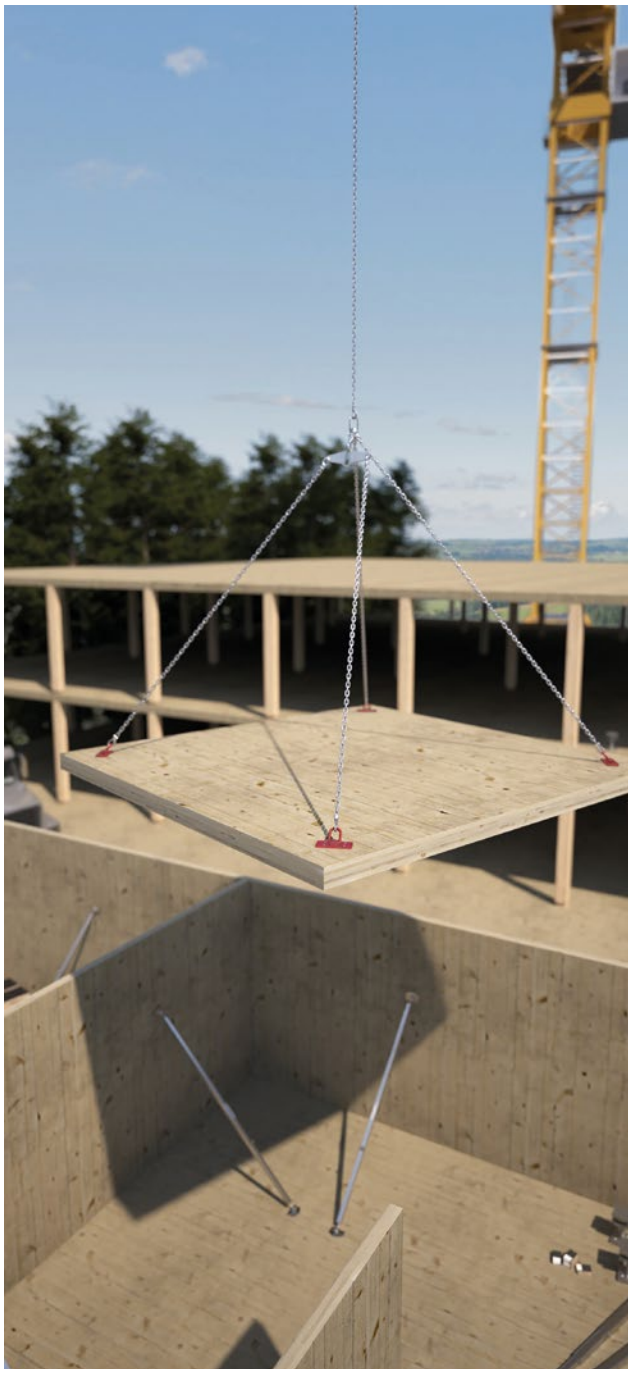
# RAPTOR

REUSABLE 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.

