

DEHA HD-SOCKET LIFTING SYSTEM

TECHNICAL INFORMATION



DEHA HD-SOCKET LIFTING SYSTEM

HD 05-E

CONCRETE



HALFEN-DEHA
YOUR BEST CONNECTIONS

THE HD-SOCKET LIFTING SYSTEM

Greater safety, fewer components, integral socket protector

The new generation HD-Lifting System with socket protector and integral data clip caters for the load range up to 15 tonnes with only eight load groups. In practice, this means:

- fewer components,
- less storage space,
- lower stocking requirements,
- less care and maintenance of lifting link

The dimensions of the new HD-Lifting Anchors are carefully designed to keep diameter to a minimum, which makes them particularly suitable for use with thin-walled precast elements.

Wider application due to smaller dimensions

The compact design the HD-Combi-Anchor, with its optimum length and foot shape, offers a wide range of benefits:

- Less space required in the precast element
- Smaller structural component dimensions
- Easy installation in the formwork and reinforcement
- Short anchors
- Low weight

Socket protector system with data clip

The new generation HD-Lifting Anchor has been designed with an integral socket protector. This is clearly labelled with the load group (data clip).



This patented system offers protection against contamination from laitance and dirt, and the ingress of water. This prevents ice or water from accumulating in the anchor socket, and significantly reduces the risk of damage from corrosion. The integration of a colour-coded data clip, specifying the manufacturer, thread size and load group, satisfies the identification requirements according to ZH 1/17, for increased safety.

Robust lifting link for increased safety and economy

The robust HD-Lifting Link, with its fixed steel link, provides a high level of safety and offers clear economic benefits due to the increased service life. The HD-Lifting Link has the following outstanding features:

- A loop ready for the crane hook which is permanently marked with its identification and resistant to wear.
- A robust ring-bolt with rolled and specially hardened thread.



Fit the data clip supplied with the unit.



Screw the nailing plate into the data clip to drive the HSS protector down the socket. Rotate the data clip in the desired direction (depending on the position of the angled lift reinforcement).



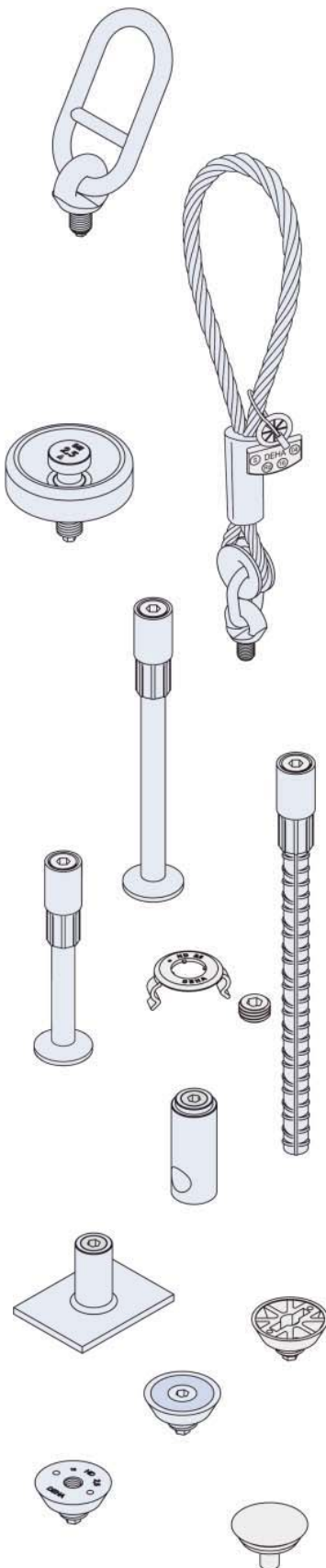
Ready for casting in. Fix the nailing plate to the formwork and wire the tail to the reinforcement if necessary.

The HD-Lifting Link is easy to use, withstands diagonal and shear forces and activates the socket protector. The hexagonal driver makes it easy to both screw down the thread protector for lifting and bring it up again when lifting is complete.



HD load groups										
Rd 12		Rd 16		Rd 20	Rd 24	Rd 30	Rd 36	Rd 42	Rd 52	
1.3		2.5		4.0	5.0	7.5	10.0	12.5	15.0	
0.5	0.8	1.2	1.6	2.0	2.5	4.0	6.3	8.0	12.5	15.0
Rd12	Rd14	Rd16	Rd18	Rd20	Rd24	Rd30	Rd36	Rd42	Rd52	Rd56
traditional load groups										

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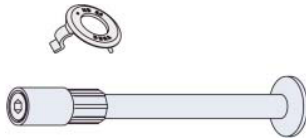
SYSTEM – OVERVIEW

HD-SOCKET LIFTING SYSTEM

HD-SOCKET ANCHORS

HD-Anchor

Designation 6360-Load group



For lifting a wide range of different sized precast concrete elements.

Load groups 1.3 - 15.0. Available:

- Galvanized Socket, carbon steel rod
- Dacromet socket, carbon steel rod
- Stainless steel socket, carbon steel rod

see Pages 12/13

HD-Rod Anchor

Designation 6361-Load group



For use with especially thin precast concrete elements such as the walls of garages and transformer stations.

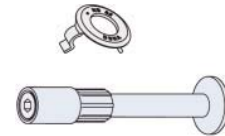
Load groups 1.3 - 15.0. Available:

- Galvanized Socket, carbon steel rod
- Dacromet socket, carbon steel rod
- Stainless steel socket, carbon steel rod

see Pages 14/15

HD-Short Anchor

Designation 6360-Load group



For lifting thin structural elements such as floor slabs etc.

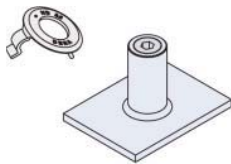
Load groups 1.3 - 5.0. Available:

- Galvanized Socket, carbon steel rod
- Dacromet socket, carbon steel rod
- Stainless steel socket, carbon steel rod

see Page 16

HD-Plate Anchor

Designation 6370-Load group



For lifting large, thin precast elements such as slabs or demolding panels.

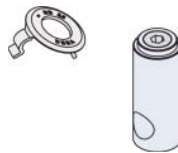
Load groups 1.3 - 7.5. Available:

- Galvanized
- Dacromet
- Stainless steel

see Page 17

HD-Plain Anchor With Hole

Designation 6376-Load group



For lifting thin precast walls or for use with low-strength concrete. Reinforcement tail essential.

Load groups 1.3 - 10.0.

Available:

- Galvanized
- Dacromet
- Stainless steel

see Page 18

CORROSION PROTECTION – CARBON STEEL

"DACROMET" is a metallic coating (8-10 μm) which mainly consists of zinc and aluminium flakes. These are blended with a mineral chromium oxide binder. The overlapping zinc and aluminium flakes and the ceramic binder form an excellent barrier against external effects. The zinc corrodes in preference to the steel and protects the steel and internal thread of the socket.

The cathodic protection ensures optimum corrosion protection, particularly when exposed to the weather.

Advantages for the customer

- Better thread protection.
- Significantly increased corrosion protection in comparison to electroplated zinc.
- No risk of hydrogen embrittlement.

- Better resistance to abrasion than electroplated zinc.
- High resistance to operating materials such as solvents and oils etc.
- The dacrometisation process is listed in all the important national and international standards.
- DIN EN ISO 10683 non-electrolytically applied zinc-flake coatings.

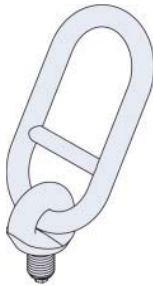
SYSTEM – OVERVIEW

HD-SOCKET LIFTING SYSTEM

HD-LIFTING ATTACHMENTS

HD-Lifting Link

Designation 6362-Load group



For lifting precast elements in conjunction with HD-Socket Anchors. Load groups 1.3 - 15.0

see Page 19

HD-Perfect Lifting Head

Designation 6377-Load group



For lifting precast elements in combination with HD-Socket Anchors. Load groups 1.3 - 15.0

see Page 20

HD-Adaptor

Designation 6366-Load group



The HD-Adaptor enables the universal lifting head clutch to be used with the HD-Socket Lifting Anchor. The DEHA Universal Head Lifting Clutch (6102) is engaged in the adaptor for lifting. Load groups 1.3 - 15.0

see Page 20

ACCESSORIES

HD-Nailing Plate, plastic

Designation 6364-Load group



For attaching the HD-Socket Lifting Anchor to the mould. For thread sizes M/Rd 12-52.

see Page 21

HD-Nailing Plate, steel

Designation 6369-Load group



For attaching the HD-Socket Lifting Anchor to the mould. For thread sizes M/Rd 12-52.

see Page 21

HD-Magnetic Plate

Designation 6365-Load group



For attaching the HD-Socket Lifting Anchor to the mould. For thread sizes M/Rd 12-52.

see Page 21

HD-Sealing Plate

Designation 6513-Load group



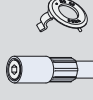
For sealing the HD-Socket Lifting Anchor as protection against contamination and for use in face concrete. For thread sizes M/Rd 12-24.

