

HD-SOCKET LIFTING SYSTEM

TECHNICAL PRODUCT INFORMATION



HD-SOCKET LIFTING SYSTEM

HD 09-E

CONCRETE



HALFEN
YOUR BEST CONNECTIONS

HD-SOCKET LIFTING SYSTEM

Greater safety, fewer components, integral socket protector

The new generation HD-Lifting System with thread protector and integral data clip, caters for the loads 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.

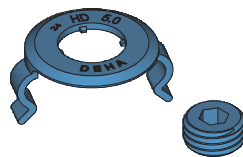
Wider application due to smaller dimensions

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 carrier

The new generation HD-Lifting Anchor has been designed with an integral thread protector, and is clearly labelled with the load group (data carrier). This patented system protects the thread from the ingress of



dirt, and water.

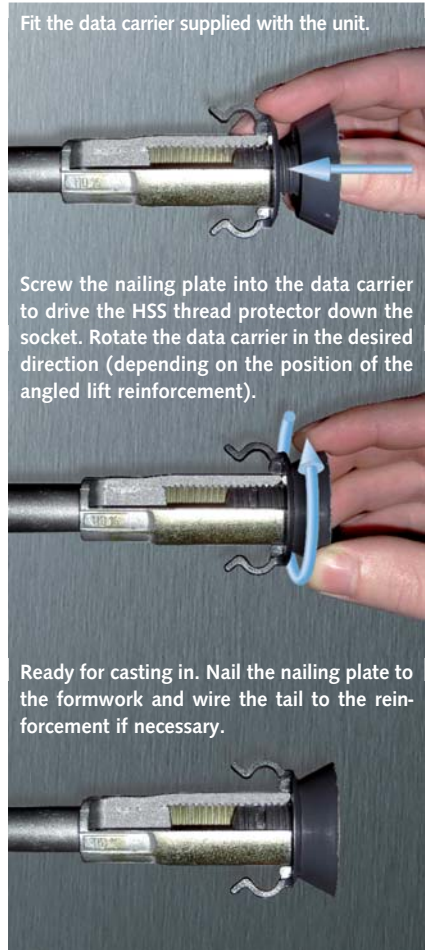
This prevents ice or water from accumulating in the anchor socket, and significantly reduces the risk of damage from corrosion. The colour-coded data carrier, specifying the manufacturer, thread size and load group, complies with BGR 106, for increased safety.

Robust lifting link for increased safety and economy

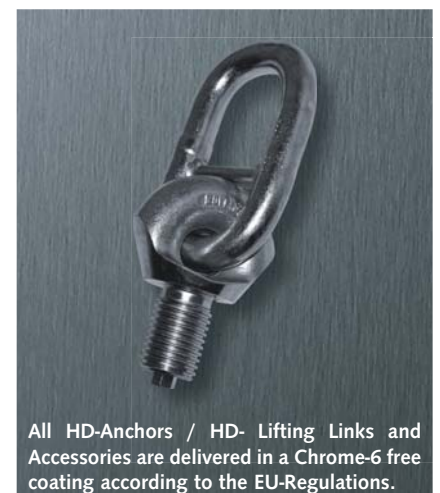
The robust HD-Lifting Link provides a high level of safety and offers clear economic benefits due to the increased service life. The HD-Lifting Link has the following outstanding features:

- 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.

| HD load groups | | | | | | | | | |
|-------------------------|------|------|------|------|------|------|------|------|------|
| Rd12 | Rd16 | | Rd20 | Rd24 | Rd30 | Rd36 | Rd42 | Rd52 | |
| 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 | 5.0 | 8.0 | 12.5 |
| Rd12 | Rd14 | Rd16 | Rd18 | Rd20 | Rd24 | Rd30 | Rd36 | Rd42 | Rd52 |
| traditional load groups | | | | | | | | | |



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



All HD-Anchors / HD- Lifting Links and Accessories are delivered in a Chrome-6 free coating according to the EU-Regulations.

HD-SOCKET LIFTING SYSTEM

Contents

| | |
|---|----------------|
| System-Overview | 4 - 5 |
| The Range | 6 - 7 |
| Design | 8 - 10 |
| Safety regulations | 8 |
| Load capacity | 8 |
| Dead load | 8 |
| Adhesion to the formwork | 8 |
| Dynamic forces | 9 |
| Total load | 9 |
| Anchor positioned asymmetrically | 9 |
| Transport without spreader beam | 9 |
| Multiple slings | 10 |
| HD Lifting Anchors | 11 - 19 |
| HD-Anchor | 11 |
| HD-Short Anchor | 14 |
| HD-Rod Anchor | 15 |
| HD-Plate Anchor | 18 |
| HD-Plain Anchor with hole | 19 |
| Accessories | 20 - 21 |
| HD-Nailing plate, plastic | 20 |
| HD-Nailing plate, steel | 20 |
| HD-Magnetic plate | 20 |
| HD-Nailing plate, steel with adapter for assembly pin | 20 |
| HD-Data carrier | 20 |
| Retaining bolt | 20 |
| Assembly pin, plastic | 21 |
| Sealing plate, rubber | 21 |
| HD-Sealing plate, plastic | 21 |
| Stencil form, rubber | 21 |
| Key for Nailing Plate | 21 |
| HD-Lifting Links | 22 |
| General information | 22 |
| HD-Lifting Link | 22 |
| HD-Perfect Lifting Head | 23 |
| HD-Adapter | 23 |
| Using the Lifting Links | 24 |
| Installation of the HD-Socket Lifting System | 25 - 27 |

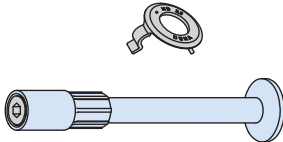
HD-SOCKET LIFTING SYSTEM

System-Overview

HD-Socket Anchors

HD-Anchor

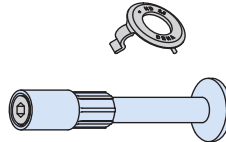
6360-Load group
see page 11-13



For lifting a wide range of different sized precast concrete elements.
Load groups 1.3-15.0

HD-Short Anchor

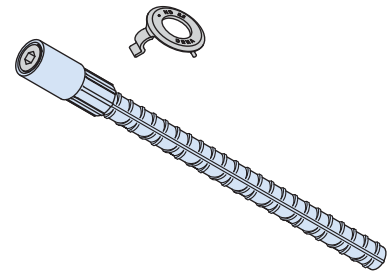
6360-Load group
see page 14



For lifting thin structural elements such as floor slabs etc.
Load groups 1.3-7.5

HD-Rod Anchor

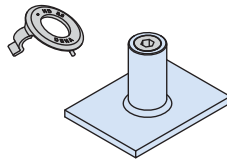
6361-Load group
see page 15-17



For use with especially thin precast concrete elements such as the walls of garages and transformer stations.
Load groups 1.3-15.0

HD-Plate Anchor

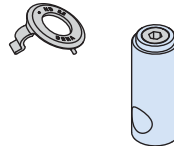
6370-Load group
see page 18



For lifting large, thin precast elements such as slabs or demolding panels.
Load groups 1.3-7.5

HD-Plain Anchor with hole

6376-Load group
see page 19

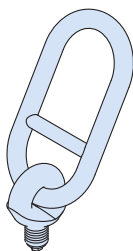


For lifting thin precast walls or for use with low-strength concrete.
Reinforcement tail essential.
Load groups 1.3-10.0

HD-Lifting Links

HD-Lifting Link

6362-Load group
see page 22



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

HD-Perfect Lifting Head

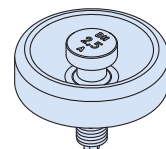
6377-Load group
see page 23



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

HD-Adapter

6366-Load group
see page 23



The HD-Adapter enables the DEHA Universal Head Lifting Clutch (6102) to be used with the HD Anchor range.
Load groups 1.3-15.0

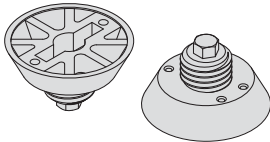
HD-SOCKET LIFTING SYSTEM

System-Overview

Accessories

HD-Nailing Plate, plastic

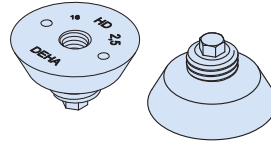
6364-Lgr.
see page 20



To attach the HD-Socket Lifting Anchor to the formwork.
For thread sizes M/Rd 12-52

HD-Nailing Plate, steel

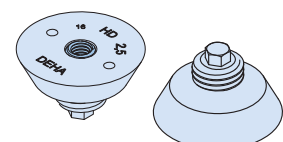
6369-Lgr.
see page 20



To attach the HD-Socket Lifting Anchor to the formwork.
For thread sizes M/Rd 12-52

HD-Nailing Plate, steel with Adapter, premounted

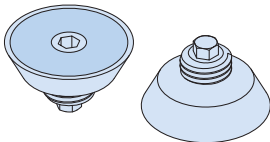
6369-Lgr.-A
see page 20



To attach the HD-Socket Lifting Anchor to the formwork using the Assembly pin or the Retaining Screw.
For thread sizes M/Rd 12-30

HD-Magnetic Plate

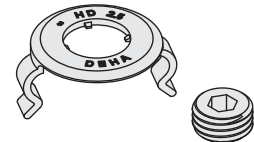
6365-Lgr.
see page 20



To attach the HD-Socket Lifting Anchor to the steel formwork without any accessories.
For thread sizes M/Rd 12-52

HD-Data Carrier

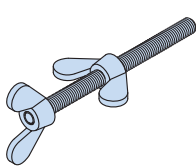
6363-Lgr.
see page 20



Identification marking for the embedded HD-Lifting Anchor and connection for the angled lift reinforcement.
For thread sizes M/Rd 12-52

Retaining Bolt

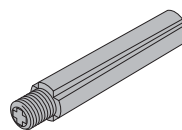
6160-Lgr.
see page 20



To attach the HD-Socket Lifting Anchor to the formwork using HD-Steel Nailing Plates.
Load groups 4.0-15.0

HD-Assembly Pin

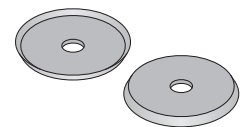
6330-Lgr.
see page 21



For fast attachment and removal HD-Steel Nailing Plates to the formwork.
Load groups 1.3-7.5

Sealing Plate, rubber

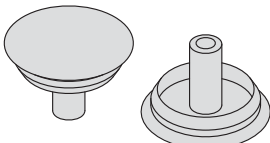
6334-Lgr.
see page 21



To seal the HD-Steel Nailing Plate with Adapter, when used with the HD-Assembly Pin.
Load groups 1.3-7.5

HD-Sealing Plate

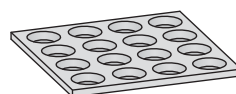
6513-Lgr.
see page 21



To seal the HD-Socket Anchor and recess in the concrete formed by the nailing plate.
For thread sizes M/Rd 12-24

Stencil form, rubber

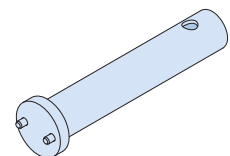
6329-Lgr.
see page 21



This rubber former is used to cast concrete discs to be used as recess fillers.
Load groups 1.3-15.0

Key for Nailing Plates

6337-Rd
see page 21

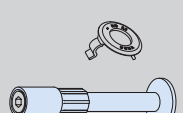


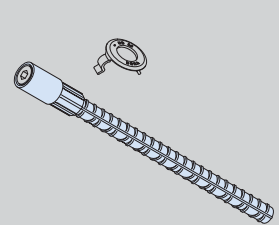
Tool for an easy and fast removal of Steel Nailing Plates.
All load groups

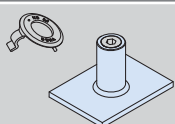
HD-SOCKET LIFTING SYSTEM

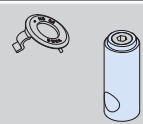
The Range

| HD-Socket Anchor | | | |
|---------------------------|------|---|-------|
| Load range [t] | |  Designation Order No. 0740.130- | |
| zinc-plated socket | 1.3 | 6360- 1.3-130 | 00001 |
| | 2.5 | 6360- 2.5-140 | 00040 |
| | 2.5 | 6360- 2.5-200 | 00002 |
| | 4.0 | 6360- 4.0-258 | 00003 |
| | 5.0 | 6360- 5.0-325 | 00004 |
| | 7.5 | 6360- 7.5-400 | 00005 |
| | 10.0 | 6360-10.0-475 | 00006 |
| | 12.5 | 6360-12.5-550 | 00007 |
| | 15.0 | 6360-15.0-575 | 00008 |
| stainless steel A4 socket | 1.3 | 6360- 1.3-130 A4 | 00009 |
| | 2.5 | 6360- 2.5-200 A4 | 00010 |
| | 4.0 | 6360- 4.0-258 A4 | 00011 |
| | 5.0 | 6360- 5.0-325 A4 | 00012 |
| | 7.5 | 6360- 7.5-400 A4 | 00013 |
| | 10.0 | 6360-10.0-475 A4 | 00014 |
| | 12.5 | 6360-12.5-550 A4 | 00015 |
| | 15.0 | 6360-15.0-575 A4 | 00016 |

| HD-Short Anchor | | | |
|---------------------------|-----|---|-------|
| Load range [t] | |  Designation Order No. 0740.130- | |
| zinc-plated socket | 1.3 | 6360-1.3-070 | 00017 |
| | 2.5 | 6360-2.5-090 | 00018 |
| | 4.0 | 6360-4.0-125 | 00019 |
| | 5.0 | 6360-5.0-140 | 00020 |
| | 7.5 | 6360-7.5-185 | 00038 |
| stainless steel A4 socket | 1.3 | 6360-1.3-070 A4 | 00021 |
| | 2.5 | 6360-2.5-090 A4 | 00022 |
| | 4.0 | 6360-4.0-125 A4 | 00023 |
| | 5.0 | 6360-5.0-140 A4 | 00024 |
| | 7.5 | 6360-7.5-185 A4 | 00039 |

| HD-Rod Anchor | | | |
|---------------------------|------|---|-------|
| Load range [t] | |  Designation Order No. 0740.140- | |
| zinc-plated socket | 1.3 | 6361- 1.3- 300 | 00001 |
| | 2.5 | 6361- 2.5- 400 | 00002 |
| | 4.0 | 6361- 4.0- 480 | 00003 |
| | 5.0 | 6361- 5.0- 540 | 00004 |
| | 7.5 | 6361- 7.5- 700 | 00005 |
| | 10.0 | 6361-10.0- 800 | 00006 |
| | 12.5 | 6361-12.5- 920 | 00007 |
| | 15.0 | 6361-15.0-1100 | 00008 |
| stainless steel A4 socket | 1.3 | 6361- 1.3- 300 A4 | 00009 |
| | 2.5 | 6361- 2.5- 400 A4 | 00010 |
| | 4.0 | 6361- 4.0- 480 A4 | 00011 |
| | 5.0 | 6361- 5.0- 540 A4 | 00012 |
| | 7.5 | 6361- 7.5- 700 A4 | 00013 |
| | 10.0 | 6361-10.0- 800 A4 | 00014 |
| | 12.5 | 6361-12.5- 920 A4 | 00015 |
| | 15.0 | 6361-15.0-1100 A4 | 00016 |