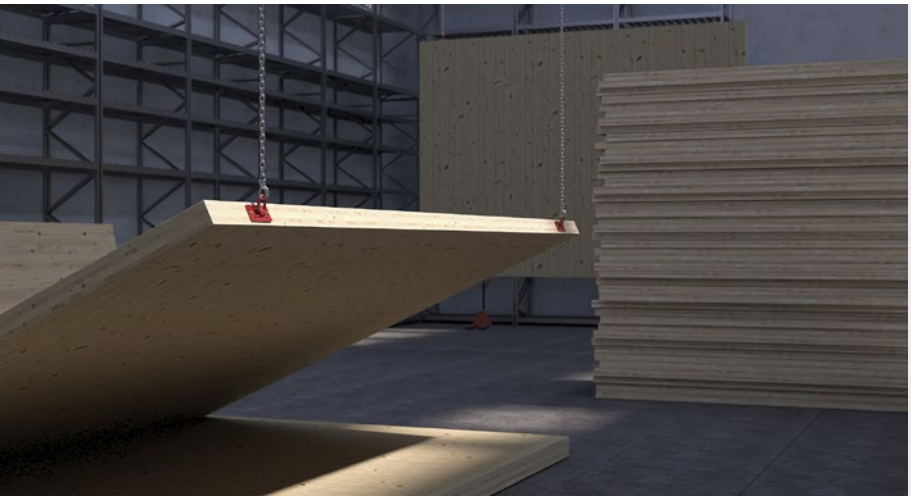
### CERTIFIED

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

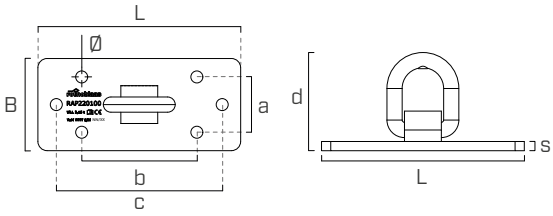
The metal plate and lifting hook are made of steel. Strong and durable, RAPTOR guarantees safe lifting. The red coating that protects the device ensures good visibility and increases the safety of workers on the construction site.

### 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 |

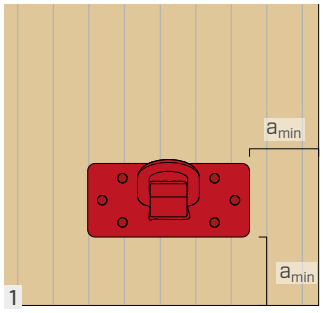



## RAPTOR INSTALLATION

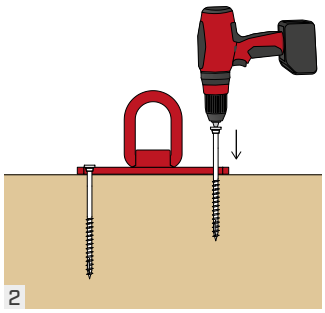
MANUALS

$M_{ins,max}$ = 25 Nm

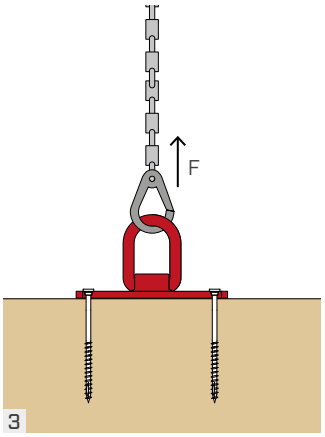
NO IMPACT



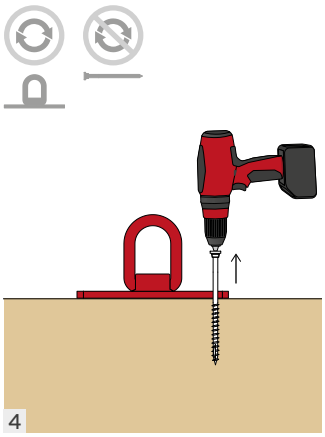

Read the instructions for use carefully and follow the directions. The positioning of the plate on the timber element must comply with the minimum distances.




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.

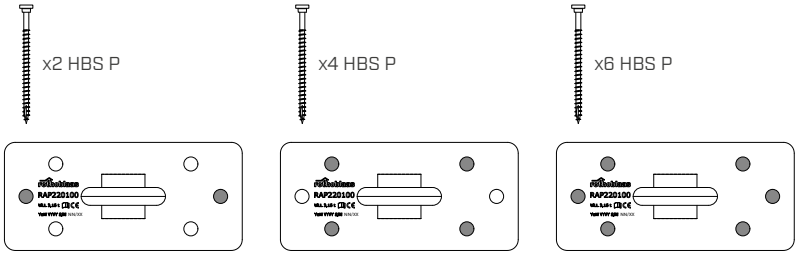



When lifting is complete, remove the screws and dispose of them. The screws can be used for only one handling cycle.

