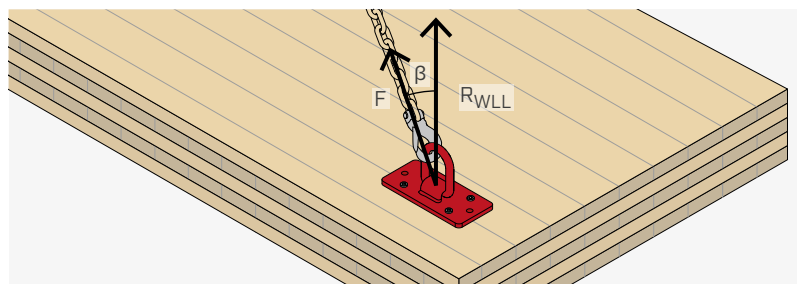
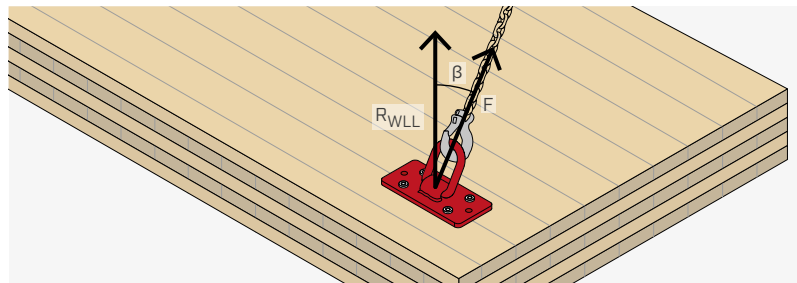
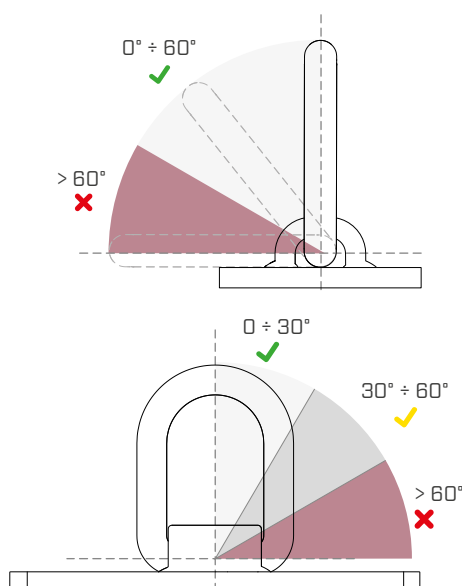
RELATED SCREWS

d_1	CODE	L	b	pcs
[mm]		[mm]	[mm]	
10 TX 40	HBSP1080	80	60	50
	HBSP10100	100	75	50
	HBSP10120	120	95	50
	HBSP10140	140	110	50
	HBSP10160	160	130	50
	HBSP10180	180	150	50

POSSIBLE LAYOUT OF SCREWS

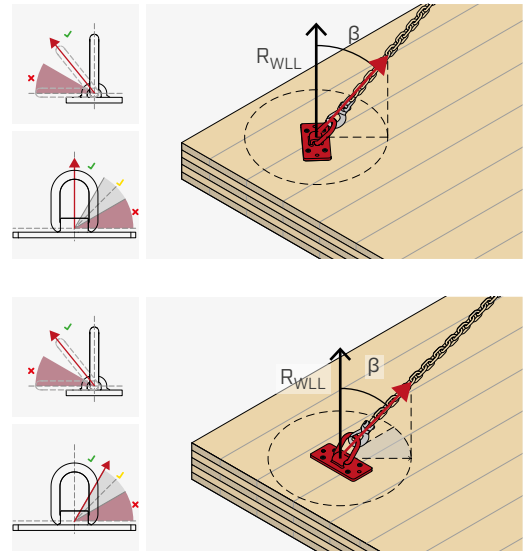
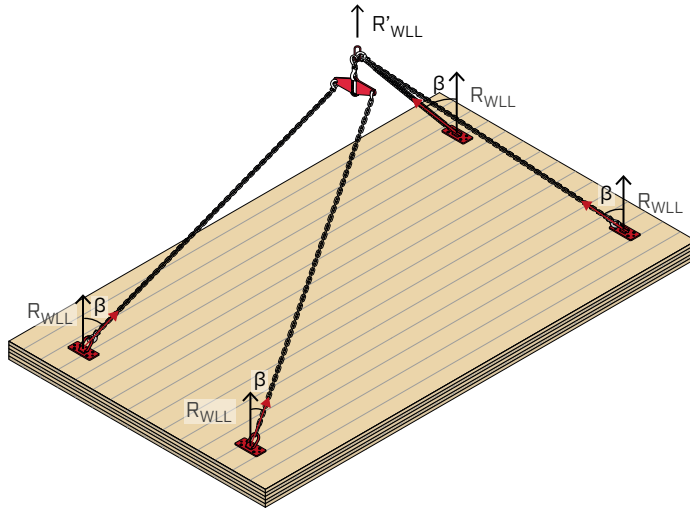


