KLH®

MADE FOR BUILDING
BUILT FOR LIVING

LIFTING SYSTEMS

WITH EC DECLARATION OF CONFORMITY

IMPRINT

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KLH®

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LIFTING SYSTEMS

This brochure is intended to provide an overview of lifting systems that have become established for the installation of KLH® - CLT. The basis for use is either the EC Declarations of Conformity obtained by KLH for lifting equipment installed in the factory or the operating instructions of the respective manufacturers for lifting equipment installed on site (please always use the latest documents from the respective websites and inform us of any deviations from this brochure, for example due to updates). Please observe the country-specific safety regulations for all systems and ensure that the prescribed personal protective equipment and construction site equipment are used.

The type and position of the lifting equipment is determined and ordered by the customer. It must be coordinated with both the construction site processes and the means of transportation of the delivery, especially if it is necessary to turn upright or flip elements at the place of arrival. Required drill holes must be marked in the element plans and, if necessary, sealed or filled in a suitable manner on site after installation.

For elements with a visible surface, holes for lifting equipment on the visible surface must always be avoided. If panels are turned upright or turned over on site, additional lifting equipment must be provided for the different load cases where necessary.

For the assembly of small elements (weight < 250 kg), we recommend the on-site use of lifting screws (e.g. Würth ASSY® transport anchor system or WASP hook for timber elements transport) instead of lifting equipment with loops.
For deliveries with widely varying element weights, different lifting equipment for light and heavy elements is usually advantageous. Our team will be happy to advise you on the choice of suitable lifting equipment.

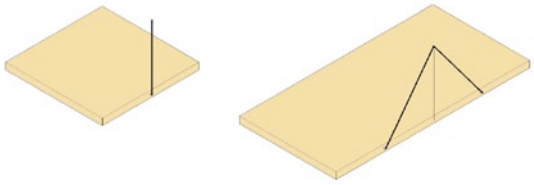
LIFTING EQUIPMENT INSTALLED ON SITE

Lifting clamp Power Clamp III, Type: D40/90 (www.pitzl-connectors.com)	
Load attachment Sihga® Pick (www.sihga.com)	
Würth ASSY® transport anchor system (www.wuerth.de)	
RAMPA® lifting system type X (www.rampa.com)	
WASP hook for timber elements transport (www.rothoblaas.de)	
RAPTOR rigging device for timber elements (www.rothoblaas.de)	

FACTORY-INSTALLED LIFTING EQUIPMENT

KLH® lifting gear system “W” (“Wall System”)	
KLH® lifting gear system “FD” (“Floor Diagonal System”)	
KLH® lifting gear system “FB VLS” (“Visible Lifting System”)	
KLH® lifting gear system “VLS S” (“Visible Lifting System for Slab Elements”)	
KLH® lifting gear system “FB” (“Floor Bolt System”)	
KLH® lifting gear system “VLS W” (“Visible Lifting System for Wall Elements”)	

"TURNING UPRIGHT"

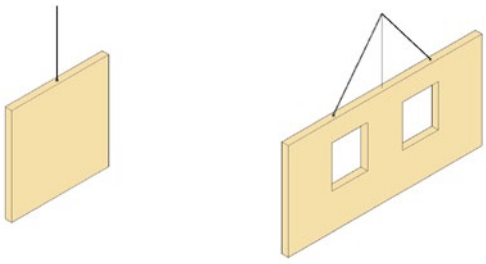


Turning upright, laying down or flipping elements

The load-bearing capacity of the lifting equipment must be designed for half the weight of the element;

additional lifting equipment may be required for this load case only.

"STANDING LIFTING"



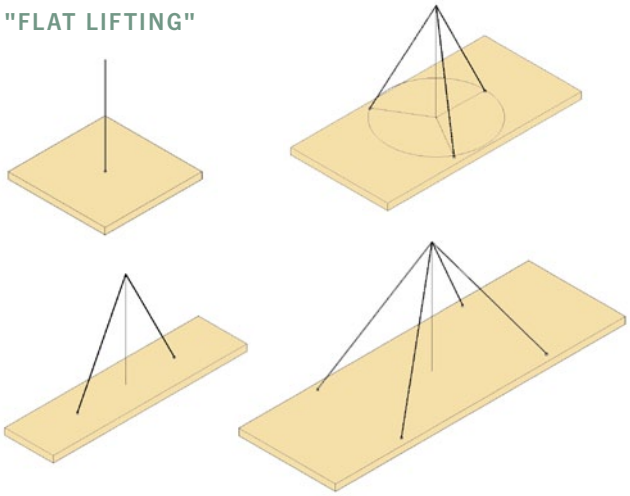
Lifting upright elements

1 or 2 lifting points (max. distance 6 m);

symmetrical arrangement to the element's centre of gravity;

small elements (weight < 250 kg) should be installed with lifting screws.

"FLAT LIFTING"



Lifting horizontal elements

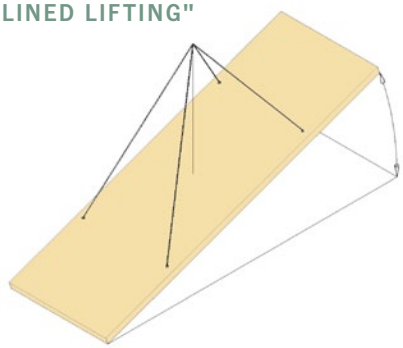
1 to max. 4 lifting points (max. distance 6 m);

the element weight must be distributed evenly to all lifting points in relation to the centre of gravity;

for elements with 4 lifting points, the maximum element weight also depends on the type of hanger;

small elements (weight < 250 kg) should be installed with lifting screws.

"INCLINED LIFTING"



Lifting inclined elements

Max. 4 lifting points (max. distance 6 m) analogous to lifting horizontal elements;

small elements (weight < 250 kg) should be installed with lifting screws.

GENERAL PRINCIPLES

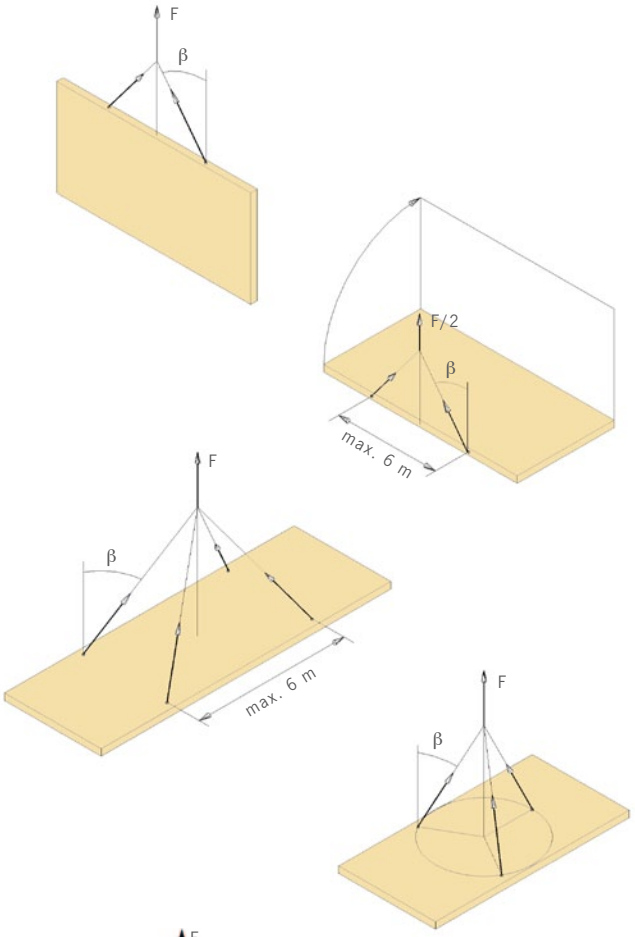
In addition to the element weight, dynamic loads must be taken into account during lifting operations. Depending on the type of lifting device and the hanger as well as the ambient conditions on the construction site, this influence is taken into account by the dynamic coefficient (vibration coefficient φ).