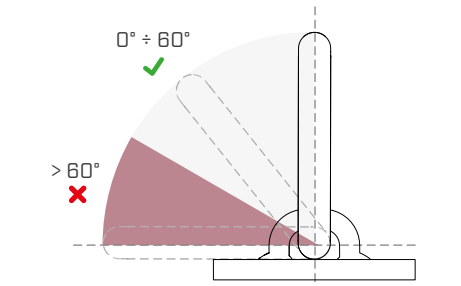
### RELATED SCREWS

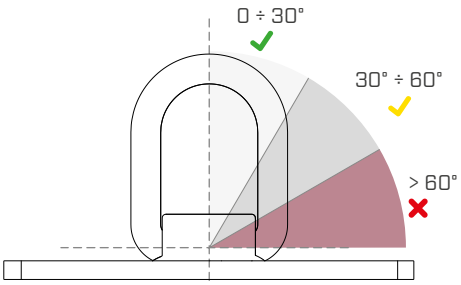
| $d_1$ [mm] | CODE | L [mm] | b [mm] | pcs |
|---|---|---|---|---|
| 10 TX 40 | **HBSP1080** | 80 | 60 | 50 |
| | **HBSP10100** | 100 | 75 | 50 |
| | **HBSP10120** | 120 | 95 | 50 |
| | **HBSP10140** | 140 | 110 | 50 |
| | **HBSP10160** | 160 | 130 | 50 |
| | **HBSP10180** | 180 | 150 | 50 |

