RAPTOR

OSHA 1926.753(e)(2) COMPLIANT
ASME BTH-1-2023 COMPLIANT
CE 2006/42/CE
REUSABLE

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 inserted in the RAPTOR symmetrically.

VERSATILE

RAPTOR is suitable for many different handling contexts. The lifting ring can be used for both vertical and horizontal lifts.

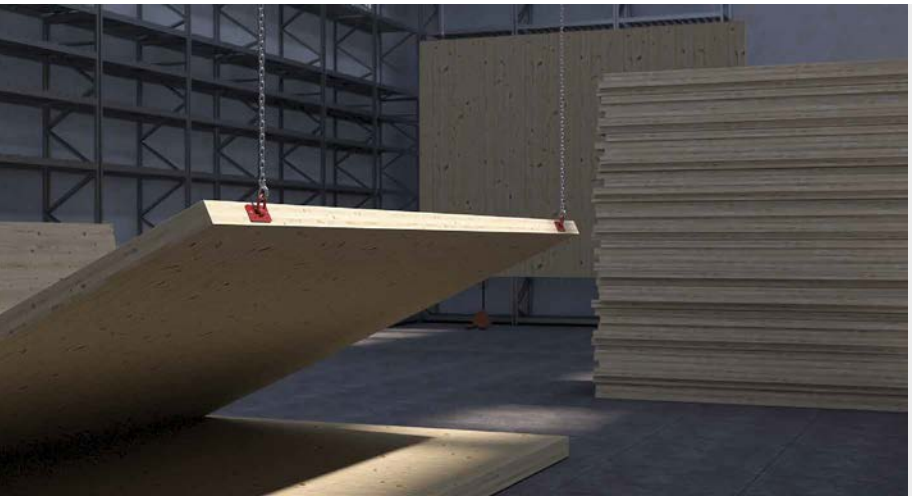
CERTIFIED

The plate is compliant to OSHA Section 1926.753(e)(2) and ASME BTH01-2023 and certified according to the EU Machinery Directive 2006/42/EC for lifts weights exceeding 3 tons (6600 lb).

MANUALS

PRODUCT CODE

CODE	max. capacity	suitable screws	pcs
RAP220100	3150 kg | 6945 lb	HBS PLATE Ø10 mm | 0.40 in	1



MATERIAL

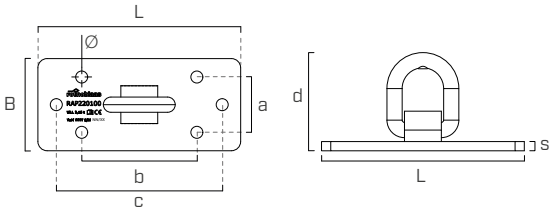
The metal plate and lifting ring are made of steel S355. Strong and durable, RAPTOR guarantees safe lifting when used as directed. The red coating that protects the device ensures good visibility and increases the safety of workers on the construction site.

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 [mm] [in]	L [mm] [in]	s [mm] [in]	Ø [mm] [in]	a [mm] [in]	b [mm] [in]	c [mm] [in]	d [mm] [in]
RAP220100	100	220	10	13	60	125	180	107
	4	8 5/8	3/8	1/2	2 3/8	4 15/16	7 1/8	4 3/16

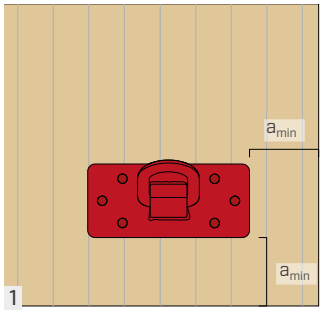


RAPTOR INSTALLATION

MANUALS

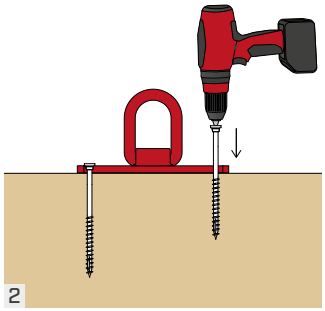
$M_{ins,max}$ = 25 Nm | 18 ft-lbs

NO IMPACT



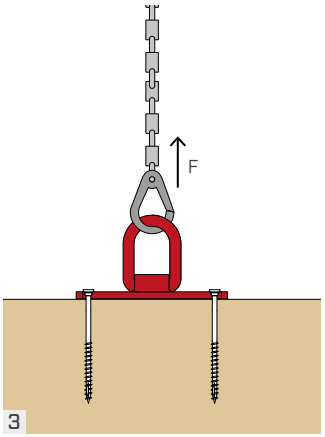
1

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.



