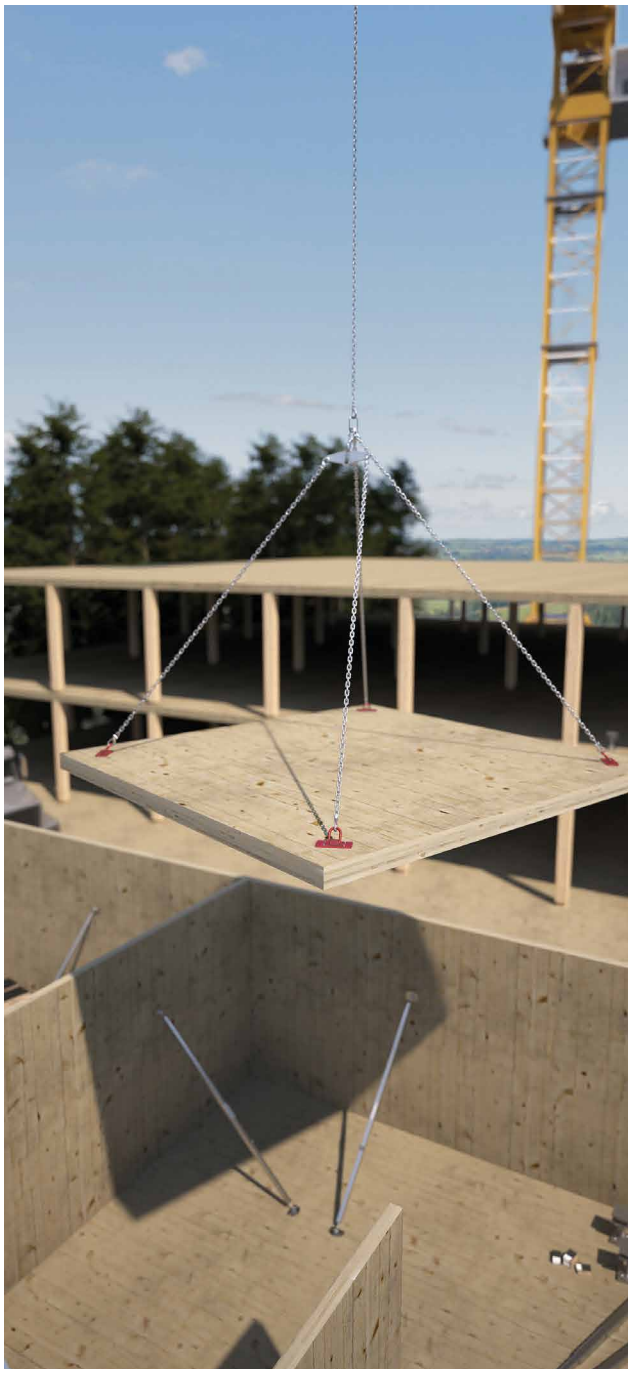
RAPTOR

REUSABLE CE 2006/42/CE

RIGGING DEVICE FOR TIMBER ELEMENTS



UNIVERSAL

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

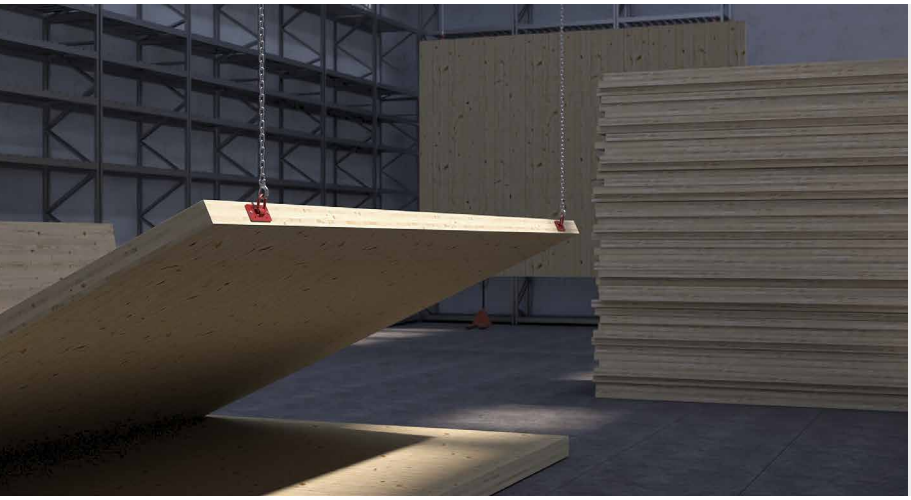
CERTIFIED

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

MANUALS

CODE

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



MATERIAL

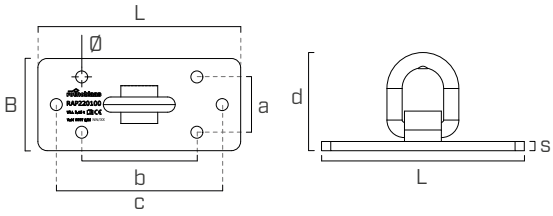
The metal plate and lifting hook are made of steel. Strong and durable, RAPTOR guarantees safe lifting. The red coating that protects the device ensures good visibility and increases the safety of workers on the construction site.

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