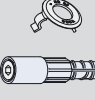
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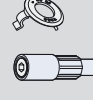
THE RANGE

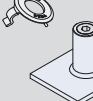
HD-SOCKET LIFTING SYSTEM


HD-SOCKET ANCHORS

Load group		 HD-Anchor	
		Designation	Order number
Socket electroplated galvanized	1.3	6360-1.3-130	0740.130-00001
	2.5	6360-2.5-200	0740.130-00002
	4.0	6360-4.0-258	0740.130-00003
	5.0	6360-5.0-325	0740.130-00004
	7.5	6360-7.5-400	0740.130-00005
	10.0	6360-10.0-475	0740.130-00006
	12.5	6360-12.5-550	0740.130-00007
Socket stainless steel A4	15.0	6360-15.0-575	0740.130-00008
	1.3	6360-1.3-130 A4	0740.130-00009
	2.5	6360-2.5-200 A4	0740.130-00010
	4.0	6360-4.0-258 A4	0740.130-00011
	5.0	6360-5.0-325 A4	0740.130-00012
	7.5	6360-7.5-400 A4	0740.130-00013
	10.0	6360-10.0-475 A4	0740.130-00014
Socket dactrometised	12.5	6360-12.5-550 A4	0740.130-00015
	15.0	6360-15.0-575 A4	0740.130-00016
	1.3	6360-1.3-130 DC	0740.130-00025
	2.5	6360-2.5-200 DC	0740.130-00026
	4.0	6360-4.0-258 DC	0740.130-00027
	5.0	6360-5.0-325 DC	0740.130-00028
	7.5	6360-7.5-400 DC	0740.130-00029
	10.0	6360-10.0-475 DC	0740.130-00030
	12.5	6360-12.5-550 DC	0740.130-00031
	15.0	6360-15.0-575 DC	0740.130-00032

Load group		 HD-Rod Anchor	
		Designation	Order number
Socket electroplated galvanized	1.3	6361-1.3-300	0740.140-00001
	2.5	6361-2.5-400	0740.140-00002
	4.0	6361-4.0-480	0740.140-00003
	5.0	6361-5.0-540	0740.140-00004
	7.5	6361-7.5-700	0740.140-00005
	10.0	6361-10.0-800	0740.140-00006
	12.5	6361-12.5-920	0740.140-00007
Socket stainless steel A4	15.0	6361-15.0-1100	0740.140-00008
	1.3	6361-1.3-300 A4	0740.140-00009
	2.5	6361-2.5-400 A4	0740.140-00010
	4.0	6361-4.0-480 A4	0740.140-00011
	5.0	6361-5.0-540 A4	0740.140-00012
	7.5	6361-7.5-700 A4	0740.140-00013
	10.0	6361-10.0-800 A4	0740.140-00014
Socket dactrometised	12.5	6361-12.5-920 A4	0740.140-00015
	15.0	6361-15.0-1100 A4	0740.140-00016
	1.3	6361-1.3-300 DC	0740.140-00017
	2.5	6361-2.5-400 DC	0740.140-00018
	4.0	6361-4.0-480 DC	0740.140-00019
	5.0	6361-5.0-540 DC	0740.140-00020
	7.5	6361-7.5-700 DC	0740.140-00021
	10.0	6361-10.0-800 DC	0740.140-00022
	12.5	6361-12.5-920 DC	0740.140-00023
	15.0	6361-15.0-1100 DC	0740.140-00024

Load group		 HD-Short Anchor	
		Designation	Order number
Socket electroplated galvanized	1.3	6360-1.3-070	0740.130-00017
	2.5	6360-2.5-090	0740.130-00018
	4.0	6360-4.0-125	0740.130-00019
	5.0	6360-5.0-140	0740.130-00020
Socket stainless steel A4	1.3	6360-1.3-070 A4	0740.130-00021
	2.5	6360-2.5-090 A4	0740.130-00022
	4.0	6360-4.0-125 A4	0740.130-00023
	5.0	6360-5.0-140 A4	0740.130-00024
Socket dactrometised	1.3	6360-1.3-070 DC	0740.130-00033
	2.5	6360-2.5-090 DC	0740.130-00034
	4.0	6360-4.0-125 DC	0740.130-00035
	5.0	6360-5.0-140 DC	0740.130-00036


Load group		 HD-Plate Anchor	
		Designation	Order number
Electroplated galvanized	1.3	6370-1.3	0740.180-00001
	2.5	6370-2.5	0740.180-00002
	4.0	6370-4.0	0740.180-00003
	5.0	6370-5.0	0740.180-00004
	7.5	6370-7.5	0740.180-00005
Stainless steel A4	1.3	6370-1.3 A4	0740.180-00006
	2.5	6370-2.5 A4	0740.180-00007
	4.0	6370-4.0 A4	0740.180-00008
	5.0	6370-5.0 A4	0740.180-00009
	7.5	6370-7.5 A4	0740.180-00010
Dactrometised	1.3	6370-1.3 DC	0740.180-00011
	2.5	6370-2.5 DC	0740.180-00012
	4.0	6370-4.0 DC	0740.180-00013
	5.0	6370-5.0 DC	0740.180-00014
	7.5	6370-7.5 DC	0740.180-00015

Load group		 HD-Plain Anchor With Hole	
		Designation	Order number
Electroplated galvanized	1.3	6376-1.3	0740.190-00001
	2.5	6376-2.5	0740.190-00002
	4.0	6376-4.0	0740.190-00003
	5.0	6376-5.0	0740.190-00004
	7.5	6376-7.5	0740.190-00005
	10.0	6376-10.0	0740.190-00006
Stainless steel A4	1.3	6376-1.3 A4	0740.190-00007
	2.5	6376-2.5 A4	0740.190-00008
	4.0	6376-4.0 A4	0740.190-00009
	5.0	6376-5.0 A4	0740.190-00010
	7.5	6376-7.5 A4	0740.190-00011
	10.0	6376-10.0 A4	0740.190-00012
Dactrometised	1.3	6376-1.3 DC	0740.190-00013
	2.5	6376-2.5 DC	0740.190-00014
	4.0	6376-4.0 DC	0740.190-00015
	5.0	6376-5.0 DC	0740.190-00016
	7.5	6376-7.5 DC	0740.190-00017
	10.0	6376-10.0 DC	0740.190-00018


THE RANGE

HD-SOCKET LIFTING ATTACHMENTS AND ACCESSORIES

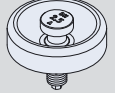
HD-LIFTING LINK

Load group		
	Designation	Order number
1.3	6362-1.3	0742.130-00001
2.5	6362-2.5	0742.130-00002
4.0	6362-4.0	0742.130-00003
5.0	6362-5.0	0742.130-00004
7.5	6362-7.5	0742.130-00005
10.0	6362-10.0	0742.130-00006
12.5	6362-12.5	0742.130-00007
15.0	6362-15.0	0742.130-00008


HD-PERFECT LIFTING HEAD

Load group		
	Designation	Order number
1.3	6377-1.3	0742.170-00001
2.5	6377-2.5	0742.170-00002
4.0	6377-4.0	0742.170-00003
5.0	6377-5.0	0742.170-00004
7.5	6377-7.5	0742.170-00005
10.0	6377-10.0	0742.170-00006
12.5	6377-12.5	0742.170-00007
15.0	6377-15.0	0742.170-00008

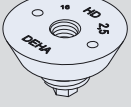
HD-ADAPTORS

Load group		
	Designation	Order number
1.3	6366-1.3	0742.140-00001
2.5	6366-2.5	0742.140-00002
4.0	6366-4.0	0742.140-00003
5.0	6366-5.0	0742.140-00004
7.5	6366-7.5	0742.140-00005
10.0	6366-10.0	0742.140-00006
12.5	6366-12.5	0742.140-00007
15.0	6366-15.0	0742.140-00008

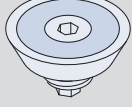
HD-NAILING PLATES, PLASTIC

Load group		
	Designation	Order number
1.3	6364-1.3	0741.160-00001
2.5	6364-2.5	0741.160-00002
4.0	6364-4.0	0741.160-00003
5.0	6364-5.0	0741.160-00004
7.5	6364-7.5	0741.160-00005
10.0	6364-10.0	0741.160-00006
12.5	6364-12.5	0741.160-00007
15.0	6364-15.0	0741.160-00008


HD-NAILING PLATES, STEEL

Load group		
	Designation	Order number
1.3	6369-1.3	0741.190-00001
2.5	6369-2.5	0741.190-00002
4.0	6369-4.0	0741.190-00003
5.0	6369-5.0	0741.190-00004
7.5	6369-7.5	0741.190-00005
10.0	6369-10.0	0741.190-00006
12.5	6369-12.5	0741.190-00007
15.0	6369-15.0	0741.190-00008

