RAPTOR

REUSABLE CE 2006/42/CE

RIGGING DEVICE FOR TIMBER ELEMENTS

UNIVERSAL

RAPTOR can be installed with configurations that make 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.

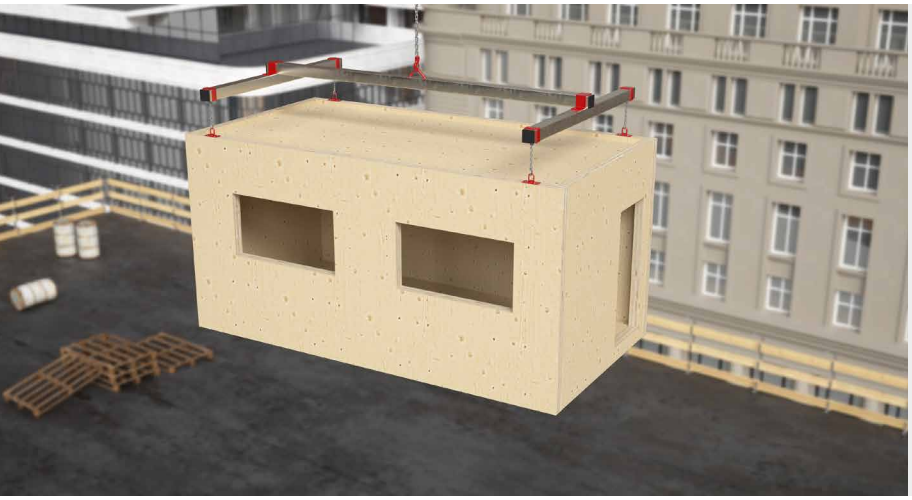
VERSATILE

The device is suitable for many different handling configurations. It can be used to work with any inclination of the chain, working effectively in both tension and shear, but also in intermediate configurations.

CERTIFIED

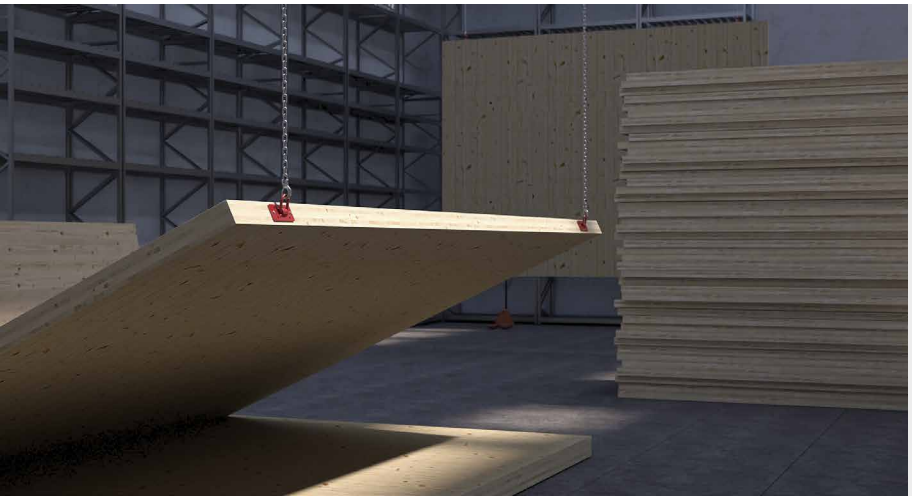
The plate is certified according to the Machinery Directive 2006/42/EC for weights exceeding 3 tonnes.

MANUALS



FIELDS OF USE

- CLT panels for floor or wall
- Solid timber or glulam beams
- Prefabricated timber frame walls
- Ribbed structural elements
- Prefabricated modular structures
- Special structures



MATERIAL

The robust and durable metal plate and steel lifting hook ensure safe lifting. The red coating improves protection and visibility, enhancing construction site safety.

CONFIGURATIONS

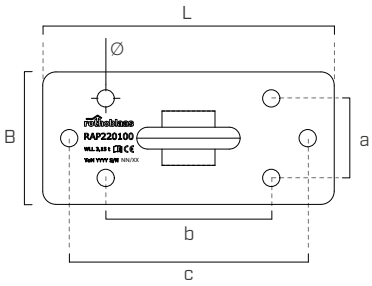
The presence of 6 holes allows 3 installation configurations (compatible with HBS PLATE or VGS screws with HUS washer in various lengths), thus guaranteeing optimised installation in different lifting conditions and materials.

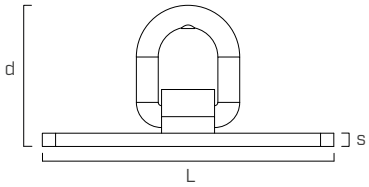
CODE

CODE	max. capacity	suitable screws	pcs
RAP220100	3150 kg	HBS PLATE / HBS PLATE EVO Ø10 mm VGS Ø11 mm (+ HUS10)	1