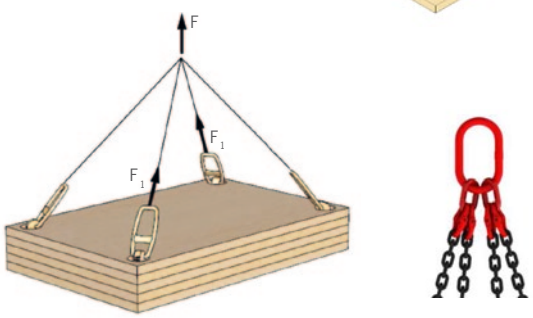
When specifying the load capacity of lifting equipment, the position of the lifting gear (on side surfaces or narrow sides), the position of the element (vertical, horizontal, inclined), the type of hanger and the angle between the hanger and the axis of the lifting gear are taken into account. When turning upright or flipping elements and then lifting them, check whether the selected lifting equipment is suitable for both lifting scenarios.

The position of the lifting gear always refers to the centre of gravity of the element, with the aim of distributing the total load evenly across the lifting gear. Selecting 2 or 4 lifting points per element results in a symmetrical arrangement around the centre of gravity.

If the element weight is to be evenly distributed over 3 lifting points, then these must be at the same distance from the centre of gravity and have an angle of 120° to each other – this can possibly be implemented for small or square elements. In practice, however, in most cases this arrangement is not possible.

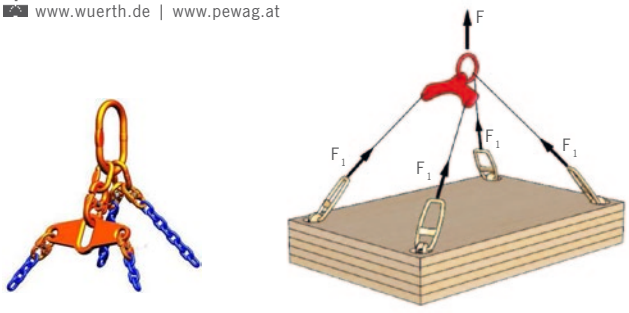
For elements with 4 lifting points, the full load capacity of the lifting equipment may only be allowed when using a statically determinate hanger (with compensating seesaw or crossbeam); when using a statically indeterminate hanger or with asymmetrical load distribution, the load capacity of the lifting equipment must be reduced in accordance with the applicable operating instructions.





statically indeterminate hanger

www.wuerth.de | www.pewag.at

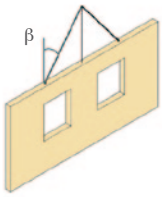


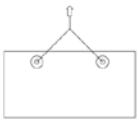
statically determinate hanger with compensating seesaw

www.pewag.at | www.wuerth.de

LIFTING UPRIGHT ELEMENTS

Use the lifting equipment
in accordance with the valid operating instructions.



Lifting gear Type	Installation	Panel thickness [mm]	Max. element weight with 1 lifting device [kg]	Max. element weight with 2 lifting devices [kg]	Angle of the hanger to the vertical, remarks
Power Clamp III D40/90	on site on the narrow side	≥ 80 ≥ 100 ≥ 160	**1000** **1200** **1500**	**1300** **1500** **2000**	for β = 7° - 60° for all panel thicknesses with asymmetrical load distribution, the load capacity is reduced by 50%, vibration coefficient φ = 1.3
Sihga® Pick	on site on the narrow side	≥ 90	see operating instructions, lifting angle β ≥ 5° to the borehole axis	**1607** **1160**	for β = 30° for β = 45° vibration coefficient φ = 1.3
	on site on the narrow side	≥ 70	**577** 	**1154** 	vibration coefficient φ = 1.3
Würth ASSY® transport anchor system	on site ASSY 4 COMBI T 12x160/145 on the narrow side	≥ 120	see operating instructions, possible with longer lifting screws	**1188** **970** screws inclined to the vertical at the angle β	for β = 30° for β = 45° load case "axial tension", vibration coefficient φ = 1.3
WASP® hook for timber elements transport	on site VGS Ø11 x 150 on the narrow side	≥ 70	is not recommended	**874** **714** screws inclined to the vertical at the angle β **342** **206** screws perpendicular to the surface	for β = 30° for β = 45° load case "inclined", vibration coefficient φ = 1.2 for β = 30° for β = 45° load case "perpendicular", vibration coefficient φ = 1.2

03 LOAD TABLE TURNING UPRIGHT OR STANDING LIFTING

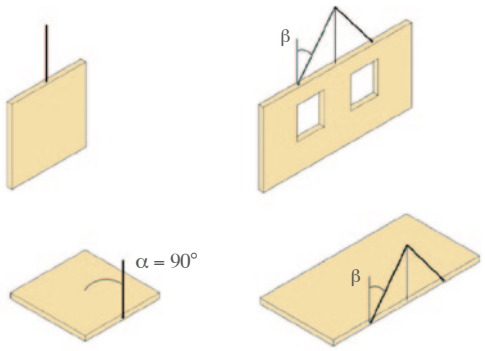
TURNING ELEMENTS UPRIGHT

Use the lifting equipment
in accordance with the valid operating instructions.

Lifting gear Type	Installation	Panel thickness [mm]	Max. element weight with 1 lifting device [kg]	Max. element weight with 2 lifting devices [kg]	Angle of the hanger to the vertical, remarks
Power Clamp III D40/90	on site on the narrow side	≥ 80 ≥ 90 ≥ 100 ≥ 120 ≥ 160	**250** **380** **380** **380** **600**	**600** **1000** **1200** **1400** **1800**	for β = 7° - 60° for all panel thicknesses with asymmetrical load distribution, the load capacity is reduced by 50%, vibration coefficient φ = 1.3
Sihga® Pick	on site on the narrow side	≥ 90 ≥ 120 ≥ 160	see operating instructions, lifting angle β ≥ 5° to the borehole axis	**1040** **1667** **1900**	vibration coefficient φ = 1.3

TURNING ELEMENTS UPRIGHT OR LIFTING UPRIGHT ELEMENTS

Hanger angle β = 30° - 45°;
the specified maximum element weights
apply to both load cases.

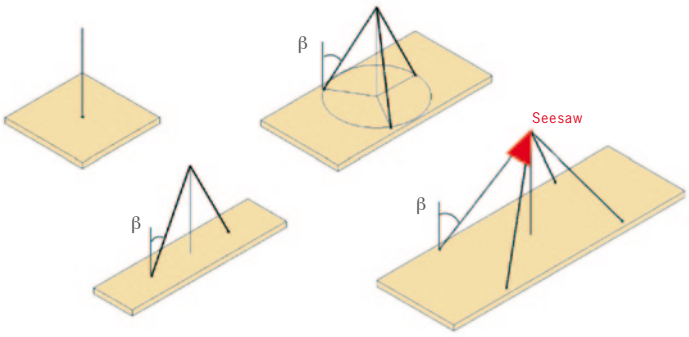


KLH® lifting gear system Type	Installation	Panel thickness [mm]	Max. element weight with 1 lifting device [kg]	Max. element weight with 2 lifting devices [kg]
W 1000	at the factory	≥ 60	**1000**	**2000**
W 2500	at the factory	≥ 125	**2500**	**5000**
VLS W2 / VLS W2 D	on request	≥ 75 - 90	**500** / 1000	**1000** / 2000
VLS W3 / VLS W3 D	on request	≥ 95 - 120	**800** / 1600	**1600** / 3200
VLS W4 / VLS W4 D	on request	≥ 125 - 185	**800** / 1600	**1600** / 3200
VLS W5 / VLS W5 D	on request	≥ 190	**800** / 1600	**1600** / 3200

The use of lifting equipment installed on site is recommended for small elements.

LIFTING HORIZONTAL ELEMENTS

Use the lifting equipment
in accordance with the valid operating instructions.