LOAD DIRECTIONS ALLOWED



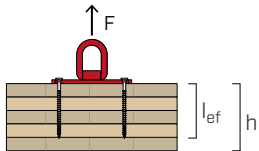
NOTE: β = lifting angle (angle between vertical axis and chain).

RIGGING CAPACITY | HORIZONTAL CLT PANEL

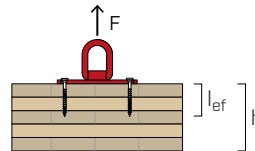


INFLUENCE OF THE RATIO OF SCREW LENGTH TO THE ELEMENT THICKNESS

Formulations according to DIN EN1995-1-1/NA.



$l_{ef} \geq 0,7 \cdot h \rightarrow 100\% R_{WLL}$ ✓



$l_{ef} < 0,7 \cdot h \rightarrow < 100\% R_{WLL}$ ✓

TOTAL RIGGING CAPACITY CALCULATION

$$R'_{WLL} = R_{WLL} \cdot n$$

where:

R'_{WLL} total system rigging capacity.

R_{WLL} reference rigging capacity for a single anchor system (provided in the tables).

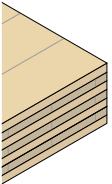
n number of completely load-bearing anchor systems.

MAXIMUM CAPACITY PER ANCHOR POINT (THICKNESS UP TO 180 mm)

CLT thickness [mm]	CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
			$\beta = 0^\circ$ 	$0^\circ < \beta \leq 30^\circ$ 	$30^\circ < \beta \leq 45^\circ$ 	$45^\circ < \beta \leq 60^\circ$
180	HBSP1080 10 x 80	2	270	235	195	140
		4	375	350	310	245
		6	470	445	405	330
	HBSP10100 10 x 100	2	395	325	250	170
		4	550	490	415	305
		6	690	635	555	425
	HBSP10120 10 x 120	2	525	405	300	195
		4	850	700	550	375
		6	1065	920	750	530
	10 x 140 HBSP10140	2	610	455	330	210
		4	1140	870	640	415
		6	1645	1265	940	615
	HBSP10160 10 x 160	2	720	515	365	230
		4	1345	990	715	455
		6	1940	1445	1050	675
	HBSP10180 10 x 180	2	830	575	400	250
		4	1555	1105	785	495
		6	2240	1615	1155	735

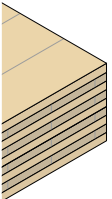
β = lifting angle.