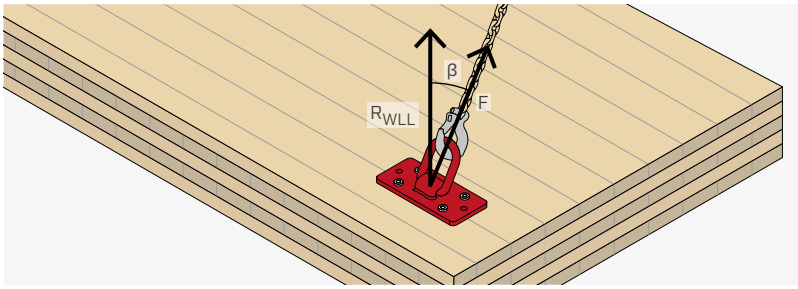
### POSSIBLE LAYOUT OF SCREWS

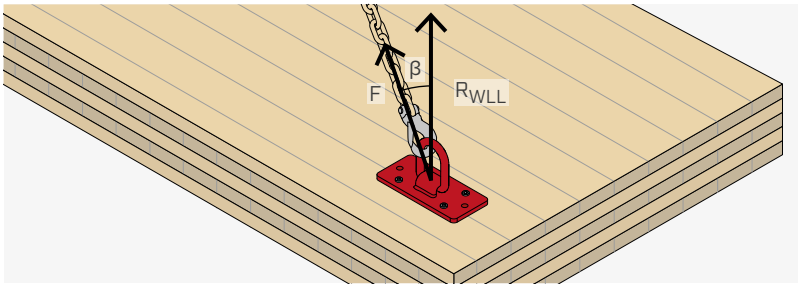



### LOAD DIRECTIONS ALLOWED



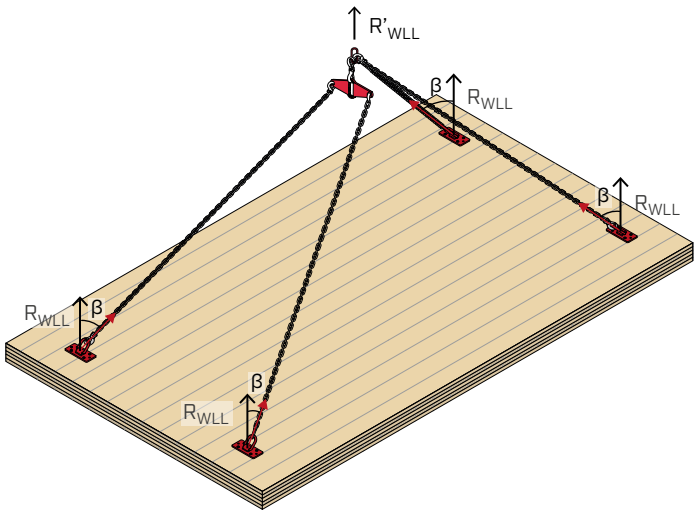



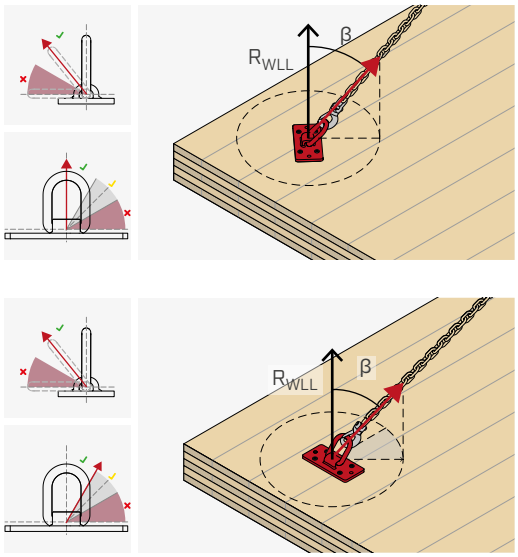




NOTE: β = lifting angle (angle between vertical axis and chain).

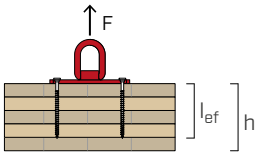
# RIGGING CAPACITY | HORIZONTAL CLT PANEL



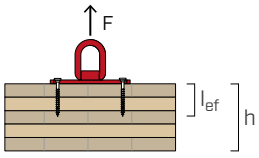




## INFLUENCE OF THE RATIO OF SCREW LENGTH TO THE ELEMENT THICKNESS

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




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




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

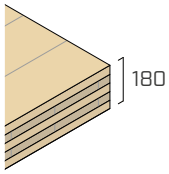
## TOTAL RIGGING CAPACITY CALCULATION

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

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)

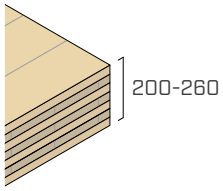
| CLT thickness [mm] | CODE HBS PLATE screw d x L [mm] | no. of screws | capacity $R_{WLL}$ [kg] β = 0° | 0° < β ≤ 30° | 30° < β ≤ 45° | 45° < β ≤ 60° |
|---|---|---|---|---|---|---|
|  180 | HBSP1080 10 x 80 | 2 | 270 | 235 | 195 | 140 |
| | | 4 | 375 | 350 | 310 | 245 |
| | | 6 | 470 | 445 | 405 | 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.



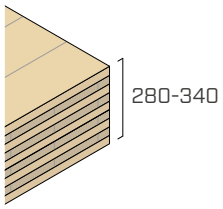
rothoblaas

## 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**)

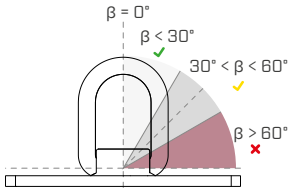
| CLT thickness [mm] | CODE HBS PLATE screw d x L [mm] | no. of screws | capacity $R_{WLL}$ [kg] β = 0° | 0° < β ≤ 30° | 30° < β ≤ 45° | 45° < β ≤ 60° |
|---|---|---|---|---|---|---|
|  280-340 | HBSP1080 10 x 80 | 2 | 185 | 175 | 155 | 120 |
| | | 4 | 275 | 265 | 245 | 210 |
| | | 6 | 325 | 315 | 300 | 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 |

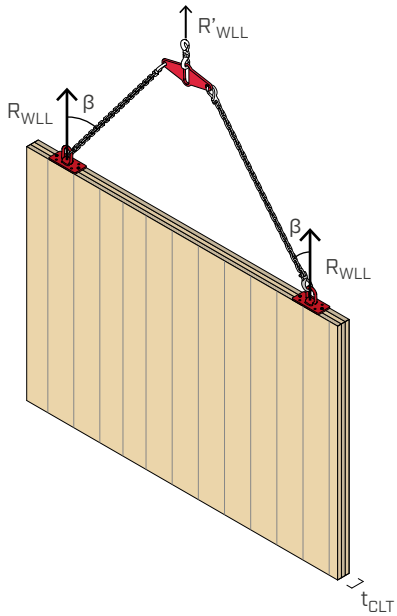
β = lifting angle.