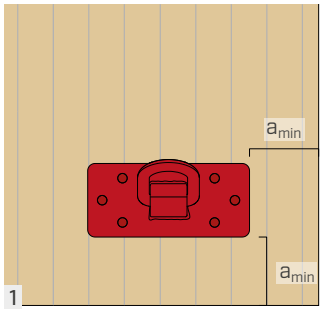


RAPTOR INSTALLATION

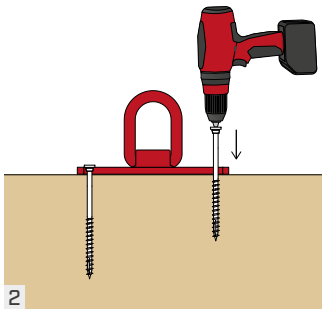
MANUALS

$M_{ins,max}$ = 25 Nm

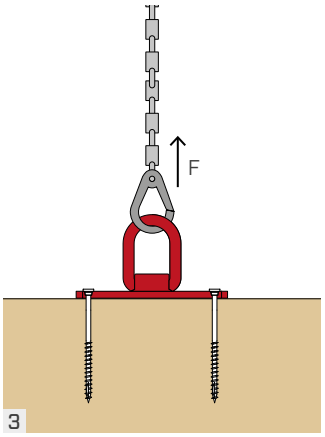
NO IMPACT



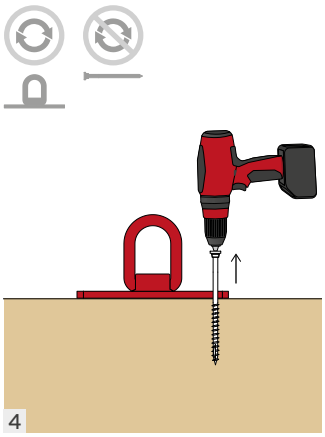
Read the instructions for use carefully and follow the directions. The positioning of the plate on the timber element must comply with the minimum distances.



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



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

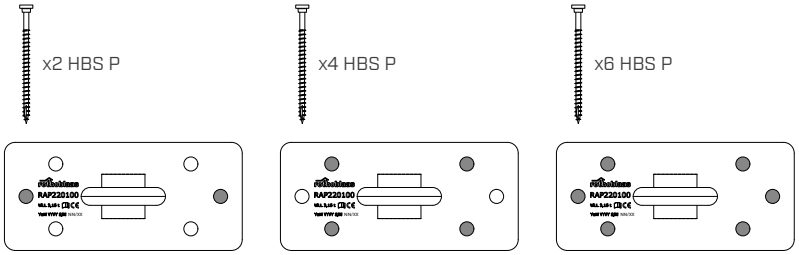


When lifting is complete, remove the screws and dispose of them. The screws can be used for only one handling cycle.