HD-MAGNETIC PLATES

Load group		
	Designation	Order number
1.3	6365-1.3	0741.180-00001
2.5	6365-2.5	0741.180-00002
4.0	6365-4.0	0741.180-00003
5.0	6365-5.0	0741.180-00004
7.5	6365-7.5	0741.180-00005
10.0	6365-10.0	0741.180-00006
12.5	6365-12.5	0741.180-00007
15.0	6365-15.0	0741.180-00008

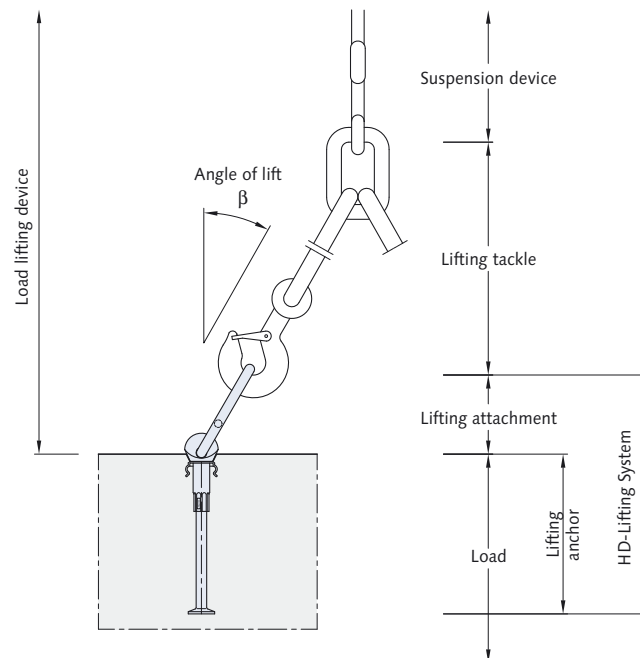
HD-SEALING PLATES

Load group		
	Designation	Order number
1.3	6513-1.3	0741.280-00001
2.5	6513-2.5	0741.280-00002
4.0	6513-4.0	0741.280-00003
5.0	6513-5.0	0741.280-00004

SAFETY

SAFETY REGULATIONS OF THE MAIN GERMAN INDUSTRIAL EMPLOYERS' LIABILITY INSURANCE ASSOCIATION FOR LIFTING ANCHORS AND LIFTING ANCHOR SYSTEMS FOR PRECAST CONCRETE ELEMENTS ZH 1/17

These safety regulations apply to series manufactured lifting anchors and lifting anchor systems for transporting precast concrete elements with lifting equipment. Under these regulations, lifting anchor systems are defined as assemblages consisting of the component which is permanently anchored in the precast concrete element (lifting anchor) and the load-bearing component which is temporarily attached for lifting purposes. Lifting anchors and lifting anchor systems must be manufactured in such a way that, when used properly, they ensure that the precast element is lifted safely.



LABELLING

All HD-Lifting Anchors and lifting attachments are clearly marked for the benefit of the user. According to the safety regulations for lifting anchor systems, the identification markings must also be clearly visible after installation. This requirement is fulfilled by the pre-assembled socket protector system which is clearly marked.

SAFETY FACTORS

The components in the HD-Lifting Anchor System is designed with a safety factor of at least 3 against steel failure. The load limits given in the tables have a safety factor of at least 2.5 against concrete failure. Note, however that all loads must be factored as shown on page 9.

INSTALLATION AND APPLICATION

The HD-Socket Lifting System must only be installed in accordance with the following technical instructions. Combining components of the system with those of other manufacturers is not permitted. Re-using lifting anchors is not permitted. Repeated lifting when lifting and installing the precast element is not considered as re-use. For lifting anchors which are intended for long term use, such as crane ballast kentledge and cover slabs, the sockets must be manufactured from stainless steel, in accordance with the approval certificate for "Stainless steels", Approval No. Z- 30.3-6. Incorrectly installed lifting anchors, or lifting anchors which have damaged components, such as corrosion or visible deformation, must not be used for lifting purposes.

The Installation instructions for the different systems must be available at the point where the anchor system is being used, i.e. at the precast yard and on the construction site. Production management and site management must ensure that personnel are aware of and have understood the installation and general safety regulations.

QUALITY CONTROL

All required testing of lifting anchors and lifting attachments is carried out as part of the internal quality assurance system operated by HALFEN-DEHA which complies with DIN ISO 9001/2000.

CRITERIA FOR SELECTING THE HD-SOCKET LIFTING SYSTEM AND LOAD RANGE

USE OF THE LIFTING ANCHOR

The dimensions of the precast element, the type and position of the lifting anchor and concrete quality are all critical factors in the design of the lifting system.

CRITERIA FOR THE CHOICE OF ANCHOR

The allowable load-edge, distances and installation values can be taken from the relevant tables.

Please consult our technical department for your particular lifting problem. Our staff will provide you with the optimum technical and cost-effective solution. (Telephone: +49-2173-970-842)

If flat panels have to be pitched using lifting anchors without a tilting table, adequate reinforcement must be provided, as shown in the tables.

Regardless of the type of anchor, the choice of correct anchor for the forces to which it is to be subjected will depend on the following factors, which must be taken into account when selecting the anchor.

- Weight of precast element
- Number of anchors
- Arrangement of the anchors
- Spread angle of the slings
- Turning details
- Dynamic forces
- Adhesion to the mould

WEIGHT OF PRECAST ELEMENT

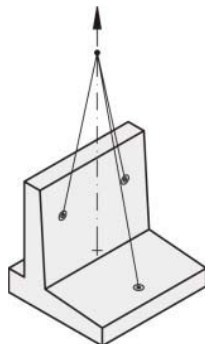
The weight determination of a fresh steel-reinforced precast element must be based on the specific weight of 25 kN/m^3 . A high concentration of reinforcement produces a significant increase in the specific weight. In this case, the volume of the concrete must be multiplied by 24 kN/m^3 plus 70% of the weight of the steel.

NUMBER OF ANCHORS

The number of anchors is determined by the sling which is to be used. Slings attached to more than 2 lifting anchors are statically indeterminate. Lifting slings attached to more than 3 lifting anchors are, in principle, statically indeterminate unless suitable arrangements such as a spreader beam are used to ensure all the anchors are equally loaded.

POSITIONING OF ANCHORS

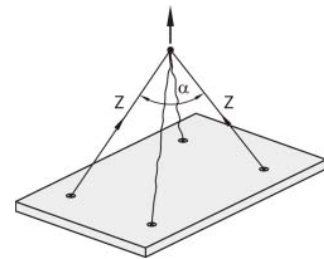
Whenever possible, the lifting anchors should be positioned symmetrically about the centre of gravity of the precast element. If it not possible to apply this rule for any reason, then the tension to which one of the anchors is subjected may be increased, depending on how far away it is from the centre of gravity. These forces must be determined beforehand in order to choose the correct anchor.



STATIC SYSTEMS

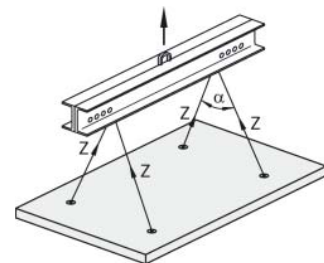
Statically indeterminate system

For statically indeterminate slings, the load must be calculated assuming it is carried by only two anchors, in accordance with UVV (VBG 9a).

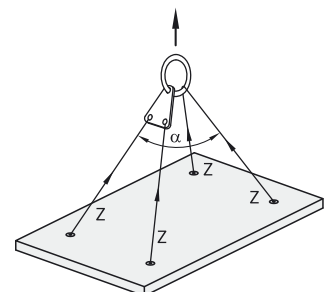


Statically determinate System

By using a spreader beam with symmetrical lifting slings, the load will be distributed equally to all 4 anchors.



Compensated lifting slings ensure equal load distribution at all times.



CRITERIA FOR SELECTING THE HD-SOCKET LIFTING SYSTEM

ANGLE OF LIFT

When a triangular lifting sling is used, the forces acting on the anchors (sling loads) are greater than those of simple diagonal shear. The loading on the anchors and ropes increases with the angle of lift.

When selecting the anchor, this effect is taken into account by the factor ω in relation to the spread angle α .

We recommend a spread angle α of 60° (Table 1). Spread angles above 90° are not permitted.

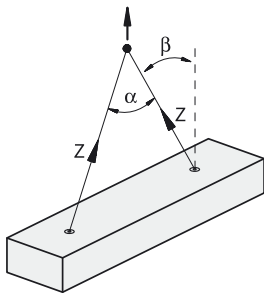


Table 1 Spread angle

Angle α	Spread angle factor ω
0°	1
30°	1.04
60°	1.16
90°	1.41
$> 90^\circ$	not permitted

DYNAMIC FORCES

The size of the dynamic loading is determined by the choice of the lifting tackle between the crane and the lifting attachment.