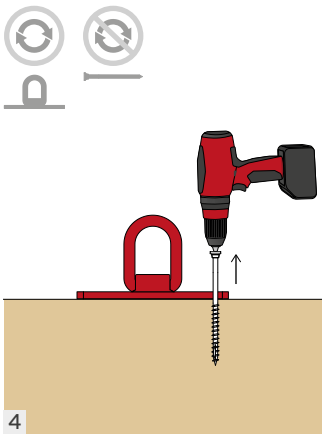
2

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

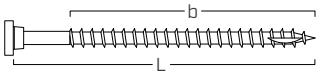
Connect the crane hook and carefully lift the timber element. Be careful about the allowed lifting directions and corresponding maximum lifting capacities.



4

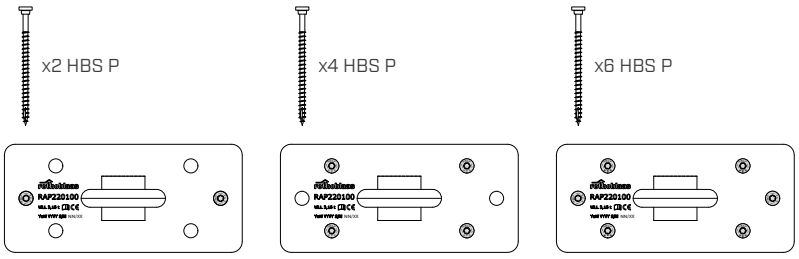
When lifting is complete, remove the screws and dispose of them. The screws can be used for only one handling cycle.

RELATED SCREWS

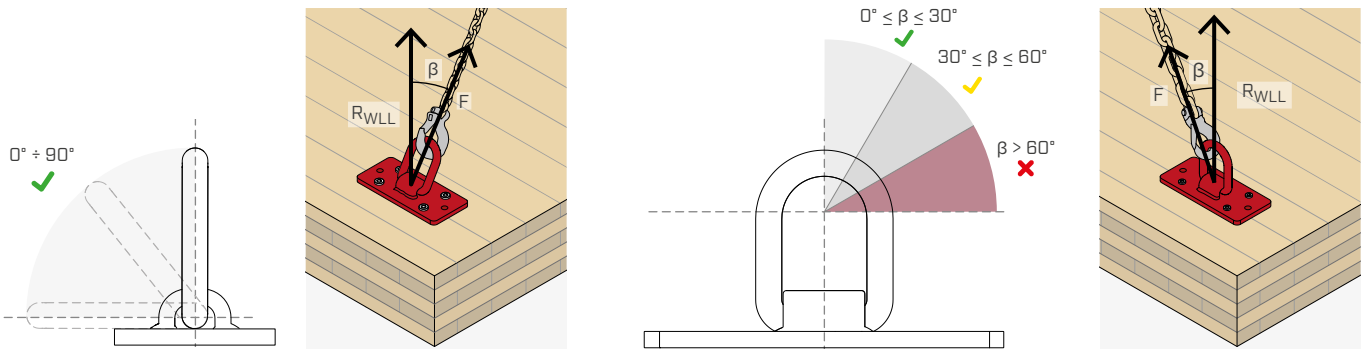


d_1 [mm] [in]	CODE	L [mm]	L [in]	b [mm]	b [in]	pcs
10 **0.40** TX 40	HBSP1080	80	3 1/8	60	2 3/8	50
	HBSP10100	100	4	75	2 15/16	50
	HBSP10120	120	4 3/4	95	3 3/4	50
	HBSP10140	140	5 1/2	110	4 3/8	50
	HBSP10160	160	6 1/4	130	5 1/8	50
	HBSP10180	180	7 1/8	150	6	50