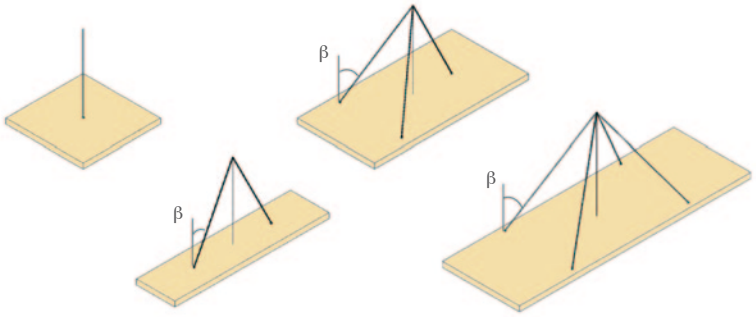
Lifting gear Type	Installation	Panel thickness [mm]	Max. element weight with 1 lifting device [kg]	Max. element weight with 2 lifting devices [kg]	Max. element weight with 3 lifting devices [kg]*	Max. element weight with 4 lifting devices [kg]	Angle of the hanger to the vertical, remarks
Power Clamp III D40/90	on site	≥ 60	**1500** for β = 0°	**2100** **1500**	**3150** **2250**	**3150** **2250** without seesaw **4200** **3000** with seesaw**	for β = 7° - 45° for β = 45° - 60° for β = 7° - 45° for β = 45° - 60° with asymmetrical load distribution, the load capacity is reduced by 50%, vibration coefficient φ = 1.3
Sihga® Pick	on site	≥ 70	see operating instructions, lifting angle β ≥ 5° to the borehole axis	**1853** **1620**	**2780** **2430**	**3707** **3240** only with seesaw**	for β = 30° for β = 45° vibration coefficient φ = 1.3
Würth ASSY® transport anchor system	on site ASSY 4 COMBI T 12x120/100 perpendicular to the surface	≥ 120	not permitted	**726** **538**	**1089** **807**	**1452** **1076** with seesaw**	for β = 30° for β = 45° load case "inclined pull", vibration coefficient φ = 1.3
	on site ASSY 4 COMBI T 12x160/145 perpendicular to the surface	≥ 160	not permitted	**950** **664**	**1425** **996**	**1900** **1328** with seesaw**	for β = 30° for β = 45° load case "inclined pull", vibration coefficient φ = 1.3
WASP® hook for timber elements transport	on site VGS Ø11 x 100 perpendicular to the surface	≥ 110	is not recommended	**570** **382**	**855** **573**	**1140** **764** with seesaw**	for β = 30° for β = 45° load case "perpendicular", vibration coefficient φ = 1.2
	on site VGS Ø11 x 150 perpendicular to the surface	≥ 160	is not recommended	**952** **636**	**1428** **954**	**1904** **1272** with seesaw**	for β = 30° for β = 45° load case "perpendicular", vibration coefficient φ = 1.2

*) even load distribution must be ensured

**) statically determinate hanger

LIFTING HORIZONTAL ELEMENTS

Hanger angle β = 30° - 45°;
statically indeterminate hanger.



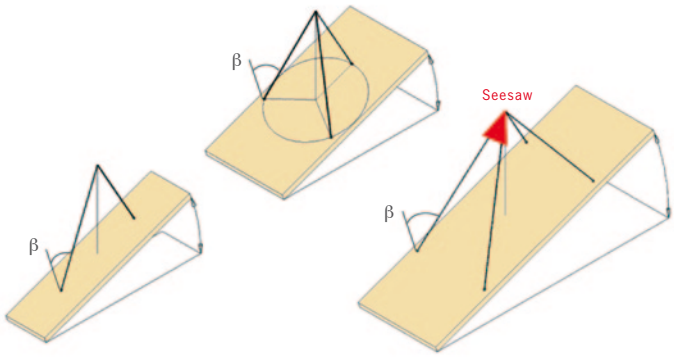
KLH® lifting gear system Type	Installation	Panel thickness [mm]	Max. element weight with 1 lifting device [kg]	Max. element weight with 2 lifting devices [kg]	Max. element weight with 3 lifting devices [kg]	Max. element weight with 4 lifting devices [kg]
FD 1000	at the factory	≥ 60	**1000**	**2000**	**2000**	**3000**
FD 2500	at the factory	≥ 125	**2500**	**5000**	**5000**	**7500**
FB10 VLS S1	at the factory	≥ 80 - 95 ≥ 100	**600** **800**	**1200** **1600**	**1200** **1600**	**1800** **2400**
FB10 VLS S2	at the factory	≥ 120	**900**	**1800**	**1800**	**2700**
FB25 VLS S3	at the factory	≥ 140	**1400**	**2800**	**2800**	**4200**
FB25 VLS S4	at the factory	≥ 180	**2500**	**5000**	**5000**	**7500**
VLS S1	at the factory*	≥ 80 - 95 ≥ 100	**600** **800**	**1200** **1600**	**1200** **1600**	**1800** **2400**
VLS S2	at the factory*	≥ 120	**900**	**1800**	**1800**	**2700**
VLS S3	at the factory	≥ 140	**1400**	**2800**	**2800**	**4200**
VLS S4	at the factory	≥ 180	**2500**	**5000**	**5000**	**7500**
FB 1000	on request	≥ 60	**1000**	**2000**	**2000**	**3000**
FB 2500	on request	≥ 125	**2500**	**5000**	**5000**	**7500**

*) with 3-layer KLH® - CLT, the bolt axis must run transverse to the fibre direction of the top layer

The use of lifting equipment installed on site is recommended for small elements.

LIFTING INCLINED ELEMENTS

Use the lifting equipment
in accordance with the valid operating instructions.



Lifting gear Type	Installation	Panel thickness [mm]	Max. element weight with 2 lifting devices [kg]	Max. element weight with 3 lifting devices [kg]*	Max. element weight with 4 lifting devices [kg]	Angle of the hanger to the drill hole axis / screw axis, remarks
Power Clamp III D40/90	on site	≥ 60	**1050**	**1050**	**1600** without seesaw **2100** with seesaw**	for β = 45° - 60° for β = 45° - 60° with asymmetrical load distribution, the load capacity is reduced by 50%, vibration coefficient φ = 1.3
Sihga® Pick	on site	≥ 70	**1620**	**2430**	**3240** only with seesaw**	for β = 45° for β > 45° installation with crossbeam, vibration coefficient φ = 1.3
Würth ASSY® transport anchor system	on site ASSY 4 COMBI T 12x120/100 perpendicular to the surface	≥ 120	**538** **350**	**807** **525**	**1076** **700** with seesaw**	for β = 45° for β = 60° load case "inclined pull", element inclination max. 15°, vibration coefficient φ = 1.3
	on site ASSY 4 COMBI T 12x160/145 perpendicular to the surface	≥ 160	**664** **418**	**996** **627**	**1328** **836** with seesaw**	for β = 45° for β = 60° load case "inclined pull", element inclination max. 15°, vibration coefficient φ = 1.3

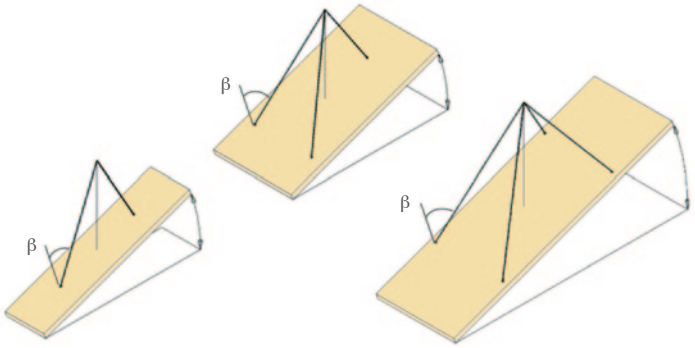
*) even load distribution must be ensured

**) statically determinate hanger

Note: even with the same load distribution, the lifting points are subject to different loads, as the hangers are not the same length; the maximum element weight is determined by the lower, decisive lifting point (with the largest occurring angle β). The specified load values assume a uniform load on the lifting points.

LIFTING INCLINED ELEMENTS

Hanger angle β = 30° - 45°;
statically indeterminate hanger.



KLH® lifting gear system Type	Installation	Panel thickness [mm]	Max. element weight with 2 lifting devices [kg]	Max. element weight with 3 lifting devices [kg]	Max. element weight with 4 lifting devices [kg]
FD 1000	at the factory	≥ 60	**2000**	**2000**	**3000**
FD 2500	at the factory	≥ 125	**5000**	**5000**	**7500**
FB10 VLS S1	at the factory	≥ 80 - 95 ≥ 100	**840** **1120**	**840** **1120**	**1260** **1680**
FB10 VLS S2	at the factory	≥ 120	**840**	**840**	**1890**
FB25 VLS S3	at the factory	≥ 140	**1120**	**1120**	**2940**
FB25 VLS S4	at the factory	≥ 180	**3500**	**5000**	**5250**
VLS S1	at the factory*	≥ 80 - 95 ≥ 100	**840** **1120**	**1200** **1600**	**1260** **1680**
VLS S2	at the factory*	≥ 120	**1260**	**1800**	**1890**
VLS S3	at the factory	≥ 140	**1960**	**2800**	**2940**
VLS S4	at the factory	≥ 180	**3500**	**5000**	**5250**
FB 1000	on request	≥ 60	**2000**	**2000**	**3000**
FB 2500	on request	≥ 125	**5000**	**5000**	**7500**

*) with 3-layer KLH® - CLT, the bolt axis must run transverse to the fibre direction of the top layer

The use of lifting equipment installed on site is recommended for small elements.