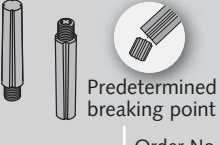
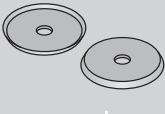

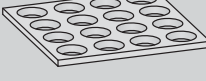
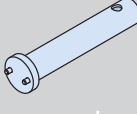
| HD-Plate Anchor | | | |
|--------------------|-----|---|-------|
| Load range [t] | |  Designation Order No. 0740.180- | |
| zinc-plated socket | 1.3 | 6370-1.3 | 00001 |
| | 2.5 | 6370-2.5 | 00002 |
| | 4.0 | 6370-4.0 | 00003 |
| | 5.0 | 6370-5.0 | 00004 |
| | 7.5 | 6370-7.5 | 00005 |
| stainless steel A4 | 1.3 | 6370-1.3 A4 | 00006 |
| | 2.5 | 6370-2.5 A4 | 00007 |
| | 4.0 | 6370-4.0 A4 | 00008 |
| | 5.0 | 6370-5.0 A4 | 00009 |
| | 7.5 | 6370-7.5 A4 | 00010 |

| HD-Plain Anchor with hole | | | |
|---------------------------|------|---|-------|
| Load range [t] | |  Designation Order No. 0740.190- | |
| zinc-plated socket | 1.3 | 6376- 1.3 | 00001 |
| | 2.5 | 6376- 2.5 | 00002 |
| | 4.0 | 6376- 4.0 | 00003 |
| | 5.0 | 6376- 5.0 | 00004 |
| | 7.5 | 6376- 7.5 | 00005 |
| | 10.0 | 6376-10.0 | 00006 |
| stainless steel A4 socket | 1.3 | 6376- 1.3 A4 | 00007 |
| | 2.5 | 6376- 2.5 A4 | 00008 |
| | 4.0 | 6376- 4.0 A4 | 00009 |
| | 5.0 | 6376- 5.0 A4 | 00010 |
| | 7.5 | 6376- 7.5 A4 | 00011 |
| | 10.0 | 6376-10.0 A4 | 00012 |

HD-SOCKET LIFTING SYSTEM

The Range

| HD- Accessories | | | | | | | | | | | | |
|-------------------|-----------------------------|---------------------|---------------------------------------|---------------------|---|---------------------|--|---------------------|--------------------------|---------------------|------------------------------------|---------------------|
| Load group [t] | HD- Nailing Plates, plastic | | HD-Nailing Plates, steel, zinc-plated | | HD-Nailing Plates, Steel with adapter, premounted | | HD-Magnetic Plates, steel, zinc-plated | | HD-Data Carrier, plastic | | Retaining Bolt, steel, zinc-plated | |
| | Designation | Order No. 0741.160- | Designation | Order No. 0741.190- | Designation | Order No. 0741.190- | Designation | Order No. 0741.180- | Designation | Order No. 0741.170- | Designation | Order No. 0737.080- |
| 1.3 | 6364- 1.3 | 00001 | 6369- 1.3 | 00001 | - | - | 6365- 1.3 | 00001 | 6363- 1.3 | 00001 | - | - |
| 2.5 | 6364- 2.5 | 00002 | 6369- 2.5 | 00002 | 6369-2.5 A | 00102 | 6365- 2.5 | 00002 | 6363- 2.5 | 00002 | - | - |
| 4.0 | 6364- 4.0 | 00003 | 6369- 4.0 | 00003 | 6369-4.0 A | 00103 | 6365- 4.0 | 00003 | 6363- 4.0 | 00003 | 6160-12 | 00003 |
| 5.0 | 6364- 5.0 | 00004 | 6369- 5.0 | 00004 | 6369-5.0 A | 00104 | 6365- 5.0 | 00004 | 6363- 5.0 | 00004 | | |
| 7.5 | 6364- 7.5 | 00005 | 6369- 7.5 | 00005 | 6369-7.5 A | 00105 | 6365- 7.5 | 00005 | 6363- 7.5 | 00005 | 6160-16 | 00004 |
| 10.0 | 6364-10.0 | 00006 | 6369-10.0 | 00006 | - | - | 6365-10.0 | 00006 | 6363-10.0 | 00006 | | |
| 12.5 | 6364-12.5 | 00007 | 6369-12.5 | 00007 | - | - | 6365-12.5 | 00007 | 6363-12.5 | 00007 | | |
| 15.0 | 6364-15.0 | 00008 | 6369-15.0 | 00008 | - | - | 6365-15.0 | 00008 | 6363-15.0 | 00008 | | |

| HD Accessories | | | | | | | | | | |
|-------------------|---|------------------------|---|------------------------|---|------------------------|--|------------------------|---|------------------------|
| Load group [t] | Assembly Pin, plastic | | Sealing Plates, rubber | | Sealing Plates | | Stencil Form, rubber | | Key for Nailing Plates, zinc-plated | |
| |  Predetermined breaking point | |  | |  | |  | |  | |
| | Designation | Order No. 0741.300- | Designation | Order No. 0741.330- | Designation | Order No. 0741.280- | Designation | Order No. 0741.290- | Designation | Order No. 0741.350- |
| 1.3 | 6330-1.3-7.5 | 00001 | 6334-1.3- 2.5 | 00001 | 6513-1.3 | 00001 | 6329- 1.3- 2.5 | 00001 | 6337-Rd 12-16 | 00001 |
| 2.5 | | | | | 6513-2.5 | 00002 | | | | |
| 4.0 | | | 6334-4.0- 5.0 | 00002 | 6513-4.0 | 00003 | 6329- 4.0- 5.0 | 00002 | | |
| 5.0 | | | | | 6513-5.0 | 00004 | | | | |
| 7.5 | | | 6334-7.5 | 00003 | - | - | 6329- 7.5-10.0 | 00003 | | |
| 10.0 | - | - | - | - | | | | | | |
| 12.5 | - | - | - | - | 6329-12.5-15.0 | 00004 | | | | |
| 15.0 | - | - | - | - | | | | | | |

| HD-Lifting Link | | |
|-------------------|-------------|---------------------|
| Load group [t] | zinc-plated | |
| | Designation | Order No. 0742.130- |
| 1.3 | 6362- 1.3 | 00001 |
| 2.5 | 6362- 2.5 | 00002 |
| 4.0 | 6362- 4.0 | 00003 |
| 5.0 | 6362- 5.0 | 00004 |
| 7.5 | 6362- 7.5 | 00005 |
| 10.0 | 6362-10.0 | 00006 |
| 12.5 | 6362-12.5 | 00007 |
| 15.0 | 6362-15.0 | 00008 |

| HD-Perfect Lifting Head | | |
|-------------------------|-------------|---------------------|
| Load group [t] | zinc-plated | |
| | Designation | Order No. 0742.170- |
| 1.3 | 6377- 1.3 | 00001 |
| 2.5 | 6377- 2.5 | 00002 |
| 4.0 | 6377- 4.0 | 00003 |
| 5.0 | 6377- 5.0 | 00004 |
| 7.5 | 6377- 7.5 | 00005 |
| 10.0 | 6377-10.0 | 00006 |
| 12.5 | 6377-12.5 | 00007 |
| 15.0 | 6377-15.0 | 00008 |

| HD-Adaptors | | |
|-------------------|-------------|---------------------|
| Load group [t] | zinc-plated | |
| | Designation | Order No. 0742.140- |
| 1.3 | 6366- 1.3 | 00001 |
| 2.5 | 6366- 2.5 | 00002 |
| 4.0 | 6366- 4.0 | 00003 |
| 5.0 | 6366- 5.0 | 00004 |
| 7.5 | 6366- 7.5 | 00005 |
| 10.0 | 6366-10.0 | 00006 |
| 12.5 | 6366-12.5 | 00007 |
| 15.0 | 6366-15.0 | 00008 |

HD-SOCKET LIFTING SYSTEM

Dimensioning

Safety regulations

The lifting system consists of the threaded anchors cast in to the pre-cast concrete component and the lifting eye which is attached temporarily.

The "Hauptverband der gewerblichen Berufsgenossenschaften" has issued "Safety rules for transport anchors and systems of prefabricated concrete components" (BGR 106) which represent the generally acknowledged status of the technology.

Typical national safety rules require the following breakage strengths: Vary according to national and regional regulations.

Table 01 Safety against failure

| | |
|---------------------------|----------------|
| Steel failure of anchors: | $\gamma = 3$ |
| Breaking of concrete: | $\gamma = 2.5$ |
| Breakage of lifting link: | $\gamma = 4$ |

In order to ensure safe use of the lifting system, this catalogue and the job calculation must be kept available at the place of use.

Load capacity

The load capacity of the system depends on:

- The strength of the concrete at the time of lifting
- The embedded depth of the anchor
- Edge distances and spacings of the anchors
- The load direction
- The arrangement of reinforcement

The calculation of the force acting on the anchors is made according to the following load assumptions. It is essential that this calculation is carried out on every job/application.

Dead load

For the calculation of the weight (G) of a normally precast reinforced concrete unit, a specific weight of $\gamma = 25 \text{ kN/m}^3$ is often assumed.

G = Total weight of the precast unit

Adhesion to the formwork

Adhesion forces between the formwork and the concrete vary according to the type of formwork used. The following may be taken as a guide:

Table 02 Adhesion to the formwork

| | |
|---------------------------|------------------------|
| Oiled steel formwork | $q = 1 \text{ kN/m}^2$ |
| Varnished timber formwork | $q = 2 \text{ kN/m}^2$ |
| Rough formwork | $q = 3 \text{ kN/m}^2$ |

The value (H_a) of adhesion to the formwork is thus calculated by the following equation:

$$H_a = q \times A \text{ ①}$$

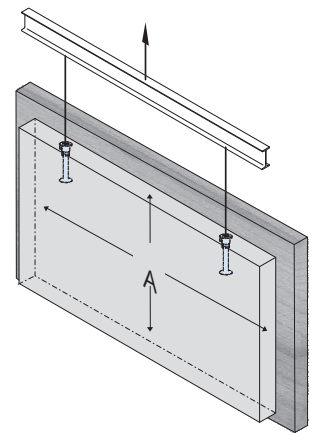
① Surface of the prefabricated concrete component in contact with the formwork prior to lifting.

π - panel, ribbed panel and waffled panel cause more adhesion. For ease of calculation, a multiple of the mass is used:

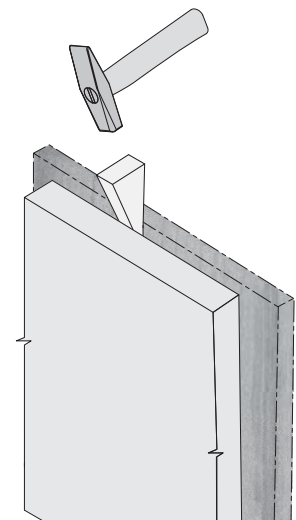
Table 03 Increased adhesion to the formwork

| | |
|---------------|--------------------|
| π - panel | $H_a = 2 \times G$ |
| Ribbed panel | $H_a = 3 \times G$ |
| Waffle panel | $H_a = 4 \times G$ |

As with ribbed panels and waffled panels, substantial load increases can also be encountered when components are lifted parallel to the formwork, such as vertically poured supports or panels.



Adhesion to the formwork should be minimised before lifting by removing as many parts of the formwork as possible.



If it is impossible to remove the form the adhesion can be reduced by using a wedge.

HD-SOCKET LIFTING SYSTEM

Design

Dynamic forces

The magnitude of dynamic loading is mainly determined by the choice of lifting equipment.
Cables made of steel or synthetic fibre have a damping effect. This effect increases with cable length. In contrast, short chains have an adverse effect.

Table 04 Shock factors

| Lifting equipment | Lifting speed m/min. | Shock factors ψ |
|---|----------------------|----------------------|
| Stationary Crane, Revolving Crane, Rail-mounted Crane | < 90 | 1.0 - 1.2 |
| Stationary crane, Revolving crane, Rail-mounted Crane | ≥ 90 | 1.3 - 1.4 |
| Lifting and transporting on even ground | - | 1.5 - 1.65 |
| Lifting and transporting on uneven ground | - | ≥ 2.00 |

The forces acting on the lifting anchor should be calculated with shock factors ψ (see table) .

Depending on the situation and the circumstances the shock factors can be modified.

The site must be fully aware of the shock factor selected by the designer.

Total load

The total load of the precast unit for selecting the anchor is determined as follows:

1. Lifting from the formwork:

$$V_1 = G + H_a$$

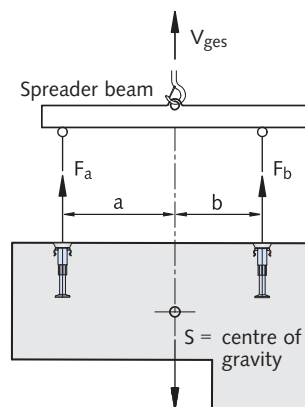
2. During transporting:

$$V_2 = G \times z \times \psi$$

Anchor positioned asymmetrically

If the anchors cannot be placed symmetrically to the centre of gravity, the load on the anchors must be calculated according to simple static design rules.

Unequal loads on the anchors resulting from anchors positioned asymmetrically to the centre of gravity:



With centre of gravity under the hook, the real loads for two anchors under a spreader beam can be calculated as following:

$$F_a = V_{\text{tot}} \times b / (a + b)$$

$$F_b = V_{\text{tot}} \times a / (a + b)$$

Transport without spreader beam

If no spreader beam is used, the cable angle β depends on the length of the suspending cable.

The resulting horizontal component increases the tensile force on the anchor by a further factor:

$$z = 1 / \cos \beta$$

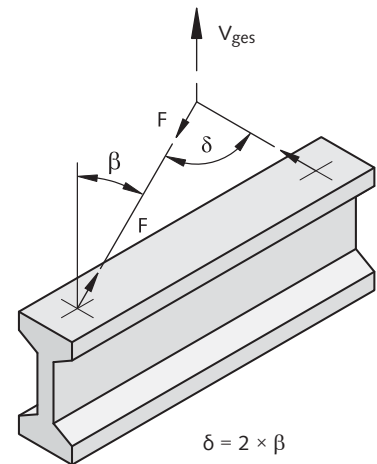


Table 05 Spread angle factors

| Cable angle β | Spread angle δ | Factor z |
|---------------------|-----------------------|------------|
| 0° | - | 1.00 |
| 7.5° | 15.0° | 1.01 |
| 15.0° | 30.0° | 1.04 |
| 22.5° | 45.0° | 1.08 |
| 30.0° | 60.0° | 1.16 |
| 37.5° | 75.0° | 1.26 |
| 45.0° | 90.0° | 1.41 |
| 52.5° | 105.0° | 1.64 |
| 60.0° | 120.0° | 2.00 |

For a symmetrical arrangement, the tensile force on the anchor is:

$$F = z \times V_{\text{tot}} / n$$

n = number of load bearing anchors
(see also section "Multiple strings")

Note:

To avoid tilting of the unit during lifting, the load should be suspended from the spreader beam such that its centre of gravity S is directly below the crane hook.