Cables made from steel or synthetic fibre have a damping effect. This effect increases with increasing cable length. On the other hand, short chains have an adverse effect. The forces acting on the lifting anchor must be calculated taking into account the shock factor ψ (Table 2). Deviations from the shock factors according to Table 2 can vary significantly according to the situation and given conditions. If necessary, the values according to DIN 15 018 must be used.

Table 2 Shock factors

lifting equipment	Lifting speed m/min.	Shock factor ψ
Stationary crane, revolving crane, rail-mounted crane	< 90	1.0 - 1.1
Stationary crane, revolving crane, rail-mounted crane	≥ 90	≥ 1.3
Lifting and transport on level ground	–	≥ 1.65
Lifting and transport on level ground	–	≥ 2.0

ADHESION TO THE MOULD

When the precast element is first lifted out of the mould, the force required may be many times more than the actual weight of the concrete. This is due to the suction, adhesion and friction between the mould and the concrete element. These effects can be reduced by using a suitable release agent on the mould. The adhesion to the mould is determined by factors such as the mould surface.

Table 3 Adhesion force

Type of mould	Adhesion force h_a
smooth oiled mould	1 kN/m ²
smooth non-oiled mould	2 kN/m ²
rough mould	3 kN/m ²

Unless special steps have been taken to release the precast element, this adhesion should be taken into account using the adhesion factor ξ shown in Table 4 when choosing the anchor, particularly with double π slabs and waffle slabs.

Table 4 Adhesion factor

Type of slab	Adhesion factor ξ
π slabs	≥ 2
Ribbed slabs	≥ 3
Waffle slabs	≥ 5

CRITERIA FOR SELECTING THE HD-SOCKET LIFTING SYSTEM

TENSILE FORCES ON THE ANCHOR

The tensile force Z acting on the anchor is normally determined by the following equation:

Lifting from the mould

$$Z = G \times \omega \times \xi / n$$

or

$$Z = (G + h_a \times A) \times \omega / n$$

Lifting load case

$$Z = G \times \omega \times \psi / n$$

where:

Z = tensile force on anchor (kN)

G = weight of precast concrete unit (kN)

h_a = adhesion force (kN/m²)

A = base area (m²)

n = number of load-carrying anchors

ω = spread angle factor

ψ = shock factor

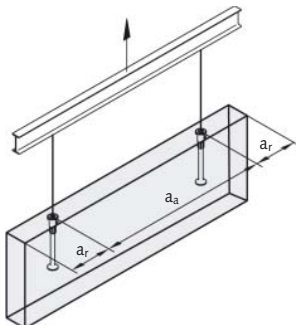
ξ = adhesion factor

LOAD ANGLE, EDGE DISTANCE AND SPACINGS

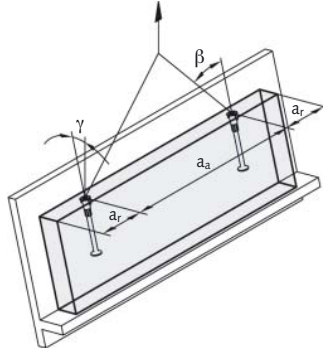
The appropriate reinforcement must be installed according to this technical information.

The existing reinforcement must be taken into account.

Axial pull β 0° to 10°

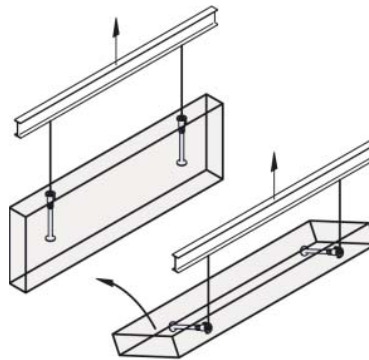


Diagonal pull angle β 12,5° to 45°



The transverse pull can be omitted when using a tilting table and a load angle of $\gamma < 15^\circ$.

90° pitching

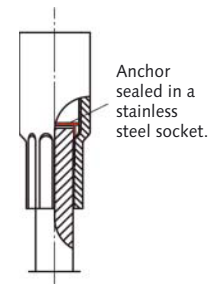


The edge distances and interaxial distances specified in the following tables must be followed.

CORROSION PROTECTION

Standard anchors are carbon steel. The designer must take care to consider suitable corrosion protection.

If the lifting anchors are covered over with a layer of modified mortar after the precast element has been installed, in line with the requirements of DIN 1045-1, further corrosion protection may not be necessary. The standard version with plated socket must not be used for repeated use. An anchor with a stainless steel socket must be used for lifting anchors intended for repeated use as stated in the safety regulations ZH 1/17. With the version of HD-Combi-Anchors with stainless steel sockets, the shaft is protected against corrosion by a seal within the socket. Because of the proportion of molybdenum in the alloy, lifting anchors with 1.4401/1.4571 (A4) stainless steel sockets are also recommended for industrial environments and applications close to the sea, as well as those mentioned above.



The shaft and socket are available in stainless steel if necessary.

Note:

The latest version of the approval certificate for "Stainless steels", no. Z-30.3-6 must be used!

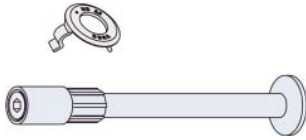
FIRE PROTECTION

Due to their high load-bearing capacity, and low socket and foot diameters, HD-Combi-Anchors and HD-Rod Anchors are particularly suitable for use in concrete panels used in fire-resistant walls. The required component thicknesses for the individual load stages and the relevant minimum levels of reinforcement also have a positive effect on the fire-resistance properties of steel-reinforced concrete walls.

HD-SOCKET LIFTING SYSTEM

HD-ANCHOR

ALLOWABLE LOAD CAPACITY, DIMENSIONS AND REINFORCEMENT FOR HD-ANCHORS



For lifting a wide range of sizes of pre-cast concrete elements. Load groups 1.3 - 15.0. Also available with stainless steel sockets.

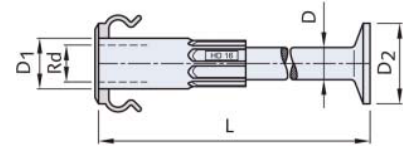


Table 5 Allowable load capacities for HD-Anchors in kN

Load group	Minimum element thickness b (mm)	Concrete compressive strength 15 N/mm ²			Concrete compressive strength 25 N/mm ²		
		Axial load and angled load up to 30° [kN]	Angled load up to 45° [kN]	Pitching load	Axial load and angled load up to 30° [kN]	Angled load up to 45° [kN]	Pitching load
1.3	80	13.0	10.4	5.9	13.0	10.5	7.5
	100	13.0	10.5	7.5	13.0	10.5	7.5
	120	13.0	10.5	7.5	13.0	10.5	7.5
2.5	80	18.7	15.0	4.2	24.1	18.9	5.4
	100	22.7	18.2	6.8	25.0	18.9	8.8
	120	25.0	18.9	9.9	25.0	18.9	12.7
4.0	80	24.0	21.6	4.1	31.0	27.9	5.3
	100	29.8	26.9	6.9	38.5	31.8	8.9
	120	33.1	29.8	8.9	40.0	31.8	11.5
	140	36.0	31.8	12.9	40.0	31.8	16.6
	160	39.0	31.8	17.5	40.0	31.8	22.5
5.0	100	33.4	33.4	9.3	43.1	42.1	12.0
	120	40.0	40.0	13.1	50.0	42.1	16.9
	140	45.6	42.1	14.7	50.0	42.1	19.0
	160	49.0	42.1	20.0	50.0	42.1	25.8
7.5	140	56.0	56.0	18.1	72.3	67.7	23.4
	160	66.8	66.8	24.2	75.0	67.7	31.2
	180	71.8	67.7	31.1	75.0	67.7	40.1
	200	75.0	67.7	39.1	75.0	67.7	42.5
10.0	160	78.7	78.7	24.0	100.0	92.6	30.9
	180	90.7	90.7	30.5	100.0	92.6	39.4
	200	98.3	92.6	38.1	100.0	92.6	49.1
	220	100.0	92.6	46.2	100.0	92.6	57.0
12.5	180	111.6	111.6	33.2	125.0	120.2	42.8
	200	125.0	120.2	40.1	125.0	120.2	51.7
	220	125.0	120.2	48.4	125.0	120.2	62.4
	240	125.0	120.2	57.9	125.0	120.2	71.0
15.0	180	114.1	114.1	29.2	147.4	144.8	37.7
	200	126.8	126.8	36.2	150.0	144.8	46.7
	220	139.5	139.5	44.3	150.0	144.8	57.2
	240	150.0	144.8	53.0	150.0	144.8	68.5
	280	150.0	144.8	72.5	150.0	144.8	85.5

Additional reinforcement as shown on page 9.

The value given for the concrete compressive strength relates to normal concrete according to DIN EN 206 or the new DIN 1045-1 on 150 mm test cubes.