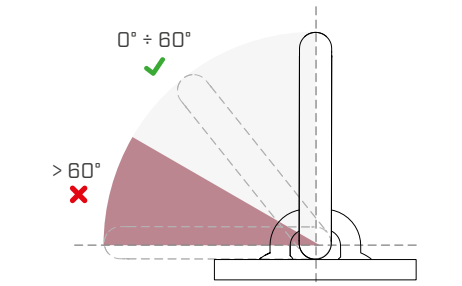
RELATED SCREWS

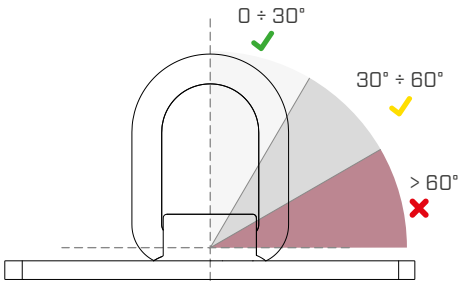
d_1 [mm]	CODE	L [mm]	b [mm]	pcs
10 TX 40	**HBSP1080**	80	60	50
	HBSP10100	100	75	50
	HBSP10120	120	95	50
	HBSP10140	140	110	50
	HBSP10160	160	130	50
	HBSP10180	180	150	50

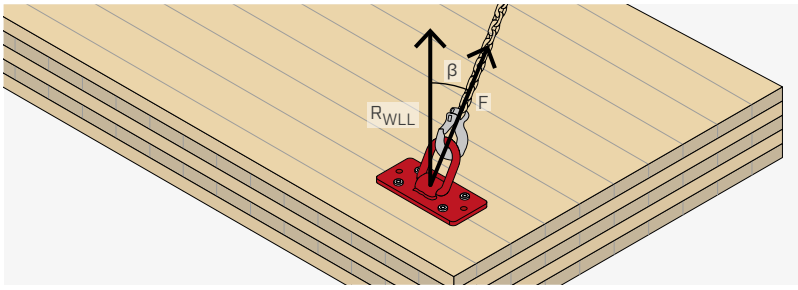
POSSIBLE LAYOUT OF SCREWS

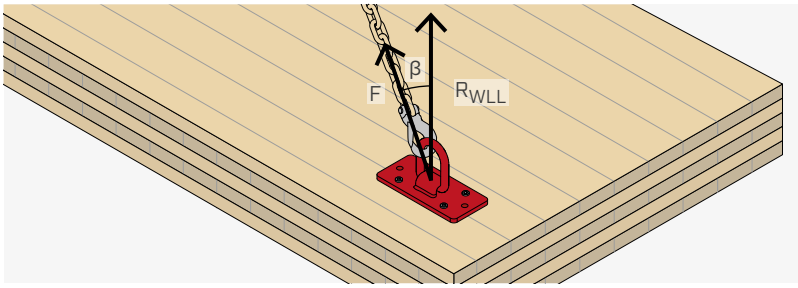


LOAD DIRECTIONS ALLOWED



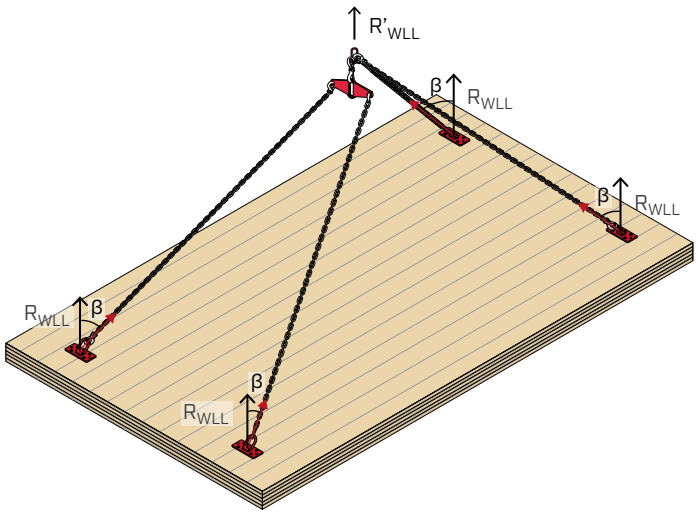


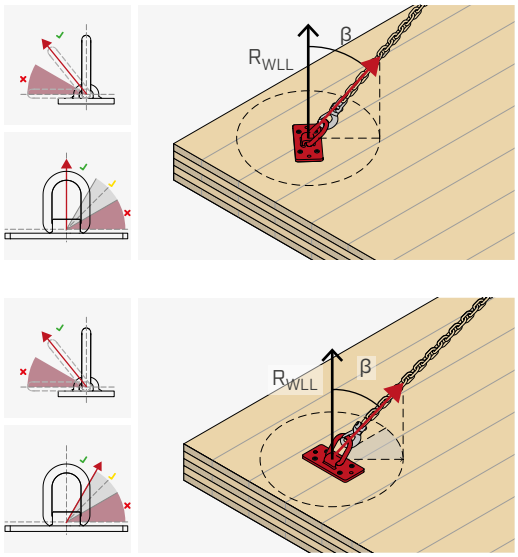




NOTE: β = lifting angle (angle between vertical axis and chain).

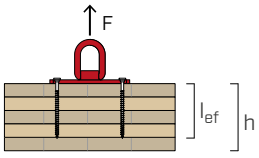
RIGGING CAPACITY | HORIZONTAL CLT PANEL



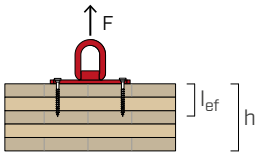


INFLUENCE OF THE RATIO OF SCREW LENGTH TO THE ELEMENT THICKNESS

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



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



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

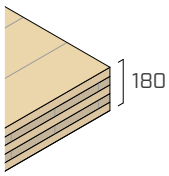
TOTAL RIGGING CAPACITY CALCULATION

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

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.