If no spreader beam is used during lifting, the anchors must be cast in symmetrically to the load.

HD-SOCKET LIFTING SYSTEM

Design

Multiple slings

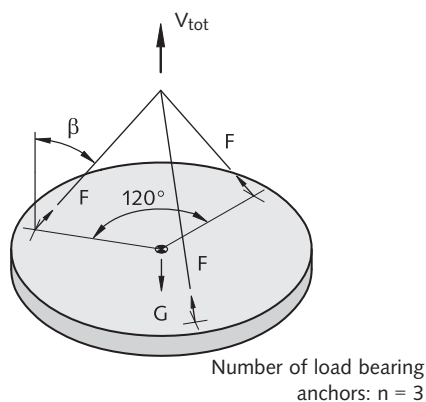
For a beam with more than two suspension points and for a panel with more than three, it is impossible to work out the load per anchor precisely, even if the anchors are arranged symmetrically to the load centre. Due to unavoidable tolerances in the suspension system and in the position of the anchors, it can never be determined whether the load on each anchor is equal.

The use of tolerance-compensating suspension systems (e.g. articulated lifting beam combinations, multiple slings with compensating rig, etc.) permits exact load distribution, but should only be used by experienced specialists, also bear in mind that such a system must be used both in yard and on site. In case of doubt, only two anchors should be assumed to be load bearing.

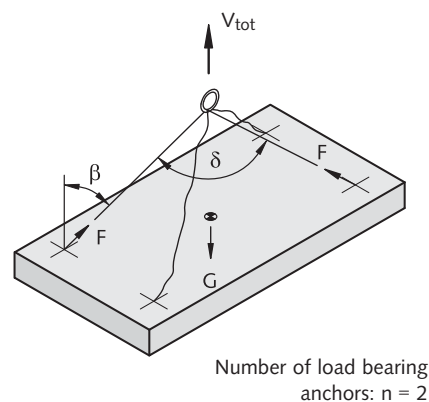
The use of two anchors is recommended for beams and upright panels, and four anchors installed symmetrically to the load centre is recommended for horizontal slabs. In both instances, it can be assumed that two anchors will be bearing equal loads.

Examples:

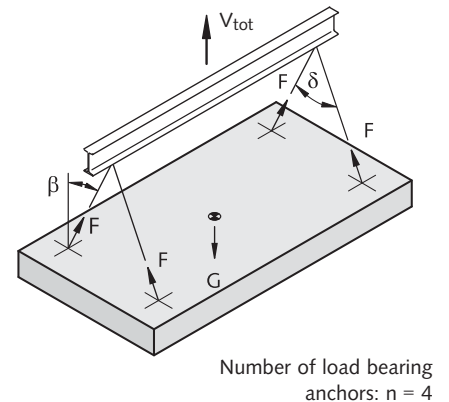
The use of three anchors ensures that the static load is shared evenly.



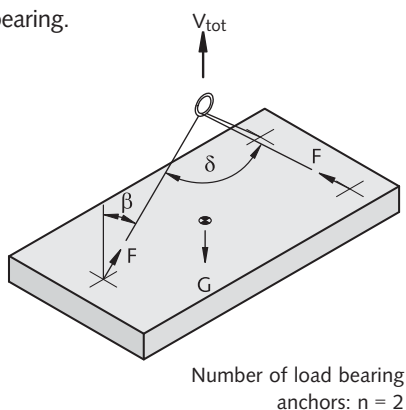
For an arrangement of four independent cable runs or continuous diagonal cable runs, only two anchors can be assumed to be load-bearing.



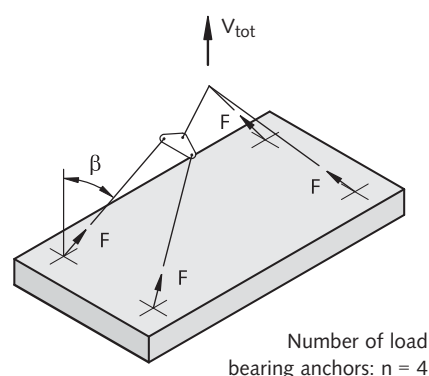
A perfect static weight distribution can be obtained by the use of a spreader beam and two pairs of anchors set out symmetrically.



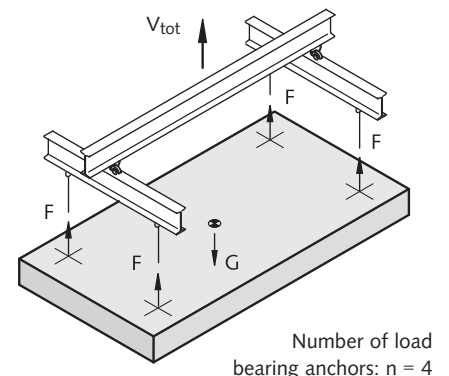
Due to the fact that the anchors are arranged asymmetrically, only two anchors can be assumed to be load-bearing.



The system with compensating rig makes it possible to distribute the load evenly over 4 anchors.



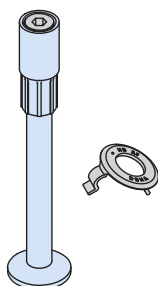
A perfect static weight distribution can be obtained using a crossed spreader beam, which avoids angled load.



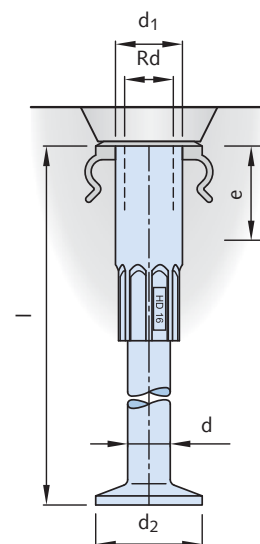
HD-SOCKET LIFTING SYSTEM

HD-Anchor

Dimensions for HD-Anchors



For lifting a wide range of sizes of precast concrete elements.
Load groups 1.3 – 15.0.



Order example

Product group
Load group [t]
Anchor length [mm]
Material

6360 - 2.5 - 200 A4

Table 06 Dimensions for HD-Anchor in mm

| Load range [t] | Designation | | Order No. 0740.130- | Designation | Order No. 0740.130- | Dimensions HD-Anchor | | | | | |
|-------------------|--------------------|-------|------------------------|---------------------------|------------------------|-------------------------|-----------|--------------------------|------------------------|-----------|---------------------------|
| | zinc-plated socket | | | stainless steel A4 socket | | Rd | d [mm] | d ₁ ① [mm] | d ₂ [mm] | l [mm] | Thread depth e [mm] |
| 1.3 | 6360- 1.3-130 | 00001 | | 6360- 1.3-130 A4 | 00009 | 12 | 10 | 17 (15.5) | 25 | 130 | 31 |
| 2.5 | 6360- 2.5-140 | 00040 | | | | 16 | 14 | 22 (21) | 35 | 140 | 36 |
| 2.5 | 6360- 2.5-200 | 00002 | | 6360- 2.5-200 A4 | 00010 | 16 | 14 | 22 (21) | 35 | 200 | 36 |
| 4.0 | 6360- 4.0-258 | 00003 | | 6360- 4.0-258 A4 | 00011 | 20 | 18 | 27 (26) | 45 | 258 | 42 |
| 5.0 | 6360- 5.0-325 | 00004 | | 6360- 5.0-325 A4 | 00012 | 24 | 20 | 32 | 50 | 325 | 48 |
| 7.5 | 6360- 7.5-400 | 00005 | | 6360- 7.5-400 A4 | 00013 | 30 | 24 | 39 | 60 | 400 | 58 |
| 10.0 | 6360-10.0-475 | 00006 | | 6360-10.0-475 A4 | 00014 | 36 | 28 | 47 | 70 | 475 | 66 |
| 12.5 | 6360-12.5-550 | 00007 | | 6360-12.5-550 A4 | 00015 | 42 | 34 | 55 | 85 | 550 | 75 |
| 15.0 | 6360-15.0-575 | 00008 | | 6360-15.0-575 A4 | 00016 | 52 | 34 | 68 | 85 | 575 | 89 |

① Smaller sockets in higher grade of steel are available (see values in brackets).

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

Additional reinforcement as shown in the tables and the reinforcement drawings.

For use external stairs we recommend the use of the anchors with stainless steel sockets.

HD-SOCKET LIFTING SYSTEM

HD-Anchor

Table 07 Allowable load capacity for HD-Anchors in kN

| Load range [t] | Designation | Minimum element thickness $2 \times e_r$ [mm] | Position of anchors ① | | Allowable load capacity [kN] with concrete compressive strength | | | | | | | |
|----------------|---------------|---|-----------------------|------|---|-----------------------|----------------|--------------------------------------|----------------|--------------------------------------|----------------|----------------|
| | | | | | 15 N/mm ² | | | 25 N/mm ² | | 35 N/mm ² | | |
| | | | | | axial load and angled load up to 30° | angled load up to 45° | shear load 90° | axial load and angled load up to 45° | shear load 90° | axial load and angled load up to 45° | shear load 90° | shear load 90° |
| 1.3 | 6360-1.3-130 | 80 | 100 | 560 | 13.0 | 10.4 | 5.9 | 13.0 | 7.5 | 13.0 | 7.5 | |
| | | 100 | | | 13.0 | 10.5 | 7.5 | | | | | |
| | | 120 | | | 13.0 | 10.5 | 7.5 | | | | | |
| 2.5 | 6360-2.5-140 | 100 | 115 | 600 | 13.5 | 10.8 | 6.8 | 17.4 | 8.8 | 20.6 | 10.4 | |
| | | 120 | | | 15.5 | 12.4 | 9.9 | 20.0 | 12.7 | 23.7 | 14.0 | |
| | | 140 | | | 17.4 | 13.9 | 11.6 | 22.4 | 14.0 | 25.0 | 14.0 | |
| | 6360-2.5-200 | 80 | 115 | 840 | 18.7 | 15.0 | 4.2 | 24.1 | 5.4 | 25.0 | 6.4 | |
| | | 100 | | | 22.7 | 18.2 | 6.8 | 25.0 | 8.8 | | 10.4 | |
| | | 120 | | | 25.0 | 18.9 | 9.9 | | 12.7 | | 14.0 | |
| 4.0 | 6360-4.0-258 | 80 | 140 | 800 | 24.0 | 21.6 | 4.1 | 31.0 | 5.3 | 36.6 | 6.3 | |
| | | 100 | | | 29.8 | 26.9 | 6.9 | 38.5 | 8.9 | 40.0 | 10.5 | |
| | | 120 | | | 33.1 | 29.8 | 8.9 | 40.0 | 11.5 | | 13.6 | |
| | | 140 | | | 36.0 | 31.8 | 12.9 | | 16.6 | | 19.6 | |
| | | 160 | | | 39.0 | 31.8 | 17.5 | | 22.6 | | 23.0 | |
| | | 180 | | | 42.1 | 33.4 | 20.0 | | 25.8 | | 28.0 | |
| 5.0 | 6360-5.0-325 | 100 | 150 | 1000 | 40.0 | 40.0 | 13.1 | 50.0 | 16.9 | 50.0 | 20.0 | |
| | | 120 | | | 45.6 | 42.1 | 14.7 | | 19.0 | | 22.5 | |
| | | 140 | | | 49.0 | 42.1 | 20.0 | | 25.8 | | 28.0 | |
| | | 160 | | | 56.0 | 56.0 | 18.1 | | 23.4 | | 27.7 | |
| 7.5 | 6360-7.5-400 | 160 | 190 | 1230 | 66.8 | 66.8 | 24.2 | 75.0 | 31.2 | 75.0 | 36.9 | |
| | | 180 | | | 71.8 | 67.7 | 31.1 | | 40.1 | | 42.5 | |
| | | 200 | | | 75.0 | 67.7 | 39.1 | | 42.5 | | 42.5 | |
| | | 220 | | | 78.7 | 78.7 | 24.0 | | 30.9 | | 36.5 | |
| 10.0 | 6360-10.0-475 | 180 | 200 | 1460 | 90.7 | 90.7 | 30.5 | 100.0 | 39.4 | 100.0 | 46.6 | |
| | | 200 | | | 98.3 | 92.6 | 38.1 | | 49.1 | | 57.0 | |
| | | 220 | | | 100.0 | 92.6 | 46.2 | | 57.0 | | 57.0 | |
| | | 240 | | | 111.6 | 111.6 | 33.2 | | 42.8 | | 50.6 | |
| 12.5 | 6360-12.5-550 | 200 | 215 | 1690 | 125.0 | 120.2 | 40.1 | 125.0 | 51.7 | 125.0 | 61.1 | |
| | | 220 | | | 125.0 | 120.2 | 48.4 | | 62.4 | | 71.0 | |
| | | 240 | | | 125.0 | 120.2 | 57.9 | | 71.0 | | 71.0 | |
| | | 260 | | | 114.1 | 114.1 | 29.2 | 147.4 | 37.7 | 150.0 | 44.6 | |
| 15.0 | 6360-15.0-575 | 200 | 240 | 1760 | 126.8 | 126.8 | 36.2 | | 46.7 | | 55.2 | |
| | | 220 | | | 139.5 | 139.5 | 44.3 | | 57.2 | | 66.7 | |
| | | 240 | | | 150.0 | 144.8 | 53.0 | | 68.5 | | 81.0 | |
| | | 260 | | | 150.0 | 144.8 | 72.5 | | 85.5 | | 85.5 | |
| | | 280 | | | | | | | | | | |

① e_z = min. anchor spacing ; $e_z/2$ = min. edge distance

Axial load up to 10°

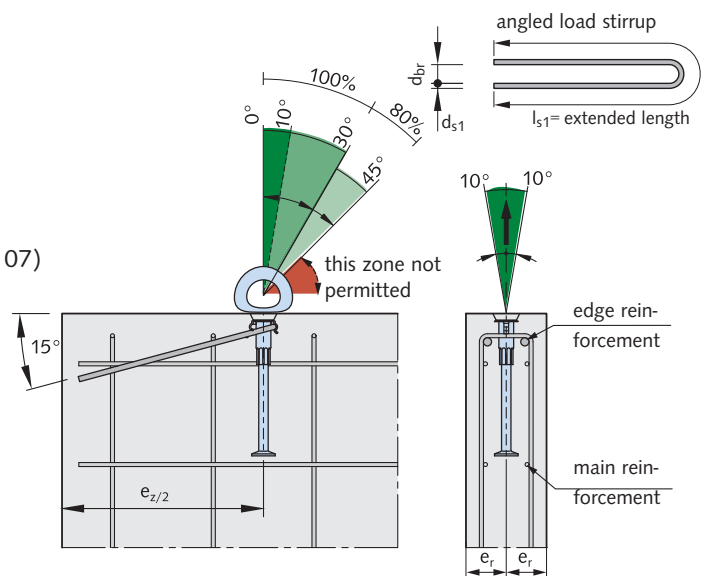
- no angled load reinforcement is required
- loadable 100 % as per table 07