POSSIBLE LAYOUT OF SCREWS

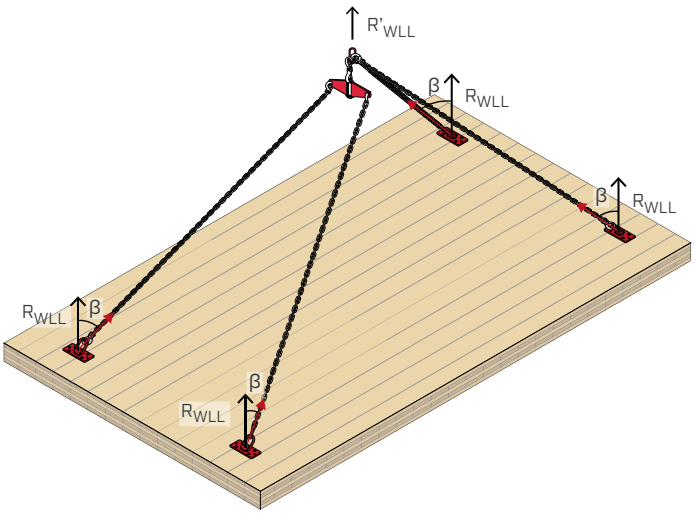


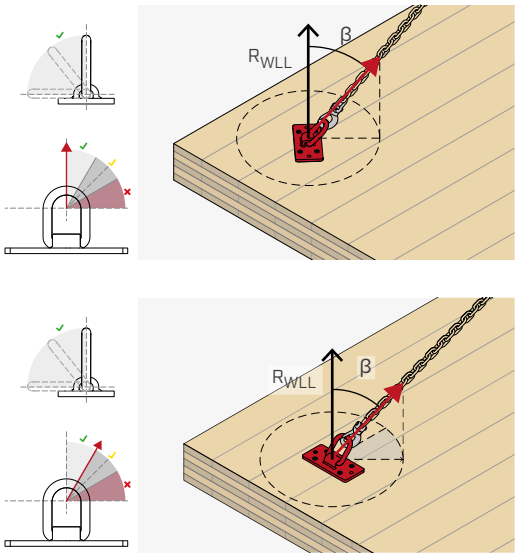
LOAD DIRECTIONS ALLOWED



β = lifting angle (angle between vertical axis and chain)
R_{WLL} = working load limit for one anchor point

RIGGING CAPACITY | HORIZONTAL CLT PANEL





TOTAL RIGGING CAPACITY CALCULATION

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

where:

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

MAXIMUM CAPACITY PER ANCHOR POINT (G = 0.42)

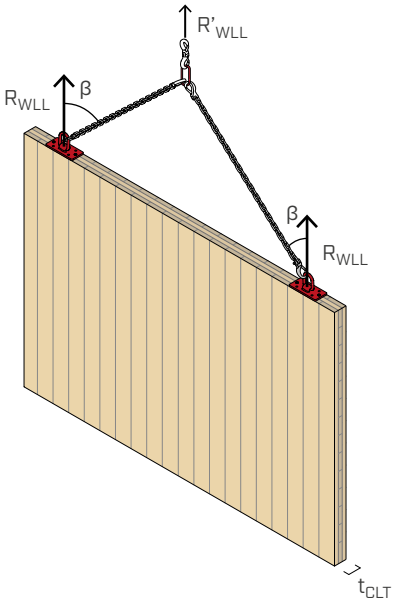
HBS PLATE screw CODE	d x L [mm] [in]	no. of screws	capacity R_{WLL} [lb] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSP1080	10 x 80 0.40 x 3 1/8	2	1069	804	580	367
		4	2139	1608	1160	735
		6	3208	2412	1740	1102
HBSP10100	10 x 100 0.40 x 4	2	1390	983	678	415
		4	2780	1966	1357	831
		6	4170	2949	2035	1246
HBSP10120	10 x 120 0.40 x 4 3/4	2	1818	1149	738	430
		4	3635	2297	1476	861
		6	5453	3446	2215	1291
HBSP10140	10 x 140 0.40 x 5 1/2	2	2139	1251	771	438
		4	4277	2503	1543	876
		6	6416	3754	2314	1315
HBSP10160	10 x 160 0.40 x 6 1/4	2	2566	1367	806	446
		4	5132	2733	1611	892
		6	6945	4100	2417	1337
HBSP10180	10 x 180 0.40 x 7 1/8	2	2994	1463	832	451
		4	5988	2926	1664	903
		6	6945	4389	2496	1354