06.1 LIFTING CLAMP POWER CLAMP III, TYPE: D40/90

Scope of KLH services:

- Drill holes on side surfaces
- Drill holes on narrow sides along master panel edges and of at least 100 mm thickness

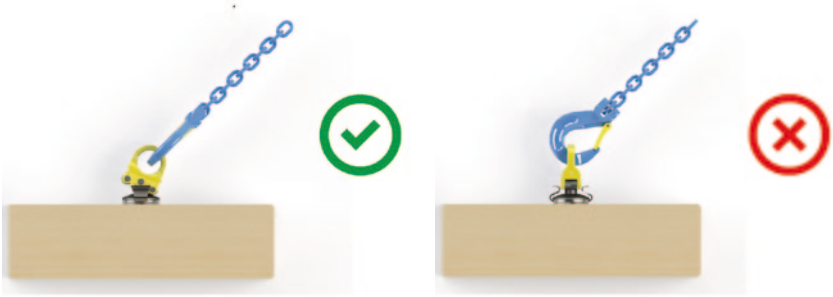
This lifting system must be used in accordance with the valid operating instructions for "Power Clamp 40-90-III":

https://www.pitzl-connectors.com/en/products/product-list/55890.1000

www.pitzl-connectors.com

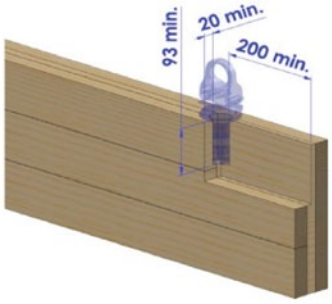
Extract from the operating instructions (as of January 2024):

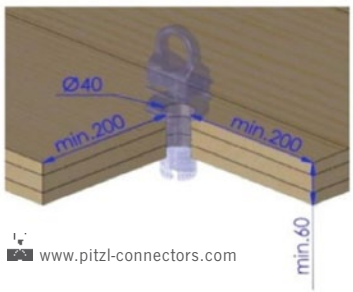
Maximum load capacity per Power Clamp: 1500 kg; drill hole: diameter 40 mm (max. 41 mm), minimum depth 93 mm (or 73 mm when using the blue spacer in accordance with the valid operating instructions for "Spacer for Power Clamp III D40/90 to reduce the drilling depth").



www.pitzl-connectors.com

Minimum edge distances:





www.pitzl-connectors.com

Drill holes on narrow sides:
Panel thickness min. 80 mm; edge distance (residual wood thickness) min. 20 mm (or 200 mm).

Drill holes on side surfaces:
Panel thickness min. 100 mm, or 80 mm when using the spacer, or 60 mm for drilled-through, visible holes; edge distances (residual wood width) min. 200 mm.

For other types of lifting clamp (e.g. Power Clamp III, type D25/70), the respective manufacturer's operating instructions apply.

Practical tip: the operator must check the condition and quality of the drill hole immediately before lifting and re-drill on site if necessary – have suitable drill bits ready!

06.2 LOAD ATTACHMENT SIHGA® PICK

Scope of KLH services:

- Drill holes on side surfaces
- Drill holes on narrow sides along master panel edges and of at least 100 mm thickness

This lifting system must be used in accordance with the valid operating instructions for "Sihga® Pick":

https://www.sihga.com/en/pick/

Extract from the operating instructions (as of January 2024):

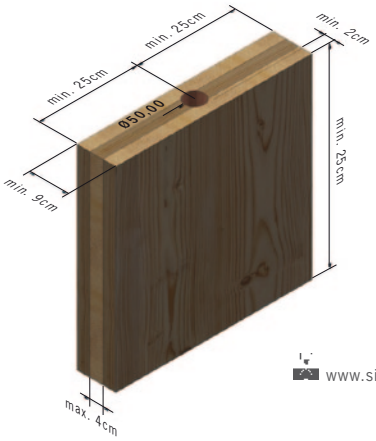
www.sihga.com

Lifting may only be carried out at an angle of ≥ 5° to the borehole axis.

Drill hole:
Diameter 50 mm (max. 51 mm), minimum depth 70 mm, axis of the hole always 90° to the surface.

Drill holes on narrow sides:
Panel thickness min. 90 mm; edge distance (residual wood thickness) min. 20 mm (or 250 mm edge-centre distance); end grain max. 40 mm (= max. lamella thickness).

Drill holes on side surfaces:
Panel thickness min. 90 mm, or 70 mm for drilled-through, visible holes; edge-centre distances min. 250 mm.



www.sihga.com

For other types of the load attachment (e.g. Sihga® Pick Max), the respective manufacturer's operating instructions apply.

Practical tip: the operator must check the condition and quality of the drill hole immediately before lifting and re-drill on site if necessary – have suitable drill bits ready!

06.3 WÜRTH ASSY® TRANSPORT ANCHOR SYSTEM

Scope of KLH services:

- Delivery of Würth ASSY® 4 COMBI T transportation anchor screw 12x120/100 or 12x160/145
- Delivery of Würth ASSY® transport anchor 1.3 tonnes

This lifting system must be used in accordance with the valid operating instructions for the "Würth ASSY® Transport Anchor System":

https://www.wuerth.de/web/de/assy/zulassungen_1/zulassungen_1.php

Extract from the operating instructions (as of January 2024):

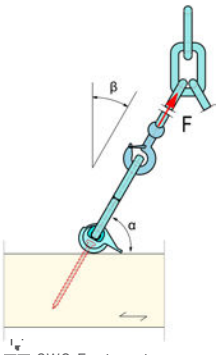
Würth spherical head anchors of load group 1 – 1.3 tonnes may be used in combination with the following screws:

- Würth ASSY® 4 COMBI T transportation anchor screw Ø 10 and 12 mm
- Würth ASSY® 4 COMBI timber screw Ø 12 mm
- Würth ASSY® PLUS VG 4 COMBI construction screw Ø 12 mm

www.wuerth.de

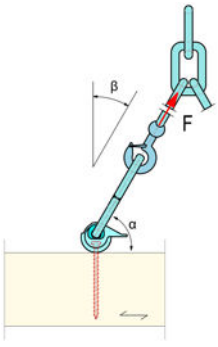
The following screw load cases are possible:

Axial tension

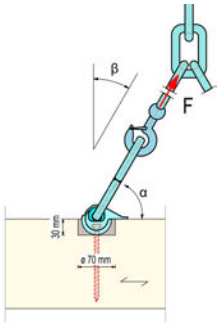


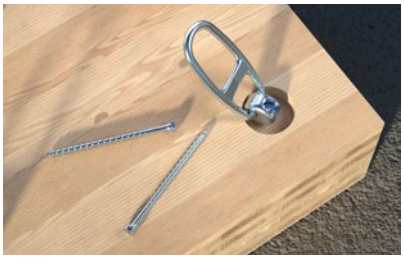
SWG Engineering

Inclined pull



Inclined pull with precise blind-hole milling





www.wuerth.de

If necessary, the customer must produce precisely fitting blind-hole millings or install transverse tension reinforcements when using the lifting screws on narrow sides.

For safety reasons, the lifting screws may only be used once.

06.4 RAMPA® LIFTING SYSTEM TYPE X

Scope of KLH services (on request):

- Drill holes on side surfaces
- Drill holes on narrow sides along master panel edges and of at least 100 mm thickness
- Installation of the RAMPA® inserts in the KLH® elements

This lifting equipment must be used in accordance with the valid operating instructions for "Audited 1-click RAMPA® lifting system":

https://www.rampa.com/eu/en/Products/RAMPA-Lifting-gear/

Extract from the product data sheet (as of January 2024):

RAMPA® lifting system type X consisting of: load suspension type X and insert type X:

- Insert type X D25x50: drill hole diameter 23 mm, minimum panel thickness 60 mm
- Insert type X D33x73: drill hole diameter 31 mm, minimum panel thickness 80 mm
- Insert type X D36x73: drill hole diameter 34 mm, minimum panel thickness 120 mm

www.rampa.com

Inserts must be screwed in at right angles to the surface and flush with the surface. They may be installed on the sides and narrow sides of elements. The following load cases can be modelled:

- Lifting upright elements
- Lifting horizontal elements
- Turning a horizontal element upright and then lifting it

For other types of RAMPA® lifting equipment (e.g. RAMPA® inserts type SKL), the respective manufacturer's operating instructions apply.