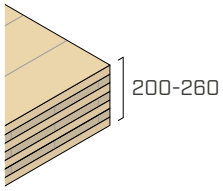
MAXIMUM CAPACITY PER ANCHOR POINT (THICKNESS UP TO **180 mm**)

CLT thickness [mm]	CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
 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.

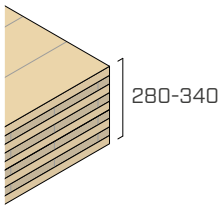
rothoblaas

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] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
 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**)

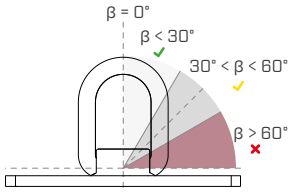
CLT thickness [mm]	CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
 280-340	HBSP1080 10 x 80	2	185	175	155	120
		4	275	265	245	210
		6	325	315	300	265
	HBSP10100 10 x 100	2	215	200	180	140
		4	315	305	285	240
		6	375	365	350	310
	HBSP10120 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

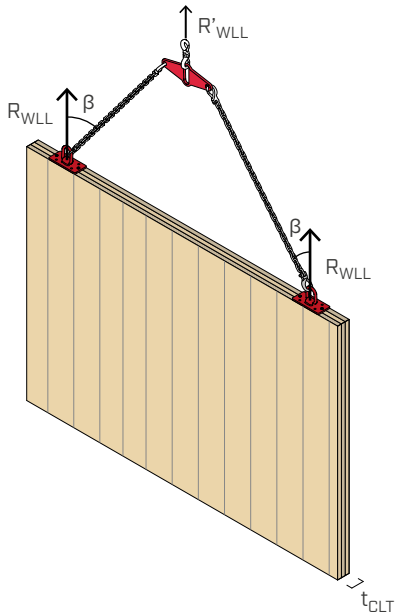
β = lifting angle.

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:

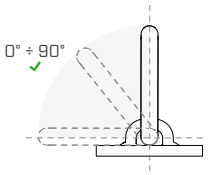
R'_{WLL}	total system rigging capacity.
R_{WLL}	reference rigging capacity for a single anchor system (provided in the tables).
n	number of completely load-bearing anchor systems.