Angled load as from 10° to 30°

- loadable 100 % as per table 07
- angled load reinforcement does not apply with $e_r \geq e_1$ (table 07)
- angled load reinforcement can be replaced by shear reinforcement on both sides

Angled load as from 30° to 45°

- angled load reinforcement is always required
- loadable approx. 80 % with 15 N/mm²
- loadable 100 % as from 25 N/mm² as per table 07
- angled load reinforcement can be replaced by a shear reinforcement on both sides



HD-SOCKET LIFTING SYSTEM

HD-Anchor

Table 08 Reinforcement for HD-Anchor in mm

| Load range [t] | | Designation | Minimum ele- ment thickness 2 × e _r | ④ Main reinforcement crosswise on both sides mm ² /m | axial load up to 10° [β] edge reinforce- ment | Additional reinforcement | | | | | | shear load 90° [β] d _{s2} l _{s2} ② h ₂ ③ r ₁ | | | |
|-------------------|---------------|-------------|--|---|--|--|----|--|------|----|-----|--|-----|----|--|
| | | | | | | angled load up to 30° [β] d _{s1} l _{s1} ①② | | angled load up to 45° [β] d _{br} d _{s1} l _{s1} ①② d _{br} | | | | | | | |
| 1.3 | 6360- 1.3-130 | 80 | 188 | - | Ø 8 | 470 | 30 | Ø8 | 560 | 30 | Ø8 | 550 | 33 | 15 | |
| | | 100 | | | | | | | | | | | 43 | | |
| | | 120 | | | | | | | | | | | 53 | | |
| 2.5 | 6360- 2.5-200 | 80 | 188 | - | Ø 10 | 620 | 30 | Ø10 | 870 | 30 | Ø12 | 750 | 37 | 20 | |
| | | 100 | | | | | | | | | | | 47 | | |
| | | 120 | | | | | | | | | | | 57 | | |
| 4.0 | 6360- 4.0-258 | 80 | 188 | - | Ø 12 | 750 | 40 | Ø14 | 930 | 40 | Ø16 | 910 | 42 | 25 | |
| | | 100 | | | | | | | | | | | 52 | | |
| | | 120 | | | | | | | | | | | 62 | | |
| | | 140 | | | | | | | | | | | 72 | | |
| | | 160 | | | | | | | | | | | 82 | | |
| 5.0 | 6360- 5.0-325 | 100 | 188 | - | Ø 12 | 890 | 40 | Ø14 | 1115 | 40 | Ø16 | 1080 | 56 | 25 | |
| | | 120 | | | | | | | | | | | 66 | | |
| | | 140 | | | | | | | | | | | 76 | | |
| | | 160 | | | | | | | | | | | 86 | | |
| 7.5 | 6360-7.5-400 | 140 | 188 | 2 Ø 12 | Ø 16 | 1360 | 50 | Ø16 | 1585 | 50 | Ø20 | 1300 | 84 | 30 | |
| | | 160 | | | | | | | | | | | 94 | | |
| | | 180 | | | | | | | | | | | 104 | | |
| | | 200 | | | | | | | | | | | 114 | | |
| 10.0 | 6360-10.0-475 | 160 | 188 | 2 Ø 14 | Ø 16 | 1720 | 50 | Ø20 | 1740 | 60 | Ø20 | 1690 | 98 | 30 | |
| | | 180 | | | | | | | | | | | 108 | | |
| | | 200 | | | | | | | | | | | 118 | | |
| | | 220 | | | | | | | | | | | 128 | | |
| 12.5 | 6360-12.5-550 | 180 | 188 | 2 Ø 14 | Ø 20 | 1710 | 60 | Ø20 | 2115 | 60 | Ø25 | 1650 | 117 | 40 | |
| | | 200 | | | | | | | | | | | 127 | | |
| | | 220 | | | | | | | | | | | 137 | | |
| | | 240 | | | | | | | | | | | 147 | | |
| 15.0 | 6360-15.0-575 | 180 | 188 | 2 Ø 14 | Ø 20 | 2060 | 80 | Ø25 | 2000 | 80 | Ø25 | 1940 | 123 | 40 | |
| | | 200 | | | | | | | | | | | 133 | | |
| | | 220 | | | | | | | | | | | 143 | | |
| | | 240 | | | | | | | | | | | 153 | | |
| | | 280 | | | | | | | | | | | 173 | | |

① For concrete compressive strength 15 N/mm², for higher concrete compressive strengths shorter stirrups are possible.

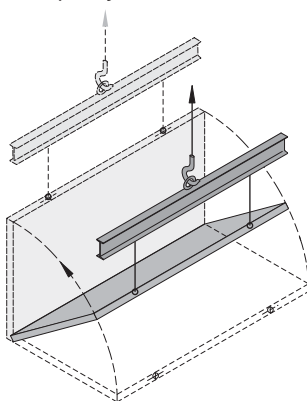
② Extended length

③ At $c_{min} = 20\text{mm}$

④ Mesh reinforcement, bent or similar reinforcement

90° shear situation

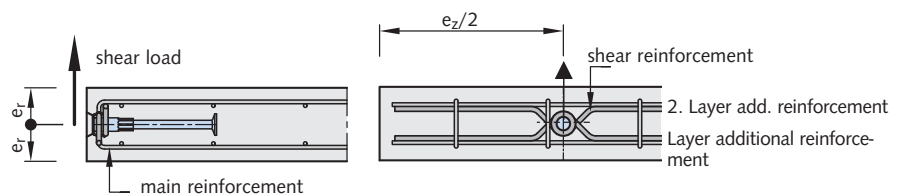
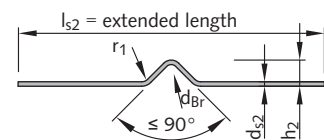
- pitching with 90°
- load capacity see table 07



The shear reinforcement on both sides also serves as angled load. Additional angled load reinforcement is not necessary.

This additional reinforcement should be placed in with tight contact with the socket.

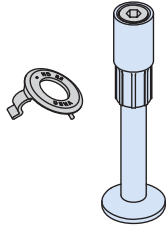
Shear reinforcement



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 – 7.5

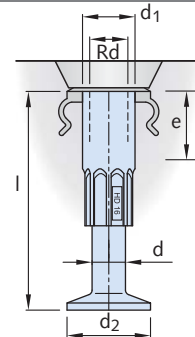


Table 09 Dimensions and reinforcement for HD-Short Anchors in mm

| Load range [t] | Designation zinc-plated socket | Order No. 0740.130- | Designation stainless steel A4 socket | Order No. 0740.130- | Dimensions HD-Short Anchor | | | | | Main rein- forcement crosswise both sides mm ² /m | Additional reinforcement for angled load up to 45° l _{s1} @ [mm] | | | | |
|-------------------|--------------------------------------|------------------------|---|------------------------|-------------------------------|----|------------------|----------------|-----|--|---|-------------------------|-------------------------|-------------------------|-----------------|
| | | | | | Rd | d | d ₁ ① | d ₂ | l | | d _{s1} | 15 N/mm ² | 25 N/mm ² | 35 N/mm ² | d _{br} |
| 1.3 | 6360-1.3-070 | 00017 | 6360-1.3-070 A4 | 00021 | 12 | 10 | 17 (15.5) | 25 | 70 | 188 | 10 | 620 | 570 | 500 | 30 |
| 2.5 | 6360-2.5-090 | 00018 | 6360-2.5-090 A4 | 00022 | 16 | 14 | 22 (21) | 35 | 90 | 188 | 12 | 680 | 630 | 580 | 30 |
| 4.0 | 6360-4.0-125 | 00019 | 6360-4.0-125 A4 | 00023 | 20 | 18 | 27 (26) | 45 | 125 | 188 | 14 | 900 | 830 | 740 | 40 |
| 5.0 | 6360-5.0-140 | 00020 | 6360-5.0-140 A4 | 00024 | 24 | 20 | 32 | 50 | 140 | 188 | 14 | 1300 | 1200 | 1100 | 40 |
| 7.5 | 6360-7.5-185 | 00038 | 6360-7.5-185 A4 | 00039 | 30 | 24 | 39 | 60 | 185 | 188 | 16 | 1520 | 1410 | 1300 | 50 |

① Smaller diameter sockets are available in higher grade steel (see values in brackets). Delivery is subject to change.

② Extended length

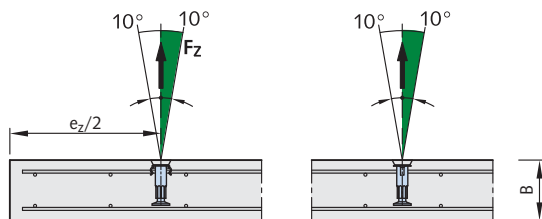
Table 10 Allowable load capacities for HD-Short Anchors in kN

| Load range [t] | Designation | Anchor arrangement ③ | | Increased element thickness B ④ [mm] | Allowable load capacity with concrete compressive strength for axial and angled load up to 45° | | | Minimum structural ele- ment thickness B ④ [mm] | Allowable load capacity with concrete compressive strength for axial load and angled load up to 45° | | |
|-------------------|--------------|----------------------|--------------------|---|--|----------------------|----------------------|--|---|----------------------|----------------------|
| | | e _z /2 | e _z min | | 15 N/mm ² | 25 N/mm ² | 35 N/mm ² | | 15 N/mm ² | 25 N/mm ² | 35 N/mm ² |
| 1.3 | 6360-1.3-070 | 250 | 500 | 115 | 13.0 | 13.0 | 13.0 | 115 | 13.0 | 13.0 | 13.0 |
| 2.5 | 6360-2.5-090 | 400 | 800 | 160 | 19.5 | 25.0 | 25.0 | 125 | 16.5 | 21.3 | 25.0 |
| 4.0 | 6360-4.0-125 | 500 | 1000 | 220 | 31.2 | 40.0 | 40.0 | 160 | 25.3 | 32.6 | 38.6 |
| 5.0 | 6360-5.0-140 | 650 | 1300 | 275 | 39.3 | 50.0 | 50.0 | 175 | 29.1 | 37.5 | 44.4 |
| 7.5 | 6360-7.5-185 | 750 | 1500 | 360 | 59.4 | 75.0 | 75.0 | 240 | 44.9 | 57.9 | 68.5 |

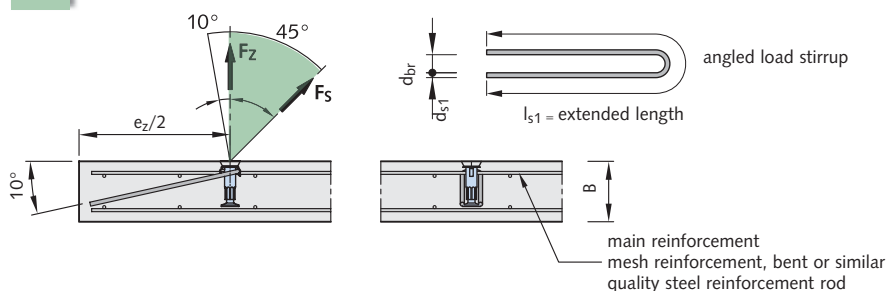
③ e_z/2 = min. edge distance (e_z min applies to axial load; for angled load, see reinforcement) ; e_z = min. anchor spacing

④ Values for other element thicknesses may be interpolated.

Without angled load stirrup, axial load up to 10°



With angled load stirrup, angled load up to 45°



The required additional reinforcement is shown in the reinforcement drawings and tables for each load group. 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.

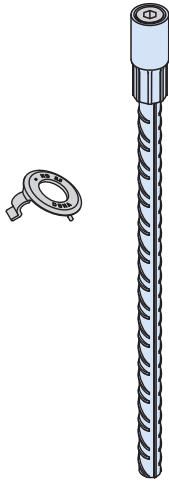
If axial load does not exceed 10° angled load reinforcement not required.

Angled loads above 45° and shear loads are not possible with HD-Short Anchors.

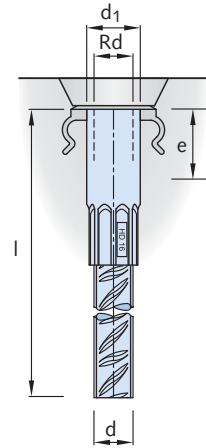
HD-SOCKET LIFTING SYSTEM

HD-Rod Anchor

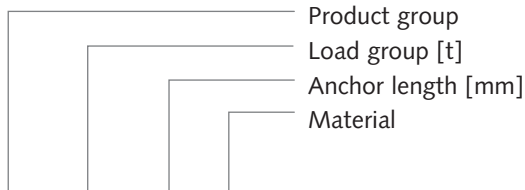
Allowable load capacity, dimensions and reinforcement for HD-Rod Anchors



Normally used in thin precast concrete elements such as the walls of garages and transformer stations.
Load groups 1.3 – 15.0



Order example



6361 - 2.5 - 0400 A4

Table 11 Dimensions and reinforcement for HD-Rod Anchor in mm

| Load range [t] | Designation zinc-plated socket | Order No. 0740.140- | Designation stainless steel A4 socket | Order No. 0740.140- | Dimensions HD-Rod Anchor | | | | | |
|-------------------|--------------------------------------|------------------------|---|------------------------|-----------------------------|-----------|--------------------------|-----------|------------------------|--|
| | | | | | Rd | d [mm] | d ₁ ① [mm] | l [mm] | Threat depth e [mm] | |
| 1.3 | 6361-1.3-0300 | 00001 | 6361-1.3-0300 A4 | 00009 | 12 | 10 | 17 (15.5) | 300 | 31 | |
| 2.5 | 6361-2.5-0400 | 00002 | 6361-2.5-0400 A4 | 00010 | 16 | 14 | 22 (21) | 400 | 36 | |
| 4.0 | 6361-4.0-0480 | 00003 | 6361-4.0-0480 A4 | 00011 | 20 | 18 | 27 (26) | 480 | 42 | |
| 5.0 | 6361-5.0-0540 | 00004 | 6361-5.0-0540 A4 | 00012 | 24 | 20 | 32 | 540 | 48 | |
| 7.5 | 6361-7.5-0700 | 00005 | 6361-7.5-0700 A4 | 00013 | 30 | 24 | 39 | 700 | 58 | |
| 10.0 | 6361-10.0-0800 | 00006 | 6361-10.0-0800 A4 | 00014 | 36 | 28 | 47 | 800 | 66 | |
| 12.5 | 6361-12.5-0920 | 00007 | 6361-12.5-0920 A4 | 00015 | 42 | 34 | 55 | 920 | 75 | |
| 15.0 | 6361-15.0-1100 | 00008 | 6361-15.0-1100 A4 | 00016 | 52 | 34 | 68 | 1100 | 89 | |

① Smaller diameter sockets are available in higher grade steel (see values in brackets). Delivery is subject to change.