06.5 WASP HOOK FOR TIMBER ELEMENTS TRANSPORT

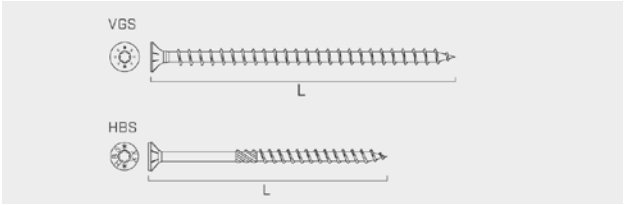
This lifting equipment must be used in accordance with the valid operating instructions:

https://www.rothoblaas.com/products/machines-and-tools/transport-and-lifting/wasp

Extract from the technical documentation (as of January 2024):

WASP is made of very high strength carbon steel, WASPL is forged from high-strength steel. Both versions are coated with white electro-galvanising.

Suitable screws:		
	VGS [mm]	**HBS** [mm]
WASP	Ø11	Ø10
WASPL	Ø11 | Ø13	Ø12



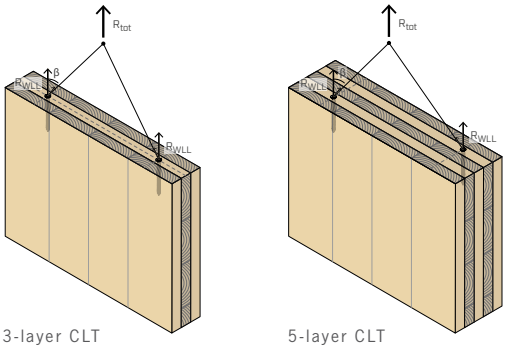
Possible installation of lifting screws:

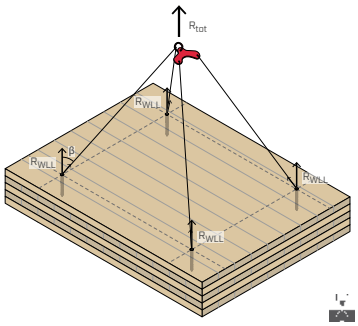
- perpendicular
- perpendicular with milling
- inclined

On narrow sides, lifting screws may only be screwed into the inner layers and only at right angles to the fibres.

The angle β between the screw axis and the hanger must not exceed 60°.

For safety reasons, lifting screws may only be used once and must be fully countersunk into the wooden element or unscrewed after use.





06.6 RAPTOR RIGGING DEVICE FOR TIMBER ELEMENTS

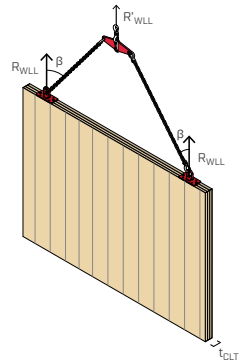
This lifting equipment must be used in accordance with the valid operating instructions:

https://www.rothoblaas.com/products/machines-and-tools/transport-and-lifting/raptor

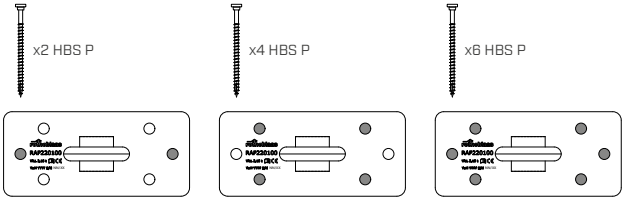
Extract from the technical documentation (as of January 2024):

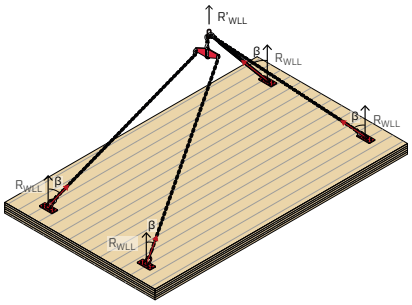
The metal plate with 6 holes and the lifting hook are made of steel. It provides 3 installation options with HBS PLATE screws (HBSP Ø 10) of different lengths depending on the load conditions (axial or transverse loads) and the material being transported (L = 80 to 180 mm).

- 6 screws: maximum load capacity
- 4 or 2 screws for lifting lighter elements



Possible layout of screws

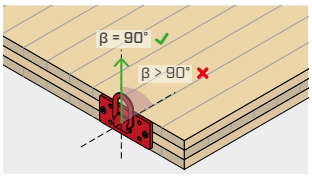


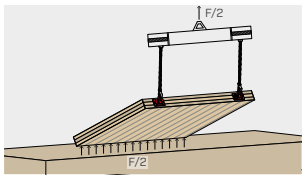


The angle β between the screw axis and the hanger must not exceed 60°.

For safety reasons, lifting screws may only be used once.

From a panel thickness of 100 mm, the RAPTOR rigging device may be attached to narrow sides and used for turning upright ("tipping" phase).





www.rothoblaas.de

07.1 KLH® LIFTING GEAR SYSTEM "W" ("WALL SYSTEM")

Type: "W 1000" and "W 2500"

Scope of KLH services:

- Drill hole (1 piece with diameter 30 mm)
- Installation of the one-way lifting loop (type Pewag 1000 or Pewag 2500)

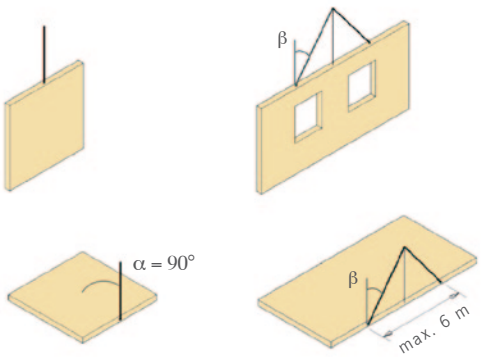
EC Declaration of Conformity: see annex page 26

Description and characteristics:

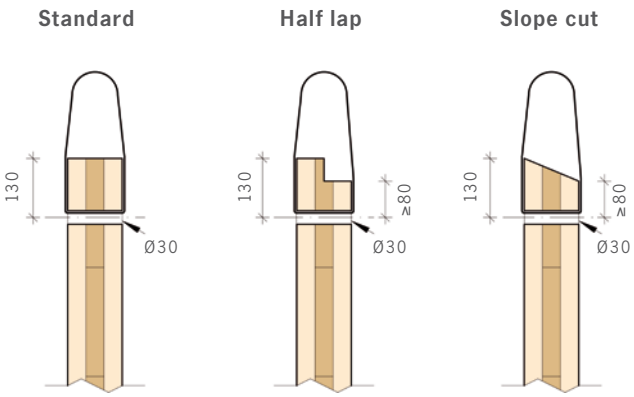
- Visibly installed lifting device primarily for wall elements in non-visible quality
- 1 or max. 2 loops per element (max. distance 6 m)

The following load cases can be modelled:

- Lifting upright elements
- Turning a horizontal element upright and then lifting it



Minimum edge distances:



Depending on the load, the loops can leave marks in the wood. If necessary, the holes can be re-drilled (widened) on site with a 35 mm drill bit and sealed with a wooden plug.