MAXIMUM CAPACITY PER ANCHOR POINT

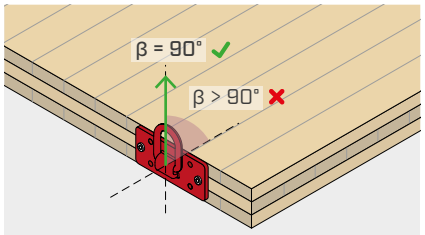
CODE HBS PLATE screw d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSP1080 10 x 80	2	235	185	140	90
HBSP10100 10 x 100	2	290	225	170	110
HBSP10120 10 x 120	2	360	275	200	130
HBSP10140 10 x 140	2	410	305	225	145
HBSP10160 10 x 160	2	475	345	245	155
HBSP10180 10 x 180	2	545	380	265	165

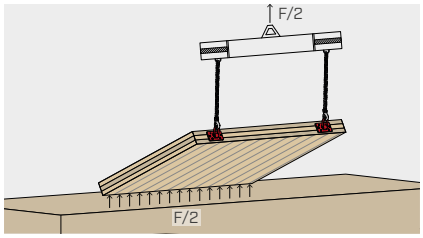
β = lifting angle.

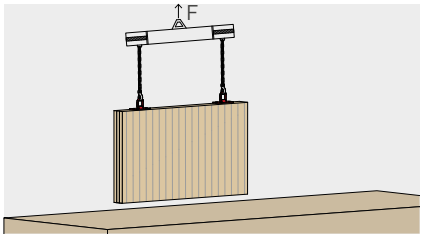
RIGGING CAPACITY | LIFTING PANEL/CLT WALL FROM A HORIZONTAL POSITION



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.



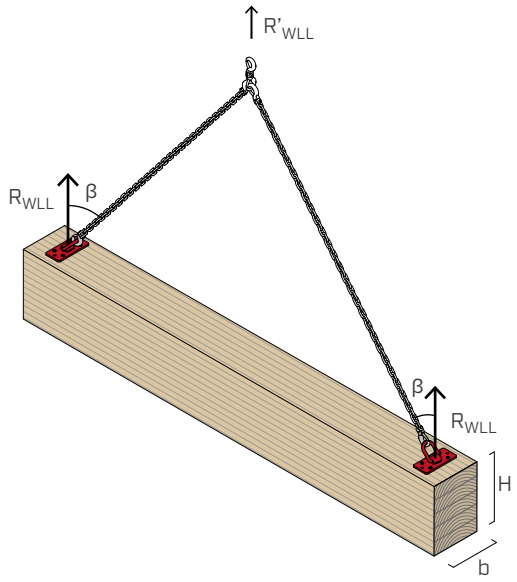


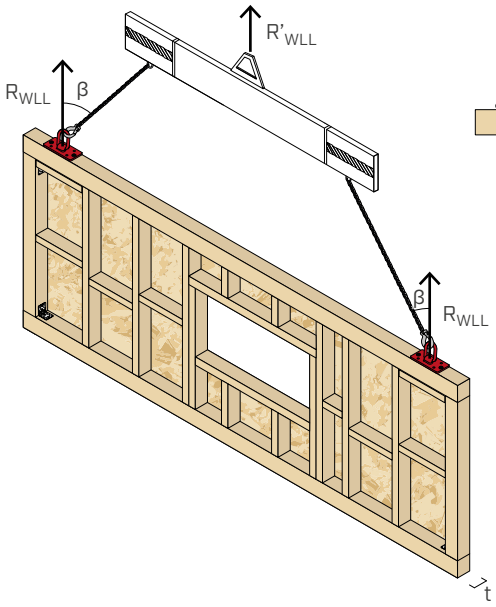


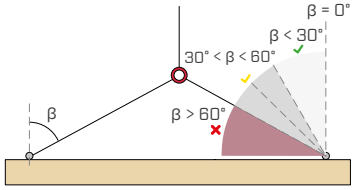
NOTES:

- 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] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSP1080 10 x 80	2	360	295	230	155
	4	525	465	390	285
	6	650	595	515	390
HBSP10100 10 x 100	2	450	355	270	180
	4	560	505	430	315
	6	690	640	565	435
HBSP10120 10 x 120	2	570	430	315	205
	4	600	545	470	350
	6	740	690	615	485
HBSP10140 10 x 140	2	660(*)	485	350	225
	4	645(*)	585	505	380
	6	795(*)	745	665	520
HBSP10160 10 x 160	2	780(*)	550	390	245
	4	700(*)	640	550	410
	6	865(*)	810	720	570
HBSP10180 10 x 180	2	900(*)	615	425	265
	4	765(*)	695	595	445
	6	945(*)	880	785	620

β = lifting angle.