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

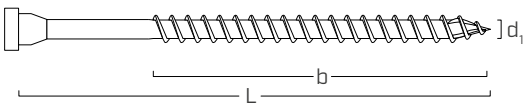




COMPATIBLE SCREWS

HBS PL EVO - pan head screw for plates

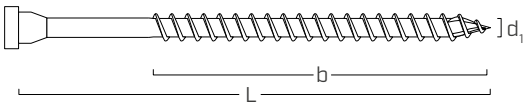
C4 EVO COATING



d_1 [mm]	CODE	L [mm]	b [mm]	pcs
10 TX 40	**HBSPLEVO1060**	60	52	50

HBS PL - pan head screw for plates

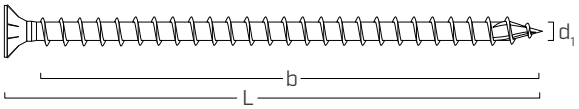
Zn ELECTRO PLATED



d_1 [mm]	CODE	L [mm]	b [mm]	pcs
10 TX 40	**HBSPL1080**	80	60	50
	HBSPL10100	100	75	50
	HBSPL10120	120	95	50
	HBSPL10140	140	110	50
	HBSPL10160	160	130	50
	HBSPL10180	180	150	50

VGS - full thread screw with countersunk head

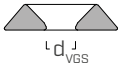
Zn ELECTRO PLATED



d_1 [mm]	CODE	L [mm]	b [mm]	pcs
11 TX 50	**VGS1180**	80	70	25
	VGS11100	100	90	25
	VGS11125	125	115	25
	VGS11150	150	140	25
	VGS11175	175	165	25
	VGS11200	200	190	25
	VGS11225	225	215	25
	VGS11250	250	240	25
	VGS11275	275	265	25
	VGS11300	300	290	25
	VGS11325	325	315	25
	VGS11350	350	340	25
	VGS11375	375	365	25
	VGS11400	400	390	25

The VGS screw can only be installed in combination with HUS washer.

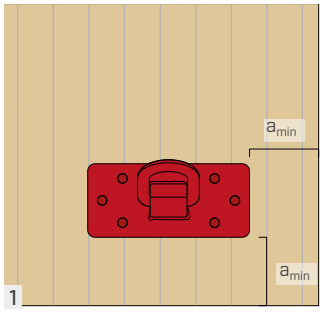
HUS - turned washer



CODE	d_{VGS} [mm]	pcs
HUS10	11	50

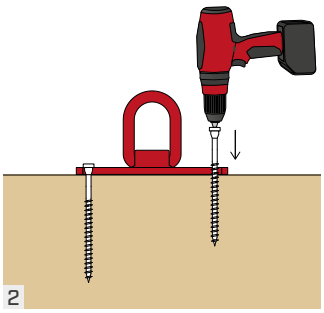
RAPTOR INSTALLATION

MANUALS

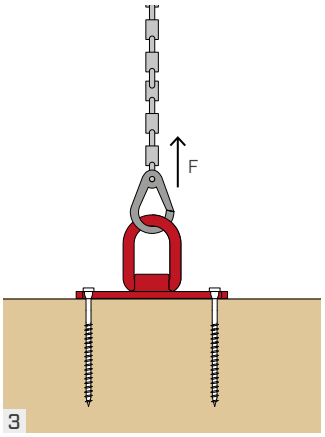


Read the instructions for use carefully and follow the directions. The positioning of the plate on the timber element must comply with the minimum recommended distances.

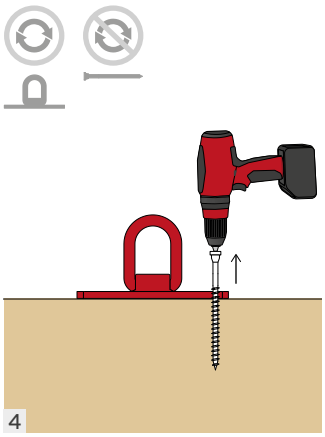
HBSPL Ø10 $M_{ins,max}$ = 35 Nm
VGS Ø11 $M_{ins,max}$ = 40 Nm



Length and quantity of screws depend on the application and the weight of the element to be moved. It is recommended to tighten them in accordance with the tightening torques indicated in the relevant installation instructions.

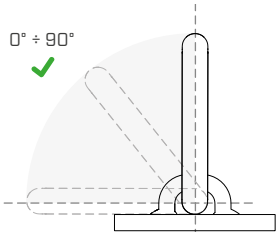


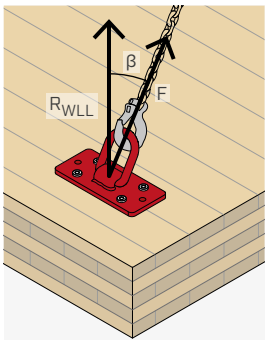
Connect the crane hook and carefully lift the element. Be careful at the corners and about the allowed lifting directions and corresponding maximum lifting capacities.

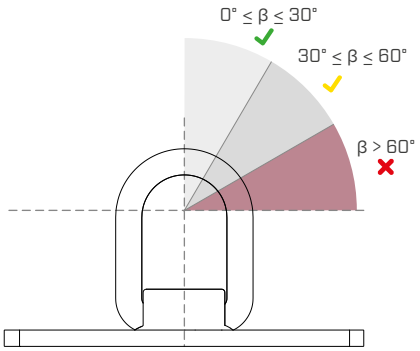


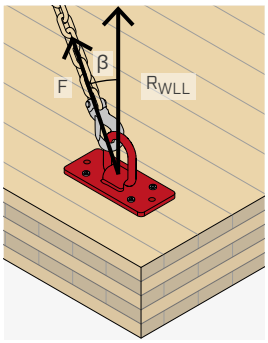
When lifting is complete, remove the screws and dispose of them. The screws can be used for only one handling cycle.