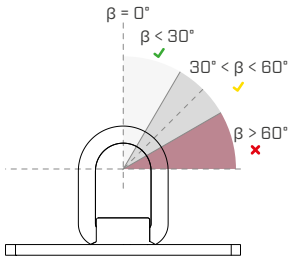
β = lifting angle.

NOTES

- 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.
- For conversion to other Specific Gravities, see conversion table on page 9.

RIGGING CAPACITY | VERTICAL CLT PANEL FROM EDGE





TOTAL RIGGING CAPACITY CALCULATION

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

where:

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

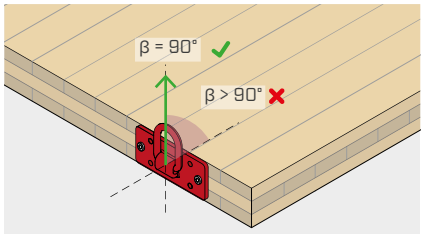
MAXIMUM CAPACITY PER ANCHOR POINT (G = 0.42)

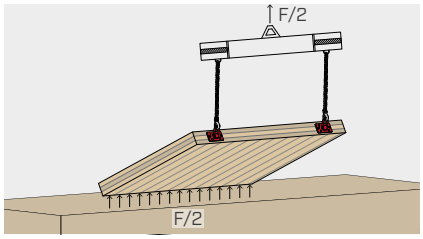
HBS PLATE screw CODE	d x L [mm] [in]	no. of screws	capacity R_{WLL} [lb] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSP1080	10 x 80 **0.40 x 3 1/8**	2	716	539	389	246
HBSP10100	10 x 100 **0.40 x 4**	2	931	659	454	278
HBSP10120	10 x 120 **0.40 x 4 3/4**	2	1218 (981)	770	495	288
HBSP10140	10 x 140 **0.40 x 5 1/2**	2	1433 (981)	838	517	294
HBSP10160	10 x 160 **0.40 x 6 1/4**	2	1719 (981)	916 (850)	540	299
HBSP10180	10 x 180 **0.40 x 7 1/8**	2	2006 (981)	980 (850)	558	302

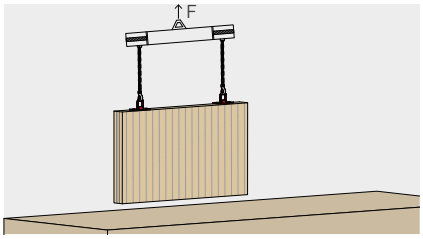
β = lifting angle.
The values in parenthesis refer to the situation, in which the CLT panel is lifted from a horizontal to a vertical position and a reduced capacity applies.

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 CLT panel from edge) apply. In cases where the uplifting is governing, the reduced value is written in brackets. 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.



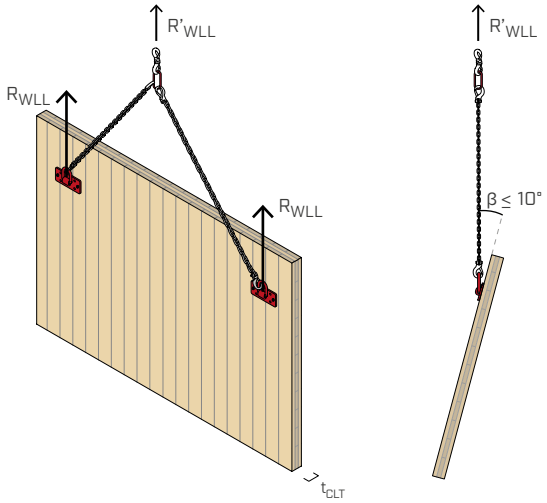




NOTES

- Minimum panel thickness: $t_{CLT} \geq 100$ mm | 4".
- Be careful not to insert the screw along the glueline of the CLT panel.
- An end-grain factor $C_{eg} = 0.67$ according to NDS was assumed, regardless of whether the screw is installed parallel or perpendicular to the grain.
- For conversion to other Specific Gravities, see conversion table on page 9.