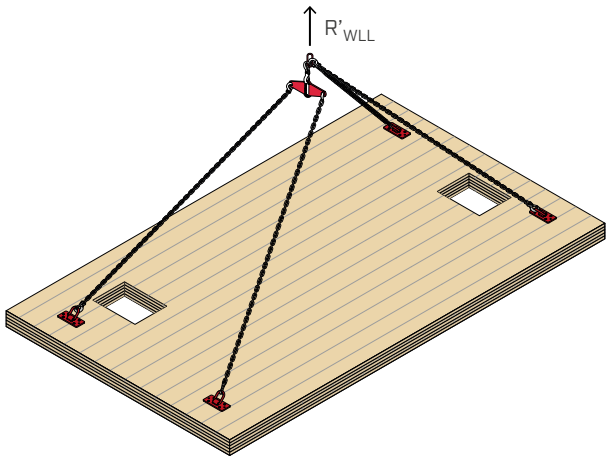
(*) For the indicated configurations, splitting verification of the lifted element may be binding, and the resistance is influenced more by the geometric arrangement of the screws used than by their number.

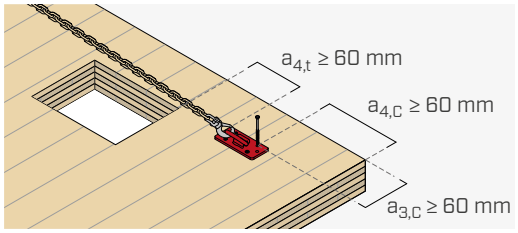
NOTES:

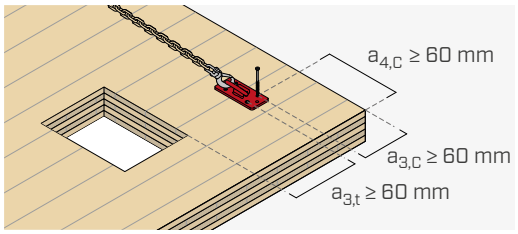
- The values given are calculated considering a timber density of ρ_k = 385 kg/m^3 (GL24h). For values referring to materials with a timber density of ρ_k = 350 kg/m^3 (C24), the values can be calculated from those listed in table by applying a reduction factor of 0,8. The values obtained in this way may differ, for safety reasons, from those derived from an exact calculation.
- Minimum beam base b ≥ 240 mm.
- Minimum Timber Frame structure thickness t ≥ 100 mm.