LOAD DIRECTIONS ALLOWED





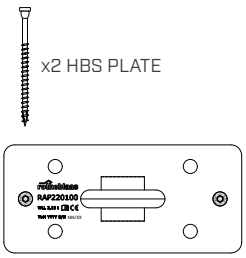


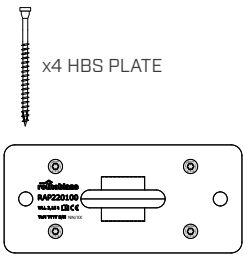


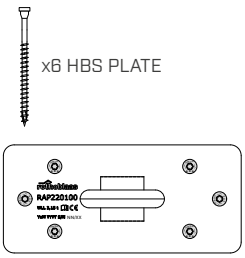
β = lifting angle (angle between vertical axis and chain).
R_{WLL} = reference rigging capacity for a single anchor system.

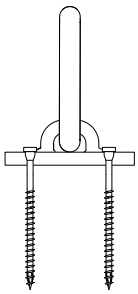
POSSIBLE LAYOUT OF SCREWS

HBS PLATE - HBS PLATE EVO

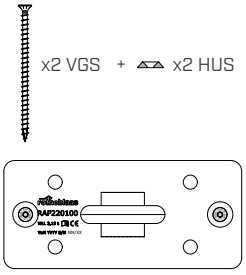


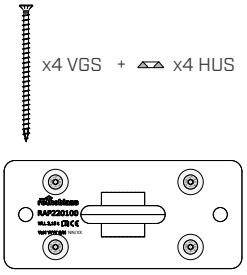


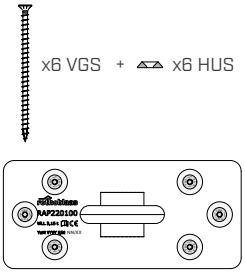


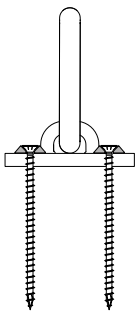


VGS + HUS





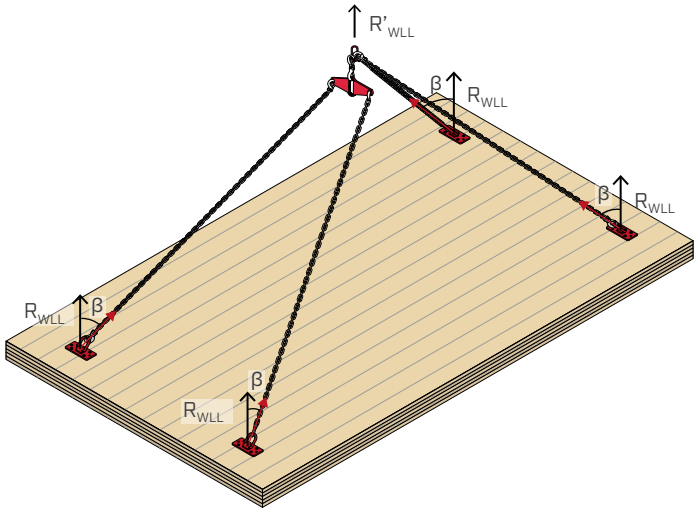


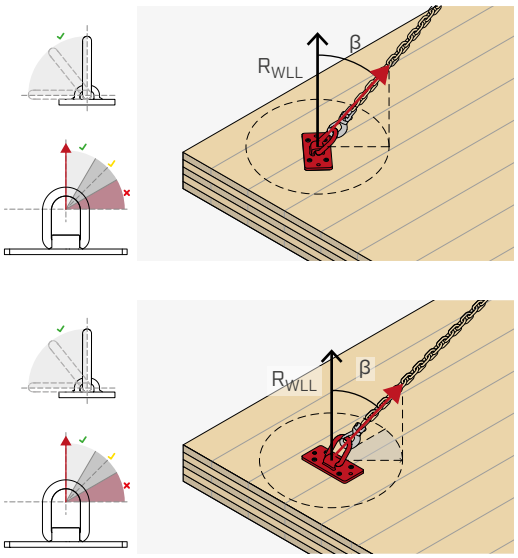


NOTES:

- The RAPTOR plate must be fixed with homogeneous connectors, same type (HBS PLATE or VGS) of the same length. The same configuration must be replicated on all plates used on the element to be moved.

RIGGING CAPACITY | HORIZONTAL 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 WITH **HBS PLATE** SCREWS

CODE HBS PLATE screw/ HBS PLATE EVO d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSPLEVO1060 10 x 60	2	275	230	180	120
	4	515	430	340	235
	6	745	625	495	340
HBSPL1080 10 x 80	2	330	275	215	145
	4	620	520	410	280
	6	895	755	600	410
HBSPL10100 10 x 100	2	415	340	265	175
	4	775	640	505	340
	6	1120	930	735	500
HBSPL10120 10 x 120	2	525	410	310	205
	4	985	785	595	395
	6	1420	1140	870	580
HBSPL10140 10 x 140	2	610	465	340	220
	4	1140	880	655	430
	6	1645	1285	965	635
HBSPL10160 10 x 160	2	720	525	380	240
	4	1345	1010	735	475
	6	1940	1470	1080	700
HBSPL10180 10 x 180	2	830	590	415	260
	4	1555	1130	805	515
	6	2240	1650	1190	760