The HD-Lifting Link is supported against the concrete. It is essential that the correct nailing plate is used to provide the correct fit.

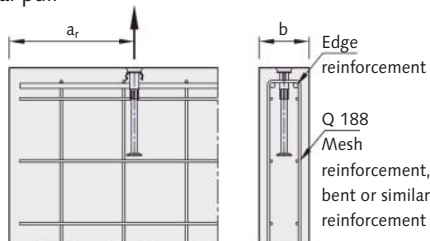
HD-SOCKET LIFTING SYSTEM

HD-ANCHOR

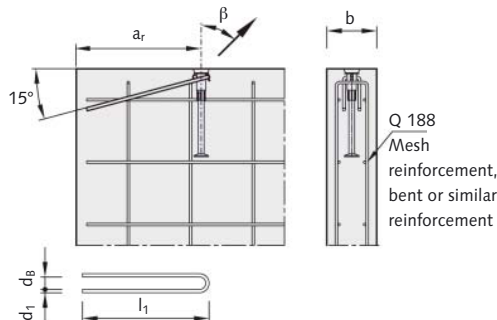
Table 6 Dimensions and reinforcement for HD-Anchors in mm

Load group		HD-Anchor dimensions					Minimum element thickness b	Position of anchors*		Additional reinforcement							
										Axial load		Angled load up to 45°			Pitching load		
		Rd	D	D ₁	D ₂	L		a _r min	a _a min	Edge reinforcement	d ₁	l ₁	d _B	d ₂	l ₂ **	h ₁ ***	R ₁
1.3	12	10	17	25	130	80	280	560	-	10	600	19	10	600	33	10	
						100									43		
						120									53		
2.5	16	14	22	35	200	80	420	840	-	10	600	24	12	800	37	11	
						100									47		
						120									57		
4.0	20	18	27	45	258	80	400	800	-	12	1000	29	14	950	42	13	
						100									52		
						120									62		
						140									72		
						160									82		
5.0	24	20	32	50	325	100	500	1000	-	12	1000	34	16	1000	56	16	
						120									66		
						140									76		
						160									86		
						140									84		
7.5	30	24	39	60	400	160	615	1230	2Ø12	20	1100	41	20	1200	94	20	
						180									104		
						200									114		
						160									98		
10.0	36	28	47	70	475	180	730	1460	2Ø14	20	1100	49	20	1200	108	24	
						200									118		
						220									128		
						180									117		
12.5	42	34	55	85	550	200	845	1690	2Ø14	20	1100	57	25	1500	127	28	
						220									137		
						240									147		
						180									123		
15.0	52	34	68	85	575	200	880	1760	2Ø14	25	1100	70	25	1800	133	34	
						220									143		
						240									153		
						280									173		
						200									133		

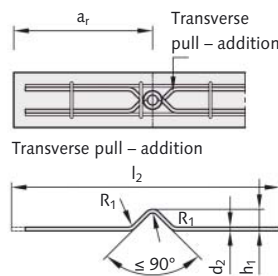
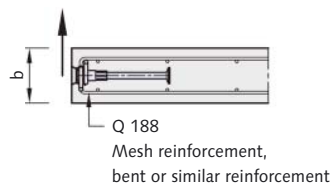
Axial pull



Angled pull up to $\beta = 45^\circ$



90° pitching



- * a_r = Edge distance
- * a_s = spacings
- ** Extended length
- *** at c_{min} = 20 mm

The pitching reinforcement on both sides also serves as diagonal-pull reinforcement. Additional angled-pull reinforcement is not necessary. This additional reinforcement placed in with tight contact with the socket.

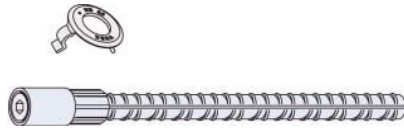
Note:
Element thickness, edge distance and spacings are for guidance only. If in doubt please consult HALFEN-DEHA.

Note:
 $\beta < 45^\circ$ is preferred.

HD-SOCKET LIFTING SYSTEM

HD-ROD ANCHOR

ALLOWABLE LOAD CAPACITY, DIMENSIONS AND REINFORCEMENT FOR HD-ROD ANCHORS



Normally used in thin precast concrete elements such as the walls of garages and transformer stations. Load groups 1.3 - 15.0
Also available with dacrometised or stainless steel socket.

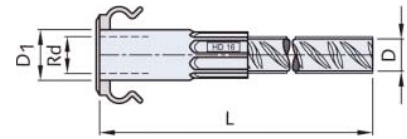


Table 7 Allowable load capacities for HD-Rod Anchors in kN

Load group	Minimum element thickness b (mm)	Concrete compressive strength 15 N/mm ²			Concrete compressive strength 25 N/mm ²		
		Axial load and angled load up to 30° [β]	Angled load up to 45° [β]	Pitching load	Axial load and angled load up to 30° [β]	Angled load up to 45° [β]	Pitching load
1.3	60	13.0	10.5	3.5	13.0	10.5	4.5
	80	13.0	10.5	5.9	13.0	10.5	7.5
	100	13.0	10.5	7.5	13.0	10.5	7.5
2.5	80	25.0	18.9	4.2	25.0	18.9	5.4
	100	25.0	18.9	6.8	25.0	18.9	8.8
	120	25.0	18.9	9.9	25.0	18.9	12.7
4.0	80	32.8	29.5	4.1	40.0	31.8	5.3
	100	35.5	31.8	6.9	40.0	31.8	8.9
	120	38.2	31.8	8.9	40.0	31.8	11.5
	140	40.0	31.8	12.9	40.0	31.8	16.6
	160	40.0	31.8	17.5	40.0	31.8	22.5
5.0	100	40.9	40.9	9.3	50.0	42.1	12.0
	120	44.2	42.1	13.1	50.0	42.1	16.9
	140	47.1	42.1	14.7	50.0	42.1	19.0
	160	50.0	42.1	20.0	50.0	42.1	25.8
7.5	120	66.1	66.1	12.9	75.0	67.7	16.7
	140	70.1	67.7	18.1	75.0	67.7	23.4
	160	75.0	67.7	24.4	75.0	67.7	31.2
	180	75.0	67.7	31.1	75.0	67.7	40.1
10.0	140	100.0	92.6	18.2	100.0	92.6	23.4
	160	100.0	92.6	24.0	100.0	92.6	30.9
	180	100.0	92.6	30.5	100.0	92.6	39.4
	200	100.0	92.6	38.1	100.0	92.6	49.1
12.5	140	125.0	120.2	20.2	125.0	120.2	26.1
	160	125.0	120.2	26.3	125.0	120.2	33.9
	180	125.0	120.2	33.2	125.0	120.2	42.8
	200	125.0	120.2	40.1	125.0	120.2	51.7
15.0	160	150.0	144.8	22.6	150.0	144.8	29.2
	180	150.0	144.8	29.2	150.0	144.8	37.7
	200	150.0	144.8	36.2	150.0	144.8	46.7
	220	150.0	144.8	44.3	150.0	144.8	57.2
	240	150.0	144.8	53.0	150.0	144.8	68.5

The necessary auxiliary reinforcement must be read from the reinforcement drawings and tables for the corresponding load groups. Additional reinforcement is essential as shown on page 15.

The value given for the concrete compressive strength relates to normal concrete according to DIN EN 206 or the new DIN 1045-1 on 150 mm test cubes.

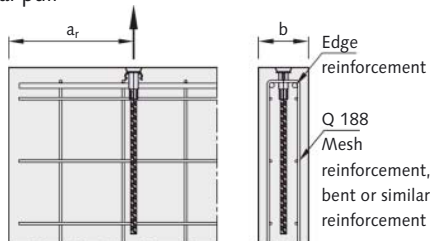
HD-SOCKET LIFTING SYSTEM

HD-ROD ANCHOR

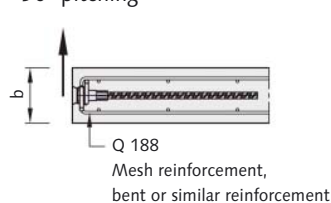
Table 8 Dimensions and reinforcement for HD-Rod Anchor in mm

Load group		HD-Anchor dimensions				Minimum element thickness b	Position of anchors*		Additional reinforcement							
									Axial pull		Angled pull up to 45°			Pitching pull		
		Rd	D	D ₁	L		a _r min	a _a min	Edge rein- forcement	d ₁	l ₁	d _B	d ₂	l ₂ **	h ₁ ***	R ₁
1.3	12	10	17	300	60	310	620	-	10	600	19	10	600	23	10	
					80									33		
					100									43		
2.5	16	14	22	400	80	410	820	-	10	600	24	12	800	37	11	
					100									47		
					120									57		
4.0	20	18	27	480	80	490	980	2Ø12	12	1000	29	14	950	42	13	
					100									52		
					120									62		
					140									72		
5.0	24	20	32	540	160	550	1100	2Ø12	12	1000	34	16	1000	82	16	
					100									56		
					120									66		
					140									76		
7.5	30	24	39	700	160	710	1420	2Ø14	20	1100	41	20	1200	86	20	
					120									74		
					140									84		
					160									94		
10.0	36	28	47	800	180	810	1620	2Ø14	20	1100	49	20	1200	104	24	
					140									88		
					160									98		
					180									108		
12.5	42	34	55	920	200	935	1870	2Ø14	20	1100	57	25	1500	118	28	
					140									97		
					160									107		
					180									117		
15.0	52	34	68	1100	200	1115	2230	2Ø14	25	1100	70	25	1800	127	34	
					160									113		
					180									123		
					220									133		
					240									143		
														153		