MINIMUM DISTANCES

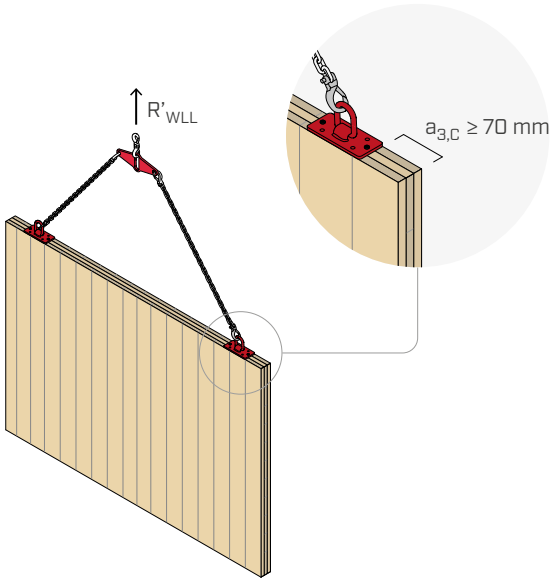
CLT FLOOR



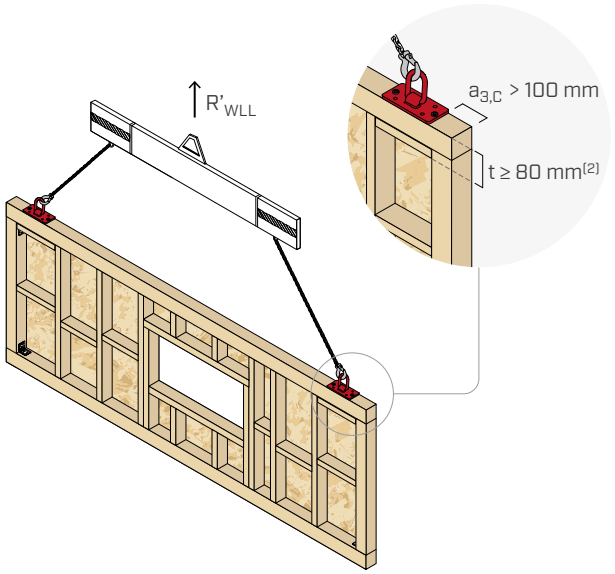




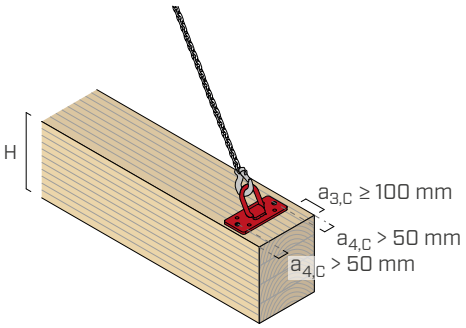
VERTICAL CLT WALL



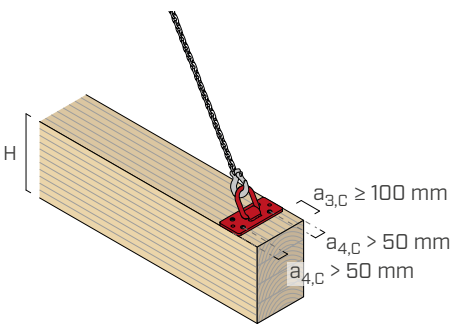
TIMBER FRAME WALL | VERTICAL[1]



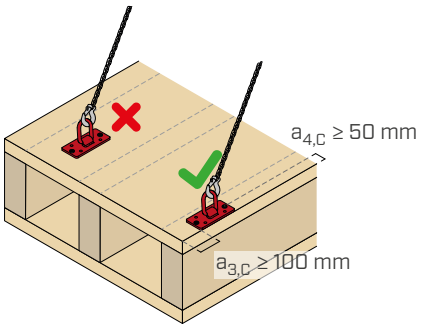
TIMBER BEAM | 2-SCREW FASTENING



TIMBER BEAM- 4-SCREW FASTENING



RIBBED FLOORS



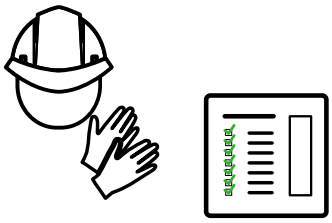
NOTES:

(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.

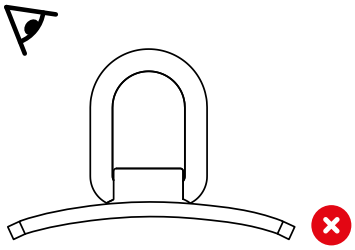
(2) For beams of reduced thickness, consider inserting a reinforcing timber element such that the minimum thickness of fixture is achieved.

- 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.

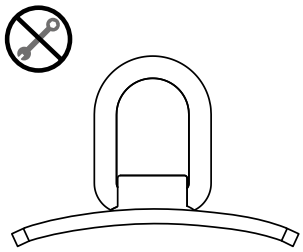
MAINTENANCE



Always follow the instructions in the manual.



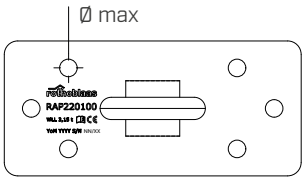
Visual inspection before each use. If there are any defects, the product must not be used again.

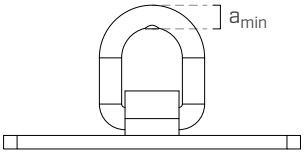


Do not perform any repair!

MINIMUM DIMENSIONS

	$Ø_{max}$ [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 ρ_k = 385 kg/m^3, of CLT elements equal to ρ_k = 350 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.