β = lifting angle

RIGGING CAPACITY | HORIZONTAL CLT PANEL

MAXIMUM CAPACITY PER ANCHOR POINT WITH **VGS** SCREWS

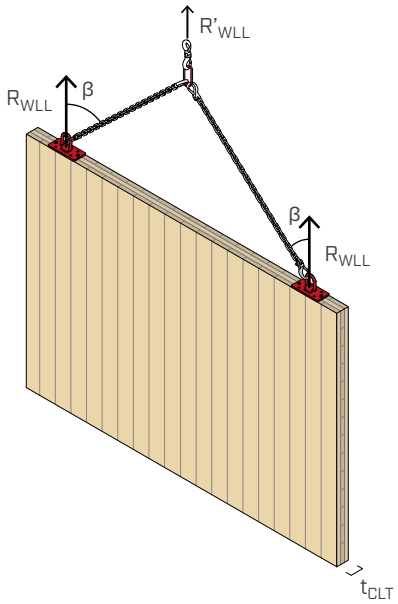
CODE VGS screw + HUS10 d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
VGS1180 11 x 80	2	375	305	235	155
	4	705	580	450	300
	6	1015	840	655	445
VGS11100 11 x 100	2	500	395	300	200
	4	935	755	580	385
	6	1345	1095	845	565
VGS11125 11 x 125	2	650	495	360	235
	4	1220	940	700	455
	6	1760	1370	1025	670
VGS11150 11 x 150	2	805	580	415	260
	4	1505	1110	800	515
	6	2170	1620	1180	760
VGS11175 11 x 175	2	960	660	460	290
	4	1790	1270	900	570
	6	2580	1860	1325	840
VGS11200 11 x 200	2	1110	740	505	315
	4	2075	1425	990	620
	6	2990	2085	1465	920
VGS11225 11 x 225	2	1265	815	550	340
	4	2360	1570	1080	670
	6	3150	2220	1570	990
VGS11250 11 x 250	2	1415	885	595	365
	4	2645	1715	1165	720
	6	3150	2295	1650	1055
VGS11275 11 x 275	2	1570	960	635	390
	4	2935	1855	1250	770
	6	3150	2360	1725	1115
VGS11300 11 x 300	2	1725	1030	680	415
	4	3150	1975	1330	815
	6	3150	2420	1795	1170
VGS11325 11 x 325	2	1805	1065	700	425
	4	3150	2015	1360	840
	6	3150	2420	1795	1170
VGS11350 11 x 350	2	1805	1065	700	425
	4	3150	2015	1360	840
	6	3150	2420	1795	1170
VGS11375 11 x 375	2	1805	1065	700	425
	4	3150	2015	1360	840
	6	3150	2420	1795	1170
VGS11400 11 x 400	2	1805	1065	700	425
	4	3150	2015	1360	840
	6	3150	2420	1795	1170

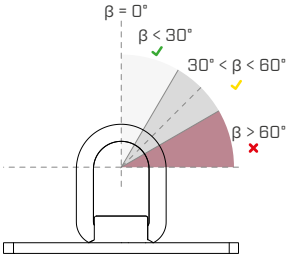
β = lifting angle

NOTES:

- When transporting horizontal CLT panels, the ratio of timber thickness to screw length can affect the load-bearing capacity.
- 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 FROM THE EDGE





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 WITH **HBS PLATE** SCREWS

CODE HBS PLATE screw/ HBS PLATE EVO d x L [mm]	no. of screws	capacity R_{WLL} [kg] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSPLEVO1060 10 x 60	2	200	155	115	75
HBSPL1080 10 x 80	2	235	190	145	95
HBSPL10100 10 x 100	2	290	225	170	110
HBSPL10120 10 x 120	2	360	275	205	135
HBSPL10140 10 x 140	2	410	315	235	150
HBSPL10160 10 x 160	2	475	355	255	165
HBSPL10180 10 x 180	2	545	390	280	175

β = lifting angle

RIGGING CAPACITY | VERTICAL CLT PANEL FROM THE EDGE

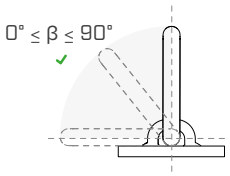
MAXIMUM CAPACITY PER ANCHOR POINT WITH **VGS** SCREWS

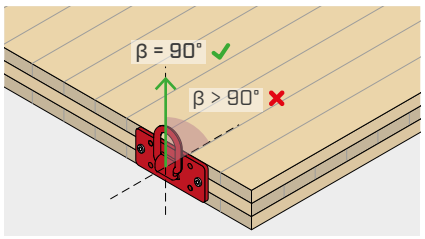
CODE VGS screw + HUS10 d x L [mm]	no. of screws	capacity R_{WLL} [kg] β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
VGS1180 11 x 80	2	265	205	155	100
VGS11100 11 x 100	2	340	255	190	120
VGS11125 11 x 125	2	430	320	230	150
VGS11150 11 x 150	2	520	380	275	175
VGS11175 11 x 175	2	610	430	305	190
VGS11200 11 x 200	2	700	475	330	205
VGS11225 11 x 225	2	785	520	355	220
VGS11250 11 x 250	2	870	560	380	235
VGS11275 11 x 275	2	955	600	400	245
VGS11300 11 x 300	2	1035	640	425	260
VGS11325 11 x 325	2	1120(*)	675(*)	450(*)	275(*)
VGS11350 11 x 350	2	1200(*)	715(*)	470(*)	285(*)
VGS11375 11 x 375	2	1280(*)	750(*)	490(*)	300(*)
VGS11400 11 x 400	2	1365(*)	785(*)	515(*)	310(*)