07.2 KLH® LIFTING GEAR SYSTEM "FD" ("FLOOR DIAGONAL SYSTEM")

Type: "FD 1000" and "FD 2500"

Scope of KLH services:

- Drill holes (2 pieces with a diameter of 30 mm, distance e = 100 mm at 45° to the fibre direction)
- Installation of the one-way lifting loop (type Pewag 1000 or Pewag 2500)

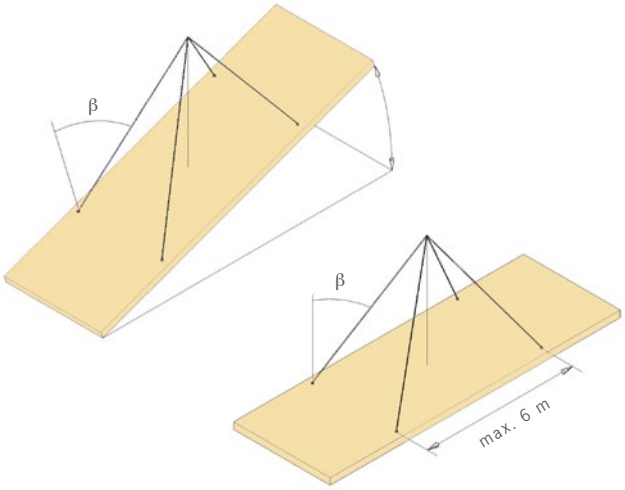
EC Declaration of Conformity: see annex page 26

Description and characteristics:

- Visibly installed lifting device primarily for slab and roof elements in non-visible quality
- 1 or max. 4 loops per element (max. distance 6 m)

The following load cases can be modelled:

- Lifting horizontal elements
- Assembling horizontal or inclined elements



Installation of the lifting loops:

1. Insert the lifting loop into the hole

2. Feed the loop back through the second hole

3. Lifting situation with built-in FD system

Depending on the load, the loops can leave marks in the wood. If necessary, the holes can be re-drilled (widened) on site with a 35 mm drill bit and sealed with a wooden plug.

07.3 KLH® LIFTING GEAR SYSTEM “FB VLS”

Type: “FB10 VLS S1”, “FB10 VLS S2”, “FB25 VLS S3” and “FB25 VLS S4”

Description:

- KLH decides whether the "FB" or "VLS S" lifting gear is to be installed
- The "VLS S" lifting gear is shown graphically in the element plans
- However, the elements are supplied with the "FB" or "VLS S" lifting gear

The lifting devices "FB" and "VLS S" are described in the following chapters, whereby the designation "FB10" corresponds to the lifting device "FB 1000" and the designation "FB25" corresponds to the lifting device "FB 2500". By taking into account the different (site-specific) installation options at KLH, a cost advantage can be passed on to the customer when using this lifting system.

Ordered lifting gear:	Graphical representation in element drawing as:	Factory-installed lifting gear:
“FB10 VLS S1”	VLS S1	“FB 1000” or “VLS S1”
“FB10 VLS S2”	VLS S2	“FB 1000” or “VLS S2”
“FB25 VLS S3”	VLS S3	“FB 2500” or “VLS S3”
“FB25 VLS S4”	VLS S4	“FB 2500” or “VLS S4”

Variant 1: “FB VLS” delivered as “FB”

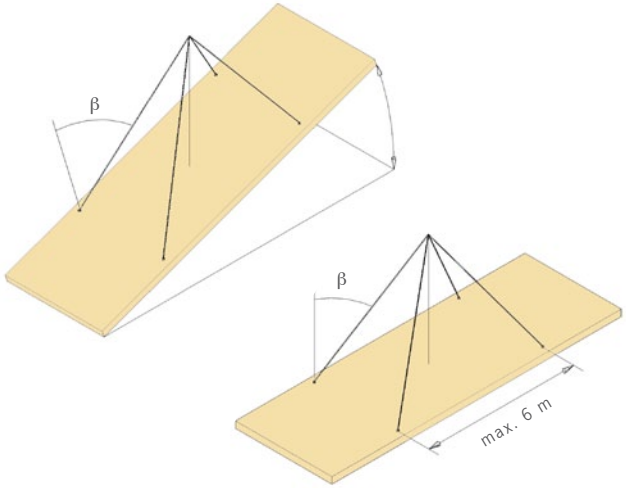
Variant 2: “FB VLS” delivered as “VLS S”

Characteristics:

- Visible or concealed lifting device primarily for slab and roof elements in visible quality
- 1 to max. 4 loops per element (max. distance 6 m)

The following load cases can be modelled:

- Lifting horizontal elements
- Assembling horizontal or inclined elements



07.4 KLH® LIFTING GEAR SYSTEM "VLS S" ("VISIBLE LIFTING SYSTEM FOR SLAB ELEMENTS")

Type: "VLS S1", "VLS S2", "VLS S3" and "VLS S4"

Scope of KLH services:

- Blind hole (1 piece with diameter 68 mm)
- Installation of the one-way lifting loop (type Pewag 600 or Pewag 1000 or Pewag 2500) with rod dowel and stowing the loop in the blind hole

EC Declaration of Conformity: see annex page 27

Description and characteristics:

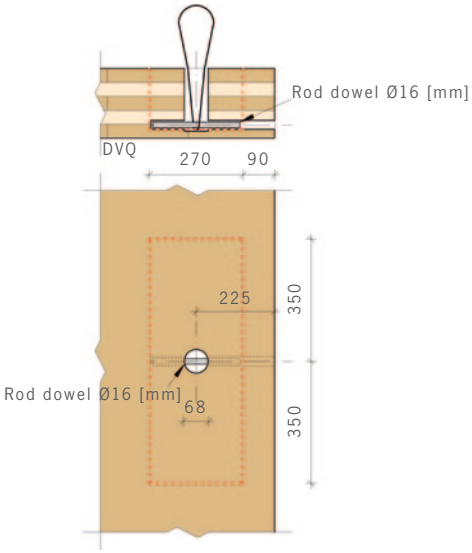
- Concealed lifting device primarily for slab and roof elements in visible quality
- 1 to max. 4 loops per element (max. distance 6 m)

The following load cases can be modelled:

- Lifting horizontal elements
- Assembling horizontal or inclined elements (max. 45°)

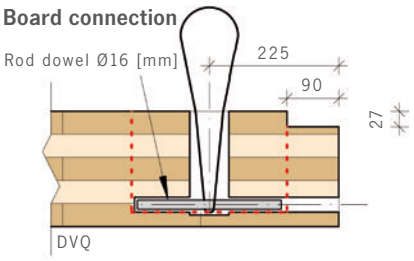
Minimum edge distances:

Illustration of the edge distances for VLS S systems
(the area marked in red must not be processed)

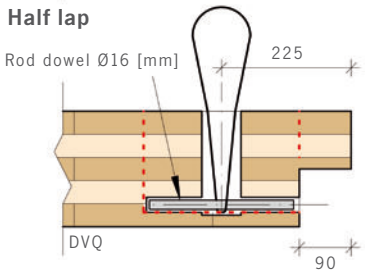


Examples of permissible edge processing

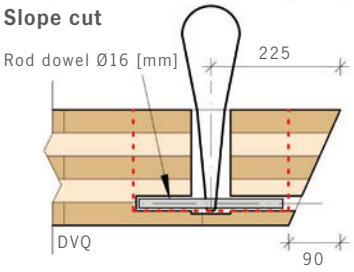
Board connection



Half lap

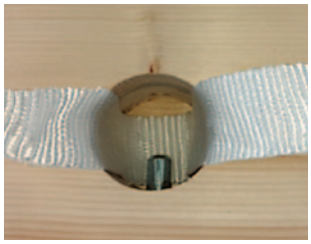


Slope cut

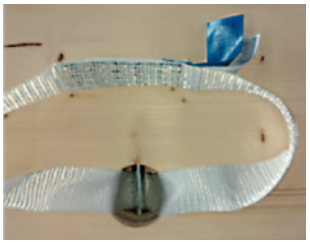


The galvanised rod dowel remains in the KLH element. If necessary, the blind hole must be filled on site in a suitable manner.