RIGGING CAPACITY | VERTICAL CLT PANEL FROM FACE



TOTAL RIGGING CAPACITY CALCULATION

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

where:

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

MAXIMUM CAPACITY PER ANCHOR POINT (G = 0.42)

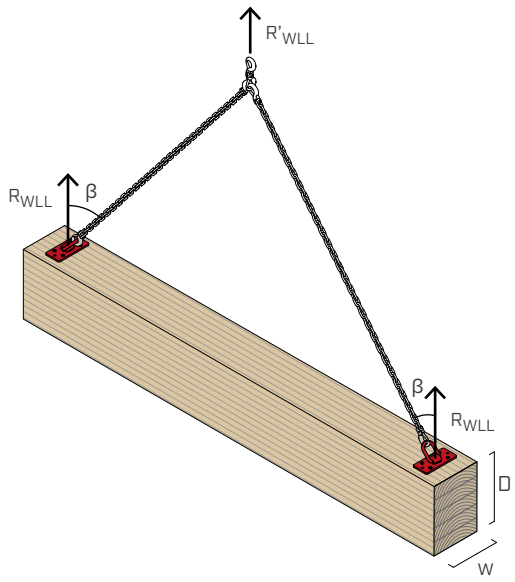
HBS PLATE screw		no. of screws	capacity R_{WLL} [lb]			
CODE	d x L [mm] [in]		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSP1080	10 x 80 0.40 x 3 1/8	2	632	547	447	316
		4	1264	1095	894	632
		6	1896	1642	1341	948
HBSP10100	10 x 100 0.40 x 4	2	696	602	492	348
		4	1391	1205	984	696
		6	2087	1807	1476	1044
HBSP10120	10 x 120 0.40 x 4 3/4	2	696	602	492	348
		4	1391	1205	984	696
		6	2087	1807	1476	1044
HBSP10140	10 x 140 0.40 x 5 1/2	2	696	602	492	348
		4	1391	1205	984	696
		6	2087	1807	1476	1044
HBSP10160	10 x 160 0.40 x 6 1/4	2	696	602	492	348
		4	1391	1205	984	696
		6	2087	1807	1476	1044
HBSP10180	10 x 180 0.40 x 7 1/8	2	696	602	492	348
		4	1391	1205	984	696
		6	2087	1807	1476	1044

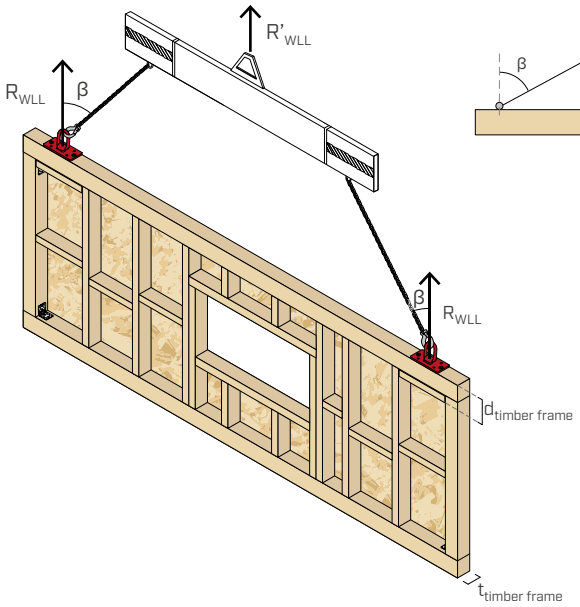
β = lifting angle.