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:

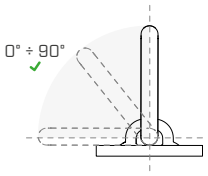
| | |
|---|---|
| $R'_{WLL}$ | total system rigging capacity. |
| $R_{WLL}$ | reference rigging capacity for a single anchor system (provided in the tables). |
| n | number of completely load-bearing anchor systems. |

### MAXIMUM CAPACITY PER ANCHOR POINT

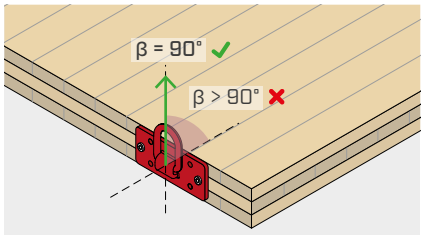
| CODE<br>HBS PLATE screw<br>d x L [mm] | no. of screws | capacity $R_{WLL}$ [kg] | | | |
|---|---|---|---|---|---|
| | | β = 0° | 0° < β ≤ 30° | 30° < β ≤ 45° | 45° < β ≤ 60° |
| HBSP1080<br>10 x 80 | 2 | 235 | 185 | 140 | 90 |
| HBSP10100<br>10 x 100 | 2 | 290 | 225 | 170 | 110 |
| HBSP10120<br>10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

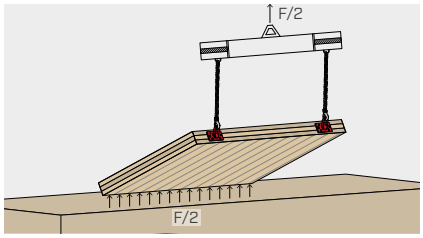
β = lifting angle.

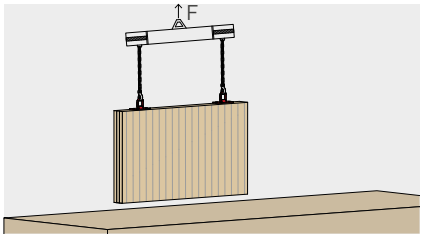
## RIGGING CAPACITY | LIFTING PANEL/CLT WALL FROM A HORIZONTAL POSITION




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.



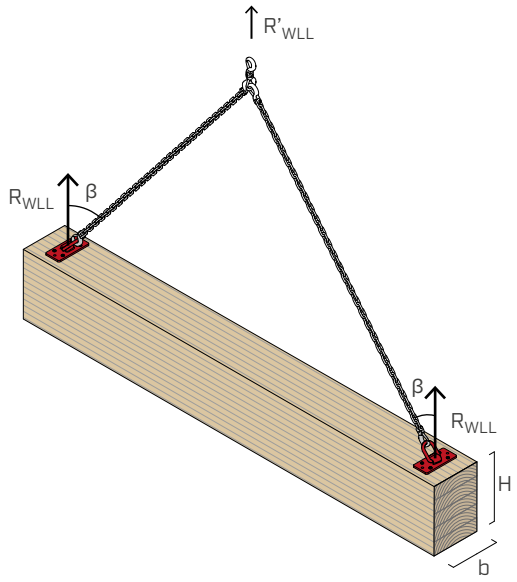



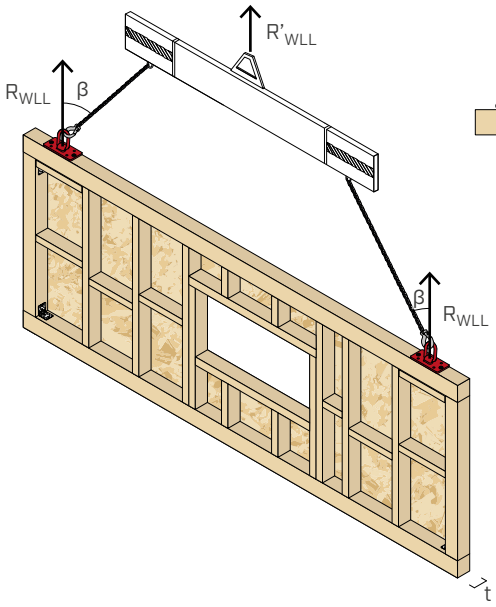



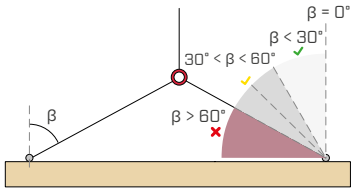

**NOTES:**

- 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 | 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 |