MAXIMUM CAPACITY PER ANCHOR POINT (THICKNESS UP TO 260 mm)

CLT thickness [mm]	CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
			$\beta = 0^\circ$ 	$0^\circ < \beta \leq 30^\circ$ 	$30^\circ < \beta \leq 45^\circ$ 	$45^\circ < \beta \leq 60^\circ$ 
 200-260	HBSP1080 10 x 80	2 	205	190	165	125
		4 	290	280	260	215
		6 	355	345	325	285
	HBSP10100 10 x 100	2 	250	230	200	150
		4 	360	345	315	260
		6 	440	425	400	340
	HBSP10120 10 x 120	2 	320	285	240	175
		4 	460	435	390	310
		6 	560	535	495	415
	HBSP10140 10 x 140	2 	420	360	285	200
		4 	605	550	475	360
		6 	735	690	620	490
	HBSP10160 10 x 160	2 	565	450	340	225
		4 	810	710	585	415
		6 	985	900	775	580
	HBSP10180 10 x 180	2 	785	560	395	250
		4 	1130	915	705	475
		6 	1370	1180	960	675

β = lifting angle.

MAXIMUM CAPACITY PER ANCHOR POINT (THICKNESS UP TO 340 mm)

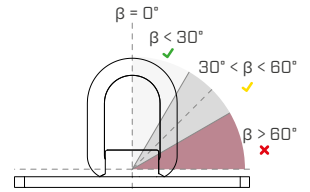
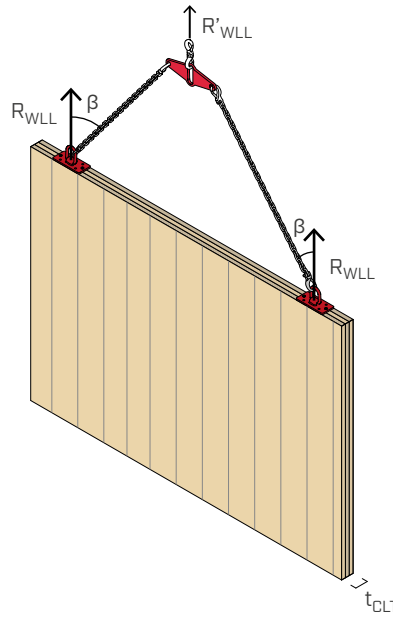
CLT thickness [mm]	CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
			$\beta = 0^\circ$ 	$0^\circ < \beta \leq 30^\circ$ 	$30^\circ < \beta \leq 45^\circ$ 	$45^\circ < \beta \leq 60^\circ$ 
 280-340	HBSP1080 10 x 80	2 	185	175	155	120
		4 	275	265	245	210
		6 	325	315	300	265
	HBSP10100 10 x 100	2 	215	200	180	140
		4 	315	305	285	240
		6 	375	365	350	310
	HBSP10120 10 x 120	2 	255	235	210	160
		4 	370	355	330	275
		6 	440	430	410	360
	HBSP10140 10 x 140	2 	300	275	240	180
		4 	445	420	385	315
		6 	530	510	480	410
	HBSP10160 10 x 160	2 	365	330	275	205
		4 	540	505	455	360
		6 	640	615	570	475
	HBSP10180 10 x 180	2 	450	390	320	225
		4 	660	610	535	410
		6 	785	745	680	550

β = lifting angle.

NOTES:

- When transporting horizontal CLT panels, the ratio of timber thickness to screw length affects the load-bearing capacity. Only three subdivisions of CLT thickness have been made in this sheet for improved readability.
- The load-bearing capacity values given are per single anchorage point. In order to consider all fastening points as fully load-bearing, it is necessary to ensure that the load is evenly distributed over all fastening points by means of suitable compensating systems.

RIGGING CAPACITY | VERTICAL CLT PANEL



TOTAL RIGGING CAPACITY CALCULATION

$$R'_{WLL} = R_{WLL} \cdot n$$

where:

R'_{WLL} total system rigging capacity.
 R_{WLL} reference rigging capacity for a single anchor system (provided in the tables).
 n number of completely load-bearing anchor systems.