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 150mm test cubes.

HD-SOCKET LIFTING SYSTEM

HD-Rod Anchor

Table 12 Allowable load capacities for HD-Rod Anchor in kN

| Load range [t] | | Designation | Minimum element thickness $2 \times e_r$ [mm] | Position of Anchors ① | | Allowable load capacity with concrete compressive strength | | | | | | |
|-------------------|------|----------------|---|--------------------------|--------------------|--|----------------------------|-------------------|---------------------------------------|-------------------|---------------------------------------|----------------------|
| | | | | e ₁ | e _z min | 15 N/mm ² for | | | 25 N/mm ² for | | 35 N/mm ² for | |
| | | | | | | axial and angled load up to 30° | diagonal load up to 45° | shear load 90° | axial and angled load up to 45° | shear load 90° | axial and angled load up to 45° | shear load at 90° |
| Red | 1.3 | 6361-1.3-0300 | 60 | 100 | 620 | 13.0 | 10.5 | 3.5 | 13.0 | 4.5 | 13.0 | 5.3 |
| | | | 80 | | | | | 5.9 | | 7.5 | | 7.5 |
| | | | 100 | | | | | 7.5 | | 7.5 | | 7.5 |
| Dark Gray | 2.5 | 6361-2.5-0400 | 80 | 115 | 820 | 25.0 | 18.9 | 4.2 | 25.0 | 5.4 | 25.0 | 6.3 |
| | | | 100 | | | | | 6.8 | | 8.8 | | 10.4 |
| | | | 120 | | | | | 9.9 | | 12.7 | | 14.0 |
| Green | 4.0 | 6361-4.0-0480 | 80 | 140 | 980 | 32.8 | 29.5 | 4.1 | 40.0 | 5.3 | 40.0 | 6.3 |
| | | | 100 | | | 35.8 | 31.8 | 6.9 | | 8.9 | | 10.5 |
| | | | 120 | | | 38.2 | 31.8 | 8.9 | | 11.5 | | 13.6 |
| | | | 140 | | | 40.0 | 31.8 | 12.9 | | 16.6 | | 19.6 |
| | | | 160 | | | 40.0 | 31.8 | 17.5 | | 22.5 | | 23.0 |
| Blue | 5.0 | 6361-5.0-0540 | 100 | 150 | 1100 | 40.9 | 40.9 | 9.3 | 50.0 | 12.0 | 50.0 | 14.2 |
| | | | 120 | | | 44.2 | 42.1 | 13.1 | | 16.9 | | 20.0 |
| | | | 140 | | | 47.1 | 42.1 | 14.7 | | 19.0 | | 22.5 |
| | | | 160 | | | 20.0 | 42.1 | 20.0 | | 25.8 | | 28.0 |
| Gray | 7.5 | 6361-7.5-0700 | 120 | 190 | 1420 | 66.1 | 66.1 | 12.9 | 75.0 | 16.7 | 75.0 | 19.7 |
| | | | 140 | | | 70.1 | 67.7 | 18.1 | | 23.4 | | 27.7 |
| | | | 160 | | | 75.0 | 67.7 | 24.4 | | 31.2 | | 36.9 |
| | | | 180 | | | 75.0 | 67.7 | 31.1 | | 40.1 | | 42.5 |
| | | | | | | | | | | | | |
| Orange | 10.0 | 6361-10.0-0800 | 140 | 200 | 1620 | 100.0 | 92.6 | 18.2 | 100.0 | 23.4 | 100.0 | 27.7 |
| | | | 160 | | | | | 24.0 | | 30.9 | | 36.5 |
| | | | 180 | | | | | 30.5 | | 39.4 | | 46.6 |
| | | | 200 | | | | | 38.1 | | 49.1 | | 57.0 |
| Yellow | 12.5 | 6361-12.5-0920 | 140 | 215 | 1870 | 125.0 | 120.2 | 20.2 | 125.0 | 26.1 | 125.0 | 30.9 |
| | | | 160 | | | | | 26.3 | | 33.9 | | 40.1 |
| | | | 180 | | | | | 33.2 | | 42.8 | | 50.6 |
| | | | 200 | | | | | 40.1 | | 51.7 | | 61.2 |
| | | | | | | | | | | | | |
| Black | 15.0 | 6361-15.0-1100 | 160 | 240 | 2230 | 150.0 | 144.8 | 22.6 | 150.0 | 29.2 | 150.0 | 34.5 |
| | | | 180 | | | | | 29.2 | | 37.7 | | 44.6 |
| | | | 200 | | | | | 36.2 | | 46.7 | | 55.2 |
| | | | 220 | | | | | 44.3 | | 57.2 | | 67.7 |
| | | | 240 | | | | | 53.0 | | 68.5 | | 81.0 |

① $e_z/2 = \min.$ edge distance ; $e_z = \min.$ anchor spacing

Axial load up to 10°

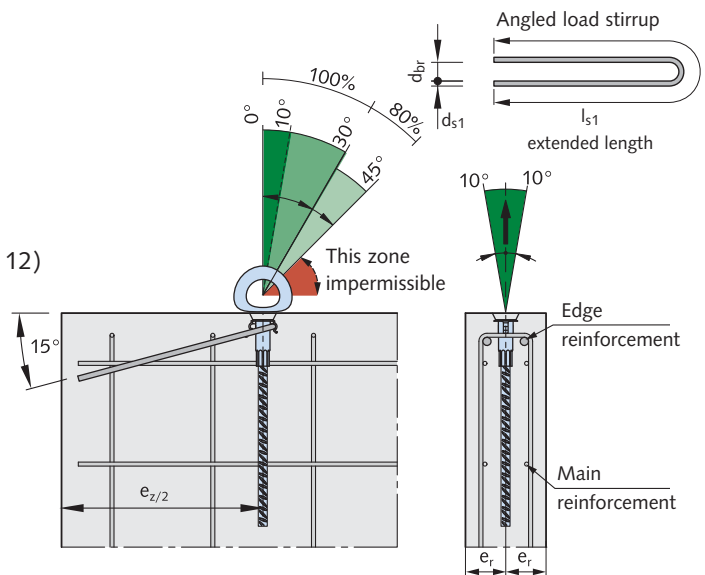
- no angled load reinforcement is required
- loadable 100 % as per table 12

Angled load 10° to 30°

- loadable 100 % as per table 12
- angled load reinforcement does not apply with $e_r \geq e_1$ (table 12)
- angled load reinforcement can be replaced by shear reinforcement on both sides

Angled load 30° to 45°

- angled load reinforcement is always required
- loadable approx. 80 % with 15 N/mm²
- loadable 100 % as from 25 N/mm² as per table 12
- angled load reinforcement can be replaced by a shear reinforcement on both sides



HD-SOCKET LIFTING SYSTEM

HD-Rod Anchor

Table 13 Allowable load capacities for HD-Rod Anchor in kN

| Load range [t] | Designation | Minimum element thick- ness | ④ Main reinforcement crosswise on both sides mm ² /m | axial load up to 10° [β] Edge rein- forcement | angled load up to 30° | | | angled load up to 45° | | | shear load at 90° | | | |
|-------------------|------------------|-----------------------------------|---|---|--------------------------|--------------------|-----------------|--------------------------|--------------------|-----------------|----------------------|-------------------|------------------|----------------|
| | | 2 × e _r | | | d _{s1} | l _{s1} ①② | d _{br} | d _{s1} | l _{s1} ①② | d _{br} | d _{s2} | l _{s2} ② | h ₂ ③ | r ₁ |
| 1.3 | 6361 - 1.3-0300 | 60 | 188 | - | Ø 8 | 470 | 30 | Ø8 | 560 | 30 | 8 | 550 | 23 | 15 |
| | | 80 | | | | | | | | | | | 33 | |
| | | 100 | | | | | | | | | | | 43 | |
| 2.5 | 6361 - 2.5-0400 | 80 | 188 | - | Ø 10 | 620 | 30 | Ø10 | 870 | 30 | 12 | 750 | 37 | 20 |
| | | 100 | | | | | | | | | | | 47 | |
| | | 120 | | | | | | | | | | | 57 | |
| 4.0 | 6361 - 4.0-0480 | 80 | 188 | 2 Ø 12 | Ø 12 | 750 | 40 | Ø14 | 930 | 40 | 16 | 910 | 42 | 25 |
| | | 100 | | | | | | | | | | | 52 | |
| | | 120 | | | | | | | | | | | 62 | |
| | | 140 | | | | | | | | | | | 72 | |
| 5.0 | 6361 - 5.0-0540 | 160 | 188 | 2 Ø 12 | Ø 12 | 890 | 40 | Ø14 | 1115 | 40 | 16 | 1080 | 82 | 25 |
| | | 100 | | | | | | | | | | | 56 | |
| | | 120 | | | | | | | | | | | 66 | |
| | | 140 | | | | | | | | | | | 76 | |
| 7.5 | 6361 - 7.5-0700 | 160 | 188 | 2 Ø 12 | Ø 12 | 890 | 40 | Ø14 | 1115 | 40 | 16 | 1080 | 86 | 25 |
| | | 120 | | | | | | | | | | | 74 | |
| | | 140 | | | | | | | | | | | 84 | |
| | | 160 | | | | | | | | | | | 94 | |
| 10.0 | 6361 - 10.0-0800 | 180 | 188 | 2 Ø 14 | Ø 16 | 1360 | 50 | Ø16 | 1585 | 50 | 20 | 1300 | 104 | 30 |
| | | 140 | | | | | | | | | | | 88 | |
| | | 160 | | | | | | | | | | | 98 | |
| | | 180 | | | | | | | | | | | 108 | |
| 12.5 | 6361 - 12.5-0920 | 200 | 188 | 2 Ø 14 | Ø 20 | 1720 | 50 | Ø20 | 1740 | 60 | 20 | 1690 | 118 | 30 |
| | | 140 | | | | | | | | | | | 97 | |
| | | 160 | | | | | | | | | | | 107 | |
| | | 180 | | | | | | | | | | | 117 | |
| 15.0 | 6361 - 15.0-1100 | 200 | 188 | 2 Ø 14 | Ø 20 | 1710 | 60 | Ø20 | 2115 | 60 | 25 | 1650 | 127 | 40 |
| | | 160 | | | | | | | | | | | 113 | |
| | | 180 | | | | | | | | | | | 123 | |
| | | 220 | | | | | | | | | | | 133 | |
| 15.0 | 6361 - 15.0-1100 | 240 | 188 | 2 Ø 14 | Ø 20 | 2060 | 80 | Ø25 | 2000 | 80 | 25 | 1940 | 143 | 40 |
| | | 240 | | | | | | | | | | | 153 | |

① For concrete compressive strength 15 N/mm², for higher concrete compressive strengths shorter stirrups are possible.

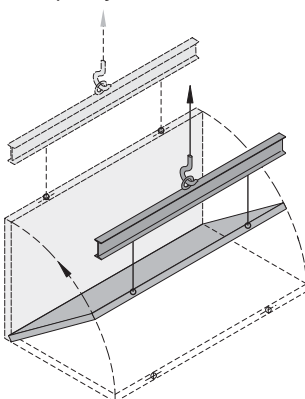
② Extended length

③ For c_{min} = 20mm

④ Mesh reinforcement, bent or similar quality steel reinforcement

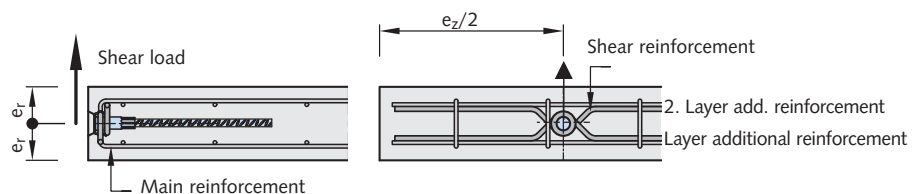
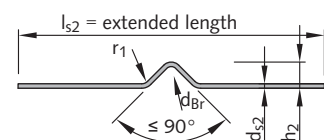
90° shear situation

- rotating element 90°
- load capacity see table 12



The shear reinforcement on both sides also serves as angled load reinforcement. Additional angled load reinforcement is not necessary. This additional reinforcement has to be placed in tight contact with the socket.

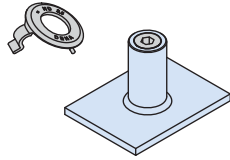
Shear reinforcement



HD-SOCKET LIFTING SYSTEM

HD-Plate Anchor

Allowable load capacity, dimensions and reinforcement for HD-Plate Anchor



HD-Plate Anchors are designed for lifting large, thin-walled precast concrete elements which should be lifted perpendicular to their main dimension (slabs and shells). Zinc-plated an also available in stainless steel.

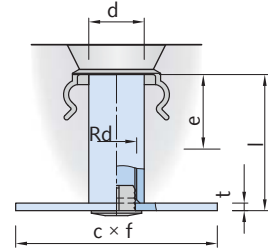


Table 14 Dimensions and reinforcement for HD-Plate Anchor in mm

| Load range [t] | | Designation zinc-plated | Order No. 0740.180- | Dimensions HD-Plate Anchor | | | | | | | ② Main re- inforcement crosswise both sides mm²/m | Additional reinforcement | | | | | | | |
|-------------------|----------|--------------------------------|------------------------|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|---|--|-----------------|-------------------|----|------------------------------------|--------------------|-----------------|--|
| | | | | Rd | l [mm] | d [mm] | t [mm] | c [mm] | f [mm] | e [mm] | | axial- and angled load additional reinforcement | | | | angled load angled load stirrup | | | |
| | | | | | | | | | | | | d _{s2} | l _{s2} | l _{s3} ① | h | d _{s1} | l _{s1} ①③ | d _{br} | |
| 1.3 | 6370-1.3 | 00001 | 12 | 46 | 17 | 4 | 50 | 50 | 31 | 188 | 4 Ø 8 | 60 | 425 | 40 | 10 | 660 | 20 | | |
| 2.5 | 6370-2.5 | 00002 | 16 | 54 | 22 | 5 | 60 | 80 | 36 | 188 | 4 Ø10 | 90 | 640 | 50 | 12 | 980 | 25 | | |
| 4.0 | 6370-4.0 | 00003 | 20 | 72 | 27 | 6 | 80 | 100 | 42 | 188 | 4 Ø12 | 110 | 830 | 55 | 12 | 1100 | 25 | | |
| 5.0 | 6370-5.0 | 00004 | 24 | 84 | 32 | 6 | 100 | 130 | 48 | 188 | 4 Ø16 | 140 | 1140 | 60 | 16 | 1250 | 30 | | |
| 7.5 | 6370-7.5 | 00005 | 30 | 98 | 39 | 8 | 130 | 130 | 58 | 257 | 4 Ø16 | 140 | 1250 | 60 | 16 | 1500 | 30 | | |

① Extended length

② Mesh reinforcement, bent or similar quality steel reinforcement

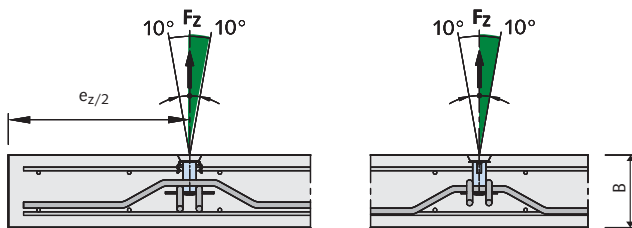
③ For concrete compressive strength 15 N/mm², for higher concrete compressive strengths shorter stirrups are possible.