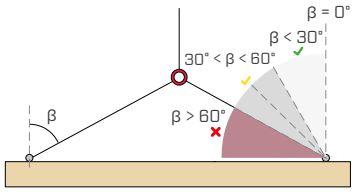
NOTES

- Minimum panel thickness: $t_{CLT} \geq 80$ mm | 3 1/8".
- For conversion to other Specific Gravities, see conversion table on page 9.
- Due to one-sided fastening, the wall will tilt slightly. It is recommended to fasten the transport plates as high up as possible while maintaining the minimum distances. The wall may be inclined by a maximum of 10° to the vertical.

RIGGING CAPACITY | HORIZONTAL BEAM AND FRAME WALL







TOTAL RIGGING CAPACITY CALCULATION

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

where:

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

MAXIMUM CAPACITY PER ANCHOR POINT (G = 0.42)

HBS PLATE screw		no. of screws	capacity R_{WLL} [lb]			
CODE	d x L [mm] [in]		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSP1080	10 x 80 0.40 x 3 1/8	2	1069	924	753	532
		4	2139	1849	1507	1064
		6	3208	2773	2260	1596
HBSP10100	10 x 100 0.40 x 4	2	1390	1117	851	564
		4	2780	2235	1703	1129
		6	4170	3352	2554	1693
HBSP10120	10 x 120 0.40 x 4 3/4	2	1818	1336	948	593
		4	3635	2673	1896	1185
		6	5453	4009	2844	1778
HBSP10140	10 x 140 0.40 x 5 1/2	2	2139	1478	1003	607
		4	4277	2955	2007	1215
		6	6416	4433	3010	1822
HBSP10160	10 x 160 0.40 x 6 1/4	2	2566	1641	1062	622
		4	5132	3282	2124	1244
		6	6945	4924	3187	1866
HBSP10180	10 x 180 0.40 x 7 1/8	2	2994	1782	1109	633
		4	5988	3564	2217	1266
		6	6945	5347	3326	1899

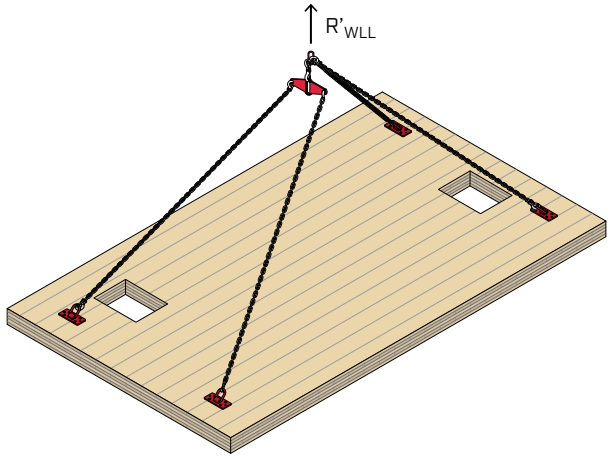
β = lifting angle.

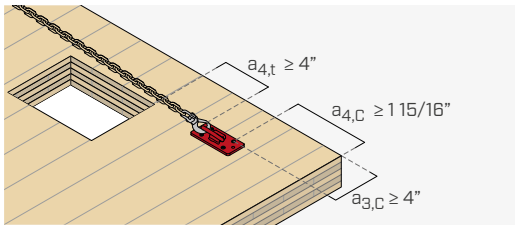
NOTES

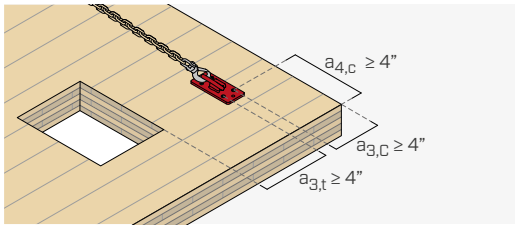
- Minimum beam width w ≥ 240 mm | 9 1/2".
- Minimum beam depth D ≥ 80 mm | 3 1/8".
- Minimum timber frame structure thickness $t_{timber\ frame}$ ≥ 100 mm | 4".
- Minimum timber frame structure depth $d_{timber\ frame}$ ≥ 80 mm | 3 1/8"
- For conversion to other Specific Gravities, see conversion table on page 9.
- For beams of reduced thickness, consider inserting a reinforcing timber element such that the minimum thickness of fixture is achieved.