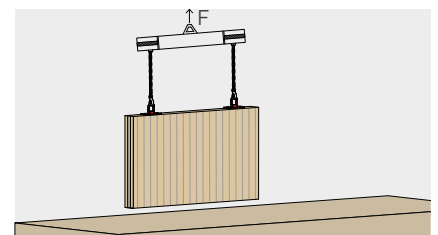
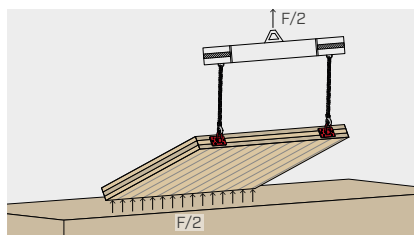
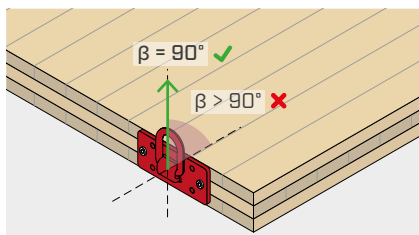
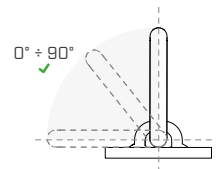
MAXIMUM CAPACITY PER ANCHOR POINT

CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		$\beta = 0^\circ$	$0^\circ < \beta \leq 30^\circ$	$30^\circ < \beta \leq 45^\circ$	$45^\circ < \beta \leq 60^\circ$
HBSP1080 10 x 80	2	235	185	140	90
HBSP10100 10 x 100	2	245	200	155	105
HBSP10120 10 x 120	2	255	215	175	125
HBSP10140 10 x 140	2	260	230	185	130
HBSP10160 10 x 160	2	275	240	195	140
HBSP10180 10 x 180	2	285	250	205	150

β = lifting angle.

RIGGING CAPACITY | LIFTING PANEL/CLT WALL FROM A HORIZONTAL POSITION

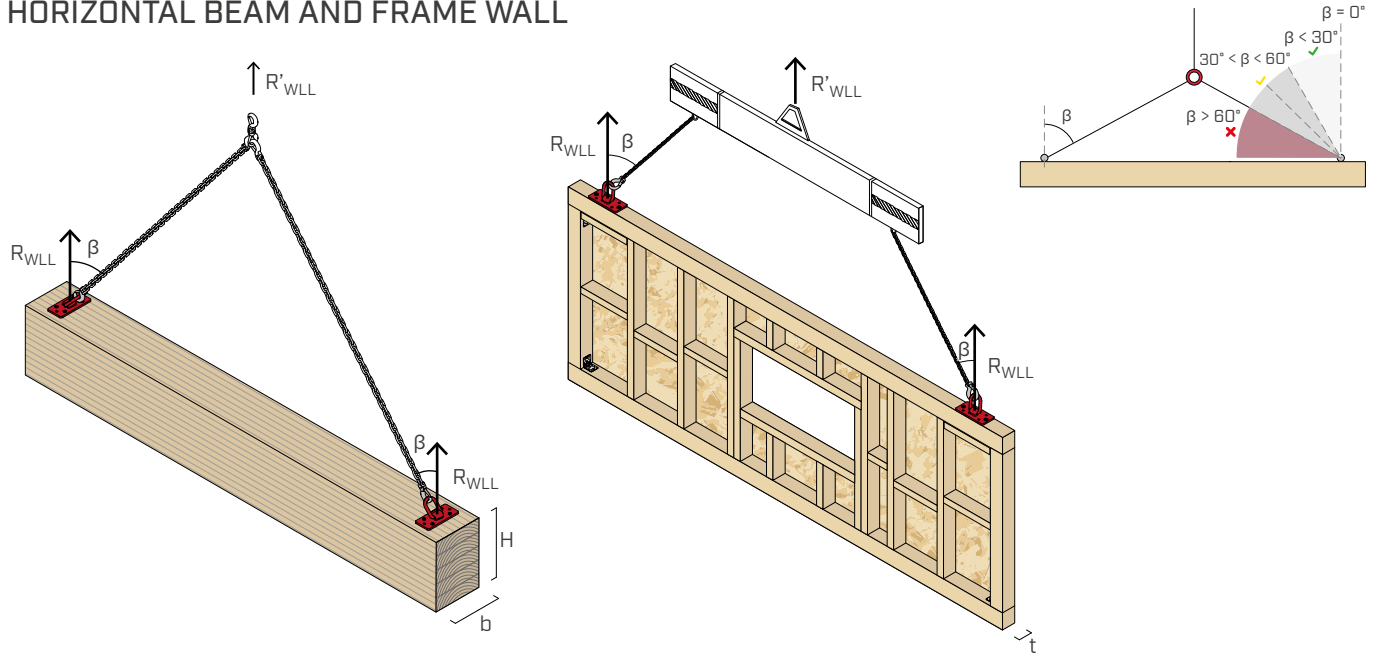
For raising CLT walls from a horizontal to a vertical position, the rigging capacities given in the table above (vertical wall lifting) apply. During the "tipping" phase, however, fixed support of the underside of the wall must be ensured so that half of the load is transferred to the ground.