Axial pull

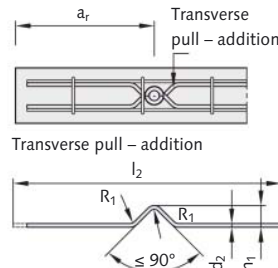
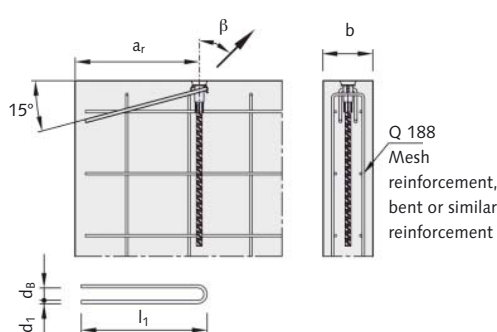


90° pitching



- * a_r = Edge distance
- * a_s = spacings
- ** Extended length
- *** at c_{min} = 20 mm

Angled pull up to $\beta = 45^\circ$

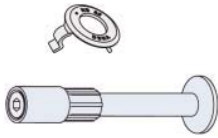


The pitching reinforcement on both sides also serves as diagonal-pull reinforcement. Additional angled-pull reinforcement is not necessary. This additional reinforcement must be placed in tight contact with the socket.

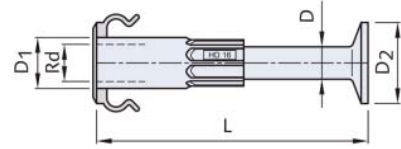
HD-SOCKET LIFTING SYSTEM

HD-SHORT ANCHOR

ALLOWABLE LOAD CAPACITY, DIMENSIONS AND REINFORCEMENT FOR HD-SHORT ANCHORS



For lifting flat structural elements such as floor slabs etc.
Load groups 1.3 - 5.0
Also available with dacrometised or stainless steel socket.



The values for intermediate slab thicknesses can be interpolated.

Table 9 Allowable load capacities for HD-Short Anchors in kN

Load group		Minimum structural element thickness b (mm)	Concrete compressive strength		Minimum structural element thickness b (mm)	Concrete compressive strength	
			15 N/mm ²	25 N/mm ²		15 N/mm ²	25 N/mm ²
			Axial and angled pull up to 45°	Axial and angled pull up to 45°		Axial and angled pull up to 45°	Axial and angled pull up to 45°
1.3		115	13.0	13.0	115	13.0	13.0
2.5		160	19.5	25.0	125	16.5	21.3
4.0		220	31.2	40.0	160	25.3	32.6
5.0		275	39.3	50.0	175	29.1	37.5

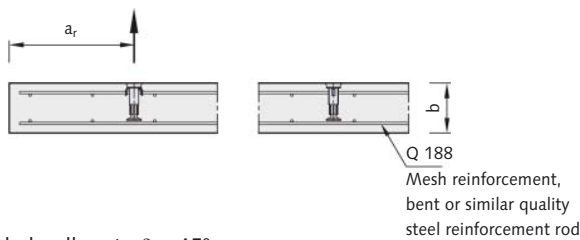
Table 10 Dimensions and reinforcement for the HD-Short Anchors in mm

Load group	Dimensions of HD-Short Anchors						Anchor arrangement*		Additional reinforcement		
							a _r min	a _a min	Diagonal pull up to 45°		
		Rd	D	D ₁	D ₂	L			d ₁	l ₁	d ₈
1.3		12	10	17	25	70	250	500	10	370	19
2.5		16	14	22	35	90	400	800	12	520	24
4.0		20	18	27	45	125	500	1000	14	610	29
5.0		24	20	32	50	140	650	1300	14	720	34

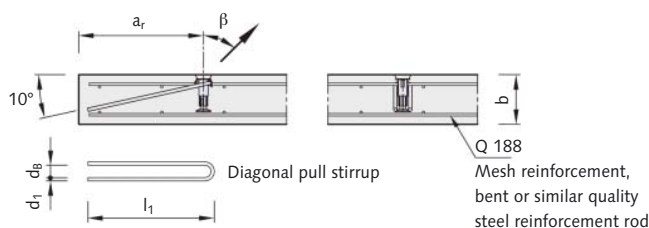
* a_r = Edge distance (a_r min applies to axial pull. For angled pull, see reinforcement)

* a_a = interaxial distance

Axial pull



Angled pull up to $\beta = 45^\circ$



The required additional reinforcement must be read from the reinforcement drawings and tables for the corresponding load groups. The value given for the concrete compressive strength relates to normal concrete according to DIN EN 206 or the new DIN 1045-1 on 150 mm test cubes.

HD-PLATE ANCHOR

A diagram showing a bolt and a nut. The bolt is a long cylindrical rod with a hexagonal head, and the nut is a hexagonal ring with internal threads. They are shown in a perspective view, with the bolt passing through the nut.

Table 11 Permitted load-carrying capacities for HD-Plate Anchors in kN

Table 12 Dimensions and reinforcement for HD-Plate Anchors in mm

- * a_r = Edge distance
- * a_a = Interaxial distance

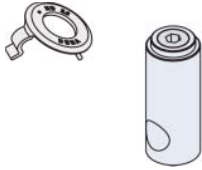
Technical drawing of a diagonal pull stirrup. The drawing includes a side view showing the stirrup's position within a concrete slab, with dimensions a_r , β , and 10° . It also shows a top view of the stirrup with dimensions d_1 , d_2 , and l_1 . A label "Diagonal pull stirrup" is present.

The slab thickness must not exceed 25 cm for angled lift because of the bond stress which is applied. (The minimum slab thicknesses and minimum reinforcements are shown in the tables.)

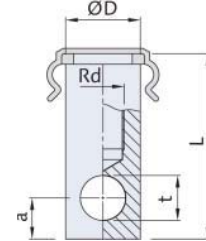
HD-SOCKET LIFTING SYSTEM

HD-PLAIN ANCHOR WITH HOLE

ALLOWABLE LOAD CAPACITY, DIMENSIONS AND REINFORCEMENT FOR HD-PLAIN ANCHORS WITH HOLE



The HD-Plain Anchor With Hole are used for lifting thin precast walls or used in low-strength concrete.



The permissible interaxial distance of the lifting anchor sockets is 2 x minimum edge distance. The necessary reinforcement rod must be introduced through the hole in the lower part of the HD-Plain Anchor With Hole.

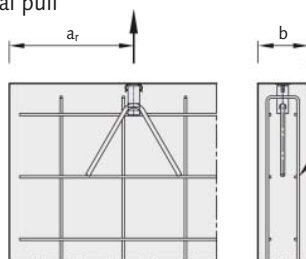
Table 13 Permitted load-carrying capacities for HD-Plain Anchor With Hole in kN

Load group	Minimum element thickness b (mm)	Concrete compressive strength 15N/mm ²	
		Axial load	Diagonal pull up to 45°
1.3	80	13.0	10.5
2.5	100	25.0	20.0
4.0	110	40.0	32.0
5.0	120	50.0	40.0
7.5	130	75.0	60.0
10.0	140	100.0	80.0

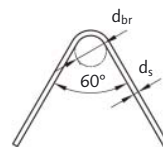
Table 14 Dimensions and reinforcement for HD-Plain Anchor With Hole in mm

Load group	Dimensions for HD-Plain Anchor With Hole						Minimum element thickness b	Anchor arrangement*		Additional reinforcement					
										Axial pull			Angled pull up to 45°		
	Rd	L	D	t	a			a _r min	a _a min	d _s	l**	d _{br}	d ₁	l ₁	d ₈
1.3	12	65	21	13.5	12	80		250	500	10	650	40	8	250	19
2.5	16	70	28	17.0	16	100		300	600	12	1000	48	10	320	24
4.0	20	85	38	24.5	21	110		350	700	16	1200	64	12	420	29
5.0	24	93	40	25.5	22	120		375	750	16	1500	64	14	520	34
7.5	30	116	46	28.0	28	130		500	1000	20	1750	80	16	600	41
10.0	36	136	51	30.0	30	140		600	1200	25	1850	25	20	750	49

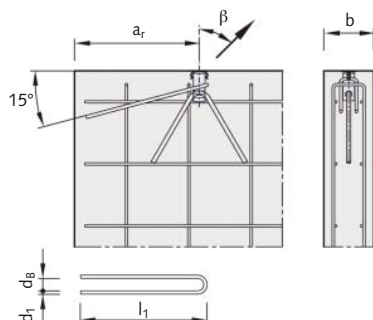
Axial pull



* a_r = Edge distance
* a_a = Interaxial distance
** Extended length



Angled pull up to $\beta = 45^\circ$



The HD-Plain Anchor With Hole is designed so that the entire anchor force is transferred into the concrete via the reinforcement tail. The tail is not supplied by HALFEN-DEHA.