MINIMUM DISTANCES

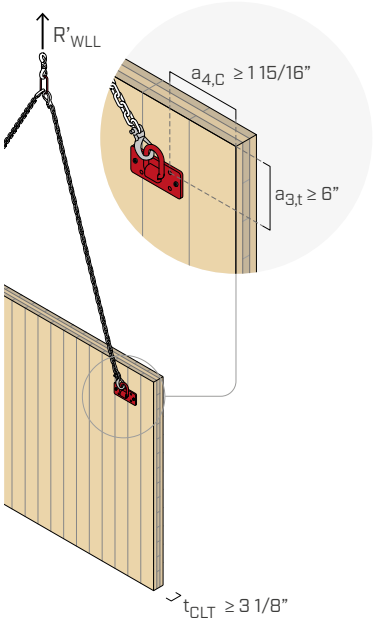
CLT FLOOR



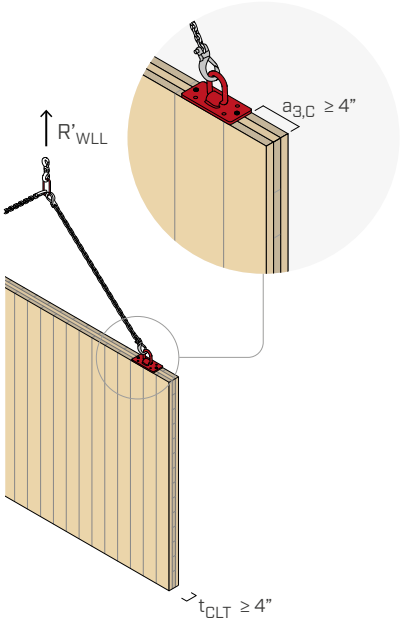




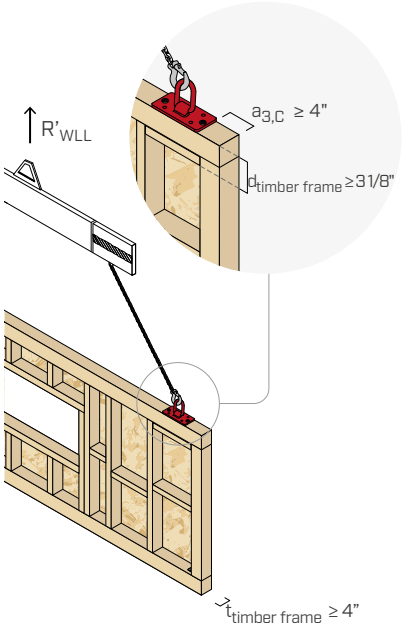
VERTICAL CLT WALL-TO-FACE



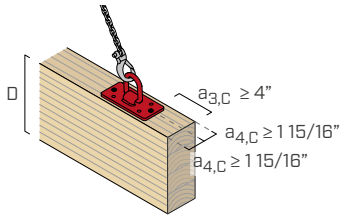
VERTICAL CLT WALL-TO-EDGE



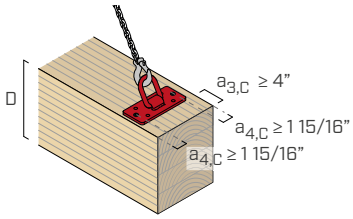
TIMBER FRAME WALL | VERTICAL



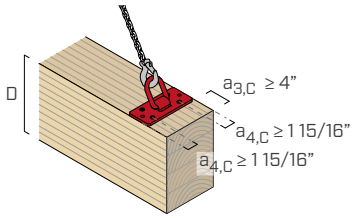
TIMBER BEAM - 0° 2 SCREW FASTENING



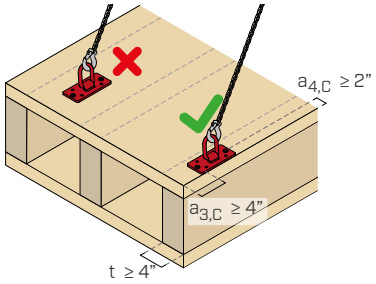
TIMBER BEAM - 90° 2 & 6-SCREW FASTENING



TIMBER BEAM - 90° 4-SCREW FASTENING



RIBBED FLOORS



NOTES

- Minimum distances are in accordance with ESR-4645 and based on testing. They are valid for G < 0.50 unless otherwise specified in this data sheet.
- The minimum distances shown are valid for screws inserted without pre-drilling. In case of predrilling according to ESR-4645 the minimum distances can be reduced.