NOTES:

- Minimum wall thickness: $t_{CLT} \geq 100$ mm.
- Be careful not to insert the screw into the glue of the CLT panel.

HORIZONTAL BEAM AND FRAME WALL



TOTAL RIGGING CAPACITY CALCULATION

$$R'_{WLL} = R_{WLL} \cdot n$$

where:

R'_{WLL} total system rigging capacity.
 R_{WLL} reference rigging capacity for a single anchor system (provided in the tables).
 n number of completely load-bearing anchor systems.

MAXIMUM CAPACITY PER ANCHOR POINT

CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		$\beta = 0^\circ$	$0^\circ < \beta \leq 30^\circ$	$30^\circ < \beta \leq 45^\circ$	$45^\circ < \beta \leq 60^\circ$
HBSP1080 10 x 80	2	240	215	185	140
	4	515	460	385	280
HBSP10100 10 x 100	2	255	235	205	155
	4	550	495	425	315
HBSP10120 10 x 120	2	270	250	220	170
	4	585	535	460	350
HBSP10140 10 x 140	2	295	270	240	185
	4	635	575	500	375
HBSP10160 10 x 160	2	320	295	260	200
	4	685	625	540	410
HBSP10180 10 x 180	2	345	320	280	215
	4	750	680	590	445

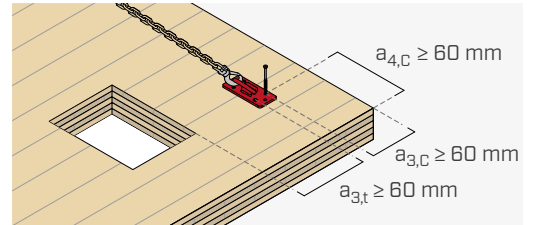
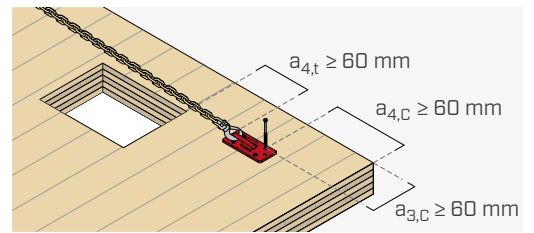
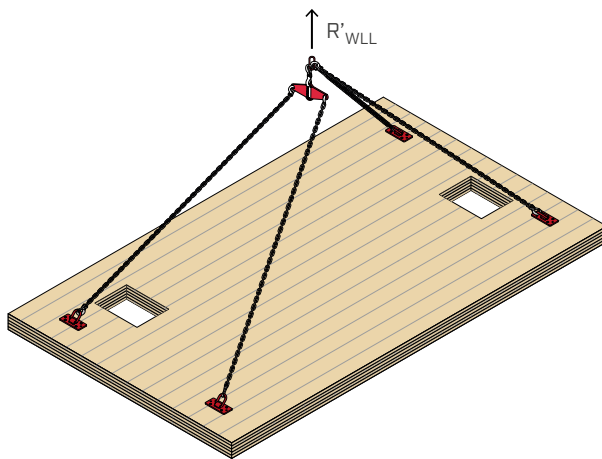
β = lifting angle.