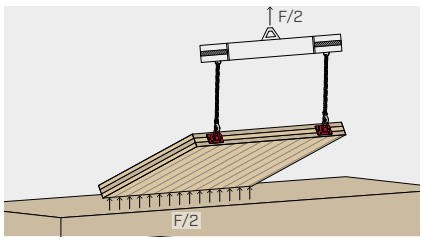
β = lifting angle

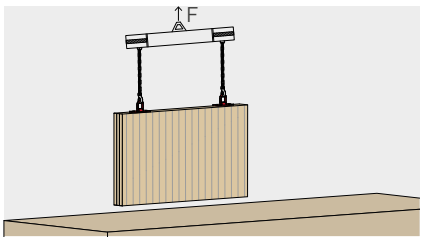
RIGGING CAPACITY | LIFTING PANEL/CLT WALL FROM A HORIZONTAL POSITION

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







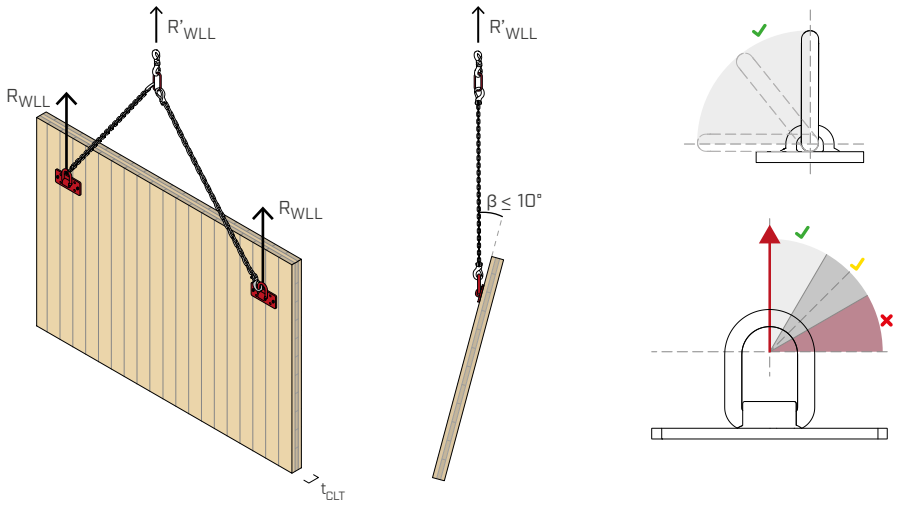


(*) In the case of lifting from a horizontal position, for screws with L > 300 mm the strength during "tilting" becomes governed. In this case, the strength must be reduced by applying a reduction coefficient of 0.8.

NOTES:

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

RIGGING CAPACITY | VERTICAL CLT PANEL WIDE FACE



TOTAL RIGGING CAPACITY CALCULATION

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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 WITH **HBS PLATE** SCREWS

CODE HBS PLATE screw/ HBS PLATE EVO d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSPLEVO1060 10 x 60	2	145	125	100	70
	4	290	245	200	140
	6	425	365	295	205
HBSPL1080 10 x 80	2	180	155	125	85
	4	360	305	245	170
	6	525	450	360	250
HBSPL10100 10 x 100	2	215	180	145	100
	4	420	360	290	200
	6	615	525	425	295
HBSPL10120 10 x 120	2	250	215	175	120
	4	495	425	340	240
	6	730	625	505	355
HBSPL10140 10 x 140	2	285	245	195	135
	4	560	480	390	270
	6	825	710	570	400
HBSPL10160 10 x 160	2	305	260	210	145
	4	605	515	420	290
	6	890	765	620	435
HBSPL10180 10 x 180	2	325	280	225	155
	4	640	550	445	310
	6	950	815	660	465