It must be inserted so that it fits firmly in the lower edge of the hole. The necessary additional reinforcement must be read from the reinforcement drawings and tables for the corresponding load groups. The value given for the concrete compressive strength relates to normal concrete according to DIN EN 206 or the new DIN 1045-1 on 150 mm test cubes.

The additional reinforcement for angled lift must be placed light against the socket.

HD-LIFTING ATTACHMENTS

GENERAL INFORMATION

The lifting attachments must be screwed in fully. Only one thread turn must be visible outside the lifting anchor. If socket threads which are contaminated with concrete residues must be cleaned. If in doubt please contact HALFEN-DEHA.

Lifting attachments with loops must be suspended in loading hooks with large return radii. Sharp edged hooks or hooks with a cross section which is too small can cause excessive wear due to the small bending radii. This will lead to an early need for replacement. The accident prevention regulations must be followed at all times.

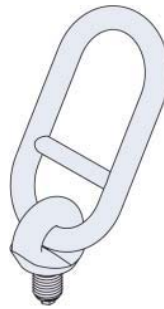
VBG 9 "Crane" and VBG 9a "Load-suspension devices for lifting" must be followed in particular.

HD-Lifting Attachments are labelled to show the name of the manufacturer, the year of manufacture (e.g. 04), the thread (e.g. Rd 30) and the load group.

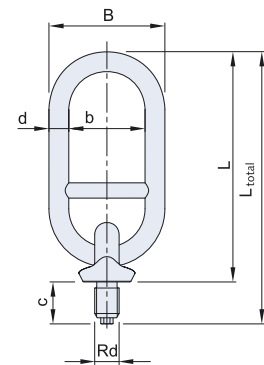
HD-LIFTING LINK

The HD-Lifting Link is made specially for use with the HD-Anchors. The HD-Perfect Lifting Head may also be used (see page 20).

The HD-Lifting Link can activate the integrated socket protector, by means of the hexagon on the stud, and screw into the socket. After casting the HD-Anchor, the socket protector is at the upper edge of the socket and therefore helps to prevent the socket from being contaminated.



For angled lift are pitching, the eyebolt of the HD-Lifting Link supports against the concrete provided the anchor has been installed by means of the HD-Nailing Plate or HD-Magnetic Plate.



The dimensions and load-capacities of the HD-Lifting Link shown in the table below.

Table 15 Dimensions of the HD-Lifting Link

Designation	Order number 0742.130-	Load group/ load capacity	Rd	Weight kg	L _{total} mm	L mm	c mm	B mm	b mm	d mm
6362-1.3	00001	1.3	12	0.57	179.5	150	29.5	76	50	13
6362-2.5	00002	2.5	16	0.65	179.5	150	29.5	76	50	13
6362-4.0	00003	4.0	20	1.21	197.0	162	35.0	82	50	16
6362-5.0	00004	5.0	24	1.29	197.0	162	35.0	82	50	16
6362-7.5	00005	7.5	30	2.40	228.0	177	51.0	94	50	22
6362-10.0	00006	10.0	36	2.54	236.5	177	59.5	94	50	22
6362-12.5	00007	12.5	42	4.84	298.5	218	67.5	117	65	26
6362-15.0	00008	15.0	52	5.31	298.5	218	80.5	117	65	26

HD-LIFTING ATTACHMENTS

HD-PERFECT LIFTING HEAD

The HD-Perfect Lifting Head is particularly suitable for angled pull and pitching. The application instructions for the HD-Lifting Link must be followed.

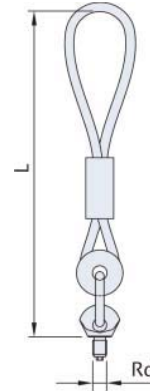
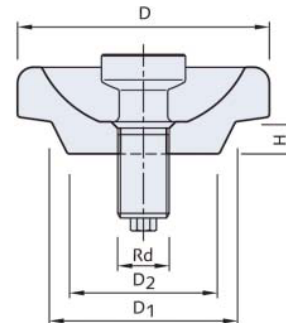
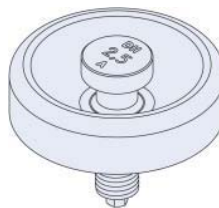



Table 15 Dimensions of the HD-Perfect Lifting Head

Designation	Order number 0742.130-	Load group	Rd	L
6377-1.3	00001	1.3	12	300
6377-2.5	00002	2.5	16	390
6377-4.0	00003	4.0	20	510
6377-5.0	00004	5.0	24	550
6377-7.5	00005	7.5	30	700
6377-10.0	00006	10.0	36	760
6377-12.5	00007	12.5	42	860
6377-15.0	00008	15.0	52	940

HD-ADAPTOR

The HD-Adaptor enables the pin-lifting system to be used with the HD-Socket System. The universal head lifting clutch for the appropriate load group is linked into the adaptor.



Designation	Order number 0742.130-	Load group	Rd	D mm	D ₁ mm	D ₂ mm	H mm	Fits universal head lifting clutch			
								Designation		Order number 0738.010-	Load group
6366-1.3	00001	1.3	12	70	40	30	10		6102-1.3	00001	1.3
6366-2.5	00002	2.5	16	78	40	30	10		6102-1.5/2.5	00002	2 and 2.5
6366-4.0	00003	4.0	20	97	55	45	10		6102-3/5	00003	4 and 5
6366-5.0	00004	5.0	24	97	55	45	10		6102-3/5	00003	4 and 5
6366-7.5	00005	7.5	30	117	70	60	10		6102-6/10	00004	7.5 and 10
6366-10.0	00006	10.0	36	117	70	60	10		6102-6/10	00004	7.5 and 10
6366-12.5	00007	12.5	42	177	95	85	12		6102-12/20	00005	15 and 20
6366-15.0	00008	15.0	52	177	95	85	12		6102-12/20	00005	15 and 20

HD-SOCKET LIFTING SYSTEM

ACCESSORIES

FIXING

All HD-Anchors must be fixed to the formwork with one of these nailing plates.

When the nailing plate is used a recess is produced which accurately conforms to all HD-Lifting Attachment.

HD-NAILING PLATE, PLASTIC

HD-Nailing Plates are used to attach HD-Socket Anchors to the mould. Plastic nailing plates are available for thread sizes Rd 12 to Rd 52 and are coloured according to the thread size.



Table 18 Dimensions of the HD-Plastic Plate

Load group	Designation	D mm	H mm	Order number 0741.160-
1.3	6364-1.3	40	10	00001
2.5	6364-2.5	40	10	00002
4.0	6364-4.0	55	10	00003
5.0	6364-5.0	55	10	00004
7.5	6364-7.5	70	10	00005
10.0	6364-10.0	70	10	00006
12.5	6364-12.5	95	12	00007
15.0	6364-15.0	95	12	00008

HD-NAILING PLATE, STEEL

Steel nailing plates available for thread sizes Rd 12 to Rd 52 and are plated.

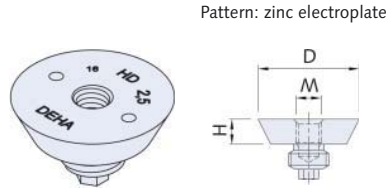


Table 19 Dimensions of the HD-Steel Plate

Load group	Designation	D mm	H mm	M	Order number 0741.190-
1.3	6369-1.3	40	10	6	00001
2.5	6369-2.5	40	10	10	00002
4.0	6369-4.0	55	10	12	00003
5.0	6369-5.0	55	10	12	00004
7.5	6369-7.5	70	10	12	00005
10.0	6369-10.0	70	10	16	00006
12.5	6369-12.5	95	12	16	00007
15.0	6369-15.0	95	12	16	00008

HD-MAGNETIC PLATE

HD-Magnetic Plates used to attach HD-Socket Anchors to the mould. They are available for thread sizes Rd 12 to Rd 52 and are plated.

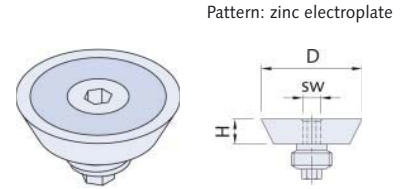


Table 20 Dimensions of the HD-Magnetic Plate

Load group	Designation	D mm	H mm	SW	Order number 0741.180-
1.3	6365-1.3	40	12	6	00001
2.5	6365-2.5	40	12	6	00002
4.0	6365-4.0	55	12	10	00003
5.0	6365-5.0	55	12	10	00004
7.5	6365-7.5	70	12	16	00005
10.0	6365-10.0	70	12	16	00006
12.5	6365-12.5	95	12	16	00007
15.0	6365-15.0	95	12	16	00008

HD-SEALING PLATE

The grey HD-Sealing Plate is used for sealing the HD-Socket Anchor and is available for thread sizes Rd 12, Rd 16, Rd 20 and Rd 24.