NOTES:

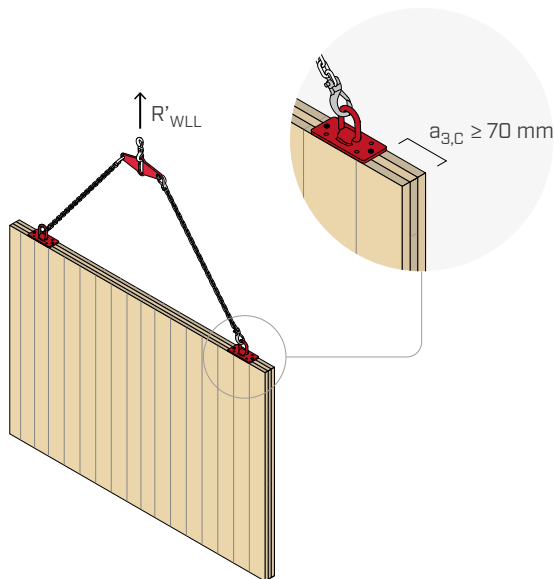
- The values given are calculated considering a timber density of $\rho_k = 385 \text{ kg/m}^3$ (GL24h). For values referring to materials with a timber density of $\rho_k = 350 \text{ kg/m}^3$ (C24), the values can be calculated from those listed in table by applying a reduction factor of 0.8. The values obtained in this way may differ, for safety reasons, from those derived from an exact calculation.
- Minimum beam base $b \geq 240 \text{ mm}$.
- Minimum Timber Frame structure thickness $t \geq 100 \text{ mm}$.