β = lifting angle

RIGGING CAPACITY | VERTICAL CLT PANEL WIDE FACE

MAXIMUM CAPACITY PER ANCHOR POINT WITH **VGS** SCREWS

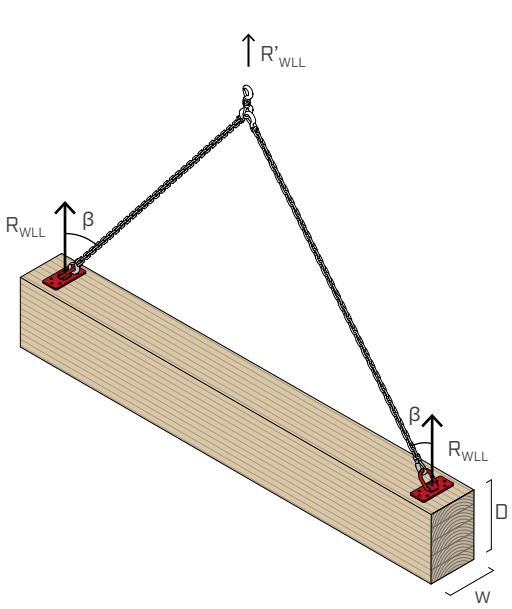
CODE VGS screw + HUS10 d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
VGS1180 11 x 80	2	190	160	130	90
	4	375	320	260	180
	6	550	470	380	265
VGS11100 11 x 100	2	225	195	155	110
	4	450	385	310	215
	6	660	565	460	320
VGS11125 11 x 125	2	275	235	190	135
	4	545	470	380	265
	6	805	690	560	395
VGS11150 11 x 150	2	325	280	225	155
	4	640	550	445	310
	6	945	810	660	460
VGS11175 11 x 175	2	350	300	245	170
	4	695	595	480	335
	6	1025	880	715	500
VGS11200 11 x 200	2	375	320	260	180
	4	745	640	515	365
	6	1100	945	770	540
VGS11225 11 x 225	2	400	340	280	195
	4	790	680	550	385
	6	1170	1010	820	575
VGS11250 11 x 250	2	420	365	295	205
	4	840	720	585	410
	6	1245	1070	870	610

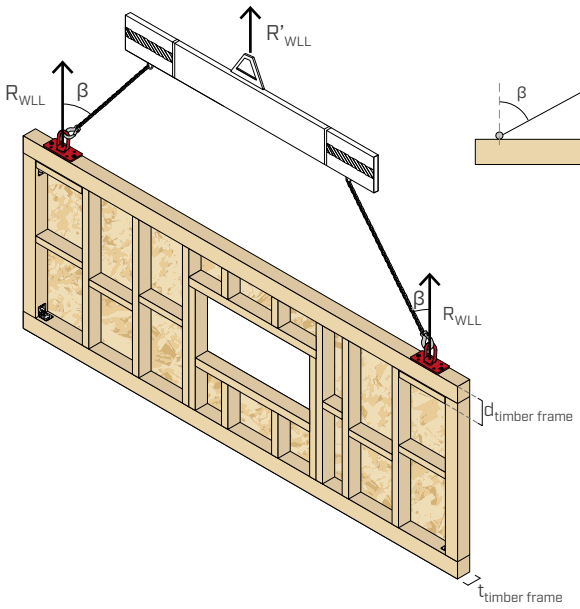
β = lifting angle

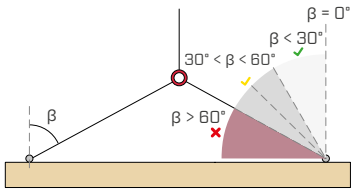
NOTES:

- Minimum wall thickness: $t_{CLT} \geq 80$ mm.
- Due to the single-sided fastening, the wall will tilt slightly. It is advisable to fix the transport plates as high as possible, maintaining minimum distances from the ends, in order to limit this phenomenon. It is suggested to limit the tilt angle within 10° of the vertical.

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 WITH **HBS PLATE** SCREWS

CODE HBS PLATE screw/ HBS PLATE EVO d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
HBSPLEVO1060 10 x 60	2	300	245	190	130
	4	560	465	365	250
	6	805	675	535	370
HBSPL1080 10 x 80	2	360	295	230	155
	4	670	560	445	305
	6	965	815	645	445
HBSPL10100 10 x 100	2	450	365	280	190
	4	840	690	540	365
	6	1210	1000	785	535
HBSPL10120 10 x 120	2	570	440	330	215
	4	1060	840	635	420
	6	1530	1225	930	620
HBSPL10140 10 x 140	2	660	495	365	235
	4	1230	945	705	460
	6	1775	1380	1030	675
HBSPL10160 10 x 160	2	780	565	405	255
	4	1455	1080	785	505
	6	2095	1580	1155	745
HBSPL10180 10 x 180	2	900	630	445	280
	4	1680	1210	865	550
	6	2420	1770	1270	810

β = lifting angle

HORIZONTAL BEAM AND FRAME WALL

MAXIMUM CAPACITY PER ANCHOR POINT WITH **VGS** SCREWS

CODE VGS screw + HUS10 d x L [mm]	no. of screws	capacity R_{WLL} [kg]			
		β = 0°	0° < β ≤ 30°	30° < β ≤ 45°	45° < β ≤ 60°
VGS1180 11 x 80	2	405	330	260	170
	4	760	625	500	325
	6	1100	905	725	480
VGS11100 11 x 100	2	540	430	335	215
	4	1010	810	645	415
	6	1455	1180	935	610
VGS11125 11 x 125	2	705	530	395	250
	4	1315	1010	765	485
	6	1895	1470	1120	715
VGS11150 11 x 150	2	870	620	450	280
	4	1625	1190	880	550
	6	2340	1740	1285	810
VGS11175 11 x 175	2	1035	710	500	310
	4	1935	1360	980	605
	6	2785	1995	1445	900
VGS11200 11 x 200	2	1200	790	550	335
	4	2240	1525	1080	660
	6	3150	2210	1580	980
VGS11225 11 x 225	2	1365	870	600	365
	4	2550	1685	1175	715
	6	3150	2290	1665	1050
VGS11250 11 x 250	2	1530	950	645	390
	4	2855	1840	1270	770
	6	3150	2365	1750	1115
VGS11275 11 x 275	2	1695	1025	690	415
	4	3150	1985	1360	820
	6	3150	2420	1825	1170
VGS11300 11 x 300	2	1805	1075	720	435
	4	3150	2035	1400	855
	6	3150	2420	1870	1170
VGS11325 11 x 325	2	1805	1075	720	435
	4	3150	2035	1400	855
	6	3150	2420	1870	1170
VGS11350 11 x 350	2	1805	1075	720	435
	4	3150	2035	1400	855
	6	3150	2420	1870	1170
VGS11375 11 x 375	2	1805	1075	720	435
	4	3150	2035	1400	855
	6	3150	2420	1870	1170
VGS11400 11 x 400	2	1805	1075	720	435
	4	3150	2035	1400	855
	6	3150	2420	1870	1170