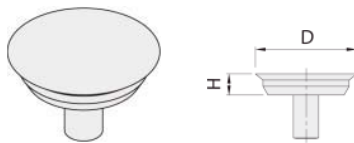


Table 21 Dimensions of the HD-Sealing Plate

Load group	Designation	D mm	H mm	Order number 0741.280-
1.3	6513-1.3	40	10	00001
2.5	6513-2.5	40	10	00002
4.0	6513-4.0	55	10	00003
5.0	6513-5.0	55	10	00004

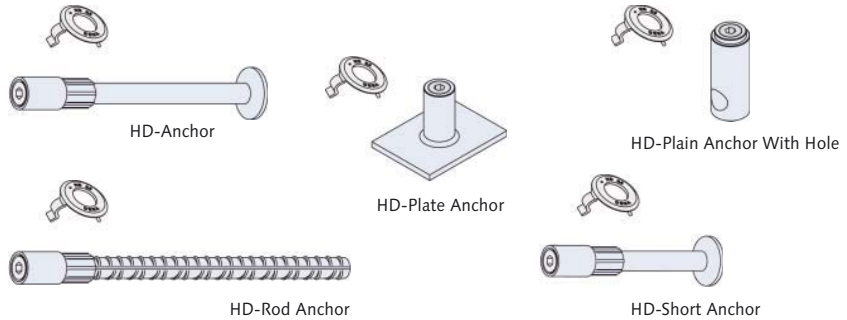
ASSEMBLY AND INSTALLATION OF THE HD-LIFTING ANCHOR

HD-ANCHORS

The HD-Anchor is supplied complete with the Socket Protector System.



The HD-Anchor together with the HD-Lifting Link complete the lifting anchor system.



INSTALLING THE HD-LIFTING ANCHOR SYSTEM

The HD-Nailing Plate is used to attach the HD-Anchor to the mould. It is colour-coded according to the load group and is available in plastic or steel for load groups 1.3 to 15.0.



Table 22 Colour codes

Load group	Colour code
1.3	red
2.5	dark grey
4.0	dark green
5.0	blue
7.5	pale grey
10.0	orange
12.5	yellow
15.0	deep black

see picture 01

The Nailing Plates are either nailed to the mould or screwed in place using retaining screws through a hole in the mould. For steel-formwork, the HD-Magnetic Plate, which is attached to the mould by an integral magnet may be used.

see picture 02

Before assembling the HD-Anchor, the data clip must be placed on the threaded stud of the nailing plate. After this, the anchor with the pre-mounted Socket Protector is placed on the hexagonal stud of the nailing plate.

see picture 03

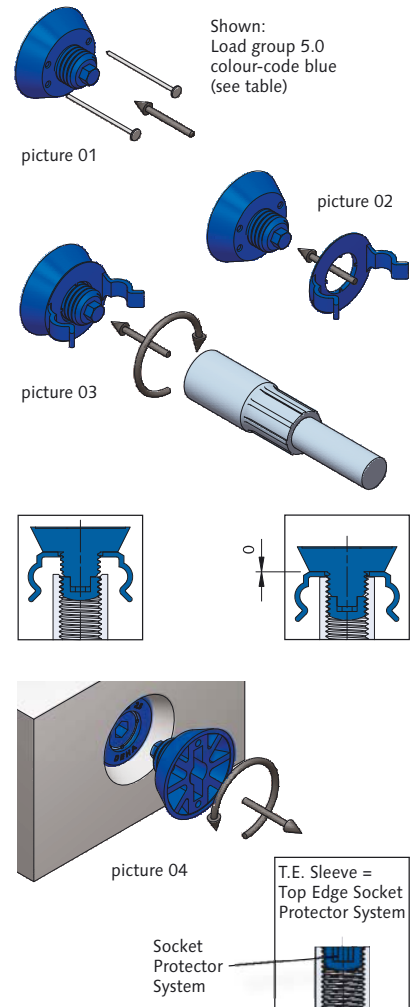
The Socket Protector System is screwed into the threaded sleeve by turning the HD-Anchor. There must be no air gap between the nailing plate and the anchor socket. The data clip, which is now clamped, must be moved to the correct position by rotating it (depending on the position of the angled pull reinforcement).

⚠ The anchor must be fastened to the reinforcement by suitable means so that it does not move during concreting. Using forming oil in the area of the nailing plate makes it easier to remove.

see picture 04

The Nailing Plate can be removed after the concrete has hardened. While doing so, it must be ensured that the Socket Protection System is rotated to the socket top edge.

⚠ We recommend filling up the hexagonal recess of the Socket Protector System with grease or forming oil each time after it is used, particularly during winter. This prevents the ingress of water in the hexagonal recess, which may freeze and restrict the connection between the threaded stud of the lifting link and the Socket Protector System. It is advisable to fill the entire nailing plate recess with forming oil. This will make it easier to remove any ice which may form.



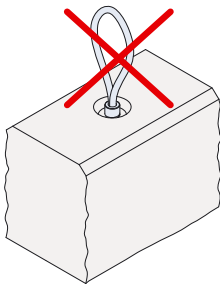
⚠ The data clip is packed separately. It must be used with the appropriate HD-Anchor, which has the same identification colour (see picture 04)

LIFTING AND TRANSPORT

HANDLING THE LIFTING ATTACHMENTS

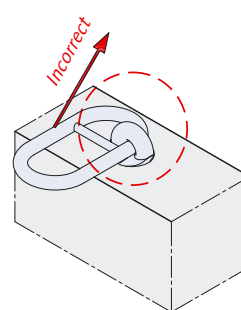
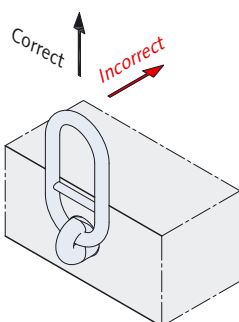
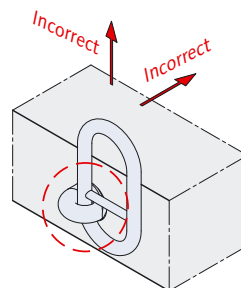
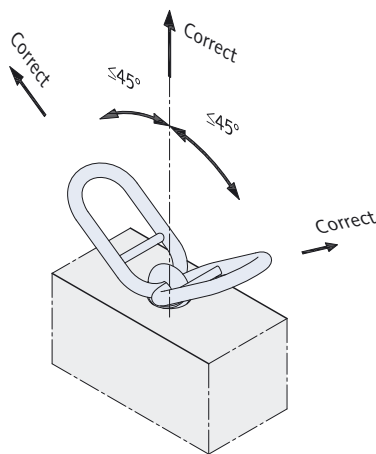
Handling the lifting attachments

Only the HD-Lifting Link and the HD-Perfect Lifting Head may be used as lifting attachments. The fitting of other lifting attachments, such as looped cables is not permitted for safety reasons.



Labelling

HD-Lifting Links are marked with the name of the manufacturer, the type and year of manufacture, the thread and load group.



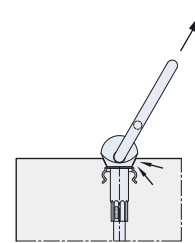
Operating

The HD-Lifting Link is a manually-operated connection. In general, the accident prevention regulations must be followed at all times. The VBG 9 „Crane“ and VBG 9a „Load-suspension devices for lifting“ of the Main German Industrial Employer's Liability Insurance Association must be followed in particular.

Optimum load distribution is only possible if the direction of pull is as shown below. If necessary, after screwing the HD-Lifting Link fully home, it may be slackened by a maximum of half a turn. By slackening the HD-Lifting Link, the correct position may be achieved in the direction of pull.

The recess in the concrete created by the nailing plate or magnet plate exactly matches the contour of the HD-Lifting Attachment and allows it to be supported against the concrete while the anchor is subjected to diagonal or transverse pull.

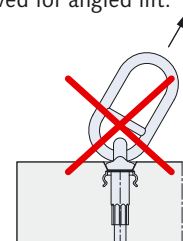
Correct



Applying the load as shown in the following is not allowed for diagonal or transverse pull:

Incorrect

Not allowed for angled lift.



Maintenance

The contractor is responsible for ensuring that the HD-Lifting Attachment are checked for wear or damage by a trained person before every use.

The contractor is also responsible for ensuring that the HD-Lifting Attachment is checked by an expert at least once a year (see VBG 9a §39 and §40). Using damaged HD-Lifting Attachment is not allowed.



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