Installation of the lifting gear:



1. Insert the loop and dowel into the hole



2. Lifting situation with built-in system VLS S

3. Transport situation with rolled-up loop in the blind hole

07.5 KLH® LIFTING GEAR SYSTEM "FB" ("FLOOR BOLT SYSTEM")

Type: "FB 1000" and "FB 2500"

Scope of KLH services (on request):

- Drill hole (1 piece with diameter 30 mm)
- Installation of the one-way lifting loop (type Pewag 1000 or Pewag 2500) with safety bolt (reusable)

EC Declaration of Conformity: see annex page 26

Description and characteristics:

- Visibly installed lifting gear primarily for slab and roof elements in visible quality
- 1 to max. 4 loops per element (max. distance 6 m)

The following load cases can be modelled:

- Lifting horizontal elements
- Assembling horizontal or inclined elements

Installation of the lifting loops:

1. Insert the loop into the hole

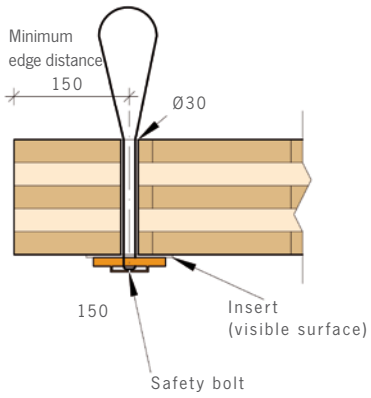
2. Do not position the loop seam in the area of the bolt or lifting hook

3. Insert the bolt with the safety clip facing downwards and position it accordingly

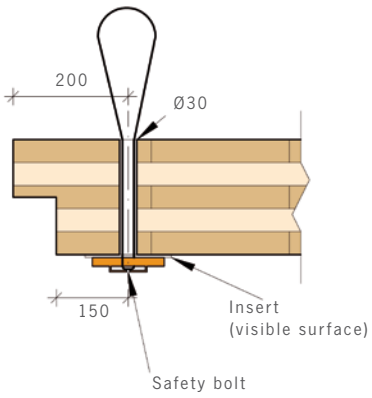
4. Lifting situation with built-in FB system

Minimum edge distances:

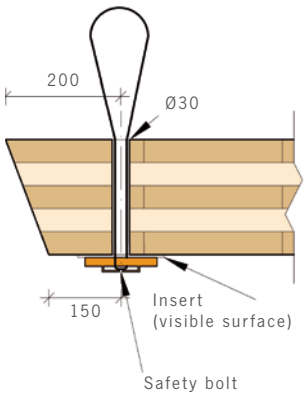
Standard



Half lap



Slope cut



Depending on the load, the loops can leave marks in the wood. If necessary, the holes can be re-drilled (widened) on site with a 35 mm drill bit and sealed with a wooden plug.

07.6 KLH® LIFTING GEAR SYSTEM "VLS W" ("VISIBLE LIFTING SYSTEM FOR WALL ELEMENTS")

Type: "VLS W2", "VLS W3", "VLS W4" and "VLS W5"
"VLS W2 D", "VLS W3 D", "VLS W4 D" and "VLS W5 D"

Scope of KLH services (on request):

- Drill hole for rod dowel and loop (1 each with a diameter of 25 mm)
- Installation of the one-way lifting loop (type Pewag 1000 or Pewag 2500) with rod dowel

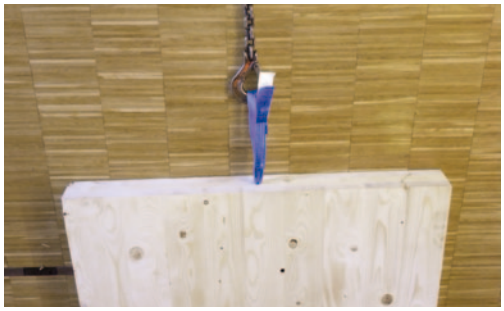
EC Declaration of Conformity: see annex page 28

Description and characteristics:

- Concealed lifting device primarily for wall elements in visible quality
- 1 to max. 2 loops per element (max. distance 6 m)

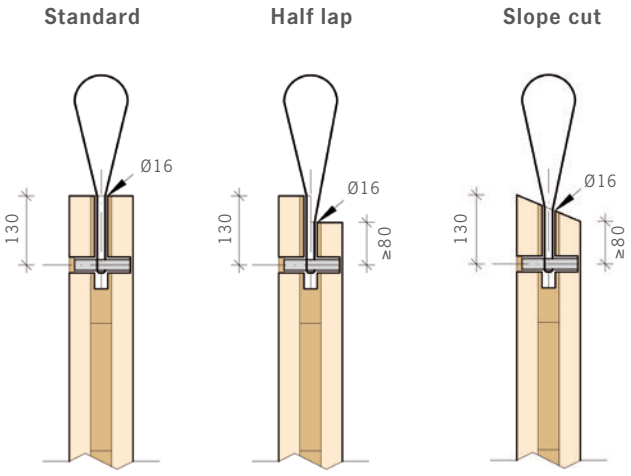
The following load cases can be modelled:

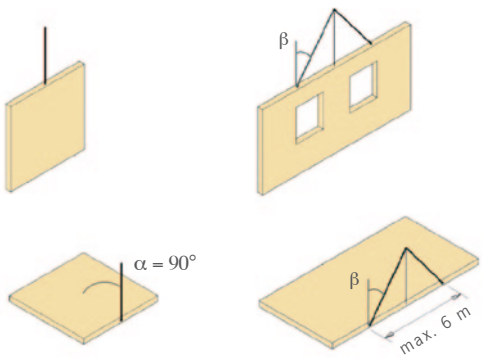
- Lifting upright elements
- Turning a horizontal element upright and then lifting it



If the lifting gear is installed in pairs, the lifting hook must be hooked into both loops

Minimum edge distances:





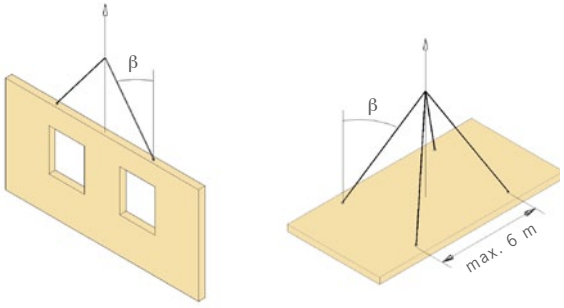
The galvanised rod dowel remains in the KLH element.

GUIDELINE FOR THE USE OF KLH® LIFTING GEAR SYSTEMS WITH EC CERTIFICATE OF CONFORMITY

Lifting operations using KLH® lifting gear systems with an EC certificate of conformity may only be carried out with suitable lifting equipment and a suitable hanger.

Please observe the following procedure for lifting, unloading, interim storing, and assembling:

- Visually inspect the installed one-way lifting loops
- Hook into all installed lifting loops (hook opening to the outside)
- Maximum distance between the lifting points 6 m
- Inclination angle of the hanger β = 30° - 45°

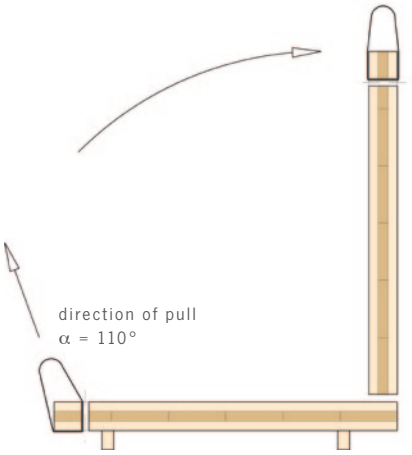


TRANSPORT FLAT → LIFT FLAT
OR
TRANSPORT STANDING → LIFT STANDING

Unloading and assembling are carried out directly from the trailer using the built-in KLH® lifting gear; the position of the element remains unchanged.

TRANSPORT FLAT → TURNING UPRIGHT → LIFT STANDING

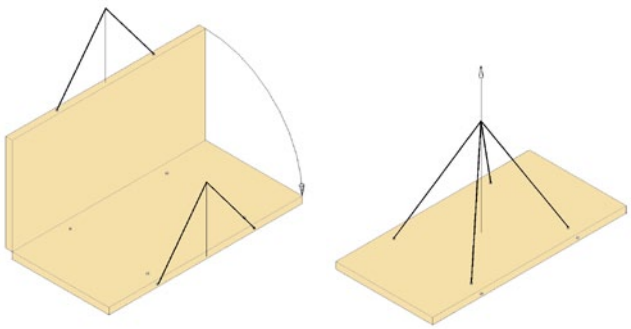
The built-in KLH® lifting devices of type "W" and "VLS W" are suitable both for turning upright and for lifting the element upright. When turning upright, the elements must be prevented from slipping (direction of pull α = 110°). This variant can be used for horizontal delivery of wall elements.



Load securing in accordance with legal regulations and provisions

TRANSPORT STANDING → LAYING DOWN → LIFT FLAT

The element is unloaded and deposited horizontally and securely using the built-in KLH® lifting gear type "W" or "VLS W". The hanger must then be transferred to the lifting gear for horizontal lifting (e.g. type "VLS S"). In exceptional cases, the loops supplied must be installed on site in the factory-prepared holes in accordance with the installation instructions. This variant can be used for upright delivery of slab or roof elements.