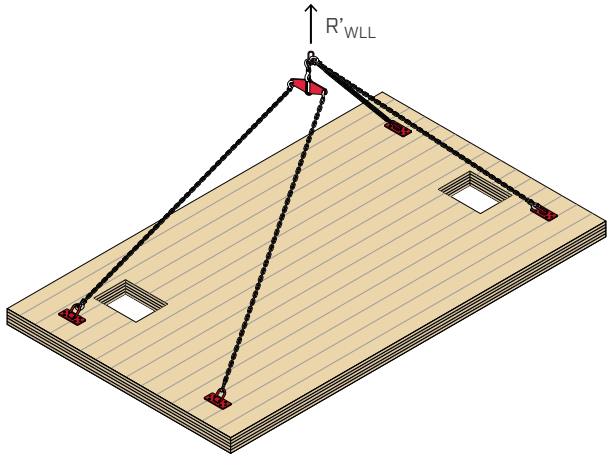
β = lifting angle

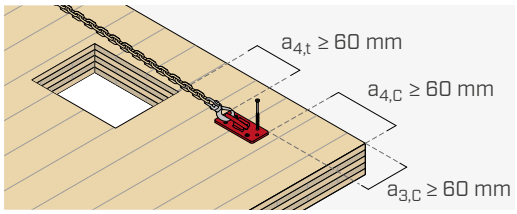
NOTES:

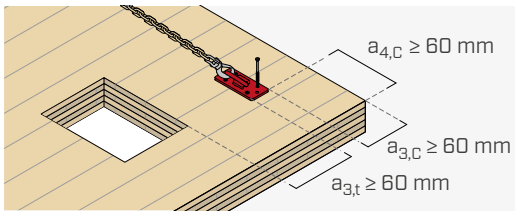
- Minimum beam base w ≥ 240 mm.
- Minimum beam base D ≥ 80 mm.
- Minimum thickness of Timber Frame structure $t_{timber\ frame}$ ≥ 100 mm.
- Minimum thickness of Timber Frame structure $d_{timber\ frame}$ ≥ 80 mm.