Table 15 Allowable load capacity for HD-Plate Anchor in kN

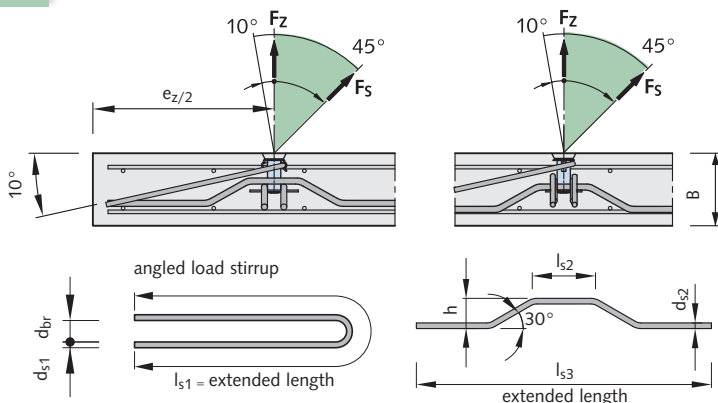
| Load range [t] | Designation | Minimum element thick- ness B | Position of anchors ③ | | Concrete compressive strength 15 N/mm ² | |
|-------------------|-------------|--|--------------------------|-----------|--|--------------------------|
| | | | $e_z/2$ | e_z min | axial load up to 10° | angled load up to 45° |
| 1.3 | 6370-1.3 | 100 | 250 | 500 | 13.0 | 13.0 |
| 2.5 | 6370-2.5 | 115 | 400 | 800 | 25.0 | 25.0 |
| 4.0 | 6370-4.0 | 150 | 500 | 1000 | 40.0 | 40.0 |
| 5.0 | 6370-5.0 | 160 | 650 | 1300 | 50.0 | 50.0 |
| 7.5 | 6370-7.5 | 200 | 650 | 1300 | 75.0 | 75.0 |

③ $e_z/2$ = min. edge distance ; e_z = min. anchor spacing

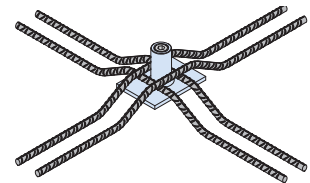
Without angled load stirrup - axial load up to 10°



With angled load stirrup - axial load up to 45°



The axial reinforcement must be laid over the footplate of the HD- Plate Anchor and tied.



It must be arranged on the footplate in two layers at right-angles to each other with the smallest distance possible to the threaded socket. The lower layers should run parallel to the shorter side of the footplate, and must be tight to the top of the footplate.

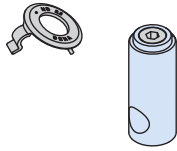
The angled load reinforcement must be installed against the socket and with a maximum inclination of 10°, if provided with end hooks, the leg lengths in table 13 apply.

The slab thickness must not exceed 250mm for angled lift because of the bond stress which is applied. (The minimum slab thickness 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 Anchors with hole are used for lifting thin precast walls. HD-Plain Anchors with hole are not suited for slabs. Zinc-plated and also available in stainless steel.

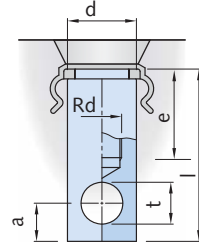


Table 16 Dimensions and reinforcement for HD- Plain Anchors with hole in mm

| Load range [t] | Designation zinc-plated | Order No. 0740.190- | Dimensions HD- Plain Anchor with hole | | | | | | | Additional reinforcement | | | | | |
|-------------------|----------------------------|------------------------|--|-----|----|------|----|----|----|--------------------------|-------------------|------------------|-----------------------|-------------------|------------------|
| | | | Rd | l | d | t | a | e | | axial load up to 10° | | | angled load up to 45° | | |
| 1.3 | 6376 - 1.3 | 00001 | 12 | 95 | 21 | 13.5 | 12 | 31 | 10 | d _{s1} | l _{s1} ① | d _{br1} | d _{s2} | l _{s2} ② | d _{br2} |
| 2.5 | 6376 - 2.5 | 00002 | 16 | 70 | 28 | 17.0 | 16 | 36 | 12 | 650 | 40 | 8 | 250 | 25 | 30 |
| 4.0 | 6376 - 4.0 | 00003 | 20 | 85 | 38 | 24.5 | 21 | 42 | 16 | 1200 | 65 | 12 | 420 | 40 | 40 |
| 5.0 | 6376 - 5.0 | 00004 | 24 | 93 | 40 | 25.5 | 22 | 48 | 16 | 1500 | 65 | 16 | 520 | 50 | 50 |
| 7.5 | 6376 - 7.5 | 00005 | 30 | 116 | 46 | 28.0 | 28 | 58 | 20 | 1750 | 80 | 16 | 600 | 50 | 50 |
| 10.0 | 6376 -10.0 | 00006 | 36 | 136 | 51 | 30.0 | 30 | 66 | 25 | 1850 | 100 | 20 | 750 | 55 | 55 |

① Extended length

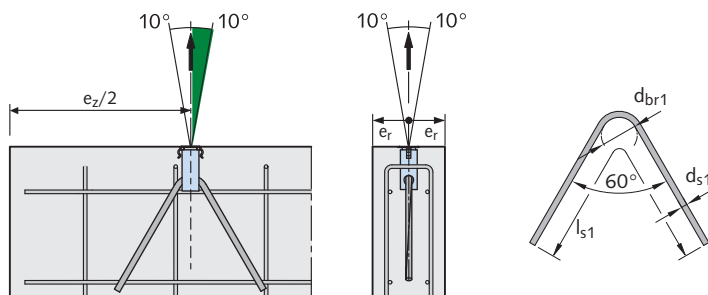
② For concrete compressive strength 15 N/mm², for higher concrete compressive strengths shorter stirrups are possible.

Table 17 Allowable load capacity for HD- Plain Anchor with hole in kN

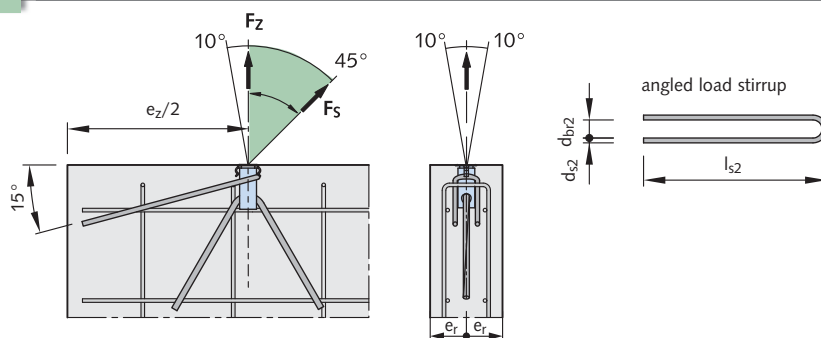
| Load range [t] | Designation | Minimum element thickness 2 x e _r [mm] | Position of Anchors ③ | | Allowable load capacity with concrete compressive strength | | | |
|-------------------|-------------|---|----------------------------|----------------------------|--|-----------------------|--------------------------------------|--------------------------------------|
| | | | e _r min [mm] | e _z min [mm] | 15 N/mm ² for | | 25 N/mm ² for | 35 N/mm ² for |
| | | | | | axial load up to 10° | angled load up to 45° | axial load and angled load up to 45° | axial load and angled load up to 45° |
| 1.3 | 6376 - 1.3 | 80 | 40 | 500 | 13.0 | 10.5 | 13 | 13 |
| 2.5 | 6376 - 2.5 | 100 | 50 | 600 | 25.0 | 20.0 | 25 | 25 |
| 4.0 | 6376 - 4.0 | 110 | 55 | 700 | 40.0 | 32.0 | 40 | 40 |
| 5.0 | 6376 - 5.0 | 120 | 60 | 750 | 50.0 | 40.0 | 50 | 50 |
| 7.5 | 6376 - 7.5 | 130 | 65 | 1000 | 75.0 | 60.0 | 75 | 75 |
| 10.0 | 6376 -10.0 | 140 | 70 | 1200 | 100.0 | 80.0 | 100 | 100 |

③ e_z/2 = min. edge distance ; e_z = min. anchor spacing

Without angled load stirrup - axial load up to 10°



With angled load stirrup - axial load up to 45°



The minimum spacing of the lifting anchor is e_z.

The axial pull reinforcement is essential and must be placed through the hole in the HD-Plain Anchor.

It must be inserted so that it fits firmly to the lower edge of the hole. Required additional reinforcement is shown in the reinforcement drawings and tables for each load group.

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

Additional reinforcement must be placed as tight as possible to the barrel of the socket.

HD-SOCKET LIFTING SYSTEM

Accessories

HD-Nailing plate, plastic

HD-Nailing plates are used to attach HD-Anchors to the formwork. Plastic nailing plates are available for thread sizes Rd 12 to Rd 52 and are coloured according to the thread size. Suitable for all lifting links (see page 22-23).

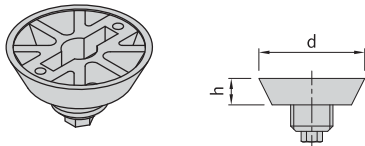


Table 18 HD-Nailing plate, plastic

| Designation | Order No. 0741.160- | for Rd | d [mm] | h [mm] |
|-------------|---------------------|--------|--------|--------|
| 6364- 1.3 | 00001 | 12 | 40 | 10 |
| 6364- 2.5 | 00002 | 16 | 40 | 10 |
| 6364- 4.0 | 00003 | 20 | 55 | 10 |
| 6364- 5.0 | 00004 | 24 | 55 | 10 |
| 6364- 7.5 | 00005 | 30 | 70 | 10 |
| 6364-10.0 | 00006 | 36 | 70 | 10 |
| 6364-12.5 | 00007 | 42 | 95 | 12 |
| 6364-15.0 | 00008 | 52 | 95 | 12 |

HD-Nailing plate, steel

Steel nailing plates are available for thread sizes Rd 12 to Rd 52 and are zinc-plated. The Nailing plate creates a recess in which the HD-Lifting Link, the HD Perfect head or the HD-Adapter is screwed..

finish: zinc-plated

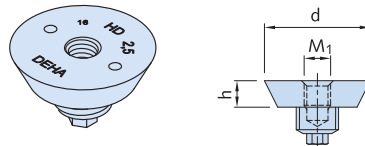


Table 19 HD-Nailing plate, steel

| Designation | Order No. 0741.190- | for Rd | d [mm] | h [mm] | M1 [mm] |
|-------------|---------------------|--------|--------|--------|---------|
| 6369- 1.3 | 00001 | 12 | 40 | 10 | 6 |
| 6369- 2.5 | 00002 | 16 | 40 | 10 | 10 |
| 6369- 4.0 | 00003 | 20 | 55 | 10 | 12 |
| 6369- 5.0 | 00004 | 24 | 55 | 10 | 12 |
| 6369- 7.5 | 00005 | 30 | 70 | 10 | 12 |
| 6369-10.0 | 00006 | 36 | 70 | 10 | 16 |
| 6369-12.5 | 00007 | 42 | 95 | 12 | 16 |
| 6369-15.0 | 00008 | 52 | 95 | 12 | 16 |

HD-Magnetic plate

HD-Magnetic plates are used to attach HD-Anchors to the formwork. They are available for thread sizes Rd 12 to Rd 52 and are zinc-plated. The Magnetic plate creates a recess in which the HD-Lifting Link, the HD Perfect head or the HD-Adapter is screwed.

finish: zinc-plated

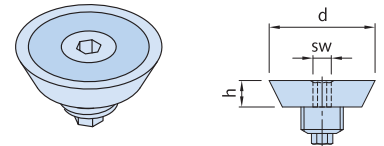


Table 20 HD-Magnetic plate

| Designation | Order No. 0741.180- | for Rd | d [mm] | h [mm] | SW |
|-------------|---------------------|--------|--------|--------|----|
| 6365- 1.3 | 00001 | 12 | 40 | 12 | 6 |
| 6365- 2.5 | 00002 | 16 | 40 | 12 | 6 |
| 6365- 4.0 | 00003 | 20 | 55 | 12 | 10 |
| 6365- 5.0 | 00004 | 24 | 55 | 12 | 10 |
| 6365- 7.5 | 00005 | 30 | 70 | 12 | 16 |
| 6365-10.0 | 00006 | 36 | 70 | 12 | 16 |
| 6365-12.5 | 00007 | 42 | 95 | 12 | 16 |
| 6365-15.0 | 00008 | 52 | 95 | 12 | 16 |

HD-Nailing plate, steel with adapter for assembly pin

Similar to steel nailing plate 6369, but with pre-installed adapter for the use with the assembly pin.

finish: zinc-plated

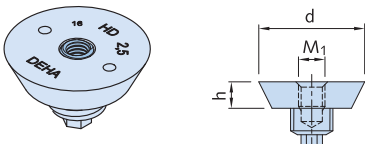


Table 21 HD- Nailing plate, steel with adapter

| Designation | Order No. 0741.190- | for Rd | d [mm] | h [mm] | M1 [mm] |
|-------------|--------------------------------|--------|--------|--------|---------|
| 6369-1.3 A | equates to 6369-1.3 (Table 19) | | | | |
| 6369-2.5 A | 00102 | 16 | 40 | 10 | 6 |
| 6369-4.0 A | 00103 | 20 | 55 | 10 | 6 |
| 6369-5.0 A | 00104 | 24 | 55 | 10 | 6 |
| 6369-7.5 A | 00105 | 30 | 70 | 10 | 6 |

HD-Data carrier

Data carrier and holder for the integral socket protector.

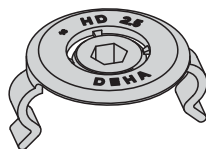


Table 22 HD- Data carrier, plastic

| Designation | Order No. 0741.- | for Rd | d [mm] | h [mm] |
|-------------|------------------|--------|--------|--------|
| 6363- 1.3 | 00001 | 12 | 40 | 10 |
| 6363- 2.5 | 00002 | 16 | 40 | 10 |
| 6363- 4.0 | 00003 | 20 | 55 | 10 |
| 6363- 5.0 | 00004 | 24 | 55 | 10 |
| 6363- 7.5 | 00005 | 30 | 70 | 10 |
| 6363-10.0 | 00006 | 36 | 70 | 10 |
| 6363-12.5 | 00007 | 42 | 95 | 12 |
| 6363-15.0 | 00008 | 52 | 95 | 12 |

Retaining bolt

Retaining bolt are used to attach the HD-Steel nailing plates to formwork. Foxed wing nut on one end. Second wing nut with thread used to tighten.