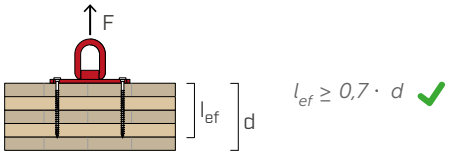
CONVERSATION TABEL FOR DIFFERENT SPECIFIC GRAVITIES

When using wood with specific gravity different than G = 0.42 the WLL values in the tabels below should be multiplied with the following modification Factors

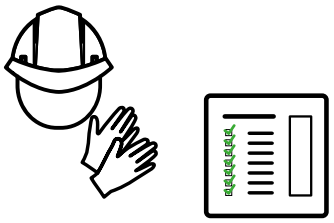
Specific Gravity [G]	Modification Factor
0.35	0.80
0.42	**1.00**
0.49	1.10
0.55	1.20

INFLUENCE OF THE RATIO OF SCREW LENGTH TO THE ELEMENT THICKNESS

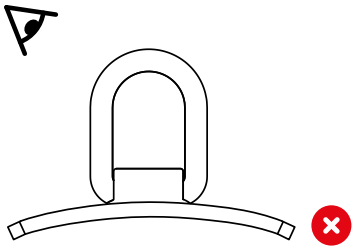
For lifting application with loading component perpendicular to the grain, to achive the maximum capacity of the lifting system, it is recomanded to use screws with a length greater than 0,7·d (d = depth of the wood element) to avoid splitting failure. If this is not respected, additional checks can be done according to DIN EN1995-1-1/NA.



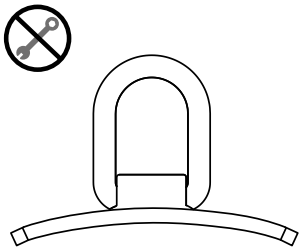
MAINTENANCE



Always follow the instructions in the manual.



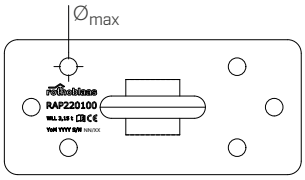
Visual inspection before each use. If there are any defects, the product must not be used again.

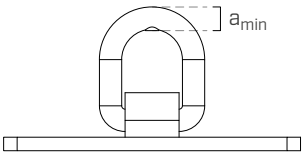


Do not perform any repair!

MINIMUM DIMENSIONS

	$Ø_{max}$		a_{min}	
	[mm]	[in]	[mm]	[in]
RAP220100	13,5	**0.53**	16,0	**0.63**





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 than the minimum required, but 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 rigging capacity values (WLL) provided are based on calculations made according to ICC-ES Evaluation Report ESR-4645, the 2018 NDS and the results of tests performed. A safety factor of 5.0 was applied to the values provided in accordance with OSHA section 1926.753(e)(2).
- A Specific Gravity of G = 0.42 was considerd in the calculation. For application with different timber species and Specific Gravity the conversion tabel with the modification factors shall be used.
- All values of screw capacity are adjusted by a dynamic acceleration factor of 1/1.1 and a load duration factor CD = 1.25.
- For all calcuation it is conservatively considerd a load-to-grain angle of 90°.
- The rigging capacitiy values (WLL) provided are calculated in the case of the plate fixed with screws inserted without pre-drilling. However, they are also valid in the case of predrilling according to ESR-4645.
- To conform with the fatigue limits of Service Class 0 of ASME BTH01-2023, no RAPTOR lifting device may be used for more than 20,000 load cycles.
- For lifting plate rigging capacity calculation in installation configurations other than those indicated here, contact Rothoblaas Technical Department.
- 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.