MINIMUM DISTANCES

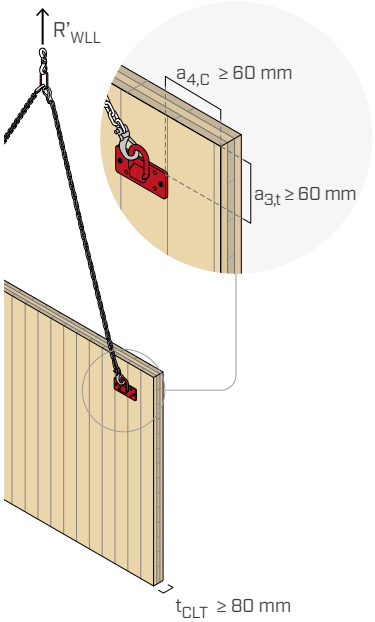
CLT FLOOR



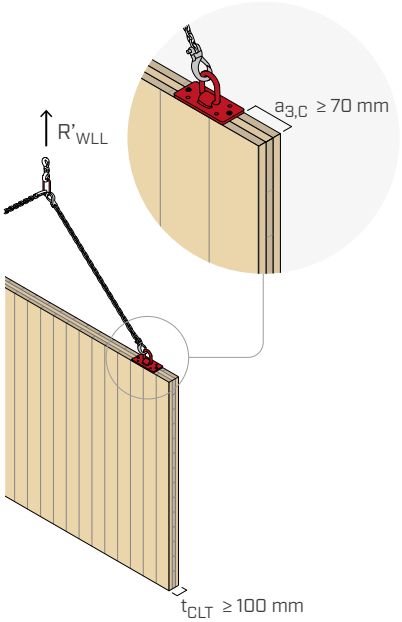




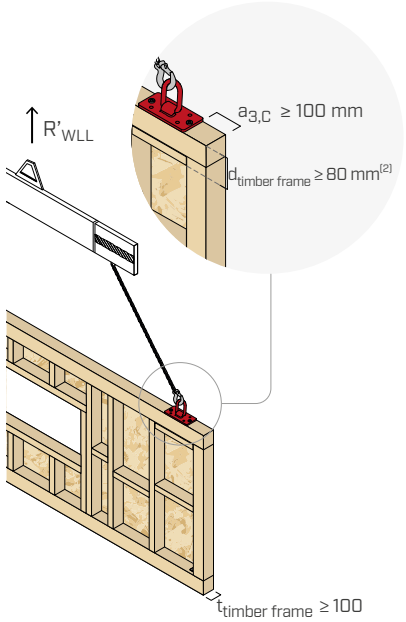
VERTICAL CLT WALL | WIDE FACE



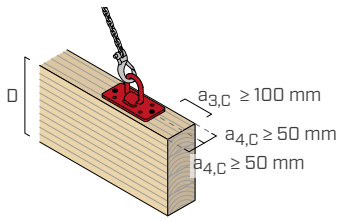
VERTICAL CLT WALL | EDGE FACE



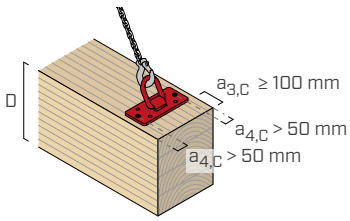
TIMBER FRAME WALL | VERTICAL[1]



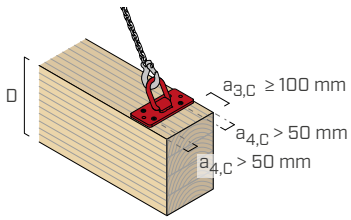
TIMBER BEAM - 0° 2 SCREW FASTENING



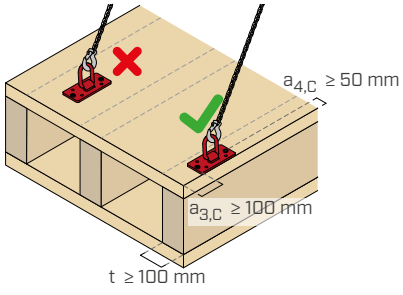
TIMBER BEAM - 90° 2 & 6 SCREW FASTENING



TIMBER BEAM - 90° 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.

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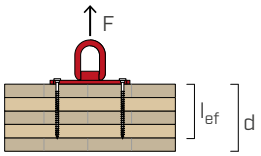
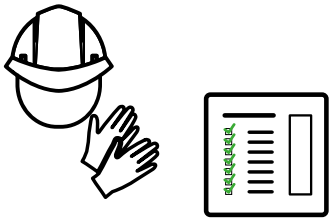
INFLUENCE OF THE RATIO OF SCREW LENGTH TO THE ELEMENT THICKNESS

For lifting applications with the load component perpendicular to the timber grain, in order to reach the maximum capacity of the lifting system, it is recommended to use screws longer than 0.7·d (d = depth of the timber element) to avoid cracking. In the event that the ratio is not fulfilled, brittle fracture checks can be carried out according to DIN EN 1995-1-1/NA.

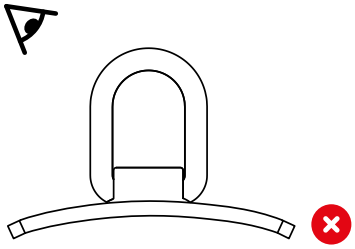


$l_{ef} \geq 0{,}7 \cdot d$ ✓

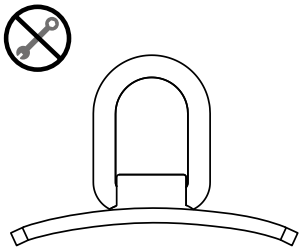
MAINTENANCE



Always follow the instructions in the manual.



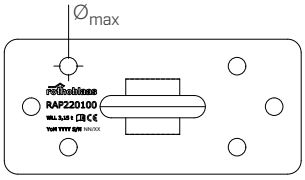
Visual inspection before each use. If there are any defects, the product must not be used again.

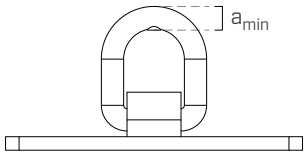


Do not perform any repair!

DIMENSIONS TO BE CHECKED

CODE	$Ø_{max}$ [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 the use of connectors that are as long as possible 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 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, the strength can be considered equivalent.
- The rigging capacity values provided are based on calculations made according to EN 1995-1-1/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. For different ρ_k values, the strength values in the table can be converted by the k_{dens} coefficient. The calculated value must never exceed the maximum capacity of the plate of **3150 kg.**

$R'_{WLL} = min\ (k_{dens} \cdot R'_{WLL};\ 3150\ kg)$

$\rho_{g,k}$ [kg/m^3]	310	330	350	380	**385**	405	425	430	440
C-GL	*C16*	*C20*	*C24*	*C30*	***GL24h***	*GL26h*	*GL28h*	*GL30h*	*GL32h*
k_{dens}	0,80	0,85	0,90	0,98	**1,00**	1,02	1,05	1,05	1,07

$\rho_{g,k}$ [kg/m^3]	310	330	**350**	380	385	405	425	430	440
C-GL	*C16*	*C20*	***C24***	*C30*	*GL24h*	*GL26h*	*GL28h*	*GL30h*	*GL32h*
k_{dens}	0,88	0,94	**1,00**	1,04	1,05	1,07	1,10	1,11	1,12

Strength values thus determined may differ, for higher safety standards, from those resulting from an exact calculation.

- 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.
- The values indicated in the data sheet for the transport plate fixed with HBS PLATE screws have been calculated considering the geometry and mechanical parameters of the HBS PL version. For the load-bearing capacities of the transport plate fixed with the HBS P screw, refer to the previous version of the data sheet on this website. Alternatively, contact the Technical Office for further support.