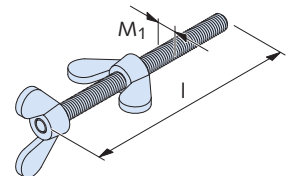


Table 23 Retaining screw

| Designation | Order No. 0741.280- | Load group | M1 [mm] | l [mm] |
|-------------|---------------------|------------|---------|--------|
| 6160-12 | 00003 | 4.0 | 12 | 110 |
| | | 5.0 | | |
| | | 7.5 | | |
| 6160-16 | 00004 | 10.0 | 16 | 110 |
| | | 12.5 | | |
| | | 15.0 | | |

HD-SOCKET LIFTING SYSTEM

Accessories

Assembly pin, plastic

For quick removal of the formwork the assembly pin can be screwed in the steel nailing plate. The assembly pin breaks off when removing the formwork.

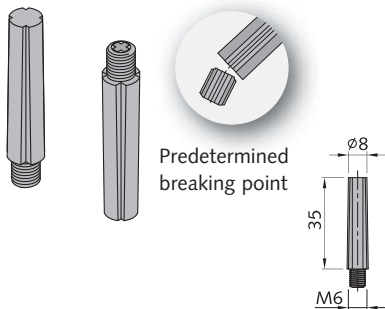


Table 24 Assembly pin, plastic

| Designation | Order No. 0741.300- | for Load group |
|------------------|------------------------|----------------|
| 6330- 1.3-7.5 | 00001 | 1.3 |
| | | 2.5 |
| | | 4.0 |
| | | 5.0 |
| | | 7.5 |

Sealing plate, rubber

To prevent the penetration of cement slurry in the nailing plate holes during concreting, when using Steel nailing plate with adapter and the assembly pin. The sealing plate made of rubber is mounted between nailing plates and formwork.

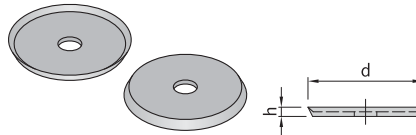


Table 25 Sealing plate, rubber

| Designation | Order No. 0741.330- | Load group | d [mm] | h [mm] |
|---------------|------------------------|------------|--------|--------|
| 6334-1.3-2.5 | 00001 | 1.3-2.5 | 40 | 6 |
| 6334-4.0-5.0 | 00002 | 4.0-5.0 | 55 | 6 |
| 6334-7.5-10.0 | 00003 | 7.5-10.0 | 70 | 6 |

HD-Sealing plate, plastic

The grey HD-Sealing plate is used for sealing HD-Anchors and recesses. It is available for thread sizes Rd12 to Rd24.

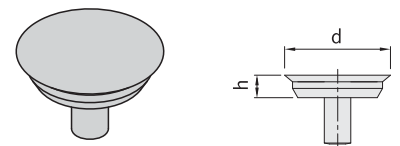


Table 26 HD- Sealing plate, plastic

| Designation | Order No. 0741.280- | for Rd | d [mm] | h [mm] |
|-------------|------------------------|--------|--------|--------|
| 6513-12 | 00001 | 12 | 40 | 10 |
| 6513-16 | 00002 | 16 | 40 | 10 |
| 6513-20 | 00003 | 20 | 55 | 10 |
| 6513-24 | 00004 | 24 | 55 | 10 |

Stencil form, rubber

For the production of concrete recess plugs to fill the recess produced by the nailing plates.
Re-usable.

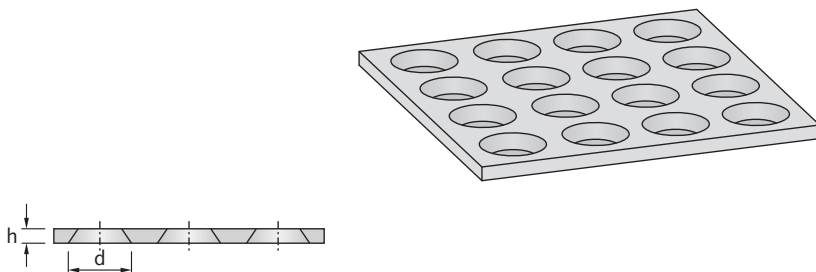


Table 27 Stencil form, rubber

| Designation | Order No. 0741.290- | Load group | h | d | Number of plugs |
|----------------|------------------------|-------------|----|----|--------------------|
| 6329- 1.3- 2.5 | 00001 | 1.3 + 2.5 | 8 | 37 | 16 |
| 6329- 4.0- 5.0 | 00002 | 4.0 + 5.0 | 8 | 52 | 16 |
| 6329- 7.5-10.0 | 00003 | 7.5 + 10.0 | 8 | 67 | 16 |
| 6329-12.5-15.0 | 00004 | 12.5 + 15.0 | 10 | 92 | 9 |

Key for Nailing Plate

Key to unscrew steel nailing plates.
Enables easy and fast removal of steel nailing plates once the concrete has set.

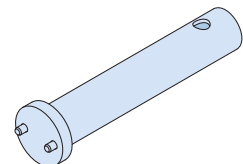


Table 28 Key for Nailing Plate

| Designation | Order No. 0741.350- | Load group | for Rd [mm] |
|--------------|------------------------|------------|-------------|
| 6337 - 12-16 | 00001 | 1.3 - 2.5 | 12 - 16 |
| 6337 - 20-52 | 00002 | 4.0 - 15.0 | 20 - 52 |

HD-SOCKET LIFTING SYSTEM

HD-Lifting links

General information

The lifting links must be fully screwed into the socket. A maximum of one thread may be visible outside the anchor.

If necessary the thread of the transport anchor must be cleaned of debris using a finishing bolt, so that the minimum thread depth is always achieved.

HD-Lifting links should be lifted with large radius hooks.

If a sharp edged hook or one with a small section is used then life expectancy of the link is reduced.

Health and safety regulations must always be observed.

The lifting links are provided with coloured identification tags.

These indicate the manufacturer, the year of manufacture (e.g. 09), the thread (e.g. Rd 30) and the load group (e.g. green for 4.0 load group).

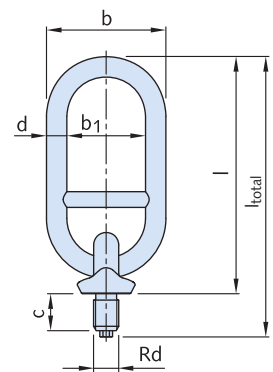
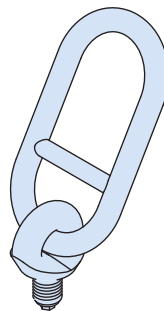
HD- Lifting Link

The HD-Lifting Link is made specially for use with the HD-Anchor. The HD-Lifting Link and HD-Perfect Lifting Head are suitable for the higher load ranges of the HD-System.

The HD-Lifting Link engages with the integrated thread protector inside the anchor, by means of the hexagon drive on the stud.

After casting the HD-Anchor, the thread protector is at the top of the socket and therefore helps to prevent the socket from being blocked with debris.

finish: zinc-plated



For angled lifts and pitching, the accurate shape of the ring bolt of the HD-Lifting Link supports loads against the concrete, providing that 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 are shown in the table below.

Table 29 Dimensions for HD- Lifting links

| Designation | Order No. 0742.130- | Load group | Rd | Weight [kg] | l _{total} [mm] | l [mm] | c [mm] | b [mm] | b ₁ [mm] | d [mm] |
|-------------|------------------------|------------|----|----------------|----------------------------|-----------|-----------|-----------|------------------------|-----------|
| 6362- 1.3 | 00001 | 1.3 | 12 | 0.57 | 177.5 | 153 | 18.5 | 76 | 50 | 13 |
| 6362- 2.5 | 00002 | 2.5 | 16 | 0.65 | 182.5 | 153 | 23.5 | 76 | 50 | 13 |
| 6362- 4.0 | 00003 | 4.0 | 20 | 1.21 | 197.0 | 162 | 29.0 | 82 | 50 | 16 |
| 6362- 5.0 | 00004 | 5.0 | 24 | 1.29 | 203.0 | 162 | 35.0 | 82 | 50 | 16 |
| 6362- 7.5 | 00005 | 7.5 | 30 | 2.40 | 228.0 | 177 | 43.0 | 94 | 50 | 22 |
| 6362-10.0 | 00006 | 10.0 | 36 | 2.54 | 236.5 | 177 | 51.5 | 94 | 50 | 22 |
| 6362-12.5 | 00007 | 12.5 | 42 | 4.84 | 286.5 | 219 | 59.5 | 117 | 65 | 26 |
| 6362-15.0 | 00008 | 15.0 | 52 | 5.31 | 299.5 | 219 | 72.5 | 117 | 65 | 26 |

HD-SOCKET LIFTING SYSTEM

HD-Lifting links

HD- Perfect Lifting Head

The Perfect Lifting Head is suitable especially for angled load and is used for rotating a wall into upright position with an applied load angle less than 90°.

The instructions for the HD-Lifting Anchor must be followed.

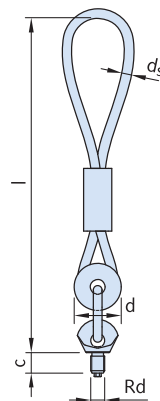
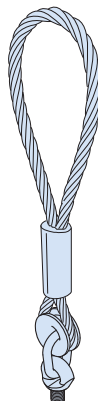


Table 30 Dimensions for HD- Perfect Lifting Head

| Designation | Order No. 0742.170- | Load group | R _d | Weight [kg] | l [mm] | d [mm] | c [mm] | d _s [mm] |
|-------------|------------------------|------------|----------------|----------------|-----------|-----------|-----------|------------------------|
| 6377- 1.3 | 00001 | 1.3 | 12 | 0.5 | 300 | 41 | 18.5 | 8 |
| 6377- 2.5 | 00002 | 2.5 | 16 | 0.9 | 390 | 54 | 23.5 | 11 |
| 6377- 4.0 | 00003 | 4.0 | 20 | 2.0 | 510 | 70 | 29.0 | 14 |
| 6377- 5.0 | 00004 | 5.0 | 24 | 2.4 | 550 | 70 | 35.0 | 16 |
| 6377- 7.5 | 00005 | 7.5 | 30 | 5.8 | 700 | 98 | 43.0 | 20 |
| 6377-10.0 | 00006 | 10.0 | 36 | 6.9 | 760 | 98 | 51.5 | 22 |
| 6377-12.5 | 00007 | 12.5 | 42 | 11.0 | 860 | 124 | 59.5 | 24 |
| 6377-15.0 | 00008 | 15.0 | 52 | 14.0 | 940 | 124 | 72.5 | 28 |

HD- Adapter

The HD-Adapter enables the Universal Head Lifting Link the DEHA Spherical Head Lifting Anchor System to be used with the HD-Anchor System. The Universal Head Lifting Link is used when it is required to rotate a panel without a spreader beam.

finish: zinc-plated

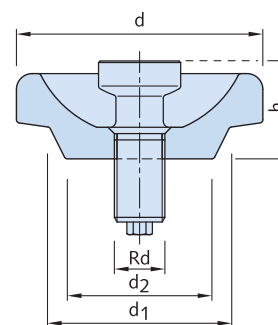
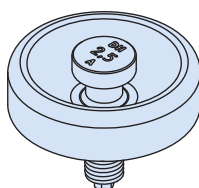



Table 31 Dimensions for HD- Adapter

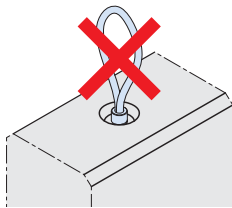
| Designation | Order No. 0742.140- | Load group | Rd | d | d ₁ | d ₂ | h | to use with Universal Head Lifting Link | | | |
|-------------|------------------------|------------|----|------|----------------|----------------|------|---|------------------------|------------|-----------|
| | | | | [mm] | [mm] | [mm] | [mm] | Designation | Order No. 0738.010- | Load group | |
| 6366- 1.3 | 00001 | 1.3 | 12 | 70 | 40 | 30 | 30 |  | 6102-1.3 | 00001 | 1.3 |
| 6366- 2.5 | 00002 | 2.5 | 16 | 78 | 40 | 30 | 38 | | 6102-1.5/2.5 | 00002 | 2 and 2.5 |
| 6366- 4.0 | 00003 | 4.0 | 20 | 97 | 55 | 45 | 45 | | 6102-3/5 | 00003 | 4 and 5 |
| 6366- 5.0 | 00004 | 5.0 | 24 | 97 | 55 | 45 | 45 | | | | |
| 6366- 7.5 | 00005 | 7.5 | 30 | 117 | 70 | 60 | 60 | | 6102-6/10 | 00004 | 6 and 10 |
| 6366-10.0 | 00006 | 10.0 | 36 | 117 | 70 | 60 | 60 | | | | |
| 6366-12.5 | 00007 | 12.5 | 42 | 117 | 95 | 85 | 95 | | 6102-12/20 | 00005 | 12 and 20 |
| 6366-15.0 | 00008 | 15.0 | 52 | 117 | 95 | 85 | 95 | | | | |

HD-SOCKET LIFTING SYSTEM

Using Lifting Links

Using Lifting Links

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



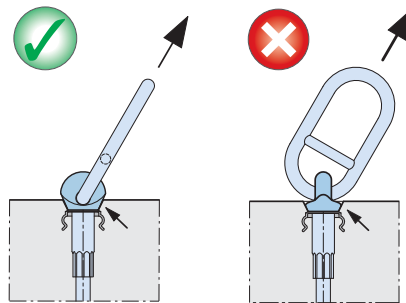
Labelling

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

Usage

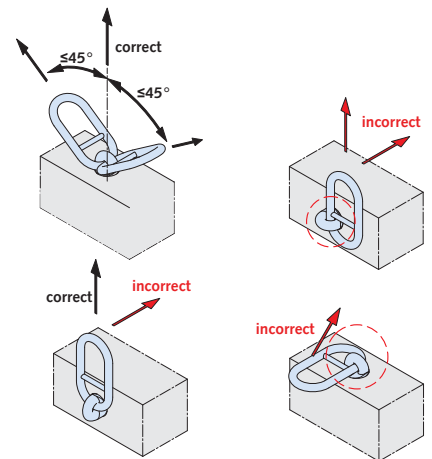
The HD-Lifting Link is a manually-operated connection. All applicable accident prevention regulations must be observed and Health and Safety regulations.

Optimum load distribution is only possible if the direction of load is as shown below. To assure that the ring bolt of the HD-Lifting Link is oriented in the direction of angled and shear loads, the bolt can be unscrewed half a turn (see illustration).



The recess in the concrete created by the nailing plate or the magnetic plate exactly matches the contour of the HD-Lifting Links. It allows the Lifting Link to be supported against the concrete while the anchor is subjected to angled or shear loads.