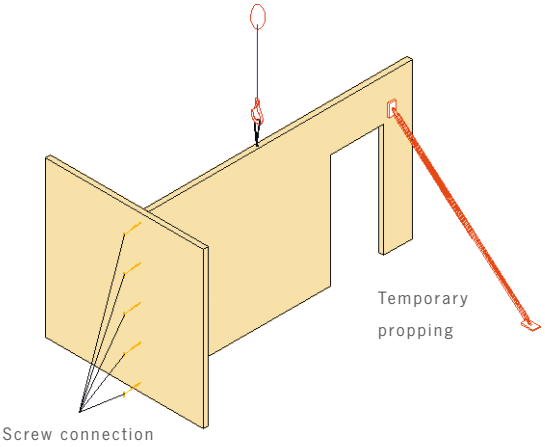
1. Unloading with the unloading lifting system
2. Assembling with the assembly lifting system

Load securing in accordance with legal regulations and provisions

VERTICAL ELEMENT INSTALLATION FOR WALL ELEMENTS

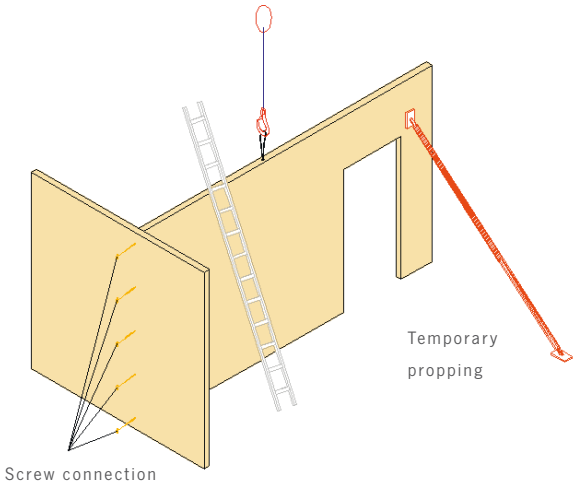
FIX WALL ELEMENT

- Bring the wall into the installation position – ensure that the wall is secured in position



UNHOOK CRANE HOOKS

- Observe the applicable employee protection regulations and other provisions



DISPOSE OF ONE-WAY LIFTING LOOPS

HORIZONTAL ELEMENT INSTALLATION FOR SLAB AND ROOF ELEMENTS

FIX SLAB/ROOF ELEMENT

- Bring the slab/roof element into the installation position – ensure that the element is secured in position

UNHOOK CRANE HOOKS

- When accessing the slab or roof elements, observe the applicable employee protection regulations and other provisions

CUT THE LIFTING LOOPS WHEN USING THE VLS SYSTEM

- Wearing safety gloves and using a safety knife in accordance with the Employee Protection Ordinance

DECLARATION of CONFORMITY

accord. Directive of Machinery 2006/42/EG

The Signee:	*Dipl.-Ing. Dr. techn. Erich Moschik* *Zivilingenieur für Maschinenbau, A-9300 St. Veit/Glan*

declares, that the system / machinery

1. Product:	***KLH Lifting Systems*** ***for lifting wall and ceiling elements*** ***consisting of lifting loops, manuf. Pewag as well as bolts***
2. Type:	***W 1000, W 2500, FD 1000, FD 2500, FB 1000, FB 2500***
3. Year of Manufacture:	***2009 / Adaptation 2021 / Adaptation 2023***
4. User:	***KLH Massivholz GmbH, A-8842 Teufenbach-Katsch, Gewerbestraße 4*** ***KLH Massivholz Wiesenau GmbH, A-9400 Wolfsberg, Schwemmtratten 7***

meets the following essential safety requirements and standards:

- Provisions of the EC Directives:

2006/42/EG	*Directive of Machinery*

- harmonized Standards

EN 12100 -1	*Safety of machinery - General principles for design — Risk assessment and risk reduction*
EN 547-3	*Safety of machinery - Human body measurements*
EN 614-2	*Safety of machinery - Ergonomic design principles,* *Part 2: Interactions between the design of machinery and work tasks*
EN 818-2	*Short link chain for lifting purposes - Safety* *Part 2: Medium tolerance chain for chain slings - Grade 8*
EN 1492-1	*Textile slings - Safety* *Part 1: Flat woven webbing slings made of man-made fibers for general purpose use*
EN 13854	*Standards on Safety of Machinery - Minimum gaps to avoid crushing of parts of the human body*
EN ISO 13857	*Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs*
EN ISO 14120	*Safety of machinery - General requirements for the design and construction of fixed and movable guards*
EN ISO 14123	*Safety of machinery - Reduction of risks to health from hazardous substances emitted by machinery*

Originally issued	*16.06.2012*
Prolongation	*01.06.2021*
Prolongation	*04.12.2023*
Valid until	*03.12.2028*

St. Veit/Glan, 04.12.2023

Dipl.-Ing. Dr. techn. Erich Moschik

The content of this declaration is in conformance with the DIN EN ISO/IEC 17050-1

DECLARATION of CONFORMITY

accord. Directive of Machinery 2006/42/EG

The Signee:	*Dipl.-Ing. Dr. techn. Erich Moschik* *Zivilingenieur für Maschinenbau, A-9300 St. Veit/Glan*

declares, that the system / machinery

1. Product:	***VLS-S Visible Lifting System*** ***For lifting ceiling elements***
2. Type:	***S1, S2, S3, S4 – ceiling elements***
3. Year of Manufacture:	***2021 / Adaptation 2023***
4. User:	***KLH Massivholz GmbH, A-8842 Teufenbach-Katsch, Gewerbestraße 4*** ***KLH Massivholz Wiesenau GmbH, A-9400 Wolfsberg, Schwemmtratten 7***

meets the following essential safety requirements and standards:

- Provisions of the EC Directives:

2006/42/EG	*Directive of Machinery*

- harmonized Standards

EN 12100 -1	*Safety of machinery - General principles for design — Risk assessment and risk reduction*
EN 547-3	*Safety of machinery - Human body measurements*
EN 614-2	*Safety of machinery - Ergonomic design principles,* *Part 2: Interactions between the design of machinery and work tasks*
EN 818-2	*Short link chain for lifting purposes - Safety* *Part 2: Medium tolerance chain for chain slings - Grade 8*
EN 1492-1	*Textile slings - Safety* *Part 1: Flat woven webbing slings made of man-made fibers for general purpose use*
EN 13854	*Standards on Safety of Machinery - Minimum gaps to avoid crushing of parts of the human body*
EN ISO 13857	*Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs*
EN ISO 14120	*Safety of machinery - General requirements for the design and construction of fixed and movable guards*
EN ISO 14123	*Safety of machinery - Reduction of risks to health from hazardous substances emitted by machinery*

Originally issued	*16.06.2021*
Prolongation:	*04.12.2023*
Valid until	*03.12.2028*

St. Veit/Glan, 04.12.2023

The content of this declaration is in conformance with the DIN EN ISO/IEC 17050-1

DECLARATION of CONFORMITY

accord. Directive of Machinery 2006/42/EG

The Signee:	*Dipl.-Ing. Dr. techn. Erich Moschik* *Zivilingenieur für Maschinenbau, A-9300 St. Veit/Glan*

declares, that the system / machinery

1. Product:	***VLS-Visible Lifting System*** ***For lifting wall and ceiling elements*** ***consisting of lifting loops, TGH rod and one-way bolts***
2. Type:	***W2, W3, W4, W5 – wall elements*** ***D1, D2, D3 – ceiling elements***
3. Year of Manufacture:	***2009 / Adaptation 2021 / Adaptation 2023***
4. User:	***KLH Massivholz GmbH, A-8842 Teufenbach-Katsch, Gewerbestraße 4*** ***KLH Massivholz Wiesenau GmbH, A-9400 Wolfsberg, Schwemmtratten 7***

meets the following essential safety requirements and standards:

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2006/42/EG	*Directive of Machinery*

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EN ISO 14123	*Safety of machinery - Reduction of risks to health from hazardous substances emitted by machinery*

Originally issued	*16.06.2012*
First Prolongation	*01.06.2021*
Second Prolongation	*04.12.2023*
Valid until	*03.12.2028*

St. Veit/Glan, 04.12.2023

The content of this declaration is in conformance with the DIN EN ISO/IEC 17050-1

KLH MASSIVHOLZ GMBH

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