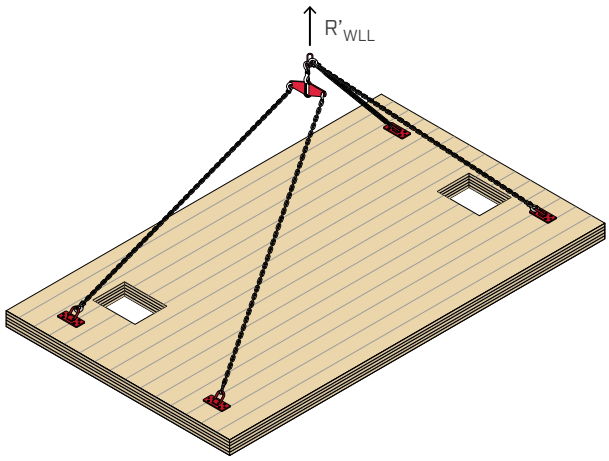
β = lifting angle.

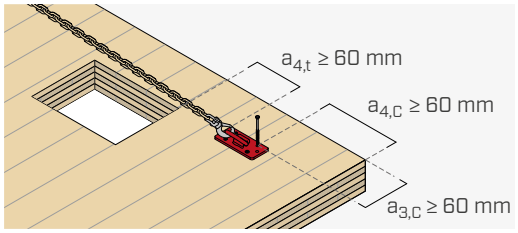
### NOTES:

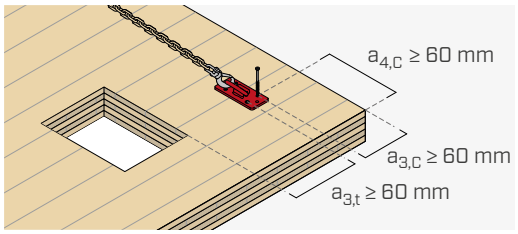
- The values given are calculated considering a timber density of $\rho_k$ = 385 kg/m$^3$ (GL24h). For values referring to materials with a timber density of $\rho_k$ = 350 kg/m$^3$ (C24), the values can be calculated from those listed in table by applying a reduction factor of 0,8. The values obtained 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