MINIMUM DISTANCES

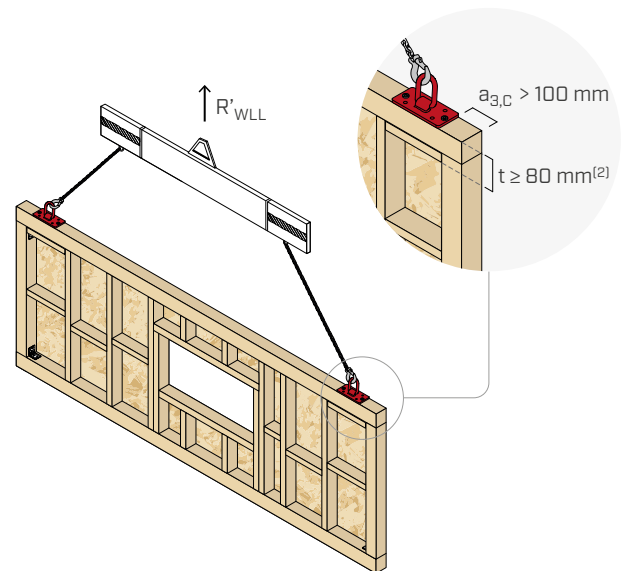
CLT FLOOR



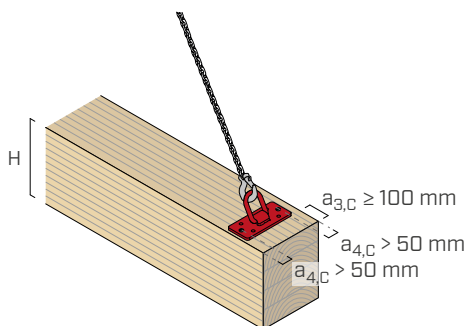
VERTICAL CLT WALL



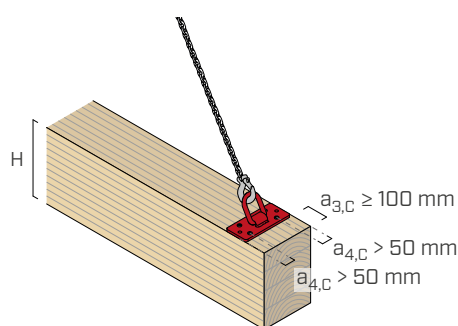
TIMBER FRAME WALL | VERTICAL⁽¹⁾



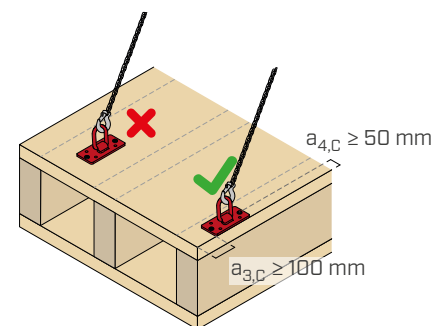
TIMBER BEAM | 2-SCREW FASTENING



TIMBER BEAM- 4-SCREW FASTENING



RIBBED FLOORS



NOTES:

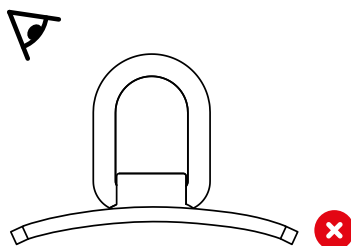
- ⁽¹⁾ For load capacities in Timber Frame applications refer to the rigging capacity table for "horizontal beam" considering possible reduction factors for different timber grades.
- ⁽²⁾ For beams of reduced thickness, consider inserting a reinforcing timber element such that the minimum thickness of fixture is achieved.

- Minimum clearances are in accordance with ETA-11/0030 and based on testing. They are valid unless otherwise specified in this data sheet.
- The minimum distances shown are valid for screws inserted without pre-drilling hole.

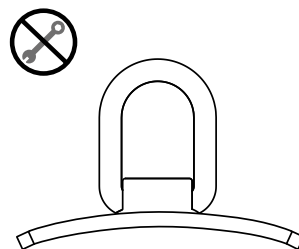
MAINTENANCE



Always follow the instructions in the manual.



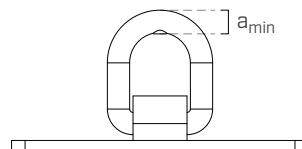
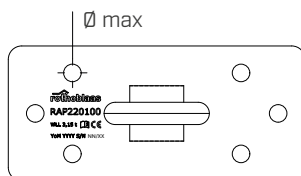
Visual inspection before each use. If there are any defects, the product must not be used again.



Do not perform any repair!

MINIMUM DIMENSIONS

	$\varnothing_{\max}$ [mm]	$a_{\min}$ [mm]
RAP220100	13,5	16,0



GENERAL PRINCIPLES:

- The choice of fastener length is to be based each time on the dimensions of the wooden element, on the fastener's positioning, on the lift angle, on the weight of the load to be lifted and the arrangement of the lifting plate. In all cases, it is recommended that the connectors have greater length and such that the tip does not protrude from the element to be lifted.
- For safety reasons, the screws may only be used once. Once tightened and loaded, the screws must not be loosened and used a second time to secure the transport plate. As soon as the timber element to be transported has been lifted to its final position and the transport plate is no longer needed for this purpose, the screws must be unscrewed and disposed of properly.
- The load capacities provided are calculated in the case of the plate fixed with screws inserted without pre-drilling hole. In the case of screws inserted with pre-drilling hole, greater resistance values can be obtained.
- The rigging capacity values provided are based on calculations made according to DIN EN1995-1-1/NA in accordance with ETA-11/0030 and the results of tests performed. A safety factor of 4.0 was applied to the values provided in accordance with the Machinery Directive.
- A timber density $\rho_k = 385 \text{ kg/m}^3$, of CLT elements equal to $\rho_k = 350 \text{ kg/m}^3$

was considered in the calculation. The values calculated may change for timber species with a different density.

- The lifting plate may only be used by qualified personnel. The user manual (supplied with the product and available at www.rothoblaas.com) must be read and understood before use. The information and instructions contained therein must be followed. If in doubt, contact the Rothoblaas Technical Department before use.
- For lifting plate rigging capacity calculation in installation configurations other than those indicated here, contact Rothoblaas Technical Department.