The following illustration shows correct and incorrect usage

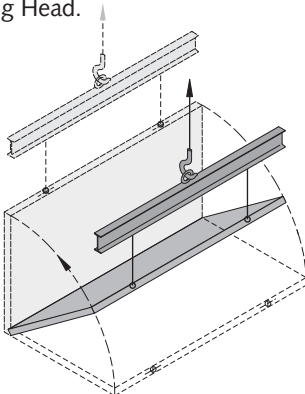


Maintenance

The contractor is responsible for ensuring that the HD-Lifting Links are checked for wear or damage by a trained person before every use. The contractor is also responsible for ensuring that the HD-Lifting Links are checked by an expert at least once a year. Using damaged HD-Lifting Links is very dangerous and is not allowed.

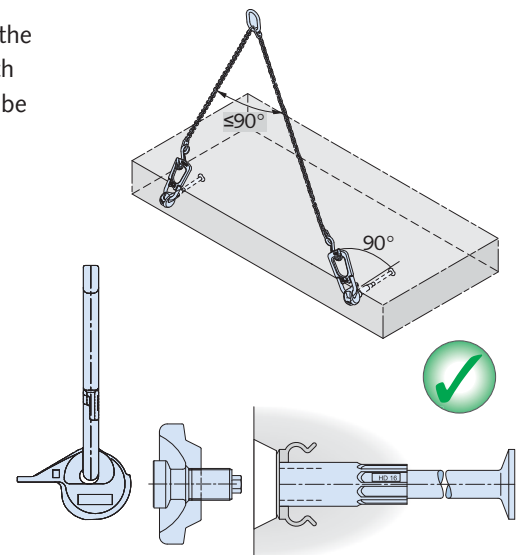
General information for pitching with HD-Anchors

For pitching **always** use a spreader beam, if using the HD-Lifting Link or HD-Perfect Lifting Head.



Pitching with angled loads using the HD-Anchor or HD-Lifting Link, **incorrect**.

If a spreader beam is not available the HD-Adapter No. 6366 together with Universal Head Link No. 6102 can be used as alternative.

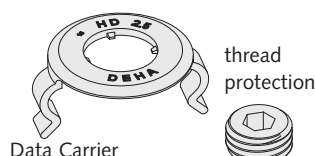


HD-SOCKET LIFTING SYSTEM

Installation of the HD-Lifting System

Installation of the HD-Lifting System

HD-Anchors are delivered ready for use with a screwed-in thread protection plug (colour coded).



The HD-Anchors together with the HD-Lifting Link comprise the HD-Lifting System.

HD-Nailing plates are used to attach HD-Anchors to the formwork. Nailing plates are colour coded according to the load groups, are made of plastic or steel, and available for load groups 1.3 to 15.0.

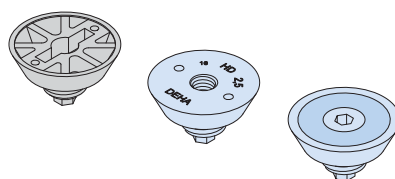


Table 32 Colour coding of tags a. Data carrier

| Load group | Colour |
|------------|------------|
| 1.3 | red |
| 2.5 | dark-grey |
| 4.0 | dark-green |
| 5.0 | blue |
| 7.5 | light-grey |
| 10.0 | orange |
| 12.5 | yellow |
| 15.0 | black |

Fig. 01:

Nailing plates are either nailed to the formwork or screwed in place using HALFEN Assembly Pins (see page 21) through a hole in the formwork. For steel formwork, we recommend the HD-Magnetic plate (see page 20).

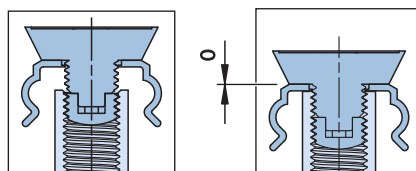
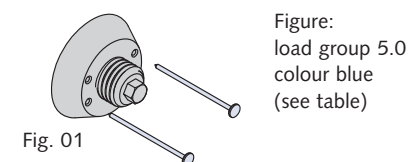


Fig. 02:

Before installing the HD-Anchor, the data carrier must be placed on the threaded stud of the nailing plate. After this, the HD-Anchor with the pre-installed thread protection plug is placed on the hexagonal stud of the nailing plate.



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

! The Data carrier is packed separately. It must be fitted to the appropriate HD-Anchor, which has the same identification colour. The integrated thread protection always remains in the HD-Anchor (see Fig. 04).

Fig. 03:

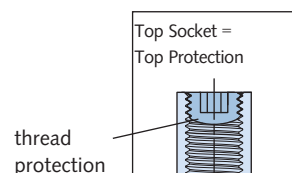
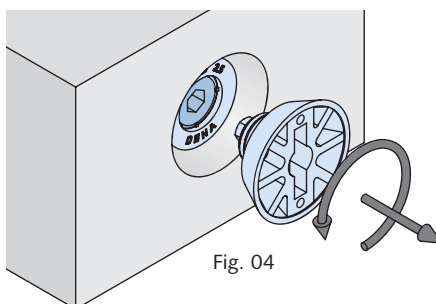
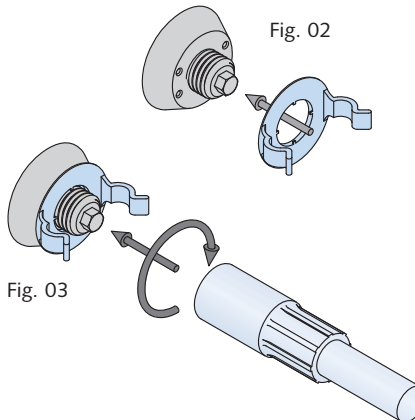
The thread protection plug is screwed into the threaded socket by turning the HD-Anchor. There must be no air gap between the nailing plate and the anchor socket.

The data carrier, which is now clamped, must be moved to the correct position by rotating it (depending on the position of any angled load reinforcement).

Fig. 04:

When the nailing plate is unscrewed after the concrete has hardened, the thread protection plug is rotated to top of the socket, to protect the thread from debris.

! We recommend filling up the hexagonal recess of the thread protection plug with grease or forming wax 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 thread of the lifting link and the socket protection system. If the nailing plate is not removed before storage it is advisable to fill the entire nailing plate recess with forming wax. This will make it easier to remove any ice which may form.



HD-SOCKET LIFTING SYSTEM

Installation of the HD-Lifting System

Installation of the HD-Anchor using the Assembly pin and the HD-Nailing plate made of steel

For steel forms, or timber forms where it is preferred not to use nails the Assembly Pin offers a safe and easy connection for the HD-Anchor to formwork. Assembly Pins can be used with nailing plates in the load range 1.3t to 7.5t.

Fig. 01:
The Assembly Pin is screwed in the steel nailing plate. Then the sealing plate is put over the Assembly Pin.

Fig. 01

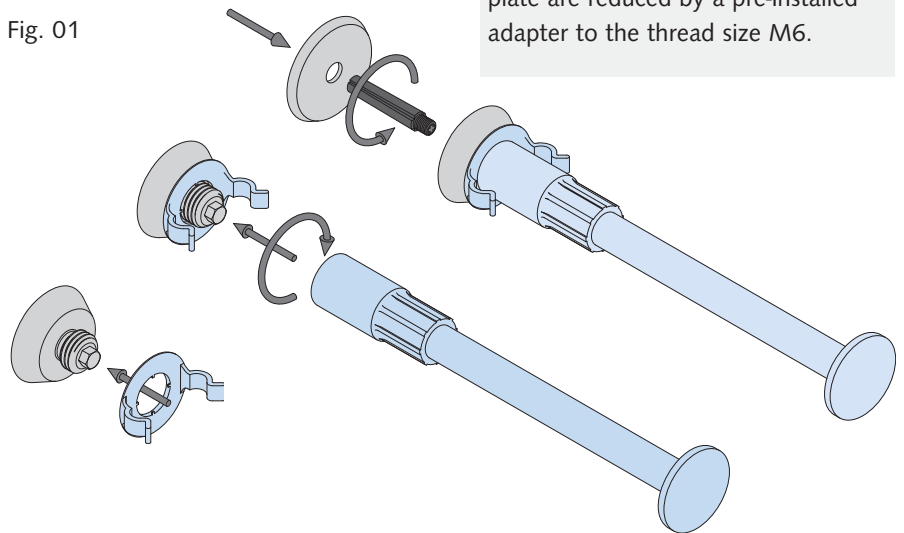
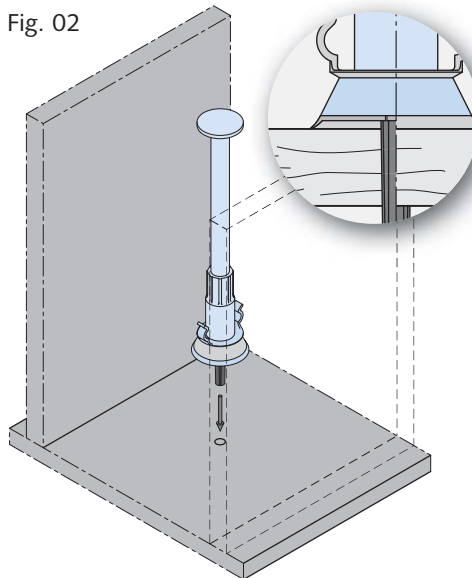


Fig. 02:
The Assembly Pin is pushed into a pre-drilled 8 mm hole in the form. The pin is suitable for wood and steel formwork.

Fig. 02



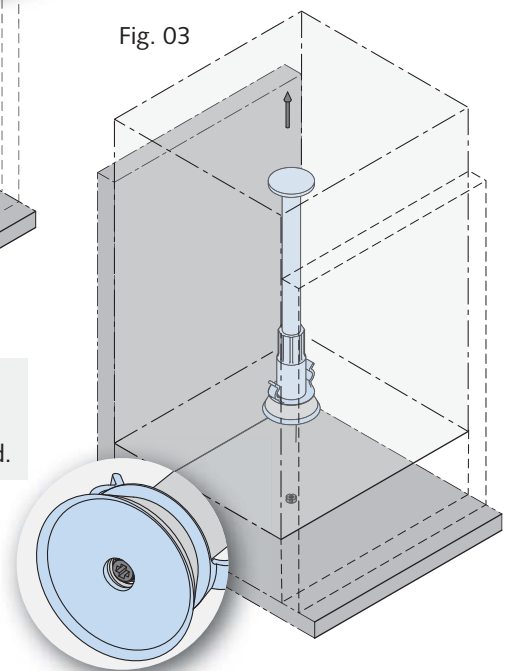
! The sealing plate between steel nailing plate and formwork prevents concrete from running into the holes of the nailing plate.

We recommend to use the assembly pin only with self compressing concrete.

Fig. 03:
When removing the formwork, the assembly pin breaks away automatically. The remaining part of the pin can be screwed out of the nailing plate with a screw driver later.

Fig. 03

The lip of the sealing plate has to be installed against the formwork in order to keep the nailing plate sealed.



HD-SOCKET LIFTING SYSTEM

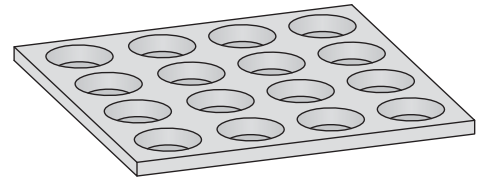
Installation of the HD-Lifting System

Filling the recess in the concrete formed by the nailing plate

HD-Sealing plates made of plastic are available to seal the HD-Anchor and recess. (see page 21). However, if a more aesthetic solution is required custom concrete plugs can be formed using the HALFEN Stencil form.

An optically good solution it provides a concrete recess filler that is

- in the same material
- with the same structure
- and the same colour.



The concrete recess filler can hardly distinguished from the surface of the precast concrete parts.

Fig. 01

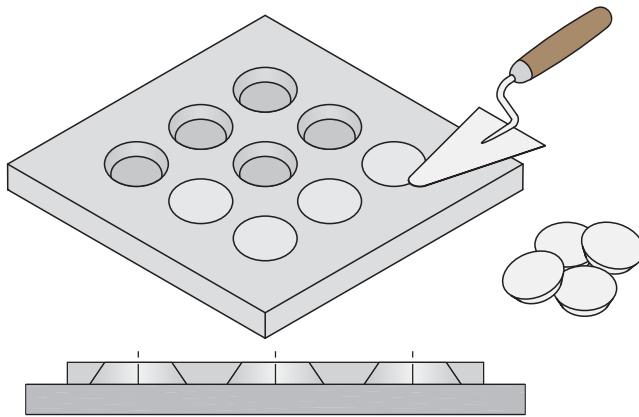


Fig. 01:

The stencil forms for larger diameters recesses have to be installed on a steel table in order to have the finish of the formwork. The stencil form is filled with concrete. In order to get a smooth surface concrete surplus has to be removed. When the concrete is hardened the stencil form is removed and the concrete recess fillers can be taken from the formwork table.

Fig. 02

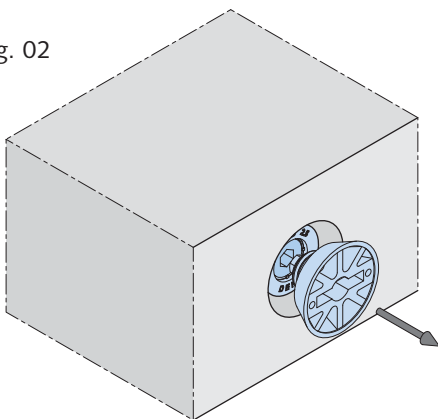


Fig. 03

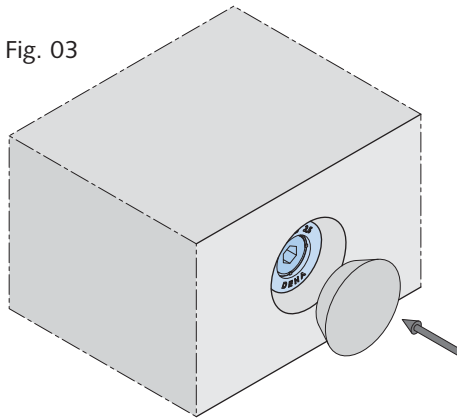


Fig. 04

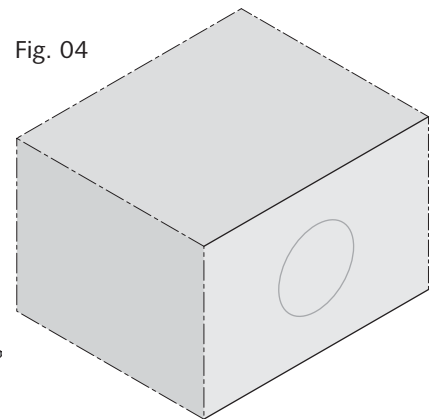


Fig. 02-04:

After removing the nailing plate and installing the precast element the recess fillers can be glued in.

We recommend to use commercial rapid mortar.

The stencil forms can be used several times.

CONTACT HALFEN WORLDWIDE

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