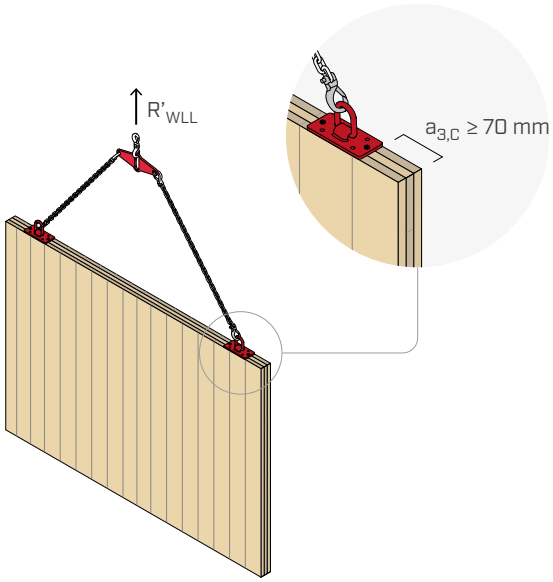
## CLT FLOOR



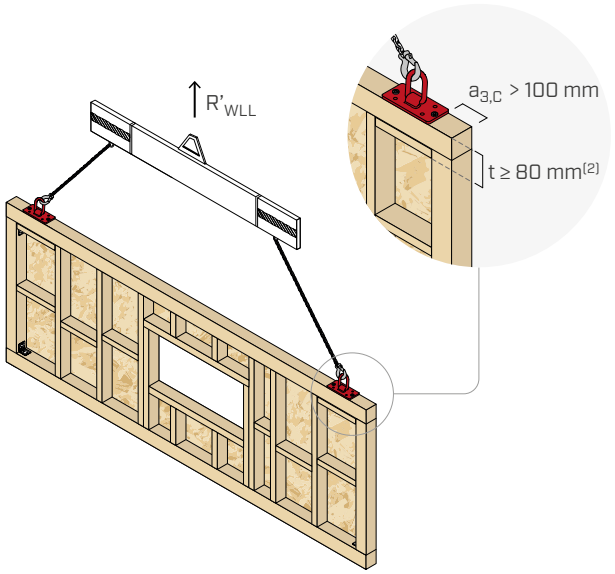



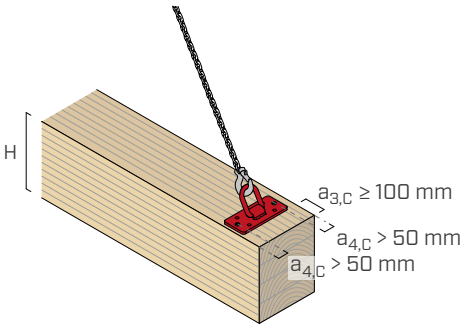

## VERTICAL CLT WALL



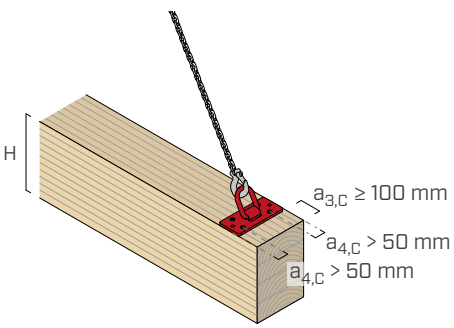

## TIMBER FRAME WALL | VERTICAL[1]



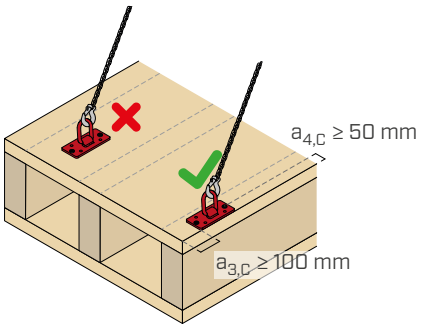

## TIMBER BEAM | 2-SCREW FASTENING




## TIMBER BEAM- 4-SCREW FASTENING




## RIBBED FLOORS



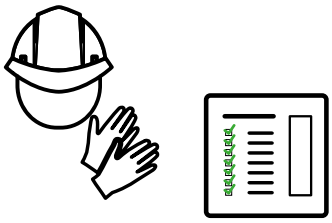

NOTES:

(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.

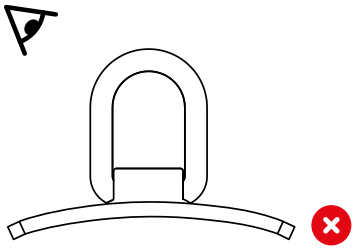
(2) For beams of reduced thickness, consider inserting a reinforcing timber element such that the minimum thickness of fixture is achieved.

- 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.

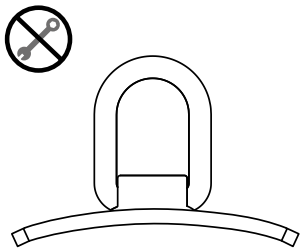
## MAINTENANCE



Always follow the instructions in the manual.



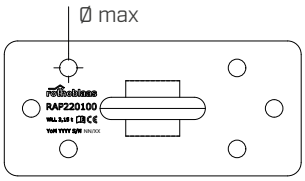
Visual inspection before each use. If there are any defects, the product must not be used again.

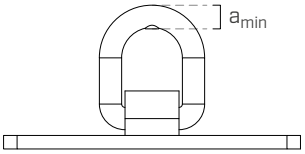


Do not perform any repair!

### 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 $\rho_k$ = 385 kg/m$^3$, of CLT elements equal to $\rho_k$ = 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.